STATE OF TEXAS §

§

COUNTY OF FORT BEND §

AGREEMENT TO COMPLETE CONSTRUCTION OF ARBORETUM CRICKET COMPLEX (RFP 22-069)

THIS AGREEMENT ("Agreement") is made and entered into by and between Fort Bend County, (hereinafter "County"), a body corporate and politic under the laws of the State of Texas, and E Contractors USA, LLC (hereinafter "Contractor"), a company authorized to conduct business in the State of Texas, (herein referred to collectively as "parties").

W I T N E S S E T H

WHEREAS, County desires that Contractor complete the construction of Arboretum Cricket Complex, located at 15928 Old Richmond, Road, Sugar Land, Texas (hereinafter the "Services") pursuant to RFP 22-069; and

WHEREAS, Contractor represents that it is qualified and desires to perform such Services; and

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth below, the parties agree as follows:

AGREEMENT

Section 1. Scope of Services

1.1 Contractor shall render Services to County as defined in Contractor's Proposal dated April 24, 2023, and relevant portions of Contractor's Competitive Sealed Proposal in response to County's Request for Proposals RFP 22-069, collectively attached hereto as Exhibit A and incorporated herein for all purposes; and in accordance with the requirements and specifications of RFP 22-069, including any Addendum to RFP 22-069, which is attached hereto as Exhibit B and incorporated fully by reference for all purposes.

1.2 In accordance with Chapter 2258 of the Texas Government Code, all persons employed by Contractor shall be compensated at not less than the rates shown in the attached Exhibit C. Contractor shall keep detailed records of each of its workers and said records shall be made available to County for inspection at all reasonable times.

Section 2. Personnel

2.1 Contractor represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for the timely performance of the Scope of Services required under this Agreement and that Contractor shall furnish and maintain, at its own expense, adequate and sufficient personnel, in the opinion of County, to perform the Scope of Services when and as required and without delays.

2.2 All employees of Contractor shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of Contractor who, in the opinion of County, is incompetent or by his conduct becomes detrimental to the project shall, upon request of County, immediately be removed from association with the project.

Section 3. Compensation and Payment

3.1 Contractor's fees shall be calculated at the rates set forth in the attached Exhibits. The Maximum Compensation for the performance of Services within the Scope of Services described in Exhibit A is Eight Hundred Eighty-Two Thousand, Nine Hundred Thirty-One Dollars and 25/100 ($882,931.25). In no case shall the amount paid by County under this Agreement exceed the Maximum Compensation without a written agreement executed by the parties.

3.2 All performance of the Scope of Services by Contractor including any changes in the Scope of Services and revision of work satisfactorily performed will be performed only when approved in advance and authorized by County.

3.3 Contractor shall submit all "Applications for Payment" (as herein defined) for installments of the Maximum Compensation for approval and processing to County staff designated by the County's Parks and Recreation Director, one (1) electronic (pdf) or one (1) original on a monthly basis showing the amounts due for Services performed on or before the tenth (10^{th}) day of each calendar month during the progress of the Services. Each Application for Payment shall be in a form acceptable to the County and shall reflect any amount representing the proportionate part of the Services performed during the previous month. As support of each Application for Payment, Contractor shall submit the following in a form acceptable to the County Auditor:

3.3.1 A statement in the form of the current Application and Certificate for Payment, as published by the American Institute of Architects ("Application for Payment") executed by Contractor certifying that:

3.3.1.1 The proportionate part of the Services described in such Application for Payment has been performed;

3.3.1.2 Contractor's amount included in the Application for Payment attributable to the Services provided is due and owing;

3.3.1.3 There are no known mechanics' or materialmen's liens outstanding as of the date of the Application for Payment or if such liens are known, such have been adequately bonded;

3.3.1.4 All due and payable bills with respect to the Services have been paid to date or are included in the amount requested in the current Application for Payment, and

3.3.1.5 Except for such bills not paid but so included, there is no known basis for the filing of any mechanics' or materialmen's liens on the Services.

3.3.2 A partial lien waiver and release in a form acceptable to the County Auditor effective through the date of Contractor's preceding Application for Payment, executed by Contractor with a statement certifying those matters set forth in clauses 3.3.1.1 through 3.3.1.5

of subparagraph 3.3.1 above, certifying that waivers from all subcontractors and materialmen have been obtained in such form so as to constitute an effective waiver of liens under the laws of the State of Texas.

3.3.3 An affidavit executed by Contractor that payrolls, bills for materials and equipment, and other indebtedness connected with the Services for which County or Contractor might be responsible or encumbered (less amounts withheld by Contractor) have been paid or otherwise satisfied, including unconditional waivers and releases upon final payment from all trade contractors, suppliers, material men, or other third parties that provided labor, services, equipment or material to the Project, satisfying the requirements for such releases set forth in the Texas Property Code Section 53.085.

3.4 Within thirty (30) days after receipt of each uncontested Application for Payment together with the supporting materials required under this Agreement, County shall advance to Contractor the uncontested amount requested in such uncontested Application for Payment, except five percent (5%) of the amount requested (hereinafter "Retainage") in each Application for Payment by County. The Retainage withheld shall be released upon final completion of the entire Project and verification of satisfactory work performed, unless grounds exist for withholding payment on account of other defaults by Contractor, including Services provided by its sub-contractors.

3.5 Payment, constituting the entire unpaid balance of the Maximum Compensation, less fifty percent (50%) of the Retainage then held by County and such amount as the Parks and Recreation Director determines is reasonably necessary for all incomplete Services (including, without limitation, punchlist items) and for all unsettled claims, as provided in this Agreement, shall be advanced by County to Contractor upon the date determined substantially completed. County shall pay all outstanding and withheld portions of the Maximum Compensation to Contractor upon the later to occur of (i) thirty (30) days after the Project is accepted by the County or, (ii) the date the Contractor causes all mechanics' and materialmen's liens filed against the Project to be removed. County shall have received from Contractor a lien waiver or an affidavit to the effect that it and all its subcontractors and suppliers of labor and materials have been paid in full (which lien waiver or affidavit must be in form and substance sufficient as a matter of law to dissolve all liens or claims of liens for labor or service performed or rendered and material supplied or furnished, in connection with the construction and installation of the Project), and with respect to this Agreement, Contractor shall have provided to the County any applicable Final Certificate of Occupancy concerning the Services.

3.6 Upon payment of the entire balance of the Maximum Compensation and all other amounts withheld by County pursuant to Section 3.5, Contractor shall execute and deliver to County a release discharging County from all liabilities, obligations and claims to pay the Maximum Compensation to this Agreement.

Section 4. <u>Limit of Appropriation</u>

4.1 Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence of this Agreement, that County shall have available the total

maximum sum of Eight Hundred Eighty-Two Thousand, Nine Hundred Thirty-One Dollars and 25/100 ($882,931.25), specifically allocated to fully discharge any and all liabilities County may incur.

4.2 Contractor does further understand and agree, said understanding and agreement also being of the absolute essence of this Agreement, that the total maximum compensation that Contractor may become entitled to and the total maximum sum that County may become liable to pay to Contractor shall not under any conditions, circumstances, or interpretations thereof exceed Eight Hundred Eighty-Two Thousand, Nine Hundred Thirty-One Dollars and 25/100 ($882,931.25).

Section 5. Time of Performance

5.1 The time for performance of the Scope of Services by Contractor shall begin with receipt of the Notice to Proceed from County and end no later than one hundred eighty (180) calendar days thereafter. Contractor shall complete the tasks described in the Scope of Services within this time or within such additional time as may be extended by the County.

5.2 If the Services are not substantially completed within the time for performance or within such additional time as may be extended by County, County will deduct from the final payment as liquidated damages and not as a penalty the sum of two hundred and fifty ($250.00) per calendar day that the Services are not substantially complete. Such sum is agreed upon as a reasonable and proper measure of the damages County will sustain.

Section 6. Modifications and Waivers

6.1 The parties may not amend or waive this Agreement, except by a written agreement executed by both parties.

6.2 No failure or delay in exercising any right or remedy or requiring the satisfaction of any condition under this Agreement, and no course of dealing between the parties, operates as a waiver or estoppel of any right, remedy, or condition.

6.3 The rights and remedies of the parties set forth in this Agreement are not exclusive of, but are cumulative to, any rights or remedies now or subsequently existing at law, in equity, or by statute.

Section 7. Termination

7.1 Termination for Convenience – County may terminate this Agreement at any time upon thirty (30) days written notice.

7.2 Termination for Default

7.2.1 County may terminate the whole or any part of this Agreement for cause in the following circumstances:

7.2.1.1 If Contractor fails to perform services within the time specified in the Scope of Services or any extension thereof granted by the County in writing;

7.2.1.2 If Contractor materially breaches any of the covenants or terms and conditions set forth in this Agreement or fails to perform any of the other provisions of this Agreement or so fails to make progress as to endanger performance of this Agreement in accordance with its terms, and in any of these circumstances does not cure such breach or failure to County's reasonable satisfaction within a period of ten (10) calendar days after receipt of notice from County specifying such breach or failure.

7.2.2 If, after termination, it is determined for any reason whatsoever that Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the County in accordance with Section 7.1 above.

7.3 Upon termination of this Agreement, County shall compensate Contractor in accordance with Section 3, above, for those Services which were provided under this Agreement prior to its termination and which have not been previously presented for payment by Contractor to County. Contractor's final Pay Application for said Services will be presented to and paid by County in the same manner set forth in Section 3 above.

7.4 If County terminates this Agreement as provided in this Section, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to Contractor.

Section 8. Ownership and Reuse of Documents

All documents, data, reports, research, graphic presentation materials, etc., developed by Contractor as a part of its work under this Agreement, shall become the property of County upon completion of this Agreement, or in the event of termination or cancellation thereof, at the time of payment under Section 3 for work performed. Contractor shall promptly furnish all such data and material to County on request.

Section 9. Inspection of Books and Records

Contractor will permit County, or any duly authorized agent of County, to inspect and examine the books and records of Contractor for the purpose of verifying the amount of work performed under the Scope of Services. County's right to inspect survives the termination of this Agreement for a period of four years.

Section 10. Insurance

10.1 Prior to commencement of the Services, Contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days' prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional

Liability Insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

10.1.1 Workers' Compensation insurance in accordance with the laws of the State of Texas. Substitutes to genuine Workers' Compensation Insurance will not be allowed.

10.1.2 Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

10.1.3 Commercial general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

10.1.4 Business Automobile Liability insurance with a combined Bodily Injury/Property Damage limit of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

10.2 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of Contractor, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.

10.3 If required coverage is written on a claims-made basis, Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 2 years beginning from the time that work under the Agreement is completed.

10.4 Builders Risk Insurance: Contractor shall obtain and keep in full force and effect until the Transfer Date, Builders Risk Insurance, subject to policy terms and conditions, of direct physical loss or damage to property, materials, equipment and supplies which are to become an integral part of the Project, whether owned by Contractor, or subcontractors of every tier, and in which one or more of same has an insurable interest, while in transit, while at the Construction Site awaiting construction, during construction, and until the Transfer Date. Such insurance shall be maintained to cover, as nearly as practicable, the insurable value of such property, materials, equipment and supplies at risk, and shall contain a waiver of subrogation in favor of Contractor, Architect, subcontractors of any tier and County for loss or damage occurring during the Work and shall name Contractor as the named insured and County as additional insureds. All Builder's Risk Insurance proceeds shall be paid directly to the Contractor.

Section 11. <u>Performance and Payment Bond</u>

Contractor shall post with County, not later than ten (10) days of the execution of this Agreement, a performance and payment bond in the amount of one hundred percent (100%) of the total lump sum price in such form as is satisfactory to County. The bond shall be executed by a corporate surety company duly authorized and admitted to do business in the State of Texas and licensed to issue such a bond in the State of Texas.

Section 12. Indemnity

12.1 CONTRACTOR SHALL INDEMNIFY AND DEFEND COUNTY AGAINST ALL LOSSES, LIABILITIES, CLAIMS, CAUSES OF ACTION, AND OTHER EXPENSES, INCLUDING REASONABLE ATTORNEYS FEES, ARISING FROM ACTIVITIES OF CONTRACTOR, ITS AGENTS, SERVANTS OR EMPLOYEES, PERFORMED UNDER THIS AGREEMENT THAT RESULT FROM THE NEGLIGENT ACT, ERROR, OR OMISSION OF CONTRACTOR OR ANY OF CONTRACTOR'S AGENTS, SERVANTS OR EMPLOYEES.

12.2 Contractor shall timely report all such matters to County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of County required by Contractor in the defense of each matter.

12.3 Contractor's duty to defend indemnify and hold County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of the Agreement unless otherwise agreed by County in writing. The provisions of this section shall survive the termination of the Agreement and shall remain in full force and effect with respect to all such matters no matter when they arise.

12.4 In the event of any dispute between the parties as to whether a claim, demand, suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Contractor, Contractor shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Contractor are not at issue in the matter.

12.5 Contractor's indemnification shall cover, and Contractor agrees to indemnify County, in the event County is found to have been negligent for having selected Contractor to perform the work described in this request.

12.6 The provision by Contractor of insurance shall not limit the liability of Contractor under this Agreement.

12.7 Contractor shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify County and to hold it harmless from all claims for bodily injury and property damage that arise may from said Contractor's operations. Such provisions shall be in form satisfactory to County.

12.8 Loss Deduction Clause - County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of deductibles shall be the sole responsibility of Contractor and/or trade contractor providing such insurance.

Section 13. Confidential and Proprietary Information

13.1 Contractor acknowledges that it and its employees or agents may, in the course of performing their responsibilities under this Agreement, be exposed to or acquire

information that is confidential to County. Any and all information of any form obtained by Contractor or its employees or agents from County in the performance of this Agreement shall be deemed to be confidential information of County ("Confidential Information"). Any reports or other documents or items (including software) that result from the use of the Confidential Information by Contractor shall be treated with respect to confidentiality in the same manner as the Confidential Information. Confidential Information shall be deemed not to include information that (a) is or becomes (other than by disclosure by Contractor) publicly known or is contained in a publicly available document; (b) is rightfully in Contractor's possession without the obligation of nondisclosure prior to the time of its disclosure under this Agreement; or (c) is independently developed by employees or agents of Contractor who can be shown to have had no access to the Confidential Information.

13.2 Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purposes whatsoever other than the provision of Services to County hereunder, and to advise each of its employees and agents of their obligations to keep Confidential Information confidential. Contractor shall use its best efforts to assist County in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limitation of the foregoing, Contractor shall advise County immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Agreement and Contractor will at its expense cooperate with County in seeking injunctive or other equitable relief in the name of County or Contractor against any such person. Contractor agrees that, except as directed by County, Contractor will not at any time during or after the term of this Agreement disclose, directly or indirectly, any Confidential Information to any person, and that upon termination of this Agreement or at County's request, Contractor will promptly turn over to County all documents, papers, and other matter in Contractor’s possession which embody Confidential Information.

13.3 Contractor acknowledges that a breach of this Section, including disclosure of any Confidential Information, or disclosure of other information that, at law or in equity, ought to remain confidential, will give rise to irreparable injury to County that is inadequately compensable in damages. Accordingly, County may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies that may be available. Contractor acknowledges and agrees that the covenants contained herein are necessary for the protection of the legitimate business interest of County and are reasonable in scope and content.

13.4 Contractor in providing all services hereunder agrees to abide by the provisions of any applicable Federal or State Data Privacy Act.

13.5 Contractor expressly acknowledges that County is subject to the Texas Public Information Act, TEX. GOV’T CODE ANN. §§ 552.001 *et seq.*, as amended, and notwithstanding

any provision in the Agreement to the contrary, County will make any information related to the Agreement, or otherwise, available to third parties in accordance with the Texas Public Information Act. Any proprietary or confidential information marked as such provided to County by Consultant shall not be disclosed to any third party, except as directed by the Texas Attorney General in response to a request for such under the Texas Public Information Act, which provides for notice to the owner of such marked information and the opportunity for the owner of such information to notify the Attorney General of the reasons why such information should not be disclosed. The terms and conditions of this Agreement are not proprietary or confidential information.

13.6 Contractor expressly acknowledges that County is subject to the Texas Open Meetings Act, TEX. GOV'T CODE ANN. §§ 551.001 *et seq.*, as amended, and notwithstanding any provision in the Agreement to the contrary, County will comply with the provisions of the Texas Open Meetings Act in relation to the Agreement.

Section 14. Independent Contractor

14.1 In the performance of work or services hereunder, Contractor shall be deemed an independent contractor, and any of its agents, employees, officers, or volunteers performing work required hereunder shall be deemed solely as employees of contractor or, where permitted, of its subcontractors.

14.2 Contractor and its agents, employees, officers, or volunteers shall not, by performing work pursuant to this Agreement, be deemed to be employees, agents, or servants of County and shall not be entitled to any of the privileges or benefits of County employment.

Section 15. Notices

15.1 Each party giving any notice or making any request, demand, or other communication (each, a "Notice") pursuant to this Agreement shall do so in writing and shall use one of the following methods of delivery, each of which, for purposes of this Agreement, is a writing: personal delivery, registered or certified mail (in each case, return receipt requested and postage prepaid), or nationally recognized overnight courier (with all fees prepaid).

15.2 Each party giving a Notice shall address the Notice to the receiving party at the address listed below or to another address designated by a party in a Notice pursuant to this Section:

County: Fort Bend County
Attn: Parks and Recreation Director
301 Jackson Street, Suite 201
Richmond, Texas 77469

With a copy to: Fort Bend County
Attn: County Judge
401 Jackson Street, 1st Floor
Richmond, Texas 77469

Contractor: E Contractors USA, LLC
Attn: Irfan Abji, Managing Member
16554 Creek Bend Drive, Suite 200
Sugar Land, Texas 77478

15.3 A Notice is effective only if the party giving or making the Notice has complied with subsections 15.1 and 15.2 and if the addressee has received the Notice. A Notice is deemed received as follows:

15.3.1 If the Notice is delivered in person, or sent by registered or certified mail or a nationally recognized overnight courier, upon receipt as indicated by the date on the signed receipt.

15.3.2 If the addressee rejects or otherwise refuses to accept the Notice, or if the Notice cannot be delivered because of a change in address for which no Notice was given, then upon the rejection, refusal, or inability to deliver.

Section 16. Compliance with Laws

Contractor shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required by County, Contractor shall furnish County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

Section 17. Performance Warranty

17.1 Contractor warrants to County that Contractor has the skill and knowledge ordinarily possessed by well-informed members of its trade or profession practicing in the greater Houston metropolitan area and Contractor will apply that skill and knowledge with care and diligence to ensure that the Services provided hereunder will be performed and delivered in accordance with the highest professional standards.

17.2 Contractor warrants to County that the Services will be free from material errors and will materially conform to all requirements and specifications contained in the attached Exhibits; and in accordance with the requirements and specifications of RFP 22-069, including any Addendum to RFP 22-069.

Section 18. Assignment and Delegation

18.1 Neither party may assign any of its rights under this Agreement, except with the prior written consent of the other party. That party shall not unreasonably withhold its consent. All assignments of rights are prohibited under this subsection, whether they are voluntarily or involuntarily, by merger, consolidation, dissolution, operation of law, or any other manner.

18.2 Neither party may delegate any performance under this Agreement.

18.3 Any purported assignment of rights or delegation of performance in violation of this Section is void.

Section 19. Applicable Law

The laws of the State of Texas govern all disputes arising out of or relating to this Agreement. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to this Agreement and waive the right to sue or be sued elsewhere. Nothing in the Agreement shall be construed to waive the County's sovereign immunity. County does not agree to pay any and/or all attorney fees incurred by Contractor in any way associated with the Agreement

Section 20. Successors and Assigns

County and Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Agreement and to the successors, executors, administrators and assigns of the other party, in respect to all covenants of this Agreement.

Section 21. Third Party Beneficiaries

This Agreement does not confer any enforceable rights or remedies upon any person other than the parties.

Section 22. Severability

If any provision of this Agreement is determined to be invalid, illegal, or unenforceable, the remaining provisions remain in full force, if the essential terms and conditions of this Agreement for each party remain valid, binding, and enforceable.

Section 23. Publicity

Contact with citizens of Fort Bend County, media outlets, or governmental agencies shall be the sole responsibility of County. Under no circumstances whatsoever, shall Contractor release any material or information developed or received in the performance of the Services hereunder without the express written permission of County, except where required to do so by law.

Section 24. Captions

The section captions used in this Agreement are for convenience of reference only and do not affect the interpretation or construction of this Agreement.

Section 25. Conflict

In the event there is a conflict between documents, the following will have priority with regard to the conflict: first: this document titled Agreement to Complete Construction of Arboretum Cricket Complex (RFP 22-069); second: Contractor's Proposal dated April 24, 2023 (included within Exhibit A); third: RFP 22-069, including any Addendum to RFP 22-069 (attached

as Exhibit B); and fourth: Contractor's Competitive Sealed Proposal in response to County's Request for Proposals RFP 22-069 (included within Exhibit A).

Section 26. Certain Federal Requirements for Contracts

26.1 Contractor shall provide any and all notices as may be required under the Drug-Free Workplace Act of 1988, 28 CFR Part 67, Subpart F, to its employees and all sub-contractors to insure that the County remains a drug-free workplace.

Section 27. Certain State Law Requirements for Contracts

27.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: By signature below, Contractor verifies that if Contractor employs ten (10) or more full-time employees and this Agreement has a value of $100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.

27.2 Texas Government Code Section 2251.152 Acknowledgment: By signature below, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

27.3 Agreement not to Boycott Energy Company Chapter 809 of the Texas Government Code: By signature below, Contractor verifies that if Contractor employs then (10) or more full-time employees and this Agreement has a value of $100,000 or more, Contractor does not boycott energy companies and will not boycott energy companies during the term of this Agreement. "Boycott energy company" has the meaning provided in Section 809.001 of the Texas Government Code.

27.4 Agreement not to Discriminate Against Firearm Entity or Firearm Trade Association Chapter 2274 of the Texas Government Code. By signature below, Contractor verifies that if Contractor employs then (10) or more full-time employees and this Agreement has a value of $100,000 or more, Contractor does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and is authorized to agree in such contracts not to discriminate against a firearm entity or firearm trade association during the term of such contracts. "Discriminate against a firearm entity or firearm trade association" has the meaning provided in § 2274.001(3) of the Texas Government Code. "Firearm entity" and "firearm trade association" have the meanings provided in § 2274.001(6) and (7) of the Texas Government Code.

Section 28. Human Trafficking

BY ACCEPTANCE OF AGREEMENT, CONTRACTOR ACKNOWLEDGES THAT THE COUNTY IS OPPOSED TO HUMAN TRAFFICKING AND THAT NO COUNTY FUNDS WILL BE USED IN SUPPORT OF SERVICES OR ACTIVITIES THAT VIOLATE HUMAN TRAFFICKING LAWS.

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the day signed by the last party.

FORT BEND COUNTY	E CONTRACTORS USA, LLC
	Authorized Agent – Signature
KP George, County Judge	IRFAN ABSI
Date	Authorized Agent – Printed Name
ATTEST:	MANAGING MEMBER
	Title
Laura Richard, County Clerk	08/10/2023
	Date

APPROVED:

Darren McCarthy, Parks and Recreation Director

AUDITOR'S CERTIFICATE

I hereby certify that funds are available in the amount of $_____ to accomplish and pay the obligation of Fort Bend County under this contract.

Robert Ed Sturdivant, County Auditor

EXHIBIT A

E CONTRACTORS
EXCELLENCE IN GENERAL CONTRACTING

April 24, 2023

Brooke Lindemann
Fort Bend County
301 Jackson, Suite 201
Richmond, TX 4469

RE: Fort Bend County | Arboretum Cricket Complex
RFP 22-069

Dear Mrs. Lindemann

E Contractors is pleased to provide the following pricing for the above reference project as requested.

Pricing for scope of work is as follows of the total project:

The overall Scope of Work includes construction of a Canopy of approximately 800 square feet, a Batting Cage area of approximately 840 square feet, a 4" thick x 4' wide sidewalk, fencing, CMU screen wall, electrical for all lighting, and Lighting Base Option 2 (45/34FC).

Base Bid:	**$ 882,931.25**
Calendar Days for Duration	**180 Days**

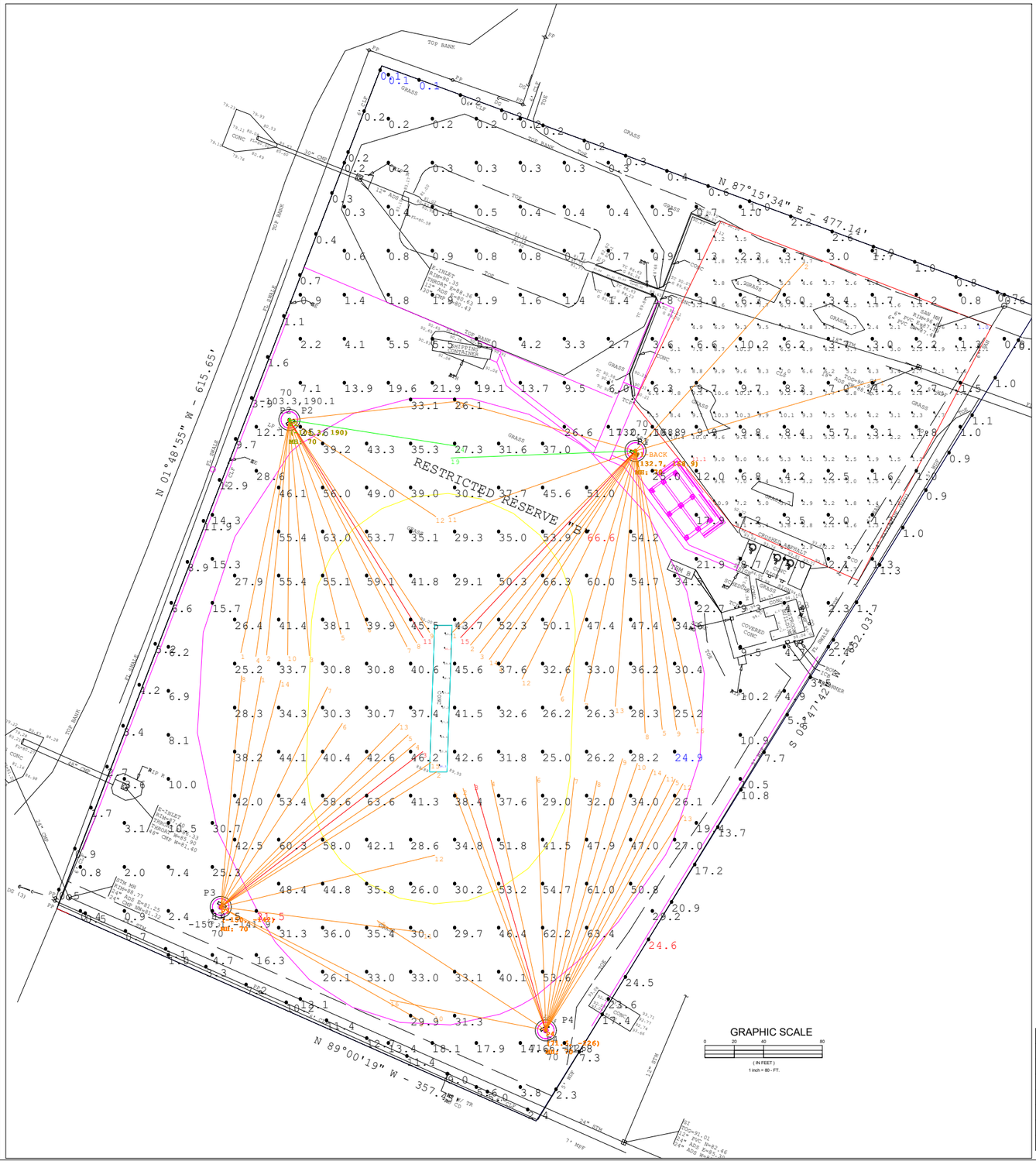
Sincerely,

Christopher Jay
Operations Manager

16554 Creek Bend Drive, Suite 200. Sugar Land, Texas 77478
T: 713-493-2500 | F: 713-493-2501

Division	Description	Cost
1	General Conditions	$137,406.25
1	Permit	$2,500.00
1	Bond	$17,500.00
1	Insurance	$3,000.00
4	Masonry	$27,350.00
5	Steel	$27,150.00
6	Wood Framing & Deck	$18,875.00
7	Roofing	$10,350.00
9	Paint	$6,250.00
26	Electrical	$465,750.00
32	Site Work	$127,850.00
32	Fencing	$38,950.00
	Total	$882,931.25

16554 Creek Bend Drive, Suite 200. Sugar Land, Texas 77478
T: 713-493-2500 | F: 713-493-2501



Pole Wattage Summary	
Scene: DEFAULT	
Label	Total Watts
P1	15014.4
P2	11065.4
P3	11849.7
P4	12639.5
TOTAL	50569.03

Pole Summary			
Scene: DEFAULT			
Poles	Location	# Lums	MH
P1	-150, -142	17	70'
P1-BACK	-	2	70'
P2	-130.3,190	14	70'
P3	132.7, 168.9	15	70'
P4	71.6, -226	16	70'

Luminaire Schedule					
Scene: DEFAULT					
Symbol	Qty	Label	LLF	Lum. Watts	Arrangement
	58	TSLM-20EV-NLV	0.950	789.8	Single
	4	TSLN-20EV-NLV	0.950	792.5	Single
	2	TSLW-20EV-NLV	0.950	795.3	Single

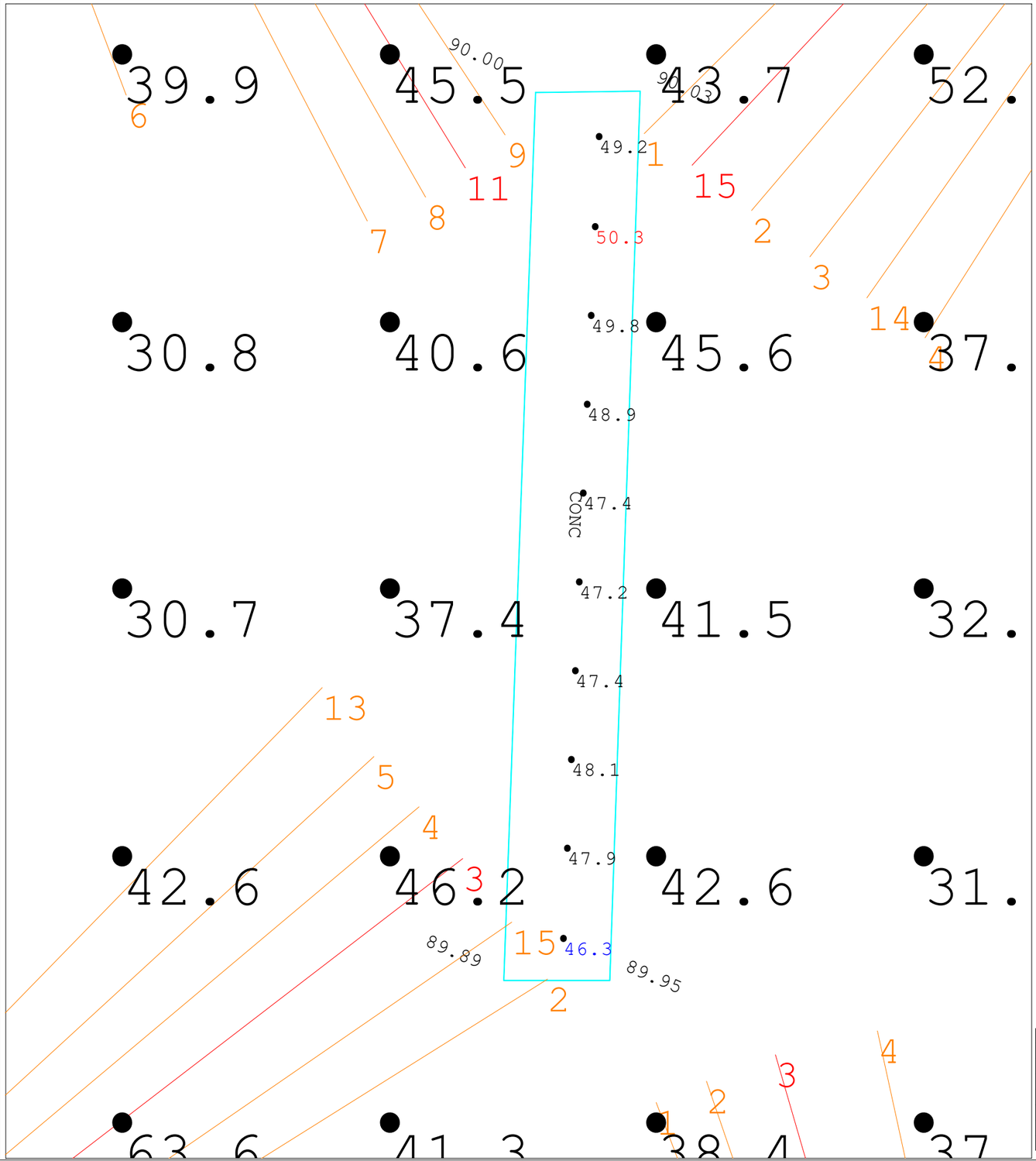
Calculation Summary										
Scene: DEFAULT										
Label	Units	Avg	Max	Min	Max/Min	# Pts	PtSpcLr	PtSpcTb	CV	UG
1_INFIELD	Fc	48.25	50.3	46.3	1.09	10	10	N.A.	0.02	N.A.
2_OUTFIELD	Fc	40.47	66.6	24.9	2.67	127	30	30	0.27	1.99
3_CONCRETE AREA	Fc	6.69	31.5	0.1	315.00	160	30	30	1.11	10.25
4_PARKING LOT	Fc	4.95	11.1	1.0	11.10	152	15	15	0.61	1.74
5_PROPRTY LINE	Fc	4.73	24.6	0.1	246.00	70	30	N.A.	1.26	N.A.

TECHLINE SPORTS LIGHTING
www.sportlighting.com

CITY OF SUGAR LAND
CRICKET PITCH
45/35 FC
23-7377-CR.AGI

1. THIS LIGHTING DESIGN IS BASED ON INFORMATION SUPPLIED BY OTHERS.SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.
3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

DRAWN BY: AMP
Date:4/17/2023
SCALE: NTS
Page 1 of 2
23-7377-CR.AGI



Pole Wattage Summary	
Scene: DEFAULT	
Label	Total Watts
P1	15014.4
P2	11065.4
P3	11849.7
P4	12639.5
TOTAL	50569.03

Pole Summary			
Scene: DEFAULT			
Poles	Location	# Lums	MH
P1	-150, -142	17	70'
P1-BACK	-	2	70'
P2	-130.3,190	14	70'
P3	132.7, 168.9	15	70'
P4	71.6, -226	16	70'

Luminaire Schedule					
Scene: DEFAULT					
Symbol	Qty	Label	LLF	Lum. Watts	Arrangement
	58	TSLM-20EV-NLV	0.950	789.8	Single
	4	TSLN-20EV-NLV	0.950	792.5	Single
	2	TSLW-20EV-NLV	0.950	795.3	Single

Calculation Summary										
Scene: DEFAULT										
Label	Units	Avg	Max	Min	Max/Min	# Pts	PtSpcLr	PtSpcTb	CV	UG
1_INFIELD	Fc	48.25	50.3	46.3	1.09	10	10	N.A.	0.02	N.A.
2_OUTFIELD	Fc	40.47	66.6	24.9	2.67	127	30	30	0.27	1.99
3_CONCRETE AREA	Fc	6.69	31.5	0.1	315.00	160	30	30	1.11	10.25
4_PARKING LOT	Fc	4.95	11.1	1.0	11.10	152	15	15	0.61	1.74
5_PROPRTY LINE	Fc	4.73	24.6	0.1	246.00	70	30	N.A.	1.26	N.A.

TECHLINE SPORTS LIGHTING
www.sportlighting.com

CITY OF SUGAR LAND
CRICKET PITCH
45/35 FC
23-7377-CR.AGI

1. THIS LIGHTING DESIGN IS BASED ON INFORMATION SUPPLIED BY OTHERS.SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
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Date:4/17/2023
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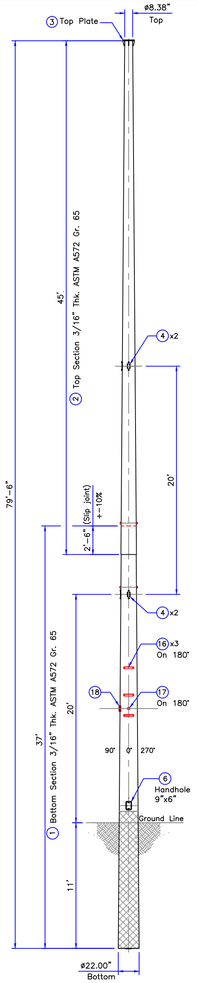
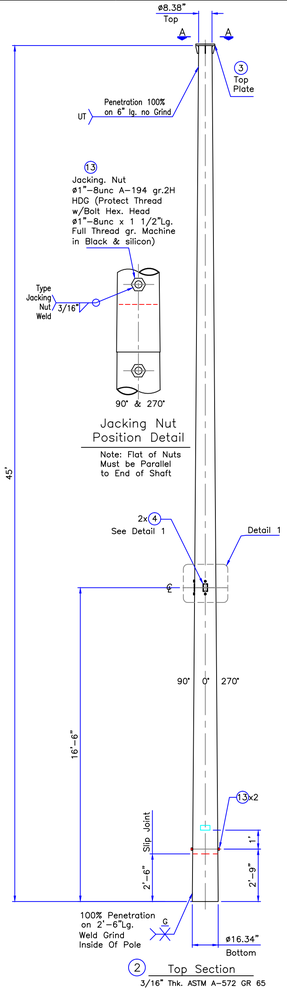
Page 2 of 2
23-7377-CR.AGI

FABRICATION PLAN

F73-01



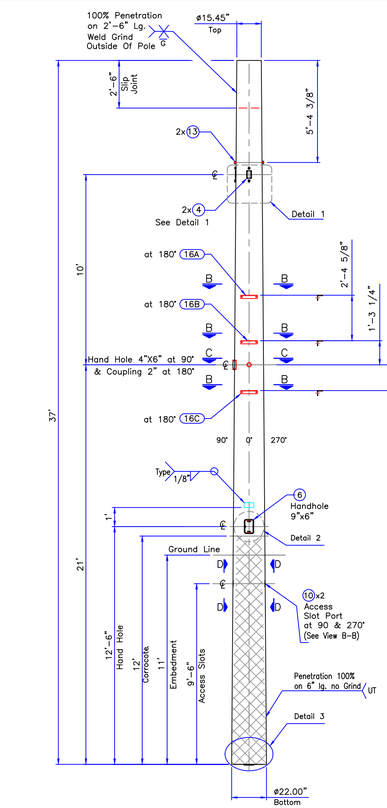
TSL75HA Pole Elevation
Round Tapered Pole 2 Sections



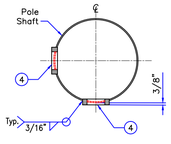
2 Top Section
3/16" Thk. ASTM A-572 GR 65

Jacking Nut Position Detail

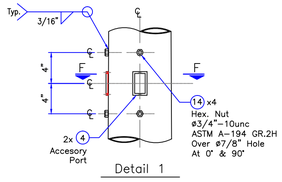
Note: Flat of Nuts Must be Parallel to End of Shaft



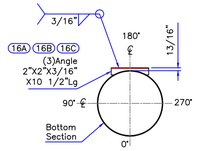
1 Bottom Section
3/16" Thk. ASTM A-572 GR 65



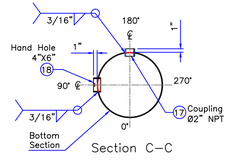
Section F–F
Typical Welding Detail for Accesory Port



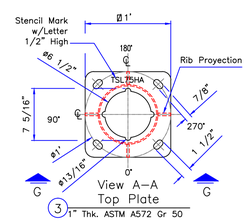
Detail 1



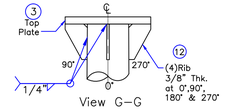
Section B–B



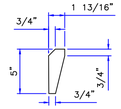
Section C–C



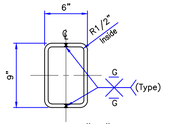
View A–A
Top Plate



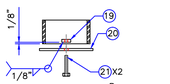
View G–G

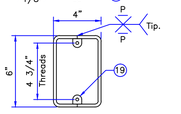


12 Rib
3/8" Thk. ASTM A–36

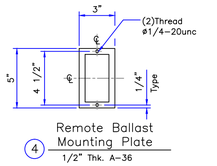


6 Handhole 6"x9"
6"x9"x 1/2"x2" Lg. A–36

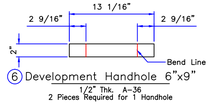




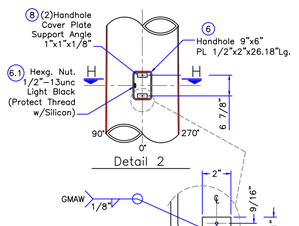
18 Hand Hole 4"X6"
Thk. 1/4" A–36



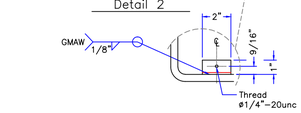
Remote Ballast Mounting Plate
1/2" Thk. A–36

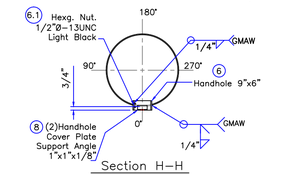


6 Development Handhole 6"x9"
1/2" Thk. A–36
2 Pieces Required for 1 Handhole

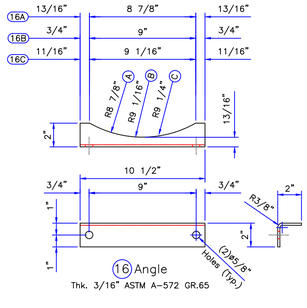


Detail 2

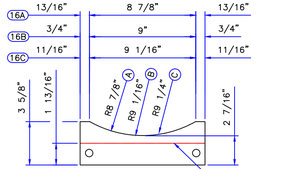




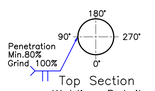
Section H–H



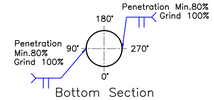
16 Angle
Thk. 3/16" ASTM A–572 GR.65



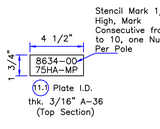
16 Development Angle
Thk. 3/16" ASTM A–572 GR.65

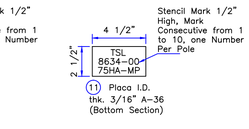


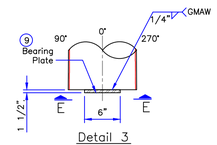
Top Section Welding Detail



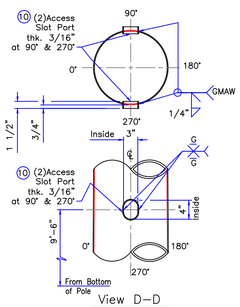
Bottom Section Welding Detail



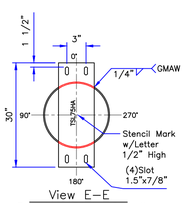




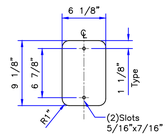
Detail 3



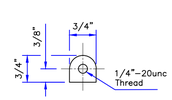
View D–D



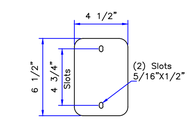
View E–E
Bearing Plate Detail
1" Thk. A–36



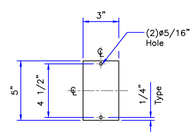
7 Handhole 9"x6" Cover
A–36 Thk. 3/16"



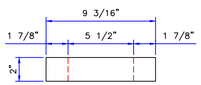
19 Handhole Tab
thk. 3/16"–A36



20 HandHole 4"X6" Cover
Thk. 3/16" A–36



5 3"x5" Port Cover Plate
3/16" Thk. A–36



Development Handhole 4"X6"
1/4" Thk. A–36
2 Pieces Required for 1 Handhole

Qty - 4

BILL OF MATERIAL

MARK	QTY.	DESCRIPTION	BOTTOM DIAM. INCH	TOP DIAM. INCH	PLATE THK. INCH	UNIT WEIGHT LBS.	TOTAL WEIGHT LBS.
1	1	BOTTOM SECTION, PL 1480x11278MM 3/16" THK. A572 GR.65	22.00"	15.45"	3/16"	1400	1400.00
2	1	TOP SECTION, PL 972x13716MM 3/16" THK. A572 GR.65	16.34"	8.38"	3/16"	1124.30	1124.30
3	1	TOP PLATE 12"x12"x1" THK.			1"	39.44	39.44
4	4	REMOTE BALLAST MOUNTING PLATE 5"x3" 1/2" THK. A–36			1/2"	1.078	4.31
5	4	3"x5" PORT COVER PLATE 3/16" THK A–36			3/16"	0.81	3.24
6	1	9"x6" HANDHOLE RING, PL. 1/2"x2"x26.18"Lg. A–36				7.39	7.39
6.1	1	HEXAGONAL NUT ø1/2"–13unc Light BLACK				0.31	0.31
7	1	9"x6" HANDHOLE COVER PLATE 3/16" THK. A–36			3/16"	2.88	2.88
8	2	ANGLE 1"x1/8"X2"LG.				0.13	0.26
9	1	BEARING PLATE PL 6"x30" A–36			1"	16.65	16.65
10	2	ACCESS SLOT PORT 4 3/8"X3 3/8"X1 1/2" A–36			3/16"	1.01	2.02
11	1	I.D. PLATE 2 1/2" X 4 1/2"			3/16"	0.60	0.60
11.1	1	I.D. PLATE 1 3/4" X 4 1/2"			3/16"	0.42	0.42
12	4	RIB ASTM A–36			3/8"	0.68	2.72
13	4	HEXG. NUT ø1"–8UNC GR.2H HDG				.92	3.68
14	8	HEXAG. NUT ø3/4"–10unc ASTM A–572 GR.2H HDG				0.41	3.28
16	3	ANGLE ASTM A–572 GR.65			3/16"	2.25	6.75
17	1	COUPLING Ø2" NPT W/INTERNAL THREAD				0.46	0.46
18	1	HAND HOLE 4"X6"			1/4"	2.64	2.64
19	2	HAND HOLE TAB			3/16"	0.03	0.06
20	1	HAND HOLE COVER			3/16"	1.54	1.54
21	12	HEXG. HEAD BOLT 1/4"–20UNC X 1 1/2"LG FULL THREAD GR. MACHINE ELECTROLYTIC GALVANIZED (FOR HAND HOLE COVERS)				0.03	0.36
					T. WEIGHT LBS 1 PIECE		2623.31

GENERAL TOLERANCES

Bucling:
1. From 21' to 30' lg= 1/4" Max.
2. From 41' to 50' lg= 1/2" Max

Rounding:
1. Diameter: +– 1 /16"
2. Oval: +–1/16" to be Measured on 0° & 180°

Base Plate:
1. Outside Dimensions: +– 1/4"
2. Length Between Holes: +– 1/8"
3. Hole Circle= +– 1/8"
4. Diameter Made by CNC: –0 + 1/8"

Accessories:
1. Nuts Location: + – 1/8"
2. Length Between Nuts: + – 1/8"
3. Hand Holes Location: + – 1/8"

Slip Joint:
1. Slip Joint: +– 10%

Pole Length:
1. Length of Each Section: + 1" – 1/2"

GENERAL NOTES

1. DIMENSIONS IN MILLIMETERS AND INCHES UNLESS OTHERWISE SPECIFIED
2. HOT DIP GALVANIZED.
3. USE THIS FABRICATION DRAWING IN CONJUCTION WITH DRAWINGS INDICATED AS REFERENCE.
4. ALL DIMENSIONS GOVERN OVER DRAWING SCALE, DO NOT SCALE.

TECHLINE SPORTS LIGHTING

ROUND TAPERED POLE 2 SECTIONS
TYPE TSL75HA

REV.	DESCRIPTION	DATE	BY	REV

REVISIONS

CUSTOMER:

	NAME	DATE
DRAW:	RMP	JUL/19
CHECKED:	NAVEJAR	JUL/19
APPD:	NAVEJAR	JUL/19

TITLE: ASSEMBLY DRAWING & FABRICATION DETAILS

ORDER: QTY: CATÁLOGUE: TSL75HA

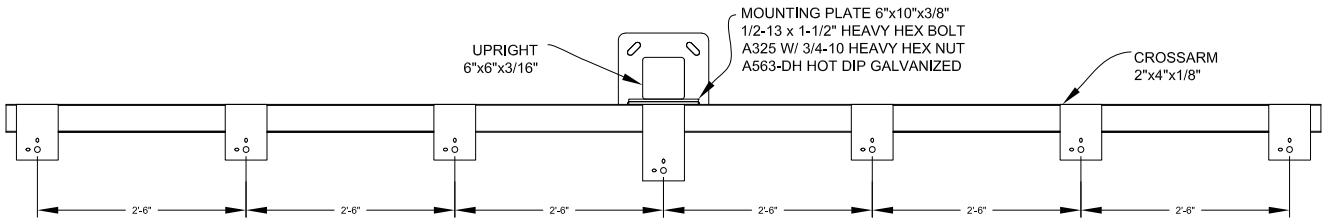
DRAWING No. : 10774–PTDA5–001

ITEM: REV.

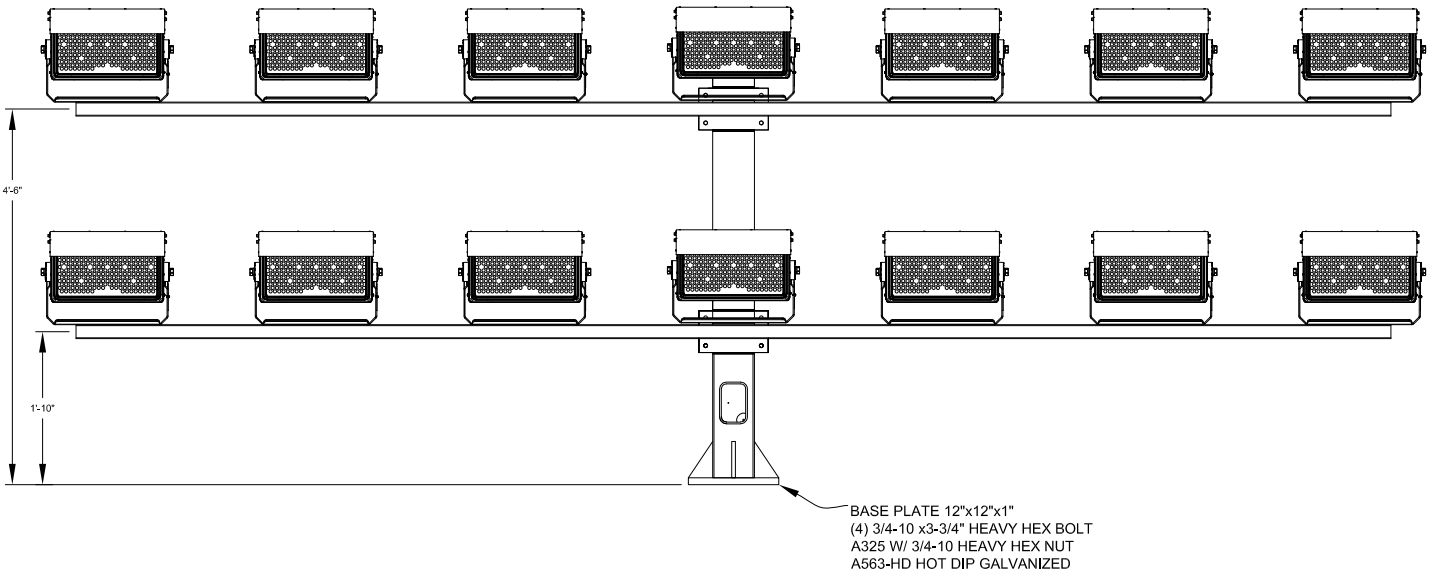
SHEET 1 OF 1

TOP VIEW

Qty - 1



FRONT VIEW



TECHLINE SPORTS LIGHTING POWERED BY GEOSPORT

** NOT TO SCALE

** Hot-Dip galvanized after fabrication to ASTM A123 specifications

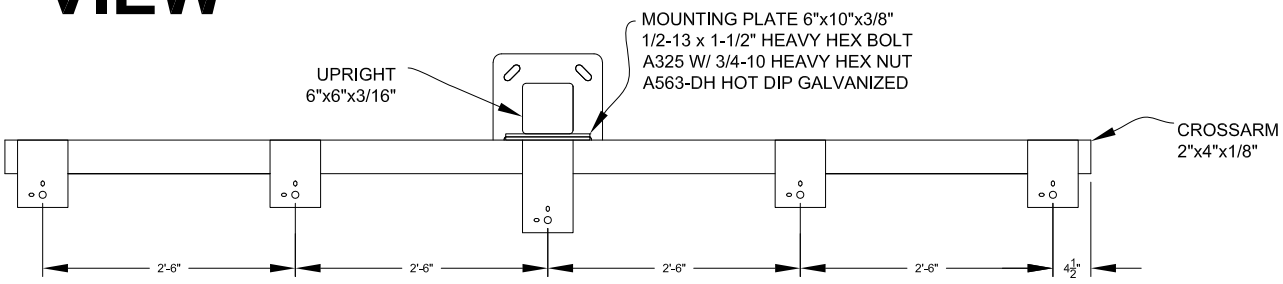
** Assembly Weight: 886 lbs
Assembly EPA: 34.00 sq. ft.
(Including Fixtures)

15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

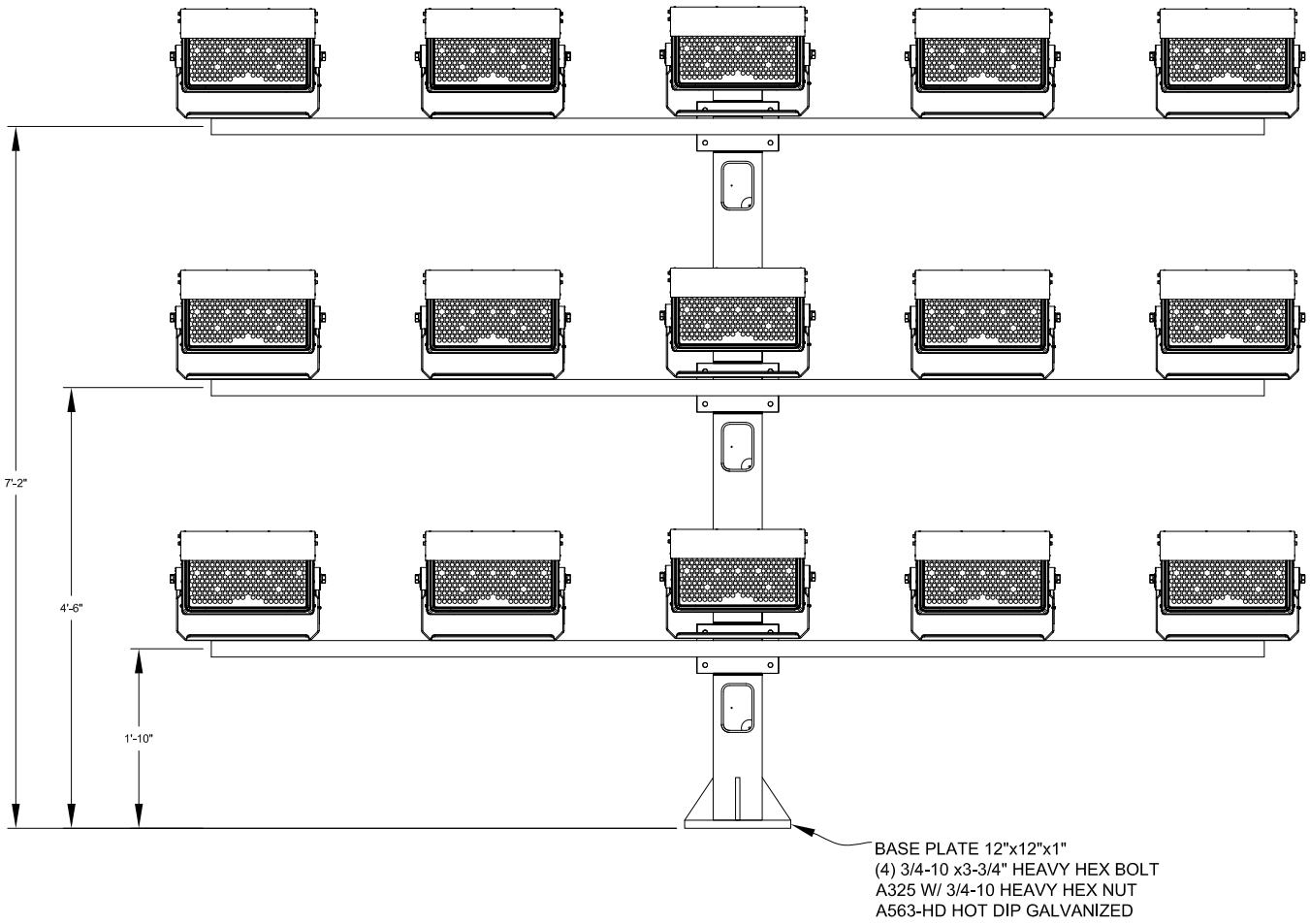
DATE:	REV.:	CHECKED BY:	14 FIXTURE CROSSARM ASSEMBLY
12/3/21			
DRAWING NUMBER: TDA 14 (CLIR)		DRAWN BY: WW	

TOP VIEW

Qty - 1



FRONT VIEW



** Hot-Dip galvanized after fabrication to ASTM A123 specifications

** NOT TO SCALE

** Assembly Weight: 984 lbs
Assembly EPA: 38.01 sq. ft.
(Including Fixtures)

TECHLINE SPORTS LIGHTING
POWERED BY GEOSPORT

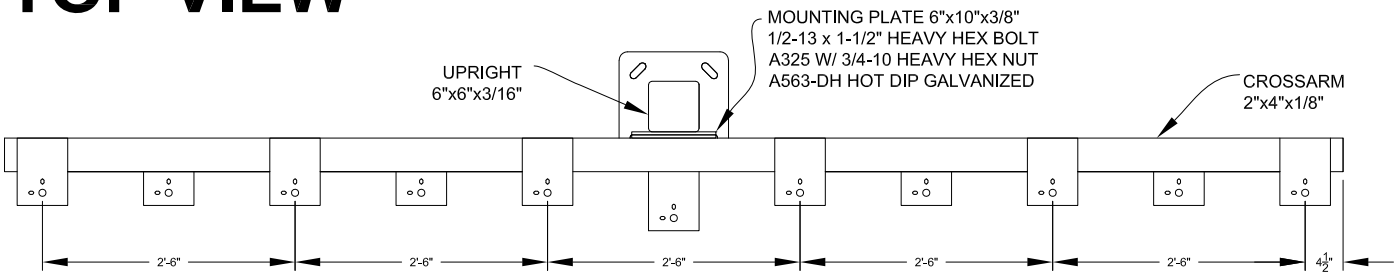
15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

DATE:	REV.:	CHECKED BY:
12/3/21		
DRAWING NUMBER:		DRAWN BY:
TTA 15 (CLIR)		WW

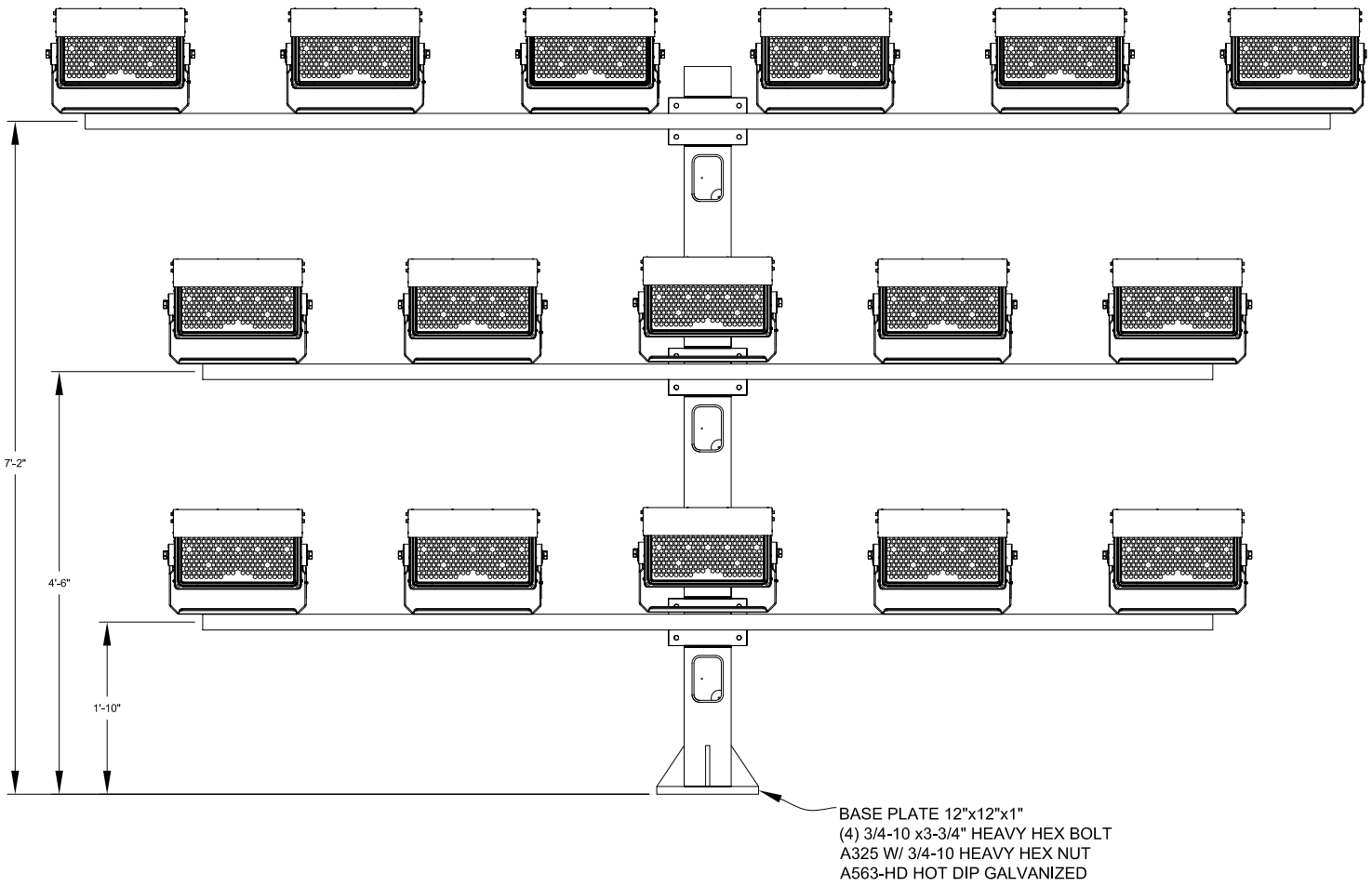
15 FIXTURE CROSSARM ASSEMBLY

Qty - 1

TOP VIEW



FRONT VIEW



** Hot-Dip galvanized after fabrication to ASTM A123 specifications

** NOT TO SCALE

** Assembly Weight: 1,038 lbs
Assembly EPA: 40.19 sq. ft.
(Including Fixtures)

TECHLINE SPORTS LIGHTING
POWERED BY GEOSPORT

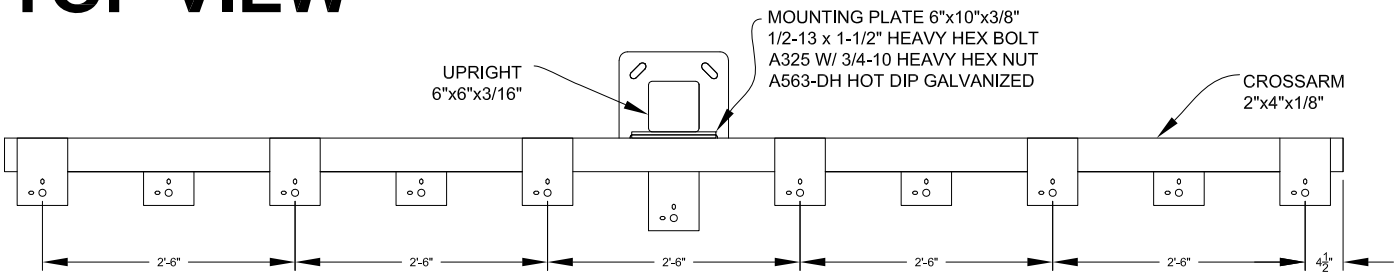
15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

DATE:	REV.:	CHECKED BY:
12/3/21		
DRAWING NUMBER:		DRAWN BY:
TTA 16 (CLIR)		WW

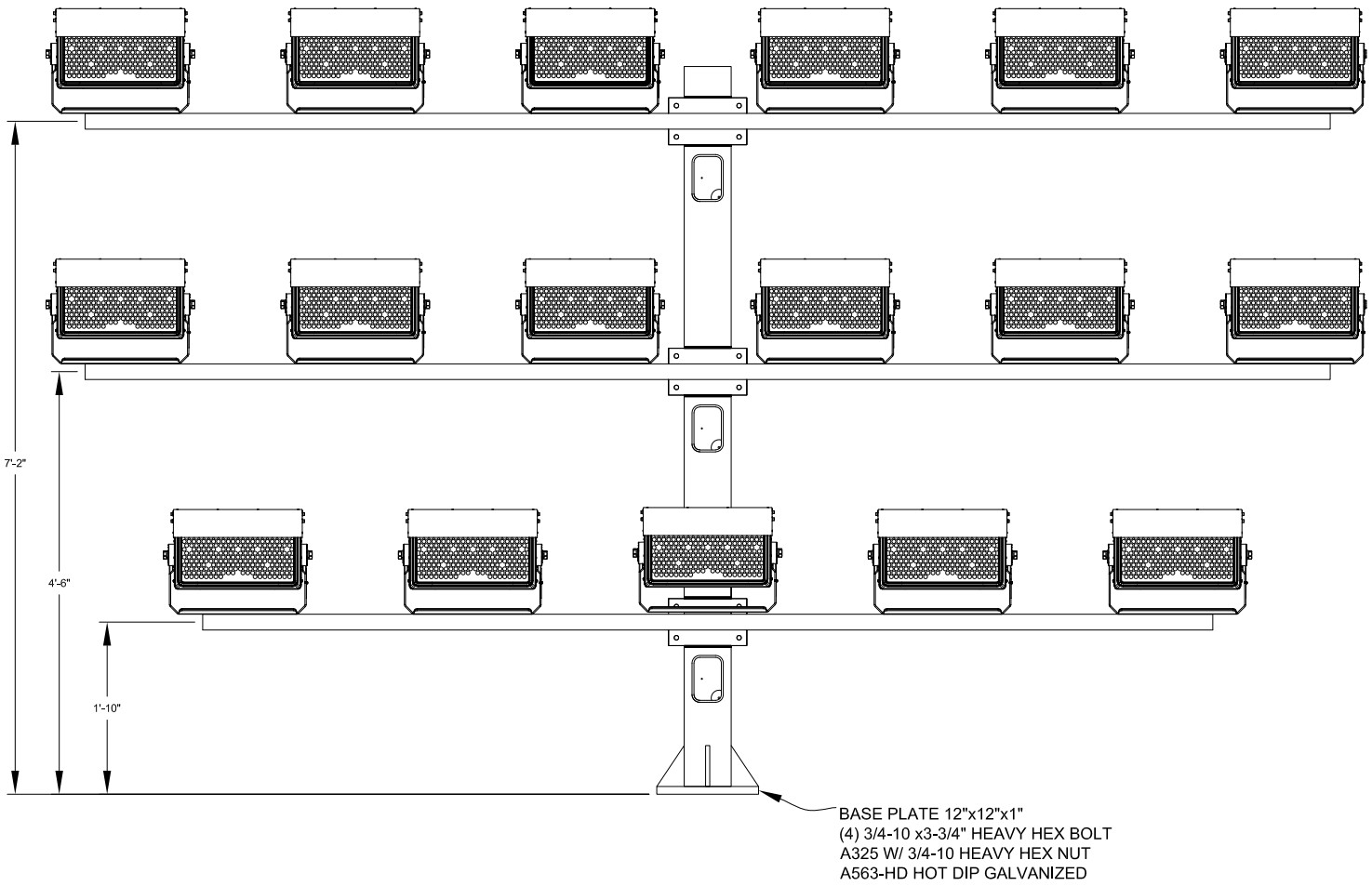
16 FIXTURE CROSSARM ASSEMBLY

Qty - 1

TOP VIEW



FRONT VIEW



** Hot-Dip galvanized after fabrication to ASTM A123 specifications

** Assembly Weight: 1,092 lbs
Assembly EPA: 42.37 sq. ft.
(Including Fixtures)

** NOT TO SCALE

TECHLINE SPORTS LIGHTING
POWERED BY GEOSPORT

15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

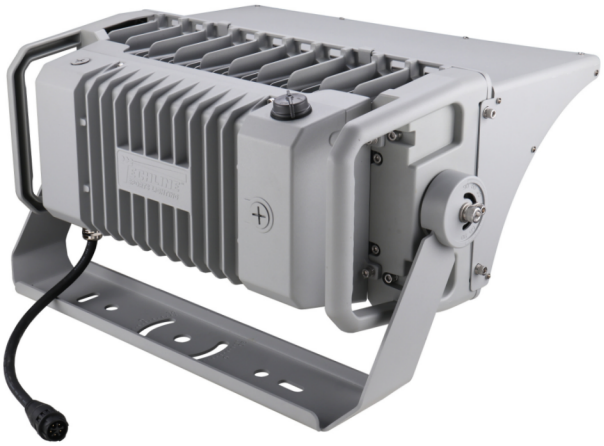
DATE:	REV.:	CHECKED BY:
12/3/21		
DRAWING NUMBER:		DRAWN BY:
TTA 17 (CLIR)		WW

17 FIXTURE CROSSARM ASSEMBLY

800 WATT FIXTURE

Qty - 64 - (All fixtures include extended 20" visors as shown on last page)

Standard Visor



Extended Visor (optional)

UL CERTIFIED
SAFETY US·CA
E495046
LUMINAIRE

TECHLINE SPORTS LIGHTING

800 WATT

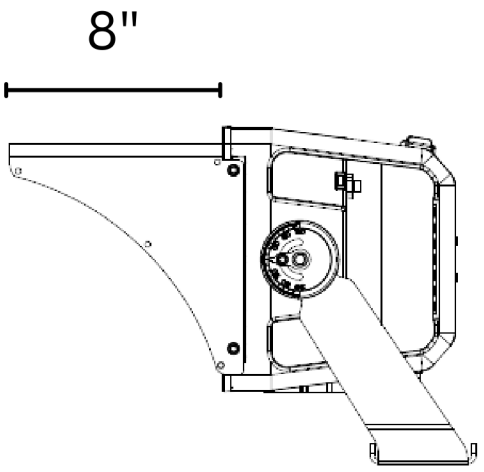
TECHNICAL DATA

SYSTEM WATTS	800w
LUMEN OUTPUT	120,000
EFFICACY	150 LM/W
EPA	1.9
WEIGHT	45 lbs
BEAM ANGLE	N, M, W, EW
POWER FACTOR	0.99
CCT	5700K
CRI	>70Ra
INPUT VOLTAGE	200-480v
INPUT PROTECTION	10KV Current Surge
DRIVER	Integral, Remote
IP RATING	IP65
OPERATING TEMP RANGE	-40° C to +45°C
HOUSING MATERIAL	Alumimum, Powder Coated

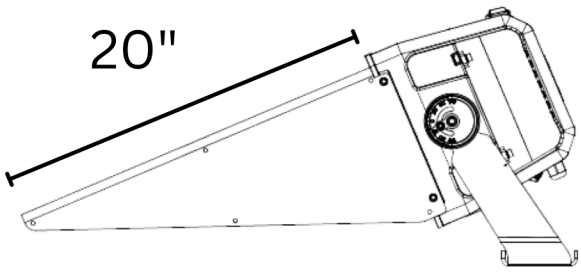
800 WATT

VISOR OPTIONS

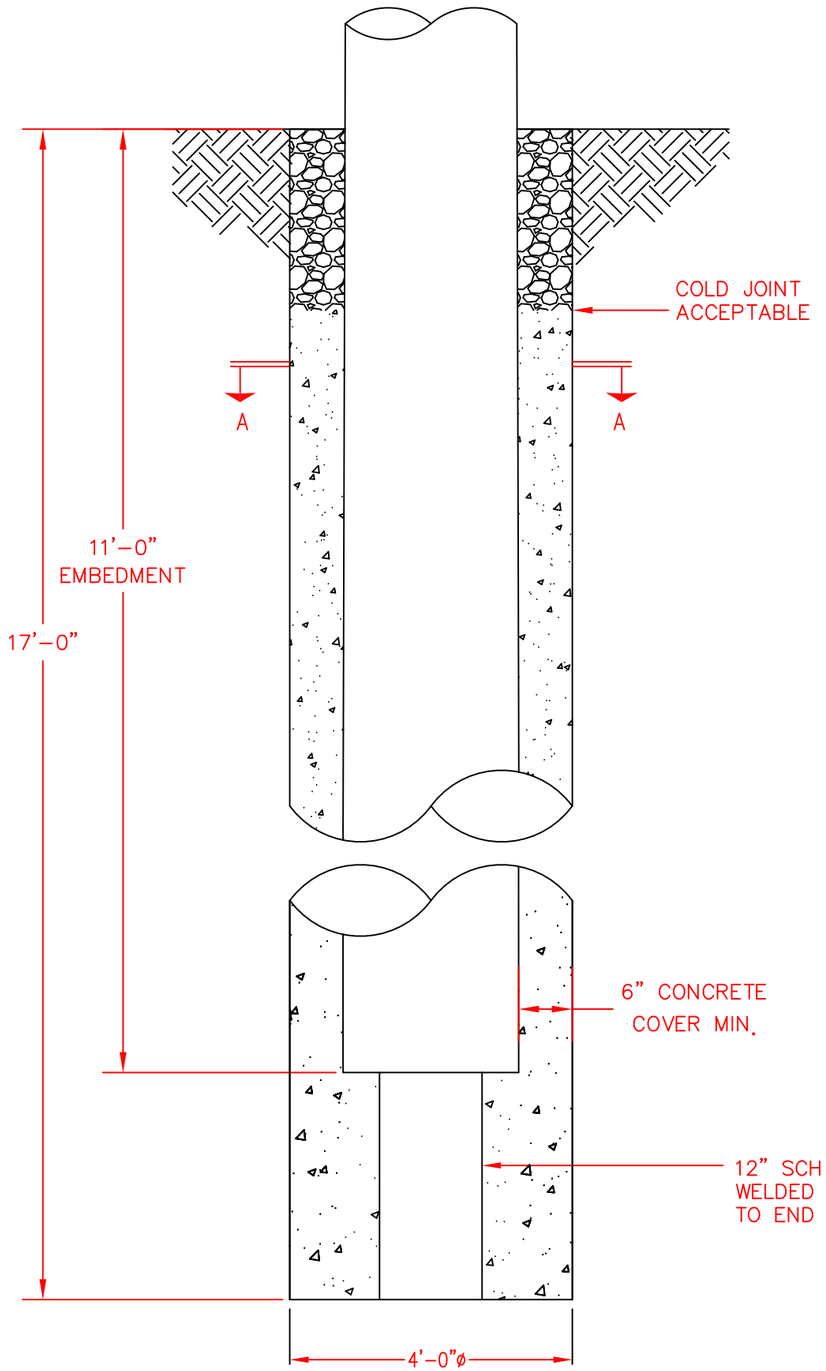
Standard Visor



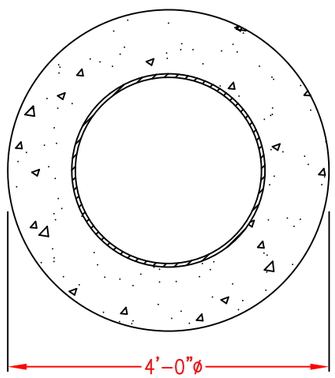
Extended Visor (optional)



Fixture Aimed at 23° Below Horizontal



FOUNDATION



SECTION A – A

NOTES:

FOUNDATION

1. ALL CONCRETE SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. CONCRETE SHALL HAVE MAXIMUM WATER/CEMENT RATIO OF 0.5. FOUNDATION INSTALLATION SHALL BE IN ACCORDANCE WITH ACI 336, "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF DRILLED PIERS", LATEST EDITION.

2. SOIL PARAMETERS ARE BASED UPON RECOMMENDED DESIGN PARAMETERS FROM GEOTECHNICAL REPORT BY THE MURILLO COMPANY, DATED JUNE 2021. REFER TO PAGE 2 OF 14 FOR SOIL PARAMETERS USED IN THE DESIGN. UPON CONSTRUCTION, IF SOIL PARAMETERS DO NOT MEET OR EXCEED THOSE CONTAINED HEREIN, DO NOT SET POLES AND CONTACT DESIGNER IMMEDIATELY.

3. FOUNDATION IS DESIGNED TO SUPPORT THE FOLLOWING LOADS:
AXIAL: 4.10 K
SHEAR: 3.40 K
MOMENT: 220.00 K-FT

4. GROUND SLOPE WAS ASSUMED TO NOT EXCEED 7H 1V. IF ACTUAL CONDITIONS VARY FROM THIS ASSUMPTION, PLEASE CONTACT ENGINEER BEFORE CONSTRUCTION.

5. TOP 2' OF FOUNDATION MAY BE FILLED WITH GRAVEL OR CONCRETE.

04/25/2022

LACH ENGINEERING, LLC.
539 SILICON DR.
STE. 100
SOUTHLAKE, TX, 76092
(817) 416-9999
www.lachengineering.com

Project Name

TECHLINE SPORTS LIGHTING, LLC.
#21-3767
ARBORETUM PARK
SUGARLAND, TEXAS
CRICKET FIELD
68' LIGHTING POLE FOUNDATION
POLES: P1-P4
LOADING: 57.38 SQ. FT. EPA / 1721.40 LBS

Stamp

STATE OF TEXAS
THOMAS S. LACH
96234
LICENSED PROFESSIONAL ENGINEER

Lach Engineering, LLC
#F-11487

Project Information

Project Number: 9063

Date: 04/25/2022

Sheet Information

Sheet Name: 9063-1

Drawing Scale: NTS

Drawn By: NHT

Sheet

S - 1

OF 1

Dimensional Solutions	**Shaft3D 2019**	**Product Version**	**21.2.2606.401**	**Date**	**4/25/2022 6:18:17 PM**
Workspace Name	**9063-1**				
Designed By	**NHT**	**Checked By:**	**TSL**		
File Path					

REPORT - 9063-1

PROJECT INFORMATION

Client Name:	TECHLINE SPORTS LIGHTING, LLC.
Project Name:	68' LIGHTING POLE FOUNDATION (POLES: P1-P4)
Project Number:	9063-1

DESIGN CODE ACI_318_2014 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength	3000	psi
Unit Weight	150	pcf

SOIL PARAMETERS:

Unit Weight	120	pcf
Soil Type	Cohesive	
Soil Subtype	Clay	
Ultimate Cohesion c	0.5	ksf
Ultimate Adhesion Ad	1	ksf
Passive Pressure Coefficient Ppc	2	
Angle of Internal Friction	0	
Modulus of Subgrade Reaction Method	Constant	
Constant Modulus	95	kcf
Coefficient A	0	
Coefficient B	0	
Coefficient n	0	
Allowable Increase In Soil Pressure		
Dead	0	
Live	0	
Wind	0	
Earthquake	0	
Erec	0	
Oper	0	
Test	0	

Axial Capacity Parameters

Shaft Type	Drilled	
Boundary Condition	Trans & Rot at Top	
Axial Capacity Method	Use Soil Parameters	
Tip Cohesion	0.5	ksf
Tip Angle of Internal Friction	0	
Tip Soil Unit Weight	120	pcf
Consider End Bearing	True	
Percent End Bearing	100	
Consider Skin Resistance	True	
Percent Skin Resistance	100	
Safety Factor - End Bearing	2	
Safety Factor - Skin Resistance	2	
Safety Factor - Pullout	2	
Safety Factor - Cohesion	2	

BUOYANCY CRITERIA:

Consider Buoyancy:	No	
Water Table Below Grade	27	ft

Soil Profile

No.	Name	Depth	Soil Type	Cohesion	Angle of Int Friction	Unit Weight	Subgrade Modulus	Alpha Factor	Beta Factor	Blow Count
		ft		ksf		pcf	kcf			
1	L1	17	Clay	0.5	0	120	95	0	0	0
2	L2	23	Sand	0	32	65	55	0	0	0

Shaft Geometry

Shaft Name	S	
Design Type	Concrete Drilled Shaft	
Shape Factor	1	
Grade Elevation	0	ft
Diameter	4	ft
Top Above Grade	0	ft
Neglected Soil Resistance Zone Length	3	ft
Length Below Neglected Soil Resistance	14	ft
Bell Diameter	0	ft
Bell Length	0	ft
Casing Length	0	ft
Consider Type Dependent Moment of I	True	
Moment of Inertia	12.5663706	ft^4

LOAD ELEMENT GEOMETRY AND APPLIED LOADS

Shaft Element - S - Load Element - S

Geometry	Shape	X Dim	Z Dim	Length	Offset - X	Offset - Z	Min Reinft Ratio
		ft	ft	ft	ft	ft	
	Circle	4	4	17	0	0	0.01

Load Case	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - Dead	4.1	0	0	0	0
2 - Live	0	0	0	0	0
3 - Wind	0	3.4	220	0	0
4 - Earthquake	0	0	0	0	0

ALLOWABLE LOAD COMBINATIONS

Shaft Element - S - Load Element - S

Load Combination	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - Dead	4.1	0	0	0	0
2 - Dead + Wind	4.1	3.4	220	0	0
3 - 0.6 Dead + Wind	2.46	3.4	220	0	0

ULTIMATE LOAD COMBINATIONS

Shaft Element - S - Load Element - S

Load Combination	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - 1.4 Dead	5.74	0	0	0	0
2 - 1.2 Dead + 1.6 Wind	4.92	5.44	352	0	0
3 - 1.2 Dead + 0.8 Wind	4.92	2.72	176	0	0
4 - 0.9 Dead + 1.6 Wind	3.69	5.44	352	0	0

Shaft Element - S

SELF WEIGHTS AND APPLIED EXTERNAL LOAD - Allowable Load Combinations

Load Combination	Load Element Weight kips	Soil Weight kips	Footing Weight kips	App Axial Load kips	Total Axial Load kips	Buoyant Load kips
1 - Dead	32.0442	0	0	4.1	36.1442	
2 - Dead + Wind	32.0442	0	0	4.1	36.1442	
3 - 0.6 Dead + Wind	32.0442	0	0	2.46	34.5042	

Base Shears and Moments - Allowable Load Combinations

Load Combination	Shear-X kips	Mom-Z kip-ft	Shear-Z kips	Mom-X kip-ft
1 - Dead	0	0	0	0
2 - Dead + Wind	3.4	277.8	0	0
3 - 0.6 Dead + Wind	3.4	277.8	0	0

SELF WEIGHTS AND APPLIED EXTERNAL LOAD - Ultimate Load Combinations

Load Combination	Load Element Weight kips	Soil Weight kips	Footing Weight kips	App Axial Load kips	Total Axial Load kips	Buoyant Load kips
1 - 1.4 Dead	44.8619	0	0	5.74	50.6019	
2 - 1.2 Dead + 1.6 Wind	38.4531	0	0	4.92	43.3731	
3 - 1.2 Dead + 0.8 Wind	38.4531	0	0	4.92	43.3731	
4 - 0.9 Dead + 1.6 Wind	38.4531	0	0	3.69	42.1431	

Base Shears and Moments - Ultimate Load Combinations

Load Combination	Shear-X kips	Mom-Z kip-ft	Shear-Z kips	Mom-X kip-ft
1 - 1.4 Dead	0	0	0	0
2 - 1.2 Dead + 1.6 Wind	5.44	444.48	0	0
3 - 1.2 Dead + 0.8 Wind	2.72	222.24	0	0
4 - 0.9 Dead + 1.6 Wind	5.44	444.48	0	0

Axial Capacity - Allowable Load Combinations

Shaft Element - S

Load Combination	App Axial Load kips	All Axial Load kips	Net Uplift Load kips	All Pullout Load kips	Vertical Settlement in	Max Bear Pressure ksf	All Bearing Pressure ksf
1 - Dead	4.1	50.7942	0	-56.292	0.4603	0	2.1125
2 - Dead + Wind	4.1	50.7942	0	-56.292	0.4603	0	2.1125
3 - 0.6 Dead + Wind	2.46	50.7942	0	-56.292	0.4234	0	2.1125

Rigid Analysis - Ultimate Load Combinations

Shaft Element - S

Load Combination	Max Mom Location ft	Max Mom Value kip-ft	Crossover Location ft
1 - 1.4 Dead	0	0	17
2 - 1.2 Dead + 1.6 Wind	4.4373	372.3481	15.5867
3 - 1.2 Dead + 0.8 Wind	3.7513	185.1988	12.1974
4 - 0.9 Dead + 1.6 Wind	4.4373	372.3481	15.5867

Finite Element Analysis - Deflections - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Deflections - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ft	ft	ft
1	0.0000	0.0000	0.0203	0.0203
2	3.0000	0.0000	0.0135	0.0135
3	3.4375	0.0000	0.0125	0.0125
4	3.8750	0.0000	0.0116	0.0116
5	4.3125	0.0000	0.0106	0.0106
6	4.7500	0.0000	0.0097	0.0097
7	5.6250	0.0000	0.0078	0.0078
8	6.5000	0.0000	0.0060	0.0060
9	7.3750	0.0000	0.0042	0.0042
10	8.2500	0.0000	0.0024	0.0024
11	9.1250	0.0000	0.0006	0.0006
12	10.0000	0.0000	-0.0012	-0.0012
13	11.7500	0.0000	-0.0047	-0.0047
14	13.5000	0.0000	-0.0082	-0.0082
15	15.2500	0.0000	-0.0116	-0.0116
16	17.0000	0.0000	-0.0150	-0.0150

Finite Element Analysis - Deflections - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ft	ft	ft
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Deflections - Ultimate Load Combinations

LC #1 : 1.4 Dead

LC #2 : 1.2 Dead + 1.6 Wind

LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Deflections - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ft	ft	ft	ft
1	0.0000	0.0000	0.0325	0.0162	0.0325
2	3.0000	0.0000	0.0216	0.0108	0.0216
3	3.4375	0.0000	0.0201	0.0100	0.0201
4	3.8750	0.0000	0.0185	0.0093	0.0185
5	4.3125	0.0000	0.0170	0.0085	0.0170
6	4.7500	0.0000	0.0155	0.0078	0.0155
7	5.6250	0.0000	0.0125	0.0063	0.0125
8	6.5000	0.0000	0.0096	0.0048	0.0096
9	7.3750	0.0000	0.0067	0.0033	0.0067
10	8.2500	0.0000	0.0038	0.0019	0.0038
11	9.1250	0.0000	0.0009	0.0005	0.0009
12	10.0000	0.0000	-0.0019	-0.0010	-0.0019
13	11.7500	0.0000	-0.0075	-0.0037	-0.0075
14	13.5000	0.0000	-0.0130	-0.0065	-0.0130
15	15.2500	0.0000	-0.0186	-0.0093	-0.0186
16	17.0000	0.0000	-0.0241	-0.0120	-0.0241

Finite Element Analysis - Deflections - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ft	ft	ft	ft
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Soil Pressure - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Soil Pressure - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	1.2824	1.2824
3	3.4375	0.0000	1.1910	1.1910
4	3.8750	0.0000	1.1002	1.1002
5	4.3125	0.0000	1.0100	1.0100
6	4.7500	0.0000	0.9205	0.9205
7	5.6250	0.0000	0.7432	0.7432
8	6.5000	0.0000	0.5682	0.5682
9	7.3750	0.0000	0.3953	0.3953
10	8.2500	0.0000	0.2243	0.2243
11	9.1250	0.0000	0.0550	0.0550
12	10.0000	0.0000	-0.1129	-0.1129
13	11.7500	0.0000	-0.4453	-0.4453
14	13.5000	0.0000	-0.7746	-0.7746
15	15.2500	0.0000	-1.1023	-1.1023
16	17.0000	0.0000	-1.4295	-1.4295

Finite Element Analysis - Soil Pressure - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Soil Pressure - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Soil Pressure - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ksf	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	2.0519	1.0260	2.0519
3	3.4375	0.0000	1.9056	0.9528	1.9056
4	3.8750	0.0000	1.7603	0.8801	1.7603
5	4.3125	0.0000	1.6160	0.8080	1.6160
6	4.7500	0.0000	1.4728	0.7364	1.4728
7	5.6250	0.0000	1.1891	0.5946	1.1891
8	6.5000	0.0000	0.9091	0.4546	0.9091
9	7.3750	0.0000	0.6325	0.3163	0.6325
10	8.2500	0.0000	0.3589	0.1795	0.3589
11	9.1250	0.0000	0.0880	0.0440	0.0880
12	10.0000	0.0000	-0.1807	-0.0903	-0.1807
13	11.7500	0.0000	-0.7125	-0.3562	-0.7125
14	13.5000	0.0000	-1.2393	-0.6197	-1.2393
15	15.2500	0.0000	-1.7637	-0.8818	-1.7637
16	17.0000	0.0000	-2.2872	-1.1436	-2.2872

Finite Element Analysis - Soil Pressure - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ksf	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Shear Forces - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Shear Forces - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	kips	kips	kips
1	0.0000	0.0000	-3.4000	-3.4000
2	3.0000	0.0000	0.4549	0.4549
3	3.4375	0.0000	6.7068	6.7068
4	3.8750	0.0000	8.7910	8.7910
5	4.3125	0.0000	10.7163	10.7163
6	4.7500	0.0000	12.4838	12.4838
7	5.6250	0.0000	14.9001	14.9001
8	6.5000	0.0000	17.5013	17.5013
9	7.3750	0.0000	19.4900	19.4900
10	8.2500	0.0000	20.8737	20.8737
11	9.1250	0.0000	21.6588	21.6588
12	10.0000	0.0000	21.8512	21.8512
13	11.7500	0.0000	21.2585	21.2585
14	13.5000	0.0000	18.1414	18.1414
15	15.2500	0.0000	12.7193	12.7193
16	17.0000	0.0000	5.0032	5.0032

Finite Element Analysis - Shear Forces - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	kips	kips	kips
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Shear Forces - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Shear Forces - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kips	kips	kips	kips
1	0.0000	0.0000	-5.4400	-2.7200	-5.4400
2	3.0000	0.0000	0.7278	0.3639	0.7278
3	3.4375	0.0000	10.7308	5.3654	10.7308
4	3.8750	0.0000	14.0656	7.0328	14.0656
5	4.3125	0.0000	17.1461	8.5730	17.1461
6	4.7500	0.0000	19.9741	9.9871	19.9741
7	5.6250	0.0000	23.8401	11.9201	23.8401
8	6.5000	0.0000	28.0021	14.0010	28.0021
9	7.3750	0.0000	31.1841	15.5920	31.1841
10	8.2500	0.0000	33.3979	16.6989	33.3979
11	9.1250	0.0000	34.6541	17.3270	34.6541
12	10.0000	0.0000	34.9620	17.4810	34.9620
13	11.7500	0.0000	34.0136	17.0068	34.0136
14	13.5000	0.0000	29.0263	14.5132	29.0263
15	15.2500	0.0000	20.3510	10.1755	20.3510
16	17.0000	0.0000	8.0051	4.0026	8.0051

Finite Element Analysis - Shear Forces - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kips	kips	kips	kips
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Bending Moments - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth ft	LC #1 kip-ft	LC #2 kip-ft	LC #3 kip-ft
1	0.0000	0.0000	-220.0000	-220.0000
2	3.0000	0.0000	-218.6354	-218.6354
3	3.4375	0.0000	-215.7012	-215.7012
4	3.8750	0.0000	-211.8551	-211.8551
5	4.3125	0.0000	-207.1667	-207.1667
6	4.7500	0.0000	-201.7051	-201.7051
7	5.6250	0.0000	-188.6675	-188.6675
8	6.5000	0.0000	-173.3539	-173.3539
9	7.3750	0.0000	-156.3001	-156.3001
10	8.2500	0.0000	-138.0356	-138.0356
11	9.1250	0.0000	-119.0842	-119.0842
12	10.0000	0.0000	-99.9643	-99.9643
13	11.7500	0.0000	-62.7620	-62.7620
14	13.5000	0.0000	-31.0145	-31.0145
15	15.2500	0.0000	-8.7556	-8.7556
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth ft	LC #1 kip-ft	LC #2 kip-ft	LC #3 kip-ft
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Bending Moments - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kip-ft	kip-ft	kip-ft	kip-ft
1	0.0000	0.0000	-352.0000	-176.0000	-352.0000
2	3.0000	0.0000	-349.8166	-174.9083	-349.8166
3	3.4375	0.0000	-345.1219	-172.5610	-345.1219
4	3.8750	0.0000	-338.9682	-169.4841	-338.9682
5	4.3125	0.0000	-331.4668	-165.7334	-331.4668
6	4.7500	0.0000	-322.7281	-161.3641	-322.7281
7	5.6250	0.0000	-301.8680	-150.9340	-301.8680
8	6.5000	0.0000	-277.3662	-138.6831	-277.3662
9	7.3750	0.0000	-250.0801	-125.0401	-250.0801
10	8.2500	0.0000	-220.8570	-110.4285	-220.8570
11	9.1250	0.0000	-190.5347	-95.2673	-190.5347
12	10.0000	0.0000	-159.9429	-79.9715	-159.9429
13	11.7500	0.0000	-100.4192	-50.2096	-100.4192
14	13.5000	0.0000	-49.6232	-24.8116	-49.6232
15	15.2500	0.0000	-14.0090	-7.0045	-14.0090
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kip-ft	kip-ft	kip-ft	kip-ft
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

PIER DESIGN - Ultimate Load Combinations

Modulus of Elasticity of Concrete - Section 19.2
Concrete Stress Distribution - Section 22.2.2
Design Axial Strength - Section 22.4

Shaft Element - S

Load Element - S

Geometry

Shape	Circle	
X Dim	4	ft
Z Dim	4	ft
Height	17	ft
Offset - X	0	ft
Offset - Z	0	ft

Pier Concrete Capacity

Load Combination	Applied Axial Load Load kips	Allowable Axial Load Load kips	Applied Moment Resultant kip-ft	Allowable Moment Resultant kip-ft	Capacity Ratio
1 - 1.4 Dead	5.74	1933.3055	0	0.1933	336.8128
2 - 1.2 Dead + 1.6 Wind	4.92	21.2841	372.3481	1610.7947	4.326
3 - 1.2 Dead + 0.8 Wind	4.92	43.4357	185.1988	1635.0093	8.8284
4 - 0.9 Dead + 1.6 Wind	3.69	15.9279	372.3481	1607.2378	4.3165

E CONTRACTORS
EXCELLENCE IN GENERAL CONTRACTING

COMPETITIVE SEALED PROPOSAL

Pictured is our team erecting new stadium lighting for our Client, Fort Bend ISD.

FORT BEND COUNTY

ARBORETUM CRICKET COMPLEX

RFP 22-069

LETTER OF TRANSMITTAL

Fort Bend County
Purchasing Department
Travis Annex
301 Jackson, Suite 201
Richmond, TX 77469

Thank you for the opportunity to submit our proposal for providing Construction Services the Fort Bend County. ***E Contractors USA, LLC, a proud Fort Bend County business,*** strives to consistently provide professional services, an outstanding program management, and a quality product. Our experienced management team can manage the envisioned project with vigor by proving to be a dependable resource for Fort Bend County.

Our company is built on a foundation of experience and collective collaboration of all our staff. Our management which includes individuals with decades of experience in all aspects of businessoperations, especially municipal construction, leads an incredible team which has proven themselves repeatedly. Guided by ownership that has managed various multi-million dollar construction projects in the Greater Houston Area; supported by multiple Project Managers who have a myriad of project experience; E Contractors feels confident that we would be able to fulfillFort Bend County's desire for a reputable and efficient contractor to assist with their envisioned Contemporary Library.

Our goal is the safety of all the project stakeholders, including but not limited to our team, your team, and the end users. At each site, safety is the number one priority and everyone at E Contractors is empowered to stop work if it is being done unsafely. We assure a secure environment surrounding each of our project sites.

E Contractors promotes open communication to build a professional relationship with their clientsand hopes to gain their trust in doing so by delivering a quality product at a price that the end useris happy with, without sacrificing safety.

Herein, please find the required documents illustrating our team qualifications, methods, procedures, and protocols. As a business located in Fort Bend County, we enthused to be able to assist the County with its future construction needs.

Respectfully Submitted,

Irfan Abji

Managing Member

TABLE OF CONTENTS

EXECUTIVE SUMMARY

E Contractors is a general contractor with over eleven (11) years of experience providing construction andproject management services for commercial and municipal construction projects throughout the State of Texas, particularly in and around the Greater Houston Metropolitan Area. We deliver successful construction projects from start to finish, efficiently managing them to an on-time completion.

A significant reason for our success is that our construction management team is fully immersed in projects from beginning to end, including bid process management and supervision, negotiating the awarding of subcontractors, tools and materials management, including field procurement, receipt of materials, inspection, warehousing and supplying materials to subcontractors and comprehensive field administration.

Our staffing capability is comprised of seasoned construction supervisors and superintendents (11), project managers (3), estimators (3), project coordinators (3), and dedicated subcontractors.

E Contractors principals and staff are committed to client satisfaction. Continually striving for excellence by providing our clients with complete transparency, anticipating possible issues, and making sure we keep the promises we make. To provide construction services that are excellent, efficient, and result in a high-end product that meets or exceeds client expectations, we evaluate the needs of every client – from each client's perspective.

We achieve mutual objectives by striving for perfection and committing ourselves to continual improvement. Our expansive knowledge base and access to invaluableresources enable us to handle any project – anywhere – with unmatched expertise. We also understand and stringently abide by construction regulations and laborlaws with a proven track record that is a testament of our commitment to excellence.

E Contractors has the ability to provide Fort Bend County (FBC) with unmatched services, utilizing our knowledge, capabilities, talent, and experience to furnish high-quality services within the requirements of this solicitation.

Client retention and repeat rate are greater than 90% due to our transparency and on-time delivery of projects.

Our unique management style comprised of innovative construction techniques, a network of resources and human capital, the catalyst for our robust mobilization of skilled construction teams and progressive methodologies, makes our expertise an integral component for project success.

Upon thorough review of the RFP, we understand the scope and individual project tasks to be completed in order to fulfill the requirements of this project.

Our expansive experience with concrete work, metals, wood, plastic, casework, thermal and moisture projection, finishes, specialties, equipment, fire suppression, plumbing, heating, ventilating and air conditioning, electrical, and communications sets us apart from other general contractors.

We boast of the stellar relationships we have with vendors throughout the Houston Metropolitan areas for each of the specialties listed. We are proud to state our completion of over 300 projects performing services exactly as those listed in the RFP. The subsequent pages will provide a more detail list of projects completed similar to those required for this FBC project.

COST

RFP 22-069

Exhibit I: Pricing

Base bid option 1 (as stated in specifications)

$ 750,000.00

Calendar days for completion 182

Base bid option 2 (as stated in specifications, however substituting the 30/25FC light level with the 45/34FC light level)

$ 800,000.00

Calendar days for completion 182

Acknowledgement of Receipt of Addendum(s), if issued by Purchasing, to the Request for Proposal Document.

Addendum No 1 dated 4/19/2022 Received 4/19/2022

Addendum No 2 dated _____ Received _____

Addendum No 3 dated _____ Received _____

E Contractors USA, LLC
Name of Respondent

Signature of Authorized Representative

Irfan Abji
Printed Name of Representative

UNDERSTANDING SCOPE OF WORK

E Contractors has taken our experience and expertise to assemble our response and provide a schedule to streamline and mitigate any unforeseen situations for Fort Bend County (FBC) North.

E Contractors starts every project with our preconstruction process that engages all project stakeholders to plan the permitting cycle, staging areas, scheduling reviews, and discuss anticipated long-lead items. Through this process, our proposed construction team will ensure all communication and deliverables are met.

Our project schedule is created with Critical Path Methodology (CPM), ensuring all items are completed as efficiently as possible.

We start by making the complex safe for construction. E Contractors will mobilize by installing a temporary fence with a privacy screen to assure the project site is safe and secure as needed. We then identify any existing overhead electrical power poles and install overhead flags per the Occupational Safety and Health Administration (O.S.H.A.). We then install environmental controls as listed in the project documents. Other construction preparations will include placement of an on-site jobsite trailer, site storage, and installation of a designated construction entrance.

Our E Contractors construction team will engage the key subcontractors for the preplanning and preparations of the commencement of construction. Once initial coordination meetings have occurred, we then prepare for the first phases of construction, holding coordination meetings weekly with all key stakeholders to mitigate any unforeseen circumstances. Owner and client will be updated weekly with our construction progress schedule. As we progress throughout the construction lifecycle, our quality control team will prepare QC inspections to assure that the construction provided meets or exceeds the construction documents and expectations. As we bring the project to a close our E Contractors representative will walk through with the owner to understand any punch list items and coordinate with our trade partners to bring the construction to a successful completion.

FIRMS EXPERIENCE

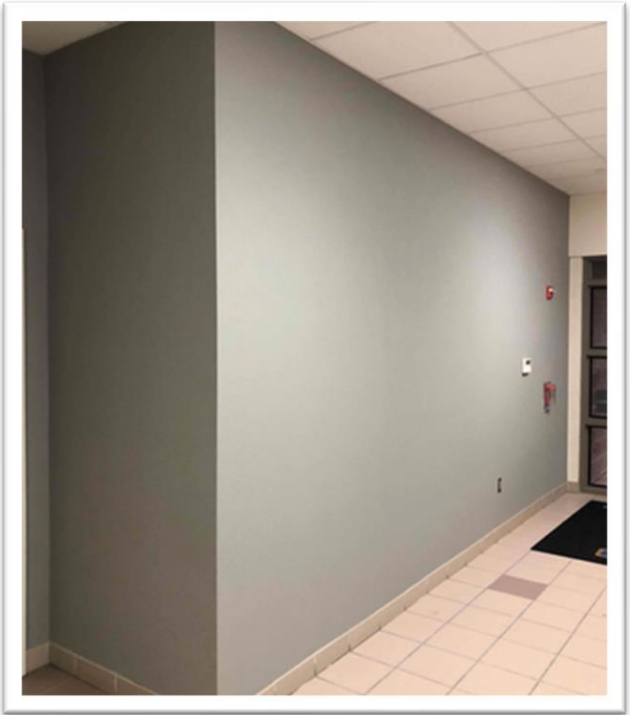
Project

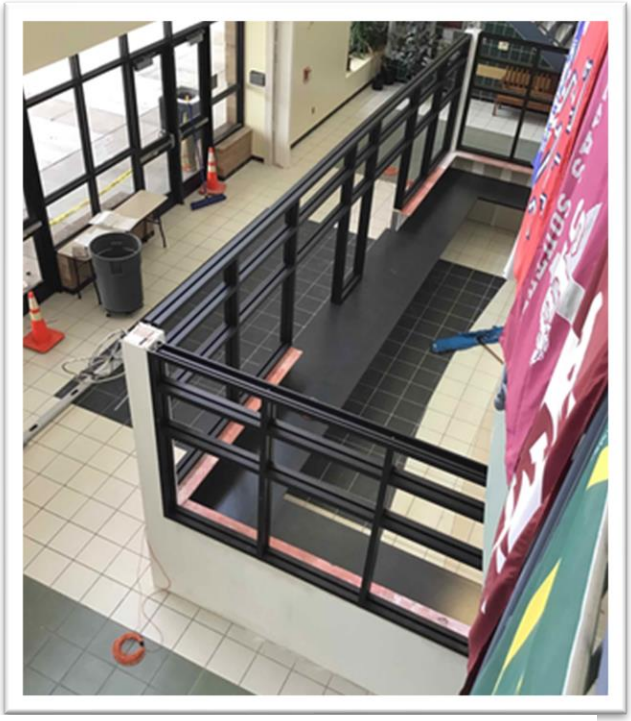
1) **Project Name**
   Hall Stadium Lighting
2) **Project Location**
   Fort Bend
3) **Project Type**
   Renovation
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Raul Ramos
6) **Contact Tel Number**
   (713) 574-0785
7) **Contact Email**
   Raul.Ramos@fortbendisd.org
8) **Architect**
   None on this project
9) **Architect Contact**
   None on this project
10) **Contact Tel Number**
    N/A
11) **Contact Email**
    N/A
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Kyle Wadlington| Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $TBD
15) **Completion Date**
    03/2022
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project

The Hall Stadium lighting restoration came along with several variables that our team meticulously planned and executed in order to fulfil the requirements of the Client. The remainder of the project is currently under design and construction is to follow.

Project

1) **Project Name**
   Package 28 Multicampus Renovation
2) **Project Location**
   Fort Bend
3) **Project Type**
   Renovation
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Bryan Ray (as program manager)
6) **Contact Tel Number**
   (281) 901-9122
7) **Contact Email**
   Bryan.Ray@jacobs.com
8) **Architect**
   STOA Architects
9) **Architect Contact**
   Victor Lee
10) **Contact Tel Number**
    (713) 955-8784
11) **Contact Email**
    vlee@stoaintl.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Joseph Roemen| Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $1,400,000.
15) **Completion Date**
    03/2019
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project





The bid package 28 included 3 campuses where E Contractors successfully provided new security vestibules (as shown on the right) to the campuses to provide the staff and students with an additional layer of security. Additional scope of work included all finishes throughout the campuses including installing new vinyl wallcovering (as shown on the left), new paint, and new flooring.

Project

1) **Project Name**
   Package 24A and 26A Renovations
2) **Project Location**
   Fort Bend
3) **Project Type**
   Renovation
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Gaurav Agarwal
6) **Contact Tel Number**
   (827) 327-5467
7) **Contact Email**
   Gaurav.agarwal@fortbendisd.com
8) **Architect**
   Auto Arch
9) **Architect Contact**
   Adam Wiess
10) **Contact Tel Number**
    (713) 952-3366
11) **Contact Email**
    adam@autoarch.net
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Joseph Roemen| Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $3,600,000.
15) **Completion Date**
    10/2018
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project

The bid package 24 and 26A included the restroom renovation at an existing elementary school, we worked hand in hand with the district and campus staff to assure that within our phasing plan no other utilities or other campus functions were disrupted. Alongside this restroom renovation project, at another campus, we were on a strict schedule to complete our scope during the summer break, assuring that we were on time to provide the campus a newly built HVAC system ready for the new school year.

Project

1) **Project Name**
   Package 25 Multicampus Renovation
2) **Project Location**
   Fort Bend
3) **Project Type**
   Renovation
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Bryan Ray (as program manager)
6) **Contact Tel Number**
   (281) 901-9122
7) **Contact Email**
   Bryan.Ray@jacobs.com
8) **Architect**
   Salas O Brien
9) **Architect Contact**
   Alan Penn
10) **Contact Tel Number**
    (281) 664-1900
11) **Contact Email**
    Alan.Penn@salasobrien.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Joseph Roemen| Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $5,700,000.
15) **Completion Date**
    03/2019
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project

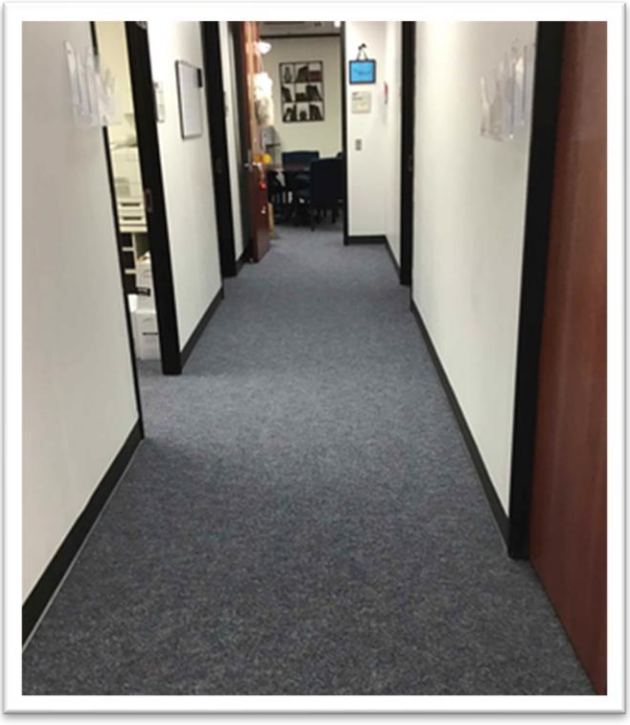
Pictured on the left is our team conducting an owners training on a newly installed generator.

On the right we have a newly installed TPO roof completed by our team of trade partners.

The bid package 25 included 5 campuses, each unique in scope and detailed in accomplishments, from installing a new HVAC system on an existing and occupied building, from installing new security vestibules or a complete reroof.

Project

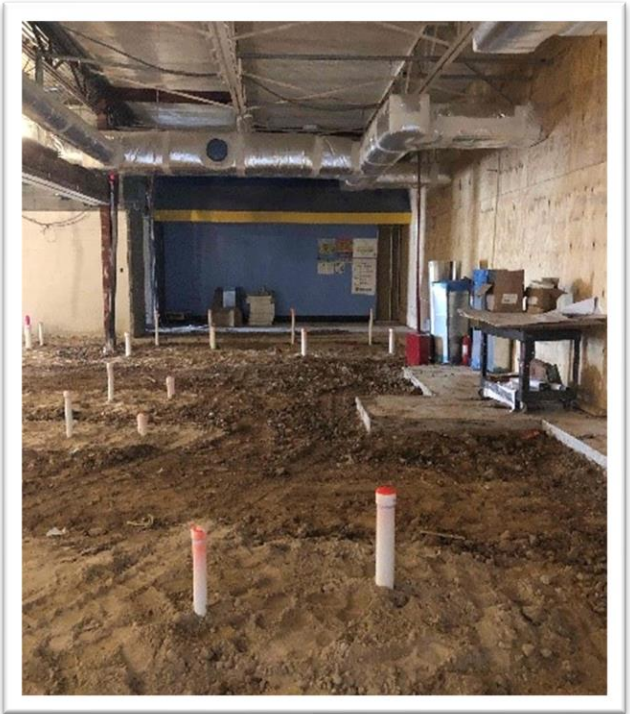
19) Project Name
Package 26 Multicampus Renovation
20) Project Location
Fort Bend
21) Project Type
Renovation
22) Owner
Fort Bend Independent School District
23) Owner Contact
Raul Ramos
24) Contact Tel Number
(713) 574-0785
25) Contact Email
Raul.Ramos@fortbendisd.org
26) Architect
Auto Arch
27) Architect Contact
Adam Weiss
28) Contact Tel Number
(713) 952-3366
29) Contact Email
adam@autoarch.net
30) Contractors Project Executive
Irfan Abji | Principal
31) Key Personnel
Joseph Roemen| Project Manager
Hector Vasquez| Job Site Supervisor
Michael Darr | General Superintendent
32) Project Contract Amount
$1,500,000.
33) Completion Date
02/2019
34) % Self Performed
Fifteen Percent (15%)
35) Project Delivery Method
Competitive Sealed Proposal
36) Sustainability Certification
None required on this project



The bid package 26 included the renovations to 4 campuses, many having the replacement of the existing flooring as an item for scope. E Contractors worked alongside the campus staff to coordinate the plan to remove and relocate furniture and associated items to complete the flooring replacements. Additionally, at other campuses we performed HVAC upgrades throughout the campus.

Project

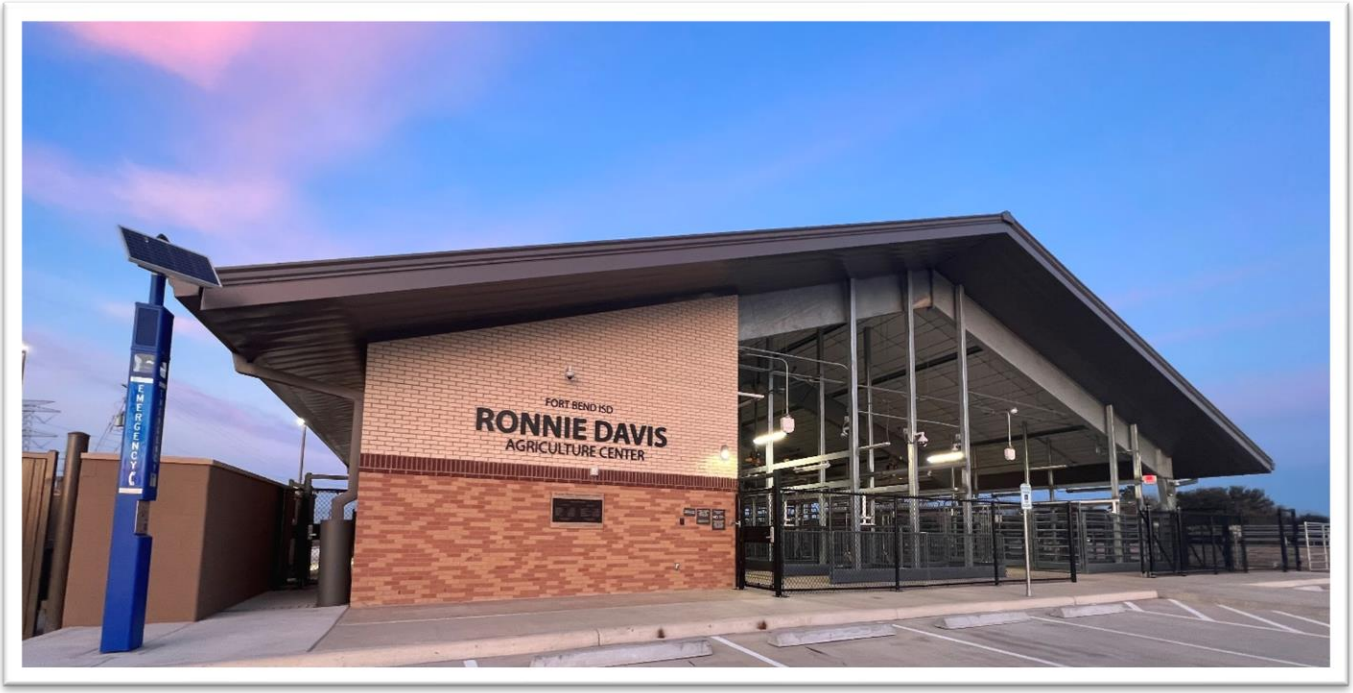
1) **Project Name**
   Package 13 Kitchen Renovation
2) **Project Location**
   Fort Bend
3) **Project Type**
   Renovation
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Ashley Dixon
6) **Contact Tel Number**
   (281) 634-5909
7) **Contact Email**
   Ashley.Dixon@fortbendisd.org
8) **Architect**
   Molina Walker Architects
9) **Architect Contact**
   Horacio Gomez
10) **Contact Tel Number**
    (713) 482-2303
11) **Contact Email**
    hgomez@molinawalker.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Kyle Wadlington| Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $14,500,000.
15) **Completion Date**
    12/2021
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project



E Contractors was selected as the awarded general contractor early 2020 to construct 10 new kitchens for the Fort Bend Independent School District. We overcame several obstacles as our agile leadership was confronted with the global pandemic, despite such impacts we were able to deliver our first phase of construction 30% ahead of schedule. Our scope involved completely demoing and building back the kitchens, providing temporary kitchens, as the students and staff occupied the building.

Project

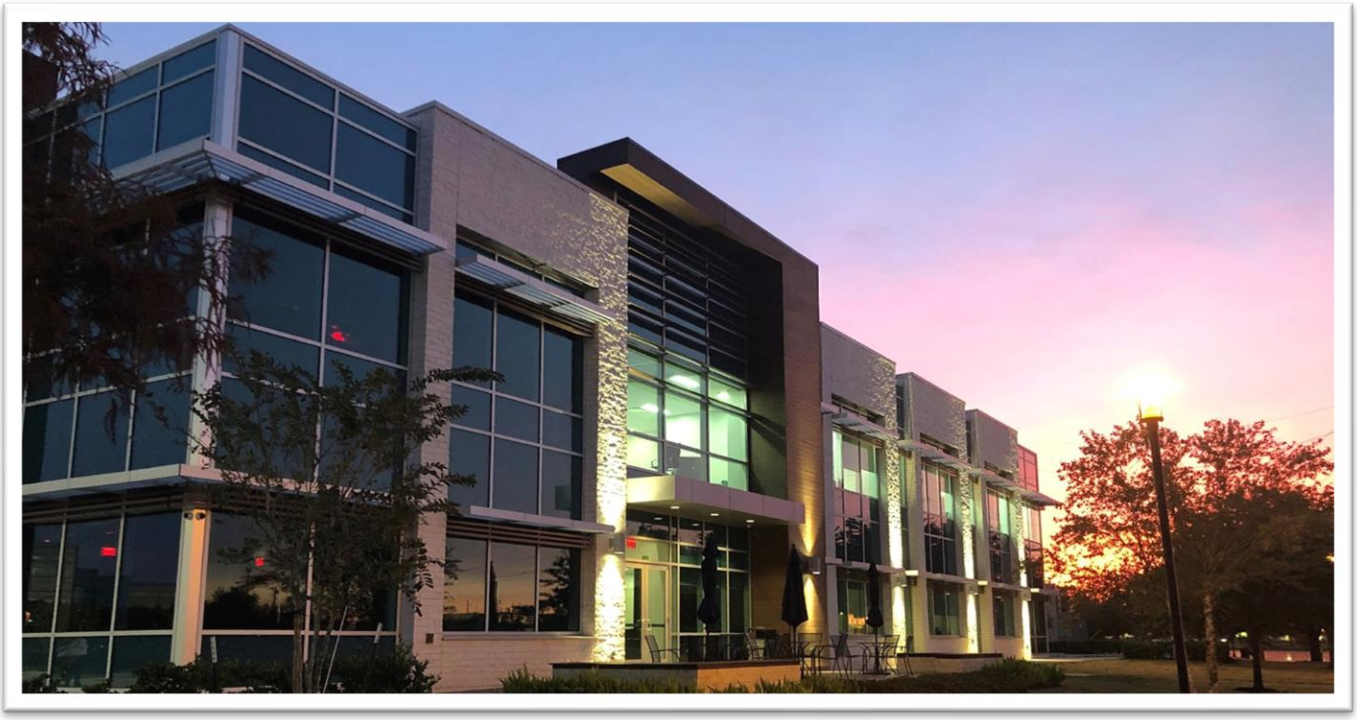
1) **Project Name**
   Ronnie Davis Agriculture Facility
2) **Project Location**
   Missouri City
3) **Project Type**
   Ground-up Construction
4) **Owner**
   Fort Bend Independent School District
5) **Owner Contact**
   Minh Ngo
6) **Contact Tel Number**
   217-979-8834
7) **Contact Email**
   minh.ngo@fortbendisd.com
8) **Architect**
   Harrison Kornberg Architects
9) **Architect Contact**
   Rey Lastimosa
10) **Contact Tel Number**
    832-232-9181
11) **Contact Email**
    rlastimosa@harrisonkornberg.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Willyann Paz | Project Manager
    Juan Osorio | Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $2,811,403.15
15) **Completion Date**
    12/2021
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Competitive Sealed Proposal
18) **Sustainability Certification**
    None required on this project.



Construction of a new 12,400 S.F. Agricultural Facility, fully equipped with complete integrated security systems, HVAC controls and lighting controls. Structural Pre-Engineered Metal Building with Standing Seam Metal roof. CMU and face brick north wall with east and south wing walls to allow build out of the MDF, Electrical, Utility, and Bathrooms.

Project

1) **Project Name**
   Egrets Landing Sugar Land
2) **Project Location**
   Sugar Land
3) **Project Type**
   Ground-up Construction
4) **Owner**
   Egrets Landing Sugar Land
5) **Owner Contact**
   Tara Oliver
6) **Contact Tel Number**
   (713) 600-9090
7) **Contact Email**
   tara.oliver@oliver-cre.com
8) **Architect**
   Identity Architects
9) **Architect Contact**
   William Kalkman
10) **Contact Tel Number**
    (713) 595-2191
11) **Contact Email**
    wkalkman@identityarchitects.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Joseph Roemen | Project Manager
    Hector Vasquez| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $6,500,000.
15) **Completion Date**
    09/2018
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Design-Build
18) **Sustainability Certification**
    None required on this project.



E Contractors served as the general contractor of the new 2 story office building located in Sugar Land Texas. The project included all trades encompassed to bring this building to a successful completion, detailed finishes for the shell and all buildouts.

Project

1) **Project Name**
   1488 Medical Office Building
2) **Project Location**
   Cypress
3) **Project Type**
   Ground-up Construction
4) **Owner**
   Magnolia Medical Ventures
5) **Owner Contact**
   Alejandra Cobas
6) **Contact Tel Number**
   (713) 465-3500
7) **Contact Email**
   acobas@egretsgroup.com
8) **Architect**
   Identity Architects
9) **Architect Contact**
   William Kalkman
10) **Contact Tel Number**
    (713) 595-2191
11) **Contact Email**
    wkalkman@identityarchitects.com
12) **Contractors Project Executive**
    Irfan Abji | Principal
13) **Key Personnel**
    Michael Marquez| Project Manager
    Daniel Cowan| Job Site Supervisor
    Michael Darr | General Superintendent
14) **Project Contract Amount**
    $14,000,000.
15) **Completion Date**
    09/2018
16) **% Self Performed**
    Fifteen Percent (15%)
17) **Project Delivery Method**
    Design-Build
18) **Sustainability Certification**
    None required on this project

E Contractors is currently constructing a new 3 story office building, tilt wall and structural steel is being used as the shell of the building. Exterior finishes such as stucco, engineered wood and glazing are being utilized. E Contractors is scheduled to being the interior build outs of the suites mid-2022 and to complete construction early 2023.

STAFF EXPERIENCE

Key Project Management & Staff

E Contractors offers a team of skilled individuals with extensive construction knowledge combined with the skill set and experience to achieve contract objectives. All personnel work from our Sugar Land, Texas location and at project locations when needed.

E Contractor's proposed project organization is comprised of:

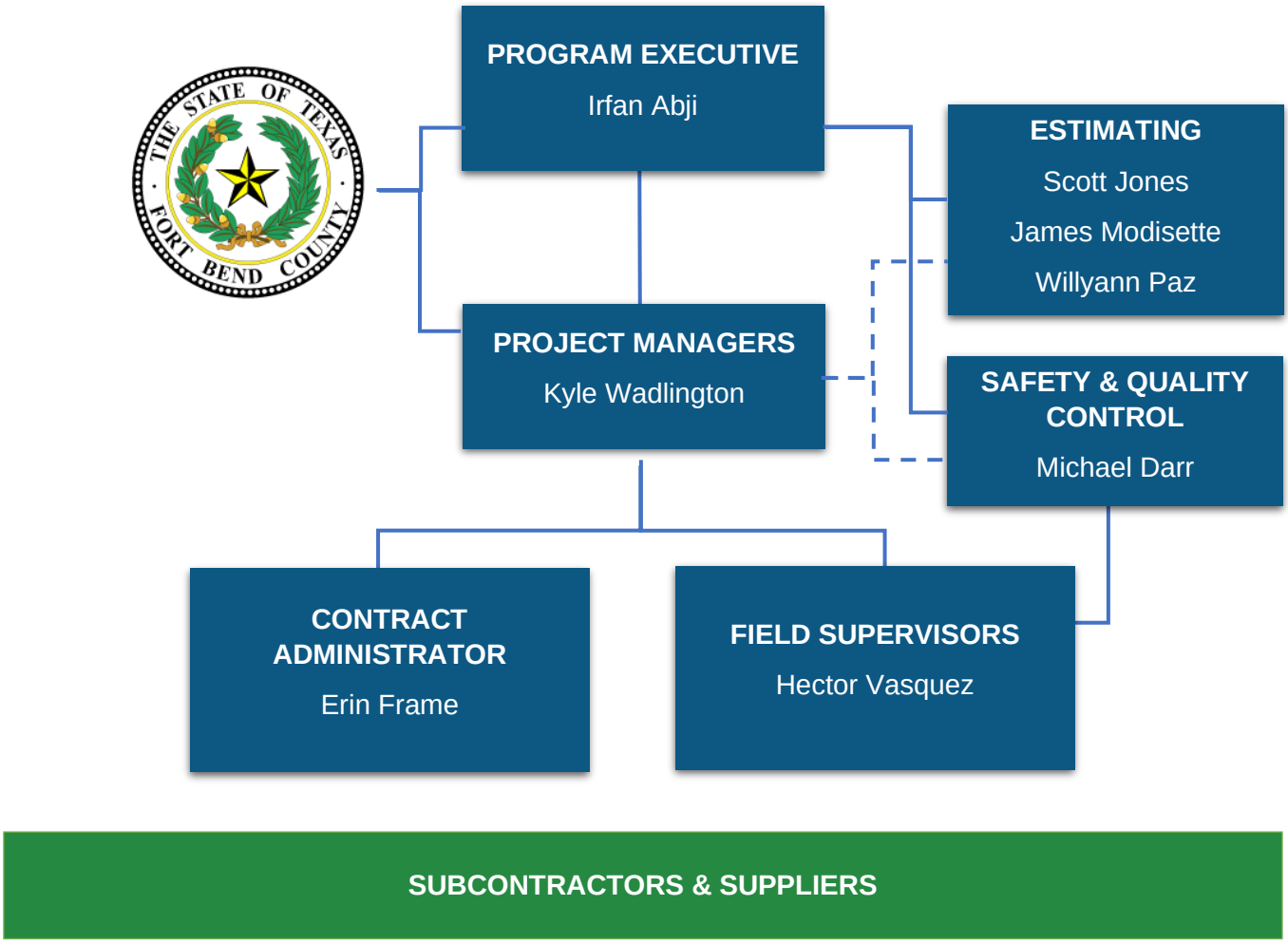
- Project positions
- Project Organizational structure
- Position descriptions

Project Positions

E Contractors proposes the following *supervisory* positions:

PROJECT POSITION	E CONTRACTORS PERSONNEL	E CONTRACTORS TITLE
Program Executive	Irfan Abji	Principal
Project Manager	Kyle Wadlington	Project Manager
Safety & Quality Control	Michael Darr	General Superintendent
Field Superintendents	Hector Vasquez	Jobsite Supervisor
Contract Administrator	Erin Frame	Project Coordinator

Project Organization Chart



Position Descriptions

Project Executive

- Primary Fort Bend County Point of Contact for all contract operations.
- Provides overall project control for the Fort Bend County.
- Communicates and interfaces with the Fort Bend County.
- Possesses signature and contract authority to negotiate with Fort Bend County.
- Possesses overall responsibility for construction operations.
- Ensures contract performance to include compliance with schedule, budget, quality, and safety
- Oversees the Project Managers
- Oversees estimating and scheduling for the Project.
- Assigns budgeted resources to job orders including project managers and superintendents
- Coordinates with the Company Quality Control/Safety Manager in enforcing program wide safety and QC policies and procedures.

Project Manager

- Point of Contact for Fort Bend County.
- Possesses stop-work authority.
- Ensures overall contract compliance and expeditious response to Fort Bend County.
- Manages superintendents, oversees quality control and overall health and safety of onsite personnel.
- Prepares contract progress schedules reports.
- Conducts and participates in weekly construction progress meetings.
- Communicates with the Quality Control/Safety Manager and Program Manager on quality and safety issues including corrective action.
- Ensures timely corrective actions for non-compliant work including QC or safety violations, accidents and lessons learned implemented.
- Possesses estimating and scheduling abilities.

Safety and Quality Control Manager

- Ensures every employee receives training on their roles regarding safety.
- Supports and encourages active employee involvement in creating and supporting a culture of safety.
- Accurately communicate any safety violations and recommends solutions.
- Identifies hazard and unsafe work practices, remove obstacles to incident prevention and assists management to evaluate the injury and illness program.
- Assists in safety inspections and accident investigations.
- Establishes the procedures and protocol for investigating the causes of accidents and near miss-incidents.

Field Superintendents

- Supervises job order job sites
- Maintains schedule and to ensure that each subcontractor stays on task.
- Ensures project safety at job site through daily morning safety ‘toolbox’ meetings
- Ensures each subcontractor complies with all contract requirements and stays within the parameters of plans and specifications set forth by the engineers and or architects.
- Ensures quality control is maintained throughout each phase of the job.
- Ensures that all local, city and state regulations, inspections and code compliances are being followed.
- Creates and maintains daily reports and sign in sheets
- POC for on-site activity
- Possesses stop work authority
- Interfaces with customers from the jobsite-work with individual customers to coordinate construction efforts.

Contract Administrators

- Interfaces with corporate accounting for processing invoices, contracts, and payroll, insurance and subcontractor payments/purchase orders.
- Disseminates relevant documentation to Project Executive
- Maintains Project database and work orders
- Maintains subcontractor files and administration
- Ensures contract documents are in compliance, properly maintained and updated

IRFAN ABJI
PROJECT EXECUTIVE

Since his acquisition of E Contractors USA, LLC in 2013, Irfan manages and oversees all business matters for the company. Irfan has over 30 years of business management experience that spans the globe, with 22 years of it being in real estate development and construction related businesses.

Prior to his ownership of E Contractors, Irfan's unique approach to business growth strategies made him to be a sought-after consultant by many business owners globally. He has been an advisor to many parastatals within the former Soviet Union, Sub-Saharan Africa and Central America on matters including infrastructure development, real estate endeavors, manufacturing, and telecommunications. He gives credit to his unique ability of creating award winning rapid growth to any company through the understanding and practicing of integrity in everything he does. He and his partner, who also happens to be his wife, own several healthy businesses which are all run by their own management structures. All businesses follow Irfan's management principals and have been recognized by various magazines for their excellence in design and growth in business.

As a Project Executive, Irfan's goal would include maintaining a transparent and healthy communication of all contractual matters of any project. His ability to think out of the box is one of the many reasons why repeat clients including some independent school districts and municipalities prefer working with E Contractors.

WORK EXPERIENCE

2013 to Present	**E Contractors USA, LLC** Sugar Land, Texas Irfan manages all operations of the company including managing multiple Project Managers and overseeing numerous JOC contracts with municipal and independent school districts.	*Principal*
1998 to Present	**Oakdale Group of Companies** Houston, Texas Irfan was the founder of a conglomerate that offers various financial services including mortgage lending and risk mitigation.	*Principal*
2018 to Present	**Egrets Group** Houston, Texas Irfan and his partner own a Real Estate Development company that focuses on improving communities through design of purpose-built buildings that enhance communities.	*Principal*
2018 to Present	**Egrets Group** Houston, Texas Irfan and his partner started a Real Estate Development company that focuses on improving communities through design and ownership of purpose-built buildings that enhance neighborhoods.	*Principal*
1995 to 1998	**Transcontinental Services, Inc** Houston, Texas	*Chief Financial Officer*

800+
GROUND UP & REFURBISHMENT PROJECTS CONSTRUCTED

500+
REAL ESTATE DEVELOPMENTS & REPOSITIONING

$150M+
GROUND UP & REFURBISHMENT CONSTRUCTION BILLED

$800M+
REAL ESTATE DEVELOPMENT OR REFURBISHMENT PROJECTS

Irfan founded and managed a merchant banking firm focusing on international infrastructure projects. The company procured financing in the U.S. for multinationals globally. Projects included the construction of gas stations in Russia, building of low-income housing in the country of Belize with the Ministry of Housing, turnkey project of a glass bottle factory in Poland and telecommunications project involving the Russian Government and a U.S. based satellite company.

1991 to 1995 **Texas Syndications, Inc.** *Chief Executive Officer*
Houston, Texas

Irfan was the family representative in the America's for his family-owned group of companies located in East Africa. Responsibilities included the expansion and diversification of the business holdings to the US and Canada. Projects included the acquisition, construction and management of various hotels throughout the United States which ultimately were sold under the first REIT on the New York Stock Exchange; setup of operational arms under a license agreement for NCR and AT&T product lines in five countries throughout Africa; and the evaluation and proposal of a new NBA venue and team for the City of Toronto where Irfan partnered with Ervin "Magic" Johnson.

KYLE WADLINGTON
PROJECT MANAGER

PRIOR WORK EXPERIENCE

2021 to Present — **E Contractors USA, LLC** — *Project Manager*
Sugar Land, Texas
Decisive and results driven, Kyle is a manager with both office and field experience in healthcare, higher education, and government markets. He places a high importance in developing relationships with both owners and subcontractors and confidently communicates with all stake holders on all project progress reports. His experience, especially in heavy MEP projects gives him a unique ability. He can effectively take projects from bid to close out with detail to cost allocation and schedule projection. His ability to manage several projects concurrently due to his strong organization skills.

2019 to 2021 — **Horizon International Group** — *Program Manager*
Houston, Texas
In his role as Program Manager Kyle managed multiple small projects on the Houston Medical Center area. His ability to muti task various jobs in areas that needed high logistical coordination made him to become a sought-after manager. Kyle was able to foster the relationships with the company's clients and was able to grow those relationships by proving how efficiency is maintained within projects.

2012 to 2019 — **JT Vaugh Construction** — *Project Manager*
Houston, Texas
Starting at an entry level position while attending university, Kyle was recognized as potential management material due to his commitment and work performance. Upon graduation, Vaughn started giving him the opportunity to prove his ability to manage various field supervision positions. His dedication to his trade catapulted him to become a Project Manager. Kyle worked on projects for clients such as MD Anderson, Methodist Hospitals and Reliant Center.

2006 to 2009 — **Texas Department of Transportation** — *Project Inspector*
Houston, Texas
Kyle had six internships at TXDOT which included concrete testing, inspection, project management and reporting

City of Residence:
Pearland, Texas

Education/Certifications:
B.S. Construction Management

Software Capabilities:
Procore, P6, Microsoft Project, RS Means, E Builder, Building Connected, Microsoft Office, Bluebeam, RS Means Online

100+
REFURBISHMENT PROJECTS COMPLETED

$25M+
REFURBISHMENT BILLINGS

MICHAEL DARR
GENERAL SUPERINTENDENT

PRIOR WORK EXPERIENCE

2017 to Present — **E Contractors USA, LLC** — *General Superintendent*
Houston, Texas
Michael manages, directs, and oversees all field operations including quality control and safety. His involvement in the field construction lifecycle includes scheduling and field personnel management. Michael brings more than 40 years' experience in the commercial construction industry. While working closely in coordinating site logistics and field work needs, Michael ensures specific site safety plans are created and adhered to. Michael exhibits excellent work ethics, exceptional problem-solving skills that have been an asset in ensuring quality project delivery.

2015 to 2017 — **Drymalla Construction Co.** — *Project Superintendent*
Houston, Texas
Managed project site personnel. Coordinated subcontractor activities and performed quality control inspections. Oversaw site safety to ensure an accident-free worksite.

2013 to 2015 — **Aldine ISD** — *General Superintendent*
Houston, Texas
Managed a team of Superintendents for all construction and maintenance projects throughout a School District of 75 campuses. Ensured scheduling, safety, and quality construction.

2011 to 2013 — **Teal Construction, Inc.** — *Project Superintendent*
Houston, Texas
Supervised projects from pre-construction through close out. Responsibilities included coordination and scheduling of materials and subcontractors, daily activity documentation, Architect and Owners correspondence, and administering weekly meetings.

2003 to 2007 — **Hull & Hull, Inc.** — *Superintendent / Project Manager*
Houston, Texas
Supervised multiple jobs involving scheduling and coordination for institutions including San Jacinto College. Other work included medical including operating rooms, x-ray, and medical labs.

1999 to 2003 — **Constructors & Associates** — *Project Superintendent*
Houston, Texas
Responsible for the project coordination of sub-contractors, manpower and materials.

1994 to 1999 — **DeJager Construction** — *Project Superintendent*
Houston, Texas
Focused on projects in retail. Duties included personnel placement, material, and sub-contractors.

City of Residence:
Cypress, Texas

Education/Certifications:
Red Cross First Aid/CPR

Software Capabilities:
Prolog, Procore, Microsoft Project, Microsoft Office,

OSHA:
30 Hour Training

600+
GROUND-UP & REFURBISHMENT PROJECTS COMPLETED

$120M
GROUND UP & REFURBISHMENT BILLED

HECTOR VASQUEZ

JOBSITE SUPERVISOR

Hector Vazquez holds a B.S. as an Electrical Engineer with 24 years' construction experience, Health Care and Hotel Facilities. Hector majored in Power Engineering with additional courses in Automatic Process Control, Process Control Instrumentation and Construction Management.

PRIOR WORK EXPERIENCE

2017 to Present — **E Contractors USA, LLC** — *Jobsite Supervisor*
Houston, Texas
Hector demonstrates his expertise in Jobsite Management by identifying project delivery risks at each stage of the project, respond effectively to sensitive issues and technical inquiries, and proactively identify remedial actions to maintain project on schedule and within budget.

2015 to 2017 — **Aldine ISD** — *Project Manager*
Houston, Texas
Responsibilities included the construction of four new schools, four expansions and eight renovations. Hector led the project scope development, design review, contractor management, project scheduling, cost management and progress monitoring.

2014 to 2015 — **Apollo A/C & Heating, Inc.** — *Superintendent*
Houston, Texas
Responsible for all HVAC crews, trucks, tools on multiple, commercial building projects. Work included process piping, duct work, coordinating subcontractors, complete take-off of material, tracking schedules, labor, and material problems, solving day-to-day operations of project.

2008 to 2014 — **Mayaguez Resort and Casino** — *Maintenance Director*
Mayaguez, Puerto Rico
Led capital improvements projects implementation including overseeing the construction of a new conference center, water park and casino facilities.

2006 to 2008 — **Marc Engineering Consulting** — *Construction Manager*
San Juan, Puerto Rico
Project Manager for new healthcare facility complex that included a new hospital (300 rooms), medical/commercial offices and parking facilities.

2002 to 2006 — **Perea Hospital Pavia Health Inc.** — *Facilities Director*
Mayaguez, Puerto Rico
Led a maintenance team of 60 responsible for maintenance, engineering, security of healthcare facility complex.

1997 to 2002 — **Mayaguez Resort and Casino** — *Project Engineer*
Mayaguez, Puerto Rico
Responsible field inspections and progress report and cost tracking for a new hotel and casino project.

City of Residence:
Kingwood, Texas

Education/Certifications:
B.S., Electrical Engineering / Power Engineering
Automatic Process Control, Control Instrumentation
Construction Management

Software Capabilities:
Prolog, Procore, Microsoft Project, Microsoft Office, Visio, AutoCAD, Primavera and Fieldwire

OSHA:
30 Hour Training

525+
GROUND UP & REFURBISHMENT PROJECTS COMPLETED

$130M
GROUND-UP & REFURBISHMENT PROJECTS

ERIN FRAME
PROJECT COORDINATOR

City of Residence:
Wharton, Texas

Education/Certifications:
Procore Certification

Software Capabilities:
Prolog, Procore, Project Mates, AIA Documents, Microsoft Office,

80+
GROUND UP & RENOVATION PROJECTS COORDINATED

$200M
GROUND UP & RENOVATION PROJECTS COORDINATED

PRIOR WORK EXPERIENCE

2005 to Present — **E Contractors USA, LLC** — *Project Coordinator*
Sugar Land, Texas

Erin is a highly motivated team player and an asset to E Contractors who exercises a strong work ethic, impeccable organizational skills and creative problem-solving. She brings over 16 years of experience in the fields of Industrial, Commercial, and Assisted Living Facility construction and is a strong support to Project Managers, Field Superintendents and Company Executives. Erin's project coordinator experience gives her the ability to assist in the administrative and construction support for any Project. Her attention to detail, open communication with all project stakeholders through timely documentation keeps projects on target culminating in successful delivery. Erin serves as the Project Coordinator, reporting directly to the Project Manager, and oversees the day-to-day coordination of all projects,

2005 to 2021 — **T&W Corporation** — *Project Coordinator*
Indianapolis, Indiana

Erin's responsibility included all documentation and administrative functions on projects including:

- Communication with subcontractors for estimates/bid proposals for bidding purposes
- Set up Prime Contracts and Subcontracts
- Collaboration in all phases of the Design/Build projects
- AIA Contract Billings
- Ordered & scheduled all jobsite utilities and temporary facilities
- Support for Project Manager and Superintendents from the office
- Document control of construction drawings and specifications
- Working directly with the Architects, Engineers and Owners in all design facets of the project
- Obtained state and local municipality building permits
- Creating start-up and close-out documents, as needed per the contract guidelines on each project.

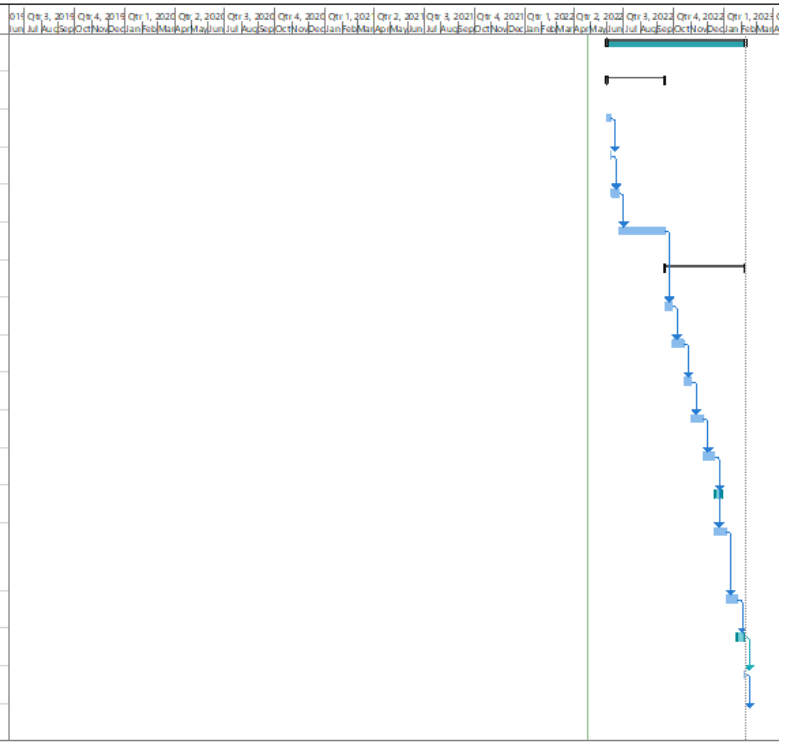
RELEVANT EXPERIENCE

TXDOT Yoakum Facility Renovation: $4,829,643.61
Demo and renovation of two building interiors for TXDOT facilities including complete MEP and interior layout reconfiguration.

Ismaili Jamatkhana at Harvest Green $9,235,000.00
Ground up construction of a 27,000 S.F. prayer hall and community center. Project included the coordination of HVAC materials bought by the general contractor, installed by a church member, and finished by a subcontractor.

FB County Arboretum Cricket Complex

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Fort Bend County Arboretum Cricket Complex**	**182 days**	**Wed 6/1/22**	**Thu 2/9/23**	
2		**Pre-Construction**	**76 days**	**Wed 6/1/22**	**Wed 9/14/22**	
3		Receive Notice to Proceed and Sign Contract	4 days	Wed 6/1/22	Mon 6/6/22	
4		Submit bond, insurance, and schedule of values documents	2 days	Tue 6/7/22	Wed 6/8/22	3
5		Prepare and submit product submittals	2 wks	Thu 6/9/22	Wed 6/22/22	4
6		Long Lead time for Electrical Gear	12 wks	Thu 6/23/22	Wed 9/14/22	5
7		**Construction "Including 10 rain days'**	**105 days**	**Thu 9/15/22**	**Wed 2/8/23**	
8		Site Mobilization, Kick Off Meeting, and Site Surveying	2 wks	Thu 9/15/22	Wed 9/28/22	6
9		Foundations for light poles, pavillion, batting cage, and CMU screen wall	3 wks	Thu 9/29/22	Wed 10/19/22	8
10		Rough in Electrical	2 wks	Thu 10/20/22	Wed 11/2/22	9
11		Concrete flatwork for pavillion, sidewalk and batting cage.	3 wks	Thu 11/3/22	Wed 11/23/22	10
12		Build Pavillion and Install 30yr Shingle Roof	3 wks	Thu 11/24/22	Wed 12/14/22	11
13		Build CMU Screen Wall around pavillion	2 wks	Thu 12/15/22	Wed 12/28/22	12
14		Build Batting Cages with Netting and Install 2" nylon cricket field outfield boundary	3 wks	Thu 12/15/22	Wed 1/4/23	12
15		Top Out electrical pole fixtures and controls	3 wks	Thu 1/5/23	Wed 1/25/23	14
16		Substantial completion and Complete Punch List Items	2 wks	Wed 1/25/23	Tue 2/7/23	15
17		Final Completion	1 day	Wed 2/8/23	Wed 2/8/23	16
18		**Issue final completion documents including warrantles**	**1 day**	**Thu 2/9/23**	**Thu 2/9/23**	**17**



Project: FBC Cricket Complex
Date: Tue 4/26/22

Task | Summary | Inactive Milestone | Duration-only | Start-only | External Milestone | Manual Progress
Split | Project Summary | Inactive Summary | Manual Summary Rollup | Finish-only | Deadline
Milestone | Inactive Task | Manual Task | Manual Summary | External Tasks | Progress

FORMS

COUNTY PURCHASING AGENT
Fort Bend County, Texas

Jaime Kovar
County Purchasing Agent

(281) 341-8640
Fax (281) 341-8645

April 19, 2022

TO: All Prospective Bidders

RE: Addendum No. 1 – Fort Bend County RFP 22-069 – Construction of Arboretum Cricket Complex for Fort Bend County

Addendum 1:

Attached is Addendum 1. Vendors are to utilize Addendum 1 when returning their bid response. Changes are to scope of work under Section 1.0 to remove LED scoreboard.

****

Immediately upon your receipt of this addendum, please fill out the following information and email this page to Brooke Lindemann at brooke.lindemann@fortbendcountytx.gov

E Contractors USA, LLC
Company Name

Signature of person receiving addendum

04/26/2022
Date

If you have any questions, please contact this office.

Sincerely,

Brooke Lindemann
Senior Buyer

COUNTY PURCHASING AGENT
Fort Bend County, Texas

Vendor Information

Jaime Kovar
Purchasing Agent

Office (281-341-8640)

Legal Company Name (top line of W9)	E Contractors USA, LLC		
Business Name (if different from legal name)			
Federal ID # or S.S. #	45-2741910	DUNS # 01-480-6139	
Type of Business	x Corporation/LLC ___ Partnership ___ Sole Proprietor/Individual ___ Tax Exempt Organization		Age in Business? 11
Publicly Traded Business	x No ___ Yes Ticker Symbol ___		
Remittance Address	16554 Creek Bend Dr. Suite 200		
City/State/Zip	Sugar Land TX 77478		
Physical Address	16554 Creek Bend Dr. Suite 200		
City/State/Zip	Sugar Land TX 77478		
Phone/Fax Number	Phone: 713-493-2500 Fax: 713-493-25001		
Contact Person	Irfan Abji		
E-mail	RFP@econtractors.com		
Check all that apply to the company listed above and provide certification number.	**DBE-Disadvantaged** Business Enterprise ☑ **SBE-Small Business** Enterprise ☐ HUB-Texas Historically **Underutilized Business** ☑ WBE-Women's Business Enterprise ☐	**Certification #** HS02987 Cert Date 12/2021 Exp Date 01/2023 **Certification #** ___ **Certification #** 1452741910600 12/2021 01/2023 **Certification #** ___	
Company's gross annual receipts	<$500,000 ___	$500,000-$4,999,999 ___	
	$5,000,000-$16,999,999 ___	$17,000,000-$22,399,999 ___	
	>$22,400,000 x		
NAICs codes (Please enter all that apply)	236220		
Signature of Authorized Representative			
Printed Name	Irfan Abji		
Title	Managing Member		
Date	02/28/2022		

THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
E Contractors USA, LLC

2 Business name/disregarded entity name, if different from above
45-2741910

3 Check appropriate box for federal tax classification; check only one of the following seven boxes:
☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☑ S Corporation ☐ Partnership ☑ Trust/estate
☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ S
Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.
☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):
Exempt payee code (if any)
Exemption from FATCA reporting code (if any)
(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.)
16554 Creek Bend Dr. Suite 200

Requester's name and address (optional)

6 City, state, and ZIP code
Sugar Land TX 77478

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number
___ - ___ - ____

or

Employer identification number
4 5 - 2 7 4 1 9 1 0

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here Signature of U.S. person ▶ [signature] Date ▶ 4/26/22

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Job No.: _____

TAX FORM/DEBT/ RESIDENCE CERTIFICATION
(for Advertised Projects)

Taxpayer Identification Number (T.I.N.): 45-2741910

Company Name submitting Bid/Proposal: 16554 Creek Bend Dr. Suite 200

Mailing Address: Sugar Land TX 77478

Are you registered to do business in the State of Texas? ✓ Yes No

If you are an individual, list the names and addresses of any partnership of which you are a general partner or any assumed name(s) under which you operate your business

_____

_____

I. **Property:** List all taxable property in Fort Bend County owned by you or above partnerships as well as any d/b/a names. Include real and personal property as well as mineral interest accounts. (Use a second sheet of paper if necessary.)

Fort Bend County Tax Acct. No.*	Property address or location**
_____	_____
_____	_____
_____	_____
_____	_____

** This is the property account identification number assigned by the Fort Bend County Appraisal District.*

*** For real property, specify the property address or legal description. For business personal property, specify the address where the property is located. For example, office equipment will normally be at your office, but inventory may be stored at a warehouse or other location.*

II. **Fort Bend County Debt** - Do you owe any debts to Fort Bend County (taxes on properties listed in I above, tickets, fines, tolls, court judgments, etc.)?

Yes ✓ No If yes, attach a separate page explaining the debt.

III. **Residence Certification** - Pursuant to Texas Government Code §2252.001 *et seq*., as amended, Fort Bend County requests Residence Certification. §2252.001 *et seq.* of the Government Code provides some restrictions on the awarding of governmental contracts; pertinent provisions of §2252.001 are stated below:

(3) "Nonresident bidder" refers to a person who is not a resident.

(4) "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

✓ I certify that E Contractors USA, LLC is a Resident Bidder of Texas as defined in Government Code
[Company Name]
§2252.001.

I certify that _____ is a Nonresident Bidder as defined in Government Code
[Company Name]
§2252.001 and our principal place of business is _____.
[City and State]

Created 05/12

Mandatory Form

Contractor Acknowledgement of Storm Water Management Program

I hereby acknowledge that I am aware of the stormwater management program and standard operating procedures developed by Fort Bend County in compliance with the TPDES General Permit No. TXR040000. I agree to comply with all applicable best management practices and standard operating procedures while conducting my services for Fort Bend County. I agree to conduct all services in a manner that does not introduce illicit discharges of pollutants to streets, stormwater inlets, drainage ditches or any portion of the drainage system. The following materials and/or pollutant sources must not be discharged to the drainage system as a result of any services provided:

1. Grass clippings, leaves, mulch, rocks, sand, dirt or other waste materials resulting from landscaping activities, (except those materials resulting from ditch mowing or maintenance activities)
2. Herbicides, pesticides and/or fertilizers, (except those intended for aquatic use)
3. Detergents, fuels, solvents, oils and/or lubricants, other equipment and/or vehicle fluids,
4. Other hazardous materials including paints, thinners, chemicals or related waste materials,
5. Uncontrolled dewatering discharges, equipment and/or vehicle wash waters,
6. Sanitary waste, trash, debris, or other waste products
7. Wastewater from wet saw machinery,
8. Other pollutants that degrade water quality or pose a threat to human health or the environment.

Furthermore, I agree to notify Fort Bend County immediately of any issue caused by or identified by:

E Contractors USA, LLC
(Company/Contractor)

that is believed to be an immediate threat to human health or the environment.

Contractor Signature

04/26/2022
Date

Irfan Abji
Printed Name

Managing Member
Title

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

1 of 1

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY
CERTIFICATION OF FILING
Certificate Number:
2022-877831
Date Filed:
04/25/2022
Date Acknowledged:

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.
E CONTRACTORS USA, LLC
Houston, TX United States

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.
Fort Bend County

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.
RFP 22-069
Arboretum Cricket Complex

4 Name of Interested Party	City, State, Country (place of business)	Nature of interest (check applicable)	
		Controlling	Intermediary
Cobas, Maria A.	Richmond , TX United States	X	
Abji, Irfan	Richmond , TX United States	X	

5 Check only if there is NO Interested Party. ☐

6 UNSWORN DECLARATION

My name is Irfan Abji, and my date of birth is 02/04/1967.

My address is 16554 Creek Bend Dr. Suite 200 (street), Sugar Land (city), TX (state), 77478 (zip code), US (country).

I declare under penalty of perjury that the foregoing is true and correct.

Executed in Fort Bend County, State of Texas, on the 26 day of April (month) 20 22 (year).

Signature of authorized agent of contracting business entity
(Declarant)

Forms provided by Texas Ethics Commission www.ethics.state.tx.us Version V1.1.191b5cdc

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 4/25/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Irma Lasanta Stenson
Oakdale Insurance Group, LLC 16554 Creek Bend Dr., Ste. 220 Sugar Land TX 77478	PHONE (A/C, No, Ext): 713-779-0445, ext. 223 FAX (A/C, No): E-MAIL ADDRESS: commercialins@oakdalegroup.com

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
E Contractors USA, LLC 16554 Creek Bend Dr., Ste. 200 Sugar Land TX 77478	INSURER A: Gemini Insurance Company	10833
	INSURER B: Progressive Specialty Insurance Company	32786
	INSURER C: Gemini Insurance Company	10833
	INSURER D: Texas Mutual Insurance Company	22945
	INSURER E: National Fire & Marine Insurance Company	20079
	INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR [X] Deductible: $5,000 [X] EBL: Retro: 11/3/2017 GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:	X	X	VIGP020358	11/03/2021	11/03/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 1,000,000 $ 300,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
B	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [X] HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY	X	X	00505384-3	03/11/2022	03/11/2023	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
C	[ ] UMBRELLA LIAB [X] OCCUR [X] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ N/A	X	X	VIFX001290	11/03/2021	11/03/2022	EACH OCCURRENCE AGGREGATE $	$ 5,000,000 $ 5,000,000 $
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N [N] If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	X	0001260364	11/04/2021	11/04/2022	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
E	Builders Risk			42-MAR-101292-02	03/01/2022	03/01/2023	Limit: Deductible (all perils) Deductible (windstorm)	$10,000,000 $2,500 3% Tier1/2% Tier

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

General Contractor.
The GL Policy includes a blanket automatic additional insured endorsement based on signed agreement that provides additional insured status to the certificate holder together with a waiver of subrogation for the same on primary and Non-Contributory basis.

Project Name: Arboretum Cricket Complex;
Project Number# RFP 22-069

CERTIFICATE HOLDER

Fort Bend County
301 Jackson, Suite 201
Richmond, TX 77469

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

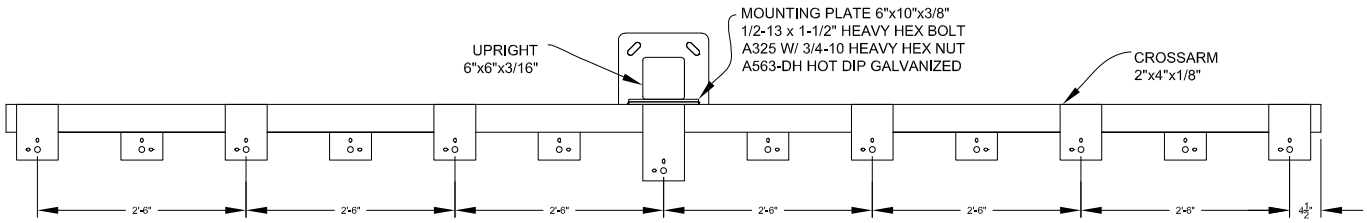
AUTHORIZED REPRESENTATIVE

I.L.Stenson

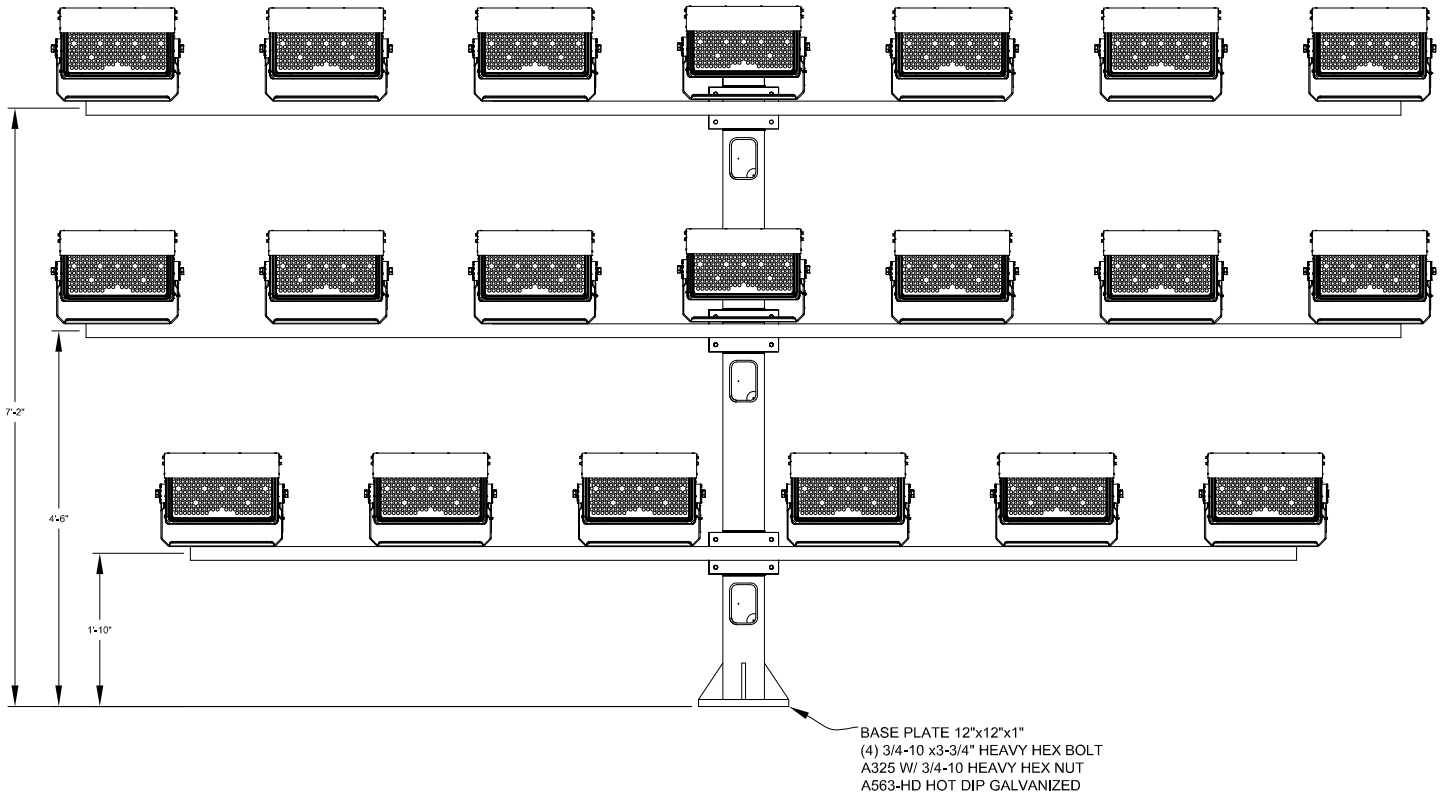
PRE-SUBMITTALS

TOP VIEW

Qty - 2



FRONT VIEW



** Hot-Dip galvanized after fabrication to ASTM A123 specifications

** NOT TO SCALE

** Assembly Weight: 1,253 lbs
Assembly EPA: 48.90 sq. ft.
(Including Fixtures)

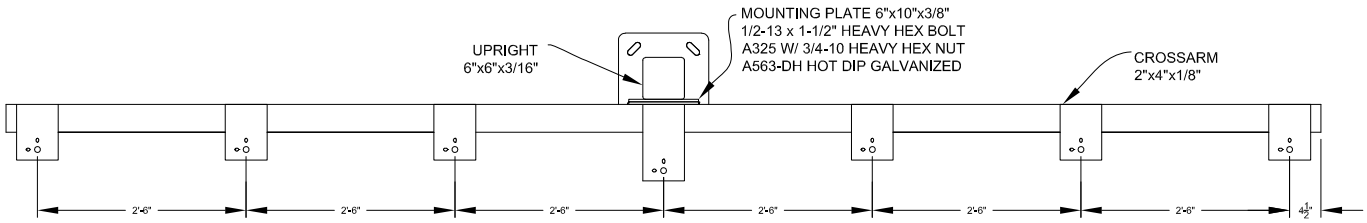
TECHLINE SPORTS LIGHTING
POWERED BY GEOSPORT

15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

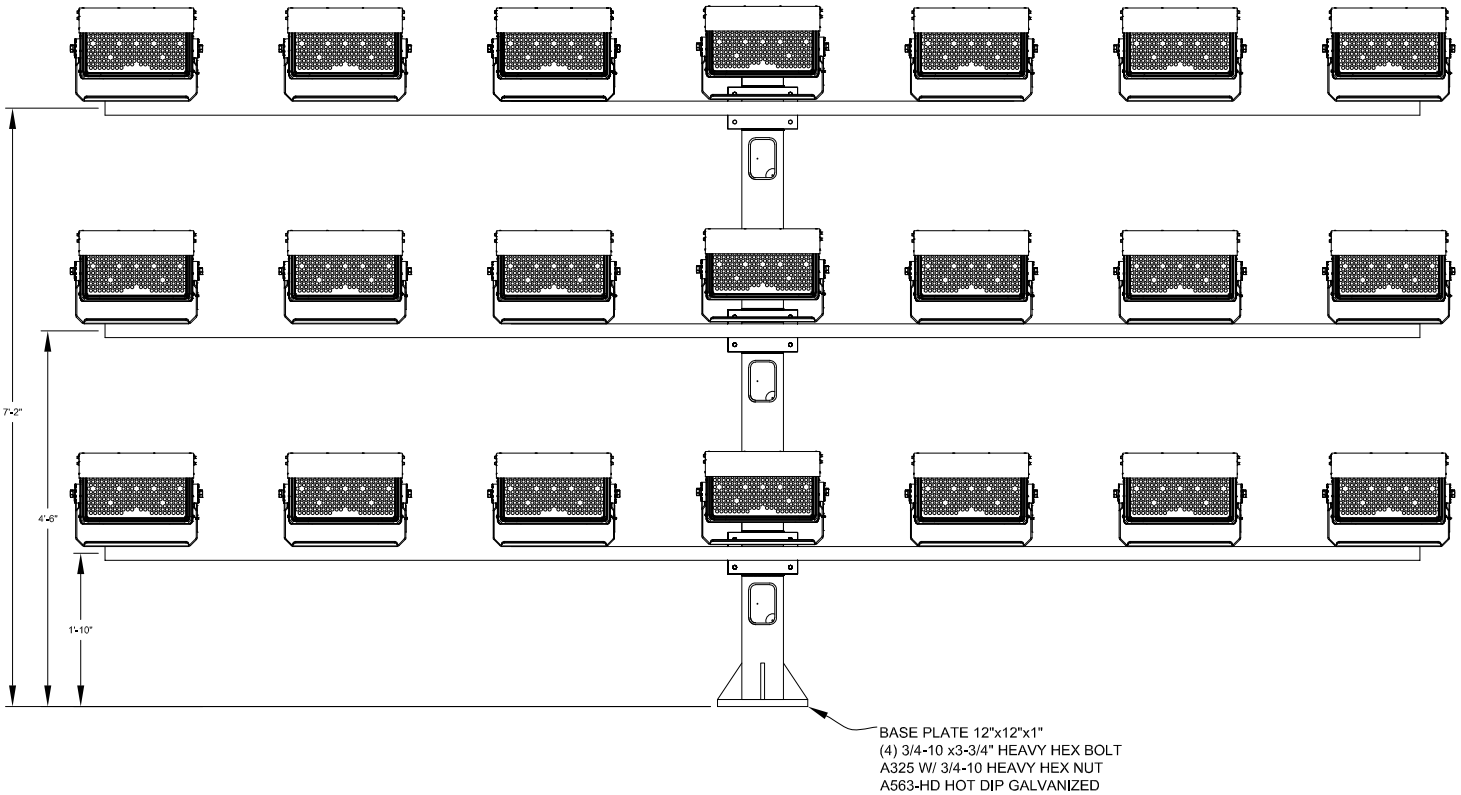
DATE:	REV.:	CHECKED BY:	20 FIXTURE CROSSARM ASSEMBLY
12/3/21			
DRAWING NUMBER: TTA 20 (CLIR)		DRAWN BY: WW	

TOP VIEW

Qty - 2



FRONT VIEW



** Hot-Dip galvanized after fabrication to ASTM A123 specifications

** NOT TO SCALE

** Assembly Weight: 1,307 lbs
Assembly EPA: 51.08 sq. ft.
(Including Fixtures)

TECHLINE SPORTS LIGHTING
POWERED BY GEOSPORT

15303 STORM DR.
AUSTIN, TX 78734
PHONE: (512)977-8880
TOLL FREE: (800)500-3161
FAX: (512)977-8882

DATE:	REV.:	CHECKED BY:	21 FIXTURE CROSSARM ASSEMBLY
12/3/21			
DRAWING NUMBER: TTA 21 (CLIR)		DRAWN BY: WW	

TECHLINE SPORTS LIGHTING

POWERED BY GEOSPORT

ELITE SERIES

CLIR 630w

Qty - 87 - (All fixtures inc our 20" Extended Visors, see last page of cut sheet)

TECHNICAL DATA

FIXTURE

TECHLINE SPORTS LIGHTING

POWERED BY GEOSPORT

ELITE SERIES
CLIR 630w

TECHNICAL DATA
SYSTEM SPECIFICATIONS

-SYSTEM WATTS: 630w

-LUMEN OUTPUT: 85,000

-kW Load: 646 watts

-EPA: 1.5

-WEIGHT: 41lbs

-CLIR Module: OM, CM, ECM

-BEAM ANGLE: N, M, W, EW

-POWER FACTOR: 0.95

-CCT: 5700K

-CRI: >70Ra

-INPUT VOLTAGE: 208-480v

-INPUT PROTECTION: 10KV Current Surge

-DRIVER: Integral, Remote

-IP RATING: IP66, IP68

-OPERATING TEMP RANGE: -40°C to +55°C

-HOUSING MATERIAL: Aluminum Powder Coated

UL LISTED

AMERICAN PRODUCT

TECHLINE SPORTS LIGHTING

POWERED BY GEOSPORT

ELITE SERIES

CLIR 630w

TECHNICAL DATA

TECHNOLOGY CHANGES PERFORMANCE

ADJUSTABLE

Adjustable CLIR™ Module for system tuning.

NO INTERFERENCE

State-of-the art circuit system which works perfectly with other systems. Ultra-low EMI noise generation eliminates electrical interference.

OPTICS

Advanced, free-form, optics designed with unique "multi-scales lenses" to create uniform light distribution and glare-reduction. Advanced materials maximize light output.

SOLID STATE DESIGN

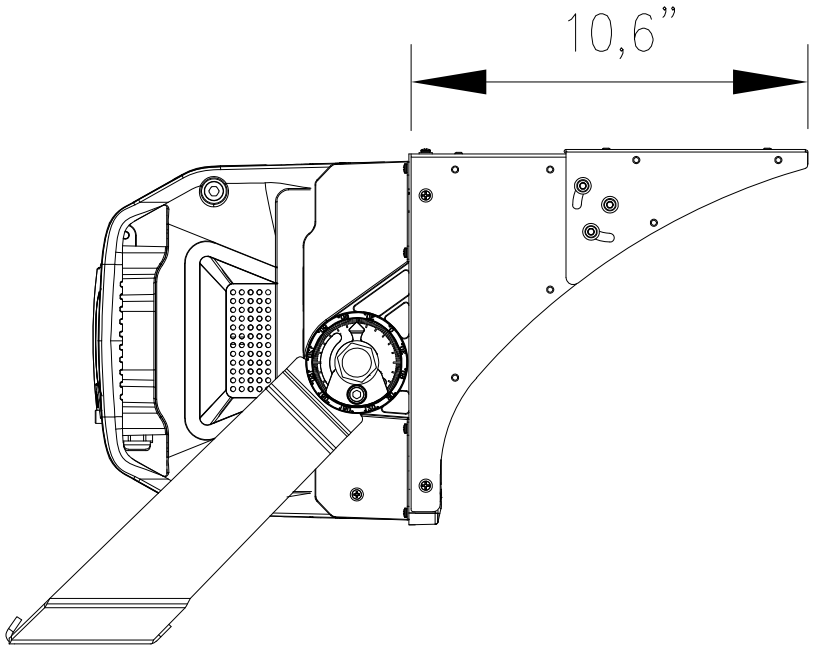
Unique "SSD" design, simple, and advanced. Ensures durability of LED chip.

All parts are individual, rugged and strong.

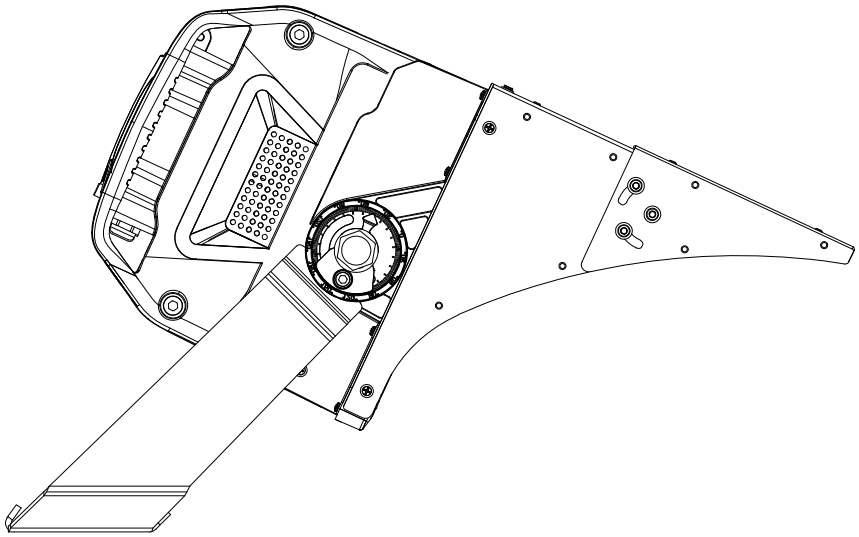
ELITE SERIES

TECHNICAL DATA

CLIR 630w - Standard Visor



Fixture Aimed 25º Below Horizontal

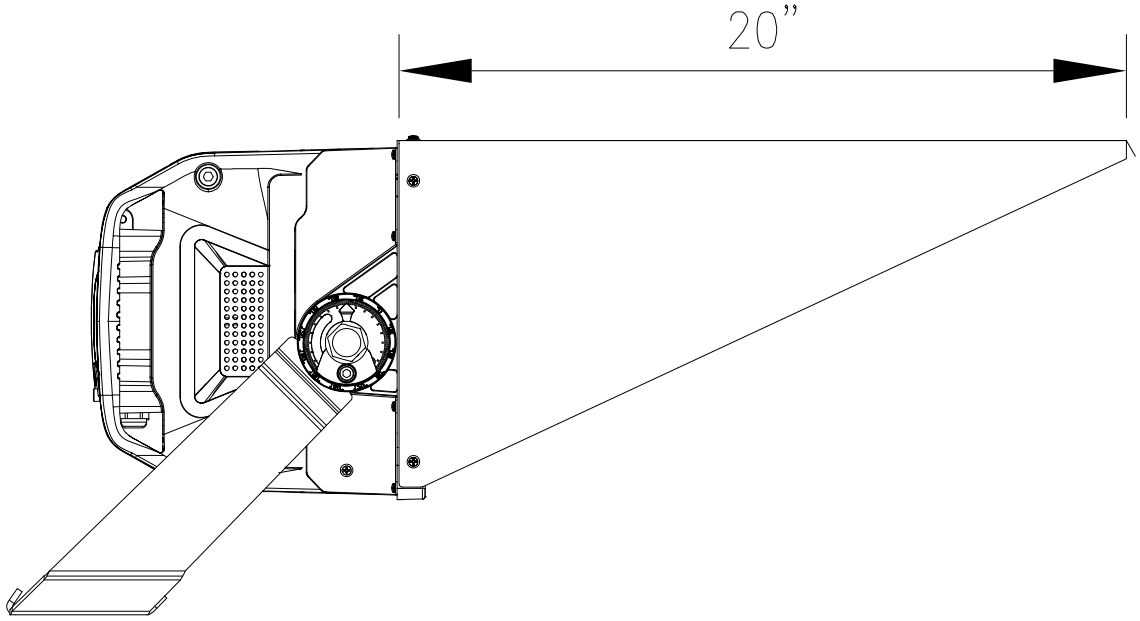


ELITE SERIES

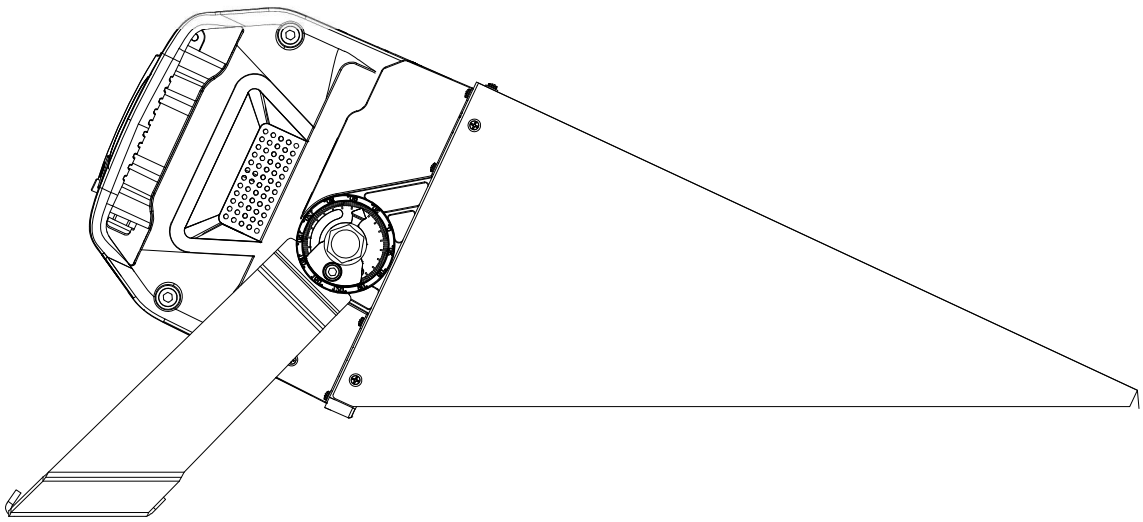
TECHNICAL DATA

CLIR 630w - Extended Visor

*SPECIAL ORDER OPTION



Fixture Aimed 25º Below Horizontal

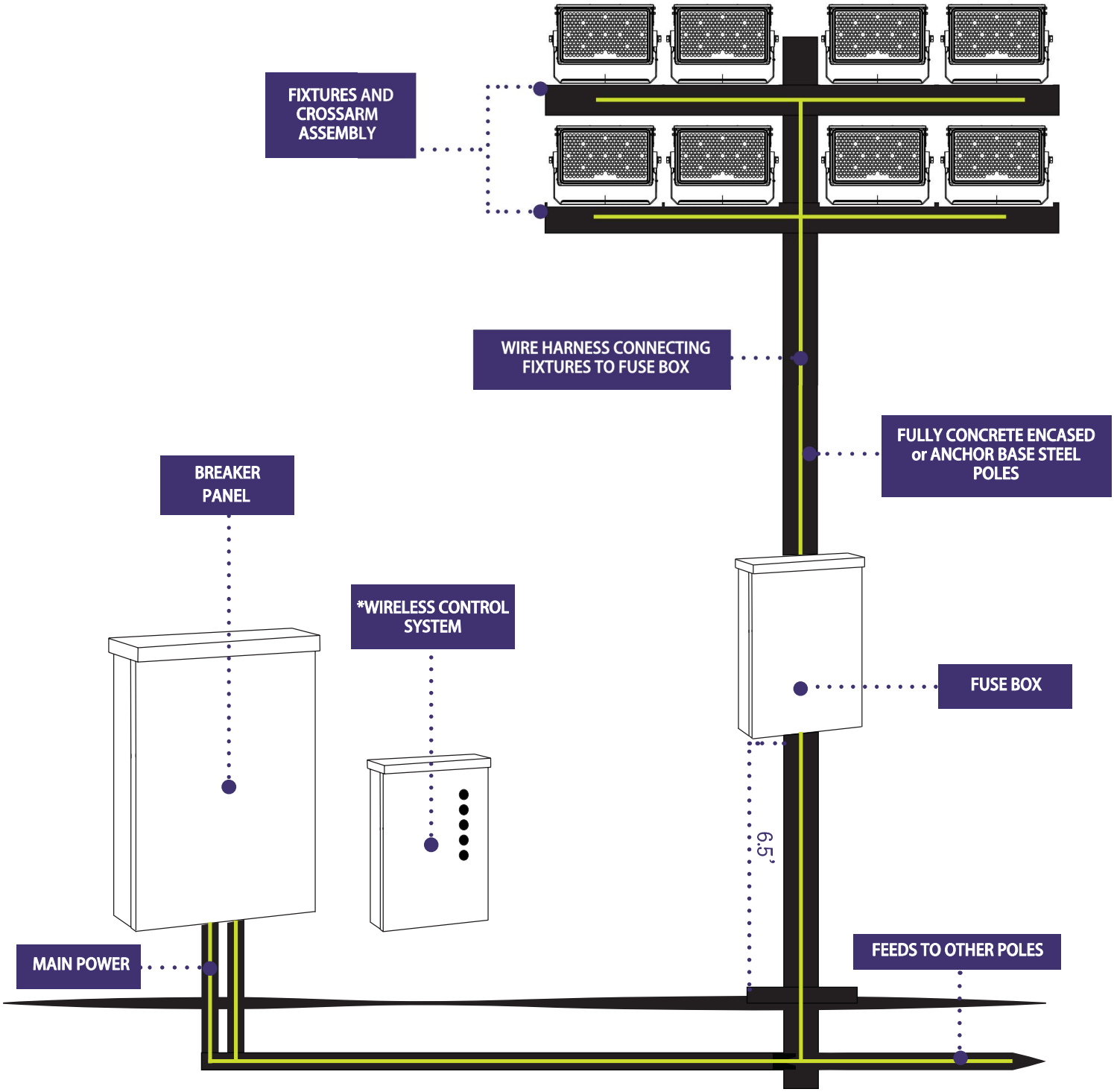


CLIR 630w

Qty - 4 - (1 ea. pole)

TECHNICAL DATA

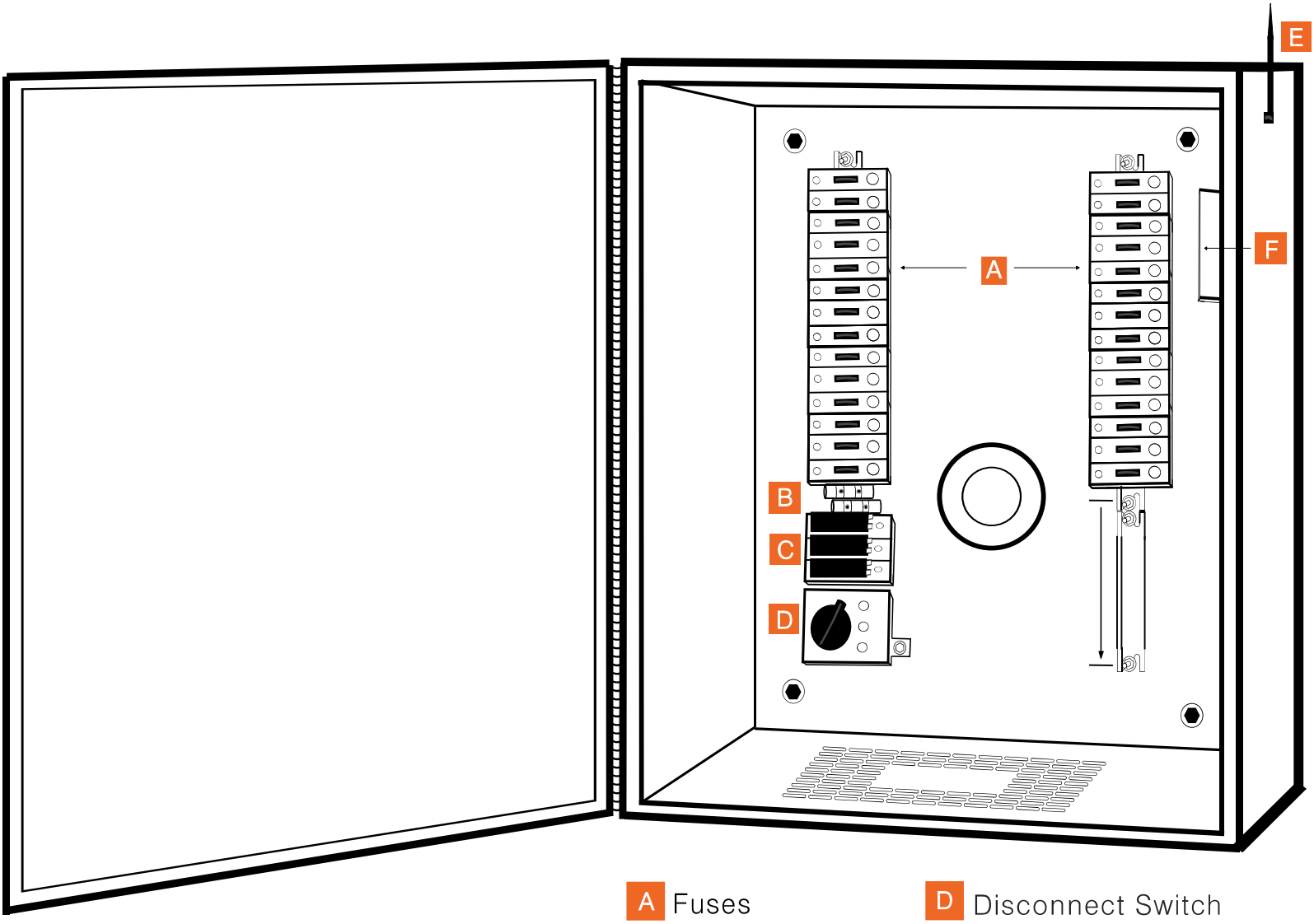
SIMPLE SYSTEM DRAWING



CLIR 630w

TECHNICAL DATA

FUSE BOX



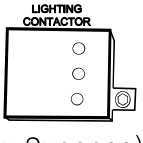
A	Fuses	D	Disconnect Switch
B	Ground Block	E	Wireless Antenna
C	Distribution Block	F	Wireless Relay (Dimming – On/Off)

Drawings do not designate fuse size, wiring, NEMA box type, distribution block information, disconnect switch size, ampacity, and surge arrester specification

Drawing depicts a typical example of a Fuse Box (control enclosure)

A customized Fuse Box will be designed for any specific required application

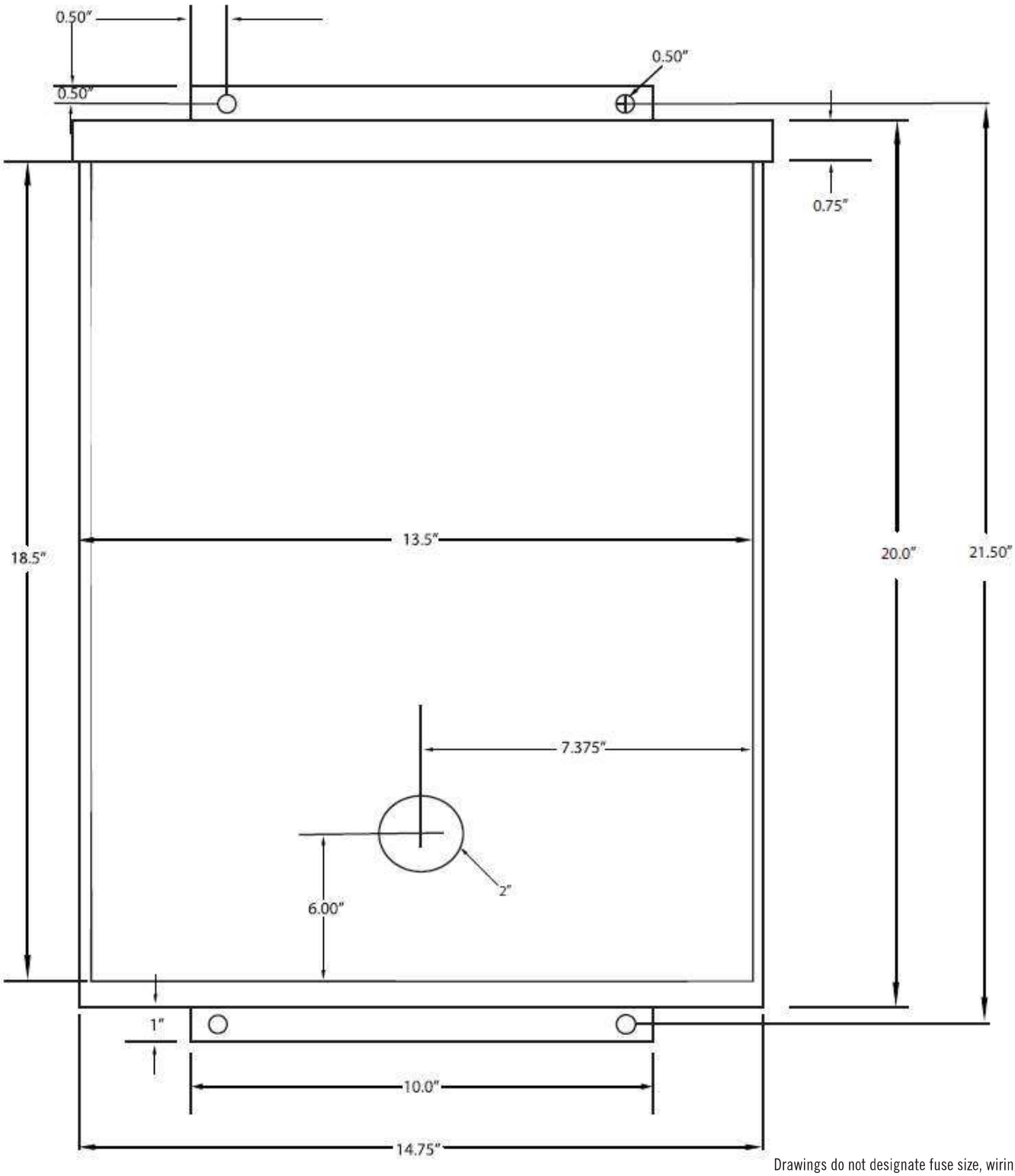
G *Alternate Control Option
(Simple ON/OFF No Dimming)



Allows Digital Contactor (AirMesh Hub by Synapse) the ability to remotely turn lights ON/OFF.
This option DOES NOT allow dimming capability.

CLIR 630w

TECHNICAL DATA
SMALL BOX

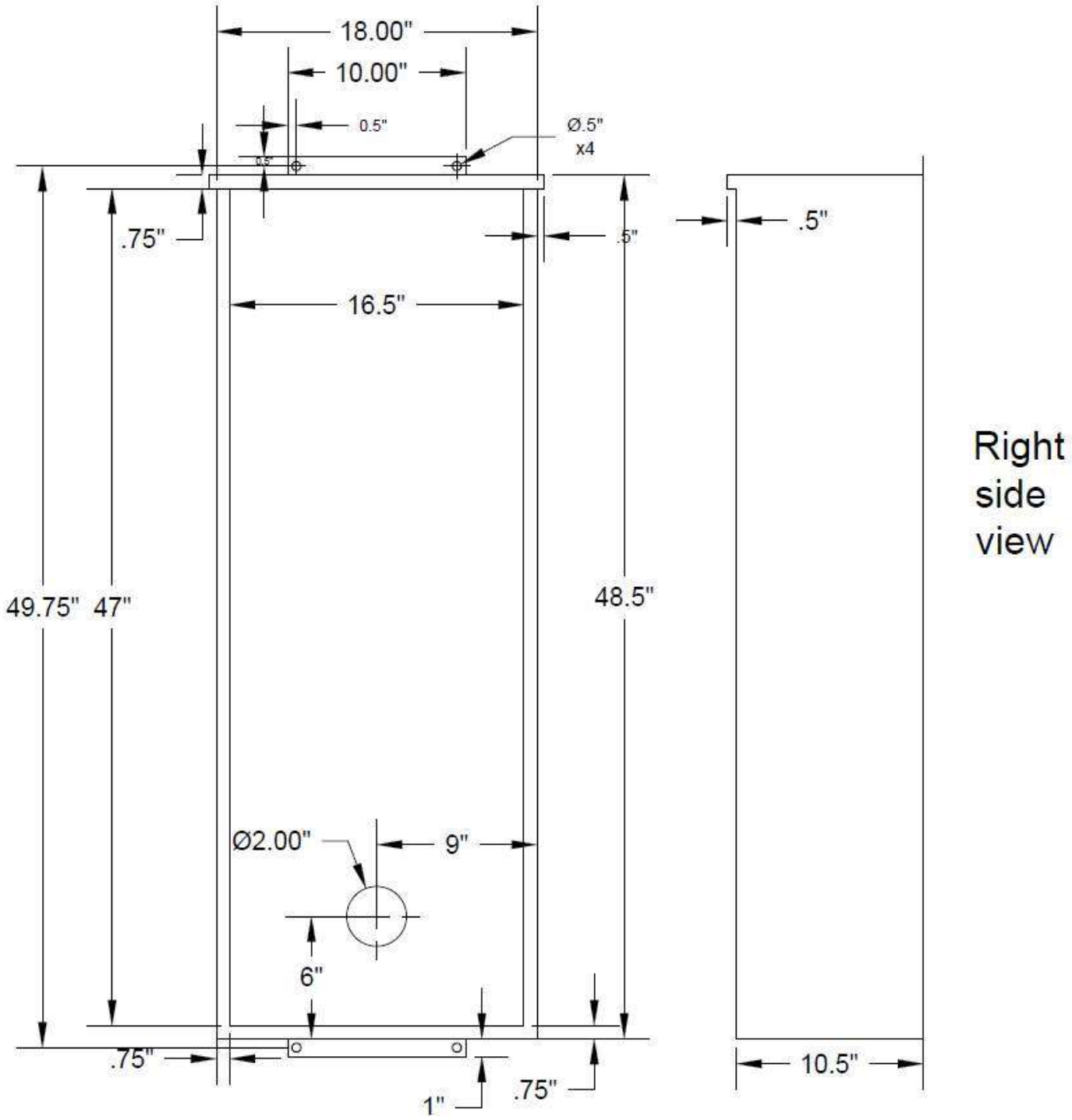


Drawings do not designate fuse size, wiring, NEMA box type, distribution block information, disconnect switch size, ampacity, and surge arrester specification.

For technical questions please contact us at 1-877-663-5968.

CLIR 630w

TECHNICAL DATA
LARGE BOX



For technical questions please contact us at 1-877-663-5968.

Drawings do not designate fuse size, wiring, NEMA box type, distribution block information, disconnect switch size, ampacity, and surge arrester specification.

TECHLINE SPORTS LIGHTING

POWERED BY GEOSPORT

CLIR 630w

TECHNICAL DATA

WIRELESS CONTROLLER

(CONTROLLER ACESSORIES)

Product Overview

The **Wireless Controller** is a SimplySNAP component that can be installed anywhere you need wireless push-button lighting control, such as municipal ballparks, hockey arenas, basketball facilities, and other multi-use complexes.

The heart of the Wireless Controller is the SS450 site controller, contained in the NEMA 4X enclosure with 5 buttons that allow for controlled manual access to site lighting.

The Wireless Controller makes it easy for electricians to quickly install the SimplySNAP site controller and enables quick and simple access to a switch station that can be programmed to meet the needs of the end-user.

Product #	Description
CBSSW-450-001 Cellular & Wi-Fi	SS450-based Model w/ 5-button switch

Features

- Allows for controlled manual access to a SimplySNAP lighting system
- Weather protected — perfect for both indoor and outdoor applications
- Optional, pre-configured 5-button switch to allow for control of all lighting within the facility
- External Ethernet port for connecting to IT network

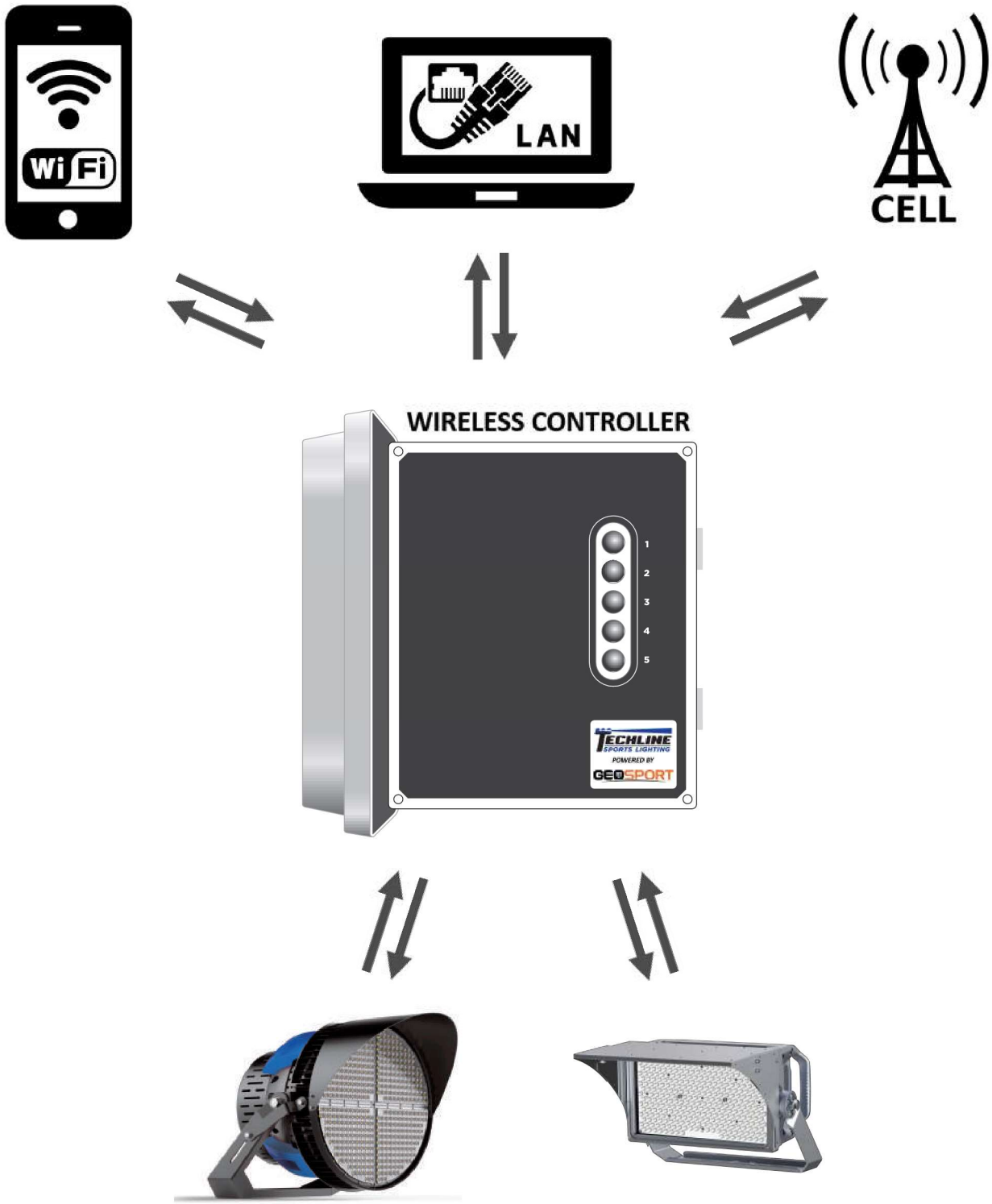
Dimensions	15.5” x 13.5” x 7.7” (393 x 342 x 195 mm)
Input Power	90-120VAC; 8W max, 6kV surge protection
Operating Environment	-20°C to +55°C, IP65
Radio	SNAP 2.4GHz 802.15.4 Wi-Fi 2.4Ghz 802.11 b/g/n
Certifications	FCC/IC; Tested to CAN/CSA C22.2 No. 60950-1/A2:2014 and UL 60950-1/R:2014-10

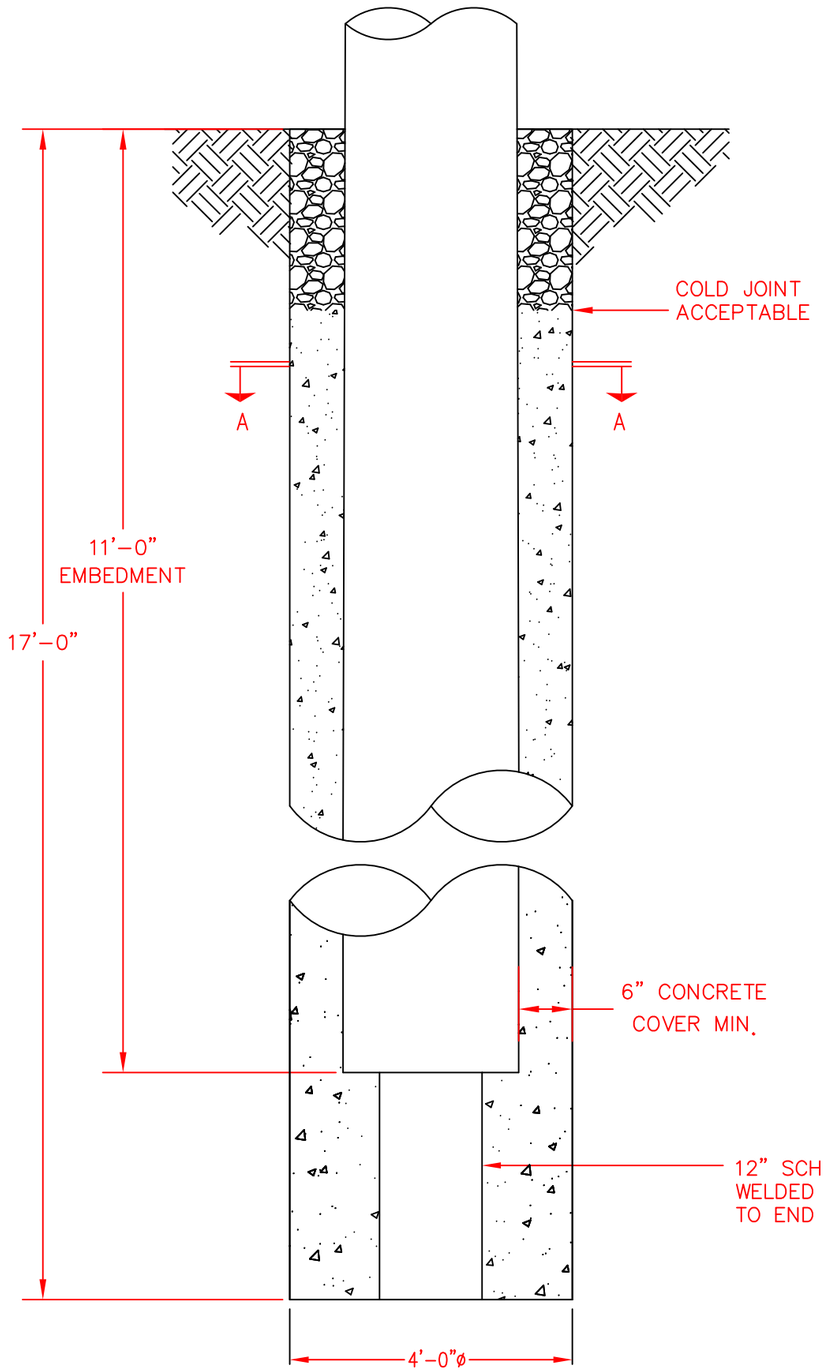
To learn more, call or visit:
synapsewireless.com
(877) 982-7888

DLC QPL LISTED

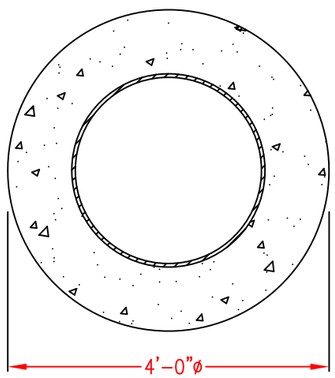
CLIR 630w

TECHNICAL DATA
WIRELESS CONTROLS





FOUNDATION



SECTION A – A

NOTES:

FOUNDATION

1. ALL CONCRETE SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. CONCRETE SHALL HAVE MAXIMUM WATER/CEMENT RATIO OF 0.5. FOUNDATION INSTALLATION SHALL BE IN ACCORDANCE WITH ACI 336, "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF DRILLED PIERS", LATEST EDITION.

2. SOIL PARAMETERS ARE BASED UPON RECOMMENDED DESIGN PARAMETERS FROM GEOTECHNICAL REPORT BY THE MURILLO COMPANY, DATED JUNE 2021. REFER TO PAGE 2 OF 14 FOR SOIL PARAMETERS USED IN THE DESIGN. UPON CONSTRUCTION, IF SOIL PARAMETERS DO NOT MEET OR EXCEED THOSE CONTAINED HEREIN, DO NOT SET POLES AND CONTACT DESIGNER IMMEDIATELY.

3. FOUNDATION IS DESIGNED TO SUPPORT THE FOLLOWING LOADS:
AXIAL: 4.10 K
SHEAR: 3.40 K
MOMENT: 220.00 K-FT

4. GROUND SLOPE WAS ASSUMED TO NOT EXCEED 7H 1V. IF ACTUAL CONDITIONS VARY FROM THIS ASSUMPTION, PLEASE CONTACT ENGINEER BEFORE CONSTRUCTION.

5. TOP 2' OF FOUNDATION MAY BE FILLED WITH GRAVEL OR CONCRETE.

04/25/2022

LACH ENGINEERING, LLC.
539 SILICON DR.
STE. 100
SOUTHLAKE, TX, 76092
(817) 416-9999
www.lachengineering.com

Project Name

TECHLINE SPORTS LIGHTING, LLC.
#21-3767
ARBORETUM PARK
SUGARLAND, TEXAS
CRICKET FIELD
68' LIGHTING POLE FOUNDATION
POLES: P1-P4
LOADING: 57.38 SQ. FT. EPA / 1721.40 LBS

Stamp

STATE OF TEXAS
THOMAS S. LACH
96234
LICENSED PROFESSIONAL ENGINEER

Lach Engineering, LLC
#F-11487

Project Information

Project Number: 9063

Date: 04/25/2022

Sheet Information

Sheet Name: 9063-1

Drawing Scale: NTS

Drawn By: NHT

Sheet

S - 1

OF 1

Dimensional Solutions	**Shaft3D 2019**	**Product Version**	**21.2.2606.401**	**Date**	**4/25/2022 6:18:17 PM**
Workspace Name	**9063-1**				
Designed By	**NHT**	**Checked By:**	**TSL**		
File Path					

REPORT - 9063-1

PROJECT INFORMATION

Client Name:	TECHLINE SPORTS LIGHTING, LLC.
Project Name:	68' LIGHTING POLE FOUNDATION (POLES: P1-P4)
Project Number:	9063-1

DESIGN CODE ACI_318_2014 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength	3000	psi
Unit Weight	150	pcf

SOIL PARAMETERS:

Unit Weight	120	pcf
Soil Type	Cohesive	
Soil Subtype	Clay	
Ultimate Cohesion c	0.5	ksf
Ultimate Adhesion Ad	1	ksf
Passive Pressure Coefficient Ppc	2	
Angle of Internal Friction	0	
Modulus of Subgrade Reaction Method	Constant	
Constant Modulus	95	kcf
Coefficient A	0	
Coefficient B	0	
Coefficient n	0	
Allowable Increase In Soil Pressure		
Dead	0	
Live	0	
Wind	0	
Earthquake	0	
Erec	0	
Oper	0	
Test	0	

Axial Capacity Parameters

Shaft Type	Drilled	
Boundary Condition	Trans & Rot at Top	
Axial Capacity Method	Use Soil Parameters	
Tip Cohesion	0.5	ksf
Tip Angle of Internal Friction	0	
Tip Soil Unit Weight	120	pcf
Consider End Bearing	True	
Percent End Bearing	100	
Consider Skin Resistance	True	
Percent Skin Resistance	100	
Safety Factor - End Bearing	2	
Safety Factor - Skin Resistance	2	
Safety Factor - Pullout	2	
Safety Factor - Cohesion	2	

BUOYANCY CRITERIA:

Consider Buoyancy:	No	
Water Table Below Grade	27	ft

Soil Profile

No.	Name	Depth	Soil Type	Cohesion	Angle of Int Friction	Unit Weight	Subgrade Modulus	Alpha Factor	Beta Factor	Blow Count
		ft		ksf		pcf	kcf			
1	L1	17	Clay	0.5	0	120	95	0	0	0
2	L2	23	Sand	0	32	65	55	0	0	0

Shaft Geometry

Shaft Name	S	
Design Type	Concrete Drilled Shaft	
Shape Factor	1	
Grade Elevation	0	ft
Diameter	4	ft
Top Above Grade	0	ft
Neglected Soil Resistance Zone Length	3	ft
Length Below Neglected Soil Resistance	14	ft
Bell Diameter	0	ft
Bell Length	0	ft
Casing Length	0	ft
Consider Type Dependent Moment of I	True	
Moment of Inertia	12.5663706	ft^4

LOAD ELEMENT GEOMETRY AND APPLIED LOADS

Shaft Element - S - Load Element - S

Geometry	Shape	X Dim	Z Dim	Length	Offset - X	Offset - Z	Min Reinft Ratio
		ft	ft	ft	ft	ft	
	Circle	4	4	17	0	0	0.01

Load Case	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - Dead	4.1	0	0	0	0
2 - Live	0	0	0	0	0
3 - Wind	0	3.4	220	0	0
4 - Earthquake	0	0	0	0	0

ALLOWABLE LOAD COMBINATIONS

Shaft Element - S - Load Element - S

Load Combination	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - Dead	4.1	0	0	0	0
2 - Dead + Wind	4.1	3.4	220	0	0
3 - 0.6 Dead + Wind	2.46	3.4	220	0	0

ULTIMATE LOAD COMBINATIONS

Shaft Element - S - Load Element - S

Load Combination	Axial Load	Shear-X	Mom-Z	Shear-Z	Mom-X
	kips	kips	kip-ft	kips	kip-ft
1 - 1.4 Dead	5.74	0	0	0	0
2 - 1.2 Dead + 1.6 Wind	4.92	5.44	352	0	0
3 - 1.2 Dead + 0.8 Wind	4.92	2.72	176	0	0
4 - 0.9 Dead + 1.6 Wind	3.69	5.44	352	0	0

Shaft Element - S

SELF WEIGHTS AND APPLIED EXTERNAL LOAD - Allowable Load Combinations

Load Combination	Load Element Weight kips	Soil Weight kips	Footing Weight kips	App Axial Load kips	Total Axial Load kips	Buoyant Load kips
1 - Dead	32.0442	0	0	4.1	36.1442	
2 - Dead + Wind	32.0442	0	0	4.1	36.1442	
3 - 0.6 Dead + Wind	32.0442	0	0	2.46	34.5042	

Base Shears and Moments - Allowable Load Combinations

Load Combination	Shear-X kips	Mom-Z kip-ft	Shear-Z kips	Mom-X kip-ft
1 - Dead	0	0	0	0
2 - Dead + Wind	3.4	277.8	0	0
3 - 0.6 Dead + Wind	3.4	277.8	0	0

SELF WEIGHTS AND APPLIED EXTERNAL LOAD - Ultimate Load Combinations

Load Combination	Load Element Weight kips	Soil Weight kips	Footing Weight kips	App Axial Load kips	Total Axial Load kips	Buoyant Load kips
1 - 1.4 Dead	44.8619	0	0	5.74	50.6019	
2 - 1.2 Dead + 1.6 Wind	38.4531	0	0	4.92	43.3731	
3 - 1.2 Dead + 0.8 Wind	38.4531	0	0	4.92	43.3731	
4 - 0.9 Dead + 1.6 Wind	38.4531	0	0	3.69	42.1431	

Base Shears and Moments - Ultimate Load Combinations

Load Combination	Shear-X kips	Mom-Z kip-ft	Shear-Z kips	Mom-X kip-ft
1 - 1.4 Dead	0	0	0	0
2 - 1.2 Dead + 1.6 Wind	5.44	444.48	0	0
3 - 1.2 Dead + 0.8 Wind	2.72	222.24	0	0
4 - 0.9 Dead + 1.6 Wind	5.44	444.48	0	0

Axial Capacity - Allowable Load Combinations

Shaft Element - S

Load Combination	App Axial Load kips	All Axial Load kips	Net Uplift Load kips	All Pullout Load kips	Vertical Settlement in	Max Bear Pressure ksf	All Bearing Pressure ksf
1 - Dead	4.1	50.7942	0	-56.292	0.4603	0	2.1125
2 - Dead + Wind	4.1	50.7942	0	-56.292	0.4603	0	2.1125
3 - 0.6 Dead + Wind	2.46	50.7942	0	-56.292	0.4234	0	2.1125

Rigid Analysis - Ultimate Load Combinations

Shaft Element - S

Load Combination	Max Mom Location ft	Max Mom Value kip-ft	Crossover Location ft
1 - 1.4 Dead	0	0	17
2 - 1.2 Dead + 1.6 Wind	4.4373	372.3481	15.5867
3 - 1.2 Dead + 0.8 Wind	3.7513	185.1988	12.1974
4 - 0.9 Dead + 1.6 Wind	4.4373	372.3481	15.5867

Finite Element Analysis - Deflections - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Deflections - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ft	ft	ft
1	0.0000	0.0000	0.0203	0.0203
2	3.0000	0.0000	0.0135	0.0135
3	3.4375	0.0000	0.0125	0.0125
4	3.8750	0.0000	0.0116	0.0116
5	4.3125	0.0000	0.0106	0.0106
6	4.7500	0.0000	0.0097	0.0097
7	5.6250	0.0000	0.0078	0.0078
8	6.5000	0.0000	0.0060	0.0060
9	7.3750	0.0000	0.0042	0.0042
10	8.2500	0.0000	0.0024	0.0024
11	9.1250	0.0000	0.0006	0.0006
12	10.0000	0.0000	-0.0012	-0.0012
13	11.7500	0.0000	-0.0047	-0.0047
14	13.5000	0.0000	-0.0082	-0.0082
15	15.2500	0.0000	-0.0116	-0.0116
16	17.0000	0.0000	-0.0150	-0.0150

Finite Element Analysis - Deflections - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ft	ft	ft
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Deflections - Ultimate Load Combinations

LC #1 : 1.4 Dead

LC #2 : 1.2 Dead + 1.6 Wind

LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Deflections - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ft	ft	ft	ft
1	0.0000	0.0000	0.0325	0.0162	0.0325
2	3.0000	0.0000	0.0216	0.0108	0.0216
3	3.4375	0.0000	0.0201	0.0100	0.0201
4	3.8750	0.0000	0.0185	0.0093	0.0185
5	4.3125	0.0000	0.0170	0.0085	0.0170
6	4.7500	0.0000	0.0155	0.0078	0.0155
7	5.6250	0.0000	0.0125	0.0063	0.0125
8	6.5000	0.0000	0.0096	0.0048	0.0096
9	7.3750	0.0000	0.0067	0.0033	0.0067
10	8.2500	0.0000	0.0038	0.0019	0.0038
11	9.1250	0.0000	0.0009	0.0005	0.0009
12	10.0000	0.0000	-0.0019	-0.0010	-0.0019
13	11.7500	0.0000	-0.0075	-0.0037	-0.0075
14	13.5000	0.0000	-0.0130	-0.0065	-0.0130
15	15.2500	0.0000	-0.0186	-0.0093	-0.0186
16	17.0000	0.0000	-0.0241	-0.0120	-0.0241

Finite Element Analysis - Deflections - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ft	ft	ft	ft
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Soil Pressure - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Soil Pressure - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	1.2824	1.2824
3	3.4375	0.0000	1.1910	1.1910
4	3.8750	0.0000	1.1002	1.1002
5	4.3125	0.0000	1.0100	1.0100
6	4.7500	0.0000	0.9205	0.9205
7	5.6250	0.0000	0.7432	0.7432
8	6.5000	0.0000	0.5682	0.5682
9	7.3750	0.0000	0.3953	0.3953
10	8.2500	0.0000	0.2243	0.2243
11	9.1250	0.0000	0.0550	0.0550
12	10.0000	0.0000	-0.1129	-0.1129
13	11.7500	0.0000	-0.4453	-0.4453
14	13.5000	0.0000	-0.7746	-0.7746
15	15.2500	0.0000	-1.1023	-1.1023
16	17.0000	0.0000	-1.4295	-1.4295

Finite Element Analysis - Soil Pressure - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Soil Pressure - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Soil Pressure - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ksf	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	2.0519	1.0260	2.0519
3	3.4375	0.0000	1.9056	0.9528	1.9056
4	3.8750	0.0000	1.7603	0.8801	1.7603
5	4.3125	0.0000	1.6160	0.8080	1.6160
6	4.7500	0.0000	1.4728	0.7364	1.4728
7	5.6250	0.0000	1.1891	0.5946	1.1891
8	6.5000	0.0000	0.9091	0.4546	0.9091
9	7.3750	0.0000	0.6325	0.3163	0.6325
10	8.2500	0.0000	0.3589	0.1795	0.3589
11	9.1250	0.0000	0.0880	0.0440	0.0880
12	10.0000	0.0000	-0.1807	-0.0903	-0.1807
13	11.7500	0.0000	-0.7125	-0.3562	-0.7125
14	13.5000	0.0000	-1.2393	-0.6197	-1.2393
15	15.2500	0.0000	-1.7637	-0.8818	-1.7637
16	17.0000	0.0000	-2.2872	-1.1436	-2.2872

Finite Element Analysis - Soil Pressure - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	ksf	ksf	ksf	ksf
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Shear Forces - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Shear Forces - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	kips	kips	kips
1	0.0000	0.0000	-3.4000	-3.4000
2	3.0000	0.0000	0.4549	0.4549
3	3.4375	0.0000	6.7068	6.7068
4	3.8750	0.0000	8.7910	8.7910
5	4.3125	0.0000	10.7163	10.7163
6	4.7500	0.0000	12.4838	12.4838
7	5.6250	0.0000	14.9001	14.9001
8	6.5000	0.0000	17.5013	17.5013
9	7.3750	0.0000	19.4900	19.4900
10	8.2500	0.0000	20.8737	20.8737
11	9.1250	0.0000	21.6588	21.6588
12	10.0000	0.0000	21.8512	21.8512
13	11.7500	0.0000	21.2585	21.2585
14	13.5000	0.0000	18.1414	18.1414
15	15.2500	0.0000	12.7193	12.7193
16	17.0000	0.0000	5.0032	5.0032

Finite Element Analysis - Shear Forces - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3
	ft	kips	kips	kips
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Shear Forces - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Shear Forces - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kips	kips	kips	kips
1	0.0000	0.0000	-5.4400	-2.7200	-5.4400
2	3.0000	0.0000	0.7278	0.3639	0.7278
3	3.4375	0.0000	10.7308	5.3654	10.7308
4	3.8750	0.0000	14.0656	7.0328	14.0656
5	4.3125	0.0000	17.1461	8.5730	17.1461
6	4.7500	0.0000	19.9741	9.9871	19.9741
7	5.6250	0.0000	23.8401	11.9201	23.8401
8	6.5000	0.0000	28.0021	14.0010	28.0021
9	7.3750	0.0000	31.1841	15.5920	31.1841
10	8.2500	0.0000	33.3979	16.6989	33.3979
11	9.1250	0.0000	34.6541	17.3270	34.6541
12	10.0000	0.0000	34.9620	17.4810	34.9620
13	11.7500	0.0000	34.0136	17.0068	34.0136
14	13.5000	0.0000	29.0263	14.5132	29.0263
15	15.2500	0.0000	20.3510	10.1755	20.3510
16	17.0000	0.0000	8.0051	4.0026	8.0051

Finite Element Analysis - Shear Forces - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kips	kips	kips	kips
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Allowable Load Combinations

LC #1 : Dead

LC #2 : Dead + Wind

Finite Element Analysis - Bending Moments - X Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth ft	LC #1 kip-ft	LC #2 kip-ft	LC #3 kip-ft
1	0.0000	0.0000	-220.0000	-220.0000
2	3.0000	0.0000	-218.6354	-218.6354
3	3.4375	0.0000	-215.7012	-215.7012
4	3.8750	0.0000	-211.8551	-211.8551
5	4.3125	0.0000	-207.1667	-207.1667
6	4.7500	0.0000	-201.7051	-201.7051
7	5.6250	0.0000	-188.6675	-188.6675
8	6.5000	0.0000	-173.3539	-173.3539
9	7.3750	0.0000	-156.3001	-156.3001
10	8.2500	0.0000	-138.0356	-138.0356
11	9.1250	0.0000	-119.0842	-119.0842
12	10.0000	0.0000	-99.9643	-99.9643
13	11.7500	0.0000	-62.7620	-62.7620
14	13.5000	0.0000	-31.0145	-31.0145
15	15.2500	0.0000	-8.7556	-8.7556
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Z Dir - Allowable Load Combinations

Shaft Element - S

Node No	Depth ft	LC #1 kip-ft	LC #2 kip-ft	LC #3 kip-ft
1	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Ultimate Load Combinations

LC #1 : 1.4 Dead
LC #2 : 1.2 Dead + 1.6 Wind
LC #3 : 1.2 Dead + 0.8 Wind

Finite Element Analysis - Bending Moments - X Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kip-ft	kip-ft	kip-ft	kip-ft
1	0.0000	0.0000	-352.0000	-176.0000	-352.0000
2	3.0000	0.0000	-349.8166	-174.9083	-349.8166
3	3.4375	0.0000	-345.1219	-172.5610	-345.1219
4	3.8750	0.0000	-338.9682	-169.4841	-338.9682
5	4.3125	0.0000	-331.4668	-165.7334	-331.4668
6	4.7500	0.0000	-322.7281	-161.3641	-322.7281
7	5.6250	0.0000	-301.8680	-150.9340	-301.8680
8	6.5000	0.0000	-277.3662	-138.6831	-277.3662
9	7.3750	0.0000	-250.0801	-125.0401	-250.0801
10	8.2500	0.0000	-220.8570	-110.4285	-220.8570
11	9.1250	0.0000	-190.5347	-95.2673	-190.5347
12	10.0000	0.0000	-159.9429	-79.9715	-159.9429
13	11.7500	0.0000	-100.4192	-50.2096	-100.4192
14	13.5000	0.0000	-49.6232	-24.8116	-49.6232
15	15.2500	0.0000	-14.0090	-7.0045	-14.0090
16	17.0000	0.0000	0.0000	0.0000	0.0000

Finite Element Analysis - Bending Moments - Z Dir - Ultimate Load Combinations

Shaft Element - S

Node No	Depth	LC #1	LC #2	LC #3	LC #4
	ft	kip-ft	kip-ft	kip-ft	kip-ft
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	3.0000	0.0000	0.0000	0.0000	0.0000
3	3.4375	0.0000	0.0000	0.0000	0.0000
4	3.8750	0.0000	0.0000	0.0000	0.0000
5	4.3125	0.0000	0.0000	0.0000	0.0000
6	4.7500	0.0000	0.0000	0.0000	0.0000
7	5.6250	0.0000	0.0000	0.0000	0.0000
8	6.5000	0.0000	0.0000	0.0000	0.0000
9	7.3750	0.0000	0.0000	0.0000	0.0000
10	8.2500	0.0000	0.0000	0.0000	0.0000
11	9.1250	0.0000	0.0000	0.0000	0.0000
12	10.0000	0.0000	0.0000	0.0000	0.0000
13	11.7500	0.0000	0.0000	0.0000	0.0000
14	13.5000	0.0000	0.0000	0.0000	0.0000
15	15.2500	0.0000	0.0000	0.0000	0.0000
16	17.0000	0.0000	0.0000	0.0000	0.0000

PIER DESIGN - Ultimate Load Combinations

Modulus of Elasticity of Concrete - Section 19.2
Concrete Stress Distribution - Section 22.2.2
Design Axial Strength - Section 22.4

Shaft Element - S

Load Element - S

Geometry

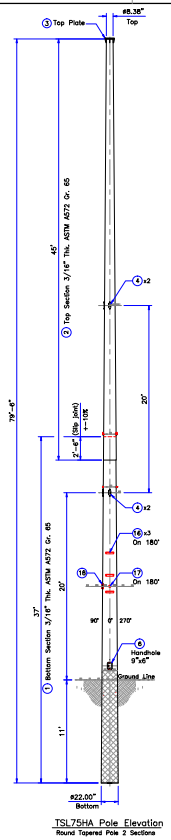
Shape	Circle	
X Dim	4	ft
Z Dim	4	ft
Height	17	ft
Offset - X	0	ft
Offset - Z	0	ft

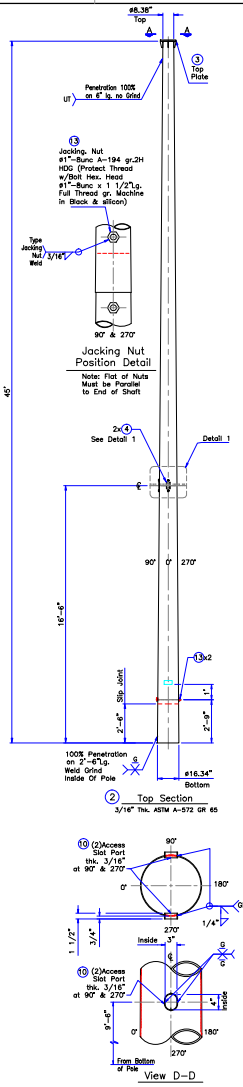
Pier Concrete Capacity

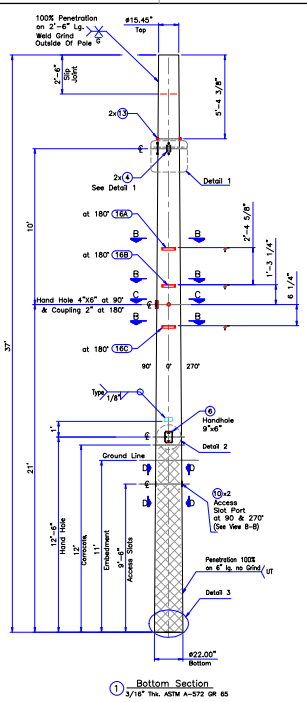
Load Combination	Applied Axial Load Load kips	Allowable Axial Load Load kips	Applied Moment Resultant kip-ft	Allowable Moment Resultant kip-ft	Capacity Ratio
1 - 1.4 Dead	5.74	1933.3055	0	0.1933	336.8128
2 - 1.2 Dead + 1.6 Wind	4.92	21.2841	372.3481	1610.7947	4.326
3 - 1.2 Dead + 0.8 Wind	4.92	43.4357	185.1988	1635.0093	8.8284
4 - 0.9 Dead + 1.6 Wind	3.69	15.9279	372.3481	1607.2378	4.3165

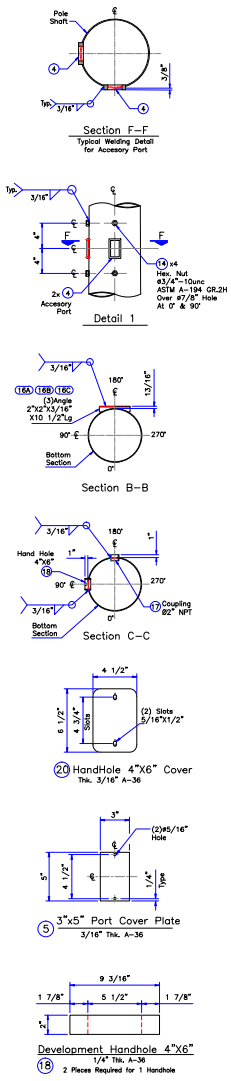
Qty - 4

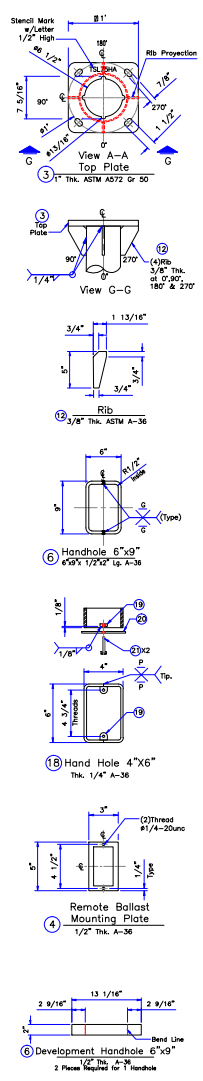
FABRICATION PLAN F73-01

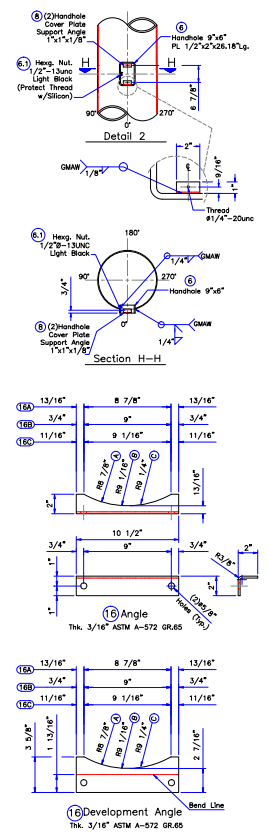












BILL OF MATERIAL							
MARK	QTY.	DESCRIPTION	BOTTOM DIA. INCH	TOP DIA. INCH	PLATE THK. INCH	UNIT WEIGHT LBS.	TOTAL WEIGHT LBS.
1	1	BOTTOM SECTION, PL 1480x1127MM 3/16" THK. A572 GR.65	22.00"	15.45"	3/16"	1400	1400.00
2	1	TOP SECTION, PL 972x1371MM 3/16" THK. A572 GR.65	16.34"	8.38"	3/16"	124.30	124.30
3	1	TOP PLATE 12"x12"x1" THK.			1"	39.44	39.44
4	4	REMOTE BALLAST MOUNTING PLATE 5"x3" 1/2" THK. A-36			1/2"	1.078	4.31
5	4	3"x5" PORT COVER PLATE 3/16" THK A-36			3/16"	0.81	3.24
6	1	9"x6" HANDHOLE RING, PL 1/2"x2"x26.18"Lg. A-36				7.39	7.39
6.1	1	HEXAGONAL NUT #1/2"-13unc Light BLACK				0.31	0.31
7	1	9"x6" HANDHOLE COVER PLATE 3/16" THK. A-36			3/16"	2.88	2.88
8	2	ANGLE 1"x1/8"x2"LG.				0.13	0.26
9	1	BEARING PLATE PL 6"x30" A-36			1"	16.65	16.65
10	2	ACCESS SLOT PORT 4 3/8"X3 3/8"X1 1/2" A-36			3/16"	1.01	2.02
11	1	I.D. PLATE 2 1/2" X 4 1/2"			3/16"	0.60	0.60
11.1	1	I.D. PLATE 1 3/4" X 4 1/2"			3/16"	0.42	0.42
12	4	RIB ASTM A-36			3/8"	0.68	2.72
13	4	HEXG. NUT #1"-8UNC GR.2H HDG				.92	3.68
14	8	HEXAG. NUT ø3/4"-10unc ASTM A-572 GR.2H HDG				0.41	3.28
16	3	ANGLE ASTM A-572 GR.65			3/16"	2.25	6.75
17	1	COUPLING Ø2" NPT W/INTERNAL THREAD				0.46	0.46
18	1	HAND HOLE 4"X6"			1/4"	2.64	2.64
19	2	HAND HOLE TAB			3/16"	0.03	0.06
20	1	HAND HOLE COVER			3/16"	1.54	1.54
21	12	HEXG. HEAD BOLT 1/4"-20UNC X 1 1/2"LG FULL THREAD GR. MACHINE ELECTROLYTIC GALVANIZED (FOR HAND HOLE COVERS)				0.03	0.36
					T. WEIGHT LBS 1 PIECE		2023.31

GENERAL TOLERANCES

Bucling:
1. From 21' to 30' lg= 1/4" Max.
2. From 41' to 50' lg= 1/2" Max
Rounding:
1. Diameter: +- 1 /16"
2. Oval: +-1/16" to be Measured on 0° & 180°
Base Plate:
1. Outside Dimensions: +- 1/4"
2. Length Between Holes: +- 1/8"
3. Hole Circle= +- 1/8"
4. Diameter Made by CNC: -0 + 1/8"
Accessories:
1. Nuts Location: + - 1/8"
2. Length Between Nuts: + - 1/8"
3. Hand Holes Location: + - 1/8"
Slip Joint:
1. Slip Joint: +- 10%
Pole Length:
1. Length of Each Section: + 1" - 1/2"

GENERAL NOTES

1. DIMENSIONS IN MILLIMETERS AND INCHES UNLESS OTHERWISE SPECIFIED
2. HOT DIP GALVANIZED.
3. USE THIS FABRICATION DRAWING IN CONJUCTION WITH DRAWINGS INDICATED AS REFERENCE.
4. ALL DIMENSIONS GOVERN OVER DRAWING SCALE, DO NOT SCALE.

TECHLINE SPORTS LIGHTING

ROUND TAPERED POLE 2 SECTIONS
TYPE TSL75HA

REVISIONS				
REV.	DESCRIPTION	DATE	BY	REV

CUSTOMER:

	NAME	DATE
DRAW:	RMP	JUL/19
CHECKED:	NAVEJAR	JUL/19
APPD:	NAVEJAR	JUL/19

TITLE: ASSEMBLY DRAWING & FABRICATION DETAILS

ORDER: QTY: CATALOGUE: TSL75HA

DRAWING No. : 10774-PTDA5-001 ITEM: REV.

SHEET 1 OF 1

EXHIBIT B

COUNTY PURCHASING AGENT

Fort Bend County, Texas

Jaime Kovar
County Purchasing Agent

(281) 341-8640
Fax (281) 341-8645

April 19, 2022

TO: All Prospective Bidders

RE: Addendum No. 1 – Fort Bend County RFP 22-069 – Construction of Arboretum Cricket Complex for Fort Bend County

Addendum 1:

Attached is Addendum 1. Vendors are to utilize Addendum 1 when returning their bid response. Changes are to scope of work under Section 1.0 to remove LED scoreboard.

****

Immediately upon your receipt of this addendum, please fill out the following information and email this page to Brooke Lindemann at brooke.lindemann@fortbendcountytx.gov

_____

Company Name

_____

Signature of person receiving addendum Date

If you have any questions, please contact this office.

Sincerely,

Brooke Lindemann
Senior Buyer

**Amended 04/19/22*

Fort Bend County, Texas
Request for Proposals

Construction of Arboretum Cricket Complex for Fort Bend County
RFP 22-069

SUBMIT PROPOSALS TO:

Fort Bend County
Purchasing Department
Travis Annex
301 Jackson, Suite 201
Richmond, TX 77469

****NOTE:**
All correspondence must include the term "Purchasing Department" in address to assist in proper delivery

SUBMIT NO LATER THAN:

Tuesday, April 26, 2022
2:00 PM (Central)

MARK ENVELOPE:

RFP 22-069
Arboretum Cricket Complex

ALL SUBMITTALS MUST BE RECEIVED AND TIME/DATE STAMPED BY THE PURCHASING OFFICE OF FORT BEND COUNTY ON OR BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.

SUBMITTALS RECEIVED AS REQUIRED WILL THEN BE OPENED AND THE NAMES PUBLICLY READ.

SUBMITTALS RECEIVED AFTER THE SPECIFIED TIME WILL BE RETURNED UNOPENED.

Results will not be given by phone.
Results will be provided to bidder in writing after Commissioners Court award.

Requests for information must be in writing and directed to:
Brooke Lindemann
Senior Buyer
Brooke.Lindemann@fortbendcountytx.gov

Vendor Responsibilities:

- Download and complete any addendums. (Addendums will be posted on the Fort Bend County website no Later than 48 hours prior to bid opening)
- Submit response in accordance with requirements stated on the cover of this document.
- DO NOT submit responses via email or fax.

Prepared: 3/29/2022
Issued: 4/3/2022

COUNTY PURCHASING AGENT

Fort Bend County, Texas

Vendor Information

Jaime Kovar
Purchasing Agent

Office (281-341-8640

Legal Company Name (top line of W9)			
Business Name (if different from legal name)			
Federal ID # or S.S. #		DUNS #	
Type of Business	___ Corporation/LLC ___ Partnership ___ Sole Proprietor/Individual ___ Tax Exempt Organization		Age in Business?
Publicly Traded Business	___ No ___ Yes Ticker Symbol _____		
Remittance Address			
City/State/Zip			
Physical Address			
City/State/Zip			
Phone/Fax Number	Phone: _____ Fax: _____		
Contact Person			
E-mail			
Check all that apply to the company listed above and provide certification number.	DBE-Disadvantaged Business Enterprise ☐ SBE-Small Business Enterprise ☐ HUB-Texas Historically Underutilized Business ☐ WBE-Women's Business Enterprise ☐	**Certification #** _____ **Certification #** _____ **Certification #** _____ **Certification #** _____	Cert Date _____ _____ _____ _____
Company's gross annual receipts	<$500,000 _____	$500,000-$4,999,999 _____	Exp Date _____ _____ _____ _____
	$5,000,000-$16,999,999 ___	$17,000,000-$22,399,999 _____	
	>$22,400,000 _____		
NAICs codes (Please enter all that apply)			
Signature of Authorized Representative			
Printed Name			
Title			
Date			

THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE

*1.0 SCOPE OF WORK:

Fort Bend County, Texas (hereafter referred to as the "County") seeks Proposals ("Proposals or RFP") for selection of a Contractor ("Respondent") to complete the construction of Arboretum Cricket Complex ("Project"), located at 15928 Old Richmond Road, Sugarland Texas. Vendor is to construct a Canopy of approximately 800 square feet, a Batting Cage area of approximately 840 square feet, and a 4" thick x 4' wide sidewalk per the plans. Vendor to provide ~~LED scoreboard~~, fencing, CMU screen wall, and electrical for all lighting. Alternate bid to include 45/34FC light level and all associated electrical requirements.

2.0 GUIDELINES:

By virtue of submitting a proposal, interested parties are acknowledging:

2.1 The County reserves the right to reject any or all proposals if it determines that select proposals are not responsive to the RFP. The County reserves the right to reconsider any proposal submitted at any phase of the procurement. It also reserves the right to meet with select Respondents at any time to gather additional information. Furthermore, the County reserves the right to delete or add scope up until the final contract signing.

2.2 All Respondents submitting proposals agree that their pricing is valid for a minimum of ninety (90) days after proposal submission to the County. Furthermore, the County is by statute exempt from the State Sales Tax and Federal Excise Tax; therefore, proposal prices shall not include taxes.

2.3 This Proposal does not commit the County to award nor does it constitute an offer of employment or a contract for services. Costs incurred in the submission of this proposal, or in making necessary studies or designs for the preparation thereof, are the sole responsibility of the Respondents. Further, no reimbursable cost may be incurred in the anticipation of award. Proposals containing elaborate artwork, expensive paper and binding and expensive visual or other presentations are neither necessary nor desired.

2.4 In an effort to maintain fairness in the process, all inquiries concerning this procurement are to be directed only to the County's Purchasing Agent in writing. Attempts to contact any members of the County's Commissioners' Court or any other County employee to influence the procurement decision may lead to immediate elimination from further consideration.

2.5 When responding to this Proposal, follow all instructions carefully. Submit proposal contents according to the outline specified and submit all hard copy and electronic documents according to the instructions. Failure to follow these instructions may be considered a non-responsive proposal and may result in immediate elimination from further consideration.

3.0 PROPOSAL CONTACT:

This Proposal is being issued by the County Purchasing Agent on behalf of Fort Bend County, Texas. Thus, responses should be directed to the Purchasing Agent, as outlined below. **Respondents are specifically directed NOT to contact any County personnel for meetings, conferences or technical discussions that are related to this Proposal other than specified herein. Unauthorized contact of any County personnel will likely be cause for rejection of the Respondent's proposal. All communications regarding the Proposal shall be directed to the County's Proposal Contact.** Communication with the Proposal Contact is permitted via email, facsimile, or written correspondence.

PROPOSAL CONTACT:

Brooke Lindemann
Senior Buyer
Fort Bend County Travis Annex
301 Jackson, Suite 201
Richmond, Texas 77469
Brooke.Lindemann@fortbendcountytx.gov
Phone: 281.344.3929

4.0 SUBMISSION REQUIREMENTS:

4.1 Submission requirements: one (1) original proposal is required by RFP opening time of 2:00 PM on Tuesday, April 26, 2022. Six (6) paper copies and one (1) electronic response on CD or flash drive are required to be submitted to Purchasing by 9:00 AM on Wednesday, April 27, 2022. CD or flash drive must contain only one (1) file in PDF format and must match written response identically. Failure to provide proper CD or flash drive is cause for disqualification. Proposal shall be submitted to the address shown below. Proposal shall be signed, in ink, by a person having the authority to bind the firm in a contract.

Fort Bend County	Proposal Number: R22-069
Purchasing Department	Due Date: April 26, 2022
301 Jackson, Suite 201	Time: 2:00 PM (CST)
Richmond, Texas 77469	For: Arboretum Cricket Complex

4.2 Respondents may submit their proposal any time prior to the Opening Date and time. The Respondent's name and address as well as a distinct reference to the Proposal number above shall be marked clearly on the submission. All proposals are time-stamped upon receipt and are securely kept, unopened, until the Opening Date. No responsibility will attach to the County, or any official or employee thereof, for the pre-opening of, post-opening of, or the failure to open a proposal not properly addressed and identified. No oral, telegraphic, telephonic, or facsimile proposals will be considered.

4.3 Proposals may be modified or withdrawn prior to the established opening date by delivering written notice to the proposal contact. Any alteration made prior to opening date and time shall be initialed by the signer of the proposal, guaranteeing authenticity.

4.4 Proposals time-stamped after the due date and time will not be considered and will be returned to the Respondent unopened. Regardless of the method used for delivery, respondents shall be wholly responsible for the timely delivery of submitted proposals.

4.5 The Respondent's name and address shall be clearly marked on all copies of the proposal.

5.0 INCURRED COSTS:

Those submitting proposals do so entirely at their expense. There is no expressed or implied obligation by the County to reimburse any individual or firm for any costs incurred in preparing or submitting proposals, for providing additional information when requested by the County or for participating in any selection interviews, including discovery (pre-contract negotiations) and contract negotiations.

6.0 ACCEPTANCE:

6.1 Submission of any proposal indicates a Respondent's acceptance of the conditions contained in this Proposal unless clearly and specifically noted otherwise in their proposal.

6.2 Furthermore, the County is not bound to accept a proposal on the basis of lowest price, and further, the County has the sole discretion and reserves the right to cancel this Proposal, to reject any and all proposals, to waive any and all informalities and or irregularities, or to re-advertise with either the identical or revised specifications, if it is deemed to be in the County's best interests. The County reserves the right to accept or reject any or all of the items in the proposal, and to award the contract in whole or in part and/or negotiate any or all items with individual Respondents if it is deemed in the County's best interest.

6.3 Although Fort Bend County desires to negotiate toward a contract with a selected Respondent, the Commissioners' Court may award the contract on the basis of the initial proposals received, without discussions. Therefore, each initial proposal should contain the Respondent's best terms.

7.0 INTERPRETATIONS, DISCREPANCIES, AND OMISSIONS:

7.1 It is incumbent upon each potential Respondent to carefully examine these specifications, terms, and conditions. Should any potential Respondent find discrepancies, omissions or ambiguities in this Proposal, the Respondent shall at

once request in writing an interpretation from the County's Proposal Contact. Any inquiries, suggestions, or requests concerning interpretation, clarification or additional information shall be made in writing via e-mail only to the County's Proposal Contact, as specified in Section 3.0. Deadline for submission of questions and/or clarification is **Tuesday, April 19, 2022 at 10:00 AM. (CST).** Requests received after the deadline will not be responded to due to the time constraints of this Proposal process.

7.2 The issuance of a written addendum is the only official method by which interpretation, clarification or additional information will be given by the County. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarification will be without legal effect. If it becomes necessary to revise or amend any part of this Proposal, notice will be given by the County Purchasing Agent to all prospective Respondents who were sent a Proposal. The Respondent in their proposal shall acknowledge receipts of amendments. Each Respondent shall ensure that they have received all addenda and amendments to this Proposal before submitting their proposals.

8.0 TENTATIVE SCHEDULE:

Release of RFP:	April 3, 2022
Pre-RFP conference:	April 12, 2022
Deadline for Questions:	April 19, 2022
Submission Due Date:	April 26, 2022
Evaluation of Submissions:	Week of May 2nd
Commissioners Court Permission to Negotiate:	May 10, 2022
Negotiations:	Beginning May 10, 2022
Final Contract Approval Commissioners Court:	June 7, 2022

9.0 PRE-RFP CONFERENCE:

A Pre-RFP conference will be conducted on **Tuesday, April 12, 2022 at 9:00 AM** (central). The pre-RFP conference will be held at the Fort Bend County Purchasing Department located in the Travis Annex at 301 Jackson, Suite 201, Richmond, Texas 77469. All vendors are encouraged to attend. A site visit will be conducted after the conference, if necessary.

10.0 RETENTION OF RESPONDENT'S MATERIAL:

The County reserves the right to retain all proposals regardless of which response is selected. All proposals and accompanying documents become the property of the County.

11.0 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION:

By submission of a proposal, each Respondent certifies, that in connection with this procurement:

11.1 The prices in this proposal have been arrived at independently, without consultation, communication, or agreement with any other Respondent; with any competitor; or with any County employee(s) or consultant(s) for the purpose of restricting competition on any matter relating to this Proposal.

11.2 Unless otherwise required by law, the prices which have been quoted in this proposal have not been knowingly disclosed by the Respondent and will not knowingly be disclosed by the Respondent prior to award directly or indirectly to any other Respondent or to any competitor; and;

11.3 No attempt has been made or will be made by the Respondent to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

12.0 ASSIGNMENT:

The Respondent may not sell, assign, transfer or convey the contract resulting from this Proposal, in whole or in part, without the prior written approval from Fort Bend County Commissioners' Court.

13.0 CONFIDENTIAL MATTERS:

13.1 All data and information gathered by the Respondent and its agents, including this Proposal and all reports, recommendations, specifications, and data shall be treated by the Respondent and it's agents as confidential. The Respondent and it's agents shall not disclose or communicate the aforesaid matters to a third party or use them in advertising, publicity, propaganda, and/or in another job or jobs, unless written consent is obtained from the County.

13.2 Proposals will only be publicly received and acknowledged only so as to avoid disclosure of the contents to competing Respondents and kept secret during negotiation. However, all proposals shall be open for public inspection after the contract is awarded. Trade secrets and any material that is considered to be confidential information contained in the proposal and identified by Respondent as such will be treated as confidential to the extent allowable in the Open Records Act.

14.0 LIMITS OF SUBCONTRACTORS:

14.1 The County has approval rights over the use and/or removal of all subcontractors and/or vendor(s). Subcontractors shall conform to all County policies.

14.2 Any dispute between the Respondent and subcontractors, including any payment dispute, will be promptly remedied by the Respondent. Failure to promptly remedy or to make prompt payment to subcontractor may result in the

withholding of funds from the Respondent by the County for any payments owed to the subcontractor.

15.0 JURISDICTION, VENUE, CHOICE OF LAW:

This Proposal and any contract resulting there from shall be governed by and construed according to the laws of the State of Texas. Should any portion of any contract be in conflict with the laws of the State of Texas, the State laws shall invalidate only that portion. The remaining portion of the contract(s) shall remain in effect. Any lawsuit shall be governed by Texas law and Fort Bend County, Texas shall be the venue for any action or proceeding that may be brought or arise out of, in connection with or by reason of this Proposal process and resulting Agreements.

16.0 INDEPENDENT CONTRACTOR:

The Respondent is an independent contractor and no employee or agent of the Respondent shall be deemed for any reason to be an employee or agent of the County.

17.0 AMERICANS WITH DISABILITIES ACT (ADA)

Proposals shall comply with all federal, state, county, and local laws concerning this type of products/service/equipment/project and the fulfillment of all ADA requirements.

18.0 DRUG-FREE WORKPLACE:

All Respondents shall provide any and all notices as may be required under the Drug-Free Workplace Act of 1988, 28 CFR Part 67, Subpart F, to their employees and all sub-contractors to insure that the County maintains a drug-free workplace.

19.0 PERFORMANCE AND PAYMENT BOND:

The Respondent shall post with Fort Bend County, not later than ten (10) days of the County's award of a contract, a performance and payment bond in the amount of one hundred percent (100%) of the total lump sum price in such form as is satisfactory by County. This bond shall be executed by a corporate surety company duly authorized and admitted to do business in the State of Texas and licensed to issue such a bond in the State of Texas. The Respondent shall notify its corporate surety of any contract changes.

20.0 POWER OF ATTORNEY:

An attorney-in-fact who signs a bid bond, performance bond or payment bond must file with each bond a certified and effectively dated copy of his or her power of attorney.

21.0 TEXAS ETHICS COMMISSION FORM 1295:

21.1 Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", per the new Government Code Statute §2252.908. All firms submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit:
https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm.

21.2 On-line instructions:

21.2.1 Name of governmental entity is to read: Fort Bend County.

21.2.2 Identification number use: RFP 22-069

21.2.3 Description is: Arboretum Cricket Complex

21.3 Apparent low bidder(s) will be required to provide the Form 1295 within three (3) calendar days from notification; however, if your company is publicly traded you are not required to complete this form.

22.0 INSURANCE:

22.1 All respondents shall submit, with RFP, a current certificate of insurance indicating coverage in the amounts stated below. In lieu of submitting a certificate of insurance, respondents may submit, with RFP, a notarized statement from an Insurance company, authorized to conduct business in the State of Texas, and acceptable to Fort Bend County, guaranteeing the issuance of an insurance policy, with the coverage stated below, to the firm named therein, if successful, upon award of this Contract.

22.2 At contract execution, contractor shall furnish County with properly executed certificates of insurance, which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

22.2.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.

22.2.2 Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

22.2.3 Commercial general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

22.2.4 Business Automobile Liability coverage with a combined Bodily Injury/Property Damage limit of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

22.3 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of contractor, excluding Professional Liability, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.

22.4 If required coverage is written on a claims-made basis, contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning from the time that work under the agreement is completed.

22.5 Builder's Risk Insurance: Contractor is required to provide proof before a Purchase Order is issued for this project and keep in full force and effect until the Transfer Date, Builders Risk Insurance, subject to policy terms and conditions, of direct physical loss or damage to property, materials, equipment and supplies which are to become an integral part of the Project, whether owned by Contractor, or subcontractors of every tier, and in which one or more of same has an insurable interest, while in transit, while at the Construction Site awaiting construction, during construction, and until the Transfer Date. Such insurance shall be maintained to cover, as nearly as practicable, the insurable value of such property, materials, equipment and supplies at risk, and shall contain a waiver of subrogation in favor of Contractor, Architect, subcontractors of any tier and Owner for loss or damage occurring during the Work and shall name Contractor as the named insured and Owner as additional insureds. All Builder's Risk Insurance proceeds shall be paid directly to the Contractor.

23.0 INDEMNIFICATION:

Respondent shall save harmless County from and against all claims, liability, and expenses, including reasonable attorney's fees, arising from activities of Respondent, its agents, servants or employees, performed under this agreement that result from the negligent act, error, or omission of Respondent or any of Respondent's agents, servants or employees.

23.1 Respondent shall timely report all such matters to Fort Bend County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide Fort Bend County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of Fort Bend County required by Respondent in the defense of each matter.

23.2 Respondent's duty to defend, indemnify and hold Fort Bend County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of any contract unless otherwise agreed by Fort Bend County in writing. The provisions of this section shall survive the termination of the contract and shall remain in full force and effect with respect to all such matters no matter when they arise.

23.3 In the event of any dispute between the parties as to whether a claim, demand, suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Respondent, Respondent shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Respondent are not at issue in the matter.

23.4 Respondent's indemnification shall cover, and Respondent agrees to indemnify Fort Bend County, in the event Fort Bend County is found to have been negligent for having selected Respondent to perform the work described in this request.

23.5 The provision by Respondent of insurance shall not limit the liability of Respondent under an agreement.

23.6 Respondent shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify Fort Bend County and to hold it harmless from all claims for bodily injury and property damage that arise may from said Respondent's operations. Such provisions shall be in form satisfactory to Fort Bend County.

23.7 Loss Deduction Clause - Fort Bend County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of deductibles shall be the sole responsibility of Respondent

and/or trade contractor providing such insurance.

24.0 PREVAILING WAGES:

This project is subject to the prevailing wage rate requirements of Chapter 2258 of the Government Code. The Contractor shall pay Fort Bend County sixty dollars ($60.00) for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit https://sam.gov/content/wage-determinations.

General Decision Number: TX20220247 03/11/2022
Superseded General Decision Number: TX20210247

State: Texas
Construction Type: Building
County: Fort Bend County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/07/2022
1	01/21/2022
2	02/18/2022
3	02/25/2022
4	03/11/2022

* ASBE0022-009 06/01/2021

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 25.14	15.15
BOIL0074-003 01/01/2021		
BOILERMAKER	$ 29.47	24.10
CARP0551-008 04/01/2016		
CARPENTER (Excludes Acoustical Ceiling Installation,Drywall Hanging, Form Work and Metal Stud Installation)	$ 23.05	8.78
ELEC0716-005 08/30/2021		
ELECTRICIAN (Excludes Low Voltage Wiring and Installation of Alarms)	$ 33.20	10.37
ELEV0031-003 01/01/2022		
ELEVATOR MECHANIC	$ 47.04	36.885+a+b

FOOTNOTES:
A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014

POWER EQUIPMENT OPERATOR		
Cranes	$ 34.85	9.85

IRON0084-002 06/01/2021

IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 26.01	7.56
PLAS0783-001 04/01/2021		
PLASTERER	$ 26.04	9.02
PLUM0068-002 10/01/2021		
PLUMBER	$ 36.83	11.71
PLUM0211-010 10/01/2021		
PIPEFITTER (Including HVAC Pipe Installation)	$ 37.03	12.56
SHEE0054-003 04/01/2020		
SHEET METAL WORKER (Excludes HVAC Duct and Unit Installation)	$ 29.70	13.85
* SUTX2014-023 07/21/2014		
ACOUSTICAL CEILING MECHANIC	$ 16.41	3.98
BRICKLAYER	$ 19.86	0.00
CAULKER	$ 15.36	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.82**	0.00
DRYWALL FINISHER/TAPER	$ 16.30	3.71
DRYWALL HANGER AND METAL STUD INSTALLER	$ 17.45	3.96
ELECTRICIAN (Alarm Installation Only)	$ 17.97	3.37
ELECTRICIAN (Low Voltage Wiring Only)	$ 18.00	1.68
FLOOR LAYER: Carpet	$ 20.00	0.00
FORM WORKER	$ 11.87**	0.00
GLAZIER	$ 19.12	4.41
INSULATOR – BATT	$ 14.87**	0.73
IRONWORKER, REINFORCING	$ 12.10**	0.00
LABORER: Common or General	$ 10.79**	0.00
LABORER: Mason Tender – Brick	$ 13.37**	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.50**	0.00
LABORER: Pipelayer	$ 12.94**	0.00
LABORER: Roof Tearoff	$ 11.28**	0.00
LABORER: Landscape and Irrigation	$ 9.49**	0.00
LATHER	$ 19.73	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.10**	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93**	0.00
OPERATOR: Bulldozer	$ 20.77	0.00
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 15.64	0.00

OPERATOR: Grader/Blade	$ 13.37**	0.00
OPERATOR: Loader	$ 13.55**	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 16.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 16.77	4.51
ROOFER	$ 15.40	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 17.81	2.64
SHEET METAL WORKER (HVAC Unit Installation Only)	$ 16.00	1.61
SPRINKLER FITTER (Fire Sprinklers)	$ 22.17	9.70
TILE FINISHER	$ 12.00**	0.00
TILE SETTER	$ 16.17	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 14.95**	5.23
TRUCK DRIVER: Dump Truck	$ 12.39**	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50**	0.00
TRUCK DRIVER: Water Truck	$ 12.00**	4.11
WATERPROOFER	$ 14.39**	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate

whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

25.0 PERMITS:

It shall be the sole responsibility of the successful Respondent to obtain any required permits in the name of Fort Bend County.

26.0 TAX EXEMPT:

Fort Bend County is exempt from state and local sales and use taxes under Section 151.309 of the Texas Tax Code. This project will be deemed a separate project for Texas tax purposes, and as such, Fort Bend County hereby issues its Texas Exemption for the purchase of any items qualifying for exemption under this project. Respondent is to issue its Texas Resale Certificate to vendors and subcontractors for such items qualifying for this exemption, and further, Respondent should state these items at cost.

27.0 NAME BRANDS:

Name Brands: Specifications may reference name brands and model numbers. It is not the intent of Fort Bend County to restrict these bids in such cases, but to establish a desired quality level of merchandise or to meet a pre-established standard due to like existing items. Bidders may offer items of equal stature and the burden of proof of such stature rests with them. Fort Bend County shall act as sole judge in determining equality and acceptability of products offered.

28.0 EVALUATION CRITERIA:

In order to facilitate the analysis of responses to this Proposal, Respondents are required to prepare their proposals in accordance with the instructions outlined in this part. Proposals should be prepared as simply as possible and provide a straightforward, concise description of the Respondent's capabilities to satisfy the requirements of the Proposal. Emphasis should be concentrated on accuracy, completeness, and clarity of content. All parts, pages, figures, and tables should be numbered and clearly labeled.

28.1 Respondents are required to follow the outline below when preparing their proposals:

Tab	Title
	Title Page
	Letter of Transmittal
	Table of Contents
	Executive Summary
1	Cost
2	Understanding Scope of Work
3	Firm's Experience
4	Staff Experience
5	Proposed Schedule
6	Overall Completeness of Proposal

28.2 Any exceptions to the Proposal requirements shall be identified in the applicable section.

28.3 Executive Summary - This part of the response to the Proposal should be limited to a brief narrative highlighting the Respondent's proposal. This section should not include cost quotations. Note that the executive summary should identify the primary contacts for the Respondent.

28.4 Respondents will be evaluated utilizing the factors, as weighted below:

Tab 1

Cost (weight factor = 45%)

- Complete Exhibit I.

Tab 2

Understanding Scope of Work (weight factor = 15%)

- Respondents must express, in detail, their understanding of this specific project. In addition, describe how the project requested will be provided and managed. Describe the approach your firm will take to the required collaboration, scheduling and coordination required for this project.

Tab 3

Firm's Experience (weight factor = 15%)

- Firm Experience with Projects of Similar Size and Complexity: Such experience must be in the form of providing general contracting services for youth sports complexes or similar facilities. List a minimum of three (3) similar projects completed within the last ten (10) years; provide the name and location of each project, detailed description of project, completion date, final cost, the client, and a contact person and phone number.

Tab 4

Staff Experience (weight factor = 10%)

- Staff Experience with Projects of Similar Size and Complexity: Such experience must be in the form of providing project management and construction services for building youth sports complexes or similar facilities. List a minimum of three (3) similar projects completed within the last ten (10) years; provide the name and location of each project, the client, and a contact person and phone number and completion date. In addition, provide resumes for project superintendent and project manager who will be assigned to this project.

Tab 5

Proposed Schedule (weight factor = 10%)

- Provide project schedule.

Tab 6

Overall Completeness of Proposal (weight factor = 5%)

- Required Proof of Insurance
- Completed Respondent forms
- Completed W9 form
- Completed debt form
- Completed Contractor Acknowledgement of Stormwater Management Program form

29.0 AWARD:

The County will select the respondent whose proposal is the highest evaluated and responsible for the County. Contractual commitments are contingent upon the availability of funds, as evidenced by the issuance of a purchase order. All contracts are subject to the approval of the County's legal counsel and Commissioners' Court, prior to execution. Once awarded, the contract will be the final expression of the agreement between the parties and may not be altered, changed, or amended except by mutual agreement, in writing.

30.0 RETAINAGE:

Within thirty (30) days after receipt of each uncontested Application for Payment together with the supporting materials required, County shall advance to Contractor the uncontested amount requested in such uncontested Application for Payment, except *five* percent (5%) of the amount requested (hereinafter "Retainage") in each Application for Payment by County. The Retainage withheld shall be released upon final completion of the entire Project and verification of satisfactory work performed, unless grounds exist for withholding payment on account of other defaults by Contractor, including services provided by its sub-contractors.

31.0 LIQUIDATED DAMAGES:

If the Services are not substantially completed within the time for performance or within such additional time as may be extended by County, County will deduct from the final payment as liquidated damages and not as a penalty the sum of two hundred and fifty ($250.00) per calendar day that the Services are not substantially complete. Such sum is agreed upon as a reasonable and proper measure of the damages County will sustain.

32. STATE LAW REQUIREMENTS FOR CONTRACTS:

The contents of this section are required by Texas Law and are included by County regardless of content.

32.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: Contractor verifies that if Contractor employs ten (10) or more full-time employees and this Agreement has a value of $100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.

32.2 Texas Government Code Section 2251.152 Acknowledgment: By signature on vendor form, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

33.0 HUMAN TRAFFICKING:

By acceptance of this contract, Contractor acknowledges that Fort Bend County is opposed to human trafficking and that no County funds will be used in support of services or activities that violate human trafficking laws.

34.0 REQUIRED FORMS:

All respondents submitting are required to complete the attached and return with submission:

34.1 Vendor Form

34.2 W9 Form

34.3 Tax Form/Debt/Residence Certification

34.4 Contractor Acknowledgement of Stormwater Management Program

35.0 EXHIBIT:

Exhibit I: Pricing

Exhibit II: Project Manual

Exhibit III: Geotechnical Report

Exhibit IV: Plans

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See **Specific Instructions** on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification; check only **one** of the following seven boxes:

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____

Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	**Signature of U.S. person ▶**	**Date ▶**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor[2]
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee[1] The actual owner[1]
5. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity[4]
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

***Note.** Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov.* You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Job No.: _____

TAX FORM/DEBT/ RESIDENCE CERTIFICATION
(for Advertised Projects)

Taxpayer Identification Number (T.I.N.): _____

Company Name submitting Bid/Proposal: _____

Mailing Address: _____

Are you registered to do business in the State of Texas? Yes No

If you are an individual, list the names and addresses of any partnership of which you are a general partner or any assumed name(s) under which you operate your business

_____

_____

I. **Property:** List all taxable property in Fort Bend County owned by you or above partnerships as well as any d/b/a names. Include real and personal property as well as mineral interest accounts. (Use a second sheet of paper if necessary.)

Fort Bend County Tax Acct. No.*	Property address or location**
_____	_____
_____	_____
_____	_____
_____	_____

** This is the property account identification number assigned by the Fort Bend County Appraisal District.*

*** For real property, specify the property address or legal description. For business personal property, specify the address where the property is located. For example, office equipment will normally be at your office, but inventory may be stored at a warehouse or other location.*

II. **Fort Bend County Debt** - Do you owe any debts to Fort Bend County (taxes on properties listed in I above, tickets, fines, tolls, court judgments, etc.)?

Yes No If yes, attach a separate page explaining the debt.

III. **Residence Certification** - Pursuant to Texas Government Code §2252.001 *et seq.*, as amended, Fort Bend County requests Residence Certification. §2252.001 *et seq.* of the Government Code provides some restrictions on the awarding of governmental contracts; pertinent provisions of §2252.001 are stated below:

(3) "Nonresident bidder" refers to a person who is not a resident.

(4) "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

I certify that _____ is a Resident Bidder of Texas as defined in Government Code
[Company Name]
§2252.001.

I certify that _____ is a Nonresident Bidder as defined in Government Code
[Company Name]
§2252.001 and our principal place of business is _____.
[City and State]

Mandatory Form

Contractor Acknowledgement of Storm Water Management Program

I hereby acknowledge that I am aware of the stormwater management program and standard operating procedures developed by Fort Bend County in compliance with the TPDES General Permit No. TXR040000. I agree to comply with all applicable best management practices and standard operating procedures while conducting my services for Fort Bend County. I agree to conduct all services in a manner that does not introduce illicit discharges of pollutants to streets, stormwater inlets, drainage ditches or any portion of the drainage system. The following materials and/or pollutant sources must not be discharged to the drainage system as a result of any services provided:

1. Grass clippings, leaves, mulch, rocks, sand, dirt or other waste materials resulting from landscaping activities, (except those materials resulting from ditch mowing or maintenance activities)
2. Herbicides, pesticides and/or fertilizers, (except those intended for aquatic use)
3. Detergents, fuels, solvents, oils and/or lubricants, other equipment and/or vehicle fluids,
4. Other hazardous materials including paints, thinners, chemicals or related waste materials,
5. Uncontrolled dewatering discharges, equipment and/or vehicle wash waters,
6. Sanitary waste, trash, debris, or other waste products
7. Wastewater from wet saw machinery,
8. Other pollutants that degrade water quality or pose a threat to human health or the environment.

Furthermore, I agree to notify Fort Bend County immediately of any issue caused by or identified by:

_____

(Company/Contractor)

that is believed to be an immediate threat to human health or the environment.

_____ _____

Contractor Signature Date

_____

Printed Name

_____

Title

RFP 22-069

Exhibit I: Pricing

Base bid option 1 (as stated in specifications)

$_____

Calendar days for completion _____

Base bid option 2 (as stated in specifications, however substituting the 30/25FC light level with the 45/34FC light level)

$_____

Calendar days for completion _____

Acknowledgement of Receipt of Addendum(s), if issued by Purchasing, to the Request for Proposal Document.

Addendum No 1 dated _____ Received _____

Addendum No 2 dated _____ Received _____

Addendum No 3 dated _____ Received _____

_____
Name of Respondent

_____
Signature of Authorized Representative

_____
Printed Name of Representative

Fort Bend County

Electrical Technical Specifications
(Division 16)
for Construction of
Cricket Field Upgrade at Arboretum Park
Fort Bend County, Texas

BAIRD GILROY & DIXON
ELECTRICAL ENGINEERS

TBPE Registration No. 16575

Baird Gilroy & Dixon, LLC
9711 S. Mason Rd. Ste 125 #326
Richmond, Texas 77407
(281) 529-5005

TABLE OF CONTENTS
ELECTRICAL

SECTION 16010
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Basic requirements specifically applicable to the work of Division 16 - Electrical Requirements.

B. The Contractor shall furnish equipment, materials, and labor for assembly and installation plus checkout and start-up of the complete electrical system as shown on the Drawings and stipulated in the Specifications.

1.02 REFERENCES

A. As a minimum requirement, the electrical system shall be constructed in accordance with:

1. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), No. 70 - National Electrical Code (NEC).

2. Local Building Code.

3. Other applicable Codes and Standards as referenced in other Master Specifications.

B. Comply with local, county, state and federal regulations and codes in effect as of date of purchase.

C. Equipment of foreign manufacture must meet U.S. codes and standards.

D. Equipment and materials shall conform to requirements of specification and to the criteria provided in data sheets for the project.

1.03 CONTRACTOR QUALIFICATIONS

A. All electrical work shall be performed only by a Texas State Licensed Electrical Contractor.

B. Electrical Contractor shall have full-time Master Electrician License on staff for City or County; in which project is located and shall have a State issued Master Electrician License.

C. All electrical work must be completed with a State of Texas Licensed Electrical Journeyman onsite at all times.

D. Contractor’s Project Manager or his Assistant shall be familiar with types of electrical construction required by this project in order to determine that all subcontractor and vendor’s work is in conformance with the plans and specifications.

E. Contractor shall have an established safety-training program in effect for the duration of this project and will be required to submit proof of safety training for all employees working on this project.

1.04 QUALITY ASSURANCE

A. Product Conformance Certificate and Quality Assurance Release.

1. Submit an overall conformance certificate for electrical components signed by the person responsible for product quality. Specifically identify the purchased material or equipment by project name and location, purchase order number, supplements, and item number where applicable, including materials and services provided by others. Indicate that all requirements have been met and identify any approved deviations.

2. Field Inspection:

a. Electrical work shall be inspected and approved by the local code inspector and the Engineer.

b. Contractor shall give a minimum of one-day notice to the Inspector that the installation is ready for inspection and two days' notice to the Engineer.

c. Concealed work shall be inspected before it is covered:

(1) Conduit with stub-ups, underground in duct banks before concrete is poured.

(2) Conduit in slabs, walls and ceilings, complete with boxes.

d. Electrical equipment and materials shall be inspected upon arrival by the Engineer for compliance with specifications.

1.05 SITE CONDITIONS

A. Take the following site conditions into consideration when fabricating, erecting, installing and wiring electrical equipment under this contract:

1. Seismic Zone — Zone 0

2. Wind Velocity — 90 mph

3. Temperature, Min/Max.:

a.	Coldest Winter Month:	High 60 degrees F	Low 41 degrees F
b.	Warmest Summer Month:	High 94 degrees F	Low 73 degrees F
c.	Lowest Expected:	11 degrees F	
d.	Highest Expected:	107 degrees F	

4. Rainfall:

a. Annual 45 inches
b. Design hours 3.4 inches/hour, 8.4 inches/24 hours

5. Design Relative Humidity: 98%

6. Station Barometric Pressure:

a. Average Annual 29.5 inches Hg Absolute.

7. Utility Water Systems:

		Design Pressure	Design Temp.
a.	River Water	_____ PSI	____ degrees F
b.	Well Water	_____ PSI	____ degrees F
c.	City Water	55 PSI	70 degrees F

8. Electric Power Supply Characteristics (Available to Contractor):

	Voltage	Phase	Hz	Wire	Delta or Wye
1	480	3	60	TBD	TBD
2					
3					

PART 2 PRODUCTS

2.01 COMPONENT DESIGN

A. Components utilized in the construction of the material or equipment shall be of the latest proven design, new and in current production. Do not use obsolete components or components to be phased out of production.

2.02 FACTORY INSPECTION

A. Provide free access with prior notice for the Engineer at all times to the shop where the material or equipment is being fabricated or tested. Provide reasonable facilities for inspection, witnessing tests, and examining records. Give 7 days notice prior to starting tests, which are scheduled for factory inspection.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify dimensions and ratings of equipment and materials to ensure proper fit and performance.

3.02 INSTALLATION

A. Install equipment and materials in accordance with the Drawings and manufacturer's written instructions. If field conditions necessitate changes in electrical installation, obtain approval from the Engineer.

B. All electrical equipment shall be mounted at an elevation of twenty-four (24) inches above the base water surface flood elevation (500 YR WSEL) of the construction site. Should there be a difference in the mounting elevation on the construction Drawings that is in conflict with the previous directive the Contractor shall immediately bring such conflict to the attention of the Engineer for resolution.

3.03 DEMONSTRATION

A. Test the electrical system to specification requirements and to demonstrate correct installation and operation of equipment.

B. Before 7-days test, demonstrate the system to the Engineer. Show the system to be fully operational. All alarms, safety's, and communication points to central and locally must operate in both full-automatic and back-up modes. Use fresh water in the test medium.

C. Operate the system continuously for a period of 7 days in full automatic, without failure, to qualify as acceptable. "Failure" is considered any problem that requires correction by maintenance personnel, such as: high or low water level, any motor alarm, power failure, phase failure, communication failure, PLC failure, or UPS failure. This would exclude conditions not under the control of Contractor, such as: evident lightning strikes, 25-year rains, purchased power failure longer than the specified duration of service from UPS. Failures due to uncontrollable situations would allow the 7-day test to continue, as soon as test conditions are restored and the Engineer is notified.

D. The existing station shall remain in service during this test.

END OF SECTION

SECTION 16012
ELECTRICAL WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. The work shall include providing materials and equipment required for installation of complete and functioning electrical system as specified and as shown on the drawings.

B. This section is an integral part of all Specification Sections related to electrical, control and instrumentation construction under this contract. Conditions of this section are paramount to all other conditions in applicable sections and shall supercede all other conditions and requirements.

C. Electrical Control and Instrumentation Plans & Specifications are representative of the design intent and may not contain minute details normally associated with normally accepted electrical construction, as described in applicable codes or as described in manufacturer's literature. Contractor shall provide all appurtenances normally associated with a particular equipment or device, and as required for a properly operating system.

1.02 MAJOR ITEMS OF WORK AS FOLLOWS

A. Installation of Underground Ductbanks

B. Installation of Ground Systems

C. Installation of Sports Lighting

D. Installation of Lighting Transformer & Panelboard

1.03 SUBMITTALS

A. Submit all products covered under this specification for Engineer's approval.

B. Where submittals for a particular equipment, device or material item vary from that specified or shown on plan drawings, and where that item is not specifically noted as acceptable and, where installation of submitted item results in improper or undesirable operation of the system, Contractor shall be liable for removal and/or replacement of that item with the item specified or shown on plan drawings at no additional cost to Owner.

C. With each submittal include a copy of the applicable specification(s) Page(s) for the item submitted and mark "complies" or "non-compliance" or "exception" adjacent to the applicable paragraph. Identify applicable drawing sheet number and specification section on front of each submittal cover.

1.04 CONTRACTORS RESPONSIBILITIES

A. Electrical Contractor shall coordinate electrical power, telephone, data or special purpose line installation with utility companies. Within 30 days after award of contract, Electrical contractor shall contact utility company and owner and shall request service needed.

B. It is Electrical Contractors sole responsibility to assure that utility company and owner are notified and are kept aware of requirements.

C. Contractor shall provide all conduit, conductors and termination equipment as needed for utilities and shall coordinate with utility companies for installation requirements and shall provide installation constructed according to the utility company standards whether or not such is shown in detail or plans.

D. Electrical Contractor shall review all sections of the plans including Civil, Structural, Mechanical, Instrumentation, Process, Architectural, and Electrical and shall note all electrical and/or requirements for devices and equipment shown or implied, and shall provide service accordingly for a complete operating electrical system.

E. Electrical Contractor shall provide all programming set-up, adjustments and testing of devices or equipment included under this contract unless specifically excluded or unless equipment is not provided by Electrical Contractor.

F. General Contractor is specifically responsible for coordination of all electrical systems, devices and equipment provided or installed under this contract and shall assure that all requirements by all trades are met such as to insure a complete and operating electrical, control, process or instrumentation system.

G. Electrical Contractor shall be experienced with all types of electrical systems covered under this contract. No work shall be undertaken where Contractor's firm, project supervisors and project electrical workers have not had recent experience in similar projects in area or project location. Contractor will be required to furnish proof of experience where requested by Owner or Engineer or their Representatives.

H. General Contractors Project Manager or his Assistant shall be familiar with types of electrical construction required by this project in order to determine that all subcontractors work in conformance with the plans and specifications.

I. Contractor shall assure that all systems have been properly installed, adjusted and tested prior to final inspection, unless, Engineer has been duly notified in writing that certain equipments are not ready for final testing and such is acceptable with Engineer.

J. Additional site visits, inspections, and tests conducted by Engineer due to systems not being ready at designated time of final inspection may result in charges to Contractor by Engineer to pay for additional time of electrical inspectors not covered in Electrical Engineers scope of work. All charges will be at Engineers Standard rates.

K. Contractor shall fully inspect all equpment, conduit, wiring devices and other items before starting work, ordering materials or submitting shop drawings in order to verify existing conditions are as shown on plans and shall immediately notify Engineer of any discrepancies between plans & specifications and existing conditions. Failure to do so

may result in responsibility for any required changes in construction.

L. At completion of project and before final inspection, Contractor shall provide the Electrical Engineer with full size blue prints, red-lined to reflect the As-Built electrical installation. Any variation from plans shall be shown on each applicable plan sheet.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials provided under all sections of the specifications shall be new and the standard products of manufacturers regularly engaged in the production of such equipment. All materials shall conform to the National Electrical Code and shall be approved and listed by the Underwriters' Laboratories. Materials described by manufacturer's name and catalog number are selected to set a definite standard of design and quality to be required. There is not any intention to discriminate against a product of another manufacturer, which is equally durable in construction, similar in design, and will serve the purpose for which it is intended. Within 30 days after award of the contract and before any materials and equipment are placed on order, the Contractor shall submit to the Engineer for approval a complete list including catalog numbers and descriptive matter, of all materials and equipment he proposes to provide.

B. Materials and equipment specifications are general in coverage and may contain reference to construction items that apply in only particular situations and may not apply as a general rule for materials installed on this project.

2.02 PLANS AND SPECIFICATIONS

A. Electrical plans and specifications are not intended to discriminate against any particular manufacturer. Specific values shown for a particular manufacturer's product may vary slightly for another product. The Electrical Engineer reserves the right to interpret the electrical specifications and to make judgement as to acceptance of a product, regardless of minute details in the specifications or on the Plans.

B. Specifications shall be reviewed for applicability of materials under certain conditions and in certain environments and, where not shown otherwise on plan drawings. These application directions shall be adhered to.

C. Where a particular reference on drawing plans does not conform to standard acceptable construction methods for a particular type project, the Contractor shall immediately notify the Engineer and request a clarification before ordering materials or starting construction.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. All wiring shall be installed in accordance with current NEC and local codes. Conduits

exposed to the weather shall be rigid galvanized steel (RGS) unless noted otherwise on plans. Conduit placed underground shall be schedule 40 PVC unless noted otherwise on plans.

B. A fish wire shall be left in all conduits in which the permanent wiring is not installed.

C. All fixtures, switch, and receptacle locations shall be approved by Engineer.

D. Refer to other sections of this specification for controls. Under this section of the specifications, the Contractor shall install the control devices and provide control wiring switches, outlet boxes, and shall make all final connections. Control wiring and interlocks shall conform to wiring diagrams furnished by equipment manufacturers.

E. The Contractor shall provide services of his Engineer or a factory trained technician to instruct personnel for a period of at least one (1) full day after completion of the contract work.

3.02 EXCAVATION AND BACKFILL

A. All underground conduits shall be buried to a minimum depth of 24-inches below finished grade. All trenches shall be uniform width and shall be backfilled and compacted to 95% that of original density. Any damage to underground conduits caused by other Contractors shall be repaired by this Contractor and shall be compensated accordingly by the party or parties responsible for the damage.

3.03 CLEAN UP

A. The Contractor shall upon completion of the work, remove all materials, empty containers, and any other materials that are not incorporated into the work.

END OF SECTION

SECTION 16110
RACEWAYS AND BOXES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:

a. Conduits.
b. Conduit fittings.
c. Conduit supports.
d. Wireways.
e. Outlet boxes.
f. Pull and junction boxes.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 1 – General Requirements
2. Section 16119 – Underground Ducts & Pull Boxes
3. Section 16140 – Wiring Devices

1.02 DEFINITIONS

A. Underfloor Conduits.

1. Conduits which run underground within perimeter of building walls under building floor. This may consist of one conduit, or several conduits grouped together.

B. Duct Bank Conduits

1. Conduits which run underground outside perimeter of building walls. This may consist of one conduit, or several conduits grouped together.

C. Underground Conduits

1. Underground conduits are both under floor conduits and duct bank conduits.

1.03 SUBMITTALS

A. Shop Drawings:

1. See Division 1 – General Requirements for requirements for mechanics and administration of the submittal process.

2. Product technical data:

a. Provide submittal data for all products specified in PART 2 of this Specification Section.

3. Fabrication and/or layout drawings:

    a. Identify dimensional size of pull and junction boxes to be used.

1.04 QUALITY ASSURANCE

A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.

2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.

B. Referenced Standards:

1. Aluminum Association (AA).

2. American Iron and Steel Institute (AISI).

3. ASTM International (ASTM):

    a. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

    b. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

    c. D2105, Standard Test Method for Longitudinal Tensile Properties of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Tube.

    d. D2564, Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Piping Systems.

    e. F512, Standard Specification for Smooth-Wall Polyvinyl Chloride (PVC) Conduit and Fittings for Underground Installation.

4. National Electrical Manufacturers Association (NEMA):

    a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

    b. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit (IMC).

    c. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.

    d. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.

5. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):

    a. C80.1, Electric Rigid Steel Conduit (ERSC).

    b. C80.3, Steel Electrical Metallic Tubing (EMT).

    c. C80.5, Electrical Aluminum Rigid Conduit.

    d. OS 1, Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

6. National Fire Protection Association (NFPA):

    a. 70, National Electrical Code (NEC)

7. Underwriters Laboratories, Inc. (UL):

    a. 1, Standard for Flexible Metal Conduit.

    b. 6, Standard for Electrical Rigid Metal Conduit – Steel.

    c. 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.

    d. 360, Standard for Liquid-Tight Flexible Steel Conduit.

    e. 467, Grounding and Bonding Equipment.

    f. 514A, Metallic Outlet Boxes.

    g. 514B, Conduit, Tubing, and Cable Fittings.

    h. 651, Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings.

    i. 797 Electrical Metallic Tubing – Steel.

    j. 870, Standard for Wireways, Auxiliary Gutters, and Associated Fittings.

    k. 886, Standard for Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

    l. 1660, Liquid-Tight Flexible Nonmetallic Conduit.

C. Comply with NECA "Standard of Installation."

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufactures are

acceptable:

1. Rigid metallic conduits:

    a. Allied Tube and Conduit Corporation.
    b. Triangle PWC Inc.
    c. Western Tube and Conduit Corporation.
    d. Wheatland Tube Company.
    e. LTV Steel Company.
    f. EASCO Aluminum.
    g. Indalex.
    h. VAW of American, Inc.

2. PVC coated rigid metallic conduit and repair kits:

    a. Calbond
    b. KorKap
    c. Perma-Cote
    d. Rob-Roy Ind.
    e. Raychem “GelTek” tape.
    f. Thomas & Betts O-Cal
    g. NEC Black Guard

3. Rigid non-metallic conduit:

    a. Carlon.
    b. Cantex.
    c. Heritage Plastics.
    d. Osburn Associates.
    e. Prime Conduit
    f. Champion Fiberglass.
    g. United Fiberglass of America, Inc.

4. Flexible metallic conduit:

    a. AFC Cable Systems.
    b. Anamet, Inc.
    c. Carlon.
    d. Electri-Flex.
    e. Flexible Metal Hose Company.
    f. International Metal Hose Company.
    g. Triangle PWC Inc.
    h. LTV Steel Company.

5. Flexible non-metallic conduit.

    a. Carlon
    b. Carflex.

6. Wireway:

    a. Hoffman Engineering Company.

b. Weigmann.
c. Square D.

7. Conduit fittings and accessories:

a. Appleton.
b. Carlon.
c. Cantex.
d. Crouse-Hinds.
e. Killark.
f. Osburn Associates.
g. OZ Gedney Company.
h. RACO.
i. Steel City.
j. Thomas and Betts.

8. Support systems:

a. Unistrut Building Systems.
b. B-Line Systems Inc.
c. Kindorf.
d. Minerallac Fastening Systems.
e. Caddy.

9. Outlet, pull, and junction boxes:

a. Appleton.
b. Crouse-Hinds.
c. Killark.
d. OZ Gedney Company.
e. Steel City.
f. RACO.
g. Bell.
h. Hoffman Engineering Company.
i. Wiegmann.
j. B-Line Circle AW.
k. Adalet.
l. Rittal.

10. Anti-seize compound:

a. Crouse-Hinds

2.02 RIGID METALLIC CONDUITS

A. PVC-Coated Rigid Steel Conduit (PVC-RGS):

1. Nominal 40 mil Polyvinyl Chloride (PVC) exterior coating:

a. Coating: Bonded to hot-dipped galvanized rigid steel conduit conforming to NEMA/ANSI C80.1.

b. The bond between the PVC coating and the conduit surface: Greater than the tensile strength of the coating.

2. Nominal 2 mil, minimum, urethane interior coating.

3. Urethane coating on threads.

4. Conduit: Epoxy prime coated prior to application of PVC and urethane coatings.

5. Female Ends:

a. Have a plastic sleeve extending a minimum of 1 pipe diameter or 2 in, whichever is less beyond the opening.

b. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used with it.

6. Standards: NEMA/ANSI C80.1, UL 6, NEMA RN 1.

B. PVC-Coated Rigid Aluminum Conduit (PVC-RAC):

1. Nominal 40 mil Polyvinyl Chloride (PVC) exterior coating:

a. Coating: Bonded to rigid aluminum conduit conforming to NEMA/ANSI C80.1.

b. The bond between the PVC coating and the conduit surface: Greater than the tensile strength of the coating.

2. Nominal 2 mil, minimum, urethane interior coating.

3. Urethane coating on threads.

4. Conduit: Epoxy prime coated prior to application of PVC and urethane coatings.

5. Female Ends:

a. Have a plastic sleeve extending a minimum of 1 pipe diameter or 2 in, whichever is less beyond the opening.

b. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used with it.

6. Standards: NEMA/ANSI C80.1, UL 6, NEMA RN 1.

C. Rigid Galvanized Steel Conduit (RGS):

1. Mild steel with continuous welded seam.

2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.

3. Threads galvanized after cutting.

4. Internal coating: Backed lacquer, varnish, or enamel for smooth surface.

5. Standards: NEMA/ANSI C80.1, UL 6.

6. Rigid Aluminum Conduit (RAC) is an acceptable alternative to RGS.

D. Electrical Metallic Tubing (EMT):

1. Mild steel with continuous welded seam.

2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.

3. Internal coating: Baked lacquer, varnish, or enamel for a smooth surface.

4. Standards: NEMA/ANSI C80.3, UL 797.

E. Rigid Aluminum Conduit (RAC):

1. AA Type 6063 aluminum allow, T-1 temper.

2. Maximum copper content of 0.10 percent.

3. Extruded, seamless.

4. Standards: NEMA/ANSI C80.5, UL 6.

2.03 RIGID NON-METALLIC CONDUIT

A. Schedules 40 (PVC-40) and 80 (PVC-80)

1. Polyvinyl-chloride (PVC) plastic compound which includes inert modifiers to improve weatherability and heat distribution.

2. Rated for direct sunlight exposure.

3. Fire retardant and low smoke emission.

4. Shall be suitable for use with 90 DegC wire and shall be marked “maximum 90 DegC”.

5. Standards: NEMA TC 2, UL 651.

B. Fiberglass:

1. Epoxy based resin system using an anhydride curing agent.

2. Continuous E-glass roving.

3. Winding angle approximately 54.75 degrees.

4. Halogen free additive for flame spread and smoke control.

5. Ultraviolet inhibitor: Carbon black.

6. Two (2) step curing process.

7. Tensile strength: 9000 psi per ASTM D2105.

8. Integral bell and spigot.

9. Conduits and fittings to be joined with an epoxy adhesive creating a water tight connection.

10. Standard: UL 1684.

2.04 Flexible Conduit

A. Flexible Galvanized Steel Conduit (FLEX):

1. Formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.

2. Standard: UL 360.

B. PVC-Coated Flexible Galvanized Steel (liquid-tight) Conduit (FLEX-LT):

1. Core formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.

2. Extruded PVC outer jacket positively locked to the steel core.

3. Liquid and vaportight.

4. Standard: UL 360.

C. Flexible non-metallic (liquid-tight) conduit (FLEX-NM):

1. Formed of a helically wound spiral of rigid PVC reinforcement embedded within a flexible PVC wall.

2. Layered construction with a smooth seamless inner core of flexible PVC that is bonded to a covering of flexible PVC.

3. Between the layers is a woven nylon mesh for reinforcement.

4. Standard: UL1660

2.05 Wireway

A. General:

1. Suitable for lay-in conductors.

2. Designed for continuous grounding.

3. Covers:

a. Hinged or removable in accessible areas.

b. Non-removable when passing through partitions.

c. Finish: Rust inhibiting primer and manufacturer's standard paint inside and out except for stainless steel type.

d. Standards: UL 870, NEMA 250.

B. General Purpose (NEMA 1 rated) Wireway:

1. 14 or 16 gage steel without knockouts.

2. Cover: Non-gasketed and held in place by captive screws.

C. Raintight (NEMA 3R rated) Wiring Trough:

1. 14 or 16 gage galvanized steel without knockouts.

2. Cover: Non-gasketed and held in place by captive screws.

D. Watertight (NEMA 4X rated) Wireway:

1. 14 gage type 304 or 316 stainless steel bodies and covers without knockouts and 10 gage stainless steel flanges.

2. Cover: Fully gasketed and held in place with continuous piano hinge with three-point latch.

3. Flanges: Fully Gasketed and bolted.

E. Dusttight (NEMA 12 rated) Wireway:

1. 14 gage steel bodies and covers without knockouts and 10 gage steel flanges.

2. Cover: Fully gasketed and held in place with continuous piano hinge with three-point latch.

3. Flanges: Fully gasketed and bolted.

2.06 CONDUIT FITTINGS AND ACCESSORIES

A. Fittings for use with RGS:

1. General:

a. In hazardous locations, provide fittings listed for use in Class I, Groups C

and D locations.

2. Locknuts:

   a. Threaded steel or malleable iron.
   b. Gasketed or non-gasketed.
   c. Grounding or non-grounding type.

3. Bushings:

   a. Threaded, insulated metallic.
   b. Grounding or non-grounding type.

4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.

5. Couplings:

   a. Threaded straight type: Same material and finish as the conduit with which they are used on.

   b. Threadless type: Gland compression or self-threading type, concrete tight.

6. Unions: Threaded galvanized steel or zinc plated malleable iron.

7. Conduit bodies (ells and tees):

   a. Body: Zink plated cast iron with threaded hubs.

   b. Standard and mogul size.

   c. Cover:

      1) Clip-on type with stainless steel screws.

      2) Gasketed or non-gasketed galvanized steel, zinc plated cast iron.

8. Conduit bodies (round):

   a. Body: Zinc plated cast iron.

   b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron.

9. Sealing fittings:

   a. Body: Zinc plated cast iron with threaded hubs.

   b. Standard and mogul size.

   c. With or without drain and breather.

d. Fiber and sealing compound: UL listed for use with the sealing fitting.

B. Fittings for use with RAC:

1. General:

a. In hazardous locations, provide fittings listed for use in Class I, Groups C and D locations.

2. Locknuts:

a. Threaded stainless steel.
b. Gasketed or non-gasketed.
c. Grounding or non-grounding type.

3. Bushings:

a. Threaded, insulated metallic.
b. Grounding or non-grounding type.

4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.

5. Couplings:

a. Threaded straight type: Same material and finish as the conduit with which they are used on.

6. Unions: Threaded copper free cast aluminum.

7. Conduit bodies (ells and tees):

a. Body: Copper free cast aluminum with threaded hubs.

b. Standard and mogul size.

c. Cover:

1) Clip-on type with stainless steel screws.

2) Gasketed or non-gasketed copper free cast aluminum.

8. Conduit bodies (round):

a. Body: Copper free cast aluminum.

b. Cover: Threaded screw on type, gasketed, copper free cast aluminum.

9. Sealing fittings:

a. Body: Copper free cast aluminum with threaded hubs.

b. Standard and mogul size.

c. With or without drain and breather.

d. Fiber and sealing compound: UL listed for use with the sealing fitting.

C. Fittings for use with PVC-RGS:

1. The same material and construction as those fittings listed under paragraph “Fittings for use with RGS” and coated as defined under paragraph “PVC Coated Rigid Steel Conduit (PVC-RGS).

D. Fittings for use with PVC-RAC:

1. The same material and construction as those fittings listed under paragraph “Fittings for use with RAC” and coated as defined under paragraph “PVC Coated Rigid Steel Conduit (PVC-RGS).

E. Fittings for use with EMT:

1. Connectors:

a. Straight, angle and offset types furnished with locknuts.

b. Zinc plated steel.

c. Insulated gland compression type.

d. Concrete and raintight.

2. Couplings:

a. Zinc plated steel.

b. Gland compression type.

c. Concrete and raintight.

3. Conduit bodies (ells and tees):

a. Body: Copper free aluminum with threaded hubs.

b. Standard and mogul size.

c. Cover:

1) Screw down type with steel screws.

2) Gasketed or non-gasketed galvanized steel or copper free aluminum.

4. Standard: UL 514B

F. Fittings for use with FLEX:

1. Connector:

a. Zinc plated malleable iron.
b. Squeeze or clamp type.

2. Standard: UL 514B.

G. Fittings for use with FLEX-LT and FLEX-NM:

1. Connector:

a. Straight or angle type.
b. Metal construction, insulated and gasketed.
c. Composed of locknut, grounding ferrule and gland compression nut.
d. Liquid tight.

2. Standards: UL 467, UL 514B.

H. Fittings for use with Rigid Non-Metallic PVC Conduit:

1. Coupling, adapters, and conduit bodies:

a. Same material, thickness, and construction as the conduits with which they are used.

b. Homogeneous plastic free from visible cracks, holes, or foreign inclusions.

c. Bore smooth and free of blisters, nicks or other imperfections which could damage the conductor.

2. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.

3. Standards: ASTM D2564, NEMA TC3, UL 651, UL 541B.

I. Fittings for use with Rigid Non-Metallic Fiberglass Conduit:

1. Coupling and adapters shall be of the same material, thickness, and construction as the conduit.

2. Epoxy adhesive for joining conduits and fittings shall be supplied by the same manufacturer as the conduit and fittings and shall provide a water tight connection.

3. Standard: UL 1684.

J. Weather and Corrosion Protection Tape:

1. PVC based tape, 10 miles thick.

2. Protection against moisture, acids, alkalis, salts and sewage and suitable for direct bury.

3. Used with appropriate pipe primer.

2.07 ALL RACEWAY AND FITTINGS

A. Mark Products:

1. Identify the nominal trade size on the product.

2. Stamp with the name or trademark of the manufacturer.

2.08 OUTLET BOXES

A. Metallic Outlet Boxes:

1. Hot-dip galvanized steel.

2. Conduit knockouts and grounding pigtail.

3. Styles:

a. 2 IN x 3 IN rectangle.
b. 4 IN square.
c. 4 IN octagon.
d. Masonry/tile.

4. Accessories:

a. Flat blank cover plats.
b. Barriers.
c. Extension, plaster or tile rings.
d. Box supporting brackets in stud walls.
e. Adjustable bar hangers.

5. Standards: NEMA/ANSI OS 1, UL 514A.

B. Cast Outlet Boxes:

1. Zinc plated cast iron or die-cast copper free aluminum with manufacturer's standard finish.

2. Threaded hubs and grounding screw.

3. Styles:

a. "FS" of "FD".
b. Single or multiple gang and tandem.
c. "EDS" or "EFS" for hazardous locations.

4. Accessories: 40 mil PVC exterior coating and 2 mil urethane interior coating.

5. Standards: UL 514A, UL 886.

C. Non-metallic Outlet Boxes:

1. Polyvinyl-chloride (PVC) plastic compound.

2. Rated for direct sunlight exposure.

3. Fire retardant and low smoke emission.

4. Suitable for use with 90 DegC wire.

5. Styles:

a. “FS” or “FD”.
b. Single or multiple gang.

6. Standard: UL 514A, NEMA TC 3.

D. See Specification 16140 for wiring devices, wallplates, and cover plates.

2.09 PULL AND JUNCTION BOXES

A. NEMA 1 Rated:

1. Body and cover: 14 gage minimum, galvanized steel or steel finished with rust inhibiting primer and manufacturer’s standard paint inside and out.

2. With or without concentric knockouts on four (4) sides.

3. Flat cover fastened with screws.

B. NEMA 3R Rated:

1. Body and cover: 14 gage minimum steel finished with rust inhibiting primer and manufacturer’s standard paint inside and out.

2. No knockouts.

3. Seams continuously welded and ground smooth.

4. Door with hinge and latch

C. NEMA 4X Rated (metallic):

1. Body and cover: 14 gage type 304 or 316 stainless steel.

2. Seams continuously welded and ground smooth.

3. No knockouts.

4. External mounting flanges.

5. Door with oil-resistant gasket.

D. NEMA 4X Rated (non-metallic):

1. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.

2. No knockouts.

3. External mounting flanges.

4. Hinged door with quick release latches and padlocking hasp.

5. Door with oil resistant gasket.

E. NEMA 7 and NEMA 9 Rated:

1. Cast gray iron allow or copper-free aluminum with manufacturer's standard finish.

2. Drilled and tapped openings or tapered threaded hub.

3. Cover bolted down with stainless steel bolts or threaded cover with neoprene gasket.

4. External mounting flanges.

5. Grounding lug.

6. Accessories: 40 mil PVC exterior coating and 2 mil urethane interior coating.

F. NEMA 12 Rated:

1. Body and cover:

a. 14 gage steel finished with rust inhibiting primer and manufacturer's standard paint inside and out.

b. Type 5052 H-32 aluminum, unpainted.

2. Seams continuously welded and ground smooth.

3. No knockouts.

4. External mounting flanges.

5. Non-hinged cover held closed with captivated cover screws threaded into sealed wells or hinged cover held closed with stainless steel screws and clamps.

6. Flat door with oil resistant gasket.

G. Miscellaneous Accessories:

1. Rigid handles for covers larger than 9 SF or heavier than 25 LBS.

2. Split covers when heavier than 25 LBS.

3. Weldnuts for mounting optional panels and terminal kits.

4. Tamper proof screws.

5. Terminal blocks: Screw-post barrier-type, rated 600 volt and 20 ampere minimum.

H. Standards: NEMA 250, UL 50

2.10 SPECIAL PURPOSE BOXES

A. Pedestal-Type Floor-Mounted or Counter-Mounted Duplex Receptacles:

1. Horizontal design housing with threaded conduit fittings in base with satin chromium finish.

B. Flush in Floor Duplex Receptacles:

1. Dual level, full adjustable box with power fittings and brass carpet flange.

2.11 SUPPORT SYSTEMS

A. Multi-conduit Surface or Trapeze Type Support and Pull or Junction Box Supports:

1. Material Requirements.

a. Galvanized steel: ASTEM A123 or ASTM A153.

b. Stainless steel: AISI Type 304 or 316.

c. PVC coated galvanized steel: ASTM A123 or ASTM A153 and 20 mil PVC coating.

d. Aluminum: AA Type 6063-T6.

e. Fiberglass: Fire-retardant polyester or vinylester resin, ASTM E84, UL 94.

B. Single Conduit and Outlet Box Support Fasteners:

1. Material Requirements:

a. Zinc plated steel.
b. Stainless steel, Type 304 or 316.
c. Malleable iron.
d. PVC coated malleable iron or steel: 20 mil PVC coating.

e. Steel protected with zinc phosphate and oil finish.

2.12 RACEWAY/DUCT SEALING COMPOUND

A. Use with explosion-proof fittings to separate hazardous areas from non-hazardous areas:

1. UL Listed compound

2. Crouse-Hinds Chico or approved equal.

3. Use fiber dam for vertical installation.

B. All other areas:

1. Non-hardening, putty-like consistency workable at temperatures as low as 35 F.

2. Compound shall not slump at temperature of 300 F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

PART 3 EXECUTION

3.01 RACEWAY INSTALLATION – GENERAL

A. Shall be in accordance with requirements of:

1. NFPA 70- NEC.
2. Manufacturer's instructions.

B. Size of Raceways:

1. Raceway sizes are shown on Drawings. If not shown on the Drawings, then size in accordance with NFPA 70.

2. Unless specifically indicated otherwise, the minimum raceway size shall be:
   a. Conduit: 1 IN.
   b. Wireway: 2-1/2 IN x 2-1/2 IN.

C. Field Bending and Cutting of Conduits:

1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.

2. Do not reduce the internal diameter of the conduit when making conduit bends.

3. Prepare tools and equipment to prevent damage to the PVC coating. Use strap wrenches only to tighten joints in PVC-RGS. Replace all conduit and fittings with damage to the PVC coating, such as cuts, nicks, and threader chuck jaw marks.

4. Degrease threads after threading and apply a zinc rich paint.

5. Deburr interior and exterior after cutting.

D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.

E. The protective coating integrity of conduits, fittings, outlet, pull and junction boxes and accessories shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint.

2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.

3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicon composition strip, followed by a protective coating of vinyl tape.

a. Total nominal thickness: 40 mil.

4. Repair surface which will be inaccessible after installation prior to installation.

F. Remove moisture and debris from conduit before wire is pulled into place.

1. Pull mandrel with diameter nominally ¼ IN smaller than the interior of the conduit, to remove obstructions.

2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.

3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.

G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.

H. Install pull wires in empty raceways. Leave not less than 12 IN of slack at each end of the pull wire.

I. Where portions of a raceway are subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent circulation of warm air to colder section of the raceway.

J. Fill openings in walls, floor, and ceilings and finish flush with surface.

1. Where penetrating CMU block walls, repair with cementitious grout and paint to match.

2. Where conduit terminates at a cable tray system, fit conduit with an insulated bushing.

3. When conduits are passing through a firewall or fire-rated floor into different rooms, cabinets, or enclosures, use a fire-rated seal.

K. Install explosion-proof seals in conduit runs crossing or entering a hazardous classified area. Install CSBE removable sealing fittings to seal submersible pump cables in the wet well and at the first junction box outside the well.

L. Conduit Stub-ups

1. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above finished slab.

2. Transition underground conduit to aboveground conduit at 90 DEG elbow where conduit transitions from horizontal to vertical conduit.

3. Where RGC or RAC is in contact with earth or concrete, wrap conduit with corrosion protective tap to 4 IN above finished grade.

4. Stub-up connections: Extend conduits for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs, and set flush with finished floor.

3.02 RACEWAY ROUTING

A. Raceways shall be routed in the field unless otherwise indicated.

1. Conduit and fittings shall be installed, as required, for a complete system that has a neat appearance and is in compliance with all applicable codes.

2. Run in straight lines parallel to or at right angles to building lines.

3. Install raceways level and square and at proper elevations. Provide adequate headroom.

4. Do not route conduits:

a. Through areas of high ambient temperature or radiant heat.
b. In suspended concrete slabs.

5. Conduit shall not interfere with, or prevent access to, piping, valves, ductwork, or other equipment for operation, maintenance and repair.

6. Provide pull boxes or conduit bodies as needed so that there is a maximum of 270 degrees of bends or 3-90 degree bends in the conduit run or in long straight runs to limit pulling tensions.

7. Make changes in direction of conduit using elbows or fittings. Do not use pull boxes to make direction changes unless specifically designated otherwise.

B. All rigid conduits within a structure shall be installed exposed except as follows:

1. As indicated on the Drawings.

2. Concealed above gypsum wall board or acoustical tile suspended ceilings.

3. Concealed within stud frame, poured concrete, concrete block and brick walls of an architecturally finished area.

4. Embedded in floor slabs or buried under floor serving equipment in non-architecturally finished areas that are not locate on or near a wall or column and the ceiling height is greater than 12 FT.

5. Embedded in floor slabs or buried under floor slabs where shown on the Drawings or with the Engineer's permission.

C. Maintain minimum spacing between parallel conduit and piping runs in accordance with the following when runs are greater than 30 FT:

1. Between instrumentation and telecommunication: 1 IN.

2. Between instrumentation and 125 V, 48 V, and 24 Vdc: 2 IN.

3. Between instrumentation and 600 V and less AC power or control: 12 IN.

4. Between instrumentation and greater than 600 Vac power: 12 IN.

5. Between telecommunication and 125 V, 48 V, and 24 Vdc: 2 IN.

6. Between telecommunication and 600 V and less AC power or control: 6 IN.

7. Between telecommunication and greater than 600 Vac power: 12 IN.

8. Between 125 V, 48 V, and 24 Vdc and 600 V and less AC power or control: 1 IN.

9. Between 125 V, 48 V, and 24 Vdc and greater than 600 V power or control: 2 IN.

10. Between process, gas, air, and water pipes: 6 IN.

D. Conduits shall be installed to eliminate moisture pockets.

1. Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.

E. Conduit shall not be routed on the exterior of structures except as specifically indicated on the Drawings.

F. Where sufficient room exists within the housing of roof-mounted equipment, the conduit shall be stubbed up inside the housing.

G. Provide all required openings in walls, floors, and ceilings for conduit penetration.

1. Repair penetrations to existing condition or better.

H. Conduit embedded in columns and floor slabs or buried under slab-on-grade:

1. Run in the most direct, practical route.

2. Not to be installed under equipment pads unless approved by Engineer.

3. No crossovers unless approved by Engineer.

4. To be backfilled with concrete during the installation of the slab-on-grade or to be placed, backfilled, and compacted in the slab subgrade, as indicated on drawings.

5. Secured in place to prevent movement during the backfill and pour.

I. Conduits and accessories embedded in concrete where shown on the Drawings:

1. Shall not be considered to replace structurally the displaced concrete except as indicated in the following:

a. Conduit and fittings shall not displace more than 4 percent of the area of the cross-section of a column on which stress is calculated or which is required for fire protection.

b. Size and locate sleeves or conduits passing through floors, walls, or beams so as not to significantly impair the strength of the construction.

c. Sleeves or conduits passing through floors, walls or beams may be considered as replacing the displaced concrete structurally in compression.

1) Shall not be exposed to rusting or other deterioration.
2) Nominal inside diameter shall not exceed 2 IN.
3) Minimum spacing: 3 DIA OC.

2. Shall not be larger in outside diameter than one-third the thickness of the slab, column, or beam.

3. Shall have a minimum spacing of 3 DIA OC.

4. In reinforced concrete construction:

a. Conduit shall not be run in beams.

b. Place conduit after reinforcing steel has been laid.

c. The reinforcement steel shall not be displaced by the conduit.

d. Provide a minimum of 1-1/2 IN of cover over conduit, excluding surface finish.

e. Conduits parallel to main reinforcement shall be run near the center of the

wall.

f. Conduits perpendicular to main reinforcement shall be run midway between wall or slab supports.

3.03 RACEWAY APPLICATIONS

A. Permitted Raceway Types Per Area Designations (unless specifically indicated on Drawings):

1. Dry areas:

a. RGS.
b. RAC.

2. Wet areas:

a. RGS.
b. RAC.

3. Exterior Corrosive areas (includes, but not limited to wastewater project sites):

a. PVC-RGS.
b. PVC-RAC.

4. Interior Corrosive areas (includes, but not limited to chemical rooms):

a. PVC-40.
b. PVC-80.
c. Fiberglass.
d. As indicated on drawings.

B. Permitted Raceway types per Routing Locations:

1. In stud framed walls:

a. EMT.

2. In concrete block or brick walls:

a. PVC-40.

3. Above acoustical tile ceilings:

a. EMT.
b. NEMA 1 rated Wireway.

4. Embedded in poured concrete walls and floors:

a. PVC-40
b. PVC-80
c. Fiberglass

d. PVC-RGS when emerging from concrete into areas designated as exterior and corrosive.

5. Beneath floor slab-on grade:

a. PVC-40
b. PVC-80
c. Fiberglass

6. Direct buried conduits and ductbanks:

a. PVC-40.

b. PVC-80.

c. Fiberglass.

d. 90 degree elbows for transition to above grade:

1) PVC-RGS.
2) Fiberglass.

e. Long sweeping bends greater than 15 degrees.

1) PVC-RGS.
2) Fiberglass.

7. Concrete encased ductbanks:

a. PVC-40.

b. PVC-80.

c. Fiberglass.

d. 90 degree elbows for transition to above grade:

1) PVC-RGS.
2) Fiberglass.

e. Long sweeping bends greater than 15 degrees.

1) PVC-RGS.
2) Fiberglass.

C. FLEX conduits shall be installed for connections to light fixtures, HVAC equipment and other similar devices above the ceilings.

1. The maximum length shall not exceed:

a. 6 FT to light fixtures.
b. 3 FT to all other equipment.

D. FLEX-LT and FLEX-NM conduits shall be installed as the final conduit connection to light fixtures, dry type transformers, motors, electrically operated valves, instrumentation primary elements, and other electrical equipment that is liable to vibrate.

1. The maximum length shall not exceed:

a. 6 FT to light fixtures.
b. 3 FT to motors.
c. 2 FT to all other equipment.

E. NEMA 1 Rated Wireway:

1. Surface mounted in electrical rooms.

2. Surface mounted above removable ceilings tiles of an architecturally finished area.

F. NEMA 3R Wiring Trough:

1. Surface mounted in exterior, non-corrosive locations.

G. NEMA 4X Rated Wireway:

1. Surface mounted in areas designated as corrosive.

H. NEMA 12 Rated Wireway:

1. Surface mounted in areas designated as dry in architecturally and non-architecturally finished areas.

3.04 CONDUIT FITTINGS AND ACCESSORIES

A. Conduit Seals:

1. Install in conduit systems located in hazardous areas as required by the NEC or as shown on Drawings.

B. Rigid non-metallic conduit and fittings shall be joined utilizing solvent cement.

1. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated ¼ turn to provide uniform contact.

C. Install Expansion Fittings:

1. Where conduits are exposed to the sun and conduit run is greater than 200 FT.

2. Elsewhere as identified on the Drawings.

D. Install Expansion/Deflection Fittings:

1. Where conduits enter a structure.

a. Except electrical manholes and handholes.
b. Except where the duct bank is tied to the structure with rebar.

2. Where conduits span structural expansion joints.

3. Elsewhere as identified on the Drawings.

E. Threaded connections shall be made wrench-tight.

F. Conduit joints shall be watertight:

1. Where subjected to possible submersion.

2. In areas classified as wet.

3. Underground.

G. Terminate Conduits:

1. In metallic outlet boxes:

a. RGS and RAC:

1) Conduit hub and locknut.
2) Insulated bushing and two (2) locknuts.
3) Use grounding type locknut or bushing when required by NEC.

b. EMT: Compression type connector and locknut.

2. In NEMA 1 rated enclosures:

a. RGS and RAC:

1) Conduit hub and locknut.
2) Insulated bushing and two (2) locknuts.
3) Use grounding type locknut or bushing when required by NEC.

b. EMT: Compression type connector and locknut.

3. In NEMA 12 rated enclosures:

a. Watertight, insulated and gasketed hub and locknut.
b. Use grounding type locknut or bushing when required by NEC.

4. In NEMA 3R, 4 and NEMA 4X rated enclosures:

a. Watertight, insulated and gasketed hub and locknut.

5. In NEMA 7 and NEMA 9 rated enclosures:

a. Into an integral threaded hub.

6. When stubbed up through the floor into floor mounted equipment:

    a. With an insulated grounding bushing on metallic conduits.
    b. With end bells on non-metallic conduits.

H. Threadless couplings shall only be used to join new conduit to existing conduit when the existing conduit end is not threaded and it is not practical or possible to cut threads on the existing conduit with a pipe threader.

3.05 CONDUIT SUPPORT

A. Permitted multi-conduit surface or trapeze type support system per area designations and conduit types:

1. Dry or wet and/ or hazardous areas:

    a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit straps.

    b. Aluminum system consisting of: Aluminum channels, fittings and conduit clamps with stainless steel nuts and hardware.

    c. Stainless steel system consisting of: Type 304 or 316 stainless steel channels and fittings, nuts and hardware and conduit straps.

2. Corrosive areas:

    a. PVC coated steel system consisting of: PVC coated galvanized steel channels and fittings and conduit clamps with stainless steel nuts and hardware.

    b. Fiberglass system consisting of: Fiberglass channel and fittings, and conduit clamps with stainless steel nuts and hardware.

    c. Stainless steel systems consisting of Type 304 or 316 stainless steel channels and fittings, nuts and hardware and conduit straps.

3. Conduit type shall be compatible with the support system material.

    a. Galvanized steel system may be used with RGS and EMT.

    b. Stainless steel system may be used with RGS, PVC-RGS and RAC.

    c. PVC coated galvanized steel system may be used with PVC-RGS, RAC, PVC-40, PVC-80, and Fiberglass.

    d. Aluminum system may be used with RAC and PVC-RGS.

    e. Fiberglass system may be used with PVC-40, PVC-80, PVC-RGS, and Fiberglass.

B. Permitted single conduit support fasteners per area designations and conduit types:

1. Architecturally finished areas:

a. Material: Zinc plated steel, or steel protected with zinc phosphate and oil finish.

b. Types of fasteners: Spring type hangers and clips, straps, hangers with bolts, clamps with bolts, and bolt on beam clamps.

c. Provide anti-rattle conduit supports when conduits are routed through metal studs.

2. Dry or wet and/or hazardous areas:

a. Material: Zinc plated steel, stainless steel and malleable iron.

b. Types of fasteners: Straps, hangers with bolts, clamps with bolts, and bolt on beam clamps.

3. Corrosive areas:

a. Material: Type 304 or 316 stainless steel or PVC coated malleable iron or steel. For indoor corrosive areas, non-metallic PVC or fiberglass straps may be used.

b. Types of fasteners: Straps, hangers with bolts, clamps with bolts, and bolt on beam clamps.

4. Conduit type shall be compatible with the support fastener material.

a. Zinc plated steel, steel protected with zinc phosphate and oil finish and malleable iron fasteners may be used with RGS and EMT.

b. Stainless steel system may be used with RGS, PVC-RGS, and RAC.

c. PVC coated fasteners may be used with PVC-RGS, RAC, PVC 40, and PVC-80.

d. Non-metallic fasteners may be used with PVC-40, PVC-80, and fiberglass.

C. Conduit Support General Requirements:

1. Maximum spacing between conduit supports per NEC.

2. Support conduit from the building structure.

3. Do not support conduit from process, gas, air, water piping or other conduits.

4. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS or to the maximum uniform load. Recommended by the

manufacturer if the support is rated less than 25 LBS.

a. Do not exceed the maximum concentrated load recommended by the manufacturer on any support.

b. Conduit hangers:

1) Continuous threaded rods combined with struts or conduit clamps: Do not use perforated strap hangers and iron bailing wire.

c. Do not use suspended ceiling support systems to support raceways.

d. Hangers in metal roof decks:

1) Utilize fender washers.
2) Not extend above top of ribs.
3) Not interfere with vapor barrier, insulation, or roofing.

5. Conduit support system fasteners:

a. Use sleeve-type expansion anchors as fasteners in masonry wall construction.

b. Do not use concrete nails and powder-driven fasteners.

3.06 OUTLET, PULL, AND JUNCTION BOX INSTALLATION

A. General:

1. Install products in accordance with manufacturer’s instructions.

2. Install approved thread grease on all plugs prior to installation.

3. Fill unused punched-out tapped, or threaded hub openings with insert plugs. Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.

B. Outlet Boxes:

1. Permitted uses of metallic outlet boxes:

a. Housing of wiring devices:

1) Recessed in all stud framed walls and ceilings.

2) Recessed in poured concrete, concrete block, and brick walls of architecturally finished areas and exterior building walls.

b. Pull or junction box:

1) Above gypsum wall board or acoustical tile ceilings.

2) Above 10 FT in an architecturally finished area where there is no ceiling.

2. Permitted uses of cast outlet boxes:

   a. Housing of wiring devices surface mounted in non-architecturally finished dry, wet, corrosive, and hazardous areas.

   b. Pull and junction box surface mounted in non-architecturally finished dry, wet, and corrosive areas.

3. Permitted uses of non-metallic outlet boxes:

   a. Housing of wiring devices surface mounted in non-architecturally finished corrosive areas.

   b. Pull and junction boxes mounted in non-architecturally finished corrosive areas.

4. Mount devices outlet boxes where indicated on the Drawings and at the following heights:

   a. Light switch (to center): 48 IN.
   b. Receptacle in architecturally finished areas (to center): 18 IN.
   c. Receptacle on exterior wall of building (to center): 18 IN.
   d. Receptacle in non-architecturally finished areas (to center): 48 IN.
   e. Telephone outlet in architecturally finished areas (to center): 18 IN.
   f. Telephone outlet for wall-mounted phone (to center): 54 IN.
   g. Pushbutton or selector switch control station (to center): 48 IN.

5. Set device outlet boxes plumb and vertical to the floor.

6. Outlet boxes recessed in walls:

   a. Install with appropriate stud wall support brackets or adjustable bar hangers so that they are flush with the face of the wall.

   b. Locate in ungrouted cell of concrete block with bottom edge of box flush with bottom edge of block and flush with the face of the block.

7. Place barriers between switches in boxes with 277 V switches on opposite phases.

8. Back-to-back installations are not permitted.

9. When an outlet box is connected to a PVC coated conduit, the box shall also be PVC coated.

C. Pull and Junction Boxes:

1. Install pull or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.

    a. Make covers of boxes accessible.

2. Permitted uses of NEMA 1 enclosure:

    a. Pull or junction box surface mounted above removable ceiling tiles of an architecturally finished area.

    b. Pull or junction box surface in a non-architecturally finished area.

3. Permitted uses of NEMA 3R enclosure:

    a. Pull or junction box surface mounted in dry and wet areas, unless stated otherwise in Drawings.

4. Permitted uses of NEMA 4X metallic enclosure:

    a. Pull or junction box surface mounted in areas designated as wet and/or corrosive.

5. Permitted uses of NEMA 4X non-metallic enclosure:

    a. Pull or junction box surface mounted in indoor areas designated as wet and/or corrosive where used with PVC-40 or PVC-80 conduit.

6. Permitted uses of NEMA 7 enclosure:

    a. Pull or junction box surface mounted in Class I hazardous areas.

        1) Provide PVC coating in corrosive areas when PVC-RGS conduit is used.

7. Permitted uses of NEMA 9 enclosure:

    a. Pull or junction box surface mounted in Class II hazardous areas.

        1) Provide PVC coating in corrosive areas when PVC-RGS conduit is used.

8. Permitted uses of NEMA 12 enclosure:

    a. Pull or junction box surface mounted in areas designated as dry.

END OF SECTION

SECTION 16119
UNDERGROUND DUCTS AND PULL BOXES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ducts
2. Duct banks
3. Pull Boxes

1.02 REFERENCES

A. American National Standards Institute (ANSI):

1. C2-93 - National Electrical Safety Code.

1.03 DEFINITIONS

A. Duct: General term for electrical conduit and other raceway, either metallic or nonmetallic, specified for use underground, embedded in earth or concrete.

B. Duct Bank: Group of two or more ducts in continuous run between two points.

C. Underfloor Conduits.

1. Conduits which run underground within perimeter of building walls under building floor. This may consist of one conduit, or several conduits grouped together.

D. Duct Bank Conduits

1. Conduits which run underground outside perimeter of building walls may consist of 1 conduit, or several conduits grouped together.

E. Underground Conduits

1. Underground conduits are both underfloor conduits and duct bank conduits.

F. Pull boxes: Below-the-surface enclosure in connection with ducts into which people reach, but do not enter, for purpose of installing, operating, or maintaining equipment or wiring.

1.04 SUBMITTALS

A. Submit all products covered under this specification for Engineer’s approval.

B. Submittals are not required if Contractor supplies materials or equipment of specified or named manufacturers. If Contractor proposes substitutions to material or equipment of specified or named manufacturers, submittals identified below are required.

1. Product data.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturers of precast pull boxes shall be firms regularly engaged in manufacturing factory-fabricated pull boxes, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 yrs.

B. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.

2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.

C. Regulatory Requirements:

1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store precast concrete units at site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

B. Lift and support precast concrete units only at designated lifting or supporting points.

1.07 SEQUENCING AND SCHEDULING

A. Coordination of Work:

1. Coordinate layout and installation of pull boxes with final arrangement of ducts as influenced by actual final location of other utilities in field.

2. Coordinate elevations of duct and raceway entrances into pull boxes with final profiles of ducts and raceways as determined by coordination with other utilities, underground obstructions, and buildings.

3. Establish locations and elevations to suit field conditions and assure duct banks run drain to pull boxes, or as shown on Drawings.

PART 2 PRODUCTS

2.01 DUCTS AND FITTINGS

A. Conform to Raceways, Section 16110.

2.02 DUCT BANK ACCESSORIES

A. Duct Supports: Rigid PVC spacers selected to provide minimum duct spacings and concrete cover depths indicated, while rigidly supporting ducts during concreting.

2.03 PULL BOXES AND ACCESSORIES

A. Frames and Covers: Cast iron conforming to ANSI C2, Rule 323. Furnish with cast-in legend, "Electric" or "Signal" as appropriate. Cover-to-frame bearing surfaces machined.

B. Sump Frame and Grate: Comply with FS RR-F-621, Type VII for frame, Type I for cover.

C. Pulling Eyes in Walls: Eyebolt with rebar fastening insert. 2-in. dia eye, 1-in. by 4-in. long bolt. Working load embedded in 6-in., 4,000 psi concrete: 13,000-lbs. minimum tension.

2.04 MASONRY (Not Applicable)

2.05 PRECAST MANHOLES AND HANDHOLES (Not Applicable)

2.06 RACEWAY/DUCT SEALING COMPOUND

A. Compound:

1. Non-hardening, putty-like consistency workable at temperatures as low as 35 F.

2. Compound shall not slump at temperature of 300 F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.

PART 3 EXECUTION

3.01 WIRING METHOD

A. General: Install ducts for wiring runs indicated. Provide sizes as indicated.

3.02 EXCAVATION AND BACKFILL

A. Excavation: Cut trenches neatly and uniformly, and slope uniformly to required pitch.

3.03 INSTALLATION OF DUCTS

A. Slope: Pitch ducts to drain towards manholes and handholes and away from buildings and equipment, unless otherwise shown on Drawings. Minimum slope shall be 4-in. in 100-ft. Where necessary to achieve this between manholes, slope ducts from high point in run to drain in both directions.

B. Curves and Bends: Use manufactured elbows for stub-ups at equipment and at building entrances. For other curves and bends, except as otherwise indicated, use manufactured long sweep bends with minimum radius of 25ft. in both horizontal and

vertical directions.

C. Make joints in ducts and fittings watertight in accordance with manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

D. Concrete-Encased Ducts: Support on plastic separators coordinated with duct size and required duct spacing, and install in accordance with following:

1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, and secure separators to earth and to ducts to prevent floating during concreting. Do not use tie wires or reinforcing steel in such way as to form conductive or magnetic loops around ducts or duct groups.

2. Reinforcing: Reinforce duct banks. Size and arrange reinforcing steel as indicated on Drawings.

3. Concreting: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not use power-driven agitating equipment unless specifically designed for duct bank application. Pour each run of envelope between manholes or other terminations in one continuous operation unless approved by Engineer. Where more than one pour is necessary, terminate each pour in vertical plane and continue duct bank reinforcing minimum of 18-in. beyond termination of pour.

4. Forms: Walls of trench may be used to form side walls of duct bank provided soil is self-supporting and concrete envelope can be poured without soil inclusions. Use forms where soil is not self-supporting.

5. Minimum Clearances: As Indicated on Drawings.

6. Depth: Except as otherwise indicated, top of duct bank shall be 24-in. below finished grade, minimum, in non-traffic areas, and 30 in. below finished grade, minimum, in vehicular traffic areas.

E. Stub-ups: Duct stub-ups to equipment shall be rigid steel, PVC-coated rigid steel, or rigid aluminum type conduit matching the above ground conduit requirements for the area. PVC conduit is not permitted to be used. For equipment mounted on outdoor concrete pads, steel conduit shall extend minimum of 5-ft. away from edge of pad. Install insulated grounding bushings on terminations. Couple steel conduits to ducts with adapters designed for purpose and encased concrete.

1. For galvanized rigid steel and aluminum conduit, wrap all portions of the conduit exposed to soil or concrete to 4” above finished grade with corrosion protection tape.

F. Sealing: For ducts to be wired in this Project, provide temporary closure at terminations. For spare ducts, seal bore of ducts at terminations. Use sealing compound and plugs as required to withstand 15 psi minimum hydrostatic pressure.

G. Pulling Cord: Provide 100-lb test nylon cord in ducts including spares.

H. Marker Tape: Provide plastic marker tape over ducts at 12 in. below finished grade.

3.04 INSTALLATION OF PULL BOXES, GENERAL

A. General:

1. Provide pull boxes of sizes, shapes, and locations as indicated.

2. Determine final elevation of ducts as influenced by possible adjustments in other utilities and surface features and discovery of underground obstructions before installing pull boxes. Obtain Engineer's approval for pull boxes installation adjustments necessitated by obstructions.

3. Install units plumb and level and with orientation and depth coordinated with arrangement of connecting ducts to minimize bends and deflections required for proper entrances.

B. Elevation:

1. Pull Boxes: Install flush with grade.

C. Drainage: Install drains in bottom of units where indicated. Arrange to coordinate with drainage provisions as indicated or specified.

3.05 CLEANING AND RESTORATION

A. Clean Ducts: Clean full length of ducts with a round bristle brush with dia ½-in. greater than internal diameter of duct.

B. Clean Pull Boxes: Clean internal surfaces of manholes including sump. Remove foreign material.

3.06 RESTORATION

A. Restore surface features at areas disturbed by excavation and reestablish original grades except as otherwise indicated.

B. Where sod has been removed, replace it as soon as possible after backfilling is completed.

C. Restore all areas disturbed by trenching, storing of dirt, cable laying, and other work to their original condition.

D. Include necessary top soiling, fertilizing, liming, seeding, sodding, sprigging, or mulching.

E. Restore disturbed paving as indicated.

END OF SECTION

SECTION 16120
600-VOLT BUILDING WIRE AND CABLE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for 600-volt building wire and cable.

1.02 REFERENCES

A. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA 70 - National Electrical Code (NEC), Article 310 - Conductors for General Wiring.

B. Underwriter's Laboratories (UL)

1. UL 83: Thermoplastic Insulated Wires and Cables

2. UL 1063: Machine Tool Wires and Cables

C. American Society for Testing and Materials (ASTM)

1. ASTM B3: Soft or Annealed Copper Wires

2. ASTM B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, Soft

D. Insulated Cable Engineers Association (ICEA), ICEA S-61-402: Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (NEMA WC-5).

1.03 SUBMITTALS

A. Submit the following for Engineer’s approval.

1. Manufacturer's cut sheets and catalog data

2. Instruction for handling and storage

3. Dimensions and weight

1.04 QUALITY ASSURANCE

A. Tests. Cable shall meet all the requirements of Part 6 of ICEA S-61-402.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Ship wire and cable on manufacturer's standard reel sizes unless otherwise specified. Where cut lengths are specified, mark reel footage accordingly. Each reel shall contain one continuous length of cable. Provide impact protection by wood lagging or suitable barrier across the traverse of the reel. Provide moisture protection by using manufacturer's standard procedure or heat shrinkable self-sealing end caps applied to both ends of the cable.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Alan Wire

B. American Insulated Wire Corporation

C. Cerro Wire

D. General Cable Company

E. Houston Wire & Cable

F. Okonite Company

G. Interstate Wire Company

H. Southwire

I. Service Wire Company

J. Encore Wire

K. Republic Wire, Inc

2.02 MATERIALS AND EQUIPMENT

A. Design. Provide cable designated as THWN/THHN or XHHW single conductor type and UL 83 and UL 1063 listed, rated 600 volts and certified for continuous operation at maximum conductor temperature of 90 degrees C in dry locations and 75 degrees C in wet locations while installed in underground duct, conduit or in control panels (MTW).

B. Conductors. Provide conductors which are Class B, concentric stranded, annealed un-coated copper with physical and electrical properties complying with ASTM B3 and B8 and Part 2 of ICEA S-61-402.

C. Insulation. Each conductor shall be PVC insulated and nylon jacketed to meet the requirements of Part 3 of ICEA S-61-402. The insulation thickness shall match the dimensions listed in NEC Table 310-13 for type THHN and THWN wire.

D. Wire Marking

1. Wire marking shall be in accordance with NEC Article 310-11 and shall be printed on the wire insulation at 2-foot intervals.

2. The printing method used shall be permanent and the color shall sharply contrast with the jacket color.

E. The single conductor color coding shall be as follows:

System Voltage	A	B	C	Neutral
120/208 Volt 3Ph/4w	Black	Red	Blue	White
120/240 Volt 3Ph/4w	Black	Orange	Blue	White
277/480 Volt 3Ph/4w	Black	Purple	Yellow	Grey

Motor Control	1	Black
	2	Red
	3	Blue
Ground		Green

PART 3 EXECUTION

3.01 PREPARATION

A. Complete the cable raceway systems and underground duct banks before installing cables.

B. Verify sizing of raceways and pullboxes to ensure proper accommodation for the cables.

C. Check the length of the cable raceway system against the length of cable on the selected reel.

D. Clean conduits of foreign matter before cables are pulled.

3.02 INSTALLATION

A. Wiring Methods

1. Use wiring methods indicated on the Drawings

2. In general, use THHN/THWN or XHHW building wire for lighting, power and control wiring were conductors are enclosed in raceways such as above ground conduit system, underground duct banks, or inside control panels.

3. Do not use solid conductors.

4. Use conductors not smaller than No. 12 AWG stranded for lighting circuits.

5. Use conductors not smaller than No. 14 AWG for control circuits, except when part of a multiconductor cable or internal panel wiring.

6. In general, do not splice conductors unless approved by the Engineer.

7. Splices associated with taps for lighting and control circuits are allowed without approval.

8. Make splices in accessible junction boxes.

9. Use wire nuts with insulated caps for lighting wiring splices. Splice control circuit with insulated crimp connectors.

B. Single Conductor in Conduit and Ductbank

1. Install cables in accordance with the manufacturer's instructions and NEC Chapter 3 – Wiring Methods and Materials. Do not exceed maximum wire tension, maximum insulation pressure and minimum bending radius.

2. Pull cables into conduits using adequate lubrication to reduce friction. Lubricants must not be harmful to the conductor insulation.

C. Preparation for Termination

1. Make 600-volt power cable terminations and splices with heat shrinkable sleeves and seals.

2. Terminal lugs and connectors for all sizes of conductors shall be crimp-on type.

3. For size 1/0 AWG and larger, crimp-on lugs shall have the long barrel with 2-hole tongues except in places where termination space is limited.

D. Tests

1. In general, test insulation integrity of the wiring system before terminating.

2. Make sure to disconnect sensitive electronic equipment before testing insulation.

3. Use a 500 VDC megohmmeter and perform the wire system insulation test in accordance with the operating instructions.

E. Termination

1. After the 600-volt wiring system has been tested with satisfactory results, reconnect wire.

END OF SECTION

SECTION 16131
DEVICE, PULL AND JUNCTION BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for device, pull, and junction boxes.

1.02 REFERENCES

A. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA).

1. FB1 - Fittings and Support for Conduits and Cable Assemblies

2. 250 - Enclosures for Electrical Equipment (1000 volts maximum)

B. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA70 - National Electrical Code (NEC) - Article 370 - Outlet Device, Pull and Junction Boxes, Conduit Bodies and Fittings.

C. Underwriters Laboratories (UL):

1. 50 - Safety Cabinets and Boxes

2. 508 - Safety Industrial Control Equipment

3. 514B - Safety Fittings for Conduit and Outlet Boxes

4. 886 - Safety Outlet Boxes and Fittings for Use in Hazardous Areas

1.03 SUBMITTALS

A. Submit all products covered under this specification for Engineer’s approval.

B. Manufacturer's cut sheets, catalog data

C. Instruction for handling and storage

1. Installation instructions

2. Dimensions and weights

1.04 DELIVERY, STORAGE AND HANDLING

A. Pack and crate boxes to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Cast Device Boxes

1. Appleton Electric Company

2. Crouse-Hinds, Division of Cooper Industries

3. Killark Electric Manufacturing Company

2.02 MATERIALS AND EQUIPMENT

A. Device Boxes

1. Provide UL-approved boxes designed and manufactured to house electrical devices like receptacles and switches, and in conformance with NEMA FB1 and NEC Article 370.

2. Supply boxes that are hot-dip galvanized on cast iron suitable for corrosive and 0 wet atmosphere.

B. Hardware

1. Mounting Hardware: Stainless steel

2. Conduit Connectors: Watertight as manufactured by Myers Hubs, or equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Review the drawings and determine how many boxes of each kind are required and check if supplied quantity is sufficient.

3.02 INSTALLATION

A. Boxes described in this specification shall be used both in dry and wet, corrosive areas, both inside and outside locations.

B. Install boxes in accordance with NEC Article 370 in locations indicated on the Drawings.

C. Install junction and pull boxes in readily accessible places to facilitate wire pulls, maintenance and repair.

D. Plug unused conduit openings.

E. Make conduit connections to sheet metal boxes with watertight conduit connectors.

END OF SECTION

SECTION 16140
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for wiring devices including:

1. Receptacles.

2. Wall switches.

3. Wall plates and cover plates.

1.02 REFERENCES

A. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA):

1. NEMA WD1 - General Purpose Wiring Devices.

2. NEMA WD6 - Dimensional Requirements.

B. Federal Specifications (WC-596F).

C. American National Standards Institute/National Fire Protection Association (NFPA):

1. NFPA No. 70 - National Electrical Code (NEC), Articles 210 Branch Circuits, 250 Grounding and 410, Paragraphs 56, 57 and 58.

1.03 SUBMITTALS

A. Submit all products covered under this specification for Engineer’s approval:

1. Manufacturer's product literature and specifications including dimensions, weights, certifications and instructions for handling, storage and installation.

1.04 DELIVERY, STORAGE AND HANDLING

A. Pack and crate devices to permit ease of handling and protect from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Bryant Electric

B. Crouse-Hinds, Arrow Hart Division

C. Hubbel Inc. Wiring Devices Division

D. Leviton Manufacturing Company

E. Pass & Seymour/Legrand.

2.02 MATERIALS AND EQUIPMENT

A. Standards: Conform to NEMA WD1 for general requirements and NEMA WD6 for dimensional requirements.

B. Manufacture devices to heavy-duty industrial specification grade with brown nylon bodies (orange for isolated-ground receptacles) back and side wiring provisions and green-colored grounding screws.

C. Receptacles:

1. Duplex-type receptacles: Rated 20 amps at 120 volts.

2. Contacts: Brass or phosphor bronze.

3. Receptacle grounding system: Extend to the mounting strap unless isolated ground is indicated or required.

4. GFI or GFCI (ground fault circuit interrupter) receptacles: Provide feed-through type with test and reset button.

D. Wall Switches:

1. Toggle switches: Rated 20 amps at 120/277 volts AC rated for both resistive and inductive loads.

2. Contacts: Silver cadmium oxide construction to prevent sticking, welding and excessive pitting.

E. Cover Plates:

1. Receptacles:

a. In outdoor areas, provide cover plates of cast metal, in-use type with stainless steel hardware.

b. In indoor, corrosive and/or wet areas, provide cover plates of polycarbonate type with stainless steel hardware.
c. All other plates: Type 302 stainless steel.

2. Wall Switches

a. In outdoor or corrosive or wet locations, provide cover plates of cast metal, gasketed with spring-loaded hinged covers and stainless steel hardware.
b. All other plates: Type 302 stainless steel.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that device boxes are correctly placed.

B. Verify that the correct quantity, size and type of wires are pulled to each device box.

C. Verify that wiring has been checked at both ends.

D. Prepare wire ends for connection to devices.

E. Inspect each wiring device for defects.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on top.

E. Connect wiring device grounding terminal to outlet box with bonding jumper.

F. Connect wiring devices by wrapping conductors clockwise around screw terminals.

G. Install cover plates on switch, receptacle and blank outlets in finished areas.

H. Energize and test devices for proper operation.

END OF SECTION

SECTION 16161
PANELBOARDS 480V

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for panelboards.

1.02 REFERENCES

A. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA)

1. NEMA AB1: Molded Case Circuit Breakers

2. NEMA PB1: Panelboards

3. NEMA PB1.1: Instruction for Safe Installation Operation and Maintenance of Panelboards rated 600 volts or less.

4. NEMA PB1.2: Application Guide for Ground-fault Protective Devices for Equipment

B. Federal Specifications, FS W-C-375A: Circuit Breakers, Molded Case, Branch Circuit and Service.

C. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA No. 70 - National Electrical Code (NEC), Article 384 - Switchboards and Panelboards.

1.03 SUBMITTALS

A. Submit the following under provisions of Section 01300 - Submittals:

1. Manufacturer's cut sheets and catalog data
2. Breaker arrangement
3. Breaker characteristic curves
4. Instruction for handling and storage
5. Installation instructions
6. Dimensions and weights

1.04 DELIVERY, STORAGE AND HANDLING

A. Have panelboards packed and crated to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Sheet Metal Boxes:

1. Eaton/Cutler-Hammer
2. General Electric
3. Siemens
4. Square D Company

2.02 MATERIALS AND EQUIPMENT

A. Basic Requirements:

1. Use panelboards manufactured and tested in accordance with NEMA PB 1.

2. Provide circuit breakers of industrial grade, manufactured and tested in accordance with NEMA AB 1 and Federal Specification FS W-C-375.

3. Do not exceed 42 available single pole branch circuits in any one panelboard.

B. Rating:

1. Voltage rating, current rating, number of phases, number of wires and number of poles are indicated on Drawings.

2. Branch circuit breaker interrupting capacity shall be minimum 10,000 ampere RMS symmetrical for 208V; 25,000 ampere RMS symmetrical for 480V.

C. Circuit Breakers: Molded case, bolt-on thermal magnetic type with number of poles and trip ratings as shown on the Drawings. Provide ground fault interrupters with trip rating where shown on the Drawings.

D. Bus System:

1. Bus Bars: 98 percent conductivity copper. Provide a solid neutral bar in 4-wire panelboards. Include ground bus in all panels. Provide split-bus panels where shown on Drawings.

2. Main: Circuit breaker or main lugs only as indicated on the Drawings or as required to meet the current interrupting ratings.

E. Box and Trim:

1. Construction: Code grade steel, ample gutter space, flush door, flush snaplatch and lock.

2. Trim: Surface or flush as required. Enclose panelboards located outdoors, or in other wet and corrosive areas in NEMA 4X weatherproof stainless steel enclosures. Enclose indoor panelboards in a NEMA 1 enclosure with manufacturer's standard gray enamel finish.

3. Directory: Typed card, with glass cover in frame on back of door giving the circuit numbers and the area or equipment served.

F. Conduit Connectors: Watertight as manufactured by Myers Hubs, or equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Review Drawings to verify that panelboards are correct for the application.

3.02 INSTALLATION

A. Install the panelboard in accordance with NEMA PB 1.1 and NEC Article 384.

B. Mount panelboards 6'-0" (to top of cabinet) above finished floor or grade.

C. In wet and corrosive areas, including outdoor locations, install panel enclosures on spacers to provide approximately 1/4-inch between back of cabinet and mounting surface.

D. In wet and corrosive areas, including outdoor locations, connect conduit to the bottom of enclosure and to the lower 30 percent of the sides using watertight connectors.

END OF SECTION

SECTION 16165
DISCONNECT SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for disconnect switches including:

1. Fusible disconnect switches
2. Non-fusible disconnect switches
3. Circuit breaker type disconnect switches
4. Fuses
5. Circuit breakers

1.02 REFERENCES

A. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA)

1. NEMA AB1: Molded Case Circuit Breakers
2. NEMA KS1: Enclosed Switches

B. Underwriters Laboratories (UL)

1. UL 98: Standard for safety enclosed switches and Dead Front Switches
2. UL 198C: High Interrupting Capacity Fuses, Current Limiting type
3. UL 198E: Class R Fuses

C. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA No. 70 - National Electrical Code (NEC), Article 380 - Switches.

1.03 SUBMITTALS

A. Submit all products covered under this specification for Engineer’s approval:

1. Manufacturer's cut sheets and catalog data
2. Switch internal arrangement
3. Breaker or fuse characteristic curves
4. Instructions for handling and storage
5. Installation instructions
6. Dimensions and weights

1.04 QUALITY ASSURANCE

A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term “NRTL” shall be defined in OSHA Regulation 1910.7.
2. Terms “listed” and “labeled” shall be defined in National Electrical Code, Article 100.

B. Single-Source Responsibility: Enclosed switches and circuit breakers shall be product of single manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

A. Have disconnect switches packed and crated to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Disconnect Switches and Circuit Breakers:

1. Eaton/Cutler-Hammer
2. General Electric
3. Siemens
4. Square D Company

B. Fuses:

1. Bussman Division, Cooper Industries
2. Mersen
3. Littelfuse Incorporated

2.02 MATERIALS AND EQUIPMENT

A. Disconnect Switches:

1. Characteristics: Horsepower rated, 300-volt, heavy-duty type with an interlocked door, positive quick-make, quick-break mechanism and visible blades.

2. Use switches and components designed, manufactured and tested in accordance with NEMA AB1, NEMA KS1, UL 98, and NEC Article 380.

3. Enclose switch in the enclosure type as stated on the drawings. If not stated on drawings, provide NEMA 12 type enclosure for indoor application and NEMA 3R type enclosure for outdoor applications except in corrosive areas. In corrosive areas, provide NEMA 4X (type 304 or 316 stainless steel).

4. Provide switches with provisions for padlocking the operating lever in OFF position and door in closed position.

5. Select switches having the number of poles and general size conforming to the Drawings.

6. Conform to fusible, non-fusible or circuit breaker type switch requirements as shown on Drawings or one-line diagrams.

7. Provide an auxiliary contact, shown on the Drawings.

8. Select fuses or circuit breakers with current interrupting duty as calculated for the

points of switch application or as indicated on the Drawings or one-line diagrams.

B. Fuses: Unless otherwise noted on Drawings, for fuses used in disconnect switches, provide the dual-element, time-delay type with the maximum interrupting rating of 200,000 amperes, conforming to the current NEC.

C. Circuit Breakers: When circuit breakers are used in disconnect switches, provide the thermal-magnetic type with current interruption ratings as required at the point of application.

D. Conduit Connectors: Watertight as manufactured by Myers Hubs, or equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Review the Drawings and verify the disconnect switches are correct for the applications.

B. Make sure that the correct fuses or breakers are being used regarding size and short circuit interrupting capability.

C. Prepare adhesive labels on the inside door of each switch indicating UL fuse class and size or breaker type and size for replacement.

3.02 INSTALLATION

A. Install disconnect switches in accordance with manufacturer's written instructions and NEC Article 380.

B. Mount switches 6'-6" (to top of cabinet) above finished floor or grade.

C. Install switches level and plumb.

D. In wet and corrosive areas, including outdoor locations, install switches on spacers to provide a space of approximate 1/4-inch between the back of cabinet and the mounting surface.

E. In wet and corrosive areas, including outdoor locations, connect conduit to the bottom of enclosure and to the lower 30 percent of the sides using watertight connectors.

3.03 ADJUSTING

A. Set field-adjustable enclosed switches and circuit breaker trip ranges as indicated.

3.04 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION

SECTION 16170
GROUNDING AND BONDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding electrodes and conductors
B. Equipment grounding conductors
C. Bonding
D. Power system grounding
E. Communication system grounding
F. Electrical equipment and raceway grounding and bonding
G. Control equipment grounding

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM B3: Soft or Annealed Copper Wires
2. ASTM B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, Soft
3. ASTM B33: Tinned Soft or Annealed Copper Wire for Electrical Purposes

B. Institute of Electrical and Electronics Engineers (IEEE):

1. IEEE 142-82: Recommended Practice for Grounding of Industrial and Commercial Power Systems

2. IEEE 383-2.5: IEEE Standard for Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations.

C. Underwriters' Laboratories (UL):

1. UL 83: Thermoplastic Insulated Wire and Cables
2. UL 467: Grounding and Bonding Equipment

D. National Fire Protection Association (NFPA), NFPA No. 70 - National Electrical Code (NEC), Article No. 250 - Grounding.

1.03 SUBMITTALS

A. Submit the following under the provisions of Section 01300 - Submittals:

1. Manufacturer's cut sheets and catalog data
2. Installation, terminating and splicing procedure
3. Instruction for handling and storage
4. Dimensions and weight

B. Submittals after construction

1. Report of field tests and observations certified by Contractor.

1.04 QUALITY ASSURANCE

A. Tests:

1. Use insulated cable conforming to requirements of the vertical tray flame test as described in IEEE 383-2.5.

2. Test grounding system in the field in accordance with procedures outlined in Part 3 - Execution.

1.05 DELIVERY, STORAGE AND HANDLING

A. Ship grounding cable on manufacturer's standard reel sizes unless otherwise specified. Where cut lengths are specified, mark reel footage accordingly. Each reel shall contain one continuous length of cable. Provide impact protection by wood lagging or suitable barrier across the traverse of the reel. Pack and crate other materials specified to withstand normal abuse during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Cable:

1. American Insulated Wire Company
2. Houston Wire & Cable
3. General Cable Company
4. Okonite Company
5. Interstate Wire Company
6. Southwire
7. Encore Wire

B. Ground Rods and Connectors:

1. Blackburn
2. Copperweld
3. Thomas & Betts

C. Exothermic Connections:

1. Burndy Corporation (Therm-O-Weld)
2. Erico Products (Cadweld)

D. Grounding Connectors:

1. Burndy Corporation
2. O.Z. Gedney
3. Thomas & Betts

2.02 MATERIALS AND EQUIPMENT

A. Design:

1. Provide grounding cable and materials with the following characteristics:

a. Use a grounding system designed in accordance with NEC Article No. 250 - Grounding, and the IEEE 142-82 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

B. Materials:

1. Use grounding conductors, bare or insulated, which are manufactured and tested in accordance with applicable standards ASTM B3, ASTM B8 and ASTM B33.

2. Where specified on Drawings, provide a main ground loop of No. 4/0 AWG, Class C stranded, bare copper cable. Small groups of isolated equipment may be grounded by a No. 2 AWG minimum insulated conductor connected to the main loop. Generally, taps shall be sized as follows:

a. Main ground loop or grid: #4/0 minimum
b. Switchgear, motor control centers and power transformers: #4/0
c. Motors 200 hp and above: #4/0
d. Power panels - AC and DC: #2/0
e. Control panels and consoles: #2
f. Building columns: #4/0
g. Fencing posts: #2/0

3. Where single conductor insulated grounding conductors are called for, use 600-volt insulation. Use ground conductors identified with green insulation or green tape marking.

4. Supply identifying ribbon which is PVC tape, 3 inches wide, red color, permanently imprinted with "CAUTION BURIED ELECTRIC LINE BELOW" in black letters as specified in Section 16195, Electrical Identification.

5. Utilize flexible copper braid across hinged chain link or fence gates to bond the movable portion to the grounded fence post.

PART 3 EXECUTION

3.01 PREPARATION

A. Complete site preparation and soil compaction before trenching and driving ground rods for the underground grid.

B. Verify from Drawings the exact location of stub-up points for grounding of equipment, fences and building or steel structures.

3.02 CONSTRUCTION CRITERIA

A. Install the main ground loop at a depth of at least 30 inches below earth surface. Connect the ground loop to ground rods and to tap connections to form a complete system as indicated on the electrical Drawings. The Contractor shall give special attention to the grounding of service equipment, structures and fences to comply with the NEC, local authorities and the serving utility company.

B. Electrical equipment, buildings, tanks, and other structures and equipment shall be grounded as indicated on the Drawings. Where ground rods are required, the rods shall be 20 feet long, 3/4-inch diameter, copper-clad steel ground rods, or as specified on the Drawings. Rods shall be driven vertically, and the top of the rods shall be a minimum of 18 inches below finished grade, or as specified on the Drawings.

C. Local pushbutton and selector switch stations, two-wire control devices, disconnect switches, lighting transformers, panelboards, operator panels, benchboards, and the enclosures of other electrical apparatus shall be grounded through an equipment grounding conductor run with the power supply or control circuit conductors or shall be grounded as shown on the Drawings.

D. Ground medium voltage motors, in addition to the grounding conductors in the motor feeder cable, with a separate No. 4/0 AWG cable to motor frame.

E. Motors having power supplied by multiconductor cable shall be grounded by a separate grounding conductor in the cable and where supplied by single conductor cable in conduit by a grounding conductor pulled in the conduit. Connect ground conductors to the ground bus in the motor control center and to the ground terminal provided in the motor conduit box.

F. Do not ground the insulated bearing pedestals of large motors.

G. Connect ladder-type cable trays to the grounding electrode system.

H. Install a warning ribbon approximately 12 inches below finished grade directly above the ground grid.

I. Connect fence posts of chain link and metal fences to the main ground loop at least every 50 feet.

3.03 INSTALLATION

A. Equipment Grounding:

1. Make grounding connections to surfaces, which are dry and cleaned of paint, rust, oxides, scales, grease and dirt to ensure good conductivity. Clean copper and galvanized steel to remove oxide before making welds or connections.

2. Use the exothermic welding process for below-grade grounding connections, except at ground rods. Use mechanical connectors or thermal connections for above-grade grounding connections as shown on the Drawings.

3. Make grounding connections to electrical equipment, vessels, mechanical equipment and ground rods in accordance with the Drawings.

4. Ground tanks and vessels by making connections to integral structural supports or to existing grounding lugs or pads, and not to the body of the tank or vessel.

5. Leave ground connections to equipment visible for inspection. Protect them with PVC non-metallic conduit as indicated on the Drawings.

6. Make connections to motor frames and ground buses with lugs attached to the equipment by means of bolts. Do not use motor anchor bolts or equipment housing for fastening lugs of grounding cable.

7. Where the wiring for lighting systems consists of single conductor cables in conduit, provide each conduit with an equipment-grounding conductor. Use a grounding conductor with green colored insulation and ground equipment in the lighting system.

B. Raceway and Support Systems Grounding:

1. Install raceway, cable rack or tray and conduit so that it is bonded together and permanently grounded to the equipment ground bus, according to the Drawings. Connection to conduit may be grounding bushing or ground clamp.

2. Install raceway at low voltage motor control centers or other low voltage control equipment so that it is bonded and grounded, except that any conduit which is effectively grounded to the sheet metal enclosure by bonding bushing or hubs need not be otherwise bonded.

3. Where a grounding conductor is run in or on a cable tray, bond the grounding conductor to each section of cable tray with a cable tray ground clamp.

4. Where only grounding conductor is installed in a metal conduit, bond both ends of the conduit to the grounding conductor.

5. Provide flexible "jumpers" around raceway expansion joints. Use copper bonding straps for steel conduit. Install jumpers across cable tray joints, which have been parted to allow for expansion and any hinged cable tray connections.

C. Fences and Gates:

1. Ground fences, fence posts and gates to the underground grid as shown on the Drawings.

D. Power System Grounding:

1. Solidly ground the secondary neutral of the main power supply transformer either to the ground grid or through an impedance. See Drawings for details.

2. Solidly ground the neutral of lighting, instrument and control transformers.

E. Cable Armor and Shields:

1. For shielded control cable, terminate and ground the shield at one end only, preferably at the control panel end for instrument and communication cable and at the supply end for electronic power cables. Maintain shield continuity by jumpering the ground shield across connection point where it is broken at junction boxes, or other splice points. Insulate these points from ground.

2. Connect the ground wire in power cable assemblies at each terminal point to a ground bus, if available, or to the equipment enclosure. Do not carry these ground wires through a "doughnut" current transformer (CT) used for ground fault relaying; do carry ground leads from stress cones through CTs. Ground power cable armor and shield at each terminal point.

F. Test Wells:

1. Provide access (test wells) for testing the ground grid system at one or several ground rod locations. Make test wells of a pipe surrounding the rod and connections with a cover placed on top at grade level. See Drawings for details.

3.04 FIELD QUALITY CONTROL

A. Test:

1. Perform ground resistance tests after underground installation and connections to building steel are complete, unless otherwise noted on applicable Drawings.

2. Make tests at each ground test well using a "fall of potential" test method. Each ground test well shall not exceed a maximum resistance of 5 ohms. Where measured values exceed this figure, install additional ground rods as required to reduce the resistance to the specified limit.

B. Inspection:

1. Inspection of the grounding system by the Engineer and the local Code Inspector must take place before the grid trenches are backfilled.

3.05 RESTORATION

A. Restore surface features at areas disturbed by excavation and reestablish original grades except as otherwise indicated.

B. Where sod has been removed, replace it as soon as possible after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other Work to their original condition.

D. Include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, or mulching.

E. Restore disturbed paving as indicated.

END OF SECTION

SECTION 16190
SUPPORTING DEVICES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Requirements of Division 16 "Basic Electrical Requirements" apply to this Section.

1.02 SECTION INCLUDES

A. Conduit and equipment supports.
B. Anchors and fasteners.
C. Strut.
D. Fittings.
E. Hangers.
F. Hanger rod.
G. Brackets.
H. Cable ties.
I. Spring vibration isolators.
J. Concrete Equipment Pads.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 16010:

1. Provide strut by no more than two (2) manufacturers.

2. Hanger and support schedule showing manufacturer's figure number, size, spacing, features, and application for each required type of hanger, support, sleeve, seal, and fastener to be used.

3. Shop drawings indicating details of fabricated products and materials.

4. Submittals in this section shall also be signed by the Structural Engineer and/or System Building Manufacturers where applicable.

1.04 QUALITY ASSURANCE:

A. Comply with the following:

1. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third-party certification follow-up services.

2. Comply with Federal Specification W-C-582A, FF-B-575C and FS-S-760A(2).

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

1. Slotted Metal Angle and U-Channel Systems:

    a. Allied Tube & Conduit
    b. American Electric
    c. B-Line Systems, Inc.
    d. GS Metals Corp.
    e. Unistrut Corporation

2. Hangers:

    a. Erico/Caddy
    b. Allied
    c. American Electric
    d. B-Line
    e. GS Metals
    f. Unistrut

3. Brackets:

    a. Erico
    b. Bowers
    c. Raco
    d. Steel City

4. Vibration Isolators:

    a. Amber/Booth
    b. Dynasonic
    c. Grinnell
    d. Mason Industries

2.02 COATINGS

A. Coating: Strut, fittings, hangers and hanger rod shall be ASTM A123 hot dip galvanized after fabrication. Hardware fasteners and clamps shall have ASTM B633 Type III SCI electroplated zinc coatings.

2.03 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps. Purlin hangers shall mount to the vertical member of the purlin or as otherwise required by building manufacturer and/or structural engineer.

B. Fasteners: Types, materials, and construction features as follows:

1. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using beam clamps.

2. Use steel springhead type toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

3. Fasteners for Damp or Wet Locations: Stainless steel screws and hardware.

4. Do not use powder-actuated anchors.

5. Do not drill structural steel members.

C. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50 deg F to 350 deg F. Provide ties in specified colors when used for color coding.

D. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.

E. U-Channel Systems (Strut): 12-gauge steel 1-5/8" x 1-5/8" minimum channels, with 9/16" x 1-1/8" maximum short slots at 2" on center maximum. Strut shall be cold formed per ASTM A570 GR33. Joints in strut system shall be made with 4 bolt accessories as a minimum. Conduit clamps to strut shall be bolt unistrut 1100, 1200, 1400 Series or equal.

F. Recessed Box Supports Brackets: Mount boxes with Erico/Caddy SGB Series, FBS Series or equal.

2.04 FIELD FABRICATED SUPPORTING DEVICES

A. General: Shop or field-fabricated supports or manufactured supports assembled from U-channel components.

B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

C. Pipe Sleeves: Provide pipe sleeves of one of the following:

1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:

a. 3-inch and smaller: 20-gauge.
b. 4-inch to 6-inch: 16-gauge.

c. over 6-inch: 14-gauge.

2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.

D. All Thread Rod: Hot dip galvanized, 1/4" minimum.

2.05 VIBRATION ISOLATORS

A. Hangers: Spring steel hangers shall be amber/booth BS Series or equal.

B. Pads: Provide ribbed neoprene pads amber/booth Type NR or equal.

PART 3 EXECUTION

3.01 GENERAL

A. Install supporting devices to fasten electric components securely and permanently in accordance with NEC, NECA and manufacturers requirements.

B. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.

2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.

3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration and shock resistant fasteners for attachments to concrete slabs.

C. Exclusions:

1. Do not fasten supports to ceiling system, pipes, ducts, mechanical equipment and conduit.

2. Tie wires and perforated pipe straps shall not be used for securing conduits.

3. Do not support loads from the bottom chord member of trusses or open web steel joists.

4. Do not attach conduit to ceiling support wires or ceiling tees.

5. Do not use powder-actuated anchors unless indicated by Architect or Structural Engineer.

6. Do not drill or cut structural members unless directed by Architect or Structural Engineer.

D. Touch up all scratches or cuts on steel components with an approval zinc chromate or a 90 percent zinc paint. Use PVC compound on PVC coated components.

3.02 CONDUIT, RACEWAYS AND SLEEVES

A. Fabricate supports form structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nut unless otherwise noted.

B. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four.

C. Install individual and multiple raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

D. Support parallel runs of horizontal raceways together on trapeze-type hangers. Where conduit is of different sizes, use the same trapeze hanger space supports for the smallest size conduit on the rack.

E. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use ¼-inch diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.

F. Branch circuit raceways which are 1-inch or smaller may be attached to wall studs by use manufactured clips.

G. Space supports for raceways in accordance with NEC.

H. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.

I. Sleeves: Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations. For sleeves through fire-rated wall or floor construction, apply UL-listed firestopping sealant in gaps between sleeves and enclosed conduits and cables.

3.03 BOXES AND WIRING DEVICES

A. Structural Mounting: They shall be rigidly supported from a structural member of the building either directly or by using a metal or wood brace. Support wires that do not provide rigid support shall not be permitted as the sole support.

B. Outlet or junction boxes in exposed or concealed ceilings, all thread rod, manufactured brackets shall be mounted to building structure, strut suspended from building structure. Do not support boxes with conduit only or with all thread rod.

C. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

D. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.

E. Use stamped steel bridges to fasten flush mounting outlet box between studs.

F. Metal braces shall be protected against corrosion and formed from metal not less than .020 inch (508 micrometers) thick uncoated.

G. Use adjustable steel channel fasteners for hung ceiling outlet box.

H. Do not fasten boxes to ceiling support wires or tees.

3.04 CABLE TRAYS

A. Cable tray shall be supported with strut, all thread rod and beam clamps at intervals no longer than as specified in Section 16114.

3.05 WIRES AND CABLES

A. Vertical Conductor Supports: Install simultaneously with installation of conductors.

3.06 BUSWAY

A. Provide hangers and supports by busway manufacturer at intervals indicated in Section 16466.

3.07 LIGHTING FIXTURES

A. Provide supports as indicated in Section 16510 and 16530.

3.08 INDOOR AND OUTDOOR WALL MOUNTED EQUIPMENT

A. This shall include but not be limited to cabinets, enclosures, disconnect switches, panelboards, motor controllers, VFD's, small transfer switches and wireways.

B. All cabinets and panelboards shall be wall mounted unless otherwise indicated.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboard one inch off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

3.09 INDOOR FLOOR MOUNTED EQUIPMENT

A. This shall include but not be limited to switchboards, dry type transformers and large transfer switches.

B. Free standing equipment shall be installed on concrete pads unless noted otherwise.

C. Concrete pads shall be 3" tall and be 2" wider than equipment on all 4 sides.

D. Concrete shall be 3000 PSI, 28 day compressive strength.

E. Concrete, forms and reinforcing shall be in accordance with Division 3.

F. Floor mounted transformers shall also be provided with neoprene vibration isolation pads.

3.10 INDOOR SUSPENDED EQUIPMENT

A. Equipment to be suspended shall be supported with strut, with all thread rod and beam clamps.

B. Transformers shall also have spring steel hanger vibration isolators.

3.11 INDOOR AND OUTDOOR RACK OR PEDESTAL MOUNTED EQUIPMENT

A. Equipment shall be rack or pedestal mounted only where indicated or required by installation.

B. Mount on strut bolted to concrete or anchored with concrete base when located outside.

3.12 OUTDOOR PAD MOUNTED EQUIPMENT

A. This shall include but not be limited to distribution transformers, switchgear, switchboards, dry type transformers, motor control centers and generators.

B. Concrete pads shall have a footprint 12" larger than equipment on all sides.

C. Concrete pads shall be 6" thick with 18" deep by 12" wide grade beams on all sides.

D. Concrete shall be 3000 PSI, 28 day compressive strength.

E. Provide 6" wire mesh in pad.

F. Provide 4#4 bar with #3 stirrups at 18" on center in grade beams.

END OF SECTION

SECTION 16195
ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Identification of electrical materials, equipment, and installations.

1.02 SUBMITTALS

A. Submit all products covered under this specification for Engineer’s approval.

B. Product Data:

1. Submit for each type of product specified.

C. Samples:

1. Submit for each color, lettering style, and or graphic representation required for identification materials, samples of labels and signs.

D. Miscellaneous:

1. Schedule of identification nomenclature to be used for identification signs and labels.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. National Electrical Code: Components and installation shall comply with NFPA 70.

B. Comply with ANSI C2.

PART 2 PRODUCTS

2.01 RACEWAY AND CABLE LABELS

A. Manufacturer's Standard Products:

1. Where more than one type is listed for specified application, selection is Installer's option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, or as specified elsewhere.

B. Conform to ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway or cable size.

1. Color: Black legend on orange field.

2. Legend: Indicates voltage.

C. Adhesive Labels:

1. Preprinted, flexible, self-adhesive vinyl. Legend is over-laminated with clear, wear and chemical resistant coating.

D. Pre-tensioned, Wraparound Plastic Sleeves:

1. Flexible, preprinted, color-coded, acrylic bands sized to suit diameter of line it identifies and arranged to stay in place by pre-tensioned gripping action when placed in position.

E. Colored Adhesive Tape:

1. Self-adhesive vinyl tape not less than 3-mils thick by 1 to 2-in. wide (0.08-mm thick by 25 to 51-mm wide).

F. Underground Line Warning Tape:

1. Permanent, bright-colored, continuous printed, vinyl tape with following features:

a. Size: Not less than 6-in. wide by 4-mils thick (152-mm wide by 0.102-mm thick).
b. Compounded for permanent direct burial service.
c. Embedded continuous metallic strip or core.
d. Printed Legend: Indicates type of underground line.

G. Tape Markers:

1. Vinyl or vinyl cloth, self-adhesive, wraparound type with preprinted numbers and letters.

H. Aluminum, Wraparound Marker Bands:

1. Bands cut from 0.014-in. (0.4-mm) thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

I. Plasticized Card Stock Tags:

J. Vinyl cloth with preprinted and field printed legends. Orange background, except as otherwise indicated, with eyelet for fastener.

K. Aluminum Faced Card Stock Tags:

1. Wear resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002-in. (0.05-mm) thick, laminated with moisture

resistant acrylic adhesive, and punched for fastener. Preprinted legends suit each application.

L. Brass or Aluminum Tags:

1. Metal tags with stamped legend, punched for fastener. Dimensions: 2 by 2-in. (51 by 51-mm) by 0.05-in. (1.3-mm).

2.02 ENGRAVED NAMEPLATES AND SIGNS

A. Manufacturer's Standard Products:

1. Where more than one type is listed for specified application, selection is Installer's option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, or as specified elsewhere.

B. Engraving stock, melamine plastic laminate, 1/16-in. (1.6-mm) minimum thick for signs up to 20-sq. in. (129-sq. cm), 1/8-in. (3.2-mm) thick for larger sizes.

1. Engraved Legend: Black letters on white face.
2. Punched for mechanical fasteners.

C. Baked Enamel Signs for Interior Use:

1. Preprinted aluminum signs, punched for fasteners, with colors, legend, and size as indicated or as otherwise required for application. 1/4-in. (6.4-mm) grommets in corners for mounting.

D. Exterior, Metal Backed, Butyrate Signs:

1. Wear resistant, non-fading, preprinted, cellulose acetate butyrate signs with 0.0396-in. (1-mm), galvanized steel backing, with colors, legend, and size appropriate to application. 1/4-in. (6.4-mm) grommets in corners for mounting.

E. Fasteners for Plastic Laminated and Metal Signs:

1. Self-tapping stainless steel screws or No. 10/32 stainless steel machine screws, with nuts, flat washers and lock washers.

2.03 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties:

1. Fungus inert, self-extinguishing, 1 piece, self-locking, Type 6/6 nylon cable ties with following features:

a. Minimum Width: 3/16-in. (5-mm).
b. Tensile Strength: 50-lb (22.3 kg) minimum.
c. Temperature Range: Minus 40 to 185°F (Minus 4 to 85°C).
d. Color: As indicated where used for color-coding.

B. Paint:

1. Alkyd-urethane enamel. Primer as recommended by enamel manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install identification devices according to manufacturer's written instructions.

B. Install labels where indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

C. Lettering, Colors, and Graphics:

1. Coordinate names, abbreviations, colors, and or designations used for electrical identification with corresponding designations used in Contract Documents or required by codes and standards. Use consistent designations throughout Project.

D. Sequence of Work:

1. Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.

E. Self Adhesive Identification Products:

1. Clean surfaces of dust, loose material, and oily films before applying.

F. Identify feeders over 600 V with "DANGER HIGH VOLTAGE" in black letters 2-in. (51-mm) high, stenciled with paint at 10-ft (3-m) intervals over continuous, painted orange background. Identify following:

1. Entire floor area directly above conduits running beneath and within 12-in. (305-mm) of basement or ground floor that is in contact with earth or is framed above unexcavated space.

2. Wall surfaces directly external to conduits concealed within wall.

3. All accessible surfaces of concrete envelope around conduits in vertical shafts, exposed in building, or concealed above suspended ceilings.

4. Entire surface of exposed conduits.

G. Install painted identification as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.

2. Prime Surfaces:

a. For galvanized metal, use single component, acrylic vehicle coating formulated for galvanized surfaces. For concrete masonry units, use

heavy duty, acrylic resin block filler. For concrete surfaces, use clear, alkali resistant, alkyd binder type sealer.

3. Apply one intermediate and one finish coat of silicone alkyd enamel.

4. Apply primer and finish materials according to manufacturer's instructions.

H. Identify Raceways and Exposed Cables of Certain Systems with Color Banding:

1. Band exposed and accessible raceways of systems listed below for identification.

a. Bands: Pre-tensioned, snap around, colored plastic sleeves; colored adhesive tape; or combination of both. Make each color band 2-in. (51-mm) wide, completely encircling conduit, and place adjacent bands of 2 color markings in contact, side by side.

b. Locate bands at changes in direction, at penetrations of walls and floors, at 50-ft (15 m) maximum intervals in straight runs, and at 25-ft (7.6 m) in congested areas.

c. Colors: As follows:

(1) Fire Alarm System: Red.
(2) Fire Suppression Supervisory and Control System: Red and yellow.
(3) Combined Fire Alarm and Security System: Red and blue.
(4) Security System: Blue and yellow.
(5) Mechanical and Electrical Supervisory System: Green and blue.
(6) Telecommunications System: Green and yellow.

I. Install Caution Signs for Enclosures Over 600 V:

1. Use pressure sensitive, self-adhesive label indicating system voltage in black, preprinted on orange field. Install on exterior of door or cover.

J. Install Circuit Identification Labels on Boxes:

1. Label externally as follows:

a. Exposed Boxes: Pressure sensitive, self-adhesive plastic label on cover.
b. Concealed Boxes: Plasticized card stock tags.
c. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.

K. Identify Paths of Underground Electrical Lines:

1. During trench backfilling, for exterior underground power, control, signal, and communications lines, install continuous underground plastic line marker located directly above line at 6 to 8-in. (150 to 200-mm) below finished grade. Where multiple lines installed in common trench or concrete envelope do not exceed an overall width of 16-in. (400-mm), use single line marker.

a. Install line marker for underground wiring, both direct buried and in raceway.

L. Color Code Conductors:

1. Secondary service, feeder, and branch circuit conductors throughout secondary electrical system.
   a. Field applied, color coding methods may be used in lieu of factory coded wire for sizes larger than No. 10 AWG.

      (1) Colored, pressure sensitive plastic tape in half-lapped turns for distance of 6-in. (150-mm) from terminal points and in boxes where splices or taps are made. Apply last 2 turns of tape with no tension to prevent possible unwinding. Use 1-in. (25-mm) wide tape in colors as specified. Adjust tape bands to avoid obscuring cable identification markings.

2. Colored cable ties applied in groups of 3 ties of specified color to each wire at each terminal or splice point starting 3-in. (76-mm) from terminal and spaced 3-in. (76-mm) apart. Apply with special tool or pliers, tighten to snug fit, and cut off excess length.

System Voltage	A	B	C	Neutral
120/240 Volt 1Ph/3w	Black	Red		White
120/208 Volt 3Ph/4w	Black	Red	Blue	White
120/240 Volt 3Ph/4w	Black	Orange	Blue	White
277/480 Volt 3Ph/4w	Brown	Purple	Yellow	Gray
Motor Control	1	Black		
	2	Red		
	3	Blue		
Ground				Green

M. Power Circuit Identification:

1. Use metal tags or aluminum wraparound marker bands for cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms.

   a. Legend: ¼-in. (6.4-mm) steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.

   b. Fasten tags with nylon cable ties; fasten bands using integral ears.

N. Apply identification to conductors as follows:

1. Conductors to Be Extended in Future: Indicate source and circuit numbers.

2. Multiple Power or Lighting Circuits in Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color coding for voltage and phase indication of secondary circuit.

3. Multiple Control and Communications Circuits in Same Enclosure: Identify each conductor by its system and circuit designation. Use consistent system of tags, color-coding, or cable marking tape.

O. Apply warning, caution, and instruction signs and stencils as follows:

1. Install warning, caution, and instruction signs where indicated or required to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items.

2. Emergency Operating Signs:

a. Install engraved laminate signs with white legend on red background with minimum 3/8-in. (9-mm) high lettering for emergency instructions on power transfer, load shedding, and or emergency operations.

P. Install identification as follows:

1. Apply equipment identification labels of engraved plastic laminate on each major unit of equipment, including central or master unit of each system. This includes communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Except as otherwise indicated, provide single line of text with ½-in. (13-mm) high lettering on 1-1/2-in. (38-mm) high label; where 2 lines of text are required, use lettering 2-in. (51-mm) high. Use white lettering on black field. Apply labels for each unit of following categories of equipment:

a. Panelboards, electrical cabinets, and enclosures.
b. Access doors and panels for concealed electrical items.
c. Electrical switchgear and switchboards.
d. Electrical substations.
e. Motor control centers.
f. Motor starters.
g. Push button stations.
h. Power transfer equipment.
i. Contactors.
j. Remote controlled switches.
k. Dimmers.
l. Control devices.
m. Transformers.
n. Inverters.
o. Rectifiers.
p. Frequency converters.
q. Battery racks.
r. Power generating units.
s. Telephone switching equipment.
t. Clock/program master equipment.
u. Call system master station.
v. TV/audio monitoring master station.
w. Fire alarm master station or control panel.

x. Security monitoring master station or control panel.

2. Apply designation labels of engraved plastic laminate for disconnect switches, breakers, push buttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm/signal components where labeling is specified elsewhere. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

END OF SECTION

SECTION 16460
TRANSFORMERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. General purpose, dry type transformers.

1.02 REFERENCES

A. Underwriters Laboratories, Inc. (UL):

1. UL 486A-80 - Wire Connectors and Soldering Lugs for Use with Copper Conductors.

2. UL 506-89 - Specialty Transformers.

1.03 SUBMITTALS

A. Submit the following for Engineer’s approval.

B. Product Data:

1. Dimensional plans and sections.

2. Wiring diagrams.

3. Manufacturer's nameplate data and electrical ratings.

1.04 QUALITY ASSURANCE

A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Terms "NRTL" shall be as defined in OSHA Regulation 1910.7.

2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.

B. Regulatory Requirements:

1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton/Cutler-Hammer

B. Square D.

C. General Electric.

D. Siemens

E. Or equal.

2.02 TRANSFORMERS, GENERAL

A. Transformers:

1. Factory-assembled and tested, air-cooled units of types specified, having characteristics and ratings as indicated.

2. Design unit for 60 Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

D. Internal Coil Connections: Brazed or pressure type.

E. Bolt coil/core to bottom of enclosure for transformers larger than 15 kVA.

1. Isolated by rubber, vibration-absorbing mounts.

2. Metal-to-metal contact between coil/core and enclosure not allowed.

F. Provide aluminum or copper windings.

G. Nameplates: Provide metal nameplate listing manufacturer's name, serial number, type, class, kVA voltage, frequency, and showing internal wiring diagram.

H. Sound Level: Meets sound levels for transformer type and size indicated when factory-tested in accordance with NEMA ST 20.

2.03 GENERAL PURPOSE, DRY TYPE TRANSFORMERS

A. Comply with NEMA ST 20.

B. Windings: 2-winding type. 3-phase transformers shall use 1 coil/ phase in primary and secondary.

C. Transformers shall have following features and ratings.

1. Enclosure: Indoor, ventilated unless otherwise shown on Drawings.

2. Insulation Class: 185°C or 220°C class for transformers 15 kVA or smaller; 220°C class for transformers larger than 15 kVA.

3. Insulation Temperature Rise: 80°C maximum rise above 40°C for 15 kVA and larger; 115°C maximum rise above 40°C below 15kVA.

4. Taps: For transformers 3 kVA and larger, full capacity taps in high voltage winding as follows.

   a. 3 through 10 kVA: Two 5% taps below rated high voltage.
   b. 15 through 500 kVA: Six 2-1/2% taps, 2 above and 4 below rated high voltage.
   c. 750 through 1,000 kVA: Four 2-1/2% taps, 2 above and 2 below rated high voltage.

D. Accessories: Following accessory items are required where shown on Drawings.

1. Wall Mounting Brackets: Manufacturer's standard brackets for transformers sized up to 75 kVA where wall mounting indicated.

2.04 CONTROL AND SIGNAL TRANSFORMERS

A. Comply with NEMA ST 1 and UL 506.

B. Ratings:

1. As indicated and for continuous duty.

2. Where rating not indicated, provide 125% of load.

C. Type: Self-cooled, 2-winding dry type.

D. Enclosure: Indoor, except as indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Arrange equipment to provide adequate spacing for cooling air circulation.

B. Tighten electrical connectors and terminals in accordance with manufacturer's published torque-tightening values. Where manufacturer's torque values not indicated, use those specified in UL 486A and 486B.

C. Install wall-mounted transformers on prefabricated brackets designed for purpose.

D. Touch up scratched or marred surfaces to match original finish.

E. Identify transformers as specified herein.

F. Install lightning arresters as shown on Drawings.

3.02 GROUNDING

A. Ground in accordance with Section 16452.

3.03 FIELD QUALITY CONTROL

A. Test and permanently record as follows.

1. Prior to energization of transformers, test phase-to-phase and phase-to-ground insulation resistance levels.

2. Test transformers for continuity of circuits and short-circuits.

3.04 ADJUSTING

A. Adjust transformer taps to provide optimum voltage conditions at utilization equipment.

3.05 CLEANING

A. Upon completion of installation, inspect interiors and exteriors of accessible components.

1. Remove paint splatters and other spots, dirt, and construction debris.

2. Touch up scratches and mars of finish to match original.

3.06 PROTECTION

A. Temporary Heating: Comply with manufacturer's written recommendations within enclosure of each transformer throughout periods during which equipment is not in a space continuously under normal control of temperature and humidity.

END OF SECTION

SECTION 16475
OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Overcurrent protective devices (OCPDs) rated 600 V and below and switching devices commonly used with them.

1.02 REFERENCES

A. National Electrical Manufacturers Association (NEMA).

1. NEMA AB1-86 - Molded Case Circuit Breakers and Molded Case Switches.

B. National Fire Protection Association (NFPA):

1. NFPA 70-90 - National Electrical Code (NEC).

C. Underwriters Laboratory (UL):

1. UL 98-87 - Enclosed and Dead Front Switches.

2. UL 486A-80 - Wire Connectors and Soldering Lugs for Use with Copper Conductors. Seventh Edition.

3. UL 489-86 - Molded-Case Circuit Breakers and Circuit-Breaker Enclosures. Seventh Edition.

1.03 DEFINITIONS

A. Overcurrent Protective Device (OCPD): Device operative on excessive current that causes and maintains interruption of power in circuit it protects.

B. Ampere-Squared-Seconds: Expression of available thermal energy resulting from current flow. With regard to current-limiting fuses and circuit breakers, ampere-squared-seconds during fault current interruption represents energy allowed to flow before fuse or breaker interrupts fault current within its current limiting range.

1.04 QUALITY ASSURANCE

A. Items provided under this section shall be listed and labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.

2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.

B. Regulatory Requirements:

1. Components and Installation:

a. NFPA 70 "National Electrical Code (NEC)."
b. Local codes and ordinances.

C. Single-Source Responsibility: Obtain similar OCPDs from single manufacturer.

PART 2 PRODUCTS

2.01 OVERCURRENT PROTECTIVE DEVICES (OCPDs), GENERAL

A. General: Provide OCPDs in indicated types, as integral components of panelboards, switchboards, and motor control centers; and also as individually enclosed and mounted single units.

B. All circuit breakers 1,000A or more shall be provided with ground fault protection of equipment unless noted otherwise on plans.

C. All circuit breakers 1,200A or more shall be installed with an arc energy reduction maintenance bypass switch and indicating light.

2.02 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers except as indicated:

1. Square D

2. General Electric

3. Eaton/Cutler-Hammer

4. Siemens

5. Or approved equal

B. UL 489 and NEMA AB 1.

C. Construction: Bolt-in type, except breakers in load-center-type panelboards and breakers 225-ampere frame size and larger may be plug-in type if held in place by positive locking device requiring mechanical release for removal.

D. Tripping Device: Quick-make, quick-break toggle mechanism with inverse-time delay and instantaneous overcurrent trip protection for each pole.

E. Adjustable Instantaneous Trip Devices: Factory adjusted to low-trip-setting current values.

F. Enclosure for Switchboard or Panelboard Mounting: Suitable for panel mounting in switchboard or panelboards where indicated.

G. Enclosure for Switchboard or Motor Control Center Mounting: Provide individual mounting where indicated.

H. Enclosure for Independent Mounting: NEMA Type 1 enclosure, as indicated or required to suit environment where located.

I. Combination Circuit Breakers and Ground-Fault Circuit Interrupters: UL 943 arranged for sensing and tripping for ground-fault current in addition to overcurrent and short-circuit current.

1. Match features and module size of panelboard breakers and provide clear identification of ground fault trip function.

2. Trip Setting for Ground Fault: 4 to 6 milliamperes, listed and labeled as Class A, Type 1 device.

3. Trip Setting for Ground Fault: 30 milliamperes.

J. Current-Limiting Circuit Breakers: Arranged to limit let-through ampere-squared-seconds during fault conditions to value less than ampere-squared-seconds of one-half-cycle wave of prospective symmetrical fault current. Circuit breaker shall use no fusible devices in its operation. Current-limiting characteristic shall be in addition to normal time-delay and instantaneous-trip characteristics and other features as indicated.

K. Circuit Breakers With Solid-State Trip Devices: Provide indicated circuit breakers with solid-state trip devices having following features:

1. Ambient Compensation: Trip device insensitive to temperature changes between minus 20C and plus 55C.

2. Adjustability: Breaker ratings and trip settings shall be changeable by operation of controls on front panel of breaker, by change of plug-in element without removing breaker from mounting, or by combination of 2 methods.

3. Ground-Fault Tripping: Adjustable for pick-up and time-delay values. Provide for indicated units.

4. Provide clear plastic shield limiting access to rating plug and adjustments on solid state trip circuit breaker. Seal by attaching sealing wire through hole in posts provided. With wire seal installed, circuit breaker rating plug and adjustments shall

not be "readily accessible."

2.03 INSULATED-CASE CIRCUIT BREAKERS

A. Manufacturers:

1. Square D
2. General Electric
3. Eaton/Cutler-Hammer
4. Siemens
5. Or approved equal

B. UL 489 and NEMA AB 1.

C. Ratings: Continuous-current, interrupting, and short-time-current ratings, and voltage and frequency ratings as indicated.

D. Operating Mechanism: Mechanically and electrically trip-free, stored-energy operating mechanism with following features:

1. Moving Contacts Closing Speed: Independent of both control and operator.

E. Circuit-Breaker Trip Devices: Solid-state overcurrent trip device system that includes 1 integrally mounted current transformer or sensor per phase, release mechanism, and following features:

1. Functions: Long-time-delay, short-time-delay, and instantaneous-trip functions, which are independent of each other in both action and adjustment.
2. Temperature compensation to assure accuracy and calibration stability from minus 20°C to plus 55°C.
3. Field-adjustable, time-current characteristics.
4. Current Adjustability: Effected by operating controls on front panel or by changing plug-in elements or current transformers or sensors.
5. Three bands for long-time- and short-time-delay functions marked "minimum," "intermediate," and "maximum."
6. Five pickup points, minimum, for long-time- and short-time-trip functions.
7. Six pickup points, minimum, for instantaneous-trip functions.
8. Ground fault protection with at least 3 short-time-delay settings and 37 trip-time-delay bands. Adjustable current pickup.

9. Trip Indication: Labeled lights or mechanical indicators on trip device shall indicate type of fault causing breaker trip. If lights are used, integral power source shall maintain indication for 60 hrs, minimum.

F. Auxiliary Contacts for Remote Indication: Where remote indication of breaker position is indicated, provide spare auxiliary switch in addition to other auxiliary switches required for normal breaker operation. Spare auxiliary switch shall consist of 2 Type "a" and 2 Type "b" stages (contacts), wired to terminal block in breaker housing.

G. Circuit-Breaker Features and Accessories: Include following:

1. Padlocking Provisions: For installing at least 2 padlocks on each breaker to secure its enclosure and prevent movement of draw out mechanism.

2. Operating Handle: Provide 1 for each manually operated breaker. No handle ties are permitted.

3. Electric Close Button: Provide 1 for each electrically operated breaker.

4. Indicating Lights: Contacts for "Breaker Open" and "Breaker Closed," for main and bus tie circuit breakers, and for other indicated breakers.

PART 3 EXECUTION

3.01 CONNECTIONS

A. Check connectors, terminals, bus joints, and mountings for tightness.

B. Tighten field-connected connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B.

3.02 GROUNDING

A. Provide equipment grounding connections for individually mounted OCPD units as indicated and as required by NEC. Tighten connectors to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounding.

B. Ground in accordance with Section 16452.

3.03 FIELD QUALITY CONTROL

A. Testing:

1. Reports: Prepare certified written reports on tests and observations. Report defective materials and workmanship and unsatisfactory test results. Include complete records of repairs and adjustments made.

2. Labeling: Upon satisfactory completion of tests and related effort, apply label to tested components indicating test results, date, and responsible person.

3. Schedule visual and mechanical inspections and electrical tests with at least 1 week's advance notification.

4. Pretesting: Upon completing installation of system, perform following preparations for tests:

    a. Make insulation resistance tests of OCPD buses, components, and connecting supply, feeder, and control circuits.
    b. Make continuity tests of circuits.
    c. Include full updating on final system configuration and parameters where they supplement or differ from those indicated in original Contract Documents.
    d. Comply with manufacturer's instructions for installation and testing of OCPDs.

5. Visual and mechanical inspection: Include following inspections and related work.

    a. Overcurrent-Protective-Device Ratings and Settings: Verify indicated ratings and settings to be appropriate for final system arrangement and parameters. Where discrepancies are found, test organization shall recommend final protective device ratings and settings. Use accepted revised ratings or settings to make final system adjustments.
    b. Inspect for defects and physical damage, NRTL labeling, and nameplate compliance with current single line diagram.
    c. Exercise and perform operational tests of mechanical components and other operable devices in accordance with manufacturer's instruction manual.
    d. Check tightness of electrical connections of OCPDs with calibrated torque wrench. Refer to manufacturer's instructions for proper torque values.
    e. Clean OCPDs using manufacturer's approved methods and materials.
    f. Verify installation of proper fuse types and ratings in fusible OCPDs.

6. Electrical Tests: Include following items performed in accordance with manufacturer's instructions:

    a. Insulation resistance test of OCPD conducting parts. Insulation resistance less than 100 megohms is not acceptable.
    b. Verify trip unit reset characteristics for insulated-case circuit breakers.
    c. Make adjustments for final settings of adjustable-trip devices.
    d. Activate auxiliary protective devices such as ground fault or undervoltage relays, to verify operation of shunt-trip devices.
    e. Check stored-energy charging motors for proper operation of motor, mechanism, and limit switches.
    f. Check operation of electrically operated OCPDs in accordance with manufacturer's instructions.

g. Check key and other interlock and safety devices for operation and sequence. Make closing attempts on locked-open and opening attempts on locked-closed devices including moveable barriers and shutters.

7. Retest: Correct deficiencies identified by tests and observations and retest. Verify by system tests that specified requirements are met.

3.04 CLEANING

A. Upon completion of installation, inspect OCPDs. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION

SECTION 16476
DISCONNECTS AND CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Service disconnects.

2. Feeder and equipment disconnects.

3. Enclosed circuit breakers.

1.02 SUBMITTALS

A. Submit the following for Engineer's approval.

B. Product Data:

1. Submit for switches, circuit breakers, and accessories.

2. Descriptive data and time-current curves for protective devices and let-through current curves for those devices with current-limiting characteristics. Include coordination charts and tables, and related data.

C. Shop Drawings:

1. Wiring diagrams detailing power and control wiring and differentiating clearly between manufacturer-installed wiring and field-installed wiring.

D. Test Results:

1. Field test reports indicating and interpreting test results.

E. Operating and Maintenance Data:

1. Maintenance data for tripping devices.

1.03 QUALITY ASSURANCE

A. Items provided under this section shall be listed or labeled by UL or other Nationally Recognized Testing Laboratory (NRTL).

1. Term "NRTL" shall be as defined in OSHA Regulation 1910.7.

2. Terms "listed" and "labeled" shall be as defined in National Electrical Code, Article 100.

B. Regulatory Requirements:

1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.

C. Single-Source Responsibility: Enclosed switches and circuit breakers shall be product of single manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Molded-Case Circuit Breakers:

1. Square D

2. Eaton/Cutler-Hammer

3. General Electric

4. Siemens

B. Combination Circuit Breaker and Ground Fault Trip:

1. Square D

2. Eaton/Cutler-Hammer

3. General Electric

4. Siemens

2.02 ENCLOSED CIRCUIT BREAKERS

A. Enclosed Molded-Case Circuit Breaker: NEMA AB 1, handle lockable with 2 padlocks.

B. Characteristics:

1. Frame size, trip rating, number of poles, and auxiliary devices as indicated

2. Interrupting capacity rating to meet available fault current, 10,000 symmetrical rms amperes minimum

3. Appropriate application listing when used for switching fluorescent lighting loads or heating, air conditioning, and refrigeration equipment.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install enclosed switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.

B. Install enclosed switches and circuit breakers level and plumb.

C. Install wiring between enclosed switches and circuit breakers and control/indication devices.

D. Connect enclosed switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts according to equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

3.02 ADJUSTING

A. Set field-adjustable enclosed switches and circuit breaker trip ranges as indicated.

3.03 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION

SECTION 16550
SPORTS LIGHTING

PART 1 GENERAL

1.01 SUMMARY

A. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

B. The purpose of these specifications is to define the lighting system performance and design standards for the Terraces at Arboretum Park Cricket Field using an LED Lighting source. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth in these specifications.

C. The sports lighting will be for the following venues:

1. Cricket Field

2. Parking Lot

D. The primary goals of this sports lighting project are:

1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed to not drop below specified target values for a period of 10 years.

2. Environmental Light Control: It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors.

3. Cost of Ownership: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.

4. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 10-year life cycle minimum. All communication costs for a 10-year period shall be included in the bid.

E. All lighting designs shall comply with Fort Bend County lighting ordinances. Lighting fixtures must include visors to limit light bleed.

1.02 LIGHTING PERFORMANCE

A. Illumination Levels and Design Factors: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number

of grid points specified below. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period.

Area of Lighting	**Average Target Illumination Levels**	**Maximum to Minimum Uniformity Ratio**	**Grid Points**	**Grid Spacing**
Cricket Wicket	45 foot-candles	2.0:1.0	10	10’ x 10’
Cricket Infield	45 foot-candles	2.0:1.0	110	20’ x 20’
Cricket Outfield	35 foot-candles	2.5:1.0	178	20’ x 20’
Parking Lot	3 foot-candles	10.0:1.0	-	10’ x 10’

B. Color: The lighting system shall have a minimum color temperature of 5700K and a CRI of 75.

C. Mounting Heights: Maximum mounting heights shall be as described below:

# of Poles	**Pole Designation**	**Pole Height**
4	P1 – P4	70’

1.03 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

B. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights. Illumination level shall be measured in accordance with the IESNA LM-5-04 after 1 hour warm up.

C. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified testing laboratory with a minimum of five years experience or by a manufacturer’s laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.04 COST OF OWNERSHIP

A. Manufacturer shall submit a minimum 10 year Cost of Ownership summary that includes energy consumption, anticipated maintenance costs, and control costs. All costs

associated with faulty luminaire replacement - equipment rentals, removal and installation labor, and shipping - are to be included in the maintenance costs.

PART 2 PRODUCTS

2.01 SPORTS LIGHTING SYSTEM CONSTRUCTION

A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired and tested.

B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

C. System Description: Lighting system shall consist of the following:

1. Galvanized steel poles and cross-arm assembly.

2. Lighting systems shall use concrete foundations or concrete encased galvanized steel poles. See Section 2.04 for details.

    a. For a foundation using a pre-stressed concrete base embedded in concrete backfill the concrete shall be air-entrained and have a minimum compressive design strength at 28 days of 3,000 PSI. 3,000 PSI concrete specified for early pole erection, actual required minimum allowable concrete strength is 1,000 PSI. All piers and concrete backfill must bear on and against firm undisturbed soil.

    b. For anchor bolt foundations or foundations using a pre-stressed concrete base in a suspended pier or reinforced pier design pole erection may occur after 7 days. Or after a concrete sample from the same batch achieves a certain strength.

    c. For concrete encased galvanized steel poles, the design shall include allowable stresses in accordance with latest AASHTO standards and wind speed criteria as stated in this specification.

3. Manufacturer will supply all drivers and supporting electrical equipment as follows:

a. Remote Drivers:

(1) Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure.

b. Integrated Drivers:

(1) Luminaires with integral drivers shall include a thermal isolated power supply with wide input range 208VAC-480VAC. Integrated power supply shall have efficiency greater than 95% for full load applied, hold up time greater than 25 ms, restrike time less than 3 sec, and less than 0.20% standby power consumed with primary output disabled.

(2) Luminaire enclosures shall be constructed as a single pressure cavity vessel system and include a breathable vent for pressure fluctuation reduction and increased seal life.

c. Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2_2002.

4. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.

5. All luminaires, visors, and cross-arm assemblies shall withstand 150 mi/h winds and maintain luminaire aiming alignment.

6. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.

a. Integrated grounding via concrete encased electrode grounding system.

b. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780.The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

D. Safety: All system components shall be UL listed for the appropriate application.

2.02 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:

1. Electric power: Per Plans.

2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

2.03 CONTROL

A. Instant On/Off Capabilities: System shall provide for instant on/off of luminaires.

B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum with pad-lockable exterior handle, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided on interior swing-out panel.

C. Dimming: System shall provide for 3-stage dimming (high-medium-low). Dimming will be set via scheduling options (Website, app, phone, fax, email).

D. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute “early off” commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

E. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

F. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaire outages, control operation and service. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

1. Cumulative hours: shall be tracked to show the total hours used by the facility.

2. Report hours saved by using early off and push buttons by users.

G. Communication Costs: Manufacturer shall include communication costs for operating the control and monitoring system for a period of 10 years.

H. Communication with luminaire drivers: Control system shall interface with drivers in electrical components enclosures.

2.04 STRUCTURAL PARAMETERS

A. Wind Loads: Wind loads shall be based on the 2015 International Building Code. Wind loads to be calculated using ASCE 7-10, an ultimate design wind speed of 140 mph and exposure category C.

B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2013 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-6).

C. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report.

D. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These drawings must be submitted at time of bid to allow for accurate pricing.

PART 3 EXECUTION

3.01 SOIL QUALITY CONTROL

A. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:

1. Providing engineered foundation embedment design by a registered engineer in the State of Texas for soils other than specified soil conditions;

2. Additional materials required to achieve alternate foundation;

3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.02 DELIVERY TIMING

A. Delivery Timing Equipment On-Site: The equipment must be on-site 6-8 weeks from receipt of approved submittals and receipt of complete order information.

3.03 FIELD QUALITY CONTROL

A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04.

B. Field Light Level Accountability

1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period. These levels will be specifically stated as “guaranteed” on the illumination summary provided by the manufacturer.
2. The contractor/manufacturer shall be responsible for conducting initial light level testing and an additional inspection of the system, in the presence of the owner, one year from the date of commissioning of the lighting.
3. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.
4. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.

3.04 WARRANTY AND GUARANTEE

A. 10-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for a minimum of 10 years from the date of shipment. Warranty shall guarantee specified light levels. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other manufacturers.

B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for 10 years from the date of equipment shipment. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Manufacturer is responsible for removal and replacement of failed luminaires, including all parts, labor, shipping, and equipment rental associated with maintenance. Owner agrees to check fuses in the event of a luminaire outage.

PART 4 DESIGN APPROVAL

4.01 PRE-BID SUBMITTAL REQUIREMENTS (PRE-APPROVAL)

A. Design Approval: The owner / engineer will review pre-bid submittals per section 4.01, B from all the manufacturers to ensure compliance to the specification 7 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.

B. Approved Products:

1. Musco's Light-Structure System™ with TLC for LED™

2. Techline Sports Lighting, LLC's CLIR 630W LED Sports Lighting System

C. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 7 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.

D. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 7 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.

E. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner's representative. Bids received that do not utilize an approved system/design, will be rejected.

REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED) 7 DAYS PRIOR TO BID

All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. Submit checklist below with submittal.

Yes/ No	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface.

			e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor.
	D	Off Field Lighting Design	Lighting design drawing showing initial spill light levels along the boundary line (defined on bid drawings) in footcandles. Lighting design showing glare along the boundary line in candela. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights.
	E	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	F	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	G	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of Texas, if required by owner.
	H	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system. They will also provide ten (10) references of customers currently using proposed system in the state of Texas.
	I	Electrical Distribution Plans	Manufacturer bidding an alternate product must include a revised electrical distribution plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the state of Texas.
	J	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of Texas.
	K	Project References	Manufacturer to provide a list of ten (10) projects where the technology and specific fixture proposed for this project has been installed in the state of Texas. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number.
	L	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	M	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	N	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.
	O	Cost of Ownership	Document cost of ownership as defined in the specification. Identify energy costs for operating the luminaires. Maintenance cost for the system must be included. All costs should be based on 10 Years
	P	Environmental Light Control Design	Environmental glare impact scans must be submitted showing the maximum candela from the field edge on a map of the surrounding area until 1500 candela or less is achieved.

The information supplied herein shall be used for the purpose of complying with the specifications for Sugar Land Park Cricket. By signing below, I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs

incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: _____ **Signature:** _____

Contact Name: _____ **Date:** _____/_____/_____

Contractor: _____ **Signature:**_____

END OF SECTION

Project Name:	**Sugarland Cricket Stadium**
Project City-State:	**Sugarland, TX**
Quote Date:	**10/25/2021**
Type of Field(s):	**CRICKET PITCH - 450' x 330'**
Photometrics Per Design #:	**30/24FC Avg. Light Levels / Design #21-3767-1**
Pole Top Elevation AG:	**TOP CROSSARM AT 75' ABOVE GRADE**
Warranty:	**Includes Our 10 Year Maintenance Free Warranty**

Quantity	Description
4	70 Foot Mounting Height Steel Poles - (120mph ASSHTO Wind)
1	14 Fixture Crossarms
2	15 Fixture Crossarms
1	19 Fixture Crossarms - **(14//5 Fixture Back-to-Back Crossarms)**
63	**CLIR** 630w LED w/ Visor
63	**CLIR** 20" Extended Visor
63	Prewiring for Poles and Crossarms
1	Standard Wireless Control Hub

Sports Lighting System Materials = $146,000.00

Project Notes:

- **Price includes all materials listed above (excluding adders & deducts).**
- **Price includes delivery to jobsite.**
- **Price firm for 30 days.**
- **Allow 2-3 weeks for delivery.**
- **Price does NOT include SALES or USE taxes.**
- **All work to be performed that requires a license, including but not limited to electrical & plumbing will be performed by individuals currently licensed in the proper jurisdiction.**

Warranty Notes:

- **Seller warrants that Equipment furnished or manufactured by Seller will be free from defects in material and workmanship for a period - of 10 years from date of shipment.**
- **Seller will replace any defective material for the entire 10 year period.**
- **Techline will make every effort to maintain any component of our sports lighting system for the entirety of the warranty period.**

Pole	x-loc	y-loc	height	N	M	W	Total	kw
P1	132.7	168.9	70ft	5	12	2	19	12.3
P2	-103.3	190.1	70ft	5	7	2	14	9.0
P3	-150.1	-141.9	70ft	6	7	2	15	9.7
P4	71.6	-226	70ft	9	5	1	15	9.7
Total				25	31	7	63	40.7

Infield
47 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 30
Maximum 37
Minimum 23
Avg:Min 1.29
Max:Min 1.61
Coef Var 0.10
UnifGrad 1.24

Outfield
80 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 25
Maximum 35
Minimum 17
Avg:Min 1.47
Max:Min 2.06
Coef Var 0.18
UnifGrad 1.62

Concrete Area
10 points at z=0, sp 0.352ft by 9.994ft
HORIZONTAL FOOTCANDLES
Average 35
Maximum 36
Minimum 34
Avg:Min 1.02
Max:Min 1.06
Coef Var 0.02
UnifGrad 0.04

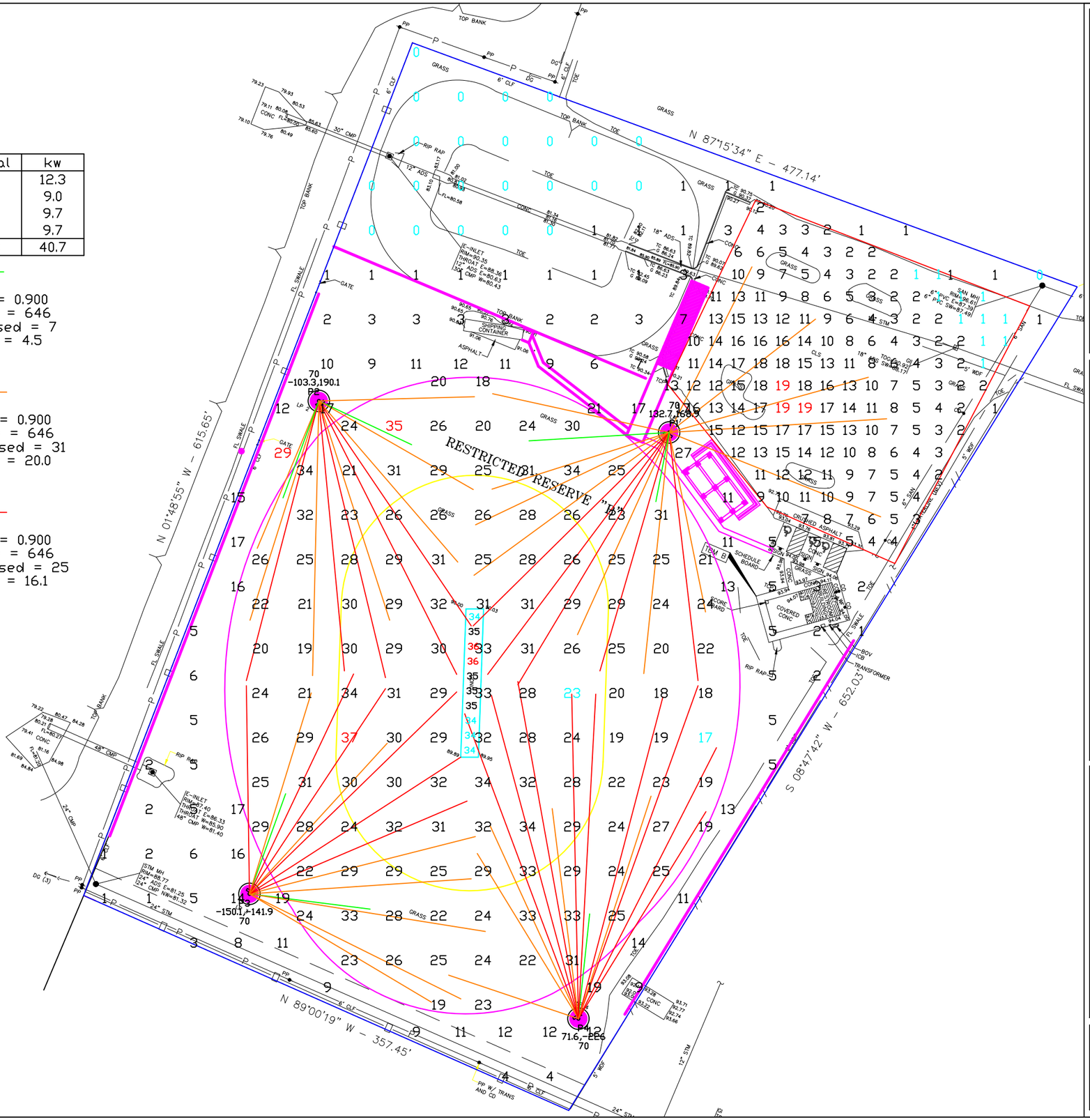
Parking Lot
154 points at z=3, sp 15ft by 15ft
HORIZONTAL FOOTCANDLES
Average 8
Maximum 19
Minimum 1
Avg:Min 8.15
Max:Min 19.00
Coef Var 0.65
UnifGrad 2.00

Spill Property Line
121 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 6
Maximum 29
Minimum 0
Avg:Min N/A
Max:Min N/A
Coef Var 1.13
UnifGrad N/A

W
CLIR 630 EV W
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 7
kw these luminaires = 4.5

M
CLIR 630 EV M
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 31
kw these luminaires = 20.0

N
CLIR 630 EV N
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 25
kw these luminaires = 16.1



CITY OF SUGAR LAND
CRICKET PITCH
SUGAR LAND, TX
CRICKET

1. THIS LIGHTING DESIGN IS BASED ON INFORMATION SUPPLIED BY OTHERS.SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.
3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
4. CALCULATIONS DO NOT TAKE INTO CONSIDERATION ANY OBSTRUCTIONS OR LIGHTING POLLUTION CAUSED BY NEIGHBORING LIGHT SOURCES.

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Date:10/25/2021
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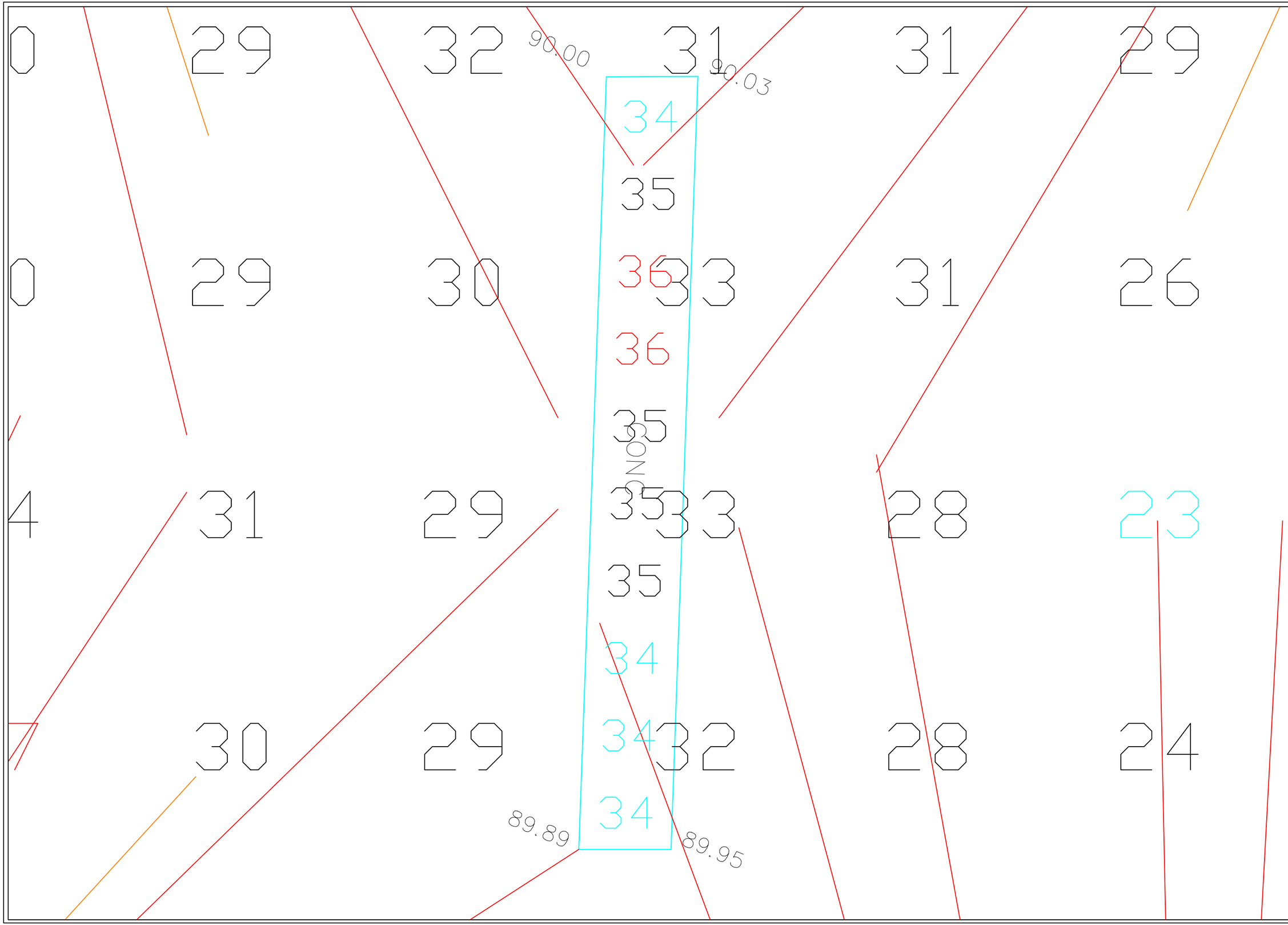
Page:1 of 2
Dwg #:21-3835



TECHLINE SPORTS LIGHTING powered by GEOSPORT

CITY OF SUGAR LAND
CRICKET PITCH
SUGAR LAND, TX
CRICKET

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GEOTECHNICAL INVESTIGATION

CRICKET FIELD AT ARBORETUM PARK

SUGAR LAND, FORT BEND COUNTY, TEXAS

PREPARED BY

THE MURILLO COMPANY
GEOTECHNICAL CONSULTANTS
HOUSTON, TEXAS

REPORT NUMBER

GEO2332021

REPORTED TO

FORT BEND COUNTY
AND
KALUZA, INC.
ROSENBERG, TEXAS

JUNE 2021

The Murillo Company
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GEOTECHNICAL INVESTIGATION
CRICKET FIELD AT ARBORETUM PARK
SUGAR LAND, FORT BEND COUNTY, TEXAS

INTRODUCTION

The study reported herein is an investigation of the subsurface conditions at the site of the proposed Upgrade to the Terraces at Arboretum Cricket Field, 15928 Old Richmond Road, Sugar Land, Fort Bend County, Texas (Key Map 527 Y).

AUTHORIZATION

This investigation was authorized on May 26, 2021 by Jaime Kovar, Purchasing Agent, Fort Bend County with P.O. # 2000349, in an agreement with this office for Geotechnical Engineering Services.

PURPOSE

The Purpose of this investigation was to evaluate the subsurface soil conditions in the subject development and provide recommendations for foundation design.

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SUBSURFACE EXPLORATION

The Subsurface Exploration at the site was accomplished by means of three (3) undisturbed sample core borings drilled to a depth of forty (40) feet below existing ground surface. Approximate locations of the borings are shown on the attached Boring Plan.

SUBSURFACE INVESTIGATION

The Subsurface Investigation consisted of drilling three (3) inch nominal diameter core borings. Undisturbed samples of the cohesive soils were obtained from the borings by means of thin-wall, seamless steel Shelby Tube samplers in accordance with ASTM Method D-1587.

All undisturbed samples were extruded mechanically from the core barrels in the field, classified, wrapped in aluminum foil and sealed in air-tight plastic bags to prevent moisture loss and disturbance. The samples were placed in core boxes and transported to our laboratory for testing and further study.

Where granular soils were encountered, they were sampled with a two (2) inch diameter split-barrel sampler in general accordance with ASTM Method D-1586. Driving resistance for the granular soils is recorded as "Blows per Foot" on the Boring Logs.

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LABORATORY INVESTIGATIONS

Boring Logs have been included in this report. The logs present visual descriptions of all soil strata encountered using the Unified Soils Classification System.

All samples from the borings were examined and classified in the laboratory by a senior soils technician or geotechnical engineer in accordance with the Unified Soils Classification System.

Laboratory tests were performed on selected soil samples in order to evaluate the engineering properties of the foundation medium in accordance with the ASTM Standards.

Undrained shear strengths of selected cohesive soils were determined by unconfined compression tests. The results of these tests are plotted on the Boring Logs as small solid circles.

Water content and dry unit weight of the foundation soils were determined as routine parts of the unconfined compression tests. Liquid and plastic limit tests were also performed on appropriate cohesive soils.

Estimated shear strengths of cohesive samples were also determined in the field with a calibrated hand penetrometer, and these values are plotted on the Boring Logs as open circles.

SUBSURFACE CONDITIONS

Specific types and depths of subsurface strata encountered at the site are shown on the attached Boring Logs. Review of the Boring Logs indicate that the generalized stratigraphy at the site is approximately as follows:

Depth, Feet	Description of Strata
0 - 2	Very stiff brown, dark gray, gray, red and tan clay (CH), FILL w/Surface Vegetation
2 - 7	Very stiff gray to tan and gray clay (CH) w/calcareous nodules
7 - 17	Very stiff red and gray clay (CH) w/calcareous nodules and slickensides
17 - 28	Firm to dense tan to reddish-tan silty fine sand (SM), dry to damp
28 - 40	Dense to firm reddish-tan silty fine sand (SM), waterbearing

Surface Soils

The near surface soils are "CH" type when classified by the Unified Soils Classification System. This type soil normally exhibits high swell potential when subjected to seasonal wetting and drying cycles.

Water Table

The boreholes were augered "dry" until the waterbearing strata was encountered twenty seven (27) feet to thirty two (32) feet below existing ground elevation. At these depths, drilling fluids were then used to advance the boreholes to the full depth explored at forty (40) feet. A final water level was not encountered due to the boreholes containing drilling fluids and requirement to seal the boreholes upon completion.

SUBSURFACE VARIATIONS

The information contained in this report summarizes conditions encountered on the date and at the locations where the borings were drilled. The depth to a static ground water table and subsurface soil moisture content will vary with seasonal and environmental variations, such as frequency and magnitude of rainfall and future construction activities, which may alter the surface and

drainage characteristics of the site. In cohesive soils, fluctuations in ground water depth occur over a longer period than in granular soils.

An accurate evaluation of the steady ground water level requires long-term measurements of monitoring wells and/or piezometers, which was beyond the scope of this study. The ground water level that might occur cannot be accurately predicted based on short-term exploration.

FAULT REVIEW

Based on our review published fault data and general knowledge of the area we are not aware of any active geological fault that may encroach on, or cross the proposed building site. A fault study was not part of our services. The locating of faults in the area would require a detailed fault study by a registered geologist.

SEISMIC SITE CLASS

According to Table 1615.1.1, Site Class Definitions of the IBC, 2006 Edition, the property is within Site Class D, which is a stiff soil profile.

The improvements to be constructed on the property should be designed to comply with all requirements of the applicable building code(s) that govern seismic design measures.

DESIGN ANALYSIS

Information provided to our office is the Upgrades to the Cricket Field will consist of a 20' x 40' Open Air Pavilion with concrete slab, and 60' tall Light Poles. Each phase of construction will be discussed in subsequent paragraphs.

OPEN AIR PAVILION

Based on an analysis of the Boring Logs and Laboratory Testing, it is our opinion the structural loads for the proposed Pavilion may be supported by either Square Spread Footings or Drilled and Underreamed Footings. Each will be discussed in subsequent paragraphs.

Square Spread Footings

Square Spread Footings should extend to a depth of approximately three (3) feet below existing ground surface into the very stiff clay strata.

Utilizing a minimum factor of safety of 3 for dead load or a minimum factor of safety of 2 for total load, the allowable bearing capacity of the foundation soils is given as 2,000 pounds per square foot for dead load or 3,000 pounds per square foot for total load. Where long continuous footings are used, they can be sized using 80% of the above design value.

Drilled and Underreamed Footings

Drilled and Underreamed Footings should extend to a depth of twelve (12) feet below existing ground surface.

Utilizing a minimum factor of safety of 3 for dead load or a minimum factor of safety of 2 for total load, the allowable bearing capacity of the foundation soils is given as 4,000 pounds per square foot for dead load or 6,000 pounds per square foot for total load.

An allowable side friction value of 500 pounds per square foot may be used if uplift pressures are considered. Lateral loads acting against drilled pier shafts should be based on a maximum 20 kips.

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Footing Installation

The footing excavation should be inspected by the Project's Engineer, Architect, or Owner's Representative prior to placing concrete to insure that (a) the footing has been constructed to the specified dimensions, at the correct depth and in the correct formation established by the previously mentioned criteria, (b) the footing is concentric with the pier shaft or column, and (c) excessive cuttings, build-up and any soft compressible materials have been removed from the bottom of the excavation.

Placement of concrete should be accomplished as soon as possible to prevent changes in the state of stress and caving of the foundation soils. The footing should be poured without the prior approval of the On-Site Geotechnical Engineer's Representative.

Foundation Settlement

A detailed settlement analysis was not within the scope of this study. It is anticipated that the footing designed using the recommended allowable bearing capacities will experience differential settlements that will be within the one (1) inch maximum this type structure can tolerate.

A Building Pad of twenty four (24) inches will reduce the PVR from 2.00 inches to approximately 1.0 inch.

Prior to placement of the building pad, existing vegetation, roots and deleterious materials should be cleared from the proposed building area. The clearing should extend at least three (3) feet beyond the building edges.

Once rough grade is established, the exposed surface should be proof-rolled in accordance with TxDOT Item 216 (2014). Any pockets of soft or weak soils encountered should be removed.

The material used to construct the building pad should consist of a select non-active, inorganic sandy clay type soil having a Plasticity Index (P.I.) between 8% to 25%.

Select fill material should be placed under laboratory control, in no greater than ten (10) inch loose layers, and compacted to a minimum 95% of Standard Proctor Density as determined by the ASTM D-698 Procedure, at Optimum Moisture Content (0 to +3%).

A modulus of subgrade reaction, k-value, of one hundred twenty (120) pounds per cubic inch (pci) may be used for design of the Floor Slab, provided the recommendations for the building pad subgrade preparation are followed.

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The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051

SURFACE DRAINAGE

The following drainage precautions should be observed during construction and maintained at all times after the structure has been completed:

(a) Backfill around the perimeter foundation walls should be compacted to a minimum 90% of Standard Proctor Density according to ASTM D-698 Procedure, at Optimum Moisture Content (0 to +3%)

(b) The ground surface around the perimeter foundation walls should have a minimum slope that provides positive drainage away from the structure a minimum ten (10) feet, or can be sloped to drain away from the structure in all directions on a maximum 1:12 slope

(c) Roof downspouts and other water collection systems should discharge well beyond the limits of the backfill, or perimeter grade beams. We suggest a minimum three (3) feet

(d) Perimeter grade beams should not be exposed more than eight (8) inches above final grade, in order to minimize moisture changes and erosion of the soil strata at bottom of grade beams

LANDSCAPING

The owner and design team should be made aware that placing large bushes and trees adjacent to the structure may contribute to future distress to the foundation system. Above grade planter boxes should be considered in lieu of landscape beds. If this landscape approach is not acceptable, vegetation placed in landscape beds adjacent to the structure should be limited to plants and shrubs that will not exceed a mature height of about four (4) feet. Large bushes and trees that will generally exceed this height should be planted at a reasonable distance away from the structure so that their canopy or "drip line" does not extend over the structure when the tree reaches maturity. Cut-off walls or barriers may be considered to prevent roots from existing trees and vegetation from affecting the foundation of the proposed structure. Watering of vegetation should be performed in a timely and controlled manner and prolonged watering should be avoided.

LIGHT POLES

Typically, Lightly Loaded Light Poles are supported by a Drilled Straight Shaft Foundation with a diameter of approximately two (2) feet to three (3) feet, depending on the height and weight of the structure. The drilled foundation depth does not usually extend below twenty (20) feet, depending on the subsurface strata encountered.

Based on the subsurface conditions encountered at this site, we recommend that the design parameters presented in Table I be used in design of the Drilled Straight Shaft Foundation. The net allowable end bearing capacity includes a safety factor of 3, and the side friction includes a safety factor of 2.

It is assumed that the lower sand strata can be waterbearing at the time of construction and would require slurry type installation.

A sufficient head of the water/fluid mixture (slurry) should be maintained to ensure that collapse of the sides of the hole does not occur when drilling through the waterbearing non-cohesive layers. Additional water and drilling fluids should be added as the hole is advanced to maintain the balance of pressure.

TABLE I
Recommended Design Parameters for Drilled Straight Shaft Footings

Boring No.	Depth Interval (ft.)	Effective Soil Unit Weight ($lb./ft.^2$)	Net Allowable End Bearing Capacity* ($lb./ft.^2$)	Passive Pressure Coefficient** K_p	Allowable Side Friction ($lb./ft.^2$)	Estimated Shear Strength Parameters	
						Undrained Cohesion ($lb./ft^2$)	Internal Friction Angle (°)
ALL	0 - 3	0	0	0	0	0	0
	3 - 17	120	4,000	3,200	300	500	0
	17 - 40	65	4,000	3,200	400	0	32

* The net allowable end bearing capacity refers to the pressure at the foundation bearing level in excess of the minimum surrounding overburden pressure. A penetration into the desired bearing strata of 3 ft. or half the pier diameter (whichever is smaller) should be achieved to use the recommended allowable values in the table. Where a stratum is underlain by a weaker stratum, the bottom of the footings in the stronger stratum should be at least one footing diameter above the top of the weaker stratum.

** Passive pressure in cohesive soils is based on a trapezoidal pressure distribution. Because of the potential for loss of contact due to shrinkage or strength loss due to wetting, we recommend that the passive resistance for soils in the upper 2 ft. of the final grade be neglected. Passive pressure, $_p = K_p z\gamma + 2c (\sqrt{K_p})$; where z is the depth of the footing below grade, γ is the effective soil unit weight above the footing bottom, and c is the undrained cohesion.

We assume that only one Drilled Straight Shaft Footing will be required to support a Light Pole. Should multiple footings be necessary, the minimum center-to-center spacing between adjacent drilled shafts should not be less than three (3) times the diameter of the larger shaft, to reduce excessive stress overlap from adjacent footings.

Footing Installation

Each footing excavation should be inspected by the On-Site Geotechnical Engineer's Representative prior to placing concrete to insure that (a) the footing has been constructed to the specified dimensions, at the correct depth and in the correct formation established by the previously mentioned criteria, (b) the footing is concentric with the pier shaft or column, and (c) the excessive cuttings, build-up and any soft compressible materials have been removed from the bottom of the excavation.

Placement of concrete should be accomplished as soon as possible to prevent changes in the state of stress and caving of the foundation soils. No footings should be poured without the prior approval of the On-Site Geotechnical Engineer's Representative.

Foundation Settlement

A settlement analysis was not included in the scope of services. Based on the design parameters, assumptions in this report and the soil conditions encountered, we anticipate that footings designed and constructed as recommended will experience maximum settlements of one (1) inch.

SITE PREPARATION

In order to remedy construction problems which may develop if attempts are made to work the surface materials following prolonged periods of rainfall, it is recommended that prior to starting any work at the site, proper construction drainage be provided to maintain a relatively dry construction site.

The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051

CONSTRUCTION MATERIALS TESTING

The Murillo Company (TMC) should be retained to provide Construction Materials Testing (CMT) and observation services during construction, particularly during all foundation installation and earthwork related activities.

As the Geotechnical Engineer of Record, it is important that our technical personnel provide these services to help ensure that our design recommendations are interpreted properly and that actual field conditions are those described in our geotechnical report.

With TMC's involvement in the project during the construction phase, we can help avoid potential problems before they become a significant issue. This can only be an effective process if our technical personnel routinely visit the project site and perform appropriate tests and observations during construction.

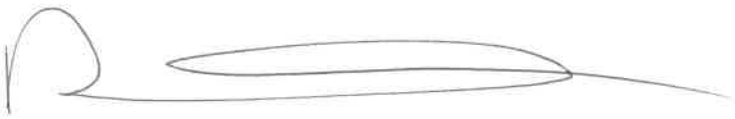
By continuing our involvement on the project after the geotechnical design phase, and by providing the CMT services during construction, a single point of contact is established for the owner regarding TMC's services for the project.

The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051

LIMITATIONS

This report is intended for the exclusive use of Client or Their Representative, and is applicable only for the property identified herein. As to any other property or project, this report is informational only and is not a recommendation for any design of any other sites. It is not to be used for any other purpose or property and is specifically not to be used as a basis to design any other structures. An environmental assessment of the site or identification or prevention of pollutants, hazardous materials or conditions was not in our scope of services for this project and any reference in this report is provided for information purposes only. Your receipt of this report signifies your agreement to hold harmless The Murillo Company from any liability whatsoever if this report is used for, or the basis of, a design of any other site structures.

Respectfully submitted,



Daniel Gutierrez, P.E.
President

The Murillo Company
F-2911

June 30, 2021

Copies submitted:

Kaluza, Inc. (1)
Fort Bend County (1)
File (1)

The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051

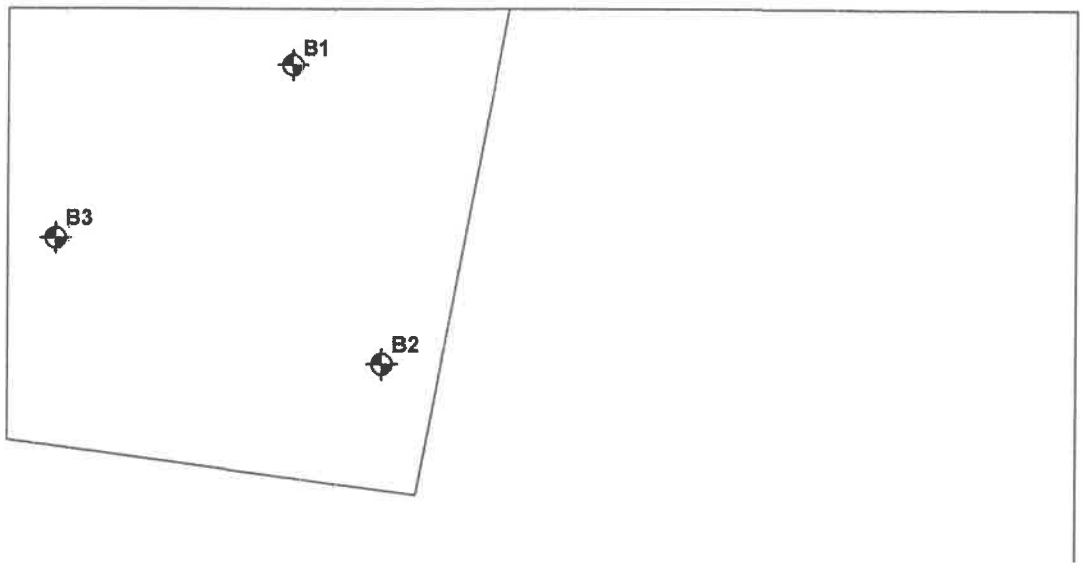
APPENDIX

Boring Plan

Boring Logs B1 thru B3

Test Methods Used

The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051



NOT TO SCALE

BORING PLAN
GEO2332021
JUNE 2021

BORING LOG **B1**

Sheet 1 of 1

The Murillo Company
10325 Landsbury Drive, Suite 400
Houston, TX, 77099
OFFICE: 281-933-9702

PROJECT: CRICKET FIELD @ ARBORETUM PARK
PROJECT NO.: GEO2332021
LOCATION: SEE BORING PLAN
DATE: 6-15-21

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT
0			Very stiff gray, red and tan clay (CH), FILL w/Surface Vegetation	105	18	54	20	34			
			Very stiff gray clay								
5			Very stiff tan and gray clay w/calcareous nodules	109	17						
			Very stiff red and gray clay w/calcareous nodules	111	16	59	21	38			
10											
			Very stiff red and gray clay w/calcareous nodules and slickensides	101	24						
15											
			Firm tan silty fine sand, dry								13
20											
			Dense reddish-tan silty fine sand, damp								14
25											
											43
30			▽								
			Dense reddish-tan silty fine sand, waterbearing								32
35											
											44
40			Termination depth = 40 feet depth								

SHEAR STRENGTH, tsf
○ POCKET PENETROMETER
● LABORATORY UNCONFINED
0.5 1.0 1.5 2.0 2.5

WATER OBSERVATIONS:
▽: WATER ENCOUNTERED AT 32.0 FT. DURING DRILLING.

LOG A GNGN05 GEO2332021.GPJ LOG A GNGN05.GDT 6/30/21

BORING LOG **B2**

The Murillo Company
10325 Landsbury Drive, Suite 400
Houston, TX, 77099
OFFICE: 281-933-9702

PROJECT: CRICKET FIELD @ ARBORETUM PARK
PROJECT NO.: GEO2332021
LOCATION: SEE BORING PLAN
DATE: 6-15-21

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT
0			Very stiff brown and dark gray clay (CH), FILL w/Surface Vegetation								
			Very stiff tan and gray clay w/calcareous nodules	109	18	51	20	31			
5			Very stiff red and gray clay w/calcareous nodules and slickensides	105	21						
10			Very stiff red and gray clay, slickensided	94	27	84	27	57			
15			Dense tan silty fine sand, dry								32
20			Dense reddish-tan silty fine sand, damp								37
25			▽ Dense reddish-tan silty fine sand, waterbearing								32
30			Firm reddish-tan silty fine sand, waterbearing								26
35											24
40			Termination depth = 40 feet depth								

SHEAR STRENGTH, tsf
○ POCKET PENETROMETER
● LABORATORY UNCONFINED
0.5 1.0 1.5 2.0 2.5

WATER OBSERVATIONS:
▽: WATER ENCOUNTERED AT 27.0 FT. DURING DRILLING.

LOG A GNGN05 GEO2332021.GPJ LOG A GNGN05.GDT 6/30/21

BORING LOG **B3**

The Murillo Company
10325 Landsbury Drive, Suite 400
Houston, TX, 77099
OFFICE: 281-933-9702

PROJECT: CRICKET FIELD @ ARBORETUM PARK
PROJECT NO.: GEO2332021
LOCATION: SEE BORING PLAN
DATE: 6-15-21

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT
0			Very stiff brown and dark gray clay (CH), FILL w/Surface Vegetation								
2			Very stiff tan and gray clay w/calcareous nodules	110	17	54	20	34			
5			Very stiff red and gray clay w/calcareous nodules and slickensides	101	21	70	24	46			
10			Very stiff red and gray clay, slickensided	98	25						
15			Firm tan silty fine sand, dry								19
20											26
25			Dense tan silty fine sand, dry								44
30			Firm reddish-tan silty fine sand, waterbearing ▽								22
35											25
40			Termination depth = 40 feet depth								

SHEAR STRENGTH, tsf
○ POCKET PENETROMETER
● LABORATORY UNCONFINED
0.5 1.0 1.5 2.0 2.5

WATER OBSERVATIONS:
▽ : WATER ENCOUNTERED AT 32.0 FT. DURING DRILLING.

LOG A GNGN05 GEO2332021.GPJ LOG A GNGN05.GDT 6/30/21

The Murillo Company
10325 LANDSBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051

TEST METHODS USED (If Applicable)

ASTM D421 – Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constant

ASTM D422 – Particle Size Analysis of Soils

ASTM D698 – Moisture Density Relations (Standard Proctor)

ASTM D854 – Specific Gravity of Soils

ASTM D1140 – Amount of Material in Soils Finer than No. 200 Sieve

ASTM D1557 – Moisture Density Relations (Modified Proctor)

ASTM D1883 – CBR (California Bearing Ratio) of Laboratory-Compacted Soils

ASTM D2166 – Unconfined Compressive Strength of Cohesive Soil

ASTM D2216 – Water Content of Soil, Rock, and Soil-Aggregate Mixtures

ASTM D2217 – Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Content

ASTM D2435 – One-Dimensional Consolidation Properties of Soils

ASTM D2487 – Classification of Soils for Engineering Purposes

ASTM D2850 – Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression

ASTM D4318 – Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D4546 – One-Dimensional Swell or Settlement Properties of Cohesive Soils

ARBORETUM CRICKET COMPLEX

FORT BEND COUNTY

ARCHITECTURAL

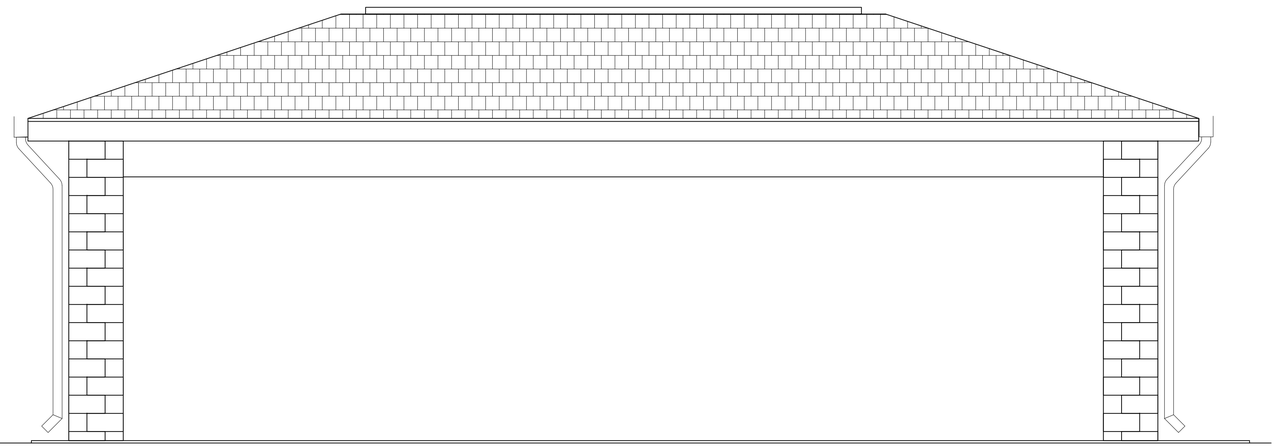
A0.00	COVER SHEET
A1.00	SITE SURVEY
A2.00	SITE PLAN
A3.00	FLOOR PLAN/ ELEVATIONS & SECTIONS

STRUCTURAL

S1.0	GENERAL NOTES
S2.0	FOUNDATION PLAN & DETAILS
S3.0	FRAMING PLANS & DETAILS
S4.0	BATTING CAGE FOUNDATION/ FRAMING PLANS

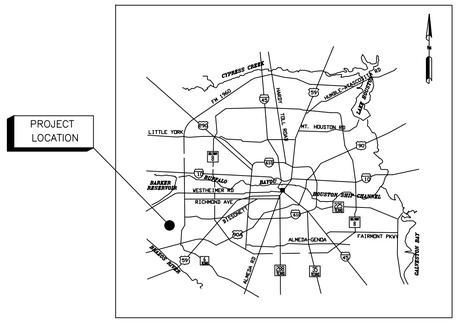
ELECTRICAL

E1.0	ELECTRICAL SITE LAYOUT
E2.0	ILLUMINATION LAYOUT
E3.0	ELECTRICAL ENLARGED LAYOUTS
E4.0	ELECTRICAL ONE-LINE DIAGRAM
E5.0	ELECTRICAL DETAILS
E6.0	ELECTRICAL DETAILS



COSTRUCTION - GENERAL NOTES

1. FORT BEND COUNTY MUST BE INVITED TO THE PRE-CONSTRUCTION MEETING.
2. CONTRACTOR SHALL NOTIFY FORT BEND COUNTY ENGINEERING DEPARTMENT 48 HOURS PRIOR TO COMMENCING CONSTRUCTION AND 48 HOUR NOTICE TO ANY CONSTRUCTION ACTIVITY WITHIN THE LIMITS OF THE PAVING AT CONSTRUCTION@FORTBENDCOUNTYTX.GOV
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FROM FORT BEND COUNTY PRIOR TO COMMENCING CONSTRUCTION OF ANY IMPROVEMENTS WITHIN COUNTY ROAD RIGHT OF WAYS.
4. ALL PAVING IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH FORT BEND COUNTY "RULES, REGULATIONS, AND REQUIREMENTS" RELATING TO THE APPROVAL AND ACCEPTANCE OF IMPROVEMENTS IN SUBDIVISIONS AS CURRENTLY AMENDED.
5. ALL ROAD WIDTHS, CURB RADII AND CURB ALIGNMENT SHOWN INDICATES BACK OF CURB.
6. A CONTINUOUS LONGITUDINAL REINFORCING BAR SHALL BE USED IN THE CURBS.
7. ALL CONCRETE PAVEMENT SHALL BE 5 1/2 SACK CEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS. TRANSVERSE EXPANSION JOINTS SHALL BE INSTALLED AT EACH CURB RETURN AND AT A MAXIMUM SPACING OF 60 FEET.
8. ALL WEATHER ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
9. 4"x12" REINFORCED CONCRETE CURB SHALL BE PLACED IN FRONT OF SINGLE FAMILY LOTS ONLY. ALL OTHER AREAS SHALL BE 6" REINFORCED CONCRETE CURB.
10. AT ALL INTERSECTION LOCATIONS, TYPE 7 RAMPS SHALL BE PLACE IN ACCORDANCE WITH TXDOT PED-18 STANDARD DETAIL SHEET. A.D.A. - HANDICAP RAMPS SHALL BE INSTALLED WITH STREET PAVING AT ALL INTERSECTIONS AND COMPLY WITH CURRENT A.D.A. REGULATIONS.
11. CURB HEADERS ARE REQUIRED AT CURB CONNECTIONS TO HANDICAP RAMPS, WITH NO CONSTRUCTION JOINT WITHIN 5' OF RAMPS.
12. ALL INTERSECTIONS UTILIZING TRAFFIC CONTROL MEASURES SHALL HAVE A.D.A. WHEEL CHAIR RAMPS INSTALLED.
13. GUIDELINES ARE SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAGMEN, SIGNING, STRIPING AND WARNING DEVICES, ETC., DURING CONSTRUCTION - BOTH DAY AND NIGHT.
14. ALL R1-1 STOP SIGNS SHALL BE 30"x30" WITH DIAMOND GRADE SHEETING PER TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
15. STREET NAME SIGNAGE SHALL BE ON A 9" HIGH SIGN FLAT BLADE W/ REFLECTIVE GREEN BACKGROUND. STREET NAMES SHALL BE UPPER AND LOWERCASE LETTERING WITH UPPERCASE LETTERS OF 6" MINIMUM AND LOWERCASE LETTERS OF 4.5" MINIMUM. THE LETTERS SHALL BE REFLECTIVE WHITE. STREET NAME SIGNS SHALL BE MOUNTED ON STOP SIGN POST.
16. A BLUE DOUBLE REFLECTORIZED BUTTON SHALL BE PLACED AT ALL FIRE HYDRANT LOCATIONS. THE BUTTON SHALL BE PLACED 12 INCHES OFF OF THE CENTERLINE OF THE STREET ON THE SAME SIDE AS THE HYDRANT.
17. THE PROJECT AND ALL PARTS THEREOF SHALL BE SUBJECT TO INSPECTION FROM TIME TO TIME BY INSPECTORS DESIGNATED BY FORT BEND COUNTY. NO SUCH INSPECTIONS SHALL RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER. NEITHER FAILURE TO INSPECT NOR FAILURE TO DISCOVER OR REJECT ANY OF THE WORK AS NOT IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS, REQUIREMENTS AND SPECIFICATIONS OF FORT BEND COUNTY OR ANY PROVISION OF THIS PROJECT SHALL BE CONSTRUED TO IMPLY AN ACCEPTANCE OF SUCH WORK OR TO RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER.



AREA MAP

SCALE: N.T.S.

THE STATE OF TEXAS
FORT BEND COUNTY

OWNER	ARCH/STRUCTRUAL	ELECTRICAL ENGINEER
FORT BEND COUNTY PARKS 15700 OLD RICHMOND ROAD SUGARLAND, TX 77479	APEX CONSULTING GROUP, INC 9888 BISSONETT, SUITE 415 HOUSTON, TX 77036	BAIRED GILROY & DIXON, LLC 9711 S. MASON ROAD , SUITE 125 RICHMOND, TX 77407

APEX CONSULTING, INC.
ENGINEERING ◦ CONSTRUCTION SERVICES
9894 Bissonnet Street, Suite 635
Houston, Texas 77036
Bus: 713.779.5700
Email: info@apexengroup.com

ACG
APEX Consulting Group, Inc.

STATE OF TEXAS
CHARLES C.A. MGBEIKE
73307
LICENSED
PROFESSIONAL ENGINEER
12/28/21

ARBORETUM CRICKET COMPLEX
15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

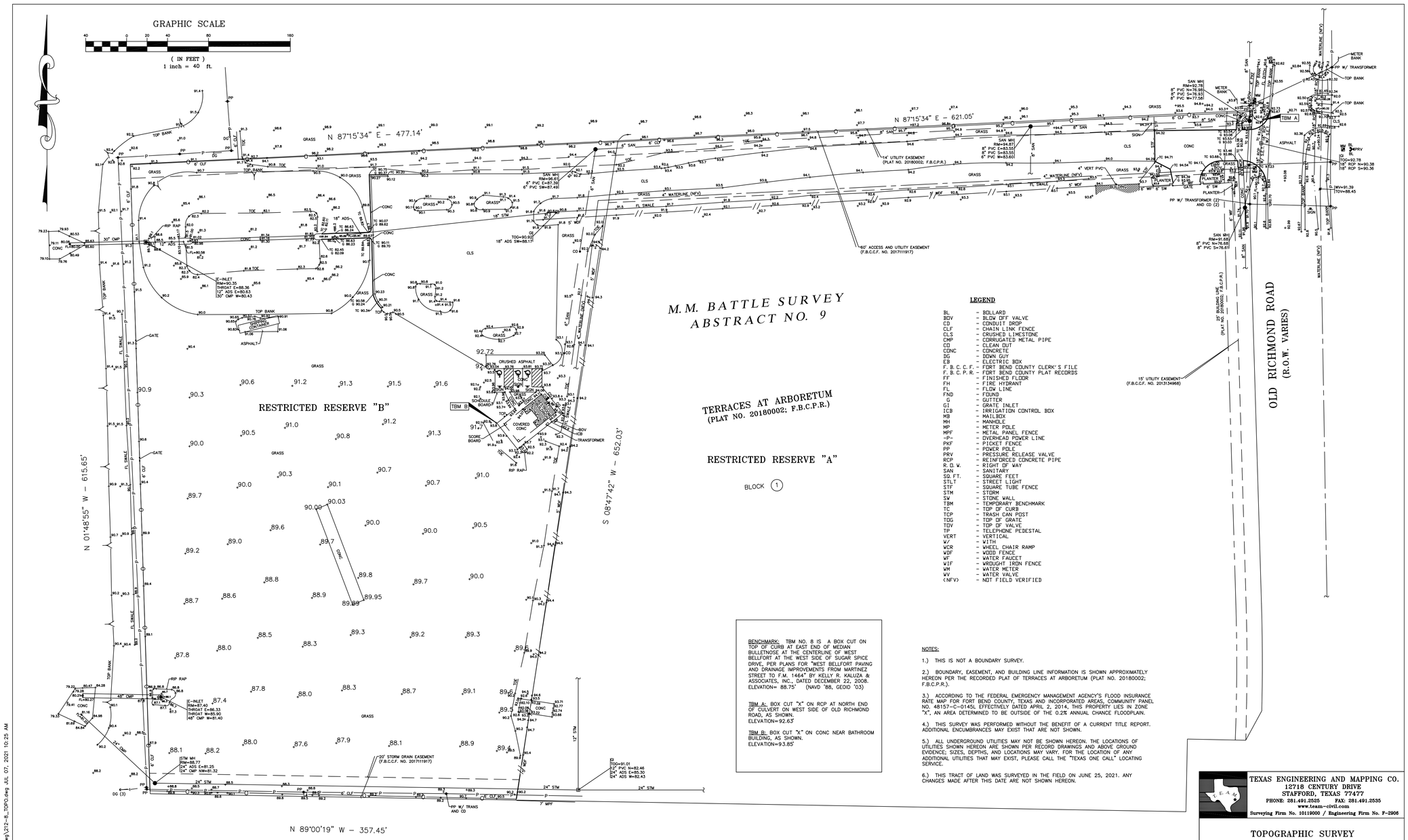
MARK	DATE	DESCRIPTION
1	07/30/2021	ISSUED FOR CLIENT REVIEW
2	12/06/2021	ISSUED FOR 75% CLIENT REVIEW
3	12/20/2021	ISSUED FOR BID/ CONSTRUCTION

PROJECT NO.	
CAD DRAWING FILE:	
DRAWN BY :	HE
CHECKED BY:	CM

SCALE
NTS

SHEET TITLE
COVER SHEET

A0.00



LEGEND

BL	- BOLLARD
BDV	- BLOW OFF VALVE
CD	- CONDUIT DROP
CLF	- CHAIN LINK FENCE
CLS	- CRUSHED LIMESTONE
CMP	- CORRUGATED METAL PIPE
CO	- CLEAN OUT
CONC	- CONCRETE
DG	- DOWN GUY
EB	- ELECTRIC BOX
F. B. C. C. F.	- FORT BEND COUNTY CLERK'S FILE
F. B. C. P. R.	- FORT BEND COUNTY PLAT RECORDS
FF	- FINISHED FLOOR
FH	- FIRE HYDRANT
FL	- FLOW LINE
FND	- FOUND
G	- GUTTER
GI	- GRATE INLET
ICB	- IRRIGATION CONTROL BOX
MB	- MAILBOX
MH	- MANHOLE
MP	- METER POLE
MPF	- METAL PANEL FENCE
-P-	- OVERHEAD POWER LINE
PKF	- PICKET FENCE
PP	- POWER POLE
PRV	- PRESSURE RELEASE VALVE
RCP	- REINFORCED CONCRETE PIPE
R. O. W.	- RIGHT OF WAY
SAN	- SANITARY
SQ. FT.	- SQUARE FEET
STLT	- STREET LIGHT
STF	- SQUARE TUBE FENCE
STM	- STORM
SW	- STONE WALL
TBM	- TEMPORARY BENCHMARK
TC	- TOP OF CURB
TCP	- TRASH CAN POST
TOG	- TOP OF GRATE
TOV	- TOP OF VALVE
TP	- TELEPHONE PEDESTAL
VERT	- VERTICAL
W/	- WITH
WCR	- WHEEL CHAIR RAMP
WDF	- WOOD FENCE
WF	- WATER FAUCET
WIF	- WROUGHT IRON FENCE
WM	- WATER METER
WV	- WATER VALVE
(NFV)	- NOT FIELD VERIFIED

NOTES:

1.) THIS IS NOT A BOUNDARY SURVEY.

2.) BOUNDARY, EASEMENT, AND BUILDING LINE INFORMATION IS SHOWN APPROXIMATELY HEREON PER THE RECORDED PLAT OF TERRACES AT ARBORETUM (PLAT NO. 20180002; F.B.C.P.R.).

3.) ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAP FOR FORT BEND COUNTY, TEXAS AND INCORPORATED AREAS, COMMUNITY PANEL NO. 48157-C-0145L EFFECTIVELY DATED APRIL 2, 2014, THIS PROPERTY LIES IN ZONE "X", AN AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

4.) THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT. ADDITIONAL ENCUMBRANCES MAY EXIST THAT ARE NOT SHOWN.

5.) ALL UNDERGROUND UTILITIES MAY NOT BE SHOWN HEREON. THE LOCATIONS OF UTILITIES SHOWN HEREON ARE SHOWN PER RECORD DRAWINGS AND ABOVE GROUND EVIDENCE; SIZES, DEPTHS, AND LOCATIONS MAY VARY. FOR THE LOCATION OF ANY ADDITIONAL UTILITIES THAT MAY EXIST, PLEASE CALL THE "TEXAS ONE CALL" LOCATING SERVICE.

6.) THIS TRACT OF LAND WAS SURVEYED IN THE FIELD ON JUNE 25, 2021. ANY CHANGES MADE AFTER THIS DATE ARE NOT SHOWN HEREON.

TEXAS ENGINEERING AND MAPPING CO.
12718 CENTURY DRIVE
STAFFORD, TEXAS 77477
PHONE: 281.491.2525 FAX: 281.491.2535
www.team-civil.com
Surveying Firm No. 10119000 / Engineering Firm No. F-2906

TOPOGRAPHIC SURVEY

OF

A PORTION OF RESTRICTED RESERVE "A" & "B", BLOCK 1, TERRACES AT ARBORETUM (PLAT NO. 20180002; F.B.C.P.R.), IN THE M.M. BATTLE SURVEY, ABSTRACT NO. 9, FORT BEND COUNTY, TEXAS

CREW: RL	DRAWN BY: RCA	CALC. BY: CK	CK.BY: CK
DATE: 07/07/21	SCALE: 1"=40'	KEY MAP: 527 Y	JOB.NO.: 212-8

DRAWING INFO: Z:\Jobs\212-8\dwg\212-8_TOPO.dwg JUL 07, 2021 10:25 AM

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ARBORETUM CRICKET COMPLEX

15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

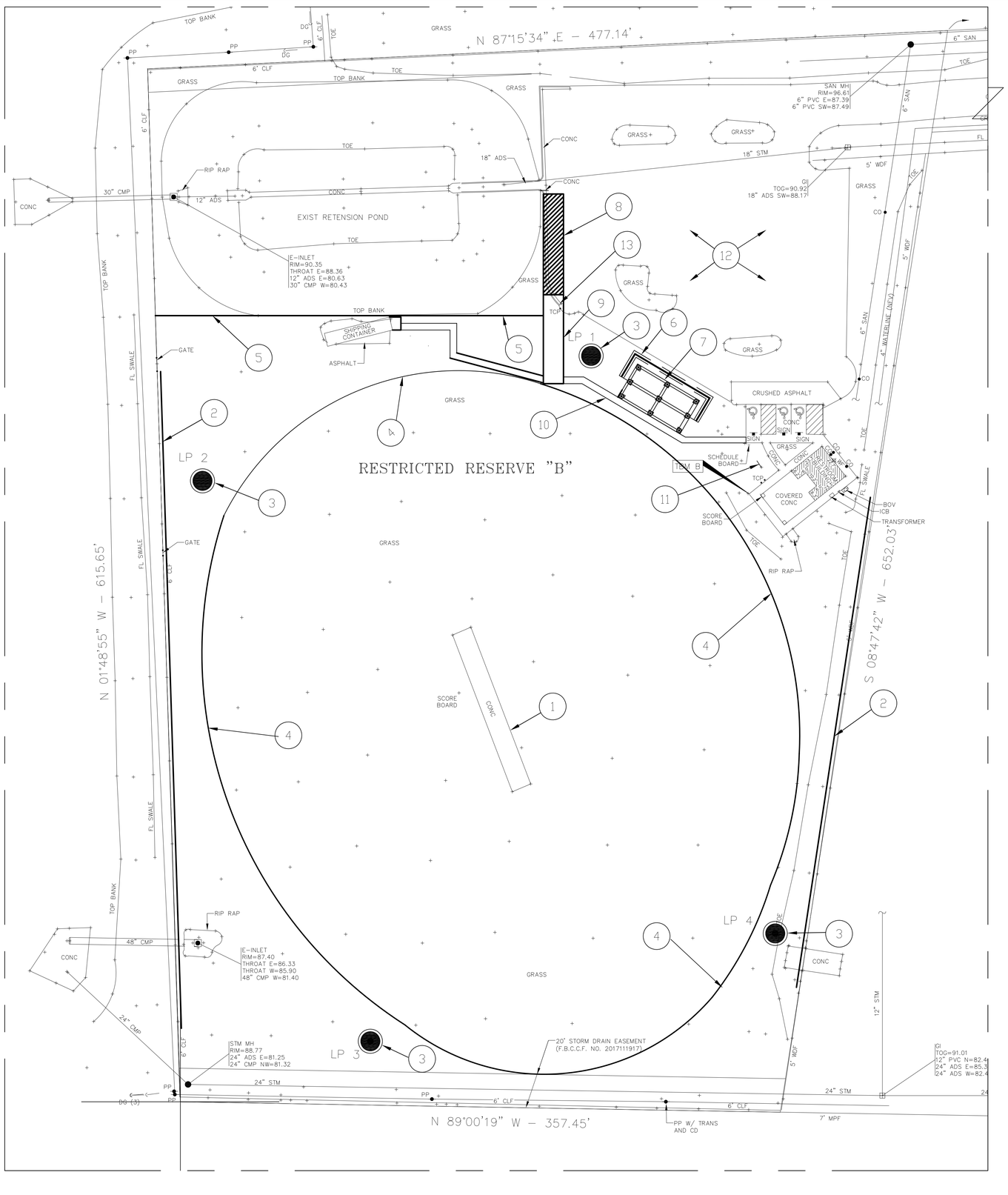
MARK	DATE	DESCRIPTION
1	07/30/2021	ISSUED FOR CLIENT REVIEW
2	12/06/2021	ISSUED FOR 75% CLIENT REVIEW
3	12/20/2021	ISSUED FOR BID/ CONSTRUCTION

PROJECT NO.
CAD DRAWING FILE:
DRAWN BY: HE
CHECKED BY: CM

SCALE
NTS

SHEET TITLE
TOPO SURVEY

A1.00



NOTES:

1. EXIST CONCRETE (PITCH) TO REMAIN
2. PROPOSED 60 FEET HIGH NETTING (NIC – BY OTHERS)
3. PROPOSED LIGHT POLES REF. ELECTRICAL FOR DRAWINGS
4. REMOVE AND REPLACE EXISTING ROPE WITH 2" DIA. NYLON ROPE
5. PROPOSED 160LF (6'–0" HIGH) CHAIN LINK FENCE TO MATCH EXIST.
6. PROPOSED 8" CMU SCREEN WALL
7. PROPOSED 20'X40' PAVILION REF. STRUCTURAL DRAWING.
8. PROPOSED BATTING CAGE 14'X60'X14'HIGH REF. STRUCTURAL DRAWING.
9. PROPOSED 14'–0" WIDE CONCRETE APRON REF. STRUCTURAL DRAWING.
10. PROPOSED 4" THICK x 4'–0" WIDE SIDEWAL. Reinforce with #3 @ 18" O.C. E.W.
11. PROPOSED ELECTRONIC SCORE BOARD (LED)
12. RE–GRADE AND PAVE WITH ASPHALT – BY FBC (NIC)
13. DEMO AND REMOVE EXISTING CURB & GUTTER

LIGHT POLE LOCATION	
NUMBER	COORDINATES
LP–1	X = 3029208.30 Y = 13805334.51
LP–2	X = 3028976.78 Y = 13805260.10
LP–3	X = 3029076.77 Y = 13804926.27
LP–4	X = 3029293.23 Y = 13804936.34

GRADING

RE–GRADE AREA AROUND NEW PAVILION TO DRAIN STORM WATER TO THE EXISTING DETENTION POND.

LIGHT POLE FOUNDATION

LIGHT POLE FOUNDATION DESIGN & DETAILS SHALL BE PROVIDED AT TIME OF BID BY THE LIGHTING SUPPLIER AS SPECIFIED BY THE ELECTRICAL ENGINEER

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STATE OF TEXAS
CHARLES C.A. MGBEIKE
73307
REGISTERED PROFESSIONAL ENGINEER
12/28/21

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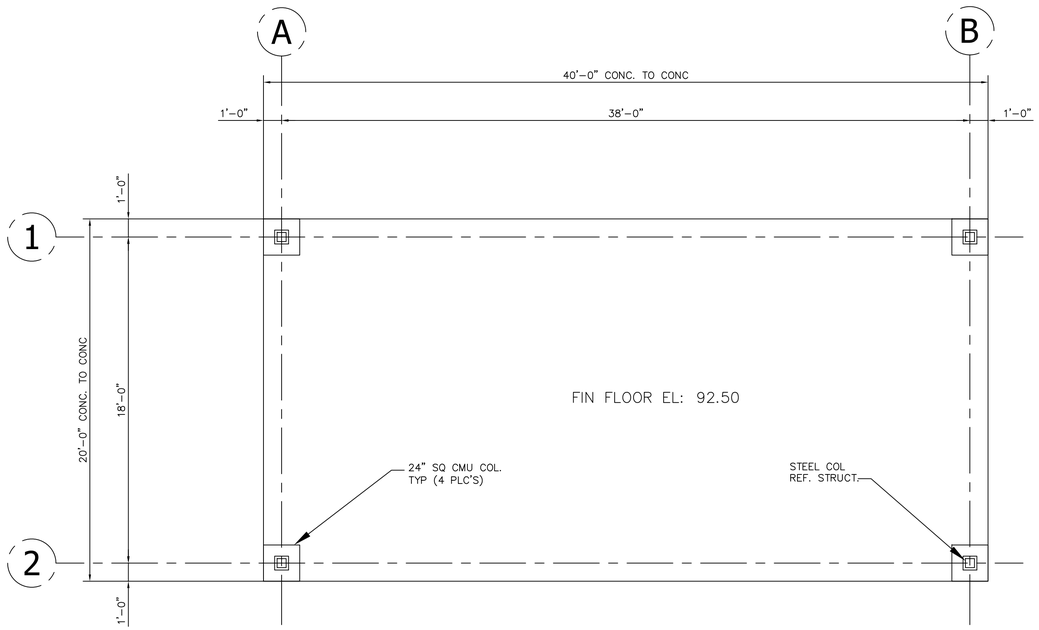
CHECKED BY:	CM

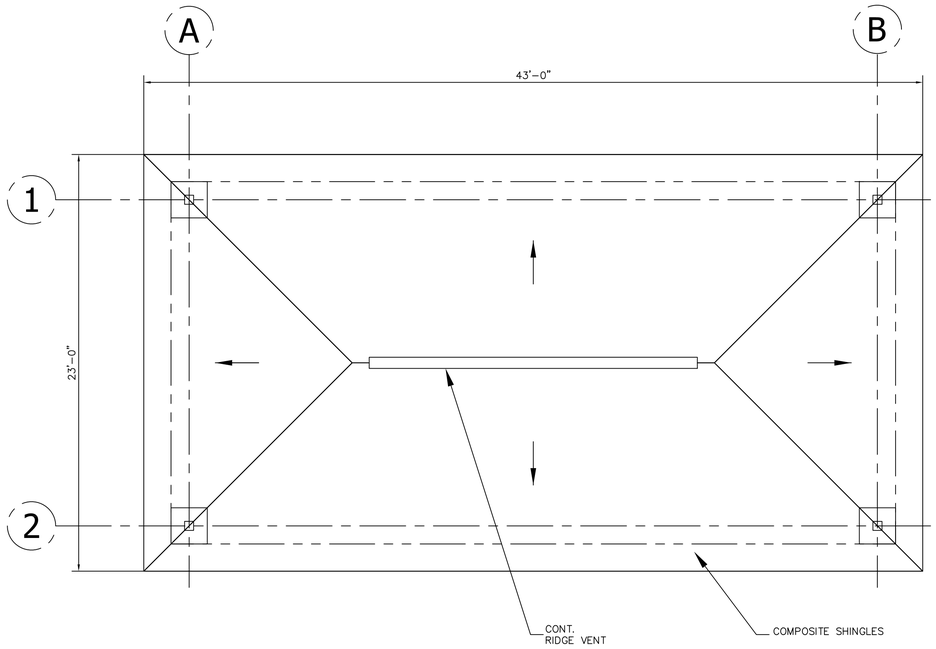
SCALE
AS NOTED
SHEET TITLE
SITE / DEMO PLAN

A2.0



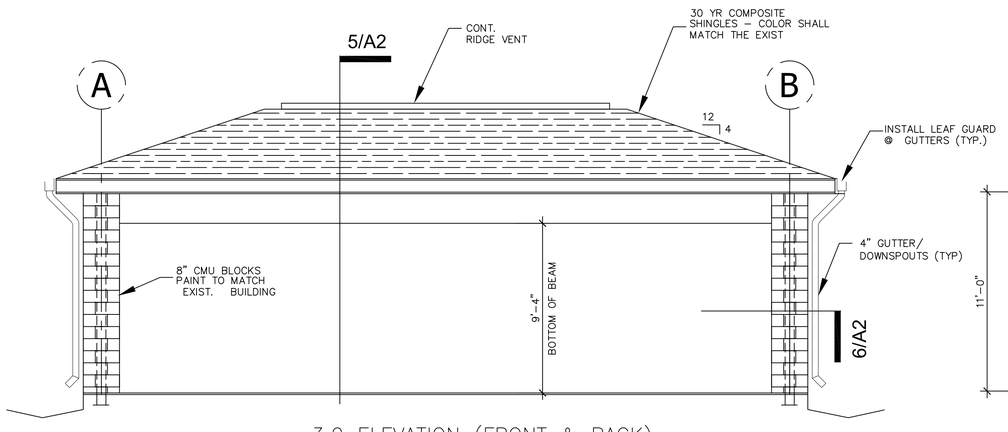
1.0 FLOOR PLAN – PAVILION

SCALE: 1/4" = 1'-0"



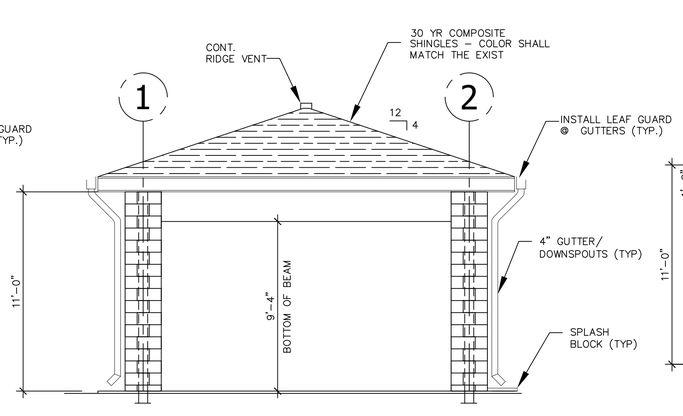
2.0 ROOF PLAN – PAVILION

SCALE: 1/4" = 1'-0"



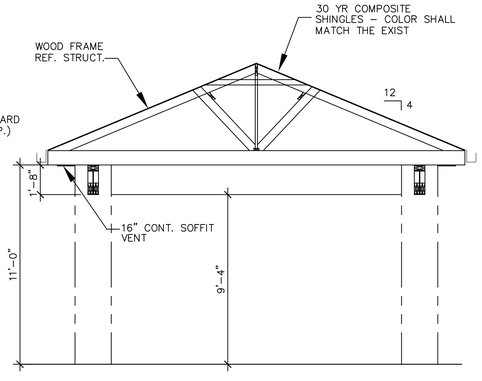
3.0 ELEVATION (FRONT & BACK)

SCALE: 1/4" = 1'-0"



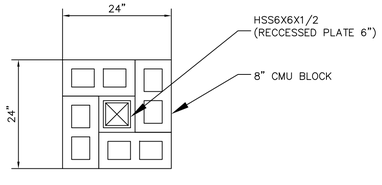
4.0 SIDE ELEVATION

SCALE: 1/4" = 1'-0"



5.0 DETAIL

SCALE: 1/4" = 1'-0"



6.0 DETAIL

NTS

GENERAL NOTES

1. THE GOVERNING CODE IS THE INTERNATIONAL BUILDING CODE AND ALL APPLICABLE STATE AND LOCAL ORDINANCES.
2. THE CONTRACTOR SHALL VERIFY THE CONDITIONS OF THE SITE PRIOR TO STARTING WORK.

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SCALE: AS NOTED

SHEET TITLE: CANOPY PLANS & ELEVATIONS

A3.00

1. GENERAL NOTES

A. CONSTRUCTION METHODS, PROCEDURES AND SEQUENCES ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEANS TO MAINTAIN AND PROTECT THE STRUCTURAL INTEGRITY OF ALL CONSTRUCTION STAGES.

B. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE MECHANICAL, ELECTRICAL, PLUMBING AND ARCHITECTURAL DRAWINGS TO DETERMINE WHERE OPENINGS ARE REQUIRED IN CONCRETE BEAMS AND SLABS.

2. STANDARDS, CODES & LOADS

A. BUILDING CODES & STANDARDS:

1. INTERNATIONAL BUILDING CODE, LATEST EDITION

B. GRAVITY LOADS:

BUILDING AREA	DEAD LOAD (PSF)	LIVE LOAD (PSF)
1. ROOF	15	20

C. LATERAL LOADS:

1. DESIGN WIND SPEED OF 139 MPH (3 SECOND WIND GUST) WITH EXPOSURE B.

3. EXCAVATION & FOUNDATIONS

A. STRIP AND REMOVE ALL SURFACE PAVING, ORGANICS, TOP SOIL AND UNSUITABLE MATERIALS FROM ALL CONSTRUCTION AREAS.

B. ESTABLISH POSITIVE SITE DRAINAGE. PROVIDE STORM DRAINAGE STRUCTURES AS REQUIRED.

C. PROOF ROLL THE SUBGRADE TO DETECT ANY WET OR SOFT AREAS. TREAT THESE AREAS WITH DRYING AND STABILZING AGENTS AS NECESSARY OR REMOVE AND REPLACE THEM WITH A SUITABLE FILL MATERIAL.

D. COMPACT THE SUBGRADE TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY STANDARD PROCTOR COMPACTION TEST, ASTM D698.

E. PROVIDE 24" SELECT COMPACTED FILL MATERIAL WITHIN THE BUILDING AREA OF SILTY OR SANDY CLAY HAVING A PLASTICITY INDEX OF 10 TO 20 AND A LIQUID LIMIT OF 35. PLACE FILL IN 8 INCH LOOSE LIFTS AND COMPACT AS SPECIFIED ABOVE.

G. AFTER EXCAVATION TO THE REQUIRED DEPTH, PLACE REINFORCING AND CONCRETE WITHIN 8 HOURS. DO NOT LEAVE FOOTING EXCAVATION OPEN OVERNIGHT. DEPOSIT CONCRETE IN ITS FINAL POSITION BY USE OF A TREMIE AND CONSOLIDATE CONCRETE BY VIBRATING.

H. PLACE SLAB-ON-GRADE ON A MOISTURE BARRIER AND A LAYER OF GRANULAR FILL AS SHOWN.

I. CONCRETE MIX SHALL BE DESIGNED FOR PROPER STRENGTH IN ACCORDANCE WITH ACI 318.

J. REFER TO GEOTECH REPORT BY MURILLO COMPANY DATED JUNE 2021 FOR SOIL PREPARATION & FOUNDATION DESIGN REQUIREMENT

4. CONCRETE

A. CONCRETE:

STRUCTURAL MEMBER	28 DAY COMPRESSIVE STRENGTH (PSI)
	NORMAL WEIGHT CONCRETE (PSI)
1. DRILLED FOOTINGS	3500
2. GRADE BEAMS	3500
3. SLAB-ON-GRADE	3500

B. CONCRETE COVER:

PROVIDE THE FOLLOWING COVER FOR CAST-IN-PLACE CONCRETE REINFORCING

1. UNFORMED SURFACES IN CONTACT WITH EARTH — 3 IN.
2. UNFORMED SURFACES OVER MOISTURE BARRIER — 2 IN.
3. FORMED SURFACES EXPOSED TO EARTH OR WEATHER:
   - #6 AND LARGER — 2 IN.
   - #5 AND SMALLER — 1 1/2 IN.
4. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:
   - SLAB & WALLS — 3/4 IN.
   - BEAMS & COLUMNS — 1 1/2 IN.

5. REINFORCING STEEL

A. PROVIDE DEFORMED STEEL BARS CONFORMING TO ASTM A615 GRADE 60. ALL REINFORCING STEEL SHALL BE HELD IN PLACE; PROVIDE ADDITIONAL BARS OR STIRRUPS FOR SUPPORT AS REQUIRED.

B. PROVIDE FULL EMBEDMENT WITH STANDARD 90 DEGREE HOOKS FOR ALL DOWELS. IF NOT OTHERWISE SPECIFIED, THE DOWELS SIZE AND SPACING SHALL BE THE SAME AS THE MAIN REINFORCING.

C. REINFORCING BAR DEVELOPMENT LENGTHS (Ld):

BAR SIZE GRADE 60	Ld FOR TOP BARS		Ld FOR BOTTOM BARS	
	28 DAY CONC. STRENGTH (PSI)		28 DAY CONC. STRENGTH (PSI)	
	3000	4000	3000	4000
#3	17	14	13	12
#4	22	19	17	15
#5	27	24	21	18
#6	33	28	25	22

6. WOOD

1. ALL FRAMING MATERIAL SHALL BE #2 19% MOISTURE CONTENT SYP. ALL OTHER FRAMING MATERIAL SHALL BE #2 19% MOISTURE CONTENT SYP UNLESS OTHERWISE NOTED. FOR THE RAFTERS, DOUGLAS FIR SOUTH #2 19% MOISTURE CONTENT MATERIAL CAN BE SUBSTITUTED FOR SYP.

2. ROOF FRAMING:
THE MAXIMUM UNSUPPORTED SPAN FOR 2X6 AT 16" O.C. RAFTERS SHALL BE 10'-0". THE RAFTERS SHALL BE BIRDS-MOUTHED AROUND THE PLYWOOD. RAFTERS ARE TO BE SUPPORTED BY CONTINUOUS 2X6 PURLINS WITH 2X6 BRACES AT 32" OC. MAXIMUM ANGLE FOR 2X6 BRACES=45° FROM VERTICAL. ROOF BRACING TO BE SUPPORTED BY BEAM BELOW

4. ROOF DECKING SHALL BE 5/8" EXPOSURE 1 (CDX) PLYWOOD RUN PERPENDICULAR TO THE RAFTER AND NAILED WITH 8d NAILS 6" ON SUPPORTED EDGES AND 12" ON CENTER IN THE FIELD

5. ALL BEAMS FRAMING TO WALLS ARE TO BE SUPPORTED BY A MINIMUM OF (2) 2X4 OR (2) 2X6 STUDS UNLESS OTHERWISE NOTED.

7. NAILING SCHEDULE

	CONNECTION		NAILING
1	JOIST TO SILL OR GIRDER, TOENAIL		3- 8d
2	BRIDGING TO JOIST, TOENAIL EACH END		2- 8d
3	1"X6" SUBFLOOR OR LESS TO EACH JOIST, FACE NAIL		2- 8d 2 STAPLES, 1-3/4
4	WIDER THAN 1"X6" SUBFLOOR TO EACH JOIST, FACE NAIL		3- 8d
5	2" SUBFLOOR TO JOIST OR GIRDER, BLIND AND FACE NAIL		2- 16d
6	SOLE PLATE TO JOIST OR BLOCKING, TYPICAL FACE NAIL		16d AT 16" O.C.
7	SOLE PLATE TO JOIST OR BLOCKING, AT BRACED WALL PANELS		3- 16d AT 16" O.C.
7	TOP OR SOLE PLATE TO STUD, END NAIL		2- 16d
8	STUD TO SOLE PLATE, TOE NAIL		3-8d TOENAIL OR 2-16d, END NAIL
9	DOUBLE STUDS, FACE NAIL		10d AT 24" O.C.
10	DOUBLE TOP PLATES, MIN. 24" OFFSET OF END JOINTS, FACE NAIL IN LAPPED AREA		8- 16d
11	BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE, TOENAIL		3- 8d
12	RIM JOIST TO TOP PLATE, TOENAIL		8d AT 6" O.C.
12	RIM JOIST OR BLOCKING TO SILL PLATE, TOE NAIL		8d AT 6" O.C.
13	TOP PLATE, LAPS AT CORNERS AND INTERSECTIONS, FACE NAIL		2- 10d
14	BUILT-UP HEADER, TWO PIECES W/ 1/2" SPACER		16d AT 16" O.C. ALONG EACH EDGE
14	CONTINUOUS HEADER, TWO PIECES		16d AT 16" O.C. ALONG EACH EDGE
15	CEILING JOISTS TO PLATE, TOENAIL		3- 8d
16	CONTINUOUS HEADER TO STUD, TOENAIL		4- 8d
17	CEILING JOISTS NOT ATTACHED TO PARALLEL RAFTERS, LAPS OVER PARTITIONS, FACE NAIL		3- 10d
18	CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL		3- 16d
19	COLLAR TIE TO RAFTER, FACE NAIL OR 1-1/4x20 GAGE RIDGE STRAP		3- 10d
20	RAFTER TO PLATE, TOENAIL		3- 16d or 3-10d (2 TOE NAILS ON ONE SIDE AND 1 TOE NAILS ON OPPOSITE SIDE OF)
21	ROOF RAFTER TO RIDGE, VALLEY OR HIP RAFTERS: TOE NAIL FACE NAIL		4- 16d or 3-16d
22	BUILT-UP STUDS-FACE NAIL		10d @ 24" O.C.
23	ABUTTING STUDS AT INTERSECTING WALL CORNERS FACE NAIL		16d @ 12" O.C.
20	1" BRACE TO EACH STUD AND PLATE, FACE NAIL		2- 8d 2 STAPLES, 1-3/4
21	1"X6" SHEATHING TO EACH BEARING, FACE NAIL		2- 8d 2 STAPLES, 1-3/4
21	1"X8" SHEATHING TO EACH BEARING, FACE NAIL		2- 8d 2 STAPLES, 1-3/4
22	WIDER THAN 1"X8" SHEATHING TO EACH BEARING, FACE NAIL		3- 8d 4 STAPLES, 1-3/4
23	BUILT-UP CORNER STUDS		16d AT 24" O.C.
24	BUILT-UP GIRDER AND BEAMS, 2-IN. LUMBER LAYERS		10d AT 32" O.C. @ T&B AND STAGGERED 2-NAILS AT ENDS AND AT EACH SPLICE
25	2" PLANKS (PLANK & BEAM-FLOOR & ROOF)		2- 16d AT EACH BEARING
25	LEDGER STRIP SUPPORTING JOIST OR RAFTERS		3-16d @ EACH JOIST OR RAFTER
26	PANEL SIDING:		
	3/8" - 1/2"	8d COMMON NAIL (ROOF)	6 @ 12
	19/32" - 1"	8d COMMON NAIL	6 @ 12
	1-1/8" - 1-1/4"	10d COMMON NAIL OR 8d DEFORMED NAIL	6 @ 12"
26	CELLULOSIC FIBER-BOARD SHEATHING:		
	1/2"	1-1/2 GALV ROOFING NAIL, 7/16 CROWN OR 1" CROWN STAPLE 16 ga., 1-1/4 LONG	3 @ 6"
	25/32"	1-3/4 GALV ROOFING NAIL, 7/16 CROWN OR 1" CROWN STAPLE 16 ga., 1-1/2 LONG	3 @ 6"
26	GYPSUM SHEATHING:		
	1/2"	1-1/2 GALV ROOFING NAIL, STAPLE GALV 1-1/2 LONG; 1-1/4 SCREWS, TYPE W or S	7 @ 7"
	5/8"	1-3/4 GALV ROOFING NAIL, STAPLE GALV 1-5/8 LONG; 1-5/8 SCREWS, TYPE W or S	7 @ 7"
26	WOOD STRUCTURAL PANELS, COMBINATION SUBFLOOR UNDERLAYMENT TO FRAMING:		
	3/4" AND LESS	[6d DEFORMED 2-1/2x0.120) NAIL OR 8d COMMON (2-1/2x0.131) NAIL]	6 @ 12"
	7/8" - 1"	[8d COMMON 2-1/2x0.131) NAIL OR 8d DEFORMED (2-1/2x0.120) NAIL]	6 @ 12"
	1-1/8" - 1-1/4"	[10d COMMON 3x0.148) NAIL OR 8d DEFORMED (2-1/2x0.120) NAIL]	6 @ 12"

8. BATTING CAGE

1. GALVANIZED STEEL PIPE USED FOR POSTS, RAILS, BRACES, ETC SHALL CONFORM TO ASTM A53

2. MATERIALS SHALL CONFORM WITH THE STANDARD GUIDES OF THE CHAIN LINK FENCE MANUFACTURERS INSTITUTE (CLFMI) FOR STEEL CHAIN LINK FENCE AND FABRIC.

3. CHAIN LINK FABRIC SHALL CONFORM TO ASTM A392 AND SHALL HAVE A UNIFORM SQUARE MESH MEASURING APPROXIMATELY TWO INCHES BETWEEN PARALLEL SIDES.

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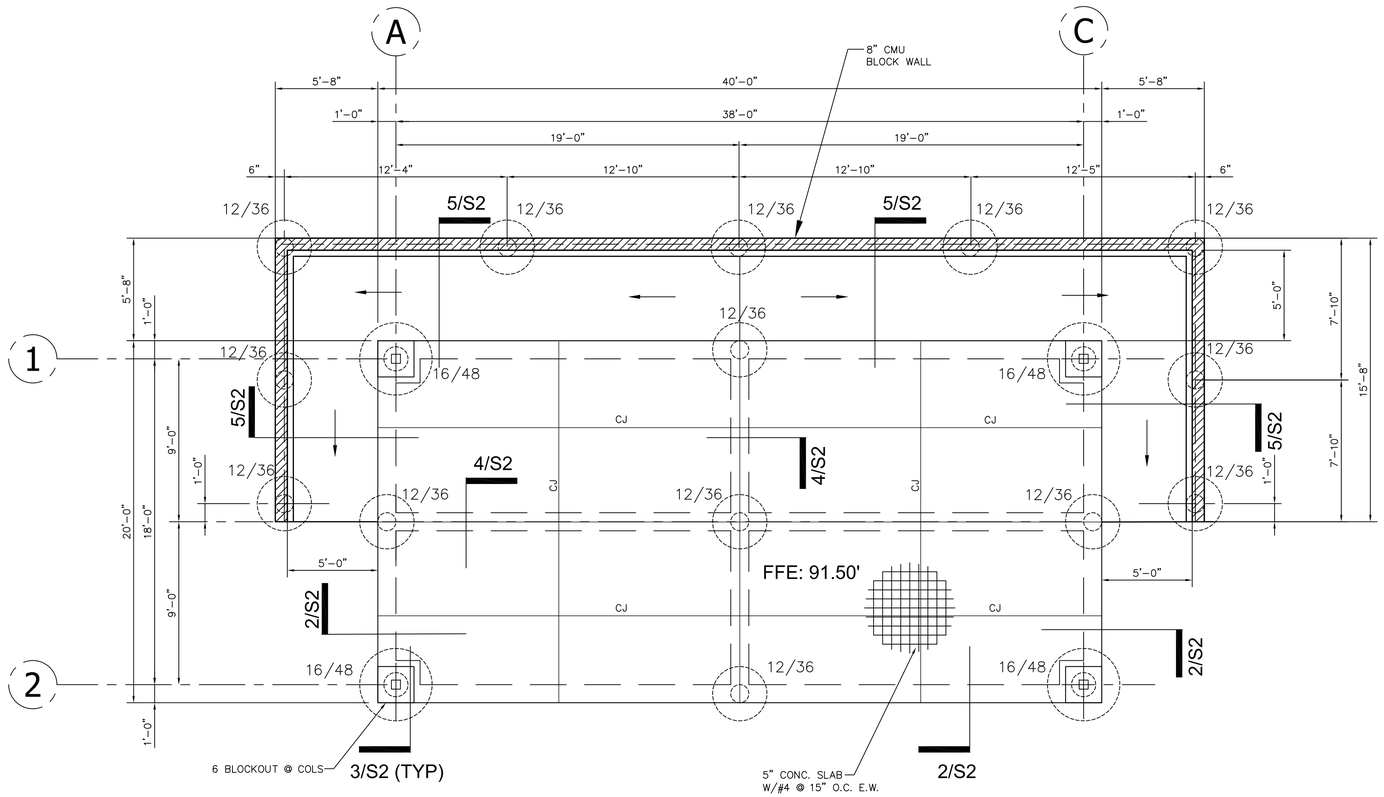
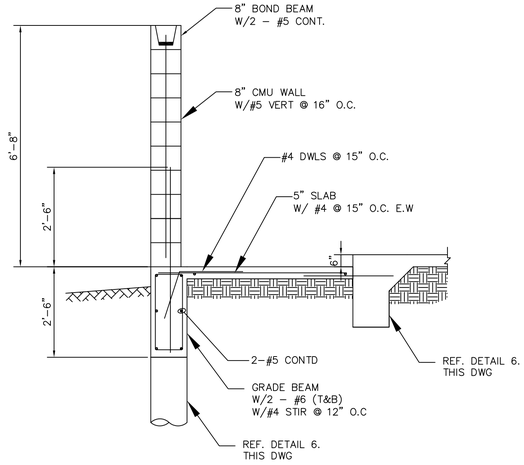
S1.00



1.0 FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

REFER TO GEOTECHNICAL REPORT FOR SITE PREPARATION AND FOR FILL REQUIREMENTS UNDER FOUNDATION SLAB.



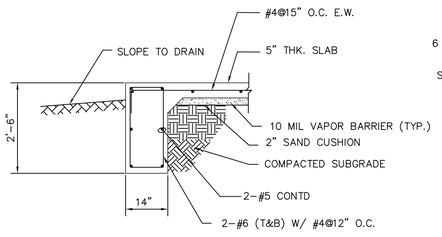
5.0 DETAIL

SCALE: 1/2" = 1'-0"

DRILLED FOOTING SCHEDULE		
SHAFT DIA.	VERT. REINF.	TIES
12"	4 – #5	#3 @ 12" O.C.
16"	6 – #5	#3 @ 12" O.C.

6.0 DRILLED PIER DETAIL (TYP)

SCALE: 1/2" = 1'-0"



2.0 DETAIL

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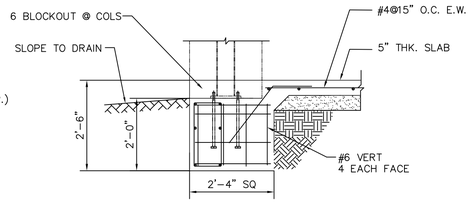

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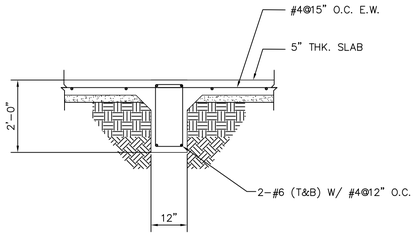

4.0 DETAIL

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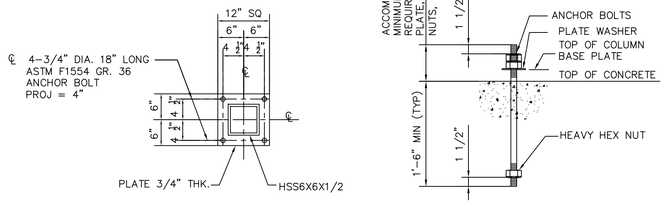

NOTES

1. UNLESS NOTED OTHERWISE, ALL BOLTS SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION

7.0 ANCHOR DETAILS

N.T.S.

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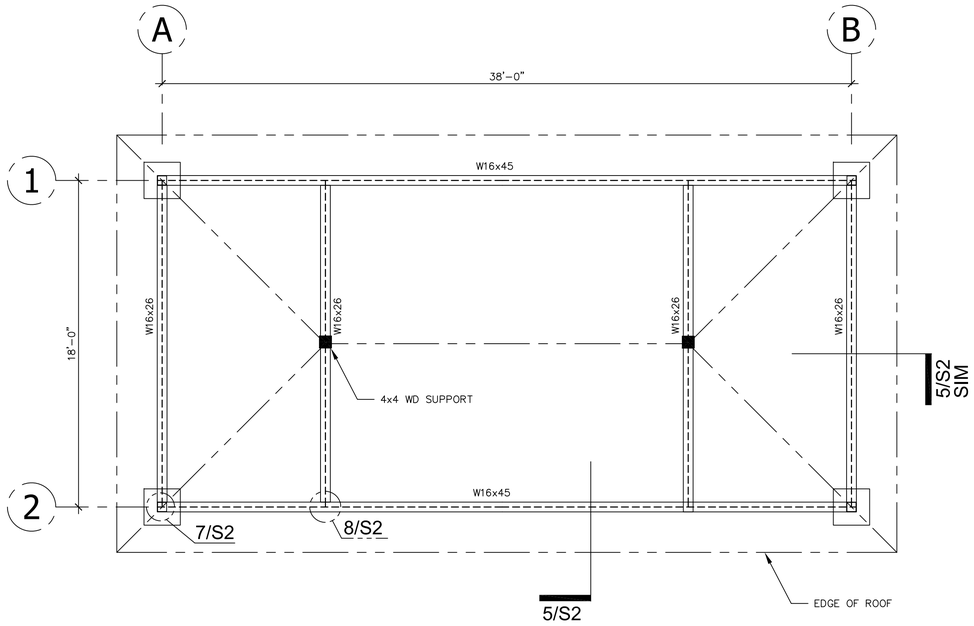
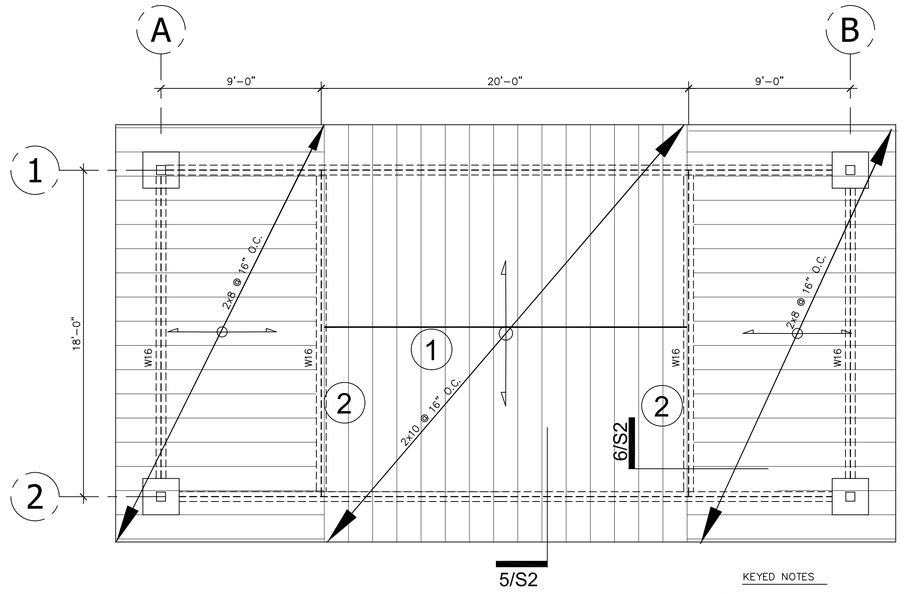
SHEET TITLE: FOUNDATION PLAN & DETAILS

S2.00



1.0 STEEL FRAMING PLAN

SCALE: 1/4" = 1'-0"

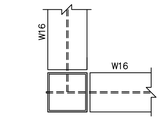


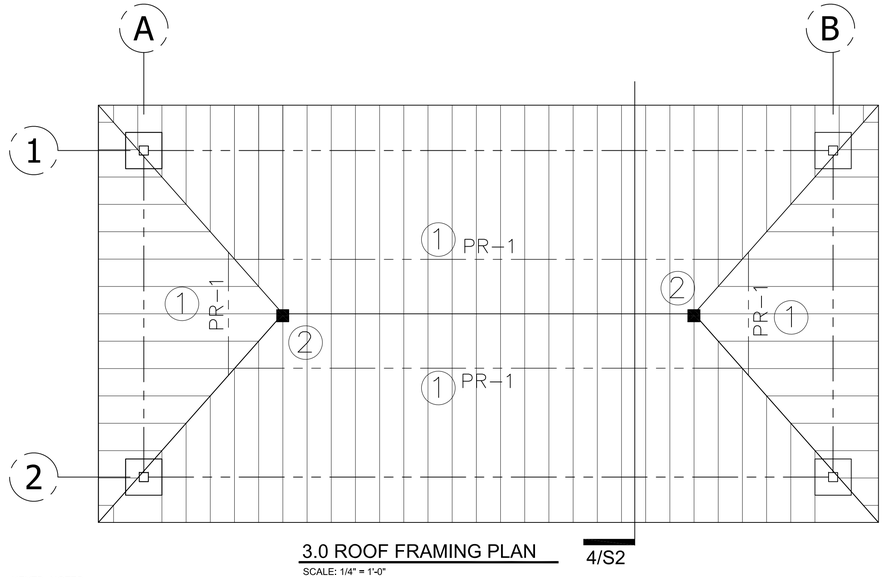
2.0 CEILING JOIST PLAN

SCALE: 1/4" = 1'-0"

KEYED NOTES

1. 2x10 BLOCKING BETWEEN JOISTS
2. BRACE ROOF TO WALL OR BEAM BELOW





3.0 ROOF FRAMING PLAN

SCALE: 1/4" = 1'-0"

4/S2

KEYED NOTES

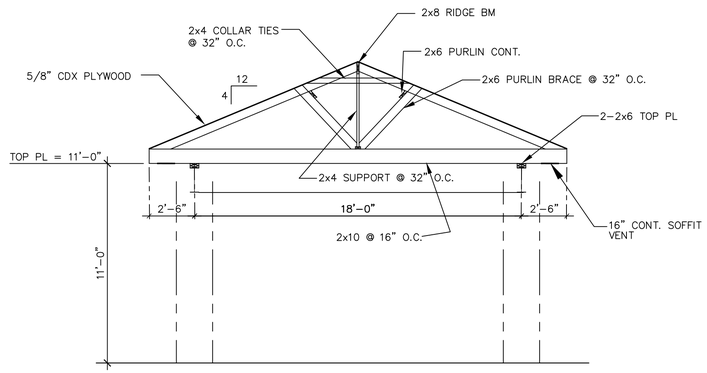
1. 2x6 CONTINUOUS PURLIN W/ 2-2x4 SUPPORT @ 32" O.C.
2. 4x4 ROOF SUPPORT

LEGENDS:

PR-1 2x6 PURLIN (BRACED TO BM BELOW)

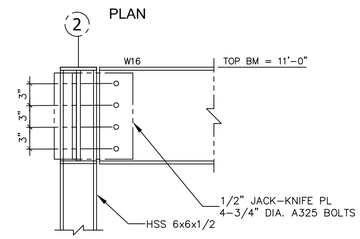
ROOF FRAMING NOTES

1. SEE SHEET S1 FOR GENERAL NOTES
2. ROOF RAFTER - 2x6 @ 16" O.C. #2 SYP (U.N.O.)
3. ROOF SHEATHING - 5/8" CDX PLYWOOD W/8d @ 6" OC EDGES 12" O.C. FIELD.
4. ALL HIPS, RIDGES, AND VALLEYS SHALL BE ONE SIZE LARGER THAN RAFTERS SIZE (U.N.O.)
5. CONNECT ALTERNATE RAFTERS TO SUPPORT WITH SIMPSON H2.5A HURRICANE TIES.
6. ALIGN OPPOSING RAFTERS AT RIDGE AND CONNECT ALTERNATE RAFTERS WITH SIMPSON LSTA STRAP TIE AND 10-10d NAILS (5 NAILS EACH SIDE OF RIDGE).



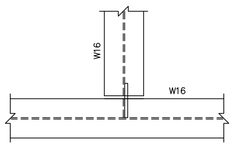
4.0 ROOF FRAME SECTION

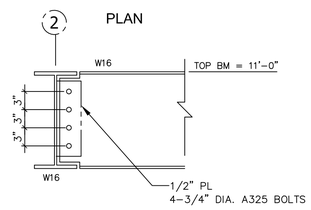
SCALE: 1/4" = 1'-0"



7. DETAIL - TYP

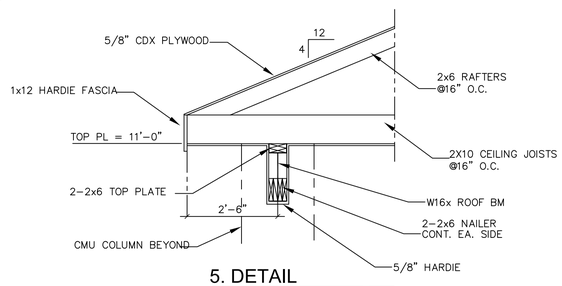
SCALE: 1" = 1'-0"





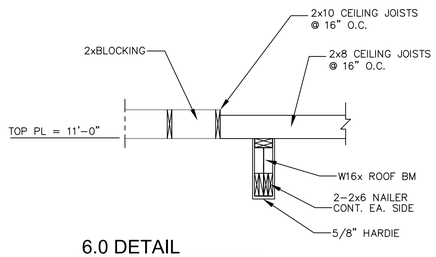
8. DETAIL - TYP

SCALE: 1" = 1'-0"



5. DETAIL

SCALE: 1/2" = 1'-0"



6.0 DETAIL

SCALE: 1/2" = 1'-0"

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STATE OF TEXAS
CHARLES C.A. MGBEIKE
73307
LICENSED
PROFESSIONAL ENGINEER
12/28/21

ARBORETUM CRICKET COMPLEX

15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

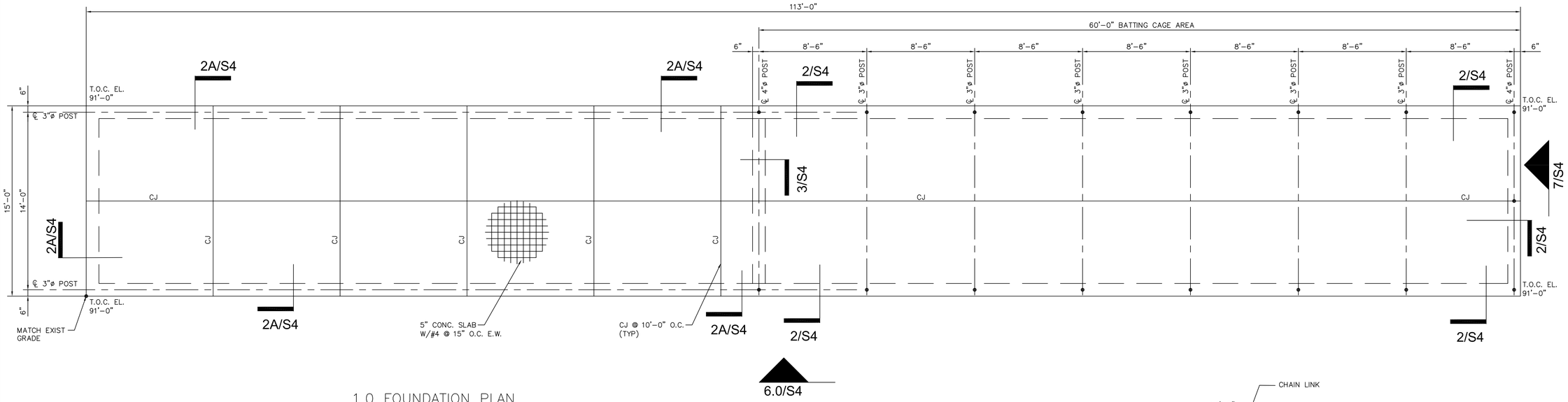
MARK	DATE	DESCRIPTION
1	07/30/2021	ISSUED FOR CLIENT REVIEW
2	12/06/2021	ISSUED FOR 70% REVIEW
3	12/28/2021	ISSUED FOR BID/CONSTRUCTION

PROJECT NO.
CAD DRAWING FILE:
DRAWN BY : FOI
CHECKED BY: CM

SCALE
AS NOTED

SHEET TITLE
FRAMING PLANS & DETAILS

S3.00

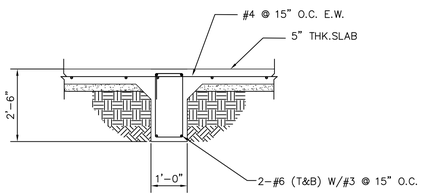


1.0 FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

2.0 & 2A DETAIL

SCALE: 1/2" = 1'-0"



3.0 DETAIL

SCALE: 1/2" = 1'-0"

4.0 SECTION

SCALE: 1/4" = 1'-0"

6.0 ELEVATION

SCALE: 1/4" = 1'-0"

7.0 ELEVATION

SCALE: 1/4" = 1'-0"

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15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

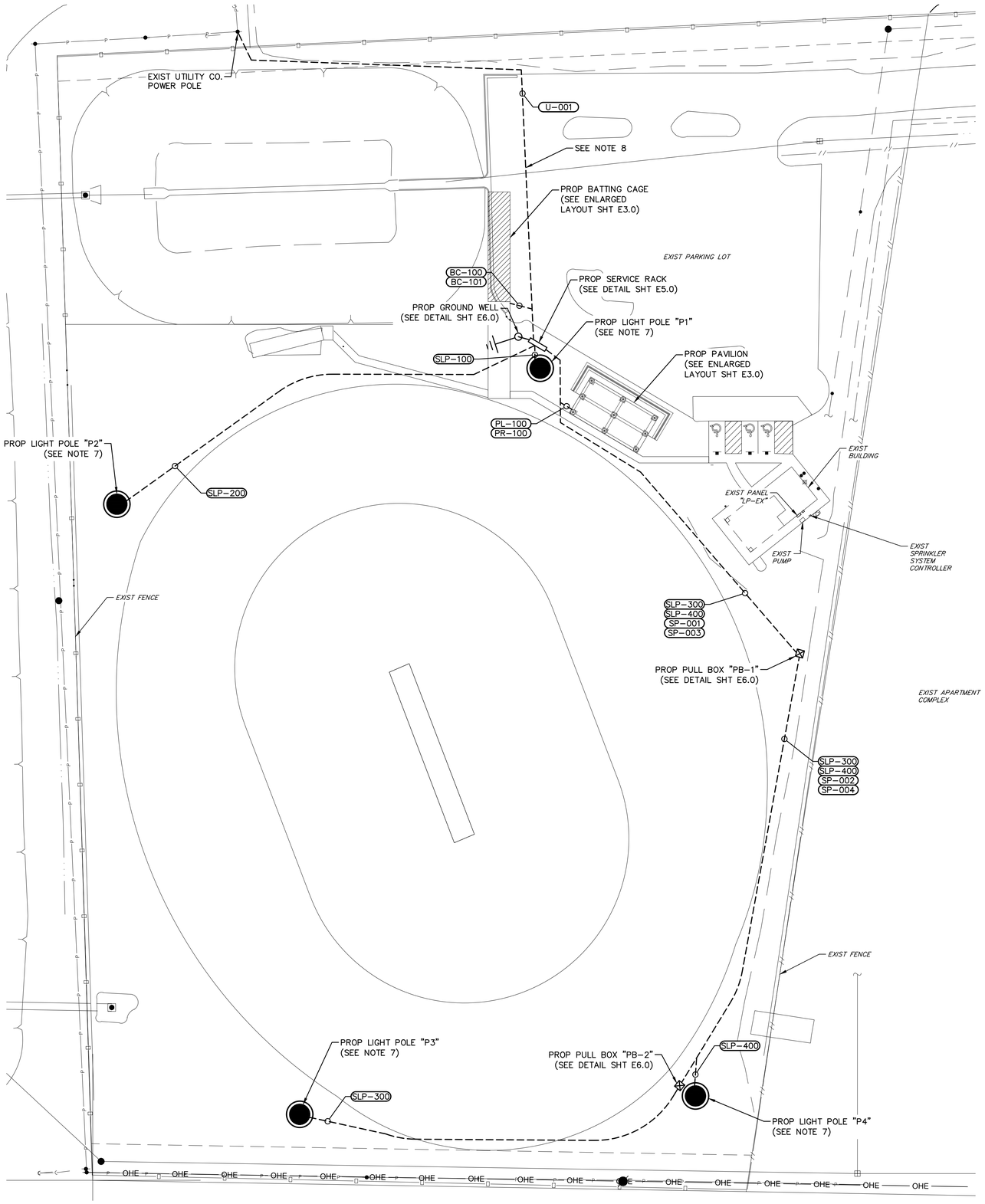
MARK	DATE	DESCRIPTION
1	07/30/2021	ISSUED FOR CLIENT REVIEW
2	12/06/2021	ISSUED FOR 75% REVIEW
3	12/28/2021	ISSUED FOR BID/CONSTRUCTION

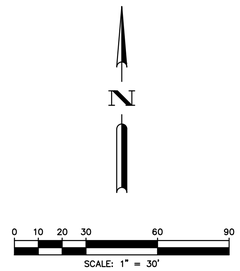
PROJECT NO.	
CAD DRAWING FILE:	
DRAWN BY :	FOI
CHECKED BY:	CM

SCALE: AS NOTED

SHEET TITLE: BATTING CAGE PLAN, ELEVATIONS, SECTION & DETAILS

S4.00





GENERAL NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH LOCAL AND NATIONAL CODES AND REQUIREMENTS.
2. DO NOT ROUTE IN CONFLICT WITH OTHER PIPING, CONDUITS, EQUIPMENT, OR STRUCTURES.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY AND ALL PERMITS ASSOCIATED WITH THE WORK. THE COSTS OF THE PERMITS, IF ANY, SHALL BE BORNE BY THE CONTRACTOR.
4. VERIFY BY FIELD INVESTIGATION THE LOCATIONS OF ALL UTILITY FACILITIES WITHIN AND ADJACENT TO THE LIMITS OF THE WORK THAT MAY BE AFFECTED BY THE WORK. CONFLICTS WHICH ARISE DUE TO THE NEGLIGENCE OF THE CONTRACTOR TO LOCATE, HORIZONTALLY AND VERTICALLY, EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
5. REPAIR ALL DAMAGE TO ROADS AND SIDEWALKS NECESSARY FOR CONSTRUCTION TO PRE-EXISTING CONDITION OR BETTER.
6. ALL CONDUCTORS SHALL BE THWN TYPE INSULATED COPPER CONDUCTORS. ALL UNDERGROUND CONDUIT SHALL BE SCH. 40 PVC.
7. PROVIDE FOUR (4) SPORTS LIGHTING POLES COMPLETE WITH CONCRETE FOUNDATION, LIGHTING FIXTURES, 70' STEEL POLES, CROSS ARM MOUNTS, WIRELESS LIGHTING CONTROL SYSTEM, AND ASSOCIATED ELECTRICAL EQUIPMENT PER SPECIFICATION.
8. INSTALL PROPOSED SERVICE CONDUIT THROUGH EXISTING CRUSHED GRAVEL PARKING LOT. REPAIR PARKING LOT TO PREVIOUS CONDITION OR BETTER.

ELECTRICAL PLAN LEGEND	
SYMBOL	DESCRIPTION
———	ABOVE GROUND CONDUIT
- - - - -	UNDERGROUND CONDUIT
—GND—	GROUND CONDUCTOR
	GROUND WELL
WPWIU GFCI	20A, 125V, GFI RECEPTACLE IN METAL-CLAD WEATHER PROOF WHILE-IN-USE COVER
	WEATHERHEAD
XXX-XXX	CONDUIT MARKER (SEE CONDUIT SCHEDULE THIS SHEET)

CONDUIT SCHEDULE

NO.	SIZE & CONDUCTORS	FROM	TO	DESCRIPTION
BC-100	1" C, W/2-#10 + #12 GND	EXIST LIGHTING PANEL "LP-EX"	PROP BATTING CAGE	BATTING CAGE LIGHTS & RECEPT
LC-100	1" C, W/2-#10 + #12 GND	EXIST LIGHTING PANEL "LP-EX"	PROP WIRELESS LIGHTING CONTROLLER	LIGHTING CONTROLLER POWER
P-001	2 1/2" C, W/3-#4/0 + #2 NEU + #2 GND	METER DISCONNECT	UTILITY CO. METER	INCOMING SERVICE
P-002	2 1/2" C, W/3-#4/0 + #2 NEU + #2 GND	UTILITY CO. METER	PROP PANELBOARD "PB-A"	INCOMING SERVICE
PL-100	1" C, W/2-#10 + #10 GND	PROP LIGHTING PANEL "LP-A"	PROP PAVILION	PAVILION LIGHTS
PR-100	1 1/4" C, W/2-#6 + #6 GND	PROP LIGHTING PANEL "LP-A"	PROP PAVILION	PAVILION RECEPTACLES
SLP-100	2" C, W/2-#6 + #10 GND	PROP PANELBOARD "PB-A"	PROP LIGHT POLE "P1"	LIGHT POLE "P1" FEEDER
SLP-200	2" C, W/2-#6 + #10 GND	PROP PANELBOARD "PB-A"	PROP LIGHT POLE "P2"	LIGHT POLE "P2" FEEDER
SLP-300	2" C, W/2-#2 + #4 GND	PROP PANELBOARD "PB-A"	PROP LIGHT POLE "P3"	LIGHT POLE "P3" FEEDER
SLP-400	2" C, W/2-#4 + #8 GND	PROP PANELBOARD "PB-A"	PROP LIGHT POLE "P4"	LIGHT POLE "P4" FEEDER
SP-001	2" E.C., W/PULL STRING	PROP PANELBOARD "PB-A"	PROP PULL BOX "PB-1"	SPARE
SP-002	1" E.C., W/PULL STRING	PROP PANELBOARD "PB-A"	PROP PULL BOX "PB-1"	SPARE
SP-003	2" E.C., W/PULL STRING	PROP PULL BOX "PB-1"	PROP PULL BOX "PB-1"	SPARE
SP-004	1" E.C., W/PULL STRING	PROP PULL BOX "PB-1"	PROP PULL BOX "PB-2"	SPARE
T-100	1" C, W/2-#10 + #10 NEU	PROP PANELBOARD "PB-A"	PROP TRANSFORMER	TRANSFORMER FEEDER
T-101	1" C, W/2-#8 + #8 NEU + #8 GND	PROP TRANSFORMER	PROP LIGHTING PANEL "LP-A"	LIGHTING PANEL "LP-A" FEEDER
U-001	3" C, W/3-#4/0 + #2 NEU	UTILITY CO.	METER DISCONNECT	INCOMING SERVICE

STATE OF TEXAS
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ARBORETUM CRICKET COMPLEX

15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

MARK	DATE	DESCRIPTION

PROJECT NO.	
CAD DRAWING FILE:	
DESIGNED BY :	SRM
CHECKED BY:	NEL

SCALE:
AS NOTED
SHEET TITLE
ELECTRICAL SITE LAYOUT

E1.0

NOTES:

1. THIS IS AN EXAMPLE ILLUMINATION LAYOUT BASED ON DESIGN REQUIREMENTS PER SPECIFICATIONS. REFER TO SPECIFICATION 16550 FOR ALL PERFORMANCE BASED REQUIREMENTS FOR THIS FACILITY.

Pole	x-loc	y-loc	height	N	M	W	Total	kw
P1	132.7	168.9	70ft	9	14	2	25	16.2
P2	-103.3	190.1	70ft	9	9	2	20	12.9
P3	-150.1	-141.9	70ft	9	10	2	21	13.6
P4	71.6	-226	70ft	14	6	1	21	13.6
Total				41	39	7	87	56.2

Infield
47 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 45
Maximum 61
Minimum 33
Avg:Min 1.35
Max:Min 1.85
Coef Var 0.12
UnifGrad 1.52

Outfield
80 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 34
Maximum 48
Minimum 24
Avg:Min 1.43
Max:Min 2.00
Coef Var 0.17
UnifGrad 1.67

Concrete Area
10 points at z=0, sp 0.352ft by 9.994ft
HORIZONTAL FOOTCANDLES
Average 53
Maximum 55
Minimum 50
Avg:Min 1.05
Max:Min 1.10
Coef Var 0.03
UnifGrad 0.04

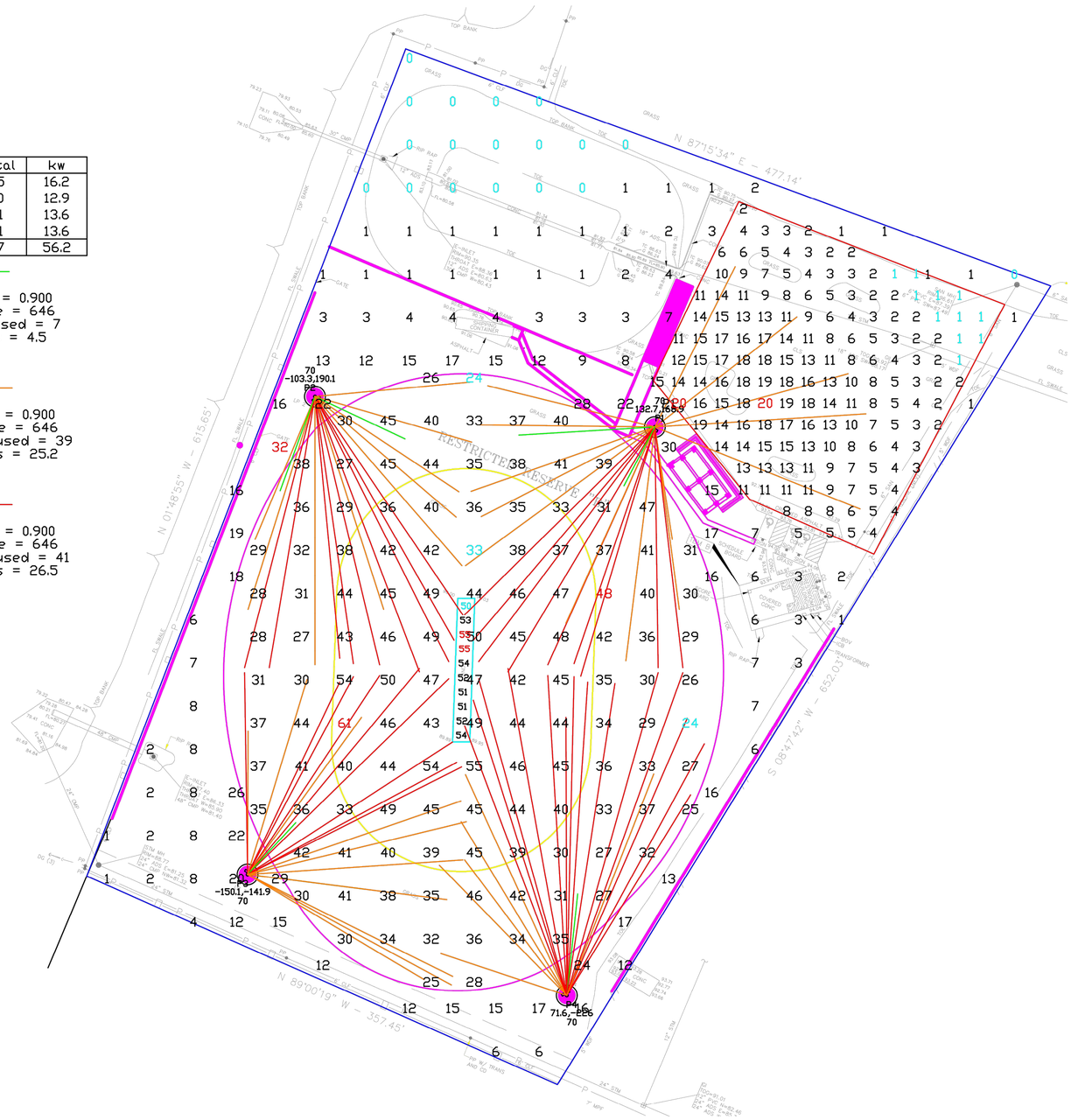
Parking Lot
154 points at z=3, sp 15ft by 15ft
HORIZONTAL FOOTCANDLES
Average 9
Maximum 20
Minimum 1
Avg:Min 8.53
Max:Min 20.00
Coef Var 0.66
UnifGrad 2.00

Spill Property Line
121 points at z=3, sp 30ft by 30ft
HORIZONTAL FOOTCANDLES
Average 7
Maximum 32
Minimum 0
Avg:Min N/A
Max:Min N/A
Coef Var 1.11
UnifGrad N/A

W
CLIR 630 EV W
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 7
kw these luminaires = 4.5

M
CLIR 630 EV M
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 39
kw these luminaires = 25.2

N
CLIR 630 EV N
Light Loss Factor = 0.900
Watts per luminaire = 646
Number luminaires used = 41
kw these luminaires = 26.5



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15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

MARK	DATE	DESCRIPTION

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DESIGNED BY :	SRM
CHECKED BY:	NEL

SCALE
AS NOTED
SHEET TITLE
ILLUMINATION LAYOUT

STATE OF TEXAS
SHANE R. MECKE
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12/15/21

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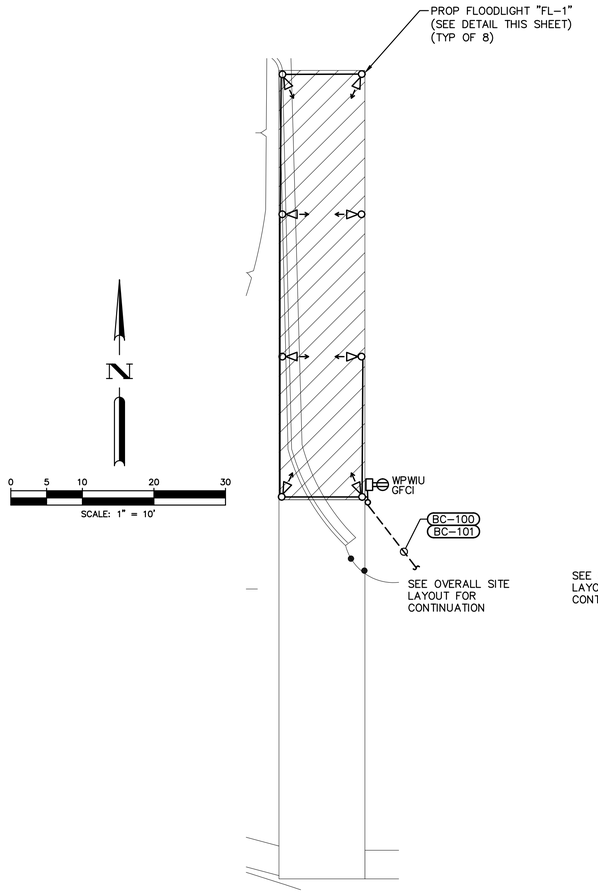
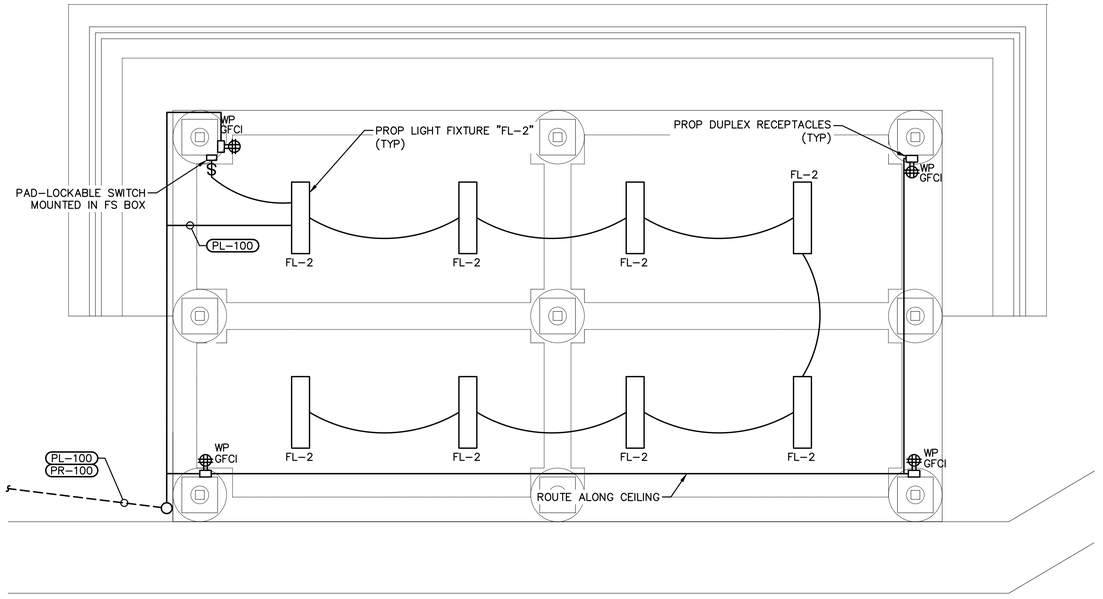


BATTING CAGE LIGHTING LAYOUT
SCALE: 1" = 10'

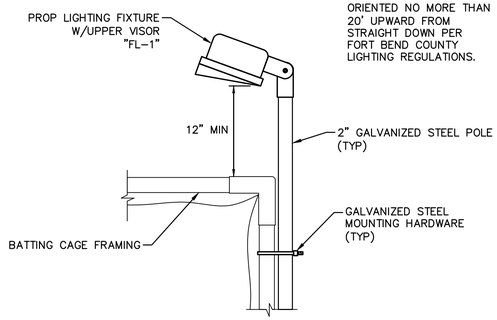


PAVILION LIGHTING LAYOUT
SCALE: 1/4" = 1'-0"

LIGHT FIXTURE SCHEDULE							
TYPE	MANUFACTURER & MODEL NUMBER	VOLTAGE	INPUT POWER	MOUNTING	LAMP NO.	LAMP TYPE	REMARKS
FL-1	LITHONIA TFX2 LED 4000K MVOLT IS	120	94W	SLIP-FITTER	1	LED 4,000K 13,200 LUMENS	MOUNT TO TENON POLE TOP ADAPTER PROVIDE WITH UPPER VISOR
FL-2	LITHONIA STL2 40L LP840	120	39W	SURFACE MOUNT	1	LED 4,000K 3,796LUMENS	4' STRIP LED

LIGHTING NOTE:

LIGHT FIXTURES TO BE ORIENTED NO MORE THAN 20' UPWARD FROM STRAIGHT DOWN PER FORT BEND COUNTY LIGHTING REGULATIONS.



BATTING CAGE LIGHT MOUNTING DETAIL
NOT TO SCALE

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ARBORETUM CRICKET COMPLEX
15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

MARK	DATE	DESCRIPTION

PROJECT NO.	
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CHECKED BY:	NEL

SCALE
AS NOTED
SHEET TITLE
ELECTRICAL ENLARGED LAYOUTS

STATE OF TEXAS
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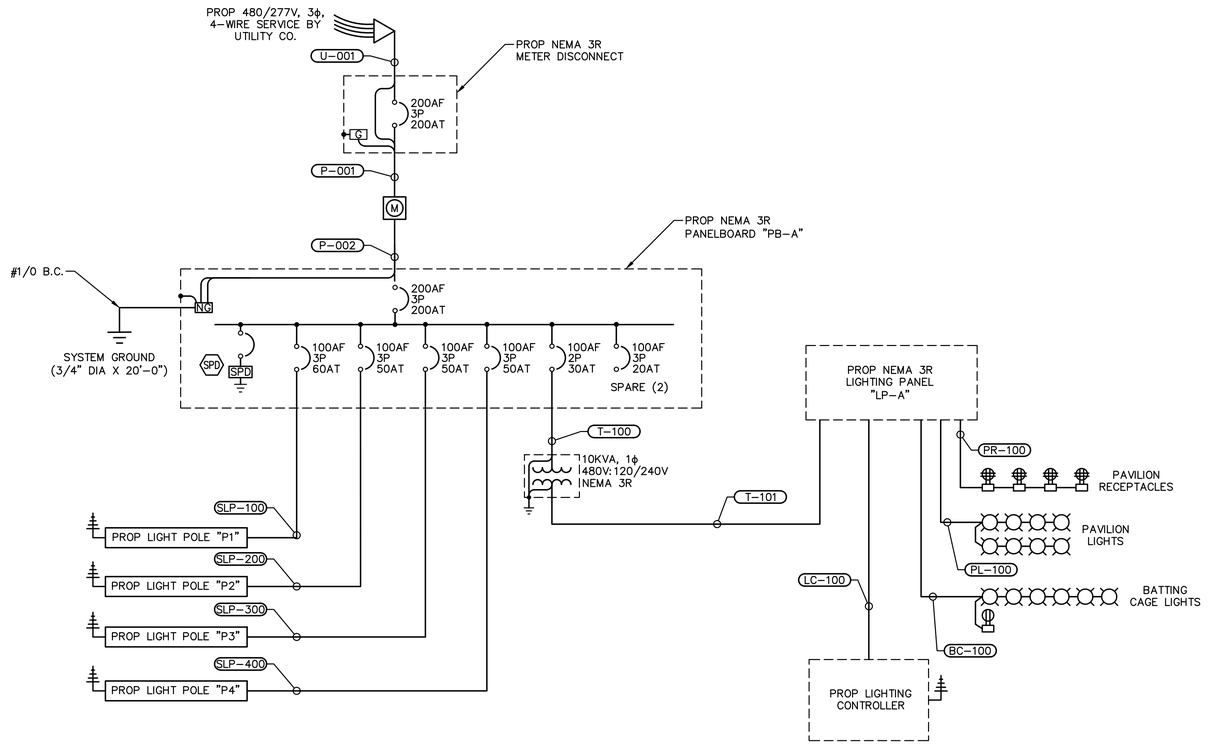
E3.0



ONE LINE DIAGRAM
NOT TO SCALE

SPECIAL DEVICE SCHEDULE

ITEM	DESCRIPTION
SPD	SURGE PROTECTIVE DEVICE – 480V, 3ø, UL 1449 3RD ED. SURGE PROTECTION; 100kA RATING WITH STATUS INDICATOR

PROP LIGHTING PANEL "LP-A"

(L-L) VOLT: 240 V **BUSS:** 125 A **ENCLOSURE:** NEMA 3R
(L-N) VOLT: 120 V **MCB:** 50 A **LOCATION:** SERVICE RACK
PHASE: 1 Ø **MLO:** N/A **SURGE PROTECTOR:** N/A
WIRE: 3-W **KAIC:** 14 KA

DESCRIPTION	LOAD (VA)	BRKR	CKT	A	B	CKT	BRKR	LOAD (VA)	DESCRIPTION
CONTROLS	500	20/1	1	A		2	20/1	396	PAVILION LIGHTS
BATTING CAGE LIGHTS & RECEPT	888	20/1	3		B	4	20/1	1,440	PAVILION RECEPTS
WIRELESS LIGHTING CONTROLLER	120	20/1	5	A		6	20/1		SPARE
SPARE		20/1	7		B	8	20/1		SPARE
SPARE		20/1	9	A		10	20/1		SPARE
SPARE		20/1	11		B	12	20/1		SPARE

CONNECTED LOAD
PHASE A: 1,016 VA 8.5 A
PHASE B: 2,328 VA 19.4 A
TOTAL LOAD: 3,344 VA 13.9 A

NOTE:
ADJUST CIRCUITS TO BALANCE PANEL. CONNECTED LOAD IS ESTIMATED FROM AVAILABLE INFORMATION. TOTAL LOAD CALCULATION ASSUMES BALANCED

ELECTRICAL LOAD ANALYSIS

LOAD NAME	CONNECTED LOAD (VA)	DEMAND FACTOR (%)	QUANTITY	kVA	AMPS ØA	AMPS ØB	AMPS ØC
LIGHT POLE "P1"	17,510	125	1	21.9	-	46	46
LIGHT POLE "P2"	13,760	125	1	17.2	36	36	-
LIGHT POLE "P3"	13,760	125	1	17.2	36	-	36
LIGHT POLE "P4"	13,760	125	1	17.2	36	36	-
MISC. LIGHTING & CONTROLS			1	10.0	-	20.8	20.8
TOTAL LOAD					107.5	138.1	102.2
RATED AMPACITY @ 480 VOLT, 3Ø, 4-WIRE					200	200	200
SPARE AMPACITY					92.5	61.93	97.77
FAULT CURRENT							< 22 K.A.I.C.

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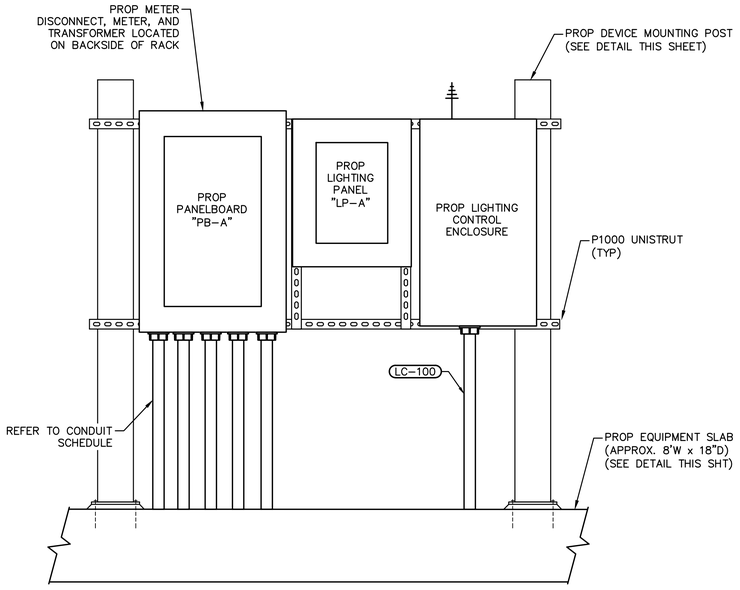
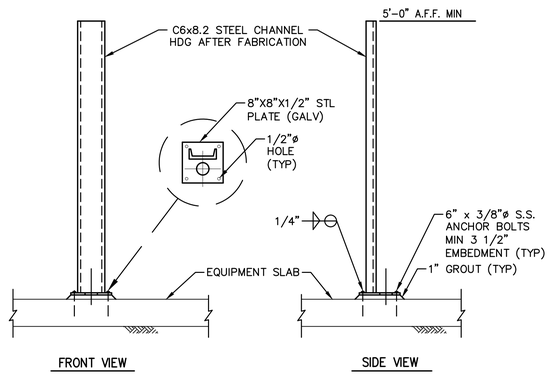
SCALE
AS NOTED

SHEET TITLE
ELECTRICAL ONE-LINE DIAGRAM

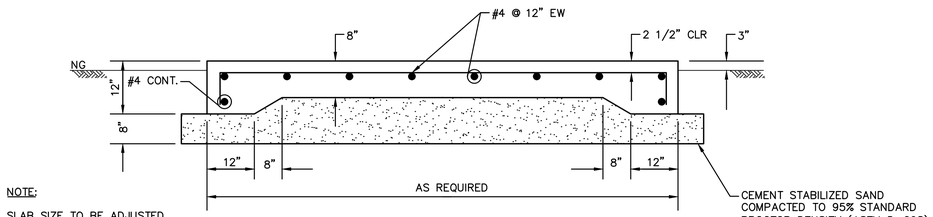
E4.0



SERVICE RACK DETAIL
NOT TO SCALE



DEVICE MOUNTING POST DETAIL
NOT TO SCALE



NOTE:

SLAB SIZE TO BE ADJUSTED TO SERVICE RACK EQUIPMENT PROVIDED.

ELECTRICAL EQUIPMENT SLAB DETAIL
NOT TO SCALE

SUBGRADE NOTES:

1. PRIOR TO PLACING OF CONCRETE PAD, OR BEFORE ANY FILL IS PLACED, ALL TRACES OF ORGANIC, LOOSE OR OBVIOUSLY COMPRESSIBLE MATERIAL MUST BE REMOVED. TREE ROOTS GREATER THAN 0.5 INCHES SHOULD BE ALSO REMOVED. THE SUBGRADE SHOULD BE PROOF ROLLED UNTIL THE GRADE OFFERS A RELATIVELY UNYIELDING SURFACE AND THE SPECIFIED DEGREE OF COMPACTION HAS BEEN ACHIEVED. AREAS OF EXCESSIVE YIELDING SHOULD BE EXCAVATED AND BACKFILLED WITH A CLEAN COMPACTED SOIL. SPECIFIED COMPACTION: NINETY-FIVE PERCENT (95%) OF MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST (ASTM D-698).
2. ANY ADDITIONAL MATERIAL USED TO INCREASE THE ELEVATION OF THE SITE SHOULD BE RELATIVELY NONEXPANSIVE SANDY CLAY MATERIAL WITH A LIQUID LIMIT OF 28 OR MORE, PLASTICITY INDEX IN THE RANGE OF 10 TO 20, AND SHOULD BE PLACED IN LAYERS OF NOT MORE THAN EIGHT (8) INCHES IN THICKNESS, AT MOISTURE CONTENTS AT OR ABOVE OPTIMUM, AND COMPACTED TO DENSITIES OF AT LEAST NINETY-FIVE PERCENT (95%) OF STANDARD PROCTOR DENSITY ASTM D-698.

STRUCTURAL NOTES:

1. ALL CONCRETE SHALL TEST 3,000 PSI AT 28 DAYS.
2. ALL CONCRETE REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60.
3. DETAILING AND FABRICATION OF CONCRETE REINFORCEMENT AND ACCESSORIES SHALL BE IN ACCORDANCE WITH ACI-315 LATEST EDITION.
4. LAP ALL CONTINUOUS REINFORCING BARS 36 DIAMETERS AT SPLICES, TEES, AND CORNERS.
5. THE USE OF HEAT TO FACILITATE THE BENDING OF REINFORCING BARS WILL NOT BE PERMITTED.
6. NO ENGINEERING DRAWING MAY BE REPRODUCED FOR USE AS SHOP DRAWINGS.

NOTES:

1. CONTRACTOR SHALL VERIFY SLAB DIMENSIONS WITH THE SELECTED EQUIPMENT MANUFACTURER. REQUIRED ADJUSTMENTS TO THE SLAB DIMENSIONS SHALL BE MADE AT NO COST TO THE OWNER AND SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO COMMENCING CONSTRUCTION.
2. TURNDOWN IS CONTINUOUS AROUND PERIMETER OF SLAB, WIDTH VARIES (SEE PLAN VIEW).
3. SLOPE SLAB 1/8" PER FOOT TO DRAIN AWAY FROM EQUIPMENT.

STATE OF TEXAS
SHANE R. MECKE
124906
LICENSED PROFESSIONAL ENGINEER
12/15/21

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Job No. 192-0001

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ACG
APEX Consulting Group, Inc.

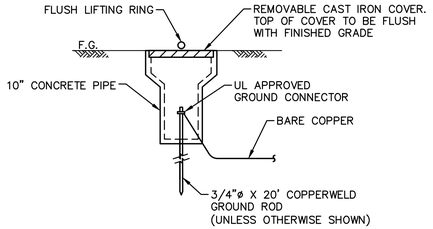
ARBORETUM CRICKET COMPLEX
15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

MARK	DATE	DESCRIPTION

PROJECT NO.	
CAD DRAWING FILE:	
DESIGNED BY :	SRM
CHECKED BY:	NEL

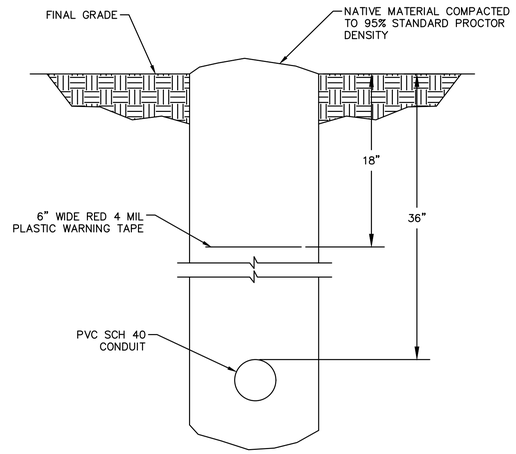
SCALE
AS NOTED
SHEET TITLE
ELECTRICAL DETAILS SHEET 1 OF 2

E5.0



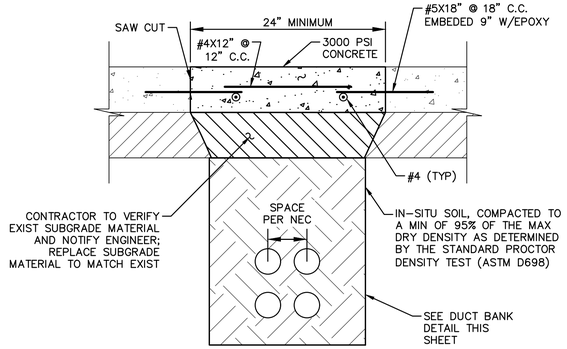
GROUND WELL DETAIL

NOT TO SCALE



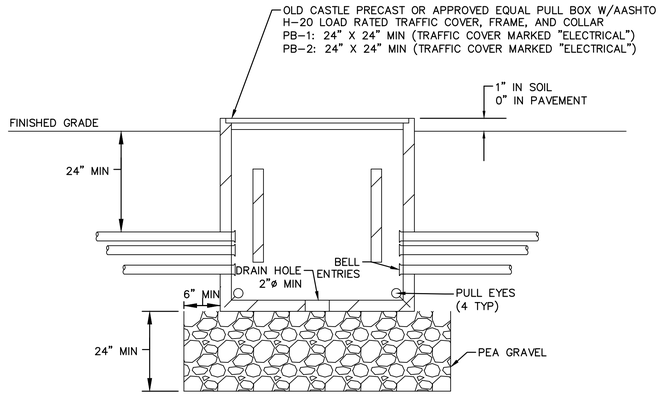
TYP UNDERGROUND CONDUIT INSTALLATION DETAIL

NOT TO SCALE



SAW CUT DETAIL

NOT TO SCALE



PULL BOX DETAIL

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ACG
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ARBORETUM CRICKET COMPLEX

15928 OLD RICHMOND ROAD
FORT BEND COUNTY, TX

MARK	DATE	DESCRIPTION

PROJECT NO.	
CAD DRAWING FILE:	
DESIGNED BY :	SRM
CHECKED BY:	NEL

SCALE
AS NOTED
SHEET TITLE
ELECTRICAL DETAILS SHEET 2 OF 2

STATE OF TEXAS
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E6.0

EXHIBIT C

PREVAILING WAGES:

This project is subject to the prevailing wage rate requirements of Chapter 2258 of the Government Code. The Contractor shall pay Fort Bend County sixty dollars ($60.00) for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit https://sam.gov/content/wage-determinations.

General Decision Number: TX20220247 03/11/2022
Superseded General Decision Number: TX20210247

State: Texas
Construction Type: Building
County: Fort Bend County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/07/2022
1	01/21/2022
2	02/18/2022
3	02/25/2022
4	03/11/2022

* ASBE0022-009 06/01/2021

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 25.14	15.15
BOIL0074-003 01/01/2021		
BOILERMAKER	$ 29.47	24.10
CARP0551-008 04/01/2016		
CARPENTER (Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work and Metal Stud Installation)	$ 23.05	8.78
ELEC0716-005 08/30/2021		
ELECTRICIAN (Excludes Low Voltage Wiring and Installation of Alarms)	$ 33.20	10.37
ELEV0031-003 01/01/2022		
ELEVATOR MECHANIC	$ 47.04	36.885+a+b

FOOTNOTES:
A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014		
POWER EQUIPMENT OPERATOR		
Cranes	$ 34.85	9.85
IRON0084-002 06/01/2021		

IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 26.01	7.56
PLAS0783-001 04/01/2021		
PLASTERER	$ 26.04	9.02
PLUM0068-002 10/01/2021		
PLUMBER	$ 36.83	11.71
PLUM0211-010 10/01/2021		
PIPEFITTER (Including HVAC Pipe Installation)	$ 37.03	12.56
SHEE0054-003 04/01/2020		
SHEET METAL WORKER (Excludes HVAC Duct and Unit Installation)	$ 29.70	13.85
* SUTX2014-023 07/21/2014		
ACOUSTICAL CEILING MECHANIC	$ 16.41	3.98
BRICKLAYER	$ 19.86	0.00
CAULKER	$ 15.36	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.82**	0.00
DRYWALL FINISHER/TAPER	$ 16.30	3.71
DRYWALL HANGER AND METAL STUD INSTALLER	$ 17.45	3.96
ELECTRICIAN (Alarm Installation Only)	$ 17.97	3.37
ELECTRICIAN (Low Voltage Wiring Only)	$ 18.00	1.68
FLOOR LAYER: Carpet	$ 20.00	0.00
FORM WORKER	$ 11.87**	0.00
GLAZIER	$ 19.12	4.41
INSULATOR – BATT	$ 14.87**	0.73
IRONWORKER, REINFORCING	$ 12.10**	0.00
LABORER: Common or General	$ 10.79**	0.00
LABORER: Mason Tender – Brick	$ 13.37**	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.50**	0.00
LABORER: Pipelayer	$ 12.94**	0.00
LABORER: Roof Tearoff	$ 11.28**	0.00
LABORER: Landscape and Irrigation	$ 9.49**	0.00
LATHER	$ 19.73	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.10**	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93**	0.00
OPERATOR: Bulldozer	$ 20.77	0.00
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 15.64	0.00

OPERATOR: Grader/Blade	$ 13.37**	0.00
OPERATOR: Loader	$ 13.55**	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 16.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 16.77	4.51
ROOFER	$ 15.40	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 17.81	2.64
SHEET METAL WORKER (HVAC Unit Installation Only)	$ 16.00	1.61
SPRINKLER FITTER (Fire Sprinklers)	$ 22.17	9.70
TILE FINISHER	$ 12.00**	0.00
TILE SETTER	$ 16.17	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 14.95**	5.23
TRUCK DRIVER: Dump Truck	$ 12.39**	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50**	0.00
TRUCK DRIVER: Water Truck	$ 12.00**	4.11
WATERPROOFER	$ 14.39**	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate

whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.