City of San Diego

CONTRACTOR'S NAME:_____
ADDRESS:_____
TELEPHONE NO.:_____ **FAX NO.**:_____
CITY CONTACT: **Eleida Felix Yackel, Contract Specialist, Email: EFelixYackel@sandiego.gov**
Phone No. (619) 533-3449, Fax No. (619) 533-3633
S.Bose/NB/egz

CONTRACT DOCUMENTS

FOR

RANCHO BERNARDO COMMUNITY PARK - SPORTS FIELD LIGHTING

VOLUME 1 OF 2

BID NO.:	**L-14-5764-DBB-2**
SAP NO. (WBS/IO/CC):	**S-11012**
CLIENT DEPARTMENT:	**1714**
COUNCIL DISTRICT:	**5**
PROJECT TYPE:	**GA**

THIS CONTRACT IS SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM.
- COMPETITION RESTRICTED TO: SLBE-ELBE FIRMS ONLY.

BID DUE DATE:

1:30 PM
AUGUST 7, 2013
CITY OF SAN DIEGO
PUBLIC WORKS DEPARTMENT
1010 SECOND AVENUE, SUITE 1400, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Civil Engineer:

1) Registered Civil Engineer — Date: 06/20/13 — Seal:

2) For City Engineer — Date: 6/20/13 — Seal:

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CITY OF SAN DIEGO, CALIFORNIA

NOTICE INVITING BIDS

1. **LIMITED COMPETITION:** This contract may only be bid by the Contractors on the City's approved SLBE-ELBE Construction Contractors List. For information regarding the SLBE-ELBE Construction Program and registration visit the City's web site: http://www.sandiego.gov.

2. **RECEIPT AND OPENING OF BIDS:** Bids will be received at the Public Works Contracting Group at the location, time, and date shown on the cover of these specifications for performing work on **Rancho Bernardo Community Park - Sports Field Lighting** (Project).

3. **DESCRIPTION OF WORK:** The Work involves furnishing all labor, materials, equipment, services, and other incidental works and appurtenances for the construction of the Project as described below:

This project provides for new sports lighting at fields 5 and 6 and required accessibility upgrades to parking, path of travel and restroom. All improvements comply with City, State and Federal accessibility guidelines and standards.

3.1. The Work shall be performed in accordance with:

3.1.1. This Notice Inviting Bids and Plans numbered **36857-01-D** through **36857-15-D**, inclusive.

4. **EQUAL OPPORTUNITY**

4.1. To The WHITEBOOK, Chapter 10, Sections D and E, DELETE in their entirety and SUBSTITUTE with the following:

D. CITY'S EQUAL OPPORTUNITY COMMITMENT.

1. Nondiscrimination in Contracting Ordinance.

1. The Contractor, Subcontractors and Suppliers shall comply with requirements of the City's Nondiscrimination in Contracting Ordinance, San Diego Municipal Code §§22.3501 through 22.3517.

   The Contractor shall not discriminate on the basis of race, gender, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers. The Contractor shall provide equal opportunity for subcontractors to participate in subcontracting opportunities. The Contractor understands and agrees that violation of this clause shall be considered a material breach of the contract and may result in contract termination, debarment, or other sanctions.

   The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. Disclosure of Discrimination Complaints. As part of its Bid or Proposal, the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors, or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

3. Upon the City's request, the Contractor agrees to provide to the City, within 60 days, a truthful and complete list of the names of all Subcontractors and Suppliers that the Contractor has used in the past 5 years on any of its contracts that were undertaken within San Diego County, including the total dollar amount paid by the Contractor for each subcontract or supply contract.

4. The Contractor further agrees to fully cooperate in any investigation conducted by the City pursuant to the City's Nondiscrimination in Contracting Ordinance, Municipal Code §§22.3501 through 22.3517. The Contractor understands and agrees that violation of this clause shall be considered a material breach of the Contract and may result in remedies being ordered against the Contractor up to and including contract termination, debarment and other sanctions for violation of the provisions of the Nondiscrimination in Contracting Ordinance. The Contractor further understands and agrees that the procedures, remedies and sanctions provided for in the Nondiscrimination in Contracting Ordinance apply only to violations of the Ordinance.

E. EQUAL EMPLOYMENT OPPORTUNITY OUTREACH PROGRAM.

1. The Contractor, Subcontractors and Suppliers shall comply with the City's Equal Employment Opportunity Outreach Program, San Diego Municipal Code §§22.2701 through 22.2707.

   The Contractor shall not discriminate against any employee or applicant for employment on any basis prohibited by law. Contractor shall provide equal opportunity in all employment practices. Prime Contractor shall ensure their subcontractors comply with this program. Nothing in this section shall be interpreted to hold a prime contractor liable for any discriminatory practice of its subcontractors.

   The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. If the Contract is competitively solicited, the selected Bidder shall submit a Work Force Report (Form BB05), within 10 Working Days after receipt by the Bidder of Contract forms to the City for approval as specified in the Notice of Intent to Award letter from the City.

3. If a Work Force Report is submitted, and the City determines there are under-representations when compared to County Labor Force Availability data, the selected Bidder shall submit an Equal Employment Opportunity Plan.

4. If the selected Bidder submits an Equal Employment Opportunity Plan, it shall include the following assurances:

    1. The Contractor shall maintain a working environment free of discrimination, harassment, intimidation and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work.

    2. The Contractor reviews its EEO Policy, at least annually, with all on-site supervisors involved in employment decisions.

    3. The Contractor disseminates and reviews its EEO Policy with all employees at least once a year, posts the policy statement and EEO posters on all company bulletin boards and job sites, and documents every dissemination, review and posting with a written record to identify the time, place, employees present, subject matter, and disposition of meetings.

    4. The Contractor reviews, at least annually, all supervisors' adherence to and performance under the EEO Policy and maintains written documentation of these reviews.

    5. The Contractor discusses its EEO Policy Statement with subcontractors with whom it anticipates doing business, includes the EEO Policy Statement in its subcontracts, and provides such documentation to the City upon request.

    6. The Contractor documents and maintains a record of all bid solicitations and outreach efforts to and from subcontractors, contractor associations and other business associations.

    7. The Contractor disseminates its EEO Policy externally through various media, including the media of people of color and women, in advertisements to recruit, maintains files documenting these efforts, and provides copies of these advertisements to the City upon request.

    8. The Contractor disseminates its EEO Policy to union and community organizations.

    9. The Contractor provides immediate written notification to the City when any union referral process has impeded the Contractor's efforts to maintain its EEO Policy.

    10. The Contractor maintains a current list of recruitment sources, including those outreaching to people of color and women, and provides written notification of employment opportunities to these recruitment sources with a record of the organizations' responses.

    11. The Contractor maintains a current file of names, addresses and phone numbers of each walk-in applicant, including people of color and women, and referrals from unions, recruitment sources, or community organizations with a description of the employment action taken.

12. The Contractor encourages all present employees, including people of color and women employees, to recruit others.

13. The Contractor maintains all employment selection process information with records of all tests and other selection criteria.

14. The Contractor develops and maintains documentation for on-the-job training opportunities, participates in training programs, or both for all of its employees, including people of color and women, and establishes apprenticeship, trainee, and upgrade programs relevant to the Contractor's employment needs.

15. The Contractor conducts, at least annually, an inventory and evaluation of all employees for promotional opportunities and encourages all employees to seek and prepare appropriately for such opportunities.

16. The Contractor ensures the company's working environment and activities are non-segregated except for providing separate or single-user toilets and necessary changing facilities to assure privacy between the sexes.

5. SUBCONTRACTING PARTICIPATION PERCENTAGES.

5.1. The City has incorporated voluntary subcontractor participation percentage to enhance competition and maximize subcontracting opportunities as follows.

5.2. The following voluntary subcontractor participation percentage for DBE, DVBE, WBE, MBE, SLBE, and ELBE certified Subcontractors shall apply to this contract:

Total voluntary subcontractor participation percentage for this project is 19.8%.

6. PRE-BID MEETING:

6.1. There will be a Pre-Bid Meeting to discuss the scope of the Project, bidding requirements, pre-qualification process, and Equal Opportunity Contracting Program requirements and reporting procedures in the Public Works Contracting Group, Conference Room at 1010 Second Avenue, Suite 1400, San Diego, CA 92101 **at 10:00 AM, on JULY 18, 2013.**

6.2. All potential bidders are encouraged to attend.

6.3. To request a copy of the agenda on an alternative format, or to request a sign language or oral interpreter for this meeting, call the Public Works Contracting Group at (619) 533-3450 at least 5 Working Days prior to the Pre-Bid Meeting to ensure availability.

7. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:

7.1. **Prior** to the Award of the Contract or each Task Order, you and your Subcontractors and Suppliers **must** register with Prism®, the City's web-based contract compliance portal at:

https://pro.prismcompliance.com/default.aspx.

7.2. The City may not award the contract until registration of all subcontractors and suppliers is complete. In the event this requirement is not met within the time frame specified in the Notice of Intent to Award letter, the City reserves the right to rescind the Notice of Award / Intent to Award and to make the award to the next responsive and responsible bidder / proposer.

8. CONSTRUCTION COST: The City's estimated construction cost for this contract is **$470,000**.

9. LOCATION OF WORK: The location of the Work is as follows:

Rancho Bernardo Community Park, 18402 West Bernardo Dr., San Diego, California 92127

10. CONTRACT TIME: The Contract Time for completion of the Work shall be **90 Working Days.**

11. CONTRACTOR'S LICENSE CLASSIFICATION: In accordance with the provisions of California Law, the Contractor shall possess valid appropriate license(s) at the time that the Bid is submitted. Failure to possess the specified license(s) shall render the Bid as **non-responsive** and shall act as a bar to award of the Contract to any Bidder not possessing required license(s) at the time of Bid.

11.1. The City has determined the following licensing classification for this contract:

- CLASS A

12. JOINT VENTURE CONTRACTORS. Provide a copy of the Joint Venture agreement and the Joint Venture license to the City within 10 Working Days after receiving the Contract forms. See 2-1.1.2, "Joint Venture Contractors" in The WHITEBOOK for details.

13. WAGE RATES: Prevailing wages are not applicable to this contract.

14. INSURANCE REQUIREMENTS:

14.1. All certificates of insurance and endorsements required by the contract are to be provided upon issuance of the City's Notice of Intent to Award letter.

14.2. Refer to sections 7-3, "LIABILITY INSURANCE", and 7-4, "WORKERS' COMPENSATION INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.

15. PREQUALIFICATION OF CONTRACTORS:

15.1. Contractors submitting Bid must be pre-qualified for the total amount proposed, inclusive of all alternate items prior to the date of submittal. Bids from contractors who have not been pre-qualified as applicable and Bids that exceed the maximum dollar amount at which contractors are pre-qualified will be deemed **non-responsive** and ineligible for award. Complete information and prequalification questionnaires are available at:

http://www.sandiego.gov/cip/bidopps/prequalification.shtml

15.2. The completed questionnaire, financial statement, and bond letter or a copy of the contractor's SLBE-ELBE certification and bond letter, must be submitted no later than 2 weeks prior to the bid opening to the Public Works Department - Engineering & Capital Project, Prequalification Program, 1010 Second Avenue, Suite 1400, San Diego, CA 92101. For additional information or the answer to questions about the prequalification program, contact David Stucky at 619-533-3474 or dstucky@sandiego.gov.

16. REFERENCE STANDARDS: Except as otherwise noted or specified, the Work shall be completed in accordance with the following standards:

Title	Edition	Document Number
Standard Specifications for Public Works Construction ("The GREENBOOK")	2012	PITS070112-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")*	2012	PITS070112-02
City of San Diego Standard Drawings*	2012	PITS070112-03
Caltrans Standard Specifications	2010	PITS070112-04
Caltrans Standard Plans	2010	PITS070112-05
California MUTCD	2012	PITS070112-06
City Standard Drawings - Standard Drawings Approved For Use*	Varies	Varies
Standard Federal Equal Employment Opportunity Construction Contract Specifications and the Equal Opportunity Clause Dated 09-11-84	1984	769023
NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

17. CITY'S RESPONSES AND ADDENDA: The City at its option, may respond to any or all questions submitted in writing, via letter, or FAX in the form of an addendum. No oral comment shall be of any force or effect with respect to this solicitation. The changes to the Contract Documents through addendum are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda on the form provided for this purpose in the Bid.

18. CITY'S RIGHTS RESERVED: The City reserves the right to cancel the Notice Inviting Bids at any time, and further reserves the right to reject submitted Bids, without giving any reason for such action, at its sole discretion and without liability. Costs incurred by the Bidder(s) as a result of preparing Bids under the Notice Inviting Bids shall be the sole responsibility of each bidder. The Notice Inviting Bids creates or imposes no obligation upon the City to enter a contract.

19. CONTRACT PRICING FORMAT: This solicitation is for a Lump Sum contract with Unit Price provisions as set forth in the Bid Proposal Form(s), Volume 2.

20. SUBMITTAL OF "OR EQUAL" ITEMS: See Section 4-1.6, "Trade Names or Equals" in The WHITEBOOK and as amended in the SSP.

21. AWARD PROCESS:

21.1. The Award of this contract is contingent upon the Contractor's compliance with all conditions precedent to Award.

21.2. Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening and award the Contract approximately within 7 days of receipt of properly executed Contract, bonds, and insurance documents.

21.3. This contract will be deemed executed, and effective, only upon the signing of the Contract by the Mayor or designee of the City.

22. SUBCONTRACT LIMITATIONS: The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 2-3, "SUBCONTRACTS" in The WHITEBOOK and as amended in the SSP which requires the Contractor to self perform the amount therein stipulated. Failure to comply with these requirements may render the Bid **non-responsive** and ineligible for award.

23. AVAILABILITY OF PLANS AND SPECIFICATIONS: Contract Documents may be obtained by visiting the City's website: http://www.sandiego.gov/cip/. Plans and Specifications for this contract are also available for review in the office of the City Clerk or Public Works Contracting Group.

24. QUESTIONS:

24.1. The Director (or designee), of the Public Works Department is the officer responsible for opening, examining, and evaluating the competitive Bids submitted to the City for the acquisition, construction and completion of any public improvement except when otherwise set forth in these documents. All questions related to this procurement action shall be addressed to the Public Works Contracting Group, Attention Contract Specialist, 1010 Second Avenue, Suite 1400, San Diego, California, 92101, and Telephone No. (619) 533-3450.

24.2. Questions received less than 14 days prior to the date for opening of Bids may not be answered.

24.3. Interpretations or clarifications considered necessary by the City in response to such questions will be issued by Addenda which will be uploaded to the City's online bidding service.

24.4. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. It is the Bidder's responsibility to become informed of any Addenda that have been issued and to include all such information in its Bid.

25. ELIGIBLE BIDDERS: No person, firm, or corporation shall be allowed to make, file, or be interested in **more** than one (1) Bid for the same work unless alternate Bids are called for. A person, firm or corporation who has submitted a sub-proposal to a Bidder, or who has quoted prices on materials to a Bidder, is not hereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or from submitting a Bid in its own behalf. Any Bidder who submits more than one bid will result in the rejection of all bids submitted.

26. SAN DIEGO BUSINESS TAX CERTIFICATE: The Contractor and Subcontractors, not already having a City of San Diego Business Tax Certificate for the work contemplated shall secure the appropriate certificate from the City Treasurer, Civic Center Plaza, first floor and submit to the Contract Specialist upon request or as specified in the Contract Documents. Tax Identification numbers for both the Bidder and the listed Subcontractors must be submitted on the City provided forms with the Notice Inviting Bids and Contract forms.

27. PROPOSAL FORMS: Bid shall be made only upon the Bidding Documents i.e., Proposal form attached to and forming a part of the specifications. The signature of each person signing shall be in longhand.

27.1. Bidder shall complete and submit all pages in the "Bidding Document" Section (see Volume 2) as their Bid per the schedule given under "Required Documents Schedule," (see Volume 1). Bidder is requested to retain for their reference other portions of the Contract Documents that are not required to be submitted with the Bid. The entire specifications for the bid package do not need to be submitted with the bid.

27.2. The City may require any Bidder to furnish a statement of experience, financial responsibility, technical ability, equipment, and references.

27.3. Bids and certain other forms and documents as specified in the Volume 2 of 2 of the Contract Documents shall be enclosed in a sealed envelope and shall bear the title of the work and name of the Bidder and the appropriate State Contractors License designation which the Bidder holds.

27.4. Bids may be withdrawn by the Bidder prior to, but not after, the time fixed for opening of Bids.

28. BIDDERS' GUARANTEE OF GOOD FAITH (BID SECURITY):

28.1. With the exception of the contracts valued $5,000 or less, JOC and Design-Build contracts, and contracts subject to the Small and Local Business Program of $250,000 or less e.g., ELBE contracts, each Bidder shall accompany its Bid with either a cashier's check upon some responsible bank, or a check upon such bank properly certified or an approved corporate surety bond payable to the City of San Diego, for an amount of not less than 10% of the aggregate sum of the Bid, which check or bond, and the monies represented thereby shall be held by the City as a guarantee that the Bidder, if awarded the contract, will in good faith enter into such contract and furnish the required final bonds.

28.2. The Bidder agrees that in case of Bidder's refusal or failure to execute this contract and give required final bonds, the money represented by a cashier's or certified check shall remain the property of the City, and if the Bidder shall fail to execute this contract, the Surety agrees that it will pay to the City damages which the City may suffer by reason of such failure, not exceeding the sum of 10% of the amount of the Bid.

28.3. A Bid received without the specified bid security will be rejected as being **non-responsive**.

29. AWARD OF CONTRACT OR REJECTION OF BIDS:

29.1. This contract may be awarded to the lowest responsible and reliable Bidder.

29.2. Bidders shall complete the entire Bid schedule (also referred to as "schedule of prices" or Proposal form). Incomplete price schedules will be rejected as being non-responsive.

29.3. The City reserves the right to reject any or all Bids, and to waive any informality or technicality in Bids received and any requirements of these specifications as to bidding procedure.

29.4. Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City from the Bidder within 3 Working Days, excluding Saturdays, Sundays, and state holidays, after the opening of Bids, of written notice which includes proof of honest, credible, clerical error of material nature, free from fraud or fraudulent intent, and of evidence that reasonable care was observed in the preparation of the Bid.

29.5. A non-selected Bidder may protest award of the Contract to the selected Bidder by submitting a written "Notice of Intent to Protest" including supporting documentation which shall be received by Public Works Contracting Group no later than 10 days after the City's announcement of the selected Bidder or no later than 10 days from the date that the City issues notice of designation of a Bidder as non-responsible in accordance with San Diego Municipal Code Chapter 2, § 22.3029, "Protests of Contract Award."

29.6. The City of San Diego will not discriminate with regard to race, religious creed, color, national origin, ancestry, physical handicap, marital status, sex or age, in the award of contracts.

29.7. Each Bid package properly executed as required by these specifications shall constitute a firm offer, which may be accepted by the City within the time specified in the Proposal.

29.8. The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of any proposed alternates, additive items or options, at its discretion that will be disclosed in the Volume 2 of 2.

30. BID RESULTS:

30.1. The Bid opening by the City shall constitute the public announcement of the Apparent Low Bidder. In the event that the Apparent Low Bidder is subsequently deemed non-responsive or non-responsible, a public announcement will be posted in the City's web page: http://www.sandiego.gov/cip/index.shtml, with the name of the newly designated Apparent Low Bidder.

30.2. To obtain Bid results, either attend Bid opening, review the results on the City's web site, or provide a self-addressed, stamped envelope, referencing Bid number, and Bid tabulation will be mailed to you upon verification of extensions. Bid results cannot be given over the telephone.

31. THE CONTRACT:

31.1. The Bidder to whom award is made shall execute a written contract with the City of San Diego and furnish good and approved bonds and insurance certificates specified by the City within 14 days after receipt by Bidder of a form of contract for execution unless an extension of time is granted to the Bidder in writing.

31.2. If the Bidder takes longer than 14 days to fulfill these requirements, then the additional time taken shall be added to the Bid guarantee. The Contract shall be made in the form adopted by the City, which includes the provision that no claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

31.3. If the Bidder to whom the award is made fails to enter into the contract as herein provided, the award may be annulled and the Bidder's Guarantee of Good Faith will be subject to forfeiture. An award may be made to the next lowest responsible and reliable Bidder who shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made.

31.4. Pursuant to the San Diego City Charter section 94, the City may only award a public works contract to the lowest responsible and reliable Bidder. The City will require the Apparent Low Bidder to (i) submit information to determine the Bidder's responsibility and reliability, (ii) execute the Contract in form provided by the City, and (iii) furnish good and approved bonds and insurance certificates specified by the City within 14 Days, unless otherwise approved by the City, in writing after the Bidder receives notification from the City, designating the Bidder as the Apparent Low Bidder and formally requesting the above mentioned items.

31.5. The award of the Contract is contingent upon the satisfactory completion of the above mentioned items and becomes effective upon the signing of the Contract by the Mayor or designee. If the Apparent Low Bidder does not execute the Contract or submit required documents and information, the City may award the Contract to the next lowest responsible and reliable Bidder who shall fulfill every condition precedent to award. A corporation designated as the Apparent Low Bidder shall furnish evidence of its corporate existence and evidence that the officer signing the Contract and bond for the corporation is duly authorized to do so.

32. EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK: The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 2-7, and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.

33. CITY STANDARD PROVISIONS. This contract is subject to the following standard provisions. See The WHITEBOOK for details.

33.1. The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.

33.2. The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.

33.3. The City of San Diego Municipal Code §22.3004 for Pledge of Compliance.

33.4. The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.

33.5. Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code concerning the employment of apprentices by contractors and subcontractors performing public works contracts.

33.6. The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).

33.7. The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.

34. PRE-AWARD ACTIVITIES:

34.1. The selected contractor by the City to execute a contract for this Work shall provide the information required within the time specified in "Required Documents," of this bid package. Failure to provide the information within the time specified may result in the Bid being rejected as **non-responsive.**

34.2. If the Bid is rejected as non-responsive, the selected contractor by the City to execute a contract for this Work shall forfeit the required Bid. The decision that the selected contractor by the City to execute a contract for this Work is non-responsive for failure to provide the information required within the time specified shall be at the sole discretion of the City.

35. REQUIRED DOCUMENT SCHEDULE:

35.1. The Bidder's attention is directed to the City's Municipal Code §22.0807(e), (3)-(5) for important information regarding grounds for debarment for failure to submit required documentation.

35.2. The specified Equal Opportunity Contracting Program (EOCP) forms are available for download from the City's web site at:

http://www.sandiego.gov/eoc/forms/index.shtml

ITEM	WHEN DUE	FROM	DOCUMENT TO BE SUBMITTED
1.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Bid
2.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Bid Bond
3.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Non-collusion Affidavit to be Executed By Bidder and Submitted with Bid under 23 USC 112 and PCC 7106
4.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Contractors Certification of Pending Actions
5.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Equal Benefits Ordinance Certification of Compliance
6.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Form AA35 - List of Subcontractors

ITEM	WHEN DUE	FROM	DOCUMENT TO BE SUBMITTED
7.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Form AA40 - Named Equipment/Material Supplier List
8.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Names of the principal individual owners of the Apparent Low Bidder
9.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	If the Contractor is a Joint Venture: • Joint Venture Agreement • Joint Venture License
10.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Form BB05 - Work Force Report
11.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contract Forms - Agreement
12.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contract Forms - Payment and Performance Bond
13.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Certificates of Insurance and Endorsements
14.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractor Certification - Drug-Free Workplace
15.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractor Certification - American with Disabilities Act
16.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractors Standards - Pledge of Compliance

CONTRACT FORMS

AGREEMENT

CONTRACT FORMS
AGREEMENT

CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and PAL GENERAL ENGINEERING, INC., herein called "Contractor" for construction of **RANCHO BERNARDO COMMUNITY PARK - SPORTS FIELD LIGHTING;** Bid No. **L-14-5764-DBB-2**, in the amount of FOUR HUNDRED FOURTEEN THOUSAND NINE HUNDRED SIX DOLLARS AND 00/100 ($414,906.00), which is comprised of the Base Bid.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:

   (a) The attached Faithful Performance and Payment Bonds.

   (b) The attached Proposal included in the Bid documents by the Contractor.

   (c) Reference Standards listed in the Notice Inviting Bids and the Supplementary Special Provisions (SSP).

   (d) That certain documents entitled **RANCHO BERNARDO COMMUNITY PARK - SPORTS FIELD LIGHTING** on file in the office of the Public Works Department as Document No.**S-11012**, as well as all matters referenced therein.

2. The Contractor shall perform and be bound by all the terms and conditions of this contract and in strict conformity therewith shall perform and complete in a good and workmanlike manner **RANCHO BERNARDO COMMUNITY PARK - SPORTS FIELD LIGHTING**, Bid Number **L-14-5764-DBB-2**, San Diego, California.

3. For such performances, the City shall pay to Contractor the amounts set forth at the times and in the manner and with such additions or deductions as are provided for in this contract, and the Contractor shall accept such payment in full satisfaction of all claims incident to such performances.

4. No claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

5. This contract is effective as of the date that the Mayor or designee signs the agreement.

CONTRACT FORMS (continued)

AGREEMENT

IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102(d) authorizing such execution.

THE CITY OF SAN DIEGO

B: By: _____
Stephen Samara
Senior Contract Specialist
Pr Public Works Contracting Group

Date: 10-21-13

APPROVED AS TO FORM AND LEGALITY

Jan I. Goldsmith, City Attorney

By _____

Print Name: Malc M. Mercer
Deputy City Attorney

Date: 10/21/13

CONTRACTOR

By _____

Print Name: Marla Jahshan

Title: President

Date: August 22, 2013

City of San Diego License No.: B2008032175

State Contractor's License No.: 916931

CONTRACT/AGREEMENT

ATTACHMENTS

Executed in Triplicate

Bond Number: 1015519
Premium: $4,730

CONTRACT ATTACHMENT
PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

PAL GENERAL ENGINEERING, INC., a corporation, as principal, and The Hanover Insurance Company, a corporation authorized to do business in the State of California, as Surety, hereby obligate themselves, their successors and assigns, jointly and severally, to The City of San Diego a municipal corporation in the sum of of FOUR HUNDRED FOURTEEN THOUSAND NINE HUNDRED SIX DOLLARS AND 00/100 ($414,906.00), for the faithful performance of the annexed contract, and in the sum of of FOUR HUNDRED FOURTEEN THOUSAND NINE HUNDRED SIX DOLLARS AND 00/100 ($414,906.00), for the benefit of laborers and materialmen designated below.

Conditions:

If the Principal shall faithfully perform the annexed contract **RANCHO BERNARDO COMMUNITY PARK-SPORTS FIELD LIGHTING**, Bid Number **L-14-5764-DBB-2**, San Diego, California then the obligation herein with respect to a faithful performance shall be void; otherwise it shall remain in full force.

If the Principal shall promptly pay all persons, firms and corporations furnishing materials for or performing labor in the execution of this contract, and shall pay all amounts due under the California Unemployment Insurance Act then the obligation herein with respect to laborers and materialmen shall be void; otherwise it shall remain in full force.

The obligation herein with respect to laborers and materialmen shall inure to the benefit of all persons, firms and corporations entitled to file claims under the provisions of Chapter 3 of Division 5 of Title I of the Government Code of the State of California or under the provisions of Section 3082 et seq. of the Civil Code of the State of California.

Changes in the terms of the annexed contract or specifications accompanying same or referred to therein shall not affect the Surety's obligation on this bond, and the Surety hereby waives notice of same.

CONTRACT ATTACHMENT (continued)
PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND

The Surety shall pay reasonable attorney's fees should suit be brought to enforce the provisions of this bond.

Dated August 22, 2013

Approved as to Form and Legality

Jan I. Goldsmith, City Attorney

By _____
Deputy City Attorney

Approved:

By: _____
Stephen Samara
Senior Contract Specialist
Public Works Contracting Group

PAL General Engineering, Inc.
Principal

By _____

Marla Jahshan, President
Printed Name of Person Signing for Principal

The Hanover Insurance Company
Surety

By _____
Attorney-in-fact
Matthew C. Gaynor

2 MacArthur Place 2nd Floor
Local Address of Surety

Santa Ana, CA 92707
Local Address (City, State) of Surety

(714) 415-3808
Local Telephone No. of Surety

Premium $ 4,730

Bond No. 1015519

THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

POWERS OF ATTORNEY
CERTIFIED COPY

KNOW ALL MEN BY THESE PRESENTS: That THE HANOVER INSURANCE COMPANY and MASSACHUSETTS BAY INSURANCE COMPANY, both being corporations organized and existing under the laws of the State of New Hampshire, and CITIZENS INSURANCE COMPANY OF AMERICA, a corporation organized and existing under the laws of the State of Michigan, do hereby constitute and appoint

Matthew C. Gaynor, Kim D. Vasquez and/or Daniel Frazee

of **Santee, CA** and each is a true and lawful Attorney(s)-in-fact to sign, execute, seal, acknowledge and deliver for, and on its behalf, and as its act and deed any place within the United States, or, if the following line be filled in, only within the area therein designated

any and all bonds, recognizances, undertakings, contracts of indemnity or other writings obligatory in the nature thereof, as follows:

Any such obligations in the United States, not to exceed Ten Million and No/100 ($10,000,000) in any single instance

and said companies hereby ratify and confirm all and whatsoever said Attorney(s)-in-fact may lawfully do in the premises by virtue of these presents. These appointments are made under and by authority of the following Resolution passed by the Board of Directors of said Companies which resolutions are still in effect:

"RESOLVED, That the President or any Vice President, in conjunction with any Vice President, be and they are hereby authorized and empowered to appoint Attorneys-in-fact of the Company, in its name and as its acts, to execute and acknowledge for and on its behalf as Surety any and all bonds, recognizances, contracts of indemnity, waivers of citation and all other writings obligatory in the nature thereof, with power to attach thereto the seal of the Company. Any such writings so executed by such Attorneys-in-fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company in their own proper persons." (Adopted October 7, 1981 - The Hanover Insurance Company; Adopted April 14, 1982 - Massachusetts Bay Insurance Company; Adopted September 7, 2001 - Citizens Insurance Company of America)

IN WITNESS WHEREOF, THE HANOVER INSURANCE COMPANY, MASSACHUSETTS BAY INSURANCE COMPANY and CITIZENS INSURANCE COMPANY OF AMERICA have caused these presents to be sealed with their respective corporate seals, duly attested by two Vice Presidents, this **21st** day of **April 2011**.

THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

Robert Thomas, Vice President

Mark Fitzgerald, Vice President

THE COMMONWEALTH OF MASSACHUSETTS)
COUNTY OF WORCESTER) ss.

On this **21st** day of **April 2011**, before me came the above named Vice Presidents of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, to me personally known to be the individuals and officers described herein, and acknowledged that the seals affixed to the preceding instrument are the corporate seals of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, respectively, and that the said corporate seals and their signatures as officers were duly affixed and subscribed to said instrument by the authority and direction of said Corporations.

BARBARA ANN GARLICK
Notary Public
Commonwealth of Massachusetts
My Commission Expires Nov 3, 2011

Barbara A. Garlick, Notary Public
My Commission Expires November 3, 2011

I, the undersigned Vice President of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, hereby certify that the above and foregoing is a full, true and correct copy of the Original Power of Attorney issued by said Companies, and do hereby further certify that the said Powers of Attorney are still in force and effect.

This Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America.

"RESOLVED, That any and all Powers of Attorney and Certified Copies of such Powers of Attorney and certification in respect thereto, granted and executed by the President or any Vice President in conjunction with any Vice President of the Company, shall be binding on the Company to the same extent as if all signatures therein were manually affixed, even though one or more of any such signatures thereon may be facsimile." (Adopted October 7, 1981 - The Hanover Insurance Company; Adopted April 14, 1982 - Massachusetts Bay Insurance Company; Adopted September 7, 2001 - Citizens Insurance Company of America)

GIVEN under my hand and the seals of said Companies, at Worcester, Massachusetts, this 22nd day of August 2013 .

THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

Glenn Margosian, Vice President

ACKNOWLEDGMENT

State of California
County of San Diego)

On August 22, 2013 before me, Kathy Scheuerman, Notary Public
(insert name and title of the officer)

personally appeared Matthew C. Gaynor,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(~~s~~), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

CLS1 KATHY SCHEUERMAN CLS1
Commission No.1884440
NOTARY PUBLIC - CALIFORNIA
SAN DIEGO COUNTY
Commission Expires March 28, 2014

Signature Kathy Scheuerman (Seal)

CONTRACTOR CERTIFICATION

DRUG-FREE WORKPLACE

PROJECT TITLE: RANCHO BERNARDO COMMUNITY PARK – SPORTS FIELD LIGHTING

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 7-13.3, "Drug-Free Workplace", of the project specifications, and that;

PAL General Engineering, Inc.

(Name under which business is conducted)

has in place a drug-free workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of subdivisions a) through c) of the policy as outlined.

Signed _____

Printed Name Marla Jahshan

Title President

CONTRACTOR CERTIFICATION

AMERICAN WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION

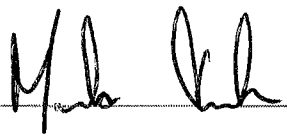
PROJECT TITLE: RANCHO BERNARDO COMMUNITY PARK – SPORTS FIELD LIGHTING

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-4 regarding the American With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 7-13.2, "American With Disabilities Act", of the project specifications, and that;

PAL General Engineering, Inc.

(Name under which business is conducted)

has in place workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of the policy as outlined.

Signed 

Printed Name Marla Jahshan

Title President

CONTRACTOR CERTIFICATION

CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE

PROJECT TITLE: Rancho Bernardo Community Park - Sports Field Lighting

I declare under penalty of perjury that I am authorized to make this certification on behalf of PAL General Engineering, Inc., as Contractor, that I am familiar with the requirements of City of San Diego Municipal Code § 22.3224 regarding Contractor Standards as outlined in the WHITEBOOK, Section 7-13.4, ("Contractor Standards"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors whose subcontracts are greater than $50,000 in value has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3224.

Dated this 22nd Day of August, 2013.

Signed _____

Printed Name Marla Jahshan

Title President

AFFIDAVIT OF DISPOSAL

WHEREAS, on the _____ DAY OF _____, _____, the undersigned entered into and executed a contract with the City of San Diego, a municipal corporation, for:

Rancho Bernardo Community Park - Sports Field Lighting
(Name of Project)

as particularly described in said contract and identified as Bid No. **L-14-5764-DBB-2**; SAP No. (WBS/IO/CC) **S-11012**; and **WHEREAS**, the specification of said contract requires the Contractor to affirm that "all brush, trash, debris, and surplus materials resulting from this project have been disposed of in a legal manner"; and **WHEREAS**, said contract has been completed and all surplus materials disposed of:

_____

_____

_____

NOW, THEREFORE, in consideration of the final payment by the City of San Diego to said Contractor under the terms of said contract, the undersigned Contractor, does hereby affirm that all surplus materials as described in said contract have been disposed of at the following location(s)

_____

_____

_____

and that they have been disposed of according to all applicable laws and regulations.

Dated this _____ DAY OF _____, _____.

_____ Contractor
by

ATTEST:

State of _____
County of _____

On this _____ DAY OF _____, 2_____, before the undersigned, a Notary Public in and for said County and State, duly commissioned and sworn, personally appeared _____ known to me to be the _____ Contractor named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractor executed the said Release.

Notary Public in and for said County and State

SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

SUPPLEMENTARY SPECIAL PROVISIONS

The following Supplementary Special Provisions (SSP) modifies the following documents:

1) Standard Specifications for Public Works Construction (The GREENBOOK) currently in effect.

2) The City of San Diego Standard Specifications for Public Works Construction (The WHITEBOOK).

SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS.

Normal Working Hours. To the City Supplements, ADD the following:

The Normal Working Hours are 8:30 AM to 3:30 PM.

SECTION 2 - SCOPE AND CONTROL OF WORK

2-3.2 Self Performance. DELETE in its entirety and SUBSTITUTE with the following:

1. You must perform, with your own organization, Contract work amounting to at least **35%** of the base bid alone or base bid and any additive or deductive alternate(s) that together when added or deducted form the basis of award.

2-5.3.2 Working Drawings. TABLE 2-5.3.2(A), ADD the following:

Item	Section No.	Title	Subject
17	306-1.6	Water Valve Bypass for Mainlines 16” and Larger	SDW-154*

* Note: The distance dimensions shown between the bypass pipes and between bypass pipes and the mainlines are subject to change per field conditions.

2-9.1 Permanent Survey Markers. DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall notify the Engineer on a Private Contract, at least 7 days before starting the Work to allow for the preservation of survey monuments, and benchmarks. The Engineer on a Private Contract through its Registered Land Surveyor or a Registered Civil Engineer, will, at its cost, file a Corner Record or a Record of Survey referencing survey monuments subject to disturbance in the Office of the County Surveyor in accordance with Business and Professions Code 8771.

The Contractor shall not disturb or permanently cover survey monuments or benchmarks without the consent of the Engineer on a Private Contract. The Contractor shall bear the expense of uncovering and replacing any that may be disturbed or covered without permission. When a change is made in the finished elevation of the pavement of any roadway in which a street survey monument is located, the Contractor shall adjust the monument riser ring to the new grade within 7

days of finished paving unless otherwise specified in the Special Provisions. If a referenced monument is unable to be reset in its original location due to improvements, the Contractor shall establish the reset monument in a location approved by the Engineer.

Replacing and establishing survey references e.g., survey monuments and benchmarks shall be done only under the direction of the Engineer by a Registered Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the State of California.

2-9.2 **Survey Service.** DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall be responsible for all surveying services or as may be specified in these special provisions.

The payment for survey services shall be included in the various Bid items unless a Bid item for Survey Service has been provided

2-14.3 **Coordination.** To the City Supplements, ADD the following:

Other adjacent City project(s) is (are) scheduled for construction for the same time period in the vicinity of parking lot shown in plan sheet 36857-6-D. Coordinate the Work with the adjacent project(s) as listed below:

a) Various Senior Centers Parking Lot Resurfacing/ Various Recreation Centers Parking Lot Resurfacing

b) Project Manager: Sheila Bose

2-15 **TECHNICAL STUDIES AND DATA.** To the City Supplement, ADD the following:

In the preparation of Contract Documents, the designer has relied upon the following studies, data, reports of explorations, and tests:

1. Structural Calculations, Pole Foundation Standard for Rancho Bernardo Park Field Lighting, by R.L. Foley & Associates, Inc. (revised) March 25, 2013.

   The report listed above is included in this document as a Contract appendix.

SECTION 4 - CONTROL OF MATERIALS

4-1.3.4 **Inspection Paid For By the Contractor.** To the City Supplements, ADD the following:

Special Inspections as require by Development Services Department permits for lighting pole foundations.

4-1.6 **Trade Names or Equals.** ADD the following:

You must submit your list of proposed substitutions for “an equal” (“or equal”) item(s) **no less than 15 Working Days prior to Bid due date** and on a City form when provided by the City.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-3 LIABILITY INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

The insurance provisions herein must not be construed to limit your indemnity obligations contained in the Contract.

7-3.1 Policies and Procedures.

1. You must procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by you, your agents, representatives, officers, employees or Subcontractors.

2. Insurance coverage for property damage resulting from your operations is on a replacement cost valuation. The market value will not be accepted.

3. You must maintain this insurance for the duration of this contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this contract. Your liabilities under the Contract, e.g., your indemnity obligations, is not deemed limited to the insurance coverage required by this contract.

4. Payment for insurance is included in the various items of Work as bid by you, and except as specifically agreed to by the City in writing, you are not entitled to any additional payment. Do not begin any work under this contract until you have provided and the City has approved all required insurance.

5. Policies of insurance must provide that the City is entitled to 30 days (10 days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

7-3.2 Types of Insurance.

7-3.2.1 Commercial General Liability Insurance.

1. Commercial General Liability Insurance must be written on the current version of the ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad.

2. The policy must cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract).

3. There must be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You must maintain the same or equivalent insurance for at least 10 years following completion of the Work.

4. All costs of defense must be outside the policy limits. Policy coverage must be in liability limits of not less than the following:

General Annual Aggregate Limit	Limits of Liability
Other than Products/Completed Operations	$2,000,000
Products/Completed Operations Aggregate Limit	$2,000,000
Personal Injury Limit	$1,000,000
Each Occurrence	$1,000,000

7-3.2.2 Commercial Automobile Liability Insurance.

1. You must provide a policy or policies of Commercial Automobile Liability Insurance written on the current version of the ISO form CA 00 01 12 90 or later version or equivalent form providing coverage at least as broad in the amount of $1,000,000 combined single limit per accident, covering bodily injury and property damage for owned, non-owned, and hired automobiles ("Any Auto").

2. All costs of defense must be outside the limits of the policy.

7-3.3 Rating Requirements. Except for the State Compensation Insurance Fund, all insurance required by this contract as described herein must be carried only by responsible insurance companies with a rating of, or equivalent to, at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

7-3.3.1 Non-Admitted Carriers. The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Approved Surplus Lines Insurers (LASLI list).

All policies of insurance carried by non-admitted carriers must be subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

7-3.4 Evidence of Insurance. Furnish to the City documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and furnish renewal documentation prior to expiration of this insurance. Each required document must be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. We reserve the right to require complete, certified copies of all insurance policies required herein.

7-3.5 Policy Endorsements.

7-3.5.1 Commercial General Liability Insurance.

7-3.5.1.1 Additional Insured.

a) You must provide at your expense policy endorsement written on the current version of the ISO Occurrence form CG 20 10 11 85 or an equivalent form providing coverage at least as broad.

b) To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy must be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured.

c) The additional insured coverage for projects for which the Engineer's Estimate is $1,000,000 or more must include liability arising out of: (a) Ongoing operations performed by you or on your behalf, (b) your products, (c) your work, e.g., your completed operations performed by you or on your behalf, or (d) premises owned, leased, controlled, or used by you.

d) The additional insured coverage for projects for which the Engineer's Estimate is less than $1,000,000 must include liability arising out of: (a) Ongoing operations performed by you or on your behalf, (b) your products, or (c) premises owned, leased, controlled, or used by you.

7-3.5.1.2 **Primary and Non-Contributory Coverage.** The policy must be endorsed to provide that the coverage with respect to operations, including the completed operations, if appropriate, of the Named Insured is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives. Further, it must provide that any insurance maintained by the City and its elected officials, officers, employees, agents and representatives must be in excess of your insurance and must not contribute to it.

7-3.5.1.3 **Project General Aggregate Limit.** The policy or policies must be endorsed to provide a Designated Construction Project General Aggregate Limit that will apply only to the Work. Only claims payments which arise from the Work must reduce the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit must be in addition to the aggregate limit provided for the products-completed operations hazard.

7-3.5.2 **Commercial Automobile Liability Insurance.**

7-3.5.2.1 **Additional Insured.** Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy must be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured, with respect to liability arising out of automobiles owned, leased, hired or borrowed by you or on your behalf. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

7-3.6 **Deductibles and Self-Insured Retentions.** You must pay for all deductibles and self-insured retentions. You must disclose deductibles and self-insured retentions to the City at the time the evidence of insurance is provided.

7-3.7 **Reservation of Rights.** The City reserves the right, from time to time, to review your insurance coverage, limits, deductibles and self-insured retentions to determine if they are acceptable to the City. The City will reimburse you, without overhead, profit, or any other markup, for the cost of additional premium for any coverage requested by the Engineer but not required by this contract.

7-3.8 **Notice of Changes to Insurance.** You must notify the City 30 days prior to any material change to the policies of insurance provided under this contract.

7-3.9 **Excess Insurance.** Policies providing excess coverage must follow the form of the primary policy or policies e.g., all endorsements.

7-4 WORKERS' COMPENSATION INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

7-4.1 Workers' Compensation Insurance and Employers Liability Insurance.

1. In accordance with the provisions of §3700 of the California Labor Code, you must provide at your expense Workers' Compensation Insurance and Employers Liability Insurance to protect you against all claims under applicable state workers compensation laws. The City, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by your failure to comply with the requirements of this section.

2. Limits for this insurance must be not less than the following:

Workers' Compensation	Statutory Employers Liability
Bodily Injury by Accident	$1,000,000 each accident
Bodily Injury by Disease	$1,000,000 each employee
Bodily Injury by Disease	$1,000,000 policy limit

3. By signing and returning the Contract you certify that you are aware of the provisions of §3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code and you must comply with such provisions before commencing the Work as required by §1861 of the California Labor Code.

7-4.1.1 Waiver of Subrogation. The policy or policies must be endorsed to provide that the insurer will waive all rights of subrogation against the City, and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the Named Insured for the City.

7-5 PERMITS, FEES, AND NOTICES. To the City Supplement, ADD the following:

1. City shall obtain plan approval and Contractor to pay permit fees for lighting permit required by the Development Services Department (DSD).

2. Fees paid to the DSD by the Contractor will be reimbursed by the city, with no markup. Reimbursement will be paid from the "Permit Allowance" Bid item.

3. Contractor shall be required to request inspections from DSD for work permitted by DSD.

7-8.6 Water Pollution Control. ADD the following:

1. Based on a preliminary assessment by the City, the Contract is subject to WPCP.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-2 FIELD OFFICE FACILITIES. To the City Supplements, DELETE in its entirety.

SECTION 9 - MEASUREMENT AND PAYMENT

9-3.2.5 **Withholding of Payment.** To the City Supplements, Paragraph (i), DELETE in its entirety and SUBSTITUTE with the following:

i) Your failure to comply with 7-2.3, "PAYROLL RECORDS" and 2-16, "CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM."

ADD:

9-3.7 Compensation Adjustments for Price Index Fluctuations. This Contract is not subject to the provisions of The WHITEBOOK for Compensation Adjustments for Price Index Fluctuations for the paving asphalt.

SECTION 211 - SOILS AND AGGREGATE TESTS

ADD:

211-6 **AGRONOMIC SOILS TEST.** Soil test shall be submitted to an approved and qualified laboratory. Testing methods shall comply with the United States Department of Agriculture Handbook Publication No. 60, Methods of Soil Analysis published by the Soil Science Society of America and peer-viewed methods published in scientific journals. Evaluations and recommendations shall be based on University of California publications and peer-viewed articles published in scientific journals. The Engineer will appoint a representative to oversee soil sampling that may be required. The time, depth, location, and number of samples taken shall be as per instructions from the Engineer. A minimum of three representative samples shall be taken from random and varied locations of the project site that will receive turf, shrub, or tree planting. Samples shall represent major conditions of exposed cut soils and fill soils. Sample from the top foot for turf and shrub areas and from the expected depth for large container stock. Label each sample for location/origin, type of soil condition visibly observed, and sampling depth. Laboratory report shall identify each sample with the same information. Samples taken shall be split into two samples, one sample will be retained by the City. Samples shall be at least one pint in volume. The following is a listing of two approved soil-testing laboratories:

Wallace Laboratories
365 Coral Circle
El Segundo, CA 90245
Phone: 310-615-0116
Fax: 310-640-6863

Or

Soil & Plant Laboratory
41 East Hunter Ave. Suite A,
Anaheim, CA 92807
Phone: (714) 282-8777
Fax: (714) 282-8575

The Contractor shall provide the City and the Landscape Architect with a copy of the written report prepared by the approved laboratory after performing the test.

Reports shall include the following information:

a) Date of Testing

b) Project Name

c) The Contractor's Name

d) Source of Materials and Supplier's Name

e) Estimate of Quantity Needed

f) Soil Gradation

g) Soil Permeability

h) Toxic Elements

i) pH

j) EC

k) Organic Content

l) Recommendations for adding amendments, chemical corrections, or both.

m) Measurement of sodicity (Sodium Adsorption Ratio).

n) Recommendations for soil leaching.

o) Pounds of pre-plant fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

p) Pounds of maintenance fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

Each soil analysis shall include written recommendations for soils treatments and soils amendments to be added based upon test results.

SECTION 212 - LANDSCAPE AND IRRIGATION MATERIALS

212-1.1.2 **Class "A" Topsoil**. To the City Supplement, Paragraph (3), at the end of the test results list, ADD the following:

m) Measurement of sodicity (Sodium Adsorption Ratio).

n) Recommendations for soil leaching.

o) Pounds of pre-plant fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

p) Pounds of maintenance fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

212-1.1.3 **Class "B" Topsoil**. To the City Supplement, Paragraph (1), before the first sentence, ADD the following:

The soil shall be tested for Part 3, agricultural suitability, in accordance with 212-1.1.2, "Class "A" Topsoil." The soils shall be amended in accordance with the recommendations included in the test results and as approved by the Engineer.

212-1.1.4 **Class "C" Topsoil**. To the City Supplement, Paragraph (1), in the first sentence, after the words "tested for" and before "agricultural suitability", ADD the following:

Part 3,

ADD:

212-1.10 **Herbicide.** Pre-emergent herbicide shall be as determined by Contractor. The purpose of the pre-emergent herbicide is to control the growth of weeds within planter areas below the bark mulch layer. Contractor shall submit a sample label and Material Safety Data Sheet (MSDS) to the Resident Engineer for approval prior to purchase and applications.

Post-emergent herbicide shall be non-selective type for total control of undesirable vegetation, available as Roundup or approved substitution as determined by the Contractor. Contractor shall submit a sample label and Material Safety Data Sheet (MSDS) to the Resident Engineer for approval prior to purchase and applications. Application shall be in accordance with precautions and rates suggested by the manufacturer.

212-2 **IRRIGATION SYSTEM MATERIALS**. ADD the following:

Work included in these specifications shall consist of the furnishing of labor, tools, materials, permits, fees, appliances, taxes and other costs necessary for the installation of an automatic irrigation system in an acceptable operational condition as specified and shown on the project drawings.

Material List: Contractor shall furnish articles, equipment, materials, and processes specified by name in construction documents. No substitution shall be allowed without prior written approval by the City. Complete material list shall be submitted prior to performing work. Material list shall include manufacturer, model number, and description of materials and equipment to be used.

Equipment and materials provided without prior approval of the City may be rejected and the Contractor is required to remove such materials from the site at his own expense.

Acceptance of items, alternates and substitutes indicates only that the product(s) apparently meets requirements of contract documents based on information or samples submitted to the City.

Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

212-2.1.1 **General.** Revise to read as follows:

The Contractor shall furnish only new pipe and fittings of types designated on the Plans and in accordance with these specifications.

ADD:

212-2.1.6 **Sand Encasement.** Sand Encasement for all irrigation pipe, direct burial control wire and electrical conduit shall be clean plaster or mortar sand, as per section 200 of the Greenbook, with a minimum sand equivalent of 50.

ADD:

212-3.2.2.4 **Wires in Pull Boxes.** Wires in Pull Boxes shall be loose and shall not come within 3" from lid. Boxes shall be sized accordingly to accommodate this requirement.

ADD:

212-3.2.2.5 **Wire Testing.** Wire shall be tested for continuity, open circuits, and unintentional grounds prior to connecting to equipment. Any wiring that is defective shall be replaced, at the Contractor's expense.

SECTION 300 – EARTHWORK

300 – 1.1 **General.** ADD the following:

1. The site shall be cleared of grass and weeds to a depth of at least 6 inches and debris and obstructions including brush, trees, logs, stumps, roots, heavy sod, vegetation, rock, stones larger than 6 inches in any dimension, broken or old concrete and pavement.

   The site shall be grubbed to a depth necessary to remove objectionable material including stumps and roots.

ADD:

300-2.1.1 **Miscellaneous Grading Conditions.** Site Grading: Slope grades to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.

Moisture Control: Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy.

2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

Compaction of Backfill and Fills:

1. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

2. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

3. Compact soil to not less than the following percentages of maximum density according to ASTM D 1557: Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.

SECTION 308 – LANDSCAPE AND IRRIGTION INSTALLATION

308-2.1 **General.** After Paragraph (3), ADD the following:

Moisture Content: Do not perform soil preparation and earthwork if soil moisture content is such that excessive soil compaction will result. Apply water to control dust, break up soil clods, and provide suitable moisture content for tilling and planting.

ADD:

308-2.1.1 **Equipment.** Equipment necessary for soil preparation, finish grading, and handling and placing of materials shall be available and in good working condition before starting work.

308-2.2 **Trench Excavation and Backfill.** After the last Paragraph, ADD the following:

Trenches shall not be backfilled, except to anchor pipe, until required tests are completed and accepted by the City. Pipe joints shall remain exposed until satisfactory completion of testing. Lateral trenches, and mainline trenches after initial sand backfill, shall be carefully backfilled with approved fine select material, consisting of loam, sandy clay, sand, and other approved materials-free from large clods of earth and stones. Backfill shall be mechanically compacted in landscaped areas to dry density equal to adjacent undisturbed soil in planting areas. Backfill shall conform to adjacent grades without settlement, sunken areas, humps, and other surface irregularities.

Flooding of trenches will be permitted only with approval of the City, in accordance with subsection 306-1.3.3.

If trench settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, drip emitters, planting, and other installations are necessary, then Contractor shall make required adjustments at no extra cost to the City.

ADD:

308-2.2.1 **Trenching and Backfilling Under Paving.** PVC Schedule 40 sleeves shall be placed for irrigation pipe installed below paving. Trenches located below paving (asphaltic concrete and concrete) shall be backfilled with sand (six inches above and below the pipe). Compact backfill in layers to 95% relative density (minimum) with manual or mechanical tamping devices.

Trenches shall be flush with adjoining subgrade. Contractor shall set in place, cap and pressure test piping under pavement prior to start of paving work. Install piping under existing walks by jacking or boring. If cutting or breaking of sidewalks is necessary, then Contractor shall replace concrete walks at no extra cost to the City. Permission to cut or break sidewalks shall be obtained from the Resident Engineer. No hydraulic boring shall be permitted under concrete paving.

308-5.1 **General.** Between Paragraphs (2) and (3), ADD the following:

Existing Trees: If excavating adjacent to existing trees, Contractor shall exercise caution to avoid injury to trees and tree roots. Excavation near roots 1-1/2 inches and larger shall be done by hand. Tunnel under roots 1-1/2 inches and larger in diameter, except directly in the path of pipe and conduit. Roots shall be heavily wrapped with burlap to prevent scarring and excessive drying. If a trenching machine is run close to trees with roots smaller than 1-1/2 inches in diameter, wall of the trench adjacent to tree shall be hand trimmed, making clean cuts through roots. Trenches adjacent to trees shall be closed within twenty-four hours; if not possible, side of the trench adjacent to the tree shall be kept shaded with burlap or canvas.

Last Paragraph, DELETE in its entirety and REPLACE with the following:

Record and As-Built Drawings: Contractor shall provide and keep current complete "as-built" record set of blueline ozalid prints. Record set shall be corrected daily and show every change from original drawings and specifications and precise locations, sizes, and kinds of equipment. Prints for this purpose may be obtained at cost from the City. Drawings shall be kept on site and shall be used only as a record set. Contractor shall provide Resident Engineer with "as-built" record drawings (marked in red) prior to final acceptance. City will prepare final mylar as-built drawings after review and approval of red-lined record set.

Contractor shall dimension from two (2) permanent points of reference (building corners, sidewalk, road intersections, etc.) locations of the following items:

(a) Remote control valves

(b) Routing of control wiring

(c) Quick coupling valves

(d) Ball valves and gate valves

(e) Connection to existing water lines/water meter location

(f) Connection to existing electrical power/automatic controller location

(g) Other related equipment as directed by the City

(h) Significant changes in routing of lateral lines from those indicated on the plans

(i) Routing of pressure mainline piping (dimension every 100 feet along route)

On or before the date of final inspection, Contractor shall deliver corrected and completed as-builts to the City. Delivery of final as-builts shall not relieve Contractor of the responsibility of providing required information that may be omitted from the prints.

Controller Charts: As-built record drawings shall be approved by the City before Contractor prepares controller charts.

Provide two controller charts for each controller installed. (Non anticipated) A reduced copy of the approved as-built irrigation plan, color coded by stations and laminated in plastic, shall be provided at 11x17 size (to Park and Recreation Department) and at the maximum size that will fit inside the solar controller enclosure at the time of final acceptance.

Charts shall be reduced plans of as-built systems. If control circuits are not legible when plans are reduced, then they shall be enlarged to a size that will be readable when reduced.

Charts shall be blackline or blueline ozalid prints, and different colors shall be used to indicate area of coverage for each station.

After approval by the City, charts shall be hermetically sealed between two pieces of plastic-minimum 10 mils. thick each.

Charts shall be completed and approved by the City prior to final inspection of irrigation system.

Operation and Maintenance Manuals: Prepare and deliver to the City within 10 calendar days prior to completion of construction, 2 hard cover binders with 3 rings containing the following information:

(a) Index sheet stating Contractor's address and telephone number, list of equipment with name and address of local manufacturers' representatives.

(b) Catalog and parts sheets on material and equipment installed under this contract.

(c) Guarantee statement (refer to Subsection 308-7, Guarantee).

(d) Complete operating and maintenance instruction manuals on major equipment.

SECTION 707 – RESOURCE DISCOVERIES

ADD:

707-1.1 **Environmental Document.** The City of San Diego Environmental Analysis Section (EAS) of the Development Services Department has prepared a **Notice of Exemption** Project No. S-11012.02.06 for Rancho Bernardo Community Park Sports Field Lighting, as referenced in the Contract Appendix.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS TABLE OF CONTENTS

SECTION 05500 - MISCELLANEOUS METALWORK

PART 1 -- GENERAL

1. WORK OF THIS SECTION

A. The WORK of this Section includes providing miscellaneous metalwork and appurtenances including the following:

(1) Anchor Bolts
(2) Power Driven Pins
(3) Bolts

2. CODES

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

Uniform Building Code

3. STANDARD SPECIFICATIONS

A. Except as otherwise indicated in this Section of the Specifications, the CONTRACTOR shall comply with the Standard Specifications for Public Works Construction (SSPWC).

4. SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

(1) **Federal Specifications:**

QQ-F-461 C (1)	Floor Plate, Steel, Rolled
MIL-6-18015	(Ships) Aluminum Planks, (6063-T6)

(2) **Commercial Standards:**

AISC MO11	Manual of Steel Constructions
AASHTO HS-20	Truck Loading
ASTM A36	Specification for Structural Steel
ASTM A 48	Specification for Gray Iron Castings
ASTM A 53	Specification for Pipe, Steel, Black and Hot- Dipped, Zinc-Coated Welded and Seamless
ASTM A 123	Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 125	Specification for Steel Springs, Helical, Heat Treated

ASTM A 153	Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A283	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
ASTM A 307	Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile
ASTM A320	Specification for Alloy-Steel Bolting Materials for Low-Temperature Service
ASTM A489	Carbon Steel Eyebolts
ASTM A 569	Specification for Steel, Carbon, (0.15 Maximum Percent) Hot Rolled, Sheet and Strip, Commercial Quality
ASTM A 575	Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
ASTM B 98	Specification for Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 210	Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
ASTM B 221	Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
ASTM B 438	Specification for Sintered Bronze Bearings (Oil-Impregnated)
ANSI/AWS D1.1	Structural Welding Code - Steel
NFPA 101	Life Safety Code
NAAMM	Metal Stairs Manual

5. SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

(1) Shop drawings showing connection details and locations proposed for power driven pins.

(2) Shop drawings of miscellaneous metalwork including seat angles, supports and guides.

(3) Shop drawings showing proposed use of adhesive anchors.

(4) Data indicating load capacities, chemical resistance and temperature limitations of power driven pins.

(5) Manufacturer's catalog data for manhole frame, covers, and each type of anchor.

(6) Welding procedures and welder qualifications.

6. OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

(1) Manufacturer's installation instructions.

PART 2 -- PRODUCTS

2.1 MISCELLANEOUS METALWORK

A. **Materials:** Except as otherwise indicated, products fabricated of structural steel shapes, plates and bars shall comply with the requirements of ASTM A 36 or ASTM A283.

B. **Corrosion Protection:** Miscellaneous metalwork of fabricated steel, which will be used in a corrosive environment or will be submerged shall be stainless steel. Other miscellaneous steel metalwork shall be hot-dip galvanized after fabrication except as otherwise indicated.

C. **Stainless Steel:** Stainless steel metalwork shall be of Type 316 L stainless steel. Stainless steel shall not be torch heated for welding. The CONTRACTOR shall submit welding methods and procedures. All welded stainless steel shall be passivated after welding by immersing in a pickling solution of 6 percent nitric acid and 3 percent hydrofluoric acid. Temperature and detention time for passivation shall be sufficient for removal of oxidation and ferrous contamination without etching of surface. The passivated steel shall undergo a complete neutralization by immersion in a detergent rinse followed by clean water wash, or shall be buffed with Scotch Brite EXL (or approved equal) for removal of weld discoloration and heat tint.

D. **Welding:** Welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" and supplemented by other standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards.

E. In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall comply with the AWS Code. Upon completion of welding, weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. Sharp corners of material which is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

F. **Galvanizing:** Where galvanizing is indicated, structural steel plates shapes, bars and fabricated assemblies shall be thoroughly cleaned of rust and scale and shall be galvanized in accordance with the requirements of ASTM A 123. Any galvanized part that becomes warped during the galvanizing operation shall be straightened. Bolts (except ASTM A325), anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A 153.

2.2 ANCHOR BOLTS

A **General:** Anchor bolts shall comply with the following:

(1) Anchor bolts shall be fabricated of materials complying with SSPWC Subsections 206-1.4.1 and 209-2.2 and as follows:

Steel bolts	ASTM A325
Fabricated steel bolts	ASTM A36
Stainless steel bolts, nuts, washers	ASTM A320, Type 316

(2) Anchor bolt holes in equipment support frames shall not exceed the bolt diameters by more than 25 percent, up to a maximum oversizing of 1/4 inch. Unless otherwise indicated, minimum anchor bolt diameter shall be 1/2 inch. Anchor bolts for equipment shall be 316 stainless steel and shall be provided with leveling nuts which shall be tightened against flat surfaces to not less than 10 percent of the bolt's safe tensile stress.

(3) Tapered washers shall be provided where mating surface is not square with the nut.

(4) Expansion, wedge, or adhesive anchors set in holes drilled in the concrete after the concrete is placed is not permitted as substitution for anchor bolts except where otherwise indicated. Upset threads shall not be acceptable.

(5). ASTM A307 anchor bolts are prohibited.

B. **Adhesive Anchors:** Unless otherwise indicated, drilled concrete or masonry anchors shall be adhesive anchors. Substitutions will not be considered unless accompanied with ICBO report verifying strength and material equivalency. Except as otherwise indicated, adhesive anchors shall comply with the following:

1. Epoxy adhesive anchors may be provided for drilled anchors where exposed to weather, in submerged, wet, splash, overhead, and corrosive conditions, and for anchoring handrails and reinforcing bars. Threaded rod shall be stainless steel Type 316.
2. Glass capsule, polyester resin adhesive anchors may be permitted in other locations.

C. **Expanding-Type Anchors:** Expanding-type anchors, where indicated, shall be Type 316 stainless steel. Size shall be as shown. Expanding-type anchors are prohibited from use in corrosive areas and in deteriorating concrete

2.3 POWER DRIVEN PINS

A. **Materials:** Power-driven pins for installation in concrete or steel in interior locations of nonprocess areas shall be heat-treated steel alloy complying with AISI 1062 or 4063 and shall be zinc-plated. Pins shall have capped or threaded heads capable of transmitting the shank loads. Pins that are connected to steel shall have longitudinal serrations around the circumference of the shank.

2.4 BOLTS

A. **Bolt Requirements:** Bolts shall comply with the following:

1. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. Bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.
2. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2-inch beyond the nut.

B. **Standard Service Bolts (Not Buried or Inside Tanks or Channels)**: Except where otherwise indicated, bolts and nuts shall be steel and shall be galvanized after fabrication. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated herein, steel for bolts, anchor bolts and cap screws shall be in accordance with the requirements of ASTM A 325, or threaded parts of ASTM A 36. ASTM A 325 bolts and nuts shall not be galvanized.

C. **Bolts Buried or Inside Tanks or Channels:** Unless otherwise indicated, bolts, anchor bolts, nuts and washers which are buried, submerged, or below the top of the wall inside any hydraulic structure shall be of Type 316 stainless steel.

D. Unless otherwise indicated, eyebolts shall conform to ASTM A 489.

2.5 SEAT ANGLES, SUPPORTS AND BRACKETS (NOT USED)

2.6 IRON CASTINGS

A. Castings shall conform to the requirements of ASTM A 48 unless otherwise indicated. Castings weighing less than 100 pounds shall be hot-dip galvanized after machining. Castings weighing greater than 100 pounds shall be galvanized where indicated.

2.7 GRATINGS (NOT USED)

2.8 FLOOR AND COVER PLATES (NOT USED)

2.9 STAIRS (NOT USED)

2.10 SAFETY STAIR TREADS (NOT USED)

2.11 FLOOR HATCHES (NOT USED)

2.12 PIPE COLUMNS (NOT USED)

2.13 FALL PREVENTION SYSTEM (NOT USED)

2.14 MANHOLE FRAMES AND COVERS (NOT USED)

2.15 MANUFACTURERS

A. Products of the type or model (if any) indicated shall be manufactured by one of the following (or approved equal):

1. **Epoxy Adhesive Anchors:**

   Sika/FI System with Sikadur Injection Gel Epoxy

   Masterbuilders Concresive Epoxy Cartridge Dispensing System and Concresive Paste LPL

2. **Glass Capsule Polyester Resin Adhesive Anchors:**

   Hilti HV

   Molly Parabond

3. **Expanding-Type Anchors:**

   Phillips Drill Company "Red Head"

   McCullock Industries "Kwick-Bolt"

4. **Field Repairs to Galvanizing:**

"Galvinox"

"Galvo-Weld"

PART 3 -- EXECUTION

3.1 GENERAL

A. **Fabrication and Erection:** Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

B. **General:** Fieldwork, including cutting and threading, shall not be permitted on galvanized items. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or isolators. Grouting of anchor bolts with nonshrink or epoxy grouts, where indicated, shall be in accordance with Section 03315.

1. Drilling of bolts or enlargement of holes to correct misalignment will not be allowed.

2. Metalwork shall be embedded in concrete and shall be placed accurately and held in correct position while the concrete is placed or, if indicated, recesses or blockouts shall be formed in the concrete. The surfaces of metalwork in contact with or embedded in concrete shall be thoroughly cleaned. Recesses may be neatly cored in the concrete after it has attained its design strength and the metalwork grouted in place. Embedments shall comply with Section 03310.

3. Holes shall be punched 1/16 inch larger than the nominal size of the bolts, unless otherwise indicated. Whenever needed, because of the thickness of the metal, holes shall be subpunched and reamed or shall be drilled.

4. Fabrication including cutting, drilling, punching, threading and tapping required for miscellaneous metal or adjacent work shall be performed prior to hot-dip galvanizing.

3.2 INSTALLATION OF ANCHOR BOLTS

A. After anchor bolts have been embedded, their threads shall be protected by grease and the nuts run on.

B. Installation of adhesive, capsule and expansion anchors shall comply with the following:

(1) All installation recommendations by the anchor system manufacturer shall be followed carefully, including maximum hole diameter.

(2) Use shall be limited to applications where exposure to fire or exposure to concrete or rod temperature above 120 degrees F is not indicated. Overhead applications (such as pipe supports) shall not be allowed.

(3) Use shall be limited to locations where exposure to acid concentrations higher than 10 percent, to chlorine gas, or to machine or diesel oils, is not indicated.

(4) Concrete temperature (not air temperature) shall be compatible with curing requirements recommended by adhesive manufacturer. Anchors shall not be placed in concrete below 25 degrees F.

(5) Anchor diameter and grade of steel shall comply with equipment supplier specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease, and oils.

(6) Adhesive capsules of different diameters may be used to obtain proper volume for the embedment, but no more than two capsules per anchor may be used. When installing different diameter capsules in the same hole, the larger diameter capsule shall be installed first. Any extension or protrusion of the capsule from the hole is prohibited.

(7) Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill.

(8) Holes shall be blown clean with compressed air and be free of dust or standing water prior to installation.

(9) Anchor shall be left undisturbed and unloaded for full adhesive curing period.

3.3 INSTALLATION OF SEAT ANGLES, SUPPORTS AND GUIDES (NOT USED)

3.4 INSTALLATION OF POWER DRIVEN PINS:

A. Power-driven pins shall be installed by a craftsman who is certified by the manufacturer as being qualified to install the manufacturer's pins. Pins shall be driven in one initial movement by an instantaneous force that has been carefully selected to attain the required penetration. Driven pins shall conform to the following requirements where "D" = Pin's shank diameter:

Material Minimum by Pin	Material's Penetrated Thickness	Pin's Shank Penetration in MinimumSupporting Material	Minimum Space From Pin's CL to Edge of Pene-trated Material	Pin Spacing
Concrete	16D	6D minimum	14D	20D
Steel	1/4-inch	Steel thickness	4D	7D

3.5 INSTALLATION OF GRATING, FLOOR AND COVER PLATES (NOT USED)

3.6 INSTALLATION OF STAIRS AND LADDERS (NOT USED)

3.7 INSTALLATION OF SAFETY STAIR TREADS (NOT USED)

3.8 INSTALLATION OF FLOOR HATCHES (NOT USED)

3.9 INSTALLATION OF DRILLED ANCHORS

A. Drilled anchors shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill, cleaned and dry. Drilled anchors shall not be installed until the concrete has reached the indicated 28-day compressive strength. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

4.0 INSTALLATION OF MANHOLE FRAMES AND COVERS (NOT USED)

** END OF SECTION **

SECTION 16030 - ELECTRICAL TESTS

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes testing, commissioning and demonstrating electrical WORK.

B. The WORK of this Section includes circuit activation, equipment running and installation of temporary jumpers.

C. The WORK of this Section includes correction of defects and retesting.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

Section 16050 Electrical Materials and Methods

1.3 CODES

A. The WORK of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:

National Electrical Code

1.4 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

NETA National Electrical Testing Association, Latest Edition

1.5 SEQUENCE AND SCHEDULING

A. Electrical testing including functional testing of power and controls shall be completed before commencement of the 7-day test.

1.6 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

1. Report of testing of electrical WORK.

PART 2 -- PRODUCTS

2.1 TEST EQUIPMENT AND MATERIALS

A. Test instruments shall be calibrated to references traceable to the National Bureau of Standards and shall have a current sticker showing date of calibration, deviation from standard, name of calibration laboratory and technician, and date recalibration is required.

PART 3 -- EXECUTION

3.1 TESTING

A. In addition to indicated testing requirements and acceptance criteria, testing shall include the following:

1. **Lighting:** Switching, including remote control. Circuitry in accordance with panel schedules. Lighting fixtures located to minimize obstruction of illumination by mechanical equipment or building structural elements.

2. Functional test and testing of electrical components shall be performed prior to subsystem testing and commissioning. Compartments and equipment shall be cleaned before commencement of functional testing. Functional testing shall include:

   Visual and physical check of cables, busswork, circuit breakers, and connections associated with new and modified equipment.

3.2 COMMISSIONING

A. Commissioning during the 7-day test shall not be attempted until all subsystems have been found to operate satisfactorily.

** END OF SECTION **

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 -- GENERAL

1. WORK OF THIS SECTION

A. The WORK of this Section includes providing the following:

1. Raceways, Fittings and Supports
2. Concrete Pads, Underground Ducts, Manholes and Pull-Boxes
3. Conductors, Wire and Cable
4. Wiring Devices
5. Lighting and Power Distribution Panelboards
6. Disconnect Switches
7. Electrical Identification
8. Time Clocks
9. Cabinets and Enclosures

2. RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 05500 Miscellaneous Metalwork
2. Section 16030 Electrical Tests
3. Section 16170 Grounding System
4. Section 16400 Low Voltage Electrical Service and Distribution

3. STANDARD SPECIFICATIONS

A. Except as otherwise indicated in this Section of the Specifications, the CONTRACTOR shall comply with the Standard Specifications for Public Works Construction (SSPWC).

4. CODES

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

(1) California Building Code

(2) National Electrical Code

5. SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

(1) **Federal Specifications:**

FS W-C-596E/GEN(1)	Connector, Plug, Receptacle and Cable Outlet, Electrical Power
FS W-S-896E/GEN(1)	Switches, Toggle (Toggle and Lode), Flush Mounted (ac)
FS WW-C-581E	Conduit, Metal, Rigid, And Intermediate; And Coupling, Elbow, and Nipple, Electrical Conduit: Steel, Zinc Coated
WW-C-581E	Intermediate; and Coupling, Elbow, and Nipple, Electrical Conduit; Zinc Coated

(2) **Commercial Standards:**

ANSI B16.5	Pipe Flanges and Flanged Fittings, Steel, Nickel Alloy, and Other Special Alloys
ANSI C80.1	Rigid Steel Conduit, Zinc Coated, Specification For
ANSI Z55.1	Gray Finishes for Industrial Apparatus and Equipment
ANSI C80.1	Rigid Steel Conduit-Zinc Coated
ANSI C80.3	Electrical Metallic Tubing-Zinc Coated
ANSI C37.46	Specifications for Power Fuses and Fused Disconnecting Switches
NEMA VE-1	Ventilated Cable Tray
NEMA TC2	Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80)
NEMA ICS 6	Enclosures for Industrial Controls and Systems
NEMA 250	Enclosures for Electrical Equipment (1000 volts maximum)
NEMA WC7	Cross-Linked-Thermosetting Insulated Wire and Cable for the Transmission and Distribution of Electric Energy
IPCEA S-61-402	Thermoplastic - Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
IPCEA S-19	Rubber - Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
JIC EMP-1-67	Electrical Standards for Mass Production Equipment
ASTM B3	Soft or Annealed Copper Wire
ASTM B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Tinned Soft or Annealed Copper Wire for Electrical Purposes
ASTM B189	Lead Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes
ASTM A193/A193M	Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
ICEA S-68-516	Ethylene-Propylene-Rubber-Insulated Wire

IEEE 383	Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating StationsUL 1242 Intermediate Metal Conduit
UL 44	Rubber-Insulated Wires and Cable
UL 83	Thermoplastic-Insulated Wires and Cable
UL 67	Underwriters Laboratories, Electric Panelboards
UL 489	Molded-Case Circuit Breakers and Circuit Breaker Enclosures
UL 50	Cabinets and Boxes

6. SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

(1) **General:**

Shop drawings including the following:

Manufacturers' equipment drawings.

Component data.

Connection, terminal and internal wiring diagrams, and conductor sizes.

Manufacturer's product data including the following:

Catalogue cuts, bulletins, brochures, or photocopies of applicable pages for mass produced, non-custom manufactured products stamped to indicate the project name, applicable Specification section and paragraph, model number, ratings and options.

Lists of the following:

Materials, equipment, apparatus and fixtures proposed for use; with the list including sizes, names of manufacturers, catalog numbers, and such other information required to identify the items.

Test reports of the following:

Factory-fabricated products.

(2) **Lighting and Power Distribution Panelboards:**

Manufacturer's data as follows:

Manufacturer's certification that bus bracing is capable of withstanding the specified short circuit condition.

Quantity and rating of circuit breakers provided with each panelboard.

7. OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

(1) Manufacturer's installation instructions.

(2) Manufacturer's maintenance procedures.

8. PROJECT RECORD DRAWINGS

A. The following shall be included in the PROJECT RECORD DRAWINGS:

(1) Accurate location of conductors including depths and routing of concealed below-grade electrical WORK.

(2) Accurate location of electrical WORK (raceway and conductors) where the location differs substantially from the locations indicated.

9. AREA DESIGNATIONS

1. **General:** For purposes of delineating electrical enclosure and installation requirements, certain areas are classified as defined below. Electrical installations within these areas shall conform to the indicated code requirements for the area indicated.

2. **General Purpose Locations**: WORK installed in areas which are not otherwise specifically classified shall be "General Purpose." Enclosures shall comply with the requirements of these Specifications and shall be NEMA Type 1.

3. **Outdoor Locations**: In outdoor locations, raceway shall be rigid galvanized steel conduit; entrances shall be threaded; and fittings shall have gasketed covers. Fittings and conduit shall be drained. Threaded fastening hardware shall be stainless steel. Mounting brackets shall be galvanized. Attachments or welded assemblies shall be galvanized after fabrication. Instruments and control cabinets, panels, switchboards and motor control centers shall be "Weatherproof NEMA Type 3R." Enclosures shall be mounted 1/4-inch from walls to provide an air space unless specifically shown otherwise.

4. **Damp Location**: Locations which are indoors and 2 feet below grade elevation or which are indicated as damp locations on the Drawings shall have electrical installations which conform to the requirements for outdoor locations; except, that the air space from walls may be less than 1/4-inch and enclosures shall be NEMA Type 2. "Damp locations" shall include pipe galleries, tunnels, and basements. Rooms housing liquid handling equipment are also classified as damp locations regardless of grade elevation.

5. **Splash Locations**: Areas indicated as "splash-proof" locations shall have electrical installations as described for "outdoor locations"; except, that NEMA Type 4 enclosures shall be provided for instruments and controls, panels, switchboards, and motor control centers.

10. FIELD TESTING

1. **Testing:** Products shall be field-tested for compliance with the indicated requirements.

2. **Witnesses:** The City reserves the right to witness field tests.

11. PRODUCT DELIVERY, STORAGE, AND HANDLING

1. **Delivery of Materials**: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

2. **Storage:** Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements. Products shall not be damaged, marred, or splattered with water, foam, plaster, or paint. Moving parts shall be kept clean and dry.

3. **Replacement**: Damaged materials or equipment, including face plates of panels and switchboard sections, shall be replaced or refinished by the manufacturer at no expense to the City.

12. REGULATORY REQUIREMENTS

A. In addition to other indicated regulatory requirements, the WORK of this Section shall comply with the requirements of SSPWC Subsection 209-1.

13. UTILITY REQUIREMENTS

A. The WORK of this Section includes compliance with the requirements of San Diego Gas and Electric Company and payment of related charges.

PART 2 -- PRODUCTS

2.1 GENERAL

A **Listing:** Electrical equipment and materials shall be listed for the intended purpose by an independent testing laboratory including Underwriters Laboratories (UL) or an independent testing laboratory shall be acceptable to the inspection authority having jurisdiction.

B. **Unlisted Products:** When a product is not available with a testing laboratory listing for the intended purpose, special testing (if any) required by the authority having jurisdiction shall be included in the original contract price.

C. **Project/Site Conditions:** Unless otherwise indicated, equipment and materials shall be sized and rated for the ambient conditions in San Diego but not less than an ambient temperature of 40 degrees C at sea level without exceeding the manufacturer's stated tolerances.

D. **Product Qualifications**: Equipment and materials shall be new and shall bear the UL label, where UL requirements apply. Equipment and materials shall be the products of reputable manufacturers specializing in the products indicated in this Section. Similar items in the project shall be products of the same manufacturer. Equipment and materials shall be of industrial grade and standard of construction and shall be of sturdy design and manufacture; and shall be capable of reliable, trouble-free service.

2.2 RACEWAY, FITTINGS AND SUPPORTS

A. **Raceway**: Raceway shall comply with the following:

(1) **Rigid Steel Conduit:** Raceway shall be rigid steel conduit complying with ANSI C80.1 unless otherwise indicated. Rigid steel conduit shall be full weight, mild steel, hot-dip galvanized and bichromate coated inside and outside after galvanizing.

(2) **Intermediate Metal Conduit**: Intermediate metal conduit shall comply with UL 1242 and FEDSPEC WW-C-581E and shall have smooth finished surfaces. Conduit shall be galvanized. Minimum size shall be 3/4 inch.

(3) **Fittings:** Locknuts shall be extra heavy electrogalvanized steel for sizes through 2 inches. Locknuts larger than 2 inches shall be electrogalvanized malleable iron. Bushings shall be electrogalvanized malleable iron with insulating collar. Grounding bushings shall be locking type and shall include a feed-through compression lug for securing the ground cables. Unions shall be electrogalvanized ferrous alloy type. Threadless fittings are not acceptable. Gaskets shall be made of neoprene.

Expansion fittings in embedded runs shall be watertight and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for 3/4-inch movement in any direction.

(4) **Plastic Coated Rigid Steel Conduit and Fittings:** Plastic coated conduit shall be rigid steel conduit with PVC jacket and shall conform to Federal Specification WW-C-581E, ANSI C80.1, and to Underwriter's Laboratories specifications. The zinc surfaces of the conduit shall remain intact and undisturbed on both the inside and the outside of the conduit through the preparation and application processing. A PVC coating shall be bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of 40 mils. A PVC jacketed coupling shall be provided with each length of conduit. A PVC sleeve equal to the OD of the conduit shall extend 1-1/2 inches from each end of coupling.

Fittings used with plastic coated conduit shall be similarly coated to the same thickness as the conduit and shall be provided with type 304 stainless steel hardware. Conduit and fittings shall be manufactured by the same company. Minimum size shall be 3/4 inch.

(5) **Electrical Metallic Tubing:** Electrical metallic tubing shall be electrogalvanized complying with ANSI C80.3. Fittings shall be compression type. Minimum size shall be 3/4 inch. Electrical metallic tubing shall be galvanized inside and out with an enamel coating inside and a chromate coating outside.

(6) **Flexible Metal Conduit:** Flexible metal conduit shall be formed from spirally wound galvanized steel strip with successive convolutions securely interlocked. Minimum size shall be 1/2 inch. Fittings shall be compression type. Flexible metal conduit shall be provided with ground wire.

(7) **Liquidtight Flexible Steel Conduit:** Liquidtight flexible steel conduit shall be formed from spirally wound galvanized steel strip with successive convolutions securely interlocked and jacketed with liquidtight plastic cover. Minimum size shall be 1/2 inch. Fittings for liquidtight conduit shall have cadmium-plated malleable iron body and gland nut with cast-in lug, brass grounding ferrule threaded to engage conduit spiral and O-ring seals around the conduit, box connection and insulated throat. Forty-five and 90-degree fittings shall be used where applicable.

(8) **Rigid Nonmetallic Conduit:** Rigid nonmetallic conduit shall be NEMA TC2, type EPC-40-PVC, or EPC-80-PVC high impact, polyvinylchloride (PVC). Fittings used with PVC conduit shall be PVC solvent weld type. Nonmetallic conduits shall be UL listed for applications indicated. Minimum size shall be 1 inch.

(9) **Wireways:** Wireways and auxiliary gutters shall be JIC EMP-1 sectional flanged oiltight type with hinged covers and shall be 8 inches by 8 inches in cross section unless otherwise indicated.

B. **Boxes and Fittings:** Boxes and fittings shall comply with the following:

(1) **Sheet Metal Boxes:** Boxes and fittings installed in areas where electrical metallic tubing is indicated shall be standard UL approved electro-galvanized sheet steel.

(2) **Cast Ferrous Alloy Boxes:** Boxes shall be hot-dip galvanized cast ferrous alloy unless otherwise indicated. Integrally cast threaded hubs or bosses shall be provided for conduit entrances and shall provide for full 5-thread contact on tightening. Drilling and threading shall be done before galvanizing. A full body neoprene gasket shall be included with the cover. Type 304 stainless steel screws shall be provided for covers. Where two or more devices are located together, outlet and device boxes shall be gang type. Cover plates shall be hot-dip galvanized cast ferrous alloy unless the particular device requires a cover that is not manufactured in this material.

(3) **Floor Boxes:** Floor boxes shall be hot-dip galvanized cast boxes with an NEMA 4 rating. Boxes shall include a recessed ring neoprene gasket, hot-dip galvanized steel checker cover plates and type 304 stainless steel machine screws of not less than 1/4 inch diameter. The cover screws shall be flat head type or recessed socket head screws designed to be flush with cover plate.

(4) **Welded Sheet Steel Boxes:** Large boxes shall be fabricated from welded steel and shall be hot-dip galvanized after fabrication. Before finish is applied, a grounding pad drilled for two bolted grounding lugs or a grounding stud shall be welded to the inside of the box. Hardware shall be 304 stainless steel. Boxes shall, as a minimum, meet NEMA 12 and JIC EMP-1 requirements.

(5) **Hubs:** Threaded hubs for connection of conduit to junction, device or terminal boxes shall be made of cast ferrous alloy, electroplated with zinc and shall have insulated liner and insulating bushings. The hubs shall utilize a neoprene O-ring and shall ensure a watertight connection.

C. **Raceway Supports**: Raceway supports shall comply with the following:

(1) **Conduit Supports:** Hot-dip galvanized framing channel shall be used to support groups of conduit. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps used with galvanized clamp backs and nesting backs where required. Conduit supports for PVC coated rigid steel and PVC conduit systems shall be one-hole PVC coated clamps or PVC conduit wall hangers.

(2) **Ceiling Hangers:** Ceiling hangers shall be adjustable galvanized carbon steel rod hangers. Straps or hangers of plumber's perforated tape are not acceptable. Unless otherwise indicated hanger rods shall be 1/2-inch full-threaded rods and shall meet ASTM A193. Hanger rods in corrosive areas and those exposed to weather or moisture shall be stainless steel.

(3) **Structural Attachments (Racks):** Structural attachments shall be constructed from hot-dip galvanized framing channel as specified. Field cuts shall be treated with zinc enriched paint.

2.3 UNDERGROUND DUCTS, MANHOLES AND PULL-BOXES

A. **General:** The WORK of this Section includes concrete pads, manholes, pull-boxes and concrete required for encasement, installation, or construction and shall be 2500-psi concrete and conforming to the following:

(1) Consolidation of encasement concrete around duct banks shall be by hand puddling, and no mechanical vibration will be permitted.

(2) A workability admixture consisting of a hydroxylated carboxylic acid type in liquid form shall be used in encasement concrete, admixtures containing calcium chloride shall not be used.

(3) Concrete for encasement of conduit or duct banks shall contain an integral red-oxide coloring pigment in the proportion of 8 pounds per cubic yard of concrete.

B. **Concrete-Encased Ducts:** Where an underground distribution system is indicated, it shall be constructed of multiple runs of single bore thin-wall non-metallic ducts, concrete encased, with steel reinforcing bars, with underground manholes and pullboxes.

C. **Manholes and Pull-Boxes**: Manholes and pullboxes shall comply with the following:

(1) Manholes and pull-boxes shall be of precast concrete. Concrete construction shall be designed for traffic loading. Covers shall be traffic type, except as otherwise indicated. "P" covers shall be identified as "High Voltage Electric." "S" covers shall be identified as "Secondary Electric" and "C" covers as "Signal." Manholes and pullboxes shall be equipped with pulling-in irons opposite and below each ductway entrance. Manholes shall have concrete covers with 30-inch diameter lids. Covers and lids shall be bolted to cast-in-place steel frames with corrosion resistant hardware. Frames shall be factory-primed; covers shall be galvanized and shall have lifting handles.

(2) Manholes and pullboxes shall have cable supports so that each cable is supported at 3-foot intervals within the manhole or pullbox. Cable supports shall be fastened with galvanized bolts and shall be fabricated of fiberglass or galvanized steel.

(3) Duct entrances shall be grouted smooth. Ducts for primary and secondary cables shall be terminated with flush-end bells. Sections of prefabricated manholes and pullboxes shall be assembled with waterproof mastic. Each manhole or pullbox shall be set on a 6-inch bed of gravel as recommended by the manufacturer.

2.4 CONDUCTORS, WIRE AND CABLE

A. **General**: The type, size and number of conductors shall comply with the indicated requirements. Number and types of communication, paging, and security cables shall be as required for the particular equipment provided.

Conductors, including ground conductors, shall be copper. Insulation shall bear the manufacturer's trademark, type, voltage rating, and conductor size.

B. **Color Coding:** Color coding shall comply with the following:

(1) **Control Conductors:** Control conductors color coding shall be manufacturer's standard.

(2) **Power Conductors**: Single-conductor power conductors shall have the following colors for 600V or less:

	120/208V
Phase A	Black
Phase B	Red
Phase C	Blue
Ground	Green
Neutral	White

Color coding tape shall be used where colored insulation is not available. Branch circuit switch shall be yellow. Insulated ground wire shall be green, and neutral shall be gray. Color coding and phasing shall be consistent throughout the site, but bars at panelboards, switchboards, and motor control centers shall be connected Phase A-B-C, top to bottom, or left to right, facing connecting lugs.

General purpose ac control conductors shall be pink. General purpose dc control conductors shall be blue.

Cables sized No. 4 AWG and larger may be black with colored 3/4-inch vinyl plastic tape applied in 3-inch lengths around the cable at each end. The cables shall be tagged at terminations and in pull boxes, handholes and manholes.

C. **Lighting and Receptacle Branch Circuit Conductors:** Lighting conductors shall be stranded except for No. 12 AWG which shall be solid.

(1) Conductors shall comply with the following characteristics:

Voltage:	600 volts.
Conductor:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	THWN/THHN, 90 degree C dry, 75 degree C wet, polyvinylchloride (PVC) per UL 83.
Jacket:	Nylon.
Flame resistance:	UL 83.

D. **Power and Control Conductors and Cable, 600 Volts:** Conductors and cable shall comply with the following:

(1) **Single Conductors:** Single conductor cable shall be stranded and shall be installed in conduits for power and control circuits.

Conductors shall comply with the following characteristics:

Voltage:	600 volts.
Conductor:	Coated, Class B, stranded, annealed copper per ASTM B8.
Insulation:	XHHW, 90 degrees C dry, 75 degrees C wet, composite of ethylene propylene rubber (EPR) and chlorosulfonated polyethylene (CSPE) per ICEA UL 44 and NEMA WC-7.
Jacket:	Chlorosulfonated polyethylene (CSPE).
Flame resistance:	IEEE 383.

E. **Signal Cables:** Signal cables shall comply with the following:

(1) **General:** Signal cable shall be provided for instrument signal transmission, alarm, communication and any circuit operating at less than 100 volts. Cables shall be color coded black and white for pairs or black, white and red for triads. Circuit shielding shall be provided in addition to cable shielding.

(2) **Single Circuit:** Cable shall consist of one pair or triad, No. 16 AWG conductors with 15 mils of 90 degree C polyvinylchloride (PVC) insulation, 4 mils nylon conduit or jacket, twisted on a 2-inch lay, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with No. 18 AWG 7-strand tinned copper drain wire and a 45 mil PVC jacket overall. Cable shall be UL listed, Type TC, rated 600 volts.

(3) **Multiple Circuit:** Cable shall consist of four or more pairs or triads which are made up of No. 18 AWG conductors with 15 mils of 90 degree C PVC insulation, 4 mils nylon jacket, twisted on a staggered lay 1-1/2 to 2-1/2 inches, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with No. 22 AWG 7-strand tinned copper drain wire. Overall cable shield shall be 2.35 mil aluminum-Mylar tape with a No. 20 AWG 7-strand tinned copper drain wire. Cable shall be UL listed, Type TC, 600 volts.

(4) **Thermocouple Extension:** Extension cable shall be provided for the type of thermocouple circuit indicated. Conductors shall be 16 AWG, solid alloy, with 15 mils of 90 degree C flame-retardant polyvinylchloride insulation, twisted and covered with 100 percent 2.35 mil aluminum polyester tape and a 20 AWG, 7-strand, tinned-copper drain wire and a 35 mil, flame-retardant PVC jacket overall. Cable shall be listed for cable tray installation.

G. **Portable Cord:** Portable cord shall be UL listed, Type SO for sizes No. 10 AWG and smaller. Cords with conductors larger than No. 10 AWG shall be UL listed, Type G. Cords shall contain an equipment grounding conductor.

(1) Cables shall comply with the following:

Conductors:	Flexible rope stranded per ASTM B189 and B33. Conductors shall be coated except ground conductors may be uncoated.
Insulation:	Insulation shall be ethylenepropylene (EPR) as per ICEA S-68-516 and rated for continuous operation at 90 degrees C.
Jacket:	Heavy-duty neoprene as per ICEA S-68-516.

H. **Splicing and Terminating Materials:** Splicing and terminating materials shall comply with the following:

(1) 600 Volt Conductor and Cable Connectors: Connectors shall be compression type of correct size and UL listed for the specific application. Connectors shall be tin-plated high conductivity copper. Connectors for wire sizes No. 10 AWG and smaller shall be nylon self-insulated, ring tongue or locking-spade terminals. Connectors for wire sizes No. 8 AWG and larger shall be one-hole lugs up to size No. 3/0 AWG, and two-hole or four-hole lugs for size No. 4/0 and larger. Mechanical clamp, dimple, screw-type connectors are not acceptable.

In-line splices and taps shall be used only where indicated, or shown on the shop drawings. When used, they shall be of the same construction as other connectors. Splices shall be compression type, made with a compression tool die designed for the purpose. Splice shall be covered with a heat-shrinkable sleeve or boot.

(2) Portable Cable Fittings: Portable cable fittings for terminating the cable shall provide a watertight seal between the cord and the terminator and between the terminator and mounting hub. The cable terminator shall include neoprene liner which grips the cord jacket when the back nut on the fitting is tightened.

2.5 WIRING DEVICES

A. **General:** Wiring devices shall be UL approved for the current and voltage indicated and shall comply with NEMA WD-1. Devices shall contain provisions for back wiring and side wiring with captively held binding screws.

Devices shall be brown, except those located in finished areas shall be ivory.

Special purpose devices shall be the color indicated.

Receptacles and switches shall conform to Federal Specifications W-C-596E and W-S-896E, respectively, and the indicated standards.

2.6 CABINETS AND ENCLOSURES

A. **General:** The WORK of this Section includes the following requirements for control cabinets of lighting panelboards.

B. **Wiring:** Wiring of terminal cabinets and control cabinets shall be accomplished with stranded copper conductor rated for 600-volts and UL listed as Type MTW. Wires for annunciator and indication circuits shall be No. 16 AWG. Other wiring shall be No. 14 AWG. Color coding shall comply with the indicated requirements. Incoming wires to terminal or relay cabinets shall be terminated on a master set of terminal blocks. All wiring from the master terminals to internal components shall be factory-installed and shall be contained in plastic raceways with removable covers. Wiring to door-mounted devices shall be extra flexible and anchored to doors using wire anchors cemented in place. Exposed terminals of door-mounted devices shall be guarded to prevent accidental personnel contact with energized terminals.

C. **Engraving:** Nameplates shall comply with the indicated requirements.

2.7 MANUFACTURERS

A. Products of the type or model number indicated shall be manufactured by one of the below listed manufacturers (or approved equal):

(1) **Sealing Compound:**

Chico A

(2) **Watertight Seals:**

O.Z. Gedney Co., Type CSMC

Thunderline Corp.

Link Seal

(3) **Lighting and Receptacle Branch Circuit Conductors:**

Okoseal-N, Series 116-67-XXXX

(4) **Single Power and Control Conductors and Cable, 600V:**

Okonite-Okolon, Series 112-11-XXXX

Anaconda

Durasheath EP

(5) **Single Circuit Signal Cable:**

Okoseal-N Type P-OS

(6) **Multiple Circuit Signal Cable:**

Okoseal-N Type SP-OS

(7) **Thermocouple Extension:**

Okonite P-OS, Type PLTC

(8) **Portable Cords:**

Okocord

(9) **Compression Tool Die For Splicing:**

Thomas and Betts Corp.

(10) **Heat Shrinkable Moisture Seal Caps:**

Raychem Corp. "Thermofit"

(11) **Electrical Identification:**

Nameplates

Formica Type ES-1

Imprinted Plastic Coated Cloth

Brady

Thomas & Betts

(12) **Manholes and Pullboxes:**

Brooks

Quikset

(13) **Compression Connectors:**

Burndt "Hi Lug"

Thomas & Betts "Shure Stake"

(14) **Spring Connectors (Wire Nuts):**

3M "Scotch Lok"

Ideal "Wing Nuts"

(15) **Insulating Tape:**

Scotch No. 33

Plymouth "Slip knot"

(16) **High Temperature Insulating Tape (Polyvinyl):**

Plymouth

3M

(17) **Pre-Insulated Fork Tongue Lugs:**

Thomas & Betts RC Series

Burndy

(18) **Epoxy Resin Splicing Kits**:

3M Scotchcoat 82 Series

Burndy "Hy Seal"

(19) **Stress Cone Material For Make-up Of Medium Voltage Shielded Cable:**

G & W

3M

duPont

(20) **Stainless Steel Covers:**

Sierra S-line

Hubbell

(21) **Products For Cast Boxes:**

Switches at outdoor locations

Crouse-Hinds DS 128

Mackworth Rees Style 3845

Joy Flexitite

Switches at damp locations

Mackworth Rees Style 3496

Joy Flexitite

Switches at dry locations

Crouse-Hinds DS 32G

Pyle National SCT-10k

Receptacles at outdoor locations

Crouse-Hinds

Hubbell

Receptacles at damp or dry locations

Crouse-Hinds DS 23G

Pyle National N-1

Receptacles at corrosive locations

Crouse-Hinds "Ark Gard"

Appleton DTQ

Hubbell 52CM21 or 5221

(22) **Cast Boxes Required for Pull or Junction Boxes:**

Floor boxes with checker plate covers

O-Z Type "YR",

Surface boxes

O-Z type "YH"

(23) **Insulated Bushings:**

O-Z Type A and B

Thomas & Betts

Steel City

Appleton

Efcor

Gedney

(24) **Insulated Grounding Bushings:**

O-Z Type BL

Thomas & Betts

Steel City

Efcor

Gedney

(25) **Erickson Couplings:**

Appleton Type EC

Thomas & Betts

Steel City

Efcor

Gedney

(26) **Liquid-tight Fittings:**

Appleton Type ST

Thomas & Betts

Crouse-Hinds

Efcor

Gedney

(27) **Hubs:**

Appleton Type HUB

Thomas & Betts

Myers Scrutite

Efcor

(28) **Sealing Fittings:**

Appleton Type EYS

O-Z Type FSK

(29) **Expansion Couplings:**

O-Z Type D

Crouse-Hinds Type

(30) **Clocks:**

Simplex Time Recorder Co. Type 78-45

Edwards Co. Cat. 1882B

PART 3 -- EXECUTION

3.1 GENERAL

A. **Field Control of Location and Arrangement**: The Drawings diagrammatically indicate the location and arrangement of outlets, conduit runs, equipment, and other items. Exact locations shall be determined in the field based on the physical size and arrangement of equipment, finished elevations, and obstructions. Locations shown on the Drawings shall be adhered to as closely as possible. Omissions or conflicts on Drawings or between Drawings and Specifications shall be brought to the attention of the ENGINEER for clarification before proceeding with the WORK.

B. **Installation:** The CONTRACTOR shall make all necessary provisions throughout the site to receive the work as construction progresses and shall furnish and install adequate backing, supports, inserts, and anchor bolts for the hanging and support of all electrical fixtures, conduit, panelboard, and switches, and shall furnish and install sleeves through walls, floors, or foundations where electrical lines are required to penetrate.

Conduit and equipment shall be installed in such a manner as to avoid all obstructions and to preserve head room and keep openings and passageways clear. Fixtures, switches, convenience outlets, and similar items shall be located within finished rooms, as shown. Where the Drawings do not indicate exact locations, locations of concealed conductors shall be as indicated on the shop drawings.

C. **Workmanship:** Materials and equipment shall be installed in accordance with printed recommendations of the manufacturer. The installation shall be accomplished by workmen skilled in this type of work and installation shall be coordinated in the field with other trades so that interferences are avoided.

D. **Tests:** The WORK of this Section includes tests required by the authority having jurisdiction. Tests shall be performed in the presence of the ENGINEER. The WORK includes testing equipment, replacement parts and labor necessary to repair damage resulting from damaged equipment or from testing and correction of faulty installation. The following tests shall be performed:

Insulation resistance tests.

Operational testing of equipment.

E. **Field Quality Control**: Conduit shall be provided with a number tag at each end and in each manhole and pullbox. Trays shall be identified by stencils at intervals not exceeding 50 feet, at intersections, and at each end.

3.2 RACEWAY, FITTINGS AND SUPPORTS

A. **General**: Except as otherwise indicated, conduit installed in direct contact with earth and in concrete slabs on grade shall be corrosion-protected.

Conduit shall be left exposed until inspected by the ENGINEER.

Raceways shall be installed as indicated. Raceway systems shall be electrically and mechanically complete before conductors are installed. Bends and offsets shall be smooth and symmetrical, and shall be accomplished with tools designed for the purpose intended. Factory elbows shall be used for all 3/4-inch conduits. Bends in larger sizes of metallic conduit shall be accomplished by field bending or by the use of factory elbows.

Conduit may be cast integral with horizontal and vertical concrete slabs, providing one-inch clearance is maintained between conduit surface and concrete surface. If said clearance cannot be maintained, the conduit shall be installed exposed below elevated slabs; provided, that in the case of slabs on grade, conduit shall be installed below the slab and shall be encased with a minimum cover of 3 inches of concrete.

Non-metallic conduit may be cast integral with horizontal slabs with placement criteria as stated in the previous paragraph. Non-metallic conduit may be run beneath structures or slabs on grade, without concrete encasement. In these instances conduit shall be placed at least 12 inches below the bottom of the structure or slab. Non-metallic conduit may be buried 24 inches minimum below grade, with a 3-inch concrete cover, in open areas or where otherwise not protected by concrete slab or structures. Top of concrete cover shall be colored red. Non-metallic conduit shall be permitted only in concealed locations as described above. The use of direct burial thinwall duct will be permitted only as indicated for underground ducts.

Where a run of concealed PVC conduit becomes exposed, a transition to rigid steel conduit is required. Such transition shall be accomplished by means of a factory elbow or a minimum 3-foot length of rigid steel conduit, either terminating at the exposed concrete surface with a flush coupling. Piercing of concrete walls by non-metallic runs shall be accomplished by means of a short steel nipple terminating with flush couplings.

Flexible conduit may be used in lengths required for the connection of recessed lighting fixtures; otherwise the maximum length of flexible conduit shall be 18 inches.

(1) **Application:** Galvanized rigid steel shall be installed in the locations indicated:

Embedded or encased in non-hazardous areas	Schedule 40 PVC
Exposed in corrosive areas	Plastic coated, rigid steel
Direct buried lighting and receptacle raceways in non-hazardous areas	Schedule 80 PVC
Hazardous and corrosive areas within stud walls, above suspended ceilings, and within elevator machine rooms	Plastic coated, rigid metallic tubing
Final raceway connections to equipment	Liquidtight, flexible metallic

(2) **Conduit Runs Between Boxes:** The number of directional changes of the conduit shall be limited to total not more than 270 degrees in any run between pull boxes. Conduit runs shall be limited to 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction. Bends and offsets shall be avoided where possible but, where necessary, shall be made without flattening or kinking, or shall be factory preformed bends. Turns shall be made with cast metal fittings or conduit bends. Welding, brazing or otherwise heating of conduit is not acceptable.

(3) **Junction and Pull Boxes:** Cast junction or pull boxes shall be installed where required for pulling cable and as necessary to meet the indicated requirements. Pull boxes used for multiple conduit runs shall not combine circuits of different motor control centers, switchboards, or switchgear.

(4) **Conduit Terminations:** The WORK of this Section includes conductors required to interconnect incoming annunciator, control and instrumentation except as otherwise indicated.

Two- and 3-conductor shielded cables installed in conduit runs which exceed 2,000 feet may be spliced in pullboxes. These cable runs shall have only one splice per conductor.

Control conductors shall be spliced or terminated only at the locations indicated and only on terminal strips or terminal lugs of vendor furnished equipment. 120/208-volt branch circuit conductors may be spliced in suitable fittings at locations required.

Solid conductors shall be terminated at equipment terminal screws such that conductor is tightly wound around screw and does not protrude beyond screw head. Stranded conductors shall be terminated directly on equipment box lugs such that all conductor strands are confined within lug. Use forked-tongue lugs where equipment box lugs have not been provided.

PVC conduit entering fiberglass boxes or cabinets shall be secured by threaded bushings on the interior of the box and shall be terminated with a threaded male terminal adapter having a neoprene O-ring. Joints shall be made with standard PVC couplings.

Conduit entering field equipment enclosures shall enter the bottom or side of the box. Where conduit comes from above, it shall be run down beside the enclosure and a tee conduit and drip leg installed.

(5) **Matching Existing Facilities:** When new conduit is added to areas which are already painted, the conduit and its supports shall be painted to match the existing facilities. Where new conduit is used to replace existing conduit, the existing conduit and supports shall be removed, resulting blemishes shall be patched and repainted to match original conditions. Similarly, if existing conduits are to be reused and rerouted, resulting blemishes shall be corrected in the same manner.

(6) **Conduit Support:** Exposed rigid steel or plastic coated conduit shall be run on supports spaced not more than 10 feet apart and shall be constructed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceiling. Exposed PVC conduit shall be run on supports spaced not more than 3 feet apart for conduits up to 1 inch, 5 feet apart for conduits 1 1/4 inches to 2 inches and 6 feet apart for conduits 2 1/2 inches and larger. No conduit shall approach closer than 6 inches to any object operating above 30 degrees C. PVC conduit shall not be provided where it will be damaged by heat.

Conduit rack and tray supports shall be secured to concrete walls and ceilings by means of cast-in-place anchors. Individual conduit supports shall use cast-in-place anchors, die-cast, rustproof alloy or expansion shields. Wooden plugs, plastic inserts or gunpowder-driven inserts are not acceptable.

(7) **Conduit Penetrations:** Unless otherwise indicated, conduit routed perpendicular through floors, walls or other concrete structures shall pass through cast-in-place openings wherever possible. In cases where cast-in-place openings are not possible, appropriate size holes shall be bored through the concrete to accommodate the conduit passage. The size and location of the holes shall not impair the structure's integrity. After completion, grout or calk around conduit and finish to match existing surroundings. Unless otherwise protected, conduits that rise vertically through the floor shall be protected by a 3 1/2-inch high concrete pad with a sloping top.

Conduits entering manholes and handholes shall be horizontal. Conduits shall not enter through the concrete bottom of handholes and manholes.

Wherever conduits penetrate outdoor concrete walls or ceilings below grade, watertight seal shall be installed.

(8) **Conduit Separation:** Signal conduits shall be separated from AC power or control conduits. The separation shall be a minimum of 12 inches for metallic conduits and 24 inches for nonmetallic conduits.

(9) **Plastic Coated Conduit:** Plastic coated conduit shall be made up tight with strap wrenches. Conduit threads shall be covered by a plastic overlap which shall be coated and sealed in accordance with manufacturer's recommendations. Pipe wrenches and channel locks shall not be used for tightening plastic coated conduits. Damaged areas shall be patched, using manufacturer's recommended material. The area to be patched shall be built up to the full thickness of the coating. Painted fittings are not acceptable.

(10) **Conduit Fittings:** Fittings shall comply with the same requirements as the raceway with which they will be used. Fittings having a volume less than 100 cubic inches for use with rigid steel conduit, shall be cast or malleable non-ferrous metal. Fittings larger than one inch shall be "mogul size." Fittings shall be of the gland ring compression type. Covers of fittings, unless in "dry" locations, shall include gaskets. Surface-mounted cast fittings, housing wiring devices in outdoor and damp locations, shall have mounting lugs.

Erickson couplings shall be used at all points of union between ends of rigid steel conduits which cannot be coupled. Running threads and threadless couplings shall not be used. Couplings shall be 3-piece type.

Transition fittings to mate steel to PVC conduit, and PVC access fitting, shall be as furnished or recommended by the manufacturer of the PVC conduit.

3.3 UNDERGROUND DUCTS, MANHOLES AND PULL-BOXES

A. **Underground Ducts**: Where an underground distribution system is indicated, installation shall comply with the following:

(1) Ducts shall be laid on a grade line of at least 4 inches per 100 feet, sloping towards pullboxes or manholes. Duct shall be installed and pullbox and manhole depths adjusted so that the top of the concrete envelope is a minimum of 24 inches below grade. Changes in direction of the duct envelope by more than 10 degrees horizontally or vertically shall be accomplished using bends with a minimum radius 24 times the duct diameter. Couplings shall be staggered at least 6 inches vertically. Bottom of trench shall be of select backfill or sand. Horizontal and vertical duct separation shall

be maintained by plastic spacers set every 5 feet. The duct array shall be anchored every 4 feet to prevent movement during placement of the concrete envelope. Each bore of the completed duct bank shall be cleaned by drawing through it a standard flexible mandrel one foot long and 1/4-inch smaller than the nominal size of the duct through which the mandrel will be drawn. After passing of the mandrel, a wire brush and swab shall be drawn through. A raceway, in the duct envelope, which does not require conductors, shall have a 1/8-inch polypropylene pull cord installed throughout the entire length of the raceway.

(2) Duct bank markers shall be installed every 200 feet along run of duct bank, at changes in horizontal direction of duct bank, and at ends of duct bank. Concrete markers, 6 by 6 inches square and one foot long, shall be set flush with grade. The letter "D" and arrow set in the concrete shall be facing in the direction of the duct alignment

B. **Manholes and Pull-Boxes**: Manholes and handholes shall be set plumb to limit the depth of standing water to a maximum of 2 inches. Manhole covers, unless otherwise indicated, shall be set at grade. Sections of pre-fabricated manholes and pullboxes shall be assembled with waterproof mastic and shall be set on a 6-inch bed of gravel as recommended by the manufacturer.

3.4 CONDUCTORS, WIRE AND CABLE

A. **General:** Pulling wire and cable into conduit shall be completed without damaging or putting undue stress on the cable insulation. Soapstone, talc or UL listed pulling compounds are acceptable lubricants for pulling wire and cable. Grease is not acceptable. Raceway construction shall be complete, cleaned, and protected from the weather before cable is installed.

Whenever a cable leaves a raceway, a cable support shall be provided.

When flat bus bar connections are made with unplated bar, the contact areas shall be "scratch-brushed" before connection. Bolts shall be torqued to the bus manufacturer's recommendations.

B. **600 Volt Conductor and Cable:** Conductors in panels and electrical equipment, No. 6 AWG and smaller, shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Lacing is not necessary in plastic panel wiring duct. Conductors crossing hinges shall be bundled into groups not exceeding 12 and shall be so arranged that they will be protected from chafing when the hinged member is moved.

Slack shall be provided in junction and pull boxes, handholes and manholes. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box. Amount of slack shall be equal to largest dimension of the box. Where plastic panel wiring duct is installed for wire runs, lacing is not required. Plastic panel wiring duct shall not be used in manholes and handholes.

Stranded conductors shall be terminated. Conductors shall be terminated directly on the terminal block. Compression lugs and connectors shall be installed using manufacturer's recommended tools.

Lighting and receptacle circuits may be in the same conduit in accordance with derating requirements of the NEC. However, lighting and receptacle circuits shall not be installed in conduits with power or control conductors.

Solid wire shall not be lugged nor shall electrical spring connectors be used on any except for solid wires in lighting and receptacle circuits. Lugs and connectors shall be installed with a compression tool.

Conductor and cable markers shall be provided at splice points.

3.5 WIRING DEVICES

A. **General**: Boxes shall be independently supported by galvanized brackets, expansion bolts, toggle bolts, or machine or wood screws as appropriate. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure boxes, nor shall welding or brazing be used for attachment.

Unless otherwise indicated, receptacles and switches installed in sheet steel boxes shall be flush mounted and shall be located 18 inches above the floor unless otherwise indicated.

Switch boxes and receptacles installed in cast device boxes shall be mounted 48 inches above the floor.

B. **Application of Boxes and Covers**: Boxes and covers shall be installed as follows:

(1) Outlet, switch, and junction boxes for flush-mounting in general purpose locations shall be sheet metal.

(2) Outlet, switch, and junction boxes where surface mounted in exposed locations shall be cast alloy ferrous boxes with mounting lugs, zinc or cadmium plating, and enamel finish. Surface mounted boxes in concealed locations may be welded sheet steel boxes.

(3) Outlet, control station, and junction boxes, including covers, for installation in corrosive locations shall be fiberglass-reinforced polyester and shall include mounting lugs.

(4) Sheet metal boxes for flush-mounting in concrete shall include with cast, malleable box covers and gaskets. Covers for pressed steel boxes shall be one-piece pressed steel, cadmium plated, except that boxes for installation in plastered areas shall be stainless steel over plaster rings.

(5) Outlet boxes shall be used as junction boxes wherever possible. Where separate pullboxes are indicated, they shall include screw covers. Outdoors boxes shall be galvanized and shall be provided with gasketed covers and threaded hubs. Indoor boxes shall be painted.

3.6 CONDUCTOR AND EQUIPMENT IDENTIFICATION

A. The completed electrical installation shall include adequate identification to facilitate proper control of circuits and equipment and to reduce maintenance effort.

B. Control and instrumentation wire and cable shall be assigned a unique identification number. Numbers shall be assigned to conductors having common terminals. Identification numbers shall appear within 3 inches of conductor terminals. "Control" shall be defined as any conductor used for alarm, annunciator, or signal purposes or any connect switch or relay contacts or any relay coils.

(1) Multiconductor cable shall be assigned a number which shall be attached to the cable at intermediate pull boxes and at stub-up locations beneath free-standing equipment. It is expected that the cable number will form a part of the individual wire number. All individual control conductors and instrumentation cable shall be identified at pull points as described above.

(2) The instrumentation cable numbers shall incorporate the loop numbers shown.

C. Spare conductors shall be terminated on terminal screws and shall be identified with a unique number as well as with destination.

D. Nameplates shall be provided for panelboards, panels, starters, switches, and pushbutton stations. In addition to the name plates indicated, control devices shall be equipped with standard collar-type legend plates, as required.

E. Terminal strips shall be identified by imprinted, varnished, marker strips attached under the terminal strip.

F. Three-phase receptacles shall be consistent with respect to phase connection of receptacle terminals. Errors in phasing shall be corrected at the bus, not at the receptacle.

G. Toggle switches which control loads out of sight of switch, and all multi-switch locations of more than 2 switches, shall have suitable inscribed finish plates.

H. Empty conduits shall be tagged at both ends to indicate the destination at the far end. Where it is not possible to tag the conduit, destination shall be identified by marking an adjacent surface.

I. Identification tape shall be installed directly above buried raceway. Tape shall be installed 8 inches below grade and parallel with raceway. Identification tape shall be installed for buried raceway not under buildings or equipment pads except identification tape is not required for protection of street lighting raceway.

** END OF SECTION **

SECTION 16170 - GROUNDING SYSTEM

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing grounding for electrical systems, exposed nonenergized metal surfaces of equipment and metal structures.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 05500 Miscellaneous Metalwork

2. Section 16050 Basic Electrical Materials and Methods

1.3 CODES

A. The WORK of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:

1. National Electrical Code

1.4 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

IEEE 81	Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System, Guide for
UL 467	Standard for Grounding and Bonding Equipment

1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

1. Shop drawings showing details of grounding system.

2. Product data for grounding electrodes and connections.

1.6 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

1. Manufacturer's instructions including instructions for storage, handing, protection, examination, preparation and installation of exothermic welded connectors.

2. Test reports indicating overall resistance to ground and resistance of each electrode.

1.7 PROJECT RECORD DRAWINGS

A. The following shall be included in the PROJECT RECORD DRAWINGS:

1. Accurate record of actual locations of grounding electrodes.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. **Delivery of Materials:** Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

B. **Storage:** Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

PART 2 -- PRODUCTS

2.1 GENERAL

A. The WORK of this Section includes the following:

1. Products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and shown.

2. Except as otherwise indicated, grounding products and systems shall comply with the NEC.

2.2 ROD ELECTRODE

A. Rod electrodes shall be 3/4 inch copper-clad steel unless otherwise shown on the drawings, sectional type, joined by threaded copper alloy couplings. Length of rods forming an individual ground array shall be equal in length and shall be of the length required to obtain a minimum ground resistance of 5 ohms. Top of ground rod shall be fitted with a coupling and steel driving stud. Rods shall be of sufficient length to ensure contact with ground water and shall be not less than 10 feet.

2.3 CABLE

A. Ground cable shall be annealed bare copper, concentric stranded wire. If cable sizes are not indicated, the minimum sizes shall be as follows:

1. Lighting panels 2 AWG

2. Exposed metal 2 AWG

2.4 MECHANICAL CONNECTORS

A. Compression connectors shall comply with the following:

1. **Material:** Cast Copper

2.5 GROUNDING WELL COMPONENTS

A. Grounding well components shall comply with the following:

1. **Well Pipe:** 8 inch diameter by 24 inch long concrete pipe with belled end.

2. **Well Cover:** Cast iron with legend "GROUND" embossed on cover.

2.6 MANUFACTURERS

A. Products indicated shall be manufactured by one of the following (or equal):

1. **Rods and Fittings:**

Copperweld

Blackburn

Weaver

2. **Compression Connectors:**

Thomas and Bett

PART 3 – EXECUTION

3.1 GENERAL

A. Embedded and buried ground connections shall be made by compression connectors utilizing diamond or hexagon dies and a hand compression tool for wire sizes 2 AWG and smaller and a hydraulic pump and compression head for wire sizes 2/0 AWG and larger. Compression connections shall be prepared in accordance with the manufacturer's instructions. Exposed ground connections to equipment shall be made by bolted clamps unless otherwise indicated. Solder shall not be used in any part of the ground circuits.

B. Embedded ground cables and fittings shall be securely attached to concrete reinforcing steel with tie wires and prevented from displacement during concrete placement. As each part of the grounding system which is laid below finished grade is completed, the CONSTRUCTION MANAGER shall be notified 2 hours prior to backfilling.

C. Grounding conductors which are extended beyond concrete surfaces for equipment connection shall be extended a sufficient length to reach the final connection point without splicing. Minimum extension shall be 3 feet. Grounding conductors which project from a concrete surface shall be located as close as possible to a corner of the equipment pad, protected by conduit, or terminated in a flush grounding plate. Exposed grounding conductors shall be supported by noncorrosive metallic hardware at 4-foot intervals maximum Grounding conductors for future equipment shall be terminated using a two-hole copper flush mounted grounding plate.

D. Grounding conductor shall not be used as a system neutral.

E. Lightning arresters shall be directly connected to the ground system using copper conductors.

3.3 EQUIPMENT AND ENCLOSURE GROUND

A. Electrical and distribution equipment and metal equipment platforms which support any electrical equipment shall be bonded to the nearest ground bus or to the nearest switchgear ground bus. This grounding requirement is in addition to the indicated raceway grounding.

B. Connection to ground electrodes and ground conductors shall be exothermic welded where concealed and shall be bolted pressure type where exposed. Bolted connectors shall be assembled wrench-tight.

C. Insulated grounding bushings shall be employed for all grounding connections to steel conduits in switchboards, in motor control centers, in pullboxes, and elsewhere where conduits do not terminate at a hub or a sheet metal enclosure.

D. Where insulated bushings are required, they shall be installed in addition to double lock-nuts.

E. Shielded power cable shall have its shield grounded at each termination in a manner recommended by the cable manufacturer. Shielded instrumentation cable shall be grounded at one end only; this shall be at the Motor Control Board or otherwise at the "receiving" end of the signal carried by the cable except as otherwise indicated. Termination of each shield drain wire shall be on its own terminal screw. All of these terminal screws in one rack shall be connected with No. 16 solid tinned bare copper wire jumper; connection to ground shall be accomplished with a No. 12 green insulated conductor to the main ground bus.

F. Nonelectrical equipment with metallic enclosures shall be connected to the grounding system.

3.4 ISOLATED GROUNDING

A. Where the manufacturer of equipment supplied from 120 volt instrument power panels requires an isolated ground, an additional isolated ground conductor from the equipment through the instrument power panel for connection to a single point ground bus in the automatic transfer switch enclosure shall be provided. The isolated ground conductor shall have green insulation with a yellow stripe and shall be run in the same raceway as the power and neutral conductors.

B. The neutral conductor from the ultra-isolation transformers shall be grounded only at the single point ground bus in the automatic transfer switch.

3.5 EXAMINATION

A. The WORK of this Section includes verification that final backfill and compaction has been completed before driving rod electrodes.

3.6 INSTALLATION

A. Rod electrodes and additional rod electrodes as required to achieve specified resistance to ground shall be installed at locations indicated.

B. Grounding well pipes with cover shall be installed at each rod location with well pipe top flush with finished grade.

C. Number 4 AWG bare copper wire shall be installed in foundation footing.

D. Grounding electrode conductor shall be installed and connected to reinforcing steel in foundation footing.

E Metal siding not attached to grounded structure shall be bonded together and to ground.

F. Reinforcing steel and metal accessories shall be bonded to structures.

G. Transient suppression plates shall be installed where indicated.

H. Ground grid shall be installed under access floors where indicated. Grid shall be constructed of 2 AWG bare copper wire installed on 24 inch centers both ways. Each access floor pedestal shall be bonded to grid.

I. Metallic raceway, pipe, duct and other metal object entering space under access floors shall be bonded together using 2 AWG bare copper conductor.

J. Isolated grounding conductors shall be installed for circuits supplying personal computers.

K. Where equipment grounding conductors are indicated, separate insulated conductors shall be installed within each feeder and branch circuit raceway. Ends shall be terminated on suitable lug, bus, or bushing.

3.7 FIELD QUALITY CONTROL

A. Grounding and bonding system conductors and connections shall be inspected for tightness and proper installation.

3.8 GROUNDING SYSTEM TESTS

A. Suitable test instruments shall be used to measure resistance to ground of system. Testing shall be performed in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

B. The grounding test shall comply with IEEE Standard 81. A plot of ground resistance readings for each isolated ground rod or ground mat shall be submitted on 8-1/2 x 11 inch size graph paper. The current reference rod shall be driven at least 100 feet from the ground rod or grid under test. The measurements shall be made at 10-foot intervals beginning 25 feet from the test electrode and ending 75 feet from it, in direct line between the ground rod or center of grid and the current reference electrode.

C. A grounding system that shows greater than 2 ohm resistance for the flat portion of the plotted data shall be considered inadequately grounded. Additional parallel connected ground rods and/or deeper driven rods shall be provided until the ground resistance measurements complies with the indicated requirements. Use of salts, water or compounds to attain the specified ground resistance is not acceptable.

** END OF SECTION **

SECTION 16400 - LOW VOLTAGE ELECTRICAL SERVICE AND DISTRIBUTION

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing all electrical service sections, distribution switchboards, special control panels, control and terminal cabinets, control devices, circuit breakers, and all appurtenant work, complete and operable.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 16030 Electrical Tests

2. Section 16050 Basic Electrical Materials and Methods

1.3 CODES

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

1. National Electrical Code (NEC) NFPA 70

1.4 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

ANSI/IEEE C37.20	Switchgear Assemblies, including Metal-Enclosed Bus
ANSI/NEMA ICS-2	Devices, Controllers, and Assemblies for Industrial Control
NEMA PB2	Dead Front Distribution Switchboard

1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

1. Shop drawings of the service section and switchboards. After review of shop drawings of the service section by the Engineer, said drawings shall also be submitted to the utility company for approval prior to fabrication.

2. Design test reports conducted for similar assemblies at the factory.

1.6 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

1. Operating procedures.

2. Maintenance procedures.

3. Manufacturer's parts list, illustrations, assemblies and diagrams.

PART 2 -- PRODUCTS

2.1 GENERAL

A. **Materials:** All materials and equipment furnished under this Specification shall be new and shall bear the Underwriters' Laboratories label where such service is regularly available.

B. **Equipment:** All equipment for the same purpose shall be of the same make.

C. **Standard Products:** Materials and equipment shall be catalogue products of companies regularly engaged in the manufacture of such items, shall be the latest standard design that conforms to the specification requirements, and shall essentially duplicate material and equipment that has been in satisfactory use for several years.

2.2 OVERCURRENT PROTECTIVE DEVICES

A. Circuit breakers having a frame size of 150-amperes or less shall be molded-case type with thermal magnetic non-interchangeable, trip-free, sealed trip units. Breaker contact material shall be a non-weldable silver alloy. Breakers shall have arc-extinguishing chutes. Ground fault tripping, where required, shall be as indicated below.

B. Circuit breakers with a frame size of 225 amperes to 600 amperes shall be molded case with interchangeable thermal and adjustable magnetic trip elements. Ground fault protection shall be provided by means of a core balance transformer encircling all feeder leads. The transformer shall energize a surface-mounted, solid-state relay, adjustable from 10-20 percent of phase current with an adjustable time delay of zero to 36 cycles. Ground fault protection shall include a test panel containing indication and test tripping circuits.

2.3 MANUFACTURERS

A. Products of the type indicated shall be manufactured by the following (or equal):

a. Westinghouse

b. General Electric

c. Square D

PART 3 -- EXECUTION

3.1 INSTALLATION - GENERAL

A. All electrical equipment materials shall be installed securely in place. Equipment shall be mounted parallel and perpendicular to the walls, floors, and ceilings.

B. All anchors and fasteners shall be types designed for the intended purpose and shall be capable of adequately, safely, and permanently securing the material in place. Screws shall be used on wood surfaces, masonry anchors in concrete or brick, toggle bolts on hollow walls, machine screws, bolts, or welded studs on steel. Nails shall be used only for temporary attachment or support.

C. Omissions or conflicts on Drawings or between Drawings and Specifications shall be brought to the attention of the ENGINEER for clarification before proceeding with the work.

D. The CONTRACTOR shall make all necessary provisions throughout the site to receive all equipment as construction progresses and shall provide adequate backing, supports, inserts, and anchor bolts for the hanging and support of all electrical cabinets, enclosures, conduit, panelboards, and switches, and shall provide sleeves through walls, floors, or foundations where electrical lines are required to penetrate.

E. Floor standing equipment shall be leveled with shims as required to maintain horizontal surfaces within 1/32-inch per horizontal foot; after leveling, equipment shall be anchored, then grouted so that no space is existing between concrete and equipment support beams.

3.2 TESTING

A. All WORK shall be tested per Section 16030.

** END OF SECTION **

SECTION 16500 - LIGHTING

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing lighting fixtures, accessories, and controls required for a complete and operable lighting system.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

Section 16050 Basic Electrical Materials and Methods

1.3 STANDARD SPECIFICATIONS

A. Except as otherwise indicated in this Section of the Specifications, the CONTRACTOR shall comply with the Standard Specifications for Public Works Construction (SSPWC).

1.4 CODES

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

National Electrical Code (NEC), NFPA 70

Uniform Building Code (UBC)

1.5 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

UL	Underwriters Laboratories
CBM	Certified Ballast Manufacturer's Association

1.6 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted:

1. List of all fixture types with manufacturer's name and full catalog number.
2. Catalog information for each fixture, accessory, and control device. Each equipment submittal shall clearly describe make, materials, and dimensions. Catalog information shall clearly show manufacturer's name and full catalog number. Additional information is required for the following items:
    a. Fixtures: Material description shall include diffuser, hardware, gasketing, reflector and chassis, and finish.
    b. Ballasts: Type of ballast, power factor, starting characteristics, temperature and sound rating, input watts and lamp watts.

c. Lighting Poles: Anchoring details, fixture attachment hardware, handholes, and pole mounted accessories or controls.

d. Polar plots on 8-1/2 x 11 inch paper providing candlepower vs. angle and foot-lamberts of brightness vs. angle for longitudinal and traverse axis.

d. Table of utilization factors for calculation of illumination levels by the zonal cavity method.

1.7 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL in compliance with Section 01300:

1. Manufacturer's installation instructions.

2. Manufacturer's maintenance procedures, including dismantling procedures and parts list.

PART 2 - PRODUCTS

2.1 GENERAL

A. Lighting materials including lighting fixtures, accessories, hardware, and controls shall conform with the detailed requirements indicated on the lighting fixture schedule. Lighting fixtures shall be provided where indicated. Raceway and wire, for other than street lighting, shall be in accordance with Section 16050. Materials for street lighting applications shall be in accordance with SSPWC section 209.

2.2 FIXTURES

A. General: Fixtures shall be pre-wired with leads 18 AWG minimum, for Connection to external lighting circuit.

B. Exterior Fixtures: Pole-mounted fixtures, in combination with their mounting pole and bracket, shall be designed to withstand 100 MPH winds without damage. Exterior fixtures shall have corrosion-resistant hardware and either hinged door or lens retainer. Fixtures specified with integral photo-electric control shall be of the fixture manufacturer's standard design.

2.3 LAMPS

A. Type: Sports lighting fixtures shall have metal halide type lamps.

2.4 LIGHTING POLES

A. General: Lighting poles shall be provided with pole cap and all necessary fixture mounting hardware. Contractor to submit structural calculations for poles.

2.5 LIGHTING JUNCTION BOXES

A. Junction boxes for the distribution of outdoor lighting circuits shall be precast concrete, set flush with the ground. Size shall be approximately 10.5 x 17.25 x 12 inches deep. Junction boxes for street lighting shall be in accordance with SSPWC section 307. Junction box cover, for other than street lighting, shall be cast iron with cast inscription: "LIGHTING".

2.6 LIGHTING CONTROL RELAYS

A. Unless otherwise indicated, relays for lighting control shall be mechanically held, based-mounted, and single-purpose units.

B. Unless otherwise indicated, coil voltage rating shall be 120 volts AC with double break contacts rated 20 amps continuous to 600 volts AC. Contacts shall be marked for ballast lighting (HID), tungsten, and general purpose loads.

2.7 SPARE LAMPS

A. Spares shall be provided for all lamp types except medium base incandescent lamps rated less than 300 watts. The number of spares shall be equal to 5 percent of each rating type, with a minimum of one standard manufacturer's package.

2.8 LIGHTING CONTROL PANEL FOR BALL FIELD LIGHTING

Remote Lighting Control System

The control system shall be supplied from the same manufacturer as the sports lighting per Section 16526. This section includes the remote lighting control system suitable for control of remote equipment using a nationwide communication network. Software features are tailored to control equipment in parks and recreation facilities but not limited to these applications. The remote equipment controllers shall be suitable for control of electrical equipment in multiple locations.

Acceptable Manufacturers

The basis of design is the Control-Link Series by Musco. Similar systems from other manufacturers, that fully meet the functional and performance requirements listed herein, will be considered. A detailed line-by-line compliance comparison of any alternate system shall be submitted for the engineer’s review. Exceptions and non-compliance shall be clearly identified. It is the sole responsibility of the electrical contractor to ensure and demonstrate that any alternate equipment meets these specifications.

Standards

The lighting control system shall be UL Listed under UL508 – Industrial Control Equipment.

All lighting control equipment shall be in compliance with FCC Emission Standards specified in Part 15 Subpart J for Class A applications. Each element of the lighting control system is subject to FCC rules and will comply with the rules prior to delivery.

Submittals

Submittal documentation shall be furnished by the manufacturer for approval by the engineer and must be approved in writing prior to shipment of any equipment from the manufacturer. The submittal shall consist of:

Bill of Materials - An itemized list of materials.

Shop Drawings - Dimensional drawings and product data sheets for equipment provided.

Typical Wiring Diagrams - Typical wiring diagrams showing component connections.

Control System Summary – Shows switching schedule and circuits that are grouped together.

Control Equipment

The lighting control manufacturer shall provide a factory assembled, wired, and tested control and monitoring cabinet(s) with the following features at a minimum:

Onsite memory - The controller must accept and store 7-day schedules.

Zone capabilities - Each controller must be able to control up to eight (8) zones. A zone is a collection of circuits that are controlled together. For instance, a field with six circuits (light banks) can be controlled as one zone.

Individual zone control - Each zone shall be individually controlled; it shall be the responsibility of the lighting control manufacturer to provide a sufficient number of controllers at each location to fulfill the operational requirements as specified for this project.

Manual Off-On-Auto Switch and contactor status feedback - The controller must be able to determine the switch position (Manual or Auto) and the contactor status (open or closed) and report these two items back to the central command hub.

Operating ambient temperature range: -20^{o}C to 60^{o}C.

Field replaceable electronic assemblies - All electronic assemblies are to be mounted on panels to allow for easy field maintenance.

NEMA 4 enclosures - Each contactor cabinet must be a NEMA 4 enclosure with lockable cover which shall contain all electronic equipment and contain no prepunched knockouts.

Future enhancements - As new technologies are developed, manufacturer may incorporate new features and capabilities to the controller. These enhancements to the controller shall be transparent to the end user and will be provided as part of the service and warranty contract.

Monitoring feedback - Each controller must be able to receive feedback from six (6) monitoring modules.

Power outage recovery - The controller firmware shall protect against power outages and memory loss. Once power is regained, the controller shall reboot and execute any on/off commands that would have occurred during the outage.

Monitoring Equipment

Module capabilities - Each controller cabinet must contain one (1) monitoring module. This module will monitor all the contactors in that cabinet. Each monitoring module must be able to monitor up to twelve (12) contactors.

Monitoring amperage - The monitoring module must be able to determine the amperage flowing through each contactor. If there is any fluctuation in the amperage beyond preset thresholds, the monitoring module must be able to inform the central command hub of the fluctuation by means of an alarm.

Monitoring voltage - The monitoring module must be able to determine the voltage applied to the contactors. If there is any fluctuation in the voltage beyond preset thresholds, the monitoring module must be able to inform the central command hub of the fluctuation by means of an alarm.

Contactor Modules

Contactors - Contactors shall be UL Listed for lighting applications. They shall be rated at full capacity, be electrically held, utilize a 120 volt coil and be rated for operation in an ambient temperature range of -20 degrees C to +60 degrees C.

Terminal blocks - Terminal blocks shall be provided for each contactor and shall be UL Listed. 30 and 60 amp modules shall be sized to handle 2/0-14 gauge wire. 100 amp modules shall be sized for 350 mcm-6 gauge wire. When required, neutral blocks shall be provided next to the terminal blocks.

Communication Equipment

Communication link - The manufacturer shall be responsible for providing and maintaining a communication link in order to send and affect schedules, and receive reports.

Communication link requirements - The communication link must be a TCP/IP type connection for 2-way realtime communication.

Customer Support Services

Monitoring alarm tracking - The central command hub shall have a database to store all monitoring alarms received from the customer site, and contact the customer if the fault requires immediate maintenance if lamp outages will significantly affect play on the field.

Management reports - The central command hub shall generate reports confirming the operating schedules per site and per user that will be made available via the Internet.

Website scheduling and training - Manufacturer shall maintain and support a basic website specific to this system where the City can access schedules and download user manuals.

Technical support - Technical help via telephone, fax, or email shall be available 24 hours per day, 7 days per week.

Commissioning - The manufacturer shall supply factory-authorized representatives to start up all equipment and demonstrate full compliance with this specification. They shall verify that all supplied components have been properly installed and connected.

Training - The manufacturer shall train the owner’s representatives on the remote equipment controllers, including all user functions.

Telephone override - Any pre-authorized user may call the central command hub toll-free and request an immediate schedule change.

Manual Off-On-Auto Selector Switches

Onsite manual control switches - Three position selector switches (Off-On-Auto) shall be factory-mounted through the controller cabinet door. The switches shall be keyed and maintain position, with make-before-break contacts. A legend plate shall clearly identify the zone and position of each switch. Switches shall be factory-wired.

Operation - The OFF-ON-AUTO switches shall operate as follows: The three position switch will control each lighting zone which controls the contactor(s) directly. In the OFF position all contacts are open. In the ON position the ON set of contacts close, closing the contactor. In the AUTO position, the AUTO contacts are closed, and the Controller will operate the contactor. The ON contacts are open in this position. The contacts on the OFF-ON-AUTO switch are make-before-break so that the switch may be moved between ON and AUTO without de-energizing the circuit.

Scheduling

Web-based scheduling - Scheduling shall be performed by the customer via a manufacturer maintained web site. Access to the web site shall be protected by a customer defined users list and individual passwords.

Scheduling via the website shall include the following features:

- Scheduling may be done daily, weekly or monthly. The scheduling database shall be able to store scheduling data more than a year in advance.
- A typical schedule shall be entered into the system by selecting facility/zone, the start and end time, and the start and end dates for the schedule to operate in. This allows the same schedule to be used for consecutive days without separate entries.
- A recurring scheduling may be entered by indicating the day(s) of the week, (i.e. Monday, Wednesday and Friday) start and end time and the start and end date for the recurring cycle. A 'no end date' option shall be available for schedules that need to run continuous without change.
- The start and end time may be selected in 15 minute increments or as sunset and sunrise. The actual sunset and sunrise shall be calculated for each scheduled date and displayed on the schedule as such.

Schedule support - Skilled operators shall be available toll-free 24 hours per day, 7 days a week to monitor customer schedules and shall have the ability to override the current schedule and send commands directly to the control and monitoring cabinet(s) to turn the lights on or off.

Contractor Responsibilities

Contractor shall design, supply and install the electrical system to meet the circuit wiring requirements shown on the Control System Summary / switching schedule provided by the manufacturer. The manufacturer shall supply detailed installation instructions for installation of the control system.

2.9 MANUFACTURERS

A. Products of the type indicated shall be of the following manufacturer (or approved equal):

1. Lamps:

   General Electric

   North American Philips (Norelco)

   Sylvania

   Venture Lighting International

2. Lighting Control Panel and Relays:

   Musco (Ball Field) or approved equal

3. Sports Lighting Fixtures and Pole:

   Musco or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Raceways and lighting circuits shall be provided from the fixtures, switches, and fixture outlets to the power panelboard in accordance with the NEC. Raceways and wire shall be provided in accordance with Section 16050. Fixtures shall be aligned and directed to illuminate an area as indicated. A concealed latch and hinge mechanism shall be provided to permit access to the lamps and ballasts and for removal and replacement of the diffuser without removing the fixture from ceiling panels. Fixtures recessed in concrete shall have protective coating of bituminous paint.

B. Fixtures: Internally wired conductors of fixtures having a temperature rating exceeding 75 degrees C shall be spliced to circuit conductors in a separately mounted junction box. Fixture shall be connected to junction box using flexible conduit with a temperature rating equal to that of the fixture.

3.2 CLEANUP

A. Labels and marks, except the UL label, shall be removed from exposed parts of the fixtures. Fixtures shall be cleaned when the project is ready for acceptance.

B. All burned-out, broken, and otherwise disabled lamps shall be replaced when the project is ready for acceptance.

** END OF SECTION **

SECTION 16526 – SPORTS FIELD LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

A. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

B. The purpose of these specifications is to define the performance and design standards for Rancho Bernardo Park. The manufacturer/contractor shall supply lighting equipment to meet or exceed the standards set forth by the criteria set forth in these specifications.

C. The sports lighting will be for the following fields:

1. Softball Field #5 - 200’ Radius / 60’ basepath
2. Softball Field #6 - 315’ Radius / 60’ basepath
3. Soccer Field – 315’x200’

D. The primary goals of this sports lighting project are:

1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore the lighting system shall be designed such that the light levels are guaranteed for a period of 25 years.

2. Life Cycle Cost: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate.

3. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. All maintenance costs shall be eliminated, and the field(s) should be proactively monitored to detect fixture outages over a 25 year life cycle.

1.2 LIGHTING PERFORMANCE

A. Performance Requirements: Playing surfaces shall be lit to an average constant light level and uniformity as specified in the chart below. Light levels shall be held constant for 25-years. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Average illumination level shall be measured in accordance with the IESNA LM-5-04. Light levels shall be guaranteed from the first 100 hours of operation for the maximum warranty period.

Area of Lighting	Average Constant Light Levels	Max to Min Uniformity Ratio	Grid Points	Grid Spacing
Softball Field #5 - Infield	40 footcandles	2.0:1.0	25	20’ x 20’
Softball Field #5 - Outfield	25 footcandles	3.5:1.0	73	20’ x 20’
Softball Field #6 - Infield	50 footcandles	2.0:1.0	25	20’ x 20’
Softball Field #6 - Outfield	25 footcandles	3.5:1.0	203	20’ x 20’
Soccer Field	20 foorcandles	3.0:1.0	70	30’ x 30’

1. Lumen maintenance control strategy: A constant light system shall use automatic power adjustments to achieve a lumen maintenance control strategy as described in the IESNA Lighting Handbook 10th Edition, Lighting Controls Section, page 16-8: "Lumen maintenance involves adjusting lamp output over time to maintain constant light output as lamps age, and dirt accumulation reduces luminaire output. With lumen maintenance control, either lamps are dimmed when new, or the lamp's current is increased as the system ages."

2. Project References: Manufacturers bidding any form of a constant light system must provide a minimum of five (5) project references within the state of California that have been completed within the last calendar year utilizing this exact technology. Manufacturer will include project name, project city, and if requested, contact name and contact phone number for each reference.

B. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, the pole mounting heights from the playing field surface shall be 70’.

1.3 LIFE CYCLE COSTS

A. Energy Consumption: The average kWh consumption for the field lighting system shall be 57.9 or less.

B. Complete Lamp Replacement: Manufacturer shall include all group lamp replacements required to provide 25-years of operation based upon 500 usage hours per year for the baseball and softball field; 300 for the soccer field.

C. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. City agrees to check fuses in the event of a luminaire outage.

D. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The manufacturer shall notify the City of outages within 24 hours, or the next business day. The controller shall determine switch position (Manual or Auto) and contactor status (open or closed).

E. Remote Lighting Control System: System shall allow City and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The City may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields, to only having permission to execute “early off” commands by phone.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

F. Management Tools: Manufacturer shall provide a web-based database of actual field usage and provide reports by facility and user group.

1. Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the City.

   a. Cumulative hours: shall be tracked to show the total hours used by the facility.

   b. Current lamp hours: shall be tracked separately to reflect the amount of hours on the current set of lamps being used, so relamping can be scheduled accurately.

G. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

H. 25-Year Life Cycle Cost: Manufacturer shall submit 25-year life cycle cost calculations as follows. Equipment price and total life cycle cost shall be entered separately on bid form.

a.	**Luminaire energy consumption** # luminaires x __kW demand per luminaire x $.12 kWh rate x 500 annual usage hours x 25 years for the baseball and softball fields		
b.	**Luminaire energy consumption** # luminaires x __kW demand per luminaire x $.12 kWh rate x 300 annual usage hours x 25 years for the soccer field		
c.	**Cost for spot relamping and maintenance over 25 years** Assume 7.5 repairs at $500 each if not included with the bid		
d.	**Cost to relamp all luminaires during 25 years** 500 annual usage hours x 25 years /2,100 hours x $125 lamp & labor x # fixtures if not included with the bid (baseball and softball field)	+	
e.	**Cost to relamp all luminaires during 25 years** 300 annual usage hours x 25 years /2,100 hours x $125 lamp & labor x # fixtures if not included with the bid (soccer field)	+	
f.	**Extra energy used without base bid automated control system** $ Energy consumption in item a. x 10% if control system not included with the bid	+	
.	**TOTAL 25-Year Life Cycle Operating Cost**	=	

1.4 WARRANTY AND GUARANTEE

A. 25-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 25 years OR for the maximum hours of coverage based on the estimated annual usage, whichever occurs first. Warranty shall guarantee light levels; lamp replacements; system energy consumption; monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations. Group lamp replacements for constant light systems must occur in accordance with the independent test report provided by the manufacturer; alternate systems must relamp every 2,100 hours.

1.5 DELIVERY TIMING

A. Equipment On-Site: The equipment must be on-site 4 to 6 weeks from receipt of approved submittals and receipt of complete order information.

1.6 PRE-BID SUBMITTAL REQUIREMENTS

A. Approved Product: Musco's Green Generation Lighting® sports lighting system is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.

B. Design Approval: The City will review pre-bid shop drawings from the manufacturers to ensure compliance to the specification. If the design meets the design requirements of the specifications, a letter will be issued to the manufacturer indicating approval for the specific design submitted.

1.7 ALTERNATE SYSTEM REQUIREMENTS

A. Compliance to Specifications: Acceptance of a bid alternate does not negate the contractor and lighting manufacturer's responsibility to comply fully with the requirements of these specifications. Any exceptions to the specifications must be clearly stated in the prior approval submittal documents.

B. Light Level Requirements: Manufacturer shall provide computer models guaranteeing light levels on the field over 25-years. If a constant light level cannot be provided, the specified maximum Recoverable Light Loss Factor and maintenance/group relamping schedule shall be provided in accordance with recommendations in the Pennsylvania State University report "Empirical Light Loss Factors for Sports Lighting", presented at the 2009 IESNA Annual Conference.

Lamp Replacement Interval (hours)	Recoverable Light Loss Factor (RLLF)
2,100	0.69

For alternate systems, scans for both initial and maintained light levels are required.

Area of Lighting	Average Initial Light Levels	Average Target/Maintained Light Levels	Max. to Min. Uniformity Ratio	Grid Points	Grid Spacing
Softball Field #5 - Infield	57.9 footcandles	40 footcandles	2:1	25	20’ x 20’
Softball Field #5 - Outfield	36.2 footcandles	25 footcandles	3.5:1	73	20’ x 20’
Baseball Field #6 - Infield	72.4 footcandles	50 footcandles	2:1	25	20’ x 20’
Baseball Field #6 - Outfield	36.2 footcandles	25 footcandles	3.5:1	203	20’ x 20’
Soccer Field	28.9 footcandles	20 footcandles	3:1	70	30’ x 30’

C. Revised Electrical Distribution: Manufacturer shall provide revised electrical distribution plans to include changes to service entrance, panel, and wire sizing.

PART 2 – PRODUCT

2.1 LIGHTING SYSTEM CONSTRUCTION

A. System Description: Lighting system shall consist of the following:

1. Galvanized steel poles and crossarm assemblies for pole locations A16, A21, A22, B14 and galvanized crossarm assemblies for attachment to existing structures for pole locations B13, and B16.

2. Pre-stressed concrete base embedded in concrete backfill allowed to cure for 12-24 hours before pole stress is applied. Alternate may be an anchor bolt foundation designed such that the steel pole and any exposed steel portion of the foundation is located a minimum of 18 inches above final grade. The concrete for anchor bolt foundations shall be allowed to cure for a minimum of 28 days before the pole stress is applied. (Applies for pole locations A16, A21, A22, and B14).

3. All luminaires shall be constructed with a die-cast aluminum housing or external hail shroud to protect the luminaire reflector system.

4. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10’ above grade. The enclosures shall include ballast, capacitor and touch-safe fusing to indicate when a fuse is to be replaced for each luminaire. Safety disconnect per circuit for each pole structure will be located in the enclosure.

5. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation. (Applies for pole locations A16, A21, A22, and B14).

6. Controls and Monitoring Cabinet to provide on-off control and monitoring of the lighting system, constructed of NEMA Type 4 aluminum. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual Off-On-Auto selector switches shall be provided.

B. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.

C. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the crossarms, pole, or electrical components enclosure.

D. Lightning Protection: Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.

E. If grounding is not integrated into the structure, the Manufacturer shall supply grounding electrodes, copper down conductors and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be not less than 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting.

F. Safety: All system components shall be UL Listed for the appropriate application.

G. Electric Power Requirements for the Sports Lighting Equipment:

1. Electric power: 480 Volt, 3 Phase

2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

2.2 STRUCTURAL PARAMETERS

A. Support Structure Wind Load Strength: Poles and other support structures, brackets, arms, bases, anchorages and foundations shall be determined based on the 2010 CBC Building Code, wind speed of 85 mph, exposure category C, and an importance factor of 1.0. Luminaire, visor, and crossarm shall withstand 150 mph winds and maintain luminaire aiming alignment.

B. Structural Design: The stress analysis and safety factor of the poles shall conform to AASHTO 2009 (LTS-5) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

C. Soil Conditions: The design criteria for these specifications are based on soil design parameters as outlined in the geotechnical report. If a geotechnical report is not provided by the City, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2010 CBC.

It shall be the contractor's responsibility to notify the City if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the City's approval / payment for additional costs associated with:

a) Providing engineered foundation embedment design by a registered engineer in the State of California.

b) Additional materials required to achieve alternate foundation.

c) Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

D. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole.

2.3 EXISTING STRUCTURAL PARAMETERS

A. Existing Support Structure Wind Load Strength: Existing poles and other support structures, brackets, arms, bases, anchorages and foundations meet the 1997 edition of the UBC-C Building Code, wind speed of 70 mph, exposure category C. Applies to existing pole locations B16.

B. Existing Support Structure Wind Load Strength: Existing poles and other support structures, brackets, arms, bases, anchorages and foundations meet the 2001 edition of the UBC-C Building Code, wind speed of 70 mph, exposure category C. Applies to existing pole location B13.

PART 3 – EXECUTION

3.1 FIELD QUALITY CONTROL

A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, City, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04.

B. Correcting Non-Conformance: If, in the opinion of the City or his appointed Representative the equipment was installed per the manufacturer's stated requirements, and the actual performance levels including footcandles, uniformity ratios, and maximum kilowatt consumptions are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be liable to any or all of the following:

1. Manufacturer shall at his expense provide and install any necessary additional fixtures to meet the minimum lighting standards. The Manufacturer shall also either replace the existing poles to meet the new wind load (EPA) requirements or verify by certification by a licensed structural engineer that the existing poles will withstand the additional wind load.

2. Manufacturer shall minimize the City's additional long term fixture maintenance and energy consumption costs created by the additional fixtures by reimbursing the City the amount of $1,000.00 (one thousand dollars) for each additional fixture required.

3. Manufacturer shall remove the entire unacceptable lighting system and install a new lighting system to meet the specifications.

SUBMITTAL INFORMATION

Design Submittal Data Checklist and Certification

All items listed below are mandatory, shall comply with the specification, and be submitted according to pre-bid submittal requirements

Tab	Item	Description
A	Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
B	Equipment Layout	Drawing(s) showing field layouts with pole locations.
C	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by, and other pertinent data b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), or homeplate for baseball/softball fields. Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, as well as luminaire information including wattage, lumens and optics d. Height of light level test meter above field surface e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance and uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor. f. Alternate manufacturers shall provide both initial and maintained light scans using a maximum Recoverable Light Loss Factor (RLLF) as specified in section 1.8.
D	Life Cycle Cost Calculation	Document life cycle cost calculations as defined in the specification. Identify energy costs for operating the luminaires, maintenance cost for the system including spot lamp replacement, and group relamping costs. All costs should be based on 25 years.
E	Luminaire Aiming Summary	Document showing each luminaire's aiming angle and the poles on which the luminaries are mounted. Each aiming point shall identify the type of luminaire.
F	Structural Information	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of California. (Applies for new pole locations A16, A21, and A22).
G	Control and Monitoring System	Manufacturer shall provide written definition and schematics for automated control system to include monitoring. They will also provide examples of system reporting and access for numbers for personal contact to operate the system.
H	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the City. Light levels must be guaranteed per specification for 25 years.
I	Warranty	Provide written warranty information including all terms and conditions.

J	Project References	Manufacturer to provide a list of projects where the technology proposed for this project has been installed in the state of California. If any form of a constant light system is bid, a minimum of 5 project references completed within the last calendar year is required. For a depreciating light system a full list of projects completed within the past 3 years is required. Reference list will include project name, project city, and if requested, contact name and contact phone number.
K	Product Information	Complete set of product brochures for all components, including a complete parts list and UL Listings.
L	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
M	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.

The information supplied herein shall be used for the purpose of complying with the specifications for Rancho Bernardo Park. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: Signature:

Contact Name: Date: _____/_____/_____

** END OF SECTION **

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

Notice of Exemption

NOTICE OF EXEMPTION

(Check one or both)

TO: __X__ RECORDER/COUNTY CLERK
P.O. BOX 1750, MS A-33
1600 PACIFIC HWY, ROOM 260
SAN DIEGO, CA 92101-2422

_____ OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET, ROOM 121
SACRAMENTO, CA 95814

FROM: CITY OF SAN DIEGO
DEVELOPMENT SERVICES DEPARTMENT
1222 FIRST AVENUE, MS 501
SAN DIEGO, CA 92101

PROJECT NO.: S – 11012.02.06 PROJECT TITLE: **RANCHO BERNARDO COMMUNITY PARK SPORTS FIELD LIGHTING**

PROJECT LOCATION-SPECIFIC: The project site is located at 18402 Rancho Bernardo Drive in the Rancho Bernardo Community Planning area.

PROJECT LOCATION-CITY/COUNTY: San Diego -San Diego

DESCRIPTION OF NATURE AND PURPOSE OF THE PROJECT: **RANCHO BERNARDO COMMUNITY PARK SPORTS FIELD LIGHTING**
This project consists of the design and construction of lighting systems for the multi-purpose sports field #6 within the community park. ADA improvements in the vicinity of sports field #6 include path of travel requirements, the construction of new sidewalk and upgrade of the existing sidewalk. The project is located within and existing developed park and no sensitive vegetation would be affected or removed. The lights will have design features to shield surrounding properties and the lights will go off at 10:15 pm to protect surrounding properties from excessive light and glare.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of San Diego

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT: Sheila Bose, Public Works Department/ Engineering and Capital Projects
600 B Street, San Diego, CA 92101
Phone: 619-533-4698.

EXEMPT STATUS: (CHECK ONE)

( ) MINISTERIAL (SEC. 21080(b)(1); 15268);
( ) DECLARED EMERGENCY (SEC. 21080(b)(3); 15269(a));
( ) EMERGENCY PROJECT (SEC. 21080(b)(4); 15269 (b)(c))
(X) CATEGORICAL EXEMPTION: 15301- Existing Facilities, 15303- New Construction or Conversion of Small Structures,
( ) STATUTORY EXEMPTIONS:

REASONS WHY PROJECT IS EXEMPT: The City of San Diego conducted an Initial Study which determined that since the project is located within an existing community park it will not result in any significant environmental impacts. Furthermore, the project meets the criteria set forth in CEQA Section 15301 which allows for the operation, repair maintenance, or minor alteration of existing public or private structures, facilities and 15303 which allows for New Construction or conversion of small structures for utilities/facilities and where the exception listed in CEQA section 15300.2 would not apply.

LEAD AGENCY CONTACT PERSON: Cameron TELEPHONE: (619) 446-5379

IF FILED BY APPLICANT:

1. ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING.
2. HAS A NOTICE OF EXEMPTION BEEN FILED BY THE PUBLIC AGENCY APPROVING THE PROJECT?
   ( ) YES ( ) NO

IT IS HEREBY CERTIFIED THAT THE CITY OF SAN DIEGO HAS DETERMINED THE ABOVE ACTIVITY TO BE EXEMPT FROM CEQA

Senior Planner March 28, 2012

SIGNATURE/TITLE DATE

CHECK ONE:

Revised March 28, 2012mjh

APPENDIX B

Fire Hydrant Meter Program

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER **DI** 55.27	DEPARTMENT Water Department
SUBJECT **FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)**	**PAGE** 1 **OF** 10	**EFFECTIVE DATE** October 15, 2002
	SUPERSEDES **DI** 55.27	**DATED** April 21, 2000

1. **PURPOSE**

1.1 To establish a Departmental policy and procedure for issuance, proper usage and charges for fire hydrant meters.

2. **AUTHORITY**

2.1 All authorities and references shall be current versions and revisions.

2.2 San Diego Municipal Code (NC) Chapter VI, Article 7, Sections 67.14 and 67.15

2.3 Code of Federal Regulations, Safe Drinking Water Act of 1986

2.4 California Code of Regulations, Titles 17 and 22

2.5 California State Penal Code, Section 498B.0

2.6 State of California Water Code, Section 110, 500-6, and 520-23

2.7 Water Department Director

Reference

2.8 State of California Guidance Manual for Cross Connection Programs

2.9 American Water Works Association Manual M-14, Recommended Practice for Backflow Prevention

2.10 American Water Works Association Standards for Water Meters

2.11 U.S.C. Foundation for Cross Connection Control and Hydraulic Research Manual

3. **DEFINITIONS**

3.1 **Fire Hydrant Meter:** A portable water meter which is connected to a fire hydrant for the purpose of temporary use. (These meters are sometimes referred to as Construction Meters.)

3.2 **Temporary Water Use:** Water provided to the customer for no longer than twelve (12) months.

3.3 **Backflow Preventor:** A Reduced Pressure Principal Assembly connected to the outlet side of a Fire Hydrant Meter.

4. POLICY

4.1 The Water Department shall collect a deposit from every customer requiring a fire hydrant meter and appurtenances prior to providing the meter and appurtenances (see Section 7.1 regarding the Fees and Deposit Schedule). The deposit is refundable upon the termination of use and return of equipment and appurtenances in good working condition.

4.2 Fire hydrant meters will have a 2 ½" swivel connection between the meter and fire hydrant. The meter shall not be connected to the 4" port on the hydrant. All Fire Hydrant Meters issued shall have a Reduced Pressure Principle Assembly (RP) as part of the installation. Spanner wrenches are the only tool allowed to turn on water at the fire hydrant.

4.3 The use of private hydrant meters on City hydrants is prohibited, with exceptions as noted below. All private fire hydrant meters are to be phased out of the City of San Diego. All customers who wish to continue to use their own fire hydrant meters must adhere to the following conditions:

a. Meters shall meet all City specifications and American Water Works Association (AWWA) standards.

b. Customers currently using private fire hydrant meters in the City of San Diego water system will be allowed to continue using the meter under the following conditions:

1. The customer must submit a current certificate of accuracy and calibration results for private meters and private backflows annually to the City of San Diego, Water Department, Meter Shop.

2. The meter must be properly identifiable with a clearly labeled serial number on the body of the fire hydrant meter. The serial number shall be plainly stamped on the register lid and the main casing. Serial numbers shall be visible from the top of the meter casing and the numbers shall be stamped on the top of the inlet casing flange.

3. All meters shall be locked to the fire hydrant by the Water Department, Meter Section (see Section 4.7).

4. All meters shall be read by the Water Department, Meter Section (see Section 4.7).

5. All meters shall be relocated by the Water Department, Meter Section (see Section 4.7).

6. These meters shall be tested on the anniversary of the original test date and proof of testing will be submitted to the Water Department, Meter Shop, on a yearly basis. If not tested, the meter will not be allowed for use in the City of San Diego.

7. All private fire hydrant meters shall have backflow devices attached when installed.

8. The customer must maintain and repair their own private meters and private backflows.

9. The customer must provide current test and calibration results to the Water Department, Meter Shop after any repairs.

10. When private meters are damaged beyond repair, these private meters will be replaced by City owned fire hydrant meters.

11. When a private meter malfunctions, the customer will be notified and the meter will be removed by the City and returned to the customer for repairs. Testing and calibration results shall be given to the City prior to any re-installation.

12. The register shall be hermetically sealed straight reading and shall be readable from the inlet side. Registration shall be in hundred cubic feet.

13. The outlet shall have a 2 ½ "National Standards Tested (NST) fire hydrant male coupling.

14. Private fire hydrant meters shall not be transferable from one contracting company to another (i.e. if a company goes out of business or is bought out by another company).

4.4 All fire hydrant meters and appurtenances shall be installed, relocated and removed by the City of San Diego, Water Department. All City owned fire hydrant meters and appurtenances shall be maintained by the City of San Diego, Water Department, Meter Services.

4.5 If any fire hydrant meter is used in violation of this Department Instruction, the violation will be reported to the Code Compliance Section for investigation and appropriate action. Any customer using a fire hydrant meter in violation of the requirements set forth above is subject to fines or penalties pursuant to the Municipal Code, Section 67.15 and Section 67.37.

4.6 **Conditions and Processes for Issuance of a Fire Hydrant Meter**

Process for Issuance

a. Fire hydrant meters shall only be used for the following purposes:

1. Temporary irrigation purposes not to exceed one year.

2. Construction and maintenance related activities (see Tab 2).

b. No customer inside or outside the boundaries of the City of San Diego Water Department shall resell any portion of the water delivered through a fire hydrant by the City of San Diego Water Department.

c. The City of San Diego allows for the issuance of a temporary fire hydrant meter for a period not to exceed 12 months (365 days). An extension can only be granted in writing from the Water Department Director for up to 90 additional days. A written request for an extension by the consumer must be submitted at least 30 days prior to the 12 month period ending. No extension shall be granted to any customer with a delinquent account with the Water Department. No further extensions shall be granted.

d. Any customer requesting the issuance of a fire hydrant meter shall file an application with the Meter Section. The customer must complete a "Fire Hydrant Meter Application" (Tab 1) which includes the name of the company, the party responsible for payment, Social Security number and/or California ID, requested location of the meter (a detailed map signifying an exact location), local contact person, local phone number, a contractor's license (or a business license), description of specific water use, duration of use at the site and full name and address of the person responsible for payment.

e. At the time of the application the customer will pay their fees according to the schedule set forth in the Rate Book of Fees and Charges, located in the City Clerk's Office. All fees must be paid by check, money order or cashiers check, made payable to the City Treasurer. Cash will not be accepted.

f. No fire hydrant meters shall be furnished or relocated for any customer with a delinquent account with the Water Department.

g. After the fees have been paid and an account has been created, the

meter shall be installed within 48 hours (by the second business day). For an additional fee, at overtime rates, meters can be installed within 24 hours (within one business day).

4.7 **Relocation of Existing Fire Hydrant Meters**

a. The customer shall call the Fire Hydrant Meter Hotline (herein referred to as "Hotline"), a minimum of 24 hours in advance, to request the relocation of a meter. A fee will be charged to the existing account, which must be current before a work order is generated for the meter's relocation.

b. The customer will supply in writing the address where the meter is to be relocated (map page, cross street, etc). The customer must update the original Fire Hydrant Meter Application with any changes as it applies to the new location.

c. Fire hydrant meters shall be read on a monthly basis. While fire hydrant meters and backflow devices are in service, commodity, base fee and damage charges, if applicable, will be billed to the customer on a monthly basis. If the account becomes delinquent, the meter will be removed.

4.8 **Disconnection of Fire Hydrant Meter**

a. After ten (10) months a "Notice of Discontinuation of Service" (Tab 3) will be issued to the site and the address of record to notify the customer of the date of discontinuance of service. An extension can only be granted in writing from the Water Department Director for up to 90 additional days (as stated in Section 4.6C) and a copy of the extension shall be forwarded to the Meter Shop Supervisor. If an extension has not been approved, the meter will be removed after twelve (12) months of use.

b. Upon completion of the project the customer will notify the Meter Services office via the Hotline to request the removal of the fire hydrant meter and appurtenances. A work order will be generated

for removal of the meter.

c. Meter Section staff will remove the meter and backflow prevention assembly and return it to the Meter Shop. Once returned to the Meter Shop the meter and backflow will be tested for accuracy and functionality.

d. Meter Section Staff will contact and notify Customer Services of the final read and any charges resulting from damages to the meter and backflow or its appurtenance. These charges will be added on the customer's final bill and will be sent to the address of record. Any customer who has an outstanding balance will not receive additional meters.

e. Outstanding balances due may be deducted from deposits and any balances refunded to the customer. Any outstanding balances will be turned over to the City Treasurer for collection. Outstanding balances may also be transferred to any other existing accounts.

5. EXCEPTIONS

5.1 Any request for exceptions to this policy shall be presented, in writing, to the Customer Support Deputy Director, or his/her designee for consideration.

6. MOBILE METER

6.1 Mobile meters will be allowed on a case by case basis. All mobile meters will be protected by an approved backflow assembly and the minimum requirement will be a Reduced Pressure Principal Assembly. The two types of Mobile Meters are vehicle mounted and floating meters. Each style of meters has separate guidelines that shall be followed for the customer to retain service and are described below:

a) **Vehicle Mounted Meters**: Customer applies for and receives a City owned Fire Hydrant Meter from the Meter Shop. The customer mounts the meter on the vehicle and brings it to the Meter Shop for

inspection. After installation is approved by the Meter Shop the vehicle and meter shall be brought to the Meter Shop on a monthly basis for meter reading and on a quarterly basis for testing of the backflow assembly. Meters mounted at the owner's expense shall have the one year contract expiration waived and shall have meter or backflow changed if either fails.

b) **Floating Meters**: Floating Meters are meters that are not mounted to a vehicle. **(Note: All floating meters shall have an approved backflow assembly attached.)** The customer shall submit an application and a letter explaining the need for a floating meter to the Meter Shop. The Fire Hydrant Meter Administrator, after a thorough review of the needs of the customer, (i.e. number of jobsites per day, City contract work, lack of mounting area on work vehicle, etc.), may issue a floating meter. At the time of issue, it will be necessary for the customer to complete and sign the "Floating Fire Hydrant Meter Agreement" which states the following:

    1) The meter will be brought to the Meter Shop at 2797 Caminito Chollas, San Diego on the third week of each month for the monthly read by Meter Shop personnel.

    2) Every other month the meter will be read and the backflow will be tested. This date will be determined by the start date of the agreement.

If any of the conditions stated above are not met the Meter Shop has the right to cancel the contract for floating meter use and close the account associated with the meter. The Meter Shop will also exercise the right to refuse the issuance of another floating meter to the company in question.

Any Fire Hydrant Meter using reclaimed water shall not be allowed use again with any potable water supply. The customer shall incur the cost of replacing the meter and backflow device in this instance.

7. FEE AND DEPOSIT SCHEDULES

7.1 **Fees and Deposit Schedules:** The fees and deposits, as listed in the Rate Book of Fees and Charges, on file with the Office of the City Clerk, are based on actual reimbursement of costs of services performed, equipment and materials. Theses deposits and fees will be amended, as needed, based on actual costs. Deposits, will be refunded at the end of the use of the fire hydrant meter, upon return of equipment in good working condition and all outstanding balances on account are paid. Deposits can also be used to cover outstanding balances.

All fees for equipment, installation, testing, relocation and other costs related to this program are subject to change without prior notification. The Mayor and Council will be notified of any future changes.

8. UNAUTHORIZED USE OF WATER FROM A HYDRANT

8.1 Use of water from any fire hydrant without a properly issued and installed fire hydrant meter is theft of City property. Customers who use water for unauthorized purposes or without a City of San Diego issued meter will be prosecuted.

8.2 If any unauthorized connection, disconnection or relocation of a fire hydrant meter, or other connection device is made by anyone other than authorized Water Department personnel, the person making the connection will be prosecuted for a violation of San Diego Municipal Code, Section 67.15. In the case of a second offense, the customer's fire hydrant meter shall be confiscated and/or the deposit will be forfeited.

8.3 Unauthorized water use shall be billed to the responsible party. Water use charges shall be based on meter readings, or estimates when meter readings are not available.

8.4 In case of unauthorized water use, the customer shall be billed for all applicable charges as if proper authorization for the water use had been obtained, including but not limited to bi-monthly service charges, installation charges and removal charges.

8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

Larry Gardner
Water Department Director

Tabs:
1. Fire Hydrant Meter Application
2. Construction & Maintenance Related Activities With No Return To Sewer
3. Notice of Discontinuation of Service

APPENDIX

Administering Division: Customer Support Division

Subject Index:
Construction Meters
Fire Hydrant
Fire Hydrant Meter Program
Meters, Floating or Vehicle Mounted
Mobile Meter
Program, Fire Hydrant Meter

Distribution: DI Manual Holders

Application for Fire Hydrant Meter (EXHIBIT A)

City of San Diego PUBLIC UTILITIES Water & Wastewater

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

Application Date	Requested Install Date:

Meter Information

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) Zip:	T.B.	G.B. (CITY USE)
Specific Use of Water:		
Any Return to Sewer or Storm Drain, If so , explain:		
Estimated Duration of Meter Use: ☐ Check Box if Reclaimed Water		

Company Information

Company Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
*Business license#	*Contractor license#		
A Copy of the Contractor's license OR Business License is required at the time of meter issuance.			
Name and Title of Billing Agent: (PERSON IN ACCOUNTS PAYABLE)			Phone: ( )
Site Contact Name and Title:			Phone: ( )
Responsible Party Name:			Title:
Cal ID#			Phone: ( )
Signature:		Date:	

Guarantees Payment of all Charges Resulting from the use of this Meter. Insures that employees of this Organization understand the proper use of Fire Hydrant Meter

☐ Fire Hydrant Meter Removal Request	Requested Removal Date:	
Provide Current Meter Location if Different from Above:		
Signature:	Title:	Date:
Phone: ( )	Pager: ( )	

☐ City Meter	☐ Private Meter		
Contract Acct #:	Deposit Amount: $ 936.00	Fees Amount: $ 62.00	
Meter Serial #	Meter Size: 05	Meter Make and Style: 6-7	
Backflow #	Backflow Size:	Backflow Make and Style:	
Name:	Signature:	Date:	

WATER USES WITHOUT ANTICIPATED CHARGES FOR RETURN TO SEWER

Auto Detailing
Backfilling
Combination Cleaners (Vactors)
Compaction
Concrete Cutters
Construction Trailers
Cross Connection Testing
Dust Control
Flushing Water Mains
Hydro Blasting
Hydro Seeing
Irrigation (for establishing irrigation only; not continuing irrigation)
Mixing Concrete
Mobile Car Washing
Special Events
Street Sweeping
Water Tanks
Water Trucks
Window Washing

Note:

1. If there is any return to sewer or storm drain, then sewer and/or storm drain fees will be charges.

Date

Name of Responsible Party
Company Name and Address
Account Number:_____

Subject: Discontinuation of Fire Hydrant Meter Service

Dear Water Department Customer:

The authorization for use of Fire Hydrant Meter #_____, located at *(Meter Location Address)* ends in 60 days and will be removed on or after *(Date Authorization Expires)*. Extension requests for an additional 90 days must be submitted in writing for consideration 30 days prior to the discontinuation date. If you require an extension, please contact the Water Department, or mail your request for an extension to:

City of San Diego
Water Department
Attention: Meter Services
2797 Caminito Chollas
San Diego, CA 92105-5097

Should you have any questions regarding this matter, please call the Fire Hydrant Hotline at (619)_____-_____.

Sincerely,

Water Department

APPENDIX C

Materials Typically Accepted by Certificate of Compliance

Materials Typically Accepted by Certificate of Compliance

1. Soil amendment
2. Fiber mulch
3. PVC or PE pipe up to 16 inch diameter
4. Stabilizing emulsion
5. Lime
6. Preformed elastomeric joint seal
7. Plain and fabric reinforced elastomeric bearing pads
8. Steel reinforced elastomeric bearing pads
9. Waterstops (Special Condition)
10. Epoxy coated bar reinforcement
11. Plain and reinforcing steel
12. Structural steel
13. Structural timber and lumber
14. Treated timber and lumber
15. Lumber and timber
16. Aluminum pipe and aluminum pipe arch
17. Corrugated steel pipe and corrugated steel pipe arch
18. Structural metal plate pipe arches and pipe arches
19. Perforated steel pipe
20. Aluminum underdrain pipe
21. Aluminum or steel entrance tapers, pipe downdrains, reducers, coupling bands and slip joints
22. Metal target plates
23. Paint (traffic striping)
24. Conductors
25. Painting of electrical equipment
26. Electrical components
27. Engineering fabric
28. Portland Cement
29. PCC admixtures
30. Minor concrete, asphalt
31. Asphalt (oil)
32. Liquid asphalt emulsion
33. Epoxy

APPENDIX D

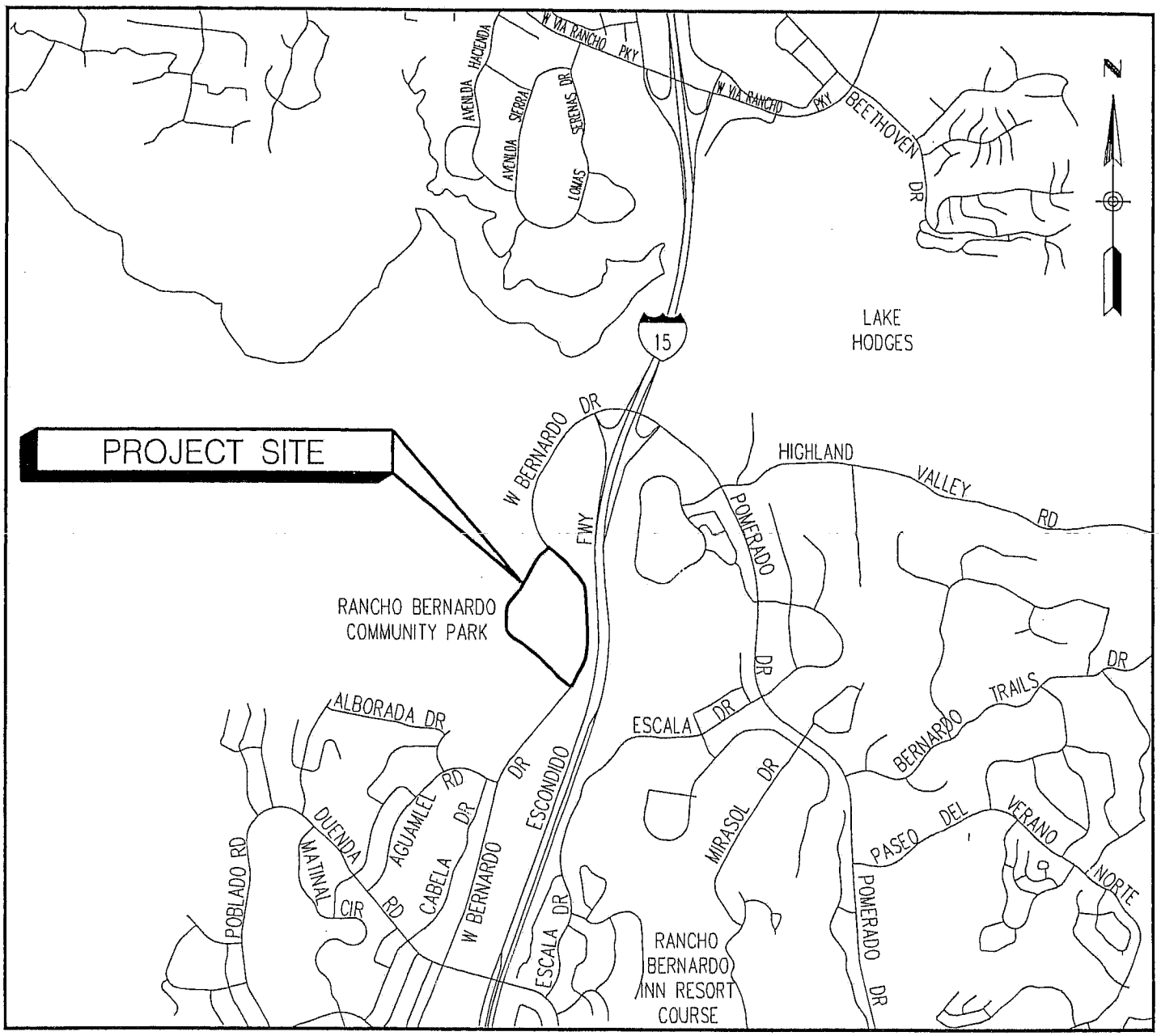
Sample City Invoice

City of San Diego, Field Engineering Div., 9485 Aero Drive, SD CA 92123						Contractor's Name:					
Project Name:						Contractor's Address:					
SAP No. (WBS/IO/CC)											
City Purchase Order No.						Contractor's Phone #:				Invoice No.	
Resident Engineer (RE):						Contractor's Fax #:				Invoice Date:	
RE Phone#:		RE Fax#:				Contact Name:			Billing Period:		
Item #	Item Description	Contract Authorization				Previous Estimate		This Estimate		Totals to Date	
		Unit	Qty	Price	Extension	%/QTY	Amount	% / QTY	Amount	% / QTY	Amount
1	2 Parallel 4" PVC C900	LF	1,380	$34.00	$46,920.00						
2	48" Primary Steel Casing	LF	500	$1,000.00	$500,000.00						
3	2 Parallel 12" Secondary Steel	LF	1,120	$53.00	$59,360.00						
4	Construction and Rehab of PS 49	LS	1	$150,000.00	$150,000.00						
5	Demo	LS	1	$14,000.00	$14,000.00						
6	Install 6' High Chain Link Fence	LS	1	$5,600.00	$5,600.00						
7	General Site Restoration	LS	1	$3,700.00	$3,700.00						
8	10" Gravity Sewer	LF	10	$292.00	$2,920.00						
9	4" Blow Off Valves	EA	2	$9,800.00	$19,600.00						
10	Bonds	LS	1	$16,000.00	$16,000.00						
11	Field Orders	AL	1	80,000	$80,000.00						
11.1	**Field Order 1**	**LS**	**5,500**	**$1.00**	$5,500.00						
11.2	**Field Order 2**	**LS**	**7,500**	**$1.00**	$7,500.00						
11.3	**Field Order 3**	**LS**	**10,000**	**$1.00**	$10,000.00						
11.4	**Field Order 4**	**LS**	**6,500**	**$1.00**	$6,500.00						
12	**Certified Payroll**	**LS**	**1**	**$1,400.00**	$1,400.00						
CHANGE ORDERS											
Change Order 1		**4,890**									
Items 1-4					**$11,250.00**						
Item 5-Deduct Bid Item 3		**LF**	**120**	**-$53.00**	**($6,360.00)**						
Change Order 2		**160,480**									
Items 1-3					**$95,000.00**						
Item 4 Deduct Bid Item 1		**LF**	**380**	**-$340.00**	**($12,920.00)**						
Item 5-Encrease bid Item 9		**LF**	**8**	**$9,800.00**	**$78,400.00**						
Change Order 3 (Close Out)		**-121,500**									
Item 1 Deduct Bid Item 3			**53**	**-500.00**	**($26,500.00)**						
Item 2 Deduct Bid Item 4		**LS**	**-1**	**45,000.00**	**($45,000.00)**						
Items 3-9			**1**	**-50,500.00**	**($50,500.00)**						
SUMMARY								Total This	$ -	**Total Billed**	$0.00
A. Original Contract Amount							**Retention and/or Escrow Payment Schedule**				
B. Approved Change Order 1 Thru 3							Total Retention Required as of this billing				
C. Total Authorized Amount (A+B)							Previous Retention Withheld in PO or in Escrow				
D. Total Billed to Date							Add'l Amt to Withhold in PO/Transfer in Escrow:				
E. Less Total Retention (5% of D)							Amt to Release to Contractor from PO/Escrow:				
F. Less Total Previous Payments											
G. Payment Due Less Retention						**Contractor Signature and Date:**					
H. Remaining Authorized Amount											

APPENDIX E

Location Map

Rancho Bernardo Community Park



LOCATION MAP

NOT TO SCALE

APPENDIX F

Structural Calculations, Pole Foundation Standard for Rancho Bernardo Park Field Lighting, by R.L. Foley & Associates, Inc. (revised March 25, 2013)

MUSCO LIGHTING, INC.
Light Structure Pole and Foundation Standard

ITEM : **Structural Calculations**
Pole Foundation Standard
Revise to assume Class 5 Soils

PROJECT RANCHO BERNARDO PARK
FIELD LIGHTING
SAN DIEGO, CA

PROJECT NO : 156542
2013-009

DATE : 3/25/2013

ENGINEER : R.L. Foley & Associates, Inc.
Structural Engineers
25652 Ashby Way
Lake Forest, Ca 92630

MUSCO LIGHTING, INC.
Light Structure Pole and Foundation Standard

Calculation Index

CONTENTS:

CODE REFERENCE:

2010 CBC

ACI 318-08
Building Code Requirements for Structural Concrete

AISC 360-05
Specifications for Structural Steel Buildings

R.L. POLEY & ASSOCIATES, INC.
STRUCTURAL ENGINEERS
LAKE FOREST, CA

POLE DESIGNATION: LS70-AA W/ 3 FIXTURES
MANUFACTURER: MUSCO
PROJECT NO:

JOB NO: 2013-009
PROJECT: RANCHO BERNARDO PARK
LOCATION: SAN DIEGO, CA

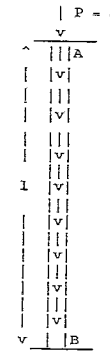
ASCE 7-05
WIND CRITERIA 85.0 MPH, EXP C

POLE ID: A16

| P = SUPERIMPOSED WT + POLE WT

EPA/FIXTURE*, Af	= 1.90	ft2	
D.L./FIXTURE**	= 40.0	lbs	
D.L./BALLAST***	= 50.0	lbs	

* EPA = EFFECTIVE PROJECTED AREA PER MUSCO
** D.L.= DEAD LOAD OF FIXTURE, & CROSSARM PER MUSCO
*** D.L.= DEAD LOAD OF BALLAST PER MUSCO; APPLIED AT 15.0 FT ABOVE GRADE



LOADING DIAGRAM

<---FIXTURES, F/Af= qz*Gf*Cf = 25.04 PSF MAX (6-28)
<---where qz = 0.00256*Kz*Kzt*Kd(20.64 PSF MAX (6-15)
<---

ATTACHMENT TYPE	NUMBER	DIST. FROM TOP POLE, FT	PA SQ FT	Cf	EPA SQ FT	Kz	qz PSF	WIND, F LBS	WEIGHT, P LBS
FIXTURE	3.0	0.5		1.0	1.90	1.173	20.61	143	120
FIXTURE	0.0	3.0		1.0	1.90	1.164	20.45	0	0
FIXTURE	0.0	5.5		1.0	1.90	1.155	20.29	0	0
FIXTURE	0.0	8.0		1.0	1.90	1.145	20.12	0	0
FIXTURE	0.0	10.5		1.0	1.90	1.135	19.95	0	0
FIXTURE	0.0	13.0		1.0	1.90	1.125	19.77	0	0
FIXTURE	0.0	15.5		1.0	1.90	1.115	19.59	0	0
FIXTURE	0.0	18.0		1.0	1.90	1.104	19.39	0	0
FIXTURE	0.0	20.5		1.0	1.90	1.092	19.19	0	0
FIXTURE	0.0	23.0		1.0	1.90	1.081	18.99	0	0
FIXTURE	3.0	58.2	4.00	1.3	5.20	0.849	14.92	94	150
							TOTALS =	237	270

POLE, F/Af= qz*G*Cf = 30.05 PSF MAX (6-28)
where qz = 0.00256*Kz*Kzt*I 20.64 PSF MAX (6-15)

INPUT

-> l = 70.20 ft. (max. ht. from grade)
-> l = 70.20 ft. (ht. from grade)
->tA = 0.156 in. (pole thk. @ top)
->dA = 5.00 in. (pole diam. @ top)
->dB = 12.00 in. (pole diam. @ btm)
->tB = 0.179 in. (pole thk. @ btm)
->Fy = 38.0 ksi (fixt mount sect. = 15.00 ft)
->Fy = 55.0 ksi (other pole sect.)
-> E = 29,000 ksi
->Kzt= 1 (6-3)
->Kd = 0.95 (Table 6-4)
-> Kz = 1.175 MAX-EXP C @ 70.2 FT. (Table 6-3)
-> I = 1.00 (Table 6-
-> Cf = 1.00 LIGHT FIXTURE (INCLUDED IN EPA)
-> Cf = 1.200 MAX (VARIES 0.5-1.2 FOR RND POLE) (Figure 6-21)
POLE DAMPING, beta= 0.025 Per Musco test

OUTPUT

-> POLE NATURAL FREQUENCY = 0.443 Hz 1/(2PI*(DELTA/386)^0.5) where DELTA is due to self weight
-> Gf= 1.21 (6-8) (Reference Vibration Problems in Engineering by Timoshenko, 4th ED. pg.34; Reference 2001 AASHTO Eqn C11-3)

Pole Properties:

Ia =	6.97	in4	taper =	0.140	in/ft
Ib =	116	in4	db/da =	2.400	
ra =	1.714	in	rb =	4.180	in.
Aa =	2.374	in2	Ab =	6.65	in2
Sa =	2.79	in3	Sb =	19.36	in3

From Critical Buckling Loads of Tapered Columns, ASCE 2/62:

n = Log (Ib/(Ia)/Log (db/da) = 3.21
P* = (Ib/Ia)/(Ib/Ia)^.333 = 6.5
kl/req* (1/(P*)^.5)[kl/ra] = 404 (where k= 2.1)

AISC 360-05 Specification Table B4.1, Case 15

for Fy =	55.0 KSI	38	KSI
D/t < .45E/Fy =	237	343	(MAX)
D/t < .31E/Fy =	163	237	Noncompact
D/t < .07E/Fy =	37	53	Compact
D/t < .11E/Fy =	58	84	Slender element Section for Uniform Compression

Section 6.5.8.2 Gust-Effect Factor					
constant epsilon,e	=	0.2	Lz	=	525.0
constant l	=	500	N1	=	2.763
Vz	=	84.13	Rn	=	0.073
4.6n1h/Vz	=	1.699			
4.6n1B/Vz	=	0.017	R	=	1.096
15.4n1L/Vz	=	0.057	g_R	=	3.991
			c	=	0.200
Rh	=	0.421	Iz	=	0.192
RB	=	0.989	Q	=	0.921
RL	=	0.963	G	=	0.887
			Gf =		1.213

F=	1.068 KIPS	MOMENT=	44.11 K-FT	e= M/F=	41.32 FT	P=	1.237 KIPS	(SUMMARY FOR FOOTING CHECK)

< ΦMn/1.6 = 51 K-FT Precast Base O.K.

1/31/2013

LS70-AA

DIST. FROM TOP, FT	OUTSIDE DIAM. IN.	THICK. t	D/t	Kz	qz PSF	Cf Pole	kl/r eqiv.	E3-4 Fe KSI	E3-2 or E3-3 ALL.Pn KIPS	F8.1-F8.2 ACT. Pr KIPS	F8.1-F8.2 ALL. Mn K-FT	F8.1-F8.2 ACT. Mr K-FT	Pr/Pc	H1-1b for Pr/Pc <0.2	H1-1a for Pr/Pc ≥ 0.2	2nd Order /1st Order Moment FT-K	CSR O.K.	Shear, P KIPS	1st Order Delta IN	C2.2a 1.6xP-Delta Moment FT-K	Total 2nd Order Moment FT-K	E7-19 Q	ACTING MOM DUE TO DL	M/I	DEFL DUE TO D - IN
0	5.00	0.156	32.1	1.175	20.64	1.2	404	1.75	2.18	0.000	6.61	0.0	0.000	0.000	N.A.	1.000	Y	0.000	65.4	0.0	0.0	1.571	0.00	0.0003	49.88
1	5.00	0.156	32.1	1.171	20.58	1.2	404	1.75	2.18	0.128	6.61	0.1	0.059	0.046	N.A.	1.397	Y	0.155	63.6	0.0	0.1	1.571	0.00	0.0101	48.53
2	5.00	0.156	32.1	1.168	20.52	1.2	404	1.75	2.18	0.136	6.61	0.2	0.062	0.077	N.A.	1.266	Y	0.167	61.8	0.1	0.3	1.571	0.14	0.0296	47.17
3	5.00	0.156	32.1	1.164	20.45	1.2	404	1.75	2.18	0.144	6.61	0.4	0.066	0.110	N.A.	1.238	Y	0.180	60.0	0.2	0.5	1.571	0.28	0.0503	45.82
4	5.00	0.156	32.1	1.160	20.39	1.2	404	1.75	2.18	0.152	6.61	0.6	0.070	0.146	N.A.	1.225	Y	0.192	58.2	0.2	0.7	1.571	0.42	0.0721	44.47
5	5.00	0.156	32.1	1.157	20.32	1.2	404	1.75	2.18	0.160	6.61	0.8	0.073	0.183	N.A.	1.217	Y	0.205	56.4	0.3	1.0	1.571	0.58	0.0951	43.12
6	5.00	0.156	32.1	1.153	20.26	1.2	404	1.75	2.18	0.168	6.61	1.0	0.077	0.223	N.A.	1.212	Y	0.217	54.6	0.3	1.2	1.571	0.75	0.1193	41.78
7	5.00	0.156	32.1	1.149	20.19	1.2	404	1.75	2.18	0.177	6.61	1.2	0.081	0.265	N.A.	1.207	Y	0.229	52.8	0.4	1.5	1.571	0.92	0.1446	40.45
8	5.00	0.156	32.1	1.145	20.12	1.2	404	1.75	2.18	0.185	6.61	1.5	0.085	0.309	N.A.	1.204	Y	0.241	51.1	0.5	1.8	1.571	1.10	0.1711	39.12
9	5.00	0.156	32.1	1.141	20.05	1.2	404	1.75	2.18	0.193	6.61	1.7	0.088	0.355	N.A.	1.201	Y	0.253	49.3	0.5	2.1	1.571	1.29	0.1988	37.80
10	5.00	0.156	32.1	1.137	19.98	1.2	404	1.75	2.18	0.201	6.61	2.0	0.092	0.403	N.A.	1.198	Y	0.266	47.6	0.6	2.4	1.571	1.48	0.2276	36.49
11	5.00	0.156	32.1	1.133	19.91	1.2	404	1.75	2.18	0.209	6.61	2.2	0.096	0.454	N.A.	1.195	Y	0.278	45.9	0.7	2.7	1.571	1.69	0.2576	35.20
12	5.00	0.156	32.1	1.129	19.84	1.2	404	1.75	2.18	0.217	6.61	2.5	0.099	0.506	N.A.	1.193	Y	0.290	44.2	0.8	3.0	1.571	1.90	0.2887	33.92
13	5.00	0.156	32.1	1.125	19.77	1.2	404	1.75	2.18	0.225	6.61	2.8	0.103	0.560	N.A.	1.190	Y	0.302	42.5	0.9	3.4	1.571	2.12	0.321	32.65
14	5.00	0.156	32.1	1.121	19.70	1.2	404	1.75	2.18	0.232	6.61	3.1	0.106	0.616	N.A.	1.188	Y	0.314	40.8	0.9	3.7	1.571	2.35	0.4034	31.41
15	4.84	0.135	36.0	1.117	19.62	1.2	404	1.75	1.83	0.239	7.81	3.5	0.130	0.589	N.A.	1.186	Y	0.325	39.2	1.0	4.1	1.223	2.59	0.4698	30.18
16	4.98	0.135	37.0	1.113	19.55	1.2	404	1.75	1.88	0.246	8.61	3.8	0.131	0.585	N.A.	1.183	Y	0.337	37.6	1.1	4.5	1.208	2.83	0.47	28.99
17	5.12	0.135	38.1	1.108	19.47	1.2	404	1.75	1.94	0.253	9.07	4.1	0.131	0.602	N.A.	1.181	Y	0.349	36.0	1.2	4.9	1.193	3.08	0.4691	27.82
18	5.26	0.135	39.1	1.104	19.39	1.2	404	1.75	1.99	0.261	9.53	4.5	0.131	0.619	N.A.	1.178	Y	0.361	34.5	1.3	5.3	1.179	3.34	0.4674	26.67
19	5.40	0.135	40.2	1.099	19.32	1.2	404	1.75	2.05	0.269	10.01	4.8	0.131	0.635	N.A.	1.176	Y	0.374	33.0	1.4	5.7	1.166	3.60	0.465	25.56
20	5.54	0.135	41.2	1.095	19.24	1.2	404	1.75	2.10	0.277	10.50	5.2	0.132	0.650	N.A.	1.173	Y	0.386	31.6	1.4	6.1	1.153	3.87	0.4621	24.47
21	5.68	0.135	42.2	1.090	19.15	1.2	404	1.75	2.16	0.285	11.00	5.6	0.132	0.664	N.A.	1.170	Y	0.399	30.2	1.5	6.6	1.141	4.15	0.4589	23.41
22	5.82	0.135	43.3	1.085	19.07	1.2	404	1.75	2.21	0.293	11.51	6.0	0.133	0.678	N.A.	1.168	Y	0.413	28.8	1.6	7.0	1.13	4.44	0.4553	22.38
23	5.96	0.135	44.3	1.081	18.99	1.2	404	1.75	2.27	0.302	12.03	6.4	0.133	0.691	N.A.	1.165	Y	0.426	27.5	1.7	7.5	1.119	4.74	0.4515	21.38
24	6.10	0.135	45.4	1.076	18.90	1.2	404	1.75	2.32	0.311	12.56	6.9	0.134	0.703	N.A.	1.163	Y	0.440	26.2	1.8	8.0	1.108	5.05	0.4475	20.40
25	6.24	0.135	46.4	1.071	18.81	1.2	404	1.75	2.37	0.320	13.11	7.3	0.135	0.716	N.A.	1.160	Y	0.454	24.9	1.9	8.5	1.098	5.36	0.4434	19.45
26	6.38	0.135	47.4	1.066	18.73	1.2	404	1.75	2.43	0.329	13.66	7.8	0.135	0.727	N.A.	1.157	Y	0.468	23.7	2.0	9.0	1.089	5.68	0.4393	18.53
27	6.52	0.135	48.5	1.061	18.64	1.2	404	1.75	2.48	0.338	14.23	8.3	0.136	0.739	N.A.	1.155	Y	0.483	22.5	2.0	9.5	1.08	6.02	0.4351	17.63
28	6.66	0.135	49.5	1.055	18.54	1.2	404	1.75	2.54	0.348	14.81	8.8	0.137	0.749	N.A.	1.152	Y	0.498	21.4	2.1	10.1	1.071	6.36	0.4309	16.76
29	6.80	0.135	50.6	1.050	18.45	1.2	404	1.75	2.59	0.357	15.40	9.3	0.138	0.760	N.A.	1.150	Y	0.513	20.3	2.2	10.6	1.063	6.71	0.4267	15.91
30	6.94	0.135	51.6	1.045	18.36	1.2	404	1.75	2.65	0.367	16.00	9.8	0.139	0.770	N.A.	1.147	Y	0.528	19.2	2.3	11.2	1.055	7.08	0.4226	15.09
31	7.08	0.135	52.6	1.039	18.26	0.7	404	1.75	2.70	0.378	16.62	10.3	0.140	0.780	N.A.	1.145	Y	0.537	18.1	2.4	11.8	1.047	7.45	0.4185	14.30
32	7.22	0.135	53.7	1.034	18.16	0.7	404	1.75	2.75	0.388	17.24	10.9	0.141	0.789	N.A.	1.142	Y	0.547	17.1	2.5	12.4	1.04	7.83	0.4144	13.53
33	7.36	0.135	54.7	1.028	18.06	0.7	404	1.75	2.81	0.399	17.88	11.4	0.142	0.798	N.A.	1.140	Y	0.556	16.1	2.6	13.0	1.033	8.22	0.4105	12.78
34	7.50	0.135	55.8	1.022	17.96	0.7	404	1.75	2.86	0.409	18.52	12.0	0.143	0.806	N.A.	1.138	Y	0.565	15.2	2.6	13.6	1.026	8.63	0.4066	12.06
35	7.64	0.135	56.8	1.016	17.85	0.7	404	1.75	2.92	0.420	19.18	12.5	0.144	0.814	N.A.	1.135	Y	0.575	14.3	2.7	14.2	1.019	9.04	0.4027	11.37
36	7.78	0.135	57.9	1.010	17.74	0.7	404	1.75	2.97	0.432	19.85	13.1	0.145	0.821	N.A.	1.133	Y	0.585	13.4	2.8	14.9	1.013	9.47	0.399	10.69
37	7.92	0.135	58.9	1.003	17.63	0.7	404	1.75	3.03	0.443	20.53	13.7	0.146	0.828	N.A.	1.131	Y	0.594	12.6	2.9	15.5	1.007	9.91	0.3953	10.05
38	8.06	0.135	59.9	0.997	17.52	0.7	404	1.75	3.08	0.455	21.23	14.3	0.148	0.835	N.A.	1.129	Y	0.604	11.8	3.0	16.2	1.001	10.35	0.3918	9.42
39	8.20	0.135	61.0	0.990	17.40	0.7	404	1.75	3.14	0.466	21.93	14.9	0.149	0.841	N.A.	1.127	Y	0.614	11.0	3.0	16.8	0.995	10.81	0.3883	8.82
40	8.34	0.135	62.0	0.984	17.28	0.7	404	1.75	3.19	0.478	22.65	15.5	0.150	0.847	N.A.	1.125	Y	0.624	10.2	3.1	17.5	0.99	11.29	0.3849	8.24
41	8.48	0.135	63.1	0.977	17.16	0.7	404	1.75	3.24	0.491	23.37	16.2	0.151	0.852	N.A.	1.123	Y	0.635	9.5	3.2	18.2	0.984	11.77	0.3816	7.69
42	8.62	0.135	64.1	0.970	17.04	0.7	404	1.75	3.30	0.503	24.11	16.8	0.152	0.857	N.A.	1.121	Y	0.645	8.9	3.3	18.8	0.979	12.27	0.3783	7.16
43	8.76	0.135	65.1	0.962	16.91	0.7	404	1.75	3.35	0.516	24.86	17.5	0.154	0.863	N.A.	1.119	Y	0.655	8.2	3.3	19.5	0.974	12.78	0.3752	6.65
44	8.90	0.135	66.2	0.955	16.77	0.7	404	1.75	3.41	0.528	25.62	18.1	0.155	0.867	N.A.	1.117	Y	0.666	7.6	3.4	20.2	0.969	13.30	0.3721	6.16
45	9.04	0.135	67.2	0.947	16.64	0.7	404	1.75	3.46	0.541	26.39	18.8	0.156	0.872	N.A.	1.115	Y	0.676	7.0	3.5	20.9	0.965	13.83	0.3692	5.70
46	9.18	0.135	68.3	0.939	16.50	0.7	404	1.75	3.52	0.555	27.18	19.5	0.158	0.876	N.A.	1.113	Y	0.687	6.4	3.5	21.7	0.96	14.38	0.3663	5.25
47	9.32	0.135	69.3	0.931	16.35	0.7	404	1.75	3.57	0.572	27.97	20.2	0.160	0.881	N.A.	1.112	Y	0.698	5.9	3.6	22.4	0.956	14.94	0.3328	4.83
48	9.20	0.179	51.4	0.922	16.20	0.7	404	1.75	4.67	0.589	37.44	20.9	0.126	0.681	N.A.	1.110	Y	0.708	5.4	3.7	23.1	1.057	15.52	0.2995	4.43
49	9.34	0.179	52.2	0.913	16.04	0.7	404	1.75	4.74	0.607	38.51	21.6	0.128	0.685	N.A.	1.108	Y	0.719	4.9	3.7	23.9	1.051	16.12	0.297	4.05
50	9.48	0.179	53.0	0.904	15.88	0.7	404	1.75	4.81	0.625	39.61	22.3	0.130	0.688	N.A.	1.106	Y	0.729	4.5	3.8	24.7	1.045	16.74	0.2947	3.69

1/31/2013 LS70-AA

51	9.62	0.179	53.7	0.894	15.71	0.7	404	1.75	4.88	0.644	40.72	23.0	0.132	0.690	N.A.	1.104	Y	0.740	4.0	3.8	25.4	1.039	17.37	0.2925	3.35
52	9.76	0.179	54.5	0.884	15.54	0.7	404	1.75	4.96	0.662	41.84	23.8	0.134	0.693	N.A.	1.102	Y	0.751	3.6	3.9	26.2	1.034	18.02	0.2905	3.02
53	9.90	0.179	55.3	0.874	15.35	0.7	404	1.75	5.03	0.681	42.98	24.5	0.135	0.696	N.A.	1.101	Y	0.761	3.3	4.0	27.0	1.029	18.70	0.2885	2.71
54	10.04	0.179	56.1	0.863	15.16	0.7	404	1.75	5.10	0.700	44.14	25.3	0.137	0.699	N.A.	1.099	Y	0.772	2.9	4.0	27.8	1.024	19.39	0.2866	2.41
55	10.18	0.179	56.9	0.851	14.96	0.7	404	1.75	5.17	0.720	45.31	26.1	0.139	0.701	N.A.	1.097	Y	0.783	2.6	4.1	28.6	1.019	20.10	0.2849	2.14
56	10.32	0.179	57.7	0.849	14.92	0.7	404	1.75	5.25	0.739	46.49	26.9	0.141	0.704	N.A.	1.096	Y	0.794	2.2	4.1	29.4	1.014	20.83	0.2832	1.88
57	10.46	0.179	58.4	0.849	14.92	0.7	404	1.75	5.32	0.759	47.69	27.7	0.143	0.706	N.A.	1.094	Y	0.804	1.9	4.2	30.3	1.01	21.58	0.2816	1.64
58	10.60	0.179	59.2	0.849	14.92	0.7	404	1.75	5.39	0.779	48.91	28.5	0.145	0.708	N.A.	1.092	Y	0.816	1.7	4.2	31.1	1.005	22.34	0.2801	1.41
59	10.74	0.179	60.0	0.849	14.92	0.7	404	1.75	5.46	0.950	50.14	29.3	0.174	0.725	N.A.	1.091	Y	0.921	1.4	4.3	32.0	1.001	23.13	0.2795	1.20
60	10.88	0.179	60.8	0.849	14.92	0.7	404	1.75	5.54	0.971	51.39	30.3	0.175	0.729	N.A.	1.089	Y	0.932	1.2	4.3	33.0	0.996	24.09	0.2798	1.01
61	11.02	0.179	61.6	0.849	14.92	0.7	404	1.75	5.61	0.992	52.65	31.2	0.177	0.733	N.A.	1.087	Y	0.944	1.0	4.3	33.9	0.992	25.07	0.28	0.83
62	11.16	0.179	62.3	0.849	14.92	0.7	404	1.75	5.68	1.013	53.92	32.2	0.178	0.736	N.A.	1.085	Y	0.956	0.8	4.4	34.9	0.988	26.08	0.2802	0.68
63	11.30	0.179	63.1	0.849	14.92	0.7	404	1.75	5.75	1.035	55.21	33.1	0.180	0.740	N.A.	1.083	Y	0.967	0.6	4.4	35.9	0.984	27.10	0.2803	0.53
64	11.44	0.179	63.9	0.849	14.92	0.7	404	1.75	5.83	1.056	56.52	34.1	0.181	0.743	N.A.	1.082	Y	0.979	0.5	4.5	36.9	0.98	28.15	0.2804	0.41
65	11.58	0.179	64.7	0.849	14.92	0.7	404	1.75	5.90	1.078	57.84	35.1	0.183	0.746	N.A.	1.080	Y	0.992	0.3	4.5	37.9	0.976	29.21	0.2804	0.30
66	11.72	0.179	65.5	0.849	14.92	0.7	404	1.75	5.97	1.101	59.18	36.1	0.184	0.749	N.A.	1.078	Y	1.004	0.2	4.5	38.9	0.973	30.30	0.2804	0.21
67	11.86	0.179	66.3	0.849	14.92	0.7	404	1.75	6.04	1.123	60.53	37.1	0.186	0.752	N.A.	1.076	Y	1.016	0.2	4.5	39.9	0.969	31.41	0.2803	0.13
68	12.00	0.179	67.0	0.849	14.92	0.7	404	1.75	6.12	1.146	61.90	38.1	0.187	0.755	N.A.	1.075	Y	1.029	0.1	4.5	41.0	0.966	32.55	0.2802	0.08
69	12.14	0.179	67.8	0.849	14.92	0.7	404	1.75	6.19	1.169	63.28	39.1	0.189	0.758	N.A.	1.073	Y	1.042	0.0	4.6	42.0	0.962	33.71	0.2801	0.03
70	12.28	0.179	68.6	0.849	14.92	0.7	404	1.75	6.26	1.193	64.68	40.2	0.191	0.761	N.A.	1.071	Y	1.055	0.0	4.6	43.0	0.959	34.89	0.28	0.01
71	12.42	0.179	69.4	0.849	14.92	0.7	404	1.75	6.33	1.237	66.09	41.3	0.195	0.765	N.A.	1.069	Y	1.068	0.0	4.6	44.1	0.955	36.09	0	0.00

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CRETEX CONCRETE PRODUCTS MIDWEST, INC.

SCOPE: Analysis of an annular prestressed concrete pole member based on compatible strain procedure per ACI-318-08* with an ultimate concrete strain of 0.003.

PROJECT: Musco Standard Pole Base
DATE: Jan-11-2011 2:01 PM
POLE TYPE = 2B

PROGRAM VERSION 2.1
Revised to reference ACI 318

USER DEFINED INPUTS

CROSS-SECTION OUTER DIAMTER = D_o =	**11.92**	INCHES
HOLLOW CORE INSIDE DIAMETER = D_i =	**5.625**	INCHES
TENDON CIRCLE DIAMETER = D_t =	**9**	INCHES
NUMBER OF TENDONS = N (56 or less and even)	**10**	
TENDON DIAMETER = d_t =	**0.5**	INCHES
NOMINAL TENDON AREA = A_{ps} =	**0.1531**	IN^2
ULTIMATE TENDON STRENGTH = f_{pu} =	**270**	KSI
TENDON YIELD STRENGTH = f_{py} =	**230**	KSI
CONCRETE COMPRESSIVE STRENGTH = F'_c =	**9500**	PSI
MODULUS OF ELASTICITY - STEEL = E_s =	**29000**	KSI
INITIAL PRESTESS FACTOR = IPF =	**0.64**	
PRESTRESS LOSS FACTOR = PLF =	**0.82**	
*PHI FACTOR CALCULATED PER ACI 318 1999 OR 2008	**ACI 1999**	

OUTPUT

PHI FACTOR = ϕ =	0.90		
PRESTESSING STRAIN IN TENDON = ε_{se} =	0.0049		
CONCRETE SERVICE STRESS DUE TO PRESTRESS =	2501	PSI	
CROSS SECTIONAL AREA =	87	IN^2	
GROSS MOMENT OF INERTIA =	942	IN^4	
DISTANCE TO NEUTRAL AXIS FROM COMP. SIDE = c =	5.67	INCHES	
CONCRETE COMPRESSIVE FORCE =	224	KIPS	
AREA OF BONDED REINFORCEMENT =	1.53	IN^2	
MINIMUM BONDED REINFORCEMENT AREA (ACI 18.9.2) =	0.17	IN^2	**SATISFIED**
REINFORCEMENT RATIO = ρ_p =	0.0197		
REINFORCEMENT INDEX = ω =	0.3673		
MAXIMUM REINFORCEMENT INDEX (ACI 318-99, 18.8.1) =	0.2340		**EXCEEDED**
STRAND DEVELOPMENT LENGTH = L_d =	41	INCHES	

RESULTS

NOMINAL MOMENT CAPACITY = M_n =	92	FT-KIPS	
DESIGN MOMENT CAPACITY = ϕM_n =	**82**	FT-KIPS	
CRACKING LOAD MOMENT (ACI 18.8.2) =	43	FT-KIPS	**SATISFIED**

R.L. FOLEY & ASSOCIATES, INC.
STRUCTURAL ENGINEERS
LAKE FOREST, CA

POLE DESIGNATION: LS70-A W/ 4 FIXTURES
MANUFACTURER: MUSCO
PROJECT NO:

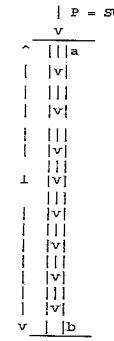
JOB NO: 2013-009
PROJECT: RANCHO BERNARDO PARK
LOCATION: SAN DIEGO, CA

ASCE 7-05
WIND CRITERIA 85 MPH, EXP C

POLE ID: A21,A22

EPA/FIXTURE*, Af	= 1.9	ft2
D.L./FIXTURE**	= 40.0	lbs
D.L./BALLAST***	= 50.0	lbs

* EPA = EFFECTIVE PROJECTED AREA OF LIGHT FIXTURE INCLUDING CROSSARM, PER MUSCO
** D.L.= DEAD LOAD OF FIXTURE, & CROSSARM, PER MUSCO
*** D.L.= DEAD LOAD OF BALLAST, PER MUSCO; APPLIED AT 15.0 FT ABOVE GRADE



LOADING DIAGRAM

<--FIXTURES, F/Af= qz*Gf*Cf = 24.27 PSF MAX (6-28)
<--where qz=.00256*Kz*Kzt*Kd(V)^{2}I = 20.73 PSF MAX (6-15)

ATTACHMENT TYPE	NUMBER	DIST. FROM TOP POLE, FT	PA SQ FT	Cf	EPA SQ FT	Kz	qz PSF	WIND, F LBS	WEIGHT, P LBS
FIXTURE	4.0	0.5		1.0	1.90	1.178	20.69	184	160
FIXTURE	0.0	3.0		1.0	1.90	1.169	20.54	0	0
FIXTURE	0.0	5.5		1.0	1.90	1.160	20.38	0	0
FIXTURE	0.0	8.0		1.0	1.90	1.150	20.21	0	0
FIXTURE	0.0	10.5		1.0	1.90	1.141	20.04	0	0
FIXTURE	0.0	13.0		1.0	1.90	1.131	19.87	0	0
FIXTURE	0.0	15.5		1.0	1.90	1.120	19.69	0	0
FIXTURE	0.0	18.0		1.0	1.90	1.110	19.50	0	0
FIXTURE	0.0	20.5		1.0	1.90	1.099	19.30	0	0
FIXTURE	0.0	23.0		1.0	1.90	1.087	19.10	0	0
BALLAST	4.0	59.6	4.00	1.3	5.20	0.849	14.92	91	200
							TOTALS =	275	360

POLE, F/Af= qz*Gf*Cf = 29.12 PSF MAX (6-28)
where qz=.00256*Kz*Kzt*Kd(V)^{2}I = 20.73 PSF MAX (6-15)

INPUT

-> l = 71.55 ft. (ht. from adj. grade)
-> l = 71.55 ft. (ht. from grade)
->tA = 0.12 in. (pole thk. @ top)
->dA = 4.75 in. (pole diam. @ top)
->dB = 13.4 in. (pole diam. @ btm)
->tB = 0.179 in. (pole thk. @ btm)
->Fy = 38.0 ksi (fixt mount sect. = 5.25 ft)
->Fy = 55.0 ksi (other pole sect.)
-> E = 29,000 ksi
->Kzt= 1 (6-3)
->Kd = 0.95 (Table 6-4)
-> Kz = 1.179 MAX-EXP C @ 71.6 FT. (Table 6-3)
-> I = 1.00 (Table 6-1)
-> Cf = 1.00 LIGHT FIXTURE (INCLUDED IN EPA)
-> Cf = 1.200 MAX (VARIES 0.5-1.2 FOR RND POLE) (Figure 6-21)
POLE DAMPING, beta= 0.025 Per Musco test

OUTPUT

-> POLE NATURAL FREQUENCY = 0.505 Hz 1/(2PI*(DELTA/386)^0.5) where DELTA is due to self weight
-> Gf= 1.17 (6-8) (Reference Vibration Problems in Engineering by Timoshenko, 4th ED. pg.34)

Pole Properties:

Ia =	4.68	in4	taper =	0.140	in/ft
Ib =	162	in4	db/da =	2.821	
ra =	1.638	in	rb =	4.675	in.
Aa =	1.745	in2	Ab =	7.43	in2
Sa =	1.97	in3	Sb =	24.25	in3

From Critical Buckling Loads of Tapered Columns, ASCE 2/62:

n =	Log (Ib/(Ia)/Log (dB/dA) =	3.42	
P* =	(Ib/Ia)/(Ib/Ia)^.333 =	10.6	
kl/req*	(1/(P*)^.5)[kl/ra] =	338	(where k= 2.1)
AISC 360-05 Specification Table B4.1, Case 15			
	for Fy = 55.0 KSI	38	KSI
D/t < .45E/Fy =	237	343	(MAX)
D/t < .31E/Fy =	163	237	Noncompact
D/t < .07E/Fy =	37	53	Compact
D/t < .11E/Fy =	58	84	Slender element Section for Uniform Compression

Section 6.5.8.2 Gust-Effect Factor					
constant epsilon,e	=	0.2	Lz	=	527.0
constant l	=	500	N1	=	3.156
Vz	=	84.38	Rn	=	0.068
4.6n1h/Vz	=	1.971			
4.6n1B/Vz	=	0.021	R	=	0.998
15.4n1L/Vz	=	0.070	g_R	=	4.023
			c	=	0.200
Rh	=	0.381	Iz	=	0.191
RB	=	0.986	Q	=	0.920
RL	=	0.955	G	=	0.886
			Gf =		1.171

SHEAR,F= 1.121 KIPS MOMENT, M = 46.45 K-FT e= M/F = 41.44 FT AXIAL,P = 1.443 KIPS (SUMMARY FOR FOOTING CHECK)

< ΦMn/1.6 = 73 K-FT Precast Base O.K.

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Distance from top of Pole FT	Outside Diameter of Pole,D IN	Pole thick,t IN	D/t	Kz	qz PSF	cf Pole	kl/r eqiv.	E3-4 Fe	E3-2 or E3-3 ALL.Pn KIPS	ACT. Pr KIPS	F8.1-F8.2 ALL. Mn K-FT	ACT. Mr K-FT	Pr/Pc	H1-1b for Pr/Pc <0.2	H1-1a for Pr/Pc ≥ 0.2	2nd Order /1st Order Moment FT-K	CSR O.K.	Shear, F KIPS	1st Order Delta IN	C2.2a 1.6xP-Delta Moment FT-K	Total 2nd Order Moment FT-K	E7-19 Q	ACTING MOM DUE TO DL	M/I	DEFL DUE TO DI IN
0	4.75	0.12	39.6	1.179	20.73	1.2	338	2.51	2.30	0.000	4.67	0.0	0.000	0.000	N.A.	1.000	Y	0.000	48.1	0.0	0.0	1.40	0.00	0.000	38.3
1	4.75	0.12	39.6	1.176	20.66	1.2	338	2.51	2.30	0.166	4.67	0.1	0.072	0.063	N.A.	1.307	Y	0.196	46.7	0.0	0.1	1.40	0.00	0.019	37.3
2	4.75	0.12	39.6	1.172	20.60	1.2	338	2.51	2.30	0.172	4.67	0.3	0.075	0.114	N.A.	1.204	Y	0.207	45.4	0.1	0.4	1.40	0.17	0.055	36.2
3	4.75	0.12	39.6	1.169	20.54	1.2	338	2.51	2.30	0.178	4.67	0.5	0.077	0.168	N.A.	1.182	Y	0.219	44.0	0.1	0.6	1.40	0.35	0.093	35.2
4	4.75	0.12	39.6	1.165	20.48	1.2	338	2.51	2.30	0.184	4.67	0.7	0.080	0.225	N.A.	1.171	Y	0.230	42.7	0.2	0.9	1.40	0.53	0.133	34.1
5	4.75	0.12	39.6	1.162	20.41	1.2	338	2.51	2.30	0.190	4.67	1.0	0.082	0.284	N.A.	1.164	Y	0.241	41.3	0.3	1.1	1.40	0.71	0.164	33.1
6	4.90	0.12	40.8	1.158	20.35	1.2	338	2.51	2.38	0.196	7.33	1.2	0.083	0.234	N.A.	1.160	Y	0.253	40.0	0.3	1.4	1.16	0.91	0.187	32.1
7	5.04	0.12	42.0	1.154	20.28	1.2	338	2.51	2.45	0.203	7.73	1.5	0.083	0.262	N.A.	1.156	Y	0.265	38.7	0.4	1.7	1.14	1.11	0.206	31.1
8	5.18	0.12	43.2	1.150	20.21	1.2	338	2.51	2.52	0.209	8.13	1.7	0.083	0.289	N.A.	1.152	Y	0.277	37.4	0.4	2.0	1.13	1.31	0.222	30.1
9	5.32	0.12	44.3	1.147	20.15	1.2	338	2.51	2.59	0.216	8.55	2.0	0.084	0.315	N.A.	1.149	Y	0.289	36.1	0.5	2.3	1.12	1.53	0.237	29.1
10	5.46	0.12	45.5	1.143	20.08	1.2	338	2.51	2.66	0.223	8.97	2.3	0.084	0.339	N.A.	1.146	Y	0.302	34.9	0.5	2.7	1.11	1.74	0.249	28.1
11	5.60	0.12	46.7	1.139	20.01	1.2	338	2.51	2.73	0.230	9.41	2.6	0.085	0.362	N.A.	1.144	Y	0.315	33.6	0.6	3.0	1.10	1.97	0.259	27.2
12	5.74	0.12	47.8	1.135	19.94	1.2	338	2.51	2.80	0.238	9.86	3.0	0.085	0.385	N.A.	1.141	Y	0.328	32.4	0.7	3.4	1.09	2.21	0.268	26.2
13	5.88	0.12	49.0	1.131	19.87	1.2	338	2.51	2.87	0.245	10.31	3.3	0.086	0.406	N.A.	1.139	Y	0.341	31.2	0.7	3.7	1.08	2.45	0.275	25.3
14	6.02	0.12	50.2	1.127	19.80	1.2	338	2.51	2.93	0.253	10.78	3.6	0.086	0.427	N.A.	1.136	Y	0.355	30.1	0.8	4.1	1.07	2.70	0.281	24.4
15	6.16	0.12	51.3	1.122	19.72	1.2	338	2.51	3.00	0.261	11.25	4.0	0.087	0.447	N.A.	1.134	Y	0.369	28.9	0.9	4.5	1.06	2.95	0.287	23.5
16	6.30	0.12	52.5	1.118	19.65	1.2	338	2.51	3.07	0.269	11.74	4.4	0.088	0.466	N.A.	1.132	Y	0.384	27.8	0.9	5.0	1.05	3.22	0.291	22.6
17	6.44	0.12	53.7	1.114	19.57	1.2	338	2.51	3.14	0.277	12.24	4.8	0.088	0.484	N.A.	1.129	Y	0.398	26.7	1.0	5.4	1.04	3.49	0.295	21.8
18	6.58	0.12	54.8	1.110	19.50	1.2	338	2.51	3.21	0.286	12.74	5.2	0.089	0.502	N.A.	1.127	Y	0.413	25.6	1.1	5.8	1.03	3.77	0.298	20.9
19	6.72	0.12	56.0	1.105	19.42	1.2	338	2.51	3.28	0.295	13.26	5.6	0.090	0.520	N.A.	1.125	Y	0.428	24.5	1.1	6.3	1.02	4.06	0.301	20.1
20	6.86	0.12	57.2	1.101	19.34	0.7	338	2.51	3.35	0.303	13.79	6.0	0.091	0.536	N.A.	1.123	Y	0.437	23.5	1.2	6.8	1.02	4.36	0.303	19.3
21	7.00	0.12	58.3	1.096	19.26	0.7	338	2.51	3.42	0.312	14.32	6.5	0.091	0.552	N.A.	1.121	Y	0.446	22.5	1.3	7.3	1.01	4.67	0.305	18.5
22	7.14	0.12	59.5	1.092	19.18	0.7	338	2.51	3.49	0.322	14.87	6.9	0.092	0.567	N.A.	1.119	Y	0.456	21.5	1.3	7.7	1.00	4.99	0.306	17.7
23	7.28	0.12	60.7	1.087	19.10	0.7	338	2.51	3.56	0.331	15.43	7.4	0.093	0.581	N.A.	1.118	Y	0.465	20.5	1.4	8.2	1.00	5.31	0.308	17.0
24	7.42	0.12	61.8	1.082	19.02	0.7	338	2.51	3.63	0.341	15.99	7.9	0.094	0.595	N.A.	1.116	Y	0.475	19.6	1.5	8.8	0.99	5.65	0.308	16.3
25	7.56	0.12	63.0	1.077	18.93	0.7	338	2.51	3.70	0.350	16.57	8.3	0.095	0.608	N.A.	1.114	Y	0.484	18.7	1.5	9.3	0.98	5.99	0.309	15.5
26	7.70	0.12	64.2	1.073	18.85	0.7	338	2.51	3.77	0.360	17.16	8.8	0.096	0.620	N.A.	1.113	Y	0.494	17.8	1.6	9.8	0.98	6.35	0.309	14.8
27	7.84	0.12	65.3	1.068	18.76	0.7	338	2.51	3.84	0.370	17.76	9.3	0.096	0.631	N.A.	1.111	Y	0.504	17.0	1.7	10.4	0.97	6.71	0.310	14.2
28	7.98	0.12	66.5	1.062	18.67	0.7	338	2.51	3.91	0.380	18.36	9.8	0.097	0.643	N.A.	1.110	Y	0.514	16.1	1.7	10.9	0.97	7.09	0.310	13.5
29	8.12	0.12	67.7	1.057	18.58	0.7	338	2.51	3.98	0.391	18.98	10.3	0.098	0.653	N.A.	1.108	Y	0.524	15.3	1.8	11.5	0.96	7.48	0.310	12.9
30	8.26	0.12	68.8	1.052	18.48	0.7	338	2.51	4.05	0.402	19.61	10.9	0.099	0.664	N.A.	1.107	Y	0.535	14.5	1.9	12.0	0.96	7.87	0.310	12.2
31	8.40	0.12	70.0	1.047	18.39	0.7	338	2.51	4.12	0.412	20.25	11.4	0.100	0.673	N.A.	1.106	Y	0.545	13.8	1.9	12.6	0.95	8.28	0.309	11.6
32	8.54	0.12	71.2	1.041	18.29	0.7	338	2.51	4.19	0.423	20.90	12.0	0.101	0.683	N.A.	1.104	Y	0.556	13.1	2.0	13.2	0.95	8.70	0.309	11.1
33	8.68	0.12	72.3	1.036	18.19	0.7	338	2.51	4.26	0.434	21.56	12.5	0.102	0.692	N.A.	1.103	Y	0.566	12.3	2.1	13.8	0.94	9.13	0.308	10.5
34	8.82	0.12	73.5	1.030	18.09	0.7	338	2.51	4.33	0.446	22.23	13.1	0.103	0.701	N.A.	1.101	Y	0.577	11.7	2.1	14.4	0.94	9.57	0.308	9.9
35	8.96	0.12	74.7	1.024	17.99	0.7	338	2.51	4.40	0.457	22.90	13.7	0.104	0.709	N.A.	1.100	Y	0.588	11.0	2.2	15.1	0.94	10.02	0.307	9.4
36	9.10	0.12	75.8	1.018	17.89	0.7	338	2.51	4.47	0.469	23.59	14.3	0.105	0.717	N.A.	1.099	Y	0.599	10.4	2.3	15.7	0.93	10.48	0.307	8.9
37	9.24	0.12	77.0	1.012	17.78	0.7	338	2.51	4.54	0.481	24.29	14.9	0.106	0.725	N.A.	1.097	Y	0.610	9.8	2.3	16.3	0.93	10.95	0.306	8.4
38	9.38	0.12	78.2	1.006	17.67	0.7	338	2.51	4.61	0.498	25.00	15.5	0.108	0.733	N.A.	1.096	Y	0.622	9.2	2.4	17.0	0.92	11.44	0.269	7.9
39	9.20	0.179	51.4	0.999	17.56	0.7	338	2.51	6.69	0.516	37.45	16.1	0.077	0.510	N.A.	1.094	Y	0.633	8.6	2.4	17.6	1.06	11.95	0.231	7.5
40	9.34	0.179	52.2	0.993	17.44	0.7	338	2.51	6.80	0.534	38.53	16.8	0.078	0.515	N.A.	1.093	Y	0.644	8.1	2.5	18.3	1.05	12.47	0.230	7.0
41	9.48	0.179	53.0	0.986	17.33	0.7	338	2.51	6.90	0.552	39.63	17.4	0.080	0.520	N.A.	1.092	Y	0.655	7.6	2.6	19.0	1.04	13.02	0.230	6.6
42	9.62	0.179	53.8	0.979	17.20	0.7	338	2.51	7.01	0.570	40.74	18.1	0.081	0.524	N.A.	1.091	Y	0.666	7.1	2.6	19.7	1.04	13.58	0.229	6.2
43	9.76	0.179	54.5	0.972	17.08	0.7	338	2.51	7.11	0.589	41.86	18.7	0.083	0.529	N.A.	1.089	Y	0.677	6.6	2.7	20.4	1.03	14.16	0.228	5.8
44	9.90	0.179	55.3	0.965	16.95	0.7	338	2.51	7.21	0.607	43.00	19.4	0.084	0.534	N.A.	1.088	Y	0.689	6.2	2.7	21.1	1.03	14.75	0.228	5.4
45	10.04	0.179	56.1	0.957	16.82	0.7	338	2.51	7.32	0.627	44.16	20.1	0.086	0.538	N.A.	1.087	Y	0.700	5.7	2.8	21.9	1.02	15.37	0.228	5.0
46	10.18	0.179	56.9	0.950	16.69	0.7	338	2.51	7.42	0.646	45.33	20.8	0.087	0.542	N.A.	1.086	Y	0.712	5.3	2.9	22.6	1.02	16.01	0.227	4.7
47	10.32	0.179	57.7	0.942	16.55	0.7	338	2.51	7.53	0.666	46.51	21.5	0.088	0.547	N.A.	1.085	Y	0.723	4.9	2.9	23.4	1.01	16.66	0.227	4.3
48	10.46	0.179	58.4	0.933	16.40	0.7	338	2.51	7.63	0.686	47.71	22.3	0.090	0.551	N.A.	1.083	Y	0.735	4.5	3.0	24.1	1.01	17.34	0.227	4.0
49	10.60	0.179	59.2	0.925	16.25	0.7	338	2.51	7.73	0.706	48.93	23.0	0.091	0.555	N.A.	1.082	Y	0.747	4.1	3.0	24.9	1.00	18.03	0.226	3.6
50	10.74	0.179	60.0	0.916	16.10	0.7	338	2.51	7.84	0.726	50.16	23.8	0.093	0.559	N.A.	1.081	Y	0.758	3.7	3.1	25.7	1.00	18.75	0.226	3.3

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51	10.88	0.179	60.8	0.907	15.94	0.7	338	2.51	7.94	0.747	51.40	24.5	0.094	0.562	N.A.	1.080	Y	0.770	3.4	3.1	26.5	1.00	19.49	0.226	3.0
52	11.02	0.179	61.6	0.898	15.77	0.7	338	2.51	8.05	0.768	52.67	25.3	0.095	0.566	N.A.	1.079	Y	0.782	3.1	3.2	27.3	0.99	20.24	0.226	2.8
53	11.16	0.179	62.4	0.888	15.60	0.7	338	2.51	8.15	0.789	53.94	26.1	0.097	0.570	N.A.	1.078	Y	0.794	2.8	3.2	28.1	0.99	21.02	0.226	2.5
54	11.30	0.179	63.1	0.877	15.42	0.7	338	2.51	8.25	0.811	55.23	26.9	0.098	0.573	N.A.	1.077	Y	0.806	2.5	3.3	29.0	0.98	21.82	0.225	2.2
55	11.44	0.179	63.9	0.867	15.23	0.7	338	2.51	8.36	0.833	56.54	27.7	0.100	0.577	N.A.	1.075	Y	0.818	2.2	3.3	29.8	0.98	22.64	0.225	2.0
56	11.58	0.179	64.7	0.855	15.03	0.7	338	2.51	8.46	0.855	57.86	28.5	0.101	0.580	N.A.	1.074	Y	0.829	2.0	3.4	30.6	0.98	23.49	0.225	1.8
57	11.72	0.179	65.5	0.849	14.92	0.7	338	2.51	8.56	0.877	59.20	29.4	0.102	0.584	N.A.	1.073	Y	0.841	1.7	3.4	31.5	0.97	24.35	0.225	1.6
58	11.86	0.179	66.3	0.849	14.92	0.7	338	2.51	8.67	0.900	60.55	30.2	0.104	0.587	N.A.	1.072	Y	0.853	1.5	3.5	32.4	0.97	25.24	0.225	1.4
59	12.00	0.179	67.1	0.849	14.92	0.7	338	2.51	8.77	0.923	61.92	31.1	0.105	0.590	N.A.	1.071	Y	0.865	1.3	3.5	33.3	0.97	26.15	0.225	1.2
60	12.14	0.179	67.8	0.849	14.92	0.7	338	2.51	8.88	1.146	63.30	32.0	0.129	0.605	N.A.	1.070	Y	0.969	1.1	3.6	34.2	0.96	27.09	0.226	1.0
61	12.28	0.179	68.6	0.849	14.92	0.7	338	2.51	8.98	1.169	64.70	33.0	0.130	0.609	N.A.	1.068	Y	0.981	0.9	3.6	35.2	0.96	28.24	0.227	0.8
62	12.42	0.179	69.4	0.849	14.92	0.7	338	2.51	9.08	1.193	66.11	34.0	0.131	0.614	N.A.	1.067	Y	0.994	0.8	3.6	36.2	0.96	29.42	0.229	0.7
63	12.56	0.179	70.2	0.849	14.92	0.7	338	2.51	9.19	1.217	67.54	35.0	0.132	0.618	N.A.	1.066	Y	1.006	0.6	3.7	37.3	0.95	30.63	0.230	0.6
64	12.70	0.179	71.0	0.849	14.92	0.7	338	2.51	9.29	1.241	68.98	36.0	0.134	0.622	N.A.	1.065	Y	1.019	0.5	3.7	38.3	0.95	31.86	0.231	0.5
65	12.84	0.179	71.7	0.849	14.92	0.7	338	2.51	9.40	1.266	70.44	37.0	0.135	0.626	N.A.	1.063	Y	1.032	0.4	3.8	39.3	0.95	33.11	0.233	0.3
66	12.98	0.179	72.5	0.849	14.92	0.7	338	2.51	9.50	1.290	71.91	38.0	0.136	0.630	N.A.	1.062	Y	1.045	0.3	3.8	40.4	0.94	34.39	0.234	0.3
67	13.12	0.179	73.3	0.849	14.92	0.7	338	2.51	9.60	1.315	73.40	39.1	0.137	0.633	N.A.	1.061	Y	1.059	0.2	3.8	41.5	0.94	35.69	0.235	0.2
68	13.26	0.179	74.1	0.849	14.92	0.7	338	2.51	9.71	1.341	74.90	40.1	0.138	0.637	N.A.	1.060	Y	1.072	0.1	3.8	42.5	0.94	37.02	0.236	0.1
69	13.40	0.179	74.9	0.849	14.92	0.7	338	2.51	9.81	1.366	76.42	41.2	0.139	0.640	N.A.	1.058	Y	1.086	0.1	3.8	43.6	0.93	38.37	0.237	0.1
70	13.54	0.179	75.7	0.849	14.92	0.7	338	2.51	9.91	1.392	77.95	42.3	0.140	0.644	N.A.	1.057	Y	1.099	0.0	3.8	44.7	0.93	39.75	0.237	0.0
71	13.68	0.179	76.4	0.849	14.92	0.7	338	2.51	10.02	1.418	79.50	43.4	0.142	0.647	N.A.	1.055	Y	1.113	0.0	3.9	45.8	0.93	41.16	0.238	0.0
72	13.82	0.179	77.2	0.849	14.92	0.7	338	2.51	10.12	1.463	81.07	44.5	0.145	0.651	N.A.	1.054	Y	1.127	0.0	3.9	47.0	0.93	42.59	0.000	0.0

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1/31/2013

R.L. FOLEY & ASSOCIATES, INC.
STRUCTURAL ENGINEERS
LAKE FOREST, CA

POLE DESIGNATION: LS70-B W/ 8 FIXTURES
MANUFACTURER: MUSCO
PROJECT NO:

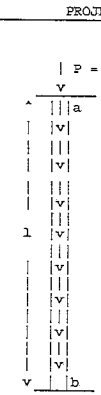
JOB NO: 2013-009
PROJECT: RANCHO BERNARDO PARK
LOCATION: SAN DIEGO, CA

POLE ID: B14

ASCE 7-05
WIND CRITERIA 85 MPH, EXP C

EPA/FIXTURE*, Af	= 2.1	ft2
D.L./FIXTURE**	= 40.0	lbs
D.L./BALLAST***	= 50.0	lbs

* EPA = EFFECTIVE PROJECTED AREA OF LIGHT FIXTURE INCLUDING CROSSARM, PER MUSCO
** D.L.= DEAD LOAD OF FIXTURE, & CROSSARM, PER MUSCO
*** D.L.= DEAD LOAD OF BALLAST, PER MUSCO; APPLIED AT 15.0 FT ABOVE GRADE



LOADING DIAGRAM

<--FIXTURES, F/Af= qz*Gf*Cf = 25.37 PSF MAX (6-28)
<--where qz=.00256*Kz*Kzt*Kd(V)^2I = 20.69 PSF MAX (6-15)

ATTACHMENT TYPE	NUMBER	DIST. FROM TOP POLE, FT	PA SQ FT	Cf	EPA SQ FT	Kz	qz PSF	WIND, F LBS	WEIGHT, P LBS
FIXTURE	4.0	0.5		1.0	2.10	1.176	20.66	213	160
FIXTURE	4.0	3.0		1.0	2.10	1.167	20.50	211	160
FIXTURE	0.0	5.5		1.0	2.10	1.158	20.34	0	0
FIXTURE	0.0	8.0		1.0	2.10	1.148	20.18	0	0
FIXTURE	0.0	10.5		1.0	2.10	1.139	20.01	0	0
FIXTURE	0.0	13.0		1.0	2.10	1.128	19.83	0	0
FIXTURE	0.0	15.5		1.0	2.10	1.118	19.65	0	0
FIXTURE	0.0	18.0		1.0	2.10	1.107	19.46	0	0
FIXTURE	0.0	20.5		1.0	2.10	1.096	19.26	0	0
FIXTURE	0.0	23.0		1.0	2.10	1.084	19.05	0	0
BALLAST	8.0	57.5	9.00	1.3	11.70	0.849	14.92	214	400
							TOTALS =	638	720

POLE, F/Af= qz*Gf*Cf = 30.45 PSF MAX (6-28)
where qz=.00256*Kz*Kzt*Kd(V)^2I = 20.69 PSF MAX (6-15)

INPUT

-> l = 71.00 ft. (ht. from adj. grade)
-> l = 71.00 ft. (ht. from grade)
->tA = 0.12 in. (pole thk. @ top)
->dA = 4.75 in. (pole diam. @ top)
->dB = 13.40 in. (pole diam. @ btm)
->tB = 0.179 in. (pole thk. @ btm)
->Fy = 38.0 ksi (fixt mount sect. = 5.25 ft)
->Fy = 55.0 ksi (other pole sect.)
-> E = 29,000 ksi
->Kzt= 1 (6-3)
->Kd = 0.95 (Table 6-4)
-> Kz = 1.178 MAX-EXP C @ 71.0 FT. (Table 6-3)
-> I = 1.00 (Table 6-1)
-> Cf = 1.00 LIGHT FIXTURE (INCLUDED IN EPA)
-> Cf = 1.200 MAX (VARIES 0.5-1.2 FOR RND POLE) (Figure 6-21)
POLE DAMPING, beta= 0.025 Per Musco test

OUTPUT

-> POLE NATURAL FREQUENCY = 0.420 Hz 1/(2PI*(DELTA/386)^0.5) where DELTA is due to self weight
-> Gf= 1.23 (6-8) (Reference Vibration Problems in Engineering by Timoshenko, 4th ED. pg.34)

Pole Properties:

Ia =	4.68 in4	taper =	0.140 in/ft
Ib =	162 in4	db/da =	2.821
ra =	1.638 in	rb =	4.675 in.
Aa =	1.745 in2	Ab =	7.43 in2
Sa =	1.97 in3	Sb =	24.25 in3

From Critical Buckling Loads of Tapered Columns, ASCE 2/62:

n = Log (Ib/(Ia)/Log (dB/dA) = 3.42
P* = (Ib/Ia)/(Ib/Ia)^.333 = 10.6
kl/req* (1/(P*)^.5)[kl/ra] = 335 (where k= 2.1)

AISC 360-05 Specification Table B4.1, Case 15

for Fy =	55.0 KSI	38	KSI
D/t < .45E/Fy =	237	343	(MAX)
D/t < .31E/Fy =	163	237	Noncompact
D/t < .07E/Fy =	37	53	Compact
D/t < .11E/Fy =	58	84	Slender element Section for Uniform Compression

Section 6.5.8.2 Gust-Effect Factor

constant epsilon,e	=	0.2	Lz	=	526.2
constant l	=	500	N1	=	2.622
Vz	=	84.28	Rn	=	0.076
4.6n1h/Vz	=	1.627			
4.6n1B/Vz	=	0.017	R	=	1.129
15.4n1L/V;	=	0.058	g_R	=	3.977
			c	=	0.200
Rh	=	0.433	Iz	=	0.192
RB	=	0.989	Q	=	0.921
RL	=	0.962	G	=	0.886
		Gf =	1.226		

SHEAR, F= 1.505 *KIPS* MOMENT, M= 68.23 *K-FT* e= M/F = 45.32 *FT* AXIAL, P= 1.907 *KIPS* (SUMMARY FOR FOOTING CHECK)

< ΦMn/1.6 = 73 K-FT Precast Base O.K.

LS70-B

Distance from top of Pole FT	Outside Diameter of Pole,D IN	Pole thick,t IN	D/t	Kz	qz PSF	Cf Pole	kl/r equiv.	E3-4 Fe	E3-2 or E3-3 ALL.Pn KIPS	ACT. Pr KIPS	F8.1-F8.2 ALL. Mn K-FT	ACT. Mr K-FT	Pr/Pc	H1-1b for Pr/Pc <0.2	H1-1a for Pr/Pc ≥ 0.2	2nd Order /1st Order Moment FT-K	CSR O.K.	1st Order Shear, F KIPS	1st Order Delta IN	C2.2a 1.6xP-Delta Moment FT-K	Total 2nd Order Moment FT-K	E7-19 Q	ACTING MOM DUE TO DL	M/I	DEFL DUE TO DL IN
0	4.75	0.120	39.6	1.178	20.69	1.2	335	2.55	2.34	0.000	4.67	0.0	0.000	0.000	N.A.	1.000	Y	0.000	66.5	0.0	0.0	1.40	0.00	0.000	55.44
1	4.75	0.120	39.6	1.174	20.63	1.2	335	2.55	2.34	0.166	4.67	0.1	0.071	0.068	N.A.	1.357	Y	0.225	64.7	0.1	0.2	1.40	0.00	0.019	54.01
2	4.75	0.120	39.6	1.171	20.57	1.2	335	2.55	2.34	0.172	4.67	0.3	0.073	0.128	N.A.	1.238	Y	0.237	62.9	0.1	0.4	1.40	0.17	0.055	52.58
3	4.75	0.120	39.6	1.167	20.50	1.2	335	2.55	2.34	0.338	4.67	0.7	0.144	0.255	N.A.	1.236	Y	0.460	61.1	0.3	0.9	1.40	0.35	0.110	51.15
4	4.75	0.120	39.6	1.163	20.44	1.2	335	2.55	2.34	0.344	4.67	1.2	0.147	0.374	N.A.	1.212	Y	0.472	59.3	0.4	1.4	1.40	0.69	0.184	49.72
5	4.75	0.120	39.6	1.160	20.38	1.2	335	2.55	2.34	0.353	4.67	1.6	0.151	0.496	N.A.	1.201	Y	0.484	57.5	0.5	2.0	1.40	1.03	0.204	48.31
6	4.90	0.179	27.4	1.156	20.31	1.2	335	2.55	3.56	0.362	10.37	2.1	0.102	0.296	N.A.	1.195	Y	0.496	55.7	0.7	2.5	1.40	1.39	0.203	46.90
7	5.04	0.179	28.2	1.152	20.24	1.2	335	2.55	3.66	0.372	11.01	2.6	0.101	0.335	N.A.	1.191	Y	0.508	54.0	0.8	3.1	1.38	1.76	0.230	45.51
8	5.18	0.179	28.9	1.148	20.18	1.2	335	2.55	3.77	0.382	11.66	3.1	0.101	0.371	N.A.	1.187	Y	0.521	52.3	0.9	3.7	1.36	2.13	0.253	44.13
9	5.32	0.179	29.7	1.144	20.11	1.2	335	2.55	3.87	0.392	12.33	3.7	0.101	0.403	N.A.	1.185	Y	0.534	50.6	1.1	4.3	1.34	2.52	0.273	42.76
10	5.46	0.179	30.5	1.141	20.04	1.2	335	2.55	3.98	0.402	13.02	4.2	0.101	0.433	N.A.	1.182	Y	0.547	48.9	1.2	5.0	1.32	2.92	0.289	41.41
11	5.60	0.179	31.3	1.137	19.97	1.2	335	2.55	4.08	0.413	13.74	4.8	0.101	0.460	N.A.	1.180	Y	0.560	47.2	1.4	5.6	1.31	3.32	0.303	40.08
12	5.74	0.179	32.1	1.133	19.90	1.2	335	2.55	4.19	0.424	14.46	5.3	0.101	0.485	N.A.	1.178	Y	0.574	45.6	1.5	6.3	1.29	3.74	0.315	38.77
13	5.88	0.179	32.8	1.128	19.83	1.2	335	2.55	4.30	0.435	15.21	5.9	0.101	0.508	N.A.	1.177	Y	0.588	44.0	1.7	7.0	1.28	4.17	0.324	37.47
14	6.02	0.179	33.6	1.124	19.76	1.2	335	2.55	4.40	0.446	15.98	6.5	0.101	0.529	N.A.	1.175	Y	0.603	42.4	1.8	7.6	1.26	4.61	0.333	36.19
15	6.16	0.179	34.4	1.120	19.68	1.2	335	2.55	4.51	0.458	16.77	7.1	0.102	0.549	N.A.	1.173	Y	0.618	40.8	2.0	8.4	1.25	5.06	0.340	34.93
16	6.30	0.179	35.2	1.116	19.61	1.2	335	2.55	4.61	0.470	17.57	7.7	0.102	0.567	N.A.	1.172	Y	0.633	39.3	2.1	9.1	1.24	5.53	0.345	33.69
17	6.44	0.179	36.0	1.112	19.53	1.2	335	2.55	4.72	0.482	18.40	8.4	0.102	0.584	N.A.	1.170	Y	0.648	37.8	2.3	9.8	1.22	6.00	0.350	32.48
18	6.58	0.179	36.8	1.107	19.46	1.2	335	2.55	4.82	0.495	19.24	9.0	0.103	0.600	N.A.	1.168	Y	0.663	36.4	2.4	10.6	1.21	6.49	0.354	31.28
19	6.72	0.179	37.5	1.103	19.38	1.2	335	2.55	4.93	0.507	20.82	9.7	0.103	0.595	N.A.	1.167	Y	0.679	34.9	2.6	11.3	1.20	6.99	0.357	30.10
20	6.86	0.179	38.3	1.098	19.30	0.7	335	2.55	5.03	0.520	21.63	10.4	0.103	0.611	N.A.	1.165	Y	0.689	33.5	2.7	12.1	1.19	7.51	0.359	28.95
21	7.00	0.179	39.1	1.094	19.22	0.7	335	2.55	5.14	0.534	22.46	11.1	0.104	0.626	N.A.	1.164	Y	0.698	32.1	2.9	12.9	1.18	8.03	0.361	27.81
22	7.14	0.179	39.9	1.089	19.14	0.7	335	2.55	5.25	0.547	23.30	11.8	0.104	0.640	N.A.	1.162	Y	0.708	30.8	3.1	13.7	1.17	8.57	0.362	26.70
23	7.28	0.179	40.7	1.084	19.05	0.7	335	2.55	5.35	0.561	24.16	12.5	0.105	0.653	N.A.	1.161	Y	0.718	29.5	3.2	14.5	1.16	9.13	0.363	25.61
24	7.42	0.179	41.5	1.080	18.97	0.7	335	2.55	5.46	0.575	25.03	13.2	0.105	0.665	N.A.	1.160	Y	0.728	28.2	3.4	15.3	1.15	9.70	0.363	24.54
25	7.56	0.179	42.2	1.075	18.88	0.7	335	2.55	5.56	0.590	25.92	14.0	0.106	0.677	N.A.	1.158	Y	0.738	26.9	3.5	16.2	1.14	10.28	0.363	23.49
26	7.70	0.179	43.0	1.070	18.80	0.7	335	2.55	5.67	0.604	26.82	14.7	0.107	0.688	N.A.	1.157	Y	0.748	25.7	3.7	17.0	1.13	10.88	0.363	22.47
27	7.84	0.179	43.8	1.065	18.71	0.7	335	2.55	5.77	0.619	27.74	15.5	0.107	0.698	N.A.	1.156	Y	0.758	24.5	3.9	17.9	1.12	11.49	0.363	21.46
28	7.98	0.179	44.6	1.060	18.62	0.7	335	2.55	5.88	0.635	28.67	16.2	0.108	0.707	N.A.	1.155	Y	0.769	23.3	4.0	18.7	1.12	12.11	0.363	20.48
29	8.12	0.179	45.4	1.054	18.53	0.7	335	2.55	5.98	0.650	29.62	17.0	0.109	0.716	N.A.	1.153	Y	0.780	22.2	4.2	19.6	1.11	12.76	0.362	19.52
30	8.26	0.179	46.1	1.049	18.43	0.7	335	2.55	6.09	0.666	30.58	17.8	0.109	0.724	N.A.	1.152	Y	0.790	21.1	4.3	20.5	1.10	13.41	0.361	18.58
31	8.40	0.179	46.9	1.044	18.34	0.7	335	2.55	6.19	0.681	31.56	18.6	0.110	0.732	N.A.	1.151	Y	0.801	20.0	4.5	21.4	1.09	14.09	0.391	17.66
32	8.10	0.179	45.3	1.038	18.24	0.7	335	2.55	5.97	0.696	29.51	19.4	0.117	0.813	N.A.	1.150	Y	0.812	18.9	4.6	22.3	1.11	14.78	0.421	16.77
33	8.24	0.179	46.1	1.032	18.14	0.7	335	2.55	6.08	0.712	30.47	20.2	0.117	0.820	N.A.	1.149	Y	0.823	17.9	4.8	23.2	1.10	15.48	0.418	15.90
34	8.38	0.179	46.8	1.027	18.04	0.7	335	2.55	6.18	0.728	31.45	21.0	0.118	0.826	N.A.	1.147	Y	0.833	16.9	5.0	24.1	1.09	16.20	0.416	15.05
35	8.52	0.179	47.6	1.021	17.93	0.7	335	2.55	6.29	0.744	32.44	21.9	0.118	0.832	N.A.	1.146	Y	0.844	15.9	5.1	25.1	1.09	16.94	0.413	14.23
36	8.66	0.179	48.4	1.015	17.83	0.7	335	2.55	6.39	0.761	33.44	22.7	0.119	0.837	N.A.	1.145	Y	0.855	15.0	5.3	26.0	1.08	17.69	0.410	13.43
37	8.80	0.179	49.2	1.008	17.72	0.7	335	2.55	6.50	0.777	34.46	23.6	0.120	0.842	N.A.	1.143	Y	0.866	14.1	5.4	27.0	1.07	18.46	0.408	12.66
38	8.94	0.179	50.0	1.002	17.61	0.7	335	2.55	6.60	0.795	35.50	24.4	0.120	0.846	N.A.	1.142	Y	0.877	13.3	5.6	27.9	1.07	19.24	0.405	11.91
39	9.08	0.179	50.7	0.996	17.50	0.7	335	2.55	6.71	0.812	36.55	25.3	0.121	0.851	N.A.	1.141	Y	0.889	12.4	5.7	28.9	1.06	20.05	0.402	11.19
40	9.22	0.179	51.5	0.989	17.38	0.7	335	2.55	6.82	0.829	37.62	26.2	0.122	0.855	N.A.	1.139	Y	0.900	11.6	5.8	29.9	1.06	20.87	0.400	10.49
41	9.36	0.179	52.3	0.982	17.26	0.7	335	2.55	6.92	0.847	38.70	27.1	0.122	0.859	N.A.	1.138	Y	0.912	10.8	6.0	30.9	1.05	21.70	0.397	9.81
42	9.50	0.179	53.1	0.975	17.14	0.7	335	2.55	7.03	0.865	39.80	28.0	0.123	0.862	N.A.	1.136	Y	0.923	10.1	6.1	31.9	1.04	22.56	0.394	9.16
43	9.64	0.179	53.9	0.968	17.01	0.7	335	2.55	7.13	0.884	40.91	29.0	0.124	0.866	N.A.	1.135	Y	0.935	9.4	6.3	32.9	1.04	23.44	0.392	8.53
44	9.78	0.179	54.7	0.961	16.88	0.7	335	2.55	7.24	0.902	42.04	29.9	0.125	0.869	N.A.	1.133	Y	0.946	8.7	6.4	33.9	1.03	24.33	0.389	7.93
45	9.92	0.179	55.4	0.953	16.75	0.7	335	2.55	7.34	0.921	43.18	30.9	0.125	0.872	N.A.	1.132	Y	0.958	8.0	6.5	34.9	1.03	25.24	0.387	7.35
46	10.06	0.179	56.2	0.945	16.61	0.7	335	2.55	7.45	0.940	44.34	31.8	0.126	0.875	N.A.	1.130	Y	0.970	7.4	6.6	36.0	1.02	26.17	0.384	6.79
47	10.20	0.179	57.0	0.937	16.47	0.7	335	2.55	7.55	0.960	45.51	32.8	0.127	0.877	N.A.	1.129	Y	0.982	6.8	6.8	37.0	1.02	27.12	0.382	6.25
48	10.34	0.179	57.8	0.929	16.32	0.7	335	2.55	7.66	0.980	46.70	33.8	0.128	0.880	N.A.	1.127	Y	0.994	6.2	6.9	38.1	1.01	28.09	0.379	5.74
49	10.48	0.179	58.6	0.920	16.17	0.7	335	2.55	7.76	1.000	47.90	34.8	0.129	0.882	N.A.	1.126	Y	1.006	5.7	7.0	39.2	1.01	29.08	0.377	5.25
50	10.62	0.179	59.4	0.911	16.01	0.7	335	2.55	7.87	1.020	49.12	35.8	0.130	0.884	N.A.	1.124	Y	1.018	5.2	7.1	40.3	1.00	30.09	0.374	4.78

1/31/2013 LS70-B

51	10.76	0.179	60.1	0.902	15.85	0.7	335	2.55	7.98	1.040	50.35	36.8	0.130	0.886	N.A.	1.123	Y	1.030	4.7	7.2	41.3	1.00	31.12	0.372	4.34
52	10.90	0.179	60.9	0.892	15.68	0.7	335	2.55	8.08	1.061	51.60	37.9	0.131	0.888	N.A.	1.121	Y	1.042	4.2	7.3	42.4	1.00	32.17	0.370	3.91
53	11.04	0.179	61.7	0.882	15.50	0.7	335	2.55	8.19	1.082	52.87	38.9	0.132	0.890	N.A.	1.119	Y	1.055	3.8	7.4	43.6	0.99	33.24	0.367	3.51
54	11.18	0.179	62.5	0.872	15.31	0.7	335	2.55	8.29	1.104	54.14	40.0	0.133	0.892	N.A.	1.118	Y	1.067	3.3	7.5	44.7	0.99	34.33	0.365	3.14
55	11.32	0.179	63.3	0.860	15.12	0.7	335	2.55	8.40	1.125	55.44	41.1	0.134	0.893	N.A.	1.116	Y	1.079	3.0	7.6	45.8	0.98	35.45	0.363	2.78
56	11.46	0.179	64.0	0.849	14.92	0.7	335	2.55	8.50	1.147	56.75	42.1	0.135	0.895	N.A.	1.114	Y	1.091	2.6	7.7	47.0	0.98	36.58	0.361	2.44
57	11.60	0.179	64.8	0.849	14.92	0.7	335	2.55	8.61	1.169	58.07	43.2	0.136	0.896	N.A.	1.113	Y	1.103	2.3	7.8	48.1	0.98	37.74	0.359	2.13
58	11.74	0.179	65.6	0.849	14.92	0.7	335	2.55	8.71	1.592	59.41	44.4	0.183	0.923	N.A.	1.111	Y	1.330	1.9	7.9	49.4	0.97	38.92	0.359	1.84
59	11.88	0.179	66.4	0.849	14.92	0.7	335	2.55	8.82	1.614	60.76	45.8	0.183	0.927	N.A.	1.109	Y	1.343	1.6	8.0	50.8	0.97	40.53	0.360	1.57
60	12.02	0.179	67.2	0.849	14.92	0.7	335	2.55	8.93	1.637	62.13	47.1	0.183	0.932	N.A.	1.107	Y	1.355	1.4	8.1	52.2	0.96	42.15	0.361	1.32
61	12.16	0.179	68.0	0.849	14.92	0.7	335	2.55	9.03	1.660	63.52	48.5	0.184	0.936	N.A.	1.105	Y	1.368	1.1	8.2	53.6	0.96	43.80	0.362	1.09
62	12.30	0.179	68.7	0.849	14.92	0.7	335	2.55	9.14	1.684	64.92	49.9	0.184	0.940	N.A.	1.103	Y	1.381	0.9	8.3	55.0	0.96	45.47	0.363	0.88
63	12.44	0.179	69.5	0.849	14.92	0.7	335	2.55	9.24	1.708	66.33	51.3	0.185	0.944	N.A.	1.102	Y	1.394	0.7	8.3	56.5	0.95	47.17	0.364	0.70
64	12.58	0.179	70.3	0.849	14.92	0.7	335	2.55	9.35	1.732	67.76	52.7	0.185	0.947	N.A.	1.100	Y	1.408	0.6	8.4	57.9	0.95	48.89	0.365	0.53
65	12.72	0.179	71.1	0.849	14.92	0.7	335	2.55	9.45	1.756	69.21	54.1	0.186	0.950	N.A.	1.098	Y	1.421	0.4	8.4	59.4	0.95	50.63	0.365	0.39
66	12.86	0.179	71.9	0.849	14.92	0.7	335	2.55	9.56	1.780	70.67	55.5	0.186	0.954	N.A.	1.096	Y	1.435	0.3	8.5	60.8	0.95	52.40	0.365	0.27
67	13.00	0.179	72.6	0.849	14.92	0.7	335	2.55	9.66	1.805	72.14	56.9	0.187	0.957	N.A.	1.094	Y	1.449	0.2	8.5	62.3	0.94	54.19	0.365	0.17
68	13.14	0.179	73.4	0.849	14.92	0.7	335	2.55	9.77	1.830	73.63	58.4	0.187	0.959	N.A.	1.092	Y	1.463	0.1	8.6	63.8	0.94	56.01	0.366	0.10
69	13.28	0.179	74.2	0.849	14.92	0.7	335	2.55	9.87	1.856	75.14	59.9	0.188	0.962	N.A.	1.090	Y	1.477	0.0	8.6	65.2	0.94	57.85	0.366	0.04
70	13.42	0.179	75.0	0.849	14.92	0.7	335	2.55	9.98	1.881	76.66	61.4	0.188	0.965	N.A.	1.088	Y	1.491	0.0	8.6	66.7	0.93	59.72	0.366	0.01
71	13.56	0.179	75.8	0.849	14.92	0.7	335	2.55	10.09	1.907	78.20	62.9	0.189	0.967	N.A.	1.086	Y	1.505	0.0	8.6	68.2	0.93	61.61	0.000	0.00

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CRETEX CONCRETE PRODUCTS MIDWEST, INC.

SCOPE: Analysis of an annular prestressed concrete pole member based on compatible strain procedure per ACI-318-08* with an ultimate concrete strain of 0.003.
PROJECT: Musco Standard Pole Base
DATE: Jan-11-2011 2:01 PM
POLE TYPE = 3B

PROGRAM VERSION 2.1
Revised to reference ACI 318

USER DEFINED INPUTS

CROSS-SECTION OUTER DIAMTER = D_o =	**13.32** INCHES
HOLLOW CORE INSIDE DIAMETER = D_i =	**6.125** INCHES
TENDON CIRCLE DIAMETER = D_t =	**10.625** INCHES
NUMBER OF TENDONS = N (56 or less and even)	**12**
TENDON DIAMETER = d_t =	**0.5** INCHES
NOMINAL TENDON AREA = A_{ps} =	**0.1531** IN^2
ULTIMATE TENDON STRENGTH = f_{pu} =	**270** KSI
TENDON YIELD STRENGTH = f_{py} =	**230** KSI
CONCRETE COMPRESSIVE STRENGTH = F'_c =	**9500** PSI
MODULUS OF ELASTICITY - STEEL = E_s =	**29000** KSI
INITIAL PRESTESS FACTOR = IPF =	**0.64**
PRESTRESS LOSS FACTOR = PLF =	**0.82**
*PHI FACTOR CALCULATED PER ACI 318 1999 OR 2008	**ACI 1999**

OUTPUT

PHI FACTOR = ϕ =	0.90	
PRESTESSING STRAIN IN TENDON = ε_{se} =	0.0049	
CONCRETE SERVICE STRESS DUE TO PRESTRESS =	2369 PSI	
CROSS SECTIONAL AREA =	110 IN^2	
GROSS MOMENT OF INERTIA =	1476 IN^4	
DISTANCE TO NEUTRAL AXIS FROM COMP. SIDE = c =	6.15 INCHES	
CONCRETE COMPRESSIVE FORCE =	274 KIPS	
AREA OF BONDED REINFORCEMENT =	1.84 IN^2	
MINIMUM BONDED REINFORCEMENT AREA (ACI 18.9.2) =	0.22 IN^2	**SATISFIED**
REINFORCEMENT RATIO = ρ_p =	0.0206	
REINFORCEMENT INDEX = ω =	0.3747	
MAXIMUM REINFORCEMENT INDEX (ACI 318-99, 18.8.1) =	0.2340	**EXCEEDED**
STRAND DEVELOPMENT LENGTH = L_d =	39 INCHES	

RESULTS

NOMINAL MOMENT CAPACITY = M_n =	130 FT-KIPS	
DESIGN MOMENT CAPACITY = ϕM_n =	**117** FT-KIPS	
CRACKING LOAD MOMENT (ACI 18.8.2) =	57 FT-KIPS	**SATISFIED**

DESIGN OF EMBEDDED POLE FOOTING-
NONCONSTRAINED
2010 CBC Section 1807.3.2.1

R. L. FOLEY ASSOCIATES, INC.
STRUCTURAL ENGINEERS

Mark/Type Grade			LS70-AA	LS70-A	LS70-B
INPUT					
Shear, P	lbs	=	1,068	1,121	1,505
height of P above grade, h	ft	=	41.3	41.4	45.3
allow lateral brg pressure, s	psf/ft	=	200	200	200
max allow lateral brg pressure	psf/ft	=	2400	2400	2400
Pier Diameter, b	ft	=	2.5	2.5	3.0
OUPUT					
Moment at grade, M	ft-lbs	=	44,109	46,450	68,230
acting lateral brg pressure, S_1	psf	=	623	634	677
allow lateral brg pressure, S_1	psf	=	623	634	677
$A=2.34P/(S_1 b)$		=	1.60	1.65	1.73
Min req'd embedment, d $=A/2\{1+(1+4.36h/A)^{1/2}\}$	ft	=	9.34	9.51	10.16
USE 30 IN DIAMETER --->			10'-0"		
USE 30 IN DIAMETER --->				12'-0	
USE 30 IN DIAMETER --->					12'-0

4

City of San Diego

CONTRACTOR'S NAME: PAL General Engineering, Inc.
ADDRESS: 5374 Eastgate Mall, San Diego, CA 92121
TELEPHONE NO.: (858) 638-7100 FAX NO.: (858)638-7102
CITY CONTACT: Eleida Felix Yackel, Contract Specialist, Email: EFelixYackel@sandiego.gov
Phone No. (619) 533-3449, Fax No. (619) 533-3633
S.Bose/NB/egz

CONTRACT DOCUMENTS

FOR

RANCHO BERNARDO COMMUNITY PARK - SPORTS FIELD LIGHTING

VOLUME 2 OF 2

BID NO.:	**L-14-5764-DBB-2**
SAP NO. (WBS/IO/CC):	**S-11012**
CLIENT DEPARTMENT:	**1714**
COUNCIL DISTRICT:	**5**
PROJECT TYPE:	**GA**

THIS CONTRACT IS SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPAT-ION REQUIREMENTS FOR SLBE PROGRAM.
- COMPETITION RESTRICTED TO: SLBE-ELBE FIRMS ONLY.

THIS BIDDING DOCUMENT TO BE SUBMITTED IN ITS ENTIRETY
REFER TO VOLUME 1 COVER PAGE FOR TIME, DATE, AND LOCATION

TABLE OF CONTENTS

Volume 2 - Bidding Documents

The following forms must be completed in their entirety and submitted with the Bid. Include the form(s) even if the information does not apply. Where the information does not apply write in N/A. Failure to include any of the forms may cause the Bid to be deemed **non-responsive.** If you are uncertain or have any questions about any required information, contact the City no later than 14 days prior to Bid due date.

PROPOSAL

Bidder's General Information

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

IF A SOLE OWNER OR SOLE CONTRACTOR SIGN HERE:

(1) Name under which business is conducted _____

(2) Signature (Given and surname) of proprietor _____

(3) Place of Business (Street & Number) _____

(4) City and State _____ Zip Code _____

(5) Telephone No. _____ Facsimile No. _____

IF A PARTNERSHIP, SIGN HERE:

(1) Name under which business is conducted _____

(2) Name of each member of partnership, indicate character of each partner, general or special (limited):

_____

_____

(3) Signature (Note: Signature must be made by a general partner)

_____

Full Name and Character of partner

_____

_____

(4) Place of Business (Street & Number) _____

(5) City and State _____ Zip Code _____

(6) Telephone No. _____ Facsimile No. _____

IF A CORPORATION, SIGN HERE:

(1) Name under which business is conducted PAL General Engineering, Inc.

(2) Signature, with official title of officer authorized to sign for the corporation:

_____
(Signature)

Marla Jahshan
(Printed Name)

President
(Title of Officer)

(Impress Corporate Seal Here)

(3) Incorporated under the laws of the State of California

(4) Place of Business (Street & Number) 5374 Eastgate Mall

(5) City and State San Diego, CA Zip Code 92121

(6) Telephone No. (858) 638-7100 Facsimile No. (858)638-7102

THE FOLLOWING SECTIONS MUST BE FILLED IN BY ALL PROPOSERS:

In accordance with the "**NOTICE INVITING BIDS**", the bidder holds a California State Contractor's license for the following classification(s) to perform the work described in these specifications:

LICENSE CLASSIFICATION A

LICENSE NO. 916931 EXPIRES 4/30/2015

This license classification must also be shown on the front of the bid envelope. Failure to show license classification on the bid envelope may cause return of the bid unopened.

TAX IDENTIFICATION NUMBER (TIN): [redacted]

E-Mail Address: info@palsd.com

THIS PROPOSAL MUST BE NOTARIZED BELOW:

I certify, under penalty of perjury, that the representations made herein regarding my State Contractor's license number, classification and expiration date are true and correct.

Signature _____ Title President

*See Notarization Attached

SUBSCRIBED AND SWORN TO BEFORE ME, THIS _____ DAY OF _____, _____.

Notary Public in and for the County of _____, State of _____

_____

(NOTARIAL SEAL)

State of California
County of San Diego

Subscribed and sworn to (or affirmed) before me on this 5th day of August, 2013, by Marla Jahshan,
proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

JENNIFER KATHERINE STEVENS
Commission # 2027307
Notary Public - California
San Diego County
My Comm. Expires Jun 3, 2017

(Seal) Signature

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That PAL General Engineering, Inc. as Principal, and

The Hanover Insurance Company as Surety, are

held and firmly bound unto The City of San Diego hereinafter called "OWNER," in the sum of **10% OF THE TOTAL BID AMOUNT** for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled

Rancho Bernardo Community Park - Sports Field Lighting

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" enters into a written Agreement on the form of agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this 2nd day of August, 20 13

PAL General Engineering, Inc. (SEAL)	The Hanover Insurance Company (SEAL)
(Principal)	(Surety)
By: _____	By: _____
(Signature)	(Signature)
Marla Jahshan, President	Matthew C. Gaynor, Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

POWERS OF ATTORNEY
CERTIFIED COPY

KNOW ALL MEN BY THESE PRESENTS: That THE HANOVER INSURANCE COMPANY and MASSACHUSETTS BAY INSURANCE COMPANY, both being corporations organized and existing under the laws of the State of New Hampshire, and CITIZENS INSURANCE COMPANY OF AMERICA, a corporation organized and existing under the laws of the State of Michigan, do hereby constitute and appoint

Matthew C. Gaynor, Kim D. Vasquez and/or Daniel Frazee

of **Santee, CA** and each is a true and lawful Attorney(s)-in-fact to sign, execute, seal, acknowledge and deliver for, and on its behalf, and as its act and deed any place within the United States, or, if the following line be filled in, only within the area therein designated

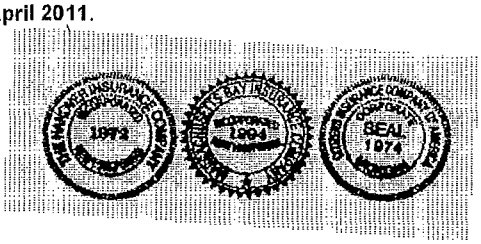
any and all bonds, recognizances, undertakings, contracts of indemnity or other writings obligatory in the nature thereof, as follows:

Any such obligations in the United States, not to exceed Ten Million and No/100 ($10,000,000) in any single instance

and said companies hereby ratify and confirm all and whatsoever said Attorney(s)-in-fact may lawfully do in the premises by virtue of these presents. These appointments are made under and by authority of the following Resolution passed by the Board of Directors of said Companies which resolutions are still in effect:

"RESOLVED, That the President or any Vice President, in conjunction with any Vice President, be and they are hereby authorized and empowered to appoint Attorneys-in-fact of the Company, in its name and as its acts, to execute and acknowledge for and on its behalf as Surety any and all bonds, recognizances, contracts of indemnity, waivers of citation and all other writings obligatory in the nature thereof, with power to attach thereto the seal of the Company. Any such writings so executed by such Attorneys-in-fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company in their own proper persons." (Adopted October 7, 1981 - The Hanover Insurance Company; Adopted April 14, 1982 - Massachusetts Bay Insurance Company; Adopted September 7, 2001 - Citizens Insurance Company of America)

IN WITNESS WHEREOF, THE HANOVER INSURANCE COMPANY, MASSACHUSETTS BAY INSURANCE COMPANY and CITIZENS INSURANCE COMPANY OF AMERICA have caused these presents to be sealed with their respective corporate seals, duly attested by two Vice Presidents, this **21st** day of **April 2011**.



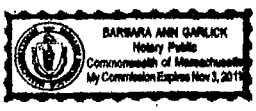
THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

Robert Thomas, Vice President

Mark Fitzgerald, Vice President

THE COMMONWEALTH OF MASSACHUSETTS)
COUNTY OF WORCESTER) ss.

On this **21st** day of **April 2011**, before me came the above named Vice Presidents of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, to me personally known to be the individuals and officers described herein, and acknowledged that the seals affixed to the preceding instrument are the corporate seals of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, respectively, and that the said corporate seals and their signatures as officers were duly affixed and subscribed to said instrument by the authority and direction of said Corporations.



Barbara A. Garlick, Notary Public
My Commission Expires November 3, 2011

I, the undersigned Vice President of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America, hereby certify that the above and foregoing is a full, true and correct copy of the Original Power of Attorney issued by said Companies, and do hereby further certify that the said Powers of Attorney are still in force and effect.

This Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of The Hanover Insurance Company, Massachusetts Bay Insurance Company and Citizens Insurance Company of America.

"RESOLVED, That any and all Powers of Attorney and Certified Copies of such Powers of Attorney and certification in respect thereto, granted and executed by the President or any Vice President in conjunction with any Vice President of the Company, shall be binding on the Company to the same extent as if all signatures therein were manually affixed, even though one or more of any such signatures thereon may be facsimile." (Adopted October 7, 1981 - The Hanover Insurance Company; Adopted April 14, 1982 - Massachusetts Bay Insurance Company; Adopted September 7, 2001 - Citizens Insurance Company of America)

GIVEN under my hand and the seals of said Companies, at Worcester, Massachusetts, this 2nd day of August 2013 .

THE HANOVER INSURANCE COMPANY
MASSACHUSETTS BAY INSURANCE COMPANY
CITIZENS INSURANCE COMPANY OF AMERICA

Glenn Margosian, Vice President

ACKNOWLEDGMENT

State of California
County of San Diego)

On August 2, 2013 before me, Kathy Scheuerman, Notary Public
(insert name and title of the officer)

personally appeared Matthew C. Gaynor ,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(~~s~~), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

CLS1 KATHY SCHEUERMAN
Commission No. 1884440
NOTARY PUBLIC - CALIFORNIA
SAN DIEGO COUNTY
Commission Expires March 28, 2014 CLS1

Signature Kathy Scheuerman (Seal)

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106

State of California)
) ss.
County of San Diego)

Marla Jahshan, being first duly sworn, deposes and says that he or she is President of the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Signed: 

Title: President

*See attached Notarization

Subscribed and sworn to before me this _____day of_____,20___

_____
Notary Public

(SEAL)

State of California
County of San Diego

Subscribed and sworn to (or affirmed) before me on this 5th day of August, 2013, by Marla Jahshan,
proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

JENNIFER KATHERINE STEVENS
Commission # 2027307
Notary Public - California
San Diego County
My Comm. Expires Jun 3, 2017

(Seal) Signature

CONTRACTORS CERTIFICATION OF PENDING ACTIONS

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

CHECK ONE BOX ONLY.

☒ The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.

☐ The undersigned certifies that within the past 10 years the Bidder has been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers. A description of the status or resolution of that complaint, including any remedial action taken and the applicable dates is as follows:

DATE OF CLAIM	LOCATION	DESCRIPTION OF CLAIM	LITIGATION (Y/N)	STATUS	RESOLUTION/REMEDIAL ACTION TAKEN
		N/A			

Contractor Name: PAL General Engineering, Inc.

Certified By Marla Jahshan Title President

Name

Signature Date 8/1/2013

USE ADDITIONAL FORMS AS NECESSARY

EQUAL BENEFITS ORDINANCE CERTIFICATION OF COMPLIANCE

For additional information, contact:
CITY OF SAN DIEGO
EQUAL BENEFITS PROGRAM
202 C Street, MS 9A, San Diego, CA 92101
Phone (619) 533-3948 Fax (619) 533-3220

COMPANY INFORMATION

Company Name: PAL General Engineering, Inc.	Contact Name: Marla Jahshan
Company Address: 5374 Eastgate Mall, San Diego, CA 92121	Contact Phone: (858)638-7100
	Contact Email: info@palsd.com

CONTRACT INFORMATION

Contract Title: Rancho Bernardo Community Park - Sports Field Lighting	Start Date: TBD
Contract Number (if no number, state location): San Diego	End Date: TBD

SUMMARY OF EQUAL BENEFITS ORDINANCE REQUIREMENTS

The Equal Benefits Ordinance [EBO] requires the City to enter into contracts only with contractors who certify they will provide and maintain equal benefits as defined in SDMC §22.4302 for the duration of the contract. To comply:

- Contractor shall offer equal benefits to employees with spouses and employees with domestic partners.
  - Benefits include health, dental, vision insurance; pension/401(k) plans; bereavement, family, parental leave; discounts, child care; travel/relocation expenses; employee assistance programs; credit union membership; or any other benefit.
  - Any benefit not offer an employee with a spouse, is not required to be offered to an employee with a domestic partner.
- Contractor shall post notice of firm's equal benefits policy in the workplace and notify employees at time of hire and during open enrollment periods.
- Contractor shall allow City access to records, when requested, to confirm compliance with EBO requirements.
- Contractor shall submit *EBO Certification of Compliance*, signed under penalty of perjury, prior to award of contract.

NOTE: This summary is provided for convenience. Full text of the EBO and Rules Implementing the EBO are available at *www.sandiego.gov/administration*.

CONTRACTOR EQUAL BENEFITS ORDINANCE CERTIFICATION

Please indicate your firm's compliance status with the EBO. The City may request supporting documentation.

☒ I affirm **compliance** with the EBO because my firm *(contractor must select one reason):*

- ☐ Provides equal benefits to spouses and domestic partners.
- ☒ Provides no benefits to spouses or domestic partners.
- ☐ Has no employees.
- ☐ Has collective bargaining agreement(s) in place prior to January 1, 2011, that has not been renewed or expired.

☐ I request the City's approval to pay affected employees a cash equivalent in lieu of equal benefits and verify my firm made a reasonable effort but is not able to provide equal benefits upon contract award. I agree to notify employees of the availability of a cash equivalent for benefits available to spouses but not domestic partners and to continue to make every reasonable effort to extend all available benefits to domestic partners.

It is unlawful for any contractor to knowingly submit any false information to the City regarding equal benefits or cash equivalent associated with the execution, award, amendment, or administration of any contract. [San Diego Municipal Code §22.4307(a)]

Under penalty of perjury under laws of the State of California, I certify the above information is true and correct. I further certify that my firm understands the requirements of the Equal Benefits Ordinance and will provide and maintain equal benefits for the duration of the contract or pay a cash equivalent if authorized by the City.

Marla Jahshan, President — Name/Title of Signatory

Signature

FOR OFFICIAL CITY USE ONLY

Receipt Date: EBO Analyst: ☐ Approved ☐ Not Approved – Reason:

rev 02/15/2011

PROPOSAL (BID)

The Bidder agrees to the construction of **Rancho Bernardo Community Park - Sports Field Lighting,** for the City of San Diego, in accordance with these contract documents for the prices listed below. The Bidder guarantees the Contract Price for a period of 120 days (90 days for federally funded contracts and contracts valued at $500,000 or less) from the date of Bid opening to Award of the Contract. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent e.g., bond and insurance.

Item	Quantity	Unit	NAICS	Payment Reference	Description	Unit Price	Extension
BASE BID							
1.	1	LS	524126	2-4.1	Bonds (Payment and Performance)		$ 14,801.70
2.	1	LS	237990	9-3.1	Field Construction Of Site Work And Access Upgrades Including: Comfort Station, Concrete Sidewalks, Parking, Baseball Seating Area, Parking, Drinking Fountain And Landscape And Irrigation Repair.		$ 110,917.30
3.	1	LS	238210	9-.3.1	Field Construction Of Sports Field Lighting Improvements.		$ 252,087.00
4.	1	LS	541330	701-13.9.5	Storm Water Pollution Prevention Program		$ 2100.00
5.	1	AL	237990	9-3.5	Field Orders – Type II Allowance		$25,000.00
6.	1	AL	237990	7-5	Permit Allowance- Type I Allowance		$10,000.00
						ESTIMATED TOTAL BASE BID:	**$** 414,906.00

TOTAL BID PRICE FOR BID (Items 1 through 6 inclusive) amount written in words:

Four Hundred Fourteen Thousand, Nine Hundred Six Dollars and Zero Cents.

The Bid shall contain an acknowledgment of receipt of all addenda, the numbers of which shall be filled in on the Bid form. If an addendum or addenda has been issued by the City and not noted as being received by the Bidder, this proposal shall be rejected as being **non-responsive.** The following addenda have been received and are acknowledged in this bid: None

The names of all persons interested in the foregoing proposal as principals are as follows:

Marla Jahshan, President

Abd Jahshan, Vice President

IMPORTANT NOTICE: If Bidder or other interested person is a corporation, state secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if Bidder or other interested person is an individual, state first and last names in full.

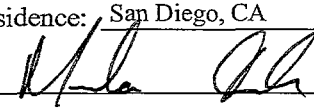
Bidder: PAL General Engineering, Inc.

Title: Marla Jahshan, President and Abd Jahshan, Vice President

Business Address: 5374 Eastgate Mall

Place of Business: San Diego, CA

Place of Residence: San Diego, CA

Signature: 

NOTES:

A. The City shall determine the low Bid based on the Base Bid alone.

B. Prices and notations shall be in ink or typewritten. All corrections (which have been initiated by the Bidder using erasures, strike out, line out, or "white-out") shall be typed or written in with ink adjacent thereto, and shall be initialed in ink by the person signing the bid proposal.

C. Failure to initial all corrections made in the bidding documents shall cause the Bid to be rejected as **non-responsive** and ineligible for further consideration.

D. Blank spaces must be filled in, using figures. Bidder's failure to submit a price for any Bid item that requires the Bidder to submit a price shall render the Bid **non-responsive** and shall be cause for its rejection.

E. Unit prices shall be entered for all unit price items. Unit prices shall not exceed two (2) decimal places. If the Unit prices entered exceed two (2) decimal places, the City will only use the first two digits after the decimal points without rounding up or down.

F. All extensions of the unit prices bid will be subject to verification by the City. In the case of inconsistency or conflict between the product of the Quantity x Unit Price and the Extension, the product shall govern.

G. In the case of inconsistency or conflict, between the sums of the Extensions with the estimated total Bid, the sum of the Extensions shall govern.

H. Bids shall not contain any recapitulation of the Work. Conditional Bids will be rejected as being **non-responsive**. Alternative proposals will not be considered unless called for.

LIST OF SUBCONTRACTORS

In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act", Division 2, Part 1, Chapter 4 of the Public Contract Code, the Bidder shall list below the name and address of each Subcontractor who will perform work, labor, render services or specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also list below the portion of the work which will be done by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement shall result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3 Subcontracts, which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors that Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
Name: Ace Electric, Inc. Address: 6061 Fairmount Ave City: San Diego State: CA Zip: 92120 Phone: 619 521-9740	CONSTRUCTOR	Electrical (item #3)	$219,206.25	SB	CADoGS	N/A
Name: Address: City: State: Zip: Phone:						
Name: Address: City: State: Zip: Phone:						

52.83

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	San Diego Regional Minority Supplier Diversity Council	SRMSDC
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

NAMED EQUIPMENT/MATERIAL SUPPLIER LIST

The Bidder seeking the recognition of equipment, materials, or supplies obtained from Suppliers towards achieving any mandatory, voluntary, or both subcontracting participation percentages shall list the Supplier(s) on the Named Equipment/Material Supplier List. The Named Equipment/Material Supplier List, at a minimum, shall have the name, locations (City) and the **DOLLAR VALUE** of the Suppliers. The Bidder will be credited up to 60% of the amount to be paid to the Suppliers for such materials and supplies unless vendor manufactures or substantially alters materials and supplies in which case 100% will be credited. The Bidder is to indicate (Yes/No) whether listed firm is a supplier or manufacturer. In calculating the subcontractor participation percentages, vendors/suppliers will receive 60% credit of the listed **DOLLAR VALUE**, whereas manufacturers will receive 100% credit. If no indication provided, listed firm will be credited at 60% of the listed dollar value for purposes of calculating the Subcontractor Participation Percentage, Suppliers will receive 60% credit of the listed **DOLLAR VALUE**, whereas manufacturers will receive 100% credit. If no indication provided, listed firm will be credited at 60% of the listed **DOLLAR VALUE** for purposes of calculating the subcontractor participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED ②
Name: Address: City: State: Zip: Phone:		NONE				
Name: Address: City: State: Zip: Phone:						
Name: Address: City: State: Zip: Phone:						

① As appropriate, Bidder shall identify Vendor/Supplier as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Vendor/Supplier is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	San Diego Regional Minority Supplier Diversity Council	SRMSDC
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

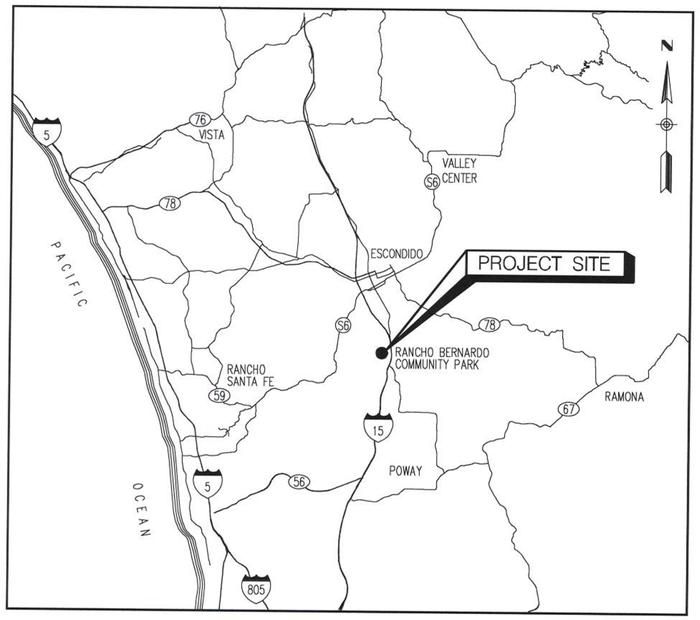
The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

CONSTRUCTION DRAWINGS FOR

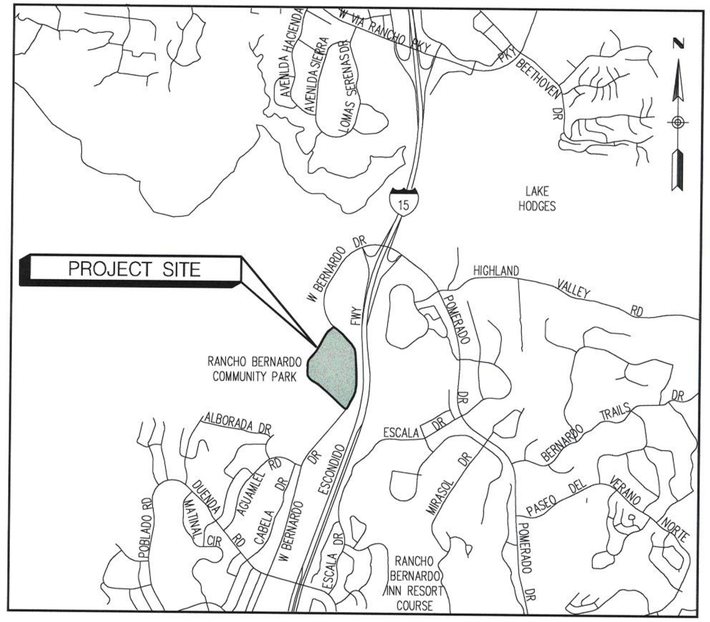
PW/ENGINEERING & CAPITAL PROJECTS DEPARTMENT

CITY OF SAN DIEGO

RANCHO BERNARDO COMMUNITY PARK SPORTS FIELD LIGHTING



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

* I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT. THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

Eric R. Lovering
(ENGINEER'S NAME)

03/22/2013
DATE

BASIS OF DESIGN

2010 CALIFORNIA BUILDING CODE
2010 CALIFORNIA ELECTRICAL CODE
2010 CALIFORNIA PLUMBING CODE

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

CITY OF SAN DIEGO
PUBLIC WORKS PROJECT

TEMPORARY BMP CONSTRUCTION SITE STORM WATER PRIORITY: HIGH ____ MEDIUM ____ LOW__X__

CONSULTANT

LEE & RO, Inc.
San Diego, California

SPEC. NO. 5764

REGISTERED PROFESSIONAL ENGINEER
ERIC R. LOVERING
No. C70807
CIVIL
STATE OF CALIFORNIA

G-1

RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)

COVER SHEET

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 01 OF 16 SHEETS

APPROVED: _____ 4/29/13
FOR CITY ENGINEER — DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

WBS S-11012
SUBMITTED BY: SHEILA BOSE, PROJECT MANAGER
KEVIN OLIVER, PROJECT OFFICER II
320-1747, CCS27 COORDINATE
1960-6307, CCS83 COORDINATE
36857-01-D

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

n:\proj\84008\current submittal\G-01.dgn
4/1/2013 2:56:33 PM Hector Robledo

DRAWING INDEX

CITY OF SAN DIEGO DRAWING NO.	SHEET NO.	DESCRIPTION
		GENERAL
36857-01-D	G-1	COVER SHEET
36857-02-D	G-2	DRAWING INDEX AND PROJECT DATA
36857-03-D	G-3	STANDARDS, LEGENDS, GENERAL NOTES, & ABBREVIATIONS
36857-04-D	G-4	ACCESS KEY MAP
		DEMOLITION
36857-05-D	D-1	CIVIL AND ELECTRICAL DEMOLITION PLAN
		CIVIL
36857-06-D	C-1	SITE PLAN SHEET 1 OF 3
36857-07-D	C-2	SITE PLAN SHEET 2 OF 3
36857-08-D	C-3	SITE PLAN SHEET 3 OF 3
36857-09-D	C-4	COMFORT STATION DEMOLITION & IMPROVEMENT PLANS
36857-10-D	C-5	COMFORT STATION DETAILS
		ELECTRICAL
36857-11-D	E-1	ELECTRICAL LEGEND, SYMBOLS, & ABBREVIATIONS
36857-12-D	E-2	ELECTRICAL SITE PLAN
36857-13-D	E-3	ELECTRICAL SINGLE LINE DIAGRAM
36857-14-D	E-4	PHOTOMETRIC SITE PLAN
36857-15-D	E-5	ELECTRICAL DETAILS

PROJECT DIRECTORY

ENGINEER
LEE & RO, INC.
10640 SCRIPPS RANCH BLVD, SUITE 150
SAN DIEGO, CA 92131
PH: (858) 558-4411

SURVEYOR
AGUIRRE & ASSOCIATES
8265 COMMERCIAL STREET, SUITE 1
LA MESA, CA 91942
PH: (619) 464-6978

PROJECT DATA

PROJECT NAME: RANCHO BERNARDO COMMUNITY PARK-SPORTS FIELD LIGHTING

PROJECT ADDRESS: RANCHO BERNARDO COMMUNITY PARK
18448 WEST BERNARDO DRIVE
SAN DIEGO, CA 92127

PROJECT MANAGER: SHEILA BOSE (619) 533-4698

SUBMITTAL DATE: MARCH 2013

ZONE: OP-1-1
OWNER: CITY OF SAN DIEGO

ASSESSOR'S PARCEL NUMBER: 272-110-43

REFERENCE DRAWINGS

1. CONSTRUCTION OF RANCHO BERNARDO COMMUNITY PARK DEVELOPMENT REFERENCE PHASE II, 23386-D
2. RANCHO BERNARDO COMMUNITY PARK SPORTS FIELD LIGHTING - PHASE 3, 31614-D

SURVEY DATA

BASIS OF BEARING
THE HORIZONTAL DATUM FOR THIS SURVEY IS NAD 83, 1991.35 EPOCH. THE BASIS OF BEARINGS IS THE GRID BEARING BETWEEN CONTROL POINT #355 AND CONTROL POINT #353 PER RECORD OF SURVEY MAP NO. 14492; I.E. N 10°23'25" E.

BENCHMARK
CITY OF SAN DIEGO BENCHMARK #20059 A BRASS PLUG IN THE EASTERLY CURB AT RANCHO BERNARDO COMMUNITY PARK AT THE NORTHERLY END OF THE NORTH PARKING LOT. ELEVATION = 379.32' DATUM: NGVD 29

INDEX OF DISCIPLINES

G	GENERAL
C	CIVIL
D	DEMOLITION
E	ELECTRICAL

LIST OF CITY OF SAN DIEGO STANDARD DRAWINGS

G-10	CONCRETE JOINT DETAILS
SDG-130	GENERAL CURB RAMP NOTES AND SUPPLEMENTAL DETAILS
SDG-132	CURB RAMPS TYPE A & B
SDG-155	SIDEWALK-TYPICAL SECTIONS
SDG-156	CONCRETE CURB, GUTTER, SIDEWALK AND PAVEMENT REMOVAL AND REPLACEMENT
SDM-107	DUAL HEIGHT DRINKING FOUNTAINS
SDM-112	VINYL COATED CHAINLINK FENCE
SDM-114	CHAINLINK GATE
SDM-117	ACCESSIBLE PARKING

UNDERGROUND UTILITIES

THE CONTRACTOR SHALL, AT LEAST THREE (3) WORKING DAYS PRIOR TO THE START OF WORK, NOTIFY THE FOLLOWING UTILITIES AND REQUEST THAT THEIR UNDERGROUND FACILITIES BE MARKED OUT. THIS REQUEST SHALL BE MADE BY THE CONTRACTOR PRIOR TO ALL TRENCHING OPERATIONS, REGARDLESS OF WHETHER THE PLANS SHOW UNDERGROUND TELEPHONE OR GAS AND ELECTRIC DUCTS, CABLES OR PIPELINES.

UNDERGROUND SERVICE ALERT	1-800-227-2600, 1-800-422-4133
SAN DIEGO GAS & ELECTRIC	1-800-227-2600, 811
AT&T	1-800-227-2600, 811
COSD NEIGHBORHOOD CODE COMPLIANCE DIVISION	1-619-236-5500
UNDERGROUND WATER/SEWER MARKOUT	1-619-527-3477
CITY IRRIGATION SYSTEMS AND WIRING	1-619-235-1179
STREET DIVISION/STREET LIGHTS	1-619-527-7500
WIRELESS COMMUNICATIONS	1-619-236-6081
SAN DIEGO FIRE DEPARTMENT	911
POLICE DEPARTMENT DISPATCH	911
ENVIRONMENTAL SERVICES	1-858-492-5055

STORM WATER PROTECTION

1. THIS PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT ORDER NO. R9-2007-0001 AND IS REQUIRED TO DEVELOP AND IMPLEMENT A "WATER POLLUTION CONTROL PLAN (WPCP)".

WATER POLLUTION CONTROL NOTES

THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS NOTED IN THE GREENBOOK 2012 CITY SUPPLEMENT SEC 801- WATER POLLUTION CONTROL.

SUMMARY OF WORK

THE WORK IN THIS CONTRACT COMPRISES THE FOLLOWING, BUT IS NOT LIMITED TO:

1. DEMOLISH EXISTING PATHWAYS AND PROVIDE NEW ADA COMPLIANT ACCESS TO SOFTBALL FIELD 6.
2. FURNISH AND INSTALL NEW ADA COMPLIANT DRINKING FOUNTAIN BY SOFTBALL FIELD 6.
3. PROVIDE BALLPARK LIGHTING FOR SOFTBALL FIELDS 5 & 6 AND SOCCER FIELD.
4. PROVIDE ADA COMPLIANT FACILITIES AT COMFORT STATION SERVING SOFTBALL FIELD 6.

APPLICABLE STANDARD DRAWINGS & SPECIFICATIONS

DISABLED ACCESS REGULATIONS, TITLE 24 (CURRENT EDITION) AND CALIFORNIA STATE ACCESSIBILITY STANDARDS INTERPRETIVE MANUAL (CURRENT EDITION) PREPARED BY THE OFFICE OF THE STATE ARCHITECT AND THE DEPARTMENT OF REHABILITATION. AMERICANS WITH DISABILITIES ACT REGULATION: ADAAG (THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES) ISSUED BY THE ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD (CURRENT EDITION) MANUAL OF TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE WORK ZONES, STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CURRENT EDITION).

NOTE: THE MOST CURRENT EDITIONS OF THE PRECEDING DOCUMENTS SHALL BE USED. WHERE ONE OR MORE SETS OF SPECIFICATIONS OR DRAWINGS ARE ACCEPTABLE, THE MORE RESTRICTIVE SHALL TAKE PRECEDENCE.

GENERAL LEGEND

- 123 — EXISTING MAJOR CONTOUR
- 123.20 — SPOT ELEVATION
- (123.20) — SPOT ELEVATION
- PVMT — PAVEMENT
- GRADE — GRADE
- CURB LINE
- PROPERTY LINE ALONG STREET OR ALLEY R/W
- MH — EXISTING MANHOLE - PLAN
- 227 — MAJOR CONTOUR
- MINOR CONTOUR
- CONTROL POINT
- TREE
- RCV — RECLAIMED WATER VALVE
- WM — WATER METER
- SIGN — SIGN
- E PB — ELECTRICAL PULLBOX
- ICV — IRRIGATION CONTROL VALVE
- LT — LIGHT STANDARD
- CHAINLINK FENCE
- E — NEW LIGHT POST
- LIMITS OF LANDING
- LIMITS OF GRADING

MATERIAL SYMBOLS

- EXISTING CONCRETE
- NEW CONCRETE
- GRASS
- CHECKERED PLATE
- EARTH
- GRATING

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764 | G-2

RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

DRAWING INDEX AND PROJECT DATA

FINAL

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 02 OF 15 SHEETS

WBS S-11012
WBS

APPROVED: FOR CITY ENGINEER — DATE 4/29/13

SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

KEVIN OLIVER, PROJECT ENGINEER

320-1747 LAMBERT COORDINATE

1960-6307 CCS83 COORDINATE

36857-02-D

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

APPROVED BY: FOR CITY ENGINEER
CHECKED BY: CONSTRUCTION ENGINEER
CHECKED BY: INSPECTOR

CONSULTANT
LEE & RO, Inc.
San Diego, California

SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — VANESSA N. WILKINS — No. 67311 — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

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0 1
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GRADING NOTES

1. GRADING AS SHOWN ON THESE PLANS SHALL BE IN CONFORMANCE WITH CURRENT STANDARD SPECIFICATIONS AND CHAPTER 14, ARTICLE 2, DIVISION OF THE SAN DIEGO MUNICIPAL CODE.

2. PLANT AND IRRIGATE ALL CUT AND FILL SLOPES AS REQUIRED BY ARTICLE 2, DIVISION 4, SECTION 142.0411 OF THE SAN DIEGO LAND DEVELOPMENT CODE AND ACCORDING TO SECTION IV OR THE LAND DEVELOPMENT MANUAL LANDSCAPE STANDARDS.

3. GRADED, DISTURBED, OR ERODED AREAS THAT WILL NOT BE PERMANENTLY PAVED, COVERED BY STRUCTURE, OR PLANTED FOR A PERIOD OVER 90 DAYS SHALL BE TEMPORARILY RE-VEGETATED WITH A NON-IRRIGATED HYDROSEED MIX, GROUND COVER, OR EQUIVALENT MATERIAL.

TRAFFIC CONTROL GENERAL NOTES

1. COMPLY WITH STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION, 2012 EDITION, SECTION 7-10.1 THRU 7-10.4.
2. PLANS SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL A MINIMUM OF 10 WORKING DAYS PRIOR TO THE START OF WORK.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING WORK ON CITY PROPERTY TO INSTALL AND MAINTAIN THE TRAFFIC CONTROL DEVICES TO INSURE THE SAFE MOVEMENT OF TRAFFIC AND PEDESTRIANS THROUGH OR AROUND THE WORK AREA AND PROVIDE MAXIMUM PROTECTION AND SAFETY TO CONSTRUCTION WORKERS.
4. THE CONTRACTOR SHALL HAVE ALL SIGNS, DELINEATORS, BARRICADES, ETC. PROPERLY PLACED PRIOR TO COMMENCING CONSTRUCTION.
5. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY SHORING, BRACING, BARRICADES AND PROTECTIVE MEASURES, ETC., REQUIRED TO SAFELY PROTECT THE ENTIRE CONSTRUCTION SITE PERIPHERY, CONSTRUCTION PERSONNEL, CITY STAFF, AND THE PUBLIC. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL OF THE ABOVE 24 HOURS PER DAY DURING THE PERIOD OF CONSTRUCTION.

WORK TYPE DESIGNATIONS

OR (D) - DEMOLITION

OR (E) - EXISTING

OR (N) - NEW WORK

ABBREVIATIONS

ABAND	ABANDON
AC	ASPHALT CONCRETE
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
ASSY	ASSEMBLY
C, ℄	CENTERLINE
CB	CATCH BASIN
CO	CLEAN OUT
CONC	CONCRETE
COND	CONDUIT
COSD STD DWG	CITY OF SAN DIEGO STANDARD DRAWING
(D)	DEMOLISH
DIA	DIAMETER
EL, ELEV	ELEVATION
ELEC	ELECTRICAL
(E), EX, EXIST	EXISTING
EW	EACH WAY
FD	FLOOR DRAIN
FF	FILTER FEED, FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
GS	GROUND SHOT
HP	HIGH PRESSURE
IE	INVERT ELEVATION
IRR	IRRIGATION
L	LENGTH
MAX	MAXIMUM
MIN	MINIMUM
MR	MANHOLE RIM
(N)	NEW
OC	ON CENTER
PROP	PROPOSED
REINF	REINFORCED
RT	RIGHT
S	SEWER, SURVEY LINE
SD	STORM DRAIN
SDG&E	SAN DIEGO GAS AND ELECTRIC
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWING
SST	STAINLESS STEEL
STR	STRUCTURAL
SWR	SEWER
TC	TOP OF CURB
TEL	TELEPHONE
TG	TOP OF GRATE
TP	TOP OF PIPE
W	WIDE, WIDTH
W/	WITH

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

FINAL

CONSULTANT

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RANCHO BERNARDO COMMUNITY
PARKS-SPORTS FIELD LIGHTING
(H084369)

STANDARDS, LEGENDS, GENERAL NOTES, & ABBREVIATIONS

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 03 OF 15 SHEETS

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1960-6307 CCS83 COORDINATE
36857-03-D

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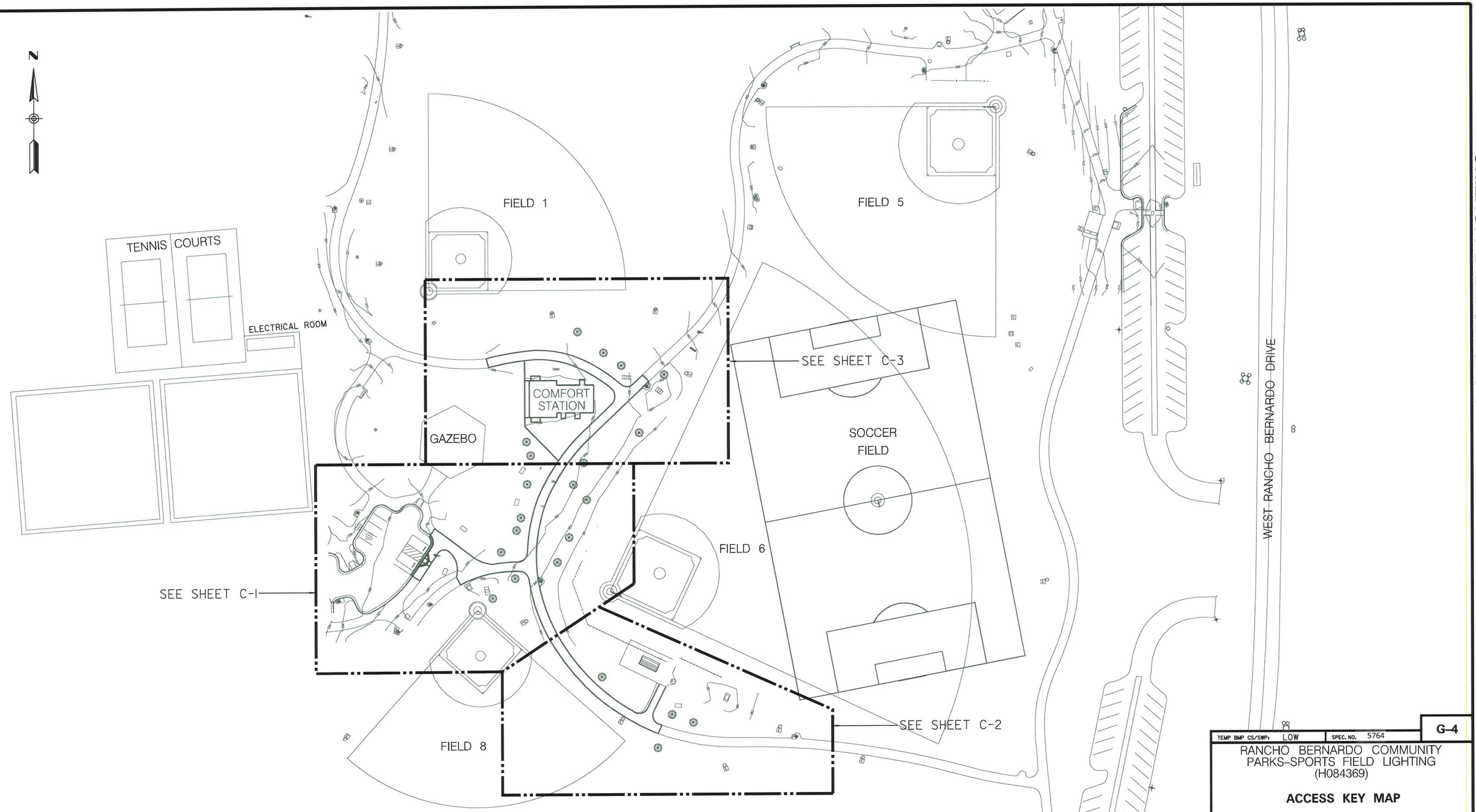

KEY MAP
SCALE: 1" = 40'

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RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764 | G-4

RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

ACCESS KEY MAP

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 04 OF 15 SHEETS

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KEVIN OLIVER, PROJECT ENGINEER

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San Diego, California

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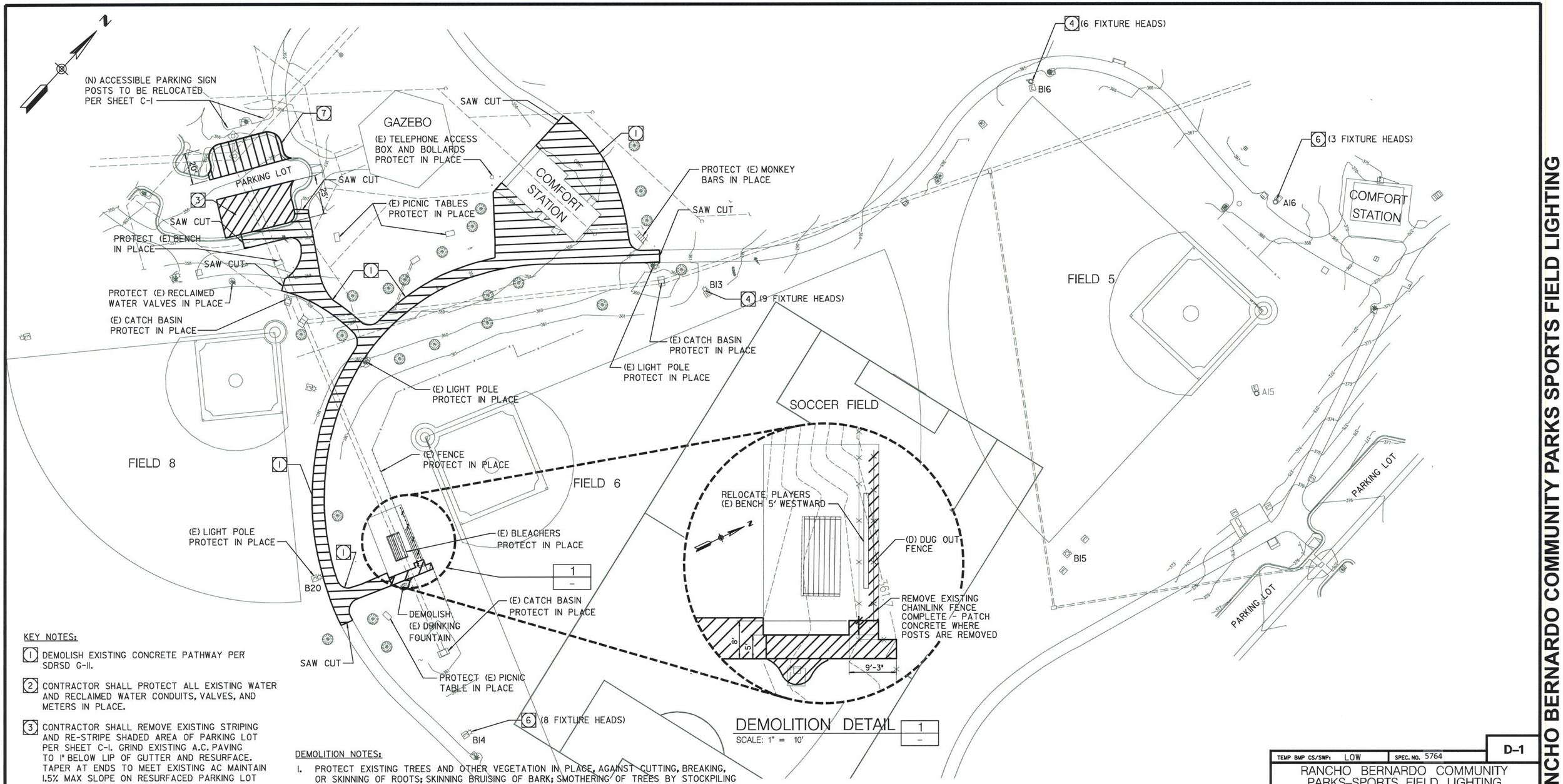

KEY NOTES:

1. DEMOLISH EXISTING CONCRETE PATHWAY PER SDRSD G-11.
2. CONTRACTOR SHALL PROTECT ALL EXISTING WATER AND RECLAIMED WATER CONDUITS, VALVES, AND METERS IN PLACE.
3. CONTRACTOR SHALL REMOVE EXISTING STRIPING AND RE-STRIPE SHADED AREA OF PARKING LOT PER SHEET C-1. GRIND EXISTING A.C. PAVING TO 1" BELOW LIP OF GUTTER AND RESURFACE. TAPER AT ENDS TO MEET EXISTING AC MAINTAIN 1.5% MAX SLOPE ON RESURFACED PARKING LOT AREA.
4. REMOVE AND DISPOSE OF OFFSITE FIXTURE HEAD QUANTITY INDICATED AND ASSOCIATED BALLAST. EXISTING CONDUCTORS TO REMAIN FOR RECONNECTION TO NEW LIGHT FIXTURES.
5. NOT USED.
6. REMOVE AND DISPOSE OF OFFSITE, POLE, FIXTURE HEAD QUANTITY INDICATED, ASSOCIATED BALLAST, POLE FOUNDATION, AND BASE. EXISTING CONDUCTORS TO REMAIN FOR RECONNECTION TO NEW LIGHT FIXTURES.
7. CONTRACTOR SHALL REMOVE EXISTING ACCESSIBLE PARKING STRIPING AND MARKOUTS AND RE-STRIPE AREA PER SHEET C-1.

DEMOLITION NOTES:

1. PROTECT EXISTING TREES AND OTHER VEGETATION IN PLACE, AGAINST CUTTING, BREAKING, OR SKINNING OF ROOTS; SKINNING BRUISING OF BARK; SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE. PROVIDE TEMPORARY GUARDS TO PROTECT TREES AND VEGETATION TO REMAIN. IF TREE FAILS AND CITY FINDS CONTRACTOR DID NOT TAKE THE NECESSARY PRECAUTIONS, TREE SHALL BE REPLACED IN KIND AND SIZE PER APPROVAL (MIN. SIZE 60" BOX). REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR PROTECTION OF EXISTING TREES.
2. DISCONNECT EXISTING CONDUCTORS/CIRCUIT FROM EXISTING POLES. ENSURE EXISTING CONTINUITY OF THE CIRCUIT TO OTHER POSSIBLE EXISTING POLE FEED DOWN STREAM.
3. COORDINATE WITH UTILITY COMPANIES AND AGENCIES AS REQUIRED. CONTRACTOR SHALL MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND FACILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS IF REVISIONS ARE NECESSARY DUE TO ACTUAL LOCATION OF EXISTING FACILITIES. WHERE UTILITY CUTTING, CAPPING, OR PLUGGING IS REQUIRED, PERFORM SUCH WORK IN ACCORDANCE WITH REQUIREMENTS OF THE UTILITY COMPANY OR GOVERNMENTAL AGENCY HAVING JURISDICTION.
4. BEFORE EXCAVATION, VERIFY THE LOCATION OF UNDERGROUND UTILITIES AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION.

DEMOLITION DETAIL 1 / –
SCALE: 1" = 10'

DEMOLITION PLAN 2
SCALE: 1" = 30'

0 30 60 90
SCALE 1"=30'

FINAL

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RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)
CIVIL AND ELECTRICAL DEMOLITION PLAN

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 05 OF 15 SHEETS

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RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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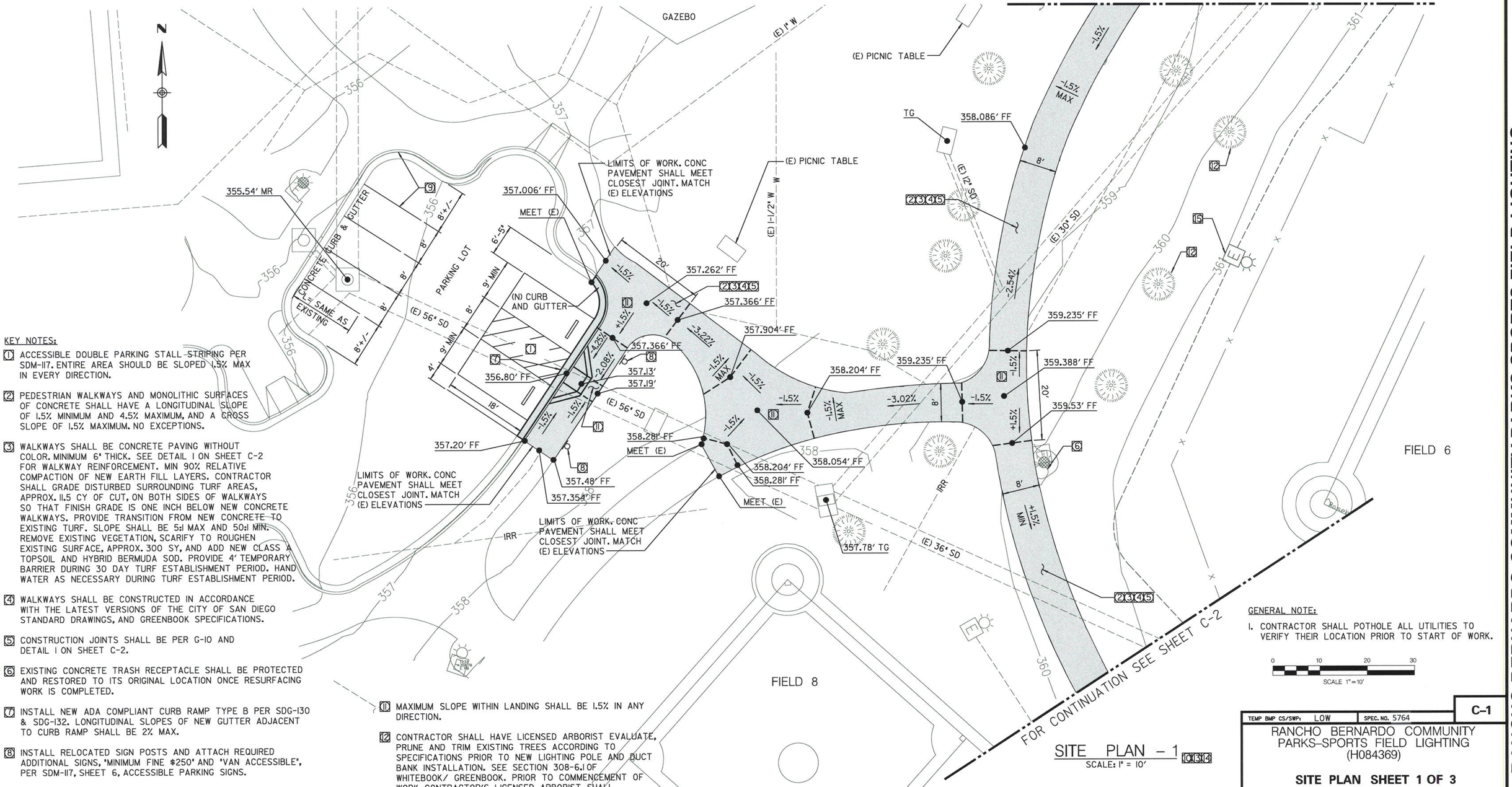

KEY NOTES:

1. ACCESSIBLE DOUBLE PARKING STALL STRIPING PER SDM-117. ENTIRE AREA SHOULD BE SLOPED 1.5% MAX IN EVERY DIRECTION.
2. PEDESTRIAN WALKWAYS AND MONOLITHIC SURFACES OF CONCRETE SHALL HAVE A LONGITUDINAL SLOPE OF 1.5% MINIMUM AND 4.5% MAXIMUM, AND A CROSS SLOPE OF 1.5% MAXIMUM. NO EXCEPTIONS.
3. WALKWAYS SHALL BE CONCRETE PAVING WITHOUT COLOR. MINIMUM 6" THICK. SEE DETAIL 1 ON SHEET C-2 FOR WALKWAY REINFORCEMENT. MIN 90% RELATIVE COMPACTION OF NEW EARTH FILL LAYERS. CONTRACTOR SHALL GRADE DISTURBED SURROUNDING TURF AREAS, APPROX. 11.5 CY OF CUT, ON BOTH SIDES OF WALKWAYS SO THAT FINISH GRADE IS ONE INCH BELOW NEW CONCRETE WALKWAYS. PROVIDE TRANSITION FROM NEW CONCRETE TO EXISTING TURF. SLOPE SHALL BE 5:1 MAX AND 50:1 MIN. REMOVE EXISTING VEGETATION, SCARIFY TO ROUGHEN EXISTING SURFACE, APPROX. 300 SY, AND ADD NEW CLASS A TOPSOIL AND HYBRID BERMUDA SOD. PROVIDE 4' TEMPORARY BARRIER DURING 30 DAY TURF ESTABLISHMENT PERIOD. HAND WATER AS NECESSARY DURING TURF ESTABLISHMENT PERIOD.
4. WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSIONS OF THE CITY OF SAN DIEGO STANDARD DRAWINGS, AND GREENBOOK SPECIFICATIONS.
5. CONSTRUCTION JOINTS SHALL BE PER G-10 AND DETAIL 1 ON SHEET C-2.
6. EXISTING CONCRETE TRASH RECEPTACLE SHALL BE PROTECTED AND RESTORED TO ITS ORIGINAL LOCATION ONCE RESURFACING WORK IS COMPLETED.
7. INSTALL NEW ADA COMPLIANT CURB RAMP TYPE B PER SDG-130 & SDG-132. LONGITUDINAL SLOPES OF NEW GUTTER ADJACENT TO CURB RAMP SHALL BE 2% MAX.
8. INSTALL RELOCATED SIGN POSTS AND ATTACH REQUIRED ADDITIONAL SIGNS, "MINIMUM FINE $250" AND "VAN ACCESSIBLE", PER SDM-117, SHEET 6, ACCESSIBLE PARKING SIGNS.
9. RE-STRIPE (E) ACCESSIBLE PARKING AREA AND PAINT (E) ACCESSIBLE PARKING AREA CURB GRAY, PER THE SAN DIEGO MUNICIPAL CODE. STRIPING AND MARKOUTS SHALL BE PER GREENBOOK SPECIFICATIONS, SECTION 310-5.6
10. CONTRACTOR MUST COORDINATE WITH RESIDENT ENGINEER FOR SHUTOFF OF IRRIGATION AT LEAST ONE WEEK PRIOR TO ANY EQUIPMENT, MACHINERY OR VEHICLES ON TURF FOR LIGHTING INSTALLATION. TURF MUST BE DRY AND 4'X 8' SHEETS OF PLYWOOD MUST BE PLACED UNDER VEHICLES AND EQUIPMENT TO PREVENT DAMAGE TO EXISTING TURF. EQUIPMENT SHALL NOT BE STORED NOR DEMOLITION MATERIALS STOCKPILED WITHIN TREE CANOPY OR TREE AREA.
11. MAXIMUM SLOPE WITHIN LANDING SHALL BE 1.5% IN ANY DIRECTION.
12. CONTRACTOR SHALL HAVE LICENSED ARBORIST EVALUATE, PRUNE AND TRIM EXISTING TREES ACCORDING TO SPECIFICATIONS PRIOR TO NEW LIGHTING POLE AND DUCT BANK INSTALLATION. SEE SECTION 308-6.1 OF WHITEBOOK/ GREENBOOK. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR'S LICENSED ARBORIST SHALL COORDINATE ALL TREE WORK WITH PARK AND RECREATION DEPARTMENT ARBORIST, MICHAEL MARIKA (619-235-1179) AND RESIDENT ENGINEER.
13. IF DAMAGE IS CAUSED TO EXISTING IRRIGATION ADJACENT TO REMOVED AND REPAIRED CONCRETE WALKWAYS, CONTRACTOR SHALL REPAIR/REPLACE IN KIND, TYPICAL.
14. CONTRACTOR SHALL REPAIR DAMAGE TO EXISTING TURF AND RESOD AS REQUIRED. REGRADE ALL AREAS TO PROVIDE A SMOOTH TRANSITION TO NEW SIDEWALK GRADES PRIOR TO PLACEMENT OF NEW SOD.
15. NEW SPORTS LIGHTING POLE. SEE ELECTRICAL SHEETS. PRUNE AND TRIM INTERFERING BRANCHES PER LICENSED ARBORIST RECOMMENDATIONS. SEE KEYED NOTE 12.

GENERAL NOTE:

1. CONTRACTOR SHALL POTHOLE ALL UTILITIES TO VERIFY THEIR LOCATION PRIOR TO START OF WORK.

0 10 20 30
SCALE 1" = 10'

SITE PLAN – 1 (1)(3)(4)
SCALE: 1" = 10'

FINAL

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

C-1

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764

RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)

SITE PLAN SHEET 1 OF 3

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 06 OF 15 SHEETS

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CONSULTANT
LEE & RO, Inc.
San Diego, California

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REGISTERED PROFESSIONAL ENGINEER — VANESSA M. WELLER — No. 73111 — Exp. 12/31/13 — CIVIL — STATE OF CALIFORNIA

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CHECKED BY: INSPECTOR

APPROVED: FOR CITY ENGINEER — DATE 4/29/13

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER
KEVIN OLIVER, PROJECT ENGINEER
320-1747 LAMBERT COORDINATE
1960-6307 CCS83 COORDINATE
36857-06-D

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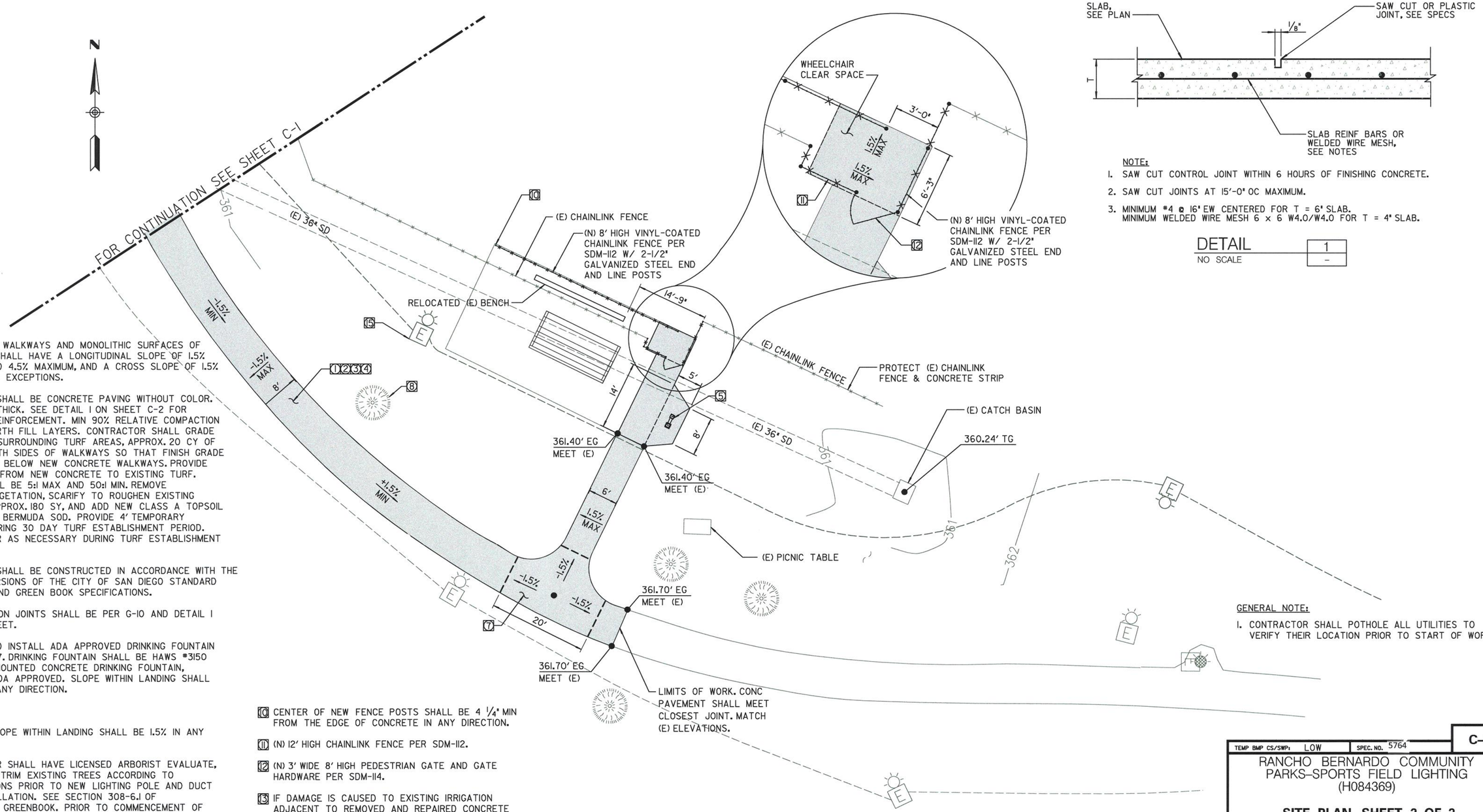

KEY NOTES:

1. PEDESTRIAN WALKWAYS AND MONOLITHIC SURFACES OF CONCRETE SHALL HAVE A LONGITUDINAL SLOPE OF 1.5% MINIMUM AND 4.5% MAXIMUM, AND A CROSS SLOPE OF 1.5% MAXIMUM. NO EXCEPTIONS.

2. WALKWAYS SHALL BE CONCRETE PAVING WITHOUT COLOR. MINIMUM 6" THICK. SEE DETAIL 1 ON SHEET C-2 FOR WALKWAY REINFORCEMENT. MIN 90% RELATIVE COMPACTION OF NEW EARTH FILL LAYERS. CONTRACTOR SHALL GRADE DISTURBED SURROUNDING TURF AREAS, APPROX. 20 CY OF FILL, ON BOTH SIDES OF WALKWAYS SO THAT FINISH GRADE IS ONE INCH BELOW NEW CONCRETE WALKWAYS. PROVIDE TRANSITION FROM NEW CONCRETE TO EXISTING TURF. SLOPE SHALL BE 5:1 MAX AND 50:1 MIN. REMOVE EXISTING VEGETATION, SCARIFY TO ROUGHEN EXISTING SURFACE, APPROX. 180 SY, AND ADD NEW CLASS A TOPSOIL AND HYBRID BERMUDA SOD. PROVIDE 4' TEMPORARY BARRIER DURING 30 DAY TURF ESTABLISHMENT PERIOD. HAND WATER AS NECESSARY DURING TURF ESTABLISHMENT PERIOD.

3. WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSIONS OF THE CITY OF SAN DIEGO STANDARD DRAWINGS AND GREEN BOOK SPECIFICATIONS.

4. CONSTRUCTION JOINTS SHALL BE PER G-10 AND DETAIL 1 ON THIS SHEET.

5. FURNISH AND INSTALL ADA APPROVED DRINKING FOUNTAIN PER SDM-107. DRINKING FOUNTAIN SHALL BE HAWS #3150 PEDESTAL MOUNTED CONCRETE DRINKING FOUNTAIN, HIGH-LOW ADA APPROVED. SLOPE WITHIN LANDING SHALL BE 1.5% IN ANY DIRECTION.

6. NOT USED.

7. MAXIMUM SLOPE WITHIN LANDING SHALL BE 1.5% IN ANY DIRECTION.

8. CONTRACTOR SHALL HAVE LICENSED ARBORIST EVALUATE, PRUNE AND TRIM EXISTING TREES ACCORDING TO SPECIFICATIONS PRIOR TO NEW LIGHTING POLE AND DUCT BANK INSTALLATION. SEE SECTION 308-6.1 OF WHITEBOOK/ GREENBOOK. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR'S LICENSED ARBORIST SHALL COORDINATE ALL TREE WORK WITH PARK AND RECREATION DEPARTMENT ARBORIST, MICHAEL MARIKA (619-235-1179) AND RESIDENT ENGINEER.

9. CONTRACTOR MUST COORDINATE WITH RESIDENT ENGINEER FOR SHUTOFF OF IRRIGATION AT LEAST ONE WEEK PRIOR TO ANY EQUIPMENT, MACHINERY OR VEHICLES ON TURF FOR LIGHTING INSTALLATION. TURF MUST BE DRY AND 4'X 8' SHEETS OF PLYWOOD MUST BE PLACED UNDER VEHICLES AND EQUIPMENT TO PREVENT DAMAGE TO EXISTING TURF. EQUIPMENT SHALL NOT BE STORED NOR DEMOLITION MATERIALS STOCKPILED WITHIN TREE CANOPY OR TREE AREA.

10. CENTER OF NEW FENCE POSTS SHALL BE 4 1/4" MIN FROM THE EDGE OF CONCRETE IN ANY DIRECTION.

11. (N) 12' HIGH CHAINLINK FENCE PER SDM-112.

12. (N) 3' WIDE 8' HIGH PEDESTRIAN GATE AND GATE HARDWARE PER SDM-114.

13. IF DAMAGE IS CAUSED TO EXISTING IRRIGATION ADJACENT TO REMOVED AND REPAIRED CONCRETE WALKWAYS, CONTRACTOR SHALL REPAIR/REPLACE IN KIND, TYPICAL.

14. CONTRACTOR SHALL REPAIR DAMAGE TO EXISTING TURF AND RESOD AS REQUIRED. REGRADE ALL AREAS TO PROVIDE A SMOOTH TRANSITION TO NEW SIDEWALK GRADES PRIOR TO PLACEMENT OF NEW SOD.

15. NEW SPORTS LIGHTING POLE. SEE ELECTRICAL SHEETS. PRUNE AND TRIM INTEFEREING BRANCHES PER LICENSED ARBORIST RECOMMENDATIONS. SEE KEYED NOTE 8.

SITE PLAN – 2 8 9 13 14

SCALE: 1" = 10'

0 10 20 30

SCALE 1"=10'

NOTE:

1. SAW CUT CONTROL JOINT WITHIN 6 HOURS OF FINISHING CONCRETE.
2. SAW CUT JOINTS AT 15'-0" OC MAXIMUM.
3. MINIMUM #4 @ 16" EW CENTERED FOR T = 6" SLAB. MINIMUM WELDED WIRE MESH 6 x 6 W4.0/W4.0 FOR T = 4" SLAB.

DETAIL 1
NO SCALE –

GENERAL NOTE:

1. CONTRACTOR SHALL POTHOLE ALL UTILITIES TO VERIFY THEIR LOCATION PRIOR TO START OF WORK.

FINAL

CONSULTANT
LEE & RO, Inc.
San Diego, California

SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — VANESSA N. WILLIAMS — No. C73111 — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

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RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)

SITE PLAN SHEET 2 OF 3

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 07 OF 15 SHEETS

WBS S-11012
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SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

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ORIGINAL	L&R			

KEVIN OLIVER, PROJECT ENGINEER
320-1747, LAMBERT COORDINATE
1960-6307, CCS83 COORDINATE
36857-07-D

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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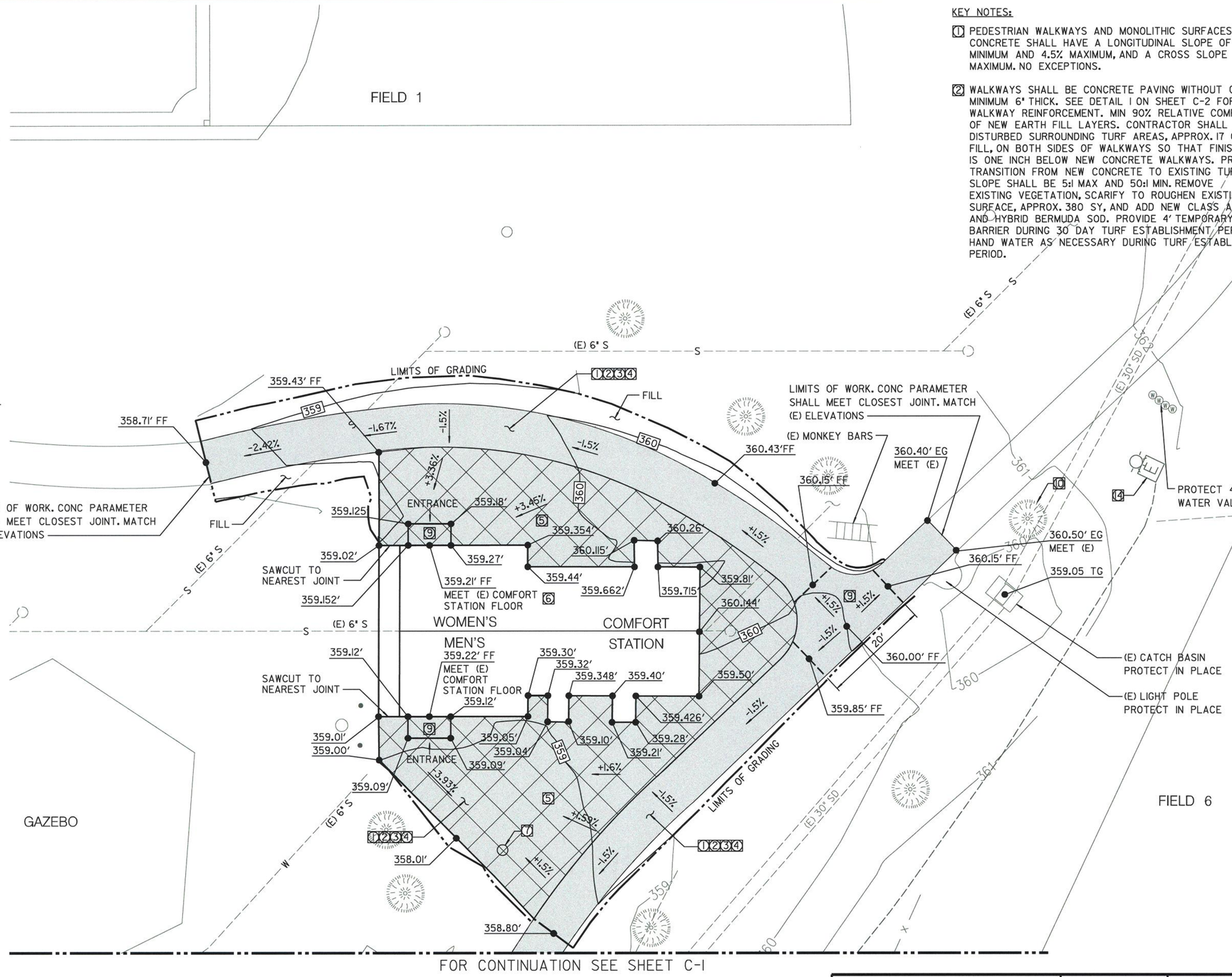

SITE PLAN – 3 [1][2][3]

SCALE: 1" = 10'

0 10 20 30

SCALE 1"=10'

KEY NOTES:

[1] PEDESTRIAN WALKWAYS AND MONOLITHIC SURFACES OF CONCRETE SHALL HAVE A LONGITUDINAL SLOPE OF 1.5% MINIMUM AND 4.5% MAXIMUM, AND A CROSS SLOPE OF 1.5% MAXIMUM. NO EXCEPTIONS.

[2] WALKWAYS SHALL BE CONCRETE PAVING WITHOUT COLOR. MINIMUM 6" THICK. SEE DETAIL 1 ON SHEET C-2 FOR WALKWAY REINFORCEMENT. MIN 90% RELATIVE COMPACTION OF NEW EARTH FILL LAYERS. CONTRACTOR SHALL GRADE DISTURBED SURROUNDING TURF AREAS, APPROX. 17 CY OF FILL, ON BOTH SIDES OF WALKWAYS SO THAT FINISH GRADE IS ONE INCH BELOW NEW CONCRETE WALKWAYS. PROVIDE TRANSITION FROM NEW CONCRETE TO EXISTING TURF. SLOPE SHALL BE 5:1 MAX AND 50:1 MIN. REMOVE EXISTING VEGETATION, SCARIFY TO ROUGHEN EXISTING SURFACE, APPROX. 380 SY, AND ADD NEW CLASS A TOPSOIL AND HYBRID BERMUDA SOD. PROVIDE 4' TEMPORARY BARRIER DURING 30 DAY TURF ESTABLISHMENT PERIOD. HAND WATER AS NECESSARY DURING TURF ESTABLISHMENT PERIOD.

[3] WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSIONS OF THE CITY OF SAN DIEGO STANDARD DRAWINGS, AND GREEN BOOK SPECIFICATIONS.

[4] CONSTRUCTION JOINTS SHALL BE PER G-10 AND DETAIL 1 ON SHEET C-2.

[5] SCORING PATTERN IN PROPOSED CONCRETE AREA SURROUNDING COMFORT STATION PLAZA IS 4' SQUARE AND SHOWN DIAGRAMMATICALLY. EXPANSION JOINTS AND SCORING PATTERN PLAN SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL PRIOR TO POURING. REFER TO G-10 FOR JOINT DETAILS. CONTRACTOR TO MAINTAIN ACCESSIBLE PATHS OF TRAVEL TO BOTH MEN'S AND WOMEN'S COMFORT STATIONS AS SHOWN ON PLANS. LONGITUDINAL SLOPE SHALL BE 1.5% MIN AND 4.5% MAX; CROSS SLOPE SHALL BE 1.5% MAX.

[6] SEE FIELD 6 COMFORT STATION ADA IMPROVEMENTS ON SHEET C-4.

[7] EXISTING CONCRETE TRASH RECEPTACLE SHALL BE PROTECTED AND RESTORED TO ITS ORIGINAL LOCATION ONCE WORK IS COMPLETED.

[9] MAXIMUM SLOPE WITHIN LANDING SHALL BE 1.5% IN ANY DIRECTION.

[10] CONTRACTOR SHALL HAVE LICENSED ARBORIST EVALUATE, PRUNE AND TRIM EXISTING TREES ACCORDING TO SPECIFICATIONS PRIOR TO DUCT BANK INSTALLATION. SEE SECTION 308-6.1 OF WHITEBOOK/ GREENBOOK. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR'S LICENSED ARBORIST SHALL COORDINATE ALL TREE WORK WITH PARK AND RECREATION DEPARTMENT ARBORIST, MICHAEL MARIKA (619-235-1179) AND RESIDENT ENGINEER.

[11] CONTRACTOR MUST COORDINATE WITH RESIDENT ENGINEER FOR SHUTOFF OF IRRIGATION AT LEAST ONE WEEK PRIOR TO ANY EQUIPMENT, MACHINERY OR VEHICLES ON TURF FOR LIGHTING INSTALLATION. TURF MUST BE DRY AND 4'X 8' SHEETS OF PLYWOOD MUST BE PLACED UNDER VEHICLES AND EQUIPMENT TO PREVENT DAMAGE TO EXISTING TURF. EQUIPMENT SHALL NOT BE STORED NOR DEMOLITION MATERIALS STOCKPILED WITHIN TREE CANOPY OR TREE AREA.

[12] IF DAMAGE IS CAUSED TO EXISTING IRRIGATION ADJACENT TO REMOVED AND REPAIRED CONCRETE WALKWAYS, CONTRACTOR SHALL REPAIR/REPLACE IN KIND, TYPICAL.

[13] CONTRACTOR SHALL REPAIR DAMAGE TO EXISTING TURF AND RESOD AS REQUIRED. REGRADE ALL AREAS TO PROVIDE A SMOOTH TRANSITION TO NEW SIDEWALK GRADES PRIOR TO PLACEMENT OF NEW SOD.

[14] NEW SPORTS LIGHTING POLE. SEE ELECTRICAL SHEETS. PRUNE AND TRIM INTERFERING BRANCHES PER LICENSED ARBORIST RECOMMENDATIONS. SEE KEYED NOTE 10.

GENERAL NOTE:

1. CONTRACTOR SHALL POTHOLE ALL UTILITIES TO VERIFY THEIR LOCATION PRIOR TO START OF WORK.

FINAL

CONSULTANT

LEE & RO, Inc.
San Diego, California

SCALE	
	HORIZONTAL
	VERTICAL

REGISTERED PROFESSIONAL ENGINEER — JANESSA M. WILLIAMS — No. C73111 — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

APPROVED BY: FOR CITY ENGINEER
CHECKED BY: CONSTRUCTION ENGINEER
CHECKED BY: INSPECTOR

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764 | C-3

RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

SITE PLAN SHEET 3 OF 3

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 08 OF 15 SHEETS

WBS S-11012
WBS

APPROVED: FOR CITY ENGINEER 4/29/13 DATE

SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

KEVIN OLIVER, PROJECT ENGINEER
320-1747 LAMBERT COORDINATE
1960-6307 CCS83 COORDINATE

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

36857-08-D

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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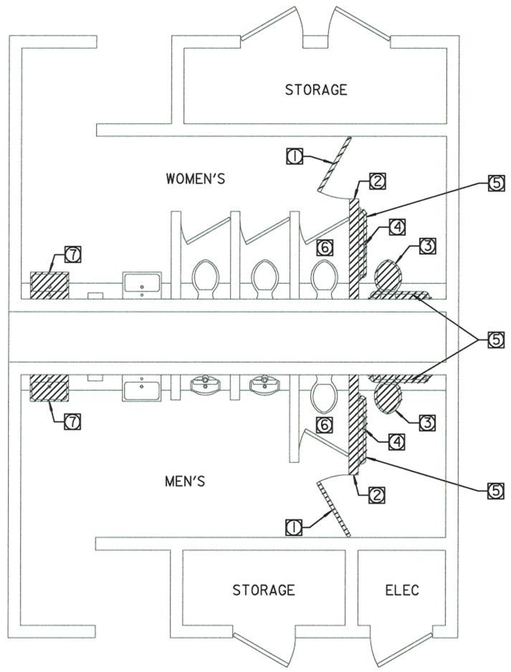


COMFORT STATION DEMOLITION PLAN

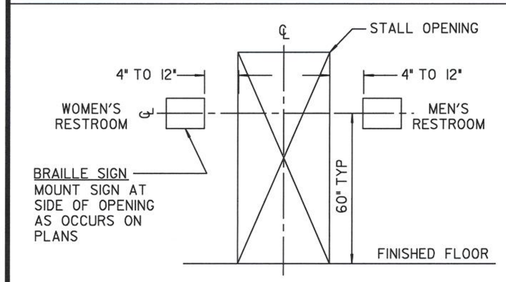
PLAN 1
SCALE: 1/4" = 1'-0" –

DEMOLITION KEY NOTES:

1. DEMOLISH EXISTING ACCESSIBLE STALL DOOR.
2. DEMOLISH EXISTING 6" MASONRY PARTITION WALL OF ACCESSIBLE STALL. GRIND REMAINING MASONRY FLUSH WITH FLOOR AND WALL TO MATCH EXISTING.
3. DEMOLISH EXISTING WALL MOUNTED TOILET IN ACCESSIBLE STALL.
4. REMOVE EXISTING TOILET PAPER DISPENSER.
5. RELOCATE EXISTING LATERAL GRAB BAR PER DETAIL 5 SHEET C-5.
6. ADJACENT STALL DOOR AND FIXTURES THAT NEED TO BE REMOVED TO COMPLETE DEMOLITION ACTIVITIES SHALL BE REINSTALLED IN KIND.
7. DEMOLISH EXISTING LAVATORY.

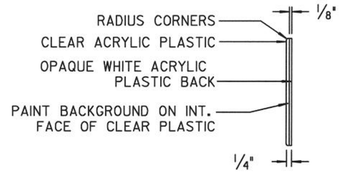
NOTES:

1. CONTRACTOR SHALL DISPOSE OF FIXTURES AND BROKEN CMU AFTER REMOVAL IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
2. AFTER REMOVING/RELOCATING FIXTURES, PATCH HOLES IN CMU WALL WITH MORTAR AND MATCH EXISTING BLOCK COLORS. APPLY 2 COATS OF ANTI-GRAFFITI COATING AS MANUFACTURED BY MONOPOLE, INC. FIRST COAT SHALL BE AQUASEAL ME12 (ITEM 5200); SECOND COAT SHALL BE PERMASHIELD BASE (ITEM 6100).
3. PROTECT ALL FIXTURES ON WATER CLOSET ADJACENT TO ACCESSIBLE STALL DURING DEMOLITION AND REPLACE/REATTACH IN KIND.



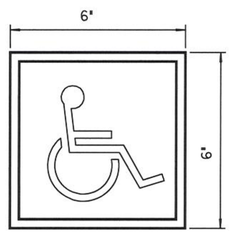
TYPICAL SIGN PLACEMENT DETAIL (TYP)

DETAIL 1
SCALE: NTS –



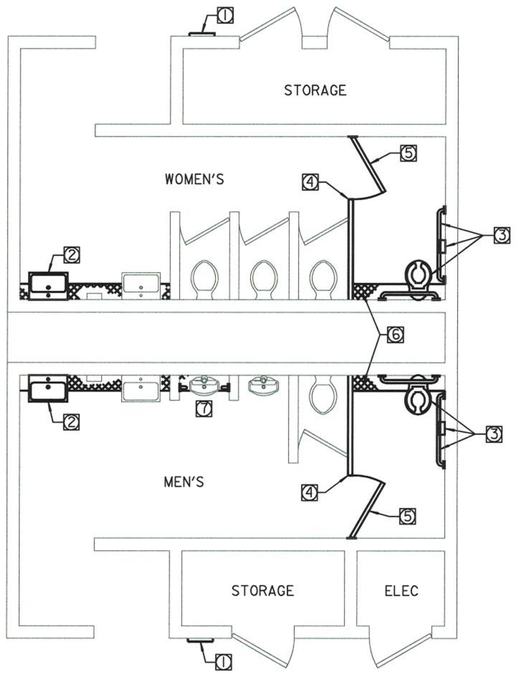
TYPICAL SIGN DETAIL (SECTION)

DETAIL 2
SCALE: NTS –



INTERNATIONAL SYMBOL OF ACCESSIBILITY

DETAIL 3
SCALE: NTS C-5



COMFORT STATION IMPROVEMENT PLAN

PLAN 2
SCALE: 1/4" = 1'-0" –

IMPROVEMENT KEY NOTES:

1. WALL MOUNT ACCESSIBLE SIGNAGE ON COMFORT STATION ENTRANCE PER DETAILS 1 & 2 ON THIS SHEET AND DETAIL 4 ON SHEET C-5.
2. INSTALL ADA APPROVED LAVATORY WITH DRAIN PIPE COVER PER DETAIL 6, ON SHEET C-5, MODEL DURAWARE 1953-1-CSG-9-GE SINGLE HOLE SST LAVATORY AND CHICAGO 333-665 SST FAUCET.
3. INSTALL NEW WALL MOUNTED TOILET WITH AUTOMATIC FLUSH MODEL DURAWARE 2100-W-1-CN SST TOILET; RELOCATE EXISTING GRAB BARS; INSTALL NEW TOILET PAPER DISPENSER MODEL ASLIN INDUSTRIES TPD0250 SR-S.S OR EQUAL. SEE DETAIL 5 & 7, SHEET C-5 FOR INSTALLATION CLEARANCES.
4. INSTALL NEW ACCESSIBLE STALL PARTITION PER DETAIL 7, SHEET C-5. STALL PARTITION SHALL BE 1" STAINLESS STEEL OR SOLID PLASTIC. ZAMAK (POT METAL) IS NOT ACCEPTABLE. COLOR AND FINISH OF PARTITION SHALL BE APPROVED BY THE PARKS AND & RECREATION DEPARTMENT.
5. INSTALL NEW INWARD SWINGING DOOR AND SELF CLOSER PER DETAILS 7, 8 AND 9, SHEET C-5. NEW DOOR SHALL BE 1" STAINLESS STEEL OR SOLID PLASTIC. ZAMAK (POT METAL) IS NOT ACCEPTABLE. COLOR AND FINISH OF PARTITION SHALL BE APPROVED BY THE PARKS AND & RECREATION DEPARTMENT AND SHALL MATCH PARTITION.
6. INSTALL APPROXIMATELY 30 LF OF FRP GRATING IN TRENCH ALONG CMU WALL IN ACCESSIBLE STALL, UNDER LAVATORIES AND URINAL. TRENCH DIMENSIONS ARE APPROXIMATELY 9"Wx2"D. SEE DETAIL 11, SHEET C-5 FOR GRATING DETAIL. FRP GRATING SHALL BE MANUFACTURED BY LIBERTY PULTRUSIONS OR APPROVED EQUAL.
7. INSTALL GRAB BARS AT EXISTING URINAL PER DETAIL 10, SHEET C-5.

NOTES:

1. ALL HARDWARE SHALL BE HEAVY DUTY STAINLESS STEEL. (NUTS, THREADS, PINS, BOLTS, ETC.)

FINAL

CONSULTANT
LEE & RO, Inc.
San Diego, California

SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — VANESSA N. MILLER — No. 73911 — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

APPROVED BY: FOR CITY ENGINEER
CHECKED BY: CONSTRUCTION ENGINEER
CHECKED BY: INSPECTOR

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764 | C-4

RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

COMFORT STATION DEMOLITION & IMPROVEMENT PLANS

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 09 OF 15 SHEETS

WBS S-11012
WBS

APPROVED: FOR CITY ENGINEER 9/29/13 DATE

SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

KEVIN OLIVER, PROJECT ENGINEER

320-1747 LAMBERT COORDINATE

1960-6307 CCS83 COORDINATE

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

36857- 09-D

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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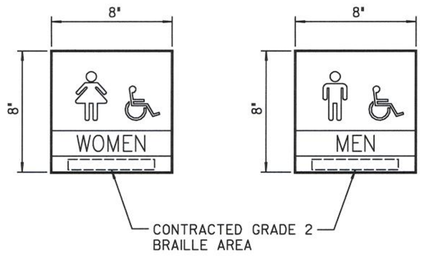
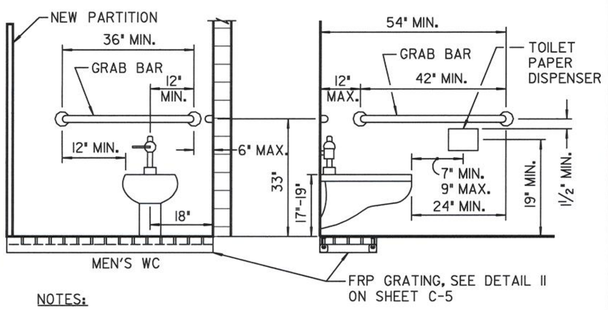


TYPICAL SIGN DETAIL

DETAIL 4 — SCALE: NTS — C-4

NOTES:

1. SIGNS SHALL COMPLY WITH CBC SECTION 1117B.5.
2. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE THE STANDARD USED TO IDENTIFY FACILITIES THAT ARE ACCESSIBLE TO AND USEABLE BY PHYSICALLY DISABLED PERSONS AS SET FORTH AND SPECIFICALLY REQUIRED IN THIS DETAIL.
3. LETTER SIZE: LETTERS AND NUMBERS ON SIGNS SHALL BE 1" HIGH, RAISED A MIN. OF 1/32" ABOVE BACKGROUND.
4. CONTRACT OF SYMBOL: CHARACTERS AND SYMBOLS CONTRAST WITH THEIR BACKGROUND, EITHER LIGHT CHARACTERS ON A DARK BACKGROUND OR DARK CHARACTERS ON A LIGHT BACKGROUND. SYMBOLS SHALL BE CONTRASTING IN COLOR FROM THE DOOR.
5. PICTORIAL SYMBOL SIGNS: PICTORIAL SYMBOL SIGNS SHALL BE ACCOMPANIED BY THE EQUAL VERBAL DESCRIPTION PLACED DIRECTLY BELOW THE PICTOGRAM. THE BORDER DIMENSION OF THE PICTOGRAM SHALL BE A MINIMUM OF 6 INCHES IN HEIGHT.
6. SIGNS (U.N.O.) ARE MOUNTED TO WALL OR SIDELIGHT ADJACENT TO DOOR AS OCCURS ON PLAN PER TYPICAL SIGN PLACEMENT DETAIL.
7. COLOR SELECTED BY CONTRACTOR THROUGH CITY PROJECT MANAGER OR REPRESENTATIVE. VERIFY LOCATION OF SIGN WITH OWNER PRIOR TO MOUNTING.
8. BRAILLE: CONTRACTED GRADE 2 BRAILLE DOTS AT 1/10" O.C. WITHIN CELL AND 2/10" BETWEEN EACH CELL. DOTS SHALL BE RAISED A MIN. OF 1/32" ABOVE BACKGROUND. TO BE PROVIDED AT SIDE OF DOOR AS OCCURS ON PLANS. SIGN MFR. TO VERIFY BRAILLE TRANSLATION.
9. SIGN SHALL BE ATTACHED WITH 1/8" DIA. SEX BOLTS + ADHESIVE WITH SCREW PORTION ON INTERIOR SIDE OF DOOR. ATTACHMENT OF SIGN SHALL BE FULLY CONCEALED AND TAMPER RESISTANT.
10. CONTRACTOR TO PROVIDE SIGNAGE SUBMITTAL FOR APPROVAL.

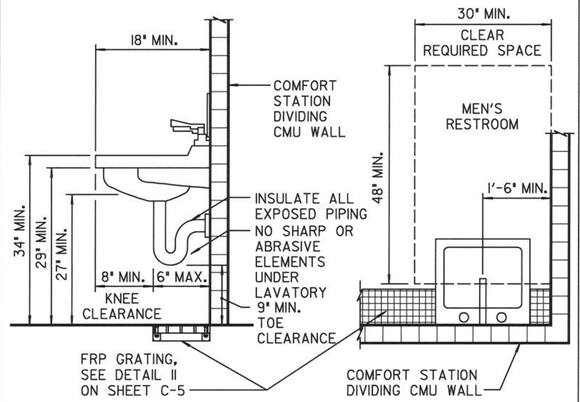


NOTES:

1. THE CONTROLS FOR THE FLUSH VALVE SHALL BE:
   A. OPERABLE WITH ONE HAND.
   B. NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST.
   C. BE MOUNTED ON THE WIDE SIDE OF THE TOILET.
   D. ACTIVATED WITH A FORCE OF LESS THAN OR EQUAL TO 5 LBS.
   E. 1½" CLEAR BELOW THE GRAB BAR.

WATER CLOSET INSTALLATION DETAIL (TYP)

DETAIL 5 — SCALE: NTS — C-4

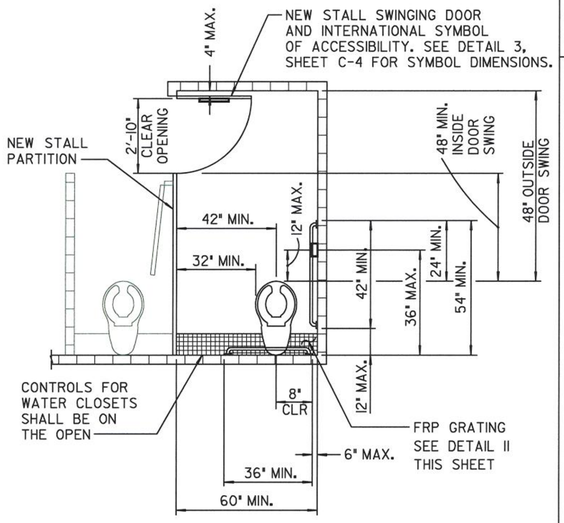


NOTES:

1. THE ACCESSIBLE LAVATORIES SHALL COMPLY WITH THE FOLLOWING:
   A. THE FAUCET'S CONTROLS AND MECHANISM ARE:
   1. THE TYPE THAT WHICH DOES NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST.
   2. HAS AN OPERATING FORCE OF LESS THAN OR EQUAL TO 5 LBS.
   B. IF SELF-CLOSING VALVES ARE USED, THEY SHALL REMAIN OPEN FOR GREATER THAN 10 SECONDS.

LAVATORY INSTALLATION DETAIL (TYP)

DETAIL 6 — SCALE: NTS — C-4

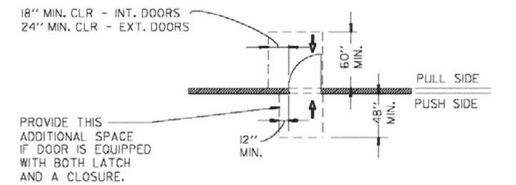


NOTES:

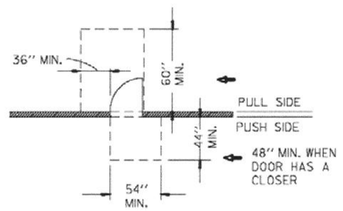
1. MIRROR RESTROOM CLEARANCES DETAIL FOR MEN'S WATER CLOSET INSTALLATION.
2. RE-INSTALL ADJACENT TOILET STALL SWING DOOR AND ALL ACCESSORIES TO NEW ACCESSIBLE WATER CLOSET PARTITION.

RESTROOM CLEARANCES (TYP)

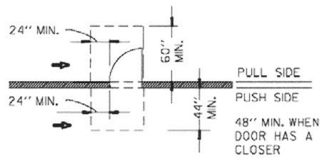
DETAIL 7 — SCALE: NTS — C-4



FRONT APPROACH



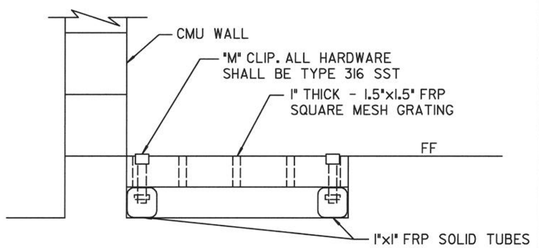
HINGE SIDE APPROACH



LATCH SIDE APPROACH

REQUIRED CLEARANCES

DETAIL 8 — SCALE: NTS — C-4

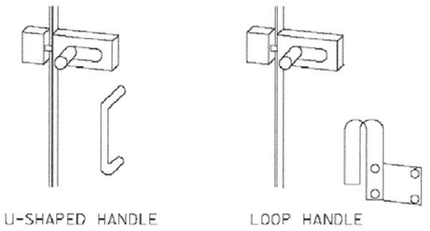


NOTES:

1. CONTRACTOR SHALL VERIFY TRENCH DIMENSIONS IN THE FIELD TO DETERMINE QUANTITIES PRIOR TO ORDERING GRATE INSERT MATERIALS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

GRATING DETAIL (TYP)

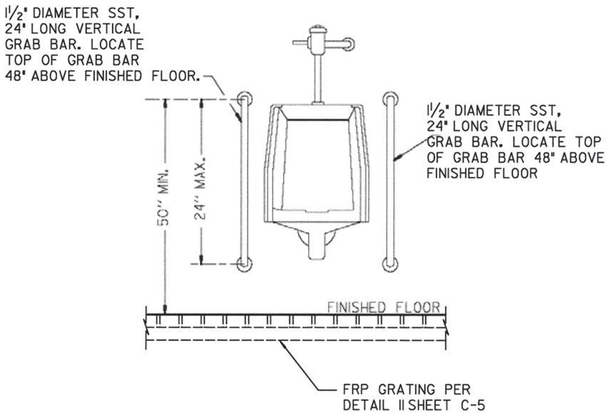
DETAIL 11 — SCALE: NTS — C-4



NOTE:
THE INSIDE AND OUTSIDE OF THE COMPARTMENT DOORS TO BE DISABLED ACCESSIBLE. STALLS MUST BE EQUIPPED WITH A LOOP OR U-SHAPED HANDLE IMMEDIATELY BELOW THE LATCH. THE LATCH MUST BE FLIP-OVER STYLE, SLIDING OR OTHER HARDWARE OPERABLE W/ ONE HAND AND NOT REQUIRING TIGHT GRASP OR TWISTING TO OPERATE. HANDLES SHALL BE SST.

TOILET HARDWARE

DETAIL 9 — SCALE: NTS — C-4



URINAL GRAB BARS

DETAIL 10 — SCALE: NTS — C-4

CONSULTANT
LEE & RO, Inc.
San Diego, California

SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — No. C73111 — TIMESSA M. WILLIAMS — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

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0 1
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FINAL

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764 | C-5

RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

COMFORT STATION DETAILS

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 10 OF 15 SHEETS

WBS S-11012
WBS

APPROVED: FOR CITY ENGINEER — DATE 4/29/13
SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

APPROVED BY: FOR CITY ENGINEER
CHECKED BY: CONSTRUCTION ENGINEER
CHECKED BY: INSPECTOR

KEVIN OLIVER, PROJECT ENGINEER
320-1747, LAMBERT COORDINATE
1960-6307, CCS83 COORDINATE
36857-10-D

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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4/1/2013 2:56:27 PM Hector Robledo

ELECTRICAL DIAGRAM LEGEND

- DRAWOUT TYPE CIRCUIT BREAKER 3-POLE UNLESS OTHERWISE NOTED
- MOLDED CASE CIRCUIT BREAKER 3-POLE UNLESS OTHERWISE NOTED
- 60A — DISCONNECT SWITCH, 60A 3-POLE UNLESS OTHERWISE NOTED
- 60AF — FUSE, 60A
- GROUND CONNECTION
- CURRENT TRANSFORMER
- POWER TRANSFORMER, DELTA CONNECTED PRIMARY AND SOLIDLY GROUNDED STAR CONNECT SECONDARY
- 1 OR 1 — MAGNETIC MOTOR STARTER FVNR, 3 POLE, UON NUMBER DENOTES NEMA SIZE
- 5 — INDUCTION MOTOR, 3 PHASE NUMBER DENOTES HP
- R — INDICATING LIGHT, PUSH TO TEST TYPE LENS COLOR CODE: A=AMBER, R=RED, W=WHITE, G=GREEN
- R — INDICATES CONTROL RELAY OR MOTOR STARTER COIL
  - T OR TD = TIME DELAY RELAY
  - R OR CR = CONTROL RELAY
  - MS = MAGNETIC MOTOR STARTER
  - C = MAGNETIC CONTACTOR

- NORMALLY OPEN VACUUM OR PRESSURE SWITCH, CLOSE ON RISING PRESSURE
- NORMALLY CLOSED VACUUM OR PRESSURE SWITCH, OPEN ON RISING PRESSURE
- NORMALLY OPEN TEMPERATURE ACTUATED SWITCH, CLOSE ON RISING TEMPERATURE
- NORMALLY CLOSED TEMPERATURE ACTUATED SWITCH, OPEN ON RISING TEMPERATURE
- NORMALLY CLOSED LIMIT SWITCH
- NORMALLY OPEN FLOW SWITCH CLOSE ON FLOW INCREASE
- NORMALLY CLOSED FLOW SWITCH OPEN ON FLOW INCREASE
- NORMALLY OPEN PUSH BUTTON, MOMENTARY CLOSE
- NORMALLY CLOSED PUSHBUTTON, MOMENTARY OPEN
- LOS — NORMALLY CLOSED PUSH BUTTON SINGLE CIRCUIT, LOCK-OUT-STOP (LOCATED AT MOTOR UNLESS OTHERWISE NOTED)
- NORMALLY OPEN TIMED CONTACT - CONTACT ACTION, IN DIRECTION OF ARROW, RETARDED ON ENERGIZATION
- NORMALLY CLOSED TIMED CONTACT - CONTACT ACTION, IN DIRECTION OF ARROW, RETARDED ON ENERGIZATION
- NORMALLY OPEN TIMED CONTACT- UPON INITIAL ENERGIZATION, CONTACT CHANGES STATE, CONTACT ACTION, IN DIRECTION OF ARROW, RETARDED ON DE-ENERGIZATION
- NORMALLY CLOSED TIMED CONTACT- UPON INITIAL ENERGIZATION, CONTACT CHANGES STATE, CONTACT ACTION, IN DIRECTION OF ARROW, RETARDED ON DE-ENERGIZATION

- ON OFF / XO / OX — TWO-POSITION SELECTOR SWITCH, H=HAND, M=MANUAL, R=REMOTE, L=LOCAL, A=AUTOMATIC, O=OFF OR OPEN, C=CLOSE, X'S AND O'S INDICATE SEQUENCE OF OPERATION
- H O A / XOO / OXO / OOX — THREE-POSITION SELECTOR SWITCH (SAME AS ABOVE)
- SINGLE POLE TOGGLE SWITCH
- GROUND CONNECTION
- OL — NORMALLY CLOSED, AUXILIARY OVERLOAD RELAY CONTACT
- OL — NORMALLY OPEN, AUXILIARY OVERLOAD RELAY CONTACT
- MANUAL MOTOR STARTER WITH THERMAL OVERLOAD RELAY
- FUSE
- ETM — ELAPSED TIME METER
- SPACE HEATER (LOCATED AT MOTOR, UNO)
- RES — RESISTOR (FIXED)
- POTENTIOMETER TYPE RESISTOR (CONTINUOUSLY ADJUSTABLE)
- R — PUSH-TO-TEST INDICATING LIGHT R=RED, A=AMBER, Y=YELLOW, W=WHITE, G=GREEN
- TERMINALS IN ELECTRICAL CONTROL EQUIPMENT
- CONTACT OR DEVICE REMOTE FROM ELECTRICAL CONTROL EQUIPMENT
- SOFTWARE LINK

ELECTRICAL PLAN LEGEND

- POLE MOUNTED LIGHTING FIXTURE WITH CONCRETE PULLBOX AT BASE OF POLE
- SURFACE OR PENDENT MOUNTED FIXTURE
- PENDENT OR CEILING MOUNTED FLUORESCENT FIXTURE
- 1' X 4' LIGHT FIXTURE
- 1' X 4' EMERGENCY LIGHT FIXTURE
- WALL MOUNTED OCCUPANCY SENSOR
- EMERGENCY FIXTURE WITH BATTERY PACK
- WALL MOUNTED FIXTURE
- STANCHION MOUNTED FIXTURE
- EXIT SIGN

- EXPLOSION PROOF CONDUIT SEAL
- S — SINGLE POLE TOGGLE TYPE LIGHTING SWITCH
- GROUNDED TYPE DUPLEX RECEPTACLE
- M M — MOTOR
- LOCAL CONTROL STATION (LCS)
- EXPOSED ELECTRICAL CONDUIT
- CONDUIT IN SLAB OR UNDERGROUND
- P — A-1.3 — HOMERUN TO PANEL A CIRCUIT 1& 3
- G — GROUND WIRE, SIZE AS NOTED

- HASH MARKS DENOTE QUANTITY OF CONDUCTORS, #12AWG UON
- ELECTRICAL CONDUIT RUN-UP
- ELECTRICAL CONDUIT RUN-DOWN
- WATER TIGHT FLEXIBLE CONDUIT
- PANEL BOARD
- D / 2/40 / X / 8' — FIXTURE TYPE, FIXTURE QUANTITY, NUMBER OF LAMPS/LAMP WATTAGE PER FIXTURE, MOUNTING HEIGHT
- J — JUNCTION BOX
- GROUND ROD AND WELL, 3/4"ø X 10'-0" LENGTH COPPERCLAD STEEL
- OR — FIELD POLE/FIXTURES

- DISCONNECT SWITCH 3P
- FIELD MOUNTED INSTRUMENT
- SPEAKER/HORN
- GENERATOR RECEPTACLE
- PC — PHOTOCELL
- TELEPHONE OUTLET
- VARIABLE FREQUENCY DRIVE
- P102 — CONDUIT NUMBER (P=POWER, C=CONTROL, I=INSTRUMENTATION)
- (##) — QUANTITY (IE CONDUIT & CONDUCTORS)

ABBREVIATIONS

A	AMPERE (AMPS), ANALOG
AC	ALTERNATING CURRENT/ AIR CONDITIONING
AF	AMPS-FRAME
AIC	AVAILABLE INTERRUPTING CURRENT
AM	AMP METER
AS	AMP SWITCH
AT	AMPS-TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
BPS	BOOSTER PUMP STATION
BSC	BARE STRANDED COPPER
C	CONDUIT
CB	CIRCUIT BREAKER
CID	CURRENT INDICATING TRANSMITTER
CKT	CIRCUIT
CO	CONDUIT ONLY
CP	CONTROL PANEL
CPT	CURRENT POTENTIAL TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DISCONNECT
DCS	DISTRIBUTIVE CONTROL SYSTEM
EB	ENCLOSED BREAKER
ETM	ELAPSED TIME METER
(E),EXST	EXISTING
E.G.	EQUIPMENT GROUND
FBK	FEEDER BREAKER
FLA	FILL LOAD AMPS
FVNR	FULL VOLTAGE NON-REVERSING
G,GND	GROUND
GFI	GROUND FAULT INTERRUPTER
GIW	GROUND FAULT INTERRUPTER, WEATHER PROOF
HH	HAND HOLE
HID	HIGH INTENSITY DISCHARGE (LAMP)
HMI	HUMAN MACHINE INTERFACE
HPS	HIGH PRESSURE SODIUM (LAMP)
HTR	HEATER
HZ	HERTZ
I/O	INPUT/OUTPUT
J	JUNCTION BOX
K	KIRK KEY INTERLOCK
KCM	THOUSAND CIRCULAR MILS (OR MCM)
KV	KILOVOLT
KVA	KILOVOLT AMPERES
L	LINE
LCP	LOCAL CONTROL PANEL
LOS	LOCK-OUT STOP PUSH BUTTON
LTG	LIGHTING
MA	MILLIAMPERE
MBK	MAIN BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTION
MH	MANHOLE
MIC	MANUFACTURER'S INTERCONNECTING CABLE
MOV	MOTOR OPERATED VALVE
MS	MAGNETIC STARTER
MTS	MANUAL TRANSFER SWITCH
(N)	NEW
N	NEUTRAL
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NC	NORMALLY CLOSED
NF	NON-FUSED
NL	NIGHT LIGHT
NO	NORMALLY OPEN
N/P	NAMEPLATE
OC	OPEN/CLOSE (STATUS)
P	POLE
PB	PULL BOX
PC	PHOTO CELL
PH,	PHASE
PNL	PANEL
PM	POWER MONITOR
RECEPT	RECEPTACLE
RTD	RESISTANCE TEMPERATURE DEVICE
RVAT	REDUCED VOLTAGE AUTO XFMR STARTER
S	STAINLESS STEEL
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TB	TERMINAL BLOCK
TD	TIME DELAY
TDI	TIME DELAY IMMIGRATION
TEMP	TEMPERATURE
TOU	TIME OF USE
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TT	THERMOSTAT
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VA	VOLTAMPERES
VAC	VOLTS AC
VDC	VOLTS DC
VFD	VARIABLE FREQUENCY DRIVE
VS	VOLTAGE SWITCH
W	WATTS, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER

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CONSULTANT

LEE & RO, Inc.
San Diego, California

SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — ERIC R. LOVERING — No. E18727 — Exp. 03-31-13 — ELECTRICAL — STATE OF CALIFORNIA

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RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

ELECTRICAL LEGENDS, SYMBOLS, & ABBREVIATIONS

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 11 OF 15 SHEETS

WBS S-11012
WBS

APPROVED: FOR CITY ENGINEER 4/29/13 DATE

SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	L&R			

KEVIN OLIVER, PROJECT ENGINEER
320-1747 LAMBERT COORDINATE
1960-6307 CCS83 COORDINATE
36857- 11 -D

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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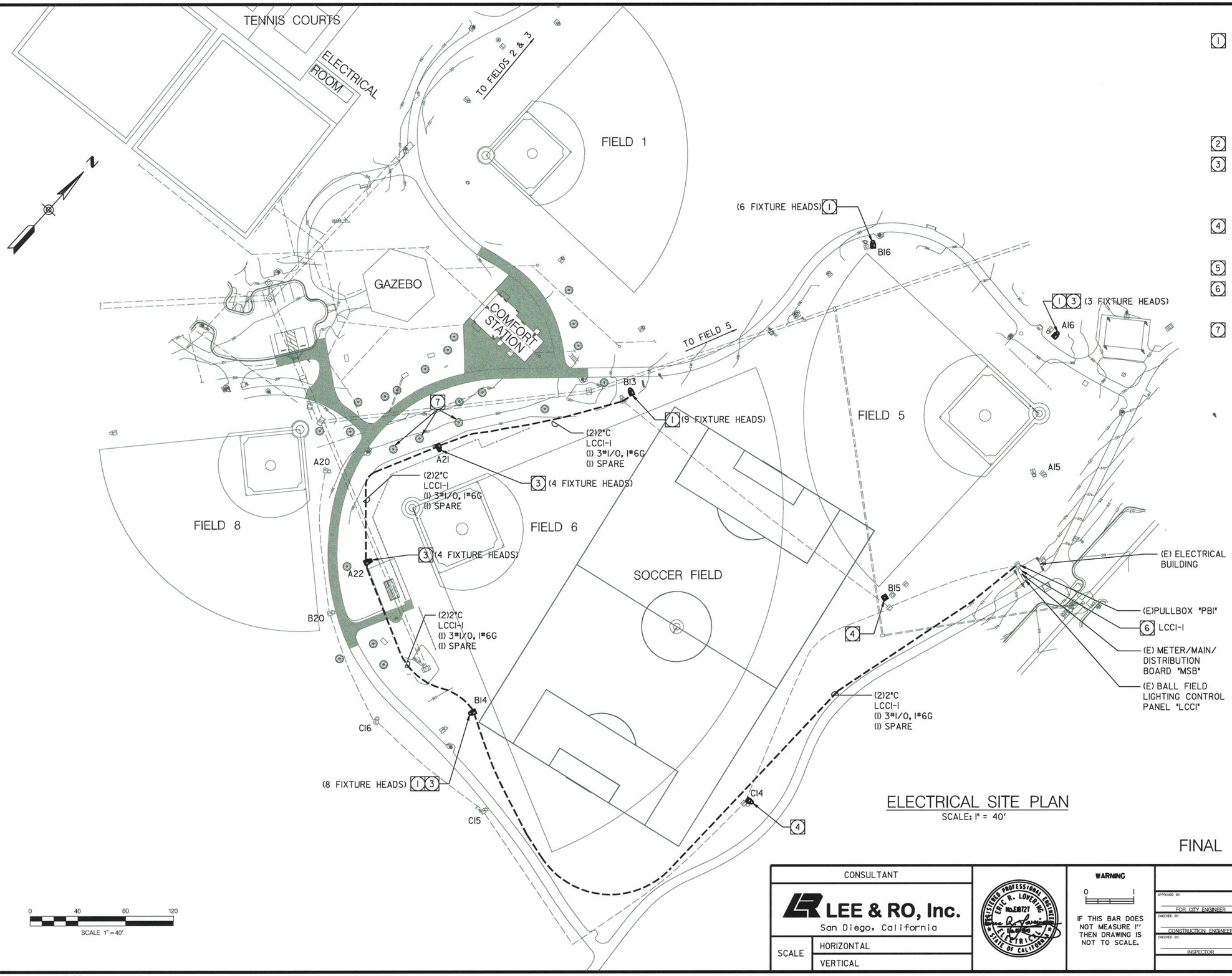

KEY NOTES:

1. INSTALL NEW FIXTURE HEADS (QUANTITY INDICATED) AND ASSOCIATED NEW ENCLOSURE W/ BALLAST. RECONNECTED NEW BALLAST TO EXISTING CONDUCTORS. FEED FROM LOCAL ELECTRICAL PULLBOX. INSTALL ADDITIONAL WIRING FROM NEW BALLAST TO NEW FIXTURE HEADS PER LIGHTING MANUFACTURER REQUIREMENTS. NEW UNDERGROUND CONDUCTORS TO REUSE/ROUTE INTO EXISTING ELECTRICAL PULLBOX BEFORE CONDUCTORS ENTER EXISTING POLE.
2. NOT USED.
3. INSTALL NEW POLE FOUNDATION, POLE BASE, 70' HIGH POLE, LIGHT FIXTURE ARM SUPPORT AND LIGHT FIXTURE HEADS (QUANTITY INDICATED). PROVIDE EXTERNAL ELECTRICAL PULLBOX NEAR NEW POLE. SEE DETAIL 1 ON SHEET E-5.
4. RE-LAMP AND RE-AIM 6 EXISTING FIXTURE HEADS FOR FIELD 5/SOCCER FIELD. CONSULT LIGHTING MANUFACTURER FOR ADDITIONAL INFORMATION.
5. NOT USED.
6. USE EXISTING SPARE CONDUITS FROM ELECTRICAL BUILDING TO EXISTING PULLBOX 'PBI' TO ROUTE NEW FEEDER 'LCCI-1'.
7. PROTECT EXISTING ACER SACCHARIUM TREES IN PLACE. REFER TO TECHNICAL SPECIFICATIONS AND SECTION 308-1 IN SSPWC (GREENBOOK/WHITEBOOK) FOR PROTECTION OF EXISTING TREES.

GENERAL NOTE:

1. CONTRACTOR SHALL POTHOLE ALL UTILITIES TO VERIFY THEIR LOCATION PRIOR TO START OF WORK.

ELECTRICAL SITE PLAN

SCALE: 1" = 40'

FINAL

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

E-2

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764

RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)

ELECTRICAL SITE PLAN

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 12 OF 15 SHEETS

WBS S-11012
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SUBMITTED BY: SHEILA BOSE, ASSOCIATE ENGINEER

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KEVIN OLIVER, PROJECT ENGINEER

320-1747 LAMBERT COORDINATE

1960-6307 CCS83 COORDINATE

CONTRACTOR _____ DATE STARTED _____
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36857-12-D

CONSULTANT
LEE & RO, Inc.
San Diego, California

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REGISTERED PROFESSIONAL ENGINEER — ERIC R. LOWERING No. E18727 — ELECTRICAL — STATE OF CALIFORNIA

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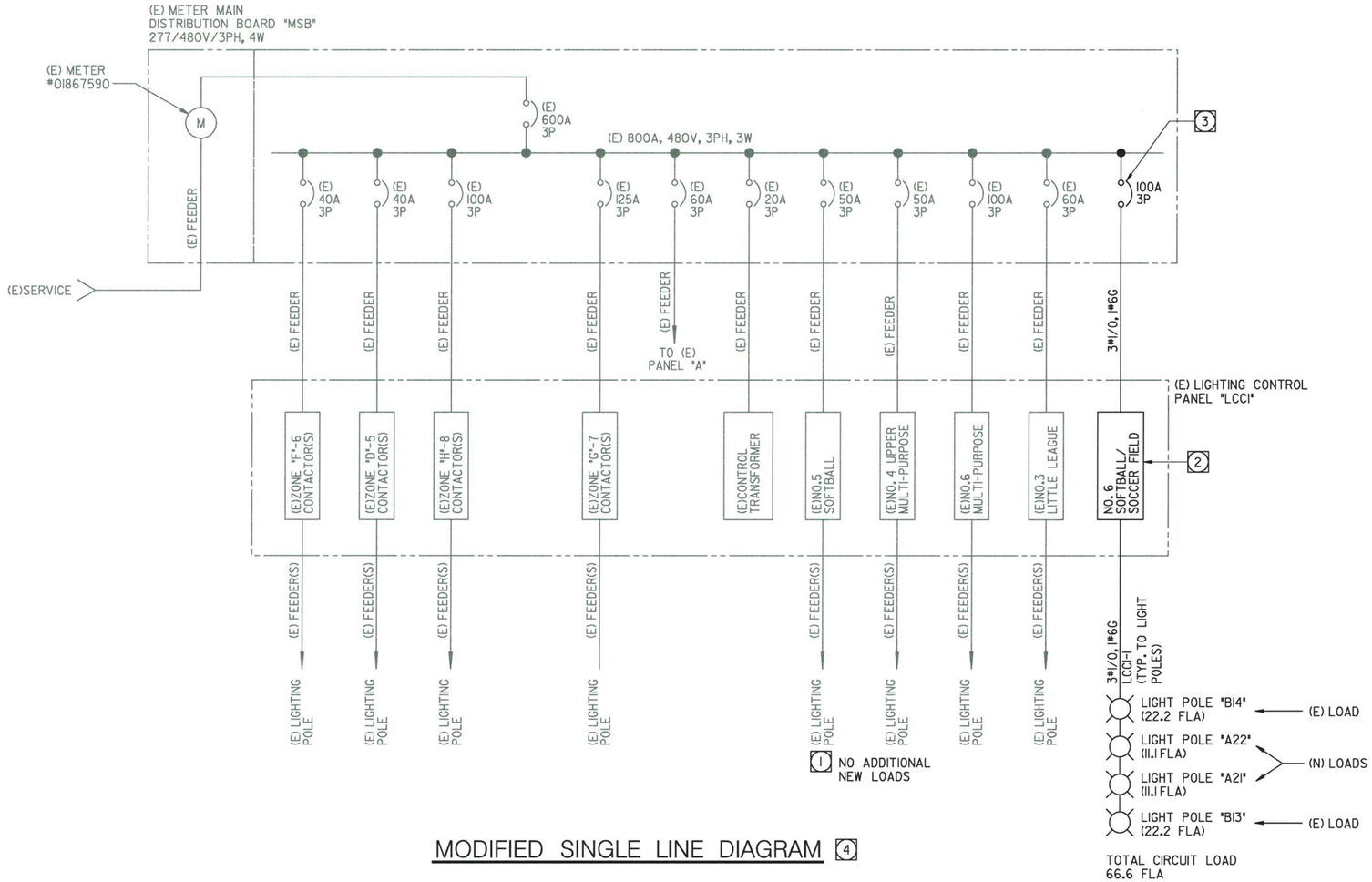

MODIFIED SINGLE LINE DIAGRAM 4

KEY NOTES:

1. NO NEW FEEDERS WILL NEED TO BE PROVIDED FOR EXISTING POLE LOCATIONS. REUSE EXISTING CONDUCTORS AT POLE.
2. PROVIDE NEW CONTACTOR IN EXISTING LIGHTING CONTROL PANEL. MATCH EXISTING CONTACTOR MANUFACTURER AND CHARACTERISTICS.
3. PROVIDE NEW BREAKER IN EXISTING EMPTY SPACE. MATCH EXISTING BREAKERS MANUFACTURER AND CHARACTERISTICS.
4. REF 31614-3-D AS-BUILTS FOR INFORMATION ON EXISTING.

LOAD LIST (METER *01867590)		
	KW	AMPS
EXISTING (NOTE 1)	125	213
ADDITIONAL NEW LOADS	13	22.2
TOTAL	138	235

NOTE:
1. EXISTING LOAD BASED ON PEAK ONE YEAR HISTORY OF (E) SDG&E METER INFORMATION.

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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E-3

TEMP BMP CS/SWP: LOW | SPEC. NO. 5764

RANCHO BERNARDO COMMUNITY
PARKS–SPORTS FIELD LIGHTING
(H084369)

ELECTRICAL
SINGLE LINE DIAGRAM

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 13 OF 15 SHEETS

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320-1747 LAMBERT COORDINATE

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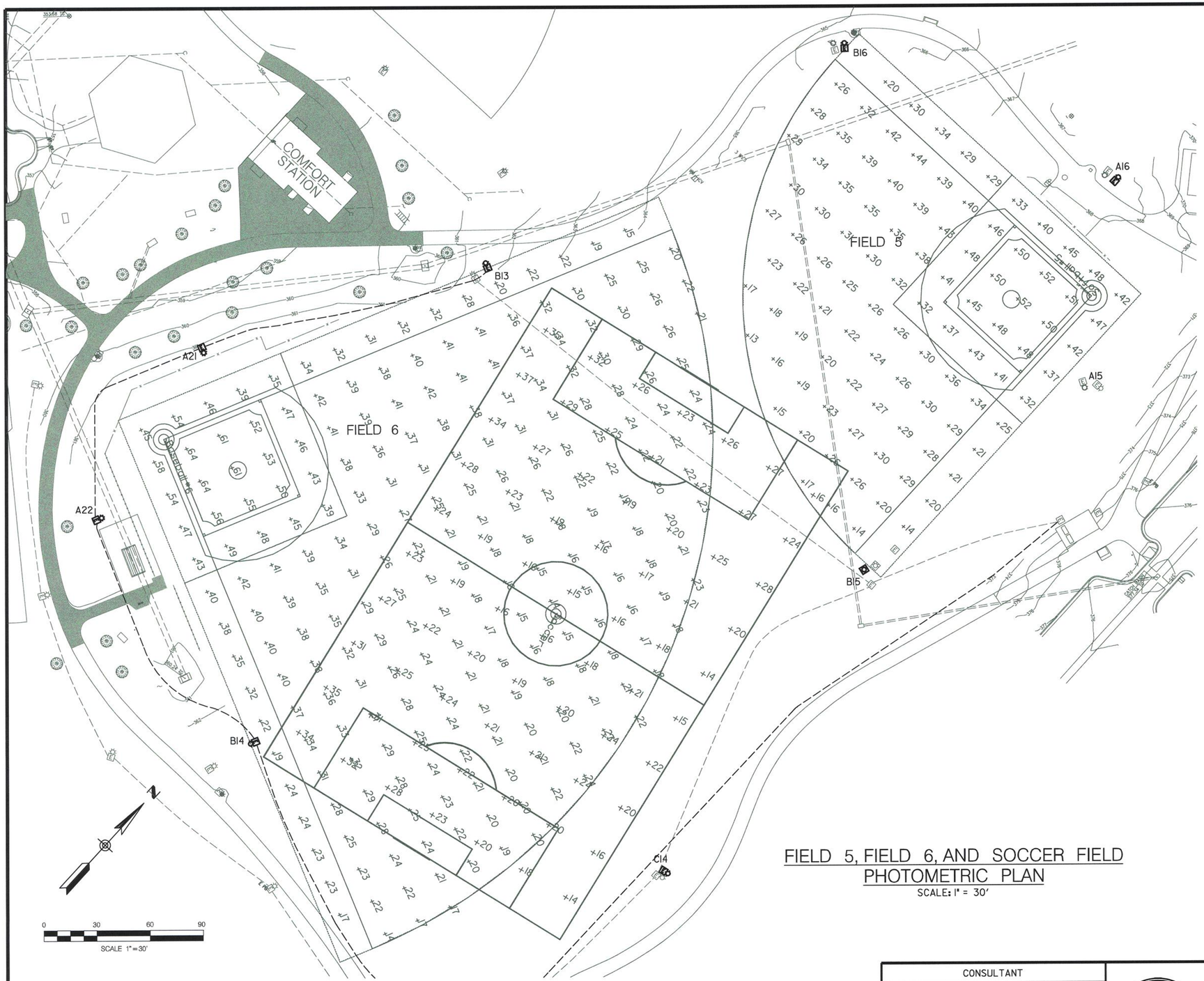

EQUIPMENT LIST FOR FIELD NO. 5							
POLE				LUMINAIRES			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY/POLE	THIS GRID
1	A16	70′	-	70′	1500W MZ	3	3
1	B15	70′	-	70′	1500W MZ	15	6
1	B16	70′	-	70′	1500W MZ	6	6
3	TOTALS					24	15

EQUIPMENT LIST FOR FIELD NO. 6 & SOCCER FIELD							
POLE				LUMINAIRES			
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY/POLE	THIS GRID
1	A21	70′	-	70′	1500W MZ	4	4
1	A22	70′	-	70′	1500W MZ	4	4
1	B13	70′	-	70′	1500W MZ	9	9
1	B14	70′	-	70′	1500W MZ	8	8
1	B15	70′	-	70′	1500W MZ	15	9
1	C14	70′	-	70′	1500W MZ	6	6
6	TOTALS					46	40

FIELD 5, FIELD 6, AND SOCCER FIELD
PHOTOMETRIC PLAN
SCALE: 1" = 30′

0 30 60 90
SCALE 1"=30'

FINAL

CONSULTANT
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San Diego, California
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RANCHO BERNARDO COMMUNITY PARKS-SPORTS FIELD LIGHTING (H084369)

PHOTOMETRIC SITE PLAN

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 14 OF 15 SHEETS

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KEVIN OLIVER, PROJECT ENGINEER
320-1747 LAMBERT COORDINATE
1960-6307 CCS83 COORDINATE
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RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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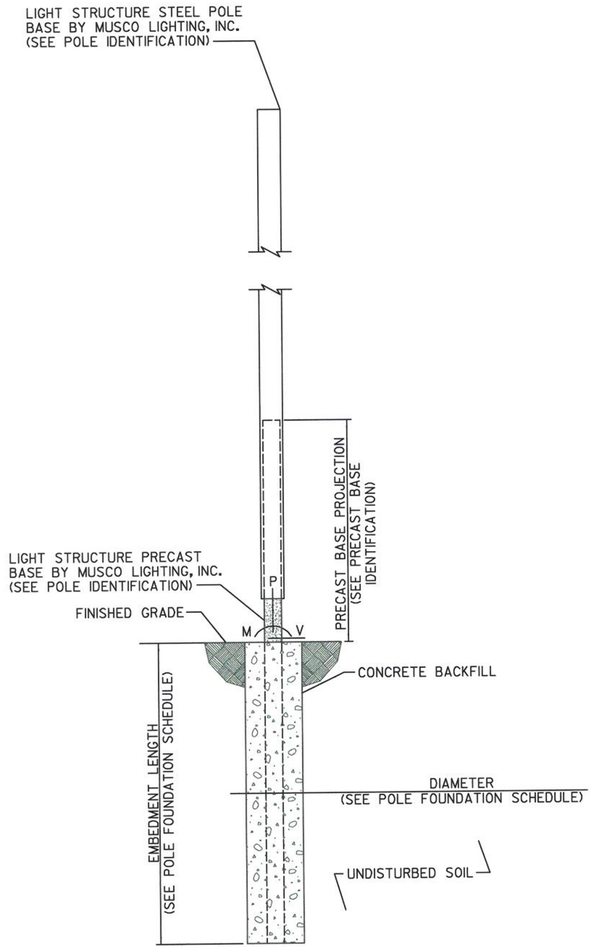

LIGHT POLE FOUNDATION DETAIL

1
–

SCALE: NTS

POLE FOUNDATION SCHEDULE					
GROUNDLINE FORCES (MAXIMUM)				C.I.P. DEEP FOUNDATION	
TYPE	MOMENT (M) KIP-FT	SHEAR (V) KIPS	VERTICAL (P) KIPS•	DIAMETER INCHES	EMBEDMENT FEET
LSS70-AA	44.11	1.068	1.237	30"	10'-0"
LSS70-A	46.45	1.121	1.443	30"	12'-0"
LSS70-B	68.23	1.505	1.907	30"	12'-0"

• VERTICAL FORCE DOES NOT INCLUDE WEIGHT OF PRECAST BASE. SEE PRECAST BASE IDENTIFICATION FOR BASE WEIGHT.

POLE IDENTIFICATION				
LOCATION MARK	POLE TYPE	PRECAST BASETYPE	FIXTURE CONFIGURATION (FIXTURES PER CROSS ARM)	FIXTURE EPA (MAXIMUM)
A16	LSS70-AA	2B	3	5.7
A2IM A22	LSS70-A	3B	4	7.6
B14	LSS70-B	3B	8 (4+4)	16.8

PRECAST BASE IDENTIFICATION					
PRECAST BASE TYPE	WEIGHT LBS	OVERALL LENGTH FEET	HEIGHT ABOVE GRADE FEET	EMBEDMENT IN C.I.P. DEEP FOUNDATION FEET	OUTSIDE DIAMETER INCHES
2B	1840	17'-3"	7'-3"	10'-0"	12.00"
3B	2670	20'-0"	8'-0"	12'-0"	13.38"

NOTES:

1. CONTRACTOR MUST SUBMIT REQUIRED DETAILS AND CALCULATIONS PREPARED BY A REGISTERED ENGINEER.
2. CONTRACTOR IS RESPONSIBLE FOR PAYING THE CITY'S DEVELOPMENT SERVICES DEPARTMENT (DSD) PERMIT FEE AND CAN REQUEST REIMBURSEMENT FROM THE CITY WITH NO MARKUP. SEE PRICE PROPOSAL FORM AND SPECIFICATIONS SECTION 7-5, PERMITS, FEES, AND NOTICES.
3. FOR COMPLETE SPORTS LIGHTING POLE STRUCTURAL CALCULATIONS PACKAGE, 'STRUCTURAL CALCULATIONS FOUNDATION STANDARDS', PREPARED BY R.L. FOLEY & ASSOCIATES, INC., 2013, REFER TO APPENDIX IN TECHNICAL SPECIFICATIONS.
4. NOTICE TO THE APPLICANT/OWNER/OWNER'S AGENT/ARCHITECT OR ENGINEER OF RECORD: BY USING THIS PERMITTED CONSTRUCTION DRAWINGS FOR CONSTRUCTION/INSTALLATION OF THE WORK SPECIFIED HEREIN, YOU AGREE TO COMPLY WITH THE REQUIREMENTS OF CITY OF SAN DIEGO FOR SPECIAL INSPECTIONS, STRUCTURAL OBSERVATIONS, CONSTRUCTION MATERIAL TESTING AND OFF-SITE FABRICATION OF BUILDING COMPONENTS, CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS AND, AS REQUIRED BY THE CALIFORNIA CONSTRUCTION CODES.' (NEW ISSUE)
5. NOTICE TO THE CONTRACTOR/BUILDER/INSTALLER/SUB-CONTRACTOR/OWNER-BUILDER: BY USING THIS PERMITTED CONSTRUCTION DRAWINGS FOR CONSTRUCTION/INSTALLATION OF THE WORK SPECIFIED HEREIN, YOU ACKNOWLEDGE AND ARE AWARE OF, THE REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS. YOU AGREE TO COMPLY WITH THE REQUIREMENTS OF SAN DIEGO FOR SPECIAL INSPECTIONS, STRUCTURAL OBSERVATIONS, CONSTRUCTION MATERIAL TESTING AND OFF-SITE FABRICATION OF BUILDING COMPONENTS, CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS AND, AS REQUIRED BY THE CALIFORNIA CONSTRUCTION CODES.

RANCHO BERNARDO COMMUNITY PARKS SPORTS FIELD LIGHTING

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CONSULTANT
LEE & RO, Inc.
San Diego, California
SCALE: HORIZONTAL / VERTICAL

REGISTERED PROFESSIONAL ENGINEER — ERIC R. LOVERING — No. E18727 — ELECTRICAL — STATE OF CALIFORNIA

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RANCHO BERNARDO COMMUNITY PARKS–SPORTS FIELD LIGHTING (H084369)

ELECTRICAL DETAILS

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 15 OF 15 SHEETS

WBS S-11012
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320-1747 LAMBERT COORDINATE
1960-6307 CCS83 COORDINATE
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