GENERATORS:
Harrington Hall - Cranston
Stedman Center - Wakefield

Rhode Island Department of Administration

Providence, Rhode Island

July 2018

FUSS & O'NEILL

317 Iron Horse Way, Suite 204
Providence, RI 02908

Project No. 20170903.A10

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00500 – AGREEMENT BETWEEN OWNER AND CONTRACTOR DOCUMENT

See AIA Document A101-2017, draft document attached.

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DRAFT

AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor *where the basis of payment is a Stipulated Sum*

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«_____»
« »
« »

The Architect:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[« »] The date of this Agreement.

[« »] A date set forth in a notice to proceed issued by the Owner.

[« »] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

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(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
« »	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
« »	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
« »		

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
« »	

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)
« »		

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

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ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

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§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »

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« »

§ 6.2 Binding Dispute Resolution
For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

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§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date
« »		

.6 Specifications

Section	Title	Date	Pages
« »			

.7 Addenda, if any:

Number	Date	Pages
« »		

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

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[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages
« »		

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
« »			

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

« »	« »
OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

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00600 – PERFORMANCE BOND AND PAYMENT BOND

See AIA Document A312-2010, draft document attached.

DRAFT

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: «»
Amount: $ «»
Description:
(Name and location)
«RI DOA - Thomas Slater Training School»
«Cranston RI»

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- **.1** have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- **.2** have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, 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; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 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 Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. 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 Construction 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 may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

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00700 – GENERAL CONDITIONS

See AIA Document A201-2017, draft document attached.

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FOR DUPLEX PRINTING PURPOSES

DRAFT

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

«_____»
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

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2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

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G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for 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 current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

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§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. 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. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

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§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

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delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon

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the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

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§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

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§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

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 that the Contractor, by these Contract 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 in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

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§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect 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.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the 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 7.3.4 shall be limited to the following:

- **.1** Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

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.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. 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.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, 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. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

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.5 damage to the Owner or a Separate Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

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§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, 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 date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' 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 by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. 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.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

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§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. 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 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.

§ 9.10.2 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, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the 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, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;

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.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

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proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

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procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

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The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public

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authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the 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; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions

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of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or Suppliers;
- **.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.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- **.1** that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of

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Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall 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.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

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.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

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§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

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DIVISION 1 - GENERAL REQUIREMENTS

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SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification

1.	Project Title:	Harrington Hall Generator	Stedman Center Generators
2.	Project Locations:	Pastore Center, Cranston, RI	4800 Tower Hill Rd., Wakefield, RI
3.	Owner:	Rhode Island Department of Administration.	

Engineer Identification: The Contract Documents, dated March 2018, were prepared for the Project by: Fuss & O'Neill, Inc., located at 317 Iron Horse Way, Suite 204, Providence, RI 02908.

B. The Work includes:

1. Underground duct banks and equipment pads.
2. Removal of existing Main Distribution Panel and install new panel, reconnecting existing loads. (Harrington only)
3. New service rated Automatic Transfer Switches and associated wiring.
4. New Manual Transfer Switches (Storm Switch) and associated wiring.
5. New Padmount Transformers and associated wiring. (Harrington only)
6. Testing and energizing service.
7. New Generators and associated wiring.
8. New remote Generator Annunciators and associated wiring.
9. New exterior 5kV Padmount Switches.
10. Acceptance testing.
11. Short circuit and coordination study.
12. Site work and concrete.

1.3 CONTRACT

A. Project will be constructed under a general construction contract.

1.4 WORK SEQUENCE

A. The Work shall be conducted in one phase.

1. Work shall consist of installation of new service transformer, stand-by generator and automatic and manual transfer switches and associated raceways, so as not to disrupt the weekday daily operations of business within the building. Any work that requires a power outage will be performed on weekends or holidays.

2. Work shall be substantially complete within 180 days after Notice to Proceed.

3. Work shall be sequenced, so as to minimize power outage. A temporary generator shall be provided when the outage is to exceed four hours.

1.5 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.6 WORK UNDER OTHER CONTRACTS

A. Separate Contract: Owner will award a separate contract for performance of certain construction operations at Project site. Those operations may be scheduled to be concurrent with the work under this Contract.

B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "Master Format" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.8 DIG SAFE

A. The Contractor shall be responsible for complying with all applicable Dig Safe Rules, including but not limited to 22 CMR 99.00.

B. Contact Dig Safe at 1-888-344-7233 at least 72 hours prior to the start of construction (excluding weekends and holidays), to mark out the utility locations.

1.9 ACCESS TO SITE

A. Minimize damage to access routes, and restore damaged areas to their original condition or better.

B. Acquire necessary permits, authorizations and approvals for working in, on or from property, rights-of-way or easements owned by the State of Rhode Island and City of Cranston. The Contractor shall secure access rights of his own for such work.

C. Remove and restore to original condition walls, structures, utility lines, and other improvements required to be relocated for construction of the Work. Costs for such activity shall be borne by the Contractor. Notify the Engineer, the Owner, and utilities of intended modification or disruption to their property prior to the start of construction and cooperate with them in the scheduling and performance of his operations.

D. If the Contractor, by direct negotiation and bargain with any land owner, lessee or tenant, has secured any right to use more space or greater privileges in the space provided by the Owner for purposes incidental to the performance of the Contract, he shall, upon request of the Engineer, furnish to the Engineer proper evidence that such additional rights have been properly secured and assurance that no damage to or claim upon the Owner or Engineer will arise therefrom. Neither the Owner nor the Engineer shall be liable in any way for any expense incurred by the Contractor in securing any such right to use additional property.

E. The Contractor shall be responsible for and reimburse the Owner and others for any and all losses, damage or expense which the Owner or those others may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights of way provided by the Owner to the Contractor or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights. The Owner may retain or deduct from any sum or sums due or to become due to the Contractor such amount or amounts as may be proper to insure the Owner against loss or expense by reason of the failure of the Contractor to observe the limits and conditions of the rights-of-way, rights-of-access, easements, etc., provided by the Owner.

1.10 SCHEDULE OF CONSTRUCTION

A. Submit construction schedule to the Engineer at the earliest possible time but no later than 10 Days prior to beginning the Work.

B. The schedule will indicate sequence of work for specific work items, off-hour construction required to replace panelboards and modify the electrical distribution system.

C. The schedule will be reviewed with the Owner to approve individual panelboard replacements to assure the least disruption to off hour operations of the building.

1.11 WORK HOURS

A. Schedule normal work activities on Monday through Friday, 7:00 AM to 4:30 PM.

B. Make arrangements with the Owner for all off hour work. No power outages scheduled unless previously approved by the Owner.

C. The Owner may consider work on Sundays, only if approved and shall require a minimum of 30 working days' notice.

D. Any short term disruption of power (less than four hours) shall require a minimum of five working days' notice in advance. Disruption of power of the entire building shall require a minimum of 30 working days' notice. Outage will take place on weekends.

E. Work on legal State holidays shall be approved and shall require a minimum of 30 working days' notice.

F. Off hour work may require an Owner supplied escort, coordinate escorts with the Owner.

1.12 SITE CONDITIONS

A. The underground utilities and structures at the site have been located primarily from information furnished by others and the locations as depicted on the Drawings are considered approximate as to size and location. There may be additional underground utilities and structures that are not shown on the Drawings and it shall be the responsibility of the Contractor to locate all existing utilities and structures and to protect same from damage or harm. Restore utilities interfered with or damaged, at the expense of the Contractor, and to the satisfaction of its Owner.

B. Ensure construction activities do not impact the activities or properties of the Owner and its Departments without prior coordination and consent of these entities.

C. Immediately notify the Engineer upon encountering archaeological material, including "charcoal," "bone," "shell," "cultural objects" (e.g., fire cracked stones/stone flaking material), "middens," or any other artifacts or related items of historical significance.

1.13 USE OF SITE

A. All deliveries shall be limited to outside the Basement in the rear of the Building.

B. All demolished materials shall be removed from the site and properly disposed. The contractor will be allowed a dumpster on site in an Owner designated area.

C. Access to the exterior for installation of the transformer, switch, and generator will require hoisting equipment. Hoisting shall be performed daytime, off hours. The cost of hoisting equipment rental and

any permits or police details shall be borne by the Contractor. Hoisting operations shall be approved by the Owner with a minimum of 30 working days' notice.

D. Contractor's personnel shall sign in and obtain a one-day visitor's badge. Application for and use of permanent badges shall be obtained from the Owner by completing a badge application form.

1.14 NO SMOKING POLICY

A. Smoking is prohibited within and outside of all buildings, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Owner will identify designated smoking areas.

1.15 STORAGE AND HANDLING OF MATERIALS

A. No materials shall be stored within the building without approval of the Owner. Storage of construction materials shall only be allowed where designated by the Owner. Prior to start of construction, the contractor shall provide the Owner will the amount of space required for storage. If sufficient space within the contractor will be required to store materials off-site at the contractor's expense.

B. A temporary laydown for large construction materials and equipment will be designated by the Owner. The storage of such materials and equipment shall be limited to a maximum of two days before installation.

C. At all times, handle and store materials and equipment to be incorporated in the work in a manner to prevent intrusion of foreign matter, warping, twisting, bending, breaking, and any injury, theft or damage of every description to the material or equipment.

D. Upon delivery, promptly inspect shipments to assure that products comply with requirements, quantities are correct and products are undamaged. Packages, materials and equipment showing evidence of damage shall be rejected and replaced at no additional cost to the Owner.

E. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Provide access to products during storage for inspection.

1. If products are stored for an extended period of time, conduct periodic inspections to assure products are undamaged and are maintained under required conditions.

2. Keep an inspection log indicating date and time of inspections. Note problems, if any.

F. For exterior storage of fabricated products, place sloped supports beneath products to keep items from coming in contact with the ground. Cover products subject to deterioration with impervious sheet covering providing ventilation to avoid condensation.

G. Store loose granular materials on solid surfaces in a well-drained area and prevent from mixing with foreign matter.

H. Store excavated soils and other construction materials in non-wooded areas near excavations. Store synthetic materials off the ground (or otherwise) to prevent accumulation of dirt or grease, and in a position to prevent accumulation of standing water.

1.16 EXISTING CONDITIONS

A. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

B. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Owner.

C. At the completion of construction, existing work shall be in a condition equal to or better than that which existed before new work started.

1.17 UTILITIES

A. The Contractor shall have use of limited existing building utilities as directed by the Owner.

B. Electrical power within the building may be used as directed by the Owner. Power cords and required temporary electrical shall be provided by the contractor.

C. Water may be used as directed by the Owner.

D. Bathroom facilities shall be provided by the contractor.

1.18 TEMPORARY POWER

A. Power outages over 4 hours shall require a temporary power supply to the affected area of the building. Provide temporary generator sized to accommodate building load.

B. The Contractor shall provide a temporary generator for temporary power not obtainable from a temporary connection with in the building electrical system. Contractor shall provide all fuel.

C. Cost for all temporary power shall be borne by the contractor.

D. Refer to specific project drawings for temporary power requirements. These are all to be provided and maintained by the contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. The following is a general recommended sequence of construction operations. The Contractor shall provide his own detailed construction schedule to the Engineer prior to the initiation of Work. Deviation from Contractor's schedule will require the Contractor to submit notification of such change in schedule to the Engineer.

1. Obtain required permits, authorizations and approvals from Federal, State and local authorities, as well as private entities including the Owner, having jurisdiction over the Project. Make required notifications to regulatory authorities. Provide copies of such permits, authorizations, approvals and notifications to the Engineer.

2. Review area with Owner and establish location to obtain power. Designate area for site trailer.
3. Obtain area for site trailer.
4. Mobilize to project Site.
5. Install temporary protective measures to ensure the safety of persons on the site and to mitigate injury to environmental receptors.
6. Install temporary protective measures to ensure the safety of persons within the working areas of the building.
7. Establish work area.
8. Provide a temporary services specific to project site such as temporary wiring and power generation.
9. Perform demolition work.
10. Perform all work possible without power outage including the installation of the new generator, transformer, manual switch, and auxiliaries.
11. Schedule required outages for tie-ins.
12. Demobilize from project Site.

3.2 SUBMITTAL PROCEDURES

A. Make submittals to the Engineer at least ten (10) Days before beginning the particular phase of Work.
   1. Submit a minimum of four (4) copies of each submittal.
   2. Clearly identify each submittal with the following:
      a. Name of Project;
      b. Name address and telephone number of Contractor;
      c. Appropriate reference to Specification Section or Drawing to which it applies; and
      d. Identify if it is an original submittal or re-submission (second, third, etc.)
   3. Facsimile transmissions of submittals will not be accepted.

B. The Engineer will review each submission in a timely fashion, for general conformance to the design concept as expressed in these Contract Documents. Engineer's review and comment will in no way relieve the Contractor of any of his responsibilities under the Contract.

C. Do not commence portion of the Work requiring a submission until submission has been accepted by the Engineer.

D. In addition to the submittals required by the various Technical Specifications, provide the following submittals:
   1. Schedule of Values. Within 10 days after signing the Contract, submit a schedule of values of the various "lump sum" portions of the Work, including quantities, and supported by such data to substantiate its correctness as the Engineer may require. Each item in the schedule of values shall include its proper share of overhead and profit. This schedule, when accepted and approved by the Owner and Engineer, shall only be used as a basis for Contractor's Periodic

Estimate. No payments will be made to Contractor until such Schedule has been submitted and accepted.

a. Within ten (10) days after signing the Contract, submit a Cash Flow Schedule including estimated monthly payment schedule for the Project.

b. Break prices down sufficiently to provide a convenient and realistic means for determining the amount of Work done during various stages of progress. Where prices are not broken down sufficiently to accurately determine the value of Work completed, the Engineer will estimate the value of the Work completed and will deduct an amount so as to arrive at a conservative value which will allow the Owner to easily complete the Work with the unpaid balance. When the required detail in the Schedule of Values is not provided by the Contractor, Contractor agrees to accept the Engineer's determinations.

2. Schedule of Construction. The Contractor shall submit his proposed schedule of construction (schedule of operations) to the Owner at the earliest possible time and no later than 10 days prior to beginning the Work or at the pre-construction conference, whichever is earlier.

a. Provide a bar-chart-type or Gantt-chart-type schedule that clearly indicates the start date and duration of specific construction activities, including individual panelboard replacement and switchboard modifications.

b. Off-hour and work on Saturday, Sunday, or Holidays shall be approved the Owner. Portions of the Work to be performed by subcontractors, the Owner or utilities shall be clearly indicated as such.

c. Incorporate the erosion control provisions into the construction schedule.

d. No work shall be started until the schedule of construction is reviewed and approved by the Owner.

e. Contract completion date shall not be changed by submission of a schedule, unless specifically authorized by Change Order approved by the Owner.

3.3 PROJECT MEETINGS

A. Pre-construction Conference: Prior to the start of construction, a pre-construction conference may be held with the representatives of the Contractor, Engineer, Owner and other interested parties.

B. Progress Meetings: During progress of the Work, meetings may be required in order that scheduling and overall job coordination can be maintained. The Contractor shall be required to attend these meetings throughout the project duration.

END OF SECTION

SUBMITTAL TRANSMITTAL Date: _____

To: Fuss & O'Neill, Inc.
317 Iron Horse Way, Suite 204
Providence, RI 02908
ATTN: **Charles Waskiewicz**

From:

PROJECT: _____ SUBMITTAL NO.: _____
(List Section No., Article No., Paragraph)

_____

_____ _____
(Revision: 1st, 2nd, 3rd, etc.)

Transmitted herewith for review and comment are the following:

Copies	Dwg.	No.	Description

MANUFACTURER / SUPPLIER

Name: _____

Address: _____

Telephone No.: _____ Facsimile No.: _____

For Additional Information, Contact _____

E-mail Address: _____

I hereby certify that I have carefully examined the enclosed submittal and have determined and verified all field measurements, construction criteria, materials, catalog numbers and similar data, coordinated the submittal with other submissions and the work of other trades and contractors, and that to the best of my knowledge and belief, the enclosed submittal is in full compliance with the Contract Documents, except for the following deviations:

BY:
Signature: _____

Title: _____

- - SAMPLE - - MATERIALS CERTIFICATE - - SAMPLE - -

(Submit on Manufacturer's letterhead)

Date: _____

WE HEREBY CERTIFY THAT _____
(Description, Kind of Material, Product Name, Model No.)

FURNISHED TO _____
(Name of Contractor) (Prime or Subcontractor)

FOR USE ON _____
(Project Name)

OWNER _____
(Project Owner)

IDENTIFIED BY: _____
(Label, Marking, Seal No., Consignment, or Waybill No.)

SHIPPED VIA: _____
(Method of Shipment, Car No., Truck No.)

SHIPPED ON: _____ DELIVERED ON: _____

MEETS THE REQUIREMENTS OF THE CONTRACT DOCUMENTS FOR THE SUBJECT PROJECT IN ALL RESPECTS. PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH APPLICABLE SPECIFICATIONS, DRAWINGS AND STANDARDS OF ARTICLES FURNISHED. ARTICLES FURNISHED COMPLY WITH THE FOLLOWING STANDARD SPECIFICATIONS:

_____

_____

_____

_____

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than 3 years from the date of this certificate.

_____
(Name of Manufacturer)

_____
(Authorized Representative's Signature)

_____
(Title)

- - SAMPLE - - EQUIPMENT RECORD SHEET - - SAMPLE - -

PROJECT: _____

_____

_____

SUBMITTAL NO.: _____
(list Section No., Article No., and Paragraph)

_____
(Revision: 1st, 2nd, 3rd, etc.)

EQUIPMENT MANUFACTURER

_____

_____

_____

_____

SERVICE REPRESENTATIVE

_____

_____

_____

_____

TYPE _____

MODEL NO. _____

SERIAL NO. _____

CAPACITY _____ at _____

Motor Mfr. _____

Motor Size _____

Volts _____ Amps _____

Phase _____ Cycles _____ RPS _____

SPECIAL NOTES AND REMARKS:

_____

_____

_____

_____

_____

_____

_____

_____

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Engineer will issue written supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Engineer are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request after receipt of Proposal Request, submit a written quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a written request for a change.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Include costs of labor and supervision directly attributable to the change.

4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive on AIA Document G714. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate proposed cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values for Base Bid items with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with Continuation Sheets.

   b. Submittals/Shop Drawings Schedule.

2. Submit three copies of the Schedule of Values to Engineer 10 days after effective date of Agreement. No payment will be made to Contractor before Schedule of Values has been submitted and accepted by Engineer.

B. Format and Content: Use the Bid Items and Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each base bid item and Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

   a. Project name and location.

   b. Name of Engineer.

   c. Engineer's project number: 20170903.A10

   d. Contractor's name and address.

   e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.

   b. Description of the Work.

   c. Change Orders (numbers) that affect value.

   d. Dollar value.

      1) Percentage of the Contract Price to nearest one-hundredth percent, adjusted to total 100 percent.

      2) Contractor's estimated quantity and unit prices.

      3) For unit price items, the quantity provided on the bid form and unit prices.

4) For alternate unit price items, the quantity authorized by the Owner and unit prices.

3. Provide a breakdown of the Contract Price in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. At minimum, each lump sum, unit bid, alternate unit bid, add/deduct unit bid, and allowance item shall be separate line items in the Schedule of Values.

4. Round amounts to nearest whole dollar; total shall equal the Contract Price.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.

6. Where items do not include sufficient detail to accurately determine the value of Work completed, Engineer will estimate the value of the Work completed and deduct a conservative value that will allow the Owner to easily complete the Work with the unpaid balance.

   a. When the required detail in the Schedule of Values is not provided by the Contractor, the Contractor agrees to accept the Engineer's determination.

7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

1.3 SCHEDULE OF PAYMENTS

A. Coordination: Coordinate preparation of the Schedule of Payments with preparation of Contractor's Schedule of Construction and Schedule of Values.

1. Such schedule shall be broken down by monthly pay period through Project completion and reflect items listed in the Schedule of Values.

2. Submit three copies of the Schedule of Payments to Engineer 10 days after effective date of Agreement.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.

1. Initial/Monthly Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is the 15th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.

C. Payment Application Forms: AIA Document G702 or an approved equal.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Work Change Directives issued before last day of construction period covered by application.

3. Itemized data and format provided on continuation sheets shall include schedules, line items, and values as stipulated in the Schedule of Values as accepted by Owner.

a. Continuation sheets shall include a total list of all scheduled component items of work with item number and scheduled dollar value for each item. Dollar values to be included in each column for each scheduled line item when Work has been performed or products stored. Round off values to nearest dollar or as may be specified for Schedule of Values.

b. List each Change Order executed prior to date of submission at end of continuation sheets. List by Change Order number and description as to original component item of Work.

E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Engineer. Verify requirements with State purchasing.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

2. Submit Applications to Engineer by means ensuring receipt within 24 hours.

F. Ownership: All Work covered by Progress Payments shall, at the time of payment, become the property of Owner.

G. Processing: With each Application for Payment the Contractor shall certify such Application for Payment represents a just estimate of costs reimbursable to Contractor under terms of the Contract and shall certify there are no Mechanic's or Materialmen's Liens outstanding at the date of that Application for Payment, that all due and payable bills with respect to the Work have been paid to date or shall be paid from the proceeds of that Application for Payment, that there is no known basis for the filing of any Mechanic's or Materialmen's Lien against the Surety in connection with the Work, that Waivers and Bills Paid Affidavit forms from all Subcontractors and Materialmen have been, or will be, obtained in the form agreeable to the Owner, and that amount of the contract remaining to be expended is sufficient to complete the project.

H. Waivers and Mechanic's Liens

1. Monthly Applications for Payment shall include Waivers of Mechanic's Liens and Claims for all Work included in the period of construction covered by the Application for Payment and the previous month's Application. Waivers of Liens and Claims from Subcontractors or Subcontractors and suppliers shall include the period of construction covered by the Application for Payment, the total amount paid prior to and including the previous month's Application.

2. Partial Waivers of Liens shall be submitted on each item of work for the amount requested, prior to deduction for retainage, for each item.

3. Contractor shall submit final or full Waivers of Liens and Claims for completed items of work shown on the monthly Application for Payment.

4. Owner reserves the right to designate which entities involved in the Work must submit Waivers of Liens.

5. The Contractor's final Application for Payment shall be submitted with, or preceded by final Waivers from every entity involved with the performance of work, supplying of materials or the providing of professional services covered by the Application who could lawfully be entitled to a Lien.

6. Waivers of Liens shall be provided on forms, and executed in a manner acceptable to the Owner.

I. Initial/Monthly Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following, which shall be updated for Monthly Applications for Payment, as applicable:

1. List of subcontracts with current MBE certification forms, as applicable.

2. Schedule of Values.

3. Schedule of Submittals

4. Contractor's Construction Schedule (preliminary if not final), updated monthly.

5. Name of Contractor Superintendent.

6. Copies of required permits.

7. Copies of authorizations and licenses from governing authorities for performance of work.

8. Any material stored off site must carry additional insurance (All Risk Rider) stating Owner as insured. All material is to be inspected by Engineer or his designated personnel before billing can be approved. Bill of Sale and receipts for items being billed at cost only are required and 50% retainage will be held for off-site stored materials. Paperwork must accompany request two weeks prior to billing to insure adequate time to schedule inspection.

9. Contractor's Health and Safety Plan (HASP)

10. Certificates of insurance and insurance policies.

J. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum, if any.

2. Submit warranties and maintenance agreements, as applicable.

3. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited to, the following:

1. Evidence of completion of Project closeout requirements.

2. Completion of items specified by the Engineer for correction after Substantial Completion.

3. Required Project Records including permit drawings, as constructed drawings both on hard copy and in electronic format.
4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
5. Updated final statement, accounting for final changes to the Contract Sum.
6. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
7. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
8. AIA Document G707, "Consent of Surety to Final Payment."
9. List of unsettled claims, if any.
10. Evidence that claims have been settled, if any.
11. Final, liquidated damages settlement statement, if any.
12. Removal of all temporary facilities and services.
13. Removal of all surplus materials, rubbish, and similar elements.

1.5 MINORITY BUSINESS ENTERPRISES

A. In accordance with Rhode Island General Law 37-14-1, Contractor shall meet the established goal of not less than ten percent (10%) of the Contract Sum be performed by Minority Business Enterprises where it has been determined that subcontract opportunities exist, and where certified Minority Business Enterprises are available. A contractor may count towards its MBE, DBE, or WBE goals 60% of its expenditures for materials and supplies required under a contract and obtained from an MBE, DBE, or WBE regular dealer, and 100% of such expenditures when obtained from an MBE, DBE, or WBE manufacturer. Small Disadvantaged Business shall refer to either a "minority business enterprise" or a "disability business enterprise".

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. General Project coordination procedures.
2. Coordination Drawings.
3. Administrative and supervisory personnel.
4. Project meetings.

1.2 COORDINATION

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

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

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

1. Preparation of Contractor's Schedule of Construction.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project closeout activities.

1.3 SUBMITTALS

A. Staff Names: Within five (5) days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room and by each temporary telephone.

B. Coordination Drawings: Prepare Coordination Drawings if limited workspace necessitates installation of different components in alternating sequence to maximize space utilization or if coordination is required for the installation of products and materials fabricated by separate entities. Indicate required installation sequences.

1.4 PROJECT MEETINGS

A. General: Engineer will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Engineer will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.

2. Agenda: Engineer will prepare the meeting agenda and distribute the agenda to all invited attendees.

3. Minutes: Engineer will record significant discussions and agreements achieved, and distribute the meeting minutes to everyone concerned, including Owner, within 10 days of the meeting.

B. Preconstruction Conference: Engineer will schedule a preconstruction conference before start of construction, at a time convenient to Owner, Contractor, and Engineer, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Engineer, and their consultants, and Contractor and its superintendent; shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.

b. Critical work sequencing.

c. Designation of responsible personnel.

d. Procedures for processing field decisions and Change Orders.

e. Procedures for processing Applications for Payment.

f. Distribution of the Contract Documents.

g. Submittal procedures.

h. Preparation of Record Documents.

i. Use of the premises.

j. Responsibility for temporary facilities and controls.

k. Parking availability.

l. Office, work, and storage areas.

m. Equipment deliveries and priorities.

n. First aid.

o. Security.

p. Progress cleaning.

q. Working hours.

3. Execution of Owner-Contractor Agreement including executed bonds and insurance certificates may be completed immediately prior to the pre-construction conference.

C. Progress Meetings: Engineer will conduct progress meetings as deemed necessary during non-critical phases of work, and weekly if conditions warrant.

1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity required to finalize discussions regarding current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.

2) Sequence of operations.

3) Status of submittals.

4) Deliveries.

5) Off-site fabrication.

6) Access.

7) Temporary facilities and controls.

8) Work hours.

9) Hazards and risks.

10) Progress cleaning.

11) Quality and work standards.

12) Change Orders.

13) Documentation of information for payment requests.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Engineer's responsive action.

B. Informational Submittals: Written information that does not require Engineer's approval. Submittals may be rejected for not complying with requirements.

C. Addresses: Include mailing address, telephone number, facsimile number, and e-mail address.

1.3 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals, unless requested by the contractor.

B. Method of Transmitting Submittals: Electronic transmission of submittals, including e-mail process, will be permitted. Facsimile transmittal of submittals will not be allowed. Hard copies must also be transmitted as indicated.

C. Clarity: Provide neat, clean and legible printed materials that can be easily reproduced by normal photocopying or blueprinting process. Illegible submittals will be returned without review.

D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal.
   1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Concurrent Review: Where concurrent review of submittals by Engineer's consultants, Owner, or other parties is required, allow 30 days for initial review of each submittal.

3. If intermediate submittal is necessary, process it in same manner as initial submittal.
4. Allow 21 calendar days for processing each resubmittal.
5. No extension of the Contract Time or claims for delay will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Engineer.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier including name and telephone number of contact.
   g. Name of manufacturer including name and telephone number of contact.
   h. Unique identifier, including revision number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Other necessary identification.

G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals. Provide list or narrative of deviations on Submittal Transmittal form.

H. Additional Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor or without a transmittal form.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Transmittal Form: Use sample form at end of Section.

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating action taken by Engineer in connection with construction.

1.4 QUALITY ASSURANCE

A. Where "Standard Specifications" is used, it shall mean "Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction, Amended December 2010" and issued supplements.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
   1. Number of Copies: Submit five copies of each submittal, unless otherwise indicated. Mark up and retain one returned copy as a Record Document.
      a. Submit a single preliminary copy of each submittal where selection of options, color, pattern, texture, or similar characteristics is required. Engineer will return submittal with options selected.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's written recommendations.
      b. Manufacturer's product specifications.
      c. Manufacturer's installation instructions.
      d. Standard color charts.
      e. Manufacturer's catalog cuts.
      f. Wiring diagrams showing factory-installed wiring.
      g. Printed performance curves.
      h. Operational range diagrams.
      i. Mill reports.
      j. Standard product operating and maintenance manuals.
      k. Compliance with recognized trade association standards.
      l. Compliance with recognized testing agency standards.
      m. Application of testing agency labels and seals.
      n. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Include the following information, as applicable:
      a. Dimensions.
      b. Identification of products.
      c. Fabrication and installation drawings.
      d. Roughing-in and setting diagrams.
      e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
      f. Shop work manufacturing instructions.
      g. Templates and patterns.

h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.

D. Samples: Prepare physical units of materials or products, including the following:

1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Include cost and wearing capability of each color and pattern.
2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Engineer's sample where so indicated. Attach label on unexposed side that includes the following:
   a. Generic description of Sample including type, quality or grade designation.
   b. Product name or name of manufacturer.
   c. Sample source.
   d. Name of Project.
   e. Name of Contractor or subcontractor.
4. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
   a. Size limitations.
   b. Compliance with recognized standards.
   c. Availability.
   d. Delivery time.
5. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
   a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least two (2) sets of paired units that show approximate limits of the variations.
   b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship; fabrication techniques; details of assembly, connections, operation and similar construction characteristics.

6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise not designated as Owner's property, are the property of Contractor.

E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.

F. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."

G. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated.
   2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

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

C. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

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

E. Material or Product Certificates: Prepare written statements on manufacturer's letterhead certifying that material or product complies with requirements. Use attached sample Material Certificate, or provide certificate that includes the following information.
   1. Project to which material is consigned.
   2. Name of contractor receiving material.
   3. Item number and description of material.

4. Quantity of material represented by the certificate.
5. Means of identifying consignment including label, marking, or lot number.
6. Preparation of substrates.
7. Required substrate tolerances.
8. Sequence of installation or erection.
9. Required installation tolerances.
10. Required adjustments.
11. Recommendations for cleaning and protection.

F. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

G. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark each copy of each submittal with approval stamp before submitting to Engineer.

B. Approval Stamp: Stamp each submittal with a uniform approval stamp.

C. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents. See attached Submittal Transmittal for sample of statement.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and submittal transmittal and will return them without action.
1. Engineer may elect not to review partial or incomplete submittals and will return such submittals with no action taken.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
   1. Furnish as Submitted: Submittal appears to conform to Contract Documents and Contractor may proceed with ordering and installation.

   2. Furnish as Noted: Same as "Furnish as Submitted" except that the Contractor must comply with modifications or notes added to the submittal by the Engineer.
   3. Rejected: Submittal must be revised and resubmitted.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

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To: Fuss & O'Neill, Inc.
317 Iron Horse Way, Suite 204
Providence, RI 02908
ATTN: Charles Waskiewicz

From: _____

PROJECT: Hamilton Hall - Generator

SUBMITTAL NO.: _____
List Section No., Article No., Paragraph)
(Revision: 1st, 2nd, 3rd, etc.)

Transmitted herewith for review and comment are the following:

Copies	Dwg.	No.	Description

MANUFACTURER / SUPPLIER

Name: _____

Address: _____

Telephone No.: _____ Facsimile No.: _____

For Additional Information, Contact: _____

E-mail Address: _____

I hereby certify that I have carefully examined the enclosed submittal and have determined and verified all field measurements, construction criteria, materials, catalog numbers and similar data, coordinated the submittal with other submissions and the work of other trades and contractors, and that to the best of my knowledge and belief, the enclosed submittal is in full compliance with the Contract Documents, except for the following deviations:

BY:
Signature: _____

Date: _____

Title: _____

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FOR DUPLEX PRINTING PURPOSES

- - SAMPLE - - MATERIALS CERTIFICATE - - SAMPLE - -

(Submit on Manufacturer's letterhead)

Date: _____

WE HEREBY CERTIFY THAT _____
(Description, Kind of Material, Product Name, Model No.)

FURNISHED TO _____
(Name of Contractor) (Prime or Subcontractor)

FOR USE ON _____
(Project Name)

OWNER _____
(Project Owner)

IDENTIFIED BY: _____
(Label, Marking, Seal No., Consignment, or Waybill No.)

SHIPPED VIA: _____
(Method of Shipment, Car No., Truck No.)

SHIPPED ON: _____ DELIVERED ON: _____

MEETS THE REQUIREMENTS OF THE CONTRACT DOCUMENTS FOR THE SUBJECT PROJECT IN ALL RESPECTS. PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH APPLICABLE SPECIFICATIONS, DRAWINGS AND STANDARDS OF ARTICLES FURNISHED. ARTICLES FURNISHED COMPLY WITH THE FOLLOWING STANDARD SPECIFICATIONS:

_____

_____

_____

_____

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than 3 years from the date of this certificate.

_____
(Name of Manufacturer)

_____
(Authorized Representative's Signature)

_____
(Title)

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FOR DUPLEX PRINTING PURPOSES

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

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

3. Requirements for Contractor to provide quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Materials that fail required tests shall not be accepted by the Town and shall be removed from the site at the Contractor's expense.

D. Contractor shall account for adequate testing times. Delays in testing by the Contractor or Contractor's testing facility shall be the responsibility of the Contractor.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Engineer.

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

1.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents,

provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

1.4 SUBMITTALS

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

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

D. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.

10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

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

1.5 QUALITY ASSURANCE

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

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

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

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product, which are similar to those indicated for this Project in material, design, and extent.

F. Testing Agency Qualifications: An agency as defined in Division 1 Section "Testing Laboratory Services"

G. Professional Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing surveying services of the kind indicated.

1.6 QUALITY CONTROL

A. Contractor Responsibilities: Unless otherwise indicated, provide all quality-control services specified and required by authorities having jurisdiction.

1. Engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies and Engineer at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where approval of laboratory test results is required by the Engineer, submit laboratory test results at least 48 hours in advance of delivery of material onsite.

4. Where quality-control services are indicated, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

7. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

D. Testing Agency Responsibilities: Adhere to Division 1 Section "Testing Laboratory Services.

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

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections, at site or at source of products, including storage and curing of test samples.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field-curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

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

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

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

2. Repair items of work where testing indicates that the work does not meet requirements specified herein and re-test at no cost to the Owner.

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

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

END OF SECTION

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

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

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

G. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

H. "Project Site": Space available for performing construction activities. The extent of Project Site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

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

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

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

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

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

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

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	 (800) 872-2253 (202) 272-0800
ANSI Z260.1	Nursery Stock, latest edition, published by the American Association of Nurserymen, Inc. (AAN).	
CFR	Code of Federal Regulations Available from Government Printing Office http://www.gpoaccess.gov/cfr/index.html	 (866)-512-1800 (202) 512-1800
CRD	Handbook for Concrete and Cement Available from Army Corps of Engineers Waterways Experiment Station http://www.erdc.usace.army.mil/	 (601) 634-2505
RIDEM DEC	Rhode Island Department of Environmental Management Residential Direct Exposure Criteria according to the most recent *Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases*.	(401) 222-6800
DOD	Department of Defense Specifications and Standards Available from Defense Automated Printing Service	(215) 697-6257

FED-STD	Federal Standard (See FS)	
FTMS	Federal Test Method Standard (See FS)	
RCRA	Resource Conservation Recovery Act	
SPN	"Standardized Plant Names," latest edition, by the American Joint Committee on Horticultural Nomenclature.	
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	 (800) 872-2253 (202) 272-0800

1.3 ABBREVIATIONS AND ACRONYMS

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

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

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AAN	American Association of Nurserymen (See ANLA)	
AASHTO	American Association of State Highway and	(202) 624-5800

	Transportation Officials www.aashto.org	
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AFPA	American Forest & Paper Association (See AF&PA)	
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association http://domensino.com/AHA/default.htm	(847) 934-8800
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction	(303) 792-9559

	www.aitc-glulam.org	
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522
ALSC	American Lumber Standard Committee http://www.alsc.org/	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen) www.anla.org	(202) 789-2900
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOAC	Association of Official Agricultural Chemists	(800) 379-2622
AOSA	Association of Official Seed Analysts www.aosaseed.com	(607) 256-3313
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(941) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ASCA	Architectural Spray Coaters Association	(609) 848-6120
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (202) 785-3756

ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
AWCI	AWCI International (Association of the Wall and Ceiling Industries International) www.awci.org	(703) 538-1600
AWCMA	American Window Covering Manufacturers Association (See WCMA)	
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood-Preservers' Association www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPPA	Corrugated Polyethylene Pipe Association (A part of the Plastic Pipes Institute) http://plasticpipe.org/drainage/index.html	(469) 499-1044
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
FM	Factory Mutual System (See FMG)	
FMG	FM Global	(401) 275-3000

	(Formerly: FM - Factory Mutual System) www.fmglobal.com	
GRI	Geosynthetic Research Institute	(610) 522-8440
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
RAWP	Remedial Action Work Plan	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service http://www.redwoodinspection.com/	(925) 935-1499
SAE	SAE International www.sae.org	(724) 776-4841
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TPI	Truss Plate Institute http://www.tpinst.org/	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	
UL	Underwriters Laboratories Inc.	(877) 854-3577

	www.ul.com	
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(503) 639-0651
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

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

BOCA	BOCA International, Inc. http://www.iccsafe.org/help/redirect-bocai.html	(888) 422-7233
CABO	Council of American Building Officials (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials (The) www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials http://www.iccsafe.org/	(888) 422-7233
ICC	International Code Council, Inc. (Formerly: CABO - Council of American Building Officials) http://www.iccsafe.org/	(888) 422-7233
SBCCI	Southern Building Code Congress International, Inc. http://www.iccsafe.org/	(888) 422-7233

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

EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
GSA	General Services Administration www.gsa.gov	(877) 472-3779
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112

NCHRP	National Cooperative Highway Research Program (See TRB)	
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

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

CRMC	Coastal Resources Management Council www.crmc.state.ri.us/	(401) 783-3370
RIDEM	Rhode Island Department of Environmental Management www.dem.ri.gov/	(401) 222-6800 (401) 222-3070
RIDOT	Rhode Island Department of Transportation www.dot.state.ri.us/	(401) 222-2481
UMASS	University of Massachusetts UMASS Extension (Amherst) www.umass.edu/	(413) 545-0111
URI	University of Rhode Island www.uri.edu	(401) 874-1000

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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FOR DUPLEX PRINTING PURPOSES

SECTION 01500 - MOBILIZATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes work necessary for the movement of personnel and equipment to and from the Project site.

1.2 SUBMITTALS

A. Submit site-specific Health and Safety Plan (HASP) for informational purposes.

1.3 QUALITY ASSURANCE

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 SAFETY

A. The Contractor shall prepare a site-specific Health and Safety Plan (HASP) in accordance with 29 CFR Part 1910.120: Hazardous Waste Operations and Emergency Response of the Occupational Safety and Health Administration (OSHA). A copy must be maintained on-site at all times and be available for examination by the Owner and Engineer, if requested.

B. The Contractor shall comply with all requirements of the most recent version of OSHA.

C. When any support system is used that requires design by an engineer, copies of the design stamped by a Professional Engineer registered in the State of Rhode Island shall be submitted to the Engineer.

D. The Contractor has full responsibility to comply with all provisions of the State of Rhode Island Public General Statutes concerning Occupational Safety and Health. Any fines levied against the Contractor for violations shall be the Contractor's responsibility.

3.2 PROTECTION

A. The Contractor shall assume full responsibility for the protection of all public or private buildings, structures and utilities in the rights-of-way, gas pipes, water pipes, hydrants, sewers, drains, electric and telephone cables, and any other improvements whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from damage of every description and any such damage thereto shall be repaired or otherwise made good by the Contractor, at his expense, in a manner acceptable to the Engineer.

B. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. The Contractor shall, at the Contractor's own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer.

END OF SECTION

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.

C. Certified Surveys: Submit two (2) copies stamped by a professional land surveyor.

1.2 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land surveying services of the kind indicated.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of electrical equipment and wiringand other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of improvements and other structures.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site Work, investigate and verify the existence, location, and status of underground utilities and other construction affecting the Work. Clean out all existing and proposed stormwater structures and drains.

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

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the work.

b. List of detrimental conditions, including substrates.

c. List of unacceptable installation tolerances.

d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

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

B. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer prior to proceeding with the Work.

B. General: Engage a professional land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines, grades, and elsewhere as needed to locate each element of Project.

2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

3. Locate and demarcate property lines adjacent to the limit of work.

4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Engineer when deviations from required grades, lines, and levels exceed allowable tolerances.

6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and layout all site improvements.

D. Structure Lines and Levels: Locate and lay out control lines and levels for structures. Transfer survey markings and elevations for use with control lines and levels.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Record Documents.

2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of major site improvements and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work by a Rhode Island licensed land surveyor.

3.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

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

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

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

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

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

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

3.6 PROGRESS CLEANING

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

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

C. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work and use of the existing properties.

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

E. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

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

1. Thoroughly clean surfaces before applying paint or other finishing materials.

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

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

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

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

3.7 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

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

B. Restore permanent facilities used during construction to their specified condition.

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

END OF SECTION

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FOR DUPLEX PRINTING PURPOSES

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list and reasons why the Work is not complete.
2. Complete final cleaning requirements.

B. Inspection: When the Work is ready for its intended use, submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will notify Contractor of construction that must be completed or corrected before final payment will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1.5 RECORD DOCUMENTS

A. General: Do not use Record Documents for construction purposes. Protect Record Documents from deterioration and loss. Provide access to Record Documents for Engineer's reference during normal working hours.

B. Prepare and submit Record Documents in accordance with Division 1 Section "Record Documents."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and federal, State, and local environmental and antipollution regulations.

B. Cleaning:

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean areas disturbed by construction activities of rubbish, surplus soil, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove debris from limited access spaces, including trenches, equipment vaults, manholes, sand filter, bioretention basin, drainage structures, and similar spaces.

f. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury stumps, debris or excess materials brought to the site on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

D. If the Contractor fails to clean up, the Owner may do so and the cost thereof will be charged to the Contractor.

END OF SECTION

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FOR DUPLEX PRINTING PURPOSES

SECTION 01781 - RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Record Documents, including the following:
   1. As-Built Drawings.
   2. Record Specifications
   3. Record Product Data.

1.2 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. As-Built Drawings: Submit three (3) copies and one CD-Rom containing CAD files and PDF of As-Builts.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.
   1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 AS-BUILT DRAWINGS

A. Immediately before inspection for Certificate of Substantial Completion, prepare and submit an As-Built Drawings, as follows:
   1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
      a. Engineer will furnish, as requested by Contractor, one set of the Contract Drawings in CAD format for use in preparation of the As-Built Drawings..

B. Identify and date As-Built Drawings; include the designation "As-Built Drawings" in a prominent location.
   1. As-Built Drawings: Organize CAD information into separate electronic files that correspond to applicable sheets of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
   2. Identification: As follows:
      a. Project name.
      b. Date.
      c. Designation: "As-Built Drawings".

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Record the name of the manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   5. Note related Change Orders, Record Drawings, and Product Data where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders and Product Data where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Record Document purposes. Post changes and modifications to Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Record Documents for Engineer's reference during normal working hours.

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following:
   1. Preparing subgrades for structures and pavements.
   2. Excavating and backfilling.
   3. Sub-base course for concrete paving.
   4. Excavating and backfilling trenches.
   5. Backfilling concrete retaining wall.

B. Related Sections
   1. Division 16 - Electrical

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill trench, structure or excavations.

B. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

C. Final Backfill: Backfill placed over initial backfill to fill a trench.

D. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe. Layer placed around electrical conduit.

E. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

F. Clean Fill: All earthen material imported to the site, including but not limited to, backfill, bedding, borrow, granular material, fill, gravel borrow, and gravel base that is laboratory analyzed by Contractor and approved as Clean Fill by the Engineer in accordance with the RAWP (Exhibit A) and Parts 1.4.C.7, 1.5.F, and 2.3 below.

G. Granular Fill: Subgrade material for concrete retaining wall and boat launch.

H. Gravel Base: Layer placed below bioretention basin overflow structures and catch basins.

I. Excavation: Removal of material encountered above subgrade elevations.

J. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, and associated remedial work directed by Engineer, shall be without additional compensation.

K. Fill: Earthen material used to raise existing grades.

L. Filter Stone: Base material for boat launch and removable bollards.

M. Gravel Borrow: Layer placed below the bituminous concrete paving, concrete walk paving, granite curbing, and light pole footings.

N. Pervious Fill: Backfill material for concrete retaining wall.

O. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material that cannot be removed by excavating equipment, without systematic drilling, ram hammering, ripping, or blasting, when permitted; and that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches.

P. Stone Dust: Material mixed with gravel borrow and placed between timber steps at kayak launch.

Q. Structures: Foundations, retaining walls, boat launches, or other man-made stationary features constructed above or below the ground surface.

R. 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.

S. Utilities include on-site underground pipes, conduits, ducts, and cables.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Each type of plastic warning tape.
2. Geotextile Fabric: Provide product data, including inventory tickets, roll numbers or batch identifications, packing papers and invoices.

B. Qualification Data: For qualified testing agency and licensed surveyor.

C. Material Test Reports: From testing agency in accordance with Division 1 Section "Testing Laboratory Services" indicating and interpreting test results for compliance of the following with requirements indicated. Prepare separate reports for each type and application of backfill, borrow, bedding, clean fill, granular fill, gravel base, gravel borrow, pervious fill, and stone dust.
   1. Classification according to ASTM D 2487.
   2. Sieve analysis according to ASTM 6913
   3. Laboratory compaction curve according to ASTM D 1557 and ASTM D 698.
   4. Origin of material.
   5. Classification and laboratory compaction curve for on-site soil material, in accordance with the above requirements, when requested by the Engineer.
   6. Nuclear density testing according to ASTM D1557.
   7. Prior to importation to the site, each type of material must be laboratory tested and certified as clean fill in accordance with Section 3.6.2.1 of the RAWP (Exhibit A). Submit Certified Test Reports by a qualified laboratory for all analytical data on imported soils at a rate as specified in the RAWP and Parts 1.5.F and 2.3 below.
   8. Submit Certification signed on company letterhead by an authorized representative of the clean fill supplier with direct knowledge of the location and nature of the origin of the clean fill material to be used at the site stating the following: "I certify, to the best of my knowledge, that the [indicate material] provided to [Contractor] for use at the Festival Pier Site in Pawtucket, RI is clean, virgin material that has not been impacted by a release of oil or hazardous materials."

D. Field Test Data Reports: For the following:
   1. Compaction Testing.
   2. Material Weight Slips: Submit weight slips verifying the quantities of the following materials imported the site:
      a. Gravel Borrow (cubic yards)
      b. Common Borrow (cubic yards)
      c. Geotextile Filter Fabric (square yards)
      d. Stone Dust and Gravel Borrow Mix (cubic yards)

1.5 QUALITY ASSURANCE

A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code."

B. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

C. Where "Standard Specifications" is used, it shall mean "Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction, Amended December 2010" and issued supplements.

D. Perform excavation operations in accordance with Occupational Safety and Health Administration (OSHA) Regulations 1926.651 and 1926.652.

E. All testing conducted by the Contractor shall be conducted by a qualified testing agency certified to do business in the State of Rhode Island.

F. Soil analytical testing and frequency –In accordance with Division 1 Section "Testing Laboratory Services". Soil will be tested at the following frequency and using the following analytical methods, as necessary in accordance with the requirements of the RAWP (Exhibit A) and QAPP Addendum (Exhibit B):

1. At a frequency of one sample per 500 cubic yards: Total arsenic by SW-846 Method 6010B: Inductively Coupled Plasma-Atomic Emission Spectrometry.
2. One quarter of the total number of samples per source, and a minimum of one sample per source:
3. Volatile Organic Compounds by SW-846 Method 8260B: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), including sample preservation by SW-846 Method 5035.
4. Semivolatile Organic Compounds by SW-846 Method 8270C: Semivolatile Organic Compounds by GC/MS.
5. Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, and Zinc by SW-846 Method 6010B: Inductively Coupled Plasma-Atomic Emission Spectrometry.
6. Mercury by SW-846 Method 7471A: Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique).
7. Total Petroleum Hydrocarbons by SW 846 Method 8100M: Total Petroleum Hydrocarbons by Gas Chromatography/Flame Ionization Detection (GC/FID) Fingerprint.

1.6 PROJECT CONDITIONS

A. All such information and drawings of existing conditions are furnished only for the information and convenience of the Contractor. It shall be understood and agreed that the Owner does not warrant or guarantee that materials encountered during construction will be the same as those indicated by information given on the drawings. The Contractor must satisfy itself regarding character, quantities and conditions of the various materials and work to be done.

B. The site is a regulated site under the RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Materials Releases.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated:

D. Notify Engineer not less than two days in advance of proposed utility interruptions.

E. Do not proceed with utility interruptions without Engineer's written permission.

F. Contact Dig Safe before excavating. Proceed with excavation only after utility locator service completes marking of utility locations.

G. Extent of trench excavation and excavated areas shall be only as required to complete the work. Contractor shall not conduct work on private property unless authorized by the Owner.

H. Place excavated material, backfill and equipment a minimum of two feet from edge of excavation. Cast excavated material so as not to interfere with ordinary use of the traveled way.

PART 2 - PRODUCTS

2.1 GENERAL

A. All material shall be new and provided by the Contractor unless otherwise stated herein or approved by the Owner or Engineer.

2.2 CLEAN FILL

A. The soil materials listed in Part 2.3 shall be imported, laboratory tested, and certified as clean fill in accordance with the RAWP, QAPP Addendum, and Part 2.4 of this Section.

2.3 SOIL MATERIALS

A. Satisfactory Soils: Free of rock or gravel larger than three inches in any dimension; meeting Standard Specification Section M.01.01 and the definition of Clean Fill.

B. Common Borrow: Shall meet the requirements for Satisfactory Soils.

C. Initial Backfill: Shall meet the requirements for Gravel Borrow.

D. Final Backfill: Final backfill shall consist of free-draining, non-frost susceptible backfill free of ice, snow, roots, sod, rubbish and other deleterious or organic matter and shall conform to the following gradation requirements:

Sieve Size	Percent Passing by Weight
3-Inch	100
No. 10	30-95
No. 40	10-70
No. 200	0-6

E. 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.

F. Filter Stone: Shall conform to Section M.01.09, Table 1, Column V of the Standard Specifications.

G. Granular Fill: Shall conform to Section M.01.09, Table 1, Column II of the Standard Specifications.

H. Gravel Base: Shall conform to Section M.01.09, Table 1, Column II of the Standard Specifications except with 100 percent passing a 1.5-inch sieve.

I. Gravel Borrow: Naturally or artificially graded mixture of natural or crushed gravel, broken or crushed stone, and natural or crushed sand; Standard Specification, Subsection M.01.09; Table I, Column Ib.

J. Pervious Fill: Shall conform to Section M.01.09, Table 1, Column IV of the Standard Specifications.

K. Stone Dust: Broken or crushed stone confirming to the following gradation requirements:

Sieve Size	Percent Passing by Weight
3-Inch	100
No. 10	30-95

2.4 CLEAN FILL TESTING REQUIREMENTS

A. All imported soil material to be used at the site shall not contain compounds at concentrations equal to or exceeding the following limits. The following table show the allowable analytical limits (i.e. the RIDEM Method 1 Residential Direct Exposure Criteria) required to demonstrate compliance with the specifications.

Analysis: Priority Pollutant 13 Metals (PP13 Metals)
Analytical Method: SW-846 6010B/7471A

Compound	Residential Direct Exposure Criteria (milli-grams/kilogram)
Antimony	10
Arsenic	7.0
Beryllium	1.5
Cadmium	39
Chromium (total)	390
Copper	3,100
Lead	150
Mercury	23
Nickel	1,000
Selenium	390
Silver	200
Thallium	5.5
Zinc	6,000

Analysis: Total Petroleum Hydrocarbons (TPH)
Analytical Method: SW-846 8100

Compound	Residential Direct Exposure Criteria (milli-grams/kilogram)
TPH	500

Analysis: Volatile Organic Compounds
Analytical Method: SW-846 8260/5035

Compound	Residential Direct Exposure Criteria (milli-grams/kilogram)
Acetone	7,800
Benzene	2.5
Bromodichloromethane	10
Bromoform	81
Bromomethane	0.8
Carbon tetrachloride	1.5
Chlorobenzene	210
Chloroform	1.2
Dibromochloromethane	7.6
1,2-Dibromo-3-chloropropane (DBCP)	0.5
1,1-Dichloroethane	920
1,2-Dichloroethane	0.9
1,1-Dichloroethene	0.2
cis-1,2-Dichloroethene	630
trans-1,2-Dichloroethene	1,100
1,2-Dichloropropane	1.9
Ethylbenzene	71
Ethylene dibromide (EDB)	0.01
Isopropyl benzene	27
Methyl ethyl ketone	10,000
Methyl isobutyl ketone	1,200
Methyl tertiary-butyl ether (MTBE)	390
Methylene chloride	45
Styrene	13
1,1,1,2-Tetrachloroethane	2.2
1,1,2,2-Tetrachloroehtane	1.3
Tetrachloroethene	12
Toluene	190

Compound	Residential Direct Exposure Criteria (milli-grams/kilogram)
1,1,1-Trichloroethane	540
1,1,2-Trichloroethane	3.6
Trichloroethene	13
Vinyl chloride	0.02
Xylenes (Total)	110

Analysis: Semi-Volatile Organic Compounds (SVOCs)
Analytical Method: SW-846 8270

Compound	Residential Direct Exposure Criteria (milligrams/kilogram)
Acenaphthene	43
Acenaphthylene	23
Anthracene	35
Benzo(a)anthracene	0.9
Benzo(a)pyrene	0.4
Benzo(b)fluoranthene	0.9
Benzo(g,h,i)perylene	0.8
Benzo(k)fluoranthene	0.9
1,1-Biphenyl	0.8
Bis(2-ethylhexyl)phthalate	46
Bis(2-chloroethyl)ether	0.6
Bis(2-chloroisopropyl)ether	9.1
4-Chloroaniline (p-)	310
2-Chlorophenol	50
Chrysene	0.4
Dibenzo(a,h)anthracene	0.4
1,2-Dichlorobenzene (o-DCB)	510
1,3-Dichlorobenzene (m-DCB)	430
1,4-Dichlorobenzene (p-DCB)	27
3,3-Dichlorobenzidine	1.4
2,4-Dichlorophenol	30
Diethyl phthalate	340
2,4-Dimethyl phenol	1,400
Dimethyl phthalate	1,900
2,4-Dinitrophenol	160
2,4-Dinitrotoluene	0.9
Fluoranthene	20

Compound	Residential Direct Exposure Criteria (milligrams/kilogram)
Fluorene	28
Hexachlorobenzene	0.4
Hexachlorobutadiene	8.2
Hexachloroethane	46
Indeno(1,2,3-cd)pyrene	0.9
2-Methyl naphthalene	123
Naphthalene	54
Pentachlorophenol	5.3
Phenanthrene	40
Phenol	6,000
Pyrene	13
1,2,4-Trichlorobenzene	96
2,4,5-Trichlorophenol	330
2,4,6-Trichlorophenol	58

2.5 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of 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.

B. Identifying Colors for Utilities:
   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.

C. Excavation Protection Systems: OSHA 1926.652.

2.6 GEOTEXTILE FABRIC

A. In accordance with Section 920.02 of the Standard Specifications.
   1. Shall be nonwoven filament polypropylene with a minimum puncture strength of 120 pounds.

PART 3 - EXECUTION

3.1 GENERAL

A. Manage all soil in accordance with the RAWP and Section 02111 Contaminated Soil Management.

B. The Contractor shall ensure that all clean fill material to be used at the site is properly segregated from all other material on the site and not co-mingled, which could result in the contamination of material. Contaminated soil will be unsuitable for use in soil cap construction and managed in accordance with Division 2 Section "Contaminated Soil Management."

C. Contractor shall provide and acquire an approval by the Engineer for all certified test reports for all clean fill material to be used prior to importation to site.

D. The Contactor shall place all clean material to be used at the site on plastic sheeting if the material is staged in an area that has not previously been capped.

E. Contractor is responsible for preparing and following a site-specific Health and Safety Plan (HASP) in accordance with OSHA 29 CFR 1910.120. A copy must be maintained onsite at all times and be available for examination by the Owner and Engineer, if requested.

3.2 HEALTH AND SAFETY

A. At a minimum, level D personnel protective equipment (PPE) must be used at all times on the site.

B. The Contractor is responsible to prepare, implement, and maintain a site specific HASP in accordance with OSHA 20 CFR 1910.120.

3.3 DECONTAMINATION PROCEDURES OF NATIVE SOIL

A. Follow the requirements of 29 CFR 1910.120 and the HASP.

B. Provide for decontamination of personnel, equipment, and supplies that enter the contaminated work area or are exposed to contaminated material.

C. Personnel decontamination, at a minimum, shall consist of work practices aimed at mitigating exposure to or ingestion of contaminants and limiting the spread of contaminants, use of disposable protective clothing, and proper personal hygiene practices.

3.4 PREPARATION

A. Protect structures, 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.

3.5 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.

C. 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.

3.6 EXPLOSIVES

A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

B. Prepare and submit a blasting plan with a pre-blast survey of surrounding properties to the Owner for review and approval before proceeding with blasting activities.

C. Perform blasting without damaging adjacent structures, property, or site improvements.

D. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.7 EXCAVATION, GENERAL

A. Excavation shall be in accordance with Section 3.1 of the RAWP and Division 2 Section "Contaminated Soil Management".

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross-sectioned by Engineer. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

C. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

D. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

E. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
   1. 24 inches outside of concrete forms other than at footings.
   2. 12 inches outside of concrete forms at footings.
   3. 6 inches outside of minimum required dimensions of concrete cast against grade.
   4. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.8 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.

B. 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.

C. Excavation for Underground 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.
   1. Any disturbance to the bottom of an excavation shall be corrected by compacting the bottom of the excavation to provide a firm base.

3.9 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.10 EXCAVATION FOR STORM DRAINS AND UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations. Prepare finished bottom of excavation accurately with hand tools.

B. Trench shoring and bracing located below the narrow limit of trench must be left-in-place.

C. Excavate trenches to uniform widths to provide working 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.

D. Trench Width: As indicated on the Contract Drawings.

E. 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.

3.11 GEOTEXTILE FABRIC

A. Install geotextile fabric to the indicated limits.

B. Install geotextile fabric in accordance with manufacturer's requirements. Do not drag materials, equipment or other items over geotextile fabric before installation of remediation cap.
   1. Minimize handling of geotextile fabric during installation.
   2. Unpackage only the material which can placed in position in the same day.

C. In areas where wind is prevalent, start installation at the upwind side of the project and proceed downwind. Secure the leading edge at all times with sandbags or other means sufficient to hold it down during high winds.

D. Overlap Seams
   1. Continuously overlap seams and panels a minimum of 12 inches at all longitudinal and transverse joints.
   2. Install the overlap in a direction, such that the cover material does not push the fabric apart.

E. Where seams must be oriented across the slope, install so upper panel overlaps lower panel.

F. Where necessary, holes may be cut in the geotextile fabric to allow for the installation of fencing or landscaping. The cut in the fabric should only be as large as necessary to complete the installation, and, where possible, the cut fabric should be replaced upon completion of the installation.

G. Repairs
   1. Place a patch of same type of geotextile fabric over damaged area. Extend fabric a minimum of 12 inches beyond edge of damaged area. Align machine direction of patch with machine direction of geotextile fabric to be repaired.
   2. Remove and replace geotextile fabric rolls which cannot be repaired.
   3. Repair geotextile fabric at no additional cost.

3.12 SITE WIDE SOIL CAP

A. Conducted in accordance with Section 3.7 of the RAWP and the specifications herein.

B. All site work must be conducted in accordance with the RAWP and the following:
   1. Appropriate health and safety procedures, including the use of personal protective equipment, shall be implemented and documented in a HASP.
   2. All existing soil at the site is considered to be regulated soil and falls under RIDEM jurisdiction. All excavated on-site soil to be removed from the site by the Contractor must be disposed of at a RIDEM approved facility.
   3. All existing soil shall be managed in accordance with the RAWP and Section 02111 Contaminated Soil Management.
   4. If the off-site disposal of soil is necessary, the Contractor shall stage the material on-site pending approval by the disposal facility and the Engineer, in accordance with the following requirements.
      a. All material shall be stockpiled in the designated staging area.
      b. All material shall be stockpiled upon polyethylene sheeting.
      c. At the end of each workday, stockpiles shall be completely covered with polyethylene sheeting, which is thoroughly secured with sand bags. Stockpiles shall also be ringed with a hay bale barrier.
      d. Contractor can direct load material to trucks following approval of the Engineer and acceptance by disposal facility.

e. Metal Roll-off containers are acceptable for storage of excavated material, provided they are covered at the end of each workday and lined with polyethylene sheeting.
f. Contractor shall load all trucks to haul materials off-site.

5. Work will be observed and documented by a representative of the Engineer to document compliance with the RAWP.
6. Do not place soil capping material prior to inspection and approval by the Engineer of the geotextile fabric and/or fill materials.
7. Place material in a manner that prevents the following:
   a. Soil from entering the geotextile fabric overlap zone.
   b. Tensile stress.
   c. Wrinkling of geotextile fabric, and wrinkles from folding over onto themselves.
   d. Do not drop cover material onto geotextile fabric from a height greater than 3 feet.
   e. Place soil cover for side slopes at the bottom and pushed up to the top of the slope.
   f. Immediately repair damage to the geotextile fabric occurring during placement of cover material.

3.13 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.14 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 Engineer.

B. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.15 STORAGE OF SOIL MATERIALS

A. Stockpile imported soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

B. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

C. The Contractor shall ensure that all Clean Fill material to be used at the site is properly segregated from all other material on the site and not co-mingled, which could result in the contamination of material. Contaminated material will be unsuitable for use in soil cap construction.

D. The Contactor shall place all Clean Fill to be used at the site on plastic sheeting if the material is staged in an area that has not previously been capped.

E. The Contractor shall stockpile excavated existing soil materials in accordance with Part 3.12.B.4 of this Section.

3.16 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade.
   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.
   8. Obtaining certification of all backfill materials as Clean Fill in accordance with the RAWP.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.17 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. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Place and compact initial backfill of sub-base material, 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.
   2. Place and compact final backfill to final subgrade elevation.
   3. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.18 SOIL FILL

A. Conducted in accordance with the RAWP.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations.

D. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.19 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by two percent and is too wet to compact to specified dry unit weight.

3.20 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 structures, ramps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
   2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
   3. Under unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
   4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.
   5. For utility trenches in paved areas, compact each layer of initial and final backfill soil material at 92 percent.

3.21 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. Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1 inch.
   3. Pavements: Plus or minus 1/2 inch.

3.22 GRAVEL BORROW COURSE

A. Prepared subgrade shall be free of mud, frost, snow, or ice.

B. On prepared subgrade, place gravel borrow course as follows:
   1. Place gravel borrow course to indicated thickness within 3/4 inch, however, not consistently in one direction.
   2. Shape gravel borrow course to required crown elevations and cross-slope grades.
   3. When thickness of compacted gravel borrow course is 6 inches or less, place materials in a single layer.
   4. When thickness of compacted gravel borrow course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

C. Apply additional material after initial spreading and compacting of gravel borrow course, if Engineer determines additional material is necessary. Shape, wet and compact gravel borrow course. Correct, or remove and replace areas of segregated coarse or fine material with well-graded material, as directed by the Engineer. Continue compacting and wetting until voids are filled.

D. Compact gravel borrow 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.

3.23 FIELD QUALITY CONTROL

A. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

B. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.24 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 Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

D. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.25 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus waste materials, including, trash, and debris, and legally dispose of them off Owner's property.

B. All existing soil at the site is considered to be regulated soil and falls under RIDEM jurisdiction. All surplus excavated on-site soil shall be removed from the site by the Contractor and disposed of at a RIDEM approved facility.

C. Dispose existing surplus soil materials in accordance with the RAWP and Section 02111 Contaminated Soil Management.

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FOR DUPLEX PRINTING PURPOSES

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following:
1. Cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.

B. Related Sections include the following:
1. Division 2 Section "Earthwork."

1.3 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Cementitious materials and aggregates.
2. Form materials and form-release agents.
3. Steel reinforcement and reinforcement accessories.
4. Admixtures.
5. Curing materials.

1.4 QUALITY ASSURANCE

A. Where "Standard Specifications" is used, it shall mean "State of Rhode Island Department of Transportation Standard Specifications (RIDOT) for Roads and Bridge Construction, Revision of 2010" and issued supplements.

B. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
   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.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
   1. ACI 301, "Specification for Structural Concrete."
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 GENERAL

A. All material shall be new and provided by the Contractor unless otherwise stated herein or approved by the Owner or Engineer.

2.2 FORM-FACING MATERIALS

A. Furnish formwork and form accessories according to ACI 301.

B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. High-density overlay, Class 1, or better.
      b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
      c. Structural 1, B-B, or better, mill oiled and edge sealed.
      d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

C. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

2.5 CONCRETE MATERIALS

A. RIDOT Class "XX" concrete shall be used for the following:
   1. Equipment pads.
   2. Electrical ductbank slabs.
   3. Concrete pavement.

B. Comply with the Standard Specifications.

2.6 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Do not use admixtures containing calcium chloride.

B. Comply with the Standard Specifications.

2.7 CONCRETE MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Provide Class XX concrete proportioned and mixed in accordance with the Standard Specifications.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with the Standard Specifications.

2.9 CURING MATERIALS

A. Comply with the Standard Specifications.

2.10 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class B, 1/4 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

1. Do not use rust-stained steel form-facing material.

F. Chamfer exterior corners and edges of permanently exposed concrete.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 REMOVING AND REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.3 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Engineer.

C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

D. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
   1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Comply with the Standard Specifications.

C. Slightly pitch equipment pads from the center of the pad in all directions to eliminate any ponding of water on the pad.

3.7 FINISHING SURFACES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
   1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

B. Related Unformed Surfaces: At tops of pavement and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 TOLERANCES

A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.9 CONCRETE PROTECTION AND CURING

A. General: Comply with the Standard Specifications.

3.10 JOINT FILLING

A. Prepare, clean, debris, saw cuttings, curing compounds, and sealers from joint; leave contact faces of joint clean and dry.
   1. Defer joint filing until concrete has aged per the manufacturers requirements.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

E. Repair defective areas, except random cracks and single holes 2 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

F. Repair random cracks and single holes 2 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

G. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

H. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: Test air content in accordance with AASHTO T 199-00, Standard Method of Test for Air Content of Freshly Mixed Concrete by the Chace Indicator or in accordance with ASTM C 231, pressure method, for normal-weight concrete;

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
   a. Cast and field cure one set of four standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
   a. Test two field-cured specimens at 7 days and two at 28 days.
   b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine

adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer.

END OF SECTION

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FOR DUPLEX PRINTING PURPOSES

SECTION 16010 - SUMMARY OF WORK - ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including all Division 1 Specification Sections, shall apply to this Section of the Specifications.

1.02 WORK INCLUDED

A. Provide materials, labor, equipment and appliances required to furnish and install a completely operational, coordinated and tested new electrical system and related work, including but not limited to:

1. Underground duct banks and equipment pads.
2. Removal of existing Main Distribution Panel and install new panel, reconnecting existing loads
3. New service rated Automatic Transfer Switches and associated wiring.
4. New Manual Transfer Switches (Storm Switch) and associated wiring.
5. New Padmount Transformer and associated wirijng.
6. Testing and energizing service.
7. New Generators and associated wiring.
8. New remote Generator Annunciators and associated wiring.
9. New exterior 5kV Padmount Switches.
10. Acceptance testing.
11. Short circuit and coordination study.
12. Site work and concrete.

B. Work to be performed, furnished, installed, located, or set by others as listed or described under this section or in other sections of these specifications shall be coordinated by the Contractor.

1.03 INTENT

A. The intent of this specification and accompanying construction drawing is to describe and indicate the furnishing, erection, installation and connections to the equipment as specified and shown on the drawing. It is not intended that the specifications and drawing describe and indicate each piece of equipment required for installation, and where items are intended or required for satisfactory installation and are considered to be the accepted practice of the trade, they shall be considered to be both specified and indicated.

B. Furnish all plant, labor and material necessary for the complete and satisfactory installation of all work for this contract.

C. Assume the entire responsibility for the materials, workmanship, and satisfactory operation of the various systems, and other work as specified herein and or as shown on the drawings.

D. Schedule and coordinate all work in close cooperation with all Contractors working on this project.

1.04 RELATED REQUIREMENTS

A. Division 1 - General Requirements.

B. Division 2 - Site Work.

C. Division 3 – Concrete.

1.05 DEFINITIONS

A. The following definitions of terms and expressions used in this section are in addition to the listing given in Supplementary Conditions:

1. "Provide" shall mean, "furnish and install," unless otherwise indicated.
2. "Wiring" shall mean conduit, cable tray, fittings, boxes, accessories, conductors (wires) and connections as required for a complete operating system.

1.06 CONTRACTOR'S RESPONSIBILITY

A. Be familiarized with the existing facilities and difficulties by visiting the job site. Be aware of material type to be replaced. The Contractor shall be responsible for the execution of all work related to the Construction Documents. No extra money claims will be allowed resulting from any discrepancies.

B. Establish grades and elevations, and check all interferences, and verify all dimensions and locations in the field.

C. The drawings are intended to indicate only diagrammatically the extent, general character and locations of work included. Work intended, but with minor details obviously omitted, shall be furnished and installed complete to accomplish the function required. If any obstructions or interferences should be encountered which are not shown on the drawings or described in the specifications, install the equipment, etc., as closely as possible to the locations indicated on the drawings, or as required. Equipment installation shall approximate the mounting heights of the adjacent equipment. Such changes shall be subject to the approval of the Owner prior to the installation and shall be made at no increase in contract price.

D. Conduit, wiring and circuiting, designations, etc., shall be installed as indicated on the drawings unless prior approval in writing has been obtained for such changes. When changes occur, sketches shall be submitted to the Owner showing all deviations from the contract drawings.

E. The locations of equipment, conduits, wiring, boxes etc., as shown on the drawings, are correct to the extent permitted by the scale of the drawings, but are subject to such modifications as may be found necessary or desirable at the time of installation in order to meet any structural conditions. Such changes shall be brought to the attention of the Owner and made by the Contractor without extra charge.

F. The Owner specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to, and the arrangement of these connections, where they do not substantially affect the agreed upon construction costs.

G. Equipment such as junction and pull boxes, panelboards and such other apparatus as may require maintenance and operation from time to time shall be installed to be easily accessible thereafter. Although the equipment may be shown on the Drawings in certain locations, the construction may disclose the fact that such locations do not make its position readily accessible. In such cases, the Contractor shall bring it to the attention of the Owner of the condition before advancing the construction to a point where a change will reflect additional expenses.

H. Attention is called to the Construction Documents involving special details. The Contractor shall carefully scrutinize all documents for the details affecting the performance of the work.

1.07 REGULATORY REQUIREMENTS

A. The installation shall comply with state and local laws and regulations applying to installations in the State of Rhode Island, with applicable requirements of the National Code and its latest revisions.

1.08 PERMITS AND FEES

A. The Contractor shall obtain all permits, pay all fees and give authority having jurisdiction requisite notices.

1.09 MATERIALS AND WORKMANSHIP

A. Materials shall be new and shall conform to the standard of the Underwriters' Laboratories, Inc. in every case where such a standard, listing or label has been established for the particular type of material in question.

B. Names of manufacturers, catalog numbers, models or types, when used in this section and the included drawings, are intended to indicate the standards of type and quality of material.

C. Where two or more units of the same class of equipment are required, these units shall be the product of a single manufacturer.

1.10 DRAWINGS

A. The drawings shall show the layout of the system and indicate the approximate locations of apparatus and equipment. The runs of feeders shall be indicated and the exact routing of conduit shall be determined by the field conditions and other obstructions.

B. Verify in the field and consult all Construction Documents to determine conditions that may affect the location of any apparatus and equipment to avoid possible interference and permit full coordination of work. The right to make any reasonable change in location of apparatus and equipment up to the time of roughing-in is reserved by the Owner.

1.11 RECORD DRAWINGS

A. Maintain at the job site at all times a complete set of blueline prints of the work on which shall be marked, clearly, neatly, accurately and promptly as the work progresses.

B. Record drawings shall conform to the requirements of Division 1.

1.12 SUBMITTALS

A. Submit shop drawings and samples (refer to Division 1 and the individual specification sections requirements).

B. Submit shop drawings giving dimensions and details to insure compliance to the project documents.

C. General bulletins or catalogs will not be accepted as shop drawings unless the equipment on which approval is to be obtained is specifically marked and information pertaining to the item, including dimensions where required for installation, is included.

D. Submit copies of test plans and reports.

1.13 GUARANTEE

A. Leave each entire electrical system in proper working order and, without additional expense to the Owner, replace any work, materials or equipment provided under this contract which develops any defects, except from ordinary wear and tear, within one (1) year from the date of final certificate of approval and acceptance by the Engineer.

B. Promptly remedy any defects in work and pay for any damage to other work resulting there from which appear during the one year guarantee period.

1.14 EQUIPMENT AND SCAFFOLDING

A. The Contractor shall be responsible for furnishing all tools and equipment, scaffolding and other temporary construction required for the execution of the work under Division 16.

1.15 QUALITY ASSURANCE

A. The services of a qualified technician shall be provided to supervise the installation, adjustments and testing of systems and equipment, as indicated under individual sections of Division 16. The technician shall instruct designated personnel in the operation, adjustment and maintenance of the system.

B. The manufacturer and/or his authorized agent shall maintain a fully equipped factory parts and service facility capable of furnishing adequate inspection and service at a location no further than 50 miles from the job site.

C. The manufacturer and/or his agent shall be prepared to offer a service contract for the maintenance of the system after the guarantee period expires.

D. "On Call" or "Contract" service shops are not acceptable.

E. Equipment manufacturer shall furnish the Owner a one-year contract for maintenance and inspection service, effective from the date of acceptance of the installation. Service contract shall provide for a minimum of two inspections during the contract year.

F. Systems and their components shall be the product of a manufacturer who has designed and produced similar systems and components for a period of at least 10 years.

G. Vendors shall be prepared to furnish a list of 10 similar installations in the project area for possible inspection by the Engineer.

H. Distributors shall be authorized agents of the equipment furnished.

1.16 INSTRUCTION MANUALS

A. Four bound copies of complete instructions for the operation and maintenance of each system shall be furnished to the Owner including circuit drawings and wiring diagrams.

B. Provide operating and maintenance data in accordance with Division 1.

1.17 INSPECTION AND TESTS

A. Provide electrical acceptance testing on all electrical equipment. Acceptance tests shall be performed in accordance with NETA (International Electrical Testing Association) Acceptance Testing Specifications. In lieu of NETA testing, the Contractor may submit for approval an acceptance testing plan indicating tests to be performed and test values that are expected.

B. Connections at cabinets, switches, circuit breakers and all splices must be made at the time of final inspection and testing. Circuits shall be continuous from service switches to each outlet. Each system shall test free from short circuits and ground and shall have an insulation resistance between conductors and ground based on maximum load not less than requirements of the latest edition of the National Code.

C. Voltages shall be tested at the line side of the panelboard main breaker with branch circuit breakers in the open position. After proper voltage has been established at the main breaker, measure voltage between phases, neutral and grounds of all feeder circuits.

D. The Contractor shall be responsible for correct voltages, tap settings and correct phase designations on all equipment.

E. The grounding installation shall be tested and the resistance between ground and absolute earth shall not exceed 25 ohms and shall be measured by the Contractor before equipment is placed in operation.

F. Testing equipment necessary to satisfactorily conduct the tests mentioned above shall be provided. The tests shall be made under the direction of and at no additional expense to the Owner.

G. Failure or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and tests shall be re-conducted. Defective material shall be replaced promptly at no additional expense to the Owner. Insofar as practicable a normal full load test shall be made on the power and lighting systems.

H. If the voltage and regulation are not within acceptable limits, coordinate with the Owner to correct for proper voltage.

I. Copies of all test reports shall be in conformance with NETA ATS, its latest edition, submitted for approval to the Owner under provisions of Division 1.

1.18 COORDINATION

A. Work shall conform to Section 01010 - Summary of Work**.**

B. Fully coordinate the various parts of the work included under this Section, with other Sections throughout the various phases of construction and before the ordering or fabrication of the various parts of the work, so as to insure compliance with the drawings and specifications, and as necessary to provide the installations complete and in satisfactory operating condition.

C. Coordinate electrical equipment installation with existing building components.

D. Coordinate installing required supporting devices and other structural components as they are constructed.

E. Sequence, coordinate and integrate installing electrical materials and equipment for efficient flow of the work in accordance with the Owner's requirements.

F. Coordinate connecting electrical wiring to existing components.

G. Coordinate requirements for electrical items requiring access per National Electric Code.

H. Coordinate installing electrical identification after completion of finishing where identification is applied to field-finished surfaces.

1.19 TYPES OF SERVICE

A. Services vary and are as indicated on the drawings for each specific building.

1.20 NOTIFICATION

A. Arrange with the Owner for switching, connecting, tapping and phasing of the electric lines. All outage requiring a power outage will be performed after hours or on weekends. No building shall be left without power, provide temporary panels and wiring as required.

1.21 ELECTRICAL EQUIPMENT IDENTIFICATION

A. All panelboards and other electrical equipment shall be provided with identification. The identification shall be as directed by the Owner.

B. Equipment 120 Volts and above shall also indicate voltage, phases and other ratings.

1.22 NAMEPLATES/WARNING SIGNS

A. Provide nameplates for equipment and enclosure identification, as required by other sections of Division 16 and the National Electrical Code.

B. Provide warning signs for equipment and enclosures in accordance with the National Electric Code, or as required by other sections of Division 16.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide equipment of the exact type and quality specified herein and indicated on the drawings in order to achieve design requirements.

B. Use UL labeled and listed equipment where listing has been established. Other qualified testing laboratories may be used if UL listing is not available with prior approval of the Engineer.

2.2 NAMEPLATES AND WARNING SIGNS

A. Provide nameplates for new electrical equipment. Nameplates shall be permanent identification of a plastic nameplate with engraving through to a white core. Nameplates shall be secured with a minimum of two (2) bronze machine screws.

B. Provide nameplates on all panelboards and electric equipment indicating panel designation, voltage, phase and the originating source of power.

C. Provide warning signs in front of electrical equipment "CAUTION- OSHA-NEC REGULATIONS REQUIRES THAT THE AREA IN FRONT OF ELECTRICAL PANEL BE KEPT CLEAR FOR 36 INCHES IN FRONT OF EQUIPMENT" or similar wording.

2.3 FIRESTOPPING MATERIALS

A. Provide UL listed firestopping material where raceways pass through fir fire partitions, fire walls or walls and floors. Fire Stopping material shall be "Firestop" Products as manufactured by 3M or an approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. When changes in location of any work are required, obtain approval of Owner before making change.

B. Do not change indicated sizes without written approval of Owner. Sizes shall be increased if required by codes or manufacturer's recommendation.

C. Provide all necessary offsets and crossovers in conduits, and raceways.

D. Install exposed conduits parallel to walls and ceilings and vertically plumb, unless otherwise indicated.

3.2 CUTTING AND PATCHING

A. Perform or pay for all cutting, fitting, repairing, patching and finishing of work of other sections where it is necessary to disturb such work to permit installation of work. Repair or replace existing or new work disturbed.

B. Before cutting, obtain approval of the Owner.

1. Perform only approved methods.

2. Cut all holes neatly and as small as possible to admit work. Holes shall be cut with diamond core drills or concrete saws.

3. Do not weaken walls or floors; locate holes in concrete to miss structural sections.

4. Pneumatic hammer, impact electric, hand or manual hammer type drills shall not be allowed, except where permitted by the Owner.

C. Locate openings and sleeves to permit neat installation of conduits and equipment.

3.3 SEALING OF PENETRATIONS

A. Where conduits, cable trays, wireways, and other electrical raceways pass through fire partitions, fire walls or walls and floors, install a firestop that provides an effective barrier against the spread of fire, smoke and cases. Firestop material shall be packed tight, and completely fill clearances between raceways and openings. Firestop material shall conform to the following:

1. Firestopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Firestopping material shall be noncombustible as defined by ASTM E136; and in addition, for insulation materials, melt point shall be a minimum of 1700 degrees F for 1-hour protection and 1850 degrees F for 2-hour protection.
2. Floor, exterior wall and roof seals shall be watertight. Walls and floors which are cored for installation of conduit shall be sleeved with steel tubing, grouted, and the space between the conduit and sleeve filled as specified herein.
3. When conduits penetrate exterior walls, foundations, or roof, coordinate and carry all costs associated for this work.

4. Conduit sleeves shall extend one inch minimum above finished floor.

3.4 INSTALLATION OF EQUIPMENT

A. Install all equipment in accordance with manufacturer's recommendations.

B. Provide all necessary anchoring devices and supports.

1. Use structural supports suitable for equipment.

2. Check loadings and dimensions of equipment with shop drawings.

C. Verify that equipment being supplied will fit layouts indicated.

1. Where substitute equipment is used, revise layouts to fit at no additional cost.

D. Arrange for necessary openings to allow entry of equipment.

E. Install equipment to permit easy access for normal maintenance and Code required clearances.

1. Maintain code-required access to switches, motors, drives, pull boxes, receptacles, etc.
2. Relocate items which interfere with access.

F. Provide overcurrent protection, accessories and installation as required by the National Electric Code for specific equipment not provided as part of the manufactured equipment.

3.5 FIELD QUALITY CONTROL

A. Perform indicated tests to demonstrate workmanship, operation, and maintenance.

1. Conduct tests in presence of Owner and, if required, inspectors of agencies having jurisdiction.
2. Arrange date of tests two work weeks in advance with Owner, manufacturer and installer.
3. Give minimum of one workweek notice to all inspectors.

B. Repair or replace equipment and systems found inoperative or defective and retest.

1. If equipment or system fails retest, replace it with products conforming with Conceptual Documents.
2. Continue remedial measures and retests until satisfactory results are obtained.

C. Test equipment and systems as indicated for each item, unless otherwise recommended by manufacturer.

3.6 FINAL ACCEPTANCE TEST

A. Perform test as required in accordance with the respective section of this specification and approved test plan.

3.7 ADJUST AND CLEAN

A. Inspect all equipment and put in good working order.
B. Clean all exposed and concealed items.
C. Where new work occurs in existing areas where no other work has been done, clean area and restore to original condition.

3.8 EQUIPMENT START-UP

A. Equipment shall satisfactory operate prior to final acceptance, at a time agreed to by the Owner.

B. Operate all systems in good working order for a period of 5 working days before acceptance.

3.9 NAMEPLATES/WARNING SIGNS

A. Nameplates shall be secured with a minimum of two suitable screws, or an approved method of attachment.

B. Nameplates on equipment 120 volts and above shall indicate voltage, phases, and other ratings.

END OF SECTION

SECTION 16010 - SUMMARY OF WORK - ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including all Division 1 Specification Sections, shall apply to this Section of the Specifications.

1.02 WORK INCLUDED

A. Provide materials, labor, equipment and appliances required to furnish and install a completely operational, coordinated and tested new electrical system and related work, including but not limited to:

1. Underground duct banks and equipment pads.
2. Removal of existing Main Distribution Panel and install new panel, reconnecting existing loads
3. New service rated Automatic Transfer Switches and associated wiring.
4. New Manual Transfer Switches (Storm Switch) and associated wiring.
5. New Padmount Transformer and associated wirijng.
6. Testing and energizing service.
7. New Generators and associated wiring.
8. New remote Generator Annunciators and associated wiring.
9. New exterior 5kV Padmount Switches.
10. Acceptance testing.
11. Short circuit and coordination study.
12. Site work and concrete.

B. Work to be performed, furnished, installed, located, or set by others as listed or described under this section or in other sections of these specifications shall be coordinated by the Contractor.

1.03 INTENT

A. The intent of this specification and accompanying construction drawing is to describe and indicate the furnishing, erection, installation and connections to the equipment as specified and shown on the drawing. It is not intended that the specifications and drawing describe and indicate each piece of equipment required for installation, and where items are intended or required for satisfactory installation and are considered to be the accepted practice of the trade, they shall be considered to be both specified and indicated.

B. Furnish all plant, labor and material necessary for the complete and satisfactory installation of all work for this contract.

C. Assume the entire responsibility for the materials, workmanship, and satisfactory operation of the various systems, and other work as specified herein and or as shown on the drawings.

D. Schedule and coordinate all work in close cooperation with all Contractors working on this project.

1.04 RELATED REQUIREMENTS

A. Division 1 - General Requirements.

B. Division 2 - Site Work.

C. Division 3 – Concrete.

1.05 DEFINITIONS

A. The following definitions of terms and expressions used in this section are in addition to the listing given in Supplementary Conditions:

1. "Provide" shall mean, "furnish and install," unless otherwise indicated.
2. "Wiring" shall mean conduit, cable tray, fittings, boxes, accessories, conductors (wires) and connections as required for a complete operating system.

1.06 CONTRACTOR'S RESPONSIBILITY

A. Be familiarized with the existing facilities and difficulties by visiting the job site. Be aware of material type to be replaced. The Contractor shall be responsible for the execution of all work related to the Construction Documents. No extra money claims will be allowed resulting from any discrepancies.

B. Establish grades and elevations, and check all interferences, and verify all dimensions and locations in the field.

C. The drawings are intended to indicate only diagrammatically the extent, general character and locations of work included. Work intended, but with minor details obviously omitted, shall be furnished and installed complete to accomplish the function required. If any obstructions or interferences should be encountered which are not shown on the drawings or described in the specifications, install the equipment, etc., as closely as possible to the locations indicated on the drawings, or as required. Equipment installation shall approximate the mounting heights of the adjacent equipment. Such changes shall be subject to the approval of the Owner prior to the installation and shall be made at no increase in contract price.

D. Conduit, wiring and circuiting, designations, etc., shall be installed as indicated on the drawings unless prior approval in writing has been obtained for such changes. When changes occur, sketches shall be submitted to the Owner showing all deviations from the contract drawings.

E. The locations of equipment, conduits, wiring, boxes etc., as shown on the drawings, are correct to the extent permitted by the scale of the drawings, but are subject to such modifications as may be found necessary or desirable at the time of installation in order to meet any structural conditions. Such changes shall be brought to the attention of the Owner and made by the Contractor without extra charge.

F. The Owner specifically reserves the right, up to the time of roughing-in, to exactly define the position of the equipment to be installed and connected to, and the arrangement of these connections, where they do not substantially affect the agreed upon construction costs.

G. Equipment such as junction and pull boxes, panelboards and such other apparatus as may require maintenance and operation from time to time shall be installed to be easily accessible thereafter. Although the equipment may be shown on the Drawings in certain locations, the construction may disclose the fact that such locations do not make its position readily accessible. In such cases, the Contractor shall bring it to the attention of the Owner of the condition before advancing the construction to a point where a change will reflect additional expenses.

H. Attention is called to the Construction Documents involving special details. The Contractor shall carefully scrutinize all documents for the details affecting the performance of the work.

1.07 REGULATORY REQUIREMENTS

A. The installation shall comply with state and local laws and regulations applying to installations in the State of Rhode Island, with applicable requirements of the National Code and its latest revisions.

1.08 PERMITS AND FEES

A. The Contractor shall obtain all permits, pay all fees and give authority having jurisdiction requisite notices.

1.09 MATERIALS AND WORKMANSHIP

A. Materials shall be new and shall conform to the standard of the Underwriters' Laboratories, Inc. in every case where such a standard, listing or label has been established for the particular type of material in question.

B. Names of manufacturers, catalog numbers, models or types, when used in this section and the included drawings, are intended to indicate the standards of type and quality of material.

C. Where two or more units of the same class of equipment are required, these units shall be the product of a single manufacturer.

1.10 DRAWINGS

A. The drawings shall show the layout of the system and indicate the approximate locations of apparatus and equipment. The runs of feeders shall be indicated and the exact routing of conduit shall be determined by the field conditions and other obstructions.

B. Verify in the field and consult all Construction Documents to determine conditions that may affect the location of any apparatus and equipment to avoid possible interference and permit full coordination of work. The right to make any reasonable change in location of apparatus and equipment up to the time of roughing-in is reserved by the Owner.

1.11 RECORD DRAWINGS

A. Maintain at the job site at all times a complete set of blueline prints of the work on which shall be marked, clearly, neatly, accurately and promptly as the work progresses.

B. Record drawings shall conform to the requirements of Division 1.

1.12 SUBMITTALS

A. Submit shop drawings and samples (refer to Division 1 and the individual specification sections requirements).

B. Submit shop drawings giving dimensions and details to insure compliance to the project documents.

C. General bulletins or catalogs will not be accepted as shop drawings unless the equipment on which approval is to be obtained is specifically marked and information pertaining to the item, including dimensions where required for installation, is included.

D. Submit copies of test plans and reports.

1.13 GUARANTEE

A. Leave each entire electrical system in proper working order and, without additional expense to the Owner, replace any work, materials or equipment provided under this contract which develops any defects, except from ordinary wear and tear, within one (1) year from the date of final certificate of approval and acceptance by the Engineer.

B. Promptly remedy any defects in work and pay for any damage to other work resulting there from which appear during the one year guarantee period.

1.14 EQUIPMENT AND SCAFFOLDING

A. The Contractor shall be responsible for furnishing all tools and equipment, scaffolding and other temporary construction required for the execution of the work under Division 16.

1.15 QUALITY ASSURANCE

A. The services of a qualified technician shall be provided to supervise the installation, adjustments and testing of systems and equipment, as indicated under individual sections of Division 16. The technician shall instruct designated personnel in the operation, adjustment and maintenance of the system.

B. The manufacturer and/or his authorized agent shall maintain a fully equipped factory parts and service facility capable of furnishing adequate inspection and service at a location no further than 50 miles from the job site.

C. The manufacturer and/or his agent shall be prepared to offer a service contract for the maintenance of the system after the guarantee period expires.

D. "On Call" or "Contract" service shops are not acceptable.

E. Equipment manufacturer shall furnish the Owner a one-year contract for maintenance and inspection service, effective from the date of acceptance of the installation. Service contract shall provide for a minimum of two inspections during the contract year.

F. Systems and their components shall be the product of a manufacturer who has designed and produced similar systems and components for a period of at least 10 years.

G. Vendors shall be prepared to furnish a list of 10 similar installations in the project area for possible inspection by the Engineer.

H. Distributors shall be authorized agents of the equipment furnished.

1.16 INSTRUCTION MANUALS

A. Four bound copies of complete instructions for the operation and maintenance of each system shall be furnished to the Owner including circuit drawings and wiring diagrams.

B. Provide operating and maintenance data in accordance with Division 1.

1.17 INSPECTION AND TESTS

A. Provide electrical acceptance testing on all electrical equipment. Acceptance tests shall be performed in accordance with NETA (International Electrical Testing Association) Acceptance Testing Specifications. In lieu of NETA testing, the Contractor may submit for approval an acceptance testing plan indicating tests to be performed and test values that are expected.

B. Connections at cabinets, switches, circuit breakers and all splices must be made at the time of final inspection and testing. Circuits shall be continuous from service switches to each outlet. Each system shall test free from short circuits and ground and shall have an insulation resistance between conductors and ground based on maximum load not less than requirements of the latest edition of the National Code.

C. Voltages shall be tested at the line side of the panelboard main breaker with branch circuit breakers in the open position. After proper voltage has been established at the main breaker, measure voltage between phases, neutral and grounds of all feeder circuits.

D. The Contractor shall be responsible for correct voltages, tap settings and correct phase designations on all equipment.

E. The grounding installation shall be tested and the resistance between ground and absolute earth shall not exceed 25 ohms and shall be measured by the Contractor before equipment is placed in operation.

F. Testing equipment necessary to satisfactorily conduct the tests mentioned above shall be provided. The tests shall be made under the direction of and at no additional expense to the Owner.

G. Failure or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and tests shall be re-conducted. Defective material shall be replaced promptly at no additional expense to the Owner. Insofar as practicable a normal full load test shall be made on the power and lighting systems.

H. If the voltage and regulation are not within acceptable limits, coordinate with the Owner to correct for proper voltage.

I. Copies of all test reports shall be in conformance with NETA ATS, its latest edition, submitted for approval to the Owner under provisions of Division 1.

1.18 COORDINATION

A. Work shall conform to Section 01010 - Summary of Work**.**

B. Fully coordinate the various parts of the work included under this Section, with other Sections throughout the various phases of construction and before the ordering or fabrication of the various parts of the work, so as to insure compliance with the drawings and specifications, and as necessary to provide the installations complete and in satisfactory operating condition.

C. Coordinate electrical equipment installation with existing building components.

D. Coordinate installing required supporting devices and other structural components as they are constructed.

E. Sequence, coordinate and integrate installing electrical materials and equipment for efficient flow of the work in accordance with the Owner's requirements.

F. Coordinate connecting electrical wiring to existing components.

G. Coordinate requirements for electrical items requiring access per National Electric Code.

H. Coordinate installing electrical identification after completion of finishing where identification is applied to field-finished surfaces.

1.19 TYPES OF SERVICE

A. Services vary and are as indicated on the drawings for each specific building.

1.20 NOTIFICATION

A. Arrange with the Owner for switching, connecting, tapping and phasing of the electric lines. All outage requiring a power outage will be performed after hours or on weekends. No building shall be left without power, provide temporary panels and wiring as required.

1.21 ELECTRICAL EQUIPMENT IDENTIFICATION

A. All panelboards and other electrical equipment shall be provided with identification. The identification shall be as directed by the Owner.

B. Equipment 120 Volts and above shall also indicate voltage, phases and other ratings.

1.22 NAMEPLATES/WARNING SIGNS

A. Provide nameplates for equipment and enclosure identification, as required by other sections of Division 16 and the National Electrical Code.

B. Provide warning signs for equipment and enclosures in accordance with the National Electric Code, or as required by other sections of Division 16.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide equipment of the exact type and quality specified herein and indicated on the drawings in order to achieve design requirements.

B. Use UL labeled and listed equipment where listing has been established. Other qualified testing laboratories may be used if UL listing is not available with prior approval of the Engineer.

2.2 NAMEPLATES AND WARNING SIGNS

A. Provide nameplates for new electrical equipment. Nameplates shall be permanent identification of a plastic nameplate with engraving through to a white core. Nameplates shall be secured with a minimum of two (2) bronze machine screws.

B. Provide nameplates on all panelboards and electric equipment indicating panel designation, voltage, phase and the originating source of power.

C. Provide warning signs in front of electrical equipment "CAUTION- OSHA-NEC REGULATIONS REQUIRES THAT THE AREA IN FRONT OF ELECTRICAL PANEL BE KEPT CLEAR FOR 36 INCHES IN FRONT OF EQUIPMENT" or similar wording.

2.3 FIRESTOPPING MATERIALS

A. Provide UL listed firestopping material where raceways pass through fir fire partitions, fire walls or walls and floors. Fire Stopping material shall be "Firestop" Products as manufactured by 3M or an approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. When changes in location of any work are required, obtain approval of Owner before making change.

B. Do not change indicated sizes without written approval of Owner. Sizes shall be increased if required by codes or manufacturer's recommendation.

C. Provide all necessary offsets and crossovers in conduits, and raceways.

D. Install exposed conduits parallel to walls and ceilings and vertically plumb, unless otherwise indicated.

3.2 CUTTING AND PATCHING

A. Perform or pay for all cutting, fitting, repairing, patching and finishing of work of other sections where it is necessary to disturb such work to permit installation of work. Repair or replace existing or new work disturbed.

B. Before cutting, obtain approval of the Owner.

1. Perform only approved methods.

2. Cut all holes neatly and as small as possible to admit work. Holes shall be cut with diamond core drills or concrete saws.

3. Do not weaken walls or floors; locate holes in concrete to miss structural sections.

4. Pneumatic hammer, impact electric, hand or manual hammer type drills shall not be allowed, except where permitted by the Owner.

C. Locate openings and sleeves to permit neat installation of conduits and equipment.

3.3 SEALING OF PENETRATIONS

A. Where conduits, cable trays, wireways, and other electrical raceways pass through fire partitions, fire walls or walls and floors, install a firestop that provides an effective barrier against the spread of fire, smoke and cases. Firestop material shall be packed tight, and completely fill clearances between raceways and openings. Firestop material shall conform to the following:

1. Firestopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Firestopping material shall be noncombustible as defined by ASTM E136; and in addition, for insulation materials, melt point shall be a minimum of 1700 degrees F for 1-hour protection and 1850 degrees F for 2-hour protection.
2. Floor, exterior wall and roof seals shall be watertight. Walls and floors which are cored for installation of conduit shall be sleeved with steel tubing, grouted, and the space between the conduit and sleeve filled as specified herein.
3. When conduits penetrate exterior walls, foundations, or roof, coordinate and carry all costs associated for this work.

4. Conduit sleeves shall extend one inch minimum above finished floor.

3.4 INSTALLATION OF EQUIPMENT

A. Install all equipment in accordance with manufacturer's recommendations.

B. Provide all necessary anchoring devices and supports.

1. Use structural supports suitable for equipment.

2. Check loadings and dimensions of equipment with shop drawings.

C. Verify that equipment being supplied will fit layouts indicated.

1. Where substitute equipment is used, revise layouts to fit at no additional cost.

D. Arrange for necessary openings to allow entry of equipment.

E. Install equipment to permit easy access for normal maintenance and Code required clearances.

1. Maintain code-required access to switches, motors, drives, pull boxes, receptacles, etc.
2. Relocate items which interfere with access.

F. Provide overcurrent protection, accessories and installation as required by the National Electric Code for specific equipment not provided as part of the manufactured equipment.

3.5 FIELD QUALITY CONTROL

A. Perform indicated tests to demonstrate workmanship, operation, and maintenance.

1. Conduct tests in presence of Owner and, if required, inspectors of agencies having jurisdiction.
2. Arrange date of tests two work weeks in advance with Owner, manufacturer and installer.
3. Give minimum of one workweek notice to all inspectors.

B. Repair or replace equipment and systems found inoperative or defective and retest.

1. If equipment or system fails retest, replace it with products conforming with Conceptual Documents.
2. Continue remedial measures and retests until satisfactory results are obtained.

C. Test equipment and systems as indicated for each item, unless otherwise recommended by manufacturer.

3.6 FINAL ACCEPTANCE TEST

A. Perform test as required in accordance with the respective section of this specification and approved test plan.

3.7 ADJUST AND CLEAN

A. Inspect all equipment and put in good working order.
B. Clean all exposed and concealed items.
C. Where new work occurs in existing areas where no other work has been done, clean area and restore to original condition.

3.8 EQUIPMENT START-UP

A. Equipment shall satisfactory operate prior to final acceptance, at a time agreed to by the Owner.

B. Operate all systems in good working order for a period of 5 working days before acceptance.

3.9 NAMEPLATES/WARNING SIGNS

A. Nameplates shall be secured with a minimum of two suitable screws, or an approved method of attachment.

B. Nameplates on equipment 120 volts and above shall indicate voltage, phases, and other ratings.

END OF SECTION

SECTION 16060 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. It is the design intent to remove electrical equipment on site as indicated, except where indicated to remain.

B. Electrical Demolition: Remove all existing electrical equipment, hardware and system components as shown on the Drawings including but is not limited to:

1. Transformer..
2. Panelboards.
3. High-voltage Splice Box with Wire and Cable.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. All materials and equipment necessary for patching and fireproofing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on Drawings.

B. Verify that feeders and branch circuits designated to be removed serve only equipment which will also be removed.

C. Beginning of demolition means contractor accepts existing conditions.

3.2 PREPARATION

A. Notify and coordinate electrical power shutdown with Owner, Engineer, General Contractor, and other trades. If work occurs while building is occupied, then power outages shall be limited to short time spans and confined to small areas and coordinated with occupants. All outages of electric service shall be approved by Owner and Engineer.

B. Tag out and "make safe" all electrical systems to be removed.

C. Disconnect electrical systems in all areas where equipment is scheduled for removal.

3.3 DEMOLITION OF EXISTING ELECTRICAL WORK

A. Demolish existing electrical work under provisions of this Section.

B. Disconnect and remove Transformer when new service is ready.

3.4 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

END OF SECTION

SECTION 16100 - BASIC MATERIALS AND METHODS – INTERIOR

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 WORK INCLUDED

A. The work covered by this Section of the Specifications includes the furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with providing and installing the interior electrical work, complete, in strict accordance with this Section of the Specifications and the applicable drawings and subject to the terms and conditions of the Contract.

1.03 RELATED WORK

A. Applicable requirements of other Sections of Division 16 shall apply to this Section.

1.04 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Submit on equipment specially manufactured or modified for this project.

C. Submit product data for:

1. Raceways, fittings and boxes.
2. Wire and cable.
3. Splicing materials.
4. Panelboards.
5. Grounding equipment.

1.05 PROJECT RECORD DOCUMENTS

A. Submit record documents under provisions in Division 1.

B. Accurately record actual locations of equipment.

PART 2 - PRODUCTS

2.01 RACEWAY SYSTEMS

A. Conductors shall be installed in raceways as specified. Raceways shall be sized as indicated in accordance with the National Electrical Code requirements and shall bear the label of the Underwriters Laboratories, Incorporated. Raceways shall include rigid steel-threaded conduit, electrical metallic tubing (EMT), metallic flexible conduit and wireways. Minimum size raceway shall be 3/4-inch.

B. Rigid threaded steel conduit shall be hot dip galvanized as manufactured by the Wheatland Tube Co., Republic Steel, Allied Tube or an approved equal. Rigid steel conduits shall conform to Federal Specification WW-C-581d.

C. Electrical Metallic Tubing (EMT) shall be manufactured by the Wheatland Tube Co., Republic Steel, Allied Tube or approved equal, conforming to Federal Specification WW-C-563.

C. Flexible metallic conduit (Greenfield) shall be galvanized steel, interlocking continuous metal strip, conforming to UL-1 and UL 1479, as manufactured by AFC Cable Systems, Inc. or approved equal.

D. Liquidtight flexible metallic conduit shall be galvanized steel core with a PVC jacket, conforming to UL-360 and CSA. Liquidtight flexible metallic conduit shall be Type GP as manufactured by AFC Cable Systems or approved equal.

E. Wireways shall be complete with necessary fittings accessories, covers and connectors and shall be painted finished NEMA 1 construction. The wireways shall be of the code size required with hinged cover and separation of high and low voltage systems, and shall bear the Underwriters' Laboratories label. Wireways shall be securely supported by approved methods.

2.02 BOXES

A. Pull boxes shall be sufficiently rigid to withstand moderate twisting strains. Steel boxes of 100 cubic inches or less shall be No. 14 USS gage; between 101 and 8500 cubic inches shall be No. 12 USS gage; larger boxes shall be No. 10 USS gage and shall be manufactured by McKinstry, Hoffman, Barber or approved equal.

B. Boxes shall be of adequate size to accommodate the installation of conductors without excessive bending of the conductor which would damage the insulation. Maximum number of conductors in a box shall comply with NEC 314-16.

C. Steel boxes other than wiring device outlet boxes, unless otherwise specified herein or shown on the drawings, shall have NEMA 1 construction with a shop-applied finish of enamel in interior location, construction either metallic or non-metallic for duct or process area locations.

D. Boxes shall be furnished with a grounding terminal having a slotted Hexagonal head washer face ground screw with green finish for ground termination.

2.03 FITTINGS

A. Rigid steel conduit fittings shall be of the malleable iron threaded type. Die cast fittings, threadless connectors and split-threaded connectors shall not be acceptable. Fittings shall be as manufactured by Crouse-Hinds, Killark, Appleton Companies or an approved equal.

B. EMT fittings shall be set screw steel insulator type. Die cast fittings shall not be installed. Split-threaded connectors will not be acceptable.

C. Flexible metallic conduit fittings shall be malleable set screw type, as manufactured by Arlington, Bridgeport, Thames & Betts or OZ Gedney.

D. Liquid tight flexible metallic conduit fittings shall be malleable, as manufactured by OZ Gedney, T&B or Raco.

E. All supports, clamps and anchors shall be galvanized steel, malleable iron or stainless steel.

2.04 WIRE AND CABLE

A. Wire and cable of the sizes, wire numbers and types, sized in accordance with the National Electrical Code, shall be provided by the Contractor.

B. All wire and cable work shall be in strict accordance with the requirements of the National Electrical Code and its latest revisions, both with respect to material and workmanship, except where insulation thickness and covering are required by these Specifications in excess of Code requirements.

C. Wire shall be copper, type "THWN/THHN" with insulation thickness for 600 volts in accordance with the National Electrical Code with dual rating of 75°C/90°F, for dry and wet locations. Wire sizes No. 6 AWG or larger, shall be copper, type "XHHW" with insulation thickness for 600 volts with dual rating of 75°C/90°F for dry and wet locations. Insulation shall be cross-linked polyethylene (XLP) rated for 600 volts.

D. Wire and cables shall be single conductor except where otherwise specified or indicated on the Drawings. Conductors of sizes No. 6 AWG and larger shall be stranded. Wires of sizes smaller than No. 8 AWG shall be solid.

E. Conductors shall be soft-drawn copper and have a conductivity of not less than 98 percent of ASTM standards for annealed copper.

F. Wires and cables shall be as manufactured by the American Insulated Wire Corp. or an approved equal.

G. Cable lubricant shall be used where necessary when pulling wire or cable and shall be U.L. listed. Cable lubricant shall be as manufactured by Ideal Products, American Polywater or an approved equal.

2.05 GUTTER WIRING

A. Gutter wiring in lighting cabinets, switches and such other equipment shall be neatly formed and tied with cable ties and straps. The ties and straps shall be Burndy, Thomas & Betts Company, or an approved equal.

2.06 COLOR CODING

A. Wires and cables shall be factory color-coded with a separate color for each phase and neutral used consistently throughout the power and lighting systems. The neutral (grounded) wire of branch circuits shall have a white covering and connections to single pole switches shall be so made that the operation of the switch opens the ungrounded conductor. Color-coding shall be as follows:

120/208 Volts, 3 Phase, 4 Wire	277/480 Volts, 3 Phase, 4 Wire
Phase A – Black	Phase A - Brown
Phase B – Red	Phase B - Orange
Phase C – Blue	Phase C - Yellow
Neutral – White	Neutral – White or Grey
Grounding – Green	Grounding - Green

B. Sizes AWG #8 and larger may be taped for color coding, providing all exposed cables outside of raceways be completely color taped or printed in accordance with IPCEA S-19-81 Method 3.

2.07 SPLICES AND TAPS

A. Splices, taps and terminations in wires No. 6 and larger shall be made with Compression type "Color Keyed" as manufactured by Burndy, Sta-Kon, Thomas and Betts Company or an approved equal, solderless pressure connectors designed for the purpose. Joints between wires shall be made with Sta-Kon, Buchanan, Scotchloc Type "R" or an approved equal, spring type connectors.

B. Splices and taps shall be covered with heat shrinkable tubing. The tubing shall be rated and UL listed to 600 volts, 90°C. The tubing shall be precoated with thermoplastic adhesive-sealant able to adhere to all common wire insulating materials including XLPE, PVC, neoprene, hypalon and EPR, lead, aluminum and steel. The tubing shall be manufactured by Raychem Type WCSM or approved equal.

2.08 NAMEPLATES AND INDEXING

A. Equipment not normally supplied with directory frames as indicated, whether supplied under this section or other sections of these specifications, and at the request of the Engineer shall be provided with dark engraved bakelite nameplates with engraving through to white core. Nameplate markings shall be approved by the Owner. Only a part of the required nameplates are indicated. Nameplates on boxes shall supplement painting specified hereinafter.

B. Engraved bakelite nameplates with engraving through to a white core shall be provided. Nameplates shall be provided on the following equipment, as well as electrical equipment.

1. Panelboards
2. Disconnect switches

C. Nameplates shall be secured with a minimum of two suitable screws.

D. Nameplates for equipment 120 volts and above shall indicate voltage and phase.

2.09 PANELBOARDS

A. Panelboards shall be provided at the locations indicated on the Drawings and in accordance with the requirements of the project. For the removal and replacement of existing panelboard with new panelboard, panelboards shall have component of the same manufacturer. Replacement panelboards and trims shall be manufactured by a UL Listed panelboard shop. Provide new panelboards, tubs, trim covers and bus interiors for existing panelboards as indicated and as manufactured by Eaton Electric, Square D, or General Electric. Panelboards shall confirm to schedules or as indicated on drawings.

B. Panelboards shall be equipped with main circuit breaker or main lugs only as indicated, of such size to accommodate the size feeder cables shown. The panels shall be designed for phase and voltage as indicated, alternating current, and shall be suitable for surface mounting. The panelboards shall be of the dead-front safety type with the quantity and capacity of circuit breakers as shown on the schedules. The circuit breaker mechanisms shall be quick-make, quick-break on manual as well as automatic operation and shall be trip-free from the handle so that contacts cannot be held closed against circuit faults or abnormal overloads. Circuit breakers shall be bolted type, manually operated with non-adjustable thermal magnetic trips, ampere interrupting capacity as indicated**. Series rated panelboards will not be acceptable.** The breakers shall have NEMA interrupting ratings as required. The capacities of the main busses shall be as indicated on the schedules. Two and three pole breakers connected to the main busses as to affect the best balance of single-phase loads.

C. The panelboard interiors, on which circuit breakers, busses and such other items are mounted, shall be of rigid construction. Screws and bolts for making copper connections shall be equipped with Belville washers to prevent loosening. Riveted bus connections will not be acceptable. The busses shall be securely fastened to insulating bases and shall not depend on breakers for support. **Busses shall have current density of not more than 1000 amperes per sq. inch** and shall be drilled and tapped to permit future circuit changes without the necessity for additional machining. Panelboards shall be designed and assembled so any individual breaker may be removed without disturbing adjacent breakers or necessitating the removal or loosening of required insulation.

D. Multi-pole breakers shall be so designed that an overload causes all poles to open without the use of an external supplement tie or connection between external handles.

F. New cabinets shall be fabricated of galvanized sheet steel; trim shall be level-stretched sheet Steel and both cabinets and trim shall be in accordance with the gauges as required by the Underwriters Laboratories, Inc. Cabinets shall be of sufficient size to provide gutters, in conformity with the latest issue of the National Electrical Code except that gutters shall not

be less than 4 inches on all sides. Existing cabinets (tub) shall be thoroughly cleaned and shall be finished with a priming coat and at least one finish coat of grey lacquer.

G. Each cabinet trim shall be furnished with a hinged door in door, combination spring locks and catches, barriers as indicated and required, directory frame and typewritten circuit designations, and two keys. Where required, panel locks shall be keyed to match existing panelboards.

H. The panel manufacturer shall provide all hardware and screws for mounting the cabinet trim to the existing tub. Tech screws and sheet metal screws shall not be used to fasten the trim to the tub.

I. Where panelboards are indicated as main lugs only, copper bus ampere size shall be provided as indicated for main lugs. Lugs shall be provided for the panelboard feeder size as required.

J. Neutral bus shall be insulated from the panel tubs. Ground bus shall be provided and secured to the panel tubs.

K. Submit for approval, manufacturer's Drawings of power panels showing dimension, gutter space gauge of cabinet and trim, type and capacity of breakers, main bus and terminal ratings and panelboard construction details to determine compliance with these Specifications.

2.10 METAL FRAMING SYSTEM (UNISTRUT)

A. The bolted metal framing system shall be made of channel, fittings and hardware as defined in the Metal Framing Manufacturers Associated Standard Publication MFMA-1 and as required by the design.

B. Stainless steel channel shall be continuous roll-formed stainless steel or steel that is hot-dipped galvanized after manufacture.

C. Other parts and accessories shall be stainless or steel hot-dipped galvanized after manufacture in accordance with ASTM A123.

D. Metal Framing Channel shall be formed 12 gauge stainless or galvanized steel. All channels shall have a nominal overall width of 1 5/8" and have a 7/8" slot face opening. Standard lengths are to be 10 and 20 foot. All testing and tolerances shall be in accordance with the latest MFMA-1 Standard.

E. Other components included in the metal framing system shall be beam clamp and other supporting devices as required.

F. Metal framing system shall be manufactured by B-Line Systems, Inc.; Super Strut, Unistrut or an approved equal.

G. Slotted angle shall not be used.

2.14 GROUNDING

A. Ground connectors shall be clamp style as required by the design. Bolts, nuts, and washers and other components of the connectors shall assure a permanent corrosion-resistant assembly. Connectors shall be as manufactured by Thomas & Betts Corp.; Cadweld by Erico Products Company, or an approved equal.

PART 3 - EXECUTION

3.01 CONDUIT INSTALLATION

A. Installation shall be in accordance with U.L., National Electrical Code (N.E.C.) and specified herein.

B. Route conduit parallel and perpendicular to walls and adjacent piping and do not obstruct headrooms, walkways or hatchways.

C. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.

D. Conduit shall be supported and clamped using hardware intended for the purpose.

E. Conduit bends shall be made with standard conduit bendings tools. Conduit deformed or flattened during bending shall be removed and replace.

F. Conduits cut in the field shall be coated with galvanized hot stick or galvanized spray approved for the purpose.

G. Supports shall be provided every 5 feet for conduits wherever possible, and within 3 feet of outlets, boxes or fittings, the points of support to be determined in the field. The supports shall consist of approved types of clamps or straps secured by screws, bolts on wood or steel framework and decking, or expansion bolts in concrete, and brickwork. In no instance shall supporting bolts or screws protrude to the outside of building walls or roof.

H. The complete raceway system shall become metallically continuous throughout its entire length and the entire system shall be electrically continuous and shall be thoroughly grounded in accordance with the N.E.C.

I. Vapor seals shall be installed at locations required by the National Electrical Code.

J. Conduit penetrations from outside walls to interior spaces shall be sealed in an approved conduit sealing system.

K. Conduit penetrations between floors shall be fireproofed in accordance with UL standard details.

3.02 CONDUIT INSTALLATION SCHEDULE

A. Rigid Steel Conduit: Exposed exterior or interior locations, or where subjected to physical damage or wet/damp locations.

B. Electrical Metallic Tubing: All other dry locations exposed or above suspended ceilings.

C. Flexible metallic conduit shall be furnished and installed connections to motors, transformers and equipment in dry locations.

D. Liquidtight flexible conduit to motors and devices in damp or wet locations; and shall not exceed 18 inches. Grounding shall be metallically continuous in accordance with the requirements of the National Electric Code.

E. Minimum size conduit, EMT or flexible metallic raceway shall be ¾ inch.

3.03 WIRE AND CABLE INSTALLATION

A. Install in accordance with NEC, in raceway systems.

B. Lubricants for assisting in the pulling of jacketed cables shall be those specifically recommended by the cable manufacturer. Cable lubricants shall be soapstone, graphite, or talc for rubber or plastic jacketed cables. The lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings.

C. Cable pulling tension shall not exceed the maximum pulling tension recommended by the cable manufacturer.

D. Provide an insulated copper equipment-grounding conductor with every branch circuit and feeder sized in accordance with the National Electric Code. Conductors No. 6 AWG and larger may be bare copper conductor.

E. Wires and cables shall be carefully handled during storage and installation to avoid mechanical injury to the conductor, insulation or covering. Use non-metallic pulling ropes or cords. Attach pulling lines to wires with woven basket grips or pulling eyes. Pull all wires together in single conduits.

F. Use solderless pressure connectors with insulating covers for copper wire splices and taps, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps. Provide compression-type connectors for copper wire splices and taps, 6 AWG and larger.

G. Thoroughly clean wires before installing lugs and connectors.

H. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

I. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor. Heat shrinkage tubing, approved for the purpose, may be used in lieu of tape splices.

J. Terminate spare conductors with electrical tape or heat shrinkable tubing.

K. For panelboards, cabinets, wireways, switches and equipment assemblies neatly form, train, and tie the cables in individual circuits.

L. Wireways shall not exceed 30 current carrying conductors. Provide additional wireways to meet this requirement.

3.04 BOXES AND ENCLOSURE INSTALLATION

A. Provide electrical boxes as required for splices, taps, wire pulling, equipment connections, and code compliance.

B. Boxes shall be secured to conduit by means of conduit hubs if coded hubs are not provided on this box.

C. Verify location of boxes and outlets in offices and work areas prior to rough-in. Locate and install boxes above accessible ceiling or in unfinished areas. Where installation is inaccessible, call it to the attention of the Owner before relocating the box location.

D. Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches of boxes.

3.5 PANELBOARD INSTALLATION

A. Installation shall be in accordance with NEC, as shown on the drawings and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes of cabinets with designated space.

C. Install a typewritten schedule of circuits in each panelboard after approval by the Owner. Schedule shall be typed on the panel directory cards.

D. Where new panels are to be installed in existing backboxes, backboxes shall have rust and scale removed from inside. Paint inside of backboxes with gray rust preventive paint before the new panel interior is installed. Provide new trim and doors for these panels.

E. Mount the new panelboards so that maximum height of circuit breaker above finished floor shall not exceed 78 inches. For panelboards which are too high, mount panelboard so that the bottom of the cabinets will not be less than six inches above the finished floor.

F. Cables shall be neatly packed and bundled with nonflammable nylon ties, routed and supported within the cabinets or gutters. Minimum bending radii as recommended by cable manufacturers shall not be reduced.

G. Grounding shall be metallically continuous in accordance with the requirements of the National Electric Code.

H. Make wiring connections in accordance with manufacturer's instructions. All connections shall be tightened to the manufacturer's recommended torque settings utilizing a torque wrench.

3.07 GROUNDING

A. Ground to the electrical service ground at the service entrance equipment and verify building steel, water piping and supplementary grounding electrode are bonded.

B. Metallic conduit, supports, panelboards, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code and as indicated.

C. The grounding system shall be tested for a resistance not greater than 25 ohms and shall be measured prior to placing equipment in operation. If resistance is greater than 25 ohms the grounding system shall be augmented by additional grounding electrode in accordance with N.E.C.

3.08 SUPPORT AND ANCHORS

A. Review equipment submittals prior to installation of equipment. Exercise judgment when supporting equipment. If support methods are questionable or not available, call it to the attention of the Owner prior to installation.

B. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, beam clamps, galvanized steel clips. All areas shall be considered as moist, humid atmosphere and materials shall be provided for this condition.

C. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry and concrete structures; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheetmetal studs; and wood screws in wood construction.

D. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

E. Do not use powder-actuated anchors without prior approval from the Owner.

F. Do not drill structural steel members without prior approval from the Owner.

H. Installation/construction of metal framing system shall be in accordance with manufacturer's instruction and recommendations. Provide all necessary fitting and anchors for a complete support system.

3.09 ACCEPTANCE TESTS

A. Upon completion of electrical equipment installation and prior to energization, perform acceptance tests on panelboards in accordance with NETA Std. ATS, 1995.

B. Submit test results for review.

C. In addition to acceptance tests, measure and record load (amps) indicated on panel schedules and correct circuit data indicated on the schedule where possible. As a minimum, circuit data shall indicate active circuits and spare circuits and panel space.

3.10 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint.

1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.11 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

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SECTION 16345 –5 kV PADMOUNT SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. SF6 gas-insulated, rated 15 kV, 60Hz class, three-phase gang operated padmounted load interrupting and vacuum fault interrupting assemblies with maximum continuous rating of 600 Amp, for use on underground distribution systems, utilizing dead front equipment.

1.3 RELATED SECTIONS

A. Applicable sections of other sections of Division 16 shall apply to this Section.

1.4 SUBMITTALS

A. Product Data: For each component, including the following:

1. Features, characteristics, and ratings of the load break switch.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Include the following:

1. Nameplate legends.

2. Bus configuration with size of each bus, including phase, neutral, and ground buses.

3. Current ratings of buses.

4. Short-time and short-circuit ratings of switchgear assembly.

C. Product Certificates: Signed by manufacturers of switchgear certifying that the products furnished comply with requirements.

D. Certification of Ratings

1. The manufacturer of the padmounted gear shall be completely and solely responsible for the performance of the load-break switch, as well as the complete integrated assembly as rated.

2. The manufacturer shall furnish, upon request, certification of ratings of the load-break switch.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

F. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

G. Product Test Reports: Indicate compliance of switchgear with requirements.

H. Maintenance Data: For switchgear to include in the maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage a firm experienced in manufacturing switchgear similar to those indicated for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain switchgear through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of switchgear and are based on specific system indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

D. Comply with NFPA 70.

E. Comply with IEEE C2.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle switchgear using factory-installed lifting provisions.

1.7 COORDINATION

A. Coordinate layout and installation of switchgear with other overhead and underground construction.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Touchup Paint: Three containers of paint matching enclosure finish, each 0.5 pint.

PART 2 - PRODUCTS

1.9 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Padmount Switch:

1. Trayer Engineering Corp.

2. G&W Electric Co.

3. S&C Systems

4. Approved equal.

1.10 PADMOUNT SWITCHES

A. The dead-front, SF6 insulated, sectionalizing padmount switches shall consist of minimum 200 Amp manually operated load interrupting switches and vacuum interrupter fault interrupting tap switches, electronically controlled. The switch manufacturer shall be ISO 9001 certified.

B. The switches shall be configured as indicated on the drawings with:

1. Gang operated 3-phase load switch ways
2. Gang operated 3-phase vacuum interrupter tapped way(s) with gang linked operating handles.

C. Switches shall be designed for front access to cables and operators.

D. All switch components and entrances shall be assembled in a totally welded type 304 stainless steel tank. Entrances shall be internally connected by copper conductors capable of handling momentary and continuous current duty. The switch shall contain no electrically floating metallic parts or components. Construction shall be a deadfront design. Switch tanks shall be painted ASA70 light gray using a corrosion-resistant epoxy paint.

E. Each switching way is to be equipped with an internally mounted operating mechanism capable of providing quick-make, quick-break operation in either switching direction. The mechanism must be capable of delivering sufficient torque and shall be provided with latches for each position to assure load interrupting, fault closing and momentary ratings. All switch positions are to be clearly identified, padlockable and adaptable to keylock schemes. The operating mechanism shall be actuated from outside the switch tank with an operating handle. The operating shaft shall be made of stainless steel for maximum corrosion resistance. A double "O" ring type operating shaft seal shall be used for a leak resistant, long life seal.

1. Switch contacts shall be a tulip-bayonet design and made of plated, high-conductivity copper alloy with arcing tips of copper/tungsten alloy to assure permanent low resistance and to avoid sticking during operation. The contacts shall

be designed such that arcing does not occur in the area of main current interchange and contact pressure will increase with increased current flow. The stationary contacts shall be supported independent of the cable entrance bushings, eliminating possible misalignment. The contact nozzle shall have a converging/diverging geometry which improves the flow of SF6 into the arc zone. Contact travel shall be a minimum of 3 inches and have sufficient open contact separation to assure efficient arc extinction and to withstand field DC testing levels and maintain BIL levels. Switch contacts shall be clearly visible in the open position through viewing windows. Auxiliary blades used for load interruption are not acceptable.

F. The vacuum interrupter shall consist of vacuum bottles and a spring-assisted operating mechanism. The mechanism used shall be designated "Model VI" for single or three phase operation. The mechanism shall consist of a single vacuum bottle mechanically linked to a spring-assisted operation mechanism. For three phase operation, the single phase mechanisms are mechanically linked externally with an operating handle assembly.

1. The vacuum interrupter operating mechanism shall consist of the support assembly, linkage, spring latch mechanism, and solenoid utilized for electronic tripping. Maximum interrupting time shall be three cycles (50 msec). The movable contact shaft shall be flagged to indicate the contact position, open or closed. This contact position indicator shall be fully visible through viewing windows supplied in the switch tank.

2. Each tap phase is to be equipped with an individual 600A vacuum interrupter fully enclosed in an SF6 insulated switch tank. Electrical opening shall be by a solenoid that is activated from sources external to the switch tank. Closing (reset) of the vacuum interrupter shall be mechanical with the use of an external operating handle. The mechanical linkage assembly shall provide for a "trip-free" operation which allows the vacuum interrupter to interrupt independent of the operating lever.

G. Loadbreak Switch shall be designed, tested and built per ANSI C37.72-1987 and IEC 265 standards. Certified test reports shall be provided. The switch shall be rated:

Maximum design voltage, kV	15.5
Impulse level (BIL), kV	95
Continuous and loadbreak current, A	600
One minute withstand (dry), AC kV (60Hz)	35
One minute withstand (dry), AC kV Production test rating	34
15 minute withstand, DC kV	53
Momentary current, kA, ASYM	20
Fault-close current, kA, ASYM	40
One second current, kA, SYM	25
Loadbreak operations at 600 A	1200
Mechanical endurance, operations	2000

H. The vacuum interrupter shall be a non-reclosing, manual reset device incorporating vacuum bottles. It shall be designed, tested and built per application sections of ANSI C37.60-1981 and C37.72-1987. The vacuum interrupter assembly shall be rated:

Maximum design voltage, kV	15.5
Impulse level (BIL), kV	95
Continuous & loadbreak current, A	600
One minute withstand (dry), AC kV	50
One minute withstand (dry), AC kV Production test rating	34
Symmetrical interrupting rating, kA	12
Asym. interrupting rating, kA	19.2

I. Fault Interrupting Duty:

Percent of Maximum Interrupting Rating	Approx. Interrupting Current, Amps	No. of Fault Interruptions
15- 20%	2,000	44
45- 55%	6,000	56
90-100%	12,000	16

Total Number of Fault Interruptions: 116

J. Bushings shall be deadfront type for use with separable connectors confirming to ANSI/IEEE Standard 386 and ANSI Standard C119.2. The bushings shall have a continuous current rating of 600-amps or 200-amps as specified in the one-line diagram for the switchgear configuration required

1. Bushings must be horizontally mounted and accept, molded, separable deadfront connectors. A standoff bracket or parking stand shall be supplied for each bushing and shall be mounted horizontally adjacent to each bushing. The standard phasing of the bushings from left to right shall follow the sequence ABC-CBA. Each bushing shall

have an identification decal affixed to the frontplate identifying its source or tap designation, as shown on the one-line operating diagram, and its phase identification.

2. 600-amp bushings shall be insulated deadbreak type conforming to ANSI/IEEE Std. 386 and ANSI C119.2 with aluminum current carrying parts. The bushings shall be provided without removable studs unless otherwise specified.

3. 200-amp taps shall be furnished with 200-amp loadbreak bushing wells with fixed studs as standard. Bushing wells shall confirm to ANSI/IEEE Std. 386 and ANSI C119.2 and accept bushing inserts conforming to these standards. The 35-kV rated switchgear shall be supplied with 200-amp sources or taps, one-piece, loadbreak, large interface bushings.

4. Bushings shall be externally replaceable and shall not require removal of the tank cover to remove or install replacement bushings.

K. The electronic vacuum interrupter control assembly shall sense load and fault current on each phase of the load tap circuits. The electronic control shall be powered from the current transformers mounted inside the SF6 insulated switch tank. No external power source shall be required for overcurrent protection. The electronic control shall monitor the current on the individual phases of the load tap circuits using input from the internal current transformers. Electronic trip capability shall be selectable for each phase. Temperature range shall be -30°C to +50°C.

1. Minimum trip selection shall be accomplished with selector knobs inside the electronic enclosure. Trip time current characteristics (TCC) shall be field selectable using a dip switch. Maximum time for power up and ready-to-trip when closing on a circuit shall be ten percent of the trip time or 1/2 cycle, whichever is greater. Trip selection may be made with the load taps energized.

L. Enclosures shall be made of 12 gauge type 304 stainless steel and manufactured to ANSI C37.72 and C57.12.28 standards. The enclosure shall be mounted independent of the switch allowing removal for ease of cable installation or future replacement if required. Enclosures shall be tamper-resistant incorporating hinged access doors with pentahead locking bolts and provisions for padlocking. The enclosure shall be provided with lifting provisions and painted with a Munsell 7.0GY3.29/1.5 green finish. The bulk SF6 gas supply and each individual switch shall be tested for moisture content. Each individual switch shall undergo a mechanical operation check and a leak test. The switch shall be factory filled with SF6 and AC hi-pot tested one minute phase-to-phase, phase-to-ground and across the open contacts. Circuit resistance shall be checked on all ways.

M. Switches will be shipped factory filled with SF6 gas. Tank shall be designed to withstand 15 psig internal pressure and an external pressure of 14 psig without affecting the performance of the switch.

N. The following standard components shall be included:

1. Welded steel tank painted light gray with stainless steel and brass fasteners.
2. Lifting provisions.
3. Gas pressure gauge and fill valve.
4. Grounding provisions for switch tank and all cable entrances.
5. Stainless steel three line diagram and corrosion-resistant nameplates.
6. Parking stands.
7. Switch operating handle(s) with padlock provision and end stops.
8. 12 gauge type 304 stainless steel padmount enclosure painted Munsell green with stainless steel hinges and pentahead locking mechanisms.
9. Type 1 vacuum interrupter electronics package including a selector switch for single or 3-phase operation and individual phase trip levels.

O. The following options shall be supplied:

1. Low pressure warning device.
2. SF6 density switch for SCADA or remote indication of dielectric.
3. 4/0 brass ground lug(s).
4. Keylock provisions.
5. Type 2 electronics package including ground fault trip and time delay selector switches (three phase only).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Visually inspect switchgear for evidence of damage.

B. Visually inspect to confirm that all items and accessories are in accordance with specifications and drawings.

C. Verify field measurements are as shown on shop drawings.

3.2 DELIVERY, STORAGE AND HANDLING

A. Storage and handling equipment in accordance with equipment manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL (After Installation)

A. Manufacturer's Field Services: Engage a factory-authorized service representative to inspect field-assembled components, installation, and connection of switchgear; and to pretest and adjust switchgear control components. Report results in writing.

3.4 DEMONSTRATION (After Installation)

A. Engage a factory-authorized service representative to train Owner's maintenance personnel in the following:

1. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.

2. Review data in the maintenance manuals. Refer to Division 1 Section "Contract Closeout."

3. Review data in the maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."

4. Schedule training with Owner with at least seven days' advance notice.

END OF SECTION

SECTION 16414 - MANUAL TRANSFER SWITCH

PART 1 – GENERAL REQUIREMENTS

1.1 SCOPE

A. Contractor shall furnish, deliver, install and test the manual transfer switches as specified herein and in accordance with the drawings.

1.2 QUALITY ASSURANCE

A. Manual transfer switch shall be UL listed and labeled under the UL 1008 standard.

B. Manual transfer switch manufacturer shall provide a complete factory assembled, wired and tested manual transfer switch.

C. Manual transfer switch shall be factory Hi-pot tested for a period of not less than 60 seconds.

D. Manual transfer switch installation shall meet all applicable NEC standards.

1.3 SUBMITTALS

A. Contractor shall submit manufacturer's drawings and data of manual transfer switches for Engineer's approval prior to start of fabrication. Drawings and data shall include, as a minimum, dimensioned general arrangement drawings and wiring diagrams, UL listing information including UL control or file number, component data, mounting provisions, conduit entry locations and installation instructions.

B. Upon installation of manual transfer switches Contractor shall submit manufacturer's Operating & Maintenance Manual which shall include as a minimum:

1. Certified as-built General Arrangement drawings and Wiring Diagram.

2. Materials / Component List including part numbers.

3. Maintenance and service requirements.

4. Certificate of Compliance and hi-pot test data.

1.4 WARRANTY

A. Manual transfer switches shall be covered by manufacturer's warranty for a minimum period of (2) two year after acceptance..

SECTION 2 - PRODUCTS

2.1 GENERAL

A. All equipment shall be new.

B. Manual transfer switch manufacturer must have produced and sold manual transfer switches as a standard product for a minimum of (3) years.

C. Manual transfer switches shall be molded case circuit breaker type; knife switch or fused switches are not acceptable.

D. Contractor shall be responsible for the equipment until it has been installed and is finally inspected, tested and accepted in accordance with the requirements of this Specification.

E. Manual transfer switches shall be StormSwitch as manufactured by ESL Power Systems, Inc. or equal as approved by the Engineer.

2.2 MANUAL TRANSFER SWITCHES

A. Manual transfer switch shall consist of (2) two mechanically-interlocked molded case circuit breakers, cam-style male connectors, power distribution block and grounding terminals, all housed within a padlockable enclosure.

B. Manual transfer switch enclosure shall be Type 3R, constructed of continuous seam-welded, powder coated steel. The main access shall be through an interlocked, hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs shall be via cable entry openings in the bottom of enclosure. A hinged flap door shall be provided to cover the cable openings when cables are not connected; the hinged flap door shall allow cable entry only after the main access door has been opened. Enclosure shall be powder coated after fabrication; color shall be light gray RAL 7038.

C. Cam-style male connectors (inlets) shall be UL Listed single-pole separable type and rated 400 amps at 600VAC. Cam-style male connectors shall be color coded. Cam-style male connectors shall be provided for each phase and for ground, and shall also be provided for neutral if required. Each of the phase cam-style male connectors within the enclosure shall be factory-wired to a molded case circuit breaker. The ground cam-style male connectors shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. The neutral cam-style male connectors, if required, shall be factory wired to a power distribution block. None of the cam-style male connectors shall be accessible unless both molded case circuit breakers are in the "OFF" position and the main access door is open.

D. A power distribution block shall be provided for load-side field wiring. The power distribution block shall be factory wired to the molded case circuit breakers.

E. Molded case circuit breakers shall be UL Listed and the short circuit interrupt rating shall be a minimum of 35kAIC at 480VAC. Trip rating of the molded case circuit breakers shall be as shown on the drawings. One molded case circuit breaker shall be fed from utility power; the other molded case circuit breaker shall be fed from the cam-style male connectors to supply power from a portable generator. Both molded case circuit breakers shall include UL Listed door-mounted operating mechanisms, preventing the opening of the main access door unless both breakers are in the "OFF" position. Both molded case circuit breakers shall be mounted behind a deadfront panel. The load-side of the molded case circuit breakers shall not be energizable unless the main access door is closed and one of the molded case circuit breakers is in the "ON" position. The (2) molded case circuit breakers shall be safety interlocked by mechanical means to ensure that only one breaker can be closed at any given time.

F. Manual transfer switch shall be suitable for use as service equipment in the USA.

SECTION 3 - EXECUTION

3.1 INSTALLATION

A. Prior to installation of manual transfer switches, Contractor shall examine the areas and conditions under which the manual transfer switch is to be installed and notify the Engineer in writing if unsatisfactory conditions exist.

B. Manual transfer switch shall be installed as shown on the drawings and per the manufacturer's written instructions. In addition, the installation shall meet the requirements of local codes, the National Electrical Code and National Electrical Contractors Association's "Standard of Installation".

C. Conduit entry into the manual transfer switch shall be by Contractor; Contractor shall furnish and install listed watertight conduit hubs, as manufactured by MYERS or T&B, for each conduit entry on the manual transfer switch. The incoming hub size shall match the conduit size for feeders and ground as shown on the drawings. The outgoing hub size shall match the conduit size for loads and ground as shown on the drawings. Hubs shall be properly installed and tightened to maintain Type 3R integrity of the manual transfer switch enclosure.

D. Contractor shall terminate feeder conductors, load conductors and ground per the manufacturer's instructions. Use copper wire only for all conductors and grounds. All field wiring terminations shall be torqued as required per the instructions on the manual transfer switch's power distribution block, circuit breaker & ground lug.

3.2 FIELD TESTING

A. Prior to energizing manual transfer switch, the Contractor shall perform the following checks and tests as a minimum:

1. Verify mounting and connections are complete and secure.
2. Verify internal components and wiring are secure.
3. Perform continuity check of all circuits.
4. Perform 1,000 VDC megger test on feeder, load and ground cables.
5. Verify deadfront is secure.
6. With the manual transfer switch deadfront in place and the main access door closed and properly latched, actuate both Operator Mechanisms; verify only (1) breaker at a time can be turned to the "ON" position.
7. Confirm operation of the manual transfer switch ground receptacle by attaching a plug to the manual transfer switch ground receptacle and then verify that the plug is grounded to the facility ground.
8. Once utility power has been applied, confirm operation of manual transfer switch by following directions on main access door.

END OF SECTION

SECTION 16495 – AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

A. It is the intent of this specification to secure transfer switches that has been prototype tested, factory built, production tested and site tested. A transfer switch with the number of poles, voltage and current ratings shown on the plans and specified herein shall be provided. Where indicated on the drawings the switch shall be provided with service entrance rated breaker.

1.3 CODES AND STANDARDS

A. The automatic transfer switch shall conform to the requirements of:

1. UL 1008: Underwriters Laboratories standard for automatic transfer switches
2. CSA: C22.2 No. 178 certified
3. IEC: 947-6-1 certified at 480 VAC
4. NFPA 70: National Electrical Code including use in emergency and standby systems in accordance with Articles 517, 700, 701, 702
5. NFPA 99: Essential electrical systems for health care facilities
6. NFPA 101: Life safety code
7. NFPA 110: Standard for emergency and standby power systems
8. IEEE 241: I.E.E.E. recommended practice for electrical power systems in commercial buildings
9. IEEE 446: I.E.E.E. recommended practice for emergency and standby power systems
10. NEMA ICS10: AC automatic transfer switch equipment
11. UL 50/508: Enclosures
12. ICS 6: Enclosures
13. ANSI C33.76: Enclosures
14. NEMA 250: Enclosures
15. IEEE 472: (ANSI C37.90A): Ringing wave immunity
16. EN55022 (CISPR11): Conducted and radiated emissions (Exceeds EN55011 & MILSTD 461 Class 3)
17. EN61000-4-2: (Level 4): ESD immunity test Class B:

18. EN61000-4-3: (ENV50140): Radiated RF, electromagnetic field immunity
19. EN61000-4-4: Electrical fast transient/burst immunity test
20. EN61000-4-5: IEEE C62.41: Surge immunity test (1.2 x 50□s, 5 & 8 kV)
21. EN61000-4-6: (ENV50141): Conducted immunity test
22. EN61000-4-11: Voltage dips and interruption immunity

1.4 WARRANTY

A. The automatic transfer switch shall be warranted against defective workmanship for a period of two years, including both parts and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. ASCO Series 300.

B. Cummins OTEC.

C. Russelectric

D. Kohler:?

2.2 PERFORMANCE AND CONSTRUCTION

A. The automatic transfer switch shall be of double throw construction operated by a reliable solenoid driven mechanism. There shall be a direct mechanical coupling to facilitate transfer in 6 cycles or less.

B. The normal and emergency contacts shall be mechanically interlocked such that failure of any coil or disarrangement of any part shall not permit a neutral position.

C. For switches installed in systems having ground fault protective devices, and/or wired so as to be designated a separately derived system by the NEC, a 4th pole shall be provided. This additional pole shall isolate the normal and emergency neutrals. The neutral pole shall have the same withstand and operational ratings as the other poles and shall be arranged to break last and make first to minimize neutral switching transients. Add-on or accessory poles that are not of identical construction and withstand capability will not be considered.

D. The contact structure shall consist of a main current carrying contact, which is a silver alloy with a minimum of 50% silver content. The current carrying contacts shall be protected by silver tungsten arcing contacts on all sizes above 400 Amps.

E. The transfer switch manufacturer shall submit test data for each size switch, showing it can withstand fault currents of the magnitude and the duration necessary to maintain the system integrity. Minimum UL listed withstand and close into fault ratings shall be as follows:

Size (Amps)	Coordinated Breaker	Current Limiting Fuse
40 - 225	30,000	200,000
260	35,000	200,000
400 – 600	50,000	200,000
800	65,000	200,000
1000 - 1200	85,000	200,000
1600 - 3000	100,000	200,000

F. A dielectric test at the conclusion of the, withstand and closing tests shall be performed.

G. The automatic transfer switch manufacturer shall certify sufficient arc interrupting capabilities for 50 cycles of operation between a normal and emergency source that are 120 degrees out of phase at 480 volts, 600% of rated current at .50 power factor. This certification is to ensure that there will be no current flow between the two isolated sources during switching.

H. All relays shall be continuous duty industrial type with wiping contacts. Coils, relays, timers and accessories shall be readily front accessible. The control panel and power section shall be interconnected with a harness and keyed disconnect plugs for maintenance.

I. Main and arcing contacts shall be visible without major disassembly to facilitate inspection and maintenance.

J. A manual handle shall be provided for maintenance purposes with the switch de-energized. An operator disconnect switch shall be provided to defeat automatic operation during maintenance, inspection or manual operation.

K. Switches composed of molded case breakers, lighting contactors or components thereof will not be acceptable.

L. The current rating shall be a continuous rating when the switch is installed in an enclosure, and shall conform to NEMA temperature rise standards.

M. The unit shall be rated based on all classes of loads, i.e., resistive, tungsten, ballast and inductive loads. Switches rated 400 amperes or less shall be UL listed for 100% tungsten lamp load.

N. Temperature rise tests in accordance with UL 1008 shall have been conducted after the overload and endurance tests to confirm the ability of the units to carry their rated currents within the allowable temperature limits.

O. The switch shall be mounted in a Nema enclosure suitable for environment it is located in.

2.3 CONTROL

A. The control panel shall be opto-isolated from electrical noise and provided with the following inherent control functions and capabilities:
   1. Easy-to-view 4 x 20 LCD display with long lasting LED indicators.
   2. Control panel shall display voltage and frequency of both sources.
   3. The user shall be able to view the last 16 recorded events.
   4. Capability for external communication and network interface.

5. Adjustments to all settings shall be made from the front of the panel without opening the door.

B. The transfer switch shall be equipped with a microprocessor based control panel. The control panel shall perform the operational and display functions of the transfer switch. The display functions of the control panel shall include ATS position, source availability, sequence indication and diagnostics.

C. All programmable and control functions shall be pass code protected and accessible through the keypad.

D. The control panel shall be provided with a simple user interface for transfer switch monitoring, control and field changeable functions and settings.

E. Touch pad test switch with Fast Test/Load/No Load selection capability to simulate a normal source failure.

F. The controller shall provide digital timer adjustments with 1-second resolution. Voltage and Frequency shall be adjustable to 1% resolution to facilitate accurate transfer.

G. To ensure reliable and consistent user operation the controls must be equipped with nonvolatile memory and allow automatic daylight savings time adjustment.

2.4 FACTORY TESTS

A. The transfer switch manufacturer shall perform a complete functional test on the switch, controller and accessories prior to shipping from the factory. A certified test report shall be available upon request.

2.5 SEQUENCE OF OPERATION

A. The ATS shall incorporate adjustable three phase under voltage sensing on the normal source.

B. When the voltage of any phase of the normal source is reduced to 80% (adjustable) of nominal voltage, for a period of 0-10 seconds (programmable) a pilot contact shall close to initiate starting of the engine generator.

C. The ATS shall incorporate adjustable under voltage and under frequency sensing on the emergency source.

D. When the emergency source has reached a voltage value of 90% of nominal and achieved frequency within 95% of the rated value, the load shall be transferred to the emergency source after a programmable time delay.

E. When the normal source has been restored to not less than 90% of rated voltage on all phases, the load shall be retransferred to the normal source after a time delay of 0 to 60 minutes (programmable). The generator shall run unloaded for 5 minutes (programmable) and then automatically shut down. The generator shall be ready for automatic operation upon the next failure of the normal source.

F. If the engine generator should fail while carrying the load, retransfer to the normal source shall be made instantaneously upon restoration of proper voltage (90%) on the normal source.

2.6 STANDARD ACCESSORIES

A. Adjustable time delay to override momentary normal source failure prior to engine start. Field programmable 0-10 second's factory set at 3 seconds.

B. Adjustable time delay on retransfer to normal source, programmable 0-60 minutes factory set at 30 minutes. If the emergency source fails during the retransfer time delay, the transfer switch controls shall automatically bypass the time delay and immediately retransfer to the normal position.

C. A time delay on transfer to emergency, programmable 0-5 minutes, factory set at 1 second.

D. An in-phase monitor shall be provided. The monitor shall compare the phase angle difference between the normal and emergency sources and be programmed to anticipate the zero crossing point to minimize switching transients.

E. An exerciser timer with momentary test pushbutton shall be incorporated within the microprocessor and shall be capable of starting the engine generator set and transferring the load (when selected) for exercise purposes on a daily, weekly or monthly basis. The exerciser shall contain a battery for memory retention during an outage.

F. Provide a momentary pushbutton to bypass the time delays on transfer and retransfer and programmable commit/no commit control logic.

G. The controller shall accept a remote peak shave or test input to signal the transfer switch to the emergency position.

H. A set of customer contacts shall be provided to indicate both emergency and normal source position.

I. The following optional Exerciser Package shall be included**:**
   1. Additional Auxiliary Contact (A3) - Closed when the transfer switch is in Source 2 position.
   2. Additional Auxiliary Contact (A4) - Closed when the transfer switch is in Source 1 position.
   3. Programmable Clock Exerciser (CDP) – This will replace the timer exerciser and allow for a 365 day cycle.
   4. Voltage Imbalance Monitor (VI) - Three Phase sensing shall detect an imbalance and initiate a transfer to the alternate source. Adjustable 5-20% of nominal with a time delay of 10-30 seconds for nuisance conditions.

J. The following additional accessories shall be included:
   1. Universal Motor Load Disconnect (UMD) - Auxiliary contacts opens 0 – 5 minutes prior to transfer in either direction, re-closes after transfer. Can be configured for pre-transfer, post transfer or both.
   2. Sequential Universal Motor Load Disconnect (A62) – Multiple auxiliary contacts open prior to transfer in either direction, re-closes after transfer. Can be configured for pre-transfer, post transfer or both.
   3. Communications interface card (ZNETM) – RS-485 Modbus
   4. Test Switch (6A) - Maintained

5. Digital Meter (M80) - Measures and displays true RMS volts, amps and frequency in a three-phase power system.
6. Digital Meter (M83) – Includes M82 functions plus THD capability and Modbus RS485 port
7. Additional Auxiliary Contacts (A3) - Closed when the transfer switch is in Source 2 position.
8. Additional Auxiliary Contacts (A4) - Closed when the transfer switch is in Source 1 position.
9. Alarm panel (CTAP) – Alarm on transfer to emergency w/silence button & light
10. Disconnect Switch (DS) - Inhibits transfer in either direction when in inhibit. (Std on 800A and above)
11. Extended warranty (ATGEW) - annual parts and labor warranty (1-4 years for a total of 5 years max.)
12. Protective Cover (OCVR) - Lockable see-through microprocessor and meters cover for NEMA 3R or 12.

PART 3 - EXECUTION

3.1 GENERAL

A. The transfer switches shall be installed as shown on the plans, in accordance with the manufacture's recommendations and all applicable codes.

B. Transfer to generator shall be staggered in steps. Transfer switch ATS-AB shall transfer first, ATS-BB shall transfer three minutes after ATS-AB and ATS-SC shall transfer three minutes after ATS-BB.

3.2 SERVICE

A. The manufacturer shall maintain a national service organization that is factory trained and certified for transfer switch equipment. In addition, the service organization shall be available 24 hours per day, 365 days per year.

END OF SECTION

SECTION 16612 - ENGINE GENERATORS (200 KW HARRINGTON HALL)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged engine-generator sets for standby power supply with the following features:

1. Diesel engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Outdoor enclosure.

B. References and Standards

The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards below:

- CSA C22.2 No14
- CSA 282
- CSA 100
- EN61000-6
- EN55011
- FCC Part 15 Subpart B
- ISO8528
- IEC61000
- UL508
- UL2200
- UL142
- Designed to allow for installed compliance to NFPA 70, NFPA99 and NFPA 110

C. Related Sections include the following:

1. Division 16496 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.
2. Division 03 - Concrete

1.3 WORK INCLUDED

A. Installation: The work includes supplying and installing a complete integrated generator system. The system consists of a diesel generator set with related component accessories and automatic transfer switch specified under a separate section.

B. Fuel System: The CONTRACTOR shall provide a full tank of diesel fuel for the completion of all testing. Once testing is complete contractor shall provide a full tank of diesel fuel.

C. System Test: A complete system load test shall be performed after all equipment is installed. Guidelines in the Start-up Section.

D. Requirements, Codes and Regulations: The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.4 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.
5. Concrete pad recommendation, layout and stub-up locations.

C. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For manufacturer and testing agency.

E. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles (321 km) of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B15.1.

F. Comply with NFPA 37.

G. Comply with NFPA 70.

H. Comply with NFPA 99.

I. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

J. Comply with UL 2200.

K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to [1000 feet (300 m)].

B. Unusual Service Conditions: Engine-generator equipment and installation are required to operate under the following conditions:

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: The engine and generator shall be a product of an ISO 9001 certified manufacturer. The design is based on a Cummins Power Generation engine/generator set (Model DSGAE). Any changes to the design based on other manufacturers will be the responsibility of the installing contractor at no additional cost to the owner. The naming of a specific manufacturer does not waive any requirements or performance of individual components described in the specification.

D. Acceptable Manufacturers:

1. Caterpillar; Engine Div.
2. Cummins Power Generation
3. Onan Corp. Division of McGraw Edison Co.

2.2 ENGINE-GENERATOR SET

A. General Specifications: The synchronous three phase generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling. The excitation system shall be of brushless construction and be independent of main stator windings. A permanent magnet (PMG) type generator shall be furnished. .

B. Digital Voltage Regulator: The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output voltage random variation within +/- .5% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode.

C. Motor Starting: Alternator shall be capable of accepting maximum (920) kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.

D. Circuit Breaker Specifications: Provide a generator mounted 80% rated circuit breaker, molded case with solid state trip as sown on drawings.

E. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

F. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

   a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

    a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Generator Requirements: The generator set shall be Standby Duty rated at 200ekW, 250kVA, 1800 RPM, 0.8 power factor, 208 V, 3-Phase, 3 wire Wye, 60 hertz, including radiator fan and all parasitic loads. Generator set shall be sized to operate at the specified load at a maximum ambient of 40ºC (104°F) and altitude 2500m (8200 ft).

B. Material and Parts: All materials and parts comprising the unit shall be new and unused.

The engine shall be diesel fueled, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The generator set shall be EPA factory certified for stationary emergency use and comply with all state and local Codes / Ordinances at the time of installation and commissioning. This shall include, but not be limited to, engine exhaust emissions and sound emissions.

C. Rated Engine Speed: 1800 rpm.

D. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

E. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

F. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

G. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

H. Governor: Adjustable isochronous, with speed sensing. Overspeed shutdown control for protection against overspeeding, control shall be solid state type and product of the engine manufacturer.

I. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

J. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

K. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

L. Starting System: 12 or 24-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.

4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation.
7. Thermostatically controlled heater: arrange to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article.
8. Include accessories required to support and fasten batteries in place.
9. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
10. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for 24 hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.
5. Mechanical reading fuel gauge.
6. Low fuel level alarm contact.

7. Fuel tank rupture alarm contact.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Indicating and Protective Devices and Controls:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Start-stop switch.
11. Overspeed shutdown device.
12. Coolant high-temperature shutdown device.
13. Coolant low-level shutdown device.
14. Oil low-pressure shutdown device.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil, low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil, low-pressure prealarm.
7. Fuel tank, low-fuel level.
8. Low coolant level.

G. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

H. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. The alternator shall be provided with an overcurrent protection relay that is UL-listed under category NRGU. The overcurrent protection system shall be coordinated with the thermal damage curve of the specific alternator provided. Submit thermal damage curve for alternator and protection curve (and settings if applicable) for the overcurrent protective system.

B. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 80 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Mounting: Adjacent to or integrated with control and monitoring panel.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H

D. Temperature Rise: 105ºC / Class H environment

E. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

G. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.

H. Enclosure: Dripproof.

I. Instrument Transformers: Mounted within generator enclosure.

J. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

K. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

L. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

M. Subtransient Reactance: 15 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: A weatherproof, sound attenuated aluminum non-walk in type enclosure shall be provided to house the engine/generator and accessories. There shall be clearance around electrical equipment in compliance with the NEC, and the NFPA. The enclosure shall be manufactured by the engine generator manufacturer or an approved equal and conform to the following design criteria:

1. Wind rating shall be 150 mph

2. Louvers: Equipped with bird screen to permit air circulation when engine is not running while excluding birds and rodents

3. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.

4. Exhaust System: Muffler Location: Within enclosure.

5. Hardware: All hardware and hinges shall be stainless steel.

6. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.

7. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water

8. Inlet ducts shall include rain hoods

9. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 50 deg C.

   a. Louvers: Fixed-engine, cooling-air inlet and discharge.

10. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of (72) dBA measured at any location 7 m from the engine generator in a free field environment.

11. Provide steel access platforms with stairs.

2.9 VIBRATION ISOLATION DEVICES

A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolators integral to the generator, unless the engine manufacturer requires use of spring isolation.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

   1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect engine exhaust pipe to engine with flexible connector.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

A. Identify system components according to Division 26 Section "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
2. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

3. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
4. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.

5. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
6. Exhaust Emissions Test: Comply with applicable government test criteria.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
9. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four (4) locations on the property line, and compare measured levels with required values.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and retest as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

3.7 OPERATION AND MAINTENANCE MANUALS

A. Provide two (2) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

END OF SECTION

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FOR DUPLEX PRINTING PURPOSES

SECTION 16614 - ENGINE GENERATORS (300 kW STEDMAN)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged engine-generator sets for standby power supply with the following features:

1. Diesel engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Outdoor enclosure.

B. References and Standards

The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards below:

- CSA C22.2 No14
- CSA 282
- CSA 100
- EN61000-6
- EN55011
- FCC Part 15 Subpart B
- ISO8528
- IEC61000
- UL508
- UL2200
- UL142
- Designed to allow for installed compliance to NFPA 70, NFPA99 and NFPA 110

C. Related Sections include the following:

1. Division 16495 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.Division 16461 Section "Manual Transfer Switches"
2. Division 03 - Concrete

1.3 WORK INCLUDED

A. Installation: The work includes supplying and installing a complete integrated generator system. The system consists of a diesel generator set with related component accessories and automatic transfer switch specified under a separate section.

B. Fuel System: The CONTRACTOR shall provide a full tank of diesel fuel for the completion of all testing. Fuel will meet all State Requirements. Once testing is complete contractor shall provide a full tank of diesel fuel.

C. System Test: A complete system load test shall be performed after all equipment is installed. Guidelines in the Start-up Section.

D. Requirements, Codes and Regulations: The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.4 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.
5. Concrete pad recommendation, layout and stub-up locations.

C. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For manufacturer and testing agency.

E. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
8. Provide documentation required by local authorities.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.

2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles (321 km) of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B15.1.

F. Comply with NFPA 37.

G. Comply with NFPA 70.

H. Comply with NFPA 99.

I. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

J. Comply with UL 2200.

K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to [1000 feet (300 m)].

B. Unusual Service Conditions: Engine-generator equipment and installation are required to operate under the following conditions:

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: The engine and generator shall be a product of an ISO 9001 certified manufacturer. The design is based on a Cummins Power Generation engine/generator set (Model DQDAC). Any changes to the design based on other manufacturers will be the responsibility of the installing contractor at no additional cost to the owner. The naming of a specific manufacturer does not waive any requirements or performance of individual components described in the specification.

D. Acceptable Manufacturers:

1. Caterpillar; Engine Div.
2. Cummins Power Generation
3. Onan Corp. Division of McGraw Edison Co.

2.2 ENGINE-GENERATOR SET

A. General Specifications: The synchronous three phase generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling. The excitation system shall be of brushless construction and be independent of main stator windings. A permanent magnet (PMG) type generator shall be furnished. .

B. Digital Voltage Regulator: The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output voltage random variation within +/- .5% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode.

C. Motor Starting: Alternator shall be capable of accepting maximum (1372) kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.

D. Circuit Breaker Specifications: Provide a generator mounted 80% rated circuit breaker, molded case with solid state trip as sown on drawings.

E. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

F. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

   a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

    a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Generator Requirements: The generator set shall be Standby Duty rated at 300ekW, 375kVA, 1800 RPM, 0.8 power factor, 208 V, 3-Phase, 4 wire Wye, 60 hertz, including radiator fan and all parasitic loads. Generator set shall be sized to operate at the specified load at a maximum ambient of 40ºC (104°F) and altitude 549m (1800 ft).

B. Material and Parts: All materials and parts comprising the unit shall be new and unused.

The engine shall be diesel fueled, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The generator set shall be EPA factory certified for stationary emergency use and comply with all state and local Codes / Ordinances at the time of installation and commissioning. This shall include, but not be limited to, engine exhaust emissions and sound emissions.

C. Rated Engine Speed: 1800 rpm.

D. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

E. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

F. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

G. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

H. Governor: Adjustable isochronous, with speed sensing. Overspeed shutdown control for protection against overspeeding, control shall be solid state type and product of the engine manufacturer.

I. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

J. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

K. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

L. Starting System: 12 or 24-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.

4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation.
7. Thermostatically controlled heater: arrange to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article.
8. Include accessories required to support and fasten batteries in place.
9. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
10. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for 24 hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.
5. Mechanical reading fuel gauge.
6. Low fuel level alarm contact.

7. Fuel tank rupture alarm contact.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Indicating and Protective Devices and Controls:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Start-stop switch.
11. Over-speed shutdown device.
12. Coolant high-temperature shutdown device.
13. Coolant low-level shutdown device.
14. Oil low-pressure shutdown device.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil, low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil, low-pressure prealarm.
7. Fuel tank, low-fuel level.
8. Low coolant level.

G. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

H. Remote Emergency-Stop Switch: Flush; unit mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. The alternator shall be provided with an overcurrent protection relay that is UL-listed under category NRGU. The overcurrent protection system shall be coordinated with the thermal damage curve of the specific alternator provided. Submit thermal damage curve for alternator and protection curve (and settings if applicable) for the overcurrent protective system.

B. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 80 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Mounting: Adjacent to or integrated with control and monitoring panel.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H

D. Temperature Rise: 105ºC / Class H environment

E. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

G. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.

H. Enclosure: Dripproof.

I. Instrument Transformers: Mounted within generator enclosure.

J. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

K. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

L. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

M. Subtransient Reactance: 15 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: A weatherproof, sound attenuated aluminum non-walk in type enclosure shall be provided to house the engine/generator and accessories. There shall be clearance around electrical equipment in compliance with the NEC, and the NFPA. The enclosure shall be manufactured by the engine generator manufacturer or an approved equal and conform to the following design criteria:

1. Wind rating shall be 150 mph

2. Louvers: Equipped with bird screen to permit air circulation when engine is not running while excluding birds and rodents

3. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.

4. Exhaust System: Muffler Location: Within enclosure.

5. Hardware: All hardware and hinges shall be stainless steel.

6. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.

7. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water

8. Inlet ducts shall include rain hoods

9. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 50 deg C.

   a. Louvers: Fixed-engine, cooling-air inlet and discharge.

10. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of (75) dBA measured at any location 7 m from the engine generator in a free field environment.

11. Provide steel access platforms with stairs.

2.9 VIBRATION ISOLATION DEVICES

A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolators integral to the generator, unless the engine manufacturer requires use of spring isolation.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Shop drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect engine exhaust pipe to engine with flexible connector.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

A. Identify system components according to Division 26 Section "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
2. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

3. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
4. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
5. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
6. Exhaust Emissions Test: Comply with applicable government test criteria.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.

9. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four (4) locations on the property line, and compare measured levels with required values.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and retest as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

3.7 OPERATION AND MAINTENANCE MANUALS

A. Provide two (2) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

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FOR DUPLEX PRINTING PURPOSES

SECTION 16992 – SHORT-CIRCUIT/COORDINATION STUDY/ARC FLASH HAZARD ANALYSIS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 01 Specification Sections, shall apply to this Section of the Specifications.

1.2 WORK INCLUDES

A. This section includes providing a short-circuit/coordination study/arc fault analysis in connection with the new distribution equipment and reconfigured feeders.

1.3 RELATED WORK

A. Applicable requirements of other Sections of Division 16 shall apply to this Section.

1.4 QUALITY ASSURANCE

A. The short-circuit and protective device coordination studies shall be submitted to the prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the studies may cause delay in equipment manufacturing, approval from the engineer may be obtained for preliminary submittal of sufficient study data to ensure that the selection of device and characteristics will be satisfactory.

B. The results of the short-circuit; protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. No more than five (5) bound copies of the complete final report shall be submitted. Additional copies of the short-circuit input and output data, where required, shall be provided on CD in PDF format.

C. The report shall include the following sections:
1. Executive Summary.
2. Descriptions, purpose, basis and scope of the study.
3. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties.
4. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip unit settings, fuse selection.
5. Fault current calculations including a definition of terms and guide for interpretation of the computer printout.
6. Details of the incident energy and flash protection boundary calculations.
7. Recommendations for system improvements, where needed.
8. One-line diagram.

1.5 QUALIFICATIONS

A. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the supervision and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B. The Registered Professional Electrical Engineer shall be a full-time employee of the equipment manufacturer or an approved engineering firm.

C. The Contractor shall furnish an Arc Flash Hazard Analysis Study per the requirements set forth in NFPA 70E - Standard for Electrical Safety in the Workplace. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA 70E, Annex D.

1.6 DATA COLLECTION

A. The Contractor shall furnish all data as necessary and required for the power system studies. The Engineer performing the short-circuit; protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Source combination may include present and future motors and generators.

C. Load data utilized may include proposed loads obtained from Contract Documents or as requested from the Engineer/Owner.

D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

E. Available short circuit current padmount transformer shall be considered as an infinite bus.

1.7 SHORT-CIRCUIT AND PROTECTIVE DEVICE EVALUATION STUDY

A. Use actual conductor impedances if known. If unknown, use typical conductor impedances based on IEEE 141.

B. Transformer design impedances shall be used when test impedances are not available.

C. Provide the following information within the Study:
   1. Calculation methods and assumptions
   2. Selected base per unit quantities
   3. One-line diagram of the system being evaluated
   4. Source impedance data, including Base utility system and motor fault contribution characteristics
   5. Tabulations of calculated quantities
   6. Results, conclusions, and recommendations.

D. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each:

1. Base utility's supply termination point
2. Incoming switchboard
3. Distribution switchboards
4. Standby generators and automatic transfer switches
5. Branch circuit panelboards
6. UPS system
7. Other significant locations throughout the system.

E. For grounded systems, provide a bolted line-to-ground fault current study for areas as defined for the three-phase bolted fault short-circuit study.

1.8 PROTECTIVE DEVICE EVALUATION

A. Evaluate equipment and protective devices and compare to short circuit ratings.

B. Adequacy of switchboards and panelboard bus bars to withstand short-circuit stresses

C. Notify Engineer/Owner in writing, of existing, circuit protective devices improperly rated for the calculated available fault current.

1.9 PROTECTIVE DEVICE COORDINATION STUDY

A. Proposed protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B. Include on each TCC graph, a complete title and one-line diagram with legend identifying the specific portion of the system covered.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Plot the following characteristics on the TCC graphs, where applicable:

1. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
2. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands.
3. Transformer full-load current, magnetizing inrush current and ANSI through-fault protection curves.
4. Conductor damage curves.
5. Ground fault protective devices, as applicable.
6. Pertinent motor starting characteristics and motor damage points, where applicable.

7. Pertinent generator short-circuit decrement curve and generator damage point.
8. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

1.10 ARC FLASH HAZARD ANALYSIS

A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA 70E, Annex D.

B. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (switchboards and panelboards, where work could be performed on energized parts.

C. The Arc-Flash Hazard Analysis shall include all significant locations in 240 volt and 208 volt systems fed from transformers equal to or greater than 125 kVA where work could be performed on energized parts.

D. Safe working distances shall be based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm2.

E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations.

F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for all normal and emergency operating conditions. The minimum calculation will assume that the Base Utility contribution is at a minimum and will assume a minimum motor contribution (all motors off). Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume the maximum amount of motors to be operating. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable.

G. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators should be decremented as follows:
1. Fault contribution from induction motors should not be considered beyond 3-5 cycles.
2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g. contributions from permanent magnet generators will typically decay from 10 per unit to 3 per unit after 10 cycles).

H. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.

I. Miscoordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.

J. Arc Flash calculations shall be based on actual overcurrent protective device clearing time.

K. Maximum clearing time will be capped at 2 seconds based on IEEE 1584 Section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

1.11 REPORT SECTIONS

A. Input data as required shall include, but not be limited to the following:

1. Feeder input data including feeder type (cable or bus), size, length, number per phase, conduit type (magnetic or non-magnetic) and conductor material (copper or aluminum).
2. Transformer input data, including winding connections, secondary neutral-ground connection, primary and secondary voltage ratings, kVA rating, impedance, % taps and phase shift.
3. Reactor data, including voltage rating, and impedance.
4. Generation contribution data, (synchronous generators (where applicable) and Utility), including short-circuit reactance (X"d), rated MVA, rated voltage, three-phase and single line-ground contribution (for Utility sources) and XlR ratio.
5. Motor contribution data (induction motors and synchronous motors), including shortcircuit reactance, rated horsepower or kVA, rated voltage, and XlR ratio.

B. Short-Circuit Output Data shall include, but not be limited to the following reports:
1. Low Voltage Fault Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:
   a. Voltage
   b. Calculated fault current magnitude and angle
   c. Fault point XlR ratio
   d. Equivalent impedance
2. Momentary Duty Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:
   a. Voltage
   b. Calculated symmetrical fault current magnitude and angle
   c. Fault point XlR ratio
   d. Calculated asymmetrical fault currents
      1) Based on fault point XlR ratio
      2) Based on calculated symmetrical value multiplied by 1.6
      3) Based on calculated symmetrical value multiplied by 2.7

e. Equivalent impedance

C. Interrupting Duty Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:

1. Voltage
2. Calculated symmetrical fault current magnitude and angle
3. Fault point XlR ratio
4. No AC Decrement (NACD) Ratio
5. Equivalent impedance
6. Multiplying factors for 2, 3, 5 and 8 cycle circuit breakers rated on a symmetrical basis

D. Multiplying factors for 2, 3, 5 and 8 cycle circuit breakers rated on a total basis Recommended Protective Device Settings:

1. Phase and Ground Relays:

   a. Current transformer ratio
   b. Current setting
   c. Time setting
   d. Instantaneous setting
   e. Recommendations on improved relaying systems, if applicable.

2. Circuit Breakers:

   a. Adjustable pickups and time delays (long time, short time, ground)
   b. Adjustable time-current characteristic
   c. Adjustable instantaneous pickup
   d. Recommendations on improved trip systems, if applicable.

E. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude
2. Protective device clearing time
3. Duration of arc
4. Arc flash boundary
5. Working distance
6. Incident energy
7. Hazard Risk Category
8. Recommendations for arc flash energy reduction

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FIELD ADJUSTMENT

A. Adjust relay and protective device settings according to the recommended settings table provided by the coordination study. Field adjustments to be completed by the engineering service division of the equipment manufacturer.

B. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C. Notify the Engineer/Owner in writing of any required major equipment modifications.

3.2 ARC FLASH WARNING LABELS

A. The Arc Flash Hazard Analysis shall provide a 3.5 in. x 5 in. thermal transfer type label of high adhesion polyester for each work location analyzed.

B. All labels will be based on recommended overcurrent device settings and will be provided after the results of the analysis have been presented to the Contracting Officer and after any system changes, upgrades or modifications have been incorporated in the system.

C. The label shall include the following information, at a minimum:

1. Location designation
2. Nominal voltage
3. Flash protection boundary
4. Hazard risk category
5. Incident energy
6. Working distance
7. Engineering report number, revision number and issue date.

D. Labels shall be machine printed, with no field markings.

E. Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings.

1. For each 480 and applicable 208 volt panelboard, one arc flash label shall be provided.
2. For each low voltage switchboard, one arc flash label shall be provided.
3. For each switchgear, one flash label shall be provided.

F. Labels shall be field installed by the engineering service division of the equipment manufacturer under Section 26 08 00 APPARATUS INSPECTION AND TESTING.

3.3 ARC FLASH TRAINING

A. The manufacturer which prepared the Arc Flash Hazard Analysis shall train the owner's qualified electrical personnel of the potential arc flash hazards associated with working on energized equipment (minimum of 4 hours). The training shall be certified for continuing education units (CEUs) by the International Association for Continuing Education Training (lACET) or equivalent.

END OF SECTION

SECTION 16998 - ELECTRICAL ACCEPTANCE TESTS

PART 1 - GENERAL

3.1 RELATED DOCUMENTS

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

3.2 WORK INCLUDED

A. Provide the services of a recognized independent testing firm to perform short-circuit coordination studies, and acceptance testing.

B. The testing firm shall provide all material, equipment, labor, and technical supervision to perform such studies, tests and inspections.

C. It is the purpose of these specifications to assure that all tested electrical equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.

D. The tests and inspections shall determine suitability of electrical equipment and wiring for energization and proper operation.

E. The short circuit and coordination studies as specified ion Section 16992 shall determine proper equipment ratings and protective device settings to be implemented and set by the testing firm. Short circuit and coordination studies shall be submitted and approved prior to distribution equipment submittals to assure properly protected equipment is provided.

3.3 RELATED WORK

A. Applicable requirements to other Sections of Division 16 shall apply to this Section.

3.4 REFERENCES

A. Inspection and tests shall be in accordance with the latest edition of the InterNational Electrical Testing Association (NETA) "Acceptance Testing Specification (ATS-1995) for Electrical Power Distribution Equipment and Systems."

B. Studies, inspections and field tests shall be in accordance with the latest edition of the following codes, standards, and specifications, including but not limited to, Standards and Specifications described in NETA ATS 1995.
   1. American National Standards Institute – ANSI.
   2. American Society for Testing and Materials – ASTM.
   3. Association of Edison Illuminating Companies – AEIC.
   4. Canadian Standards Association – CSA.

5. Institute of Electrical and Electronic Engineers – IEEE.
6. Insulated Cable Engineers Association – ICEA.
7. National Electrical Manufacturer's Association – NEMA.
8. National Fire Protection Association – NFPA.
9. Occupational Safety and Health Administration – OSHA.
10. State and local codes and ordinances.
11. Underwriters Laboratory – UL.

3.5 SUBMITTALS

A. Provide the following documentation:
   1. Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS or similar testing program.
   2. Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician and specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.
   3. Short Circuit, Equipment Evaluation, Protective Device Coordination Study.
   4. Submit acceptance test and inspections procedures. Submit test procedure and sample reports for each item of equipment to be field tested at least 14 days prior to planned testing date. Do not perform testing until after test procedure has been approved.
   5. Acceptance Tests and Inspections: Submit certified copies of inspection reports and test reports.
   6. Final Report including all studies and tests in a comprehensive report after testing, acceptance and energization of the system is completed.
   7. Reports shall include certification of compliance with specified requirements, identify deficiencies, and recommend corrective action when appropriate. Type and neatly bind test reports to form a part of the final record. Submit test reports documenting the results of each test not more than 10 days after test is completed.

3.6 QUALIFICATIONS OF TESTING FIRM

A. The testing firm shall be an independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm.

B. The testing firm shall meet the criteria for Full Membership or be a Full Member company of the International Electrical Testing Association (NETA) or similar testing organization.

C. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.

D. The lead, on site, technical person shall be currently certified by the international Electrical Testing Association (NETA) or the National Institute for Certification in Engineering Technologies (NICET) in electrical power distribution system testing.

E. The testing firm shall utilize technicians who are regularly employed by the firm for testing services.

F. The testing firm shall submit proof of the above qualifications with submittal documents when requested.

3.7 DIVISION OF RESPONSIBILITY

A. The contractor shall perform routine insulation-resistance, continuity, and rotation tests for all distribution and utilization equipment prior to and in addition to tests performed by the testing firm.

B. The contractor/owner shall supply a suitable and stable source of electrical power to each test site. The testing firm shall specify the specific power requirements.

C. The contractor/owner shall notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.

D. The testing firm shall perform a short-circuit analysis, coordination study and a protective device setting sheets. The contractor shall provide a complete set of electrical plans, specifications, and any pertinent change orders to the testing firm prior to commencement of testing.

E. The testing firm shall notify the Owner a minimum of two weeks in advance to commencement of any testing.

F. Any system, material, or workmanship which is found defective on the basis of acceptance tests shall be reported.

G. The testing firm shall maintain a written record of all tests and shall assemble and certify a final test report.

H. Safety and Precautions
1. Safety practices should include, but are not limited to, the following requirements:
   a. Occupational Safety and Health Act.
   b. Accident Prevention Manual for Industrial Operations, National Safety Council.
   c. Applicable state and local safety operating procedures.
   d. Owner's safety practices.
   e. ANSI/NFPA 70E, Electrical Safety Requirements for Employee Workplaces.
   f. American National Standards for Personnel Protection: Lockout/Tagout.

   g. All tests shall be performed with apparatus de-energized except where otherwise specifically required.
   h. The testing organization shall have a designated safety representative on the project to supervise operations with respect to safety.

PART 2 - PRODUCTS (Not Used)

3.1

PART 3 - EXECUTION

3.1 ACCEPTANCE TESTS AND INSPECTIONS

A. Testing organization shall perform acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with NETA ATS, and the manufacturer's recommendations. Equipment shall be placed in service only after completion of required tests and evaluation of the test results has been completed. Contractor shall supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. The Owner shall be notified at least 14 days advance of when tests will be conducted by the testing organization. Perform acceptance tests and inspections on applicable equipment and systems specified in the following sections:

1. Section 16100 – Basic Materials and Methods for panelboards and grounding.
2. Section 16426 – Modifications to the Main Switchboard
3. Section 16415 – Automatic Transfer Switch

3.2 SYSTEM ACCEPTANCE

A. Final acceptance of the system is contingent upon satisfactory completion of acceptance tests and inspections.

3.3 PLACING EQUIPMENT IN SERVICE

A. A representative of the approved testing organization shall be present when equipment tested by the organization is initially energized and placed in service.

END OF SECTION