

**TOMBALL INDEPENDENT SCHOOL DISTRICT
RFP-CSP #1004-26 – TOMBALL CREEKSIDE PARK JH AND TOMBALL MEMORIAL HS
ATHLETIC IMPROVEMENTS**

**ISSUED: September 8, 2026
REQUEST FOR COMPETITIVE SEALED PROPOSALS FOR
TOMBALL CREEKSIDE PARK JH AND TOMBALL MEMORIAL HS ATHLETIC
IMPROVEMENTS**

Addendum No. 06

October 13, 2026

Questions and Clarifications to the RFP Document:

1. *Question:* Addressing clarifications to the RFP Bid Form
Response: See attached pages 20 and 21.

Questions and Clarifications to the Drawings:

1. *Question:* Addressing revisions/modifications to drawings
Response: See attached

Questions and Clarifications to the Specifications:

1. *Question:* Addressing clarifications to the Specifications
Response: See attached

General Questions and Clarifications:

1. *Question:* None at this time
Response:

End of Addendum

Submit with Part 1

Company Name:_____

1. **Contract Time:** The undersigned agrees that, if the proposal is accepted, the Date of Commencement shall be established in a "Notice to Proceed" from the Owner and to obtain Substantial Completion of all work not later than July 30, 2027, subject to extensions of time as described in the Contract Documents.
2. **Construction Permit:** The undersigned acknowledges that the bid or proposal has been submitted with the understanding that the time from submission of the bid, or proposal until a building permit will be released is estimated as **90 calendar days**. The owner may issue a notice to proceed prior to the date when a building permit is released and the contractor shall commence all activities on the project for which a building permit is not required, such as project submittals, site mobilization, subcontractor buyout, and similar activities.
3. **Addenda:** The undersigned acknowledges receipt of:

Addenda 1 dated --/--/----

Addenda 2 dated --/--/----

Addenda 3 dated --/--/----

Addenda 4 dated --/--/----

Addenda 5 dated --/--/----

4. **Base Proposal:** The undersigned agrees to perform the complete Work of this Project, for the lump sum price of (The Base Proposal includes all allowances listed in Section 01 21 00):

- a. Creekside Park JH Athletic Improvements:

_____Dollars

(Amount written in words governs)

\$_____ (Amount in figures)

- b. Tomball Memorial HS Athletic Improvements:

_____Dollars

(Amount written in words governs)

\$_____ (Amount in figures)

Submit with Part 1

Company Name:_____

- c. Total Base Bid Proposal (The Total Base Proposal includes all allowances listed in Section 01 21 00):

_____Dollars

(Amount written in words governs)

\$_____ (Amount in figures)

Company:_____

Address:_____

City

ST

Zip

Telephone:_____ Fax:_____ Email:_____

Printed Name/Title:_____ Signature:_____

State whether firm is a: ☐ Corporation ☐ Partnership ☐ Individual

ADDENDUM NO. 6
TO THE
DRAWINGS AND PROJECT MANUAL
FOR
**TOMBALL ATHLETIC IMPROVEMENTS
TOMBALL ISD
TOMBALL, TEXAS**



10/13/2026

VLK
20445 State Highway 249, Suite 350
Houston, TX 77070
281.671.2300
vlkarchitects.com

6.1 GENERAL

- A. This addendum modifies the drawings and project manual, dated September 14, 2026, as noted within and shall become part of the Contract Documents.
- B. Each holder of proposal documents registered with the Program Manager will receive a copy of the addendum. Each prime proposer is responsible for distribution of information conveyed by this addendum to its sub-proposers and suppliers.

6.2 PROJECT MANUAL TABLE OF CONTENTS

- A. Delete this Document in its entirety and insert the **revised** Table of Contents attached hereto.

6.3 SHEET A1.21 - TOMBALL MEMORIAL HS - BLEACHER EXPANSION PLAN

- A. The Bleacher count for Baseball and Softball will be 999 seats after expansion for each field.

6.4 MECHANICAL, ELECTRICAL AND PLUMBING ADDENDUM ITEMS

- A. Attached document by DBR, Inc. shall hereby become a part of this addendum.

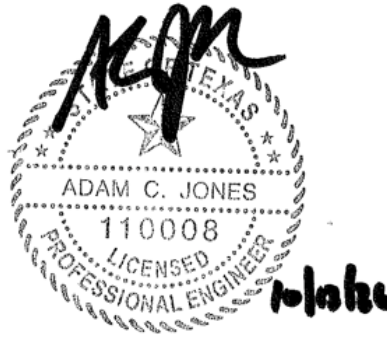
6.5 REVISED DRAWINGS - CREEKSIDE PARK JHS

- A. Sheet Nos. INDEX, ME1.21A, E3.01A, E5.01A, and E5.02A, dated October 13, 2026 and attached hereto, are revised drawings and are hereby made a part of this addendum.

6.6 REVISED DRAWINGS - TOMBALL MEMORIAL HS

- A. Sheet Nos. INDEX, ME1.21D, E3.01D, E5.01AD, and E5.02D, dated October 13, 2026 and attached hereto, are revised drawings and are hereby made a part of this addendum.

END OF ADDENDUM NO. 6



Addendum No.6

DATE

October 13, 2026

ADDENDUM NO.6

PROJECT 260057.000 | Tomball ISD-Sports LED Lighting Upgrades - (Tomball Memorial High School and Creekside Junior High School)

The work described herein shall be added to the scope of work defined by the contract documents or it shall modify the scope of work defined by the contract documents as described. This work shall become a part of the contract documents by addendum.

SPECIFICATIONS

- Item 01** **Specification Section 26 02 00 – Basic Materials and Methods for Electrical**
- A. Added section to specs.
- Item 02** **Specification Section 26 02 01 – Coordination Drawings**
- A. Added section to specs.
- Item 03** **Specification Section 26 03 13 – Electrical Demolition for Remodeling**
- A. Added section to specs.
- Item 04** **Specification Section 26 05 19 – Wire, Cable and Related Materials**
- A. Added the following sections: 1.1 Scope, 1.2 Reference Standards, 1.3 Acceptable Manufacturers, 1.4 Submittals, 1.5 requirements of Regulatory Agencies Work in Accordance With, 2.1 Wiring (A-E), 2.2 Metal Clad Cable – Type MC (600 Volt), 3.1 Wire (A-G, H-K), 3.2 Balancing System, 3.3 Low Voltage Wiring, 3.4 Grounding, 3.5 Cable Support, and 3.6 Defects.
- Item 05** **Specification Section 26 05 26 – Grounding**
- A. Added section to specs.
- Item 06** **Specification Section 26 08 00 – Commissioning of Electrical Systems**
- A. Added section to specs.
- Item 07** **Specification Section 26 09 36 – Lighting Controls (Stand-Alone)**
- A. Added section to specs.
- Item 08** **Specification Section 26 24 16 – Panelboards**

- B. Added the following sections: 1.1 Scope, 1.2 Reference Standards, 1.3 Acceptable Manufacturers, 1.4 Submittals, 1.5 Requirements of Regulatory Agencies, 2.1 Materials and Components (A-B, C-G), 3.1 Installation, 3.2 Identification, and 3.3 Infrared Scanning.

Item 09 Specification Section 26 27 26 – Wiring Devices

- A. Added the following sections: 1.1 Scope, 1.2 Reference Standards, 1.3 Quality Assurance, 1.4 Acceptable Manufacturers, 1.5 Submittals, 1.6 Requirements of Regulatory Agencies Work in Accordance With, 2.1 Materials and Components, 2.2 Switches, 2.3 Receptacles (A-B), 2.5 Digital Timer Switches, 2.6 Coverplates, 3.1 Wiring Device Mounting Heights, 3.2 Installation.

Item 10 Specification Section 26 43 12 – Surge Protective Devices (SPD) – Standard Interrupting

- B. Added section to specs.

Item 11 Specification Section 26 51 19 – Lighting Fixtures - Light Emitting Diode (LED)

- A. Added section to specs.

DRAWINGS

Item 12 Sheet ME1.21A – MECHANICAL/ELECTRICAL SITE PLAN - CREEKSIDE PARK JHS

- A. Removed sports lighting scope. See revised sheet.
- B. Removed keyed notes E10.4, E11.3, E11.4, and E11.7.

Item 13 Sheet ME1.21D – MECHANICAL/ELECTRICAL SITE PLAN - TOMBALL MEMORIAL HS

- A. Removed sports lighting scope. See revised sheet.
- B. Removed keyed notes E10.4, E11.3, E11.4, and E11.7.

Item 14 Sheet E3.01A – ELECTRICAL ENLARGED PLANS - CREEKSIDE PARK JHS

- C. Removed lighting controls. See drawings.
- D. Removed keyed note E8.3.

Item 15 Sheet E3.01D – ELECTRICAL ENLARGED PLANS - TOMBALL MEMORIAL HS

- A. Removed lighting controls. See drawings.
- B. Removed keyed note E8.3.

Item 16 Sheet E5.01A – ELECTRICAL SCHEDULES - CREEKSIDE PARK JHS

- C. Revised lighting fixture schedule. See drawings.

Item 17 Sheet E5.01AD – ELECTRICAL SCHEDULES - TOMBALL MEMORIAL HS

- D. Revised lighting fixture schedule. See drawings.

Item 18 Sheet E5.02A – ELECTRICAL PANEL SCHEDULES - CREEKSIDE PARK JHS

- E. Revised two (2) 30A breakers in panel DPFB to six (6) spaces.

Item 19 Sheet E5.02D – ELECTRICAL PANEL SCHEDULES - TOMBALL MEMORIAL HS

- A. Revised one (1) 30A breaker in panel 1CSH to three (3) spares.
- B. Revised two (2) 30A breakers in panel AF1 to six (6) spaces.

END OF ADDENDUM

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NOT USED



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SECTION 26 02 00

BASIC MATERIALS AND METHODS FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The requirements of the General Conditions and Supplementary Conditions apply to all Work herein.
- B. The Contract Drawings indicate the extent and general arrangement of the systems. If any departure from the Contract Drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore, shall be submitted to the Architect for approval as soon as practicable. No such departures shall be made without the prior written approval of the Architect.

1.2 SCOPE OF WORK

- A. The Work included under this Contract consists of the furnishing and installation of all equipment and material necessary and required to form the complete and functioning systems in all of its various phases, all as shown on the accompanying Drawings and/or described in these Specifications. The contractor shall review all pertinent drawings, including those of other contracts prior to commencement of Work.
- B. This Division requires the furnishing and installing of all items Specified herein, indicated on the Drawings or reasonably inferred as necessary for safe and proper operation; including every article, device or accessory (whether or not specifically called for by item) reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the work include, but are not limited to, materials, labor, supervision, transportation, storage, equipment, utilities, all required permits, licenses and inspections. All work performed under this Section shall be in accordance with the Project Manual, Drawings and Specifications and is subject to the terms and conditions of the Contract.
- C. The approximate locations of Electrical items are indicated on the Drawings. These Drawings are not intended to give complete and accurate details in regard to location of outlets, apparatus, etc. Exact locations are to be determined by actual measurements at the building, and will in all cases be subject to the Review of the Owner or Engineer, who reserves the right to make any reasonable changes in the locations indicated without additional cost to the Owner.
- D. Items specifically mentioned in the Specifications but not shown on the Drawings and/or items shown on Drawings but not specifically mentioned in the Specifications shall be installed by the Contractor under the appropriate section of work as if they were both specified and shown.
- E. Any discrepancies within the Contract Documents or between the Contract Documents and actual job-site conditions shall be reported to the Owner or Engineer so that they will be resolved prior to bidding. Where this cannot be done at least seven (7) working days prior to bid, the greater or more costly of the discrepancy shall be bid. All labor and materials required to perform the work described shall be included as part of this Contract.
- F. It is the intention of this Section of the Specifications to outline minimum requirements to furnish the Owner with a turn-key and fully operating system in cooperation with other trades.
- G. It is the intent of the above "Scope" to give the Contractor a general outline of the extent of the Work involved; however, it is not intended to include each and every item required for the Work. Anything omitted from the "Scope" but shown on the Drawings, or specified later, or necessary for a complete and functioning electrical system shall be considered a part of the overall "Scope".

- H. The Contractor shall rough-in fixtures and equipment furnished by others from rough-in and placement drawings furnished by others. The Contractor shall make final connection to fixtures and equipment furnished by others.
- I. Contractor shall participate in the commissioning process; including but not limited to meeting attendance, completion of checklists and participation in functional testing.

1.3 RELATED SECTIONS

- A. General Conditions
- B. Supplementary Conditions
- C. Division One

1.4 COOPERATION WITH TRADES

- A. Cooperation with trades of adjacent, related, or affected materials or operations shall be considered a part of this work in order to affect timely and accurate placing of work and bring together in proper and correct sequence, the work of such trades.

1.5 REFERENCES

- A. National Electrical Code (NEC)
- B. American Society for Testing and Materials (ASTM)
- C. Underwriter's Laboratories, Inc. (UL)
- D. Insulated Cable Engineer's Association (ICEA).
- E. National Electrical Manufacturer's Association (NEMA).
- F. Institute of Electrical and Electronic's Engineers (IEEE).
- G. American National Standards Institute (ANSI).
- H. National Fire Protection Association (NFPA).
- I. International Energy Conservation Code (IECC).

1.6 COMPLETE FUNCTIONING OF WORK

- A. All work fairly implied as essential to the complete functioning of the electrical systems shown on the Drawings and Specifications shall be completed as part of the work of this Division unless specifically stated otherwise. It is the intention of the Drawings and Specifications to establish the types of the systems, but not set forth each item essential to the functioning of the system. In case of doubt as to the work intended, or in the event of amplification or clarification thereof, the Contractor shall call upon the Architect for supplementary instructions, Drawings, etc.
- B. Contractor shall review all pertinent Drawings and adjust his work to all conditions shown there on. Discrepancies between Plans, Specifications, and actual field conditions shall be brought to the prompt attention of the Architect.

1. Approximate location of transformers, feeders, branch circuits, outlets, lighting and power panels, outlets for special systems, etc., are indicated on the Drawings. However, the Drawings, do not give complete and accurate detailed locations of such outlets, conduit runs, etc., and exact locations must be determined by actual field measurement. Such locations will, at all times, be subject to the approval of the Architect.
 2. Communicate with the Architect and secure his approval of any outlet (light fixture, receptacle, switch, etc.) location about which there may be the least question. Outlets obviously placed in a location not suitable to the finished room or without specific approval, shall be removed and relocated when so directed by the Architect. Location of light fixtures shall be coordinated with reflected ceiling plans.
- C. Additional coordination with mechanical contractor may be required to allow adequate clearances of mechanical equipment, fixtures and associated appurtenances. Contractor to notify Architect and Engineer of unresolved clearances, conflicts or equipment locations.

1.7 SCHEMATIC NATURE OF CONTRACT DOCUMENTS

- A. The contract documents are schematic in nature in that they are only to establish scope and a minimum level of quality. They are not to be used as actual working construction drawings. The actual working construction drawings shall be the approved shop drawings.

1.8 CONTRACTOR'S QUALIFICATIONS

- A. An approved contractor for the work under this division shall be:
1. A specialist in this field and have the personnel, experience, training, and skill, and the organization to provide a practical working system.
 2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that have served their Owners satisfactorily for not less than 3 years.
 3. Perform work by persons qualified to produce workmanship of specified quality. Persons performing electrical work shall be required to be licensed. Onsite supervision, journeyman shall have minimum of journeyman license. Helpers, apprentices shall have minimum of apprentice license.

1.9 DATE OF FINAL ACCEPTANCE

- A. The date of final acceptance shall be the date of owner occupancy, or the date all punch list items have been completed or final payment has been received. Refer to Division One for additional requirements.
- B. The date of final acceptance shall be documented in writing and signed by the architect, owner and contractor.

1.10 DEFINITIONS AND SYMBOLS

- A. General Explanation: A substantial amount of construction and Specification language constitutes definitions for terms found in other Contract Documents, including Drawings which must be recognized as diagrammatic and schematic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article, unless defined otherwise in Division 1.
- B. Definitions and explanations of this Section are not necessarily either complete or exclusive, but are general for work to the extent not stated more explicitly in another provision of the Contract Documents.
- C. Indicated: The term "Indicated" is a cross-reference to details, notes or schedules on the Drawings, to other paragraphs or schedules in the Specifications and to similar means of recording requirements in Contract Documents. Where such terms as "Shown", "Noted", "Scheduled", "Specified" and "Detailed" are used in lieu of "Indicated", it is for the purpose of helping the reader locate cross-reference material, and no limitation of location is intended except as specifically shown.

- D. Directed: Where not otherwise explained, terms such as "Directed", "Requested", "Accepted", and "Permitted" mean by the Architect or Engineer. However, no such implied meaning will be interpreted to extend the Architect's or Engineer's responsibility into the Contractor's area of construction supervision.
- E. Reviewed: Where used in conjunction with the Engineer's response to submittals, requests for information, applications, inquiries, reports and claims by the Contractor the meaning of the term "Reviewed" will be held to limitations of Architect's and Engineer's responsibilities and duties as specified in the General and Supplemental Conditions. In no case will "Reviewed" by Engineer be interpreted as a release of the Contractor from responsibility to fulfill the terms and requirements of the Contract Documents.
- F. Furnish: Except as otherwise defined in greater detail, the term "Furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- G. Install: Except as otherwise defined in greater detail, the term "Install" is used to describe operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning and similar operations, as applicable in each instance.
- H. Provide: Except as otherwise defined in greater detail, the term "Provide" is used to mean "Furnish and Install", complete and ready for intended use, as applicable in each instance.
- I. Installer: Entity (person or firm) engaged by the Contractor or its subcontractor or Sub-contractor for performance of a particular unit of work at the project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning and similar operations, as applicable in each instance. It is a general requirement that such entities (Installers) be expert in the operations they are engaged to perform.
- J. Imperative Language: Used generally in Specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or when so noted by other identified installers or entities.
- K. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as minimum quality level or quantity of work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable tolerance limits. In complying with requirements, indicated or scheduled numeric values are either minimums or maximums as noted or as appropriate for the context of the requirements. Refer instances of uncertainty to Owner or Engineer via a request for information (RFI) for decision before proceeding.
- L. Abbreviations and Symbols: The language of Specifications and other Contract Documents including Drawings is of an abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in text of Specifications and Drawings. Specific abbreviations and symbols have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of Specification requirements with notations on Drawings and in Schedules. These are frequently defined in Section at first instance of use or on a Legend and Symbol Drawing. Trade and industry association names and titles of generally recognized industry standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of Contract Documents so indicate. Except as otherwise indicated, graphic symbols and abbreviations used on Drawings and in Specifications are those recognized in construction industry for indicated purposes. Where not otherwise noted symbols and abbreviations are defined by the latest ASHRAE Fundamentals Handbook, Chapter 39 "Abbreviations and Symbols", ASME and ASPE published standards.

1.11 DRAWINGS AND SPECIFICATIONS

- A. These Specifications are intended to supplement the Drawings and it will not be the province of the Specifications to mention any part of the Work which the Drawings are competent to fully explain in every particular and such omission is not to relieve the Contractor from carrying out portions indicated on the Drawings only.
- B. Should items be required by these Specifications and not indicated on the Drawings, they are to be supplied even if of such nature that they could have been indicated thereon. In the event of discrepancy between Drawings and Specifications, or within either Drawings or Specifications, the greater or more costly of the discrepancy shall be estimated and the matter referred to the Architect or Engineer for review with a request for information and clarification at least seven (7) working days prior to bid opening date for issuance of an addendum.
- C. The listing of product manufacturers, materials and methods in the various sections of the Specifications, and indicated on the Drawings, is intended to establish a standard of quality only. It is not the intention of the Owner or Engineer to discriminate against any product, material or method that is the equivalent of the standards as indicated and/or specified, nor is it intended to preclude open, competitive bidding. The fact that a specific manufacturer is listed as an acceptable manufacturer should not be interpreted to mean that the manufacturer's standard product will meet the requirements of the project design, Drawings, Specifications and space constraints.
- D. The Architect or Engineer and Owner shall be the sole judge of quality and equivalence of equipment, materials and methods.
- E. Products by other reliable manufacturers, other materials, and other methods, will be accepted as outlined, provided they have equivalent capacity, construction, and performance. However, under no circumstances shall any substitution be made without the written permission of the Architect or Engineer and Owner. Request for prior approval must be made in writing 10 calendar days prior to the bid date without fail.
- F. Wherever a definite product, material or method is specified and there is not a statement that another product, material or method will be acceptable, it is the intention of the Owner or Engineer that the specified product, material or method is the only one that shall be used without prior approval.
- G. Wherever a definite material or manufacturer's product is specified and the Specification states that products of similar design and equivalent construction from the specified list of manufacturers may be substituted, it is the intention of the Owner or Engineer that products of manufacturers that are specified are the only products that will be acceptable and that products of other manufacturers will not be considered for substitution without approval.
- H. Wherever a definite product, material or method is specified and there is a statement that "OR EQUIVALENT" product, material or method will be acceptable, it is the intention of the Owner or Engineer that the specified product, material or method or an "OR EQUIVALENT" product, material or method may be used if it complies with the Specifications and is submitted for review to the Engineer as outline herein.
- I. Where permission to use substituted or alternative equipment on the project is granted by the Owner or Engineer in writing, it shall be the responsibility of the Contractor or Subcontractor involved to verify that the equipment will fit in the space available which includes allowances for all required Code and maintenance clearances, and to coordinate all equipment structural support, plumbing and electrical requirements and provisions with the Mechanical (HVAC) Design Documents and all other trades, including Division 26.
- J. Changes in architectural, structural, electrical, mechanical, and plumbing requirements for the substitution shall be the responsibility of the bidder wishing to make the substitution. This shall include the cost of redesign by the affected designer(s). Any additional cost incurred by affected Subcontractors shall be the responsibility of this bidder and not the Owner.

- K. If any request for a substitution of product, material or method is rejected, the Contractor will automatically be required to furnish the product, material or method named in the Specifications. Repetitive requests for substitutions will not be considered.
- L. The Owner or Engineer will investigate all requests for substitutions when submitted in accordance with the requirements listed above; and if accepted, will issue a letter allowing the substitutions.
- M. Where equipment other than that used in the design as specified or shown on the Drawings is substituted (either from an approved manufacturers list or by submittal review), it shall be the responsibility of the substituting Contractor to coordinate space requirements, building provisions and connection requirements with their respective trade(s) and all other trades; and to pay all additional costs to other trades, the Owner, the Architect or Engineer, if any, due to the substitutions.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- B. Deliver products to the project at such time as the project is ready to receive the equipment, pipe or duct properly protected from incidental damage and weather damage.
- C. Damaged equipment shall be promptly removed from the site and new, undamaged equipment shall be installed in its place promptly with no additional charge to the Owner.

1.13 SUBMITTALS

- A. Coordinate with Division 01 for submittal timetable requirements, unless noted otherwise within thirty (30) days after the Contract is awarded. The Contractor shall submit an electronic copy of a complete set of shop drawings and complete data covering each item of equipment or material. The submittal of each item requiring a submittal must be received by the Architect or Engineer within the above thirty day period. The Architect or Engineer shall not be responsible for any delays or costs incurred due to excessive shop drawing review time for submittals received after the thirty (30) day time limit. The Architect and Engineer will retain a copy of all shop drawings for their files. All literature pertaining to items subject to Shop Drawing submittal shall be submitted at one time. Submittals shall be placed in one electronic file in PDF format and bookmarked for individual specification sections. Individual electronic files of submittals for individual specifications shall not be permitted. Each submittal shall include the following items:
 - 1. A cover sheet with the names and addresses of the Project, Architect, MEP Engineer, General Contractor and the Subcontractor making the submittal. The cover sheet shall also contain the section number covering the item or items submitted and the item nomenclature or description.
 - 2. An index page with a listing of all data included in the Submittal.
 - 3. A list of variations page with a listing all variations, including unfurnished or additional required accessories, items or other features, between the submitted equipment and the specified equipment. If there are no variations, then this page shall state "NO VARIATIONS". Where variations affect the work of other Contractors, then the Contractor shall certify on this page that these variations have been fully coordinated with the affected Contractors and that all expenses associated with the variations will be paid by the submitting Contractor. This page will be signed by the submitting Contractor.
 - 4. Equipment information including manufacturer's name and designation, size, performance and capacity data as applicable. All applicable Listings, Labels, Approvals and Standards shall be clearly indicated.
 - 5. Dimensional data and scaled drawings as applicable to show that the submitted equipment will fit the space available with all required Code and maintenance clearances clearly indicated and labeled at a minimum scale of 1/4" = 1'-0", as required to demonstrate that the alternate or substituted product will fit in the space available.
 - 6. Identification of each item of material or equipment matching that indicated on the Drawings.
 - 7. Sufficient pictorial, descriptive and diagrammatic data on each item to show its conformance with the Drawings and Specifications. Any options or special requirements or accessories shall be so indicated. All applicable information shall be clearly indicated with arrows or another approved method.
 - 8. Additional information as required in other Sections of this Division.

9. Certification by the General Contractor and Subcontractor that the material submitted is in accordance with the Drawings and Specifications, signed and dated in long hand. Submittals that do not comply with the above requirements shall be returned to the Contractor and shall be marked "REVISE AND RESUBMIT".
- B. Refer to Division 1 for additional information on shop drawings and submittals.
- C. Equipment and materials submittals and shop drawings will be reviewed for compliance with design concept only. It will be assumed that the submitting Contractor has verified that all items submitted can be installed in the space allotted. Review of shop drawings and submittals shall not be considered as a verification or guarantee of measurements or building conditions.
- D. Where shop drawings and submittals are marked "REVIEWED", the review of the submittal does not indicate that submittals have been checked in detail nor does it in any way relieve the Contractor from his responsibility to furnish material and perform work as required by the Contract Documents.
- E. Shop drawings shall be reviewed and returned to the Contractor with one of the following categories indicated:
1. REVIEWED: Contractor need take no further submittal action, shall include this submittal in the O&M manual and may order the equipment submitted on.
 2. REVIEWED AS NOTED: Contractor shall submit a letter verifying that required exceptions to the submittal have been received and complied with including additional accessories or coordination action as noted, and shall include this submittal and compliance letter in the O&M manual. The contractor may order the equipment submitted on at the time of the returned submittal providing the Contractor complies with the exceptions noted.
 3. NOT APPROVED: Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is not approved, the Contractor will automatically be required to furnish the product, material or method named in the Specifications and/or drawings. Contractor shall not order equipment that is not approved. Repetitive requests for substitutions will not be considered.
 4. REVISE AND RESUBMIT: Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is marked revise and resubmit, the Contractor will automatically be required to furnish the product, material or method named in the Specifications and/or provide as noted on previous shop drawings. Contractor shall not order equipment marked revise and resubmit. Repetitive requests for substitutions will not be considered.
 5. CONTRACTOR'S CERTIFICATION REQUIRED: Contractor shall resubmit submittal on material, equipment or method of installation. The Contractor's stamp is required stating the submittal meets all conditions of the contract documents. The stamp shall be signed by the General Contractor. The submittal will not be reviewed if the stamp is not placed and signed on all shop drawings.
 6. MANUFACTURER NOT AS SPECIFIED: Contractor shall resubmit new submittal on material, equipment or method of installation when the alternate or substitute is marked manufacturer not as specified, the Contractor will automatically be required to furnish the product, material or method named in the specifications. Contractor shall not order equipment where submittal is marked manufacturer not as specified. Repetitive requests for substitutions will not be considered.
- F. Materials and equipment which are purchased or installed without shop drawing review shall be at the risk of the Contractor and the cost for removal and replacement of such materials and equipment and related work which is judged unsatisfactory by the Owner or Engineer for any reason shall be at the expense of the Contractor. The responsible Contractor shall remove the material and equipment noted above and replace with specified equipment or material at his own expense when directed in writing by the Architect or Engineer.
- G. Shop Drawing Submittals shall be complete and checked prior to submission to the Engineer for review.
- H. Provide detailed shop drawings, descriptive literature, table of contents listing all items being submitted at the beginning of each submittal package, physical data and a specification critique for each section indicating "compliance" and/or "variations" for the following items:
1. Switchboards
 2. Distribution Panelboards

3. Panelboards
4. Wiring Gutters
5. Heavy Duty Disconnect Switches
6. Lighting Fixtures
7. Lighting Contactors
8. Time Clocks
9. Lighting Control System
10. Photocells
11. Wiring Devices and Plates
12. Conduit and Fittings
13. Wire
14. General Purpose Dry Type Transformers
15. Harmonic Mitigating Type Transformers
16. Emergency Generator
17. Automatic Transfer Switches
18. Sound Reinforcing System
19. Fire Alarm System
20. Surge Protection Devices (SPD)
21. Lightning Protection

- I. Refer to each specification section for additional requirements.

1.14 OPERATION AND MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 1 and in addition to the requirements specified in Division 1, include the following information for equipment items:
 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 4. Servicing instructions and lubrication charts and schedules.

1.15 COORDINATION DRAWINGS

- A. Prepare coordination drawings to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
 1. Indicate the proposed locations of pipe, duct, equipment, and other materials. Include the following:
 - a. Wall and type locations.
 - b. Clearances for installing and maintaining insulation.
 - c. Locations of light fixtures and sprinkler heads.
 - d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - e. Equipment connections and support details.
 - f. Exterior wall and foundation penetrations.
 - g. Routing of storm and sanitary sewer piping.
 - h. Fire-rated wall and floor penetrations.
 - i. Sizes and location of required concrete pads and bases.
 - j. Valve stem movement.
 - k. Structural floor, wall and roof opening sizes and details.
 2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
 4. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components, and other ceiling-mounted items.
- B. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include, but not be limited to: voltage, ampacity, capacity, electrical and piping connections, space requirements, sequence of construction, building requirements and special conditions.
- C. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

1.16 RECORD DRAWINGS

- A. Prepare Record Documents in accordance with the requirements of Division 00 and Division 01, in addition to the requirements specified in Division 26.
- B. The Contractor shall maintain a separate set of clearly and legibly marked Record Drawings on the job site to record all changes and modifications, including, but not limited to the following: work details, alterations to meet site conditions, and changes made by "Change Order" notices. Mark the drawings with colored pencil(s). These shall be available for review by the Owner, Architect or Engineer during the entire construction stage.
- C. The Record Drawings shall be updated concurrently as construction progresses, and in no case less frequently than a daily basis. They shall indicate accurate dimensions for all buried or concealed work, precise locations of all concealed pipe or duct, locations of all concealed valves, controls and devices and any deviations from the work shown on the Construction Documents. All dimensions shall include at least two dimensions to permanent structure points.
- D. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located as specified herein to record the locations and invert elevations of underground installations.
- E. If the Contractor does not keep an accurate set of Record Drawings, the pay request may be altered or delayed at the request of the Architect. Delivery of Record Documents is a condition of final acceptance. Record Drawings shall be furnished in addition to Shop Drawings.
- F. The Contractor shall submit an electronic copy of the record documents in PDF format and one (1) full size set of Record Drawing prints to the Architect or Engineer for review prior to scheduling the final inspection at the completion of the work. The drawings shall have the name(s) and seal(s) of the Engineer(s) removed or blanked out and shall be clearly marked and signed on each sheet as follows:

CERTIFIED RECORD DRAWINGS

DATE:

(NAME OF GENERAL CONTRACTOR)

BY: _____

(SIGNATURE)

(NAME OF SUBCONTRACTOR)

BY: _____

(SIGNATURE)

1.17 CERTIFICATIONS AND TEST REPORTS

- A. Submit a detailed schedule for completion and testing of each system indicating scheduled dates for completion of system installation and outlining tests to be performed and schedule date for each test. This detailed completion and test schedule shall be submittal at least 90 days before the projected Project completion date.
- B. Test result reporting forms shall be submitted for review no later than the date of the detailed schedule submitted.
- C. Submit 4 copies of all certifications and test reports to the Architect or Engineer for review adequately in advance of completion of the Work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.
- D. Certifications and test reports to be submitted shall include, but not be limited to those items outlined in Section of Division 26.

1.18 MAINTENANCE MANUALS

- A. Coordinate with Division 1 for maintenance manual requirements, unless noted otherwise bind together in "D ring type" binders by National model no. 79-883 or equal, binders shall be large enough to allow 1/4" of spare capacity. Three (3) sets of all approved shop drawing submittals, fabrication drawings, bulletins, maintenance instructions, operating instructions and parts exploded views and lists for each and every piece of equipment furnished under this Specification. All sections shall be typed and indexed into sections and ed for easy reference and shall utilize the individual specification section numbers shown in the Electrical Specifications as an organization guideline. Bulletins containing information about equipment that is not installed on the project shall be properly marked up or stripped and reassembled. All pertinent information required by the Owner for proper operation and maintenance of equipment supplied by Division 26 shall be clearly and legibly set forth in memoranda that shall, likewise, be bound with bulletins.
- B. Prepare maintenance manuals in accordance with Special Project Conditions, in addition to the requirements specified in Division 26, include the following information for equipment items:
 - 1. Identifying names, name tags designations and locations for all equipment.
 - 2. Fault Current calculations and Coordination Study.
 - 3. Reviewed shop drawing submittals with exceptions noted compliance letter.
 - 4. Fabrication drawings.
 - 5. Equipment and device bulletins and data sheets clearly highlighted to show equipment installed on the project and including performance curves and data as applicable, i.e., description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and model numbers of replacement parts.
 - 6. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 - 7. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions, servicing instructions and lubrication charts and schedules.
 - 8. Equipment name plate data.
 - 9. Wiring diagrams.
 - 10. Exploded parts views and parts lists for all equipment and devices.
 - 11. Color coding charts for all painted equipment and conduit.
 - 12. Location and listing of all spare parts and special keys and tools furnished to the Owner.
 - 13. Furnish recommended lubrication schedule for all required lubrication points with listing of type and approximate amount of lubricant required.
- C. Refer to Division 1 for additional information on Operating and Maintenance Manuals.

- D. Operating and Maintenance Manuals shall be turned over to the Owner or Engineer a minimum of 14 working days prior to the beginning of the operator training period.

1.19 OPERATOR TRAINING

- A. The Contractor shall furnish the services of factory trained specialists to instruct the Owner's operating personnel. The Owner's operator training shall include 12 hours of onsite training in three 4 hour shifts.
- B. Before proceeding with the instruction of Owner Personnel, prepare a typed outline in triplicate, listing the subjects that will be covered in this instruction, and submit the outline for review by the Owner. At the conclusion of the instruction period obtain the signature of each person being instructed on each copy of the reviewed outline to signify that he has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines.
- C. Refer to other Division 26 Sections for additional Operator Training requirements.

1.20 SITE VISITATION

- A. Visit the site of the proposed construction in order to fully understand the facilities, difficulties and restriction attending the execution of the work.
- B. Before submitting a bid, it will be necessary for each Contractor whose work is involved to visit the site and ascertain for himself the conditions to be met therein in installing his work and make due provision for same in his bid. It will be assumed that this Contractor in submitting his bid has visited the premises and that his bid covers all work necessary to properly install the equipment shown. Failure on the part of the Contractor to comply with this requirement shall not be considered justification for the omission or faulty installation of any work covered by these Specifications and Drawings.
- C. Understand the existing utilities from which services will be supplied; verify locations of utility services, and determine requirements for connections.
- D. Determine in advance that equipment and materials proposed for installation fit into the confines indicated.

1.21 WARRANTY

- A. The undertaking of the work described in this Division shall be considered equivalent to the issuance, as part of this work, of a specific guarantee extending one year beyond the date of completion of work and acceptance by Owner, against defects in materials and workmanship. Materials, appliances and labor necessary to effect repairs and replacement so as to maintain said work in good functioning order shall be provided as required. Replacements necessitated by normal wear in use or by Owner's abuse are not included under this guarantee.
- B. All normal and extended warranties shall include parts, labor, miscellaneous materials, travel time, incidental expenses, freight/shipping, refrigerant, oils, lubricants, belts, filters and any expenses related to service call required to diagnose warranty problems.

1.22 TRANSFER OF ELECTRONIC FILES

- A. Project documents are not intended or represented to be suitable for reuse by Architect/Owner or others on extensions of this project or on any other project. Any such reuse or modification without written verification or adaptation by Engineer, as appropriate for the specific purpose intended, will be at Architect/Owner's risk and without liability or legal exposure to Engineer or its consultants from all claims, damages, losses and expense, including attorney's fees arising out of or resulting thereof.

- B. Because data stored in electric media format can deteriorate or be modified inadvertently, or otherwise without authorization of the data's creator, the party receiving the electronic files agrees that it will perform acceptance tests or procedures within sixty (60) days of receipt, after which time the receiving party shall be deemed to have accepted the data thus transferred to be acceptable. Any errors detected within the sixty (60) day acceptance period will be corrected by the party delivering the electronic files. Engineer is not responsible for maintaining documents stored in electronic media format after acceptance by the Architect/Owner.
- C. When transferring documents in electronic media format, Engineer makes no representations as to the long-term compatibility, usability or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by Engineer at the beginning of the Project.
- D. Any reuse or modifications will be Contractor's sole risk and without liability or legal exposure to Architect, Engineer or any consultant.
- E. The Texas Board of Architectural Examiners (TBAE) has stated that it is in violation of Texas law for persons other than the Architect of record to revise the Architectural drawings without the Architect's written consent.
 - 1. It is agreed that "MEP" hard copy or computer-generated documents will not be issued to any other party except directly to the Architect/Owner. The contract documents are contractually copyrighted and cannot be used for any other project or purpose except as specifically indicated in AIA B-141 Standard Form of Agreement Between Architect and Owner.
 - 2. If the client, Architect or Owner of the project requires electronic media for "record purposes", then AutoCAD/ Revit documents will be prepared by Engineer on electronic media such as removable memory devices, flash drives or CD's. These documents can also be submitted via file transfer protocols. AutoCAD/ Revit files will be submitted with all title block references intact to permit the end user to only view and plot the drawings. Revisions will not be permitted in this configuration.
 - 3. At the Architect/Owner's request, Engineer will assist the Contractor in the preparation of the submittals and prepare one copy of AutoCAD/ Revit files on electronic media or submit through file transfer protocols. The electronic media will be prepared with all indicia of documents ownership removed. The electronic media will be prepared in a ".rvt" or ".dwg" format to permit the end user to revise the drawings.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. The names and manufacturers and model numbers have been used in the Contract documents to establish types of equipment and standards of quality. Where more than one manufacturer is named for a specific item of equipment, only one of the specified manufacturers will be considered for approval. Where only one manufacturer is mentioned with the phrase "or approved equal", Contractor may submit an alternate manufacturer for consideration, provided the following conditions are met:
 - 1. Submit alternate equipment with complete descriptive data in shop drawing form. Provide sample of equipment upon request for review by Architect. Samples will be returned if requested in writing.
 - 2. Alternate equipment must be equal from the standpoint of materials, construction and performance.
 - 3. Alternate submittal must be presented to the Engineer/Architect ten (10) days prior to bid date for approval.
- B. The Architect and Engineer shall be the sole judge of quality and equivalence of equipment, materials and methods.

2.2 PRODUCT LISTING

- A. Products used on this project shall be listed by Underwriters' Laboratories.

2.3 ACCESS DOORS

- A. Wherever access is required in walls or ceilings to concealed junction boxes, pull boxes, equipment, etc., installed under this Division, furnish a hinged access door and frame with flush latch handle to another Division for installation. Doors shall be as follows:
1. Plaster Surfaces: Milcor Style K.
 2. Ceramic Tile Surfaces: Milcor Style M.
 3. Drywall Surfaces: Milcor Style DW.
 4. Install panels only in locations approved by the Architect.

2.4 EQUIPMENT PADS

- A. Provide 4-inch-high concrete pads for indoor floor mounted equipment. Pads shall conform to the shape of the equipment with a minimum of 6 inch beyond the equipment. Top and sides of pads shall be troweled to a smooth finish, equivalent to the floor. External corners shall be bullnosed to a 3/4" radius, unless shown otherwise.
- B. Provide 6-inch-high concrete pads for all exterior mounted equipment. Pads shall conform to the shape of the equipment with a minimum of 6 inch beyond the equipment. Provide a 4-foot monolithic extension to the pad in front of the equipment for service when mounted on a non-finished area (i.e. landscape, gravel, clay, etc.) Top and sides of pads shall be troweled to a smooth finish. External corners shall be bullnosed to a 3/4" radius, unless shown otherwise.
- C. Provide a minimum 6-inch-high, steel reinforced concrete pad for generators. Pads shall be sized 6" larger than the outside perimeter dimensions. Provide a 4-foot monolithic extension to the pad around the equipment for service when mounted on a non-finished area (i.e. landscape, gravel, clay, etc.). Refer to structural details. Top and sides of pads shall be troweled to a smooth finish. External corners shall be bullnosed to a 3/4" radius, unless shown otherwise. The generator shall be bolted to the concrete pad per the manufacturers details.
- D. Provide steel reinforced concrete pad for utility transformers. Pads shall comply with Utility Company Standards.

2.5 ESCUTCHEONS

- A. Provide heavy chrome or nickel plated plates, of approved pattern, on conduit passing through walls, floors and ceilings in finished areas. Where conduit passes through a sleeve, no point of the conduit shall touch the building construction. Caulk around such conduit with sufficient layers of two hour rated firesafing by Thermafiber 4.0 P.C.F. density, U.S.G. fire test 4/11/78 and seal off openings between conduit and sleeves with non-hardening mastic prior to application of escutcheon plate. Escutcheons shall be Gravel Sure-Lock, or approved equal.

2.6 SPACE LIMITATIONS

- A. Equipment shall be chosen which shall properly fit into the physical space provided and shown on the drawings, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearances in accordance with Code requirements. Physical dimensions and arrangement of equipment shall be subject to the approval of the Architect.

2.7 PAINTING

- A. All factory assembled equipment for electrical work, except light fixtures, that normally is delivered with a factory applied finish shall be delivered with a hard surface factory applied finish such as baked-on machinery enamel which will not require additional field painting. The finish shall consist of not less than 2 coats of medium gray color paint USA No. 61 Munsell Notation 8-3G, 6. 10/0.54 enamel. This Contractor shall protect this finish from damage due to construction operations until acceptance of the building. He shall be responsible for satisfactorily restoring any such finishes or replacing equipment that becomes stained or damaged.

2.8 ELECTRICAL SYSTEM IDENTIFICATION

- A. Conduit Systems: Provide adequate marking of major conduit which is exposed or concealed in accessible spaces to distinguish each run as either a power or signal/communication conduit. Except as otherwise indicated, use orange banding with black lettering. Provide self-adhesive or snap-on type plastic markers. Indicate voltage for that raceway. Locate markers at ends of conduit runs, on pull boxes, on junction boxes, near switches and other control devices, near items of equipment served by the conductors, at points where conduit passes through walls or floors, or enters non-accessible construction and at spacings of not more than 50 feet along each run of conduit. Switch-leg conduit and short branches for power connections do not have to be marked, except where conduit is larger than $\frac{3}{4}$ inch. Branch circuit conduits, junction boxes and pull boxes shall be marked with a permanent marker indicating panel name and branch circuit numbers.
- B. Underground Cable Identification: Bury a continuous, preprinted, bright colored plastic ribbon cable marker with each underground cable (or group of cables), regardless of whether conductors are in conduit, duct bank, or direct buried. Locate each directly over cables, 6 to 8 inches below finished grade.
- C. Identification of Equipment:
 - 1. All major equipment shall have a manufacturer's label identifying the manufacturer's address, equipment model and serial numbers, equipment size, and other pertinent data. Care shall be taken not to obliterate this nameplate in any way. Provide black back plate with white letters and numbers for normal equipment. Provide red back plate with white letters and numbers for optional emergency equipment. Provide yellow back plate with white letters and numbers for Life safety equipment.
 - 2. A black-white-black laminated plastic engraved identifying nameplate shall be secured by stainless steel screws to each automatic transfer switch, switchboard, distribution panel, motor control center, motor starter panels and panelboards.
 - a. Identifying nameplates shall have $\frac{1}{4}$ inch high engraved letters and shall contain the following information:
 - 1) Name
 - 2) Voltage
 - 3) Phase
 - 4) "3" or "4" wire, and
 - 5) Where it is fed from.
 - b. An example of a panelboard nameplate is:
Center Panel – 1HB
480/277 volt, 3 phase, 4 wire
Center Fed from DP2
 - c. An example of an automatic transfer switch nameplate is:
Center ATS #2
480/277 volt, 3 phase, 4 wire, 4 pole
Center Fed from MSB and DPE
 - 3. Each feeder device in a switchboard, distribution panel, and motor control center device shall have a nameplate showing the load served in $\frac{1}{2}$ inch high engraved letters.
 - 4. A black-white-black laminated plastic engraved identifying nameplate shall be secured by screws to each transformer, safety switch, disconnect switch, individual motor starter, enclosed circuit breaker, wireway, and terminal cabinet.
 - a. Identifying nameplates shall have $\frac{1}{4}$ inch high engraved letters and shall indicate the equipment served.
 - b. An example of a disconnect switch is: AHU-1.

5. Prohibited Markings: Markings which are intended to identify the manufacturer, vendor, or other source from which the material has been obtained are prohibited for installation within public, tenant, or common areas within the project. Also, prohibited are materials or devices which bear evidence that markings or insignias have been removed. Certification, testing (example, Underwriters' Laboratories, Inc.), and approval labels are exceptions to this requirement.
 6. Warning Signs: Provide warning signs where there is hazardous exposure associated with access to or operation of electrical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.
 7. Operational Tags: Where needed for proper and adequate information on operation and maintenance of electrical system, provide tags of plasticized card stock, either preprinted or hand printed. Tags shall convey the message, example: "DO NOT OPEN THIS SWITCH WHEN BURNER IS OPERATING."
- D. Identification of Wiring Devices
1. Contractor shall indicate the circuit serving each wiring device. Provide a typewritten label located on the inside face of the coverplate for all recessed mounted devices and on the outside face of the coverplate on all surface mounted devices.

PART 3 - EXECUTION

3.1 EXCAVATING AND BACKFILLING

- A. Trenching and backfilling and other earthwork operations required to install the facilities specified herein shall conform to the applicable requirements of Division 2 (95% of maximum standard density). Where trenching or excavation is required in improved areas, the backfill shall be compacted to a condition equal to that of adjacent undisturbed earth and the surface of the area restored to the condition existing prior to trenching or excavating operations. Provide a minimum of 3" of sand underneath all conduits. The plans indicate information pertaining to surface and sub-surface obstructions; however, this information is not guaranteed. Should obstructions be encountered whether or not shown, the Contractor shall alter routing of new work, reroute existing lines, remove obstructions where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of new work and leave existing surfaces and structures in a satisfactory and serviceable condition. All work shall comply with OSHA Standards.

3.2 WORKMANSHIP AND CONCEALMENT

- A. The work of this Section shall be performed by workman skilled in their trade. Installation shall be consistent in completeness whether concealed or exposed. Each item of electrical work shall be concealed in walls, chases, under floors and above ceilings except:
1. Where shown to be exposed.
 2. Where exposure is necessary to the proper function.

3.3 SLEEVES, CUTTING AND PATCHING

- A. This section shall be responsible for placing sleeves for all conduit passing through walls, partitions, sound walls, beams, floors, roof, etc. Sleeves through below-grade walls shall use water-tight fitting manufactured by O-Z/Gedney.
- B. Contractor shall install underground raceways including but not limited to feeders, service laterals, branch circuit and telecommunications. Contractor shall saw cut existing hard surfaces, when required for installation. Contractor shall patch surface to match existing conditions. Contractor shall replace all landscaping material when raceways are installed in these areas. Submit proposed method for patching for review.
- C. All cutting and patching will be done under another Division, but this Section will be responsible for timely performance of this work and layout of holes and setting sleeves.

- D. All un-used sleeves shall be sealed with 2 hour UL approved fire sealant manufactured by "3M" or approved equal.
- E. Refer to 26 05 33 for additional requirements.

3.4 ELECTRICAL GEAR

- A. Install all electrical equipment in accordance with the National Electrical Code and as shown on the drawings.
- B. Lighting contactors, time clocks, fire alarm equipment, security equipment disconnect switches, etc. mounted in mechanical/electrical rooms shall be mounted at a working height not requiring a ladder, when wall space is available. Installation of these devices at greater elevations shall be approved by the Engineer. Contractor shall provide a coordination sketch of each mechanical/electrical room noting locations and mounting heights of all electrical devices (note bottom and top elevations) shown to be installed. Sketches shall be provided to the Engineer for review and the general contractor for coordination with other trades working in these rooms.
- C. Fire retardant back boards secured to drywall studs may be used for contactors, time clocks, fire alarm equipment, security equipment, and disconnect switches 60 amp or smaller. All other wall mounted devices shall be mounted to unistrut. Unistrut shall be securely mounted to the floor and structural ceiling. Toggle bolts or anchor bolts attached to drywall is not acceptable.

3.5 CLEANING

- A. Clean lighting fixtures and equipment.
- B. Touch-up and refinish scratches and marred surfaces on panels, switches, starters, and transformers.

3.6 CORROSIVE AREAS

- A. In areas of a corrosive nature, which include but are not limited to the following: pool equipment rooms, cooling towers and areas subject to salt air, etc., provide NEMA 4 X stainless steel or fiberglass reinforced enclosures for contactors, panel boards, controllers, starters, disconnects and materials used as supporting means (i.e. plastibond unistrut, pipe, fittings). The use of spray on coating may be acceptable in some applications.

3.7 TESTS AND INSPECTIONS

- A. Tests and inspection requirements shall be coordinated with Division I.
- B. Date for final acceptance test shall be sufficiently in advance of completion date of contract to permit alterations or adjustments necessary to achieve proper functioning of equipment prior to contract completion date.
- C. Conduct re-tests as directed by Architect on portions of work or equipment altered or adjusted as determined to be necessary by final acceptance test. No resultant delay or consumption of time as a result of such necessary re-test beyond contract completion date shall relieve Contractor of his responsibility under contract.
- D. Put circuits and equipment into service under normal conditions, collectively and separately, as may be required to determine satisfactory operation. Demonstrate equipment to operate in accordance with requirements of these specifications. Perform tests in the presence of Architect. Furnish instruments and personnel required for tests.
- E. Final Inspection:
 - 1. At the time designated by the Architect, the entire system shall be inspected by the Architect and Engineer. The contractor or his representative shall be present at this inspection.

2. Panelboards, switches, fixtures, etc., shall be cleaned and in operating condition.
 3. Certificates and documents required hereinbefore shall be in order and presented to the Architect prior to inspection.
 4. Panel covers, junction box covers, etc., shall be removed for visual inspection of the wire, bus bars, etc.
 5. After the inspection, any items which are noted as needing to be changed or corrected in order to comply with these specifications and the drawings shall be accomplished without delay.
- F. The contractor shall provide a thermographic test using an independent testing laboratory using an infrared scanning device. This test shall include but not limited to all switchboards, distribution panelboards, panelboards, automatic transfer switches and other electrical distribution devices. This test shall be conducted to locate high temperature levels. This test shall be conducted between 3 to 8 months after occupancy, but not beyond the one year warranty period. Submit test to the architect and engineer using test reporting forms. All unacceptable conditions shall be corrected prior to the end of the warranty period.

END OF SECTION

SECTION 26 02 01
COORDINATION DRAWINGS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The requirements of the General Conditions 01 31 00 and Supplementary Conditions apply to all Work herein.

1.2 COORDINATION DRAWINGS

- A. The Contractor shall take the lead in coordinating the Mechanical, Electrical, Plumbing, Communications, Electronic Safety/Security and Fire Protection systems within the building.
- B. The Contractor shall coordinate a three-dimensional (3D) model of the building which includes the Mechanical, Electrical, Plumbing, and Fire Protection systems. The Mechanical, Electrical, Plumbing, and Fire Protection Contractors shall prepare their work and generate 3D models which will be given to the Contractor for coordination. The Contractor will be provided with the REVIT model that was used to generate the contract documents, this file may be used as the background file. The Contractor shall replace the systems drawn with the actual shop drawing models. The Contractor is not limited to using REVIT, but may use any 3-D software in generating and combining the coordination model.
- C. Submitting the contract drawings as coordination drawings will not be acceptable.
- D. The model shall include detailed and accurate representations of all equipment to be installed based upon the reviewed equipment submittals.
- E. The Contractor shall hold a 3-D coordination meeting with all sub-contractors present to review the model and discuss coordination of the installation of the building systems.
- F. Upon completion of the coordination meeting, the Contractor shall submit the 3-D model and 1/4" scale drawings for review.
- G. The model shall detail major elements, components, and systems in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
1. Indicate the proposed locations of pipe, duct, equipment, and other materials. Include the following:
 - a. Wall and type locations.
 - b. Clearances for installing and maintaining insulation.
 - c. Locations of light fixtures and sprinkler heads.
 - d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - e. Equipment connections and support details.
 - f. Exterior wall and foundation penetrations.
 - g. Routing of storm and sanitary sewer piping.
 - h. Fire-rated wall and floor penetrations.
 - i. Sizes and location of required concrete pads and bases.
 - j. Valve stem movement.
 - k. Structural floor, wall and roof opening sizes and details.
 2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

4. Prepare reflected ceiling plans to coordinate and integrate installations, air distribution devices, light fixtures, communication systems components, and other ceiling-mounted items.
- H. Sequence of Coordination
1. Below is hierarchy of model elements and the sequencing by which the models will be coordinated:
 - a. Structural and Architectural model
 - b. Miscellaneous steel
 - c. Perform preliminary space allocation
 - d. Identify hard constraints (locations of access panels, lights, A/V space requirements, etc.)
 - e. Main and medium pressure ducts from the shaft out
 - f. Main graded plumbing lines and vents
 - g. Sprinkler mains and branches
 - h. Cold and hot water mains and branches
 - i. Lighting fixtures and plumbing fixtures
 - j. Smaller sized ducts and flex ducts
 - k. Smaller size cold water and hot water piping, flex ducts, etc.
 - I. The Contractor shall not install any item until the coordination has been completed and reviewed by the Construction Manager, Owner, and A/E team.
 - J. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include, but not be limited to: voltage, ampacity, capacity, electrical and piping connections, space requirements, sequence of construction, building requirements and special conditions.
 - K. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

END OF SECTION

SECTION 26 03 13

ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. The contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen, and shall be responsible for repairing such loss or damage. The contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection and in-service maintenance of all electrical services for the new and existing facilities. The contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.
- B. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The contractor shall allow the Owner 2 weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.
- C. The contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being accomplished under this project.

1.2 RELATED SECTIONS

- A. Section 01120 - Alteration Project Procedures.
- B. Section 02072 - Minor Demolition for Remodeling.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.
- B. Include in the contract price all rerouting of existing conduits, wiring, outlet boxes, fixtures, etc., and the reconnecting of existing fixtures as necessitated by field conditions to allow the installation of the new systems. Furnish all temporary conduit, wiring, boxes, etc., as required to maintain lighting and power service for the existing areas with a minimum of interruption. Remove wire and conduit back to nearest accessible active junction box and extend to existing homeruns as required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Public Address System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from the Owner and at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Section 01120, Section 02072, and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition and extension work.
- J. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

- K. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.
- L. Where existing construction is removed to provide working and extension access to existing utilities, contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, air conditioning ductwork and equipment, etc., to provide this access and shall reinstall same upon completion of work in the areas affected.
- M. Where partitions, walls, floors, or ceilings of existing construction are being removed, all contractors shall remove and reinstall in locations approved by the Architect all devices required for the operation of the various systems installed in the existing construction.
- N. During the construction and remodeling, portions of the project shall remain in service. Construction equipment, materials, tools, extension cords, etc., shall be arranged so as to present minimum hazard or interruption to the occupants of the building.
- O. Certain work during the demolition phase of construction may require overtime or nighttime shifts or temporary evacuation of the occupants. Coordinate and schedule all proposed down time with the Owner's Representative at least 72 hours in advance.
- P. All existing lighting fixtures, switches, outlets, speakers, materials, equipment and appurtenances not included in the remodel or alteration areas are to remain in place and shall remain in service.
- Q. Electrical equipment, outlets, speakers, circuits to mechanical and building systems equipment, etc., which are to remain but which are served by conduit and/or circuiting that is disturbed by the remodeling work, shall be reconnected in such a manner as to leave it in proper operating condition.
- R. Existing branch circuit wiring which is to be removed, shall be pulled from the raceways and the empty conduit shall be removed to a point of permanent concealment.
- S. Within the remodeled or alteration areas where existing walls are being removed, all existing lighting fixtures, switches, receptacles, other materials and equipment and their appurtenances shall be removed, where required by the remodel work either shown or specified.
- T. New circuiting indicated to be connected to existing panels shall be connected to "spares" and/or "released" breakers as applicable, or new breakers provided where space is available. Contractor shall verify the existing panel load and feeder capacity prior to adding any additional loads.
- U. In all the remodeled areas where existing ceilings are being removed and reinstalled, all existing lighting fixtures, other ceiling mounted devices (i.e. smoked detectors, speakers, etc.) and their appurtenances shall be removed and reinstalled, unless otherwise shown or specified. This also applies to new ceiling installations.
- V. Existing lighting fixtures shown to be removed and indicated to be reused, shall be cleaned, repaired, and provided with new accessories as required for the proper operation in their new locations. Provide new lamps and ballast as required.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

3.5 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Section 01120.

3.6 REMOVAL OF MATERIALS

- A. The contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner, and shall be delivered to such destination as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The contractor may, at his discretion and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.
- B. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The contractor shall clean, repair, and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.
- C. When items scheduled for relocation are found to be in damaged condition before work has been started on dismantling, the contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the contractor's responsibility and shall be repaired or replaced by the contractor as approved by the Owner, at no additional cost to the Owner.
- D. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.

END OF SECTION

SECTION 26 05 19

WIRE, CABLE AND RELATED MATERIALS

PART 1 - GENERAL

1.1 SCOPE

- A. Provide 600 volt building wire, cable and connectors and 300 volt wire, cable and connectors.
- B. WORK INCLUDED: Include the following Work in addition to items normally part of this Section.
 - 1. Wiring for lighting, dimming controls and power.
 - 2. Automatic Control Wiring.
 - 3. Connection of equipment shown.
 - 4. Fire Alarm System.
 - 5. Voice Communications and Sound System.
 - 6. Mineral Insulated Cable (MI)
- C. WORK SPECIFIED ELSEWHERE:
 - 1. Heating, ventilating, and air conditioning equipment.
 - 2. Structured cabling system.
 - 3. Coaxial cables

1.2 REFERENCE STANDARDS

- A. UL 4 - Armored Cable
- B. UL 83 - Thermoplastic-Insulated Wires and Cables
- C. UL 1063 - Standard for Machine-Tool Wires and Cables
- D. UL 1569 - Metal-Clad Cables
- E. UL 1685 - Standard for Safety Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
- F. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire
- G. NFPA 70 - National Electrical Code
- H. All wire cable and connectors shall be UL approved.
- I. NEMA
- J. NEMA Bulletin 119

1.3 ACCEPTABLE MANUFACTURERS

- A. 600 VOLT WIRE AND CABLE
 - 1. Southwire
 - 2. Encore
 - 3. Cerro
 - 4. Atkore

- B. 300 VOLT WIRE AND CABLE
 - 1. Westpenn
 - 2. Beldon
 - 3. Alpha
 - 4. Tappan - Southwire
- C. FLEXIBLE CABLE SYSTEMS
 - 1. AFC Modular Cable Systems
 - 2. Kaf-Tech
- D. CONNECTORS
 - 1. IlSCO
 - 2. Cooper
 - 3. AMP - TYCO
 - 4. Burndy
 - 5. Ideal
 - 6. 3M
 - 7. O.Z. Gedney
 - 8. Thomas & Betts
 - 9. Buchanan

1.4 SUBMITTALS

- A. Shop drawings shall include, but not limited to:
 - 1. Cutsheets of wire, cable and connectors to indicate the performance, fabrication procedures, product variations, and accessories.

1.5 REQUIREMENTS OF REGULATORY AGENCIES WORK IN ACCORDANCE WITH:

- A. National Electrical Code.
- B. Local, municipal, or state codes that have jurisdiction.

PART 2 - PRODUCTS

2.1 WIRING

- A. All wire shall be new and continuous without weld, splice, or joints throughout its length. It must be uniform in cross-section, free from flaws, scales and other imperfections.
- B. WIRE MATERIAL: Conductors shall be soft drawn, annealed copper. Aluminum wiring is not acceptable unless otherwise noted on drawings.
- C. TYPES:
 - 1. Provide type "THHN/THWN-2" insulation for all buried feeders and service entrance conductors.
 - 2. Provide type "THHN/THWN-2" insulation for all branch circuits and above grade feeders.
 - 3. All wire No. 8 and larger shall be stranded. All wire No. 10 and smaller shall be stranded or solid.
 - 4. Provide type "XHHW" or other 90 degrees insulation wiring for branch circuit wiring installed through continuous rows of fixture bodies.
 - 5. All 300-volt cable including but not limited to telephone, fire alarm, data, CATV and security shall be UL listed for use in return air plenums.
 - 6. All dimming conductors shall be 300 volt, 75 C plenum rated. Dimming conductors shall be solid. Stranded conductors are not acceptable.
- D. CONDUCTOR SIZES
 - 1. Feeder conductors shall be sized for a maximum of 2% drop in rated voltage at scheduled load.

2. Branch circuit conductors shall be sized for a maximum 3% drop in the rated voltage to the longest outlet on the circuit.
 3. Minimum wire shall be 12 AWG, unless otherwise shown on Drawings or required by Code.
 4. Minimum wire size for 0-10v dimming controls shall be 18 AWG for conductors not exceeding 300 feet circuit length (one-way) and 16 AWG for those exceeding 300 feet (one-way).
- E. COLOR CODING: No. 6 or larger shall use tape for color coding. No. 8 and smaller wire shall be color coded in accordance with the governing authority requirements or as follows:
- 120/208 Volt
 - Neutral: White
 - Phase A: Black
 - Phase B: Red
 - Phase C: Blue
 - Ground: Green
 - 277/480 Volt
 - Neutral: Gray
 - Phase A: Brown
 - Phase B: Purple
 - Phase C: Yellow
 - Ground: Green
 - 120/240 Volt
 - Neutral: White
 - Phase A: Black
 - Phase B: Orange
 - Phase C: Blue
 - Ground: Green
 - 0-10 Volt dimming conductors
 - Purple (source)
 - Pink (common)

2.2 METAL CLAD CABLE - TYPE MC (600 VOLT)

- A. Provide soft drawn solid copper conductors with type THHN/ THWN-2 insulation rated 90° C in dry locations. All conductors shall be color coded. Include a white neutral and green insulated grounding conductor. Branch circuits shall include a double sized neutral when more than one phase conductors are being utilized. The conductors shall use a binding tape with a printed legend and assembled in an interlocking steel armor raceway.

PART 3 - EXECUTION

3.1 WIRE

- A. Do not pull wire into conduit until Work of an injurious nature is completed. Where two or more circuits run to a single outlet box, each circuit shall be properly tagged. Wyreze or approved equal may be used as a lubricant where necessary.
- B. Splices shall be fully made up in outlet boxes with compression crimp-on type splice connectors.
- C. Joints and splices will not be permitted in service entrance or in feeders. Joints in branch circuits will be permitted where branch circuits divide, and then shall consist of one through-circuit to which the branch shall be spliced. Joints shall not be left for the fixture hanger to make. Connect joints and splices with Buchanan Series "2000" solderless connectors complete with insulating caps or properly sized twist on wire nuts. "Wago" push-in connectors are not acceptable.
- D. All stranded conductors shall be furnished with lugs or connectors.
- E. Connectors furnished with circuit breakers or switches shall be suitable for copper wire termination.

- F. "Sta-Cons" shall be used to terminate stranded conductors on all switches and receptacles.
- G. Metal Clad Cable - Type MC
 - 1. All light fixtures shall be connected from a branch circuit junction box using 1/2" flexible metal conduit or MC cable fixture pigtails not exceeding 8'-0". Provide #12 AWG conductors. All fixtures must be grounded by using a grounding conductor. Fixture to fixture wiring installed in accessible ceiling is not permitted. Fixture whips shall not lay on ceiling tile or grid. Provide caddy clips to provide additional support.
- H. All stranded #10 and small conductors shall be terminated with an approved solderless terminal if the device or light fixture does not have provisions for clamp type securing of the conductor.
- I. The jacket for all travelers used on 3-way and 4-way switches shall be pink.
- J. Route conductors for 480Y/277 systems in a separate raceway. Do not combine with 208Y/120 volt or 120/240 volt systems.
- K. Emergency circuits shall not be routed with normal conductors.

3.2 BALANCING SYSTEM

- A. The load on each distribution and lighting panel shall be balanced to within 10% by proper arrangement of branch circuits on the different phase legs. Provide written documentation showing results. Submit with O & M manuals.

3.3 LOW VOLTAGE WIRING

- A. Low voltage wiring, including dimming conductors, shall be plenum rated. All wiring in mechanical rooms, electrical rooms, drywall ceiling, inaccessible areas, underground, plaster ceiling, inside concealed walls areas exposed to occupant view, and other areas subject to physical damage shall be run in conduit.
- B. Low voltage wiring shall be routed in separate raceways from power wiring systems.
- C. Sleeves shall be placed in the forms of concrete, masonry and fire rated walls, floor slabs and beams, for the passage of wiring. Sleeves should be set in place a sufficient time ahead of the concrete work so as not to delay the work. Sleeves shall be rigid galvanized steel.
- D. Provide Caddy J-hooks supported independently from other system to support cable at 4-foot on center or closer if required by manufacturer.
- E. Provide a junction box to make up all joints and splices.
- F. Provide dimming conductors for all lighting circuits located in spaces with dimmer switches and theatrical lighting as indicated on the drawings and as specified.

3.4 GROUNDING

- A. Permanently connect all conduit work, motors, starters, and other electrical equipment to grounding system in accordance with NFPA 70.

3.5 CABLE SUPPORTS

- A. Provide cable supports in all vertical raceways in accordance with Article 300.19 of NFPA 70.

3.6 DEFECTS

- A. Defects shall include, but are not to limited to, the following:
1. Tripping circuit breakers under normal operation.
 2. Improperly connected equipment.
 3. Damaged, torn, or skinned insulation.

END OF SECTION

SECTION 26 05 26

GROUNDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The requirements of the General Conditions and Supplementary Conditions apply to all work herein.

1.2 SCOPE

- A. WORK COMBINED WITH OTHER SECTIONS: Combine the work specified herein with the following Sections to form a single responsibility for the Work:
1. Electrical.
 2. Basic materials and methods.
- B. Provide electrical service, equipment and wiring device grounding as shown, scheduled and as specified.
- C. The types of grounding include, but not limited to, the grounding bonding of all equipment devices, building steel piping, and as required by the National Electrical Code, Local Inspection Department and Power Company.

1.3 STANDARDS

- A. National Electrical Code (NFPA-70)
- B. Local municipal and State codes that have jurisdiction.
- C. NECA

1.4 ACCEPTABLE MANUFACTURES

- A. Provide grounding products manufactured by Copperweld and Cadweld.

1.5 SUBMITTALS

- A. Shop drawings shall include, but not limited to the following:
1. Cut sheets of ground rods, clamps and connectors.
 2. Grounding system diagram.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide all materials required to construct a complete grounded electrical system.
- B. GROUND RODS: Ground rods shall be 3/4" inch diameter by 10 feet long construction with copper jacket and a steel core.
- C. CLAMPS: Ground clamps shall be copper except for steel or iron pipes in which the clamps shall be galvanized iron.
- D. CONDUCTORS: Conductors shall be connected by means of an approved pressure connector or clamp.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. GENERAL: Install grounding system as shown and specified to ensure a properly grounded system.
- B. SERVICE ENTRANCE GROUNDING SYSTEM: Provide a main bonding jumper between the neutral and ground bus of each switchboard. Route a separate grounding electrode conductor in conduit from each main distribution panel to the ground rod grid, incoming cold water piping system, and to the "lightning protection system" (250 - 106 of NEC) under ground bonding loop. Provide a bonding jumper around water meter. The grounding electrode conductor shall be stranded copper, 98% conductivity and shall be run continuous without splices or joints and installed at least 12" below grade.
- C. BUILDING STEEL AND PIPING SYSTEM: Install a bonding jumper between building steel and metallic piping systems to bond them to the electrical grounding system.
- D. NEUTRAL: The neutral shall be grounded only at the service entrance and other separately derived systems. The neutral shall be kept separate from the grounding system and shall not be used as a ground.
- E. GROUNDING SEPARATELY DERIVED ALTERNATING CURRENT SYSTEM
 - 1. TRANSFORMERS: The center point (neutral) of each wye connected transformer shall be bonded to the case and the grounding electrode conductor shall be connected to the grounded conductor (neutral).
 - 2. STANDBY EMERGENCY GENERATOR: The generator neutral shall be bonded to the generator when a 4-pole switched neutral automatic transfer switch is specified.
- F. GROUNDING CONDUCTOR: A grounding conductor and metallic conduit system shall bond all equipment served by the electrical system. Provide a flexible bonding jumper for isolated metallic piping and ductwork and around expansion fittings and joints.
- G. CONDUIT GROUNDING BUSHING: Conduit terminating in equipment that has a ground bus such as switchboards, panelboards, etc., shall have grounding bushings installed. Ground each conduit by means of a grounding bushing and to the ground bus in the equipment.
- H. MOTORS: The frame of all motors shall be grounded.
- I. SPECIAL GROUNDING: Provide a #6 AWG copper grounding conductor for each telephone board, television system, etc. Terminate the grounding conductor on ground bus and to the building electrical grounding system. Refer to 800-40(d) and 820-40(d) of the NEC.
- J. REMOTE PANELBOARDS: Provide a grounding electrode conductor all remote panels as required by the NEC and shown on drawings.
- K. LIGHTING FIXTURES: Flexible fixture whips containing a green grounding conductor shall be used to connect light fixtures. Flexible fixture whips shall not exceed ten feet.
- L. RECEPTACLES: All receptacles shall be grounded using the branch circuit grounding conductor. Receptacles shall use an approved grounding yoke.
- M. POLES SUPPORTING OUTDOOR LIGHTING FIXTURES: Provide grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.2 TESTING

- A. Perform a ground resistance test using a biddle analog or digital portable earth/ground resistance tester. The system resistance shall not exceed 5 Ohms. Provide additional electrodes as required (refer to 250-84 and 250-56 of the most current edition NEC). Test shall not be conducted following wet weather. Provide personal instruments to conduct these tests and submit certified test for review. Test shall be verified by Engineer.

END OF SECTION

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract Documents, including General and Supplementary Conditions and Division 01 Specifications, apply to this section.

1.2 RELATED SECTIONS

- A. Section 01 91 00 - General Commissioning Requirements
- B. Section 23 09 63 - Energy Management and Control System (EMCS)

1.3 SUMMARY

- A. The commissioning of the lighting system and associated controls as well as the service and distribution equipment shall be performed by an impartial technical firm hired by the owner or shall be performed by the installing contractor if the owner has not hired a commissioning firm. The commissioning provider shall be certified under one or more of the following certifications:
 - 1. CxA - Certified Commissioning Authority - ACG
 - 2. CBCP - Certified Building Commissioning Professional - AEE
 - 3. CCP - Certified Commissioning Professional - BCA
 - 4. CPMP - Certified Process Management Professional - ASHRAE
 - 5. BSC - Building System Commissioning Certification - NEBB
- B. The commissioning provider (Commissioning authority) shall be responsible for leading the entire construction team through the commissioning process including, but not limited to, conducting the commissioning kick-off meeting, preparing the commissioning plan, preparing pre-functional checklists, preparing functional test scripts, participation in functional testing and preparation of required documentation and reports.

1.4 RESPONSIBILITIES

- A. Contractor: Responsibilities of the Contractor as relate to Commissioning Process include, but are not limited to the following:
 - 1. Facilitate coordination of Commissioning work by Commissioning authority.
 - 2. Attend Commissioning meetings or other meetings called by Commissioning authority to facilitate the Commissioning Process.
 - 3. Review Functional Performance Test procedures for feasibility, safety, and impact on warranty, and provide Commissioning authority with written comment on same.
 - 4. Provide all documentation relating to manufacturer's recommended performance testing of equipment and systems.
 - 5. Provide Operations & Maintenance data to Commissioning authority for preparation of checklists and training manuals.
 - 6. Provide As-built drawings and documentation to facilitate Testing.
 - 7. Assure and facilitate participation and cooperation of Sub Contractors and equipment suppliers as required for the Commissioning Process.
 - 8. Certify to Commissioning authority that installation work listed in Pre-Functional Checklists has been completed.
 - 9. Install systems and equipment in strict conformance with project specifications, manufacturer's recommended installation procedures, and Pre-Functional Checklists.
 - 10. Provide data concerning performance, installation, and start-up of systems.

11. Provide copy of manufacturers filled-out start-up forms for equipment and systems.
 12. Ensure systems have been started and fully checked for proper operation prior to arranging for Testing with Commissioning authority. Prepare and submit to Commissioning authority **written** certification that each piece of equipment and/or system has been started according to manufacturer's recommended procedure, and that system has been tested for compliance with operational requirements.
 - a. Contractor shall carry out manufacturer's recommended start-up and testing procedures, regardless of whether or not they are specifically listed in Pre-Functional Checklists.
 - b. Contractor is not relieved of obligation for systems/equipment demonstration where performance testing is required by specifications, but a Functional Performance Test is not specifically designated by Commissioning authority.
 13. Coordinate with Commissioning authority to determine mutually acceptable date of Functional Performance Tests.
 14. Provide qualified personnel to assist and participate in Commissioning.
 15. Provide test instruments and communications devices, as prescribed by Commissioning authority, required for carrying out Testing of systems.
 16. Proprietary test equipment required by the manufacturer, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process. Proprietary test equipment shall become the property of the Owner upon completion of commissioning.
 17. Ensure deficiencies found in the Commissioning Issues Log are corrected within the time schedule shown in the Commissioning Plan.
 18. Provide Commissioning authority with all submittals, start-up instructions manuals, operating parameters, and other pertinent information related to Commissioning Process. This information shall be routed through Architect.
 19. Provide commissioning authority with a certificate of readiness to show systems are ready to schedule functional testing.
 20. Prepare and submit to Commissioning authority proposed Training Program outline for each system.
 21. Coordinate and provide training of Owner's personnel.
 22. Prepare Operation & Maintenance Manuals and As-Built drawings in accordance with specifications; submit copy to Commissioning authority in addition to other contractually required submissions. Revise and resubmit manuals in accordance with Design Professionals and Commissioning authority's comments.
 23. Commissioning requires participation of this Division Subcontractors to ensure that systems are operating in manner consistent with Contract Documents. All costs associated with the participation of Contractor, Sub-Contractors, Design Professionals, and Equipment Vendors in the Commissioning Process shall be included as part of the Construction Contract.
- B. Subcontractors and vendors shall prepare and submit to Commissioning Agent proposed Startup procedures to demonstrate proper installation of systems, according to these specifications and checklists prepared by Commissioning authority.
- C. Electrical contractor shall provide a letter certifying the installed lighting controls meet documented performance criteria specified in the commissioning plan within 90 days of substantial completion.

1.5 COMMISSIONING PLAN

- A. Commissioning Process tasks and activities:
1. Commissioning kick-off meeting: Conducted by commissioning authority and attended by construction team and design team.
 2. Pre-functional checklists: Prepared by the commissioning authority and filled out by subcontractors performing the work that is applicable.
 3. Site visits to review installation of applicable systems and progress of checklist documentation performed and reported by commissioning authority.
 4. Functional testing: Commissioning authority shall conduct functional testing with assistance of applicable subcontractors and document successful results as well as deficiencies (issues). Functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing in accordance with plans and specifications.

5. Preliminary commissioning report: Commissioning authority shall issue a preliminary commissioning report to the owner that has results of the first round of functional testing including deficiencies discovered.
 6. Systems manual: Commissioning authority shall compile the systems manual using submittal data provided by the general contractor and applicable subcontractors.
 7. Final commissioning report: Commissioning authority shall issue final commissioning report documenting the entire process and final results of functional testing. Report shall include final testing and balancing report.
- B. Electrical System Equipment to be tested
1. Occupancy sensors.
 2. Time switch controls
 3. Daylighting controls.
 4. Automatic receptacle controls.
 5. Electrical Service and Distribution System.
- C. Testing functions and conditions
1. Daylighting control devices
 - a. Verify the devices have been calibrated, properly located and adjusted.
 - b. Loads adjust to light level set points in response to daylight.
 - c. Location of calibration equipment is accessible to authorized personnel only.
 2. Time switches
 - a. Verify schedule, time, date and programming is accurate.
 - b. Verify override time limit is set, battery is installed and switch operates the lights that are specified in the design documents.
 - c. All specified lights can be turned on and off by area control switch.
 - d. Manual override switch allows only the lights in the space where the switch is located turn on or remain on until next scheduled shut off.
 3. Occupant sensors:
 - a. Certify the sensor has been located and aimed in accordance with manufacturer recommendations.
 - b. For projects with fewer than seven sensors, each sensor shall be tested.
 - c. For projects with more than seven occupant sensors, testing shall be done for each unique combination of sensor type and space geometry. Where multiples of each combination are provided not less than 10 percent shall be tested.
 - d. Verify correct operation of status indicators.
 - e. Controlled lights turn off or down to the permitted level within the required time.
 - f. For auto-on sensor, the lights turn-on to the permitted level when an occupant enters space.
 - g. Verify the lights are not incorrectly turned-on by movement in adjacent areas or by HVAC operation.
 4. Electrical Service and Distribution System
 - a. Document the ground resistance testing performed by contractors.
 - b. Document electrical subcontractor has adjusted breakers to setting recommended by coordination study.
 - c. Document that any required infrared studies are performed.
 - d. Document testing of transformer insulation and voltage drop.
 - e. Document any other testing requirements have been fulfilled as required within specifications.
- D. Performance criteria
1. Daylighting controls shall maintain specified light levels within 5% of design.
 2. All time switches shall be accurate to time on cellular network devices.

PART 2 - PRODUCTS

2.1 NO PRODUCTS SUPPLIED

PART 3 - EXECUTION

3.1 GENERAL

- A. This Division has startup responsibilities and are required to complete sub-systems so COMPLETE SYSTEMS are fully functional. Insuring they meet design requirements of Contract Documents. Commissioning procedures and testing do not relieve or lessen this responsibility or shift this responsibility, in whole or in part, to Commissioning Agent or Owner.
- B. Coordinate with other Sub-Contractors and equipment vendors to set aside adequate time to address Pre-Functional Checklists, Functional Performance Tests, Operations & Maintenance Manual creation, Owner Training, and associated coordination meetings.
- C. Commissioning authority will also conduct site inspections at critical times and issue Cx Field Reports with observations on installation deficiencies so that they may be issued by Architect as deemed appropriate.

3.2 WORK PRIOR TO COMMISSIONING

- A. Complete all phases of the work so the systems can be started, adjusted, balanced and otherwise tested.
- B. See pertinent specification sections in this Division, which outline responsibilities for start-up of equipment with obligations to complete systems, including all sub-systems so that they are fully functional.
- C. Assist Commissioning Agent with all information pertaining to actual equipment and installation as required complete the full commissioning scope.
- D. Contractor shall prepare startup procedures to demonstrate compliance with pre-functional checklists, and coordinate scheduling for completion of these checklists.
- E. A minimum of seven (7) days prior to date of system startup, submit to Commissioning Agent for review, detailed description of equipment start-up procedures which contractor proposes to perform to demonstrate conformance of systems to specifications and Checklists.

3.3 PARTICIPATION IN COMMISSIONING

- A. Attend meetings related to the Commissioning Process; arrange for attendance by personnel and vendors directly involved in the project, prior to testing of their systems.
- B. Provide skilled technicians to startup and test all systems, and place systems in complete and fully functioning service in accordance with Contract Documents.
- C. Provide skilled technicians, experienced and familiar with systems being commissioned, to assist Commissioning authority in commissioning process.

3.4 WORK TO RESOLVE DEFICIENCIES

- A. Complete corrective work in a timely manner to allow expeditious completion of Commissioning Process. If deadlines pass without resolution of identified problems, Owner reserves the right to obtain supplementary services and/or equipment to resolve the problem. Costs thus incurred will be Contractor's responsibility.

3.5 PRE-FUNCTIONAL CHECKLISTS (PFC)

- A. Contractor shall complete Pre-Functional Checklists to validate compliance with Contract Documents installation and start-up requirements, for this Division's systems.
- B. Refer to commissioning plan for detailed list of equipment to be commissioned.

3.6 FUNCTIONAL PERFORMANCE TESTING (FPT)

- A. Contractor, in cooperation with Commissioning Agent, shall conduct Functional Performance Testing to validate compliance with Contract Documents.
- B. Refer to commissioning plan for detailed list of equipment to be commissioned.
- C. Provide commissioning authority with a certificate of readiness to show systems are ready to schedule functional testing.
- D. Assist Commissioning authority in Functional Testing by removing equipment covers, opening access panels, etc. Furnish ladders, flashlights, meters, gauges, or other inspection equipment as necessary.
- E. Sampling
 - 1. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy.
 - 2. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. It is noted that no sampling by Subs is allowed in pre-functional checklist execution.
 - 3. A common sampling strategy is the "xx% Sampling - yy% Failure Rule", defined by the following example.
 - a. xx = the percent of the group of identical equipment to be included in each sample.
 - b. yy = the percent of the sample that if failing, will require another sample to be tested.
 - c. The example below describes a 20% Sampling - 10% Failure Rule.
 - d. Randomly test at least 20% (xx) of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitute the "first sample."
 - e. If 10% (yy) of the units in the first sample fail the functional tests, test another 20% of the group (the second sample).
 - f. If 10% of the units in the second sample fail, test all remaining units in the whole group.
 - g. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the responsible Sub to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.
- F. Re-Testing And Failure To Remedy Deficiencies
 - 1. Despite Contractor's best efforts to ensure systems are problem-free, it is expected that some deficiencies will be found during initial inspection of Pre-functional Checklist, and during initial Functional Testing; such deficiencies are expected to be minimal.
 - 2. It is Contractor's responsibility to remedy identified deficiencies, both in Pre-functional Checklist and in Functional Testing phases of work, in a timely and thorough manner.
 - 3. It is Contractor's responsibility to ensure that all deficiencies are corrected prior to requesting a re-inspection or re-test of systems and equipment. Do not request re-inspection or re-test until deficiencies are corrected.
 - a. At his discretion, CxA may agree to re-testing systems or equipment where deficiencies remain which are beyond Contractor's control to resolve expeditiously.
 - b. Typically such re-testing of incomplete systems and equipment will take place only if remaining deficiencies are minor in scope and nature, and are of such nature that they cannot be resolved in a timely manner (such as those due to difficulties in obtaining parts, or where Owner has requested a change that has delayed work, etc.)

4. CxA will carry out a second re-inspection or re-test of systems and equipment subsequent to receiving Contractor's request.
 - a. If CxA finds deficiencies identified in initial inspection or test have not been remedied (with exception of un-resolvable deficiencies in 3.b. above), and such remaining deficiencies are significant enough to require additional inspection or re-testing, Contractor will be back-charged for CxA's expenses, and time at a rate of \$150.00 per hour and \$100.00 expenses, for a third and any subsequent re-inspections and re-tests.
- G. Deferred Testing
 1. "Seasonal Commissioning" pertains to testing during peak heating or cooling seasons when HVAC equipment is operating at full-load or heavy-load conditions. Initial commissioning will be done as soon as contract work is completed, regardless of season. Seasonal Commissioning under full- or heavy-load conditions other than the current season will be handled at later time by GC and CxA.
 2. If adequate load may be artificially placed upon heating or cooling equipment, CxA, at his discretion, may perform functional testing during non-peak load periods.
 3. GC is to provide services of personnel and participate in seasonal testing process in the same manner as he would in non-seasonal testing.
 4. Until off-season commissioning can be accomplished, Owner may retain an amount from GC's payment sufficient to cover the cost of off-season testing.
 5. Unforeseen Deferred Tests: If any check or test cannot be completed due to building structure, required occupancy condition, or other reason, execution of checklists and functional testing may be delayed upon approval of Owner. Tests shall be conducted in same manner as seasonal tests, as soon as possible. Services of required parties will be negotiated. Make final adjustments to Operation and Maintenance Manuals and record drawings due to unforeseen deferred tests.
 6. GC is to provide services of personnel and participate in deferred testing in the same manner as he would for normal commissioning.

3.7 TRAINING

- A. The following requirements are in addition to Operations & Maintenance requirements specified elsewhere in this specifications manual.
- B. Contractor shall be responsible for training coordination and scheduling, and ultimately to ensure that training is completed.
- C. The training agenda (plan) shall include, at a minimum, the following elements:
 1. Purpose of equipment.
 2. Principle of how the equipment works.
 3. Important parts and assemblies.
 4. How the equipment achieves its purpose and necessary operating conditions.
 5. Most likely failure modes, causes and corrections.
 6. On site demonstration.
- D. Commissioning Agent shall be responsible for overseeing and approving content and adequacy of training of Owner personnel for all installed systems. Provide Commissioning Agent with training plan two weeks before planned training.

3.8 OPERATIONS & MAINTENANCE MANUALS

- A. The following requirements are in addition to Operations & Maintenance requirements specified elsewhere in this specifications manual.
- B. Contractor shall compile and prepare documentation for equipment and systems specified in this Division, and shall deliver documentation to Contractor for inclusion in Operation & Maintenance Manuals, in accordance with requirements of Division 01, prior to training Owner personnel.
- C. Provide Commissioning authority with a single, electronic copy of Operation & Maintenance Manuals for review. Commissioning authority's copy of O&M manuals shall be submitted through Architect.

- D. Operation and maintenance manuals shall include, service agency contact information, maintenance requirements, controls system settings and a narrative of how each system is intended to operate, including set points.

3.9 DOCUMENTATION

- A. Commissioning authority shall provide documentation of process as follows:
 - 1. Preliminary commissioning report including test procedures, results of testing, itemization of deficiencies, deferred tests and climatic conditions required for performance of deferred tests. Preliminary commissioning report shall be issued to owner to demonstrate the first pass of testing has occurred and to demonstrate compliance with applicable codes.
 - 2. Final commissioning report shall include the final test and balance report, final results of functional testing, disposition of deficiencies discovered during testing, including the details of corrective measures used and functional testing procedures used for repeatability of testing in the future.

END OF SECTION

SECTION 26 09 36

LIGHTING CONTROLS (STAND-ALONE)

PART 1 - GENERAL

1.1 SCOPE

- A. Electrical contractor shall provide a complete lighting control system that controls all interior and exterior lighting fixtures, including emergency fixtures. All lighting controls shall be stand-alone, and shall not have any communication with adjacent spaces. It is the contractor's responsibility to provide a complete and functional system, including, but not limited to all room controllers, switch packs, power packs, occupancy sensors, low voltage control stations, emergency bypass controllers, low voltage control cable, even if not specifically called out on the plans.

1.2 SUMMARY

- A. Section Includes:
 - 1. Digital Occupancy and Daylighting Sensor Control
 - 2. Emergency Lighting Control
 - 3. Control Intent – Control Intent includes, but is not limited to:
 - a. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
 - b. Initial sensor and switching zones
 - c. Initial time switch settings
 - d. Task lighting and receptacle controls
 - e. Emergency Lighting control

1.3 RELATED SECTIONS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section
- B. Section 26 02 00 - Basic Materials and Methods for Electrical
- C. Section 26 05 19 - Wire, Cable and Related Materials: line and low voltage conductors, dimming conductors, securement requirements.
- D. Section 26 27 26 - Wiring Devices
- E. Section 26 29 26 - Miscellaneous Electrical Controls and Wiring
- F. Section 26 51 19 - Lighting Fixtures - Light Emitting Diode (LED)

1.4 REFERENCES

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- D. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.
- E. UL 773A - Nonindustrial Photoelectric Switches for Lighting Control; Current Edition, Including All Revisions.
- F. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- G. UL 1008 - Transfer Switch Equipment; Current Edition, Including All Revisions.
- H. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.5 SYSTEM DESCRIPTION & OPERATION

- A. The Lighting Control system as defined under this section covers the following equipment:
 - 1. Room Controllers – Self-configuring and field-configurable, one, two or three relays controllers, 0-10 volt control for drivers (if applicable).
 - 2. Low Voltage Occupancy/Vacancy Sensors – Self-configuring or field-configurable, Low Voltage, calibrated occupancy sensors, Dual technology or PIR as described by this specification.
 - 3. Low Voltage On/Off Switches – Self-configuring or field-configurable, Low Voltage pushbutton switches, that may contain one, two, three, or four control zone capability per device.
 - 4. Low Voltage On/Off Dimmer Switches – Self-configuring or field-configurable, Low Voltage pushbutton switches, Dimmer and scene switches that may contain one, two, three, or four control zone capability per device.
 - 5. Photosensors – Low Voltage Single-zone closed loop daylighting sensors with switching or dimming control for daylight harvesting.
 - 6. Configuration Tools – Handheld remote for room configuration provides two-way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have, at a minimum, simple pushbutton interface and allow send/receive of room variables and occupancy/vacancy/photo/daylight sensor settings.
 - 7. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building. Under loss of normal power, the ELCU shall bypass any control device and ensure fixtures are enabled at 100% light output. Comply with UL 924 and UL 1008 as applicable for each instance. Comply with 26 51 19.
- B. System shall accommodate the square-footage coverage requirements for each area controlled, utilizing power packs, occupancy and vacancy sensors, switches, daylighting sensors and accessories that suit the required lighting and electrical system parameters.
- C. Lighting control system shall be configured to fail "on".
- D. System shall conform to requirements of NFPA 70.

1.6 SUBMITTALS

- A. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.
- B. Shop Drawings:
 - 1. Composite wiring and/or schematic riser diagram of each control circuit as proposed to be installed (standard diagrams will not be accepted).
 - 2. Scale drawing for each area showing exact location of each sensor, room controller, and digital switch.
 - 3. Riser diagrams to express lighting control hardware and wiring required to meet lighting control sequence of operations.
- C. Product Data: Catalog sheets, specifications and installation instructions.
- D. Include data for each device which:

1. Indicates where sensor is proposed to be installed.
2. Prove that the sensor is suitable for the proposed application.

1.7 QUALITY ASSURANCE

- A. Manufacturer: Minimum 7 years experience in manufacture of lighting controls, unless specifically listed in this specification.
- B. Lighting controls shall meet the minimum requirements of ICC (IECC) and ASHRAE Std 90.1 I-P as applicable.

1.8 PROJECT CONDITIONS

- A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
 1. Ambient temperature: 0° to 40° C (32° to 104° F).
 2. Relative humidity: Maximum 90 percent, non-condensing.

1.9 WARRANTY

- A. Provide a five year complete manufacturer's warranty on all products to be free of manufacturers' defects.

1.10 MAINTENANCE

- A. Spare Parts:
 1. Provide 5 spares of each product listed below to be used for maintenance.
 - a. Room Controllers
 - b. Power packs
 - c. Emergency Bypass controllers
 - d. Low voltage on/off switches
 - e. Low voltage wall sensor switch

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. WattStopper
- B. Acuity Brands
- C. Cooper/ILC/Greengate
- D. Sensorworx
- E. Steinel
- F. ETC

2.2 ALL OCCUPANCY SENSORS (CEILING OR WALL SWITCH)

- A. Where specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.
- B. Passive infrared sensors shall utilize Processing protocols to respond only to those signals caused by human motion.

- C. Passive infrared sensors shall provide high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line).
- D. Where specified, passive infrared ultrasonic and dual technology sensors shall offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.
- E. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
- F. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within $\pm 0.005\%$ tolerance, 32 kHz within $\pm 0.002\%$ tolerance, or 40 kHz $\pm 0.002\%$ tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.
- G. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- H. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.
- I. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
- J. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.
- K. All sensors shall have UL 94V-0 rated plastic enclosures.
- L. Outdoor sensors shall have UL 773A ratings. EWF outdoor sensors shall additionally have UL 1598 ratings.
- M. Outdoor sensors shall have an operating temperature range of -40°F to $+130^{\circ}\text{F}$
- N. To ensure complete protection from weather elements and exposure, outdoor sensors shall be rated and listed for outdoor use.
- O. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology room system. No additional configuration will be required.
- P. All devices shall be hard wired. No wireless devices shall be permitted.

2.3 WALL-SWITCH OCCUPANCY SENSOR

- A. Manual-ON, Automatic-OFF dual technology (passive infrared and ultrasonic) wall switch occupancy sensor. Furnish the Company's model which suits the electrical system parameters, and accommodates the square-foot coverage and wattage requirement for each area (and type of lighting) controlled;
- B. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
- C. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
- D. Wall switch products shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.

- E. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

2.4 WALL OR CEILING MOUNTED OCCUPANCY SENSOR SYSTEM

- A. Ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor. provide the Company's system which accommodates the square-foot coverage requirements for each area controlled, utilizing room controllers, occupancy sensors and accessories which suit the lighting and electrical system parameters. Passive infrared only sensors shall not be used for classroom applications.
- B. Occupancy Sensors shall provide Features include the following: digital or analog calibration and pushbutton/dip-switch/dial programming for the following variables:
 - 1. Sensitivity – 0-100% in 10% increments
 - 2. Time delay – 1-30 minutes in 1 minute increments
 - 3. Test mode – Five second time delay
 - 4. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - 5. Walk-through mode
 - 6. Load parameters including Auto/Manual-ON, and daylight enable/disable when photosensors
- C. Device Status LEDs including:
 - 1. PIR Detection
 - 2. Ultrasonic detection
 - 3. Configuration mode
 - 4. Load binding
- D. Manual override of controlled loads.

2.5 WALL SWITCHES

- A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 6 button configuration; available in white, light almond, ivory, grey and black; compatible with wall plates with decorator opening. Wall switches shall include the following features:
 - 1. Two-way infrared (IR) transceiver for use with configuration remote controls.
 - 2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
 - 3. Configuration LED on each switch that blinks to indicate data transmission.
- B. RJ-45 ports, or other manufacturer provided wiring method, for connection of devices on a common system.
- C. Plug and play technology. Devices in the same room may be interconnected together and operate in default mode without any programming. Devices in a common space may be connected together, in a manner to be described and installed by the manufacturer's installation guidelines and requirements.

2.6 ROOM CONTROLLERS

- A. Room Controllers automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers shall be simple to install and may contain dip switches, potentiometers, or other easily adjustable field devices to allow for easy modification. All shall include the following features:
 - 1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
 - 2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.
 - 3. Quick installation features including:

- a. Standard junction box mounting
- b. Quick low voltage connections using standard RJ-45 patch cable
4. Plenum rated
5. Manual override and LED indication for each load
6. Dual voltage (120/277 VAC, 60 Hz)
7. Zero cross circuitry for each load.

2.7 PHOTSENSORS

- A. Digital photosensors work with room controllers or dimming relay packs to provide automatic switching or dimming daylight harvesting capabilities for any load type connected to a room controller/relay pack. Closed loop photosensors measure the ambient light in the space and control a single lighting zone. Open loop photosensors measure incoming daylight in the space and are capable of controlling up to three lighting zones. Photosensors shall be interchangeable without the need for rewiring.
- B. Digital photosensors include the following features:
 1. An internal photodiode that measures only within the visible spectrum and has a response curve that closely matches the photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrum. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
 2. Sensor light level range shall be from 1-1,000 footcandles (fc).
 3. The capability of switching one-third, one-half or all lighting ON and OFF, or raising or lowering lighting levels, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).
 4. For switching daylight harvesting, the photosensor shall provide a deadband or a separation between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling after they turn off.
 5. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a user-selectable minimum level.
 6. Infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
- C. Closed loop digital photosensors include the following additional features:
 1. An internal photodiode that can be located within a space to remove unwanted light collection from the diode. Wide open light receptors are not permitted. Sensors must be sensitive enough to only detect ambient lighting in the intended detection zone.
 2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.
 3. Automatically establishes setpoints following self-calibration.
 4. A sliding setpoint control algorithm for dimming daylight harvesting with a "Day Setpoint" and the "Night Setpoint" to prevent the lights from cycling.
- D. Open loop digital photosensors include the following additional features:
 1. An internal photodiode that can be located within a space to remove unwanted light collection from the diode. Wide open light receptors are not permitted. Sensors must be sensitive enough to only detect ambient lighting in the intended detection zone.
 2. Automatically establishes setpoints following calibration using a wireless configuration tool or a PC with appropriate software.
 3. A proportional control algorithm for dimming daylight harvesting with a "Setpoint" to be maintained during operation.

2.8 POWER PACKS

- A. Control Units - For ease of mounting, installation and future service, control unit(s) shall be able to externally mount through a 1/2" knock-out on a standard electrical enclosure and be an integrated, self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power. Control unit shall provide power to a minimum of five (5) sensors.

- B. Relay Contacts shall have ratings of 20A, 16A continuous, LED Lighting loads, switched receptacle and associated common motor loads that can be fed by common 5-20R receptacles.
- C. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Do not begin installation until measurements have been verified and work areas have been properly prepared.
- B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that required pre-installation meeting specified in Part 1 of this specification has been completed, recorded meeting minutes have been distributed and all outstanding issues noted have been resolved prior to the start of installation.

3.2 INSTALLATION

- A. Contractor must arrange virtual or phone meeting with the manufacturer before project rough-in to ensure the hardware, cabling, and overall system requirements are understood and met.
- B. All line voltage connections shall be tagged to indicate circuit and switched legs.
- C. Test all devices to ensure proper communication.
- D. Electrical contractor shall calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings. Adjust time delay so that controlled area remains lighted while occupied.
- E. Tighten all panel Class I conductors from both circuit breaker and to loads to torque ratings as marked on enclosure UL label.
- F. All Class II cabling shall enter enclosures from within low-voltage wiring areas and shall remain within those areas. No Class I conductors shall enter a low-voltage area.
- G. Run separate neutrals for any phase dimmed branch load circuit. Different types of dimming loads shall have separate neutral.
- H. Contractor shall provide to the manufacturer all quantities for system including but not limited to relays, room controllers, relay panels, plug load controllers, switches, sensors and wire lengths and configurations for device cable at least 1 week before bid.
- I. Install all devices as required by manufacturer submitted shop drawings and installation guidelines. Wiring details included with the construction documents are for general scope of work, and exact wiring and connections may vary by manufacturer.
- J. The contractor shall coordinate rough-in size and quantity with the number of devices necessary. Since many control devices may accommodate multiple switch legs in a single gang, there may be an indirect relationship between number of devices and number of control zones.
- K. Provide J-hooks for supporting all low-voltage cabling at a spacing not to exceed 5 ft. between hooks.
- L. Provide dimming conductors for all dimming zones, as indicated by presence of dimmer devices on the plans.

- M. The lighting control system must function within the guidelines stated in the lighting control sequence of operation notes, details, matrices, and narratives on the plans.

3.3 COMMISSIONING

- A. Upon completion of the installation, the system shall be commissioned by a commissioning agent representative who will verify a complete fully functional system is installed as required by plans and specifications.
- B. Provide a training session for the owner's operations personnel. Training session shall be performed by a qualified person who is knowledgeable in the subject/equipment. Submit a training agenda two (2) weeks prior to the proposed training session for review and approval. Training session shall include at the minimum:
 - 1. Purpose of equipment.
 - 2. Principle of how the equipment works.
 - 3. Important parts and assemblies.
 - 4. How the equipment achieves its purpose and necessary operating conditions.
 - 5. Most likely failure modes, causes and corrections.
 - 6. On site demonstration.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SCOPE

- A. Provide panelboards as shown, scheduled and as specified herein.
- B. The types of panelboards include:
 - 1. Panelboards.
 - 2. Power distribution panelboards.

1.2 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- C. UL 67 - Panelboards; Current Edition, Including All Revisions.
- D. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- E. UL 943 - Ground fault Circuit Interrupters
- F. NEMA PB 1 - Panelboards
- G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less
- H. NEMA, ABI, Molded Car Circuit Breakers and Molded Case Switches
- I. Federal Spec W-P 115, Rev C, Panel, Power Distribution
- J. NEMA KSI, Enclosed and Miscellaneous Distribution Equipment Switches (600V)

1.3 ACCEPTABLE MANUFACTURERS

- A. Provide one of the following manufacturers:
 - 1. General Electric Company/ABB
 - 2. Square D Company
 - 3. Siemens
 - 4. Eaton
- B. All panelboards shall be designed, factory-manufactured, factory-assembled, and factory-tested by a single manufacturer listed above. The manufacturer shall be fully responsible for the complete panelboard assembly, including enclosures, bus, overcurrent devices, controls, metering (as applicable) and all internal wiring.

- C. Panelboards assembled by third-party panel shops, system integrators, or channel partners not owned or operated by the listed manufacturer are strictly prohibited.

1.4 SUBMITTALS

- A. Shop drawings shall include, but not be limited to:
 - 1. Cutsheets of all enclosures, circuit breakers, fusible switches, bussing, rating, schedules and all accessories clearly labeled.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

- A. WORK IN ACCORDANCE WITH:
 - 1. NFPA 70
 - 2. Local, municipal, or state codes that have jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. General
 - 1. Provide power distribution and panelboards as indicated in the panelboard schedule and as shown on the plans. Load centers are acceptable for use in dwelling units. Power distribution panelboards shall be equipped with fusible switches or circuit breakers as shown on the schedule. Panelboards shall be equipped with thermal-magnetic, molded case circuit breakers of frame and trip ratings as shown on the schedule.
- B. Busing Assembly and Temperature Rise
 - 1. Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 65°C. rise above 40°C ambient. Heat rise test shall be conducted in accordance with Underwriters Laboratories Standard UL 67. The use of conductor dimensions will not be accepted in lieu of actual heat tests. All current carrying parts of the bus shall be tin or silver plated copper.
 - 2. Bus structure shall be isolated. Bus bar connections to the branch circuit breakers shall be distributed phase or phase sequence type and shall accept bolt-on circuit breakers for lighting and appliance panelboards.
 - 3. The lugs for terminating conductors shall be rated at 75°C on all panel boards and circuit breakers.
 - 4. Provide a non-insulated bare copper ground bus. Provide an isolated ground copper bus in each panel serving isolated ground circuits as indicated on panel schedule or one-line diagram. Provide a full size copper neutral bus in each panelboard enclosure. Provide a 200% neutral buss when served by a harmonic mitigating transformer and any K4 or higher rated transformers.
- C. 480/277 Volt Panelboards
 - 1. Main breakers shall be vertically mounted. Branch mounted main breakers are not acceptable. Provide electronic trip mains with long term, short term and instantaneous trips as indicated on drawings and required for selective coordination.
 - 2. Circuit breakers shall be bolt-on thermal-magnetic, molded case circuit breakers. Breakers shall be 1, 2 or 3 pole with an integral crossbar to assure simultaneous opening of all poles in multiple circuit breakers. Breaker shall have an over-center, trip-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIPPED" positions. Circuit breakers shall be UL listed in accordance with UL Standard 489 and shall be rated 277 volt ac (single pole, 15-30 amperes) or 480Y/277 volts ac (2 and 3 pole) with continuous current ratings as noted on the plan. Interrupting ratings shall be a minimum of 18,000 rms symmetrical amperes at 277 volts ac (single pole) or 480Y/277 volts ac (2 and 3 pole) unless otherwise noted on plans.
 - 3. Provide circuit breakers with lock-on devices for applications where dedicated branch circuits are serving battery-equipped emergency lighting fixtures, exit signs or fire alarm equipment per Article 700 of NFPA 70.

D. 240 Volt Panelboards

1. Main breakers shall be vertically mounted. Branch mounted main breakers are not acceptable. Provide electronic trip mains with long term, short term and instantaneous trips as indicated on drawings and required for selective coordination.
2. Circuit breakers shall be bolt-on thermal-magnetic, molded case circuit breakers. Breakers shall be 1, 2, or 3 pole with an integral crossbar to assure simultaneous opening of all poles in multiple circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIPPED" positions.
3. Circuit breakers shall be UL listed in accordance with UL 489 and shall be rated 240 volts ac maximum with continuous current rating as noted on the plans.
4. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip settings of the breaker to prevent repeated arcing short resulting from frayed appliance cords. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" at 120V ac and carry the SWD marking.
5. UL Class A 5mA ground fault circuit protection shall be provided on all receptacle circuits serving wet areas and on all 120V ac branch circuits as specified on the plans or panelboard schedule. This protection shall be an integral part of the branch circuit breaker which also provides overload and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard branch circuit space than a conventional circuit breaker.
6. UL Class B 30mA ground fault circuit protection (GFEP) shall be provided on all equipment circuits requiring ground fault protection. This protection shall be an integral part of the branch circuit breaker which also provides overload and short circuit protection for branch circuit wiring.
7. Provide Shunt Trip Breakers including control power for circuits under cooking hoods and other equipment having this requirement.
8. Provide Breakers with Switched Neutral circuits with common trip for gasoline pumps and other equipment having this requirement.
9. Circuit breakers shall be rated 10,000 AIC at 240V unless otherwise noted on plans or served by transformers greater than 150 kVA.
10. Provide 200% sized neutral bus with panels served from a non-linear transformer and any K4 or higher rated transformers. This shall be a UL approved assembly.
11. Provide circuit breakers with lock-on devices for applications where dedicated branch circuits are serving battery-equipped emergency lighting fixtures, exit signs or fire alarm equipment per Article 700 of NFPA 70.

E. Cabinets and Fronts

1. The panelboard bus assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL 50 for cabinets. Wiring gutter space shall be in accordance with UL 67 for panelboards. The box shall be fabricated from galvanized steel or equivalent rust resistant steel. Provide stainless steel front cover for all panels located in all Pool Equipment rooms, Food Labs, Snack Bars, Culinary Arts, Kitchens and Life Skills rooms. All NEMA-1 panels shall have hinged front covers. The front cover shall have a door with hinges, latch and a lock. The piano hinged front covers door-in-door shall allow full access to the circuit breaker gutter area without having to remove the entire front cover. All panelboard lock shall be keyed alike. Circuit breaker and fusible distribution panels shall have four-piece trims. A welded circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. Provide NEMA 1 enclosure where installed indoors unless otherwise noted. Provide NEMA 3R enclosure where installed outside or in a sprinkled area.

F. Safety Barrier

1. The distribution panelboard interior assembly shall be dead front with panelboard cover removed. Main lugs or main breakers shall have a barrier. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the bus structure opposite the mains shall have barriers.

G. Integrated Equipment Short Circuit Rating

1. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the integrated equipment rating shown on the panelboard schedule or on the plans. This rating shall be established by testing with the over-current devices mounted in the panelboard. The short circuit tests on the over-current devices and on the panelboard structure shall be made simultaneously by connecting the fault to each over-current device with the panelboard connected to its rated voltage source. Method of testing shall be per UL 67. The source shall be capable of supplying the specified panelboard short circuit current or greater. Testing of panelboard over-current devices for short circuit rating only while individually mounted is not acceptable. Also, testing of the bus structure alone is not acceptable. Panelboards shall be marked with their maximum short circuit current rating at the supply voltage and shall be UL listed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install panelboards, including electrical connections, in accordance with manufacturers written instructions, NFPA 70 and recognized industry practices.
- B. All panels shall be mounted to unistrut. Unistrut shall be securely mounted to the floor and structural ceiling. Toggle bolts or anchor bolts attached to drywall is not acceptable.
- C. Housekeeping Pads: Mount floor mounted panelboards on 4 inch high concrete housekeeping pads.
- D. Fuses: Install fuses of the rating and class as shown in each fusible distribution panel scheduled on drawings.
- E. Conduits: Stub up three one inch conduits to an accessible location above the ceiling for each recessed panelboard.

3.2 IDENTIFICATION

- A. Nameplate: Each panelboard shall have an engraved bakelite nameplate. Nameplates shall be white with black letters and show panel designation. Nameplates shall be attached with stainless steel screws. Refer to Section 26 02 00, paragraph 2.8(C).
- B. Directory Card: Cardholders and directory cards shall be furnished for circuit identification in panelboards. Cardholder shall be located on inside of panel door and shall be in a metal frame with clear plastic front. Circuit lists shall be typewritten. Circuit descriptions shall include location and name of each item of equipment served. Spares and spaces shall be written in erasable pencil for future use. Circuit directory shall show the room served by each circuit. The final graphs/signage room numbers shall be used. Do not use Architectural numbering on plans.
- C. Replacement Components: Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturers, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state "caution - Series Rated System." (NEC 110-22). Nameplate shall also identify replacement components.
- D. Replacement Components: Nameplate shall identify replacement components.

3.3 INFRARED SCANNING

- A. After Substantial Completion by not more than 2 months after Final Acceptance, perform an infrared scan of each panelboard. Remove fronts if not equipped with viewing ports to make joints and connections accessible to a portable scanner. Submit a copy the owner and engineer for review. If O&M manuals are submitted prior to performance of infrared scan, contractor shall submit a signed letter to verify the scan has been arranged. Letter shall indicate the scan provider and the date It will be performed.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE

- A. Provide wiring devices as shown, scheduled, required and as specified.
- B. The types of wiring devices required include:
 - 1. Switches
 - 2. Receptacles
 - 3. Occupancy Sensors
 - 4. Digital Timer Switches
 - 5. Coverplates

1.2 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); 2017g (Validated 2023).
- C. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- D. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- H. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- I. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- J. UL 1699 - Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 QUALITY ASSURANCE

- A. All wiring devices shall comply with NEMA WD 1 and NEMA WD 6 as well as FS W-C-596 and FS W-S-896 as applicable.
- B. All switches shall comply with UL 20 as applicable.
- C. All receptacles shall comply with UL 498 as applicable.
- D. All GFCI receptacles shall comply with UL 943.
- E. All USB charging receptacles shall comply with UL 1310.

- F. All AFCI receptacles shall comply with UL 1699.

1.4 ACCEPTABLE MANUFACTURERS

- A. Hubbell
- B. Leviton
- C. Pass & Seymour

1.5 SUBMITTALS

- A. Shop drawings shall include but not be limited to:
 - 1. Cut sheets of all devices indicating NEMA configuration, rating, materials, color, and all accessories.
 - 2. Cut sheets of all coverplates indicating materials, color and any engraving specified on drawing or in the specifications.

1.6 REQUIREMENTS OF REGULATORY AGENCIES WORK IN ACCORDANCE WITH

- A. National Electric Code.
- B. Local, municipal, or state codes that have jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. GENERAL
 - 1. Provide factory assemble wiring devices with the rating type and color as required and specified for the service indicated.
 - 2. Provide matching one-piece multiple gang plates where switches are ganged.
 - 3. Provide wall plates for each receptacle furnished.
 - 4. Architect reserves the right to select wiring device styles and colors to match wall finish.
 - 5. Wall plates shall be of same manufacturer as devices.

2.2 SWITCHES

- A. Provide specification grade White toggle switches where indicated on the Drawings. Provide "Red" switches for switching emergency lighting circuits where switching is indicated. Coordinate exact locations with architect.

- 1. Wall switches shall be 20 amp, 120-277 volt and shall be Hubbell, Leviton or P&S as follows:

TOGGLE SWITCHES	HUBBELL	LEVITON	P&S
SINGLE POLE	HBL1221	1221-2	PS20AC1
DOUBLE POLE	HBL1222	1222-2	PS20AC2
THREE WAY	HBL1223	1223-2	PS20AC3
FOUR WAY	HBL1224	1224-2	PS20AC4
MOMENTARY CONTACT	HBL1557	1257	1251
THREE POSITION, TWO CIRCUIT MAINTAINED CONTACT	HBL1385	1285	1225
KEY TYPE LOCKABLE BARREL KEY OR CORBIN STYLE	HBL1221-RKL	1221-2KL	PS20AC1-KL
PROVIDE WITH EXTRA KEYS	HBL1209RKL	2KL	4609
DISCONNECT SWITCH / INSTA HOT	HBL7810DS	MS303-DSS	7803

- 2. Dwelling units shall use Hubbell CS115I, CS120I, P&S CS15AC1, and CS20AC1.

3. Dimmers: Provide Lutron DIVA or equal as shown on drawings. Wall box dimmers shall be sized to handle the load served. Provide phase dimmers to control LED lamps when 0-10 volt dimming drivers are not provided.
 4. Light Handle Switches: Provide Hubbell HBL1221-IL, Leviton 1221-LHC, P&S PS20AC1-ISI lighted handles to switch emergency lights where noted on the drawings.
- B. Provide specification grade White decora style rocker switches where indicated on the Drawings. Provide "Red" switches for switching emergency lighting circuits where switching is indicated. Coordinate exact locations with architect.
1. Wall switches shall be 20 amp, 120-277 volt and shall be Hubbell Decorator Series, Leviton, Decora or Pass & Seymour Decorator, as follows:

ROCKER/DECORATOR SWITCHES	HUBBELL	LEVITON	P&S
SINGLE POLE	DS120	5621-2	2621
DOUBLE POLE	DS220	5622-2	2622
THREE WAY	DS320	5623-2	2623
FOUR WAY	DS420	5624-2	2624
MOMENTARY CONTACT	HBL1557	1257	1251
THREE POSITION, TWO CIRCUIT MAINTAINED CONTACT	HBL1385	1285	1225
KEY TYPE LOCKABLE BARREL KEY OR CORBIN STYLE	HBL1221-RKL	1221-2KL	PS20AC1-KL
PROVIDE WITH EXTRA KEYS	HBL1209RKL	2KL	4609
DISCONNECT SWITCH / INSTA HOT	HBL7810DS	MS303-DSS	7803

2. Dimmers: Provide Lutron DIVA or equal where required. Wall Box dimmers shall be sized to handle the load. Provide Phase dimmers to control LED lamps when 0-10V drivers are not provided.
3. Light Handle Switches: Provide Leviton 5649-2 or P&S 2625 lighted handles to switch emergency lights where noted on the drawings.

2.3 RECEPTACLES

- A. Provide specification grade White receptacles where indicated on the drawings. Provide "Red" receptacles for receptacles on emergency power. Coordinate exact location with architect.
1. Receptacles shall be Hubbell, Leviton or Pass & Seymour as follows:

CONVENTIONAL RECEPTACLES	HUBBELL	LEVITON	P&S
HEAVY DUTY BRASS MOUNTING YOKE NEMA 5-20R DUPLEX	HBL5352	5362	5362
HEAVY DUTY BRASS MOUNTING YOKE NEMA 5-20R SIMPLEX	HBL5361	5361	5361
ISOLATED GROUND 20A, 125V ORANGE NEMA 5-20R DUPLEX	IG5352	5362IG	IG5362
CLOCK HANGER 15A-125V BROWN WITH STAINLESS STEEL PLATE WITH HANGER	HBL5235	5361-CH	S3733-SS
GFCI DUPLEX 20A, 125V SELF TESTING, FEED THRU CAPABLE, TAMPER RESISTANT FOR LOCATIONS REQUIRING TAMPER RESISTANT INSTALLATION OR AS INDICATED ON THE DRAWINGS	GFRST20	GFTR2	2097TR
GFCI DUPLEX 20A, 125V SELF TESTING, FEED THRU CAPABLE, TAMPER/WEATHER RESISTANT FOR INSTALLATION IN DAMP/WET LOCATION OR AS INDICATED ON THE DRAWINGS	GFTWRST20	GFWR2	2097TRWR

HEAVY DUTY TAMPER RESISTANT BRASS MOUNTING YOKE	HBL5362WTR	5362-SG	---
TAMPER RESISTANT 20A, 125V DUPLEX	BR20WHITR	8300-SG	TR63-H
SURGE PROTECTION 20A, 125V DUPLEX, BLUE NEMA 5-20R WITH AUDIBLE ALARM	HBL5362SA	7380-B	5362SP
USB CHARGER TYPE DUPLEX 20A, 125V TAMPER RESISTANT, ONE USB TYPE A PORT, ONE USB TYPE C PORT. MIN. OF 5A USB OUTPUT.	USB20AC5 5A OUTPUT	T5833 5.1A OUTPUT	TR20USBAC6 6A OUTPUT
USB CHARGER TYPE DUPLEX 20A, 125V TAMPER RESISTANT, ONE HIGH OUTPUT POWER DELIVERY USB TYPE C PORT, ONE STANDARD USB TYPE A PORT.	USB20ACPD 20V, 55W TYPE C; 5V, 1.5A TYPE A	T5834 20V, 50W TYPE C; 5V, 2A TYPE A	---
PLUG LOAD CONTROLLED RECEPTACLES 20A, 125V TAMPER RESISTANT WITH TWO CONTROLLED FACES	BR20C2WHITR	TBR20-S2W	TR5362CDW
PLUG LOAD CONTROLLED RECEPTACLES 20A, 125V TAMPER RESISTANT WITH ONE CONTROLLED FACE	BR20C1WHITR	TBR20-S1W	TR5362CHW
ARC FAULT CIRCUIT INTERRUPTER RECEPTACLES	AF20TRW	AFTR2-W	AF202TRW
GROUND FAULT CIRCUIT INTERRUPTER / ARC FAULT DUAL FUNCTION	AFGF20TR	AGTR2-W	AFGF202TR

- B. Provide specification grade, Decora type White receptacles where indicated on the drawings. Provide "Red" receptacles for receptacles on emergency power. Coordinate exact location with architect.

1. Receptacles shall be Hubbell, Leviton, or Pass & Seymour as follows:

DECORATOR / DECORA RECEPTACLES	HUBBELL	LEVITON	P&S
DECORATOR DUPLEX 20A, 125V NEMA 5-15R SELF GROUNDING	DR20	16362	26342
DECORATOR SIMPLEX 20A, 125V NEMA 5-15R SELF GROUNDING	---	1635	26361
ISOLATED GROUND DUPLEX 20A, 125V ORANGE NEMA 5-20R	IG20DRx	16362-IG	IG26362
CLOCK HANGER 15A-125V BROWN WITH STAINLESS STEEL PLATE WITH HANGER	HBL5235	5361-CH	S3733-SS
GFCI DUPLEX 20A, 125V SELF TESTING, FEED THRU CAPABLE, TAMPER RESISTANT FOR LOCATIONS REQUIRING TAMPER RESISTANT INSTALLATION OR AS INDICATED ON THE DRAWINGS	GFRST20	GFTR2	2097TR
GFCI DUPLEX 20A, 125V SELF TESTING, FEED THRU CAPABLE, TAMPER/WEATHER RESISTANT FOR INSTALLATION IN DAMP/WET LOCATION OR AS INDICATED ON THE DRAWINGS	GFTWRST20	GFWR2	2097TRWR
TAMPER RESISTANT DUPLEX 20A, 125V NEMA 5-20R	DR20WHITR	16362-SG	TR26362
SURGE PROTECTION 20A, 125V DUPLEX, BLUE NEMA 5-20R WITH AUDIBLE ALARM	HBL5362SA	7380-W	5362SP
USB CHARGER TYPE DUPLEX 20A, 125V TAMPER RESISTANT, ONE USB TYPE A PORT, ONE USB TYPE C PORT. MIN. OF 5A USB OUTPUT.	USB20AC5 5A OUTPUT	T5833 5.1A OUTPUT	TR20USBAC6 6A OUTPUT

USB CHARGER TYPE DUPLEX 20A, 125V TAMPER RESISTANT, ONE HIGH OUTPUT POWER DELIVERY USB TYPE C PORT, ONE STANDARD USB TYPE A PORT.	USB20ACPD 20V, 55W TYPE C; 5V, 1.5A TYPE A	T5834 20V, 50W TYPE C; 5V, 2A TYPE A	---
PLUG LOAD CONTROLLED RECEPTACLES 20A, 125V TAMPER RESISTANT WITH TWO CONTROLLED FACE	DR20C2WHITR	16352-2PW	TR26362CDW
PLUG LOAD CONTROLLED RECEPTACLES 20A, 125V TAMPER RESISTANT WITH ONE CONTROLLED FACE	DR20C1WHITR	16352-1PW	TR26362CHW
ARC FAULT CIRCUIT INTERRUPTER RECEPTACLES	AF20TRW	AFTR2-W	AF202TRW
GROUND FAULT CIRCUIT INTERRUPTER / ARC FAULT DUAL FUNCTION	AFGF20TR	AGTR2-W	AFGF202TR

2.4 OCCUPANCY SENSORS

- A. Provide White dual technology wall mounted sensors, provide one of the following:
 - 1. Single Pole:
 - a. Wattstopper #DSW301
 - 2. Double Pole:
 - a. Wattstopper # DSW302
 - 3. Dimmer:
 - a. Wattstopper #DW311
- B. Provide dual technology ceiling sensor with low voltage controlling switch and power pack.
 - 1. Single Button:
 - a. Wattstopper # DT300 Sensor, BZ150 Power Pack and LVSW101 Digital Switch
 - b. Provide isolated relay for additional signaling to HVAC controls.
- C. Provide Ultra Sonic Ceiling sensor for restrooms.
 - 1. Wattstopper #UT3000, BZ150 Power Pack

2.5 DIGITAL TIMER SWITCHES

- A. Provide Wattstopper TS-400-G digital timer.
- B. The time switch shall provide audible notification and visual notification (blink the room lights) prior to turning lights off.
- C. The time switch shall have a 12-hour manual override setting.

2.6 COVERPLATES

- A. Furnish and install coverplates on all outlet boxes. Oversize (Jumbo) coverplates are not acceptable.
- B. Coverplates shall be smooth nylon and 302/304 smooth stainless steel in kitchen and coffee bar areas.
- C. Provide Hubbell WP Series, Bell, Carlon or Leviton NEMA 3R weatherproof coverplates on all exterior wiring devices. Enclosure shall be suitable for wet locations when in use.
- D. Coverplates shall be Hubbell SS Series, Leviton, Pass & Seymour 302/304 smooth stainless steel on all receptacles 30 amps and larger.

- E. Stainless steel device plates shall be provided at locations with tile or stone walls.

PART 3 - EXECUTION

3.1 WIRING DEVICE MOUNTING HEIGHTS

- A. Unless noted to the contrary on plans, or directed otherwise during the progress of the Work, wiring devices shall be set as follows:
 - 1. Switches 42" above finished floor.
 - 2. Wall mounted receptacles shall be installed vertically at 15 inches to the bottom outlet above finished floor unless otherwise noted or as required by local codes.
 - 3. Wall telephone outlets shall be mounted 15 inches to the bottom above finished floor unless otherwise noted. Mount even with wall mounted receptacles.
 - 4. At locations above counters, set devices at 6 inches above to the centerline counter tops, verify exact mounting height with the architect.

3.2 INSTALLATION (REFER TO 26 05 33 FOR OUTLET BOX SPECIFICATIONS)

- A. Wall switches shall be set in a suitable steel box and shall be installed on the strike side of the door as finally hung, whether so indicated on the Drawings or not.
- B. Receptacles shall be installed in a suitable steel box.
- C. The Architect reserves the right to relocate wiring device up to a distance of 5 feet from the location shown, before rough-in, without additional cost.
- D. Provide multi-gang device covers at locations where devices gang together.
- E. Device locations are indicated schematically on the drawings along with the type and mounting height. Final locations and mounting heights shall be coordinated with the Architect on the jobsite, and with shop drawings of equipment; including equipment to be furnished and installed by the Owner. Devices installed in walls covered with vinyl, fabric wallpaper or other special finishes shall be coordinated and verified with the Architect on the job site.
- F. Stranded wire termination to switches, receptacles, devices and miscellaneous control devices shall be with an approved solderless terminal if clamp type securing is not possible (i.e. Sta-Con crimp on fork tongue connectors; Burndy Type TP-F).
- G. Provide keyed switches in all common areas not monitored by the faculty (i.e. gym, corridors, cafeteria, commons natatoriums).
- H. All 15 amp and 20 amp receptacles shall be tamper-resistant type.
- I. All 20A, 120V receptacles in food service areas shall be GFCI.
- J. Provide GFCI circuit breakers for all drinking fountain branch circuits where GFCI receptacles are not indicated on plan.
- K. Provide ARC Fault circuit interrupters (AFCI) as required to comply with article 210.12 of NFPA 70. This shall include but not be limited to dwelling units and dormitories. AFCI breakers may be used.
- L. Provide ground fault circuit interrupter (GFCI)/ARC Fault circuit interrupter (AFCI) dual function receptacles to comply with articles 210.8, 210.12 and 406.4 of NFPA 70.
- M. Provide high output model for USB receptacles for applications where end user charging time is of high priority or where specifically indicated on the drawings. Provide standard output USB receptacles for all other applications.

- N. Contractor shall indicate the circuit serving each wiring device. Provide a typewritten label located on the inside face of the coverplate for all recessed mounted devices and on the outside of the coverplate on all surface mounted devices.

END OF SECTION

SECTION 26 43 13.13

SURGE PROTECTIVE DEVICES (SPD) - STANDARD INTERRUPTING

PART 1 - GENERAL

1.1 SCOPE

- A. Specify the electrical and mechanical requirements for a non-modular high-energy surge protective device system (SPD). The specified system shall provide effective high energy surge current diversion and be suitable for application in IEEE C62.41.1 Category A, B and C3 environments, as tested by IEEE C62.11, IEEE C62.45.
- B. The system shall be constructed using multiple surge current diversion modules utilizing metal oxide varistors (MOV) computer matched to +/- 1-volt variance and tested for manufacturer's defects. The modules shall be designed and constructed in a manner that ensures surge current sharing. Use of gas tubes, silicon avalanche diodes or selenium cells are unacceptable. Devices shall utilize a minimum of three (3) MOV's fuse links pair per phase. This will allow greater than 50% redundant protection in if a MOV fails.
- C. Third Party Test Report verifying surge current rating, longevity, testing, and filtering capabilities shall be provided with submittal.

1.2 REFERENCE STANDARDS

- A. The specified system shall be designed, manufactured, tested and installed in compliance with the following codes and standards:
 - 1. Canadian Standards Association (CSA or CUL)
 - 2. American National Standards Institute (ANSI)
 - 3. Institute of Electrical and Electronic Engineers (IEEE C62.11, IEEE C62.41.1, IEEE C62.41.2 and IEEE C62.45)
 - 4. IEEE 1100 Emerald Book
 - 5. Federal Information Processing Standards Publication 94 (FIPS PUB 94)
 - 6. National Electrical Manufacturer Association (NEMA LS-1)
 - 7. National Fire Protection Association (NFPA 20, NFPA 70, NFPA 75 and NFPA 780)
 - 8. National Electric Code
 - 9. Underwriters Laboratories (UL 1449 and UL 1283)
 - 10. International Electrotechnical Commission (IEC 801)
 - 11. International Standards Organization (ISO) Company certified ISO 9001 for manufacturing, design and service
 - 12. EMC Directive 89/336/EEC - CE compliant
- B. The systems individual units shall be UL/ANSI Listed and labeled under UL 1449 (Fourth Edition) Standard for Surge Protection Devices Type 2 20kA with a nominal discharge current of 20kA and the surge ratings shall be permanently affixed to the SPD. The units shall also be listed and labeled to UL 1283 for type 2 locations Standard for Electromagnetic Interference Filters, and CSA/CUL Listed.

1.3 SUBMITTALS

- A. Shop drawings shall include, but not be limited to:
 - 1. Cutsheets of surge protection devices with ratings, physical dimensions and all accessories clearly labeled.
 - 2. Device labels shall be clearly indicated in cutsheets.
 - 3. All standards and listings, as specified in section 1.2A-B, shall be clearly labeled in cutsheets provided.
 - 4. Cutsheets shall clearly outline that design requirements of this specification have been met.

1.4 QUALITY ASSURANCE

- A. The manufacturer shall be ISO 9001 certified. The specified system shall be tested at the component and fully assembled level, under surge conditions with AC power applied for a minimum of 1 hour. Testing shall include but not be limited to quality control checks, dielectric voltage withstand test per UL and CSA requirements, UL ground continuity tests and operational and calibration tests.
- B. The unit shall be designed and manufactured in the USA by a qualified manufacturer of surge protection equipment and Active Tracking Filters. The manufacturer shall have been engaged in the design and manufacture of such products for a minimum of 10 years.

1.5 WARRANTY

- A. The manufacturer shall provide a full 10 year warranty from date of shipment against any part failure when installed in compliance with manufacturer's written instructions, UL Listing requirements and any applicable national, state or local electrical codes. Direct, factory trained, ISO 9001 certified employees must be available for 48 hour assessment. A 24 hour 800 number must be available to support warranty.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Southern Tier Technologies

2.2 ENCLOSURE

- A. The specified system shall be provided in a heavy duty NEMA 4 or better dust-tight, drip-tight enclosure with no ventilation openings.

2.3 OVERCURRENT PROTECTION (FUSING)

- A. Individual surge components shall be fused to prevent violent failure. The fusing shall be UL listed and shall be capable of interrupting up to 200kA symmetrical fault current with 480VAC applied. Replaceable fusing is unacceptable. Overcurrent protection that limits specified surge currents is not acceptable. Devices that utilize a single fuse to protect two or more suppression paths are not accepted.

2.4 DESIGN REQUIREMENTS

- A. Protection Modes:
 - 1. The SPD shall provide protection as follows: All modes, L-N or L-L, L-G and N-G (where applicable)
Note: L = Line, G = Ground, N = Neutral
- B. UL 1449 Ratings:
 - 1. The maximum UL 1449 listed surge ratings for each and/or all of the specified protection modes shall not exceed the following in any mode of protection:

System Voltage	Voltage Protection Rating			
	<u>L-N</u>	<u>L-L</u>	<u>N-G</u>	<u>L-L</u>
120/240	600-volts	700-volts	700-volts	1200-volts
120/208	600-volts	700-volts	700-volts	1200-volts
240		1200-volts		1000-volts
277/480	1200-volts	1200-volts	1200-volts	1800-volts
480		1800-volts		1800-volts

- C. Noise Attenuation:

1. The unit shall be UL 1283 Listed as an electromagnetic interference filter in type 2 locations. The filter shall provide insertion loss with a maximum of 60 dB from 100 KHz to 100 MHz per 50 Ohm Insertion Loss Methodology from MIL 220A. The system shall provide up to 120 dB insertion loss from 100 KHz to 100 MHz when used in a coordinated facility system.

D. Life Cycle Testing:

1. The SPD system shall be duty life cycle tested to survive 6,000 20kV, 10kA Surges, per IEEE C62.41.1 Category C3 surge current with less than 5% degradation of clamping voltage.

2.5 CONNECTIONS

- A. Provide 60" wire leads #10 AWG or UL 1449 tested size.

2.6 STANDARD FEATURES

A. Unit Status Indicators:

1. Red and green solid state indicators with printed labels shall be provided on the front cover to redundantly indicate on-line unit status including N-G monitoring. The absence of the green light and the presence of the red light shall reliably indicate that surge protection is reduced and service is needed to restore full operation.

B. Dry Contacts for remote monitoring:

1. Electrically isolated Form C dry contacts, one normally open and one normally closed set standard on all units for remote monitoring.

C. Undervoltage detection:

1. Unit shall be equipped with 70% undervoltage detection capability.

D. Phase Loss Monitoring:

1. Unit shall be equipped with phase loss monitoring.

E. Power Loss Monitoring:

1. Unit shall be equipped with power loss monitoring.

2.7 TESTING

A. Component Testing and Monitoring:

1. Unit shall include an on-line circuit which tests and redundantly monitors individual components in all protection modes including neutral to ground (where applicable). Units that require external test sets or equipment are not acceptable.

2.8 ENVIRONMENTAL REQUIREMENTS

- A. Storage Temperature: -55 to +85 C (-67 to +187 F)
- B. Operating Temperature: -40 to +60 C (-40 to 140 F)
- C. Relative Humidity: 0% to 95%
- D. Audible Noise: less than 45 dBa at 5 feet (1.5 m).
- E. Operating Altitude: 0 to 18,000 feet above sea level.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the parallel SPD with short and straight conductors as practically possible. Locate adjacent to the switchboard or panel it is serving. The contractor shall twist the SPD input conductors together to reduce input conductor inductance. The contractor shall follow the SPD manufacturer's recommended installation practices as found in the installation, operation and maintenance manual and comply with all applicable codes. Provide STT Tierguide cable if the cable length exceeds 5 feet from the circuit breaker servicing the SPD.
- B. Provide Flush Mount Stainless Steel Cover Kit for kitchen areas.
- C. Provide Flush Mount Cover Kit for residential units and hotel suites.

END OF SECTION

SECTION 26 51 19

LIGHTING FIXTURES - LIGHT EMITTING DIODE (LED)

PART 1 - GENERAL

1.1 SCOPE

- A. Provide general and emergency lighting fixtures as noted on the drawings. Fixtures shall be completely wired with lamps installed and shall be in perfect operating condition at the time of substantial completion.
- B. The types of lighting fixtures required for this project include:
 - 1. LED

1.2 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.
- C. NEMA JSC 10410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- F. UL 1008 - Transfer Switch Equipment; Current Edition, Including All Revisions.
- G. UL 1012 - Safety Power Units Other Than Class 2; 2010.
- H. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- I. NFPA 101
- J. NEMA-LE
- K. TM-21
- L. LM-80
- M. LM-79
- N. L70
- O. DLC

1.3 QUALITY ASSURANCE

- A. All fixtures shall conform to all applicable UL standards and shall be UL label including damp and wet location ratings. "ETL listed" is an acceptable listing.
- B. All LED drivers shall be UL recognized Class 2 per UL 1310 or non-Class 2 per UL 1012 as applicable.

- C. All LED drivers shall comply with applicable requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR 15, for Non-Consumer Equipment.
- D. All LED drivers shall be RoHS compliant.

1.4 ACCEPTABLE MANUFACTURERS

- A. Provide lighting fixtures produced by manufacturers as shown and scheduled.
- B. LED DRIVER:
 - 1. Provide one of the following manufacturers
 - a. Eldo
 - b. Lutron
 - c. Osram
 - d. Philips
- C. LAMPS:
 - 1. Provide one of the following LED Chip manufacturers
 - a. Cree
 - b. Nichia
 - c. North American Philips
 - d. Seoul
 - e. Lumileds

1.5 SUBMITTALS

- A. Shop drawings shall include a brochure with a separate cut sheet for each fixture type arranged in alphabetical order with fixture and all accessories/options clearly labeled. Provide performance data for each fixture. Provide an independent test lab report for each fixture if requested by the Architect/Engineer.
- B. Provide driver and LED module data brochures for each fixture type.
- C. Provide air handling and heat removal data for light fixtures specified with these requirements.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

- A. WORK IN ACCORDANCE WITH:
 - 1. National Electrical Code.
 - 2. Local, municipal, or state codes that have jurisdiction.
 - 3. UL fire resistance directory.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. General:
 - 1. Provide the size, type and rating of each light fixture shown and scheduled. All light fixtures shall complete with reflectors, lens, trim rings, flanges, LED modules, lamp holders, drivers, fuses, wiring, earthquake clips, etc. to provide a complete functioning light fixture.
- B. Lighting Fixture Types:
 - 1. LED Fixtures
 - a. Fixtures shall be pre-wired with frame-in kit and integral thermal management system for fixtures. Driver shall be encased in metal-can construction for optimal thermal performance.
 - b. Total fixture lumen output is dependent on the chip, thermal management, driver current and optical system. LED fixtures shall be tested as a complete unit or system. Only DOE recognized CALiPER testing laboratory results shall be utilized.

- c. Interior LED fixtures shall have integral common mode and differential mode surge protection of 3kV(1.2/50µs, 2 ohm combination wave).
- d. Exterior LED fixtures shall have integral common mode and differential mode surge protection of 10kV/10kA(1.2/50µs, 2 ohm combination wave).
- 2. Exit signs
 - a. Exit signs shall meet all federal, state and local codes.
 - b. Provide fire alarm interface relay when required to flash exit signs.
 - c. Provide battery packs for emergency operation when not connected to emergency generator power.

2.2 LED MODULES AND DRIVERS - COORDINATE WITH LIGHT FIXTURE SCHEDULE

A. LED

- 1. Driver manufacturer shall have a 10-year history producing electronic drivers for the North American market.
- 2. Driver shall carry a five year limited warranty from date of manufacture against defects in material or workmanship (including replacement) for operation at a maximum case temperature of 80 degrees Celsius.
- 3. Drivers shall not contain any Polychlorinated Biphenyl (PCB).
- 4. Provide driver with integral color-coded leads.
- 5. Driver shall operate from 50/60 Hz input source of 120 Volt through 277 Volt or 347 Volt through 480 Volt with sustained variations of +/- 10% (voltage) with no damage to the driver.
- 6. Driver output shall be regulated to +/- 5% across published load range. And shall have a power factor greater than .90 for primary application to 50% of full load rating with an input current Total Harmonic Distortion (THD) of less than 20% to 50% of full load rating.
- 7. Provide drivers with a Class A sound rating.
- 8. Provide LED drivers for outdoor fixtures with a minimum operating temperature of -40 degrees Celsius (-40 F). Provide LED drivers for indoor fixtures with a minimum operating temperature of -20 degrees Celsius (-2F).
- 9. Drivers shall tolerate sustained open circuit and short circuit output conditions without fail and auto-resetting without need for external fuses or trip devices.
- 10. Driver output ripple current shall be less than 15% measured peak-to-average, with ripple frequency being greater than 100Hz.
- 11. Driver performance requirements shall be met when operated to 50% of full load rating.
- 12. Driver shall have integral thermal foldback to reduce driver power above rated case temperature to protect the driver if temperatures reach unacceptable levels.
- 13. Drivers shall comply with NEMA JSC 10410 for in-rush current limits.
- 14. Dimmable drivers shall be controlled by a Class 2 low voltage 0-10VDC controller with dimming range controlled between 1 and 8VDC with source current 150µA.

2.3 LAMPS - COORDINATE WITH LIGHT FIXTURE SCHEDULE

- A. LED Lamps shall be appropriately matched to the driver with junction-down design for improved thermal management. Maximum DC Forward Current.

2.4 EMERGENCY LED BATTERY BACKUP

- A. Provide Bodine #BSL310M for emergency light fixtures in 9 or 10-foot ceiling.
- B. Provide Bodine #BSL20 for emergency LED driver for emergency light fixtures in ceiling heights greater than 12 feet.
- C. Provide Bodine #BSL17-C2 for emergency LED driver for LED downlights.
- D. Provide unswitched hot leg. Hot leg shall originate from the same branch circuit as required in article 700.12 (F) of NFPA 70.

2.5 POLES

- A. Provide poles for area lighting fixtures as specified. Poles shall be one piece, anchor base, with 2-piece steel bolt cover and vibration dampers. Poles shall be round straight steel as specified on the Lighting Fixture Schedule.
- B. Provide all poles with appropriate mounting accessories including arms, tenons, or bullhorns as required. Anchor bolts shall be hot dipped galvanized, sized as required by the manufacturer of the pole.
- C. All poles shall have a normal 3" x 5" hand hole at 18" above the base flange and grounding provision.
- D. Poles shall be prime painted interior and exterior. The exterior shall be finished with polyester powder coating and architectural finish as specified by the Architect. The interior with 3 mil thermoplastic hydrocarbon resin, or equivalent to meet 1000-hour salt spray exposure (ASTM B117).

2.6 BRANCH CIRCUIT EMERGENCY TRANSFER SWITCH (BCELT)

- A. Provide 20 amp, 120-277 Volt, UL 1008 listed Branch Circuit Emergency Transfer Switch to control emergency light fixtures transferring from normal to emergency branch circuits Provide Bodine GTD 20A or ETC SC 1008 UL 924 Devices are not acceptable

2.7 AUTOMATIC LOAD CONTROL RELAY (ALCR)

- A. Provide 3 amp, 120-277 volt UL 924 listed. Relay to bypass switching controlling emergency branch circuit light fixtures Provide Bodine GTD or Wattstopper ELCU.

PART 3 - EXECUTION

3.1 INSTALLATIONS

- A. General
 - 1. Install the type of lighting fixture where shown and indicated in accordance with manufacturer's written instructions.
 - 2. Provide earthquake clips on all recessed lay-in lighting fixtures as required by building code.
 - 3. Adjust all adjustable lighting fixtures, as directed by the Architect.
 - 4. Provide safety chains and wire guards for lighting fixtures located in gymnasium, multi-purpose rooms, play areas, etc.
- B. Coordination
 - 1. The contractor shall verify the type of fixtures with the ceiling types as indicated on the drawings. Any discrepancies shall immediately be brought to the architect's attention before the contractor places his order and accepts delivery. Fixtures shall fit exact in the type of ceiling scheduled. Provide plaster frames, trim rings and other accessories required for a correct fit.
 - 2. Provide supports attached to structural member to support fixtures when the ceiling system cannot maintain support. Provide separate supports for all recessed ceiling mounted HID fixtures.
 - 3. Refer to architectural reflected ceiling plan for the exact location of all lighting fixtures. Notify the architect for any discrepancies or conflicts with structural, architectural, mechanical piping or ductwork before installation.
- C. Mounting
 - 1. Provide support channels to support outlet boxes used support surface mounted lighting fixtures such as exit signs or downlights.

2. Pendant or surface mounted fixture shall be provided with required mounting devices and accessories, including hickey and stud-extensions, ball-aligners, canopies and stems. Locations of fixtures in mechanical areas shall be coordinated with mechanical contractor. Mounting stems of pendant fixtures shall be of the correct length to uniformly maintain the fixture heights shown on the drawings or established in the field. The allowable variation tolerance in mounting individual fixtures shall not exceed 1/4 inch and shall not vary more than 1/2 inch from the floor mounting height shown on the Drawings. Fixtures hung in continuous runs shall be installed absolutely level and in line with each other. Hanging devices shall comply with Code requirements. Fixtures shall employ single - not twin - stem hangers unless otherwise noted.
3. All structure mounted fixtures (i.e. bracket mounted, pipe mounted and surface mounted) shall be provided with cables of suitable size and weight to support the weight of the fixture. Cables shall be fastened around or fastened to the housing of the fixture. On pendant fixtures, one safety cable of suitable size and weight to support the weight of the fixture assembly shall connect the top of the pendant to the supporting structure by means of welding or bolting, and one safety cable shall connect the housing of the fixture to the bottom of the pendant. Where more than one pendant per fixture occurs, only one pendant must be cabled. Track fixtures for pendant mounted track shall also be supplied with clip-on safety cables of suitable size and weight to support the weight of the fixture.
4. Provide secondary support wires from all four (4) corners of the lay-in fixtures to the structure above. Do not support fixtures from ceiling grid wire supports, piping, conduit, side walls, or mechanical equipment. Ceiling specifications do not supersede this requirement.
5. Where pole mounted luminaries are provided, provide appropriate anchor base pole as specified with manufacturer's recommended anchor bolts. Verify exact location on site for poles with Architect, Civil, and Landscape documents. Poles shall be installed on proper footing. Refer to details on the drawings. Provide grounding connection to a separately driven ground rod, outside of the footing. Where indicated provide pole with identification plate indicating pole number.
6. Ground mounted flood type fixtures and flagpole lights, or similar fixtures, shall include stanchion and knuckle mount. Stanchion shall be supported by concrete base.
7. Flagpole mounted fixtures called out to be mounted on the flagpole shall be provided with tenon mount adapter and yoke.

D. Electrical Connection

1. All light fixtures shall be connected from a branch circuit junction box using 1/2" flexible metal conduit or MC cable fixture pigtails not exceeding 8'- 0". Provide #12 AWG conductors. All fixtures must be grounded by using a grounding conductor. Fixture to fixture wiring of fixtures installed in accessible ceiling is not permitted. Fixture whips shall not lay-on ceiling tile or grid. Provide caddy clips to provide additional support.

E. Fire Rated Ceiling

1. Provide fire rated canopy or enclosure for all fixtures recessed in a fire rated ceiling. The fire rated canopy or enclosure shall be as required by the UL design number listed in the UL fire resistance directory. Refer to architectural drawing for the UL design number. Coordinate with ceiling installer and manufacturer. Provide proper rated drivers for lighting fixtures installed within these rated enclosures.

F. Air Handling Fixtures

1. Install all air handling light fixtures with return air slot in the open position, if it is to be as an air handling fixture. Coordinate with mechanical contractor.

3.2 FINAL INSPECTION

- A. Remove all plastic and protective coating from all fixtures. Fixtures shall be thoroughly cleaned. Replace any damaged fixture or fixture parts including reflectors, louvers, lens and metal parts that show signs of corrosion.
- B. Replace all other defective fixtures showing signs of excessive usage.

Tomball Athletics Improvements
Tomball ISD
Tomball, Texas

- C. Demonstrate proper operation of all fixtures and controls. Refer to other sections and details on the drawings for lighting controls.

END OF SECTION

Tomball Athletic Improvements

TOMBALL ISD

TOMBALL, TEXAS



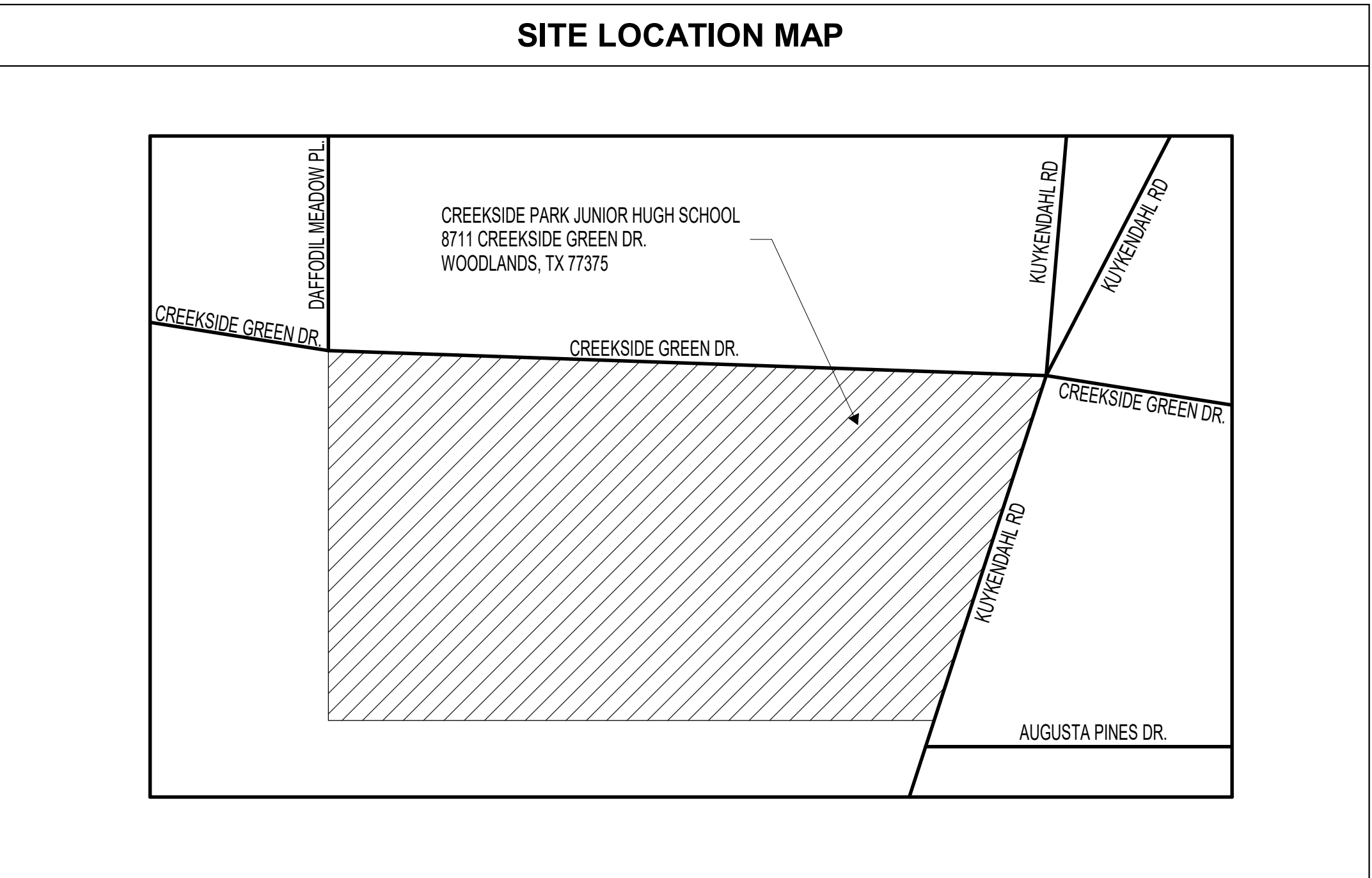
TOMBALL ISD
TOMBALL, TEXAS

ABBREVIATIONS			
A	M (CONT.)		
A.F.F.	ABOVE FINISH FLOOR	MOD BIT	MODIFIED BITUMEN
A.C.T.	ACOUSTICAL CEILING TILE	MULL.	MULLION
ADDL.	ADDITIONAL	M.E.P.	MECHANICAL-ELECTRICAL-PLUMBING
A.B.	AIR BARRIER	M.C.M.	METAL COMPOSITE MATERIAL
A.C.M.	ALUMINUM COMPOSITE PANEL	MIN.	MINIMUM
A.D.A.	AMERICANS WITH DISABILITIES ACT	MISC.	MISCELLANEOUS
AL/ALUM.	ALUMINUM		
APPROX.	APPROXIMATE OR APPROXIMATELY	N	
ARCH.	ARCHITECT OR ARCHITECTURAL	NOM.	NOMINAL
A.W.R.B.	AIR- & WATER-RESISTIVE BARRIER	N/A	NOT APPLICABLE
		N.I.C.	NOT IN CONTRACT
		N.T.S.	NOT TO SCALE
		NO. or #	NUMBER
B		O	
BD.	BOARD	O.C.	ON CENTER
B.O.W.	BOTTOM OF WALL	O.D.	OUTSIDE DIAMETER
B.U.R.	BUILT-UP ROOFING	O.H.	OPPOSITE HAND
BLDG.	BUILDING	OHD.	OVERHEAD
		O.F.C.I.	OWNER-FURNISHED, CONTRACTOR-INSTALLED
		O.F.O.I.	OWNER-FURNISHED, OWNER INSTALLED
C		P / Q	
CL	CENTER LINE	PR.	PAIR
C.R.	CLASSROOM	P.LAM.	PLASTIC LAMINATE
C.F.S.	COLD-FORMED STEEL	PL	PLATE
CONC.	CONCRETE	PLUMB.	PLUMBING
CMU	CONCRETE MASONRY UNIT	PT.	POINT
C.M.	CONSTRUCTION MANAGER	P.C.F.	POUNDS PER CUBIC FOOT
CONT.	CONTINUOUS	P.S.F.	POUNDS PER SQUARE FOOT
C.I.	CONTINUOUS INSULATION	P.S.I.	POUNDS PER SQUARE INCH
C.J.	CONTROL JOINT	PREFAB.	PREFABRICATED
COORD.	COORDINATE	PROJ.	PROJECTOR or PROJECTION
CORR.	CORRIDOR	Q.T.	QUARRY TILE
		R	
D		R.	RADIUS
DIA.	DIAMETER	REBAR	REINFORCING BAR
D.O.	DOOR OPENING	REF.	REFERENCE or REFER TO
DN.	DOWN	R.C.P.	REFLECTED CEILING PLAN
DS.	DOWNSPOUT	RE.	REGARDING
		REFG.	REFRIGERATOR
E		REINF.	REINFORCE or REINFORCING
EA.	EACH	REQD.	REQUIRED
E.W.	EACH WAY	R.	RISER (STAIR)
ELEC.	ELECTRICAL	R.D.	ROOF DRAIN
E.W.C.	ELECTRIC WATER COOLER	R.O.	ROUGH OPENING
ELEV.	ELEVATION		
EQ.	EQUAL	S	
EQUIP.	EQUIPMENT	SIM.	SIMILAR
EXIST.	EXISTING	S.C.	SOLID CORE
E.J.	EXPANSION JOINT	S.A.B.	SOUND ATTENUATION BLANKET
EXT.	EXTERIOR	S.A.F.B.	SOUND ATTENUATION FIRE BLANKET
EIFS	EXTERIOR INSULATION & FINISH SYSTEM	S.T.C.	SOUND TRANSMISSION CLASS
		SPEC.	SPECIFICATION
F		SQ.	SQUARE
FT.	FEET or FOOT	S.F.	SQUARE FOOT
F.R.P.	FIBERGLASS REINFORCED PLASTIC	S.S.	STAINLESS STEEL
F.V.	FIELD-VERIFY	STRUC.	STRUCTURAL
FIN.	FINISH	SUSP.	SUSPENDED
F.F.	FINISH FLOOR		
F.E.	FIRE EXTINGUISHER	T	
F.E.C.	FIRE EXTINGUISHER & CABINET	T.B.	TACKBOARD
F.H.C.	FIRE HOSE CABINET	T.W.	TACK WALL
F.H.C.S.	FLAT-HEAD COUNTERSUNK	T.C.	TEACHER'S CABINET
FLR.	FLOOR	T.A.S.	TEXAS ACCESSIBILITY STANDARDS
F.D.	FLOOR DRAIN	T.	TREAD (STAIR)
FLUOR.	FLUORESCENT	T&B	TOP & BOTTOM
		T.O.	TOP OF
G / H		T.C.	TOP OF CURB
GALV.	GALVANIZED	T.O.D.	TOP OF DECK
GA.	GAGE	T.O.J.	TOP OF JOIST
G.C.	GENERAL CONTRACTOR	T.O.S.	TOP OF STEEL
G.O.	GLAZED OPENING	T.O.W.	TOP OF WALL
GYP	GYPSPUM	TYP.	TYPICAL
HT.	HEIGHT	U / V	
H.P.	HIGH POINT	U.C.	UNDER COUNTER
H.M.	HOLLOW METAL	U.L.	UNDERWRITERS LABORATORY
HORIZ.	HORIZONTAL	U.N.O.	UNLESS NOTED OTHERWISE
H.B.	HORIZONTAL BLINDS	V.I.F.	VERIFY IN FIELD
H.D.G.	HOT-DIP GALVANIZED	VERT.	VERTICAL
HR.	HOUR	V.C.T.	VINYL COMPOSITION TILE
		V.W.C.	VINYL WALL COVERING
I / J / K		W / X / Y / Z	
I.D.	INSIDE DIAMETER	W.C.	WATER CLOSET
INSUL.	INSULATION	W.R.B.	WATER-RESISTIVE BARRIER
INT.	INTERIOR	WT.	WEIGHT
I.B.C.	INTERNATIONAL BUILDING CODE	W.	WIDE
L		W/	WITH
LAV.	LAVATORY	W/O	WITHOUT
L.L.H.	LONG LEG HORIZONTAL	W.P.	WORKING POINT
L.L.V.	LONG LEG VERTICAL	W.W.F.	WELDED WIRE FABRIC
LP.	LOW POINT		
L.V.T.	LUXURY VINYL TILE		
M			
MFR.	MANUFACTURER		
MFG.	MANUFACTURING		
M.B.	MARKERBOARD		
M.O.	MASONRY OPENING		
MAX.	MAXIMUM		
MECH.	MECHANICAL		

SYMBOLS LEGEND		
ROOM NAME A101	ROOM NAME & NUMBER	ALUMINUM-FRAMED GLAZED OPENING SYSTEM
A101	DOOR NUMBER	HOLLOW METAL-FRAMED GLAZED OPENING SYSTEM
AC	ACCESS CONTROL	LOUVER
HB	HORIZONTAL BLINDS	PARTITION TYPE
X1	DEMOLITION KEYNOTE	ACCESSORY OR SPECIALTY ITEM
XXX-01	BUILDING ASSEMBLY TYPE	PLUMBING FIXTURE/ EQUIPMENT
1 A101	BUILDING SECTION	INTERIOR ELEVATION/ CASEWORK ELEVATION
1 A101	WALL SECTION	DETAIL SECTION
1 A101	DETAIL CALLOUT	BUILDING ELEVATION
	DATUM ELEVATION	NORTH ARROW

MATERIAL LEGEND		
EARTH	CERAMIC TILE	
POROUS FILL	GLASS (LARGE SCALE)	
CONCRETE/ GROUT	INSULATION (RIGID FOAM BOARD)	
BRICK	INSULATION (EPS FOAM BOARD)	
CMU (LARGE SCALE)	INSULATION (BAT/ BLANKET)	
MARBLE	INSULATION (SEMI-RIGID BOARD)	
METAL (LARGE SCALE)	WOOD, ROUGH (CONTINUOUS)	
METAL (SMALL SCALE)	WOOD, ROUGH (BLOCKING)	
RESILIENT FLOORING	WOOD, FINISH	
ACOUSTICAL TILE	PLYWOOD (LARGE SCALE)	
TERRAZZO	FIBER CEMENT PANEL	
PLASTER, SAND, GROUT, GYPSUM BOARD	METAL LATH	
	GYPSUM BOARD	

APPLICABLE CODES	
2021 International Building Code w/ City of Tomball Amendments	
2021 International Fire Code w/ City of Tomball Amendments	
2021 International Plumbing Code w/ City of Tomball Amendments	
2021 International Plumbing Code w/ City of Tomball Amendments	
2021 International Mechanical Code w/ City of Tomball Amendments	
2021 International Fuel Gas Code w/ City of Tomball Amendments	
2020 NFPA 70, National Electrical Code w/ City of Tomball Amendments	
2018 International Energy Conservation Code w/ City of Tomball Amendments	
2012 Texas Accessibility Standards	
2021 International Energy Conservation Code or ASHRAE 90.1-2013	
NOTES	



PROJECT INFORMATION	
PROJECT NAME	
CREEKSIDE PARK JUNIOR HIGH SCHOOL	
OWNER	
TOMBALL I.S.D.	
PROJECT LOCATION	
8711 CREEKSIDE GREEN DR, TOMBALL, TX, 773775	
TDLR PROJECT REGISTRATION NUMBER:	
TABS2026027195	
APPROXIMATE BUILDING AREAS	
TOTAL BLDG AREA:.	144,455 S.F.

GENERAL NOTES	
1.	Refer to the CODE-series sheets for Code Information, Design Criteria and Fire Protection Requirements.
2.	Verify and document existing dimensions and conditions at the site before beginning construction. Notify the Architect of conflicts or variations prior to commencement of construction.
3.	Based on the applicable design criteria, submit Shop Drawings of the proposed pattern of control joints in masonry veneer, CMU, gypsum board, plaster and stucco to the Architect for review and approval prior to construction.
4.	In case of discrepancies in or between the Contract Documents, the greater quantity or better quality shall be bid. Clarifications regarding the discrepancies shall be requested from the Architect prior to construction, and the resulting interpretations implemented in accordance with the Contract Documents.

INDEX OF DRAWINGS	
<u>SHEET NO.</u>	<u>SHEET TITLE</u>
GENERAL	
COVER	COVER
INDEX	INDEX OF DRAWINGS, GENERAL NOTES & ABBREVIATIONS
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C0.00	COVER
C1.00	GENERAL NOTES
C1.01	TOPOGRAPHIC SURVEY
C2.00	DEMOLITION & SWPP PLAN
C3.00	SITE DIMENSION PLAN
C4.00	GRADING PLAN
C5.00	STORM & DETENTION PLAN
C6.00	MISCELLANEOUS DETAILS
C7.00	HCED REVIEW SHEET
C8.00	HCED REVIEW SHEET
ARCHITECTURAL	
A0.01	DEMO SITE PLAN - CREEKSIDE PARK JHS
A0.02	CREEKSIDE PARK JHS - LAYDOWN PLAN
A1.01	CREEKSIDE PARK JHS - SITE PLAN
A1.22	STORAGE BUILDING TYP. - ENLARGED PLANS AND ELEVATIONS
A1.23	CREEKSIDE PARK JHS - TURF DESIGN
A1.31	ARCHITECTURAL SITE PLAN DETAILS
STRUCTURAL	
S1.01	GENERAL NOTES
S1.02	CONT. GENERAL NOTES, ABBREVIATIONS AND SYMBOLS
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S3.01	STORAGE BUILDING PLANS
S3.02	TYPICAL FOUNDATION DETAILS
ELECTRICAL	
E3.01A	ELECTRICAL ENLARGED PLANS - CREEKSIDE PARK JHS
E5.01A	ELECTRICAL SCHEDULES - CREEKSIDE PARK JHS
E5.02A	ELECTRICAL PANEL SCHEDULES - CREEKSIDE PARK JHS
MECHANICAL	
ME1.21A	MECHANICAL/ELECTRICAL SITE PLAN - CREEKSIDE PARK JHS

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10/13/2026

ISSUED: SEPTEMBER 14, 2026

REVISIONS		
Revision No.	Revision Date	
1 Addendum 5	10/12/2026	
2 Addendum 6	10/13/2026	

Project Director:

Project Architect: RSJ

Project Designer:

Drawn By: SDR

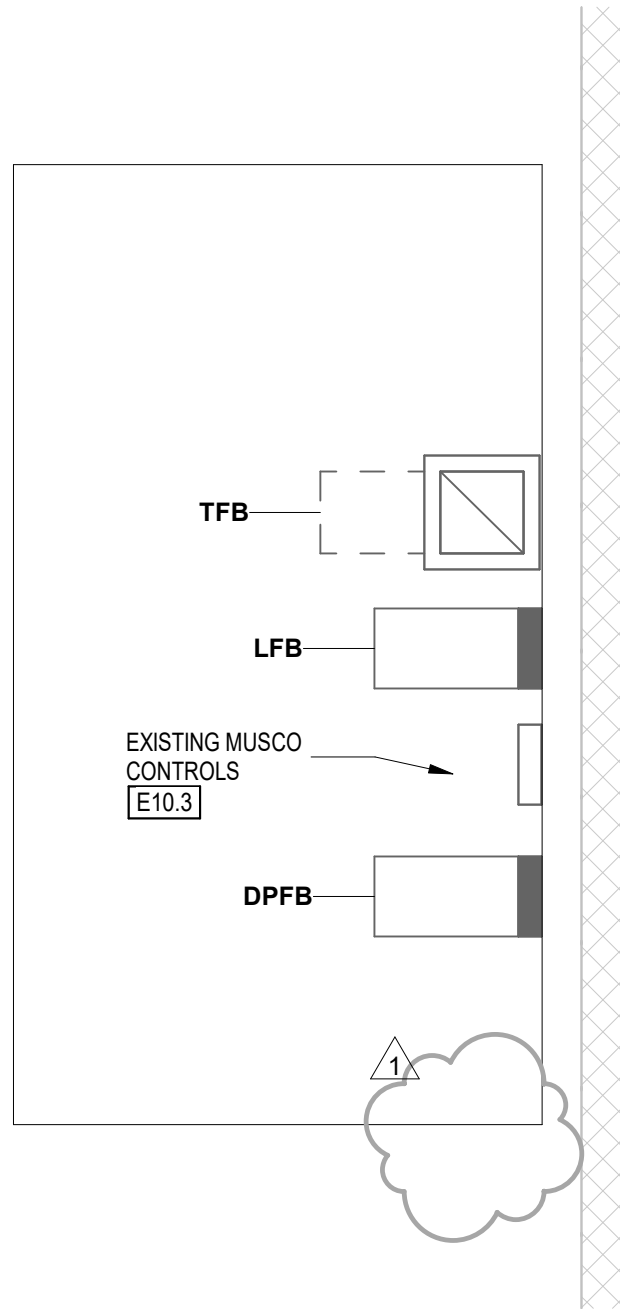
PROJECT NO.

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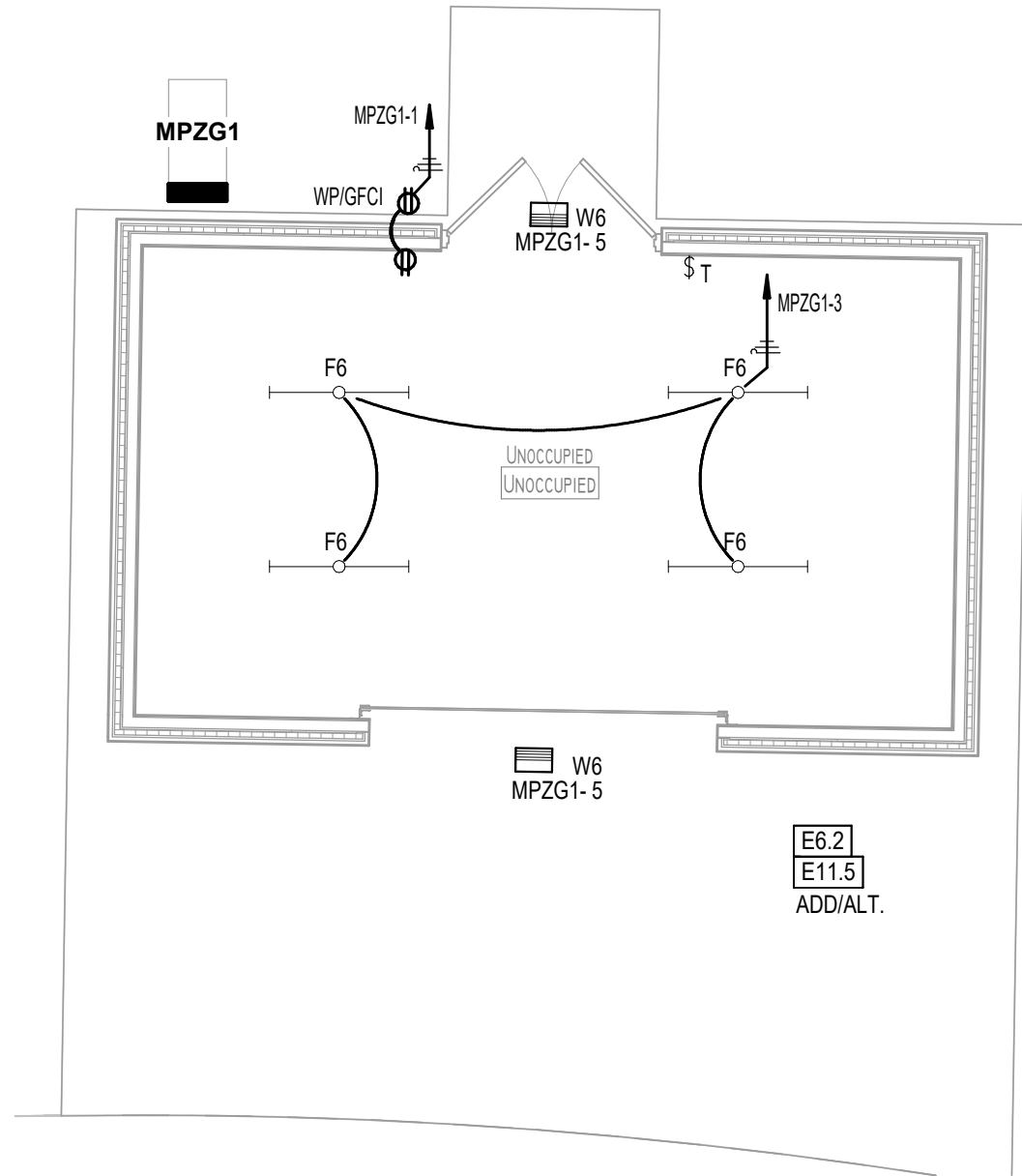
SHEET TITLE

INDEX OF DRAWINGS, GENERAL NOTES & ABBREVIATIONS

SHEET NO.



2 CREEKSIDE PARK JHS - STORAGE/ELECTRICAL ROOM
1/4" = 1'-0"



1 CREEKSIDE PARK JHS - STORAGE
3/16" = 1'-0"

GENERAL ELECTRICAL NOTE:

A. REFER TO SHEET E0.11 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E0.2 PROVIDE (1) 120V CIRCUIT TO NEW STORAGE SHED (ALTERNATE).

E10.3 APPROXIMATE LOCATION OF EXISTING MUSCO SPORTS LIGHTING CONTACTOR/CONTROLLER. INTEGRATE EXISTING CONTROLLER WITH BAS. REFER TO MUSCO SPORTS LIGHTING NOTES FOR MORE INFORMATION.

E11.5 PROVIDE (1) 277V CIRCUIT FOR INTERIOR AND EXTERIOR LIGHTING FIXTURES OF NEW SHEDS AND PROVIDE LIGHTING CONTROLS (ALTERNATE).



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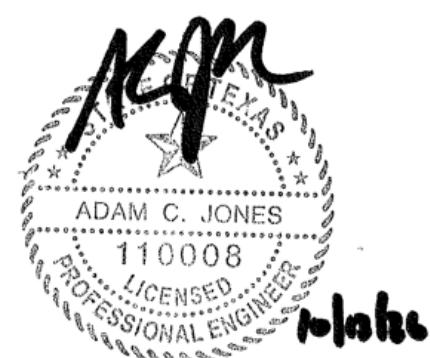
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1 Addendum No.6	10/13/26

Project Director: Proj. Director

Project Architect: Proj. Architect

Project Designer: Proj. Designer

Drawn By: Author

PROJECT NO.

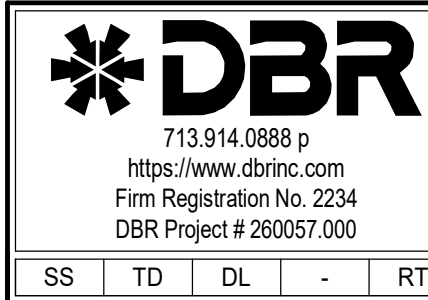
25-0158.00

SHEET TITLE

ELECTRICAL ENLARGED
PLANS - CREEKSIDE PARK
JHS

SHEET NO.

E3.01A



SS	TD	DL	-	RT
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Tomball Athletic Improvements

TOMBALL, TEXAS



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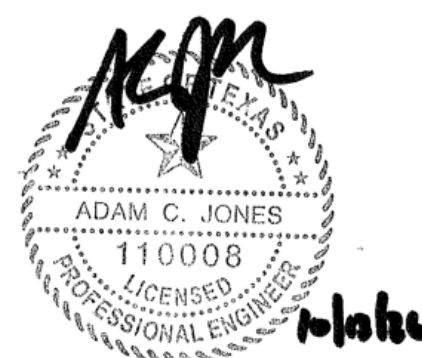
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REVISIONS

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Drawn By: DBR

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SHEET TITLE

ELECTRICAL SCHEDULES -
CREEKSIDE PARK JHS

SHEET NO.

E5.01A

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Tomball Athletic Improvements

LIGHTING FIXTURE SCHEDULE - CREEKSIDE PARK JHS

TYPE	MANUFACTURER	MODEL	MOUNTING	LAMPS	VOLTAGE	WATTAGE	MUSCO NOTES	DESCRIPTION
F6	DAYRITE	FSS-4-55L-840-UNV-DIM-FSSWG4-FXR-126	SURFACE	LED	120 V	42 VA	N/A	4' UTILITY STRIP WITH WIRE GUARD, SURFACE MOUNT OR SUSPEND WITH 54" CHAIN AS NEEDED.
JW6	GARBCO	GWM-400-740-13M-UNV-OLEA-FINISH-WirelessCopper-FSP211	WALL	LED	120 V	30 VA	N/A	EXTERIOR WALL PACK WITH 02/08AY LIGHT SENSOR, COORDINATE MOUNTING HEIGHT WITH ARCHITECT.

NOTES

- LIGHTING FIXTURE CATALOG NUMBERS AND DESCRIPTIONS ARE SCHEDULED FOR ESTABLISHING QUALITY, APPEARANCE AND PERFORMANCE OF THE FIXTURES AS REQUIRED BY THE DESIGN. EXACT CATALOG NUMBERS DESCRIBING MOUNTING CONDITIONS, FINISHES AND REQUIREMENTS RELATED TO TRIMS AND LENS FOR ALL FIXTURES SHALL BE CONFIRMED (BY THE CONTRACTOR) WITH THE ROOM FINISH SCHEDULE AND REFLECTED CEILING PLANS, INCLUDING GRID TYPES, ON THE ARCHITECTURAL DRAWINGS PRIOR TO BIDDING. FIXTURES SHALL BE SUBMITTED ACCORDING TO THE CONDITIONS INDICATED ON THE ARCHITECTURAL PLANS. REFER TO THE WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- THE NEW LIGHT FIXTURES SCHEDULED ARE THE BASIS OF DESIGN. IT IS NOT INTENDED TO LIMIT COMPETITION FROM EQUAL MANUFACTURERS. ALL BIDDERS SHALL SUBMIT THEIR PROPOSED LIGHT FIXTURES IN SUBMITTAL FORM A MINIMUM OF 10 BUSINESS DAYS PRIOR TO BID DATE FOR REVIEW. APPROVED LIGHT FIXTURES WILL BE ISSUED IN AN ADDENDUM.

MUSCO SPORTS LIGHTING NOTES:

- PROVIDE NEW SPORTS LIGHTING POLE CONTACTOR/CONTROLLER MOUNTED ON POLE AND ASSOCIATED POWER AND CONTROLS. PROVIDE WITH INTEGRAL STEP-DOWN TRANSFORMER FOR 120V CONTROLS ON POLE. IN ADDITION TO CONTROLS ON POLE, PROVIDE REMOTELY LOCATED MANUAL ON/OFF OVERRIDE CONTROL OF LIGHTS. REFER TO POWER PLANS FOR PROPOSED LOCATION, AND PROVIDE CONDUITS AND WIRE FROM THIS LOCATION TO EACH POLE LIGHT. (1") CONDUIT FOR CONTACTOR CONTROL WIRING (ONLY IF DIMMING FROM THE MANUAL SWITCH, AND (1/2") CONDUIT FOR DIMMING WIRES). COORDINATE EXACT REQUIREMENTS WITH MANUFACTURER'S SHOP DRAWINGS AND MANUAL. PROVIDE (1/2") CONDUIT FROM POLE TO FIELD-HOUSE BUILDING MDF ROOM FOR DATA (NETWORK), COORDINATE WITH TECHNOLOGY INSTALLER. COORDINATE ALL LOCATIONS, ROUTING, AND MOUNTING REQUIREMENTS AND HEIGHT WITH EXISTING SITE CONDITIONS AND UTILITIES.
- CONNECT LIGHTING CONTROLS TO THE EXISTING BUILDING AUTOMATION SYSTEM (BAS) TO CONTROL LIGHTS BASED ON TIME SCHEDULE. FIELD VERIFY ALL ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE/PHASE, CONTROL SIGNAL, INPUT/OUTPUT TYPES (N.O./C.) AND PROGRAMMING SETTINGS TO BE COMPATIBLE WITH EXISTING BAS AND AVAILABLE POINTS/SPACES OR REQUIREMENTS FOR EXISTING BAS EXPANSION. PROVIDE BAS MODULES/RELAYS AS REQUIRED. FIELD VERIFY ALL LOCATIONS AND EXISTING AVAILABLE POINTS/SPACES. COORDINATE ALL REQUIREMENTS WITH THE MECHANICAL CONTROLS INSTALLER/MANUFACTURER AND SPORTS LIGHTING INSTALLER/MANUFACTURER.

FEEDER SCHEDULE

COPPER ONLY

RATING	SETS	CONDUCTOR SIZE	CONDUIT
30A	1	4#10, 1#10 G.	3/4"
40A	1	4#8, 1#10 G.	1"
50A	1	4#8, 1#10 G.	1"
60A	1	4#6, 1#10 G.	1"
70A	1	4#4, 1#8 G.	1 1/4"
80A	1	4#4, 1#8 G.	1 1/4"
90A	1	4#3, 1#8 G.	1 1/4"
100A	1	4#3, 1#8 G.	1 1/4"
125A	1	4#1, 1#6 G.	1 1/2"
150A	1	4#1/0, 1#6 G.	1 1/2"
175A	1	4#2/0, 1#6 G.	2"
200A	1	4#3/0, 1#6 G.	2"
225A	1	4#4/0, 1#4 G.	2 1/2"
250A	1	4#250, 1#4 G.	2 1/2"
300A	1	4#350, 1#4 G.	3"
350A	1	4#500, 1#3 G.	3 1/2"
400A	1	4#600, 1#3 G.	4"
450A	2	4#4/0, 1#2 G.	2 1/2"
500A	2	4#250, 1#2G.	2 1/2"
600A	2	4#350, 1#1G.	3"
700A	2	4#500, 1#10G.	4"
800A	2	4#600, 1#10G.	4"
1000A	3	4#500, 1#20G.	4"
1200A	4	4#350, 1#30G.	3"
1600A	4	4#600, 1#40G.	4"
	5	4#500, 1#40G.	4"
2000A	5	4#600, 1#250 G.	4"
	6	4#500, 1#250 G.	4"
2500A	6	4#600, 1#350 G.	4"
3000A	7	4#500, 1#350 G.	4"
	8	4#500, 1#400 G.	4"
3500A	9	4#600, 1#500 G.	4"
	10	4#500, 1#500 G.	4"
4000A	10	4#600, 1#500 G.	4"
	11	4#500, 1#500 G.	4"
	12	4#600, 1#750 G.	4"
5000A	14	4#500, 1#750 G.	4"

- ELECTRICAL CONTRACTOR SHALL PROVIDE THE NUMBER OF LUGS AND PROPER LUG SIZES TO ACCEPT CONDUCTOR SIZES SHOWN.
- GROUND NOT REQUIRED AT SERVICE LATERAL.

1-PHASE 3-WIRE

FEEDER SCHEDULE

COPPER ONLY

RATING	SETS	CONDUCTOR SIZE	CONDUIT
30A	1	3#10, 1#10 G.	3/4"
40A	1	3#8, 1#10 G.	3/4"
50A	1	3#8, 1#10 G.	3/4"
60A	1	3#6, 1#10 G.	1"
70A	1	3#4, 1#8 G.	1"
80A	1	3#4, 1#8 G.	1"
90A	1	3#3, 1#8 G.	1 1/4"
100A	1	3#3, 1#8 G.	1 1/4"
125A	1	3#1, 1#6 G.	1 1/4"
150A	1	3#1/0, 1#6 G.	1 1/2"
175A	1	3#2/0, 1#6 G.	1 1/2"
200A	1	3#3/0, 1#6 G.	2"
225A	1	3#4/0, 1#4 G.	2"
250A	1	3#250, 1#4 G.	2 1/2"
300A	1	3#350, 1#4 G.	2 1/2"
350A	1	3#500, 1#3 G.	3"
400A	1	3#600, 1#3 G.	3 1/2"
450A	2	3#4/0, 1#2 G.	2"
500A	2	3#250, 1#2G.	2 1/2"
600A	2	3#350, 1#1G.	3"
700A	2	3#500, 1#10G.	3 1/2"
800A	2	3#600, 1#10G.	3 1/2"
1000A	3	3#500, 1#20G.	3"
1200A	4	3#350, 1#30G.	3"
1600A	4	3#600, 1#40G.	3 1/2"
	5	3#500, 1#40G.	3"
2000A	5	3#600, 1#250G.	3 1/2"
	6	3#500, 1#250G.	3"
2500A	6	3#600, 1#350G.	3 1/2"
	7	3#500, 1#350G.	3 1/2"
3000A	8	3#500, 1#400G.	3 1/2"
3500A	9	3#600, 1#500G.	3 1/2"
	10	3#500, 1#500G.	3 1/2"
4000A	10	3#600, 1#500G.	3 1/2"
	11	3#500, 1#500G.	3 1/2"

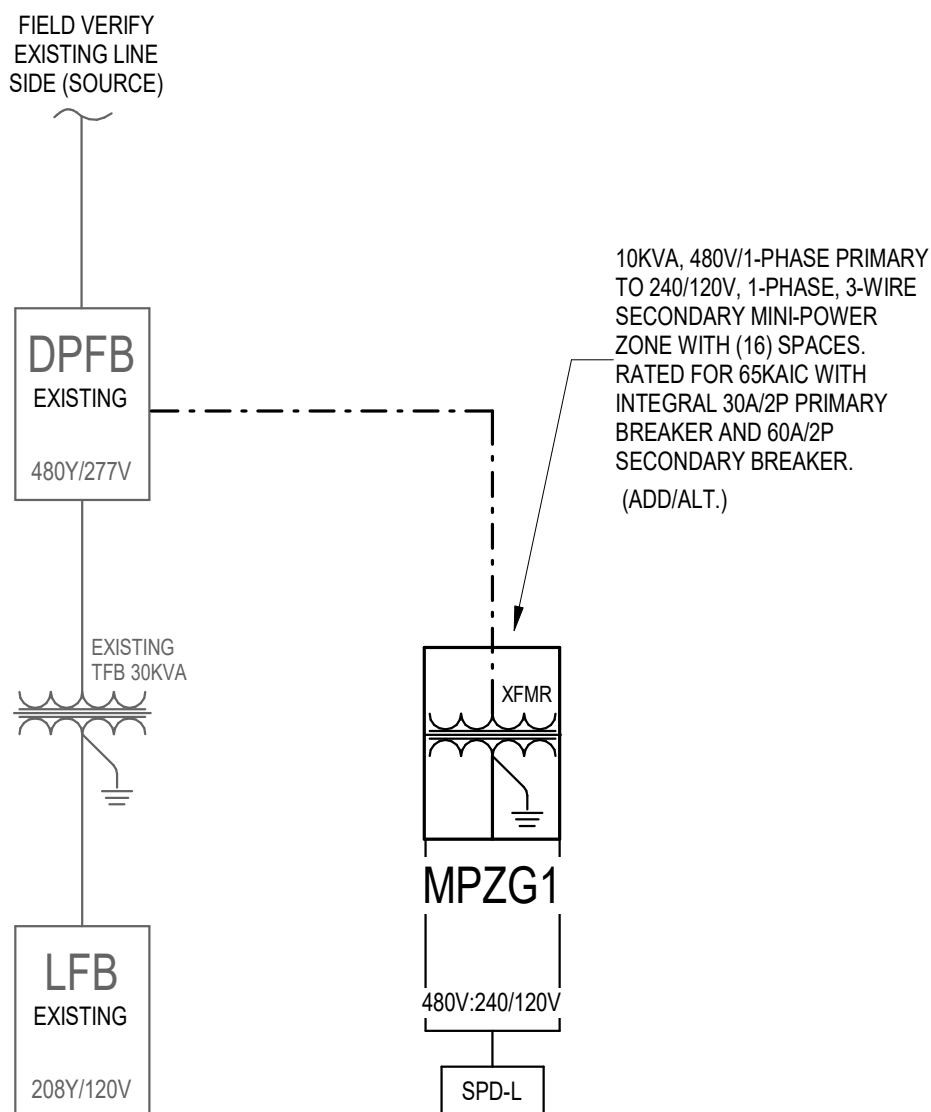
- ELECTRICAL CONTRACTOR SHALL PROVIDE THE NUMBER OF LUGS AND PROPER LUG SIZES TO ACCEPT CONDUCTOR SIZES SHOWN.
- GROUND NOT REQUIRED AT SERVICE LATERAL.

TRANSFORMER FEEDER SCHEDULE - HARMONIC MITIGATING - 3 PHASE

PRIMARY VOLTAGE				SECONDARY VOLTAGE			
480V, THREE PHASE				120/208V, THREE PHASE, FOUR WIRE			
KVA	FEEDER	CONDUIT	BREAKER	FEEDER	CONDUIT	BREAKER	G.E.C. SIZE
15	3 #10, 1 #10 G.	3/4"	25A/3P	3 #6, 1 #4N, 1 #8G.	1"	60A/3P	#8
30	3 #6, 1 #10 G.	1"	45A/3	3 #3, 1 #10N, 1 #8G.	1 1/4"	100A/3P	#8
45	3 #4, 1 #8 G.	1"	70A/3P	3 #1/0, 1 #40N, 1 #6G.	2"	150A/3P	#6
75	3 #1, 1 #6 G.	1 1/4"	125A/3P	3 #250, 2 #30N, 1 #2G.	3"	250A/3P	#2
112.5	3 #2/0, 1 #6 G.	1 1/2"	175A/3P	3 #500, 2 #300N, 1 #1/0G.	4"	400A/3P	#1/0
150	3 #4/0, 1 #4 G.	2"	225A/3P	(2) SETS OF 3 #250, 2 #30N, 1 #1/0G.	3"	500A/3P	#1/0
225	3 #500, 1 #3 G.	3"	350A/3P	(2) SETS OF 3 #600, 2 #300N, 1 #3/0G.	4"	800A/3P	#3/0
300	(2) SETS OF 3 #4/0, 1#2G	2 1/2"	450A/3P	(3) SETS OF 3 #500, 2 #250N, 1 #3/0G.	3 1/2"	1000A/3P	#3/0
500	(2) SETS OF 3 #500, 1#1/0G	3"	800A/3P	(5) SETS OF 3 #500, 2 #300N, 1 #3/0G.	3 1/2"	1800A/3P	#3/0

NOTE:

-ALL CONDUCTORS SHALL BE COPPER

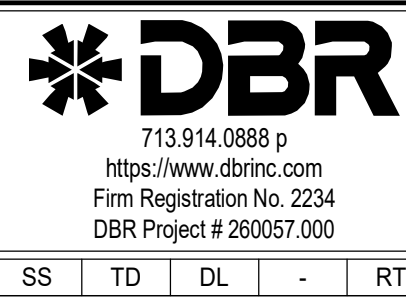


CREEKSIDE PARK JHS -
PARTIAL ONE-LINE

1 EOL Diagram - CREEKSIDE PARK JHS
12" = 1'-0"

PARTIAL ONE-LINE DIAGRAM GENERAL NOTES:

- ALL EQUIPMENT, WIRING, AND CONDUIT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL VISIT THE SITE TO VERIFY EXISTING CONDITIONS. INCLUDE ALL MODIFICATIONS REQUIRED TO COMPLY WITH THE NATIONAL ELECTRICAL CODE, LANDLORD AND POWER COMPANY.
- NEW ELECTRICAL EQUIPMENT SHALL BE ARRANGED TO COMPLY WITH THE LATEST NEC ARTICLE 110.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED THE EXISTING JOB SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF THE ARCHITECTURAL MODIFICATIONS TO THE EXISTING CONDITIONS. THE SCOPE OF WORK SHALL INCLUDE MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE REROUTE, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED SO THAT THE REMODELING WORK MAY BE ACCOMPLISHED. NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.



SS TO DL - RT



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REVISIONS

Revision No.	Revision Date
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Project Director: Proj. Director
Project Architect: Proj. Architect
Project Designer: Proj. Designer
Drawn By: Author

PROJECT NO.

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SHEET TITLE

ELECTRICAL PANEL
SCHEDULES - CREEKSIDE
PARK JHS

SHEET NO.

E5.02A

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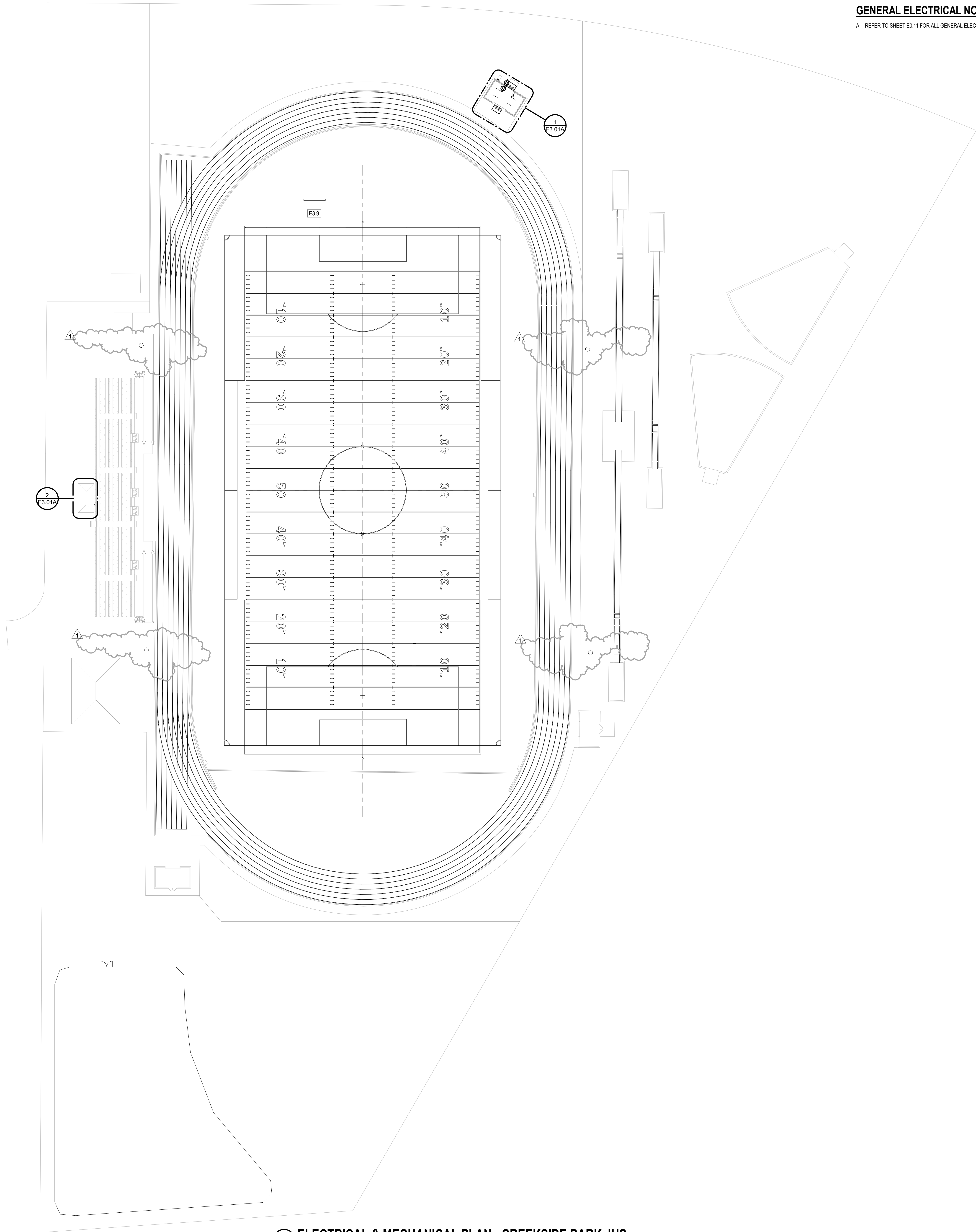
TOMBALL, TEXAS

Tomball Athletic Improvements

Mini Power Zone (CPJHS) Panelboard MPZG1											
65,000 AMPS AIC Rating											
X New											
240/120 Volt, 1 Phase, 3 Wire											
1 Section											
Mains Type: MCB											
60 A MCB											
100 A BUS (Copper)											
LUGS: --											
Mounting Style: SURFACE											
Type 1 - Nema Rating											
LOAD (VA)	TYPE	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	TYPE	LOAD (VA)
360 VA	R	RCPT. STORAGE	12	20 A	1	2	Space	--	0 VA		
168 VA	L	STORAGE LIGHTING	12	20 A	3	4	Space	--	0 VA		
60 VA	EL	EXTERIOR STORAGE LGT.	12	20 A	5	6	Space	--	0 VA		
0 VA	--	Space	12	--	7	8	Space	--	0 VA		
0 VA	--	Space	12	--	9	10	Space	--	0 VA		
0 VA	--	Space	12	--	11	12	Space	--	0 VA		
0 VA	--	Space	12	--	13	14	Space	--	0 VA		
0 VA	--	Space	12	--	15	16	Space	--	0 VA		
30 A							SPD				
10											
NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type
220.47	(R)Receptacle	360 VA	100.00%	360 VA	210.20A	(L)Lighting	168 VA	125.00%	210 VA		
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed		(EL)Ext. Ltg.	60 VA	125.00%	75 VA		
220.60	(C)Cooling	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed		
220.60	(H)Heating	Not Computed	0.00%	Not Computed		(WH)Wat. Htr.	Not Computed	0.00%	Not Computed		
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(MT)Lrg. Motor	Not Computed	0.00%	Not Computed		
	(M)Misc.	Not Computed	0.00%	Not Computed	630.11B	(SP)Sub Pnt.	Not Computed	0.00%	Not Computed		
						(W)Welders	Not Computed	0.00%	Not Computed		
Location of Panel:											
Total Connected Load: 588 VA VA = 2 A											
Total Load (Diversified): 645 VA VA = 2 A											

Panelboard DPFB											
65000 A AIC Rating											
X New											
480/277 Wye Volt, 3 Phase, 4 Wire											
1 Section											
Mains Type: MCB											
400 A MCB											
400 A BUS (Copper)											
LUGS: --											
Mounting Style: SURFACE											
Type 1 - Nema Rating											
LOAD (VA)	TYPE	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	TYPE	LOAD (VA)
12000 VA	--	STADIUM LTG POLE #1	4	70 A	3	4	STADIUM LTG POLE #2	--	12000 VA	1	
12000 VA	--	STADIUM LTG POLE #3	4	70 A	9	10	STADIUM LTG POLE #4	--	12000 VA	1	
2000 VA	--	SECURITY LTG	12	20 A	13	14	TFB(E)	--	25000 VA	1	
1000 VA	--	LIGHTING(E)	12	20 A	19	20					
4	645 VA	MPZG1 - CREEKSIDE PARK JHS STORAGE	10	30 A	21	22	BOOSTER PUMP(E)	--	11639 VA	1	
0 VA	--	Space	12	--	25	26	Space	--	0 VA	1	
0 VA	--	Space	12	--	27	28	Space	--	0 VA	1	
0 VA	--	Space	12	--	29	30	Space	--	0 VA	1	
0 VA	--	Space	12	--	31	32	Space	--	0 VA	1	
0 VA	--	Space	12	--	33	34	Space	--	0 VA	1	
0 VA	--	Space	12	--	35	36	Space	--	0 VA	1	
0 VA	--	Space	12	--	37	38	Space	--	0 VA	1	
0 VA	--	Space	12	--	39	40	Space	--	0 VA	1	
0 VA	--	Space	12	--	41	42	Space	--	0 VA	1	
0 VA	--	Space	12	--	43	44	Space	--	0 VA	1	
9000 VA	--	CONCESSION STAND (E)	12	20 A	45	46	Space	--	0 VA	1	
NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type	Conn.	Fct.	Diversity	NEC REF:	Load Type
220.47	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed		
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed		(EL)Ext. Ltg.	Not Computed	0.00%	Not Computed		
220.60	(C)Cooling	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed		
220.60	(H)Heating	Not Computed	0.00%	Not Computed		(WH)Wat. Htr.	Not Computed	0.00%	Not Computed		
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(MT)Lrg. Motor	Not Computed	0.00%	Not Computed		
	(M)Misc.	Not Computed	0.00%	Not Computed	630.11B	(SP)Sub Pnt.	Not Computed	0.00%	Not Computed		
						(W)Welders	Not Computed	0.00%	Not Computed		
Location of Panel:											
Total Connected Load: 97284 VA VA = 117 A											
Total Load (Diversified): 97284 VA VA = 117 A											

Panelboard LFB												10000 A AIC Rating New X Existing	
120/208 Wye Volt, 3 Phase, 4 Wire				Mains Type:		100 A MCB		--	LUGS: --		Mounting Style: SURFACE		
1 Section				MCB		100 A BUS (Copper)							
Type 1 - Nema Rating													
NOTES	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTES	
	1 500 VA	--	RCPT(E)	12	20 A	1	2	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 2496 VA	--	A/C UNIT(E)	12	20 A	3	4	20 A 12	EXISTING LOAD	--	500 VA	1	
						5	6	20 A 12	EXISTING LOAD	--	500 VA	1	
						7	8	20 A 12	EXISTING LOAD	--	500 VA	1	
1	5764 VA	--	EXISTING LOAD	12	20 A	9	10	20 A 12	EXISTING LOAD	--	500 VA	1	
						11	12	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 0 VA	--	Space	12	20 A	13	14	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	PLAY CLOCK FIELD (E)	12	20 A	15	16	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	RCPT - CTR BLEACHERS(E)	12	20 A	17	18	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	RCPT - CTR BLEACHERS(E)	12	20 A	19	20	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	PLAY CLOCK FIELD(E)	12	20 A	21	22	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	RCPT - T&F PLAY CLOCK(E)	12	20 A	23	24	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	RCPT - PRESSBOX(E)	12	20 A	25	26	12	Space	--	0 VA	1	
	1 500 VA	--	CONTRACTOR CONTROLS(E)	12	20 A	27	28	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	EXISTING LOAD	12	20 A	29	30	20 A 12	EXISTING LOAD	--	500 VA	1	
	1 500 VA	--	SCOREBOARD(E)	12	20 A	31	32	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	33	34	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	35	36	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	37	38	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	39	40	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	41	42	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	43	44	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	45	46	12	Space	--	0 VA	1	
	1 0 VA	--	Space	12	--	47	48	12	Space	--	0 VA	1	
	1 0 VA	--	MAIN CIRCUIT BREAKER(E)	3	100 A	49	50	20 A 12	EXISTING LOAD	--	500 VA	1	
						51	52	20 A 12	EXISTING LOAD	--	500 VA	1	
						53	54	20 A 12	EXISTING LOAD	--	500 VA	1	
NEC REF:		Load Type	Conn.	Fct.	Diversity	NEC REF:		Load Type	Conn.	Fct.	Diversity		
220.47	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed		(EL)Ext. Ltg.	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
220.60	(C)Cooking	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
220.60	(H)Heating	Not Computed	0.00%	0 VA		(WH)WHLtr. Htr.	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(MT)Ltg. Motor Not Computed	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
	(M)Misc.	Not Computed	0.00%	Not Computed		(SP)Sub Pm.	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
					630.11B	(W)Welders	Not Computed	0.00%	Not Computed	0.00%	Not Computed		
Total Connected Load:		21760 VA	VA =	60 A	Location of Panel:								
Total Load (Diversified):		21760 VA	VA =	60 A									



GENERAL ELECTRICAL NOTE:

A. REFER TO SHEET E0.11 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

E3.0 SCOREBOARD TO BE UPGRADED. COORDINATE WITH SCOREBOARD EQUIPMENT PROVIDER FOR ELECTRICAL REQUIREMENTS (ALTERNATE).



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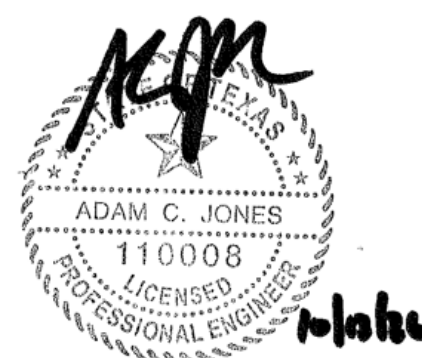
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Issued for Bid



ISSUED: SEPTEMBER 14, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No.6	10/13/26

Project Director: Proj. Director

Project Architect: Proj. Architect

Project Designer: Proj. Designer

Drawn By: DBR

PROJECT NO.

25-0158.00

SHEET TITLE

MECHANICAL/ELECTRICAL
SITE PLAN - CREEKSIDE
PARK JHS

SHEET NO.

ME1.21A



713.914.0888 p
https://www.dbrinc.com
Firm Registration No. 2234
DBR Project # 260057.000

SS TD DL - RT

1 ELECTRICAL & MECHANICAL PLAN - CREEKSIDE PARK JHS
1" = 30'-0"

Tomball Athletic Improvements

TOMBALL, TEXAS

Tomball Athletic Improvements

TOMBALL ISD

TOMBALL, TEXAS



TOMBALL ISD
TOMBALL, TEXAS

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ISSUED: SEPTEMBER 14, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum 5	10/12/2026
2 Addendum 6	10/13/2026

Project Director:

Project Architect: RSJ

Project Designer:

Drawn By: SDR

PROJECT NO.

25-0158.00

SHEET TITLE

INDEX OF DRAWINGS,
GENERAL NOTES &
ABBREVIATIONS

SHEET NO.

INDEX

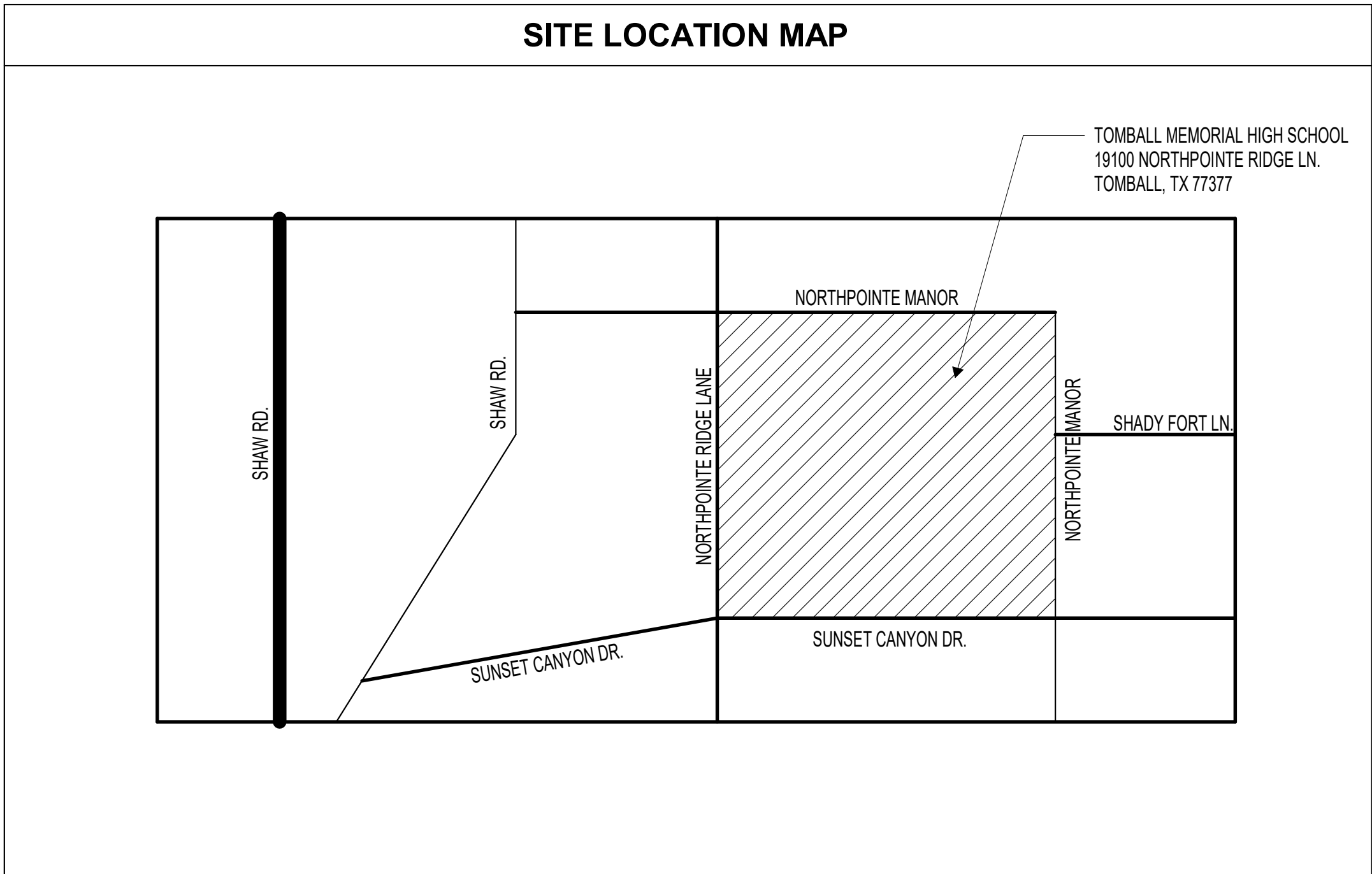
Tomball Athletic Improvements

ABBREVIATIONS			
A		M (CONT.)	
A.F.F.	ABOVE FINISH FLOOR	MOD BIT	MODIFIED BITUMEN
A.C.T.	ACOUSTICAL CEILING TILE	MULL.	MULLION
ADDL.	ADDITIONAL	M.E.P.	MECHANICAL-ELECTRICAL-PLUMBING
A.B.	AIR BARRIER	M.C.M.	METAL COMPOSITE MATERIAL
A.C.M.	ALUMINUM COMPOSITE PANEL	MIN.	MINIMUM
A.D.A.	AMERICANS WITH DISABILITIES ACT	MISC.	MISCELLANEOUS
AL/ALUM.	ALUMINUM		
APPROX.	APPROXIMATE OR APPROXIMATELY	N	
ARCH.	ARCHITECT OR ARCHITECTURAL	NOM.	NOMINAL
A.W.R.B.	AIR- & WATER-RESISTIVE BARRIER	N/A	NOT APPLICABLE
		N.I.C.	NOT IN CONTRACT
		N.T.S.	NOT TO SCALE
		NO. or #	NUMBER
B		O	
BD.	BOARD	O.C.	ON CENTER
B.O.W.	BOTTOM OF WALL	O.D.	OUTSIDE DIAMETER
B.U.R.	BUILT-UP ROOFING	O.H.	OPPOSITE HAND
BLDG.	BUILDING	OHD.	OVERHEAD
		O.F.C.I.	OWNER-FURNISHED, CONTRACTOR-INSTALLED
		O.F.O.I.	OWNER-FURNISHED, OWNER INSTALLED
C		P / Q	
CL	CENTER LINE	PR	PAIR
C.R.	CLASSROOM	P.LAM.	PLASTIC LAMINATE
C.F.S.	COLD-FORMED STEEL	PL.	PLATE
CONC.	CONCRETE	PLUMB.	PLUMBING
CMU	CONCRETE MASONRY UNIT	PT.	POINT
C.M.	CONSTRUCTION MANAGER	P.C.F.	POUNDS PER CUBIC FOOT
CONT.	CONTINUOUS	P.S.F.	POUNDS PER SQUARE FOOT
C.I.	CONTINUOUS INSULATION	P.S.I.	POUNDS PER SQUARE INCH
C.J.	CONTROL JOINT	PREFAB.	PREFABRICATED
COORD.	COORDINATE	PROJ.	PROJECTOR or PROJECTION
CORR.	CORRIDOR	Q.T.	QUARRY TILE
D		R	
DIA.	DIAMETER	R.	RADIUS
D.O.	DOOR OPENING	REBAR	REINFORCING BAR
DN.	DOWN	REF.	REFERENCE or REFER TO
DS.	DOWNSPOUT	R.C.P.	REFLECTED CEILING PLAN
		RE.	REGARDING
E		REFG.	REFRIGERATOR
EA.	EACH	REINF.	REINFORCE or REINFORCING
E.W.	EACH WAY	REQD.	REQUIRED
ELEC.	ELECTRICAL	R.	RISER (STAIR)
E.W.C.	ELECTRIC WATER COOLER	R.D.	ROOF DRAIN
ELEV.	ELEVATION	R.O.	ROUGH OPENING
EQ.	EQUAL		
EQUIP.	EQUIPMENT	S	
EXIST.	EXISTING	SIM.	SIMILAR
E.J.	EXPANSION JOINT	S.C.	SOLID CORE
EXT.	EXTERIOR	S.A.B.	SOUND ATTENUATION BLANKET
EIFS	EXTERIOR INSULATION & FINISH SYSTEM	S.A.F.B.	SOUND ATTENUATION FIRE BLANKET
		S.T.C.	SOUND TRANSMISSION CLASS
F		SPEC.	SPECIFICATION
FT.	FEET or FOOT	SQ.	SQUARE
F.R.P.	FIBERGLASS REINFORCED PLASTIC	S.F.	SQUARE FOOT
F.V.	FIELD-VERIFY	S.S.	STAINLESS STEEL
FIN.	FINISH	STRUC.	STRUCTURAL
F.F.	FINISH FLOOR	SUSP.	SUSPENDED
F.E.	FIRE EXTINGUISHER	T	
F.E.C.	FIRE EXTINGUISHER & CABINET	T.B.	TACKBOARD
F.H.C.	FIRE HOSE CABINET	T.W.	TACK WALL
F.H.C.S.	FLAT-HEAD COUNTERSUNK	T.C.	TEACHER'S CABINET
FLR.	FLOOR	T.A.S.	TEXAS ACCESSIBILITY STANDARDS
F.D.	FLOOR DRAIN	T.	TREAD (STAIR)
FLUOR.	FLUORESCENT	T&B	TOP & BOTTOM
		T.O.	TOP OF
G / H		T.C.	TOP OF CURB
GALV.	GALVANIZED	T.O.D.	TOP OF DECK
GA.	GAGE	T.O.J.	TOP OF JOIST
G.C.	GENERAL CONTRACTOR	T.O.S.	TOP OF STEEL
G.O.	GLAZED OPENING	T.O.W.	TOP OF WALL
GYP.	GYPSPUM	TYP.	TYPICAL
HT.	HEIGHT	U / V	
H.P.	HIGH POINT	U/C	UNDER COUNTER
H.M.	HOLLOW METAL	U.L.	UNDERWRITERS LABORATORY
HORIZ.	HORIZONTAL	U.N.O.	UNLESS NOTED OTHERWISE
H.B.	HORIZONTAL BLINDS	V.I.F.	VERIFY IN FIELD
H.D.G.	HOT-DIP GALVANIZED	VERT.	VERTICAL
HR.	HOUR	V.C.T.	VINYL COMPOSITION TILE
I / J / K		V.W.C.	VINYL WALL COVERING
I.D.	INSIDE DIAMETER	W / X / Y / Z	
INSUL.	INSULATION	W.C.	WATER CLOSET
INT.	INTERIOR	W.R.B.	WATER-RESISTIVE BARRIER
I.B.C.	INTERNATIONAL BUILDING CODE	WT.	WEIGHT
L		W.	WIDE
LAV.	LAVATORY	W/	WITH
L.L.H.	LONG LEG HORIZONTAL	W/O	WITHOUT
L.L.V.	LONG LEG VERTICAL	W.P.	WORKING POINT
L.P.	LOW POINT	W.W.F.	WELDED WIRE FABRIC
L.V.T.	LUXURY VINYL TILE		
M			
MFR.	MANUFACTURER		
MFG.	MANUFACTURING		
M.B.	MARKERBOARD		
M.O.	MASONRY OPENING		
MAX.	MAXIMUM		
MECH.	MECHANICAL		

SYMBOLS LEGEND			
ROOM NAME	ROOM NAME & NUMBER		ALUMINUM-FRAMED GLAZED OPENING SYSTEM
	A101		
	A101		HOLLOW METAL-FRAMED GLAZED OPENING SYSTEM
	AC		ACCESS CONTROL
	HB		HORIZONTAL BLINDS
	X1		DEMOLITION KEYNOTE
	XXX-01		BUILDING ASSEMBLY TYPE
	1 A101		BUILDING SECTION
	1 A101		WALL SECTION
	1 A101		DETAIL CALLOUT
			DATUM ELEVATION
			NORTH ARROW

MATERIAL LEGEND			
	EARTH		CERAMIC TILE
	POROUS FILL		GLASS (LARGE SCALE)
	CONCRETE/ GROUT		INSULATION (RIGID FOAM BOARD)
	BRICK		INSULATION (EPS FOAM BOARD)
	CMU (LARGE SCALE)		INSULATION (BATT/ BLANKET)
	MARBLE		INSULATION (SEMI-RIGID BOARD)
	METAL (LARGE SCALE)		WOOD, ROUGH (CONTINUOUS)
	METAL (SMALL SCALE)		WOOD, ROUGH (BLOCKING)
	RESILIENT FLOORING		WOOD, FINISH
	ACOUSTICAL TILE		PLYWOOD (LARGE SCALE)
	TERRAZZO		FIBER CEMENT PANEL
	PLASTER, SAND, GROUT, GYPSUM BOARD		METAL LATH
			GYPSUM BOARD

APPLICABLE CODES	
2021 International Building Code w/ City of Tomball Amendments	
2021 International Fire Code w/ City of Tomball Amendments	
2021 International Plumbing Code w/ City of Tomball Amendments	
2021 International Mechanical Code w/ City of Tomball Amendments	
2021 International Fuel Gas Code w/ City of Tomball Amendments	
2020 NFPA 70, National Electrical Code w/ City of Tomball Amendments	
2018 International Energy Conservation Code w/ City of Tomball Amendments	
2012 Texas Accessibility Standards	
2021 International Energy Conservation Code or ASHRAE 90.1-2013	
NOTES	



PROJECT INFORMATION	
PROJECT NAME	
TOMBALL MEMORIAL HIGH SCHOOL	
OWNER	
TOMBALL I.S.D.	
PROJECT LOCATION	
19100 NORTHPOINTE RIDGE LN, TOMBALL, TX, 77377	
TDLR PROJECT REGISTRATION NUMBER:	
TABS2026027196	
APPROXIMATE BUILDING AREAS	
TOTAL BLDG AREA.:	146,560 S.F.
GENERAL NOTES	
1. Refer to the CODE-series sheets for Code Information, Design Criteria and Fire Protection Requirements.	
2. Verify and document existing dimensions and conditions at the site before beginning construction. Notify the Architect of conflicts or variations prior to commencement of construction.	
3. Based on the applicable design criteria, submit Shop Drawings of the proposed pattern of control joints in masonry veneer, CMU, gypsum board, plaster and stucco to the Architect for review and approval prior to construction.	
4. In case of discrepancies in or between the Contract Documents, the greater quantity or better quality shall be bid. Clarifications regarding the discrepancies shall be requested from the Architect prior to construction, and the resulting interpretations implemented in accordance with the Contract Documents.	

INDEX OF DRAWINGS	
SHEET NO.	SHEET TITLE
GENERAL	COVER
INDEX	INDEX OF DRAWINGS, GENERAL NOTES & ABBREVIATIONS
CIVIL	
C0.00	COVER SHEET
C1.00	GENERAL NOTES
C1.01	TOPOGRAPHIC SURVEY
C2.00	DEMOLITION & SWPP PLAN
C3.00	SITE DIMENSION PLAN
C4.00	GRADING AND DRAINAGE PLAN
C5.00	MISCELLANEOUS DETAILS
C6.00	HCED REVIEW SHEET
C7.00	HCFOD REVIEW SHEET
ARCHITECTURAL	
A0.01	DEMO SITE PLAN - OVERALL - TOMBALL MEMORIAL HS
A0.01A	DEMO SITE PLAN - COMPETITION FIELD - TOMBALL MEMORIAL HS
A0.01B	DEMO SITE PLAN - BSBALL/SFBALL FIELDS - TOMBALL MEMORIAL HS
A0.02	TOMBALL MEMORIAL HS - LAYDOWN PLAN
A1.01	TOMBALL MEMORIAL HS - OVERALL SITE PLAN
A1.01A	TOMBALL MEMORIAL HS - COMPETITION FIELD - SITE PLAN
A1.01B	TOMBALL MEMORIAL HS - BSBALL/SFBALL FIELDS - SITE PLAN
A1.21	TOMBALL MEMORIAL HS - BLEACHER EXPANSION PLAN
A1.21A	TOMBALL MEMORIAL HS - BLEACHER NETTING AND BACKSTOPS
A1.22	STORAGE BUILDING TYP. - ENLARGED PLANS AND ELEVATIONS
A1.23	TOMBALL MEMORIAL HS - TURF DESIGN
A1.31	ARCHITECTURAL SITE PLAN DETAILS
STRUCTURAL	
S1.01	GENERAL NOTES
S1.02	CONT. GENERAL NOTES, ABBREVIATIONS AND SYMBOLS
S2.01	TOMBALL MEMORIAL HS - SITE PLAN
S3.01	STORAGE BUILDING PLANS
S3.02	TYPICAL FOUNDATION DETAILS
ELECTRICAL	
E3.01D	ELECTRICAL ENLARGED PLANS - TOMBALL MEMORIAL HS
E5.01D	ELECTRICAL SCHEDULES - TOMBALL MEMORIAL HS
E5.02D	ELECTRICAL PANEL SCHEDULES - TOMBALL MEMORIAL HS
MECHANICAL	
ME1.21D	MECHANICAL/ELECTRICAL SITE PLAN - TOMBALL MEMORIAL HS



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TOMBALL ISD
TOMBALL, TEXAS

Issued for Bid



ISSUED: SEPTEMBER 14, 2026

REVISIONS

Revision No.	Revision Date
1 Addendum No.6	10/13/26

Project Director: Proj. Director
Project Architect: Proj. Architect
Project Designer: Proj. Designer
Drawn By: Author

PROJECT NO.

25-0158.00

SHEET TITLE

ELECTRICAL ENLARGED
PLANS - TOMBALL
MEMORIAL HS

SHEET NO.

E3.01D

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GENERAL ELECTRICAL NOTE:

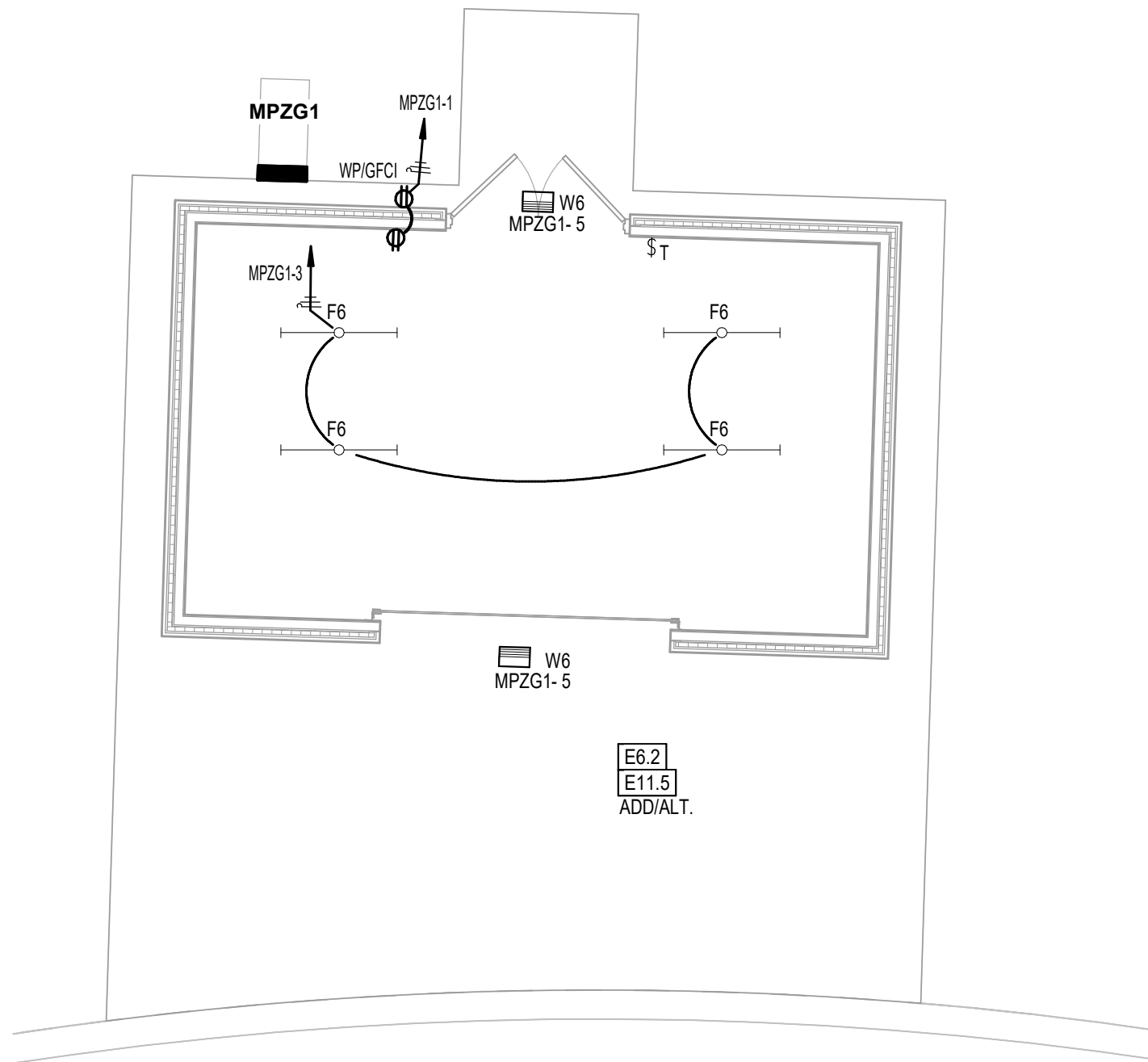
A. REFER TO SHEET E0.11 FOR ALL GENERAL ELECTRICAL NOTES.

ELECTRICAL KEYED NOTES

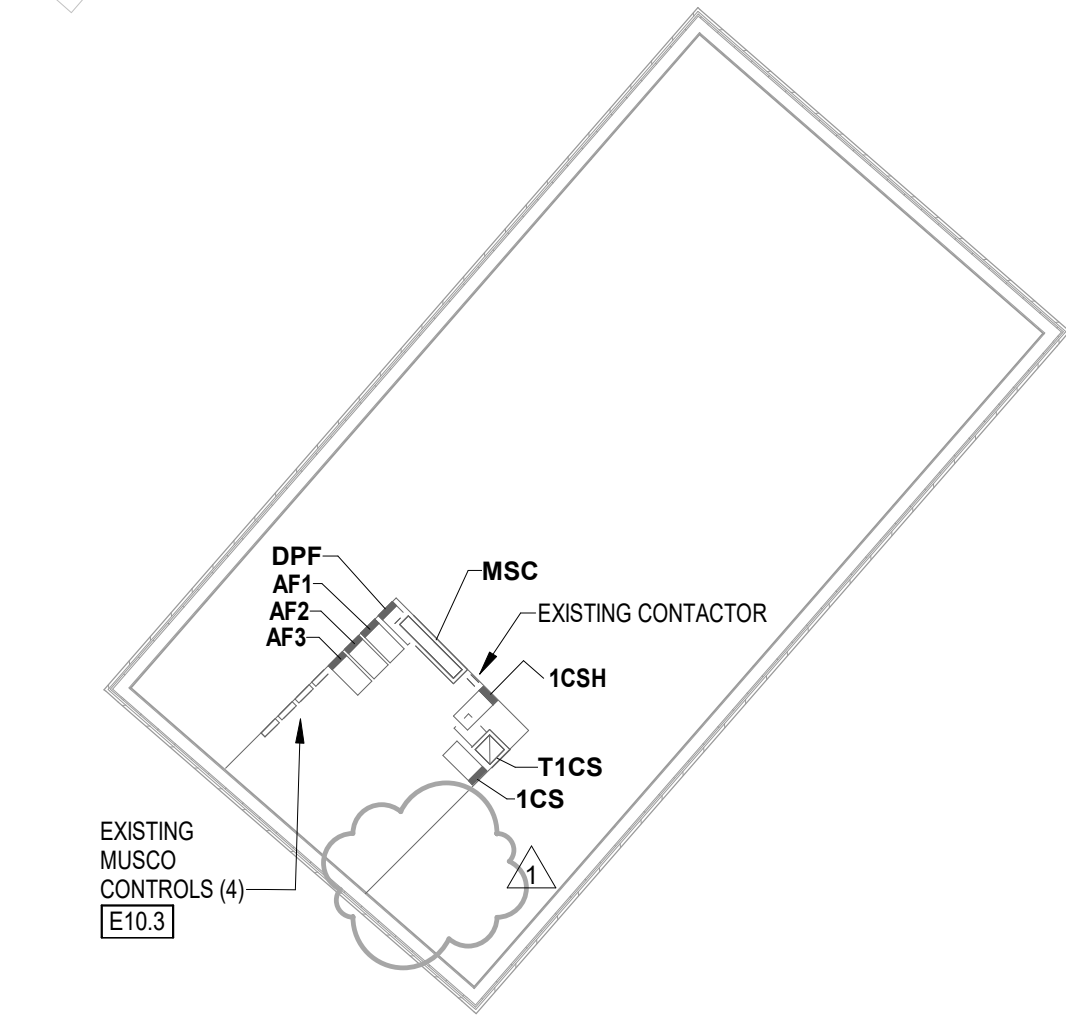
E6.2 PROVIDE (1) 120V CIRCUIT TO NEW STORAGE SHED (ALTERNATE).

E10.3 APPROXIMATE LOCATION OF EXISTING MUSCO SPORTS LIGHTING CONTACTOR/CONTROLLER. INTEGRATE EXISTING CONTROLLER WITH BAS. REFER TO MUSCO SPORTS LIGHTING NOTES FOR MORE INFORMATION.

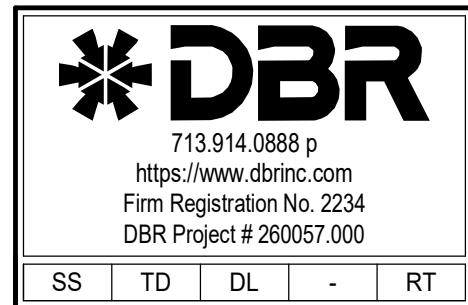
E11.5 PROVIDE (1) 277V CIRCUIT FOR INTERIOR AND EXTERIOR LIGHTING FIXTURES OF NEW SHEDS AND PROVIDE LIGHTING CONTROLS (ALTERNATE).



2 TOMBALL MEMORIAL HS - STORAGE
3/16" = 1'-0"



1 TOMBALL MEMORIAL HS - STORAGE/ELECTRICAL ROOM
1/16" = 1'-0"



SS	TD	DL	-	RT
----	----	----	---	----

Tomball Athletic Improvements



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LIGHTING FIXTURE SCHEDULE - TOMBALL MEMORIAL HS								
TYPE	MANUFACTURER	MODEL	MOUNTING	LAMPS	VOLTAGE	WATTAGE	MUSCO NOTES	DESCRIPTION
F6	DAYRITE	FSS-4-SSL-840-UNV-DIMFSSWGNGH-126	SURFACE	LED	120 V	42 VA	N/A	4' UTILITY STRIP WITH WIRE GUARD. SURFACE MOUNT OR SUSPEND WITH 54" CHAIN AS NEEDED.
WB	GARDO	GMM-AB-740-TSM-UNV-DELA-FIN(Walltop) FSP21	WALL	LED	120 V	30 VA	N/A	EXTERIOR WALL PACK WITH OCCUPANCY SENSOR. COORDINATE MOUNTING HEIGHT WITH ARCHITECT

1. LIGHTING FIXTURE CATALOG NUMBERS AND DESCRIPTIONS ARE SCHEDULED FOR ESTABLISHING QUALITY, APPEARANCE AND PERFORMANCE OF THE FIXTURES AS REQUIRED BY THE DESIGN. EXCAT CATALOG NUMBERS DESCRIBING MOUNTING CONDITIONS, FINISHES AND REQUIREMENTS RELATED TO TRIMS AND LENS FOR ALL FIXTURES SHALL BE CONFIRMED BY THE CONTRACTOR WITH THE ROOM FINISH SCHEDULE AND REFLECTED CEILING PLANS, INCLUDING GRID TYPES, ON THE ARCHITECTURAL DRAWINGS PRIOR TO FINISHING. FIXTURES SHALL BE IDENTIFIED BY THE CONTRACTOR ON THE ARCHITECTURAL DRAWINGS PRIOR TO FINISHING.

2. THE NEW LIGHT FIXTURES SCHEDULED ARE THE BASIS OF DESIGN. IT IS NOT INTENDED TO LIMIT COMPETITION FROM QUALIFIED MANUFACTURERS. ALL BIDDERS SHALL SUBMIT THEIR PROPOSED LIGHT FIXTURES IN SUBMITTAL FORM A MINIMUM OF 10 BUSINESS DAYS PRIOR TO BID DATE FOR REVIEW. APPROVED LIGHT FIXTURES WILL BE ISSUED IN AN ADDENDUM.

1. PROVIDE NEW SPOTS LIGHTING POLE CONTACTOR/CONTROLLER MOUNTED ON POLE AND ASSOCIATED POWER AND CONTROLS. PROVIDE WITH INTEGRAL STEP-DOWN TRANSFORMER FOR 120V CONTROLS ON POLE. IN ADDITION TO CONTROLS ON POLE, PROVIDE REMOTELY LOCATED MANUAL ON/OFF OVERRIDE CONTROL OF LIGHTS. REFER TO POWER PLANS FOR PROPOSED LOCATION, AND PROVIDE CONDUITS AND WIRE FROM THIS LOCATION TO EACH CLOSET LIGHT. (1)1" CONDUIT FOR CONTACTOR CONTROL WIRING (ONLY IF DIMMING FROM THE MANUAL SWITCH; AND (1)1" CONDUIT FOR DIMMING WIRES), COORDINATE EXACT REQUIREMENTS WITH MANUFACTURER SHOP DRAWINGS AND MANUAL. PROVIDE (1)1" CONDUIT FROM POLE TO FIELD-HOUSE BUILDING MDF ROOM FOR DATA (NETWORK) COORDINATE WITH TECHNOLOGY INSTALLATION. COORDINATE ALL LOCATIONS, ROUTING, AND MOUNTING REQUIREMENTS AND HEIGHT WITH EXISTING SITE CONDITIONS AND UTILITIES.

2. CONNECT LIGHTING CONTROLS TO THE EXISTING BUILDING AUTOMATION SYSTEM (BAS) TO CONTROL LIGHTS BASED ON TIME SCHEDULE. FIELD VERIFY ALL ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE/PHASE, CONTROL SIGNAL, INPUT/OUTPUT TYPES (N.O./C) AND PROGRAMMING SETTINGS TO BE COMPATIBLE WITH EXISTING BAS AND AVAILABLE POINTS/SPACES OR REQUIREMENTS FOR EXISTING BAS EXPANSION. PROVIDE BAS MODULES/RELAYS AS REQUIRED. FIELD VERIFY ALL LOCATIONS AND EXISTING AVAILABLE POINTS/SPACES. COORDINATE ALL REQUIREMENTS WITH THE MECHANICAL CONTROLS INSTALLER/MANUFACTURER AND SPORTS LIGHTING INSTALLER/MANUFACTURER.

PRIMARY VOLTAGE				SECONDARY VOLTAGE			
480V, THREE PHASE				120/208V, THREE PHASE, FOUR WIRE			
KVA	FEEDER	CONDUIT	BREAKER	FEEDER	CONDUIT	BREAKER	G.E.C. SIZE
15	3 #10, 1 #10 G.	3/4"	25A/3P	3 #6, 1 #4N, 1 #6G.	1"	60A/3P	#6
30	3 #6, 1 #10 G.	1"	45A/3	3 #3, 1 #10N, 1 #6G.	1 1/4"	100A/3P	#6
45	3 #4, 1 #6 G.	1"	70A/3P	3 #10, 1 #40N, 1 #6G.	2"	150A/3P	#6
75	3 #1, 1 #6 G.	1 1/4"	125A/3P	3 #250, 2 #30N, 1 #2G.	3"	250A/3P	#2
112.5	3 #20, 1 #6 G.	1 1/2"	175A/3P	3 #600, 2 #30N, 1 #10G.	4"	400A/3P	#10
150	3 #10, 1 #4 G.	2"	225A/3P	(2) SETS OF 3 #250, 2 #30N, 1 #10G.	3"	500A/3P	#10
225	3 #60, 1 #3 G.	3"	350A/3P	(2) SETS OF 3 #600, 2 #30N, 1 #30G.	4"	800A/3P	#30
300	(2) SETS OF 3 #400, 1 #2G.	2 1/2"	450A/3P	(3) SETS OF 3 #500, 2 #250N, 1 #35G.	3 1/2"	1000A/3P	#30
500	(2) SETS OF 3 #500, 1 #10G.	3"	800A/3P	(5) SETS OF 3 #500, 2 #250N, 1 #35G.	3 1/2"	1800A/3P	#30

NOTE:
-ALL CONDUCTORS SHALL BE COPPER

RATING	SETS	CONDUCTOR SIZE	CONDUIT
30A	1	4#10, 1#10 G.	3/4"
40A	1	4#8, 1#10 G.	1"
50A	1	4#6, 1#10 G.	1"
60A	1	4#6, 1#10 G.	1"
70A	1	4#4, 1#8 G.	1 1/4"
80A	1	4#4, 1#8 G.	1 1/4"
90A	1	4#3, 1#8 G.	1 1/4"
100A	1	4#3, 1#8 G.	1 1/4"
125A	1	4#1, 1#8 G.	1 1/2"
150A	1	4#10, 1#6 G.	1 1/2"
175A	1	4#10, 1#6 G.	2"
200A	1	4#10, 1#6 G.	2"
225A	1	4#4#4, 1#4 G.	2 1/2"
250A	1	4#250, 1#4 G.	2 1/2"
300A	1	4#350, 1#4 G.	3"
350A	1	4#500, 1#3 G.	3 1/2"
400A	1	4#600, 1#3 G.	4"
450A	2	4#440, 1#2 G.	2 1/2"
500A	2	4#250, 1#2G.	2 1/2"
600A	2	4#350, 1#1G.	2 1/2"
700A	2	4#500, 1#1G.	4"
800A	2	4#650, 1#11G.	4"
1000A	3	4#550, 1#20G.	4"
1200A	4	4#350, 1#30G.	3"
1600A	4	4#600, 1#40G.	4"
2000A	5	4#500, 1#40G.	4"
	6	4#650, 1#25G.	4"
	7	4#650, 1#25G.	4"
2500A	6	4#650, 1#35G.	4"
	7	4#550, 1#35G.	4"
3000A	8	4#550, 1#40G.	4"
	9	4#650, 1#50G.	4"
	10	4#650, 1#50G.	4"
4000A	10	4#650, 1#50G.	4"
	11	4#550, 1#50G.	4"
	12	4#600, 1#75G.	4"
5000A	14	4#550, 1#75G.	4"

2. GROUND NOT REQUIRED AT SERVICE LATERAL

COPPER ONLY			
RATING	SETS	CONDUCTOR SIZE	CONDUIT
30A	1	3#10, 1#10 G	3/4"
40A	1	3#8, 1#10 G	3/4"
50A	1	3#8, 1#10 G	3/4"
60A	1	3#8, 1#10 G	1"
70A	1	3#4, 1#8 G	1"
80A	1	3#4, 1#8 G	1"
90A	1	3#3, 1#8 G	1 1/4"
100A	1	3#3, 1#8 G	1 1/4"
125A	1	3#1, 1#6 G	1 1/4"
150A	1	3#10, 1#6 G	1 1/2"
175A	1	3#10, 1#6 G	1 1/2"
200A	1	3#10, 1#6 G	1 1/2"
225A	1	3#40, 1#4 G	2"
250A	1	3#20, 1#4 G	2 1/2"
300A	1	3#30, 1#4 G	2 1/2"
350A	1	3#50, 1#3 G	3"
400A	1	3#60, 1#3 G	3 1/2"
450A	2	3#40, 1#2 G	2"
500A	2	3#20, 1#2G	2 1/2"
600A	2	3#30, 1#1G	3"
700A	2	3#50, 1#10G	3 1/2"
800A	2	3#60, 1#10G	3 1/2"
1000A	3	3#50, 1#20G	3"
1200A	4	3#30, 1#30G	3"
1600A	4	3#60, 1#40G	3 1/2"
	5	3#50, 1#40G	3"
2000A	5	3#60, 1#250G	3 1/2"
	6	3#50, 1#250G	3"
2500A	5	3#50, 1#350G	3 1/2"
	7	3#60, 1#350G	3 1/2"
3000A	8	3#50, 1#400G	3 1/2"
	9	3#60, 1#500G	3 1/2"
3500A	10	3#50, 1#500G	3 1/2"
	10	3#60, 1#500G	3 1/2"
4000A	11	3#50, 1#500G	3 1/2"

- ## 2. GROUND NOT REQUIRED AT SERVICE LATERAL

[illegible]

ALL EQUIPMENT, WIRING AND CONDUIT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR MUST VISIT THE SITE TO VERIFY EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- C.1. ALL MODIFICATIONS REQUIRED TO COMPLY WITH THE NATIONAL ELECTRICAL CODE, LANDLORD AND POWER COMPANY.
- C.2. NEW ELECTRICAL EQUIPMENT SHALL BE ARRANGED TO COMPLY WITH THE LATEST NEC, ARTICLE 110.
- D. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED THE EXISTING JOB SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF THE ARCHITECTURAL REQUIREMENTS TO THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE RELOCATED, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE MODIFIED TO MEET THE PROJECT REQUIREMENTS. CONTRACTOR SHALL NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.

REVISIONS	
Revision No.	Revision Date
1. Addendum No. 6	10/13/26

PROJECT NO.

- 0150 0

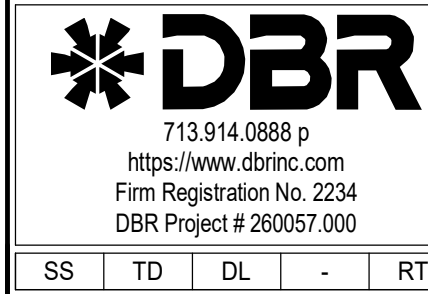
SHEET TITLE

SHEET TITLE

ELECTRICAL SCHEDULES -
TOMBALL MEMORIAL HS

SHEET NO

E5.01D



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REVISIONS

Revision No. Revision Date
1 Addendum No.6 10/13/26

Project Director: Proj. Director
Project Architect: Proj. Architect
Project Designer: Proj. Designer
Drawn By: Author

PROJECT NO.

25-0158.00

SHEET TITLE

ELECTRICAL PANEL
SCHEDULES - TOMBALL
MEMORIAL HS

SHEET NO.

E5.02D

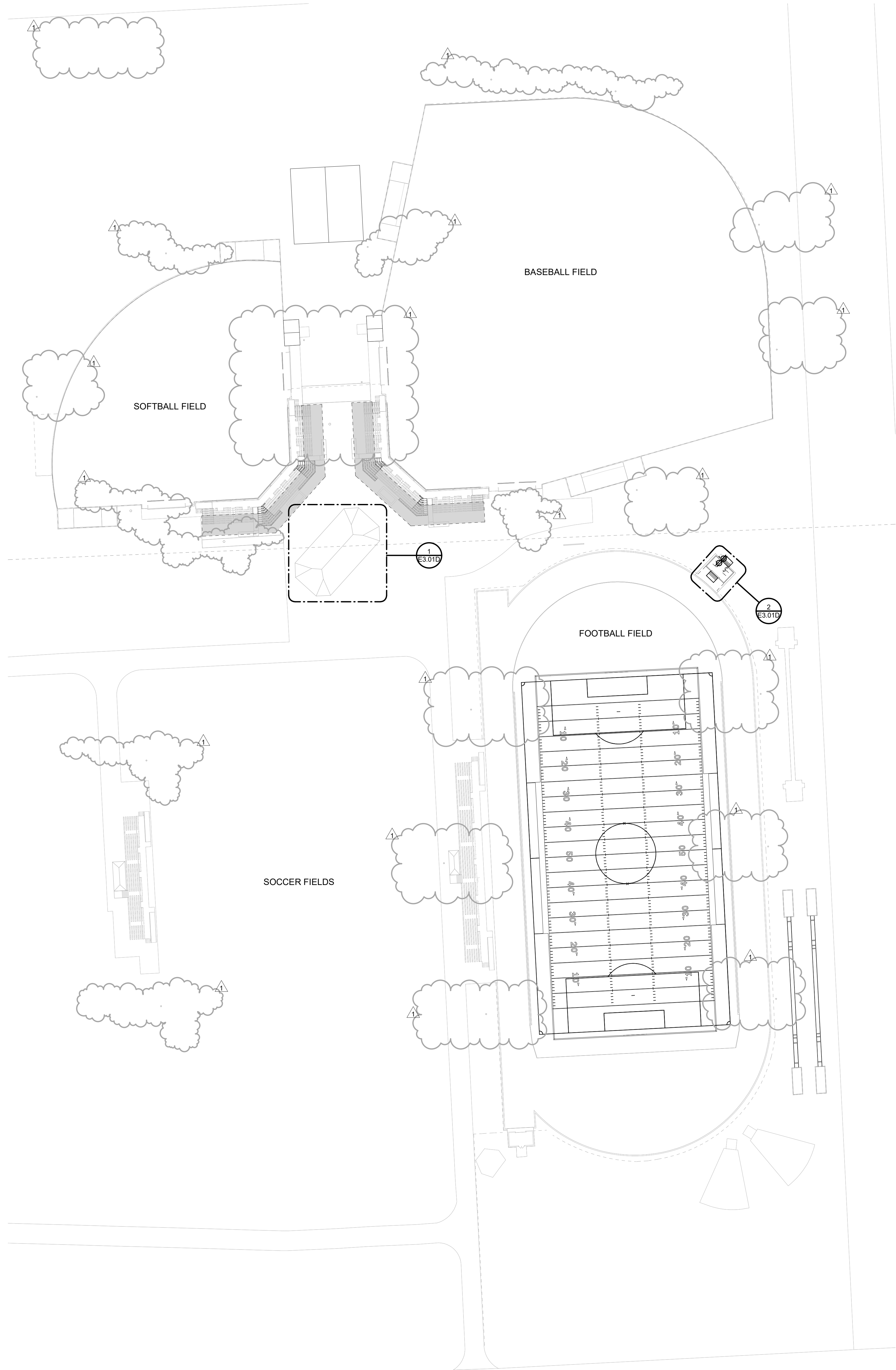
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Panelboard 1CSH												65000 A AIC Rating			
1 Section												New		X Existing	
Mains Type: 0 A --												SURFACE		SURFACE	
1 Section												SURFACE		SURFACE	
Type 1 -Nema Rating												SURFACE		SURFACE	
LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE				
1 1000 VA	--	LIGHTING (E)	12	20 A	1	2	20 A	12	EUH-1 (E)	--	3324 VA	1			
1 600 VA	--	SOFFIT LIGHTING (E)	12	20 A	5	6	20 A	12	EUH-3 (E)	--	3324 VA	1			
1 500 VA	--	EXISTING LOAD	12	20 A	7	8	20 A	12	EUH-4 (E)	--	3324 VA	1			
1 0 VA	--	Spare	12	20 A	9	10	30 A	10	EUH-5 (E)	--	3324 VA	1			
1 0 VA	--	Spare	12	20 A	11	12	30 A	10	EUH-6 (E)	--	3324 VA	1			
1 0 VA	--	Spare	12	20 A	13	14									
1 0 VA	--	Spare	12	20 A	15	16	20 A	12	EUH-7 (E)	--	3324 VA	1			
1 0 VA	--	Spare	12	20 A	17	18									
1 0 VA	--	Spare	12	20 A	19	20	20 A	12	EUH-7 (E)	--	3324 VA	1			
1 0 VA	--	Spare	12	20 A	21	22	20 A	12	Spare	--	0 VA	1			
1 0 VA	--	Spare	12	20 A	23	24	20 A	12	Spare	--	0 VA	1			
1 0 VA	--	Spare	12	20 A	25	26	20 A	12	Spare	--	0 VA	1			
1 0 VA	--	Spare	12	20 A	27	28	20 A	12	Spare	--	0 VA	1			
1 0 VA	--	Spare	12	20 A	29	30	20 A	12	Spare	--	0 VA	1			
NEC REF: Load Type Conn. Fct. Diversity												NEC REF: Load Type Conn. Fct. Diversity		NEC REF: Load Type Conn. Fct. Diversity	
220.47	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed						
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed	620.14	(E)Ext. Ltg.	Not Computed	0.00%	Not Computed						
220.60	(C)Cooling	Not Computed	0.00%	0 VA		(E)Elevators	Not Computed	0.00%	Not Computed						
220.60	(H)Heating	Not Computed	0.00%	0 VA		(WH)Wat. Htr.	Not Computed	0.00%	Not Computed						
220.60	(F)Fans	Not Computed	0.00%	Not Computed		(MT)Lrg. Motor	Not Computed	0.00%	Not Computed						
	(M)Misc.	Not Computed	0.00%	Not Computed		(SP)Sub Pnl.	Not Computed	0.00%	Not Computed						
						(W)Welders	Not Computed	0.00%	Not Computed						
Total Connected Load: 37908 VA VA = 46 A												Location of Panel:			
Total Load (Diversified): 37908 VA VA = 46 A															

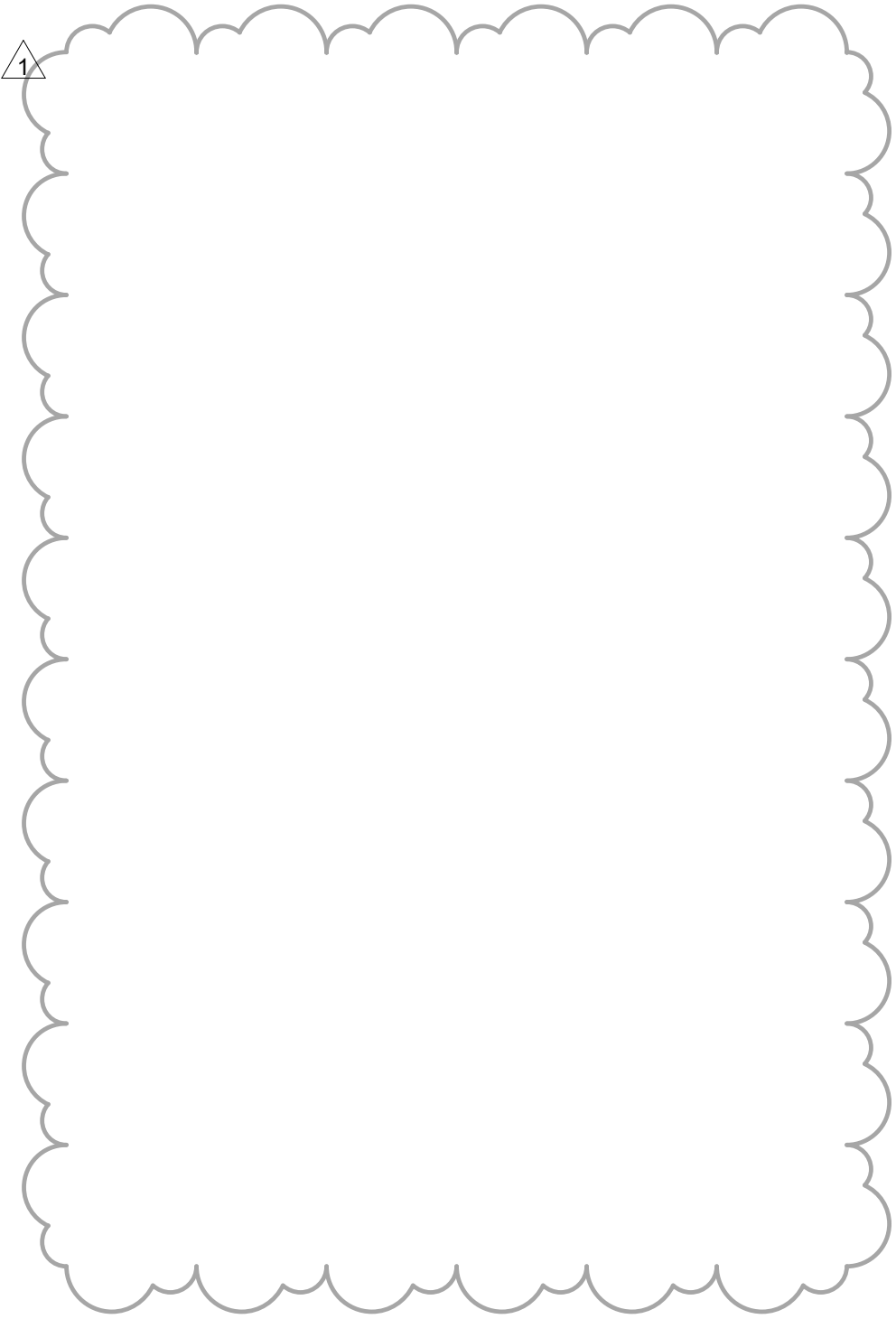
Panelboard AF3												65000 A AIC Rating			
1 Section												New		X Existing	
Mains Type: 0 A --												SURFACE		SURFACE	
1 Section												SURFACE		SURFACE	
Type 1 -Nema Rating												SURFACE		SURFACE	
LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE				
1 12000 VA	--	EXISTING POLE "T1" (TENNIS)	12	20 A	3	4	20 A	12	EXISTING POLE "T8" (TENNIS)	--	12000 VA	1			
1 12000 VA	--	EXISTING POLE "T3" (TENNIS)	10	30 A	10	10	20 A	12	EXISTING POLE "T8" (TENNIS)	--	12000 VA	1			
1 12000 VA	--	EXISTING POLE "T7" (TENNIS)	12	20 A	13	14	20 A	12	EXISTING POLE "T8" (TENNIS)	--	12000 VA	1			
1 12000 VA	--	EXISTING POLE "T2" (TENNIS)	12	20 A	15	16	30 A	10	EXISTING POLE "T5" (TENNIS)	--	12000 VA	1			
1 12000 VA	--	EXISTING POLE "T2" (TENNIS)	12	20 A	17	18	20 A	12	EXISTING POLE "T6" (TENNIS)	--	12000 VA	1			
1 12000 VA	--	EXISTING POLE "T2" (TENNIS)	10	30 A	31	32	30 A	10	EXISTING SECURITY LTG	--	6000 VA	1			
1 12000 VA	--	EXISTING POLE "T4" (TENNIS)	10	30 A	33	34	30 A	10	EXISTING SECURITY LTG	--	6000 VA	1			
NEC REF: Load Type Conn. Fct. Diversity												NEC REF: Load Type Conn. Fct. Diversity		NEC REF: Load Type Conn. Fct. Diversity	
220.47	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed						
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed		(E)Ext. Ltg.	Not Computed	0.00%	Not Computed						
220.60	(C)Cooling	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed						
220.60	(H)Heating	Not Computed	0.00%	0 VA		(WH)Wat. Htr.	Not Computed	0.00%	Not Computed						
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(MT)Lrg. Motor	Not Computed	0.00%	Not Computed						
	(M)Misc.	Not Computed	0.00%	Not Computed		(SP)Sub Pnl.	Not Computed	0.00%	Not Computed						
						(W)Welders	Not Computed	0.00%	Not Computed						
Total Connected Load: 156000 VA VA = 188 A												Location of Panel:			
Total Load (Diversified): 156000 VA VA = 188 A															

Panelboard DPF												65000 A AIC Rating			
1 Section												New		X Existing	
Mains Type: 0 A --												SURFACE		SURFACE	
1 Section												SURFACE		SURFACE	
Type 1 -Nema Rating												SURFACE		SURFACE	
LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTE				
1 40738 VA	--	EXISTING PANEL 1CS	4	70 A	3	4	50 A	8	EXISTING TICKET BOOTH	--	20784 VA	1			
1 29098 VA	--	EXISTING PANEL 1SB	8	50 A	3	4	50 A	8	EXISTING PANEL 1FB	--	29098 VA	1			
1 11639 VA	--	EXISTING PANEL 1CSH	12	20 A	13	14	20 A	12	EXISTING PANEL T1SF	--	11639 VA	1			
1 0 VA	--	Space	12	--	15	16	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	17	18	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	19	20	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	21	22	20 A	12	EXISTING TICKET BOOTH TRANSFORMER	--	8313 VA	1			
1 0 VA	--	Space	12	--	23	24	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	25	26	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	27	28	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	29	30	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	31	32	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	33	34	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	35	36	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	37	38	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	39	40	--	--	Space	--	0 VA	1			
1 0 VA	--	Space	12	--	41	42	--	--	Space	--	0 VA	1			
NEC REF: Load Type Conn. Fct. Diversity												NEC REF: Load Type Conn. Fct. Diversity		NEC REF: Load Type Conn. Fct. Diversity	
220.47	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed						
220.56	(K)Kitchen	Not Computed	0.00%	Not Computed		(E)Ext. Ltg.	Not Computed	0.00%	Not Computed						
220.60	(C)Cooling	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed						
220.60	(H)Heating	Not Computed	0.00%	0 VA		(WH)Wat. Htr.	Not Computed	0.00%	Not Computed						
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(MT)Lrg. Motor	Not Computed	0.00%	Not Computed						
	(M)Misc.	Not Computed	0.00%	Not Computed		(SP)Sub Pnl.	Not Computed	0.00%	Not Computed						
						(W)Welders	Not Computed	0.00%	Not Computed						
Total Connected Load: 151309 VA VA = 182 A												Location of Panel:			
Total Load (Diversified): 151309 VA VA = 182 A															

Panelboard 1CS												10000 A AIC Rating							
1 Section												New		X Existing					
Mains Type:												175 A MCB		--		LUGS: --		Mounting Style: Surface	
Type 1 - Nema Rating												125 A VWS (Copper)		--		--		--	
NOTES	LOAD (VA)	TYPE	DESCRIPTION	WIRE	CB	CKT	CB	WIRE	DESCRIPTION	TYPE	LOAD (VA)	NOTES							
1	900 VA	--	RCPT (E)	12	20 A	1	2	20 A	12	RCPT, IDF (E)	--	360 VA	1						
1	500 VA	--	RCPT (E)	12	20 A	3	4	20 A	12	RCPT, IDF (E)	--	360 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	5	6	30 A	10	RCPT, IDF (E)	--	360 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	7	8	30 A	10	RCPT, IDF (E)	--	360 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	9	10	20 A	12	EXISTING LOAD	--	500 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	11	12	20 A	12	EXISTING LOAD	--	500 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	13	14	20 A	12	EXISTING LOAD	--	500 VA	1						
1	360 VA	--	REC N400T (E)	12	20 A	15	16	30 A	10	POP CORN MACHINE (E)	--	5000 VA	1						
1	360 VA	--	REC N4002 (E)	12	20 A	17	18												
1	360 VA	--	REC N4002 (E)	12	20 A	19	20	20 A	12	CRFCU-1	--	1440 VA	1						
1	360 VA	--	REC N4002 (E)	12	20 A	21	22	20 A	12	CRFCU-1	--	1440 VA	1						
1	360 VA	--	REC N4002 (E)	12	20 A	23	24	20 A	12	CRFCU-1	--	1440 VA	1						
1	900 VA	--	ICE MACHINE (E)	12	20 A	25	26	20 A	12	EF-86-88 BAS PANEL (E)	--	1000 VA	1						
1	500 VA	--	EXISTING LOAD	12	20 A	27	28	20 A	12	EF-86-88 BAS PANEL (E)	--	500 VA	1						
				12	20 A	29	30	20 A	12	EF-87-91 (E)	--	500 VA	1						
1	5044 VA	--	EW-H-6 (E)	12	20 A	31	32	20 A	12	REC TENNIS COURTS (E)	--	500 VA	1						
				12	20 A	33	34	20 A	12	EXISTING LOAD	--	500 VA	1						
1	500 VA	--	EXISTING LOAD	12	20 A	35	36	20 A	12	EXISTING LOAD	--	500 VA	1						
1	500 VA	--	EXISTING LOAD	12	20 A	37	38	20 A	12	EXISTING LOAD	--	500 VA	1						
1	500 VA	--	MUSCO CONTROLS (E)	12	20 A	39	40	20 A	12	IRRIGATION CONTROLS (E)	--	500 VA	1						
1	500 VA	--	CONTACTOR (E)	12	20 A	41	42	20 A	12	IRRIGATION CONTROLS (E)	--	500 VA	1						
NEG: Fuses, Type				NEG: REC:				NEG: REC:				NEG: REC:							
220.67	(R)Receptacle	Not Computed	0.00%	Not Computed	210.20A	(L)Lighting	Not Computed	0.00%	Not Computed	220.67	(R)Receptacle	Not Computed	0.00%						
220.66	(K)Kitchen	Not Computed	0.00%	Not Computed		(E)J.Elect	Not Computed	0.00%	Not Computed	220.66	(K)Kitchen	Not Computed	0.00%						
220.60	(C)Cooling	Not Computed	0.00%	0 VA	620.14	(E)Elevators	Not Computed	0.00%	Not Computed	220.60	(C)Cooling	Not Computed	0.00%						
220.60	(H)Heating	Not Computed	0.00%	0 VA		(W)What. Htr.	Not Computed	0.00%	Not Computed	220.60	(H)Heating	Not Computed	0.00%						
220.60	(F)Fans	Not Computed	0.00%	Not Computed	220.50	(M)JLg. Motor	Not Computed	0.00%	Not Computed	220.60	(F)Fans	Not Computed	0.00%						
	(M)Misc.	Not Computed	0.00%	Not Computed		(SP)Sub Pnl.	Not Computed	0.00%	Not Computed		(M)Misc.	Not Computed	0.00%						
					630.118	(W)Welders	Not Computed	0.00%	Not Computed										
Total Connected Load				30704 VA	VA	=	85 A	Location of Panel:											
Total Load (Diversified):				30704 VA	VA	=	85 A												



GENERAL ELECTRICAL NOTE:
A. REFER TO SHEET E0.11 FOR ALL GENERAL ELECTRICAL NOTES.



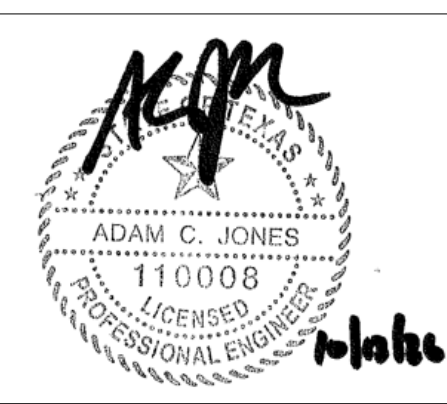


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ISSUED: SEPTEMBER 14, 2026

REVISIONS	
Revision No.	Revision Date
1 Addendum No.6	10/13/26

Project Director: Proj. Director
Project Architect: Proj. Architect
Project Designer: Proj. Designer
Drawn By: DBR

PROJECT NO.
25-0158.00

SHEET TITLE
MECHANICAL/ELECTRICAL
SITE PLAN - TOMBALL
MEMORIAL HS

SHEET NO.



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Firm Registration No. 2234
DBR Project # 260057.000

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Tomball Athletic Improvements

TOMBALL, TEXAS

1 ELECTRICAL & MECHANICAL PLAN - TOMBALL MEMORIAL HS
1" = 50'-0"