

LEGAL NOTICE

VILLAGE OF ORLAND PARK, ILLINOIS  
ADVERTISEMENT FOR BIDS

**SPORTSPLEX LED LIGHTING RETROFIT**

The Village of Orland Park, Illinois will receive sealed bids until 11:30 A.M. on the 26th day of June, 2012, at the Office of the Village Clerk, 14700 S. Ravinia Ave., Orland Park, Illinois 60462, for SportsPlex LED Lighting Retrofit. All Bids received will be publicly opened and read aloud on said date and time at the Village Hall, 14700 Ravinia Avenue, Orland Park, Illinois, 60462, before the Village Manager or his designee.

The improvements on which bids are requested will require the following: Retrofitting of the SportsPlex Soccer Field and Basketball Court existing ceiling mounted metal halide lamps with proposed LED light panels. Removal of existing ballasts and installation of all required conduit and wiring, complete in place.

Plans and specifications are on file and available for inspection and copies will be available at the Office of the Village Clerk and online at the Village's website [www.orland-park.il.us](http://www.orland-park.il.us).

A pre-bid meeting, at which attendance is mandatory, will be held on Tuesday, June 19, 2012 at 9:00 A.M., at the SportsPlex located at 11351 W. 159<sup>th</sup> Street, Orland Park, IL 60467.

No bid shall be withdrawn after the opening of the bid without the consent of the Village for a period of sixty (60) days after the scheduled time of opening and reading bids.

The President and Board of Trustees reserve the right to reject any and all bids or parts thereof and to waive any informalities, technicalities and irregularities in bidding and to disregard all non-conforming or conditional bids.

The successful bidder shall be required to comply with the provisions of all State of Illinois and federal laws concerning public works projects as well as the State of Illinois Human Rights Act and the regulations of the Illinois Human Rights Commission. Any contract executed is subject to the Davis-Bacon Act, the Illinois Prevailing Wage Act and Buy American requirements.

By order of the President and Board of Trustees of the Village of Orland Park, Cook and Will Counties, Illinois.

PRESIDENT AND BOARD OF TRUSTEES  
VILLAGE OF ORLAND PARK, ILLINOIS

BY: DAVID P. MAHER  
VILLAGE CLERK



## **VILLAGE OF ORLAND PARK, ILLINOIS**

### **INVITATION TO BID**

**SportsPlex LED Lighting  
Retrofit Project**

### **ISSUED**

June 12, 2012

### **MANDATORY PRE-BID MEETING**

June 19, 2012 @ 9:00 AM  
SportsPlex  
11351 W. 159<sup>th</sup> Street  
Orland Park, IL

### **BID OPENING**

June 26, 2012 @ 11:30 AM  
Village Hall  
14700 S. Ravinia Ave  
Orland Park, IL

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**SportsPlex LED Lighting Retrofit Project**  
**INVITATION TO BID**

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**I. INSTRUCTIONS TO BIDDERS**

**OVERVIEW**

The Village of Orland Park requests Bids for the SportsPlex LED Lighting Retrofit Project ("Project") in the Village of Orland Park, Illinois ("Village"). See the Plans and Specifications prepared by The Village of Orland Park for details on the Project ("Plans and Specifications").

In order to be responsive, SEALED BIDS must be signed and received by the Village of Orland Park in the Office of the Village Clerk, 14700 South Ravinia Avenue, Orland Park, Illinois 60462, **not later than 11:30 a.m., local prevailing time on Tuesday, June 26, 2012**. All sealed bids must be submitted to the Village Clerk, located at the above stated address. All sealed bids submitted properly will be opened publicly and read aloud immediately following the stated submission time for the Project which described in detail consists of the following:

*Retrofitting of the SportsPlex Soccer Field and Basketball Court existing ceiling mounted metal halide lamps with proposed LED light panels. Removal of existing ballasts and installation of all required conduit and wiring, complete in place.*

Oral, telephonic, facsimile or electronically transmitted bids shall not be considered.

A pre-bid meeting, **at which attendance is mandatory**, will be held on **Tuesday, June 19, 2012 at 9:00 a.m.**, at the SportsPlex located at 11351 W. 159<sup>th</sup> Street, Orland Park, IL 60467.

No oral comments will be made to any Bidder as to the meaning of the Plans and Specifications or other contract documents. Requests for comments shall be made in writing. Contact Frank Stec by fax at (708) 403-6289, if you have any technical questions on this project. Inquiries received in writing within seven (7) or more days prior to the bid opening will be given consideration and answers will be provided in writing to all potential bidders and will be available to the public. Bidders will not be relieved of obligations due to failure to examine or receive documents, visit the site or become familiar with conditions or facts of which the Bidder should have been aware and the Village will reject all claims related thereto.

Information (other than in the form of a written Addendum issued by the Village) from any officer, agent, or employee of the Village or any other person shall not affect the risks or obligations assumed by the bidder or relieve him from fulfilling any of the conditions and obligations set forth in the bid and other contract documents. Before the bids are opened, all modification or additions to the Specifications or General Provisions, or other bid documents will be made in the form of a written Addendum issued by the

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Village. The Village will send copies of any such Addendum not less than four (4) calendar days before bids are opened to those persons who have received bid packages and provided sufficient contact information. In the event of conflict with the original contract documents, addenda shall govern all other contract documents to the extent specified. Subsequent addenda shall govern over prior addenda only to the extent specified.

**The bidder shall be required to acknowledge receipt of the formal Addendum by signing the Addendum and including it with the bid quotation.** Failure of a bidder to include a signed formal Addendum in its bid quotation shall deem its quotation non-responsive; provided, however, that the Village may waive this requirement in its best interest.

Any references in the Specifications to manufacturer's name, trade name, or catalog number (unless otherwise specified) is intended to be descriptive but not restrictive and only to indicate articles or materials that will be satisfactory. Bids on other makes and catalogs will be considered, provided each bidder clearly states on the face of their bid exactly what is proposed to be furnished. Unless so stated in the bid, it shall be understood that the bidder intends to furnish the item specified and does not propose to furnish an "equal." The Village hereby reserves the right to approve as an equal, or to reject as not being an equal any article the bidder proposes to furnish which contains minor or major variations from specification requirements, but which may comply substantially therewith.

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**BID SPECIFICATIONS FOR:**

SportsPlex LED Lighting Retrofit Project

**SCOPE OF WORK:**

The Village of Orland Park, Illinois is requesting bids for:

**1. LED Lighting Retrofit – Purchase and Installation**

- Remove all existing ceiling mounted metal halide lamps and mogul base assemblies in indoor soccer field and basketball court.
- Remove ballast boxes.
- Install new LED retrofit kit assemblies in existing ceiling mounted fixture housings.
- Wire LED retrofit kit to existing branch circuit wiring.

**Alternate I**

**2. LED Lighting Retrofit - Purchase ONLY**

**SPECIAL CONDITIONS:**

- All work must be completed by August 17, 2012. Village reserves the right to selectively choose portions of this project to complete as may be required due to budget and/or time constraints.

- **Federal American Recovery and Reinvestment Act of 2009 (ARRA):**

Goods and services under this Agreement are being funded in whole or in part with monies made available by the Federal American Recovery and Reinvestment Act of 2009 (ARRA) and such law contains provisions commonly known as “Buy American” that require all of the iron, steel, and manufactured goods used in the project be produced in the United States (“Buy American Requirements”) including iron, steel, and manufactured goods provided by the Bidder pursuant to this Agreement.

- Federally funded projects must also comply with the Davis-Bacon Act.

**Bid Submission:**

Please provide a total proposed not-to-exceed fee on the Bidders Summary Sheet located in Section II.

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**GENERAL PROVISIONS**

**Contract** – The successful bidder will be required to enter into a standard form contract with the Village of Orland Park within ten (10) business days of notice of bid award (hereinafter referred to as the “Contract”).

Ex: This contract will expire upon completion, inspection, acceptance and final payment for the work/goods/services performed whichever occurs first. Certain provisions of the Contract shall survive the expiration or termination of the Contract.

**Resident Inspector** – The Director of Parks and Building Maintenance or his designee reserves the right to make any inspections at any time.

**Period of Performance** – Actual work cannot begin until the Village issues a written Notice to Proceed to the Contractor. In order to receive said Notice, the Contractor shall submit to the Village for its approval all the necessary contracts, bonds, and insurance. Village approval of the contracts, bonds and insurance, shall be evidenced by its issuance of the signed contract by the Village and the Notice to Proceed. The Village reserves the right to terminate the relationship with the successful bidder if these documents are not submitted to and approved by the Village within ten (10) days of notice of bid award.

The work to be performed by the successful bidder shall be complete on or before August 17, 2012. Liquidated damages shall be assessed for and after both dates individually if the work is not complete.

Should the Contractor neglect, refuse, or fail to complete the work under the contract by agreed upon date of August 17, 2012, and in view of the difficulty of estimating with exactness the damages caused by such delay, the Village shall have the right to charge the Contractor the sum of \$250 per day for each and every calendar day that the work is not complete according to the Village’s Specifications, as liquidated damages and not a penalty.

**Payments** – Payment terms shall be pursuant to the provisions of the Local Government Prompt Payment Act (50 ILCS 505/1 *et seq.*) after receipt by the Village of Contractor’s Dated Invoice, Contractor’s Sworn Statement, and Lien Waiver for the amount being requested. Invoices should include the following information:

- Name and address of contractor
- Purchase order number
- Dates of service
- Current invoice amount
- Invoices from subcontractors
- Lien Waivers from subcontractors
- Current retainage



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- Total retainage amount including current invoice
- Certified Payrolls

The Village may exercise its right to request photocopies of cancelled checks from the Contractor to his subcontractors, manufacturers, and suppliers, etc. Copies of these cancelled checks along with all applicable Lien Waivers shall accompany each pay request and shall be submitted for the month previous to the amount shown on the pay request minus retainage.

Upon the Village's request, invoices for progress payments must include supporting documentation such as packing slips, subcontractor's invoice and material invoices.

**Changes in the Scope of Work** – Changes in the contractual scope of work shall be preceded by a duly executed Change Order itemizing any change in the Contract sum or terms and conditions and, if required by the Village, approved by the Village Board of Trustees prior to acceptance of the Change Order.

**Assignment** – Successful bidder shall not assign the work of this Project without the prior written approval of the Village.

**Compliance with Laws** – The bidder shall at all times observe and comply with all laws, ordinances and regulations of the federal, state, local and Village governments, which may in any manner affect the preparation of bids or the performance of the Contract.

Bidder hereby agrees that it will comply with all requirements of the Illinois Human Rights Act, 775 ILCS 5/1-101 et seq., including the provision dealing with sexual harassment and that if awarded the Contract will not engage in any prohibited form of discrimination in employment as defined in that Act and will require that its subcontractors agree to the same restrictions. The contractor shall maintain, and require that its subcontractors maintain, policies of equal employment opportunity which shall prohibit discrimination against any employee or applicant for employment on the basis of race, religion, color, sex, national origin, ancestry, citizenship status, age, marital status, physical or mental disability unrelated to the individual's ability to perform the essential functions of the job, association with a person with a disability, or unfavorable discharge from military service. Contractors and all subcontractors shall comply with all requirements of the Act and of the Rules of the Illinois Department of Human Rights with regard to posting information on employees' rights under the Act. Contractors and all subcontractors shall place appropriate statements identifying their companies as equal opportunity employers in all advertisements for workers to be employed in work to be performed.

Not less than the Prevailing Rate of Wages as found by the Village of Orland Park or the Department of Labor shall be paid to laborers, workmen, and mechanics performing work under the Contract. If awarded the Contract, contractor must comply with all provisions of the Davis-Bacon Act and the Illinois Prevailing Wage Act, including, but not

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limited to, providing certified payroll records to the Village. Contractor and subcontractors shall be required to comply with all applicable federal laws, state laws and regulations regarding minimum wages, limit on payment to minors, minimum fair wage standards for minors, payment of wage due employees, and health and safety of employees. Contractor and subcontractor are required to pay employees all rightful salaries, medical benefits, pension and social security benefits pursuant to applicable labor agreements and federal and state statutes and to further require withholdings and deposits therefore.

Any contractor doing work in the Village must obtain a Contractor's license from the Village of Orland's Building Department, as may be required by Village code.

**Guarantees and Warranties** – All guarantees and warranties required shall be furnished by the bidder if awarded the Contract and shall be delivered to the Finance Department before final payment on the Contract is issued. Information describing such guarantees and warranties shall be included as part of the bid.

The bidder shall also specify any guarantees or warranties which are available for purchase by the Village and shall transfer the same in writing upon completion of the work, along with a Bill of Sale as may be appropriate.

By submitting a bid, bidder expressly warrants that materials furnished under the contract will be of good quality and new unless otherwise expressly required or permitted by the contract documents, that the work will be free from defects for one (1) year from the issuance of the final payment by the Village and deficiencies shall be corrected by the contractor under its warranty immediately upon notification from the Village.

**Alternates** – Materials are specified. Alternate equipment and or material other than those outlined within this packet will need to be submitted to the Village 7 days prior to the date of bid opening. A catalog cut sheet with related photometric calculations that meet the same values as the specified materials must be submitted with alternate. If for any reason and at the sole discretion of the Village of Orland Park any alternate equipment and or materials are deemed to be unacceptable the entire bid maybe disregarded.

**Indemnification** – The selected contractor shall indemnify and hold harmless the Village of Orland Park (“Village”), its trustees, officers, directors, agents, employees, representative and assigns, from lawsuits, actions, costs (including attorney’s fees), claims or liability of any character, incurred due to the alleged negligence of the Contractor, brought because of any injuries or damages received or sustained by any person, persons or property on account of any act or omission, neglect or misconduct of said Contractor, its officers, agents and/or employees arising out of, or in performance of any of the provisions of the Contract Documents, including any claims or amounts recovered for any infringements of patent, trademark or copyright; or from any claims or amounts arising or recovered under the “Worker’s Compensation Act: or any other law, ordinance, order or decree. In connection with any such claims, lawsuits, actions or

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liabilities, the Village, its trustees, officers, directors, agents, employees, representatives and their assigns shall have the right to defense counsel of their choice. The Contractor shall be solely liable for all costs of such defense and for all expenses, fees, judgments, settlements and all other costs arising out of such claims, lawsuits, actions or liabilities.

The Contractor shall not make any settlement or compromise of a lawsuit or claim, or fail to pursue any available avenue of appeal of any adverse judgment, without the approval of the Village and any other indemnified party. The Village or any other indemnified party, in its or their sole discretion, shall have the option of being represented by its or their own counsel. If this option is exercised, then the Contractor shall promptly reimburse the Village or other indemnified party, upon written demand, for any expenses, including but not limited to court costs, reasonable attorneys' and witnesses' fees and other expenses of litigation incurred by the Village or other indemnified party in connection therewith.

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**BID SUBMISSION REQUIREMENTS**

**Bidder must submit three (3) complete, sealed, signed and attested copies of the bid, one (1) of which shall be a complete bound copy and two (2) of which shall be complete, identical, unbound copies of the bid, and shall have provided all requested information, and submitted all appropriate forms, certificates, affidavits and addendum acknowledgements in each copy in order to be considered responsive. All copies shall contain the forms with the original signatures.**

Once submitted, no bid may be withdrawn without the Village's consent, but it may be superseded by a subsequent timely bid. Any bid received after the time and date specified for opening, or any postponement thereof, will not be considered. Bids shall be irrevocable for a period of sixty (60) calendar days after the Village opens them.

Each bidder is responsible for reading the bid documents and determining that the Specifications describe the work to be performed in sufficient detail. Failure of a bidder to do so shall not relieve the bidder of any obligation with respect to said bid. Bidders shall notify the Village of any inappropriate service, brand name, component, or equipment called for by the Village in the Specifications and shall note in its bid the adjustments made to accommodate such deficiencies in the Specifications. After bids have been opened, no bidder shall assert that there was a misunderstanding concerning the nature of the work to be done or the quantities and specifications of the materials/items to be delivered, and no such claim shall relieve a bidder from its obligation to perform. All bids must be made only on the forms provided by the Village and must be made in accordance with this Invitation to Bid and Specifications, (Project manual) all of which are on file and may be obtained for examination in the Clerk's Office at the above address and are made part of this notice as though fully set forth herein.

**Bidder Summary Sheet** – Section II includes the Bidder Summary Sheet that must be completed and submitted with the bid package. The Village reserves the right to reject any bid that includes an incomplete Bid Sheet and/or if the total bid price on the Bidder Summary Sheet does not match the summation of the total cost for the Pay Items included in the detail. In the event of a discrepancy, the total price shall govern over the unit price listed on the bid sheet.

**Bid Deposit** – A bid deposit is not required for this bid.

**References** – Bidders shall provide the Village with the names and contact information of three (3) references for which they have performed similar work. The bidders grant Village permission to contact said references and ask questions regarding prior work performance. Village shall use the information gained from bidder's references to further evaluate the bidders.

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**Insurance** – Contractor shall purchase and maintain, at all times during the performance of the work under this Contract, insurance coverage and endorsements, including Worker’s Compensation, Automobile Liability, Comprehensive General Liability and Excess Liability, in the amounts set forth in the Village’s Insurance Requirements attached in Section II. **Bidders must sign and submit with the bid, the Insurance Requirements page, as recognition of the insurance coverages and amounts (hereinafter referred to as “coverage(s)”) that will be required to be in place before the commencement of any work by the successful bidder. By signing this form, the bidder is certifying that in the event the bidder does not already have the required insurance coverages in place, that the bidder has checked with their insurance carrier and verified that the coverages and endorsements requested will be able to be obtained by the bidder within ten (10) days after the date of the Notice of Award of the Contract.** The bidder has the sole responsibility of verifying that the coverages and endorsements will be available for purchase and has made any and all inquiries necessary to satisfy this requirement and fully inform themselves in regards to any additional policy premiums the successful bidder may incur as a result of obtaining said required coverage’s. The bidder also represents that they have taken the insurance requirements into account and at the bidders’ sole discretion, has factored this into the bid prices submitted. The successful bidder is solely and entirely responsible for the payment of policy premiums and in no event will the Village of Orland Park be obligated to incur any additional expense, nor will the Village increase the amount of the Contract above the amount bid, as a result of any expense the successful bidder may incur to satisfy the obligations required herein.

**Please submit with the bid, a current policy Specimen Certificate of Insurance showing the insurance coverages the bidder currently has in force.**

Upon award of the contract, any insurance policies providing the coverages required of the Contractor shall be specifically endorsed to identify “*The Village of Orland Park, and their respective officers, trustees, directors, employees and agents as Additional Insureds on a primary/non-contributory basis with respect to all claims arising out of operations by or on behalf of the named insured.*” If the named insureds have other applicable insurance coverage, that coverage shall be deemed to be on an excess or contingent basis. The policies shall also contain a “Waiver of Subrogation in favor of the Additional Insureds in regards to General Liability and Workers Compensation coverage’s.” The certificate of insurance shall also state this information on its face and endorsements will be required to be submitted if awarded the contract. Certificates of insurance must state that the insurer shall provide the Village with thirty (30) days prior written notice of any change in, or cancellation of required insurance policies. The words “endeavor to” and “but failure to do so shall impose no obligation or liability of any kind upon the insurer, its agents or representatives” must be stricken from all Certificates of Insurance submitted to the Village, but failure of the insurer to strike this reference shall not be a waiver of the obligation to provide any written notice.

**Performance Bond** – Not applicable to this project.

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**Bid Price** – The submitted bid price shall include all permits, insurance, bonds, goods/materials, plant facilities, work and expense necessary to perform the work in accordance with the Specifications included in this bid package. The submitted bid price shall not include any amount for sales or use taxes, or any other tax from which the Village is exempt.

The Specifications describe the standards of construction and are not intended to describe a particular manufacturer's product.

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**EVALUATION OF BIDS/BIDDERS**

The Village reserves the right to accept any bid, any part or parts thereof, or to reject any and all bids.

The Village reserves the right to waive minor informalities or irregularities in the bids received, to accept any bid deemed advantageous to the Village, or to reject any and all bids submitted. Conditional bids, or those which take exception to the Contract documents without prior written approval from the Village, may be considered non-responsive and may be rejected.

The Village may make such investigations as it deems necessary to determine the ability of the bidder to perform the work in conformity with the Contract documents, and the bidder shall furnish to the Village all such information and data for this purpose as the Village may request.

The Contract shall be awarded to the lowest responsive, responsible bidder. In determining the lowest responsive and responsible bid, consideration will be given to several factors, including but not limited to price, financial responsibility of the bidder, completion date, responsiveness to the specifications, and the experience of the Village and other purchasers with the bidders.

Award of the contract is subject to Village of Orland Park Board approval. The Corporate Authority of the Village may elect to enforce its Local Vendor Purchasing Policy (see Section III Exhibit A – Local Vendor Purchasing Policy) when awarding the contract.

By submitting its bid, the bidder agrees to furnish, upon request from the Village, all information (including a list of subcontractors and suppliers and their prices) reasonably necessary for analysis. Furthermore, the Village may request that the bidder show, in detail, the kinds, quantities, and prices of direct material and direct labor used to develop prices/costs submitted in the bid. In addition, the Village reserves the right to request and receive information explaining the estimating process, including the judgmental factors and methods used to project from known data, and the contingencies used. The Village may require the bidder to show how it computes and applies indirect costs, and to show trend and budgetary data.

The Village may also conduct a pre-award facility survey of the bidder. This survey may include, but is not limited to, determining if the bidder has the experience, capability, necessary facilities and financial resources to complete the contract in a satisfactory manner within the required time.

The Village award will be made within sixty (60) calendar days after the date of the bid opening, or any mutually agreed extension thereof.

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**BID SUBMITTAL CHECKLIST**

In order to be responsive, the bidder must submit all of the following items:

- Sealed Bid Envelope – **Addressed to the Village of Orland Park, Attn: Village Clerk’s Office**, 14700 S. Ravinia Ave., Orland Park, IL 60462, and labeled: ***SportsPlex LED Lighting Retrofit Project***, in the lower left hand corner.
  
- Bid – Bidder must submit **three (3) complete, sealed, signed and attested copies of the bid, one (1) of which shall be a complete bound copy and two (2) of which shall be a complete, identical, unbound copies of the bid**, and shall have provided all requested information, and submitted all appropriate forms, certificates, affidavits and addendum acknowledgements in each copy in order to be considered responsive. All copies shall contain the forms with the original signatures Note: only need to include those required documents listed in Section II and Section III in the bid submission.
  
- All forms completed from Section II:
  - Bidder Summary Sheet
  - Business Organization
  - Certificate of Eligibility to Enter into Public Contracts
  - Equal Employment Opportunity
  - Certification of Compliance With the Illinois Prevailing Wage Act
  - Certification of Compliance with the Davis-Bacon Act
  - Contractor’s Certification Sexual Harassment, Tax & Substance Abuse
  - Apprenticeship and Training Program Certification
  - Buy American Certification Statement
  - References
  - Insurance Requirements



## **II – REQUIRED BID SUBMISSION DOCUMENTS**

**BIDDER SUMMARY SHEET**  
**Sportsplex LED Lighting Retrofit**

Project Name

IN WITNESS WHEREOF, the parties hereto have executed this Bid as of date shown below.

Firm Name: \_\_\_\_\_

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

City, State, Zip Code: \_\_\_\_\_

Contact Person: \_\_\_\_\_

FEIN #: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

E-mail Address: \_\_\_\_\_

**RECEIPT OF ADDENDA:** The receipt of the following addenda is hereby acknowledged:

Addendum No. \_\_\_\_\_, Dated \_\_\_\_\_

Addendum No. \_\_\_\_\_, Dated \_\_\_\_\_

**SportsPlex LED Lighting Retrofit Project (Purchase and Installation):**

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost
Soccer Field:					
16510/01	Retrofit Type 2 Fixtures	Each	24		
16510/02	Retrofit Type 3 Fixtures	Each	28		
Basketball Court:					
16510/03	Retrofit Type 2 Fixtures	Each	24		
16510/04	Retrofit Type 3 Fixtures	Each	24		
Gymnastics Room					
16510/05	Retrofit Type 1 Fixtures	Each	8		
Total Bid Price with Installation					

**Alternate I  
SportsPlex LED Lighting Retrofit (Purchase ONLY):**

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost
Soccer Field:					
16510/01	Retrofit Type 2 Fixtures	Each	24		
16510/02	Retrofit Type 3 Fixtures	Each	28		
Basketball Court:					
16510/03	Retrofit Type 2 Fixtures	Each	24		
16510/04	Retrofit Type 3 Fixtures	Each	24		
Gymnastics Room					
16510/05	Retrofit Type 1 Fixtures	Each	8		
Total Bid Price (Purchase Only)					

Delivery Time: \_\_\_\_\_ number of days from order date.

Signature of Authorized Signee: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

**BUSINESS ORGANIZATION:**

\_\_\_\_\_ Sole Proprietor: An individual whose signature is affixed to this bid.

\_\_\_\_\_ Partnership: Attach sheet and state full names, titles and address of all responsible principals and/or partners. Provide percent of ownership and a copy of partnership agreement.

\_\_\_\_\_ Corporation: State of incorporation: \_\_\_\_\_  
Provide a disclosure of all officers and principals by name and business address, date of incorporation and indicate if the corporation is authorized to do business in Illinois.

In submitting this bid, it is understood that the Village of Orland Park reserves the right to reject any or all bids, to accept an alternate bid, and to waive any informalities in any bid.

In compliance with your Invitation to Bid, and subject to all conditions thereof, the undersigned offers and agrees, if this bid is accepted, to furnish the services as outlined.

\_\_\_\_\_ (Corporate Seal)  
Business Name

\_\_\_\_\_ Signature \_\_\_\_\_ Print or type name

\_\_\_\_\_ Title \_\_\_\_\_ Date

**CERTIFICATION OF ELIGIBILITY  
TO ENTER INTO PUBLIC CONTRACTS**

**IMPORTANT: THIS CERTIFICATION MUST BE EXECUTED.**

I, \_\_\_\_\_, being first duly sworn  
certify and say that I am

\_\_\_\_\_  
(insert "sole owner," "partner," "president," or other proper title)

of \_\_\_\_\_, the Prime Contractor submitting this proposal, and that the Prime Contractor is not barred from contracting with any unit of state or local government as a result of a violation of either Section 33E-3, or 33E-4 of the Illinois Criminal Code, or of any similar offense of "bid-rigging" or "bid-rotating" of any state or of the United States.

\_\_\_\_\_  
Signature of Person Making Certification

Subscribed and Sworn To  
Before Me This \_\_\_\_\_ Day  
of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

## EQUAL EMPLOYMENT OPPORTUNITY

**Section I.** This EQUAL EMPLOYMENT OPPORTUNITY CLAUSE is required by the Illinois Human Rights Act and the Rules and Regulations of the Illinois Department of Human Rights published at 44 Illinois Administrative Code Section 750, et seq.

**Section II.** In the event of the Contractor's noncompliance with any provision of this Equal Employment Opportunity Clause, the Illinois Human Right Act, or the Rules and Regulations for Public Contracts of the Department of Human Rights (hereinafter referred to as the Department) the Contractor may be declared non-responsible and therefore ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this agreement may be canceled or avoided in whole or in part, and such other sanctions or penalties may be imposed or remedies involved as provided by statute or regulation.

During the performance of this Agreement, the Contractor agrees:

**A.** That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.

**B.** That, if it hires additional employees in order to perform this Agreement, or any portion hereof, it will determine the availability (in accordance with the Department's Rules and Regulations for Public Contracts) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.

**C.** That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, or physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

**D.** That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and Department's Rules and Regulations for Public Contract.

**E.** That it will submit reports as required by the Department's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Department or the contracting agency, and in all respects comply with the Illinois Human Rights Act and Department's Rules and Regulations for Public Contracts.

**F.** That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and Department's Rules and Regulations for Public Contracts.

**G.** That it will include verbatim or by reference the provisions of this Equal Employment Opportunity Clause in every subcontract it awards under which any portion of this Agreement obligations are undertaken or assumed, so that such provisions will be binding upon such subcontractor. In the same manner as the other provisions of this Agreement, the Contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the contracting agency and the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Department to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

**Section III.** For the purposes of subsection G of Section II, "subcontract" means any agreement, arrangement or understanding, written or otherwise, between the Contractor and any person under which any portion of the Contractor's obligations under one or more public contracts is performed, undertaken or assumed; the term "subcontract", however, shall not include any agreement, arrangement or understanding in which the parties stand in the relationship of an employer and an employee, or between a Contractor or other organization and its customers.

**ACKNOWLEDGED AND AGREED TO:**

NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

WITNESS: \_\_\_\_\_

DATE: \_\_\_\_\_

**CERTIFICATION OF COMPLIANCE WITH THE  
ILLINOIS PREVAILING WAGE ACT  
(820 ILCS 130/0.01, et seq.)**

It is hereby stipulated and certified to the Village of Orland Park, that the undersigned Contractor shall pay not less than the prevailing hourly rate of wages, the generally prevailing rate of hourly wages for legal holiday and overtime work, and the prevailing hourly rate for welfare and other benefits as determined by the Illinois Department of Labor and as set forth in the schedule of prevailing wages for this contract to all laborers, workers and mechanics performing work under this contract. The undersigned Contractor further stipulates and certifies that he/she/it has maintained a satisfactory record of Prevailing Wage Act compliance with no significant Prevailing Wage Act violations for the past three (3) years. In accordance with Public Act 94-0515, the Contractor will submit to the Village certified payroll records (to include for every worker employed on the project the name, address, telephone number, social security number, job classification, hourly wages paid in each pay period, number of hours worked each day and starting and ending time of work each day) on a monthly basis, along with a statement affirming that such records are true and accurate, that the wages paid to each worker are not less than the required prevailing rate and that the Contractor is aware that knowingly filing false records is a Class B Misdemeanor.

**Contractor:**

**By:**

\_\_\_\_\_  
(Authorized Officer)

Subscribed and Sworn To  
Before Me This \_\_\_\_\_ Day  
of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public



**VILLAGE OF ORLAND PARK  
CONTRACTOR'S CERTIFICATION  
COMPLIANCE WITH DAVIS-BACON ACT**

**(PUBLIC WORKS PROJECT WITH FEDERAL FUNDS ASSISTANCE)**

\_\_\_\_\_, having been first duly sworn  
(Officer, Partner, Member/Manager or Owner)

deposes and states as follows: \_\_\_\_\_, having  
(Name of Company or Firm)

submitted a bid/proposal for \_\_\_\_\_  
(Project)

to the Village of Orland Park, Illinois, hereby certifies that the undersigned Company or Firm is or will be in full compliance with the Prevailing Wage Requirements for Federally-Assisted Construction Projects at all times during the term of the Project.

By: \_\_\_\_\_  
Officer, Partner, Member/Manager or  
Owner of Company

Subscribed and Sworn to  
before me this \_\_\_\_ day  
of \_\_\_\_\_, 2012.

\_\_\_\_\_  
Notary Public

**VILLAGE OF ORLAND PARK  
CONTRACTOR'S CERTIFICATION  
SEXUAL HARASSMENT, TAX & SUBSTANCE ABUSE**

\_\_\_\_\_, having been first duly sworn deposes and states as follows:  
(Officer or Owner of Company)

\_\_\_\_\_, having submitted a proposal for:  
(Name of Company)

\_\_\_\_\_  
(PROJECT)

to the Village of Orland Park, Illinois, hereby certifies that the undersigned Contractor:

1. has a written sexual harassment policy in place in full compliance with 775 ILCS 5/2-105(A)(4).
2. is not delinquent in the payment of any tax administered by the Illinois Department of Revenue, or if:
  - a. it is contesting its liability for the tax or the amount of tax in accordance with procedures established by the approved Revenue Act; or
  - b. it has entered into an agreement with the Department of Revenue for payment of all taxes due and is currently in compliance with that agreement.
3. is in full compliance with the Federal Highway Administration Rules on Controlled Substances and Alcohol Use and Testing, 49 CFR Parts 40 and 382 and that \_\_\_\_\_ is/are currently participating  
(Name of employee/driver or "all employee drivers")  
in a drug and alcohol testing program pursuant to the aforementioned rules.

\_\_\_4A. has in place a written program which meets or exceeds the program requirements of the Substance Abuse Prevention on Public Works Projects Act (Public Act 95-0635), and has provided a written copy thereof to the Village of Orland Park; or

\_\_\_4B. has in place a collective bargaining agreement which deals with the subject matter of the Substance Abuse Prevention on Public Works Projects Act (Public Act 95-0635).

(Check either 4A or 4B, depending upon which certification is correct.)

By: \_\_\_\_\_  
Officer or Owner of Company named above

Subscribed and Sworn To  
Before Me This \_\_\_\_\_ Day  
of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

**APPRENTICESHIP AND TRAINING PROGRAM CERTIFICATION**

I, \_\_\_\_\_, having been first duly sworn depose and state as follows:

I, \_\_\_\_\_, am the duly authorized agent for \_\_\_\_\_, which has submitted a bid to the Village of Orland Park for

\_\_\_\_\_ and I hereby certify  
(Name of Project)

that \_\_\_\_\_  
(Name of Company)

participates in apprenticeship and training programs approved and registered with the United States Department of Labor Bureau of Apprenticeship and Training.

By: \_\_\_\_\_

Title: \_\_\_\_\_

Subscribed and Sworn To  
Before Me This \_\_\_\_\_ Day  
of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

**VILLAGE OF ORLAND PARK  
BUY AMERICAN CERTIFICATION STATEMENT**

The Bidder acknowledges to and for the benefit of the Village of Orland Park that it understands that goods and services under this Agreement are being funded in whole or in part with monies made available by the Federal American Recovery and Reinvestment Act of 2009 (ARRA) and such law contains provisions commonly known as “Buy American” that require all of the iron, steel, and manufactured goods used in the project be produced in the United States (“Buy American Requirements”) including iron, steel, and manufactured goods provided by the Bidder pursuant to this Agreement. The Bidder hereby represents and warrants that:

1. The Bidder has reviewed and understands the Buy American Requirements.
2. All the iron, steel, and manufactured goods used in the project will be and/or have been produced in the United States in a manner that complies with the Buy American Requirements, unless a waiver of the requirements is approved, and
3. The Bidder will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the Buy American Requirements, as may be requested by the Village of Orland Park.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name and Title of Signer (Please print/type)

ATTEST: \_\_\_\_\_

DATE: \_\_\_\_\_

**REFERENCES**

**(Please type)**

ORGANIZATION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

PHONE NUMBER \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

DATE OF PROJECT \_\_\_\_\_

ORGANIZATION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

PHONE NUMBER \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

DATE OF PROJECT \_\_\_\_\_

ORGANIZATION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

PHONE NUMBER \_\_\_\_\_

CONTACT PERSON \_\_\_\_\_

DATE OF PROJECT \_\_\_\_\_

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

Signature & Date: \_\_\_\_\_

## INSURANCE REQUIREMENTS

*Please submit a policy Specimen Certificate of Insurance showing bidder's current coverage's*

### WORKERS COMPENSATION & EMPLOYER LIABILITY

\$500,000 – Each Accident

\$500,000 – Policy Limit

\$500,000 – Each Employee

Waiver of Subrogation in favor of the Village of Orland Park

### AUTOMOBILE LIABILITY

\$1,000,000 – Combined Single Limit

Additional Insured Endorsement in favor of the Village of Orland Park

### GENERAL LIABILITY (Occurrence basis)

\$1,000,000 – Each Occurrence

\$2,000,000 – General Aggregate Limit

\$1,000,000 – Personal & Advertising Injury

\$2,000,000 – Products/Completed Operations Aggregate

Additional Insured Endorsement & Waiver of Subrogation in favor of the Village of Orland Park

### EXCESS LIABILITY (Umbrella-Follow Form Policy)

\$2,000,000 – Each Occurrence

\$2,000,000 – Aggregate

**EXCESS MUST COVER:** General Liability, Automobile Liability, Workers Compensation

Any insurance policies providing the coverages required of the Contractor shall be specifically endorsed to identify “The Village of Orland Park, and their respective officers, trustees, directors, employees and agents as Additional Insureds on a primary/non-contributory basis with respect to all claims arising out of operations by or on behalf of the named insured.” If the named insureds have other applicable insurance coverage, that coverage shall be deemed to be on an excess or contingent basis. The policies shall also contain a Waiver of Subrogation in favor of the Additional Insureds in regards to General Liability and Workers Compensation coverage's. The certificate of insurance shall also state this information on its face. Any insurance company providing coverage must hold an A VII rating according to Best's Key Rating Guide. Permitting the contractor, or any subcontractor, to proceed with any work prior to our receipt of the foregoing certificate and endorsement however, shall not be a waiver of the contractor's obligation to provide all of the above insurance.

The bidder agrees that if they are the selected contractor, within ten days after the date of notice of the award of the contract and prior to the commencement of any work, you will furnish evidence of Insurance coverage providing for at minimum the coverages and limits described above directly to the Village of Orland Park, Denise Domalewski, Contract Administrator, 14700 S. Ravinia Avenue, Orland Park, IL 60462. Failure to provide this evidence in the time frame specified and prior to beginning of work may result in the termination of the Village's relationship with the selected bidder and the bid will be awarded to the next lowest bidder or result in creation of a new bid.

ACCEPTED & AGREED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Authorized to execute agreements for:

\_\_\_\_\_  
Printed Name & Title

\_\_\_\_\_  
Name of Company

### **III – ADDITIONAL INFORMATION (EXHIBITS)**

**EXHIBIT A**

**VILLAGE OF ORLAND PARK  
LOCAL VENDOR PURCHASING POLICY**

The Village of Orland Park believes it is important to provide local vendors with opportunities to provide goods and services to the Village of Orland Park. This belief is based upon the fact that the active uses of commercial properties in the Village benefits the community through stabilization of the property tax base, the creation of local sales tax and the provision of employment opportunities for citizens of the community and surrounding region.

In an effort to promote the aforementioned benefits, the Village of Orland Park wishes to provide local vendors with preferential treatment when competing for contracts with the Village. A local vendor is defined as a business that has an actual business location within the corporate boundaries of Orland Park and is licensed by the Village. The Village will not award a contract to a local vendor when the difference between the local vendors bid and the otherwise lowest responsive and responsible bid exceeds the applicable percentage indicated below. As such, when considering contracts, the Village reserves the right to forego the lowest responsive and responsible bid in favor of a local vendor under the following circumstances:

<u>Contract Value</u>	<u>Range (up to a maximum of)</u>
\$0 - \$250,000	2.00%
\$250,000 - 1,000,000	1.50%
\$1,000,000 - 2,000,000	1.00%
Greater than \$2,000,000	Not Applicable

Under no circumstance will any contract be awarded to a local vendor when the local vendor's bid exceeds the lowest responsive and responsible bid by \$20,000 or more.

This Policy shall ONLY apply if formal notice of the aforementioned criteria is provided as part of the bid specifications. In addition, it should be noted that the Village of Orland Park shall not be obligated to forego the low bidder in favor of the local vendor under any circumstances. However, this Policy simply provides the Village with the option of doing so when applicable. Furthermore, this Policy shall not apply in any situation where any portion of the contract amount is being paid with funds other than Village monies. Specifically, this Policy shall not apply in any situation where the Village has received a grant or otherwise received a source of funds other than its own funds.



**EXHIBIT B**  
**SAMPLE CONTRACT**  
**VILLAGE OF ORLAND PARK**  
**(Contract for Small Construction or Installation Project)**

This Contract is made this \_\_\_\_ day of \_\_\_\_\_, 20\_\_ by and between the Village of Orland Park (hereinafter referred to as the “VILLAGE”) and \_\_\_\_\_ (hereinafter referred to as the “CONTRACTOR”).

**WITNESSETH**

In consideration of the promises and covenants made herein by the VILLAGE and the CONTRACTOR (hereinafter referred to collectively as the “PARTIES”), the PARTIES agree as follows:

**SECTION 1: THE CONTRACT DOCUMENTS:** This Contract shall include the following documents (hereinafter referred to as the “CONTRACT DOCUMENTS”) however this Contract takes precedence and controls over any contrary provision in any of the CONTRACT DOCUMENTS. The Contract, including the CONTRACT DOCUMENTS, expresses the entire agreement between the PARTIES and where it modifies, adds to or deletes provisions in other CONTRACT DOCUMENTS, the Contract’s provisions shall prevail. Provisions in the CONTRACT DOCUMENTS unmodified by this Contract shall be in full force and effect in their unaltered condition.

- The Contract
- The Terms and General Conditions pertaining to the Contract
- The VILLAGE’S Project Manual for the Work as described in Section 2 hereunder
  - o The Invitation to Bid
  - o The Instructions to the Bidders
- The Bid Proposal as it is responsive to the VILLAGE’s bid requirements
- All Certifications required by the VILLAGE
- Certificates of Insurance
- Performance and Payment Bonds required by the VILLAGE

**SECTION 2: SCOPE OF THE WORK AND PAYMENT:** The CONTRACTOR agrees to provide labor, equipment and materials necessary to perform the following:

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(hereinafter referred to as the “WORK”) as described in the VILLAGE’S Project Manual (Bid Documents) and the VILLAGE agrees to pay the CONTRACTOR pursuant to the provisions of the Local Government Prompt Payment Act (50 ILCS 505/1 *et seq.*) the following amounts for the WORK:

Unit Prices (if any):

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

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

Alternates chosen:

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

TOTAL: \_\_\_\_\_ No/100 (\$ \_\_\_\_\_) Dollars  
(hereinafter referred to as the "CONTRACT SUM.") The CONTRACT SUM shall not be increased without the express written consent of the VILLAGE.

**SECTION 3: ASSIGNMENT:** CONTRACTOR shall not assign the duties and obligations involved in the performance of the WORK except to the list of Subcontractors approved by the Village, which approval shall not be unreasonably withheld.

**SECTION 4: TERM OF THE CONTRACT:** The CONTRACTOR shall commence the WORK of this Contract upon receipt of a Notice to Proceed and shall complete performance of the WORK of this Contract by \_\_\_\_\_, (hereinafter referred to as the "CONTRACT TIME.") Failure to meet the CONTRACT TIME shall be considered an occasion of default under the CONTRACT DOCUMENTS. The CONTRACT TIME shall not be increased without the express written consent of the VILLAGE. Final payment shall be made by the VILLAGE upon inspection of the WORK, completion of any punch list items and after receipt of final release and waiver of liens in accordance with the requirements of the CONTRACT DOCUMENTS. This Contract may be terminated by the VILLAGE for convenience or by either of the PARTIES for default in the performance of the duties of the PARTIES as described in the CONTRACT DOCUMENTS upon thirty (30) day's written notice provided as required herein.

**SECTION 5: INDEMNIFICATION AND INSURANCE:** The CONTRACTOR shall indemnify and hold harmless the VILLAGE, its trustees, officers, directors, agents, employees and representatives and assigns, from lawsuits, actions, costs (including attorneys' fees), claims or liability of any character, incurred due to the alleged negligence of the CONTRACTOR, brought because of any injuries or damages received or sustained by any person, persons or property on account of any act or omission, neglect or misconduct of said CONTRACTOR, its officers, agents and/or employees arising out of, or in performance of any of the provisions of the CONTRACT DOCUMENTS, including any claims or amounts recovered for any infringements of patent, trademark or copyright; or from any claims or amounts arising or recovered under the "Worker's Compensation Act" or any other law, ordinance, order or decree. In connection with any such claims, lawsuits, actions or liabilities, the VILLAGE, its trustees, officers, directors, agents, employees, representatives and their assigns shall have the right to defense counsel of their choice. The CONTRACTOR shall be solely liable for all costs of such defense and for all expenses, fees, judgments, settlements and all other costs arising out of such claims, lawsuits, actions or liabilities.

The Contractor shall not make any settlement or compromise of a lawsuit or claim, or fail to pursue any available avenue of appeal of any adverse judgment, without the approval of the Village

and any other indemnified party. The Village or any other indemnified party, in its or their sole discretion, shall have the option of being represented by its or their own counsel. If this option is exercised, then the Contractor shall promptly reimburse the Village or other indemnified party, upon written demand, for any expenses, including but not limited to court costs, reasonable attorneys' and witnesses' fees and other expenses of litigation incurred by the Village or other indemnified party in connection therewith.

The indemnification obligation under this paragraph shall not be limited in any way by any limitations on the amount or type of damages, compensation or benefits payable by or for the benefit of Subcontractor or any indemnities under any Worker's Compensation Act, Occupational Disease Act, Disability Benefits Act, or any other employee benefits act. The Subcontractor further agrees to waive any and all liability limitations based upon the Worker's Compensation Act court interpretations or otherwise.

Execution of this Contract by the VILLAGE is contingent upon receipt of Insurance Certificates provided by the CONTRACTOR in compliance with the CONTRACT DOCUMENTS.

**SECTION 6: COMPLIANCE WITH LAWS:** CONTRACTOR agrees to comply with all federal, state and local laws, ordinances, statutes, rules and regulations including but not limited to all applicable provisions of the Illinois Human Rights Act (775 ILCS 5/1-101 *et seq.*) and the Illinois Prevailing Wage Act (820 ILCS 130/1 *et seq.*)

**SECTION 7: FREEDOM OF INFORMATION ACT COMPLIANCE:** The Illinois Freedom of Information Act (FOIA) has been amended and effective January 1, 2010. This amendment adds a new provision to Section 7 of the Act which applies to public records in the possession of a party with whom the Village of Orland Park has contracted. The Village of Orland Park will have only a very short period of time from receipt of a FOIA request to comply with the request, and there is a significant amount of work required to process a request including collating and reviewing the information.

The undersigned acknowledges the requirements of FOIA and agrees to comply with all requests made by the Village of Orland Park for public records (as that term is defined by Section 2(c) of FOIA) in the undersigned's possession and to provide the requested public records to the Village of Orland Park within two (2) business days of the request being made by the Village of Orland Park. The undersigned agrees to indemnify and hold harmless the Village of Orland Park from all claims, costs, penalty, losses and injuries (including but not limited to, attorney's fees, other professional fees, court costs and/or arbitration or other dispute resolution costs) arising out of or relating to its failure to provide the public records to the Village of Orland Park under this agreement.

**SECTION 8: NOTICE:** Where notice is required by the CONTRACT DOCUMENTS, it shall be considered received if it is 1) delivered in person, 2) sent by registered United States mail, return receipt requested, 3) delivered by messenger or mail service with a signed receipt, 4) sent by facsimile with an acknowledgment of receipt, or 4) by e-mail with an acknowledgment of receipt only if the PARTIES agree separately to use e-mail for providing notice. Notice shall be sent to the following:

To the VILLAGE:

Name:

Address:

Telephone:

Facsimile:

e-mail:

To the CONTRACTOR:

Name:

Address:

Telephone:

Facsimile:

e-mail:

or to such other persons or to such other addresses as may be provided by one party to the other party under the requirements of this Section.

**SECTION 9: LAW AND VENUE:** The law of the State of Illinois shall apply to this Agreement and venue for legal disputes shall be Cook County, Illinois.

**SECTION 10: MODIFICATION:** This Contract may be modified only by a written amendment signed by both PARTIES.

**SECTION 11: COUNTERPARTS:** This Contract may be executed in two (2) or more counterparts, each of which taken together, shall constitute one and the same instrument.

This Contract shall become effective on the date first shown herein and upon execution by duly authorized agents of the PARTIES.

FOR: THE VILLAGE

FOR: THE CONTRACTOR

By: \_\_\_\_\_

By: \_\_\_\_\_

Print name: \_\_\_\_\_

Print name: \_\_\_\_\_

Its: Village Manager

Its: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

## **IV – TECHNICAL SPECIFICATIONS**

# SUMMARY OF WORK

## SECTION 01010

### PART 1- GENERAL

#### 1.01 SCOPE

##### A. Description

The Work to be performed consists of furnishing labor, materials, equipment, and supervision as required by the Contract Documents for the **Village of Orland Park SportsPlex LED Lighting Retrofit Project** together with its accessory equipment, and appurtenances.

Work is briefly summarized as follows:

##### Indoor Soccer Field

1. Remove and replace the existing metal halide lamps and bases along with ballast boxes and install new LED lighting retrofit kits and associated wiring and conduit back to the original ballast box location.

##### Basketball Courts

1. Remove and replace the existing metal halide lamps and bases along with ballast boxes and install new LED lighting retrofit kits and associated wiring and conduit back to the original ballast box location.

##### Gymnastics Room

1. Remove and replace the existing metal halide lamps and bases along with ballast boxes and install new LED lighting retrofit kits and associated wiring and conduit back to the original ballast box location.

##### B. Related Work

1. Sections 01011.
2. Section 16510.
3. Note: Paragraphs of these Specifications describing the requirements of a single item shall apply equally to all identical items.

#### 1.02 QUALITY ASSURANCE

All Work of this Contract shall be performed in accordance with the applicable requirements of the

## SUMMARY OF WORK

National Electrical Code (NEC), Federal/State/local regulations, and/or as otherwise specified. Where contradictions occur, the more stringent shall apply.

### 1.03 LOCATION OF THE WORK

The location of the project site is Village of Orland Park Sportsplex, 11351 W. 159<sup>th</sup> Street, Orland Park, Illinois.

## PART 2- PRODUCTS

### 2.01 GENERAL

The Drawings show the approximate locations of lighting fixtures and other equipment connected to the lighting panelboards. They also show the circuit assignment to each device. Conduit and wiring connections shall be furnished by the Contractor in accordance with the existing circuiting and control shown on the Drawings.

### 2.02 FIXTURES

#### A. Lighting Fixtures

Fixtures shall be as manufactured by Environmental Technology Resources, Inc. Fixtures shall be of the types specified herein:

##### **Fixture Type #1**

- Model No. ETR-LE4293RET-1XPL
- LED Light Engine, Single Head Retrofit Assembly
- 186W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

##### **Fixture Type #2**

- Model No. ETR-LE4293RET-2XPL
- LED Light Engine Dual Head Retrofit Assembly
- 279W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

## SUMMARY OF WORK

### Fixture Type #3

- Model No. ETR-LE4293RET-3XPL
- LED Light Engine Triple Head Retrofit Assembly
- 279W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

Contact Mr. Daniel P. Drew at 773-383-0194 or Mr. Bob Cantarutti at 847-708-7437.

#### A. Product Specifications

1. Mounting
  - Retrofit: Mount in existing SPI luminaires
2. Driver
  - Input Voltage 120-277VAC
  - 24VDC Output
  - UL Class 2
  - UL Outdoor Damp Location Rated IP-66
  - Load Regulation  $\pm$  3%
  - THD Max 20%
  - Power Factor 90%
  - Current Crest Factor 1.5 Max
  - EMI - FCC47 Subpart 15, CISPR15 and CISPR22 Class A
  - UL1310 for Class 2; inherent short circuit protection; overload protected; 3.2kv output insulation
  - 5 year product warranty
3. LED Light Engine
  - 24VDC
  - UL Listed LED Retrofit ANSI/UL1598C
  - ARRA Buy American Compliant
  - Design Lights Consortium Qualified
  - 4-Way Switchable Power Option on Board
  - Energy Saver Program Switch on Board
  - 100,000 Hr. Maglev Fan Thermal Management
  - Thermal Over-Protection Shut Down and Resume
  - Under Voltage Protection Shut Down Under 90V
  - Operation Time - Date Control
  - 0-10V Port
  - 5 Year Standard Product Warranty

All fixtures shall be furnished complete with any required mounting brackets, fixture mounting stems, or hangers, together with steel supports and/or channels as required, and fixture wires. Fixture wire shall be as specified in Section 16120, Wire and Cable.



## SUMMARY OF WORK

### 2.03 DETAILS OF CONSTRUCTION

- A. Check to insure that all electrical power is disconnected from the ballast box. This should be done at the electrical panel.
- B. Disconnect all the wires in the ballast box and remove all the components located inside. Connect the line voltage wires (from the electrical panel) in the box to the existing wire pairs going to the fixture(s). Close the ballast box and move to the fixture.
- B. Remove the wire cage cover from the top of the fixture if the fixture has this feature. Remove the 1000W metal halide bulb from its socket and set aside.
- C. Disconnect all wiring connections in the unit with the exception of the ground wire. This is accomplished by unscrewing the wire nuts and disengaging the wires.
- D. Remove all the interior components (socket assembly) and the brackets from the fixture. Retain the screws for later use.
- E. Carefully place the mounting plate (which has either 2 or 3 LED light engines and their respective drivers mounted on it) inside the fixture with the LEDs facing upward and the drivers on the bottom of the plate.
- F. Connect the line side of the driver to the incoming power wires. This is done by twisting the black wires from the drivers to the black incoming wire and using a wire nut to firmly secure the connection. Follow the same procedure for the white wire.
- G. Using the screws provided, screw the mounting plate in place so that it is firmly secured inside the fixture. Replace the wire cage cover (if one was removed) and insure that the fixture is still securely attached to the stem.
- H. Energize the main electrical supply and check the luminaire for proper operation.
- I. Properly dispose of the metal halide bulb, contents of the ballast box, and socket assembly and brackets from the original fixture.

## SUMMARY OF WORK

### PART 3- EXECUTION

#### 3.01 FACTORY TEST AND INSPECTION

Each item of equipment shall be shop-assembled and tested in accordance with the manufacturer's standard procedure. Monitoring and control devices shall be functionally tested to verify correct operation and that all parts function properly.

#### 3.02 INSTALLATION

- A. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved shop drawings. Hang all conduit from hangers and not from ceiling grid system. Conduit system shall not be used to support fixtures.
- B. Support for Suspended Fixtures: Brace pendants and rods that are 4-feet long or longer to limit swinging. Support stem mounted single-unit suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.
- C. Lamping: Lamp units according to manufacturer's instructions.

#### 3.03 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Give advance notice of dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source. Interrupt electrical energy to demonstrate proper operation of emergency lighting installation.
- E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all

## SUMMARY OF WORK

units operate properly.

### 3.04 ADJUSTING, CLEANING AND TESTING

- A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.
- C. After installation, the complete lighting system shall be given adequate field visual and functional tests, witnessed by the Owner's Representative, to demonstrate that the requirements of the Specifications and Drawings have been met and that the performance of the system is satisfactory. Three certified copies of the field tests shall be furnished to the Owner's Representative.

### PART 4- MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

## RESPONSIBILITIES OF CONTRACTOR

### SECTION 01011

#### PART 1- GENERAL

##### 1.01 SCOPE

This Section establishes certain minimum requirements of Contractor's responsibilities for which the Contractor shall be fully liable for during the life of the Project and for the Work of this Contract. Specific details related to the Contractor's specific responsibilities shall be in accordance with applicable requirements of other Sections of these Specifications and/or as shown on the Drawings.

##### 1.02 RESPONSIBILITY OF CONTRACTOR

###### A. General

The Contractor shall perform all Work of this Contract as shown on the Drawings and as specified in a neat and orderly manner, consistent with the Work Schedule. The Contractor shall be responsible for coordinating all phases of his/her Work with the work of others so as not to interfere with that work being performed by others. The Contractor shall be responsible for notification(s) prior to commencement of Work and/or during construction activities. The Contractor shall be responsible for providing at the Project Site a qualified construction supervisor or Superintendent.

###### B. Work Schedule

Within ten (10) days after receiving the Notice to Proceed, the Contractor shall submit all items, and information required by Sections 01200 and 01300 including but not limited to a Work Schedule showing the progress to be made on the major portions of the Work; such Work Schedule to be designated to complete the entire Work within the Contract Time stipulated for completion. The Work Schedule shall be subject to the review of the Owner's Representative. If, at any time during the progress of Work, the Owner's Representative is of the opinion that the Contractor is not adhering to such Schedule, the Owner's Representative may request the Contractor to increase his/her force to comply with the Work Schedule. Failure of the Owner's Representative to request this shall not release the Contractor from his/her obligation to complete the Work of this Contract within the specified Contract Time.

## RESPONSIBILITIES OF CONTRACTOR

### C. Supervision and Direction

The Contractor shall supervise and direct the Work. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor shall employ and maintain on the Project a qualified construction supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor or superintendent shall have full authority to act on behalf of the Contractor. All communications given to the supervisor or superintendent shall be as binding as if given to the Contractor. The supervisor or superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

### D. Safety

The Contractor shall be solely responsible for the safety of persons, property or the Work at or adjacent to the construction site. All decisions relating to safe construction operations, the use and proper application of equipment and materials, and the protection of the general public from construction operations shall be the responsibility of the Contractor. The Contractor shall identify a qualified supervisor or superintendent in writing who shall have the authority to act on behalf of the Contractor relative to Project safety issues. The supervisor or superintendent shall be present on the site at all times as required to maintain safe Project operations.

In the event that the designated construction or safety supervisor or superintendent is absent from the site, the Contractor shall designate a substitute supervisor or superintendent to act in responsible charge of the Work. Any changes in the designated construction supervisor or safety supervisor or superintendent shall be documented by written statement to the Owner and the Owner's Representative at the time of the change.

## RESPONSIBILITIES OF CONTRACTOR

### E. Repair of Damaged Items

The Contractor shall be entirely responsible for damages to water lines, electric conduits and lines, existing structures, drains, sidewalks, curbs, streets, roads, fences, trees, culverts, and other structures of any kind and shall be liable for damages to public and private property. Repair of same shall be Contractor's responsibility and at Contractor's own expense, except where such items are to be removed and replaced as shown on the Drawings, or as specified by the Contract Documents, and/or as otherwise directed by the Owner's Representative during the course of Work, in which case said replacement unit(s) will be paid for at the Contract unit price, as bid.

### F. Compliance

It shall be the responsibility of the Contractor to familiarize himself/herself and comply with all applicable laws, ordinances, rules, regulations and lawful orders of all public authorities bearing on the safety of persons or property or their protection from damage, injury or loss. Further, the Contractor shall comply with all requirements of these Contract Documents, including but not limited to referenced specifications and/or standards as well as the contents of the Occupational Safety and Health Act (OSHA), all codes and ordinances adopted by and in effect by Federal, State, County, Township, and **Village** Governmental Bodies, and any other governmental agencies at any level having authoritative jurisdiction over the area of improvement and the type of Work to be performed.

### G. Existing Utilities

Existing utilities are shown on the Drawing according to information obtained from utility companies and surveys. Neither the Owner nor the Engineer will guarantee the accuracy or completeness of this information. The Contractor shall be responsible to make his/her own investigation to determine the existence, nature, and location of all utility lines and appurtenances within the limits of the improvement.

The Contractor shall take due care in all phases of construction to protect any utility which may be affected by the Work of this Contract. Any damages to

## RESPONSIBILITIES OF CONTRACTOR

existing utilities shall be repaired immediately by the Contractor and at the Contractor's own expense. The Contractor shall be required to cooperate with all utility companies involved in connection with the removal, temporary relocation, reconstruction, or abandonment by these agencies of any and all services or facilities owned or operated by them within the limits of this improvement.

Before performing any Work which may potentially damage, disturb or leave unsupported or unprotected any utility lines or appurtenances encountered, the Contractor shall notify the respective utility or Owner thereof, who will make the necessary arrangements for relocating, adjusting, or otherwise maintaining or abandoning service lines that fall within the limits of the proposed construction. After such arrangements have been made, the Contractor shall proceed with the Work as directed by the utility involved and the Owner's Representative. When applicable, all utility lines and appurtenances which are to be abandoned shall be removed and disposed of by the Contractor, without damaging existing utilities, and with the approval of the respective utility agency involved.

No extra compensation will be allowed the Contractor for any expense incurred by complying with these requirements, or because of delays, inconvenience, or interruptions in his/her Work resulting from the failure of any utility company to remove, relocate, reconstruct or abandon their services. The responsibility for the prompt and timely removal, relocation, reconstruction or abandonment of the Contractor's own Work with that of the involved utility agencies and/or the Contractor's responsibility to coordinate with any involved utility agency so as to perform the Work of this Contract without delay because of necessary changes in the existing utilities, public or private, shall rest upon the Contractor.

### H. Assignment of Contract

The Contractor shall be fully responsible for assignments of the Contract, when assignments are made by the Contractor. Furthermore, no part of the Work herein specified shall be assigned (by the Contractor) without the written consent of the Owner, and in no case shall such consent relieve the Contractor or his/her surety from the obligations herein entered

**RESPONSIBILITIES OF CONTRACTOR**

into by the same or change the terms of the Contract Agreement.

I. Discrepancies

The Contractor shall not take advantage of any apparent discrepancies on or between the Drawings and/or Specifications. In the event the Contractor discovers any apparent discrepancy, the Contractor shall be responsible for immediately notifying the Owner's Representative in writing for an interpretation and/or decision; and such decision by the Owner's Representative shall be final. Should the Contractor, having knowledge of any such apparent discrepancy, proceed with the Work, such Work and/or related expenses shall be at the Contractor's own risk and cost.

PART 2- PRODUCTS

Not applicable to this Section.

PART 3- EXECUTION

Not applicable to this Section.

PART 4- MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION



PROJECT MEETINGS

SECTION 01200

PART 1- GENERAL

1.01 PRECONSTRUCTION CONFERENCE

A. General

Within 10 days after issuance of the Notice to Proceed, a preconstruction conference will be held at the location, date, and time to be designated by the Owner.

B. Agenda

The matters to be discussed will include:

1. Construction schedule and progress reports to be submitted by the Contractor as described in Sections 01310 and 01320. Set final completion date for the Work of this Contract in accordance with the Notice to Proceed and identify when restoration will be performed.
2. Details of construction sequence, including the bar chart submitted with the Bid, lead times of equipment procurement, as well as the date by which the Contractor must place his/her material or equipment order to complete the Work within the construction schedule time limitations set in Section 00300 Paragraph 5.
3. Communication and general correspondence procedures between the involved parties. The Owner will designate his/her representative and/or Engineer at the time of this meeting.
4. The names and titles of all persons authorized by the Contractor to represent and execute documents for the Contractor.
5. The names, addresses, and telephone numbers of all those authorized by the Contractor to act for him/her in emergencies. Contractor to provide cell phone/fax/pager number of those individuals who will be available and responsible for the Work on a 24 hour per day basis, 7 days per week. (Contractor to submit certification as required by Section 00641.)

## PROJECT MEETINGS

6. Access and rights-of-way furnished by the Owner.
7. Forms and procedures for Contractor's Submittals as described in Section 01300.
8. Construction equipment and methods proposed by the Contractor. The Contractor shall submit a list of equipment to be used in the Work.
9. Administrative and general matters as needed, including working hours.
10. Traffic control on existing access roads and parking areas for public and Contractor.
11. (Reserved.)
12. Site and construction/erection equipment layout. Location of Contractor's field office and/or staging plan.
13. Subcontractors.
14. Payment estimates and submittals for payment.
15. Progress meetings during the course of the Work.

### 1.02 WEEKLY CONSTRUCTION MEETINGS

Construction meetings shall be held at once every week or more frequently as needed or called by the Contractor or the Owner. All matters bearing on the progress and performance of the Work since the preceding progress meetings shall be discussed and resolved, including, without limitation, any previously unresolved matters, deficiencies in the Work or the methods being employed for the Work, and problems, difficulties, or delays which may be encountered, in order that the Work may be constructed on schedule and within cost.

### PART 2- PRODUCT

Minutes of construction meetings shall be prepared by the Contractor subject to the review of the Owner or Owners Representative having participated in the meeting.

**PROJECT MEETINGS**

PART 3- EXECUTION

Minutes of construction meetings shall be submitted to the Owner or Owners Representative no later than 72 hours following the meeting.

PART 4- MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All cost of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**SUBMITTALS**

**SECTION 01300**

PART 1- GENERAL

1.01 SCOPE

- A. This Section establishes minimum requirements and procedures for Equipment Submittals made by the Contractor for materials and equipment provided for under the Work of this Contract. Specific details for additional drawings, data and information to be submitted shall be in accordance with the applicable requirements of other Sections of these Specifications.
- B. Acceptable Manufacturers and Equipment Suppliers for various items of equipment are specified in respective Sections of these Contract Documents. For convenience of designation in the Contract Documents, certain equipment, articles, materials, and processes are designated by manufacturer trade name or catalog name and number. Such designation shall be deemed to be followed by the words "or equal" whether such words are shown or not. The Contractor may offer material or processes which are equal to that so indicated or specified at the time of Bid. The burden of proof as to comparative quality and suitability of alternatives shall be upon the Contractor. Specified items are preferred. After acceptance of Bid, no substitutions will be allowed, except as stated in the Bid. (Exception: Where Specifications indicate "No Substitutions Allowed" the Contractor shall provide the designated manufacturers product without exception.)

1.02 SUBMITTAL SCHEDULE

The Contractor shall, within 10 days after receiving the Notice to Proceed, prepare and submit for review a construction schedule together with a detailed list of all the submittals which he/she proposes to make to meet the requirements stated herein and those cited in other Sections of the Contract Documents including the dates on which he/she proposes to make such submittals. The list shall include Working Drawings, Field Detail Drawings, Project Record Documents, Quality Control Procedures, and all other items for which a submittal is required. The list shall include identifying references for each item to relate it to the specific item of the Contract Documents. With each revision or certification of the

## SUBMITTALS

Construction Schedule, the Contractor shall either revise this schedule of submittals and submit it for review or certify that the previously furnished schedule is still in effect.

After the Submittal Schedule is reviewed by the Owner's Representative, it shall become the basis for the submittal of all items by the Contractor.

### 1.03 SUBMITTAL REQUIREMENTS

#### A. General

The Contractor shall furnish for review his/her Submittals as outlined herein and in the Specifications. Submittals shall confirm compliance with the requirements of the Contract Documents. Submittals of equipment drawings shall be made prior to the fabrication of the equipment. The sequence of submission shall be such that information is available for review of each Submittal when it is received. All Submittals furnished formally shall bear an approval stamp or a certification. The stamp or certification shall be signed by an authorized representative of the Contractor. The Contractor's stamp or certification on any Submittals shall constitute a representation to the Owner that the Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or that he/she assumes full responsibility for doing so, and that he/she has reviewed and coordinated each Submittal with the requirements of the Contract Documents. Before submitting any drawings for review, the Contractor shall obtain approval of the list of drawings he/she proposes to submit, showing sequence of submittal and submittal dates. All drawings shall be submitted in accordance with the Submittal Schedule as previously specified herein. Submittals shall be as complete as possible. Partial submittals will not be accepted for review.

#### B. Addressed To

All submittals shall be addressed to the Owner or as otherwise directed by the Owner.

#### C. Outline Drawings

The Contractor shall submit outline drawings of the equipment to be furnished together with estimated

## SUBMITTALS

weights, operating forces, external forces, anchoring details, and sufficient overall dimensions, to facilitate preparation of final designs of the structures into which the equipment is to be incorporated.

### D. Wiring Diagrams

The Contractor shall submit complete schematic and full-line wiring diagrams for all equipment furnished by him/her. The Contractor shall furnish drawings of switch developments for all instrument and control switches and internal connection diagrams for all instruments, relays, regulators, and other devices. One print of each wiring diagram will be returned on which will be marked the wire notations and cable numbers for outgoing circuits where this information is not otherwise available to the Contractor. The Contractor shall add this information to his/her drawings. Adequate space shall be allowed on the wiring diagrams to accomplish this.

### E. Detail Drawings and Erection Drawing

Before proceeding with fabrication or manufacture of the material and equipment designed and furnished by him/her, the Contractor shall submit the designs, design computations when requested, apparatus ratings, detailed specifications, general assembly drawings, sufficient subassembly drawings, details, and control and wiring diagrams to demonstrate fully that all parts will conform to the provisions and intent of the Contract Documents and to the requirements of their installations, operations, and maintenance. These drawings shall substantially conform to the Bid and Contract Drawings and shall show all necessary dimensions; all field joints and subassemblies in which the Contractor proposes to ship the equipment; locations and sizes of auxiliary connections for oil, grease, water and air; and the terminal boxes and wire sizes for electrical circuits. Before proceeding with fabrication or purchase, the Contractor shall submit shop drawings and/or catalog cuts as appropriate of items designed but not detailed on the Contract Drawings including, but not limited to structural steel and metal frames, covers, and gratings.

### F. Field Detail Drawings

Layout drawings for any and all embedded components of the equipment such as but not limited to, piping,

## SUBMITTALS

conduit, anchor bolts/plates, thimbles, etc. shall be submitted. These drawings shall be based on the Contract Drawings and shall contain sufficient detail for construction in the field.

### G. Review of Drawings

1. Four print copies on durable paper with dark lines on a white background and one durable paper type reproducible shall be furnished of each drawing submitted. All drawings submitted shall, insofar as practicable, be of one standard size, measuring approximately 24 x 36 inches. The Contractor's drawings shall have a blank area of 4 x 4 inches adjacent to the drawing title block for the review stamp of the Owner's Representative. The Contractor shall verify by inspection of sample reproductions that good legible reproductions can be obtained from the reproducible before submittal.
  
2. Within three weeks of receipt of shop drawings or manufacturer's data, the Owner's Representative will return one copy of each drawing and/or data sheet marked to indicate the result of the Owner's Representative's review, as follows:
  - a. "REVIEWED" - Revision of drawing or data will not be required.
  
  - b. "REVIEWED WITH CORRECTIONS" - Contractor shall revise the drawings or data and shall submit four print copies and one reproducible copy for Owner's Representative's records.
  
  - c. "REVISE AND RESUBMIT" - Contractor shall revise the drawing or data and shall resubmit the revised drawing or data to the Owner's Representative for review.
  
  - d. "REJECTED" - Drawings are non-conforming and do not meet intent of Specifications.
  
3. Copies marked "REVIEWED" or "REVIEWED WITH CORRECTIONS" authorize the Contractor to proceed with construction or fabrication covered by those drawings or data sheets with corrections, if any, incorporated.

4. Review will not relieve the Contractor of

## SUBMITTALS

responsibility for conformity to the Contract Documents and correct detail and fit of parts when installed.

5. If minor revisions are made after a drawing has been returned to the Contractor marked "REVIEWED", the Contractor shall furnish without delay one print copy and one reproducible copy subsequent to each revision. No major revision affecting the design shall be made after a drawing has been marked "REVIEWED" without resubmitting the drawing.
6. When prints of drawings have been marked "REVIEWED WITH CORRECTIONS" or "REVISE AND RESUBMIT" the Contractor shall make the necessary corrections and submit four print copies and one paper-type reproducible. Every revision shall be shown by number, date, and subject in a revision block, and in addition, each revised drawing shall have its latest revision clearly indicated. Submitted drawings which do not illustrate these indications will be considered non-conforming.
7. The applicable parts of the requirements of the above paragraphs with reference to the drawings shall apply equally to design data, catalog cuts, illustrations, printed specifications, draft reports or any other submittals furnished for review.
8. The Contractor shall make any changes in the designs which are necessary to make the equipment conform to the provisions and intent of the Contract Documents, without additional cost to the Owner.
9. Should an error be found in a Contractor's drawing during the erection of structures or installation of equipment, the correction, including any field changes found necessary, shall be noted on the drawing, and it shall be resubmitted for review, and recorded as outlined above.
10. Any drawing review services performed by the Engineer beyond that of the second submittal (for a specific item of equipment or material to be furnished) shall be at the Contractor's own expense.



## SUBMITTALS

### H. Record Drawings

Prior to completion of the Work under the Contract Documents, the Contractor shall furnish one complete set of full-size permanent reproducible copies of approved quality and type and 3 full size sets of prints of all Contractor's drawings and equipment as finally built, including any field changes.

### I. Operating and Maintenance Instructions

1. Six sets of detailed operating and maintenance instruction manuals which shall include reduced-size copies of applicable drawings, applicable parts lists and catalogs covering all equipment furnished and which may be needed or useful in operation, maintenance, repairs, dismantling or assembling, and for repair and identification of parts for ordering replacements, shall be furnished as specified.
2. Furnish operation and maintenance manuals for the various types of equipment and systems, as required by the Contract Documents. Unless otherwise indicated, a separate manual shall be furnished for each piece of equipment and/or system. The manual shall include complete information necessary to operate, maintain and repair the equipment and/or system and shall include the following specific requirements:
  - a. Table of contents and index.
  - b. Brief description of the equipment/system and principal components.
  - c. Starting and stopping procedures both normal and emergency.
  - d. Installation, maintenance and overhaul instructions which shall include detailed assembly drawings with parts list and numbers, and recommended spare parts list with recommended quantity, manufacturer's price, suppliers address and telephone number.
  - e. Recommended schedule for servicing including technical data sheets that indicate weights and types of oil, grease or other lubricants recommended for use and their application

## SUBMITTALS

procedures.

- f. One copy of each component wiring diagram and the system wiring diagram showing wire size and identification.
  - g. One approved copy of each submittal with any changes made during construction properly noted including test certificates, characteristic curves, factory and field test results.
  - h. For electrical systems include dimensioned installation drawings, single line diagrams, control diagrams, wiring and connection diagrams, list of material for contactors, relays and controls, outline drawings showing relays and controls, outline drawings showing relays, meters, controls and indication equipment mounted on the equipment or inside cubicles, control and protective schematics and recommended relay settings.
3. Submittal Requirements: Six preliminary copies of manuals shall be submitted no later than the date of shipment of equipment, and installation shall not begin until they are accepted by the Owner's Representative. Six approved copies of complete manuals shall be delivered to the Owner's Representative prior to Owner's Representative inspections and tests.

### J. Language

All drawings, design data, reports, instructions, catalogs, illustrations, and printed specifications shall be submitted in English.

### K. System of Units of Measurement

All units of measurement used shall be in the U.S. Customary System.

## PART 2- PRODUCTS

(Refer to Paragraph 1.03, Submittal Requirements, of this Section.)

## SUBMITTALS

### PART 3- EXECUTION

(Refer to Paragraph 1.02, Submittal Schedule, of this Section.)

### PART 4- MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices. Note: Supplementary Engineering Services for shop drawing review shall be paid for by the Contractor in accordance with paragraph 1.03, G.10 of this Section.

END OF SECTION

**PROJECT SCHEDULE, COORDINATION OF CONTRACTS  
AND LIQUIDATED DAMAGES**

**SECTION 01310**

PART 1-      GENERAL

1.01      CONSTRUCTION SCHEDULE

Within 10 days after issuance of the Notice to Proceed, the Contractor shall submit for review by the Owner a construction schedule. The construction schedule shall clearly identify the construction sequencing. The schedule shall be prepared by personnel experienced in construction scheduling. Every week thereafter during the course of the Work, the Contractor shall revise the construction schedule and shall resubmit it to the Owner for review. Revised schedules shall be submitted for discussion at the weekly project meetings.

The construction schedule shall clearly show each unit of Work to be performed under this Contract, and all items in the overall sequencing of the Work, including, but not limited to, tank draining, tank prepping and painting, repair work, equipment installations, and delivery of fabricated items, painting, testing, filling, final check-outs, start-up and placing into operation.

The schedule shall be prepared and maintained on a reproducible medium sufficient in size to show required data clearly for the entire duration of the Contract, and sufficient to permit reproduction for required distribution.

The construction schedule shall be arranged with notations to show how the sequence of Work is affected by Work by other contractors, work by Owner, site restrictions, purchase of materials, seasonal weather variations, and any other items deemed appropriate.

1.02      COORDINATION OF CONTRACTS

The Contractor shall be responsible for the coordination of the Contract.

The Contractor shall cooperate with other contractors and shall not hinder, delay or prevent other contractors from performing work.

**PROJECT SCHEDULE, COORDINATION OF CONTRACTS  
AND LIQUIDATED DAMAGES**

1.03      REQUIRED COMPLETION DATES

All Work of this Contract shall be completed **no later than August 17, 2012**. The herein specified completion date is intended to include painting Work and depending upon the time of year this Contract is awarded, the Contractor shall commit to either comply with the specified completion date including painting or shall provide an alternative schedule acceptable to the Owner indicating when the painting Work will be completed. For additional details refer to Section 00500, Article IV.

1.04      LIQUIDATED DAMAGES

In case of failure on the part of the Contractor to meet the Contract Completion Date, or any extensions thereof, as bid under the Bid Form (Section 00300), the Contractor shall pay to the Owner as fixed, agreed, and liquidated damages the sum of **\$250.00 for each calendar day** that completion is delayed. However, the total amount of liquidated damages to be assessed by the Owner in case of such delays, shall not exceed 10 percent of the original contract price.

In the event that it becomes necessary to terminate the Contractor's right to proceed with the Work under the Contract, such termination shall not relieve the Contractor of any responsibility for liquidated damages as set forth herein. If the Owner so terminates the Contractor's right to proceed, any resulting damage will include, subject to the limitation stated above, such liquidated damages as provided for herein until such reasonable time as may be required for completion of the Work by the Owner.

PART 2-      PRODUCTS

Not Applicable to this Section.

PART 3-      EXECUTION

Not Applicable to this Section.

PART 4-      MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such

**PROJECT SCHEDULE, COORDINATION OF CONTRACTS  
AND LIQUIDATED DAMAGES**

Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**PROGRESS REPORTS**

**SECTION 01320**

PART 1-     GENERAL

A weekly progress report shall be prepared by the Contractor in a form approved by the Owner and shall be submitted by the Contractor to keep the Owner properly informed with regard to the Work. Weekly progress reporting shall commence immediately after Notice to Proceed.

PART 2-     PRODUCTS

The weekly progress report shall indicate equipment procurement, the amount of the Work completed, materials actually used, materials in storage, on site personnel and the cumulative results of all operations completed or in progress and shall be summarized in terms of percentage of completion. The progress report shall include a brief description of the Work to be completed for the next week. Any delays experienced during the Work shall be stated in the progress report as well as the solution for regaining lost time.

PART 3-     EXECUTION

Progress reports shall be submitted at the close of each week's work not later than midmorning of the corresponding Friday.

PART 4-     MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**GENERAL PROVISIONS FOR ELECTRICAL WORK**

**SECTION 16010**

PART 1-     GENERAL

1.01        SCOPE

- A.     This Section describes the general provisions for the Work to be performed under Division 16, Electrical, of this Contract. The Contractor shall comply with these general provisions and shall perform all Work in accordance with the Specifications contained in this Section, as supplemented by Specification in related Sections, and as shown on the Drawings.
  
- B.     The following specifies the minimum general requirements by which the Contractor shall furnish, fabricate, deliver, erect, install, connect and test electrical materials, equipment and systems specified in the respective Sections of Division 16 and shown on the Drawings, so as to constitute a complete and operating electrical installation.
  
- C.     The Contractor shall provide all necessary coordination between the suppliers of the specified equipment so as to provide a well designed and satisfactory operating facility to the Owner. The Contractor is advised that these Specifications are not indented to cover every and all details of the Work. In case(s) where details related to the specified Work are not covered by these Specifications, it shall be the responsibility of the Contractor to include and execute such coordination and Work at no additional cost to the Owner.
  
- D.     Items of equipment furnished and installed as a part of the Work under other Sections of the Specifications shall be connected and wired as a part of the Work under this Section.
  
- E.     All operating limits of electrical apparatus whether furnished under this Section or in other Sections of the Specifications shall be adjusted in the field to meet the operating conditions reviewed by the Owner's Representative and as required. This shall include settings of all overcurrent and trip devices, limit switches, timers, and control device adjustments, etc.

1.02        QUALITY ASSURANCE

- A.     Acceptable Manufacturers and Equipment Supplier



## GENERAL PROVISIONS FOR ELECTRICAL WORK

As shown on the Drawings and/or as specified hereinafter in subsequent Sections.

Acceptable manufacturers for various items of equipment are specified in respective Sections of these Contract Documents. For convenience of designation in the Contract Documents, certain equipment, articles, materials, and processes are designated by manufacturer trade name or catalog name and number. Such designation shall be deemed to be followed by the words "or equal" whether such words are shown or not. The Contractor may offer material or processes which are equal to that so indicated or specified at the time of Bid. The burden of proof as to comparative quality and suitability of alternatives shall be upon the Contractor. Specified items are preferred. After acceptance of Bid, no substitutions will be allowed, except as stated in the Bid. (Exception: Where Specifications indicate "No Substitutions Allowed" the Contractor shall provide the designated manufacturers equipment without exception.)

### B. Applicable Standards

1. All electrical work furnished and installed under this Section shall be in strict compliance with the ordinances and bylaws of the Village, State and/or any other political subdivision thereof governing the installation of the electrical work on this Project. In the absence of other more stringent authority, the electrical work shall conform to the requirements of the National Electrical Code.
2. The Contractor shall conform to the latest safety standards as required by the Occupational Safety and Health Administration (OSHA) in all Work performed. In addition, all equipment and materials shall meet all applicable OSHA requirements.
3. All equipment shall be U.L. rated.
4. Comply with requirements of Section 16060 for other codes and standards.

### 1.03 SUBMITTALS

- A. In accordance with the Supplemental Conditions the Contractor shall submit to the Owner's Representative

## GENERAL PROVISIONS FOR ELECTRICAL WORK

for review drawings, product specifications, and description, together with installation requirements for all equipment furnished.

- B. The Contractor shall not install any electrical work for any item of equipment specified under this or other Sections of the Contract until shop drawings of such equipment, reviewed by the Owner's Representative, are made available to him/her. Any such Work installed by the Contractor prior to the Owner's Representative's review will be the responsibility of the Contractor and any modification of the electrical work necessary to meet the equipment requirements shall be made without additional compensation.
- C. Before fabrication and assembly of equipment, submit the following:
1. Front and rear elevations showing dimensions and the arrangement for each control cubicle/panel.
  2. Plan and section views, including dimensions, weights and mounting details.
  3. Details of bus, connections, terminals, etc., including the complete ground bus arrangement and enclosure ground connections.
  4. Single line diagram of equipment and control schematic diagram.
  5. Wiring Diagrams
    - a. Connection diagrams for the wiring of equipment in each cubicle.
    - b. Interconnection diagrams for the wiring to equipment in other cubicles. Clearly identify the terminal block points for the external wiring to be routed in or out of the cubicles. Provide adequate space on the wiring diagrams for additions (by the Contractor) or cable and wire designations for that external wiring to be routed in or out of the cubicles at the terminal block.
  6. Bill of Material.
  7. Factory test procedures and protocols, as well as installation instructions.

## GENERAL PROVISIONS FOR ELECTRICAL WORK

- D. Prior to shipment of the equipment, submit for record and distribution:
1. All drawings as finally reviewed and corrected.
  2. Recommended storage instructions.
  3. Installation instructions and operating and maintenance manuals.
  4. Spare parts bulletins.
  5. Factory test reports (certified).
  6. Booklet on maintenance procedures for circuit breakers and other equipment.
  7. Field test procedures and protocols.
- E. After final installation of the equipment the Contractor shall deliver a complete set of reproducible shop drawings of (including schematics, internal point-to-point and interconnecting) diagrams for all equipment and panels showing Work "as installed".

### 1.04 WARRANTY

All specified equipment shall be warrantied, and shall be provided with such warranties covering all parts and labor for a period of one (1) year from the date of Final Acceptance unless otherwise specified in subsequent Sections of these Specifications.

## PART 2- PRODUCTS

### 2.01 GENERAL

#### A. Standard Products

The equipment furnished shall be standard products in production by reputable companies regularly engaged in the manufacture of high-quality equipment of the type specified. Similar equipment shall have been in satisfactory and successful operation for a period of at least two years. All parts of the specified equipment shall be so designed as to be especially adapted for the service required and shall be proportioned, enclosed, or guarded as to have ample and liberal strength and stability to withstand,

## GENERAL PROVISIONS FOR ELECTRICAL WORK

without damage, the stresses to which they may be subjected during erection or operation. The component parts of duplicate items shall be fabricated on a principle of interchangeability to facilitate ready replacement.

### B. Materials

All material incorporated in the equipment shall be new and of first-class quality, free from injurious defects and imperfections, and of the classifications and grades designated. Materials not specifically designated herein shall be subject to the review of the Owner's Representative and shall be suitable for the purpose intended.

### C. Identification Symbols and Nomenclature

Identification symbols and nomenclature where used throughout these Specifications are the same as those shown on the Drawings. Paragraphs of the Specifications describing the requirements of a single item of equipment shall apply equally to all identical items of equipment to be furnished.

## 2.02 RATINGS

The sizes, ratings, capacities, and performance characteristics of various specified items of equipment and devices are based on currently available standard products, which are available through United States manufacturers. In no case shall the size, rating, capacity or performance characteristic be less than that specified unless approved in writing by the Owner's Representative. Ratings and performance characteristics, where applicable, of various devices and items of equipment are specified in respective Sections of these Specifications. All electrical equipment shall be UL rated.

## 2.03 DETAILS OF CONSTRUCTION

- A. Electrical work shall meet requirements of these Specification, product manufacturer's instructions, recommended tolerances and recommended procedures, and as indicated by final reviewed submittals for the Work.
- B. Materials shall be of size and thickness indicated. If not indicated, size and thickness shall be selected to provide strength and durability in finished Work for

## GENERAL PROVISIONS FOR ELECTRICAL WORK

intended application. Work to dimensions indicated, using proven fabrication details.

- C. Product finishes, surfaces and edges shall be smooth and free of marks, burrs, seams, roughness and like defects or conditions.
- D. Other electrical-mechanical product construction details shall be in accordance with the best engineering practices, applicable code requirements and as specified in other Sections of these Specifications.

### PART 3- EXECUTION

#### 3.00 GENERAL

- A. The Contract Drawings indicate the general details necessary for the complete electrical installation. It shall be the Contractor's responsibility to install all electrical work in a neat and workmanlike manner. The Contractor shall cooperate with others to permit the installation of all of the Work without interferences. If changes become necessary to avoid interference between the Work installed under various Sections, the Contractor shall submit to the Owner's Representative, for review, the proposed changes and upon review by the Owner's Representative, proceed with the installation of such changes without additional cost to the Owners.
- B. The Contractor shall maintain at the site a set of black-line prints on which shall be accurately shown the actual installation of all Work done under Division 16 and any variation from the Contract Drawings as reviewed by the Owner's Representative including changes in sizes, locations, and dimensions shall be indicated thereon. At the conclusion of the Work, the Contractor shall furnish record drawings in accordance with the General Conditions and as specified herein.

#### 3.01 FACTORY TEST AND INSPECTION

- A. All equipment shall be shop-assembled and tested in the manufacturer's shop in accordance with recognized standard practices. Factory tests and inspections shall be conducted to verify that the equipment is operating satisfactorily and in compliance with the Specifications. Certain factory tests and inspections are required to be witnessed by the Owner's

## GENERAL PROVISIONS FOR ELECTRICAL WORK

Representative. Where such witnessing is required by these Specifications the Contractor shall give ample notice to the Owner's Representative prior to the scheduled factory test or inspection.

### 3.02 INSTALLATION AND TESTING

- A. General: Examine the areas and conditions under which electrical work is to be installed or performed and remedy any conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- B. Existing Facilities: Verify existence, location, and operation of existing electrical facilities to be abandoned, removed, altered, modified and/or temporarily relocated to allow activities during construction of the Work.
- C. Install electrical work. Meet requirements of these Specifications, product manufacturer's instructions, recommended tolerances, and recommended procedures and as indicated by final reviewed submittals for the Work.
- D. Trenching and Backfilling. Unless otherwise specified, trenching and backfilling for conduit, cable, etc. shall be in accordance with IDOT Standard Specifications as a minimum and/or as may otherwise be shown on the Drawings or specified in other Sections of these Specifications.
- E. Tests: Comply with the requirements of Section 16050 as a minimum, and as specified in other Sections of these Specifications.

### 3.03 PAINTING

- A. In general, all specified equipment shall be shop painted with the manufacturer's standard finish and shall be field painted as required and specified and/or as otherwise directed by the Owner to match existing conditions.
- B. The Contractor shall be responsible for coordination of the compatibility between manufacturer's standard finish and the field paint.
- C. Painting shall be as specified in other Sections of these Specifications.

**GENERAL PROVISIONS FOR ELECTRICAL WORK**

PART 4-      MEASUREMENT AND PAYMENT

4.01      METHOD OF MEASUREMENT:

No separate measurement shall be made for GENERAL PROVISIONS FOR ELECTRICAL WORK.

4.02      BASIS OF PAYMENT:

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**BASIC ELECTRICAL MATERIALS AND METHODS**

**SECTION 16050**

PART 1-     GENERAL

1.01        SCOPE

In accordance with the Specifications contained in this Section and as shown on the Drawings, the Contractor shall furnish and install complete, and test, where specified, unless otherwise indicated, the following items of electrical material, equipment and systems for a complete operating electrical installation.

1.    Electrical Conduit
2.    Electric Devices and Accessories
3.    Wire and Cable
4.    Electrical Panel(s)
5.    Grounding

PART 2-     PRODUCT

2.01        GENERAL

All equipment shall be new and shall be essentially standard products of the manufacturers regularly engaged in the production of the type of equipment specified herein. Like items shall be the product of a single manufacturer.

2.02        RATINGS/SIZES

(As specified in other Sections of these Specifications.)

2.03        DETAILS OF CONSTRUCTION

- A.   All permanent foundation materials such as anchor bolts, either embedded in the concrete or required for anchoring, shall be furnished with the equipment. Approved types of expansion anchors may be used where practicable for small equipment.
  
- B.   Each item of manufactured equipment furnished under these Specifications shall have a permanent nameplate affixed thereto in a readily visible place, showing the serial number, the name and address of the manufacturer, rated capacity, speed, electrical characteristics, and other pertinent data, as applicable. Nameplates of distributing agents only, will not be acceptable.



## BASIC ELECTRICAL MATERIALS AND METHODS

- C. Control panels shall be furnished with the equipment complete with terminal blocks, wiring, and other miscellaneous devices as indicated or required by the intended operation of the equipment or by the Drawings or Specifications. The equipment shall include all auxiliary and accessory devices, such as auxiliary transformers, auxiliary relays, protective devices, and resistors, whether or not they are expressly specified or indicated on the Drawings. Adequate provisions shall be made to accommodate, support, and connect cables to the terminal blocks or point of attachment. The Contractor shall locate and arrange his/her terminal blocks so that the external cable connections can be made in a neat and proper fashion. Shielded cables shall be grounded at the panel end only, and shall be terminated on terminal blocks. The shield terminations shall be subject to review.
- D. Control wiring in Control panels shall be Type MTW stranded copper conductors, #12 AWG minimum size, 600-V. Class D stranded wire shall be used for wiring across hinged joints. Wiring shall be neatly arranged, properly supported, and terminated at terminal blocks. At least 20% extra terminals shall be provided at each group of blocks. Control circuits and power circuits shall be completely separated by use of divided cubicles or barriers. Terminal blocks shall be 600-V furnished with covers and marking strips showing the wire designation on the wiring diagrams or as designated by the Owner's Representative. Not more than 2 wires shall be connected to any one terminal screw. Terminals shall be suitable for a maximum external conductor size of #8 AWG.
- E. The surfaces of the panel shall be bonderized (or otherwise treated so as to be substantially corrosion-resistant), primed and finished with 2 coats of the manufacturer's standard gray baked enamel applied in accordance with the manufacturer's directions. The interior surfaces shall be finished and painted in accordance with the standard practice of the equipment manufacturer. All surfaces to be painted shall be thoroughly cleaned, and all oil film and loose scale shall be removed before applying the first coat of paint. The color of the paint will be determined by the Owner. One gallon of finish paint used shall be furnished for touching up damaged surfaces after installation.
- F. Each meter, instrument, operating device, control

## BASIC ELECTRICAL MATERIALS AND METHODS

switch, panel and circuit shall have a nameplate with engraved circuit designation mounted in a clearly visible location. If any of the foregoing devices do not have apparatus designation thereon that is visible from the front, a nameplate with engraved apparatus designation shall also be furnished. Nameplates shall be uniform in shape, size, finish and lettering and be made of laminated black and white micarta or clear plastic material with lettering embossed on the back side and filled-in with opaque paint. The width and depth of the lettering shall be so designed as to be legible from reasonable angles of observation. A typical nameplate sample shall be submitted to the Owner's Representative for review.

- G. The Contractor shall size, furnish and install all pads and anchorages required for electrical equipment. The necessary excavation, backfilling, concrete and reinforcing steel shall conform to the requirements of applicable codes and other Sections of these Specifications. The Contractor shall furnish and install all the anchor bolts, pipe sleeves, brackets, leveling and setting plates, etc. when and where required.

### PART 3- EXECUTION

#### 3.01 INSTALLATION

The methods of installation of Contractor-furnished equipment and materials are described in subsequent Sections and shall in general be in accordance with the manufacturer's standard procedure and recognized engineering practices.

#### 3.02 TESTS

- A. All electrical equipment, materials, and supplies shall have passed adequate routine factory tests. Field tests shall be made by qualified personnel, having thorough experience in previous jobs of similar scope, approved by the Owner. Field tests shall be made on electrical equipment or on each electrical installation or system as specified below, or as required to establish satisfactory operations and conformance with these Specifications. The tests shall be witnessed by the Owner's Representative. The Contractor shall give the Owner's Representative two weeks notice in advance of the tests. The Contractor shall furnish all apparatus, materials, labor, and facilities for performing the required tests.

## BASIC ELECTRICAL MATERIALS AND METHODS

Corrections for any defects shall be made by and at the expense of the Contractor to the satisfaction of the Owner's Representative. The Contractor shall submit test methods and a list of test equipment to be used for conducting these tests subject to the review of the Owner's Representative. Records of all tests made shall be kept by the Contractor and furnished to the Owner's Representative in triplicate, no later than 7 calendar days after each test is completed.

- B. Control circuits shall be tested prior to operational testing with the control circuits energized but with the controlled equipment disconnected or otherwise made inoperable. The control systems shall be checked for proper operation by actuating each contact which initiates a control operation, and then following the control sequence through the affiliated devices to ascertain that correct results are obtained with each condition of interlocking. The actuating of contacts as required to initiate an operation and to set up interlocking conditions shall be accomplished manually or by simulated operating conditions, whichever is applicable. At this time, adjustments shall be made as required to temperature switches, thermostats, pressure switches, flow switches, position switches, limit switches, auxiliary relays, timers and all other automatic control, interlocking and annunciation devices.
- C. After the individual items of wiring and equipment have been tested and proved satisfactory and the preliminary control tests have been completed, the equipment shall be further tested for satisfactory operation under normal operating conditions. The equipment shall be lubricated, balanced, aligned, adjusted and operated through sufficient sequences and for a sufficient length of time to establish, to the satisfaction of the Owner, that the equipment, including all safety and limit devices, has been correctly installed and operates properly.
- D. Specific tests to be performed in addition to the above tests are given in the Sections in which the equipment or system installation is specified.

### 3.03 PAINTING

(See Paragraph 2.03, E of this Section).

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT:

## BASIC ELECTRICAL MATERIALS AND METHODS

No separate measurement shall be made for BASIC MATERIALS AND METHODS.

### 4.02 BASIS OF PAYMENT:

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

## BASIC ELECTRICAL REQUIREMENTS

### SECTION 16060

#### PART 1- GENERAL

##### 1.01 SCOPE OF WORK

- A. The Contractor shall provide items, articles, materials, operations and methods required by the Drawings and Specifications including labor, equipment, supplies and incidentals necessary for completion of the Work under this Contract.
- B. Apparatus, appliance, material or work not shown on the Plans, but mentioned in the Specifications, or vice versa, or any incidental accessories necessary to make the work complete and ready for operation, even though not specified or shown on the Drawings shall be furnished and installed without additional expense to Village of Orland Park.
- C. Should there be any discrepancies or a question of intent, the Contractor shall refer the matter to the Engineer for decision before ordering any equipment, materials, or before starting any related work.
- D. The Contractor shall furnish, erect, install, connect, clean, adjust, test and condition all manufactured articles, materials and equipment, and place in service in accordance with the manufacturer's directions and recommendations except as otherwise specified herein.

##### 1.02 QUALITY ASSURANCE

###### A. General.

- 1. The Contractor shall carefully examine the Contract Documents, visit the site, and thoroughly become familiar with the local conditions relating to the work. Failure to do so will not relieve the Contractor from the obligations of the Contract.
- 2. Materials and installation shall conform to the applicable Codes and Standards.
- 3. After all equipment, devices and raceways are installed and wires and cables are in place and connected to devices and equipment, the Contractor shall test the system for continuity, property phase rotation, short circuit, improper

## BASIC ELECTRICAL REQUIREMENTS

grounds, and other defects. If any defective conditions are present, the Contractor shall make all necessary corrections and retest for compliance.

4. Each major component of equipment shall have the manufacturer's name, address, model number and rating on the manufacturer's nameplate securely affixed in a conspicuous place.
  - a. The nameplate of a distributing agent is not acceptable.
  - b. Code ratings, labels or other data which are die-stamped into the surface of the equipment shall be in an easily visible location.

### B. Codes and Standards

1. Materials and installation shall comply with codes, laws and ordinances of Federal, State, local governing bodies having jurisdiction.
2. In every installation where regulations of electric utility and telephone companies apply, conformance with their regulations shall be mandatory and any costs involved shall be included in the Contract.
3. In case of differences between building codes, State and Federal laws, local ordinances and utility companies regulations and the Contract Documents, the most stringent shall govern.
4. All design, equipment and materials specified by design shall conform to any acts, laws, rules and regulations of the following organizations:
  - a. Local municipal code shall take jurisdictional precedence over all other authoritative bodies except that the more stringent shall apply.
  - b. National Electrical Code (ANSI/NFPA 70).
  - c. National Electrical Safety Code (NESC-ANSI C2).
  - d. American National Standards Institute (ANSI).

## BASIC ELECTRICAL REQUIREMENTS

- e. National Fire Protection Association (NFPA).
  - f. Institute of Electrical and Electronics Engineers (IEEE).
  - g. Insulated Cable Engineers Association (ICEA).
  - h. National Electrical Manufacturers Association (NEMA).
  - i. Illuminating Engineering Society (IES).
  - j. Underwriters Laboratories Inc. (UL).
  - k. Canadian Standards Association (CSA).
  - l. Occupational Safety and Health Administration (OSHA).
5. Should work be performed which does not comply with the requirements of the applicable building codes, State and Federal laws, local ordinances, industry standards and utility company regulations, changes for compliance shall be done at no additional cost to the Village of Orland Park.
6. The Contractor shall secure and pay for all permits, governmental fees, taxes and licenses necessary for the proper execution and completion of the Work.
7. The Contractor shall submit to governmental agencies and utility companies shop drawings, which are required by these agencies, for their approval.
8. The Contractor shall notify the Engineer of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.

### 1.03 SUBMITTALS

- A. In accordance with the Supplemental Conditions the Contractor shall submit to the Owner's Representative for review drawings, product specifications, and description, together with installation instructions for all equipment furnished.

## BASIC ELECTRICAL REQUIREMENTS

- B. As soon as practical and within thirty days after award of contract and before any material or equipment is purchased, the Contractor shall submit to the Engineer for approval one sepia and six prints of all shop drawings to be incorporated in the work.
- C. Shop drawings shall include manufacturer's names, catalog numbers, cuts, diagrams and other such descriptive data as may be required to identify and approve the equipment.
- D. Extended time for submitting special shop drawing may be requested; however, an extension of time approved does not relieve this Contractor of his responsibility of executing this work in accordance with the Contract.
- E. Any listed materials, fixtures, apparatus, or equipment that are not in accordance with the Specification requirements can and will be rejected for use in this installation and construction.
- F. Any materials, fixtures, apparatus or equipment installed without stamped or written approval shall be removed by the Contractor and replaced with specified equipment at the direction of the Engineer and without recourse for additional compensation.
- G. Substitutions to listed acceptable manufacturers equipment and material will not be accepted.

### 1.04 INFORMATION REQUIREMENTS

- A. The Contractor shall submit data to the Engineer and representatives of VILLAGE OF ORLAND PARK prior to purchasing and installation. The data will include but not be limited to the following:
  - 1. Construction design drawings, schematic, wiring, lighting panel schedules, one line diagram, lighting, conduit, duct banks, conduit and cable schedules, grounding, symbols and legends, etc.
  - 2. The Equipment Manufacturer schematic diagrams shall be the JIC ladder type.
  - 3. The Equipment Manufacturers wiring diagrams shall show terminal blocks for external wiring.
  - 4. The Equipment Manufacturers internal point to



## BASIC ELECTRICAL REQUIREMENTS

point and external wiring diagrams between cubicles, panels and components within the equipment line up shall be provided.

5. Catalog cuts and major electrical Equipment Manufacturers' drawings shall be included, but is not limited to, relays, meters, current and potential transformers, disconnect switches, fuses, contactors, lighting and more.
6. Complete rating data for all equipment shall be provided.
7. Instruction books, operation and maintenance manuals with spare parts manuals shall be provided.
8. As Built drawings shall be provided. The Contractor shall prepare As Built drawings in CAD format using Microstation V8 or AutoCAD 2004 software. Digital CD-ROM back-up disks to be turned over to the Village of Orland Park together with one set of reproducible plots.

### B. Installation Drawings:

1. In addition to the preparation and submittal of Shop Drawings for manufactured electrical equipment and materials, the Contractor shall prepare and maintain in current status, a complete set of detailed, completely circuited, and dimensioned electrical construction drawings for all electrical work included under this Contract. These drawings shall be made at the Contractor's expense and shall be made by CAD in the format identified in Section 1.04(A)8.
2. The installation drawings shall be made under the direction and supervision of the Contractor and shall show all electrical work inclusive of conduit, wiring, electrical equipment and devices, lighting fixture locations and elevations, points where conduit enters or leaves structural slabs and walls, junction boxes, conduit supports and inserts.
3. The Contractor shall provide a separate set of installation drawings for the lighting system; a separate set of installation drawings for the power and control; and a separate set of installation drawings for the special systems

## BASIC ELECTRICAL REQUIREMENTS

(telephone, security and fire alarm).

4. The complete electrical distribution system from the source including each branch circuit panelboard shall be shown and dimensioned exactly as installed, with all feeders located on the installation drawings. Major equipment, lighting controls and apparatus shall be shown to scale and properly located, conduit home runs are not acceptable.
5. The installation drawings shall include floor plans and reflected ceiling plans with electrical layouts drawing at a scale (or scales) as required with a minimum scale of 1/8 inch equal 1 foot, 0 inches. It is intended that construction drawings of each trade be the same scale(s) in order to permit respective plans to be superimposed upon all others of each trade.
6. In addition to the floor plans, the layouts of all congested areas such as mechanical and/or electrical equipment rooms, and all functionally critical areas shall be drawn at a minimum scale of 1/4 inch equals 1 foot, 0 inches, or with all details of construction shown. The Engineer may request additional installation drawings if in his opinion they are required to properly coordinate the project.
7. All installation drawings shall be made on sheets of the same size and with the same border lines and title blocks as the Village of Orland Park Drawings, with the Contractor's name added.
8. The Contractor shall be responsible for the coordination of electrical work with the work of all other trades and shall, in preparing for the installation drawings, continually check the work of all other trades (inclusive of that indicated by shop drawings) in order to avoid possible installation conflicts arising therefrom. It shall be understood that the work shown on the installation drawings has been so coordinated. In the event of conflicts or interferences that cannot be resolved in the field, the Contractor shall request a written clarification from the Engineer.
9. The installation drawings shall indicate the electrical installation exactly as constructed

## BASIC ELECTRICAL REQUIREMENTS

and therefore shall be periodically revised to reflect all changes inclusive of those required by the Engineer, those which are or have been found necessary in the field, those which may be suggested by the Contractor and approved by the Engineer, etc.

10. Conduits shall be shown on the installation drawings as installed. Conduit home runs are not acceptable.
11. Revisions shall be performed when considered necessary by the Engineer or the Contractor in order to facilitate proper coordination, but shall in no event be performed at interim periods exceeding 30 days between each such revision.
12. The initial copy of all installation drawings shall be submitted to the Engineer for review. These submittals shall not be considered as shop drawings, and are not subject to the shop drawing approval process. Subsequent revised copies need not be issued to the Engineer unless so requested. It shall be clearly understood that these installation drawings are for installation coordination purposes only and cannot in any way alter the requirements of the Contract. Therefore, the Contract Drawings, Specifications, and authorized revisions thereto, shall remain the only determinants of the Contract requirements.
13. Upon completion, the initial installation drawings, and all revised installation drawings thereafter, shall be dated and certified by the Contractor as having been fully coordinated by him. It shall then be understood that the work shown thereupon is ready for construction.
14. No electrical work shall begin until these drawings (and each revision thereof) are so drawn, and thereafter finally accepted by the Engineer.
15. All installation drawings shall be made in accordance with an approved schedule, prepared by the Contractor, and arranged to coincide with actual construction in such a manner as to allow the latter to proceed without delay.
16. If, in the opinion of the Engineer, the

## BASIC ELECTRICAL REQUIREMENTS

coordination drawings are in acceptable condition after each has been finally revised and accepted, the Contractor may submit same as the field record drawings called for elsewhere in the Specifications.

17. The Contractor shall include wiring diagrams and schematic diagrams. Each schematic diagram shall be JIC ladder type. Wire numbers shall be shown on all schematic and wiring drawings.
  18. The minimum drafting letter size shall be 1/8 inch in height, block style.
- C. The Contractor shall submit test reports as described under Division 16.

### 1.05 DRAWINGS

- A. The Drawings are diagrammatic and/or home-run type which are intended to convey the scope of work and indicate the general arrangement and/or sizes of conduit, equipment, fixtures and other work included in the Contract.
- B. The location of items required by the Drawings or Specifications are not definitely fixed by dimensions, are approximate only. The exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to the approval of the Engineer.
- C. The Contractor shall coordinate the location of the lighting fixtures with the location of the mechanical equipment, and Architectural reflected ceiling plans.
- D. The Contractor shall layout the work, check drawings of other trades to verify spaces in which work will be installed, and maintain maximum headroom and space conditions at all points.
  1. Where headroom or space conditions appear inadequate, the Engineer shall be notified before proceeding with installation.
  2. Any minor changes in the locations of equipment, fixtures, lighting fixtures conduits, outlets, devices, etc., from those locations as shown on the Drawings shall be made without extra charge to the Village of Orland Park. A minor change in location shall be considered to be within 10'-0

## BASIC ELECTRICAL REQUIREMENTS

of the location as may be scale from the Drawings for all interior work and 25'-0 for all exterior work.

### 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements and mechanical injury, but readily accessible for inspection until installed.
  - 1. Items subject to moisture damage shall be stored in dry heated spaces.
  - 2. Manufacturer's directions shall be followed in the delivery, storage, protection, installation and operation of all equipment and materials.
- B. The Contractor shall determine, from examination of the Drawings, whether any special temporary openings in the building will be required for the admission of apparatus furnished under this Section, and notify the Engineer accordingly. In the event of failure to give sufficient notice in time to arrange for these openings during construction, the Contractor shall assume all costs of provide such openings thereafter.
- C. The Contractor shall coordinate with the Engineer the movement of heavy machinery, equipment and heavy parts thereof brought into or onto the building or premises.
- D. Conduit openings shall be kept closed by means of plugs or caps to prevent the entrance of foreign matter.
- E. The Contractor shall cover all fixtures, equipment and apparatus as required to protect them against dirt, water, chemical or mechanical damage both before and after installation.
- F. Equipment shall be inherently safe and moving parts shall be covered with guards.

### 1.07 EXECUTION, CORRELATION AND INTENT OF DOCUMENTS

- A. In the event that conflicts, if any, cannot be settled rapidly and amicably between the affected trades, with the Work proceeding in a workmanlike manner, then the Engineer shall decide which work is to be relocated and his judgment shall be final and binding on the Contractor.

## BASIC ELECTRICAL REQUIREMENTS

- B. No measurements of a Drawing by scale shall be used as a definite dimension to work by.

### 1.08 INSTRUCTIONS AND ADJUSTMENTS

- A. At the conclusion of the Work and before final contract payment is made, the Contractor shall demonstrate and explain to the Village of Orland Park the function, operation and maintenance of all equipment and systems installed.
- B. The primary adjustments of the system(s) shall be accomplished by the Contractor to the complete satisfaction of the Village of Orland Park and Engineer at the time of completion of the installation.

### 1.09 GUARANTEE

- A. The Contractor shall be responsible for all work in this Specification. The Contractor shall make good, repair, or replace at his own costs and expense as may be necessary, any defect which in the opinion of Village of Orland Park is due to imperfections in material, design or workmanship or if defect shows itself to be defective within one year after acceptance by the Village of Orland Park .
- B. The Contractor shall be responsible for protecting all equipment and systems against harmful exposures to, or accumulations of dust and moisture, flooding, corrosion or other forms of damage and shall clean and restore damaged finishes as may be required to place installations in a Like New conditions before acceptance by the Village of Orland Park.
- C. All manufacturers' equipment guarantees or warranties shall be included in the Maintenance Manuals.

## PART 2- PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new and shall be UL or CSA labeled and shall bear the manufacturer's name, model number and other identification markings.
- B. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at

## BASIC ELECTRICAL REQUIREMENTS

least five years (unless specifically exempted by the Engineer) and shall be the manufacturer's latest design with published properties.

- C. Equipment and materials of the same general type shall be of the same manufacturer throughout the project to provide uniform appearance, operation and maintenance.
- D. Equipment and materials shall be without blemish or defect and shall not be used for temporary light or power purposes, including lamps, without the Engineer's written authorization.

### 2.02 ENCLOSURES FOR ELECTRICAL EQUIPMENT/FITTINGS

- A. Enclosures for electrical equipment shall conform to the area classification described below or unless noted on the Drawings.
- B. NEMA Type 1A gasketed shall be used in electrical rooms.
- C. NEMA Type 12 shall be used in indoor dry locations, mechanical equipment room, garages.
- D. NEMA Type 13 oil tight shall be used for all control panels.
- E. NEMA Type 3R or NEMA Type 4X stainless steel shall be used for exterior locations as shown on the drawings or herein specified.

## PART 3- EXECUTION

### 3.01 INSTALLATION OF WORK

- A. The Contractor shall perform all Work with trained mechanics of the particular trade involved in a neat and workmanlike manner as approved by the Engineer.
- B. The Contractor shall perform all Work in cooperation with other trades and schedule to allow speedy and efficient completion of the Project.
- C. The Contractor shall furnish other trades with advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work, and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.

## BASIC ELECTRICAL REQUIREMENTS

- D. Where there is evidence that the work of one trade will interfere with the work of other trades, all trades shall assist in working out space conditions to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings.
- E. With the approval of the Engineer and without additional cost to Village of Orland Park, the Contractor shall make minor modifications in the Work as required by structural interferences, by interferences with work of other trades or for proper execution of the Work.
- F. Work installed before coordinating with other trades so as to cause interferences with the work of such other trades shall be changed to correct such condition without addition cost to the Village of Orland Park as directed by the Engineer.
- G. Minor changes in the locations of outlets, fixtures and equipment shall be made prior to rough-in at the direction of the Engineer and at no additional cost to the Village of Orland Park.
- H. The equipment shall be installed with ample space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment which is to be installed or which is in place.
- I. The Contractor shall compare the Drawings and Specifications, checking all measurements to determine the intent of the Contract Documents. Any discrepancies shall be brought to the Engineer's attention for interpretation.
- J. Locations of electrical outlets, lighting panels, cabinets, equipment, etc. are approximate and exact locations shall be determined by the Contractor at the Project site.
- K. The Contractor shall refer to the Contract Documents for details and reflected ceiling drawings.
- L. The Contractor shall protect the materials and work of other trades from damage during installation of the work provided under this Contract.



## BASIC ELECTRICAL REQUIREMENTS

### 3.02 EQUIPMENT NOISE LIMITATION

- A. Noise levels of electrical devices and equipment shall be within acceptable limits as established by NEMA or other valid noise rating agencies. Noise levels shall be subject to the Engineer's review which will be based on practical and reasonable considerations of occupancy requirements.
- B. The Contractor shall check and tighten the fastenings of sheet metal plates, covers, doors, and trims to prevent vibration and chatter under normal conditions of use.
- C. When located elsewhere than in high-noise-level equipment rooms, the enclosures or solenoid-operated switching devices and other noise-producing devices shall have anti-vibration mountings and non-combustible sound-absorbing linings.
- D. Transformers, reactors, dimmers, lamp ballasts, and solenoids shall be designed and rated for Aquiet@ operation.
- E. The Contractor shall remove and replace any individual electrical item or device that is found to produce a sound energy output exceeding that of other identical devices installed at the Project.

### 3.03 TRANSMISSION OF VIBRATION

- A. Electrical equipment, conduit, and fittings shall not be mounted to or supported by elements subject to vibration except by methods which will prevent transmission thereof.
- B. Where flexible lengths of conduit are utilized as a means of isolating equipment and conduit systems vibration, care shall be exercised to assure continuity of ground throughout.

### 3.04 PROTECTION

- A. The Contractor shall protect conduit and wireway openings against the entrance of foreign matter by means of plugs or caps.
- B. The Contractor shall cover fixtures, materials, equipment and devices furnished or installed under this Section or otherwise protect against damage, both before and after installation.

## BASIC ELECTRICAL REQUIREMENTS

- C. Fixtures, materials, equipment, or devices damaged prior to final acceptance of the work shall be restored to their original condition or replaced.
- D. Equipment shall be inherently safe and moving parts shall be covered with guards.

### 3.05 INSTALLATION OF WORK FOR OTHER SECTIONS

- A. The Contractor shall coordinate all electrical work and shall complete all wiring, conduit, material and electrical equipment as required for equipment installed under other Divisions of these Specifications.

## PART 4- MEASUREMENT AND PAYMENT

### 4.01 METHOD OF MEASUREMENT:

No separate measurement shall be made for BASIC ELECTRICAL REQUIREMENTS.

### 4.02 BASIS OF PAYMENT:

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**ELECTRICAL CONDUIT**

**SECTION 16110**

PART 1-     GENERAL

1.01        SCOPE

This Section covers the general provision for furnishing and installing all conduits, related boxes and fittings, and associated accessories as required for the electrical power, control, annunciation, instrumentation, communication, and lighting systems as shown on the Drawings and as specified herein. All necessary hardware including, but not limited to screws, bolts, hangers, concrete inserts, clamps, locknuts, bushings, sealing bushings, couplings, pulling-in irons, identification tags, etc. shall be included.

1.02        QUALITY ASSURANCE

A.        Acceptable Manufacturers

Shall include but not be limited to LTV Steel Company, Allied Tube and Conduit Corporation, The Steelduct Company, American Brass Company and Republic Steel.

B.        Applicable Standards

All Work shall conform to the applicable provisions of the codes, standards, and Specifications, as specified herein, and the following:

<u>Name</u>	<u>Abbreviation</u>
Specifications for Rigid Steel Conduit, Zinc Coated	ANSI C80.1
Specifications for Fittings for Rigid Metal Conduit and Electrical Metallic Tubing	ANSI C80.4
Conduit Fittings and Accessories	NEMA FB-1
Outlet Boxes and Fittings	UL-514
National Electrical Code	NEC

1.03        SUBMITTALS

A.        In accordance with the Supplemental Conditions, the Contractor shall submit to the Owner's Representative

## ELECTRICAL CONDUIT

for review drawings, product specifications and descriptions, together with operating and maintenance instructions of all equipment furnished.

- B. As part of the Record Drawings submitted, the Contractor shall submit a conduit schedule at the completion of the Project.

The conduit schedule shall contain, as a minimum, the following information for each run of conduit.

1. Conduit designation.
2. Conduit type and size.
3. Routing: the routing shall identify the equipment (from-to) connected at the conduit termination.
4. Description of cables installed in the conduit including function of cables.

### PART 2- PRODUCTS

#### 2.01 GENERAL

Electrical conduit and related fittings shall be U.L. listed. The conduit inside diameter shall have a smooth finish to facilitate fishing and/or pulling of wires and cables. Where flexible conduits are used they shall be of the liquid tight type.

#### 2.02 SIZE REQUIREMENTS

Conduits smaller than 3/4-inch diameter shall not be allowed. Conduit sizes shall be as shown on the Drawings. In cases where conduit sizes are not shown on the Drawings, the minimum size shall be in accordance with the applicable provisions of NEC.

#### 2.03 DETAILS OF CONSTRUCTION

##### A. Rigid Metal Conduit and Fittings

1. Rigid metal conduit shall be heavy wall, hot-dip galvanized steel. Thin wall conduits and metallic tubing are not acceptable unless specifically shown on the Drawing or specified for use in other Sections of these Specifications.
2. Metal conduit fittings and covers shall be galvanized or sherardized iron or malleable iron castings with gaskets as required. Composition or

## ELECTRICAL CONDUIT

rubber gaskets shall be provided where required to prevent entrance of moisture.

3. Rigid metal conduit expansion joint fittings shall consist of standard manufactured products, designed so as to prevent damage to the cables and equipped with approved means of providing electrical continuity of the conduit run. Expansion joint fittings shall permit a small amount of transverse movement as well as longitudinal movement. All couplings and fitting joints shall be of the threaded type.
4. Aluminum shall not be used either for conduits, fittings, pullboxes, junction boxes, or any other electrical device, unless otherwise specifically shown on the Drawings.

### B. Flexible Liquid-Tight Conduit

1. Flexible liquid-tight conduit shall be "Sealtite Type UA".
2. The conduit shall consist of an interlocked galvanized steel core and a liquid tight cover made of polyvinyl chloride synthetic resin. A ground bonding conductor shall be included.

### C. Electrical Metallic Tubing (EMT) and Related Fittings

1. Electrical metallic tubing shall comply with FS WW-C-563 and ANSI C80.3. EMT fittings shall comply with FS W-F-408. EMT shall be provided only as shown on the Drawings or as otherwise specified in other Sections of these Specifications. Couplings, connectors and other fittings for EMT shall be cadmium or zinc plated steel, or cadmium plated malleable iron and shall be raintight, compression type.

### D. Junction, Outlet, Terminal, and PullBoxes and Covers

1. Junction, outlet, and pullboxes and covers shall be made of sheet steel or cast-metal. Covers shall be secured with screws, except for boxes 20 inches or larger which shall have hinged covers or as otherwise specified. Gaskets shall be provided for all boxes. Terminal boxes shall be furnished with terminal blocks as required and as indicated on the Drawings.

## ELECTRICAL CONDUIT

2. Where shown on the Drawings, Electrical Junction Boxes shall be solid box types for bridge and street lighting, suitable for underground electrical work, furnished with neoprene gaskets and stainless steel cap screws provided with cored and tapped holes for conduits as required, polymer concrete or cast aluminum as shown on drawings. The required junction boxes, covers, conduits and ceilings shall be painted to match existing ceiling and surrounding appurtenances.

### PART 3- EXECUTION

#### 3.01 FACTORY TEST AND INSPECTION

Routine factory testing and inspection shall be performed in accordance with the requirements of the applicable standard.

#### 3.02 INSTALLATION AND TESTING

##### A. General

Any and all excavation, trenching, coring, backfilling, incidental concreting (not part of a structure in which conduits are embedded) and/or concreting required for duct banks, etc. as required for the installation of Electrical Conduit shall be performed by the Contractor at the Contractor's expense. Installation of all raceway conduits and fittings shall be in accordance with these Specifications, manufacturers recommendations, applicable standards, codes and regulations, and best engineering practices.

##### B. Installation of Rigid Steel Conduit

1. Installation of all conduits, boxed fittings, and accessories shall conform to the requirements of the "National Electrical Code", insofar as this is applicable. During installation, precaution shall be taken to protect the conduits and conduit threads from mechanical injury. The ends of conduits shall be sealed in an approved manner during installation whenever the work is interrupted. Runs shall be sealed upon completion by the use of caps and discs or plugs. The seals shall be maintained, except during inspection and tests, until the conductors are pulled in. Conduits shall be inspected before conductors are installed and thoroughly cleaned of water and

## ELECTRICAL CONDUIT

dirt by means of compressed air, swabs or other approved methods. Conduits shall be checked for freedom from obstructions by pulling a wooded mandrel of the proper size through the conduit. All boxes and fittings shall be kept closed and free from dirt, moisture, and debris.

2. Each run of conduit between boxes or equipment shall be electrically continuous. Threads shall conform to ANSI-B2.1 standards for taper pipe threads. Conduits shall be cut square, ends reamed and threads cut with approved dies. Running or non-tapered threads will not be permitted. Conduits entering slip holes in boxes shall be secured with a locknut on each side at the box wall and terminated with bushings.
3. Threaded conduit joints shall be made watertight by use of red lead and oil, white lead and oil, or other approved compounds. Threaded joint compound shall be electrically conductive.
4. Exposed conduit shall be 3/4 inch IPS or larger and shall run in straight lines parallel to walls, beams or columns. Required offsets shall be accomplished by use of uniform offsets, bends, conduit fittings, or standard boxes. Where conduits are grouped, the offsets shall be made in a manner which will present a uniform and symmetrical appearance.
5. Conduits shall be supported as required by NEC. Capped conduit and conduit terminating in boxes or fittings shall be supported as close to the terminal as possible but in no case farther than 3 feet from the terminal. Galvanized clamps, U-bolts, and J-bolts shall be used to fasten conduits. Boxes and equipment housings shall be supported independently of the conduits. Conduits and boxes shall not be fastened directly to concrete but shall be spaced away by means of one inch galvanized metal channels or spacers. Machine screws or bolts set in concrete inserts or cinch anchors shall be used for securing clamps and boxes to concrete or to steel supporting channels. The use of explosive-driven anchors for securing clamps, supports, and boxes to concrete will not be permitted, except in such cases where special permission has been obtained in writing from the Owner.

## ELECTRICAL CONDUIT

6. Conduit embedded in concrete shall be one inch or larger, unless otherwise shown on the Drawings. Embedded conduit shall be sloped towards drain points and shall be rigidly supported and braced to avoid shifting during placement of concrete. Embedded conduit runs parallel to concrete surfaces shall be located behind the reinforcing steel except at terminal connections to outlets or junction boxes. Conduit extending out of concrete walls, floors, or beams shall be at right angles to the surface.
7. Minimum spacing of conduits embedded in concrete shall be as required by N.E.C. for proper conductor heat dissipation. The minimum spacing shall be maintained except where approaching and entering a box or panel. Conduit spacing shall also permit the flow of concrete between them.
8. Conduits embedded in concrete and terminating at motors or other equipment mounted on concrete bases shall be brought up to the equipment within the concrete base wherever possible.
9. All conduit boxes shall be so located that covers and openings are easily accessible. They shall be installed parallel with building lines, and where embedded shall be flush with the surface of the finished floor, wall, or ceiling. The Contractor shall remove and reset all boxes not properly installed or shifted out of line during concreting, whenever required or directed.
10. Conduits shall have long-sweep field bends wherever possible, but shall in no case have smaller radii bends than are allowed by NEC or as recommended by the manufacturer whichever is the most stringent. All field bends shall be manufactured bends or made with a bending machine or other approved device. Field bends shall not reduce the internal diameter of the conduit or injure the protective coatings. The bend shall be free of kinks, indentations, or flattened surfaces. Heat shall not be applied. Standard bends shall be used where conduits turn out of the concrete, at the conduit terminations, and at electrical equipment. Where conduits enter switchgear cubicles or other enclosures, they shall be located by template.
11. Where conduits cross expansion joints or



## ELECTRICAL CONDUIT

contraction joints, they shall be installed perpendicular to the plane of the joint and shall have expansion fittings. Expansion fittings shall be as follows:

- a. Expansion fittings for exposed conduit shall have external bonding jumpers for ground continuity and shall be O.Z. Electrical Mfg. Co. Type Ex, Crouse-Hinds Type XJ, or equal.
  - b. Expansion fittings embedded in concrete shall be expansion deflection type consisting of molded neoprene sleeves with bonding jumpers passing through separate waterproof compartments, and two silicon bronze couplings. They shall permit a 3/4-inch expansion and contraction and a 3/4-inch deflection without deformation.
12. All conduits shall be installed as shown on the Drawings, with the exact location and routing to be determined in the field as required.
13. Cable runs shall be segregated so that no two of the following types of cable occupy the same conduit:
- a) 480-V power cable.
  - b) 480/277-V, AC, miscellaneous lighting and receptacle circuit cable; plug-in type.
  - c) 480/277-V, AC, power and control cable.
  - d) Low voltage or current, DC, control cable.
  - e) Instrumentation cable.
14. Conduits penetrating walls, ceilings and floors of buildings and/or structures shall be sealed as shown on the Drawings. Sealing of conduit ID shall be by combination seal/drain fittings where shown on the Drawings. Sealing of conduit OD shall be by means of conduit sleeve and sealing compound. Sealing compound shall be of a type approved for the conditions and use.

### C. Installation of Flexible Liquid-Tight Conduits

1. Flexible liquid-tight conduits shall be used for connection to motors and to any other equipment subject to vibration. Liquid-tight fittings and connectors shall be used in conjunction with the liquid-tight flexible conduit installation.
2. Flexible liquid-tight conduit lengths shall not

## ELECTRICAL CONDUIT

exceed 6 feet.

### D. Installation of EMT Conduits and Fittings

1. Installation of EMT shall conform to the applicable requirements of rigid steel conduits as previously specified.
2. EMT conduits shall be connected to the outlet boxes and panelboards by means of "gland" type connectors. Couplings between conduits shall be "gland" couplings. Conduits shall enter all couplings and connectors the full distance required and shall be securely held in place by a tightening of a "Locking Nut".
3. EMT shall not be embedded in concrete, used in hazardous locations where explosion-proof equipment is required, or buried in earth. Indentor or set screw type fittings shall not be used.

### E. Installation of Rigid Nonmetallic (PVC or Coilable HDPE) Ducts and Conduits

1. Installation of rigid nonmetallic (PVC or HDPE) conduit shall conform to applicable requirements of installation of rigid steel conduits as previously specified. Installation of rigid nonmetallic (PVC or HDPE) conduit shall be as shown on the Drawings and shall be in accordance with the manufacturer's recommended procedures.
2. Installation shall meet the requirements of N.E.C. Articles 352 and 353.
3. The conduit shall be cut square. All burrs shall be removed from the inside and outside of the conduit.
4. Bending:
  - a) Bending of the conduit shall be made so that the conduit will not be injured and the internal diameter of the conduit will not be effectively reduced. Bends shall be made with a standard PVC pipe bending equipment.
  - b) The conduit section shall be heated evenly over the entire length of the bend. The use of torches or other flame-type devices will

## ELECTRICAL CONDUIT

not be allowed. Sections showing evidence of scorching or discoloration shall not be acceptable for use on the project.

- c) The radius of the bend shall not be less than that shown in Table 2, Chapter 9 of the National Electric Code.

### 5. Joints:

- a) All joints shall be test mated without forcing. The socket depth of the fitting shall be marked on the outside of the conduit without scratching or damaging the surface. The conduit should enter the fitting for the full depth of the socket depth.
- b) Before applying cement, the surfaces to be joined shall be wiped clean and free of dirt, oil, grease or moisture. The solvent cement shall be applied to the conduit and fittings quickly, consistent with good workmanship. Under conditions of high humidity, a second full coating of cement shall be applied to the conduit before insertion.
- c) Immediately after applying the coat of cement to the conduit and fittings, the conduit shall be inserted into the fitting socket until it bottoms at the fitting shoulder. The conduit shall be turned 1/4 turn during insertion to distribute the cement evenly. Excess cement shall be wiped away from the outside of the joint.
- d) Newly assembled joints shall be handled carefully until the cement has gone through the set period. The recommended set periods are related to temperature as follows:

60 to 100 degrees F:	30 minutes
40 to 60 degrees F:	1 hour
20 to 40 degrees F:	2 hours
0 to 20 degrees F:	4 hours

### 6. Conduit Encased in Concrete:

- a) Underground concrete-encased conduit shall be supported on plastic spacers specifically

## ELECTRICAL CONDUIT

designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 2 inches. Concrete cover overall shall not be less than 3 inches all around the encased run. Space below the conduit, and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. When pouring concrete the concrete shall be deflected or diverted during placement to minimize the possible damage to or movement of the conduits.

- b) Conduit encased in concrete shall have steel reinforcing where installed below roadway or other paved vehicle areas (including shoulder) and the reinforcement shall extend not less than 5 feet additional from the edge of pavement unless otherwise indicated. Steel reinforcement shall not be less than No. 4 bars at corners and otherwise spaced on 12-inch centers, tied with No. 4 bars on 12-inch centers.

### 7. Expansion Fittings

- a) Expansion fittings shall be provided for all runs crossing structural expansion joints.
- b) Expansion fittings, as specified herein, shall be installed in all raceway runs crossing structural expansion joints. Unless otherwise indicated or approved by the Owner's Representative expansion fittings shall include an 8-inch expansion fitting plus a deflection fitting allowing not less than a 3/4-inch deflection in any direction. The drawings shall be examined to determine complete extent of expansion joints.
- c) Concrete shall be formed around the expansion fittings in a manner to permit their movement as specified.

### 3.03 PAINING

## ELECTRICAL CONDUIT

(Not applicable in this Section).

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT:

No separate measurement shall be made for ELECTRICAL CONDUIT.

#### 4.02 BASIS OF PAYMENT:

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**WIRE AND CABLE**

**SECTION 16120**

PART 1-     GENERAL

1.01        SCOPE

A.        Description

This Section specifies the furnishing, installing, connecting, and testing of all insulated wire and cable required for component parts of electrical power, control, annunciation, low level control, signal, instrumentation, lighting, and telephone, including lugs and terminals, terminal blocks, cable joints, splice connectors, splicing materials, cable grips and wedges, cable clamps, cable supports, cable terminators, identification tags, and other miscellaneous equipment required to make a complete installation ready for operation.

B.        Related Work

All equipment to be electrically connected.

1.02        QUALITY ASSURANCE

A.        Acceptable Materials

Conductors shall be annealed copper wire, tinned where required and shall conform to the requirements of ICEA Standards.

Cable and wire shall conform to the corresponding requirements of the below listed Applicable Standards.

B.        Applicable Standards

Construction and testing of all wire and cable shall conform to the applicable requirements of the ICEA Standard S-19-81, NEMA Pub. WC-4 "Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy"; ICEA Standard S-61-402, NEMA Pub. No. WC-5, "Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy"; or ICEA Standard S-66-524, NEMA Pub. No. WC-7, "Cross Linked Thermosetting-Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy"; ICEA Pub. No. 68-516, NEMA Pub. No. WC-8, "Ethylene-Propylene-Rubber-Insulated Wire and Cable for Transmission and Distribution of Electrical Energy"; or ICEA Pub. No. S-56-434,

## WIRE AND CABLE

"Standard for Polyethylene-Insulated Thermoplastic-Jacketed Communication Cables". Installation shall conform to the requirements of the NEC.

### 1.03 SUBMITTALS

In accordance with the Supplemental Conditions, the Contractor shall submit to the Owner's Representative for review drawings, product specifications, and description, together with installation instructions and field check-out/testing procedures for all cable and wire furnished. Construction and insulation material features of all cable and wire shall be submitted for review. Samples shall be furnished when requested.

### PART 2- PRODUCT

#### 2.01 GENERAL

Conductors shall be annealed copper wire, tinned when required and shall conform to the requirements of ICEA Standards.

#### 2.02 SIZE REQUIREMENTS

Not less than required by NEC and as shown on the Drawings.

#### 2.03 DETAILS OF CONSTRUCTION

##### A. 600-V Power and Lighting Cable

Service entrance cables and any other power and lighting cables installed in conduits which are routed in concrete slabs or underground shall be Type RHH-RHW-USE with insulation suitable for 600-V operation. Branch power and lighting circuits installed in conduits which are routed in conduit above or below grade shall be Type RHW or USE, with insulation suitable for 600-V operation. No wire smaller than No. 12 AWG shall be used. Conductors No. 10 AWG and smaller may be solid. Conductors larger than No. 10 AWG shall be Class B stranded.

##### B. Control, Instrumentation, and Annunciation Cable

Control, instrumentation, and annunciation cable shall be single conductor suitable for 600-V service. Cable shall consist of Class B stranded conductors with insulation the same as that for 600-V power cable

## WIRE AND CABLE

specified above. An overall outer jacket of polyvinyl chloride or neoprene shall be provided. Individual conductors of a multi-conductor cable shall be color coded.

### C. Low Level Control, Instrumentation, and Signal Cable

The low level control, instrumentation and signal cables for carrying digital, analog, audio, or DC pulsed signals shall have individually shielded twisted pairs, PVC insulated for 600-V service, with overall shielding, and PVC jackets. The conductor shall be Class C stranded, No. 16 AWG or larger. Individual conductors of all twisted pairs shall be color Coded.

### D. Telephone Cable

Telephone cable shall consist of No. 16 AWG or larger conductors with polyethylene insulation made up in color-coded twisted pairs to reduce crosstalk, a nonhygroscopic tape cable binder, a copper tape shield, and a polyethylene jacket.

### E. Fixture Wire

Fixture wire shall be No. 12 AWG or larger with Class B stranding and with construction conforming to NEC, Type SF-2, consisting of a silicone rubber insulation with a protective woven fiber glass braid.

## PART 3- EXECUTION

### 3.01 FACTORY TESTS AND INSPECTION

Routine factory testing and inspection shall be performed in accordance with the requirements of the applicable standard.

### 3.02 INSTALLATION AND TESTING

#### A. Installation

1. Cable runs shall be continuous from terminal to terminal to the extent permitted by available commercial lengths. If splices are made in a run, they shall be made in boxes provided for the purpose and in an approved manner. The splicing process shall produce a joint which is as moisture-proof as the cable itself. Splices concealed in conduit shall not be permitted.



## WIRE AND CABLE

2. Insulated wire and cable shall be handled with care so as to avoid kinking and damage to insulation and outer jackets. Cables shall not be bent around a radius less than that recommended by the manufacturer.
3. The Contractor shall furnish all boxes, lugs, terminal blocks, and spade or ring terminals required where not furnished with the equipment and shall make all connections required to provide a complete installation ready to operate.
4. Cable identification tags of a permanent type shall be provided and installed on all cables used for power, control, annunciation, telephone, metering and relaying, and lighting (except branch lighting conductors) for easy identification of the cables. Splices made in boxes shall also be permanently and prominently tagged. Tags shall bear the cable or wire designation shown on the Drawings or as directed. Samples of the proposed tags shall be submitted for review.
5. Wires and cables, in addition to being permanently tagged for identification, shall also be color coded as much as possible, except that Green shall always be used exclusively for "Ground" and White always for "Neutral" or "Return". In 1-ph service, Black shall always be "Hot". Switch and branch legs may be Red, Blue, Brown, Orange, Purple, or Yellow.
6. No cable shall be pulled into conduit unless the conduit is clean and dry.
7. Cable wedges, basket-weave grips, and clamps shall be furnished and installed to support vertical or inclined cable runs as shown on the Drawings or as required. Cables passing through hand holes shall be grouped, formed along the walls, and supported on brackets.
8. Sufficient slack shall be allowed in each run to permit contraction and expansion. Where a number of single conductor cables or wires comprising a circuit are trained through a pullbox, terminal box, or wiring gutter, they shall be neatly laced and tied together. Lacing shall also apply from the point of leaving a raceway to the point of

## WIRE AND CABLE

attachment on the terminals of the Service Entrances/Switchboard, Motor Control Centers, Control Cabinets, or other devices unless the run will be in conduit. Lacing cord and the method of lacing shall be subject to review. Exposed wires and cables shall be cleaned of all wire pulling lubricant which may have remained on the cables after pulling through conduits or ducts.

9. Cables entering free standing equipment compartments from below shall be supported near the floor by means of approved cable clamps and brackets.
10. Metallic braid or tapes of shielded cables shall be grounded at only one end of the cables.
11. Connections in wires and cables shall be made in conformance with National Electrical Code.
12. Splicing of wires and cables shall be made in appropriately sized enclosures, as follows:
  - a) Lighting wires and cables AWG sizes 12-10 shall be spliced by means of spring action type, insulated, color coded connectors, Scotchlock or equal. Connectors shall be individually sealed by means of Scotchlock or equal, connector sealing compound.
  - b) Power and control cables AWG sizes 12-6 shall be spliced using in line compression type copper connectors.
  - c) Power cables AWG sizes 4-350 MCM shall be spliced using compression type, one or two holes straight copper lugs.
13. Any and all excavation, trenching, concreting, backfilling required for the installation of wire and cables, shall be performed by the Contractor and at the Contractor's expense.

### B. Testing

1. All circuits shall be rung-out or talked-out with proper signaling devices, and with all equipment disconnected at each end, to indicate that the circuit is continuous.
2. Resistance measurements shall be taken after

## WIRE AND CABLE

installation on all wire and cable, but before connections are made to equipment terminal, including shielded cables but excluding telephone circuits, to determine the adequacy of the insulation. Each circuit shall be tested for insulation between conductors, and between conductors and ground. Insulation resistances shall not be less than 1,000,000 Ohms to ground when testing with a 500-V DC direct reading "Megger" Ohmmeter.

### 3.03 PAINTING

(Not applicable to this Section).

## PART 4- MEASUREMENT AND PAYMENT

### 4.01 METHOD OF MEASUREMENT

No separate measurement shall be made for WIRE AND CABLE.

### 4.02 BASIS OF PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

## SUPPORTING DEVICES

### SECTION 16190

#### PART 1- GENERAL

##### 1.01 SCOPE

###### A. Description of Work

This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings. Conduit shall not be supported by spring clips.

###### B. Related Work

1. Section 16010 - General Provisions for Electrical Work.
2. Section 16050 - Basic Electrical Materials & Methods.
3. Section 16060 - Basic Electrical Requirements.
4. Section 16110 - Electrical Conduit.
5. Other Sections of Division 16 requiring supporting devices.

##### 1.02 QUALITY ASSURANCE

- A. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code, latest edition."
- B. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally
- C. Recognized testing and listing agency that provides third-party certification follow-up services.

##### 1.03 SUBMITTALS

- A. General: All submittals shall be in accordance with the applicable requirements of the Supplemental Conditions.
- B. Product data for each type of product specified, including 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.
- C. Shop drawings indicating details of fabricated

## SUPPORTING DEVICES

products and materials.

### PART 2- PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Slotted Metal Angle and U-Channel Systems:
    - a. Allied Tube & Conduit
    - b. American Electric
    - c. B-Line Systems, Inc.
    - d. Unistrut Diversified Products
  2. Conduit Sealing Bushings:
    - a. Bridgeport Fittings, Inc.
    - b. Cooper Industries, Inc.
    - c. Killark Electric Mfg. Co.
    - d. O-Z/Gedney
    - e. Raco, Inc.
    - f. Spring City Electrical Mfg. Co.
    - g. Thomas & Betts Corp.

#### 2.02 COATINGS

- A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot-dip galvanized. All hardware provided shall be painted to match existing ceiling and surrounding equipment.

#### 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

## SUPPORTING DEVICES

steel clamps.

- B. Fasteners: Types, materials, and construction features as follows:
  - 1. Expansion Anchors: Carbon steel wedge or sleeve type.
  - 2. Toggle Bolts: All steel springhead type.
  - 3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.
- C. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.
- 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: 16-gage steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.

### 2.04 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,

## SUPPORTING DEVICES

welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:

- a. 3-inch and smaller: 20-gage.
  - b. 4-inch to 6-inch: 16-gage.
  - c. over 6-inch: 14-gage.
2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.
  3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

### PART 3- EXECUTION

#### 3.01 INSTALLATION

- A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.
- B. Coordinate with the building structural system and with other electrical installation.
- C. Raceway Supports: Comply with the NEC and the following requirements:
  1. Conform to manufacturer's recommendations for selection and installation of supports.
  2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 lbs safety allowance in the strength of each support.
  3. Install individual and multiple (trapeze) 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.
  4. Support parallel runs of horizontal raceways together on trapeze-type hangers.

## SUPPORTING DEVICES

5. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use 1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.
  6. Space supports for raceways in accordance with Table I of this section. Space supports for raceway types not covered by the above in accordance with NEC.
  7. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.
  8. 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.
- D. Vertical Conductor Supports: Install simultaneously with installation of conductors.
- E. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.
- F. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.
- G. Sleeves: Install in concrete slabs and walls and all



## SUPPORTING DEVICES

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 in accordance with "Fire Resistant Joint Sealers" requirement of Division 7 Section "Joint Sealers."

- H. Conduit Seals: Install seals for conduit penetrations of slabs on grade and exterior walls below grade and where indicated. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.
- I. 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. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. 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.
- J. Tests: Test pull-out resistance of one of each type, size, and anchorage material for the following fastener types:
  - 1. Expansion anchors.
  - 2. Toggle bolts.

## SUPPORTING DEVICES

3. Powder-driven threaded studs.

- K. Provide all jacks, jigs, fixtures, and calibrated indicating scales required for reliable testing. Obtain the structural Engineer's approval before transmitting loads to the structure. Test to 90 percent of rated proof load for fastener. If fastening fails test, revise all similar fastener installations and retest until satisfactory results are achieved.

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT

No separate measurement shall be made for SUPPORTING DEVICES.

#### 4.02 BASIS OF PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to which they pertain in the Schedule of Prices.

END OF SECTION

**ELECTRICAL IDENTIFICATION**

**SECTION 16195**

PART 1- GENERAL

1.01 SCOPE

A. Description of Work

This Section includes identification of electrical materials, equipment, and installations. It includes requirements for electrical identification components including but not limited to the following:

1. Buried electrical line warnings.
2. Identification labeling for raceways, cables, and conductors.
3. Operational instruction signs.
4. Warning and caution signs.
5. Equipment labels and signs.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Sections 16010, 16050 & 16060.
2. Division 16 Section 16120 "Wires and Cables" for requirements for color coding of conductors for phase identification.
3. Refer to other Division 16 sections for additional specific electrical identification associated with specific items.

1.02 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code."

B. ANSI Compliance: Comply with requirements of ANSI Standard A13.1, "Scheme for the Identification of Piping Systems," with regard to type and size of lettering for raceway and cable labels.

1.03 SUBMITTALS

A. General: All submittals shall be in accordance with

## ELECTRICAL IDENTIFICATION

the applicable requirements of the Supplemental Conditions.

- B. Product Data for each type of product specified.
- C. Schedule of identification nomenclature to be used for identification signs and labels.
- D. Samples of each color, lettering style, and other graphic representation required for identification materials; samples of labels and signs.

### PART 2- PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - 1. American Labelmark Co.
  - 2. Cole-Flex Corp.
  - 3. Ideal Industries, Inc.
  - 4. Markal Corp.
  - 5. National Band and Tag Co.
  - 6. Panduit Corp.
  - 7. Seton Name Plate Co.
  - 8. Standard Signs, Inc.
  - 9. W.H.Brady, Co.

#### 2.02 ELECTRICAL IDENTIFICATION PRODUCTS

- A. Adhesive Marking Labels for Raceway and Metal-clad Cable: Pre- printed, flexible, self-adhesive labels with legend indicating voltage and service (Emergency, Lighting, Power, Light, Power d.c., Air Conditioning, Communications, Control, Fire).
- B. Label Size: as follows:
  - 1. Raceways 1-Inch and Smaller: 1-1/8 inches high by 4 inches long.

## ELECTRICAL IDENTIFICATION

2. Raceways Larger than 1-Inch: 1-1/8 inches high by 8 inches long.
- C. Color: Black legend on orange background.
- D. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.
- E. Pretensioned Flexible Wraparound Colored Plastic Sleeves for Raceway and Cable Identification: Flexible acrylic bands sized to suit the raceway diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the raceway or cable.
- F. Underground Line Marking Tape: Permanent, bright-colored, continuous-printed, plastic tape compounded for direct-burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.
- G. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with preprinted numbers and letter.
- H. Brass Tags: Metal tags with stamped legend, punched for fastener. Dimensions: 2 inches by 2 inches by 19 gage.
- I. Engraved, Plastic-Laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letters on black face and punched for mechanical fasteners.
- J. Exterior Metal-Backed Butyrate Warning and Caution Signs: Weather-resistant, nonfading, preprinted cellulose acetate butyrate signs with 20-gage, galvanized steel backing, with colors, legend, and size appropriate to the location. Provide 1/4-inch grommets in corners for mounting.
- K. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.
- L. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and

## ELECTRICAL IDENTIFICATION

suitable for a temperature range from minus 50 deg F to 350 deg F. Provide ties in specified colors when used for color coding.

### PART 3-      EXECUTION

#### 3.01      INSTALLATION

- A. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.
- B. Install identification devices in accordance with manufacturer's written instructions and requirements of NEC.
- C. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.
- D. Conduit Identification:
- E. Identify Junction, Pull, and Connection Boxes: Code-required caution sign for boxes shall be pressure-sensitive, self-adhesive label indicating system voltage in black, preprinted on orange background. Install on outside of box cover. Also label box covers with identity of contained circuits. Use pressure-sensitive plastic labels at exposed locations and similar labels or plasticized card stock tags at concealed boxes.
- F. Underground Electrical Line Identification: During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.
- G. Limit use of line markers to direct-burial cables.
- H. Install line marker for underground wiring, both direct-buried and in raceway.
- I. Conductor Color Coding: Provide color coding for

## ELECTRICAL IDENTIFICATION

secondary service, feeder, and branch circuit conductors throughout the project secondary electrical system as shown in Section 16120.

- J. Use conductors with color factory-applied the entire length of the conductors except as follows:
1. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.
    - a. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.
    - b. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.
- K. Power Circuit Identification: Securely fasten identifying metal tags or aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-lb test monofilament line or one-piece self-locking nylon cable ties.
- L. Tag or label conductors as follows:
1. Future Connections: Conductors indicated to be for future connection or connection under another contract with identification indicating source and circuit numbers.
  2. Multiple Circuits: Where multiple branch circuits or control wiring or communications/signal conductors are present in the same box or enclosure (except for three-circuit, four-wire

## ELECTRICAL IDENTIFICATION

home runs), label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by mean of coded color of conductor insulation. For control and communications/signal wiring, use color coding or wire/cable marking tape at terminations and at intermediate locations where conductors appear in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tapes.

3. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.

M. Apply warning, caution, and instruction signs and stencils as follows:

1. Install warning, caution, or instruction signs where required by NEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the 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: Install engraved laminate signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, or other emergency operations.

N. Install equipment/system circuit/device identification as follows:

1. Apply equipment identification labels of engraved plastic-laminate on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with 1/2-inch-high lettering on 1-1/2-inch-high label (2-



## ELECTRICAL IDENTIFICATION

inch-high where two lines are required), white lettering in black field. Text shall match terminology and numbering of the Contract Documents and shop drawings. Apply labels for each unit of the following categories of electrical equipment.

- a. Panelboards, electrical cabinets, and enclosures.
  - b. Access doors and panels for concealed electrical items.
  - c. Motor starters.
  - d. Contactors.
  - e. Remote-controlled switches.
  - f. Control devices.
  - g. Telephone switching equipment.
- O. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, 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.
- P. Install labels at locations indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT

No separate measurement shall be made for ELECTRICAL IDENTIFICATION.

#### 4.02 BASIS OF PAYMENT

Separate measurement or payment will not be made for the Work specified in this Section. All costs of such Work shall be considered incidental and shall be included in the prices bid for the various items to

**ELECTRICAL IDENTIFICATION**

which they pertain in the Schedule of Prices.

END OF SECTION

# LED LIGHTING RETROFIT

## SECTION 16510

### PART 1- GENERAL

#### 1.01 SCOPE

##### A. Description

This Section covers the removal of the existing ballasts and boxes, internal metal halide lamp sockets, lamps and internal lamp mounting hardware and the installation of new LED retrofit kits of the type specified. These proposed retrofit lighting systems shall be furnished, installed, connected and tested as specified and described herein and as shown on the Drawings. The lighting system(s) shall include all required outlet boxes, pull and junction boxes, conduit and fittings, wire, cable, grounding connections, wiring devices and plates, fixtures, lamps, and accessories required for a complete lighting system. All related fittings, connectors, supports and anchors where required, but not specifically provided for in these Specifications shall be included under this Section of Work. The existing retrofit kits shall be installed in the existing SPI luminaires in the Orland Park SportsPlex indoor soccer field, basketball courts and gymnastics room and shall be retrofitted with solid state LED lighting retrofit kits per the Specifications and pre-qualified products listed elsewhere in these Specifications.

##### B. Related Work

1. Sections 16010 and 16050.
2. Sections 16110, 16120 and 16190.
3. Other Sections as specified herein.

##### C. Definitions

1. Fixture: A complete lighting unit. Fixtures include lamps and parts required to distribute the light, position and protect lamps, and connection of lamps to the power supply and all related conduit and wiring.
2. Luminaire: Fixture.
3. Average Life: The time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

## LED LIGHTING RETROFIT

### 1.02 QUALITY ASSURANCE

- A. Comply with NFPA 70 "National Electrical Code" for components and installation.
- B. Listing and Labeling: Provide fixtures and emergency lighting units that are listed and labeled for their indicated use on the Project.
  - 1. Special Listing and Labeling: Provide fixtures for use in damp or wet locations and recessed in combustible construction specifically listed and labeled for such use.
  - 2. The terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 3. Listing and Labeling Agency Qualification: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- C. Manufacturers Qualifications: Firms experienced in manufacturing fixtures that are similar to those indicated for this Project and that have a record of successful in-service performance.
- D. Rated Life:
  - 1. Must have demonstrated lumen depreciation to L70 to a minimum of 100,000 hours.
  - 2. Supporting documents must include independently tested InSitu temperature measurement of the LED retrofit inside a DLC approved fixture and manufacturer's current LM80 test.
  - 3. All Bidders must supply the following: Independent Photometric & Electrical Performance verification tests from Certified DOE Test Lab, Lighting Sciences, Inc. (LSI), in accordance with LM79 (IES 78-80).
- E. Coordination of Fixtures With Ceiling: Coordinate fixtures mounting hardware and trim with the ceiling system.

### 1.03 SUBMITTALS

- A. General: The Contractor shall submit to the Owner's Representative for review drawings, product specifications and descriptions, including control schematic diagrams, wiring connection diagrams, polar charts of the lighting pattern together with

## LED LIGHTING RETROFIT

installation instruction, and operating and maintenance procedures in accordance with the applicable requirements specified in the Supplemental Conditions for all equipment furnished.

- B. Product data describing fixtures, lamps, ballasts, and emergency lighting units. Arrange product data for fixtures in order of fixture designation. Include data on features and accessories and the following information:
  - 1. Outline drawings of fixtures indicating dimensions and principal features.
  - 2. Electrical ratings and photometric data with specified lamps and certified results of independent laboratory tests.
  - 3. Data on batteries and chargers of emergency lighting units.
- C. Product certifications signed by manufacturers of lighting fixtures certifying that their fixtures comply with specified requirements.
- D. Shop drawings from manufacturers detailing nonstandard fixtures and indicating dimensions, weights, methods of field assembly, components, features and accessories.
- E. Coordination drawings for fixtures mounted on, in or above the ceiling indicating coordination with ceiling grids and other equipment installed in the same place.
- F. Samples for verification purposes of specific individual fixtures.
- G. Samples for use in full size mockup of specific individual fixtures.

### 1.04 WARRANTY

- A. Special Project Warranty: Submit a warranty, mutually executed by manufacturer and the installer, agreeing that all failed materials or workmanship within the special project warranty period specified below. This warranty is in addition to, and not a limitation of, other rights and remedies the Owner may have under the Contract Documents and the manufacturer's standard warranty.

## LED LIGHTING RETROFIT

1. Special Project Warranty Period: 1 year, beginning on the date of Substantial Completion. A full warranty shall apply for the first year of the period.

### PART 2- PRODUCTS

#### 2.01 GENERAL

The Drawings show the approximate locations of lighting fixtures and other equipment connected to the lighting panelboards. They also show the circuit assignment to each device. Conduit and wiring connections shall be furnished by the Contractor in accordance with the existing circuiting and control shown on the Drawings.

#### 2.02 FIXTURES

##### A. Lighting Fixtures

Fixtures shall be as manufactured by Environmental Technology Resources, Inc. of the types specified herein:

##### Fixture Type #1

- Model No. ETR-LE4293RET-1XPL
- LED Light Engine, Single Head Retrofit Assembly
- 186W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

##### Fixture Type #2

- Model No. ETR-LE4293RET-2XPL
- LED Light Engine Dual Head Retrofit Assembly
- 279W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

##### Fixture Type #3

- Model No. ETR-LE4293RET-3XPL
- LED Light Engine Triple Head Retrofit Assembly
- 279W, 5650K Complete with Drivers and Custom Plate Mounting Assembly for SPI Fixture

Contact Mr. Daniel P. Drew at 773-383-0194 or Mr. Bob Cantarutti at 847-708-7437.

##### B. Product Specifications

##### 1. Mounting

- Retrofit: Mount in existing SPI luminaires

## LED LIGHTING RETROFIT

2. Driver
  - Input Voltage 120-277VAC
  - 24VDC Output
  - UL Class 2
  - UL Outdoor Damp Location Rated IP-66
  - Load Regulation  $\pm$  3%
  - THD Max 20%
  - Power Factor 90%
  - Current Crest Factor 1.5 Max
  - EMI - FCC47 Subpart 15, CISPR15 and CISPR22 Class A
  - UL1310 for Class 2; inherent short circuit protection; overload protected; 3.2kv output insulation
  - 5 year product warranty
  
3. LED Light Engine
  - 24VDC
  - UL Listed LED Retrofit ANSI/UL1598C
  - ARRA Buy American Compliant
  - Design Lights Consortium Qualified
  - 4-Way Switchable Power Option on Board
  - Energy Saver Program Switch on Board
  - 100,000 Hr. Maglev Fan Thermal Management
  - Thermal Over-Protection Shut Down and Resume
  - Under Voltage Protection Shut Down Under 90V
  - Operation Time - Date Control
  - 0-10V Port
  - 5 Year Standard Product Warranty

All fixtures shall be furnished complete with any required mounting brackets, fixture mounting stems, or hangers, together with steel supports and/or channels as required, and fixture wires. Fixture wire shall be as specified in Section 16120, Wire and Cable.

### 2.03 DETAILS OF CONSTRUCTION

- A. Check to insure that all electrical power is disconnected from the ballast box. This should be done at the electrical panel.
  
- B. Disconnect all the wires in the ballast box and remove ballast box and all the components located inside. Connect the line voltage wires (from the electrical panel) in a new contractor provided junction box to the existing wire pairs going to the fixture(s). Close the ballast box and move to the fixture. Provide all required wiring and conduits either flexible or EMT as required.

## LED LIGHTING RETROFIT

- C. Remove the wire cage cover from the top of the fixture if the fixture has this feature. Remove the 1000W metal halide bulb from its socket and set aside.
- D. Disconnect all wiring connections in the unit with the exception of the ground wire. This is accomplished by unscrewing the wire nuts and disengaging the wires.
- E. Now remove all the interior components (socket assembly) and the brackets from the fixture. Retain the screws for later use.
- F. Carefully place the mounting plate (which has either 1, 2 or 3 LED light engines and their respective drivers mounted on it) inside the fixture with the LEDs facing upward and the drivers on the bottom of the plate.
- G. Connect the line side of the driver to the incoming power wires. This is done by twisting the black wires from the drivers to the black incoming wire and using a wire nut to firmly secure the connection. Follow the same procedure for the white wire.
- H. Using the screws provided, screw the mounting plate in place so that it is firmly secured inside the fixture. Replace the wire cage cover (if one was removed) and insure that the fixture is still securely attached to the stem.
- I. Energize the main electrical supply and check the luminaire for proper operation.
- J. Properly dispose of the metal halide bulb, contents of the ballast box, and socket assembly and brackets from the original fixture.

### PART 3- EXECUTION

#### 3.01 FACTORY TEST AND INSPECTION

Each item of equipment shall be shop-assembled and tested in accordance with the manufacturer's standard procedure. Monitoring and control devices shall be functionally tested to verify correct operation and that all parts function properly.

#### 3.02 INSTALLATION

- A. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved shop



## LED LIGHTING RETROFIT

drawings. Hang all conduit from hangers and not from ceiling grid system. Conduit system shall not be used to support fixtures.

- B. Support for Suspended Fixtures: Brace pendants and rods that are 4-feet long or longer to limit swinging. Support stem mounted single-unit suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.
- C. Lamping: Lamp units according to manufacturer's instructions.

### 3.03 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Give advance notice of dates and times for field tests.
- C. Provide instruments to make and record test results.
- D. Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source. Interrupt electrical energy to demonstrate proper operation of emergency lighting installation.
- E. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

### 3.04 ADJUSTING, CLEANING AND TESTING

- A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.
- C. After installation, the complete lighting system shall be given adequate field visual and functional tests, witnessed by the Owner's Representative, to demonstrate that the requirements of the Specifications and Drawings have been met and that the performance of the system is satisfactory. Three certified copies of the field tests shall be furnished to the Owner's Representative.

## LED LIGHTING RETROFIT

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT

Separate measurement will be made for the unit price each for the number and type of units to be retrofitted in the soccer field and the basketball court for a complete and operational lighting system.

#### 4.02 BASIS OF PAYMENT

Payment shall be made for the following items:

Soccer Field:

16510/01 Retrofit Type 2 Fixtures

16510/02 Retrofit Type 3 Fixtures

Basketball Court:

16510/03 Retrofit Type 2 Fixtures

16510/04 Retrofit Type 3 Fixtures

Gymnastics Room:

16510/05 Retrofit Type 1 Fixtures

END OF SECTION

**ELECTRICAL TESTING**

**SECTION 16950**

PART 1-     GENERAL

1.01        SCOPE OF WORK

A.        Description of Work

The Contractor shall be responsible for testing all equipment.

This Section of Specifications covers the test and checks that shall be made on all electrical equipment and wiring to ensure compliance with the applicable codes and standards and with the Drawings and Specifications. Whenever possible, all checks and tests shall be coordinated with the field schedule and field conditions.

Before testing and energizing a system, all necessary precautions shall be taken by the Contractor to ensure the safety of personnel and equipment. All conductors and all electrical equipment shall be properly insulated and enclosed. All enclosures for conductors and equipment shall be properly grounded. Insulation resistance measurements must have been made and approved on all conductors and energized parts of electrical equipment.

B.        Related Work

All mechanical and electrical equipment specified in Division 16 which are electrically connected.

1.02        QUALITY ASSURANCE

All test procedures shall be in accordance with recognized and safe procedures.

1.03        SUBMITTALS

Prior to testing the Contractors shall submit a protocol of test procedures.

PART 2-     PRODUCTS

(NOT USED)

## ELECTRICAL TESTING

### PART 3- EXECUTION

#### 3.01 TESTING

- A. The following tests are required but shall not be limited to this list. Tests will be supervised and witnessed by the Village of Orland Park Building and Electrical Inspectors.
1. Short circuits.
  2. Power and control electrical circuits for circuit continuity and function test.
- B. The Contractor shall furnish all meters, instruments, cable connections, equipment or apparatus necessary for making all tests.

#### 3.02 TESTS

- A. The Contractor shall check and test all feeders, power and control cables and connections:
1. Phasing shall be accomplished by using distinctive colors for various phases, as indicated.
- B. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. If fault condition is present, the trouble shall be rectified, then retested.
- C. Phase conductors, if shorted, grounded or at fault shall be removed, replaced and then retested.
- D. A voltage test shall be made at lighting panel and at the last outlet on each circuit. If drop in potential exceeds 2%, the Contractor shall correct the condition by locating the ground or high resistance splice or connection and retest.
- E. Any wiring device, electrical apparatus, or lighting fixture grounded or shorted on any integral Alive@ part, shall be removed and the trouble rectified by replacing the defective parts or materials.
- F. Upon completion of the electrical work, the Contractor shall place the entire installation in operation, test for proper function, and show systems and equipment to be free of defects.

## ELECTRICAL TESTING

- G. The Engineer will conduct from time to time such tests as may be required to any part of the equipment to determine if it is installed in accordance with specifications. The Contractor shall extend to the Engineer all facilities to this end and shall furnish skilled or unskilled help required. All tests shall be witnessed by the Engineer and three copies of the verified test results shall be given to the Engineer promptly upon completion of a test.
- H. The Contractor shall provide assistance to the various Equipment Manufacturer's field engineers as required in the testing and adjusting of the electrical power and control equipment. Cooperation of the Contractor must be such that a minimum of time is required for equipment testing.
- I. A log shall be maintained for all tests. This log shall be certified before completion of the job, both as to test value and date of test.
- J. Any faults in the work performed by this Contractor or in materials or equipment furnished by the Contractor shall be corrected or replaced promptly by this Contractor at his own expense. Any faults in materials or equipment furnished by the Contractor which are the result of careless, incompetent or improper handling or installation by the Contractor shall be corrected or replaced promptly by this Contractor at his own expense.
- K. All tests shall be made at the Contractor's expense and certification of the tests shall be submitted to the Engineer. If any failures occur during the tests, the Contractor shall replace the equipment or material.

### PART 4- MEASUREMENT AND PAYMENT

#### 4.01 METHOD OF MEASUREMENT:

No separate measurement shall be made for ELECTRICAL TESTING.

#### 4.02 BASIS OF PAYMENT:

Payment shall be included in the lump sum price for the entire Contract.

END OF SECTION

**V – PROPOSED PHOTOMETRICS  
(under separate cover)**

**VI – EXISTING SPORTSPLEX DRAWINGS  
(under separate cover)**