

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SOUTHCOAST REGION
MAINTENANCE & OPERATIONS



QUOTE DOCUMENTS

PROJECT: Juneau As Needed Electrical Services
CONTRACT NO.: IFQ25253-007

Up to date and additional information is available on the web at (<http://dot.alaska.gov>). Under the Section called "Find it Fast!" select **DOT&PF Public Notices.** Look through the section called "Procurement" for the Invitation to Quotes

AS-ADVERTISED DATE: 04/4/2025

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**SPECIAL NOTICE
TO
BIDDERS**

- 1.) The bidder shall [MUST] have a valid Alaska business license at the time the contract is awarded. To qualify as an Alaska bidder under AS 36.30.321, a bidder shall have a valid Alaska business license at the time designated in the invitation for quotes for quote opening. Bidders are required to submit evidence of a valid Alaska Business License in accordance with AS 43.70.020 and 12 AAC 12.020.
- 2.) The bidder must be registered as an Electrical Administrator or employ a person whose Electrical Administrator's license is assigned to the bidder at the time designated for bid opening. This requirement cannot be met by a subcontractor.
- 3.) No bid bond, payment bond or performance bond are required for this project.



**STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES**

**INVITATION FOR QUOTES FOR
A SMALL PROCUREMENT
(CONSTRUCTION RELATED)**

[per AS 36.30.320(a)]

Project Name & No.: <u>Juneau As Needed Electrical Services;</u> <u>IFQ25253-007</u>	Procurement Agency and Address: <u>State of Alaska, DOT&PF</u> <u>6860 Glacier Highway, Juneau, AK 99801, or</u> <u>P.O. Box 112506 Juneau, AK 99811-2506</u>
Location: <u>Juneau, Alaska</u>	

Procurement Officer: <u>Christopher Goins, P.E.</u>	Date of Issuance: <u>04/4/2025</u>
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DESCRIPTION OF WORK, REQUIRED COMPLETION DATE, LISTING OF ATTACHMENT:
Perform as-needed maintenance and repair of street light luminaire, signal light luminaire and non-mandatory electrical services as defined in the Scope of Work and located in the Juneau, Alaska area unless otherwise designated in accordance with the contract documents. The State may opt to offer renewal of this contract for Three (3) additional one (1) year periods.

This is a Federal-Aid State Funded contract. The completion date for this work is **06/30/2026**

The Project cost estimate is: under \$10,000 \$10,000 - \$50,000 \$50,001 - \$100,000 \$100,001 - \$200,000^{1,2}
1. Quotes in excess of \$200,000 will be deemed non-responsive. 2. **Any project in excess of \$100,000 must be bonded.**

Davis-Bacon Wages (Title 36.05): are are not required on this project.

The following insurance coverages are required: Workers Comp General Liability Automobile

Bonding Requirements: Any project in excess of \$100,000 must be bonded.
The undersigned proposes to furnish Payment Bond in the amount of 50% and Performance Bond in the amount of 50% (of the contract), as surety conditioned for the full, complete and faithful performance of this contract. (See Bid Bond Sheet 25D-14, Payment Bond SPC-005 and Performance Bond SPC-006 forms.)

Quotes for furnishing all labor, equipment and materials and performing all work for the above Project are invited. To be eligible for consideration, quotes must be received before **2:00 pm** local time on the **23rd** day of **April, 2025**. Late quotes cannot be accepted. Disadvantaged Business Enterprises (DBE's) may submit quotes and will not be discriminated against on the grounds of race, color, national origin or sex in consideration for an Award which results from this invitation. Any errors, omissions, or questions pertaining to solicitation procedures or Project requirements, requests for additional documents, or inquiries pertaining to site conditions or scheduled visits must be made to:
Name: Alex Guthrie, at: 6860 Glacier Highway, Juneau, AK 99801
Title: M & O Superintendent, Telephone: (907) 487-4512; Fax: (907) 465-4238
Applicable provisions of AS 36.30 and 2 AAC 12 govern this solicitation.

SUBMITTAL OF QUOTES: Quotes for this Project must be submitted in the manner noted below. All Offerors must familiarize themselves with the *Instructions to Offerors*, page 2 of this form, prior to submitting their quote.

- VERBAL QUOTES SHALL BE GIVEN TO _____ AT THE ABOVE NOTED TELEPHONE NUMBER, PRIOR TO THE STATED DEADLINE. (See above Bonding Requirements.)
- WRITTEN QUOTES, INCLUDING AMENDMENTS OR WITHDRAWALS, MUST BE RECEIVED PRIOR TO THE ABOVE NOTED DEADLINE. QUOTES MUST BE SUBMITTED ON FORM SPC-002, QUOTE SUBMITTAL, ATTACHED. (See above Bonding Requirements.)

Written quotes may be submitted by Fax, hand delivered, or mailed in a sealed envelope. Confidentiality is only assured for sealed quotes. Mailed quotes must allow time for delivery and the envelope must be marked as follows:

<u>Quote for Project:</u> Name: <u>Juneau As Needed Electrical Services</u> Number: <u>IFQ25253-007</u> Attn: <u>Michael Brown Contracts Officer</u> Fax: <u>907-465-4238</u> Email: <u>srdotpfcontracts@alaska.gov</u>	<u>Procurement Agency Address:</u> <u>State of Alaska, DOT & PF</u> <u>6860 Glacier Highway</u> <u>Juneau, AK 99801</u>
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Quote amendments or withdrawals must be made in writing to the individual of the Procurement Agency receiving the quotes, and must be received prior to the time for quote submittal.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

INVITATION FOR QUOTES FOR
A SMALL PROCUREMENT
(CONSTRUCTION RELATED)

INSTRUCTIONS TO OFFERORS

The State of Alaska desires that all Offerors submitting quotes on construction contracts are given a fair and equal opportunity to compete. Offerors are required to follow these instructions:

REVIEW THE PROJECT DOCUMENTS: Most construction Projects in excess of \$1,000 will have some type of written documentation prepared expressly for the Work. If you are asked to submit a quote and no written information has been provided, you should ask the procurement Agency for written documentation. If the scope of services have been described to you verbally, and you are selected for Contract Award, you must ensure that the information of the services to be performed (scope of work) is put in writing prior to accepting the Contract. When providing a Quote, carefully review and consider all materials related to the solicitation and work of the contract. **By submitting a quote the Offeror warrants that they are familiar with the Project requirements, have visited or otherwise examined the site, and are aware of the conditions to be encountered.** Offeror's can verify the contents and completeness of their quote documents by contacting the procurement Agency individual named on the front of this form.

SUBMITTING THE QUOTE: The Quote must be submitted in one of the following formats as called for in the Invitation:

1. **ORALLY** - if a verbal quote is solicited, the Offeror must provide, in addition to their quote amount and mailing address -- (1) their valid Alaska Business License number, (2) if applicable, a valid Contractor's Registration number, (3) their status as an Alaskan Bidder (Offeror), (4) their intended use of Alaskan products, (5) the carrier's name and policy number for their Workers' Comp Insurance (or a statement of sole proprietorship, if applicable), and (6) the Employer (Tax) Identification Number or Social Security Number. The Procurement Agency will enter this information on the quote schedule.
2. **WRITTEN** - if a written quote is solicited, the Offeror must complete, in ink or typewritten, the *Small Procurement Quote Submittal*, Form SPC-002. Failure to acknowledge receipt of addenda or to execute the form correctly and completely may disqualify the quote.

NOTE: The Department of Labor requires an Offeror to be licensed and registered for the required type of work prior to submitting a quote. If the procurement Agency determines the Offeror is improperly registered or licensed, their quote may be deemed nonresponsive.

SUBCONTRACTOR LISTING: Subcontractors intended to be utilized on this contract must be listed in the response to the solicitation. Work shall not be awarded to any subcontractor without prior approval from the procurement Agency. Subcontractors may be added or removed only as approved by the procurement Agency.

DETERMINATION OF THE LOWEST RESPONSIBLE QUOTE AND CONTRACT AWARD: Following receipt and determination of all **responsive** oral, written or sealed quotes, the procurement Agency will compare the quotes and determine the lowest Offeror. If the procurement Agency discovers a discrepancy between the unit price amount and the extended amount; the unit price amount will prevail. Conditioned quotes, unless expressly requested, will not be considered. When the quote schedule is composed of a basic amount with alternates, the procurement Agency will base its determination of the low quote and the amount of the Contract Award solely upon those quotes, basic and alternates, that are priced within the extent of available construction funds. Alternates will be considered for Award in the order listed, except that if the order of Offerors is not affected, the Award may include any combination of funded alternates, or none, as may be in the best interest of the procurement Agency.

When determining the lowest quote, the procurement Agency will also give a 5% Alaska Offeror's preference and an appropriate Alaska Products preference to quotes designating the applicability of a preference. To qualify for the Offeror's preference (per AS 36.30.170) the Offeror **must** (1) hold a current Alaska Business License, (2) submit the quote under the name appearing on the license, (3) have staffed and maintained a place of business within Alaska for the previous six months and (4) be incorporated or qualified to do business under the laws of the State. In addition, if the Offeror is a partnership or joint venture, all parties must meet the criteria to be eligible for the preference. A booklet fully describing the Alaska Preferences (Bidder, Offeror, Product, Disabilities, Veteran) program is available at <http://doa.alaska.gov/dgs/pdf/pref2.pdf>. A detailed description of the Alaska Products Preference Program is available at <http://www.commerce.state.ak.us/ded/dev/prodpref/prodpref.htm>.

The procurement Agency will make a determination of **responsibility** as required by 2 AAC 12.500. If the lowest Offeror is declared responsible, the procurement Agency will execute the *Notice of Award / Notice to Proceed*, Form SPC-003, and send it to the Offeror for acknowledgement. If the lowest Offeror is found to be nonresponsive, this process will be repeated with the second lowest Offeror -- and so on until the lowest responsive and responsible Offeror is determined.

NOTICE OF AWARD AND PROTEST: A written notice will be provided on all Awards exceeding \$ 25,000 (2 AAC 12.400(h)). All protests must be filed with the Commissioner of the procurement Agency (or designee) and copied to the Procurement Officer. Protest procedures are described in AS 36.30.560 and 2 AAC 12.695. The extent of the protest remedy is limited to quote preparation costs (AS 36.30.585).

3. INDEMNITY AND INSURANCE – The following insurance is required for all construction contracts:

Article 1. Indemnification

The Contractor shall indemnify, hold harmless, and defend the contracting agency from and against any claim of, or liability for error, omission or negligent act of the Contractor under this agreement. The Contractor shall not be required to indemnify the contracting agency for a claim of, or liability for, the independent negligence of the contracting agency. If there is a claim of, or liability for, the joint negligent error or omission of the Contractor and the independent negligence of the Contracting agency, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. “Contractor” and “Contracting agency”, as used within this and the following article, include the employees, agents and other contractors who are directly responsible, respectively, to each. The term “independent negligence” is negligence other than in the Contracting agency’s selection, administration, monitoring, or controlling of the Contractor and in approving or accepting the Contractor’s work.

Article 2. Insurance

Without limiting contractor's indemnification, it is agreed that contractor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the contractor's policy contains higher limits, the state shall be entitled to coverage to the extent of such higher limits. Certificates of Insurance must be furnished to the contracting officer prior to beginning work and must provide for a notice of cancellation, non-renewal, or material change of conditions in accordance with policy provisions. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach of this contract and shall be grounds for termination of the contractor's services. All insurance policies shall comply with and be issued by insurers licensed to transact the business of insurance under AS 21.

2.1 Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees engaged in work under this contract, coverage as required by AS 23.30.045, and; where applicable, any other statutory obligations including but not limited to Federal U.S.L. & H. and Jones Act requirements. The policy must waive subrogation against the State.

2.2 Commercial General Liability Insurance: The State of Alaska, Department of Transportation and Public Facilities shall provide a policy that will protect the state against tort claims for negligent acts of the Contractor. This policy will only cover duties and services performed under this contract. The policy is only provided to those Contractors who are unable to secure a policy in the commercial market. For those Contractors who can obtain a policy in the performance of services under this agreement, please provide with minimum coverage limits of \$300,000 combined single limit per claim.

2.3 Commercial Automobile Liability Insurance: covering all vehicles used by the Contractor in the performance of services under this agreement with minimum coverage limits of \$300,000 combined single limit per claim.

REQUIRED DOCUMENTS

Required for Quote

Quotes will not be considered if the following documents are not completely filled out/signed and submitted at the time of bidding.

1. Quote Submittal - Bidder must sign form.
2. Bid Schedule - Bidder must complete.
3. Alaska Business License – (AS 36.30.110) - **To qualify as an Alaska bidder under AS 36.30.321, a bidder shall have a valid Alaska business license at the time of quote opening.** (License information; contact State of Alaska, Department of Commerce, Community and Economic Development) (<http://www.commerce.state.ak.us/occ/home.htm>)
4. Alaska Veteran's Preference Affidavit – If claiming, Bidder must sign form.
5. Military Skills Preference Certification – If claiming, Bidder must sign form.
6. Alaska Bidder Preference Certification – If claiming, Bidder must sign form
7. Electrical Administrators License - Bidder must submit a copy.

Required After Notice of Apparent Low Bidder

The apparent low bidder is required to complete and submit the following document within 5 working days after receipt of written notification.

N/A

Required for Award

In order to be awarded the contract, the successful bidder must completely fill out and submit the following documents within the time specified in the intent to award letter:

1. Construction Contract
2. Certificate of Insurance - In accordance with Appendix B Indemnity & Insurance
3. Contractors License



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
SMALL PROCUREMENT QUOTE SUBMITTAL
(CONSTRUCTION RELATED)
 [per AS 36.30.320(a)]

Project Name & No. <u>Juneau As Needed Electrical</u> Services: <u>IFQ25253-007</u> Location: <u>Juneau, Alaska</u>	Procurement Agency and Address: <u>State of Alaska, DOT&PF</u> <u>6860 Glacier Highway, Juneau, AK 99801, or</u> <u>P.O. Box 112506 Juneau, AK 9999811-2506</u>										
Procurement Officer: Christopher Goins, P.E.	Date of Issuance: April 4, 2025 Bid is Due: April 23, 2025 at 2:00pm										
<p>QUOTE: Offerors must read all attachments to this schedule. Offeror is required to bid on all items. For the scope of work and all other requirements see the "Invitation for Quotes for A Small Procurement" dated April 23, 2025. The annual prices bid by the Contractor referenced below shall be inclusive of one full 12 month State of Alaska Fiscal Year period. Any contract duration which does not contain 12 full months of the State of Alaska's Fiscal Year shall be prorated beginning the Date of Award and paid accordingly with this contract and technical specifications.</p> <p>The work as described in the IFQ shall be performed for:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ITEM</th> <th style="text-align: left;">DESCRIPTION</th> <th style="text-align: left;">UNIT BID PRICE</th> <th style="text-align: left;">ESTIMATED QUANTITY</th> <th style="text-align: left;">BASIC BID AMOUNT</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">1.0</td> <td style="vertical-align: top;">Juneau Electrical Services</td> <td style="vertical-align: top;">\$ <u> N/A </u> Per Year</td> <td style="vertical-align: top;">1</td> <td style="vertical-align: top;">\$ _____</td> </tr> </tbody> </table> <p>I have reviewed the bid documents, with addenda _____, and understand the scope of services and conditions required for Project number <u>IFQ25253-007</u>. I agree to furnish all necessary labor, materials, and equipment for the above amount(s). The Work shall be accomplished in a professional manner acceptable to the Procurement Officer.</p> <p>Contractor _____ Email Address _____</p> <p>Authorized Signature _____ Title _____</p> <p>Address _____</p> <p>Business License # _____ EIN or SSN _____ Phone # _____</p> <p>Offeror is Claiming: <input type="checkbox"/> Alaska Bidder's Preference <input type="checkbox"/> Military Skills Preference <input type="checkbox"/> Alaska Veteran Preference</p> <p>.....</p> <p>Procurement Officer: _____</p> <p>Date of Receipt of Bid: _____</p>		ITEM	DESCRIPTION	UNIT BID PRICE	ESTIMATED QUANTITY	BASIC BID AMOUNT	1.0	Juneau Electrical Services	\$ <u> N/A </u> Per Year	1	\$ _____
ITEM	DESCRIPTION	UNIT BID PRICE	ESTIMATED QUANTITY	BASIC BID AMOUNT							
1.0	Juneau Electrical Services	\$ <u> N/A </u> Per Year	1	\$ _____							

Offeror to Complete this Portion



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

ALASKA VETERAN'S PREFERENCE AFFIDAVIT

In response to the Invitation to Bid for:

Project Name and Number: **Juneau As Needed Electrical Services; IFQ25253-007,**

I certify under penalty of perjury that _____
(Name) qualifies for the Alaska Veteran's Preference under the following conditions:

- (a) If a bidder qualifies under AS 36.30.170(b) as an Alaska bidder and is a qualifying entity, a five percent bid preference shall be applied to the bid price (preference may not exceed \$5,000). In this subsection, "qualifying entity" means a:
- (1) Sole proprietorship owned by an Alaska Veteran;
 - (2) Partnership under AS 32.06 or AS 32.11 if a majority of the members are Alaska Veteran's;
 - (3) Limited liability company organized under AS 10.50 if a majority of the individuals are Alaska Veterans.
 - (4) Corporation that is wholly owned by individuals and a majority of the individuals are Alaska veterans.
- (b) To qualify for a preference under this section, a bidder must add value by the bidder itself actually performing, controlling, managing and supervising a significant part of the services provided, or the bidder must have sold supplies of the general nature solicited to other state agencies, governments, or the general public.
- (c) In this section, "Alaska Veteran" means an individual who is a:
- (1) Resident of this state; and
 - (2) Veteran; means an individual who:
 - (A) Served in the:
 - (i) Armed Forces of the United States, including a reserve unit of the United States armed forces; or
 - (ii) Alaska Territorial Guard, the Alaska Army National Guard, the Alaska Air National Guard, or the Alaska Naval Militia; and
 - (B) Was separated from the service under a condition that was not dishonorable.

Authorized Signature

Printed Name

Date



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

**ALASKA MILITARY SKILLS PREFERENCE
CERTIFICATION**

In response to the advertised procurement for:

Project Name and Number Juneau As Needed Electrical Services IFQ25253-007

Bidder (Contractor) _____

Operation of Alaska Military Skills Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.321, an eligible entity receives a two percent preference to the price in the bidder's proposal if the bidder meets two requirements.

The bidder must be:

1. a "Qualifying Entity"; and
2. an "Alaska Bidder"

Unless a bidder satisfies all these requirements and furnishes corresponding certifications, it is not eligible for the Alaska Military Skills Preference. This preference may not exceed \$5,000.

Instructions regarding Alaska Military Skills Preference

A bidder that claims the Alaska Military Skills Preference must review and complete the "Alaska Military Skills Certification", the "Qualifying Entity Certification", and the "Alaska Bidder Certification". The individual that signs a certification shall include their printed name and position within bidder's organization, e.g., sole proprietor, partner, etc. If a bidder fails to submit properly completed certifications, the Department will not apply the claimed preference.

Alaska Military Skills Certification

(To be completed by individual(s) upon whom the bidder relies in claiming the Alaska Military Skills status. If bidder is a partnership, limited liability company, or corporation, then employee(s) who are claiming Alaska Military Skills must sign this Alaska Military Skills Certification for the Bidder to be eligible for this preference and provide proof of graduation of the qualifying employee(s) from an eligible program as described in AS 36.30.321).

I hereby represent to the Department that:

I have one or more employees who are currently enrolled in, or have graduated within the past two years from, a United States Department of Defense SkillBridge or United States Army Career Skills Program. These programs provide service members or their spouses with civilian work experience, industry training, pre-apprenticeships, registered apprenticeships, or internships during the final 180 days before separation or retirement from the military.

Alternatively, I maintain an active partnership with an entity that employs apprentices through a program as outlined in AS 36.30.321.

Additionally, I am a resident of Alaska, meaning I am physically present in the state with the intent to remain indefinitely and establish a permanent home here.

I certify under penalty of perjury that the foregoing statements are true and correct as they apply to me.

By (signature)

Date

Printed name

Title

Qualifying Entity Military Skills Certification

The bidding entity for which I am the duly authorized representative is a:

(Check the appropriate box)

- employs at least one person who is currently enrolled in, or within the previous two years graduated from, a United States Department of Defense SkillBridge or United States Army Career Skills Program for service members or spouses of service members that offers civilian work experience through specific industry training, pre-apprenticeships, registered apprenticeships, or internships during the last 180 days before a service member separates or retires from the service; or
- has an active partnership with an entity that employs an apprentice through a program described in AS 36.30.321.
- proof of graduation of the qualifying employee(s) from an eligible program as described in AS 36.30.321.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning the proposal and that the statement I have acknowledged above by checking the appropriate box is true and correct.

By (signature)

Date

Printed name

Title

Alaska Bidder Certification

(To complete your claim for the Alaska Military Skills Preference, you must also submit an Alaska Bidder Certification, which the bidder can view, download, and print from the DOT&PF's Bid Express Proposal page.)



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

ALASKA BIDDER PREFERENCE CERTIFICATION

In response to the advertised procurement for:

Project Name and Number: Juneau As Needed Electrical Services IFQ25253-007

Bidder/Proposer (company name): _____

Operation of Alaska Bidder Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.990(2), if a bidder is an eligible "Alaska Bidder", the Department will apply a five percent preference to the price of the bidder's proposal.

Instructions regarding Alaska Bidder Preference

A bidder that claims the Alaska Bidder Preference must review and then certify that each statement appearing under the heading "Alaska Bidder Certification" is true. The individual that signs the certification shall include his/her printed name and position within bidder's organization, e.g., sole proprietor, partner, etc. If a bidder fails to submit a signed certification, the Department will not apply the claimed preference.

Alaska Bidder Certification

The bidding entity for which I am the duly authorized representative:

- (A) Holds a current Alaska business license;
- (B) Is submitting a bid or proposal for goods, services, or construction under the name appearing on the bidder's current Alaska business license;
- (C) Has maintained a place of business in the State staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the proposal;
- (D) Is incorporated or qualified to do business under the laws of the State, is a sole proprietorship and the proprietor is a resident of the State, is a limited liability company organized under AS 10.50 and all members are residents of the State, or is a partnership under former AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of the State; and
- (E) If a joint venture, is composed entirely of ventures that qualify under the four preceding paragraphs of this Alaska Bidder Certification.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning its proposal, and that the foregoing statements are true and correct.

By (signature)

Date

Printed name

Alaska Business License Number

Title:



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

CONSTRUCTION CONTRACT

Juneau As Needed Electrical Services; IFQ25253-007

Project Name and Number

This CONTRACT, between the STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES, herein called the Department, acting by and through its Contracting Officer, and

Company Name

Company Address (Street or PO Box, City, State, Zip)

a/an Individual Partnership Joint Venture Sole Proprietorship Corporation incorporated under the laws of the State of _____, its successors and assigns, herein called the Contractor, is effective the date of the signature of the Contracting Officer on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the Department, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor required in the construction of the above-referenced project at the prices bid by the Contractor for the respective estimated quantities aggregating approximately the sum of

_____ Dollars
(\$ _____), and such other items as are mentioned in the original Bid, which Bid and prices named, together with the Contract Documents are made a part of this Contract and accepted as such.

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Department, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Department. In no event shall the Department be liable for any materials furnished or used, or for any work or labor done, unless the materials, work, or labor are required by the Contract or on written order furnished by the Department. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost, and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered, and all labor shall be done and performed, in every respect, to the satisfaction of the Department, on or before: **06/30/2026** or within N/A calendar days. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Department, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Department shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Department shall have the right to recover _____ dollars (\$ _____) per day for each calendar day elapsing between the time stipulated for the completion and the actual date of completion in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

The bonds given by the Contractor in the sum of \$ N/A Payment Bond, and \$ N/A Performance Bond, to secure the proper compliance with the terms and provisions of this Contract, are submitted herewith and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions.

CONTRACTOR

Company Name

Signature of Authorized Company Representative

Typed Name and Title

Date

(Corporate Seal)

**STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES**

Signature of Contracting Officer

Typed Name

Date

SCOPE OF WORK

The scope of work for the intended contract shall include, but is not limited to the following:

-
- Replacing bulbs for street light luminaire and signal light luminaire.
 - Trouble shooting for street light luminaire and signal light luminaire.
 - Trouble shooting photocells for the street light luminaire.
 - Repair or replace pedestrian pedestals.
 - Trouble shoot electrical problems within street light luminaire circuitry lighting and traffic signal lights.
 - Repair or replace light poles.
 - Other electrical services as directed by the project manager.

Working Hours

1. **Electrical Service Work Scheduled during regular business hours:** For the purposes of this contract, regular business hours are considered from 8:00am to 4:30 pm Monday through Friday, excluding state holidays. The contractor will not begin any regular business hour work until a NTP is issued and fully executed. Any and all work that extends beyond regular business hours must be approved by the Project Manager in advance.
2. **Electrical Service Work Scheduled Work during Non-Business Hours:** The Contractor will not begin any non-business hour work until a NTP is issued and fully executed.
3. **Emergency or Non-Scheduled Work Electrical Service Work:** Emergency or Non-Scheduled work may occur during regular business hours or non-business hours. The Contractor will not begin work classified as an emergency or non-scheduled work until a NTP is issued and fully executed.

Response Time

For scheduled services provided during regular and non-business hours (items 1 and 2 above):

Projects will be scheduled on an as-needed basis. When services are required, the DOT&PF Procurement Officer will issue an NTP. The NTP issued by the DOT&PF Procurement Officer shall describe the services required and will include a proposed completion due date.

If the Contractor is unable to perform the services by the proposed completion date, the Contractor must contact the Project Manager and establish a revised completion date. Upon agreement to the requirements of the NTP, the NTP must be signed and returned to the Procurement Officer for final execution prior to the Contractor starting work.

For Emergency or Non-Scheduled services

State of Alaska
Department of Transportation and Public Facilities
IFQ 2521S052

If the DOT&PF Project Manager deems it necessary for emergency work to be performed, the NTP issued by the Procurement Officer will indicate the services are to be performed as an Emergency or Non Schedule service and the Contractor shall respond within a 24 hour period.

Labor

The Contractor will be required to furnish all labor and equipment needed to complete each job under this contract.

Parts

The State will furnish all parts.

Traffic Control

The state will provide traffic control as needed.

Equipment:

1. The Contractor must supply all necessary equipment to perform the maintenance and repair work. The Contractor's equipment must include a bucket truck that has a 40' high reach. Please provide a list of the equipment and their associated hourly rates that maybe used during the performance of the intended contract.
2. The contractor shall maintain all proper licensing and certifications for all equipment used under this contract.
3. The contractor must have a boom truck available that will lift a minimum of 1,200 pounds.

METHOD OF AWARD: Awards will be made to the lowest responsive and responsible bidders allowing any adjustment(s) for applicable bidder preference. The work required under the intended contract shall be on an as As Needed Basis. The state does not guarantee any minimum or maximum purchase, level of work, or number of hours. Awards will be contingent upon receipt of proof of all required licenses and insurances.

ASSIGNMENT: The Contractor shall not assign any work without the prior written approval of the Procurement Officer of Record.

SUBCONTRACTORS: The Contractor shall not subcontract any work.

HOURLY RATES: When invoicing, the Hourly rates offered are to be billed in quarter hour increments. Hourly rates must include all incidental costs such as, but not limited to, estimates, office support, insurance, contractor overhead, contractor profit, and basic tools.

CODES AND STANDARDS:All services provided shall comply with the latest editions of codes, laws and ordinances of Federal, State and local governing bodies and authorities having jurisdiction. In case of differences between State and Federal laws, local ordinances, utility companies' regulations and the Contract Documents, the most stringent shall govern

SECTION 660 SIGNALS AND LIGHTING

660-1.01 DESCRIPTION. Furnish and install, modify, remove, or salvage one or more traffic signal systems, flashing beacon systems, highway lighting systems, sign illumination systems, traffic count systems, electrical equipment on structures, falsework lighting, partial installations for future systems, or combinations thereof, as specified.

Where an existing system is to be modified, reuse the existing material in the revised system as shown on the Plans or specified in the Special Provisions, and salvage or dispose of all other materials.

When required by the Special Provisions, provide an on-site manufacturer's representative to:

1. Energize and adjust the electrical system.
2. Provide acceptable instruction for the operation and maintenance of the electrical system.

660-1.02 DEFINITIONS. Use the definitions in NEMA TS 1-1989, *Traffic Control Systems*, Section 1, Definitions, along with the following:

1. Electrolier. The complete assembly of pole, mast arm, luminaire, ballast, and lamp.
2. Luminaire. The assembly which houses the light source and controls the light emitted from the light source. Luminaires consist of hood (including socket), reflector, ballast or driver, and glass globe or refractor.
3. Lighting Standard. The pole and mast arm which supports the luminaire.
4. Vehicle. Any motor vehicle licensed for highway use by the State of Alaska.

CONSTRUCTION REQUIREMENTS

660-3.01 GENERAL.

1. Scheduling of Work. Complete each new traffic signal system, highway lighting system, and sign illumination system and ensure it is ready for operation before opening to traffic the corresponding section of new alignment.

Do not place traffic signal systems in operation until the street lighting is energized at controlled intersections.

Install detector loops and underground conduit before applying new pavement.

Do not pull conductors into conduit until the junction boxes are set to grade, crushed rock sumps are installed, grout is placed around the conduit, and metallic conduit is bonded.

In vehicular undercrossings, place soffit lights in operation as soon as practicable after removing falsework from the structure. Place lighting for pedestrian structures in operation before opening the structure to pedestrian traffic.

2. Safety Precautions. Before starting work on existing street lighting circuits, de-energize the system by opening disconnect switches, and/or opening bypass switch plugs, and tagging each opened device as detailed in Part 4, Section 44, Article 440 of NESC. Where said circuits are under the control of an electric utility, obtain written assurance daily from the utility that the circuit being worked on has been de-energized.

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Post suitable signs at load centers when any of the circuits from that load center are being worked on.

3. Excavating and Backfilling. Excavate as required for the installation of junction boxes, conduits, foundations, and other appurtenances. Avoid unnecessary damage to streets, sidewalks, landscaping, and other improvements.

Do not excavate wider than necessary for the proper installation of conduits, junction boxes, and foundations. Do not perform excavation until immediately before installing conduit and other appurtenances.

Excavate trenches for installing rigid metal conduit to a depth 6 inches below the bottom of the rigid metal conduit. Embed conduit between two 6-inch lifts of material that are free of rocks exceeding a 1-inch maximum dimension.

Place the material from the excavation where it will not cause damage or obstruction to vehicular and pedestrian traffic or interfere with surface drainage. Dispose of all surplus excavated material according to Subsection 203-3.01.

Backfill excavations according to Section 204.

Keep excavations after backfilling well-filled and maintained in a smooth and well-drained condition until permanent repairs are made.

4. Welding. Conform to Subsection 504-3.01.7, and the requirements of the individual items.
5. Removing and Replacing Improvements. Replace or reconstruct improvements damaged by your operations such as sidewalks, curbs, gutters, pavement, base material, lawns and plants, and other improvements that are removed or broken with the same kind of material as found on the work, or with materials of equal or better quality. Leave the new work in satisfactory and serviceable condition.

Whenever a part of a square or slab of existing sidewalk, curb and gutter, or driveway is broken or damaged, remove the entire square, section, or slab and reconstruct the concrete as above specified.

Before removing the sidewalk, driveways, or pavement material, cut the outline of all areas to be removed in concrete sidewalks, driveways, and in pavements through completely with a saw. Make cuts neat and true and prevent shatter outside the removal area.

6. Salvaging or Reusing Electrical Equipment. Salvage and deliver existing electrical equipment, including controller assemblies, signal equipment, luminaires, lighting standards, signal poles and mast arms, service equipment, and junction box lids to a location indicated on the Plans, the Special Provisions, or by the Engineer.

Jointly inventory, with the Engineer, all equipment and materials to be salvaged or reused. Perform the inventory within 15 days following the Notice to Proceed. Note on the inventory the location and condition of all materials to be salvaged or reused.

When a controller assembly is to be salvaged, the salvaged material includes the controller unit, timing modules, switches, detector control units, conflict monitor unit, and all other equipment contained in the controller cabinet before Contract award.

When existing electrical equipment is to be reused, furnish and install all necessary materials and equipment, including signal mounting brackets, new tap wires, fused disconnect kits, anchor bolts, nuts, washers, and concrete as required to complete the new installation. Clean, relamp, and recondition all traffic signal, flashing beacon, and lighting fixtures to be

reinstalled according to Subsection 660-3.01.8.b. You may elect to use new equipment if you determine that it will be more cost effective than reusing the old equipment called for in the Plans and/or Special Provisions. If using new equipment, notify the Engineer when submitting the equipment list(s) and drawings per Subsection 660-2.01.1. Include the submittals for the items proposed for use in lieu of the reused equipment with this submittal.

Replace salvaged materials required to be reused and found to be unsatisfactory by the Engineer with new material. Replacement will be paid for as extra work under Subsection 109-1.05.

Remove and salvage electrical equipment without damage. Replace at your expense any of the above-mentioned electrical equipment that has been damaged or destroyed by your operations.

Underground conduit, conductors, foundations, junction boxes, and detectors not reused become your property and must be removed from the highway right-of-way. If said materials, except conductors and cables, do not interfere with other construction they may, with approval, be abandoned in place with a credit taken by the Department. To limit future operation and maintenance concerns, remove all cables and conductors from any conduits that will be abandoned in place. Meet Subsection 660-3.02 for foundations abandoned in place.

Repair holes left in the shafts of existing metal poles, due to removal of equipment or mast arms, by welding in a suitable disk, grinding smooth, and painting as provided for repair of damaged coatings in AASHTO M 36.

As directed, repair or replace damaged existing metal poles that are to be relocated or reused in place. The Engineer will determine the extent of repairs or replacements. The Department will pay for the repairs or replacements ordered as extra work according to Subsection 109-1.05. Refinish poles according to Subsection 660-3.01.8.

Fill holes formed by removing junction boxes and foundations with material equivalent to the surrounding material and compact to the same density.

7. Field Tests. Before acceptance of the work, perform the following tests on all electrical systems under this Section, in the presence of the Engineer. Furnish the necessary equipment needed to perform these tests. The Department reserves the right to retest, and the test results will govern the acceptance or rejection of the installation. Replace or repair at your expense, and in an approved manner, any faults in material or any part of the installation revealed by these tests. Repeat the same test until no fault appears.

- a. Continuity. Test each circuit for continuity.

Test each loop detector circuit for continuity at two locations:

- (1) Loop detector at the junction box before splicing with the loop detector lead-in cable must have a value less than 0.5 ohms.
 - (2) Loop detector and lead-in cable system at the traffic signal controller cabinet or detector cabinet after splicing in the junction box must have a value less than 5 ohms for single pair lead-in cable and 10 ohms for multi-pair lead-in cable. The continuity test ohm reading at the traffic signal controller cabinet or detector cabinet must be greater than the ohm reading measured at the loop detector at the junction box.
- b. Grounds. Test for grounds in each circuit by physically examining the installation to ensure that all required grounding bushings, bonding jumpers, and ground rods have been installed and are mechanically firm.

- c. Insulation Resistance Test. Perform a megohm test on each circuit, between circuits, and between the circuit and a ground. Measure each detector loop and lead-in cable system at the traffic signal controller cabinet or at the detector cabinet between one loop detector lead-in conductor and the cabinet ground rod. Ensure the insulation resistance is not less than 100 megohms or the minimum specified by the manufacturer, measured at 500 volts DC. Disconnect all lamps and magnetometer sensing probes prior to the insulation resistance test. Document these tests in writing, for each circuit, and submit to the Engineer prior to acceptance of the system.
- d. Inductance Test. Measure each detector loop and lead-in cable system at the traffic signal controller cabinet or detector cabinet. The inductance must be in the range of 50 to 500 microhenries.
- e. Circuit. Energize every signal indication circuit with lamps installed before installing the load switches.
- f. Functional. Perform the following tests on each signal and lighting system after all of the component circuits have satisfactorily passed the tests for continuity, grounding, insulation integrity and circuitry.

- (1) Perform the functional test for each new traffic signal system by running at least 24 hours of flashing operation, followed by not less than 5 days of continuous, satisfactory operation. You may omit the flashing portion of the test for a modified signal system or if there was an existing signal maintained at this location during the construction activity.

The Engineer and the final owner of the signal system will determine if the flashing operation will be required. If the system performs unsatisfactorily, correct the condition and repeat the test until the system runs for 5 days with continuous satisfactory operation.

Do not start signal functional tests on a Friday, Saturday, Sunday, a legal holiday, or the day before the legal holiday.

Initially turn on the system between 9:00 a.m. and 2:00 p.m. Before turning it on, ensure all equipment is installed and operable. This includes, but is not limited to, pedestrian signals and push buttons; signal face backplates and visors; vehicle detectors; highway lighting; and all regulatory, warning, and guide signs. Aim all signal faces as required by Subsection 660-3.08.

- (2) Perform the functional test for each highway lighting system and sign illumination system until the systems burn continuously 5 days without the photocell, followed by a 5-day operational test using the photocell.
- (3) Perform the functional test for each flashing beacon system for not less than 5 days of continuous, satisfactory operation.
- (4) Perform a continuous 5-day burning test on each pedestrian overcrossing and undercrossing lighting system before final acceptance.

A shut down of the electrical system due to a power interruption does not constitute discontinuity of the functional test if the system is functional when the power is returned.

- 8. Repairing Damaged Finishes. Examine all exterior surfaces for damage in the field, including new, reused, and State-furnished equipment. Repair damaged finishes as follows:

- a. Galvanized. Repair damage to galvanized coatings in conformance with AASHTO M 36.
- b. Painted.
 - (1) Wash the equipment with a stiff bristle brush using a solution of water containing 2 tablespoons of heavy-duty detergent powder per gallon. After rinsing, wire brush all surfaces to remove all poorly bonded paint, rust, scale, corrosion, grease, or dirt. Remove any dust or residue remaining after wire brushing before priming.
 - (2) You may use factory or shop cleaning methods for metals if equal to the methods specified herein.
 - (3) Immediately after cleaning, coat all bare metal with pre-treatment, vinyl wash primer, followed by 2 prime coats of zinc chromate primer for metal.
 - (4) Give signal equipment, excluding standards, a spot-finishing coat on newly primed areas, followed by 1 finishing coat over the entire surface.
 - (5) Give ungalvanized standards 2 spot-finish coats on newly primed areas.

You may apply all paint coats either by hand brushing or by approved spraying machines. Perform the work in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unacceptable.

660-3.02 FOUNDATIONS.

1. Cast-in-Place and Precast Foundations. Use cast-in-place or precast, including cast-in-CMP, foundations for posts and poles in drilled or excavated holes. Use either precast or cast-in-place foundations for cabinets.
 - a. Form the entire controller foundation and the top 12 inches of pole or post foundations and give the top a smooth steel trowel finish. If foundation is precast, place the centerline of foundation at the station, offset, and elevation shown on the plans, and orient subsurface conduit stub for connection.
 - b. Place conduits in the center of the pole-post foundations with clearance allowed for bushings. If subsurface conditions prevent completing a drilled hole, and when approved, use a corrugated metal pipe (CMP) form as a substitute for the drilled hole. Consider the savings in concrete to offset the cost of supplying and installing the CMP form. No additional payment will be made for the CMP formed foundation.
 - c. When a CMP is used, over-excavate the area around the form enough to allow for proper compaction around the form. Backfill and compact according to Section 205, and Subsections 203-3.04 and 660-3.01. Use Select Material Type A or sand slurry as backfill material. Do not use water for drilling operations or for any other purpose where it may enter the hole.
 - d. Use controller cabinet anchor bolts as recommended by cabinet manufacturer and set with a template.
 - e. Place Class A concrete meeting Section 501. Place reinforcing steel meeting Section 503. If required, use corrugated steel pipe that is at least 14 gage, meeting Subsection 707-2.01.

- f. Drill holes or use forms that are vertical and true to the locations shown in the Plans. When foundation excavation is complete, but before placing the concrete, remove all loose material to ensure that the foundation rests on firm, undisturbed ground.
- g. If a reinforcing steel cage is required, place and secure it symmetrically about the vertical axis and securely block it to clear the sides of the foundation. Use a template to securely support all anchor bolt assemblies and conduit ends so they do not move during concrete placement. Protect anchor threads from contact with concrete during pour.
- h. Do not permit surface water to enter the hole. Before placing concrete, remove all water that may have infiltrated in the hole. Thoroughly moisten both the forms and the ground before placing concrete. Pour each foundation in one continuous pour.
- i. Do not erect or place posts, poles, and pedestals on the foundation until 7 days after placing the concrete. Plumb the assembly according to Subsection 660-3.08 by adjusting the nuts on the anchor bolts.
- j. Replace, with no additional compensation, all finished concrete pile caps with anchor bolts that do not match the base plate of the pole or are out of plumb. Do not modify the anchor bolts or base plate to get the base plate set on the leveling nuts.
- k. Install the bottoms of the bottom leveling nuts in a level plane within one inch of the top of concrete pile cap. Generously lubricate the bearing surface and internal threads of all top nuts with beeswax and tighten the top nuts according to the following:
 - (1) Luminaire poles on frangible couplings: frangible coupling manufacturer’s instructions
 - (2) Signal poles and luminaire poles without frangible couplings: Table 660-1.

**TABLE 660-1.
TOP NUT ROTATION FOR TURN-OF-NUT
PRETENSIONING OF DOUBLE-NUT MOMENT CONNECTIONS**

Anchor Bolt Diameter, in.	Nut Rotation beyond Snug Tight ^{a,b,c}	
	F1554 Grade 36	F1554 Grades 55 and 105, A449, A615, and A706 Grade 60
≤1 ½	1/6 turn	1/3 turn
>1 ½	1/12 turn	1/6 turn

- a. Nut rotation is relative to anchor bolt. The tolerance is plus 20 degrees (1/18 turn)
 - b. Applicable only to double-nut moment connections.
 - c. Use a beveled washer if the nut is not in firm contact with the base plate or if the outer face of the base plate is sloped more than 1:40.
- (3) High-tower lighting structures: Use direct-tension-indicating (DTI) washers to achieve anchor bolt preload as shown on the plans.

2. Pile Foundations.

- a. Install pipe piles according to Section 505.
- b. Install pipe piles open-ended and to a minimum depth of 15 feet (less top projection).
- c. Use CJP groove welds for all circumferential welds.
- d. Inspect 100 percent of CJP welds using UT or RT.

- e. Backfill and compact the work hole around upper portion of each pile in 8-inch lifts with a soil-cement mixture. (minimum of 3 sacks of cement per cubic yard of soil).
 - f. Certify steel pipe piles by matching the stencils on the pipe piles (by 300 foot lots) to the physical and chemical tests for the applicable lot.
3. All Foundations.
- a. When shown on the plans, install frangible couplings according to the manufacturers written installation instructions. Use shims furnished by the coupling manufacturer.
 - b. Provide new foundations and anchor bolts of the proper type and size for standards that are to be relocated. Install the anchor bolts on a bolt circle that matches the base plate.
 - c. Install a raised Type III junction box on the door side of the controller cabinet, and butt it against the cabinet's foundation unless installing a one-piece cabinet/junction box foundation. Extend the top of the controller cabinet foundation 18 inches above the junction box and provide it with a 1-inch diameter drain. The drain connected to the cabinet interior must empty to the rear and above the ground. Place all conduits in the door side half of the foundation to provide adequate terminal block clearance. For one-piece cabinet/junction foundations, place the junction box opening at the elevation and orientation shown on the plans. For cabinets with two doors, place conduits in each half-cabinet to provide adequate terminal block clearance.
 - d. Existing foundations may be abandoned-in-place. However, remove the tops of the foundations, reinforcing steel, anchor bolts, and conduits to at least 12 inches below the roadway subgrade, sidewalk, or unimproved ground. Backfill the resulting hole with material equivalent to and compacted to the density of the surrounding ground.

660-3.03 CONDUIT. Install electrical conductors in conduit, except for overhead wiring, wiring inside poles, and when otherwise specified. Use galvanized conduit and fittings that are rigid metal type and manufactured of mild steel or wrought iron.

1. If called for in the Plans, use rigid non-metallic type conduit. Where nonmetallic conduit is to be installed, use a rigid metal type conduit to run between a load-center and the nearest junction box. Use conduit routing as noted or detailed on the Plans; when it is not shown, use the routing as directed.
2. If conduit and fittings to be installed will be exposed to sunlight on the surfaces of poles or in structures and foundations, use rigid metal type.
3. Thread and ream the ends of all conduits, whether shop or field cut, to remove burrs and rough edges. Make cuts square and true so that the ends butt together for the full circumference. Do not use slip joint or running threads for coupling conduit. When a standard coupling cannot be used for coupling metal type conduit, use an approved threaded union coupling. Where the coating on ferrous metal conduit has been damaged, paint such damaged places with rust preventative paint.
4. Until wiring is started, cap all conduit ends with standard pipe caps or approved plug and coupling combinations. When caps are removed, provide the threaded ends with approved conduit grounding bushings.
5. Bury conduit at least 30 inches below the finished grade. However, under paved areas behind a curb, bury the conduit at least 18 inches below the top back of curb or abutting pavement, whichever is lower. See Subsection 660-3.01.3 for backfill requirements.

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6. Install rigid metal conduit under existing pavements which are 30 feet wide or less by jacking. Unless trenching is called for in the Plans, install conduits under existing pavements greater than 30 feet wide by boring or drilling methods.
7. When encountering obstructions during jacking or drilling operations, obtain approval and cut small test holes in the pavement to clear the obstruction. Locate the bottom inside face of the borepit no closer than the catch point of a 1-1/4:1 slope from the edge of pavement. Do not leave these pits unattended until the means of protection has been approved.
8. Keep the bottom of trenches for non-metallic conduit relatively free of sharp irregularities that would cause pinching and excessive bending of the conduit.
9. Ensure that the first 6 inches of backfill is free of rocks exceeding 1 inch maximum dimension.
10. Terminate the conduit entering the bottom of concrete junction boxes with a 90-degree sweep inside the box wall. Terminate conduit openings not less than 5 inches above the bottom of all boxes, a minimum of 6 inches below the top of the Type IA boxes, and 12 inches below the top of Type II and Type III boxes. Extend conduits entering through the junction box wall a minimum of 2 inches beyond the inside box wall, and ensure it is a minimum of 6 inches above the bottom of the box.
11. Furnish foundations with conduits as shown on the Plans. Extend the conduits a maximum of 2 inches vertically above the foundation and slope towards the handhole opening.
12. At low points in all conduit runs, install a drain and sump containing approximately 2 ft³ of coarse concrete aggregate material. Compact aggregate used for sump as directed to prevent settlement of foundations, junction boxes, or adjacent improvements. Place additional drains adjacent to all junction boxes and structures, regardless of the method of conduit placement used. The drains must be a 3/8-inch hole drilled in the bottom of the lower straight section of the sweep elbow. Prevent scraping of conductors by deburring drilled drain holes in conduit. Wrap the exterior of the hole with approved filter cloth material and secure it as directed or approved by the Engineer.
13. Provide conduits for future use with grounding bushings, bonded to ground, and capped with an approved plastic insert type plug. Install a polypropylene pull rope with 200 pound minimum tensile strength in all conduits that are to receive future conductors. Double back at least 2 feet of pull rope into the conduits at each end.
14. Mark all underground conduit with a continuous strip of polyethylene marker tape that is 4 mils thick and 6 inches wide. Mark the tape with a black legend on a red background and bury it 9 inches (± 3 inches) below the finished grade. Lay two strips of marker tape side-by-side under all road crossings.
15. Where new junction boxes are placed in existing rigid metal conduit runs, fit the conduit with threaded bushings and bond them.
16. Seal the conduit leading to soffit, wall, or other lights or fixtures below the grade of the junction box by using an approved sealing fitting and sealing compound.
17. Clean existing underground conduit to be reused in the new system before pulling in the new cables, as follows:
 - a. Conduits with reused conductors. Wherever the Plans show reusing existing conduits that contain in service cables, clean them using compressed air. Existing cables that will be reused may be left in the conduits while you clean them.

- b. Conduits with no reused conductors. Ream with a mandrel or cylindrical wire brush and blow out with compressed air.
 - c. Use a heavy-duty air compressor that delivers at least 125 cubic feet per minute of air at 110 psi.
18. Use conduit of larger size than shown on the Plans, when desired. If used, it must be for the entire length of the run from junction box to junction box. Reducing couplings are not allowed. Increase the size of the junction boxes and perform any additional work at the foundations due to the use of larger size conduit, without extra compensation.
 19. Conduits may require routing under or over existing culverts or storm drain systems and other underground utilities with additional drains and aggregate sumps at the low spots.
 20. When extending existing conduits or installing junction boxes in existing conduit runs, extend the conduit into the proposed junction box or foundation using drains, elbows, and bonding as required for new installations. When adjusting junction boxes, shorten or lengthen existing conduits to meet clearance requirements. Complete extensions and modifications to existing conduits using the same size and types of materials.
 21. Cut off abandoned conduits flush with the inside wall or bottom of junction boxes.
 22. Install expansion fittings, as detailed on the structure plans, where the conduit crosses an expansion joint in the structure. Provide each expansion fitting with a bonding jumper equivalent to a stranded, No. 6 AWG, copper wire, or equivalent copper braid. Use expansion-deflection fittings that are waterproof and permit a 3/4 inch expansion and contraction and a 3/4 inch deflection without deformation.

660-3.04 JUNCTION BOXES. Furnish pre-cast reinforced concrete junction boxes of the sizes and details shown on the Plans. Use cast iron lids.

Emboss the word TRAFFIC on the lids of all junction boxes that contain any traffic signal conductors. Emboss the word LIGHTING on the lids of all other junction boxes.

Install junction boxes at the approximate locations shown on the Plans or when a location is not specific, locate the junction boxes as directed. You may, at your expense, install additional junction boxes to facilitate the work. Locate junction boxes so they are not in the roadway, sidewalk, or pathway surfaces. Where practical, place junction boxes shown in the vicinity of curbs adjacent to the back of curb with their long dimension parallel to the curb. Do not locate junction boxes in drainage collection areas.

Effectively ground the covers of all junction boxes with metal covers. Use a 3-foot tinned copper braid for Type IA Junction Boxes and a 6-foot tinned copper braid for Type II and Type III Junction Boxes.

Bed the entire bottom of all junction boxes on coarse concrete aggregate material of a minimum depth of 18 inches.

Place the top of junction boxes flush with the sidewalk grade or top of adjacent curb. When located in an unpaved section adjacent to a paved shoulder, locate the junction box 1 inch below the finished grade. Install flush with the surface in paved areas. Adjust as directed the junction boxes located in areas requiring grading. Adjust junction boxes located in seeded areas to 2 inches below the surface.

Locate junction boxes immediately adjacent to the pole or fixture they serve with the following limitations:

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1. 300 feet maximum for any single cable conduit run or any conduit run that exclusively contains 2 or fewer 2/C No. 12 AWG loop lead-in cables.
2. 190 feet maximum for any other conduit runs.
3. If the limitations require additional junction boxes, locate them on equal spacing subject to the above limitations.

660-3.05 WIRING. Install power conductors serving the cabinet sized such that their ampacity rating is greater than the cabinet total connected load. Make wiring neat in cabinets by cabling wires together with self-clinching nylon ties. Terminate all spare conductors on terminal blocks. Attach all conductors, including spares, to terminal blocks with "spade" type terminal lugs. Furnish additional terminal blocks if enough locations are unavailable in existing terminal blocks. Do not splice conductors within cabinets, poles, signal heads, and luminaires.

Pull conductors into conduit only after junction boxes are set to grade, crushed rock sumps are installed, grout is placed around the conduit, and grounding bushings have been installed on all conduits.

1. Pull conductors by hand or by approved commercially built cable-pulling equipment that is specially designed for that purpose. Do not pull cable by any other means. Equip the cable pulling device with a force limiting circuit and force gauge.
2. Use wire-pulling lubricant when placing the cables and conductors in conduit. Do not allow the tension of the wire or cable to exceed the manufacturer's recommend allowable tension for the conductor or cable.
3. When adding new conductors to a conduit with existing conductors, remove all conductors and clean the conduit with a mandrel or brush. Pull both old and new conductors through as a unit. In a new installation, pull all conductors through the conduit as a unit.
4. Leave at least 1 foot of slack in the bottom of each signal or combination signal and lighting pole of each signal conductor or cable. Neatly leave at least 3 feet of slack illumination and signal conductor or cable curled up in the bottom of each junction box or splice location.
5. Separate the neutral for pedestrian push button circuits from the signal light circuit neutral.
6. Run all signal and feeder conductors continuously without splices from a terminal block located in a cabinet, compartment, or signal head, to a similarly located terminal block. When modifying an existing signal system, splice existing conductors (cables) to new conductors (cables) as required to complete the signal, opticom, and interconnect systems. Make these splices only in pole bases, signal terminal compartments, or the controller cabinet.
7. Route highway illumination cable through each lighting pole designated for connection to that cable's circuit. Do not splice illumination cable between a load center and a pole or between poles. Join the individual conductors by using non-insulated, overlap type pressure connectors. Insulate with mastic-lined heat shrink tubing or 2 layers of one-half lapped UL listed electrical tape. Do not use wire binding screws, studs, or nuts. Stagger splices to minimize the overall diameter.
8. Install all loops in 1-inch rigid schedule 80 PVC conduit in the roadway and to the nearest junction box. Run loop lead-in cable continuously without splices from the controller cabinet to the curbside detection junction box nearest the loop being spliced to the lead-in cable. Splice the loop(s) to the lead-in cable by soldering at the junction box and encapsulating in a waterproof splice kit.

Multiple loop configurations must have the individual lead-ins, multiple pair, or single pair brought to the controller cabinet for termination. Make series connection of loop lead-ins in the controller cabinet only. Wind all loops in the same direction with the starting lead marked with an "S." Connect the black conductor of the pair shown in Table 660-2 to the "S" designated conductor of the loop. Connect multiple loop detectors in the same lane so that the adjacent loops are in alternating directions clock wise (CW), counter clock wise (CCW), etc.

9. When splicing loop detectors to multi-pair loop lead-in cables, complete the work according to the following.
 - a. See the Plans for the identifying number assigned to each loop detector and the loops assigned to each loop lead-in cable. Using this information, splice the loop detector tails to the paired conductors found in each lead-in cable, using the color code in Table 660-2.

**TABLE 660-2
MULTIPLE PAIR LOOP LEAD-IN COLOR CONNECTION SCHEDULE**

Loop Detector Number	Colored Pair
The lowest numbered loop detector	Red and Black
The second lowest numbered loop detector	Blue and Black
The third lowest numbered loop detector	White and Black
The fourth lowest numbered loop detector	Green and Black
The fifth lowest numbered loop detector	Brown and Black
Usually a spare pair	Yellow and Black

- b. Remove a short section of cable jacket and only cut the shielded pairs dedicated to loop detectors being spliced. Run these pairs, without splices, to the controller cabinet.
 - c. Strip the insulation from the ends of the conductors. With the loop and lead-in conductors parallel to one another, twist the bare ends together and then solder them together.
 - d. Insulate and seal each soldered connection with a mastic lined heat shrink tubing; crimp the ends of the heat shrink tubing with a pair of needle nose pliers.
 - e. First, crimp and then solder spade terminals to the ends of the shielded pairs in the controller cabinet.
10. Maintain the electrical isolation between shields and do not allow the drain wires to come in contact at any point other than the ground bus in the cabinet. Tie all drain wires to the ground bus at the controller cabinet.
11. Encapsulate illumination cable conductor splices in a rigid, 2-piece, transparent, snap together, plastic mold specifically designed for each splice type.

Encapsulate all loop lead-in cable splices in rigid, transparent, PVC molds filled with re-entable polyurethane electrical insulating and sealing compound. Furnish splice kits rated for 1000 volts AC operation and direct burial.

Provide re-useable four piece molds that are held together with stainless steel hose clamps. Two pieces form a cylinder and two flexible end caps seal the ends and allow the conductor entry. Use molds with dimensions suitable for the splice made, encase the cable jackets, and have fill and vent funnels.

Insert a loose woven polyester web that allows a full 1/4 inch of insulating compound to flow between the splice and the inside of the mold. Fill the PVC molds with re-entable

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polyurethane electrical insulating and sealing compound that cures transparent, is nontoxic, is non-corrosive to copper, and does not support fungi or mold growth.

12. Use molds with dimensions suitable for the splice, to encase the cable jackets, to be rated for 600 volts, and have fill and vent funnels for epoxy resin. Fill the splice mold bodies with epoxy resin that is resistant to weather, aromatic and straight chain solvents, and that will not sustain combustion. When filling the mold bodies of loop lead-in and telemetry cable splices, use a compound that provides re-entry capabilities.
13. Permanently identify all cables and single wire conductors by labeling all pole bases and cabinets, at each detector loop tail/lead-in cable and illumination cable splices, and in junction boxes adjacent to lighting and signal poles. When modifying an existing system, label all new and existing lighting cables/conductors with circuit numbers at locations noted above. If the existing circuits are not identified, the Engineer will provide the required circuit numbers.
14. Label the cables used in the signal and illumination systems with the following legends:
 - a. Use the legends included in Table 740-2, for the cables listed.
 - b. Use the loop number shown on the Plans to label each tail of all loop detectors and the paired loop lead-in conductors in the controller cabinet.
 - c. For interconnect cables, use the first letter of the direction the cable follows to the adjacent intersection on each cable. Add a number suffix if more than one cable is routed to the adjacent intersection.
15. Furnish the two types of identification tags listed below that feature hand written legends. Write the legends specified neatly and legibly, using a black marking pen recommended by the tag manufacturer. Replace at no expense to the State all identification tags the Engineer deems illegible.
 - a. Use identification cable ties for labeling loop detector tails and the paired conductors included in each loop lead-in cable in the controller cabinet. Furnish identification cable ties made of nylon that feature a nonmagnetic stainless steel locking device embedded in the head and a tag attached "flag style" to the head. Use cable ties consisting of a single strap with a minimum size tag of 3/4 inch by 3/8 inch.
 - b. To label all other cables, use cable tags made of nylon reinforced vinyl impervious to the elements and which will not tear. Provide tags with a 4 inch by 1-3/4 inch minimum size that attach flag style at one corner to a single strap. Furnish yellow tags for labeling all signal and interconnect cables and red tags for labeling lighting and feeder cables.
16. Terminate the control and power cables as shown in Table 740-2.
17. Connect telemetry cable to a Type No. 66B3-50 terminal block. Start the wiring at the top with Pair No. 1. Connect the incoming cable from the computer to the left side of the terminal block, and connect the outgoing cable to the next intersection to the right side.
18. Wire luminaires using No. 10 AWG illumination tap conductors that run from the fused disconnect kit in the pole base.

Install a fused splice connector between the line and luminaire ballast tap conductors in the base of every pole equipped with a luminaire.

Attach the conductors to the connector halves with setscrew type pressure connectors. Provide the plug and socket assembly so that the fuse remains in the load side plug without

exposing live metal parts when the connector separates and the coil springs are not included in the current carrying circuit.

Make the fused connectors readily accessible from the handhole. Install tap conductors to prevent slack when their ends touch the top of the foundation.

660-3.06 BONDING AND GROUNDING. Make the following mechanically and electrically secure: metallic cable sheaths, metal conduit, non-metallic conduit grounding wire, ballast and transformer cases, service equipment, sign switches, pedestrian push buttons, metal poles, and pedestals. Normally non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, must be electrically connected to earth ground, and must be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path. All installations must comply with the grounding and bonding requirements of NEC Article 250.

Install main or system bonding jumper as applicable at the service as required by NEC Article 250. Install copper grounding electrode conductors (GEC), sized per NEC Table 250.66, or #6 AWG, whichever is larger. Install copper equipment grounding conductors (EGC) for each circuit or raceway, sized per NEC Table 250.122, or #12 AWG, whichever is greater. Where conduits are installed for future conductors, the EGC may be omitted.

Furnish threaded-type grounding bushings made of malleable iron or steel with a zinc or galvanized finish. Use bushings with an insulated throat, a tin-plated copper saddle for attaching the grounding conductors, and stainless steel set screws.

Retrofit all existing spare conduits that will contain new cables exclusively with new grounding bushings. Whenever you reuse an existing conduit that contains no EGC, install a bare or insulated size 8 AWG copper wire as the EGC. Where conduits are installed for future conductors, the above mentioned copper wire may be omitted.

Install a bare or insulated copper conductor in all conduit as the EGC. Attach grounding conductors to each end of the metal conduit using insulated throat grounding bushings. Leave 12 inches of slack between each grounding bushing. Allow clearance for bushings when installing conduits in foundations.

Bond breakaway type standards and pedestals by using 2 conductors from the conduit, one attached with a ground rod clamp to an anchor bolt and the other connected to the lower portion of the shaft. Bond standards with frangible coupling type bases by attaching one conductor from the conduit to the lower portion of the shaft. Use conductor from the conduit to the shaft that is 48 inches long.

Solidly ground one side of the secondary circuit of a transformer.

660-3.07 TRAFFIC CONTROLLER ASSEMBLIES. Prepare each solid-state, traffic controller assembly to operate various traffic signal devices as shown on the Plans. The controller must provide right-of-way, clearance, and other indications using duration and sequence as determined by preset programming.

Details of operation for the complete controller assembly must be according to the traffic phases; preferential phase sequence and concurrence; signal indications; signal indication sequence; detection requirements; and other details shown on the Plans or as specified herein.

At the time the controller cabinet and equipment are delivered for testing, or if ordered prior to purchase, submit the following for each controller assembly called for in the Plans:

- a. Two blackline sets of controller cabinet schematic wiring diagrams

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- b. Two copies of the manufacturer's maintenance and operations manuals for the equipment in the cabinet

The schematic wiring diagrams must show all circuits and parts in detail. Clearly identify all parts by name or number. Submit the final wiring diagrams for each controller assembly in an AutoCad Drawing Interchange File format (DXF, DWG, etc.). Use only the default font style and line type distributed with a basic AutoCad package.

1. Shop Tests. Deliver the controller units, auxiliary equipment, and fully wired cabinet (including wiring diagrams and manuals) to a designated test location. All items must arrive together. Partial shipments will not be accepted and will be returned to the vendor.

Allow 6 weeks for shop testing.

All equipment must meet the operational and functional requirements of the Plans and Specifications when tested according to NEMA Standard TS 1-1989, *Traffic Control Systems*.

If a partial failure occurs at any step in the test (physical, environmental, or operational), you may make on-site repairs within 10 days after notification of the malfunction. The test will then be restarted at the beginning of the category in which malfunction occurred. Failing to make repairs within 10 days after notification will result in rejection.

If equipment malfunctions twice in the same category, the equipment will be rejected.

When equipment is rejected, return the entire package (including the cabinet) freight collect to the vendor. Submit the new equipment, with a different serial number, for testing. Do not use rejected equipment on signal projects within the State of Alaska.

Testing after equipment rejection for failure to comply with specification requirements will be at your expense. The Department will make deductions to cover the costs of such testing from any moneys due or which may become due to you under this Contract.

A failure is any occurrence that results in other than normal equipment operation. The equipment is considered to have failed if any of the following occur:

- a. The controller unit malfunctions
- b. The load switch produces incorrect signal indications
- c. The signal conflict monitor fails to satisfy the contract requirements

After the shop test is satisfactorily completed, you will be notified to pick up the tested and marked equipment at the test site. Pick up the successfully tested equipment within 2 weeks of notification and deliver to the work site. Successful test completion does not relieve you of equipment warranty obligations as specified in Subsection 660-2.01.3 or field testing as specified in Subsection 660-3.01.7.

Copies of shop test results will be sent to you, the vendor, and the State Materials Engineer.

2. Controller Cabinet Installation.
 - a. Where the cabinet is mounted on a concrete pedestal foundation, place a 1-inch drain hole or pipe with screen in the foundation, connecting to the cabinet and emptying above the ground line.
 - b. Place a 3/8-inch fillet of silicone caulking between each controller cabinet and the concrete slab foundation to prevent dust and dirt from entering the cabinet.

- c. When called for in the Plans or Special Provisions, add 2 inches of approved foam insulation within the bottom of the cabinet between the control equipment and the concrete base. Design all wiring, terminals, and other items to allow sufficient room for the insulation.
 - d. On Precast Controller Foundations. When called for in the Plans or Special Provisions, place a 3/8-inch thick, 2-piece exterior grade plywood board on the bottom of the cabinet and under the foam insulation. Place the plywood within the controller cabinet, and do not extend under it. Make holes to allow for the conduits entering the cabinet. Place a pliable sealant composed of a silicon caulking compound between the plywood board and the cabinet and between the plywood board and all the conduits.
 - e. Place a ground rod in the Type III junction box next to the cabinet or in the foundation of the cabinet if it is precast foundation.
 - f. See Subsection 660-3.05 and Section 740 for wiring requirements.
3. Controller Operation. Provide the following operations.
- a. Wire the controller cabinet to flash the yellow signals on the main street or highway, and the red signals on the cross streets and left turn lanes.
 - b. Make the flashing circuit independent of the controller unit. They must remain in operation upon shutdown of the controller or removal of the controller from the cabinet.
 - c. Wire the controller cabinet so that removal of the conflict monitor causes the intersection to go into flashing operation.
 - d. Accomplish transfer to flashing operation by relays between the normal load switching device and the field terminals.
 - e. Do not operate pedestrian pushbuttons at more than 24 volts.
 - f. Controller Priorities. Prioritize the drives, controls and equipment so that each device, control, or item of equipment overrides the operation of those items listed below it:
 - (1) Power failure
 - (2) Power restart
 - (3) Flashing
 - (4) Railroad preemptor
 - (5) Emergency vehicle preemptor
 - (6) Phase selector
 - (7) Interconnect
 - (8) Time switch
 - (9) Normal controller unit operation
4. Preemption. Provide the following preemption operations when called for on the Plans or as specified in the Special Provisions.

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- a. General. Preemption units must use the controller unit functional inputs and timings to the largest extent possible. Signal load switching control must remain with the controller unit.
- b. Railroad Preemption. The Railroad Preemption Routine must consist of 4 functional intervals in the order listed below:
 - (1) Enter Preemption Interval.
 - (a) Energize a 120 VAC alarm circuit which may be used for a sign, bell, or beacon.
 - (b) Immediately advance to the pedestrian clearance interval of any walk that is being displayed. On any phase other than the track clearance phase(s), abbreviate the pedestrian clearance interval by a timer with a minimum range of 0-30 seconds.
 - (c) Following the pedestrian clearance period, the controller must advance into and time normally the vehicle clearance intervals.
 - (d) If the preemption is received while in the track clearance phase(s), skip step (b) and (c) above.
 - (2) Track Clearance Interval.
 - (a) Provide a timing period to allow sufficient green clearance time for any vehicles that may be stopped on or immediately behind the railroad tracks. The timing must be adjustable over a range of 0 to 30 seconds.
 - (b) Following the track clearance period, the controller must advance into and time normally the vehicle clearance interval(s).
 - (3) During Preemption Interval. Allow the controller to operate normally with the exception of not serving those phases that conflict with the railroad crossing. Keep this interval in effect until the preemption call is removed.
 - (4) Leaving Preemption Interval.
 - (a) De-energize alarm circuit.
 - (b) Immediately advance to the active phase normal pedestrian and/or vehicle clearance interval(s).
 - (c) The controller must advance to those phases that were omitted under preemption control when complete control is returned to the controller unit.
- c. Emergency Equipment Preemption. The Emergency Equipment Preemption Routine must consist of 3 functional intervals in the order listed below:
 - (1) Enter Preemption Interval.
 - (a) Energize a 120 VAC alarm circuit which may be used for a sign, bell, or beacon.
 - (b) Immediately advance to the pedestrian clearance interval of any walk that is being displayed. On any phase other than the track clearance phase(s), abbreviate the pedestrian clearance interval by a timer with a minimum range of 0-30 seconds.

- (c) Following the pedestrian clearance period, the controller must advance into and time normally the vehicle clearance intervals.
 - (d) If the preemption call is received while in the preempt phase(s), skip step (b) and (c) above.
- (2) Preempt Phase Interval. Hold the controller in the preempt phase(s) until the call is removed.
- (3) Leaving Preemption Interval. When the preemption call is removed, the controller unit must immediately revert to normal operation.

660-3.08 SIGNAL AND LIGHTING STRUCTURES. Install signal and lighting equipment according to the details shown on the Plans and the following:

Remove all burrs and sharp edges from inside and outside of all holes before passing conductors through the walls of posts, poles, mast arms, signal heads, and other equipment.

Install photoelectric control units to face the north sky. When installed on the top of steel poles, install the bracket in the center of the rain cap. Secure it with a locknut and make watertight with a fillet of silicone caulking compound. When installed on wood poles or Type 1 or 1A Load Centers, couple the bracket to the end of a rigid metal conduit.

1. Electrolier Installation. Before installation, check the socket position in the luminaire to verify that it corresponds to the setting indicated in the instructions for the light distribution type shown on the Plans. Set the pole with a slight rake, by plumbing the side of the tapered pole away from the road.

After the pole has been plumbed, level the luminaire as recommended by the manufacturer.

2. Wood Pole Installation. Place the poles in the ground to at least 6 feet deep.

After setting each wood pole in the ground, backfill the space around the pole with selected earth or sand, free of rocks 4 inches or larger, or deleterious material. Place in layers approximately 4 inches thick and thoroughly compact with mechanical tampers.

Provide overhead equipment a minimum vertical clearance of 18 feet from bottom of equipment to the pavement.

3. Signal Pole Installation. Install signal poles so the side opposite the mastarm, or combination of mastarms, is vertical in its final deflected position. Provide a 1-inch drain hole in the grouted base. Run this drain from below the top of the conduits to outside of the grouted area.
4. Signal Head Mounting. Support bracket mounted signal heads, as shown on the Plans, by mounting brackets consisting of watertight assemblies of 1-1/2 inch nominal diameter standard steel pipe and malleable iron or brass pipe fittings. All members must be either plumb or level, symmetrically arranged, and securely assembled. Construct these so that all conductors are concealed within the assembly.

Attach vehicle and pedestrian signal head mounting hardware to the side of pole that faces away from traffic.

Aim through-phase vehicle signal faces at a point located a distance from the face as shown in Table 660-3. If 2 through-signal faces are not visible from this point at a height of 42 inches above finished grade, consult the Engineer for corrective measures.

Direct pedestrian signal heads at the center of the crosswalk on the opposite side of the street.

**TABLE 660-3
THROUGH-SIGNAL AIMING POINT**

85 th Percentile Speed (mph)	Minimum Visibility Distance (feet)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

The horizontal dimension between the center of a terminal compartment or axis of a signal face and the axis of an immediately adjacent signal face must be a minimum of 22 inches in side mounted frames and 11 inches in post top installations.

At each signal location, construct a terminal compartment into the mounting brackets. Fit each compartment with a terminal block containing 12 poles, each with 2 screw-type terminals. Each terminal must accommodate at least 3 No. 14 AWG conductors. Provide a rain-tight cover, giving ready access to the terminal block. Provide a bronze terminal compartment of sufficient strength to remain intact in event the pole is knocked down. Provide cast-iron slip-fitters, where used without integral terminal compartment.

For post-top mounting of bracket mounted signals, cast the terminal compartment with an integral slip-fitter. For post-top mounting of a 1 way signal head, you may use a slip-fitter without a terminal compartment. The slip-fitter must fit over a 4-inch standard pipe or 4-1/2 inch outside diameter end of tapered standard. Provide each slip-fitter with 2 rows of cadmium plated steel set screws, with 3 screws in each row to secure the assembly in plumb position.

Where signal heads are side mounted on poles, the terminal compartment must be designed for and securely bolted to the pole. Mount pole side mounted pedestrian and traffic signal heads on the back side of pole unless noted or detailed otherwise on the Plans. Mount the pole/post mounted traffic signal heads so that no portion of the backplates are hidden by the pole/post.

Equip the signal heads with positive brass lock rings and fittings designed to prevent heads from turning due to external forces. Lock ring and connecting fittings must have serrated contacts.

Equip signal head assembly for suspension from mast arm with a ferrous or bronze plumbizer.

Do not mount signal heads within 12 inches either side of a mast arm extension splice.

Do not install signal heads at any intersection until all other signal equipment, including the controller, is in place and ready for operation at that intersection, unless the faces are not directed toward traffic or unless the faces are adequately covered.

Side-mount pedestrian signals using a 2-piece, hinge connected, cast aluminum bracket that mounts directly between the pole and the side of the signal head housing. Limit clearance

between the head and pole to 3 inches. The bracket must properly fit round poles 4 inches or greater in diameter and allow a minimum rotation of 30 degrees when mounted on a 4-inch pole. Include a rain-tight 12-position terminal block within the mounting bracket.

5. Pedestrian Push Button Installation. Install the push button and sign on the crosswalk side of the pole. Install indicator lights when specified.

Pedestrian push button signs must conform to the details in the ASDS. Install push button signs and The Meaning of Pedestrian Signals stickers, R9-4, above each push button. Use R10-4B (R or L) push button signs with the arrow pointing in the direction of the appropriate crosswalk. Install the sticker immediately above the push button and below the sign. When channel is used for mounting push button signs, tap the top and bottom sign bolts into the pole.

6. High Tower Lighting System Installation. Install the high tower poles as recommended by the manufacturer. Provide the erection plan to the Engineer prior to installing poles.

Attach the luminaire to the bracket arm by means of a bracket entry and lamp support assembly.

Install the lowering system including head frame, luminaire support ring, winch(s), hoisting assembly, and electric motor.

Adjust the luminaire reflectors until all are oriented in the same direction and they provide the asymmetrical light distribution pattern shown on the illumination sheets.

7. Underpass Lighting System Installation. Mount the fixture as detailed on the drawings so that the axis of the lamp is perpendicular to the axis of the underpass.
8. Flashing Beacon Installation. When installing flashing beacons adjacent to or in conjunction with a traffic signal system, install the flasher control in the controller cabinet.

660-3.09 MAINTAINING TEMPORARY AND EXISTING ELECTRICAL SYSTEMS. Keep in effective operation during the progress of the work all existing electrical systems (traffic signal, highway and street lighting, flashing beacon, and sign illumination), and approved temporary replacements except when shutdown is permitted to allow for alterations or final removal of the systems. Temporary replacement equipment must be compatible with existing equipment used in the Region. Limit traffic signal shutdowns to the period Sunday through Thursday between the hours of 9:00 p.m. to 6:00 a.m., unless otherwise specified in Subsection 643-3.08. Do not allow lighting system shutdowns to interfere with the regular lighting schedule. Obtain written approval before performing any work on existing systems.

Notify the local traffic enforcement and maintenance agencies at least 24 hours before the operational shutdown of a traffic signal system. Provide necessary traffic control under Section 643.

Where an existing system is being modified, the Department will pay for work not shown on the Plans or Special Provisions that is considered necessary to keep all or part of the existing system in effective operation as extra work as provided in Subsection 109-1.05.

Once commencing work on the project, provide all maintenance for temporary and existing electrical facilities. The State will pay for the electrical power for the above mentioned electrical systems. The above maintenance does not include previous damage such as burned out lamps, non-operative detection, or other malfunctioning equipment. Present written documentation of all non-functioning and malfunctioning electrical equipment before commencing work on the project. You and the Engineer will inspect this equipment jointly. If work begins on the Project and the

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Engineer does not receive written notice, this is considered evidence that all equipment is functional and operational.

Give the Engineer the name and 24-hour phone number of the person maintaining the existing and temporary electrical facilities. Commence repair work within 1 hour of notification for traffic signal systems.

Ascertain the exact location of existing conduit runs, direct burial cable, junction boxes, and all underground utilities before using equipment that may damage such facilities or interfere with any system.

Where roadways are to remain open to traffic and existing lighting systems are to be modified, complete work each day so the lighting system will be in operation by sunset.

When you work on a traffic signal system, keep a record of all work performed in a diary located in the controller cabinet. Furnish a diary for each temporary system. Make sure each entry is printed legibly and includes:

1. The dates and times you began and completed your work, and the names of the crewmembers completing the work.
2. The characteristics of the equipment failure or faulty operation evident before repair.
3. The changes made or corrective actions taken.
4. The printed name and signature of the person responsible for making the repairs or changes.

Keep temporary electrical installations in effective operation until they are no longer required. Salvage all original and Department-provided equipment according to the provisions in Subsection 660-3.01.6 and remove all other materials from the project.

660-3.10 FALSEWORK LIGHTING. When required by the Special Provisions, install falsework lighting where vehicular traffic with or without pedestrian traffic crosses through or under structure falsework.

Provide illumination of the portal faces of falsework during the hours from dusk to dawn. Provide illumination of the pavement and pedestrian openings through or under falsework 24 hours a day.

Submit a plan for the proposed lighting installations and do not commence falsework construction until the Engineer has reviewed such plans. The Engineer will make a subsequent review after you place falsework lights in operation.

Falsework lighting equipment remains your property and must be removed from the site of the work upon completion of the project or when directed.