GOVERNMENT OF THE DISTRICT OF COLUMBIA

DEPARTMENT OF TRANSPORTATION

TRAFFIC OPERATION ADMINISTRATION

SPECIFICATIONS

INVITATION NO. DCKA-2013-B-0141

PROJECT:

FY 2013 CITY WIDE TRAFFIC SIGNAL MAINTENANCE CONTRACT

FAP NO. STP-NHS-8888(440)

Bids Will Be Publicly Opened By The Office Of Contracting and Procurement, Department of Transportation, 55 M Street, S.E., 4th Floor, Washington, D.C. 20003

Bids Will Be Opened On _____ At 2:00 P.M.

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION
TITLE PAGE – SPECIFICATIONS

ISSUING OFFICE:
Office of Contracting and Procurement Bid Room
Located at
55 M Street, S.E., 4th Floor
Washington, DC 20003

Requests for clarification or interpretation of Bid Documents prior to date of Bid Opening:

ADDRESS TO: Chief Transportation Engineer
Infrastructure Project Management Administration
DC Department of Transportation
55 M Street, SE, Suite 400
Washington, D.C. 20003

Prospective Bidders:

To bid this contract, detach the Bid Form package, which is bound to the back of this book, fill out all forms along with Bid Guaranty as required, and submit it to the Issuing Officer prior to the time of bid opening.

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Special Provisions

This document contains provisions, requirements and instructions pertaining to this contract:

FY-13 Citywide Traffic Signal Maintenance Contract

Invitation No.: DCKA-2013-B-0141
FAP No.: STP-NHS-8888(440)

This document consists of:

SPECIFICATIONS: - Pages i, ii, iii, iv, v & vi and Pages 1 thru 141 and Appendices (with number of pages in parentheses) are listed on Pages v & vi.

BID FORM AND PROPOSAL: - Pages a, b, c, & d and Pages 1 thru 100 including **PAY ITEM SCHEDULE**.

Bidders should satisfy themselves that they have a complete document. Missing pages will not constitute the basis for a valid claim.

This is a Federal-Aid Contract, **FEDERAL-AID PROJECTS PROVISIONS**, applies.

ADDENDA, issued prior to bid opening date, further supplement and modify the proposed contract.
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Reference to Division Numbers, Section Numbers and Article Numbers refers to STANDARD SPECIFICATIONS FOR HIGHWAYS AND STRUCTURES, 2009.

This document supplements and modifies STANDARD CONTRACT PROVISIONS, for use with specifications for District of Columbia Government Construction Projects; STANDARD SPECIFICATIONS FOR HIGHWAYS AND STRUCTURES 2009.

In PAY ITEM SCHEDULE, the first three-digit portion of each pay item number, when used, refers to the section of the STANDARD SPECIFICATIONS in which the item is further described.

1. SCOPE OF WORK

A. The Government of the District of Columbia, Department of Transportation, Transportations Operations Administration and the Field Operations Division is soliciting competitive bids for the purpose of securing the service of a contractor to maintain the city's Traffic Signals, Safety Standards & Intelligent Transportation System assets.

B. The selected contractor shall furnish all necessary labor, materials and equipment as shall be required to effect an all-inclusive maintenance program. The work shall be performed in accordance with applicable provision of the District of Columbia Standards; Department of Transportation Standard Specifications for Highways and Structures, 2009; District Department of Transportation Standard Drawings, 2005; these Special Provisions; technical literature cited throughout these special provisions; and drawings and records available from the Traffic Signals, Safety Standards & Intelligent Transportation System.

C. The scope of maintenance services to be performed involves work above and below ground. The work to be performed by the contractor under the terms of this contract shall include:

(1) Group re-lamping of all Optical Programmable traffic signal and pedestrian signal heads and fiber optic bulbs in the city.
(2) Spot re-lamping of all Optical Programmable traffic signal and pedestrian signal heads and fiber optic bulbs in the city.
(3) Spot replacement of LED modules for traffic signals, pedestrian signals and flashing beacons in the city.
(4) Installing and Replacing LED modules for pedestrian count-down signals
(5) Installing and Replacing Driver Feedback Signs (DFS)
(6) Realigning twisted traffic or pedestrian signal heads. Installing and Replacing damaged traffic or pedestrian signal heads
(7) Realigning twisted school flashers and flasher beacons in the city. Installing and Replacing damaged school flashers and flasher beacons
(8) Installing and Replacing damaged local traffic signals or communication cable and conduit
(9) Installing and Replacing damaged or missing traffic/pedestrian signal heads
(10) Installing and Replacing damaged traffic signal pole and controller cabinet foundations
(11) Installing and Replacing damaged traffic signal/streetlight combination poles and foundations
(12) Installing and Replacing damaged traffic signal/streetlight combination pole T-bases and missing T-base doors
(13) Installing and Replacing damaged bollards adjacent to traffic signal poles
(14) Installing and Replacing damaged traffic signal controller cabinets and

traffic and/or ITS communications termination cabinets

(15) Installing and Replacing malfunctioning inductive loop detectors, microwave vehicle detectors, video vehicle detection systems and pedestrian push buttons.
(16) Installing and Replacing Accessible Pedestrian Signals (APS)
(17) Installing and Replacing damaged PVC electrical conduit.
(18) Responding to reported traffic signal malfunctions, including those involving the controller.
(19) Responding to and replacing all damaged or knocked down traffic signal equipment including poles, beacons, controllers and signal hardware.
(20) Visually reprogramming optically programmable vehicle and pedestrian signal heads.
(21) Installing and replacing the CCTV systems. Performing preventive maintenance of CCTV systems
(22) Performing preventive maintenance of all aspects of the Traffic Signals, Safety Standards & Intelligent Transportation System
(23) Deployment of emergency stop signs back-up generator systems on evacuation routes
(24) Installing and replacing wireless detection systems. Performing preventive maintenance of wireless detection systems.
(25) Performing preventive maintenance of the Dynamic Message Signs (DMS)
(26) Installing and replacing the HAWK pedestrian signals. Performing preventive maintenance of the HAWK pedestrian signals
(27) Installing and replacing the in-street lighting systems. Perform preventive maintenance of the in-street lighting systems
(28) Performing maintenance of the Critical Infrastructure Protection System (3rd Street Tunnel or any new locations)
(29) Installing and replacing the rigid and portable dynamic message signs. Performing preventive maintenance of the rigid and portable dynamic message signs.

D. The work is to be performed by the contractor in accordance with industry-accepted procedures for maintaining highway and pedestrian traffic, as defined in Part VI of the Manual of Uniform Traffic Control Devices (2003 MUTCD or latest version). Group re-lamping and preventive maintenance are activities to be performed by the contractor through the contract without direct guidance from the city. All other aspects of works shall be performed by the contractor at the specific direction of the city.

E. The contractor shall be aware that a substantial majority of the city's traffic signal system infrastructure resides within and on facilities owned and maintained by the Potomac Electrical Power Company (PEPCO). Accordingly, the contractor shall adhere to all applicable rules and regulations, governing work in PEPCO manholes, conduits, wood poles and any other facility under the jurisdiction of

PEPCO. The contractor shall maintain a dialog with PEPCO counterparts at all times to ensure that their interests are satisfied.

F. In addition to furnishing all labor, material, and equipment in the performance of this work, the contractor shall maintain office and warehousing facilities within the boundaries of the District of Columbia. The contractor shall be expected to be available seven days a week, twenty-four hours per day including holidays to perform services cited in these special provisions. Ward based schedules shall be submitted monthly to indicate man power assignments.

G. The District of Columbia currently operates signalized intersection operated by 1372 type 170E traffic signal controllers. The physical plant also includes the following estimated approximate quantities:

(1) 37,680: LED Modules for 12" traffic and pedestrian signal heads
(2) 12,560: LED Pedestrian Overlay modules.
(3) 12,560: LED Pedestrian Count-down modules.
(4) 400: LED Modules for 12" beacons for school flashers and flashing beacon warning signs
(5) 180: Installing and Replacing Fiber optic electronic sign bulbs.
(6) 60: Installing and Replacing Neon directional signs.
(7) 400: Installing and Replacing Optically programmable traffic signal and pedestrian signal heads
(8) 170: Installing and Replacing communication termination cabinets
(9) 2000: Installing and Replacing miles of traffic signal cable
(10) 10,000: Installing and Replacing traffic signal poles
(11) 4,000: Installing and Replacing traffic Signal/Streetlight combination poles
(12) 17: Installing and Replacing Driver Feedback Signs
(13) 5: Installing and Replacing Video Speed Detection Cameras
(14) 150: Installing and Replacing CCTV Cameras
(15) 200: Installing and Replacing Emergency Back-up Generators
(16) Installing and Replacing Video Detector System
(17) 40: Installing and Replacing Portable Dynamic Message Signs
(18) 1600: Installing and Replacing Wireless Detection System
(19) 12: Perform preventive maintenance of Dynamic Message Signs (DMS)
(20) 20: Installing and Replacing the HAWK pedestrian signal
(21) 7: Installing and Replacing the In-Street Lighting Systems

Maintenance to Include:

(1) New Dynamic Message Signs
(2) Portable Dynamic Message Signs
(3) Inground pedestrian crossing equipment, detectors, flashers, signs and Markings

(4) Wireless Detection Systems
(5) CCTV cameras
(6) HAWK pedestrian signal
(7) In-street lighting systems
(8) Critical Infrastructure Protection System

H. The contractor shall ensure that provisions are made to display the correct traffic signal sequence of operation prior to departure from the intersection. This shall be considered to be accomplished by effectuating all repairs, be reporting to the needed repairs outside the purview of that particular work team, or by displaying the approved flash operation prior to the expeditious return to full color operation. This shall be considered to be accomplished by effectuating all repairs, by reporting to the dispatcher needed repairs outside the purview of that particular work team, or by displaying the approved flash operation prior to the expeditious return to full color operation.

I. Removal of poles for:
-DC Water
-Washington Gas
-Verizon
-Or any other utility of third party shall be done and charges captured for reimbursement to the District of Columbia

2. CONTRACT TYPE

A. This is a Requirements Contract based on Fixed Unit Prices for the services specified herein. The Contractor shall perform all services in accordance with the terms and conditions of the contract.

B. The District agrees that it will purchase its requirements of the articles or services included herein from the Contractor. The estimated quantities stated herein reflect the best estimates available. The estimate shall not be construed as a representation that the estimated quantity will be required or ordered, or that conditions affecting requirements will be stable. They shall not be construed to limit the quantities which may be ordered from the Contractor by the District or to relieve the Contractor of his/her obligation to fill all such orders.

C. Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering Clause. The Contractor shall furnish to the District Government, when and if ordered, the supplies and/or services up to an including the maximum amount specified in the bid price of the successful bidder. The District Government will order at least the minimum amount of one hundred thousand dollars ($100,000.00). The minimum and maximum will be the same for all option years.

D. ORDERING CLAUSE

(1) The Contracting Officer shall issue any supplies and services to be furnished under this contract either ordered by issuance of delivery orders or task orders. Such order may be issued from date of award through one year thereafter.

(2) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of a conflict between a delivery order or task order and this contract, the contract shall control.

If mailed, a delivery order or task order is considered "issued" when the District deposits the order in the mail. Orders may be issued by facsimile or electronic commerce methods only if authorized in the Schedule.

3. TERM OF CONTRACT

A. The term of the contract shall be for a period of one year from the award date subject to the District's option to extend the term of the contract in accordance with the following:

B. Option Period: The government may extend the term of the contract for up to four (4) one year periods.

C. **Option to Extend the term of the Contract**:

The government may extend the term of this contract for a period of one year, The government may extend the term of this contract for a period of one year, or a fraction thereof, or multiple successive fractions thereof, by written notice to the contractor before expiration of the contract; provided, that the government shall give the contractor a preliminary written notice of its intent to extend at least thirty (30) days before the contract expires. The preliminary notice does not commit the government to an extension. The exercise of this option is subject to the availability of funds at the time of the exercise of this option.
The prices for the option period shall be as specified in the contract.
If the government exercises this option, the extended contract shall be considered to include this option provision.
The total duration to this contract, including the exercise of any options under these provisions, shall not exceed five (5) years.

4. EVALUATION OF OPTIONS:

A. The government will evaluate bids for awards purposes by adding the total price of all options to the total price for the base year requirements. Evaluation of options will not obligate the government to exercise the options(s).

B. The government may reject an offer as non-responsive if it is materially unbalanced as to price for the basic requirements and the option requirement. An offer is unbalanced when it is based on prices significantly less than cost for some items and prices that are significantly overstated for other items.

C. A prospective contractor shall be determined non-responsive if he or she fails to bid on the option year requirements.

5. BASIS OF AWARD

Bidder shall provide quotes for the base year period and for each of four one-year option periods. Failure to provide quotes for all five years will result in rejection of the bid. Award will be made to the lowest bidder based upon the Base Year and all four option years, as totaled by the Contracting Officer.

6. PRE-AWARD APPROVAL:

Pursuant to Title XXIII of the Fiscal Year 2003 Budget Support Act of 2002, D.C. Law 14-307, effective June 5, 2003, the Mayor must submit to the Council for approval any contract action over one million dollars.

7. COORDINATION WITH OTHERS:

A. The Contractor is alerted that other contracts either associated with this project or different scope either have been, will be, or may be let for work in the vicinity of the project area.

B. The Contractor shall coordinate his work and cooperate fully with all others in order to eliminate or curtail delays and interference of any kind. The Contractor shall perform his lane closings and re-openings so as not to cause interference with others or to be in conflict with performance of traffic maintenance by others. The District assumes no liability for contract delays or costs resulting from performance or non-performance of others.

C. The Contractor shall notify the District in the event of a problem or delays caused by another contractor working in the area The Contractor shall notify the Contractor Officer or the Contracting Officer's Technical Representative (COTR) in writing of any request for a time extension.

D. The District will not consider any claims for compensation due to delay, other than written authorized time extensions.

8. CONTRACTOR IDENTIFICATION:

All contractors doing business with the District of Columbia Government shall have a Federal Identification Number.

Please refer any questions regarding this matter to the Office of the Chief Financial Officer, (202) 671-2300, of the D.C. Department of Transportation.

9. BID GUARANTY:

This S.P. supplements Article 12, Bond Requirements Part A, of the INSTRUCTIONS TO BIDDERS, STANDARD CONTRACT PROVISIONS, 2009.

The Bid Guaranty period shall be ninety (90) calendar days after opening of the bids. An Irrevocable Letter of Credit or United States government securities that are assigned to the District which pledge the full faith and credit of the United States are acceptable.

10. APPLICABLE WAGE DECISION/WAGE RATES:

The Contractor shall be bound by the Wage Determination No.: 2005-2103, Revision No. 12, Date of Revision – 06/13/2012, issued by the U.S. Department of Labor in accordance with the Service Contract Act, 41 U.S.C. §351 et seq., and incorporated herein as an appendix. The Contractor shall be bound by the wage rates for the term of the contract subject to revision as stated herein and in accordance with Section 24 of the SCP. If an option is exercised, the Contractor shall be bound by the applicable wage rates at the time of the option. If the option is exercised and the CO obtains a revised wage determination, the revised wage determination is applicable for the option periods and the Contractor may be entitled to an equitable adjustment.

SERVICE CONTRACT RATES

Any revisions to the wage determinations issued after the bid date and prior to the commencement of work are subject to the appropriate provisions of 29 CFR part 4 Subpart A Section 4.5

11. PROTESTS

Any actual or prospective bidder, offeror or contractor who is aggrieved in connection with the solicitation or award of a contract, must file with the DC Contract Appeals Board (Board) a protest no later than ten (10) business days after the basis of protest is known or should have been known, whichever is earlier. A protest based on alleged improprieties in a solicitation which are apparent prior to bid opening or the time set for receipt of initial proposals shall be filed with the Board prior to bid opening or the time set for receipt of initial proposals. In procurements in which proposals are requested, alleged improprieties which do not exist in the initial solicitation, but which are

subsequently incorporated into this solicitation, must be protested no later than the next closing time for receipt of proposals following the incorporation. The protest shall be filed in writing, with the Contract Appeals Board, 441 4th Street, N.W., Suite 350N, Washington, D.C. 20001. The aggrieved person shall also mail a copy of the protest to the Contracting Officer for the solicitation

12. MAINTENANCE COMPLETION TIME:

Contract work shall be complete at all locations within three hundred and sixty-five (365) calendar days from the award of the contract.

A. The Contractor shall not begin any subtask that would preclude display of the accepted traffic signal sequence of operation at the conclusion of the work day.

B. The Contractor may darken (temporarily take out service) one (1) of the two (2) signal indications (heads) in service for any particular intersection approach for a time period not to exceed four (4) hours as long as the Contractor is actively working on that intersection corner and as long as proper acceptable maintenance of traffic practices are followed.

C. The Contractor shall be responsible for obtaining the services of and reimbursing Metropolitan Police Department personnel to direct traffic during the changeover from one signal display and/or sequence of operation to another approved signal display and/or sequence of operation.

D. The Contractor shall have Metropolitan Police Department personnel direct traffic in the event the Contractor must darken (temporarily take out of service) all traffic signal indications (heads) visible to one or more intersection approaches.

E. Payment for Metropolitan Police Department services shall be made by the Contractor and shall be incidental to the work.

13. PRE-BID CONFERENCE:

Prospective bidders are invited to attend a meeting to discuss the proposed work under this contract. The meeting will be held at 55 M Street S.E. Washington, DC 20003. Bidders will be notified of the room number, date and time by Addendum.

Representatives of the Department will be available to answer questions relative to the work. Bidders who expect to attend should inform the Department prior to the meeting date. Any pertinent date or change resulting from the conference will be included in any addendum issued to all prospective bidders after the conference; however, the importance of attending the meeting is stressed. Any questions or conflicts identified prior to bid should be brought out during this meeting.

14. MAINTENANCE OF HIGHWAY TRAFFIC:

This S.P. modifies 104.02 and 616

A. TRAFFIC FLOW RESTRICTIONS:

The actual duration of maintenance or construction at each work site shall be minimized to reduce exposure to potential hazards. The Contractor's operation shall present no interference to traffic during the peak traffic hours of 6:30 a.m. to 9:30 a.m. and 3:30 p.m. to 7:00 p.m., Monday thru Friday, except holidays.

When working on entrance or exit ramps of the Freeway system, the contractor shall maintain a minimum of one 11 feet lane for ramp traffic and, whenever possible, shall not work on the traveled portion of the ramp.

B. TRAFFIC CONTROLS:

The Contractor shall submit to the Engineer for approval, a traffic control plan or may submit typical (s) from the MUTCD that are applicable to perform the work prior to starting any maintenance or construction. The plan shall include but not be limited to, the arrangement, size and location of such items as appropriate warning signs, traffic cones, and arrow panels. These traffic control devices shall conform to the most recent version of the MUTCD and D.C. Design Standards (various typicals are included as a guide in the Appendix). The contractor shall be responsible for furnishing, installing, maintaining and removing all required traffic control devices. All devices shall be in new or like new condition.

C. LANE CLOSURES

When closing a lane, the Contractor shall furnish, install and maintain the necessary signs, traffic cones, and arrow panels, to affect the lane closure as outlined in paragraph 104.02 (c) of the Standard Specifications and these Special Provisions. All flashing arrow panels for lane closures shall be Type "C" units and shall contain a noiseless type power source.

D. Traffic Control Devices

(1) All temporary traffic control devices shall satisfy the NCHRP Report No. 350 testing requirements. The contractor shall provide written documentation to the Engineer reporting test results.

(2) Approved warning signs, traffic cones, arrow panels, etc. shall be provided to ensure motorists positive guidance in advance of and through the work zone. Erection of regulatory signs such as stop, speed limit and no parking signs must be specifically authorized. Advance Warning signs shall be 48" x 48" in size and the face sheeting shall be Fluorescent Orange High Performance Wide Angle Retro-reflective material or equal.

Roll-up signs are approved, but they also must be 48" x 48" in size and of the same Orange Fluorescent material. Note: Mesh roll-up signs are not approved.

(3) Sign supports shall be a spring-loaded type or equivalent. Tripod or A-frame sign stands are not approved. The temporary signs and markings placed in or adjacent to the work zone shall be consistent and visible at all times. The existing signs and markings may be covered and/or removed temporarily if the intended functions of these signs and markings will not be applicable during construction. However, they shall be replaced promptly, when work is completed. All temporary signs no longer applicable to the work zone shall be removed or turned away from traffic.

E. TRAFFIC SAFETY OFFICER - The Contractor shall have a competent, full time, Traffic Safety Officer in accordance with the requirements of 616.02 (B)(1).

F. MEASURE AND PAYMENT – The unit of measure for Maintenance of Traffic Work will be in accordance with the contract line item number (CLIN).

Maintenance of Traffic Work will be paid for at the contract unit cost price, Pay Item 616.001, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work

G. **COSTS**. All costs of labor, materials, equipment, electrical energy and incidentals required for performing the above administrative pay items shall be included in the contract price. Defects in materials or workmanship in the installation as disclosed by tests shall be corrected or replaced by the Contractor without additional compensation.

15. CONTRACTOR'S SUBMITTALS:

This S.P. Supplements 105.02 (B)

Selected catalog cuts, material certifications, laboratory test reports, and other required submittals will be subject to review and approval by the Engineer. The contractor is encouraged to provide submittals for review as soon as practical after project notice to proceed is issued. Every effort will be made to respond to these submittals within five (5) working days of receipt by the Engineer. The contractor shall be required to submit five (5) copies of all submittals to:

Mr. James M. Cheeks Jr.
Chief Traffic Engineer
Transportation Operations Administration (TOA)
District Department of Transportation
55 M Street SE, Suite 600

Washington, D.C. 20003

16. VALUE ENGINEERING PROPOSALS BY THE CONTRACTOR:

The provisions of 104.03 apply to this contract.

17. DEFAULT:

This Contractor shall be in default of the Contract for the following reasons:

A. Contractor's performance is deficient and requires completion by others.

B. Falsification of independent laboratory reports or

C. Falsification of performance reports, work schedules, logs, equipment or materials used

D. Insufficient staff to handle day-to-day operations.

E. Insufficient staff to handle emergency operation (planned or unplanned)

18. CONTRACTORS WORK SCHEDULE:

This SP supplements and modifies Article 17C of the General Provisions, 105.10 and 105.11.

A. Work shall be performed in the field at times of the day in accordance with SP 15(A) TRAFFIC FLOW RESTRICTIONS. Work including the fabrication of signal heads for field installation, disposal of removed equipment and administrative matters relating to the conduct of this contract may be performed at the contractor's facility during the times the contractor is working in the field.

B. Work in the field shall be canceled and/or suspended if already in progress during periods of inclement weather featuring precipitation. Electrical work in the field will be prohibited during rain and/or snow due to the potential for electrical shock and/or damage to sensitive solid state controller components. Decisions to terminate field work for a day shall be made the Chief of the D.C. Traffic Signal Maintenance Branch. The contractor shall factor inclement weather into the overall schedule to ensure compliance with yearly production goals.

C. Regular scheduled work in the field on Saturdays, Sundays, and holidays is discouraged, but will be entertained with the written request of the contractor to the Engineer seven (7) calendar days prior to the day on which work is to be performed. The Engineer shall respond to such requests within seven (7) calendar days of receipt of the request. This requirement is excluded in response to emergency traffic signal repairs.

D. The contractor must keep illuminated at least one signal head controlling a specific movement. A signal head may be taken out of service to perform required work for a period of time not to exceed four (4) hours as long as the contractor is actively working on that intersection corner and as long as proper maintenance of traffic practices are followed.

19. DDOT PROVIDED TRAINING:

A. The Field Operation Division will conduct mandatory training for the contractor's technical employees. The contractor shall be required to videotape and audiotape the entire training session. Any new employees hired by the contractor to work on this project will be required to view and understand the training as a prerequisite for participation in this project. The training will be conducted by Field Operations Division and Traffic Operations Division personnel and will feature demonstrations of the accepted methods for performing the following tasks:

(1) Working with the Type 170 controller.
(2) Properly aligning and tightening vehicular and pedestrian signal heads.
(3) Disconnecting cable from and removing existing signal heads.
(4) Connecting cable to and installing proposed signal heads.
(5) Signal head mounting techniques.
(6) Installing LED module inserts into signal heads.
(7) Terminating cable in the controller cabinet and dressing cable in a neat manner.

B. Training will be conducted on District of Columbia premised and will be scheduled to occur at a mutually agreeable time and date within 10 working days following the contract notice to proceed. Videotape and audiotape costs are to borne by the contractor. The contractor shall furnish to the District of Columbia written confirmation that employees retained after the training session shall be provided to the District of Columbia. Videotape shall be in VHS format.

C. The cost of this additional, specified training shall be reflected and distributed equally in the manner prescribed herein among the bid items.

20. DISPUTES:

A. All disputes arising under or relating to this contract shall be resolved as provided herein.

B. Claims by a Contractor against the District.
Claim, as used in Section B of this clause, means a written assertion by the Contractor seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or

relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant.

(a) All claims by a Contractor against the District arising under or relating to a contract shall be in writing and shall be submitted to the Contracting Officer for a decision. The contractor's claim shall contain at least the following:
  (1) A description of the claim and the amount in dispute;
  (2) Any data or other information in support of the claim;
  (3) A brief description of the Contractor's efforts to resolve the dispute prior to filing the claim; and
  (4) The Contractor's request for relief or other action by the contracting officer.

(b) The Contracting Officer may meet with the contractor in a further attempt to resolve the claim by agreement.

(c) For any claim of $50,000 or less, the Contracting Officer shall issue a decision within sixty (60) calendar days from receipt of a written request from a Contractor that a decision is rendered within that period.

(d) For any claim over $50,000, the Contracting Officer shall issue a decision within ninety (90) calendar days of receipt of the claim. Whenever possible, the Contracting Officer shall take into account factors such as the size and complexity of the claim and the adequacy of the information in support of the claim provided by the Contractor.

(e) The Contracting Officer's written decision shall do the following:
  (1) Provide a description of the claim or dispute;
  (2) Refer to the pertinent contract terms;
  (3) State the factual areas of agreement and disagreement;
  (4) State the reasons for the decision, including any specific findings of fact, although specific findings of fact are not required and, if made, shall not be binding in any subsequent proceeding;
  (5) If all or any part of the claim is determined to be valid, determine the amount of monetary settlement, the contract adjustment to be made, or other relief to be granted;
  (6) Indicate that the written document is the contracting officer's final decision; and
  (7) Inform the Contractor of the right to seek further redress by appealing the decision to the Contract Appeals Board.

(f) Any failure by the Contracting Officer to issue a decision on a contract claim within the required time period will be deemed to be a denial of the claim, and will authorize the commencement of an appeal to the Contract Appeals Board as authorized by D.C. Official Code § 2-309.04.

(g) If a Contractor is unable to support any part of his or her claim and it is determined that the inability is attributable to a material misrepresentation of fact or fraud on the part of the Contractor,

(1) The Contractor shall be liable to the District for an amount equal to the unsupported part of the claim in addition to all costs to the District attributable to the cost of reviewing that part of the Contractor's claim.

(2) Liability under this paragraph (g) shall be determined within six (6) years of the commission of the misrepresentation of fact or fraud.

(h) The decision of the Contracting Officer shall be final and not subject to review unless an administrative appeal or action for judicial review is timely commenced by the Contractor as authorized by D. C. Official Code § 2-309.04.

(i) Pending final decision of an appeal, action, or final settlement, a Contractor shall proceed diligently with performance of the contract in accordance with the decision of the Contracting Officer.

C. Claims by the District against a Contractor

(a) Claim as used in Section C of this clause, means a written demand or written assertion by the District seeking, as a matter of right, the payment of money in a sum certain, the adjustment of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant.

(b) Contracting Officer:

(1) All claims by the District against a Contractor arising under or relating to a contract shall be decided by the Contracting Officer.

(2) The Contracting Officer shall send written notice of the claim to the Contractor. The Contracting Officer's written decision shall do the following:

(a) Provide a description of the claim or dispute;

(b) Refer to the pertinent contract terms;

(c) State the factual areas of agreement and disagreement;

(d) State the reasons for the decision, including any specific findings of fact, although specific findings of fact are not required and, if made, shall not be binding in any subsequent proceeding;

(e) If all or any part of the claim is determined to be valid, determine the amount of monetary settlement, the contract adjustment to be made, or other relief to be granted;

(f) Indicate that the written document is the Contracting Officer's final decision; and

(g) Inform the Contractor of the right to seek further redress by appealing the decision to the Contract Appeals Board.

(3) The decision shall be supported by reasons and shall inform the Contractor of his or her rights as provided herein.

(4) The authority contained in this clause shall not apply to a claim or dispute for penalties or forfeitures prescribed by statute or

regulation which another District agency is specifically authorized to administer, settle, or determine.

(5) This clause shall not authorize the Contracting Officer to settle, compromise, pay, or otherwise adjust any claim involving fraud.

(c) The decision of the Contracting Officer shall be final and not subject to review unless an administrative appeal or action for judicial review is timely commenced by the District as authorized by D.C. Official Code §2-309.04.

(d) Pending final decision of an appeal, action, or final settlement, the Contractor shall proceed diligently with performance of the contract in accordance with the decision of the Contracting Officer

21. CONTRACT ADMINISTRATION:

Contracting Officer: Contracts may be entered into and signed on behalf of the District Government only by contracting officers. The contracting officer is the only District official authorized to contractually bind the District. The contracting officer is:

Courtney B. Lattimore
Contracting Officer (CO)
Department of Transportation
Office of Contracting and Procurement
55 M Street SE 7th Floor
Washington, DC 20003
Telephone number (202) 671-2270

Authorized Changes by the Contracting Officer:

A. The Contracting Officer is the only person authorized to approve changes in any of the requirements of this contract.

B. The Contractor shall not comply with any order, directive or request that changes or modifies the requirements of this contract, unless issued in writing and signed by the Contracting Officer.

C. In the event the Contractor effects any change at the discretion of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the contract price to cover any cost increase incurred as a result thereof.

D. **Contracting Officer's Technical Representative (COTR).** The COTR is:

Mr. James M. Cheeks, Jr.
Chief Traffic Engineer
Transportation Operations Administration (TOA)

55 M Street SE, Suite 600
Washington. D.C. 20003
Telephone: (202) 671-1497
Facsimile: (202) 671-1846
E-mail: James.Cheeks@dc.gov

E. The COTR will have the responsibility of ensuring that the work conforms to the requirements of this contract and such other responsibilities and authorities as may be specified in the contract. The COTR will act as the contracting officer's representative for technical matters, providing technical direction and discussion, as necessary with respect to the specifications or statement of work, and monitoring the progress and quality of the contractor's performance. Other responsibilities include the following:

(1) Keeping the CO fully informed of any technical or contractual difficulties encountered during the performance period and advising the CO of any potential problem areas under the contract;

(2) Coordinating site entry for Contractor personnel, if applicable;

(3) Reviewing and approving invoices for fixed-price deliveries to ensure receipt of goods and services. This includes the timely processing of invoices and vouchers in accordance with the District's Payment provisions; and

F. It is understood and agreed, in particular, that the COTR is not a contracting officer and does not have the authority to:

(1) Award, agree to, or sign any contract, delivery order or task order. Only the CO shall make contractual agreements, commitments, or modifications;

(2) Grant deviations from or waive any of the terms and conditions of the contract;

(3) Direct the accomplishment of effort, which is beyond the scope of the statement of work in the contract;

(4) Increase the dollar limits of the contact or authorize work beyond the dollar limit of the contract, or authorize the expenditure of funds by the Contractor;

(5) Change the period of performance; and

(6) Authorize the furnishing of District property, except as specified under the contract.

When in the opinion of the contractor, the COTR requests effort outside the existing scope of the contract, the contractor shall promptly notify the contracting officer, in writing. The contractor under such direction shall take no action until the contracting officer has issued a modification to the contract or until the issue has been otherwise resolved.

G. ORDERING AND PAYMENT

(1) The contractor shall not accept orders for items under this contract unless a purchase order has been issued. The participating agency shall be the Department of Transportation.

(2) Invoices shall be submitted in duplicate to the D.C. Department of Transportation, Office of the Chief Financial Officer, Customer Care Division, 2000 14th Street NW, Washington, DC 20009, Telephone (202) 671-2300.

(3) Each invoice must provide the following minimum information:

a. Contractor's name, address, invoice number and date.
b. Contract line item number (CLIN) being billed for payment and total amount due.

22. SCHEDULE AND RECORDKEEPING:

A. The contractor shall maintain an office within the District of Columbia staffed with an adequate number of people and equipped with sufficient office furniture, communications equipment and computer hardware and software to efficiently administer this contract. The contractor shall be required to perform, as a minimum, the following tasks in support of this contract:

(1) The contractor shall use an off the shelf software product such as "Microsoft project 2003 or the most recent version", or an approved equivalent product, to maintain accurate historical records, financial records, inventory records, and other pertinent milestones relating to all aspects of this project. A report shall be transmitted on the first workday of each month to the project manager detailing current monthly and cumulative milestones.

(2) The contractor shall provide a schedule on the final day of work of each week showing which intersections that will be scheduled for maintenance during the upcoming week for Group Re-lamping and Preventive

Maintenance Work. This schedule of work shall be transmitted to the project manager, and shall be provided not less than one hour before the end of the close-of-business (COB) on the last day of work for each week.

(3) The Contractor shall maintain voice and data communications with the project manager at all times. Web-base, telephone, facsimile machine, and e-mail accounts shall be employed. Voice communications shall be maintained at all times between the contractor and field crews.

(4) The contractor shall utilize existing electronic mail (e-mail) accounts as the primary medium for transmitting to the District of Columbia project engineer and other identified parties written data pertinent to this project. E-mail accounts shall also be used to request information or informally communicate. E-mail account numbers shall be shared at the pre-construction meeting. It is to be noted that Work Order processing shall be maintained in real-time via a web-based database connection.

(5) The Measure of Payment for the cost and expense pertaining to administrative efforts in support of this contract is to be equitably distributed in the manner prescribed herein among the bid items.

23. UTILITY PROTECTIVE ALERT:

The following amends Article 107.15 Utility Protective Alert:

The table at top of page 126 is modified as follows:

DC Water and Sewer Authority	200/673-6604 water-mains 202/727-5698 sewers
DC DDOT	202/698-3655 fire alarm and electrical system 202/698-3630 street lighting inspection 202/698-3660 traffic signal inspection 202/671-1495 CCTV camera inspections

24. SALVAGED MATERIALS:

Any salvaged materials considered by the Engineer to be useful to the District shall be delivered to a designated storage yard within the District of Columbia. All other materials shall be removed from the job site and be disposed of properly by the Contractor. No direct measure will be made for this work. Payment for this work shall be incidental to the appropriate removal pay items.

25. COORDINATION WITH POTOMAC ELECTRIC POWER COMPANY:

A. The Potomac Electric Power Company (PEPCO) will furnish power for the street lighting and traffic signal systems. All work involved with PEPCO facilities shall be performed in conformance with PEPCO requirements. All new service requirements involving PEPCO electrical system will be done by PEPCO forces.

B. It shall be the Contractor's responsibility to notify and coordinate with PEPCO throughout the course of the contract in connection with all PEPCO services and facilities during maintenance activities, such that removal and restoration of services can be done in a timely and orderly manner at all times. Maintenance or repair delays as a result of inadequate coordination shall be the Contractor's responsibility.

C. It should be noted that the D.C. Electrical System is un-fused, unprotected with no disconnecting means other than cutting the cable from the feed source. The Contractor shall be expected to perform electrical work on D.C. cables with the knowledge that the circuits are energized.

D. The Contractor shall coordinate with PEPCO for the following:

a. Payment to PEPCO for manhole entry before any entry into their manholes.
b. Payment to PEPCO for any PEPCO forces work (SLF – Work Orders)
c. To have each "PEPCO MANHOLE" inspected by PEPCO forces in the presents of the Electrical Contractor on this contract for safety, clearing of the cables racked on the walls, spotting of the wall for new conduit penetrations and the knowledge of the location of each feed manhole for the streetlights.
d. Calling PEPCO when it is necessary for PEPCO Forces to make the taps onto their Electrical System to energize the street lighting and signal systems
e. Calling PEPCO for the final inspection of their manholes after all electrical work is complete in the PEPCO manholes as called for in this contract.

E. All work performed within PEPCO facilities shall be performed in conformance with all PEPCO requirements. The Contractor shall initiate communication with PEPCO as early as possible after execution of this contract for the purpose of establishing scheduling guidelines to exchange telephone numbers between principals' points of contact and to develop a contractual relationship to facilitate payment. The PEPCO representative shall be:

Mr. Joseph D. Schall, Manager, Customer Design - DC
Potomac Electric Power Company

701 Ninth Street N.W., Room 6005
Washington, D.C. 20068
Telephone: (202) 872-2844
Facsimile: (202) 331-6234
Email: jdschall@pepco.com

26. CONTRACTOR PLAN OF OPERATION

A. A detailed plan of operation must be submitted by the contractor when contract is awarded and shall include the following:

(1) Organizational chart showing all personnel with their titles and job assignments

(2) Personnel: A listing of all persons by name who are assigned to this program along with their job assignment and title. This list will be updated monthly as need and submitted as part of the payment package.

(3) Equipment: A list of all vehicles including description, identification number and tag number, this list will be updated monthly as needed and submitted as part of the payment package.

(4) Inventory and Contractor Supplied Material: A list of all contractor-supplied material showing projected quantities by item shall be provided on a monthly basis and included with the monthly invoice for payment. All material purchased shall meet District specifications as called for in this contract. The Contractor shall maintain a current inventory of all traffic signal equipment required in these specifications with the minimum requirement as described in Appendix entitled Equipment Inventory List.

(5) Vehicle Signs: The contractor shall provide a clearly visible sign on each vehicle (Both Sides and Back) used as a part of this contract. The sign shall also show the contractor's name and the Contract number.

(6) Communications: The Contractor shall furnish install, and maintain two each, two-way cellular units, for District use, which will be stationary units with charging stands. All contractors' vehicles must be equipped with two-way cellular communications so that the contractor can stay in contact with all of his patrol and repair crews. The Contractor shall furnish the COTR with a copy of the maintenance contract and evidence of payment for the maintenance of his two-way cellular units. The cost for the two-way cellular units is to be distributed among the bid items.

(7) Reports: The Contractor shall submit traffic signal maintenance reports to the District of ongoing and completed work as required under this contract

on a daily basis. The reports shall be in real-time format using a web-based application as approved by the COTR. Reports of completed work must also be submitted as part of the Contractor's monthly request for payment. The following reports shall be submitted by the contractor to the COTR daily:

a. Intersection Maintenance Work Reports
b. Preventive Maintenance Work Reports
c. Real-time status of Completed and Incomplete Trouble Calls
d. Real-time status and location of sub-contractor activities

The following reports shall be submitted by the contractor to the COTR monthly with the contractor's request for payment:

a. Bench Repair and Equipment Test Reports for 336/336SS Cabinet Components
b. Bench Repair and Bench Test Reports for70/170E Traffic Signal Controller
c. Bench Repair and Bench Test Reports 218/225/2010 Conflict Monitor

(8) See Appendix entitled Sample Maintenance Documents for sample documents of information to be provided to the District.

B. CONTRACTOR QUALIFICATIONS

(1) This contract is responsible for ensuring the safe and proper operation of the Traffic Signal System for the City of Washington, DC. This is a large and complex system. Accordingly, all responsive bidders, as a company, must have extensive experience and qualifications in performing traffic signal maintenance and repair related work. Each bidder must have on their current payroll, a sufficient number of qualified personnel experienced in the maintenance of traffic signal and control systems.

C. CONTRACTOR EXPERIENCE

(1) Contractors shall submit with their bid, a minimum of three references demonstrating similar, in type and size, traffic signal system remedial; preventative maintenance and repair work. At least one of these references shall be from a City, County, or State agency with a traffic signal system infrastructure of at least 500 intersections where the contractor provided similar preventative and 24-hour maintenance repair services.

(2) Contractors or firms bidding for this work shall have been recently and regularly engaged in the maintenance and repair of a traffic signal system for no less than one year. The prime contractor shall be an electrical contractor licensed and bonded in the District of Columbia. Any subcontractor retained to perform electrical work shall also be licensed and bonded in the District of Columbia.

(3) Maintenance of the DC Traffic Signals System is defined as performing Response, Preventive and Repair Maintenance on all aspects of the traffic signal system infrastructure on a regularly scheduled basis and responding to and effecting repairs on all traffic signal system malfunctions on a 24-hour basis. Contractors or firms bidding for this work must demonstrate experience of a similar nature in performing 24-hour maintenance repair work on all aspects of a traffic signal system to qualify for work required by this contract.

D. CONTRACTOR QUALITY CONTROL BEST PRACTICES

(1) Traffic Signal System reliability and performance is critical to public safety. DDOT requires that the prime contractor have an established quality control process in place for Traffic Signal maintenance. The contractor's quality control and/or systems engineering processes shall be in accordance with industry standards and best practices. Either the International Standards Organization - ISO 9001 accreditation or an organization's appraisal at SEI Capability Maturity Model Integration (CMMI) – CMMI Level III is acceptable to DDOT. Submission of formal appraisals or accreditations in one of the above must be submitted with the bid package. Substitute appraisal or accreditation sources or levels must be approved by DDOT prior to bid.

(2) Contractors or firms bidding for this work must also demonstrate the capability or experience in the performance of traffic signal equipment test and repair work at the bench level on defective or malfunctioning traffic signal control electrical and electronic components removed from the field as work required by this contract.

(3) Contractors or firms bidding for this contract must have experience in traffic signal emergency maintenance; regular traffic signal system maintenance repair work and traffic signal preventive maintenance to be considered for work as required by this contract. Experience in traffic signal construction work or projects involving traffic signal design or installation work will not be acceptable.

E. CONTRACTOR EMPLOYEES

The Contractor shall employ a sufficient number of personnel competent in traffic signal systems maintenance to execute this contract.

(1) Technical Staff: The Contractor shall have on their payroll, at the time of his or her bid submission personnel that meet or exceed the following listed requirements:

a. Personnel shall be trained and certified in writing by factory schools conducted by suppliers of equipment and software as identified in this contract.

b. A level of certification that meets or exceeds the International Municipal Signal Association (IMSA) Certification Program for Traffic Signal Technician Levels II or III, such that the personnel are well rounded within the Traffic Signal Field and can isolate problems, both in the field and on the Bench and efficiently repair traffic signal control equipment. Copies of certifications shall be provided to the District with bid submission.

c. IMSA Level II Traffic Signal Technicians shall have a minimum of two years' experience in traffic signal maintenance technology in order to be accepted as qualified for work as described in this contract.

(2) All bidders shall submit with their bid the resume of their Project Manager, and Staff as necessary to meet all of the above requirements.

(3) Certification training shall be completed by the end of the second month after the Contractor becomes responsible for the maintenance of the equipment specified in the contract.

(4) Measure of Payment

The measure of payment for the cost and operation associated with the administrative cost incurred by the Contractor shall be reflected and distributed equally in the manner prescribed herein among the bid items.

The cost for certification training shall be reflected and distributed equally in the manner prescribed herein among the bid items.

F. Traffic Signal and Controller Repair Shop

(1) Contractor shall furnish all labor and material required to set up a complete traffic signal system repair shop. The repair shop shall be located within the boundaries of the District of Columbia in order to

reduce travel time for both preventive and response maintenance. The Contractor shall be subject to liquidated damages for failure to comply with this requirement on or prior to the date of notice-to-proceed.

(2) The traffic signal repair shop shall be maintained for the purpose of evaluation, testing, refurbishing, and repairing traffic signal equipment removed from service and for testing, evaluation and preparation of signal equipment to be installed or returned to service.

(3) The contractor shall submit evidence with their bid that a fully equipped and staffed signal repair shop will be available on or prior to the date of notice-to-proceed. This may be done in one of the following ways:

a. Submitting with their bid a detailed description of an existing, operating signal and controller repair facility in the District of Columbia currently operated by the contractor. Description shall include the facility itself, its location, equipment owned and in place, inventory, and staffing.

b. Submitting with their bid a detailed description of an existing facility operated by the contractor outside of the District of Columbia. Description shall include the facility itself, its location, equipment owned and in place, inventory, and staffing. The contractor shall then also submit a detailed explanation of how they will establish and staff a local facility.

(4) The District may inspect and verify all information pertaining to the Traffic Signal Repair Shop as a condition of award. Failure to provide a facility to the satisfaction of the District may reject the Contractor or bidders as non-responsive.

(5) The Measure of Payment for the cost and operation of the Signal Repair Shop is to be included in the bid items.

G. **24-Hour Operations and Call Center**

(1) The Contractor shall staff at all times a 24 hours a day/seven days a week call center, prepared to handle all calls and complaints related to traffic signal malfunctions. This call center shall be staffed with individuals that are fully versed in the environment of traffic signals operations and maintenance. They shall also have a distinct knowledge of the District's intersections and streets. The supervisory personnel shall have successfully passed IMSA Public Safety Dispatcher Level I.

(2) The Contractor's Operations/Call Center shall have the capability to contact all field personnel via two-way cellular communications.

(3) The Contractor's Operations/Call Center personnel shall use a Web-Based Traffic Signal Maintenance database as their primary means to enter and update the statuses of all maintenance and repair related activities on a real-time basis. The database shall have the capability of advising the District of the status of all traffic signal maintenance related complaints.

(4) A call forwarding or answering service is not acceptable for this program.

(5) The Contractor shall submit evidence with their bid that a fully equipped and staffed Operations/Call Center either exists or will be available on or prior to notice-to-proceed.

(6) In order to expedite the repair and the maintenance all traffic signal equipment in continuous service, the contractor shall be required to maintain and operate 24 hours daily including weekends and holidays, a sufficient number of personnel and vehicles, equipped with two-way cellular communications, to fulfill the requirements of this contract.

(7) Contractors shall possess and keep current a manual of standard operating procedures (SOP) for the maintenance and repair of traffic signal systems, related systems, and communications infrastructure on this project. This manual will be submitted for review and approval prior to award. Failure to submit an Operations Manual shall deem the Contractor as non-responsive.

H. **Documents and Records Availability**

(1) The Field Operations Division shall make available to the Contractor records, maps and files necessary to assist the contractor in performing the duties specified in this contract. Records are available in our Traffic Signal Branch Offices at the Rear of 1338 G Street, S.E. and in offices maintained at the Reeves Center at 2000 14th Street, N.W.

(2) Included in the Appendices are copies of the following documents currently used by the District's Traffic Signal Branch to document traffic signal maintenance activities

a. Daily Trouble Log
b. Preventive Maintenance Record form (2 sheets)
c. Employee Work Report (2 sheets)
d. Preventive Maintenance Record Card

(3) These documents describe the minimum acceptable level of information that must be recorded by the contractor when reporting work received,

processed and completed. Every complaint received must be recorded accurately on a form similar to a Daily Trouble Log, and each employee responding to a traffic signal complaint shall be responsible for completing an accurate work report for each complaint attended. The preventative maintenance record shall be kept prominently displayed in each controller cabinet.

(4) The Contractor shall, throughout the term of this contract, keep and maintain accurate records of all changes and repairs to all requirements of this contract, Notification as to all such changes and repairs shall be submitted to the COTR no later than one hour after the completion of work in the manner prescribed by this contract provision.

(5) In addition, summaries and other periodic reports, including but not limited to the stock inventory data, are to be submitted to the COTR at intervals and in the manner prescribed by the COTR.

(6) During the life of the contract the Engineer may require other reports to be submitted by the Contractor. The Engineer will supply the format and time when the Contractor is to submit such reports.

(7) The Measure of Payment for the cost and expense of maintaining records and preparing and submitting reports in the manner prescribed herein is to be included in the bid items.

I. Truck Equipment Requirements

(1) Each Contractor's truck used as part of this contract shall include the following equipment:

(a) Operational two-way cellular unit
(b) Vehicle warning lights
(c) Arrow message board
(d) Traffic cones
(e) Portable STOP signs
(f) Amp/Voltmeter test equipment
(g) Meg-ohmmeter (Megger)
(h) High power service light (½ mile beam)
(i) Broom and container for broken glass
(j) Safety helmets and safety vest for each crew member

(2) Failure of the Contractor to have the truck equipment requirements will result in liquidated damages being assessed.

(3) Measure of Payment

The Measure of Payment for the cost and expense of providing and maintaining truck equipment in the manner prescribed herein is to be included in the bid items.

J. **Computer Equipment Down-Time**

(1) In the event there is a computer equipment failure resulting in a loss of service of the DDOT Traffic Signal Maintenance Database (Cityworks Database), Work Orders shall be faxed or picked up daily by the Contractor at the TOA, Traffic Operations Division, 2nd Floor, 2000 14th Street N.W. and the Field Operations Division, Traffic Signal Branch, Rear 1338 G Street, SE, Room 202 or other locations as designated by the Engineer. Hard copies of all completed Work Orders shall be delivered daily by electronic means, i.e. by email or facsimile to the Engineer or other location as designated. Once the database is back on line, the contractor shall update and submit all competed work orders via his web-based database application to the DDOT Traffic Signal System Maintenance Database/Cityworks Database. Should the failure of the computer system be caused by the Contractor's failure to make monthly payments on equipment maintenance contracts, liquidated damages shall be assessed.

(2) The Measure of Payment for the cost and expense of maintaining Work Order documentation during Computer Equipment Down-Time; storing work orders, records and preparing and submitting reports in the manner prescribed herein is to be included in the bid items.

K. **Inspection and Verification**

(1) City Forces – The District will deploy Inspectors to check items reported by the Contractor as being repaired and to monitor the contractor's scheduled work.

(2) Discrepancy in Reporting – Whenever a field inspection by District forces determines that a reported traffic signal defect which the contractor reports back as being repaired have, in fact not been repaired, the work order will be reopened to the original date and liquidated damages may be assessed.

L. **Use of Other Contractors and Obligation of Contractors**

(1) The COTR may order other contractors to make a repair, and will make appropriate deductions from the contractors payments amounting to the cost of performing the necessary repairs inclusive of all administrative expenses when:

a. The contractor has failed to comply with the conditions covering Special Repairs and Emergencies;

b. The contractor has allowed any defect to continue for more than four (4) working days without completing its repair; or

c. The contractor fails to complete all work orders by the end of the contract period.

27. CONTRACTOR RESPONSE TIMES TO DISTRICT OF COLUMBIA

A. Complaint Notification

(1) The Contractor shall respond to and investigate a reported traffic signal complaint in accordance with the following schedule, except during periods of general contractor system emergencies. The times listed in the Traffic Signal Complaint Response Schedule, TABLE 1, include the initial response and investigation of the complaint. The following schedule reflects the maximum time allowed to respond to complaints. Once dispatched on the complaint, the Contractor shall remain on the complaint until the malfunction is corrected, temporary corrective action is taken, or directed to leave by the District. Problems involving equipment or material not maintained under this Contract shall be referred to the District within two (2) hours after Contractor identifies the problem.

(2) The Contractor within the times specified in TABLE 1, shall report to the site for the purpose of effecting the necessary repairs and shall not leave the site unattended until satisfactory repairs are completed. Upon completion of any repair, the Contractor shall ensure that the controller is operating in accordance with the intersection plans. Failure to do so shall be considered an improper repair and shall be subject to liquidated damages.

(3) During initial response to investigate a reported traffic complaint and it is discovered that there is no PEPCO service/power, the contractor shall immediately take the necessary steps to install an emergency backup generator at intersections where the controller cabinet is retrofitted for such equipment. The contractor shall monitor and maintain the emergency backup generator until PEPCO has restored regular power to the traffic signal.

(4) Measure of Payment:

The unit of measure to Respond and Investigate Traffic Signal Complaints will be in accordance with the contract line item number (CLIN)

Cost for Response and to Investigate Traffic Signal Complaints Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

B. **TRAFFIC SIGNAL COMPLAINTS**

Description of Work

(1) The DDOT, TOA receives numerous traffic and pedestrian signal complaints from the police, general public and other parties and is required to respond to all complaints.

(2) The contractor shall respond to traffic signal complaint upon notification by the District. The Contractor shall dispatch qualified personnel to the location within an agreed upon time identify the problem and take necessary action.

(3) The contractor shall be on call twenty-four (24) hours a day, seven days a week, including holidays, to perform traffic signal repairs.

(4) The contractor shall respond to Traffic signal Complaints as follows:

a. Weekdays between 6:00 AM and 7:00 PM, Monday through Friday: Contactor shall respond within one (1) hour.
b. All other times in accordance with the Traffic Signal System Complaint Response Schedule, Table 1.

(5) Emergency or dangerous situations: When contractor is notified of emergency or other dangerous situation, the contractor shall respond immediately. The contractor shall dispatch qualified personal to the site to take all necessary actions.

(6) The contractor shall reach the site within the time stated above to perform necessary repairs and shall not leave the site until all repairs are completed.

(7). The contractor shall maintain records of all traffic signal repairs and shall submit to the District weekly reports of all repairs, indicating the nature

and cause of the problem, materials used and any other pertinent information.

(8) All emergency work required to be performed by the contractor shall be approved by the District.

(9) The contractor shall furnish all labor, material and equipment necessary to investigate and remedy all traffic signal and pedestrian signal complaints at no additional cost to the District.

(10) IMPORTANT! All 1070/170E controller repairs shall be performed by the contractor at the bench level and the appropriate controller tests shall be performed on each unit before it is returned to service. At no time shall the District permit a 1070/170E controller repair to be performed in the field. Each failed unit shall be removed from the field and returned to the bench for the appropriate repairs. The contractor shall maintain records on all 1070/170E controllers repaired and submit a report to the District with each monthly invoice. The report shall include the following:

a. Serial number of controller
b. Nomenclature of components used
c. Part number of components used
d. Date and time repaired
e. Copy of tests performed
f. Technician performing repairs

(11) The contractor within the times specified below, shall upon notification that illuminated traffic control devices, controllers, detectors, sensors, or their respective supports have been damaged, are defective, inoperative, or out of time, shall report to the site thereof for the purpose of making the necessary repairs and shall not leave the site unattended until satisfactory repairs are completed.

(12) The times in which the Contractor shall be directed to report to the site are as authorized by the Engineer, as per the following table:

TRAFFIC SIGNAL SYSTEM COMPLAINT RESPONSE SCHEDULE
TABLE 1

TRAFFIC SIGNAL POLES

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
DOWN	X	X		
LOOSE	X	X		
LEANING	X	X		
POST DAMAGED	X			X
TEMP POST DOWN/DAMAGED	X	X		
BASE DOOR MISSING/DAMAGED				X

TRAFFIC CABLES AND CONDUIT

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
OPEN, SHORTED, GROUNDED, CUT OR DAMAGED CONDUCTORS OR CABLE	X	X		
CABLE EXPOSED IN BASE OF POLE				X
HANGING CABLE W/EXPOSED CONDUCTORS	X	X		
CONDUIT ON STRUCTURE DAMAGED	X	X		
MESSENGER CABLE DEFECTIVE	X	X		
BRACKETS LOOSE OR DAMAGED	X	X		
HANGERS LOOSE OR DAMAGED	X	X		

VEHICLE SIGNALS

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
ALL OUT (One or more heads out)	X	X		
ALL SIGNALS STUCK (NOT CYCLING)	X	X		
HEAD TURNED/TWISTED (Out of Alignment)	X	X		
CONFLICTING SIGNALS	X	X		
HEAD DAMAGED	X	X		
LENS MISSING/CRACKED	X	X		
VISOR MISSING/DAMAGED	X			X
SIGNAL SECTION DOOR OPEN	X	X		
LAMP OR LED MODULE OUT	X	X		
SIGNALS FLASHING	X	X		
FAULTY FLASHER	X	X		

PEDESTRIAN SIGNALS

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
LAMP or LED OUT	X	X		
ALL OUT (One or more heads out)	X	X		
Pedestrian Signals NOT Cycling	X	X		
LOOSE or out of Alignment	X	X		
DAMAGED or DEFECTIVE LENS	X	X		
MISSING OR DAMAGED VISORS	X			X
FAULTY FLASHER	X	X		

TRAFFIC SIGNAL CONTROLLERS

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
TIMING and COORDINATION	X	X		
LOOSE OR DAMAGED CONTROLLER BOX	X	X		
OUT OF SEQUENCE	X	X		
CONTROLLER DOOR OPEN	X	X		
FAULTY FLASHER	X	X		
PUSH BUTTON INOPERATIVE			X	
FAULTY OR INOPERATIVE LOCK	X	X		

DETECTORS AND SENSORS (ALL TYPES)

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
DETECTOR HEAD LOOSE	X	X		
HEAD DAMAGED	X	X		
NOT OPERATING	X	X		
STEADY CALL	X	X		
NO CALL	X	X		
DEFECTIVE AMPLIFIER	X	X		
DEFECTIVE LOOP	X	X		
DAMAGED LOOP	X	X		
DAMAGED OR DEFECTIVE PUSH BUTTON	X	X		

LANE CONTROL SIGNS

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
NO DISPLAY	X	X		
LAMP OUT	X	X		
LOOSE OR DAMAGED FIXTURE	X	X		

CCTV TRAFFIC CAMERA

	WITHIN 1 HOUR Mon – Fri 6 AM – 12 AM	WITHIN 2 HOURS All other times	WITHIN 12 HOURS All other times	WITHIN 24 HOURS All other times
NO CAMERA OPERATION				X
DEFECTIVE OR DAMAGED CAMERA				X

28. <u>CONDITIONS BEYOND CONTROL OF THE CONTRACTOR</u>

A. Due allowance will be made to the contractor for time lost because of the following:

(1) Acts of God-Should an Act of God prevent the contractor form performing timely maintenance under the terms and conditions of this contract, additional time will be granted at the discretion of the Contractor Administrator to make the repairs without assessment of damages provided an extension of time is requested the following business day.

(2) Inclement Weather - When weather conditions are such that roadways and alleyways become impassable, the COTR may allow a grace period for work orders provided an extension of time is requested the following business day.

(3) Unavoidable Obstructions - When unavoidable obstructions are such that work site becomes inaccessible, such as but not limited to, road, bridge, Metro or building construction, abandoned vehicles and trash, or disruption caused by civil incidents, the COTR may allow a grace period for the work orders, provided an extension of time is requested the next business day and verification is made by the COTR

(4) Vandalism – As a result of repeated repairs at a location, documented by

the Contractor with the COTR, allowances may be made for repairs not made within the prescribed time.

29. APPROVALS OF MATERIALS AND EQUIPMENT

A. Quality of Material - All materials, supplies and equipment to be furnished under this contract by the contractor shall be new, high quality and have best workmanship and design.

B. Approval of technical data and samples shall be reviewed and approved in writing by the COTR before the contractor proceeds with the purchase of these items. The contractor shall submit three (3) copies of all technical data and one (1) sample for approval. The COTR will return one (1) copy of the technical data approved. The sample will be retained by the Engineer and will be returned to the contractor at the end of the contract.

30. SUMMARY OF LIQUIDATED DAMAGES

A. Failure to meet the requirement specification of this contract for the offense noted below will result in the appropriate liquidated damage cost deducted from the monthly payment.

B. The COTR will prepare a list of proposed liquidated damages each month for review by the contractor. The COTR will consider an explanation for each item before the list is completed. Failure to complete all requirements of the contract by the end of the contract year will result in the delay of the final payment until all such work has been completed.

Liquidated Damages

30.3 FAILURE TO COMPLETE ON TIME:

For each calendar day that contract work or main part thereof remains incomplete after expiration of the specified construction completion time, the sum of **$1,100.00/day** has been set by the Contracting Officer as liquidated damages from any money due the Contractor. The Contractor's operation after expiration of construction completion time as extended will in no way waive the District's rights under the contract.

The Contracting Officer, in his/her discretion, can assess up to $100 per day for the Contractor’s failure to meet the requirements and schedules set forth in this contract.

31. HANDLING OF EQUIPMENT AND SUPPLIES

District Owned Equipment*:* Any District owned equipment that the contractor may pick up from the Department of Transportation warehouse shall be stored according to manufacturer's specifications. The contractor shall give an accounting off all material picked up, installed by giving work order number and all material returned. This accounting must be submitted with the contractor's monthly invoice. All equipment not accounted for or damaged will be replaced in kind by the Contractor.

32. PAYMENTS

Monthly payments will be based on the quantity of work performed for each item during the previous month, less any Liquidated Damages the COTR may levy on the contractor. For "Lump Sum (LS)" Pay Items, monthly payment will be based on 1/12 of the bid price for each pay item.

33. COSTS FOR THE OPTION YEAR

The prices quoted in the schedule of price shall remain firm for the first year of the contract. Should the District exercise the optional years of this contract, payment for the contract bid items will be based on the contractors bid prices for that option year.

34. PRE-EXISTING CODE VIOLATIONS

The District will accept any and all code violation liability that is of a pre-existing nature. However, if the contractor finds any of the below listed violations, his responsibility will be to notify the COTR of the following:

A. The nature of the violation

B. The location of the equipment, i.e., traffic signal pole, combination pole, cabinets, etc.

C. The time and day the violation was discovered

D. The Work Order Number if the contractor was working on it when the violation was discovered

35. LIST OF VIOLATIONS TO BE REPORTED

A. Metal doors not grounded properly.

B. Metal arms on wood poles not grounded properly.

C. Traffic controller cabinets and termination cabinets not grounded properly

D. Any other violations the contractor finds other than the one's listed above do not need to be reported

E. Pre-existing code violations that are known to be system-wide by the COTR which shall not be reported when found are:

F. Bare neutral conductors

G. Missing transformer base doors

H. It will be the responsibility and liability of the contractor to install all new work under this contract according to the code in force at the time the contract is awarded and the specification of the contract.

36. WORKMANSHIP

All work performed by the contractor will be inspected by the COTR or his authorized representative, who will require the contractor to correct defective workmanship, without any additional cost to the District. The contractor shall perform all work to a high degree of workmanship. During inspection, should it be found that exposed work is sub-standard; the burden of proof that the concealed work is up to the required standard is upon the contractor. The contractor may be required to do whatever is necessary, including exposing the concealed work, to clearly establish that the installation meets the specifications. All work that the contractor performs to prove that the work meets specification will be at no additional cost to the District.

37. WARRANTY

A. The Contractor warrants that the material furnished by the contractor will be free from all defects whatsoever and agrees that for a period of one (1) year, unless otherwise mentioned in the Specifications for this product, from date of acceptance by the District of Columbia, any repairs, replacements or adjustments made necessary because of such defects will be made promptly by the contractor without cost to and to the satisfaction of the District of Columbia. This warranty shall not operate to defeat the purpose of page 1, paragraph 7, Standard Contract Provisions nor shall it act to void longer guarantees by the manufacturer of the material/equipment of its components.

B. All work will be performed under the 2008 Edition of the National Electrical Code and the 2005 supplement to the District of Columbia Electrical Code. The COTR will give the contractor written notice of any defects or variances in the work per formed. The contractor will have two (2) working days after receiving the notice to bring the work into compliance.

38. INJURY TO PROPERTY

A. In the case of any direct or indirect damage to public or private property by or because of the work, or in consequence of any act or omission on the part of the contractor, his employees or agents, the contractor shall, at his own experience, restore such property to a condition similar or equal to that existing before such damage was done. The contractor shall repair rebuild, or otherwise restore, as may be required by the COTR, or shall make good such damage in a satisfactory manner. In case of failure on the part of the contractor to promptly restore or make good such damage, the COTR may upon 48 hours written notice, proceed to repair, rebuild restore or make good such damage, or otherwise restore such property as may be necessary, and the cost thereof will be deducted from any monies due the contractor a sum sufficient, in the judgment of the COTR, to reimburse the owners of the property so damaged.

B. Decision and Explanations by the COTR

The COTR shall decide any and all questions which may arise as to the quality and acceptability of materials furnished and work performed and to the manner of performance and rate of progress of the work and shall decide all questions which may arise as to the interpretations of the drawings and specifications, and all questions as to the acceptable fulfillment of the contract on the part of the contractor; and the COTR shall determine the amount of monies due the contractor. The decision of the COTR will be final.

39. AVAILABILITY OF FUNDS

In the event that the District has to make payment under the terms of this contract, the payment will not entail expenditures that exceed appropriations available at the time of payment. Based upon this, the District Government's obligation hereunder is contingent upon the availability of funds from which payment can be made. In the event funds are not available, the contract will not be awarded, and all subsequent option years may not be exercised.

40. INSURANCE

A. GENERAL REQUIREMENTS. The Contractor shall procure and maintain, during the entire period of performance under this contract, the types of insurance specified below. The Contractor shall have its insurance broker or insurance company submit a Certificate of Insurance to the CO giving evidence of the required coverage prior to commencing performance under this contract. In no event shall any work be performed until the required Certificates of Insurance signed by an authorized representative of the insurer(s) have been provided to, and accepted by, the CO. All insurance shall be written with financially responsible companies authorized to do business in the District of Columbia or in

the jurisdiction where the work is to be performed and have an A.M. Best Company rating of A-VIII or higher. The Contractor shall require all of its subcontractors to carry the same insurance required herein. The Contractor shall ensure that all policies provide that the CO shall be given thirty (30) days prior written notice in the event the stated limit in the declarations page of the policy is reduced via endorsement or the policy is canceled prior to the expiration date shown on the certificate. The Contractor shall provide the CO with ten (10) days prior written notice in the event of non-payment of premium.

1. Commercial General Liability Insurance. The Contractor shall provide evidence satisfactory to the CO with respect to the services performed that it carries $1,000,000 per occurrence limits; $2,000,000 aggregate; Bodily Injury and Property Damage including, but not limited to: premises-operations; broad form property damage; Products and Completed Operations; Personal and Advertising Injury; contractual liability and independent contractors. The policy coverage shall include the District of Columbia as an additional insured, shall be primary and non-contributory with any other insurance maintained by the District of Columbia, and shall contain a waiver of subrogation. The Contractor shall maintain Completed Operations coverage for five (5) years following final acceptance of the work performed under this contract.

2. Automobile Liability Insurance. The Contractor shall provide automobile liability insurance to cover all owned, hired or non-owned motor vehicles used in conjunction with the performance of this contract. The policy shall provide a $1,000,000 per occurrence combined single limit for bodily injury and property damage.

3. Workers' Compensation Insurance. The Contractor shall provide Workers' Compensation insurance in accordance with the statutory mandates of the District of Columbia or the jurisdiction in which the contract is performed.

   Employer's Liability Insurance. The Contractor shall provide employer's liability insurance as follows: $500,000 per accident for injury; $500,000 per employee for disease; and $500,000 for policy disease limit.

4. Umbrella or Excess Liability Insurance. The Contractor shall provide umbrella or excess liability (which is excess over employer's liability, general liability, and automobile liability) insurance as follows: $10,000,000 per occurrence, including the District of Columbia as additional insured.

B. DURATION. The Contractor shall carry all required insurance until all contract work is accepted by the District, and shall carry the required General Liability; any required Professional Liability; and any required Employment Practices

Liability insurance for five (5) years following final acceptance of the work performed under this contract.

C. LIABILITY. These are the required minimum insurance requirements established by the District of Columbia. **HOWEVER, THE REQUIRED MINIMUM INSURANCE REQUIREMENTS PROVIDED ABOVE WILL NOT IN ANY WAY LIMIT THE CONTRACTOR'S LIABILITY UNDER THIS CONTRACT.**

D. CONTRACTOR'S PROPERTY. Contractor and subcontractors are solely responsible for any loss or damage to their personal property, including but not limited to tools and equipment, scaffolding and temporary structures, rented machinery, or owned and leased equipment. A waiver of subrogation shall apply in favor of the District of Columbia.

E. MEASURE OF PAYMENT. The District shall not make any separate measure or payment for the cost of insurance and bonds. The Contractor shall include all of the costs of insurance and bonds in the contract price.

F. NOTIFICATION. The Contractor shall immediately provide the CO with written notice in the event that its insurance coverage has or will be substantially changed, canceled or not renewed, and provide an updated certificate of insurance to the CO.

G. CERTIFICATES OF INSURANCE. The Contractor shall submit certificates of insurance giving evidence of the required coverage as specified in this section prior to commencing work. Evidence of insurance shall be submitted to:

Courtney B. Lattimore
Contracting Officer
55 M Street SE 7th Floor
Washington DC 20003
202/671-2270-Phone; 202/671-1370-Fax

H. DISCLOSURE OF INFORMATION. The Contractor agrees that the District may disclose the name and contact information of its insurers to any third party which presents a claim against the District for any damages or claims resulting from or arising out of work performed by the Contractor, its agents, employees, servants or subcontractors in the performance of this contract.

41. ANTI-TRUST LAWS

For good cause and as partial consideration for executing this contract, the Contractor, acting by and through its duly authorized agent, hereby conveys, sells and assigns and transfers to the District of Columbia all rights, titles and interest in and to all causes of action it now holds or hereafter may acquire under anti-trust laws of the United States, the District of Columbia or any a state or territory relating to the particular goods, material or services purchase in connection with this contract.

42. STANDARDS FOR RESPONSIBLE CONTRACTORS

The prospective contractor must demonstrate to the satisfaction of the district the capability in all respects to perform fully the contract requirements, therefore, the prospective contractor will be required to submit the documentation requested in General Responsibility Criteria listed below within 10 days of the actual request;

43. GENERAL RESPONSIBILITY CRITERIA

A. Furnish evidence of adequate financial resources, credit, or the ability to obtain such resources required for performance of the contract.
B. Furnish evidence of ability to comply with the required performance schedule, taking into consideration all existing commercial and governmental business commitments;
C. Furnish evidence of the necessary organization experience, accounting and operational controls, and technical skills, or the ability to obtain them.
D. Furnish evidence of compliance with the applicable District licensing, tax laws and regulation;
E. Other information as may be needed by the District to make a determination as to the prospective contractor's responsibility
F. Furnish listing of similar contracts within the last two years (2), specifically setting forth the nature and extent, tasks,

44. DELIVERY OF INVOICES, PURCHASING DOCUMENTS, DBE DOCUMENTS, DAVIS-BACON DOCUMENTS, SUBMITTALS, etc.

A. All Documents shall be hand delivered and date and time stamped. Changes and Modifications must be completed in an expeditious manner and returned to be re stamped. No invoices should be sent directly to the Account Payable Department.

45. WEB-BASED APPLICATION REQUIREMENTS

Web-based Application Specifications

A. The Contractor shall implement a web-based database application and make available the required structure to communicate with the DDOT Cityworks Work Order Database, when available, in such a way as to receive reports of

malfunctioning traffic signals in real-time format from DDOT via electronics means in the form of a Work Order as approved by the COTR or his or her designated representatives.

B. Following the completion of each Work Order, repair or maintenance activity, the Contractor shall update the DDOT Cityworks Work Order Database via electronic means in real-time format on the status of each work order with the appropriate data as required in the reporting procedures that is outlined in S.P. 26 of these Specifications and as described below. The Web-based Application shall be applicable for the Base Year of this contract and all Option Years.

C. The Contractor shall implement or place in service a web-based application that provides real-time information and updates of all maintenance activities on a 24-hour a day, seven days per week basis and provide access to DDOT designated personnel as necessary to determine the status of each trouble call or traffic signal complaint. In addition, provisions shall be made where the COTR or his designated representatives can access the Contractors database to view and track work order progress and status using a web-based interface.

D. The contractor shall submit evidence with their bid that a fully operational web-based database application will be available on or prior to the date of notice-to-proceed and shall be provided throughout the term of the contract.

46. TRAFFIC SIGNAL MAINTENANCE OPERATIONS SUPPORT SOFTWARE – SOFTWARE SPEFICIFATIONS

A. INTRODUCTION

The following outlines the guidelines for a web-based enterprise platform for managing work orders, work requests, installed assets and spare parts in real-time. The web-based application shall be able to interface with the DDOT's City Works utilizing the latest secure data exchange protocols. The goal of the web-based application shall be to augment the existing processes of issuing Work Orders in real-time to the maintenance contractor, to provide assistance to DDOT traffic engineers by maintaining records in its maintenance database on the performance and inventory of traffic signal system equipment, and to assist in the management and reporting of daily functions on a real-time web enabled interface with regards to traffic signal system construction projects and maintenance activities.

B. Assets and Preventive Maintenance

The system shall track each asset installed at the intersections in a comprehensive view. Assets shall be listed in a hierarchy system based on location and parent-child relationship. The system shall track labor, material, maintenance and service on any asset. Technicians shall log their work hours, travel time, material, and

equipment directly to the work tickets. The system shall have highly customizable electronic preventive maintenance forms, procedures and tasks to fully represent maintenance procedures, allowing technicians to do their preventive maintenance work on-line. The system shall provide a visual tool to specify reference intersections and installed assets on a GIS enabled online map.

C. Intuitive Interface

The system shall provide for intuitive software menus for easy navigation in the application. Through the use of access level authorizations, the system administrator shall be able to designate which functions will be enabled for a particular user or organization.

D. FUNCTIONAL REQUIREMENTS

(1) Assets Management

The system shall allow DDOT to manage both installed inventory in field and spare parts inventory in DDOT and contractor warehouses. Field assets and spare parts which will include traffic signal controller equipment and predefined components, traffic signal poles and traffic and pedestrian signals shall be tracked with a unique identifier (barcode) which is compatible with DDOT's current bar-coding schema and requirements.

(2) Installed assets shall be viewable in a tree structure based on intersection location and parent-child relationships. The system shall be able to track the following asset details/properties:

a. Name/ID
b. Barcode/Unique identifier
c. Location
d. Serial Number
e. Vendor
f. Model #
g. Part#
h. Asset Type
i. Criticality
j. Description
k. Install date
l. Acquisition date
m. Warranty details
n. Latitude/Longitude

(3) The Maintenance Contractor shall perform labeling and bar-coding of traffic signal equipment installed and removed from the field. The approved barcode system must be implemented by the contractor.

(4) The Contractor shall report all equipment removed and installed or reinstalled via the web-based enabled database interface to the DDOT Traffic Signal System Maintenance Database Asset Inventory Record upon each occurrence. Data corresponding to each equipment item must be recorded, capable of multiple entries, and accessible in the database system.

Information to be logged shall include receive date, manufacturer, nomenclature, model #, serial #, cat./part #, location, and status.

(5) Device Application Requirements:

The Barcode Inventory Scanner Application shall be capable-of-synchronization with the Web enabled DDOT Traffic Signal System Maintenance Database System at regular daily intervals. There shall be two modules of application to facilitate barcode data collecting and synchronization with the web based database system, namely the Barcode Scanner Data Collecting and the Downloading Data to PC (Database) from Barcode Scanners. Barcode Scanner Data Collecting shall define inventory-status as required in the five described system functions:

a. RECEIVE - describes equipment designated by Department of Transportation (DDOT) for tracking
b. REMOVE- describes equipment taken from warehouse/stock area
c. INSTALL - describes equipment placed in the field cabinets
d. REMOVE-2 - describes equipment taken from the field cabinet
e. RETURN – describes equipment returned to warehouse/stock area

Downloading Data to PC (Database) from Barcode Scanners shall be utilized daily in the following manner:

f. Docking to station for data downloads into PC performed as required.
g. Uploading data to inventory component of web based database for synchronization of inventory tracking.

(6) Database Synchronization and Inventory Status Requirements:

The database shall enable authorized users to view items categorized as Traffic Control Cabinets and all interchangeable internal component devices (bench repairable or otherwise) per DDOT specification.

It shall include the following minimum status information:

a. Received quantity in stock; an aggregate count physically stored in warehouse.
b. Parts removed from warehouse, returned to warehouse, installed in field and removed from field.
c. Repairable items status: awaiting repair, repaired, and un-repairable with date/time stamp and comments input as necessary pertaining to action.
d. Work orders shall reference relevant inventory data as outlined by specifications pertaining to database formatting and also meet basic installed miscellaneous materials documentation requirements such as light bulb quantities, etc.

E. Internal Work Requests

(1) The system shall have the capability to allow all authorized users the ability to generate work request to the DDOT system administrator. The system shall provide the ability to generate work request numbers chronologically and indexed from the previous number. The system shall also have the capability to prefix each work request number with three alphabetic characters that correspond to the organization that generated the work request. All work requests generated by corresponding DDOT agencies and submitted to the system administrator shall provide the following information at a minimum:

a. Work Request Number
b. Shop Order Number
c. Intersection Location
d. Intersection ACISA
e. Intersection Ward
f. Intersection's Traffic Sequence Number
g. Work Request Date
h. Name and Telephone of Requester
I. Email address of Requester (optional)
J. Signal Numbers (if applicable)
k. Type of Work Requested or Indicated Trouble.
1. Additional Instructions or Comments.

2. The system shall be able to generate work orders for all other contractors associated with DDOT, which are submitted to the system administrator shall provide the following information at a minimum:

a. Contractor's name

b. Contractor's telephone and facsimile number
c. Contractor's Email address
d. Contract number and type
e. Description of work to be performed
f. Intersection location
g. Intersection's Traffic Sequence Number,
h. Intersection's drawing number
i. Project Manager's name, telephone number and Email address

3. The system shall alert the DDOT and contractor system administrators via a pop-up window for all new work requests. The DDOT system administrator, after receiving the work request from the requesting party, shall have the ability to either reject or approve the work requests via selectable icon buttons. An approved work request shall automatically generate a DDOT work order and send a pop-up alert to the original work requester with the following details:

a. New DDOT Work Order Number
b. Party Responsible
c. Date and Time the work order was assigned.

4. A disapproved work request shall send a pop-up alert to the original work requester with the following details:

a. Date and time work request was processed
b. Comments describing the reason for the disapproval

5. The system shall provide the DDOT system administrator the ability to narrow certain organizations access to send work requests directly to the maintenance contractor. When this feature is enabled, the system shall prefix all work requests with the three alphabetic characters that designate the corresponding agency that sent the request. In this mode all work request will be automatically tracked as work orders.

F. Trouble Work Orders

(1) The system shall provide the DDOT system administrator the capability to generate work orders to the maintenance contractor and DDOT forces independent of any work requests. Via selectable icon buttons, the system shall allow the DDOT system administrator the ability to assign either DDOT forces or its maintenance contractor as the responsible organization. All work orders generated by the DDOT system administrator and designated for maintenance contractor shall have the alphabetic characters "DDOT" automatically prefixed to the work order number.

(2) The system shall provide the capability to generate work order numbers chronologically and indexed from the previous number. All work orders designated for the maintenance contractor shall provide the following information at a minimum:

a. Work Order Number
b. ACISA Number
c. Intersection Location and Ward Number
d. Device ID, description and other device details
e. Work order date
f. Signal position at intersection
g. Direction of travel that the signal controls
h. Additional DDOT Instructions
i. Indicated Trouble
j. Caller, Organization Name, and Phone Number

(3) All work orders designated for the maintenance contractor shall automatically send an "always on" pop-up alert to the maintenance contractor's dispatch center with the following information:

a. Work Order Number
b. Date and Time work order was sent

(4) The system shall have the capability to track all work orders issued to the maintenance contractor. All work orders shall fall into one of the three listed categories:

a. Active Work Orders
b. Open Work Orders
c. Completed Work Orders

(5) The system shall designate all new work orders as active until they are acknowledge by the maintenance contractor. Upon acknowledgement, the systems shall use the System Server's time-of-day *(TOD)* as the received time for dispatch acknowledgement and provide the maintenance contractor, via a user-definable pick list, with dialog boxes so as to indicate the dispatcher whom acknowledged the work order and their designated work shift.

(6) The system shall also provide the maintenance contractor the ability to change the work order's status from active to open or from open to close. All work orders shall give the maintenance contractor the capability to provide the following information at a minimum:

a. Dispatched Time
b. Time of arrival at the intersection
c. Comment field to indicate the operation of the intersection upon arrival:
d. Comment field to indicate all repairs or action taken by the responding technician
e. Clear time or time of departure
f. Operation of the intersection upon departure
g. Employee # or reference code for the technician responding to the work order
h. The number of the vehicle used
i. The actual signal numbers affected and or repaired.
j. Resolution of work order

(7) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information that's entailed in the original work order.

(8) The system shall provide, via selectable icon button, a notification feature that allows the maintenance contractor to indicate when they have notified outside agencies of problems outside their responsibility or scope of work i.e. PEPCO, MPD or TSMB. Integral to each work order, the system shall have the following user-friendly features:

a. Hypertext four digit ACISA (Assigned Computer ID for Street Address) numbers, that upon selection shall provide all authorized user levels the ability to view the complete history of all maintenance, repair and construction activities associated with the selected intersection, all internal and approved work requests through higher level of authorization, and all inventory and bar-coding information appropriate.
b. Via selectable icon buttons, navigational tools that allow all authorized user levels the ability to traverse the database either one record at a time forward and backward, or from the first record to the last record by using home and end buttons.
c. Quick search functions to retrieve work records by location parameters, performance or completion date, type of trouble, and categorized status.

G. Preventive Maintenance Work Orders

(1) The system shall provide the system administrator and authorized users the capability to generate work order schedules in the performance of

annual contract Preventive Maintenance activity. Via selectable icon buttons, the system shall allow the authorized user the ability to schedule and adjust the annual Preventive Maintenance scheduling as necessary due to weather related or other unforeseeable conditions. All Preventive Maintenance Work Orders generated within the system shall have the alphabetic character "PM" automatically prefixed to the work order followed by the 2 digit year number and lastly the location 4 digit ACISA ID # such as by example: PM081261. All work orders generated within the system shall have the capability to create follow-up records for the original associated work order.

(2) The system shall provide the capability to generate new work orders by system administrator for new locations as deemed necessary. All work orders designated for Preventive Maintenance activities shall provide the following critical information at a minimum:

a. Work Order Number
b. ACISA Number
c. Intersection Location and ward number
d. Schedule & completion date
e. Comments box for activity documentation
f. Access to follow-up records

(3) All work orders designated for Preventive Maintenance by contractor shall automatically display a pop-up alert of the scheduled activity with function control capable of adjustment by user selection.

(4) The system shall have the capability to track all work orders under varying levels of performance by the maintenance contractor to properly verify field activities in real time as much as possible by the District.
The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information required in the original work order.

(5) All work orders shall fall into one of the three listed categories:

a. Active Work Orders
b. Open Work Orders
c. Completed Work Orders

(6) The system shall classify newly scheduled work orders by schedule date, and work orders in progress shall display all relevant details.

(7) The system shall also provide the maintenance contractor the ability to change the work order's status from active to open or from open to close. All work orders shall additionally provide the following general information at a minimum:

a. Dispatched Time
b. Time of arrival at the intersection
c. Comment field to indicate all repairs or action taken by the responding technician
d. Clear time or time of departure
e. Operation of the intersection upon departure
f. Employee # or reference code for the technician responding to the work order
g. The number of the vehicle used
h. The quantity and types of lamps installed

(8) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information that's entailed in the original work order.

(9) The system shall provide, via selectable icon button, a notification-feature that allows the maintenance contractor to indicate when they have notified outside agencies of problems outside their responsibility or scope of work i.e. PEPCO, MPD or TSMB. Integral to each work order, the system shall have the following user-friendly features:

a. Hypertext four digit ACISA (Assigned Computer ID for Street Address) numbers, that upon selection shall provide all authorized user levels the ability to view the complete history of all maintenance, repair and construction activities associated with the selected intersection, all internal and approved work requests through higher level of authorization, and all inventory and bar-coding information appropriate.
b. Via selectable icon buttons, navigational tools that allow all authorized user levels the ability to traverse the database either one record at a time forward and backward, or from the first record to the last record by using home and end buttons.
c. Quick search functions to retrieve work records by location parameters, performance or completion date, type of trouble, and categorized status.

H. School Flashers Work Orders

(1) The system shall provide the DDOT system administrator and authorized users the capability to generate work order schedules in the performance of annual contract School Flasher Re-lamping work activity.

(2) Via selectable icon buttons, the system shall allow the authorized user the ability to schedule and adjust the annual Re-lamping scheduling as necessary due to weather related or other unforeseeable conditions. All School Flasher Re-lamping work orders generated within the system shall have the alphabetic characters "SF' automatically prefixed to the work order followed by the two digit year number and lastly the city designated location and associated identification provided to contractor.

(3) All work orders generated within the system shall have the capability to create follow-up records for the original associated work order. The system shall provide the capability to generate new work orders by DDOT system administrator for new locations as deemed necessary. All work orders designated for re-lamping activities shall provide the following critical information at a minimum:

a. Work Order Number
b. School Flasher Number
c. School Flasher Location
d. Schedule & completion date
e. Comments box for activity documentation
f. Access to follow-up records

(4) All work orders designated for re-lamping by contractor shall automatically display a pop-up alert of scheduled activity with function control capable of adjustment by user selection.

(5) The system shall have the capability to track all work orders under varying levels of performance by the maintenance contractor to properly verify field activities in real-time as much as possible by the District:

(6) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information required in the original work order.

(7) All work orders shall fall into one of the three listed categories:

a. Active Work Orders
b. Open Work Orders
c. Completed Work Orders

(8) The system shall classify newly scheduled work orders by schedule date, and work orders in progress shall display all relevant details when in the open work order status. The system shall also provide the maintenance contractor the ability to change the work order's status from, active to open or from open to close. All work orders shall additionally provide the following general information at a minimum:

a. Dispatched time
b. Time of arrival at location
c. Comment field to document work performed by technician
d. Clear time or time of departure
e. Operation of the intersection upon departure
f. Employee # or reference code for the technician responding to the work order
g. The number of the vehicle used

(9) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information that's entailed in the original work order.

(10) The system shall provide, via selectable icon button, a notification feature that allows the maintenance contractor to indicate when they have notified outside agencies of problems outside their responsibility or scope of work i.e. PEPCO, MPD or TSMB. Integral to each work order, the system shall have the following user-friendly features:

a. Hypertext ACISA (Assigned Computer ID for Street Address) numbers, that upon selection shall provide all authorized user levels the ability to view the complete history of all maintenance, repair and construction activities associated with the selected intersection, all internal and approved work requests through higher authorization, and all inventory and bar-coding information as appropriate.
b. Via selectable icon buttons, navigational tools that allow all authorized user levels the ability to traverse the database either one record at a time, forward and backward, or from the first record to the last record by using home and end buttons.
c. Quick search functions to retrieve work records by location parameters, performance or completion date, type of trouble, and categorized status.

I. Fiber-Optic Re-lamping Work Orders

(1) The system shall provide the DDOT system administrator and authorized users the capability to generate work order schedules in the performance of Re-lamping Fiber-Optic Signal Lamps semi- annually, as per contract stipulation.

(2) Via selectable icon buttons, the system shall allow the authorized user the ability to schedule and adjust the semi-annual Fiber-Optic Re-lamping schedule as necessary due to weather related or other unforeseeable conditions. All Fiber-Optic Re-lamping work orders generated within the system shall have the alphabetic characters FO automatically prefixed to the work order, followed by the 2 digit year number, the associated four digit ACISA number and lastly the alphabetic character "A" or "B" to denote each specific semi-annual re-lamping record. All work orders generated within the system shall have the capability to create follow-up records for the original associated work order. The system shall provide the capability to generate new work orders by the system administrator for new locations as deemed necessary.

(3) All work orders designated for re-lamping activities shall provide for the following critical information at the minimum:

a. Work Order Number
b. School Flasher Number
c. School Flasher Location
d. Schedule & completion date
e. Comments box for activity documentation
f. Access to follow-up records

(4) All work orders designated for re-lamping by contractor shall automatically display a pop-up alert, of scheduled activity with function control capable of adjustment by user selection.

(5) The system shall have the capability to track all work orders for varying levels of performance by the maintenance contractor to properly verify field activities in real-time as much as possible by the District.

(6) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information required in the original work order.

(7) All work orders shall fall into one of the three listed categories:

a. Active Work Orders
b. Open Work Orders
c. Completed Work Orders

(8) The system shall classify newly scheduled work orders by schedule date, and work orders in progress shall display all relevant details when in the Open Work Order status. The system shall also provide the maintenance contractor the ability to change the work order's status from active to open or from open to close.

(9) All work orders shall additionally provide the following general information at a minimum:

a. Dispatched time
b. Time of arrival at location
c. Comment field to document work performed by technician
d. Clear time or time of departure
e. Operation of the intersection upon departure
f. Employee # or reference code for the technician responding to the work order. The number of the vehicle used.

(10) The system shall allow the maintenance contractor the capability to generate an infinite number of additional records, called "follow-ups", to the original work order. At a minimum, all follow-ups shall allow the contractor the ability to provide the same information that's entailed in the original work order.

(11) The system shall provide, via selectable icon button, a notification feature that allows the maintenance contractor to indicate when they have notified outside agencies of problems outside their responsibility or scope of work i.e. PEPCO, MPD or TSMB. Integral to each work order, the system shall have the following user friendly features:

a. Hypertext ACISA (Assigned Computer ID for Street Address) numbers; that upon selection shall provide all authorized user levels the ability to view the complete history of all maintenance, repair and construction activities associated-with the selected intersection, all internal and approved work requests through higher level of authorization, and all inventory and bar-coding information as appropriate
b. Via selectable icon buttons, navigational tools that allow all authorized user levels the ability to traverse the database either one record at a time, forward and backward, or from the first record to the last record by using home and end buttons.

c. Quick search functions to retrieve work records by location-parameters, performance or completion date, type of trouble, and categorized status.

J. Surveyed Field Conditions – Request For Information (RFI)

(1) Each record created shall log the date, ACISA #, location name, description of condition, and referenced work order when condition was observed. Additionally, the record shall display status as "RFI' upon transmission and display changed status as "responded" when comments are entered to the record by TSMB officials and processed if a work order is created for repair of the condition contained within a related record. Dynamic Search shall enable the following singular and multiple functions within the database:

a. The capability to search all locations by specific Surveyed Field Condition
b. The capability to search all records within defined date ranges
c. The capability to retrieve all records within each of the status classifications

K. Quality Control / Inspections:

(1) The system shall include tools to allow supervisor to create inspection tickets for anything from single devices to entire locations. Supervisors shall be able to assign and track inspection tickets to DDOT inspection team. The system shall have the ability to randomly generate Quality Control Tickets based on set criteria or on demand.

L. National Oceanic Atmospheric Administration Weather (NOAA)

The system shall provide NOAA weather report at the time of the work done for the DC area. NOAA's hourly weather information shall be logged for reference purposes.

M. Labor Management

The system shall offer supervisors several tools for managing labor. Supervisors can quickly see who they have in the field using the dispatch board view and the easily assign Work Tickets to crews with simple drag-and-drop operations. Labor load on crews shall be easily tracked and monitored.

N. ACISA Help and Maintenance History

Upon selection of this menu item, the system shall display a list of all intersections, in numeric order and based upon the ACISA number. The system shall also provide the ability to perform searches on all intersections in the database by using either the assigned ACISA number or the intersection's location. The search function shall allow the user to input any character of the intersections name or ACISA number, and then return all results that have similar search criteria. After displaying the search results, the system shall give the user, via a selectable icon button, the ability to view the complete history of all activities performed at the selected intersection including, but not limited to, all active and past maintenance and construction activities, all internal and approved work requests, and all inventory and bar-coding information.

O. Dashboard and Monitors

(1) System users shall be able to view lists of the work requests and work orders via a dashboard view. Options available under this view shall include:

a. Active Work Orders
b. Active Work Requests
c. Closed Work Orders
d. Closed Work Requests
e. Open Work Orders
f. Open Work Requests

(2) Dashboard shall give supervisors a quick, at-a-glance, system status while the Reporting module provides a full suite of reliability reports, labor management reports, and asset lifecycle reports.

P. Application Administration

(1) The database system shall have the capability to assign each user with a unique logon ID and a system administrator provided password. Additionally, each user will be assigned an access level, which will be used to determine the functions that will be available to that user when logged-on to the system.

(2) Each user is required to only see those functions for which they have access, thereby reducing the options displayed to those appropriate for any given category of user permissions. To encompass short-term contractors, the database system shall allow for the ability to provide each user with a start and end date validity period. Upon expiry of the validity period, the specified user's logon shall become automatically inactive without system administrations intervention. The time and date along with information

relating to the user's name and organization assigned, shall be displayed at all times when logged-on to the database system.

(3) In addition, the database system shall provide the system administrator the capability to view all users currently logged-on the system in real time.

The system shall provide a full range of security and administration functions. The types of functions shall include but are not limited to:

a. User Logons and Exit
b. Security – ID/Password Combination
c. Add, Modify and Delete Users
d. Specification of User's Rights on a menu-by-menu basis
e. View Logon history

(4) The system shall provide customizable fields that allow administrators to customize application pull-down menus such as:

a. ACISA list
b. Direction of travel
c. Position of signal in the intersection
d. Dispatcher List
e. Trouble types
f. Operation of Intersection upon arrival
g. Operation of Intersection upon departure
h. Resolution types
i. Surveyed field conditions
j. Pole types
k. Signal types

Q. User Logons

(1) The database system shall provide for the following separate and distinct user logons that will automatically restrict the assigned users to all functions permitted to by the system administrator.

a. DDOT System Administrator
b. DDOT TSB (Traffic Signal Branch)
c. DDOT TOD (Traffic Operations Division)
d. DDOT FOD (Field Operations Division)
e. DDOT TSCB (Traffic Signals Constructions Branch)
f. DDOT TMC (Traffic Management Center)
g. Maintenance Contractor
h. Construction Contractors

R. Reporting

(1) The system shall offer many useful reports for each piece of the system. The types of reports shall include, but are not limited to, Availability & Reliability, Asset Management, Contract Management, Preventive Maintenance, and Customer Service Reports.

(2) Availability & Reliability

a. Asset Repair and Replacement Trending Report
    i. Count of total repairs
    ii. Count of total replacements
        (a) Due to failure
        (b) Due to obsolescence or planned retirement
b. Trend ratio in total; by category; and by model
c. By most repaired to least repaired
    i. Availability Reports Uptime & Downtime
        (a) Planned
        (b) Unplanned
        (c) Ratio
        (d) Ratio Trend
        (e) Comparison to annual benchmark

d. Ratio of PM to devices / # Repair/Replace to device trend and cost
e. Cause of failure report (resolution)
f. Mean Time to Repair Done (MTTR) – show graphic & trend
g. Mean Time Between Failure (MTBF) –show graphic & trend
h. Mean Time Between Repair (MTBR) –show graphic & trend
i. Device Count Matrix by Category & Type & Cost
j. Callbacks Due to Asset Failure by Total; Category; Model; Detail
    i. Ratio to device count
    ii. Trend of ratio

(3) Asset Mgt. / Inventory Reports (Spare parts & New Installs)

a. New stock received
b. Stock used and trend
    (i) Installed
    (ii) Obsolete
    (iii) Lost
    (iv) Total
    (v) Inventory
    (vi) Reorder point report
    (vii) By location
    (viii) By project assigned

(ix) In repair

c. Budget - device replacement schedule and life expectancy and replacement due dates

(4) Preventive Maintenance Reports

a. Preventive Maintenance by Stage
   i. Not scheduled
   ii. Scheduled
   iii. Assigned
   iv. Performed
   v. Past Due
      (a) Critical
      (b) Not critical
b. Preventive Maintenance Performed Trending
   i. On time
   ii. Past due
c. Future Preventive Maintenance (day, week, 2 weeks, month, qtr., year)
   i. Scheduled not assigned
   ii. Scheduled assigned

(5) Customer Service Report

a. Meantime to respond (notification to acknowledgment) plus trend
b. # service calls & trend
c. # service calls to # assets ratio and trend
d. Callback due to technician failure and trend
e. MODT Productivity – average hours expended per repair

(6) Work Order Management Reports

a. Work Orders with most follow-ups by technician; by category; by model; by detail most to least
b. Open work order by location, stage, by technician, by age, by critical, by category, by model, by device, by customer
c. Number of work orders over time period (Repair; PM;) and hours

(7) Quality Inspections Management Reports

a # quality control & trend
   i. By category of QC
   ii. By inspector

(8) Labor Management

a. #follow-ups
    i. Device failure
    ii. Technician failure
    iii. Part on order
    iv. Work suspended by customer or event outside of control
b. Technician productivity and trending:
    i. #work order completed
        (a) PM
        (b) Repair
    ii. Hours worked and ratio to # repairs
c. Future manpower requirement (PM & Repairs)

S. Database Hardware Equipment for Traffic Signal Inventory Management and Tracking

(1) The DDOT Cityworks Traffic Signal System Maintenance Database incorporates features for integration with a tablet PC. Each tablet PC supplied and installed by the Contractor shall be capable of operating on Windows XP platform or later and be compatible with the latest wireless technology for scalability and integration with the latest wireless communication or with a minimum hot-sync technology. The below equipment shall be provided by the contractor in support of traffic signal inventory management and tracking:

(2) Tablet PC Device Specifications:

Intel® Core™ 2 Duo ULV U7600 (1.20GHz, 533Mhz), LED LCD

Operating Systems	Genuine Windows® XP Tablet PC Edition 2005, with media
Memory	2.0GB DDR2-667 SDRAM, (1GB Integrated) 2 DIMMs
Internal Keyboard	Internal English Keyboard
Graphics	ATI® Integrated Graphics Radeon Xpress 1250
Hard Drives	80GB Hard Drive, 8MM, 4200RPM
Floppy Drive	No Floppy Drive
AC Adapter	45 Watt AC Adapter
Primary External Optical Drive Options	D-Bay plus 24X CD-RW/DVD w/ Roxio Creator and Cyberlink PowerDVD™

Wireless LAN (802.11)	Wireless Mini Card
System Documentation	Resource DVD - Contains Diagnostics and Drivers for Vista and XP Tablet
Batteries	6 Cell Primary Battery
Services	3 Year Limited Warranty plus 3 Year Mail-in Service
Installation Services	No Onsite System Setup
OS Branding	OS Branding

The following features shall be included with each Tablet PC at a minimum:

• Windows XP (Upgradeable)
• MS Office Professional 2003 or most recent version
• MS Project Professional 2003 or most recent version

(3) Wireless Bluetooth Scanner Specifications:

A wireless Bluetooth Scanner shall accompany each Tablet PC and shall include the necessary software and hardware to operate the device. Operating perimeters shall meet or exceed the below specifications:

• Radio range: over 100 meters (300 ft)
• Weight: 180g (6.35 oz)
• Dimension: 145 x 80 x 155 mm (5.7 x 3.15 x 6.1 in)
• Batteries: 2xAA NimH 2100 mAh rechargeable
• Minimum battery life: 10 000 scans

(4) Wireless Communication Specifications:

Broadband Wireless communication accounts and access devices shall meet or exceed the below specifications:

Features

- Broadband **Access** and National **Access** high–speed wireless data access
- Rev. A Capable
- **VZ** Access Manager™ software for easy connection management
- Easy to install and use
- High performance, hinged antenna for increased speed and coverage
- Intuitive user interface
- 32–bit CardBus interface(3.3V) for lower power consumption
- External Antenna Connector (External antenna sold separately)

System Requirements

- Microsoft® Windows® 2000, XP and Vista™
- Mac OS X 10.3.9 or higher
- Standard Type II PCMCIA card slot (Cardbus) – CD–Rom drive
- 32 MB memory
- 14 MB free hard disk space

Specifications

- Dimensions: Size: 4.6" (H) x 2.1" (W) x 0.2" (D)
- Weight: 1.8 oz

(5) DDOT employees shall use the tablet PC to perform inventory of the Traffic Signal System assets; real-time contractor inspections and work order tracking, individual assignments, and to fulfill his or her daily work reports requirements. A tablet PC shall be assigned to each Traffic Signal Maintenance Branch Supervisor and Technician for assistance with tracking contractor activities, equipment inventory tracking, trouble call assignment tracking and for submitting reports of work order processes assigned to the Contractor.

(6) Remote Work Order Processing Via Table PC:

a. The Tablet PC operating system shall feature software with user definable pull down menus that will allow the DDOT system administrator or their designated officials the ability to remotely perform the following task at a minimum:
   i. Initiate, view or cancel trouble work orders
   ii. Explore all intersections, maintenance and repair history via their assigned ACISA numbers,
   iii. View inventory status.

(7) Measure of Payment

The Measure of Payment for the Web-based Database Application Work will be in accordance with the contract line item number (CLIN)

a. The Contractor's cost for Web-based Database Work will be at the contract unit cost price which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work
b. All equipment, software and documentation purchased or developed as a provision of this contract shall be the property of the District of Columbia Government upon installation and acceptance by the Engineer.

47. TRAFFIC SIGNAL LAMP MAINTNEANCE

General Description of Work

A. The contractor shall furnish all labor, material and equipment to maintain all bulbs (lamps) within each of the District's optically programmable traffic signal and pedestrian signal heads. This work will include, but is not limited to the following

(1) The contractor shall furnish and replace lamps on a scheduled lamp replacement basis pursuant to specification listed below. The contractor shall perform this work at each optically programmable traffic and pedestrian signal head; each flashing yellow beacon flashing school warning signs; and each fiber optic sign. Each sealed beam lamp for optically programmable signal heads shall be replaced once each twelve (12) months. Each bulb for fiber optic electronic signs shall be replaced once each six (6) months. Replacement bulbs shall be new bulbs conforming to the technical specifications contained within these special provisions. The contractor shall perform this work at a schedule guaranteed to ensure completion of the work within these appointed time schedules. The foregoing replacement schedule is predicated on the lamp mortality data as obtained from lamp manufacturers and from operating experience. The Contractor shall replace any failed lamps associated with group re-lamping without any further cost to the District over the term of the Contract.

B. The scope of work for group re-lamping by shall encompass the following:

(1) Lamps shall be replaced with new lamps of proper type, size and life rating in accordance with this specification. These lamps shall be furnished and installed by the Contractor. The Contractor shall confirm the proper operation of all replaced bulbs to departing the intersection. Failed lamps shall be replaced by the Contractor, at no additional cost to the District over the term of the contract.

(2) The contractor shall match specific bulbs with existing traffic signal hardware in accordance with this schedule.

a. One (1) 150 watt clear sealed beam bulb in each twelve (12) inch diameter optically programmable traffic signal head section.
b. One (1) 75 watt clear sealed beam bulb in each twelve (12) inch diameter optically programmable pedestrian signal head section.

(3) The interior of the socket shall be checked to determine that the lamp will screw in or plug in and seat properly, and that no arcing will take place.

(4) Sockets shall be checked to determine if any annealing process has taken place. If so, the receptacle hall must be checked for proper fit of the socket I f a socket fits loosely it shall be replaced.

(5) When re-lamping optically programmable traffic and pedestrian signal heads, the contractor shall test the integrated, directional light sensing and regulating device interposed between the lamp and the terminal lock for proper operation whenever a replacement lamp does not illuminate.

(6) Defective devices shall be replaced by the contractor. The contractor shall confirm the proper operation of the bulbs with replacement devices prior to leaving the intersection.

(7) Reflectors and lenses shall be cleaned using a brush, a cloth and a non-conducting/non corroding cleaning agent. The inside shall be cleaned first starting with the reflector, then the inside of the lens, and finally the outside of the lenses Reflector cleaning shall be performed in such a manner as to prevent the cleaning agent from entering the lamp socket. Contractor shall perform this work without further direction from the District.

(8) The contractor shall check for and replace and broken or cracked reflectors and lenses.

(9) The contractor shall attach to the exterior of each re-lamped traffic signal head and electronic sign a weatherproof color-coded label to verify that all work has been accomplished and that re-lamping is complete. Color code shall be determined a bid award.

(10) The contractor shall be responsible for the proper disposal of bulbs that are removed, as a result of this work. Bulb disposal shall be accomplished in accordance with any and all applicable federal or local regulations.

(11) The contractor shall furnish to the District a weekly schedule of where group re-lamping and lens and reflector cleaning will take place on the afternoon of the last working day prior to the start of the next week's work. Such information shall be submitted to the Field Operations Division at Rear 1338 G Street, SE, 2nd Floor, Room 202, Washington, D.C. 20003 by facsimile.

(12) The contractor shall provide documentation and reports of all re-lamping completions on a weekly basis. These reports and documentation are to be furnished to the TOA, Field Operations Division at Rear 1338 G Street SE, Washington, DC 20009 by facsimile.

(13) The reports submitted by the contractor shall specify the exact date each intersection was re-lamped and damaged material found and replaced at each intersection.

(14) The contractor is also advised that the due to District's change to LED modules citywide, LED modules will not be subject to group replacement during the term of this contract.

(15) Measure of Payment

The unit of measure for Group Lamp Replacement will be in accordance with the contract line item number (CLIN)

a. Cost for Group Lamp Replacement will be paid for at the contract unit cost price, Pay Items, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

C. SPOT LED MODULE REPLACEMENT

(1) The Contractor shall provide all labor, material, and equipment necessary to perform spot lamp replacement and shall replace burned-out traffic signal lamps and LED modules according to the instructions below:

a. The Contractor shall replace all burned out LED modules or incandescent lamps were required for traffic signal heads, pedestrian signal heads, optically programmable signal, warning beacons, flasher beacons and fiber optic electronic signs when such lamps are reported to be out and after being notified of an outage by the District of Columbia.
b. SP 47. as specified above shall also apply for spot lamp replacement. If a bulb outage is reported in a signal head section or electronic sign featuring more than one bulb, all bulbs shall be replaced, in accordance with the following:
c. Electronic fiber optic sign: sign reported to be dim or out-replace both 50 watts clear Fiber optic sign bulbs.
d. The contractor shall respond and take corrective action to all reports of signal outages within the time schedule cited in ***Table 1***.
e. After replacing the burned out modules or bulbs, the contractor shall ascertain that the replacement module or bulb did, in fact, illuminate during the signal cycle. Failure of the new modules or bulb(s) to illuminate may suggest some other malfunction, and this fact shall be reported to the dispatcher as soon as it is detected
f. The Contractor shall be responsible for maintaining all traffic and

pedestrian signal lamp outage that fails within the warranty period after Group Re-lamping or Spot Re-lamping has taken place without further charge to the contract unit cost price for Spot Re-lamping.

g. The contractor is alerted to the fact that most fiber optics electronic signs are programmed to be illuminated only at certain times of the day. In many instances, the contractor may be responding to spot lamp replacement calls at a time of day when the sign is not programmed to be illuminated. In such instances, the contractor shall replace both bulbs in the sign and temporarily energize the size in the controller for a period of time sufficient to determine that the bulbs did in fact, illuminate. Failure of the new bulbs to illuminate may suggest some other malfunction, and this fact shall be reported to the dispatcher as soon as it is detected.

h. If the reported bulb outage is a neon tube pedestrian signal head or regulatory sign, the contractor shall take no corrective action in the field. The existence of a defective neon fixture shall be reported to the Dispatcher for corrective action addressed in SP 47.

i. Bulbs and LED modules used by the contractor for spot replacement shall conform to the technical specifications in Standard Contract Provisions, Traffic Signal Materials Section 825.

(2) Measure of Payment

The unit of measure for Spot Lamp Replacement will be in accordance with the contract line item number (CLIN)

a. Cost for Spot Lamp Replacement will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

D. LED MODULE SPOT REPLACEMENT

(1) The contractor shall provide all labor, material, and equipment necessary to perform LED module replacement and shall replace LED modules according to the instructions below:

a. The Contractor shall replace all defective LED traffic signal head modules and LED pedestrian signal head modules when such traffic signal display are reported to be out and after being notified of an outage by the District of Columbia.

b. The contractor shall respond and take corrective action to all reports of bulbs and LED outages within the time schedule cited in *Table 1*.

c. After replacing the burned out LED module, the contractor shall ascertain that the replacement module did, in fact, illuminate during the signal cycle. Failure of the new module(s) to illuminate may suggest some other malfunction, and this fact shall be reported to the Dispatcher as soon as it is detected

d. LED modules used by the contractor for spot replacement shall conform to the technical specifications in Standard Contract Provisions, Traffic Signal Materials Section 825.

(2) Measure of Payment

The unit of measure for Spot LED Module Replacement will be in accordance with the contract line item number (CLIN)

a. Cost for replacing damaged or defective LED Module Work will be paid for at the contract unit bid price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

48. Traffic Signal Head Maintenance

General Description of Work

A. This work shall include furnishing all necessary manpower equipment and material for the maintenance and realignment of the District's traffic signal heads. Traffic signal heads include LED vehicle signal heads. Traffic signal heads, optically programmable vehicle and pedestrian signal heads, LED and fiber optic electronic regulatory signs, and neon regulatory signs and pedestrian signal heads shall include but not be limited to the following:

(1) Traffic Signal Head Replacement
(2) Traffic Signal LED Module Replacement
(3) Traffic Signal and Pedestrian Head alignment
(4) Fiber Optic Regulatory Sign Replacement
(5) LED Regulatory Sign Replacement
(6) Visually Re-Programming Optically Programmable Vehicle and Pedestrian Signal Heads
(7) Traffic Signal Visor Replacement
(8) Neon Regulatory Sign Replacement and Maintenance
(9) Traffic and Pedestrian Signal Heads, Visor and Fiber Optic Regulatory Sign Specifications

B. Traffic Signal Head Maintenance and Pole Alignment

Signal Head and Pole Realignment

(1) Upon notification by the District of Columbia, Contractor shall perform traffic signal realignment in accordance with and to the current Traffic Signal Sequence of Operation in effect at the time of replacement and per the following instructions.

a. The contractor shall realign all twisted traffic signal heads; pedestrian signal heads; Flasher Beacons; School Flasher Beacons and Traffic Control Regulatory Signs.
b. The hardware shall be tightened in its proper location with tools to ensure that the realigned equipment cannot be moved out of its proper position by hand or windy conditions.
c. The contractor shall spot-weld reported loose #16 and #18 cast iron traffic signal poles to prevent turning on its rotational axis causing traffic miss-aligned traffic signals. A certified welder shall be used for Work Order involving cast iron pole welding. The welder's certification shall be made available at the request of the Engineer or his designated representative. Welding certifications shall meet all of the requirements of Section 706 of the Standard Specifications.

(2) Measure of Payment

The unit of measure for Traffic Signal Head Realignment Work will be in accordance with the contract line item number (CLIN)

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(3) Cost for Traffic Signal Head Realignment Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

C. Signal Head Replacement

(1) Upon notification by the District, Contractor shall replace damaged or missing heads and fiber optic regulatory signs in accordance with the current Traffic signal Sequence of Operation in effect at the time of replacement and per the following instructions

a. The contractor shall replace all damaged or missing vehicle and pedestrian heads and fiber optic regulatory signs in accordance with the Complaint Response Schedule, Table 1 and Standard Drawings 2005
b. The Contractor shall furnish signal heads and fiber optic regulatory signs.
c. The provisions as specified above regarding the operation of fiber

optic electronic signs apply to this Section.

(2) Measure of Payment

The unit of measure for Traffic Signal Head and Pedestrian Signal Head Replacement will be in accordance with the contract line item number (CLIN)

a. Cost for Traffic Signal Head and Pedestrian Signal Head Replacement will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

D. Signal Head Programming

(1) Upon notification by the District, Contractor shall program or reprogram Optically Programmable Vehicle and Pedestrian Heads directed by the Engineer and per manufacturer's specifications for optically programmable signals.

a. The contractor shall furnish al materials and equipment for programming and reprogramming of Optically Programmable Signals.
b. Contractor shall respond after notification in accordance with the Complaint Response Schedule, Table 1.
c. The District will provide to the contractor specific guidance in the form of sketches and, if necessary, filed meetings to show precisely where the signal indication is to be visible and not visible to motorists or pedestrians.

(2) Measure of Payment

The unit of measure for Signal Head Programming will be in accordance with the contract line item number (CLIN)

a. Cost for Signal Head Programming will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

E. Visor Replacement Maintenance

(1) Upon notification by the District, the Contractor shall replace as required missing or damaged visors.

a. The contractor shall replace all missing visors on vehicle signal

head sections, and fiber optic electronic signs, after the Contractor is notified of missing visor. The contractor shall respond in accordance with the Complaint Response Schedule, Table 1.

b. Visors shall be furnished and installed by the Contractor.

c. In instances where the visor does not exactly match the signal head section, the Contractor shall attempt to affix the visor to the signal section using conventional methods, which may include drilling into the signal head section and affixing the visor to the section with a screw. Drilling shall be accomplished so as to avoid compromising in any way the structural integrity of the signal head section. The visor shall be positioned to ensure an unobstructed view of the lens in accordance with the ITE and manufacturers specification.

(2) Measure of Payment

The unit of measure for Visor Replacement Maintenance will be in accordance with the contract line item number (CLIN)

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a. Cost for Visor Replacement Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

F. Signal Backplate Replacement Maintenance

(1) The contractor shall replace damaged or missing backplates on vehicle signal head after the Contractor is notified of damaged or missing backplates

(2) The contractor shall respond in accordance with the Complaint Response Schedule, SP 26, and Table 1.

(3) Backplates shall be furnished and installed by the Contractor.

(4) Measure of Payment

The unit of measure for Backplate Replacement Maintenance will be in accordance with the contract line item number (CLIN)

a. Cost for Backplate Replacement Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work

G. Neon Signal Replacement Maintenance

(1) Upon notification by the District, Contractor shall perform the following work at location with existing neon pedestrian signs heads and neon regulatory signs.

(2) Neon Pedestrian Signal Heads

a. Defective damaged or missing neon pedestrian signal heads shall be replaced with two-section incandescent pedestrian signal heads (12") lenses per specification as outlined in SP 47 and mounted as shown on Standard Drawings 2005, and in accordance with the Complaint Response Schedule, SP 26 and Table 1.
b. The Contractor shall furnish pedestrian signal heads.

(3) Neon Regulatory Signs

a. Defective, damaged or missing neon regulatory sign shall be replaced with LED regulatory signs of the same message per specification as outlined in the SP 48 and mounted as shown on Standard Drawings 2005 and in accordance with the Complaint Response Schedule, Table 1.
b. The Contractor shall furnish LED regulatory signs.

(4) Measure of Payment

The unit of measure for Neon Signal Replacement Maintenance will be in accordance with the contract line item number (CLIN)

a. Cost for Neon Signal Replacement Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

49. Traffic Signal Cable and Detector Cable Maintenance

General Description of Work

A. This work shall include furnishing all necessary manpower equipment and material for the maintenance, installation and repair of the District's traffic signal, detector and communication cables. This work to be performed by the contractor shall include but not limited to the following.

(1) Traffic Signal Cables

(2) Detector Lead-in Cables
(3) Communication Cables
(4) Bonding Jumper Cable

B. Traffic Signal Cable

(1) Upon notification by the District of Columbia, Contractor shall repair or replace open, shorted and grounded or damaged traffic and pedestrian signal cables, pedestrian push button cables loop detector lead-in cables, fiber optic regulatory sign cables and various flashing beacons cables in accordance with the current traffic signal sequence of operation in effect at the time of repair per these Specifications and as outlined in Standard Specifications Section 617

a. 18 AWG, four conductor shielded and loop detector lead in cables shall be replaced only as per these instruction and Specifications and as outlined in the Standard Specifications Section 617.
b. All cables, labor and materials shall be furnished by the Contractor
c. Contractor shall respond to complaints after notification in accordance with the Complaint Response schedule, SP 26, Table 1.
d. Under circumstances shall the Contractor vacate the intersection until the traffic signal is operating in safe manner in accordance with the current Traffic Signal Sequence of Operation.
e. The contractor shall immediately notify the District of Columbia of any unusual conditions affecting the traffic signal operation that prohibits a safe operation of same.

C. Loop-Detector Lead in Cable

(1) Upon notification by the District of Columbia, Contractor shall replace open, shorted, grounded or damaged loop detector lead-in cables in accordance with the current Traffic Signal Sequence of Operation in effect at the time of repair per these Specifications and as outlined in the Standard Specifications Section 617

a. 18 AWG, four-conductor shielded and loop detector lead in cables shall be replaced only as per these instructions and Specifications and as outlined in the Standard Specifications Section 617
b. The Contractor shall furnish all cables, labor and materials.
c. Contractor shall respond to complaints after notification in accordance with the Complaint Response Schedule, SP 26, Table 1.

D. Communications Cable

(1) Upon notification by the District, Contractor shall repair or replace open, shorted, grounded or damaged communication cable in accordance with the current Traffic signal Sequence of Operation in effect at the time of repair per these Specification and as outlined in the Standard Specifications Section 617

a. Communications cables shall be repaired or replaced only as per these instructions and Specifications and as outlined in the Standard Specifications Section 617
b. All cables, labor and materials shall be furnished by the contractor
c. Contractor shall respond to complaints after notification in accordance with the Complaint Response Schedule, SP 26, and Table 1.
d. All No. 6 AWG ground wire and No. 8 AWG service cable shall comply with the requirements of the Underwriters Laboratory and The National Electrical Code.
e. Contractor shall furnish manufacturers certification that the cable conforms to the requirements of the IMSA.
f. Cables shall be looped in and out of the controller cabinets, manholes and hand- holes and poles to provide adequate slack and the least amount of stress on conductors and connectors. Cable runs shall be continuous with no splices in the conduit, manhole and hand hole or overhead runs.

E. Signal Cable Repair

(1) Contractor shall install, repair and or replace traffic signal cables as follows:

a. Traffic Signal cables shall not be spliced unless approved by the District. All approved splices shall be made using Scotchcast 3M 82-1 Series Power Cable Splice Kits and will be installed in accordance with the manufacturer's recommendations.

b. Branch splicing of traffic signal cable is prohibited straight splices are kept to a minimum. Straight splices shall be done in accordance with appropriate instruction and drawing herein.

c. Cable shall be racked and supported within the manhole in accordance with PEPCO Drawing 6-1-903 and 7-1-904.

d. Traffic signal controller service cable will be the sole responsibility of the Potomac Electric Power Company; The Contractor must contact PEPCO for resolution of situations involving the service cable.

F. Pulling Cables

(1) Cables should be installed and pulled so as not to damage the able or exceed manufacturers' recommendations for bending radius or pulling tension.

(2) Cables may be installed or removed in duct lines that may contain other energized cables. All duct rodding shall be performed with a non-conducive rod and appropriate safety precautions shall be followed.

(3) Cables shall be pulled in the conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable. Cable shall be pulled with a minimum of dragging on the ground or pavement. Wire pulling compound shall be used to facilitate the pulling of the cable.

(4) Cable shall be looped in the controller cabinets, transformer bases, and manholes to provide adequate slack and the least amount of stress on conductors and connectors.

(5) Lubricants for assisting the pulling of jacketed cables shall be hose specifically recommended by the cable manufacturer.

G. Cable Tagging

All traffic signal cables are to be tagged in each manhole and controller in accordance to instructions below.

H. Traffic Signal System Cable Identification Tags

(1) Traffic Signal System cables entering or leaving a traffic controller or termination cabinet, shall be tagged to identify the circuit number and signal number as designated by the traffic signal controller circuit and signal number Communications cable shall be identified by trunk and cable pair number.

IDENTIFICATION TAGS

Identifies each signal cable circuit at the controller	(a) CBL 19 Sig 18
Identifies Walk Signal Cables in manholes between controller and the signal	(b) Walk
Identifies traffic signal cables in manholes between the controller and the designated signal	(c.) SIG

Identifies the traffic signal communications cables in manholes, termination cabinets and controllers	(d) 50 T 12

I. Traffic Signal Cable Installation:

(1) The following procedures will be strictly adhered to when wiring electrical devices to operate as part of a signalized intersection.

a. All cable segments shall be identified with a waterproof tag securely affixed to the cable hand boxes and manholes and in all transformer bases.
b. All cable shall satisfactorily pass the megger test, the value of which shall be established by the Operating Committee, shall be replaced by the Contractor at no cost to the District.

J. Vehicle signal Heads:

(1) The following are procedures to be followed:

a. All cable shall contain seven (7) conductors.
b. The cable to be used shall be 14 AWG, stranded, THHN, manufactured according to the latest IMSA Specifications.
c. The seven conductors are color coded as follows: Red, Orange, Green, Blue, Black, White, and White with Black tracer.
d. The conductor coded with white insulation will be the system neutral.
Note: Existing seven conductor cable may be color coded as follows in some cases; Red, Amber, or Yellow, Green, Red w/Black tracer, Black, Green, w/Black tracer and White.
e. The conductor coded with white insulation will be the system neutral.
f. The conductors coded with Red, Orange, and Green or Red, Amber or Yellow and Green insulation will be used for vehicle signal heads controlling traffic moving in a north-south direction.
g. The conductors coded with White w/ Black tracer, Blue w/ Black; Green w/ Black tracer, and Black will be used for vehicle signals heads controlling traffic in the east-west direction.
h. Unused conductors to each signal head will be reserved for use in the event that the sequence of operation is modified and additional sections are required, or if one or more of the conductors currently in use fail.
i. A separate segment of 7-conductor cable shall be routed for the traffic signal controller to each vehicle signal head. However, one

cable may be routed from the terminal block to two signal heads if the following criteria are satisfied.

i. The two vehicle signal heads must operate identically.

ii. The two vehicle signal heads must be mounted on the same pole, or

iii. One of the two vehicle signal heads must be pole mounted and the other is mounted on a mast arm.

j. No branch splices of cable shall be permitted at any point between the traffic signal controller and the signal head, or between vehicle signal heads that are wired between their terminal blocks. Straight splices of cable shall not be made unless approved by the Chief, D.C. Traffic Signal Systems Division.

k. In event of a cable malfunction involving new and existing cable installed by the Contractor in accordance with these policies, the following policies apply.

i. All new cable shall be replaced if found defective or damaged.

ii. If there are a sufficient number of unused conductors, in the existing cable they will be used in lieu of the defective conductors. The cable shall be tagged in the controller cabinet to indicate which conductors are defective.

iii. If there are an insufficient number of unused conductors in the existing cable to replace the defective conductors, a new segment of 7-conductor cable shall be pulled from the controller cabinet to the signal head.

iv Under no circumstances will it be permissible to replace the defective segment of cable with a new segment of cable utilizing straight splices connecting the new with the old cable.

l. Unless otherwise specified in the plans, all cable for vehicle signal heads is to be furnished new and installed by the Contractor.

m. If inspection of the traffic signal work by the District shows any unauthorized deviation from the provisions of this policy, the Contractor shall be obliged to make appropriate revisions at no cost to the District before final payment is made.

K. Pedestrian Signal Heads:

(1) The provisions of item no.: SP 49.J.1.k. (i), (ii), (iii), (iv) above for vehicle signal head apply for pedestrian signal heads.

(2) The conductors coded with red and green insulation will be used for pedestrian signal heads controlling pedestrians in the north-south direction.

(3) The conductors coded with White w/Black tracer and Blue or Red w/Black tracer and Green w/Black tracer will be used for pedestrian signal heads controlling pedestrians in the east-west direction.

(4) The Orange and Black conductors shall be used together where additional conductors are required.

(5) All new signal installations and modification are to be designed so as to install a pair of pedestrian signal heads on the same pole. A separate segment of seven-conductor cable shall be routed from the traffic signal controller to each pair of pedestrian signal heads. The appropriate conductors and the system neutral are to be routed through the brackets to the terminal block of the signal head.

(6) In instances where pedestrian signal heads on the same corner of the intersection must be mounted on separate poles, a separate segment of seven- conductor cable is to be routed to each pedestrian signal head.

(7) No branch splices of cable shall be permitted at any point between the traffic signal controller and the signal head. Straight splices of cable shall not be made unless approved by the Engineer or his official representative.

L. Pedestrian Push Button Cable

(1) All cable shall contain four (4) conductors.

(2) The cable to be used shall be 18 AWG, manufactured according to District Specifications.

(3) A separate segment of #18 four (4) conductor cable shall be routed from the controller cabinet to each pedestrian push button.

(4) In the event of a cable malfunction involving cable installed in accordance with this specification, a new segment of #18 four (4) conductor cable shall be pulled from the controller cabinet to the pedestrian push button. Under no circumstances will it be permissible to replace the defective segment of cable utilizing straight splices connecting the new with the old cable.

(5) Unless otherwise specified in the plans, all cable is to be furnished and installed by the Contractor.

(6) If inspection of the traffic signal work by the District of Columbia forces shows any unauthorized deviation for the provisions of this policy, the

Contractor shall be obliged to make appropriate revision at no cost to the District before payment for the job is released.

M. Electronic Fiber Optic Signs:

a. The provisions of items no.: SP 45.10. k.1, 2, 3, 4 for vehicle signal heads apply for electronic fiber optic signs.
b. The color-coded conductors used to operate the electronic signs are to be noted in the controller cabinet.
c. A separate segment of 7-conductor cable shall be routed from a designated traffic signal controller to each electronic sign.
d. No branch splices of cable shall be permitted at any point between the designated traffic signal controller and the electronic sign. Straight splices of cable shall not be made unless approved by the Engineer or his official representative.

N. Flashing Beacons for Schools or Warning Signs

(1) The provisions of as indicated above for vehicle signal heads apply to cable for flashing beacons.

(2) Unless otherwise noted, flashing beacons are to be installed in pairs: one above and one below each sign.

(3) A separate segment of 7-conductor cable is to be routed from the designated traffic signal controller to a control cabinet to be mounted on the pole to which the beacons are affixed. This cable to be furnished and installed by the Contractor will terminate at the terminal block.

(4) A separate segment of 7-conductor cable is to be routed from the terminal block of the pole mounted cabinet to each pair of flashing yellow beacons. Unless otherwise noted on the plans, this segment of cable will be furnished and installed buy the Contractor.

(5) The conductor color-coded red will be routed from the controller through the pole- mounted cabinet to the top beacon visible to northbound or southbound traffic.

(6) The conductor color-coded green will be routed from the controller through the pole-mounted cabinet to the bottom beacon visible to northbound and southbound traffic.

(7) The conductor color-coded White w/Black tracer or Red w/Black tracer shall be routed from the controller through the pole-mounted cabinet to the top beacon visible to eastbound or westbound traffic.

(8) The conductor color-coded Blue or Green w/Black tracer shall be routed from the controller through the pole-mounted cabinet to the bottom beacon visible to eastbound or westbound traffic.

O. Traffic Signal Cable Color Code

(1) INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA) COLOR CODE:

Conductor Use	IMSA Color
NB/SB Traffic	Green, Orange, Red
EB/WB Traffic	Blue, Black, White/Black
AC-/AC Ground	White
NB/SB Pedestrian	Green, Red
EB/WB Pedestrian	Blue/White/Black
Directional Conductors	Orange, Black
NB/SB Top Beacon	Red
NB/SB Bottom Beacon	Green
EB/WB To Beacon	White/Black
EB/WB Bottom Beacon	Blue

OLD CABLE COLOR CODE:

Conductor use	IMSA Color
NB/SB Traffic	Green, Yellow. Red
EB/WB Traffic	Green/Black. Black, Red/Black

P. Loop Detector Lead-in Cable

(1) Loop Detector Lead-in cable shall extend from the traffic signal controller to each loop detector hand-box. Loop detector lead-in cable shall be subject to the following Specifications:

(2) General Requirements

a. The cable shall be acceptable to form a connection through an Underground conduit network between a Type 170 Microprocessor Based Traffic Signal Controller and an inductive pavement – embedded loop detector; an overhead mounted or side pole mounted microwave vehicular detector; or a Standard pedestrian push button.

b. The cable shall satisfy the most recent edition of the International Municipal Signal Association (IMSA) specifications for detector

lend-in cable. The cable shall be available for use in a variety of environn1ents to include conduit, direct burial, or saw slots.

(3) Physical Requirements

a. The cable shall contain four (4) conductors No.14 AWG stranded copper, conforming to the requirements of 1MSA 50.2. The conductors shall be completely encapsulated in polypropylene insulation. The insulation shall "be color coded red, green, white and black. The four color-coded conductors shall be spirally laid and enclosed in an aluminized polyester shield to minimize electrical interference. The conductor and shield assembly shall further be enclosed within a black, high-density polyethylene jacket of nominal thickness of 0.032 inches and provide superior chemical resistance and mechanical protection. The outside diameter of the cable shall be approximately 0.25 inches.

b. The interior of the cable shall be filled with a water-blocking material featuring amorphous interior moisture penetration barrier to prevent hosing, siphoning, or capillary absorption of water along cable interstices. The four conductors within the shield and polyethylene jacket shall be twisted six (6) turns per foot.

Q. Electrical Requirements

The dielectric with stand voltage strength of each conductor shall equal or exceed 600 volts per UL33 section 36. The inductance for diagonal pairs of conductors shall be approximately 23Uh per 100 feet. The capacitance for adjacent pairs with other conductors disconnected shall be 30 pf per foot. The capacitance for diagonal pairs, with others disconnected, shall be 27 pf per foot.

R. Environmental Requirements

The cable shall display stable electrical characteristics and shall be suitable for prolonged exposure to temperature in the extreme range of –65 Degree Fahrenheit

S. Shipping and Handling

The cable shall be mounted on wooden reels or spools. Unless specified otherwise, one thousand (1000) feet of cable shall be coiled on tile spools. The following information shall be indelibly stenciled on the outside of each spool shipped for delivery:

(1) Date of cable manufacture.
(2) Purchase order number.

(3) Contract Number.

a. The cable shall be secured on the spool to prevent un-raveling of cable from the spool during shipment and subsequent storage.

T. Communications Cable

(1) General

a. Interconnect Cables between Controllers – Underground communications cables shall meet all of the requirements of IMSA 40-2, or REA PE-39. Aerial (overhead) communication cable shall meet all of the requirements of 1M SA 40-2 or REA PE-22.

b. Cable shall be pulled in the conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable. Cable shall be pulled with a minimum of dragging on the ground or pavement Powdered soapstone; talc or other approved lubricants shall be used to facilitate the pulling of the cable.

c. Communications cable shall also be installed on messenger cable when shown on the plans as overhead cable. Cable shall be looped in and out of controller cabinets, and ground-mounted termination cabinets specifically installed as termination points or splice points as indicated on the Plans.

d. Overhead cable shall be secured to the messenger cable using non-corrosive metal lashing as indicated on the Overhead Cable Installation Sheet of the Plans. Drip loops shall be provided in overhead cables as required by the Plans. Drip loops shall be made with a bending board or other approved jig with radii within the manufacturer's specified limits.

e. Communications cable shall be installed for the traffic signal control system. Cable runs shall be continuous with no splices in the conduit, pull boxes, or overhead runs.

f. All large cables, over 25 pairs, shall terminate in termination cabinets only. Connection between the termination cabinets and the intersection controllers shall be made with 12- or 25-pair cables only as indicated on the Cable Routing Sheets of the Plans by the District.

g. The communications cable, in an intersection controller, shall be terminated. By District personnel on a terminal block mounted in the cabinet. The cable connection between the terminal block and the communications modem shall be through the controller's communication connector (C2).

h. Cables ends shall be taped to exclude moisture and shall remain so until D.C. personnel attach terminal equipment. For cable connections in termination cabinets, connectors approved for outside use shall be used.

i. Cables shall be looped in an out of controller cabinets, termination cabinets, and pull boxes to provide adequate slack and the least amount of stress on the conductors and connectors.

j. If an emergency cable condition exists, where a splice is permitted in underground and overhead runs, the splices should be made in the appropriate type manner using a 3M kit or a waterproof splice kit conforming to the requirements of the National Electric Code (110b.14). Boxes or kits should be of sufficient size as to allow free space for all conductors therein. All splices shall be capable of operation when submerged in water. Splice ends of overhead cable shall be left in the turned up position. All splices and conductors, including spares, shall be made waterproof and mechanically and electrically secure.

k. Before any cable is pulled into the ducts, provision shall be made for supporting the cable ends on racks in the manholes.

l. Cable shall not be allowed to lie on the manhole floor.

m. The channels, which support the racks, shall be securely fastened to the manhole wall with expansion bolts. The spacing between racks adjacent to the proposed cable joint shall be a minimum of 3 feet.

n. All cable shall satisfactorily pass the megger test, cable failing the megger test, the value of which shall be established by the District, shall be replaced by the Contractor at no cost to the District.

o. Communications cable shall be furnished on reels and pulled with a minimum of dragging on the ground or pavement.

p. Where communications cable is shown running to a utility pole from an underground conduit, vertical aluminum risers compete with a 90 degree – bend, shall be installed for each conduit. The riser will be installed to a point within 3 feet of the, messenger cable, or as directed by the Engineer. The exposed end of the riser shall be fitted with a weather head, to prevent the entrance of water.

U. Messenger cable

a. The messenger cable shall be used to support all cable indicated on the plans as overhead cable. The messenger cable shall include devices such as rings or lashing used to attach the cable and shall run from structure to structure without splicing. Prior to erecting messenger cable, the

Contractor shall determine the length of the strand required to span the distance between the poles indicated on the drawings, allowing a sufficient additional length of span wire to compensate for sag.

b. No messenger strands shall be erected which would lie on or are liable to rub on, a utility company's' wire or cable, tree limb, etc. If a messenger strand is erected within 6 inches of any other cable, wire or structure, it shall be protected with plastic wire guards.

c. The messenger cable shall be 3/8 inches in diameter. The messenger cable shall be fabricated of seven steel wires, Class A galvanized in accordance with ASTM/ A –475, and twisted into a single concentric strand. The tensile strength of 3/8inch messenger cable shall equal or exceed 6,950 pounds.

d. The contractor is to provide certification that the messenger cable has been tested and meets the required tensile strength. The Contractor shall provide the Engineer with five (5) two (2) foot samples of messenger from each shipment before installation.

e. Measure of Payment

i. The unit of measure for Traffic Signal, Detector and Communication Cable Maintenance will be in accordance with the contract line item number (CLIN)

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V. Cost for Neon Traffic Signal, Detector and Communication Cable Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

50. Traffic Signal Controller and Termination Cabinet Maintenance

A. General Description of Work

(1) The contractor shall furnish all necessary manpower equipment and material for the maintenance, installation replacement and repair of the District's Traffic Signal System controller and auxiliary equipment, controller cabinet and base and Traffic Signal Systems communications cable termination cabinet and base. This work shall include but not be limited to the following on a per call basis:

a. Traffic signal system controller maintenance
b. Damaged traffic signal controller and cabinet
c. Damaged communications cable cabinets and bases
d. Controller cabinet foundation replacement and repair
e. Traffic Signal Controller and termination cabinet specifications

B. Traffic Signal Maintenance

Upon notification by the District, contractor shall on a per call basis, locate and correct malfunctions in all controller and equipment and restore repaired equipment to a safe operation in accordance with the current Traffic Signal Sequence of Operation in effect at the time of repair and per the following instructions.

C. Traffic Signal Complaints

(1) Upon notification by the District the Contractor shall dispatch qualified personnel to malfunctioning traffic signals to effect traffic signal repairs per these provisions and in accordance with the Traffic Signal Complaint Schedule (Table 1) during normal business hours and after close of business. The following list of complaints (not all inclusive) shall be responded to on a per call basis.

a. Traffic Signal All –Out
b. Traffic signal Stuck
c. Traffic Signal Flashing
d. Traffic Signal conflict
e. Traffic Signal Timing Out Of Sequence
f. Traffic Signal Cabinet Knock Downs
g. School Flasher Time Clock Defective

(2) Contractor shall maintain service history records for each individual intersection responded to for the purpose of effecting traffic signal repairs in accordance with the procedures as set forth in SP 26 of these Specifications.

(3) All labor, equipment and materials shall be furnished by the contractor.

(4) Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in safe manner in accordance with the current Traffic Signal Sequence of Operation.

(5) The contractor shall immediately notify the District of any unusual conditions affecting the traffic signal operation that prohibits a safe operation of same.

D. Traffic Signal Hardware Knock Downs

(1) Traffic Signal Controller and Cabinet

a. Upon notification by the District, the contractor shall dispatch qualified personnel to damage or knockdown communication termination cabinets of the purpose of effecting repairs per these

provisions and in accordance with the Traffic Signal Complaint Schedule (Table 1) for knockdown traffic signal system hardware.

b. All labor, equipment and materials shall be furnished by the contractor

c. The provisions of SP 50.A, 50.B, and 50.C shall apply to this section.

(2) Communication Termination Cabinet

a. Upon notification by the District, the Contractor shall dispatch qualified personnel to damage or knockdown termination cabinets for the purpose of effecting repairs per these provisions and in accordance with the Traffic signal Complaint Schedule (Table 1) for knockdown traffic signal system hardware.

b. All labor, equipment and materials shall be furnished by the Contractor

c. The provisions of SP 50.A, 50.B, and 50.C shall apply to this section.

(3) Traffic Signal Controller & Termination Cabinet

a. Contractor shall remove damaged traffic signal controller and termination cabinet.

b. De-energized the controller and protect all traffic signal wiring.

c. Contractor shall identify the cables for the red and, if necessary the yellow signals on opposite streets and install a temporary flashing unit in accordance with the current Sequence of Operation Flash Sheet.

d. Contractor shall notify the Traffic Signal Maintenance Branch, TOC or EMA that the intersection is on flash.

e. The contractor shall report damaged traffic signal controller or termination cabinet to the District within twenty-four (24) hours and obtain approval of installing new controller or termination cabinet.

f. Contractor shall repair damaged conduits or foundation within five (5) working days.

g. All equipment removed by the contractor from the intersection shall be returned at the earliest possible date to the Traffic Signal Shop located at the Rear 1338 G Street, S.E.

(4) Pole Mounted Cabinet (Meter Cabinet)

a. Upon notification by the District, the contractor shall dispatch qualified personnel to a damaged or knockdown pole mounted cabinets for the purpose of effecting repairs per these provisions

and in accordance with the Traffic Signal Complaint Schedule (Table 1) for knockdown traffic signal system hardware.

b. All labor, equipment and materials shall be furnished by the contractor

c. The provisions of SP 46.1; 46.2; and 46.3 shall apply to this section.

(5) Controller Communication Termination Cabinet Foundation

Controller Cabinet Foundations

a. Upon notification by the District, the Contractor shall dispatch qualified personnel to damaged or knockdown pole mounted cabinets for the purpose of effecting repairs per these provisions and in accordance with the Traffic Signal Complaint Provisions SP 55 for knockdown traffic signal system hardware

b. The contractor shall furnish all labor, equipment and materials.

(6) Communication Termination Cabinet Foundation

a. Upon notification by the District, the contractor shall dispatch qualified personnel to damaged to knockdown pole mounted cabinets for the purpose of effecting repairs per these provisions and in accordance with the Traffic Signal Complaint Provisions SP 55 for knock down traffic signal system hardware

b. Measure of Payment

i. The unit of measure for Traffic Signal Controller and Termination Cabinet Maintenance will be in accordance with the contract line item number (CLIN)

E. Cost for Traffic Signal Controller and Termination Cabinet Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

51. TRAFFIC SIGNAL POLES AND HARDWARE

Description of Work

A. The contractor shall furnish and install all labor, material and equipment to repair or replace all items specified or noted and those items usually considered necessary for a complete job or ordinarily provided whether or not actually mentioned, including but not limited to the following:

B. Pole Knockdowns

Work under this section shall be coordinated with the work set forth in other sections so that the work shall be complete in every respect.

C. Traffic Signal Poles and Hardware Maintenance

(1) Traffic Signal Equipment Knockdown

a. Contractor shall remove the damaged equipment from the roadway or sidewalk; de-energize traffic signal controller; protect traffic circuits and other energized-wires; install temporary traffic signals, and designating the site with a cone or portable barricade. Contingent upon the availability of materials and readiness of the equipment foundation and posts, the Contractor shall install replacement hardware and cabinet equipment hardware within two (2) working days. Damaged posts and controller foundations shall be replaced within five (5) working days.

b. Contractor shall notify the District within one (1) working day of the location of a knockdown post or controller. Contractor shall notify the District within one (1) day of the completion of a damaged foundation.

c. Contractor shall install temporary traffic signal pole if required; temporary pole concrete pads shall be designed to accommodate a 20ft traffic signal pole and mast arm and the accompanying signal equipment and hardware, etc.

d. Contractor shall reinstall temporary traffic signal poles and accessories in accordance with the existing District Department of Transportation Standard Drawings 2005.

(2) Temporary Operation for Knockdown Traffic Pole

a. Where it is found impossible to immediately maintain the equipment at its location, the Contractor shall immediately provide a temporary installation satisfactory to the District and maintain same until it is replaced with permanent standard equipment. To facilitate the restoration of permanent equipment, the Contractor shall provide: temporary posts or supports and necessary wiring and connections for signal heads, pedestrian signals and illuminated signs adjacent to the permanent location, until permanent equipment reinstalled.

b. Contractor shall install temporary traffic signal pole and hardware and all necessary wiring and return the intersection to normal traffic operation. If signals do not resume to normal operation, Contractor shall notify the District and put the intersection on flash mode of operation.

c. Contractor shall notify the District of the damaged traffic signal pole within twenty-four (24) hours and obtain approval before installing new traffic signal pole, pole foundation and hardware.

d. Permanent equipment shall replace temporary equipment within five (5) working days with the exception where excavation is required; in which case, the Contractor shall have ten days to complete the repair.

e. In no instance is a temporary repair to be made when controller equipment is available to effect said repair.

f. Where there is provision for switching from normal to flashing operation, the Contractor shall do so while effecting repairs on the controller at the intersection. Where there is no provision either in the controller or control box that will enable the Contractor to institute flashing operation, he shall install a temporary flasher unit. In no instance shall an intersection be left on flashing operation for a period greater than two (2) hours. Flashing operation shall not be considered a temporary repair, but only an emergency measure while effecting repairs.

g. Where it is impossible to install flashing operation because of low line voltage or power failure, then the contractor shall install temporary "STOP" signs. These "STOP" signs are not to be charged under Item 616.001, but are considered part of the regular procedure for the intersection. The Contractor shall notify the TOA of this condition immediately.

h. Where directed by the Engineer, the Contractor shall assume responsibility of maintenance of temporary traffic post installed by other agencies and shall be paid for maintenance according to the Bid Item Schedule for items serviced.

D. Measure of Payment

(1) The unit of measure for Traffic Signal Pole and Hardware Maintenance Work will be in accordance with the contract line item number (CLIN)

E. Cost for Traffic Signal Pole and Hardware Maintenance Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

52. Traffic Detector Maintenance

General Description of Work

A. This work shall include furnishing all necessary manpower, equipment and material for the maintenance, installation and replacement of the District's Traffic

Signal System traffic detectors and related equipment. This work shall include but not limited to the following on a per call basis:

(1) Inductive Loop detectors
(2) Microwave detectors
(3) Detectors Amplifiers
(4) Pedestrian Push Buttons

B. Traffic Detector Maintenance

(1) Upon notification by the District Contractor shall on a per call basis, respond to damaged, missing, defective, or malfunctioning, traffic detectors and related equipment and hardware for the purpose of making all necessary repairs to restore the traffic signal to its proper operation in accordance with the applicable Traffic Signal Sequence of Operation in effect and the specification contained in SP 51. Response Times shall be in accordance with the Complaint Response Schedule, TABLE 1, SP 26

a. The contractor shall replace all defective, damaged, or missing traffic detectors and related equipment and hardware per these Specifications and drawings, S-2100.
b. Traffic detectors and related hardware shall be furnished and replaced by the Contractor.
c. Contractor shall maintain service history records for each individual intersection or equipment serviced for the purpose of effecting traffic signal detector repairs in accordance with the procedures as set forth in SP 26 of these Specifications.
d. Under no circumstances shall the contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic signal Sequence of Operation.
e. The contractor shall immediately notify the District of any unusual conditions affecting the traffic signal operation that prohibits a safe operation.

C. Pedestrian Push Button Detectors

(1) Upon notification by the District, contractor shall, on a per call basis, respond to defective damaged or missing pedestrian push buttons for the purpose of making all necessary repairs to restore the traffic signal to its proper operation in accordance with the applicable Traffic Signal Sequence of Operation in effect and the specifications contained in this Section and SP 55 Response times shall be in accordance with the Complaint Response Schedule, Table 1.

a. Pedestrian Push Button Installation

i. Pedestrian push buttons shall be installed by the Contractor in accordance with the provision of D.C. Department of Transportation Standard Drawings 2005.

ii. The Contractor shall make all cable connections at the push button.

iii. Contractor shall maintain service history records for each individual intersection or equipment serviced for the purpose of effecting traffic signal pole foundation repairs in accordance with the procedures as set forth in SP 26 of these Specifications.

iv. Under no circumstances shall the contractor vacate the intersection until the traffic signal operation gin a safe manner in accordance with the current Traffic Signal Sequence of Operation.

b. The contractor shall immediately notify the District of any unusual conditions affecting the traffic signal operation that prohibits a safe operation of it.

(2) Measure of Payment

a. The unit of measure Pedestrian Push Button Maintenance will be in accordance with the contract line item number (CLIN)

D. Cost for Pedestrian Push Button Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work

53. Traffic Detector Repair/Replacement

A. Description of Work

The Contractor shall furnish all labor, material and equipment to maintain, install and or replace traffic detectors. This work includes but not limited to the following:

(1) Detector Maintenance
(2) Detector Installation and Specification

B. Detector Installation and Specifications

(1) The work under this section consists of furnishing all labor, material, and equipment, which are necessary for the installation of traffic detectors. The work shall include lead-in cable, conduits, wires, boxes, splicing and materials necessary for sealing pavement cuts.

The contractor shall notify the District when detectors are to be installed. The placement of the loop wires, the testing of the wires, and sealing of the loops shall not be performed except in the presence of the District.

(2) Loop-Detector

a. The contractor shall install vehicle loop detectors as shown on the District Standard Traffic Plan (2005). No saw cutting of the pavement shall be done until the District has verified the loop layout. The saw cut for the lead-in to the hand box shall be made as close as possible to the curb, without marring the curb. In no case shall the saw cut end more than one foot from the shoulder or the curb. The pavement chase from the saw cut end to the curb should not be made with a punch or drill and not by excavating.

b. One (1) inch of conduit shall be installed under the shoulder or through the curb from the end of the saw cut to the hand box. The part of the curb above the pavement shall not be drilled or cut for conduit installation.

c. The conduit shall be installed in a direct line with the saw cut so that the wires entering the conduit shall not need to be bent. The hole in the curb shall be at a depth that will permit a minimum of two (2) inches of cover on top of the conduit installation.

d. A self-propelled concrete cutting saw shall be utilized for the loop saw cut. The saw shall be equipped with a depth gauge and horizontal guide to assure proper depth and alignment of the slot. The blade used for the saw cut shall provide a clean, straight, well-defined 5/16-inch wide saw cut without damage to adjacent areas. The saw shall be overlapped to provide 1.50 inches of saw filler cover over the loop wires. The saw shall be overlapped to provide full depth at all corners. Right-angle corners shall not be used. Water should be used as a lubricant and coolant for the saw blade.

e. Slots may be cut ahead of insertion of loop wire, with the approval of the District and provided wire strips are inserted into the slots to prevent shrinkage or damage to the slot.

f. Vehicular traffic shall not pass over an open cut unless a protective panel covers the cut.

g. Immediately after the cutting operation, and just prior to the installation of wire, the saw cuts shall be checked for the presence of jagged edges or protrusions, cleaned of all cutting dust, grit, oil and other contaminants, flushed by means of an air stream. The blown air from the compressor shall be free of oil and water.

h. Care shall be taken during the cleaning of cuts to avoid blowing the debris at passing pedestrians and motorists.

i. Loop wires shall be installed from hand box through the turns in the loop cuts and back to the hand box in one continuous length, without

in-line splices. The loop lead-in wires shall be twisted to provide a minimum of one (1) turn per foot from the loop to the hand box. A minimum of one (1) turns per foot from the loop to the hand-box. A minimum of three (3) feet of lead-in pair slack shall be coiled and left in the hand box for each loop. The wire shall be type XHHW class B No. 14 AWG, rated for 600 volts, stranded copper conductor or UL labeled type XLP, No. 14 AWG, stranded copper conductor with a minimum 3.64-inch insulation.

j. All wire insulations shall be made without kinks, curls or damage to the wire or its insulation. The contractor shall replace any damaged wires at his expense.

k. The wire shall be installed as far down in the curb as possible. A blunt object, similar to a wooden paint stirrer, shall be used to sect the loop wire. In no case shall a screwdriver or other sharp tool shall be used for this purpose.

l. Prior to pouring the sealant, the loop and lead-in shall be checked for continuity and resistance. In addition, the integrity of the insulation shall be checked by applying a 1,000 – volt megger test between each end of the loop lead-in and the nearest reliable electrical ground (e.g. streetlight, fire hydrant, etc.) in the event that no available ground exists; a suitable ground shall be established for the measurement (e.g. driven metal spike). The megger reading shall be in excess of 10 megohms. The inductance shall be between 60 and 300 micro henries.

m. The contractor shall record the location and the megger readings and indicate satisfactory compliance with continuity check. Readings and test equipment data shall be submitted for record.

n. The sealant shall be poured over the wire, half filling both the loop and lead in cuts. A check shall be filled to roadway level. Excess sealant shall be removed by means of a "squeegee", when poured into a saw cut, shall completely surround the wires, displace all air therein, and completely fill the area of the cut, except for that portion filled with the wire hold down material.

o. Before leaving the site, the contractor shall repeat the entire resistance continuity test specified above. The report shall be given to the District for comparison with the first report.

p. The contractor shall record any modifications to the original installation drawing.

C. Loop Detector Sealant

(1) The slot sealant shall be either a one component polyurethane or a two-part epoxy, formulated for use in sealing inductive loop wires.

a. One –Component Sealant

i. The loop slot sealant shall be a one component, moisture-curing, flexible polyurethane, formulated to encapsulate loop wires embedded in asphalted cement and Portland cement concrete pavements, The sealant shall remain flexible of –40 degrees Fahrenheit. The following characteristics of the sealant shall allow full depth wire encapsulations and resist flow-out on inclined roadways. Application equipment shall be capable of filling slots form the bottom up.

ii. The sealant shall permit the roadway to be opened to traffic over the slot immediately after application without tracking, sticking to vehicle tires, or pulling out of slot. The cured sealant shall have the performance characteristics listed in table below, when tests are conducted on derated, 20 mil. (0.020") thick, dry film liquid immersion, after curing for 28 days at 77 degrees Fahrenheit.

SEALANT PERFORMANCE CHARACTERISTICS

PROPERTY	REQUIREMENT	TEST AND CONDITIONS
Hardness	65-85	ASTM D2240 REX, TYPE A, MODEL,
(INDENTATION)	BLANK CELL	1700 at 77 F and 50% relative humidity
TENSILE STRENGTH	500 PSI, MINIMUM	ASTM D412 DIE C, PULLED AT 20 IPM
ELONGATION	400 PER CENT MINIMUM	ASTM D412 DIE C, PULLED AT 20 IPM
PROPERTY	REQUIREMENT	TEST AND CONDITION
FLEX	NO CRACKS AT –40 F	25MILL FREE FILM BEND (180) F OVER ½ IN MATERIAL
WEATHER RESISTANCE	SLIGHT CHALKING	ASTM D822 WEATHEROMETER, 350 HOURS.CURED 7 DAYS AT 77 F AD 50 PERCENT RELATIVE HUMIDITY

b. Two-Part Sealant

The saw slot sealant shall be a rapid cure high viscosity liquid epoxy formulated for use in sealing inductive wire loops and leads imbedded in asphalt concrete and Portland cement concrete. The saw slot filler shall be suitable for use in freeze-thaw areas and shall be usable on grades of 15 per cent or less, without excessive material. The material shall have the following composition:

Component A

Element	Parts by weight
Epoxy Resin	85.00
Orthocresol Glycol Ether	15.00
Titanium Dioxide ASTM Designation D476, Type III or IV	2.00
Collodial Silica	1.50
Glycerine ASTM Designation	0.50
Silicone Anti-Foam Type Q	0.01

Component B

Element	Parts by Weight
High Functionality Polymercaptan Hardener	40.00
Naminoethyle Piperazine 2,4,6-Tri (Diamethylaminomethy)	10.00
Phenol	4.00
Polysulfide Polymer	48.94
Colloidal Silica	1.00
Glycerin ASTM Designation D1256	0.50
Carbon Black	0.10
Silicone Antin-Foam, Type Q	0.01

c. Connections

The following rules shall be followed in connecting the loop wire and lead-in:

i. Loop wire, including loop feeder line, shall be continuous (No Splices). Connections between loop feeder line and lead-in are to be made only at the hand-box.

ii. Loop feeder connection shall be twisted, soldered, taped individually and then the pair shall be potted in a waterproofing compound such as 3M's "Scotchcast" or approved equal.

(2) Measure of Payment

a. The unit of measure Traffic Detector Maintenance will be in accordance with the contract line item number (CLIN)

D. Cost for Traffic Detector Installation and Maintenance will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work

54. TRAFFIC SIGNAL ELECTRICAL WORK

A. General Description of Work

(1) This work shall include furnishing all necessary manpower, equipment and material for the maintenance, installation and replacement of the District's Traffic System traffic signal related Electrical work and related equipment. This work shall include but is not limited to the following on a per call basis:

a. PVC Electrical Conduit
b. Loop Detector Hand-Boxes
c. D.C. Electrical Manholes

B. Traffic Signal Electrical Work

(1) Upon notification by the District, Contractor shall, on a per call basis, respond to damaged, or defective traffic signal Electrical Work, related equipment and hardware of the purpose of making all necessary repairs to restore the traffic signal to is proper operation in accordance with the applicable Traffic Signal Sequence of Operation in effect and the specification contained in the SP 55. Response times shall be in accordance with the Complaint Response Schedule, Table 1, SP 26.

a. The Contractor shall replace all defective or damaged traffic signal Electrical Work, related equipment and hardware per these Specifications and Standard Drawings 2005.
b. Traffic Electrical Work materials, equipment and related hardware shall be furnished, installed or replaced by Contractor. The Contractor shall supply all labor.
c. Contractor shall maintain service history records for each individual intersection or equipment serviced for the purpose of effecting traffic signal detector repairs in accordance with the procedures as set forth in SP 26 of these Specifications.
d. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Signal Sequence of Operation.
e. The Contractor shall immediately notify the District of any unusual conditions affecting the traffic signal operation that prohibits a safe operation of it.

C. General Description

(1) This section of the contract consists of furnishing all necessary labor, equipment and material for installing, modifying, and replacing all traffic

signal related Electrical work. It shall include conduits, manholes, pull boxes, hand boxes, equipment foundations, excavation and backfill, disposal of discarded materials and restoration of disturbed facilities, as shown on the existing District of Columbia Government Standard Drawings 2005 and in accordance with the special provisions.

(2) Excavation and Backfill

a. Trench excavation and backfill shall conform to the requirements of 206, Trench Excavation and Fill, and special provisions.

b.. The excavation required for installation of conduits, foundations and other appurtenances should be performed in such a manner to avoid any unnecessary damage to streets, sidewalks, landscaping and other improvements. Cuts through existing hard surface pavement shall be made by saw cutting to a minimum depth of three (3) inches along the trench limits and the using pneumatic tools as required to make even near edges, Use of impact type breakers for PCC and AC removal over trenches shall be restricted to the Hoe Tam type or approved equivalent. This equipment may be restricted or prohibited when in the public interest.

c. The trenches shall be excavated to the minimum depth required for each installation of the electrical appurtenances and foundations. Excavating shall not be performed until immediately before installation of conduit and other appurtenances. The material from the excavation shall be placed in a position that will not cause damage or obstruction to vehicular and pedestrian traffic or interfere with surface drainage.

d. All trenches shall be excavated and backfilled the same day. If the trenches are not backfilled at the end of each day's work, and at all other times when construction operations are suspended, temporary plating over trenches shall be placed to facilitate the passage of traffic over that excavated area, and all, equipment and other obstructions shall be removed from that portion of the roadway used by public traffic. Unless otherwise permitted in origin by the District of Columbia Government, all surplus excavated material shall be removed and disposed of within twenty-four (24) hours, outside the public right of way.

e. No extra pavement will be allowed for rock excavation or on account of any subsurface condition encountered. After excavation, the Contractor shall keep backfilling well filled and maintained in a smooth and well-drained condition until the contractor makes permanent restoration.

(3) Measure of Payment

Excavation and Backfill is to be included in the Bid Item price for conduit and foundations, which cost shall include all labor, materials, tools, equipment and incidentals necessary to complete the work

D. Pavement Restoration

(1) Repairs to pavement, sidewalk, curb and gutter and miscellaneous construction shall conform to the requirements of 603, 604 and these special provisions.

(2) Materials for the repair work shall meet these requirements as specified for the type of pavement to be restored. The trench shall be backfilled to the bottom of the sub-base of the existing pavement surface. The Contractor shall apply a temporary patch over the backfill until such time as final restoration can be completed.

(3) During the cold weather work, when air temperature may be expected to drop below 40 degrees, sufficient supply of insulation burlap, or other material suitable for covering concrete shall be provided. At any time When the air temperatures may be expected to reach the freezing point during the night or day, the material specified shall be spread to a sufficient depth to prevent freezing and shall remain until the concrete has hardened thoroughly. The use of such burlap does not take the place of other curing specified, but shall be applied in addition to the normal curing replacement.

E. Foundations

(1). This item shall consist of construction concrete foundation for traffic signal equipment (controller cabinets, termination cabinet, traffic signal poles) complete with necessary electrical conduit, anchor bolts, ground rod, and other work as required in accordance with the foundation detail of the plans, D.C. Standards Specifications

(2). The materials for reinforced Portland Cement concrete foundations shall meet the following requirements:

a. PCC Mix design-shall conform 817 of the Interim Revisions for Class B, structural, minimum 28-day compressive strength of 4,500 PSI on field test cylinders made in the field and cured in the laboratory.
b. Curing materials – Shall conform 816.04 of the supplemental specifications, for Membrane Cure.
c. Reinforcing steel – Shall conform 812.02 of the Standard Specifications, for Steel Material.

d. Corrugated Metal Pipe – Shall conform 808.03 of the standard specifications, for Steel Material.

e. Anchor Bolts – Shall conform to 813.08 PF the standard specification for high strength.

f. All concrete shall conform to the requirements of 703, "concrete for structures." The exposed portions shall be formed to present a neat appearance. The bottom of concrete foundation shall rest on firm undisturbed ground.

g. One solid copper ground rod shall be installed in each controller, termination cabinets and traffic signal post foundation. The ground rod shall be a minimum of ¾ inch in diameter and ten feet in length. Ground wire shall be a minimum of No. 6 AWG bare solid copper with no splices and shall be attached to the ground bus.

h. Forms shall be true to line and grade. Conduit ends and anchor bolts shall be placed in proper position and to proper height, and shall be held in place by means of a template until the concrete sets.

i. Conduit ends shall extend a minimum of two (2) inches and a maximum of four (4) inches above the top of the finished foundation.

j. Foundation for traffic controllers and cabinets shall be installed so that when a cabinet is placed in position, the side of the cabinet shall be parallel to the adjacent curb and cabinet door(s) shall open on the sidewalk.

k. Unless otherwise specified or shown on the plans, foundations not to be used shall be removed. When a foundation is to be abandoned, the top of foundation, anchor bolts and conduits shall be removed to a depth of not less than twelve (12) inches below surface of sidewalk or unimproved ground. The resulting hole shall be backfilled with embankment backfill, or soil base material, if soil base material exists in the surrounding soil. Backfill material shall be compacted in accordance with 205.504, "construction requirements." The surface of the hole shall be restored with material in kind with the surrounding surfaces.

F. Underground Structures (manholes and hand holes)

(1) Manhole and hand-holes shall conform to the requirements of 622.15 and these special provisions.

Cast in place concrete manholes shall have a smooth trowel finish for floors and horizontal surfaces. Construct walls on a footing of cast in place concrete manhole riser.

(2) Concrete block shall be concrete masonry units conforming to ASTM C 139. Pre-cast concrete manholes, risers and tops shall conform to ASTM C 478. Pre-cast units shall be the product of a manufacturer regularly engaged in the manufacturer of pre-cast concrete manholes and handholds. Manholes and hand holes shall be the type shown on the District of Columbia standard plans and shall be constructed in accordance with the applicable details as indicated.

(3) Top, walls, and bottom shall consist of reinforced concrete. Walls and bottom shall be of monolithic concrete construction. Duct entrances and windows shall be located near the corners of structures to facilitate cable racking. Covers shall fit the frame without undue play. Steel and iron shall be formed to shape and size with sharp lines and angles. Castings shall be free from warp and below holes that finish and sharp lines and arises. Provide all necessary lugs, rabbets, and brackets. Set pulling in irons and other built in items in place before depositing concrete. A pulling in iron shall be installed in the wall opposite each duct line entrance. The words "D.C. Bureau of Traffic" shall be cast in the top face cover. Cable racks, including rack arms and insulators, shall be adequate to accommodate the cable. Cast iron frames, covers and grating shall conform to Federal Specification. RR-F-621 steel frames, covers, and gratings shall conform to Federal Specification RR-G-661 Cast-iron, extra strength drains shall be cast iron, coated or uncoated plain pattern bottom outlet with perforated or slotted hinged cover.

(4) The contractor is responsible for cleaning existing manholes from debris and mud. Pump out water from manholes and comply with all federal and local regulations.

(5) In each electric manhole and hand-hole at a convenient point close to the wall, a ¾ inch by 10-foot steel ground rods shall be driven into the earth before the floor is poured so that approximately 4 inches of ground rod will extend above the floor. Ground rods installed manholes, handholds or concrete pull boxes shall be properly connected to the cable shielding, metallic sheath, and armor at each cable joint or splice by means of NO. 34 AWG or equivalent braided tinned copper wire.

(6) Connections to metallic cable sheaths shall be by means of tinned terminal soldered to ground wires and to cable sheaths. Care shall be taken in soldering not to damage metallic cable sheaths or shields.

G. Conduit and Duct Installation

(1) Conduits shall be scheduled 40 PVC (polyvinyl chloride, (type DB) for concrete encasement and shall be schedule 40 PVC, (type EB) for concrete

encasement. Do not mix the type of conduit used in anyone duct bank. Ducts shall be installed in accordance with the District of Columbia Standard Drawings 2005. The concrete encasement surrounding the bank shall be rectangular in cross-section and shall provide at least 3 inches of concrete cover for ducts.

(2) The top of the ducts shall not be less than 36 inches below the grade, and shall have a minimum slope of 3 inches in each 100 feet away from buildings and toward manholes and other necessary drainage points, and shall run in straight lines except where a change of direction is necessary. Except at conduit risers,, accomplish changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal by long sweep bends having a minimum radius of curvature of 25 feet. Sweep bends may be made up of one or more curved or straight sections or combinations thereof. Manufactured bends shall have a minimum radius of 18 inches for use with conduits of less than 3 inches in diameter and a minimum radius of 36 inches for ducts of 3 inches in diameter and larger. As each conduit run ins completed, a testing mandrel not less than 12 inches long with a diameter ¼ inch less than the inside diameter and larger. As each conduit run is completed, a testing mandrel not less than 12 inches long with a diameter ¼ inch or less than the inside diameter of the duct shall be pulled through the duct followed by a 1,500 lb. Test polyolefin pull line which remain in the duct.

(3) District of Columbia Government shall inspect and approve of all underground duct work and shall be contacted for such approval prior to any encasement or backfill of the ductwork. There shall be not less than 3 inches clearance from the conduit to each side of the trench. Provide a plastic warning tape in the backfill approximately 24 inches below grade. The tape shall be yellow plastic with integral warning legend repeated continuously throughout the entire length of the tape.

(4) Terminate conduits in end-bells, where lines enter manholes or hand holes. Separators shall be of pre-cast concrete, high impact polystyrene steel or any combination of these; stagger the joints of the conduits by rows and layers so as to provide a duct lie having the maximum strength. During construction, protect partially complete duct lines from entrance of debris such as mud, sand and dirt by means of suitable duct plugs. As each section of a duct line is completed, draw a brush through having the diameter of the duct and having stiff bristles until the conduit is clear of all particles of earth, sand and gravel; then immediately install duct plugs.

(5) All bends shall be of the long sweep, free from kinks and of such easy curvature as to permit cable pulling without undue tension on the conductors or damage to insulation.

(6) Standard manufactured elbows, nipples, bushings, reducers, bends, couplings, unions, etc., of the same materials and treatment as the straight conduit pipe shall be used as required throughout the conduit system.

H. There will be instances throughout this project where the contractor will be required to build conduit to intercept existing PEPCO manholes. In such instances, the contractor shall be required to coordinate penetration of existing manholes with the Potomac Electric Power Company to avoid disruption to PEPCO facilities.

(1) Under roads, paved areas, railroad tracks and encased ducts in concrete, the concrete encasement shall extend at least 5 feet beyond the ridges of paved areas and roads, and 12 feet beyond the rails on each side of the railroad tracks.

I. Where connections to existing duct lines are desired or indicated, excavate the lines to the maximum depth necessary. Cut off the lines and remove loose concrete from the conduits before new concrete encased ducts are installed. Provide a reinforced concrete collar, poured monolithically with the new duct line, to take the shear at the joint of the duct lines. Ducts entering PEPCO manholes shall be terminated flush with the inside wall of the manhole. Ducts shall be aligned in the manhole. Where duct lines are to be removed from existing manholes, close the openings to waterproof the manhole.

J. Measure of Payment

(1) The unit of measure Encasement and Removal is to be included in the Bid Items, which cost shall include all labor, materials, tools, equipment and incidentals necessary to complete the work

K. Electrical Service

(1) This item consists of the provision of the complete electrical service installation for the purpose of supplying power from the utility power source to traffic signal controllers as indicated on the existing District of Columbia Traffic Signal Standard Drawings 2005 and in conformance with these special provisions. This item includes proper grounding of all equipment as specified.

(2) The District will send a written request to the utility company for the provision of the power. Electrical power is to be provided by the Potomac Electrical Power Company (PEPCO). The power company representative is:

Mr. Joseph D. Schall
Manager, Customer Engineering
District of Columbia Region
Potomac Electrical Power Company
1900 Pennsylvania Avenue, NW, Suite 322
Washington, DC 20068
Telephone: (202) 872-2844
Facsimile: (202) 331-6234
Email: jdschall@pepco.com

Electrical power service will be paid for by the District of Columbia, Traffic Services Administration.

L. GROUNDING AND BONDING

(1) Metallic cable sheaths, metal conduits, non-metallic conduits, ground wires, controller cabinets and termination cabinets shall be made grounded in accordance with the National Electrical Code and shall be made mechanically and electrically secure to form a continuous grounding system.

(2) Grounding of service equipment shall comply with the National Electrical Code, PEPCO and local code requirements.

a. Non-current carrying metallic parts associated with electrical equipment shall have a maximum resistance to solid earth ground not exceeding the following values:
   i. Grounds in manholes and hand holes – 10 ohms
   ii. Grounding of traffic controllers - 25 ohms
      (a) Grounding electrode shall be cone pointed driven ground rods driven full depth plus six (6) inches, installed when indicated to provide an earth ground of the value before stated for the particular equipment being grounded
      (b) Grounding conductors shall be bare soft-drawn copper wire No. 4 AWG minimum.

b. Test ground rods for ground resistance value before any wire is connected. Use a portable ground testing megger unit to test each ground or group of grounds.

(3) Electrical Tests (Section 621 in the Standard Specifications 2005, Revised 2007)

a. The Contractor shall comply with Special Provision 621 for Electrical Tests Work on DDOT's Traffic Signal System cables and shall be responsible for furnishing all personnel and equipment required to perform the following tests and demonstrations successfully to the satisfaction of the Engineer:

i. Ground Test
ii. Cable Insulation Test
iii. Demonstration of testing results
vi. COSTS. All costs of labor, materials, equipment, electrical energy and incidentals required for performing Electrical Test Work shall be distributed equally and proportionately among the Pay Items.

(4) Measure of Payment

a. The unit of measure for Traffic Signal Electrical Work will be in accordance with the contract line item number (CLIN)

M. COSTS: All cost for Traffic Electrical Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

55. PROCEDURES FOR DISPATCHING COMPLAINTS TO CONTRACTOR DISPATCHER

A. All reports of traffic signal malfunctions requiring repairs by the Contractor shall be routed to the Contractor's Dispatcher. The Contractor Dispatcher receives input from District Department of Transportation (DDOT) or Emergency Management Agency (EMA) personnel as authorized by the Engineer.

B. The following details the sequence of events which typically occur when a complaint is dispatched from the District to the Contractor Dispatcher:

(1) The District Department of Transportation (DDOT) Traffic Signal Complaint Dispatcher is on duty 24 hours per day, seven (7) days a week. The DDOT Dispatcher is responsible for complaint response. Among the duties of the DDOT Dispatcher is the transmission to the Contractor Dispatcher of any reported traffic signal malfunction requiring action by the Contractor. Unless the complaint is an obvious one which can be rectified by the Contractor (i.e., burned-out lamp, knockdown pole, etc.), the complaint is first investigated by a traffic signal technician before it is transmitted to the Contractor Dispatcher. Traffic signal complaints are transmitted from the District to the Contractor Dispatcher in the form of an

authorized Work Order via electronic media in accordance with SP 26 or as otherwise authorized by the COTR.

(2) The DDOT Dispatcher receives traffic signal complaints from the Hansen system, EMA, Metropolitan Police Department (MPD), District Agency personnel, citizens, etc., 24 hours a day, seven days per week. These complaints are investigated by a traffic signal technician and, as appropriate, are subsequently referred to the Contractor Dispatcher during hours that the technicians are on duty. However, after close-of-business or non-business hours, all traffic signal complaints are investigated by the Contractor, as assigned by the District.

(3) Typically, Traffic Signal Technicians respond to specific complaints as dispatched by the DDOT Dispatcher. The mechanic makes all the repairs that can be made and notifies the DDOT Dispatcher of any additional malfunctions that require the Contractor's intervention. The Traffic Signal Technician also reports to the DDOT Dispatcher malfunctions requiring Contractor action, which were observed in the field during travels between assignments. The DDOT Dispatcher transmits all such complaints to the Contractor Dispatcher as defined in SP 26 of these Specifications.

(4) Traffic Signal Technicians and Inspectors are assigned to the Traffic Signal Maintenance Branch and are on duty from 7:00 AM to 3:30 PM, Monday through Friday, except Holidays.

(5) Telephone Contact Numbers:

a.	Traffic Signal Branch:	(202) 698-3660
b.	Traffic Management Center:	(202) 671-1486
c.	Transportation Operations Administration:	(202) 671-2700
d.	Traffic Operations Division:	(202) 671-2610
e.	Emergency Management Agency:	(202) 727-6161
f.	District of Columbia Operator (311):	(202) 727-1000
g.	PEPCO Dispatcher	(301) 469-5521

C. TRAFFIC SIGNAL COMPLAINTS

Malfunctioning Traffic and Pedestrian Signals

(1) <u>Traffic Signal Complaint: Signals All Out:</u>

a. Contractor shall inspect 120 VAC service to the controller and if faulted, refer the problem to the Potomac Electric Power Company (PEPCO) for corrective action and advise the District of the action take.

b. If after the service is energized, the signal comes up on colors in a flash mode, Contractor shall troubleshoot the equipment: using qualified personnel to effect repairs to restore the signal to its normal color operation.

c. If the traffic signal will not go to flash mode; and the signal are out, the Contractor shall notify his Control Center to inform the DDOT Dispatcher of this situation. Additionally, the Traffic Signal Maintenance Branch, Emergency Management Agency and the District of Columbia Police Department (MPD) shall be notified of this condition.

d. Where it is impossible to install flashing operation because of low line voltage or power failure, then the contractor shall install temporary "STOP" signs. These "STOP" signs are not to be charged under Item 000 006, but are considered part of the regular procedure for the intersection. The Contractor shall notify the TOA of this condition immediately

e. The Contractor shall take all necessary steps to restore the traffic signal to its normal color operation.

f. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation.

(2). Traffic Signal Stuck

a. If the traffic signals are not changing colors (Stuck), the Contractor shall respond after notification by the District and make all necessary repairs to restore the traffic signal to its normal color operation.

b. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation

(3) Traffic Signal Flashing

a. If signals are on flash upon arrival of the repair crew, Contractor shall make all necessary repairs to restore the traffic signal to its normal color operation.

b. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation

(4) Conflicting Traffic Signals

a. If signals are displaying a conflicting condition such as, more than one color illuminated at the same time per signal head, Contractor shall troubleshoot all connected cables and controller equipment to determine the cause of the conflicting condition and make all necessary repairs to restore the traffic signal to its normal color operation.
b. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation

(5) Traffic Signal Lamps Out

a. Contractor shall replace burned out traffic and pedestrian signal lamps or defective LED modules in accordance with SP 51 of these Specifications.
b. If intersection is on flash, Contractor shall return FLASH SWITCH to AUTO or press reset on the conflict monitor.

c. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation.

(6) Traffic Signal Malfunction: Timing Out of Sequence

a. If traffic signals are not changing colors or the timing plan operation is incorrect, Contractor shall place intersection on flash mode by changing AUTO/FLASH switch to FLASH position.
b. Contractor shall notify tile Traffic Signal Branch or the Traffic Management Center that the intersection is on flash.
c. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation.

(7) School Flasher Out or Malfunctioning: Defective Time Switch

a. If the school flasher or beacons are not operating according to plans, the Contractor shall respond after notification by the District and make all necessary repairs to restore the school flasher operation to its normal operation.
b. Under no circumstances shall the Contractor vacate the intersection until the traffic signal is operating in a safe manner in accordance with the current Traffic Sequence of Operation

(8) Measure of Payment

The unit of measure for Traffic Signal Complaint Work will be in accordance with the contract line item number (CLIN)

Cost for Traffic Signal Complaint Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

56. <u>CCTV Traffic Camera Maintenance</u>

A.. Contractor shall respond to Work Orders regarding CCTV Traffic Camera equipment and related components upon notification by the District. The Contractor shall correct, repair or replace defective; malfunctioning or damaged equipment in accordance with the Specifications in Appendix III of the Contract or as further directed by the Engineer.

B.. All CCTV Traffic Camera equipment that is replaced or removed from service due to damage, defect or malfunction shall be returned to DDOT, Traffic Signal Operations Branch or as directed by the Engineer.

C. A partial listing of CCTV Traffic Camera Equipment Requirements is as follows:

(1) Replace damaged bottom dome.
(2) Replace camera assembly
(3) Replace camera power supply
(4) Replace video encoder
(5) Replace DSL modem
(6) Replace CCTV cable assembly
(7) Replace CCTV mounting hardware
(8) Replace repeater assembly
(9) Replace 23 inch modem shelf

D. Measure of Payment

The unit of measure for CCTV Traffic Camera Maintenance Work will be in accordance with the contract line item number (CLIN)

Cost for CCTV Traffic Camera Maintenance Work will be paid for at the contract unit cost price for the Base Year and all Option Years, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work

57. EMERGENCY BACK-UP GENERATOR DEPLOYMENT AND MAINTENANCE

A. Storage of Generators

(1) Generators will be stored per the manufactures recommendations in an access controlled storage area within the boundaries of the District. DDOT will have access to view the entrance/exit log through the Work Order (Cityworks) program

(2) Authorized DDOT personnel will have 24 hours access, 365 days per year, to the generator storage area

(3) If DDOT employees remove a generator from the storage area, the Contractor will perform a pre and post inspection on each generator. The chain of custody, along with the inspection reports will be maintained on the DDOT Work Order Database (Cityworks program).

(4) Generators will not be permitted to be stored directly outside

(5) Warehouse/Storage Area will have adequate property insurance to cover any loss of equipment

(6) Generators will be stored in a method that is easily accessible for emergency deployment, 24 hours a day, 365 days per year.

B. Preventive Maintenance Program

(1) Perform Preventative Maintenance per the manufacture's recommendations on each generator.

(2) All documentation generated during the PM program will be accessible via Work Order (Cityworks) program.

(3) At a minimum the following items shall be performed monthly:

a. Inventory and account for all 200 generators. If any of the generators are not accounted during the inventory procedures and at no fault to DDOT, the generator(s) will be replaced at no cost to the District.
b. Run generator for at least 15 minutes under a load to assure that generator is operating properly
c. Start generator with remote and manual pull start to check for proper operation
d. Clean and remove any debris inside the generator compartment
e. Clean outside compartment to remove any dirt or debris

f. Assure that all markings (warning labels, generator number, etc…) are properly displayed, replace as necessary
g. Check battery for proper charge, charge if necessary
h. Check oil and fuel levels
i. Check all electrical connections

(4) At a minimum the following items shall be performed bi-annually (In addition to the monthly preventive maintenance):

a. Replace the fuel
b. Check Fuel Indication System for proper operation
c. Add fuel stabilizer

(5) At a minimum, the following items shall be performed annually (In addition to the monthly and bi-annually preventive maintenance):

a. Change the oil and filter

(6) Note: The replacement of any failed component will be replaced and installed at no cost to the District while the equipment is under the manufacturer's warranty agreement. After the warranty period expires all minor components (air filter, spark plugs, batteries, etc.) will be considered incidental to the Preventative Maintenance Program. For major component replacement after warranty period has expired, the Contractor will submit a cost proposal to replace the component.

(7) Preliminary Site Survey/Modifications to the 336SS Cabinets

a. Perform 200 site surveys of each intersection, selected by DDOT, to determine the location of the generator.
b. Prepare and submit a report to DDOT for each proposed generator location along with photo documentation. This information will also be accessible via computer database program.
c. Modify the existing 336SS cabinet to secure the generator to the cabinet per DDOT's requirements; Level II technicians will perform the cabinet modifications.

(8) Emergency Deployment up to 20 Generators per deployment

a. When DDOT requests the deployment of a generator at a specific location, IMSA Level II technicians will respond to the intersection with 2 hours to power the 336SS cabinets with the emergency generator

b. Technicians will confirm that the signals are operating per the current configuration package, if required; the technician will make any necessary changes to the cabinet for proper operation
c. Level II technicians will maintain the generator until permanent power is restored. Inspect the generator on a two hour interval o When required fuel the generator an make any field adjustments
d. Once permanent power is restored and the Contractor is notified by DDOT to remove the generator, the generator will be disconnected and removed from the intersection within 2 hours.
e. The generator will then be inspected, prepared, and be stored for the next deployment.
f. The Contractor will submit to DDOT a deployment summary after each event.

C. At a minimum the following information will be provided and will be accessible in the Work Order Database:

(1) Intersection that the generator was deployed
(2) Generator Number
(3) Deployment date and time
(4) Two Hour follow-up information
(5) Run Time
(6) Problems or field observations
(7) Time and Date the generator was removed

D. Note: For a deployment of over 20 generators the Contractor DDOT will waive the 2-hour deployment/retrieval time required in the specifications.

E. Measure of Payment

(1) The unit of measure for Emergency Generator Deployment and Maintenances will be in accordance with the contract line item number (CLIN)

F. Cost for Emergency Generator Deployment and Maintenance Work will be paid for at the contract unit cost price, which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

58. EMERGENCY READINESS

The Contractor shall have at his disposal all material, equipment and manpower required to perform emergency repairs at all times. This shall include trucks equipped with two-way cellular phones and qualified personnel.

59. PREVENTIVE MAINTENANCE

A. SCOPE OF WORK

(1) A preventive maintenance program shall be implemented as part of this contract. The Contractor shall perform preventive maintenance on all hardware as described in this contract and in addition, perform all needed servicing and repairs in order to maintain a safe and reliable operation of traffic signal equipment and to reduce the likelihood of field equipment failures.

(2) Defective, damaged or malfunctioning traffic signal equipment found during the preventive maintenance process shall be approved for replacement prior to proceeding with the work. The Contractor shall obtain approval from the Engineer before proceeding with repairs.

(3) Currently, the District of Columbia Traffic Signal System comprises 1580 signalized intersections that are controlled by 1372 traffic signal controllers. It is incumbent upon the Contractor to ensure that each signalized intersection and traffic signal controller, including fiber optic display signs, neon signs, flashing beacons, warning beacons, and time clocks located throughout the District of Columbia are inspected for preventive maintenance purposes in accordance with these procedures and specifications as outlined in this Contract and D.C. Standard Drawing 2005.

B. INSPECTION

The District reserves the right to assign an inspector to the contractor's operation for the purpose of determining compliance with the specifications and maintaining records. Any work or materials found to be substandard or not in accordance with the provision of this contract shall be repaired or replaced to the satisfaction of the District at the sole expense of the contractor.

C. WORK PERFORMANCE

(1) It shall be the contractor's responsibility to ensure that he/she does not damage any material, equipment or structure during the preventive maintenance evolution. He or she shall be held liable for any damages to material, equipment or structure which may occur. The contractor shall repair or replace any damaged equipment to the satisfaction of and at no expense to the District.

(2) All work shall be performed in a neat and workman-like manner. All material or equipment replaced shall be available for inspection by the District prior to disposal by the contractor.

D. ELECTRICAL WORK

All electrical work shall meet the Electrical Code of District of Columbia and otherwise as contained in the latest edition of the National Electric Code (NEC) of the National Board of Fire and Underwriters (NBFU).

E. PREVENTIVE MAINTENANCE PROCEDURES

(1) Traffic signal preventive maintenance procedures involve the following tasks:

a. The Contractor shall perform field inspections of all signalized intersections including all hardware associated with the proper operation of the intersection equipment in accordance with the Traffic Signal Sequence of Operation "in effect" and other equipment associated with traffic control located throughout the District of Columbia, such as, warning beacons, and school flasher time clocks, etc.

b. Where defective or malfunctioning equipment is discovered, the Contractor shall make all necessary corrections, repairs or replacements to ensure that the traffic signals are operating in accordance with the current Traffic Signal Sequence of Operation.

c. The District will provide a Preventive Maintenance Field Checklist , TABLE 2, for all required elements that the Contractor shall be required to perform for inspection and repairs.

d. The Contractor shall provide documentation, both written and electronically, for each intersection or location where preventive maintenance is performed which shall include the following:

i. *Preventive Maintenance Record* – A log of each preventive maintenance service performed. This record shall include the date, tasks performed and signatures of maintenance personnel performing the work.

ii. *Preventive Maintenance Problem Record* – A record of problems or potential problems identical (if any), corrective action taken and follow-up inspections, including dates and signatures of the maintenance personnel performing the work.

iii. *Preventive Maintenance Field Service Record* – A record placed in each intersection controller on a 4" x 5 1/2" card indicating the location, intersection ACISA Number and date preventive maintenance was performed. The record shall show the initials and any comments of maintenance personnel performing the work.

F. 170/170E CONTROLLER UNIT PREVENTIVE MAINTENANCE AND REPAIR

(1) All 1070 Controller Units shall be bench tested annually during the Preventive Maintenance Cycle.

(2) LEAD ACID BATTERIES AND CONTROLLER FAILURES

a. Signal Control Company 1070 Controller Units have been in service since February 1987. These units have a *mean-time-between-failure (MTBF) Rate* of seven years. Each of these units has a lead acid battery installed for *RAM* data retention. Experience has shown that these batteries are subject to corrosion and are in need of replacement on a periodic basic. In addition, this corrosion is often spread throughout the controller housing infecting other printed circuit boards.

b. Bench Test Procedure - At a minimum, the following items shall be checked and tested during the 170 Controller Bench Test procedures:

i. Batteries for RAM data retention
ii. DC Power supply voltages and regulator for accuracy
iii. Printed circuit boards for corrosion and proper operation
iv. STEP Program or manufacturer's diagnostics software for all operating parameters, etc.
v. Test real-time clock and system clock for accuracy
vi. Crystal Oscillator for accuracy (32.768KHz)
vii. Test communication ports and modems for proper operation
viii. Certify that the controller has been bench tested with sticker and date stamp.
ix. Recycle controller in the field only if all tests are passed

(3) 170 Controller Repairs – Controller repairs shall be effected as necessary to return a defected 170 controller to a full operational status. All controllers shall be performed at the bench level and tested before reuse. Repaired and refurbished controllers shall be returned to inventory and ready-for-issue (RFI) on a need basis. Bench repair Bid Items shall cover all repairs not otherwise covered under the individual Bid Items.

(4) Controller Service Life – When or if a traffic signal controller (1070/170E) which cannot be repaired or refurbished and has reached the end of its service-life, the same shall be removed from inventory and returned to the District. All controllers returned shall be identified by serial numbers and supplied with the returned equipment for disposal by the District.

(5) The Contractor shall use the Preventive Maintenance Checklist as outlined in these specifications to perform preventive maintenance on an annual basis on all traffic signal equipment and hardware installed at each intersection and other specified locations as directed by the District/Engineer. Other such locations and equipment which require preventive maintenance inspections are electric fiber optic signs, neon signs, flashing/warning beacons, freeway matrix signs and time clocks.

(6) Preventive Maintenance Checklist and Specifications: See "TABLE 2" and the succeeding paragraphs for a composite list of preventive maintenance tasks, inspection internals and provisions and specifications for repairs and related tasks.

TABLE 2
TRAFFIC CONTROLLER CABINET PREVENTIVE MAINTENANCE CHECKLIST

TASK NO.	TASK	INSPECTION INTERVAL
1	Check cabinets for damage and security	Annually
2	Clean, lubricate hinges and locks	Annually
3	Replace filters as necessary	Annually
4	Check for water and moisture accumulation	Annually
5	Check and seal ducts as necessary	Annually
6	Check Ground Rod	Annually
7	Check for proper grounding of cabinet	Annually
8	Check fan operation for correct setting	Annually
9	Check radio interference filter in PDA	Annually
10	Check and test all circuit breakers	Annually
11	Check and test ground fault receptacle	Annually
12	Check door switches for corrosion	Annually
13	Check cabinet for absence of cobwebs	Annually
14	Measure voltage at cabinet service receptacle	Annually
15	Check conditions of power-line surge protection	Annually
16	Check and record total current drawn per cabinet	Annually
17	Check and test each loop detector per approach	Annually
18	Verify detector input per phase	Annually
19	Check detector amplifier for proper operation	Annually
20	Check if amplifier is detecting vehicles	Annually
21	Tune detector amplifier if necessary	Annually
22	Check detector amplifier connectors for security	Annually
23	Check accuracy of intersection records per cabinet	Annually
23	Check if controller operates in correct mode	Annually
25*	Check TBC operation	Annually
26*	Check all Controller LED modules for illumination	Annually
27*	Check phase controller for extension per input	Annually

TASK NO.	TASK	INSPECTION INTERVAL
28*	Check 170 PC boards for security	Annually
29	Check all cabinet connectors for security	Annually
30	Clean dust and dirt from cabinet equipment	Annually
31	Run self-test on conflict monitor unit (CMU)	Annually
32	Remove CMU and check for corrosion	Annually
33	Apply corrosion preventive cleaner to CMU edge connectors	Annually
34*	Bench test and repair 170 controllers	Annually
35*	Test and replace defective batteries	Annually
36	Check load switches for security	Annually
37	Check load switches for proper operation	Annually
38	Check flasher for security and correct flash rate	Annually
39	Check output file terminations for security	Annually
40	Check output file motherboard for corrosion	Annually
41	Check output file motherboard for burnt-runs	Annually
42	Check output file motherboard for loose connections	Annually
43	Clean output file with corrosion preventive cleaner	Annually
44	Clean dust and dirt from communication panel	Annually
45	Check EDCO connectors and jumpers for security	Annually
46	Check communications cable for security	Annually
47	Check all cables for correct labeling and proper dressing	Annually
49	Check span wires vertical clearance over the roadway and adjust as necessary.	Annually
50	Check span wires clamps for possible slippage and tighten as required.	Annually

* See NOTE 3

NOTE 1: (X) = YES

NOTE 2: All repairs shall be an integral part of the PM Inspection and Repair Phases with the exception of those repairs that are related to a Pay Item. **Incidental repairs not covered under a pay item shall be repaired during the PM process.**

NOTE 3: Tasks 34, 35, 36, 37, 43 and 44 shall be performed during the bench test procedure.

NOTE 4: Bench testing shall be performed using the *STEP* Program or the manufacturer's diagnostics software supplied with the controllers.

For items not listed in TABLE 2, the Contractor shall provide annual preventive maintenance in accordance with the following provisions:

(7) Annual Traffic Signal Head and Pedestrian Signal Head Preventive Maintenance

a. Traffic Signal and Pedestrian signal Heads

i. Contractor shall perform the following traffic signal and pedestrian signal head preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

ii. The scope of work for annual preventive maintenance of intersections with traffic signals and pedestrian signals installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	All traffic signals and pedestrians signals heads shall be inspected for damage and water-tight seal to prevent water intrusion	Annually
2	All mounting hardware, arms, clamps , lock nuts and banding straps shall be inspected for security, rust, cracks, corrosion, tears and fatigue	Annually
3	All traffic and pedestrians signal heads shall be checked for proper alignment and visibility with roadway and crosswalks	Annually
4	Tighten loose bolts, lock nuts, pole clamps and banding straps to prevent heads from easily being moved by wind or vibration	Annually
5	Traffic signals with back plates shall be checked for cracks, bends, and loose fasteners	Annually
6	Inspect each optical programmable traffic and pedestrian signal heads for proper masking and visibility	Annually
7	Check all signal faces to ensure that they a free of dirt, dust and debris; clean and wipe away dust and dirt to improve visibility	Annually
8	Check each LED module for the minimum initial and maintained minimum intensities; replace modules that do not meet manufacturer design and DDOT operational specifications as part of the preventive maintenance process	Annually

(8) Annual Traffic Poles and Associated Hardware Preventive Maintenance

a. Traffic Signal Poles and Hardware

i. Contractor shall perform the following push button preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

ii. The scope of work for annual preventive maintenance of intersections with traffic signal pole and related hardware installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	All pole shafts, mast arms and signal brackets shall be inspected for	Annually

	rust	
2	All seams and joints shall be inspected for cracks including cold welds, tears and fatigue	Annually
3	All anchor bolts including the anchor and leveling nuts shall be inspected for rust	Annually
4	Tighten anchor bolts and leveling bolts which are loose	Annually
5	Back plates should be checked for cracks, bends, and loose fasteners	Annually
6	Inspect horizontal and vertical angle of mast arms	Annually
7	Check alignment of mast arms	Annually

iii. Rust shall be removed with a wire brush, and stripped metal surface shall be primed and painted.

iv. Particular attention shall be directed to the base pole shafts and base of mast arms. A mast arm bracket or pole that show a joint failure or a scam failure shall be reported to the District before it is scheduled to be repaired or replaced.

v. Rust: If the rust has noticeably reduced the diameter of the anchor bolt, it shall be reported to the District before any repair is scheduled.

vi. Anchor Bolts: The pole shaft should be plumb when anchor and leveling nuts re tightened to the required torque.

vii. Back Plates: replace as required if cracks are severe and when fasteners cannot be tightened. Both back plates shall be replaced.

viii. Mast Arms: Correct any minor mast arm misalignment. If misalignment is not minor report it to the District.

ix. Contractor shall provide a list of all and mast arms that will be inspected.

x. Contractor shall paint poles and mast arms, if required upon approval by the Engineer. Remove rust and prime all poles and hardware prior to painting. It is estimated that roughly 10 percent of the traffic poles will need to be painted.

xi. Contractor shall provide documentation and reports of all pole and mast arms inspection on a weekly basis. These reports and documents are to be furnished to the TOA, Field Operations Division, Rear, 1338 G Street, S.E., Washington, D.C. 20003 in accordance with SP. 26, the Contract Specifications.

(9) Annual School Beacon and Flasher Beacons Preventive Maintenance:

a. School Beacons and Flasher Beacons

i. Contractor shall perform the following school flasher and flasher beacon preventative maintenance as specified in

these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

ii. The scope of work for annual preventive maintenance of locations with school beacons and flasher beacons installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	Check and test each school beacon and flasher beacon for proper operation per approach	Annually
2	Check and verify proper alignment of each school beacon and flasher beacon	Annually
3	Check and verify school flasher time switch for correct date and time and that it is programmed correctly	Annually
4	Check each beacon to ensure that they a free of dirt, dust and debris; clean and wipe away dust and dirt to improve visibility	Annually
5	Check each LED module for the minimum initial and maintained minimum intensities; replace modules that do not meet manufacturer design and DDOT operational specifications as part of the preventive maintenance process	Annually

All defective school beacons and flasher beacons and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

(10) Annual School Flasher Time Switch Preventive Maintenance:

a. School Flasher Time Switch

i. Contractor shall perform the following school flasher time switch preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

ii. The scope of work for annual preventive maintenance of locations with school flasher time switches installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	Check and test each time switch for proper operation	Annually
2	Check and verify programming and settings	Annually
3	Check each time switch to ensure that each is free of corrosion, dirt,	Annually

TASK NO.	Description	Inspection Interval
	dust and debris	
4	Check each time clock cabinet for damage, water intrusion and security	Annually
5	Check to ensure that cabinet mounting hardware is properly secured to the pole	Annually

All defective time switches and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

(11) Annual Driver Feedback Signs (DFS) Preventive Maintenance:

a. Driver Feedback Signs

Contractor shall perform the following Driver Feedback Signs (DFS) preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

The scope of work for annual preventive maintenance of locations with Driver Feedback Signs installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	Check and test each DFS for proper operation per approach	Annually
2	Check and verify programming and communications	Annually
3	Inspect each DFS for damage and water-tight seal to prevent water intrusion	Annually
4	Inspect all mounting hardware, arms, clamps , lock nuts and banding straps for security, rust, cracks, corrosion, tears and fatigue	Annually
5	Check each DFS display to ensure that each is free of dirt, dust and debris; clean and wipe away dust and dirt to improve visibility	Annually

All defective Driver Feedback Signs and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

G. Annual Accessible Pedestrian Signal (APS) Preventive Maintenance:

(1) Accessible Pedestrian Signals

a. Contractor shall perform the following Accessible Pedestrian Signal maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

b. The scope of work for annual preventive maintenance of intersections with Accessible Pedestrian Signal installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	Check and test each Accessible Pedestrian Signals for proper operation	Annually
2	Check and verify pedestrian push-button call input per phase	Annually
3	Test each APS for the appropriate audible beaconing for its surrounding environment	Annually
4	Check each APS for the appropriate pushbutton signage	Annually
5	Check each APS for damage, water intrusion and security	Annually

c. All defective Accessible Pedestrian Signals and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

H. Annual Actuated Intersection Traffic Detector Preventive Maintenance:

(1) Push Buttons

a. Contractor shall perform the following push button preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

i. The scope of work for annual preventive maintenance of intersections with pedestrian push-buttons installed includes, but is not limited to the following tasks:

TASK NO.	Description	Inspection Interval
1	Check and test each pedestrian push-button for proper operation per approach	Annually
2	Check and verify pedestrian push-button call input per phase	Annually
3	Check the proper operation of the Model 242 Two Channel D.C. Isolators	Annually
4	Check and verify the proper termination of four (4) conductor push-button cable	Annually

TASK NO.	Description	Inspection Interval
5	Check for the proper push-button signs and their alignment	Annually

All defective push buttons and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

(2) Loop Detectors

Contractor shall perform the following loop detector preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District.

The scope of work for the preventive maintenance of loop detectors and amplifiers includes, but is not limited to:

TASK NO.	Description	Inspection Interval
1	Check the roadway condition at and around the buried detector loop	Annually
2	Check the sealant along the surface of the buried loop and lead-in cable and its condition shall be reported to the District.	Annually
3	All inductive loop and lead-in cable, per approach, shall be checked and tested for short and open-circuits using a meg-ohmmeter and resistance to ground tester and its results recorded and forwarded to the District	Annually
4	Check and reposition, if required, to confirm microwave's zone of detection has not been shifted	Annually
5	Check the operation at the central unit and reset the sensitivity if necessary	Annually
6	Check for the proper operation and connection of the TCPS microwave detector card	Annually

All defective inductive loop detectors and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action in accordance with the reporting procedures described in SP 26.

(3) Detector Maintenance

a. Contractor shall perform the following traffic detector preventive maintenance as specified in these special provisions, and shall provide certified test results and documentation to the District.

I. LOOP DETECTOR

The roadway condition at and around the buried detector loop shall be checked. Potholes shall be reported to the District immediately. The sealant along the surface of the buried loop and lead-in cable shall be examined and the condition of the sealant shall be reported to the District.

J. AMPLIFIERS

(1) The detection zone of each detector shall be verified by observing the turn-on of the detector amplifier indicator as vehicles pass over it. Check that controller responds to detector operations.

(2) If necessary, detector amplifier shall be returned to manufacturer's requirements.

(3) All connectors shall be checked before inspection is complete.

(4) Microwave Detectors

a. Contractor shall perform annual microwave detector preventative maintenance as specified in these special provisions, and shall provide certified test results and documentation, both written and electronically to the District in accordance with reporting procedures described in SP 26.

The scope of work for annual preventive maintenance of microwave detectors includes, but is not limited to:

TASK NO.	Description	Inspection Interval
1	Check alignment of microwave detectors	Annually
2	Verify microwave detector call input per controller phase	Annually
3	Check if microwave is detecting vehicle - annually	Annually
4	Check and reposition, if required, to confirm microwave's zone of detection has not been shifted	Annually
5	Check the operation at the central unit and reset the sensitivity if necessary	Annually
6	Check for the proper operation and connection of the TCPS microwave detector card	Annually

(5) MICROWAVE

a. Microwave detectors shall be checked and repositioned if required to confirm their zone of detection has not been shifted. The operation at the unit shall be checked and sensitivity reset if necessary or verifies call input to controller phases.

b. All defective microwave detectors and its accompanying equipment will be documented, both written and electronically, and forwarded to the District for corrective action.

c. The detection zone of each detector shall be verified by observing the turn-on of the detector amplifier indicator as vehicles pass over it. Check that controller responds to detector operation.

d. All connectors shall be checked before inspection is complete.

K. CCTV Traffic Camera Preventive Maintenance

(1) Periodic Maintenance shall be performed on CCTV camera equipment every three months as follows:

TASK NO.	Description	Inspection Interval
1	Wipe interior of weather dome (Top)	3-months
2	Clean bottom dome interior	3-months
3	Clean bottom dome exterior	3-months
4	Coat exterior bottom dome with Rain-X Windshield Wax	3-months
5	Check dome for leakage	3-months
6	Clean CCTV Camera Interior and Exterior Dome	3-months

Specification and Procedures:

a. Wipe exterior of weather dome (top).

Clean bottom dome interior. Clean with manufacturer's recommended foam cleaner - Slide Plastic Cleaner with Foam action Part No.41515 Slide Products, Inc. Wheeling Illinois 60090, or engineer approved equal. Spray inside dome with cleaner and allow to drip until most foam has dripped off dome (minimum of one minute) Recoat interior with cleaner and wipe clean with clean lint-free soft cloth. Dry with another clean lint-free dry soft cloth. Two new cloths must be used on each dome interior. Reattach bottom dome to camera assembly, restoring integrity of dome seals.

b. Clean bottom dome exterior – Clean with manufacturer's recommended foam cleaner - Slide Plastic Cleaner with Foam

action Part No. 41515 Slide Products, Inc. Wheeling Illinois 60090, or engineer approved equal. Spray entire exterior bottom dome with cleaner and allow to drip until most foam has dripped off dome (minimum of one minute) Recoat with cleaner and wipe clean with clean lint-free soft cloth. Dry with another clean lint-free dry soft cloth. Two new cloths must be used on each dome exterior.

c. Coat exterior bottom dome with Rain-X Windshield Wax. Apply per manufacturer's recommendation using clean, dry, lint free cloths.

d. Care must be taken to change cloths frequently and as necessary to avoid scratching dome.

e. Check dome for leakage. Reseal top threads with RTV sealant or replace bottom dome seal as needed.

f. Clean CCTV Camera Interior and Exterior Dome

(2) Periodic Maintenance shall be performed on CCTV cameral equipment on an annual basis as follows:

TASK NO.	Description	Inspection Interval
1	Check CCTV camera alignment	Annually
2	Adjust camera mounting as required	Annually
3	Check camera housing and mounting hardware for security	Annually
4	Seal threads with RTV sealant	Annually

a. Align – tighten – Adjust camera mounting – Make sure camera housing is tightly fastened to mounting hardware and camera is aimed per engineering. Seal threads with RTV sealant.

(3) Measure of Payment

The measure of payment for Traffic Signal and CCTV Traffic Camera Preventive Maintenance Work will be in accordance with the contract line item number (CLIN)

Cost for Traffic Signal and CCTV Traffic Camera Preventive Maintenance Work will be paid for at the contract unit cost price for the Base Year and all Options Years for which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

60. DETECTABLE WARNING PAVERS ON SIDEWALK RAMPS

This S.P. supplements 609.

A. DESCRIPTION. This work shall consist of furnish and install detectable warning pavers in construction of new wheelchair ramps or retrofitting the existing ramps with detectable warning pavers or other locations as indicated and in accordance with the details shown on the plans and/or as directed by the Engineer.

(1) Payment for construction of detectable warning pavers on existing sidewalk ramps will, be included in Pay Item 609 204, including cutting to a neat line, excavation, and disposal of excavated materials, construction of necessary concrete base, furnishing and placing of materials for the completed work.

(2) Furnishing and placing of materials of detectable warning pavers in the construction of new wheelchair/bicycle ramps will be paid for under the pay item for the wheelchair/bicycle ramps.

B. DETECTABLE WARNING PAVERS/TRUNCATED DOMES.

(1) General - Detectable warning pavers shall consist of a surface of truncated domes aligned in a square grid pattern

(2) Dome Size - Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inches minimum to 1.4 inches maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 0.2 inches.

(3) Dome Spacing - Truncated domes in a detectable warning surface shall have a center-to center spacing of 1.6 inches minimum and 2.4 inches maximum, and a base-to-base spacing of 0.65 inches minimum, measured between the most adjacent domes on square grid.

(4) Size - Detectable warning surfaces shall extend 24 inches in the direction of travel
from the back of the curb for the entire width of the wheelchair ramp, landing, or blended transition.

(5) Rail Crossings - The detectable warming surface shall be located so that the edge nearest the rail crossing is 6 inches minimum and 8 inches maximum from the vehicle dynamic envelope.

(6) MATERIALS. Pavers will meet Americans with Disabilities Act (ADA) requirements for detectable warning pavers (truncated domes) either

ASTM C 902 Pedestrian and Light Traffic Paving Block, Class SX, Type 1; or ASTM C 936 Solid Concrete Interlocking Paving Units; or ASTM C 1272 Heavy Vehicular Paving Brick, Type R.

Listed below are the acceptable manufacturers and products or approved equal for detectable warnings and truncated domes pavers.

Manufactures	Products
Whitacre-Greer Fireproofing Company 1400 S Mahoning Ave Alliance, OH 44601	ADA Paver, 4"x8"x 2 ¼" Clear Red (Rustic) #30
Hanover Architectural Products 240 Bender Rd. Hanover, PA 17331	Detectable Warning Paver, 11 ¾" x 11 ¾" x 2" Red or Quarry Red
Endicott Clay Products PO Box 17 Fairbury, NE 68352	Handicap Detectable Warning Paver Nominal 4" x 8" x 2 ¼" Red Blend

(7) Pavers will be laid on top of a 4" un-reinforced concrete base. Setting bed and joints are to be mortared in accordance with manufacturer's instructions or with a maximum 1 1/2″ thick setting bed of latex modified cement mortar joints to a width not greater than 5/32" and not less than 1/16". Pavers shall not be directly touching each other unless they have spacing bars. Portion of concrete ramp that is thickened to 6" shall be extended such that a minimum 4" of concrete shall be beneath the brick pavers.

(8) Joints are to be flush with top surface and struck so as to give a smooth surface. Pavers shall be laid such that joints are level with adjoining joints so as to provide a smooth transition from brick to brick and brick to concrete surface. The top surface of any two adjacent units should not differ by more then 1/8" in height for mortared brick paving. Bricks shall be placed in a running bond pattern. Pavers that do not conform to the smoothness requirement shall be removed and replaced at the expense of the contractor as determined by the Engineer. Face of all brick shall be clean of cement and protected so as to avoid chipping during construction.

(9) Stamping or imprinting systems when used must be capable of uniformly providing the specified texture and pattern using the Department's standard class of concrete for sidewalks. The minimum dry static coefficient of friction, as defined by ASTM C-1028, shall be 0.80.

C. CONSTRUCTTON. The Contractor shall submit literature describing the following to the Engineer at least 30 days prior to the proposed installation:

a. The detectable warning paving material
b. All associated materials
c. Preparation requirements
d. In addition, a minimum 12" x 12" sample of the detectable warning material shall be submitted

(1) The manufacturer shall demonstrate in writing and by providing references that the detectable warning paving materials have been satisfactorily used for roadway, path or flooring applications, in high pedestrian use and under weather conditions similar to those experienced in the District, for a minimum period of five years.

(2) In no case shall the Contractor permit the application of any materials by untrained personnel or non-approved installers. The material manufacturer's certification of compliance with this requirement shall be provided to the Engineer.

(3) Prior to the start of work, the Contractor shall show evidence of successful completion of similar installations and provide a job site sample for the approval of the Engineer. The sample size shall be 4’x 2', minimum, and constructed at a location selected by the Engineer.

(4) As many test panels will be constructed as are necessary to achieve a sample panel that meets the satisfaction of the Engineer. All work shall conform to the appearance of the approved sample to the satisfaction of the Engineer. The sample shall not be incorporated into the work and will be removed when ordered by the Engineer.

(5) Follow all applicable manufacturers’ requirements for environmental conditions, surface preparation, installation procedures, curing procedures, and materials compatibility. The Contractor is responsible for removing any material spatters from areas. The Contractor shall repair any damage that should arise from the installation or the clean-up effort.

D. MEASURE. Detectable Warning Pavers on Sidewalk Ramps will be measured as specified below:

(1) DETECTABLE WARNING PAVERS ON EXISTING SIDEWALK RAMPS: The unit of measure will be the number of square yards of Detectable Warning Pavers installed.

(2) DETECTABLE WARNING PAVERS ON NEW CONSTRUCTION OF SIDEWALK RAMPS: No separate measurement will be made for the Detectable Warning Pavers.

E. PAYMENT. Payment for the Detectable Warning Pavers on Sidewalk Ramps will be made as specified below:

(1) DETECTABLE WARNING PAVERS ON EXISTING SIDEWALK RAMPS: Payment for Detectable Warning Pavers on Sidewalk Ramps will be made at the contract unit price per square yard as measured for Detectable Warning Pavers, which payment will include furnishing and placing all materials, tools, equipment, all labor and incidentals necessary to complete the work, including cutting to a neat line, excavation, and disposal of excavated materials, construction of necessary concrete base and repairs. No payment will be made for job site sample(s) and clean-up.

(2) DETECTABLE WARNING PAVERS ON NEW CONSTRUCTION OF STDEWALK RAMPS: Payment for the Detectable Warning Pavers on Sidewalk Ramps will be included in the contract unit price for the Wheelchair/Bicycle Ramp which payment will include furnishing and placing all materials, tools, equipment, all labor and incidentals necessary to complete the work. No payment will be made for job site sample(s) and clean-up.

61 HIGHWAY ADVISORY RADIO (HAR)

A. **Highway Advisory Radio Equipment**

DESCRIPTION: Includes the furnishing and replacement of a complete, fully operational, highway advisory radio (HAR) system, which includes a vertical whip antenna, FCC licensed transmitter, radial or triad grounding system on either a dial up or fiber-optic connection, and all necessary documentation and permits.

B. Measure of Payment

The measure of payment for highway advisory radio equipment will be in accordance with the contract line number (CLINS) for any traffic signal equipment replaced.

C. Cost for highway advisory radio equipment will be paid at the contract unit price for the base year and all option years for which payment will include all labor , materials, tools and incidentals necessary to complete the work.

62. DRIVER FEEDBACK SIGNS

A. Driver Feedback Signs (DFS)

(1) DESCRIPTION: Driver feedback signs are designed to communicate speed of travel to the driver through a combination of radar, LEDs and 3M™ Diamond Grade™ Fluorescent Yellow-Green Reflective Sheeting. Signs have a high impact, polycarbonate face with UV inhibitor and can be programmed to flash when motorists exceed the speed limit. Studies show feedback signs are effective in slowing motorists down.

(2) Power Provisions: Signs are AC powered for 24/7 operation or solar/battery power options. Features includes software for scheduling on/off times of operation, "slow now" message, and the ability to download speed data from the sign. Speed data is analyzed using 3M™ DFS Reporter Macro.

(3) District of Columbia Installations - DFB Series 100

a. The DFB-100: U.S. model available in 24x30-inch and 36x48-inch displays, AC power, with key-switch control and local serial port.

B. Measure of Payment

The measure of payment for driver feedback signs will be in accordance with the contract line number (CLINS) for any traffic signal equipment replaced.

C. Cost for driver feedback signs will be paid at the contract unit price for the base year and all option years for which payment will include all labor , materials, tools and incidentals necessary to complete the work.

63. TRAFFIC SIGNAL CONSTRUCTION SITE EMERGENCY MAINTENANCE RESPONSE

DESCRIPTION: The contractor shall respond to traffic signal complaints reported at intersections involving in process or ongoing construction and make temporary or emergency repairs to traffic signal equipment as necessary to restore the traffic signal to a safe operation according to the traffic signal sequence of operation in effect.

This S.P. supplements 105.09

A. Section 105.09, District of Columbia, Department of Transportation Standard Specification for Highways and Structures 2005, Revised 2007 outlines the requirement for construction contractors regarding roadway and structures at District of Columbia construction sites. The Construction Contractor is required

to maintain the roadway and structures, if included in the contract documents, and make all necessary repairs within the specified time period.

B. If a traffic signal or related equipment is reported to the District as malfunctioning, the District shall direct the maintenance contractor to respond and make temporary repairs were necessary at the reported construction site as follows:

(1) The maintenance contractor shall make temporary emergency traffic signal repairs as follows:

a. Restore "All-out" traffic signal to color operation
b. Restore "Flashing" signal to color operation
c. Perform temporary cable repairs
d. Realign twisted signals causing conflicting conditions
e. Remove knockdown poles and install temporary poles and signals if necessary
f. Replace LED modules or traffic lamps if found out.

C. The maintenance contractor shall document all repair activity per S.P 26 and inform the District within 1-hour of the repair activity and status.

D. The maintenance contractor shall advise the District that the malfunction is at a construction site.

(1) The District will notify the Construction Contractor of the discrepancy and the need to make any permanent repairs

(2) The Construction Contractor shall reimburse the District of all repairs made by the maintenance contractor due to their negligence.

E. Measure of Payment

The measure of payment for traffic signal construction site emergency maintenance work will be in accordance with the contract line number (CLINS) for any traffic signal equipment replaced.

F. Cost for traffic signal construction site emergency maintenance will be paid at the contract unit price for the base year and all option years for which payment will include all labor , materials, tools and incidentals necessary to complete the work.

64. IN-ROAD LIGHTING MAINTENANCE AT PEDESTRIAN CROSSWALKS

A. This S.P. supplements 2007-TS-006

B. The Contractor shall schedule and perform routine and technical maintenance on in-road lighting at pedestrian cross walks.

Standard Specifications for Highways and Structures 2007 Supplemental Specifications, Section 2007-TS-006 outlines the requirements for installation and operation of In-Road Lighting at pedestrian crosswalks

C. The Contractor shall schedule and perform routine equipment maintenance on a weekly basis or according to manufacturer's recommendations and requirements.

D. The Contractor shall schedule and perform technical maintenance according to manufacturer's recommendations and requirements anytime routine maintenance reveals a problem.

E. Measure of Payment

The measure of payment for the cost and expense pertaining to the maintenance of In-Road Lighting at pedestrian crosswalks will be according to the contract line item number (CLIN).

Cost for in-road lighting work at pedestrian crosswalks will be paid for at the contract unit cost price for the Base Year and all Options Years for which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

65 ROADWAY WEATHER INFORMATION SYSTEM EQUIPMENT MAINTENANCE

A. This S.P. supplements 2007-TS-005(h)

B. The Contractor shall schedule and perform routine and technical maintenance on roadway weather information system equipment and related components

Standard Specifications for Highways and Structures 2007 Supplemental Specifications, Section 2007-TS-005(h) outlines the requirements for installation and operation of roadway weather information system equipment and components

C. The Contractor shall schedule and perform routine equipment maintenance on a weekly basis or according to manufacturer's recommendations and requirements.

D. The Contractor shall schedule and perform technical maintenance according to manufacturer's recommendations and requirements anytime routine maintenance reveals a problem.

E. Measure of Payment

The measure of payment for the cost and expense pertaining to the maintenance of roadway weather information system equipment and components will be according to the contract line item number (CLIN).

Cost for roadway weather information system equipment and components will be paid for at the contract unit cost price for the Base Year and all Options Years for which payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work.

66 TRAFFIC SIGNAL PRIORITY CONTROL SYSTEM GPS/FHSS/LAN (Revised 02-20-08)

Equipment Specifications

The following specification is for a Wireless Traffic Signal Priority Control System, which utilizes secure Frequency Hopping Spread Spectrum (FHSS) data communications and Global Positioning System (GPS) technology to detect equipped bus, light rail, and emergency vehicles passing through predefined intersection approach zones and to place corresponding priority or pre-emption requests to intersection signal-control equipment. The system is capable of communicating wirelessly and through existing Local Area Networks (LANs) in traffic cabinets to enable remote monitoring, data collection, and configuration.

General Operation

A. The Traffic Signal Priority Control System shall consist of three main elements:

Vehicle Equipment, consisting of a GPS/UHF antenna mounted on top of the vehicle and a GPS positioning engine, 900 MHz FHSS data transceiver, and single board computer integrated in a single rugged cabinet for mounting inside the vehicle.

Intersection Equipment, consisting of a UHF antenna which mounts on the signal pole or on top of traffic cabinet and a Priority Detector consisting of a 900 MHz FHSS data transceiver and single board computer integrated into a single dual card assembly which plugs into the traffic cabinet's detector rack or a shelf-mount cabinet.

Systems Manager Software, consisting of an integrated suite of database, communications, and configuration tools for the setup, maintenance and operation of the Traffic Signal Priority Control System.

B. The Priority Detector installed in the traffic signal cabinet shall provide a signal that can be interpreted as a priority request by a local NEMA or 170-based traffic signal control when an equipped vehicle has entered a predefined area of an intersection's approach street. Intersection approach zones shall be rectangular geographic areas defined by the longitude and latitude of start and end points, zone width, and an allowable range of vehicle headings.

C. The position of equipped vehicles shall be determined by Wide Area Augmentation System (WAAS) enabled GPS technology using satellites operated by the US Department of Defense. Dead Reckoning (DR) augmentation of GPS position shall be implemented in the GPS engine. An onboard gyroscope element and vehicle speed sensor input shall be used to augment computed position accuracy in areas of limited satellite visibility such as urban canyons, large overpasses, and tunnels. The dead reckoning GPS position engine shall use Enhanced Kalman Filter (EKF) technology.

D. The system shall be capable of activating or deactivating a priority or pre-emption request signal to a traffic signal controller within two seconds of the equipped vehicle entering or exiting a predefined system intersection approach zone.

E. The start and stop point of detection in each equipped intersection's approach corridors shall be independently programmable by distance to the center of the intersection for each approach. The detection start and stop point shall be capable of being defined separately for each vehicle or class of vehicle.

F. The intersection approach zone length shall be programmable from 50 to 3600 feet. Under typical urban RF propagation conditions, the effective range of communications from vehicle to equipped intersection is 3,000 feet. The typical maximum useful intersection approach zone length in urban applications is 3,000 feet.

G. The width of the each intersection approach zone shall be programmable from 20 to 500 feet.

H. Each vehicle equipped with the priority control system shall have a vehicle identifier (ID) that is transmitted to the priority control detector located in the signal cabinet for recording request/activity.

I. Each intersection unit located in a traffic control cabinet shall have an intersection identifier (ID) such that it will only initiate a request when an equipped vehicle has crossed into a preprogrammed intersection approach zone established for that

particular intersection. Each traffic control cabinet unit shall record request/activity. The intersection ID may be changed with configuration software.

J. Wireless communications between the equipped vehicles and the associated equipped intersections shall be accomplished by a Frequency Hopping Spread Spectrum radio signal in the 900 MHz band using 256-bit AES coded radio transmission security. The RF equipment shall not require a government license to operate in the US or Canada.

K. The intersection equipment shall support RS-232 or 100Base-T Ethernet communications. The system shall be capable of remote monitoring of activity and configuration of intersection equipment through the existing IP traffic data network or wireless mesh communications.

L. Vehicle detection performance shall be consistent over the normal range of operating speed of equipped vehicles.

M. The vehicle and intersection equipment shall be configurable by any desktop or laptop computer using Windows XP as the operating system and having a serial or Ethernet port meeting minimum system requirements. The Systems Manager software shall be required for this task. Vehicle and intersection equipment shall be configurable over an IP network or via wireless communications.

N. Intersection approach zones shall be extended around curves or side streets by adding multiple overlapping zones. A direct line of sight between the vehicle and intersection antenna shall not be required for the priority request signal to be received by the intersection.

O. The system shall support test approach zones established in fire, bus, and light-rail maintenance facilities to verify proper operation of vehicle equipment without activating intersections.

Systems Manager Software

A. The Systems Manager software shall create and maintain a database of all equipped vehicle, equipped intersection, and intersection approach zone information. It shall be capable of graphically displaying user-programmed streets and approach zones for each intersection. The program shall be used as a repository for all system-wide information. It shall be capable of configuring required operating information into each piece of equipment and obtaining stored operation history from each device.

B. The following intersection and intersection approach zone information shall be stored in the Systems Manager database for each equipped intersection:

(1) Intersection ID (numeric only, 1 through 100 million)
(2) Intersection Code (agency's own alpha-numeric)
(3) Intersection Priority Detector IP address
(4) Intersection Center (latitude and longitude)
(5) Zone # (per approach to intersection)
(6) Route Street (main street name)
(7) Crossing Street (crossing street name)
(8) Start (beginning of zone, latitude and longitude)
(9) Finish (ending of zone, latitude and longitude)
(10) Heading (vehicle primary intended degree heading)
(11) Heading Variance (allows you to select the amount of acceptable variance in degrees for the approach heading direction)
(12) Heading Limits (degree counter-clockwise and clockwise)
(13) Directional Code (select direction N, E, S, W, aux.1, and aux.2)
(14) Zone Width (select how wide the detection zone rectangle is)
(15) Zone Type (fire, bus weekly m-f, bus weekend, or bus special event; Software functions 3-4 and 7-9 shall be capable of being set utilizing real-time data from vehicle equipment.)
(16) Zone distance or length (calculated by system)

C. The Systems Manager software shall be able to display and record an equipped vehicle's motion through an approach, save that information with a distinct file name, and later recall and replay the equipped vehicle's run graphically on an intersection map. This playback shall also indicate heading, speed, and distance to the intersection at each stored data-point.

D. The Systems Manager program shall print a vehicle configuration-zone table report having the following format and information:

Date: 9/20/2007
Vehicle Configuration Report
Vehicle ID Agency Class Unit # Priority Trans. Lgth. No Motion Shutdown
Zones Applied to this Vehicle
Zone# RouteStreet CrossStreet Intersection-ID Direction Time Description StartTime StopTime

E. The Systems Manager software shall be capable of collecting and organizing real-time vehicle GPS position data in order to create or modify the intersection and intersection approach-zone location database for each intersection in the system while the vehicle is passing through the area of interest.

F. The Systems Manager software shall support serial RS-232, Ethernet 100Base-T, or wireless communications.

G. The Systems Manager software shall retrieve, display and store activity log reports from the vehicle unit. Special report formats for emergency response and bus or light-rail mass transit shall be selectable by the user.

Vehicle Equipment

A. All vehicle equipment shall operate off any automotive 8-40 Volt DC power source.

B. Vehicle equipment shall be supplied with a minimum of 10 feet of cabling/wiring for each connection.

C. Vehicle equipment shall have a connector to support an optional remote control head which will have an "Active/Standby" switch and indicator lights for "Power On", "GPS Fix Acquired", "In Zone", and "Time Out".

D. Vehicle equipment shall be programmable with the following general identification and operational information:

(1) Vehicle ID (range 1 through 100 million)
(2) Agency (city agency using system)
(3) Class of Vehicle (engine, ladder truck, pumper, bus, police, snow plow, etc.)
(4) City Unit # (unit number or plate number issued by city)
(5) Priority Level (range 1 through 5)
(6) Transmission Length (maximum length of data transmission in milliseconds)
(7) No-Motion Velocity (transmitted request will end if vehicle falls below this speed for [No motion shutdown interval] seconds)
(8) No-Motion Shutdown Interval (If vehicle has fallen below [No-motion velocity] speed for this time in seconds, the transmitted request will cease.)

Traffic Control Cabinet Equipment (Priority Detector)

A. Priority Detector output shall provide a steady contact closure for Priority 1 and 6.25 HZ 50% duty cycle square wave output for Priority 2. Four main outputs are provided. Four auxiliary outputs shall be provided for use such as lower priority outputs, as required. One auxiliary output can be configured for use as a GPS timing signal. Each output signal will be optically isolated for 2500 volts.

B. Priority Detector shall be housed in the Traffic Signal Controller Cabinet and operate on 120 VAC and shall be equipped with its own power supply.

C. Priority Detector shall be capable of being housed in its own plug-in enclosure (supplied by the manufacturer) or fit in a NEMA or 170 Controller detector rack with slots designated for pre-emption or priority control.

D. Priority Detector indicator lights for Power On shall flash when power is applied to the detector unit. There shall also be indicator lights for signal received, active output/priority, and direction of signal or channel.

E. Priority Detector shall have a toggle switch to change pre-emptor between Standby and Active mode. Detector shall have a test switch for manual test of each output channel.

F. Priority Detector equipment shall be programmable with the following parameters:

(1) Time for call to remain on after loss of signal (in seconds)
(2) Intersection ID enable (Turn on or off intersection ID to activate unit)
(3) Output bit map N, E, S, W or 1, 2, 3, 4 (Select which of 8 output pins to activate for a particular direction.)
(4) Intersection ID (range 1 to 100 million)
(5) Limit to 1 output (the receiver can give one channel call at a time or more than one to the controller)
(6) Direction enable N, E, S, W or 1, 2, 3, 4 (turn on or off each direction or channel you wish to output)
(7) Minimum time duration (Unit will give an output signal for minimum amount of time after detection.)

G. Priority Detector will record the following detection information that can be printed or converted to electronic PDF format:

Intersection ID
Zone ID
Vehicle ID
Priority
Start Date
Start Time
Stop Date
Stop Time
Direction
Velocity
Heading
Termination Cause

H. Priority Detector shall have 4 Auxiliary NEMA Logic Level inputs that can be configured for various special tasks such as monitoring selected signal phases.

I. Priority Detector shall have the capability to send test signals between equipped intersections to verify proper operation of the RF link. Automatic daily testing and reporting of RF link performance can be scheduled over the traffic LAN using Systems Manager.

Special Mass Transit Capabilities

A. Systems Manager software shall have the capability to set specific priority-call request allow/disallow time schedules for city buses or rail lines. This is accomplished by compiling and storing a table of valid priority-call request time periods for each intersection approach zone. The zone time schedules are compiled from agency bus schedule information provided in varied formats.

B. Vehicle equipment shall be capable of being programmed by the Systems Manager software with passage time schedule data for Monday through Friday, schedule data for the weekend, and allow up to three special event schedules per day per vehicle

C. Vehicle equipment shall be capable of using status inputs from bus and light rail accessories such as fare counters, power doors, and wheelchair lifts to initiate, suspend, or extend priority requests.

67. TITLE VI DDOT TITLE VI ASSURANCE

During the performance of this Contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(1) COMPLIANCE WITH REGULATIONS

The contractor shall comply with the Regulations relative to Non-Discrimination in Federally Assisted Programs of the Department of Transportation, Title 49, Code of Federal Regulations, Part 21, (hereinafter referred to as the "Regulations"), as they may be amended from time to time, which are incorporated by reference and made a part of this contract.

(2) NON-DISCRIMINATION

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, gender or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. A contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) SOLICIATIONS FOR SUBCONTRACTORS, INCLUDING PROCUREMENTS OF MATERIALS AND EQUIPMENT

In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, gender, or national origin.

(4) INFORMATION AND REPORTS

The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts and other sources of information, and its facilities as may be determined by DDOT or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to DDOT, or the Federal Highway Administration, as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) SANCTIONS FOR NON-COMPLIANCE

In the event of the contractor's non-compliance with non-discrimination provisions of this contract, DDOT shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:

- withholding of payments to the contractor under the contract until the contractor complies, and/or

- cancellation, termination, or suspension of the contract, in whole or in part.

(6) INCORPORATION OF PROVISIONS

The Contractor shall include the provisions of paragraphs (1) through (6) of this Assurance in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontract or procurement as DDOT or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of this direction, the contractor may request DDOT to enter into such litigation to protect the interests of DDOT, and in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

68. DBE ASSURANCE:

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

69. SUBCONTRACTING:

This Special Provision supplements 108.01 of the Standard Specifications.

The subcontractor approval request form included herein should be used to request approval of subcontractors on this project. The form should be completed for each subcontractor requested for approval and submitted to:

Attention: Contracting Officer
Department of Transportation
55 M Street SE 7th Floor
Washington, DC 20003

A copy of this form is provided in the Appendices.

Copies of subcontracts shall be made available for review at any time by representatives of the Department of Transportation and the Federal Highway Administration.