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GP-SECTION 2 BIDDING REQUIREMENTS AND CONDITIONS

On page 7 of the Standard Specifications.

INSERT: The following:

GP-2.00 GENERAL

PREQUALIFICATION OF BIDDERS

Only the bid of a Contractor who holds a valid Baltimore County Prequalification Certificate 10 days prior to the date of Bid Opening will be considered. A Prequalified Contractor is one whose rating and classification have been determined by the Prequalification Committee and ratified by the Director of Public Works.

All applicants for prequalification must submit to the Department of Public Works the Contractor's Prequalification Application.

These forms may be obtained from the Division of Construction Contracts Administration or on the website at www.baltimorecountyonline.info/constructioncontracts. They must be filed with the Department of Public Works and 60 days should be allowed for processing. Prequalification must be obtained 10 days before the date of Bid opening.

A prospective bidder, when prequalifying, shall state in the application the extent and type of work the firm is considered himself qualified to handle at one time. The firm's experience shall show all principal public projects completed in the last three years, or, if none, the principal private projects. This information shall be the basis for a determination of the financial rating and work classification. Following this evaluation, the Contractor may receive a Certificate of Prequalification from the Director of Public Works.

A Prequalification Certificate, subject to the following provision, is valid for 12 to 36 months following date of issue. The County reserves the right to re-evaluate a Prequalified Contractor without cause. A bidder who holds a Prequalification Certificate shall furnish additional information bearing on the firm's qualification as may be required. The County reserves the right to reject, unopened, the bid of any bidder who fails to furnish promptly and properly all the information called for when so notified.

A Contractor, upon request, may review his/her prequalification file, except for the Reference Inquiry rating forms, which are confidential.

A Contractor, dissatisfied with the firm's rating or classification or both, may request a reconsideration on the basis of additional or revised information submitted to the committee in writing and may request a meeting with the committee to support the resubmittal.

Each bidder shall further qualify as otherwise called for in the Contract documents.

A prospective bidder may purchase plans if the firm's Prequalification Certificate is valid. Materials suppliers and other interested parties may purchase Plans without prequalification, such Plans to be marked: "NOT FOR BIDDING PURPOSES".

On page 10 of the Standard Specifications

GP-2.07 PROPOSAL GUARANTY

DELETE : In its entirety :

INSERT : The following :

No Proposal will be considered unless accompanied by a guaranty of the character and in the amount specified herein and in an amount not less than the specified dollar value indicated in the Proposal Form, made payable to Baltimore County, Maryland. The character of the guaranty must be a bid bond or certified check.

GP-SECTION 3
AWARD AND EXECUTION OF CONTRACT

On page 19 of the Standard Specifications

GP-3.02 RETURN OF PROPOSAL GUARANTY

DELETE : All terminology under this part in its entirety.

INSERT : The following :

Proposal guaranties of all but the lowest three bidders are considered released immediately following opening and review of the Proposals. The guaranties of the lowest three bidders are considered effective until a Contract Agreement is executed or until all bids are rejected.

On page 20 of the Standard Specifications

GP-3.03 PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

ADD : The following after “ (b) Performance and Payment Bonds.”

The Contractor shall be responsible for notifying the Baltimore County Traffic Engineering and Transportation Planning Bureau (887-3554) at least 14 days prior to laying the final base course and curb and gutter in the vicinity of intersections where traffic signalization may be modified or installed. When the Traffic Engineering and Transportation Planning Bureau is contacted, a schedule will be set up as to when representatives of the Bureau shall be on site to install all required poles and underground wiring.

The Contractor shall also be responsible for notifying the Traffic Engineering and Transportation Planning Bureau at least 14 days before laying the final course. At this time, the Bureau shall install detector loops on the final base course. When the Traffic Engineering and Transportation Planning Bureau forces are working on site, the Contractor shall schedule his forces so as not to conflict with the Bureau's operations.

The Contractor shall notify the Baltimore County Fire Department (887-4511) before starting any work involving the removal or relocation of existing fire hydrants.

The Contractor shall notify utility companies and public agencies at least 48 hours before digging. The name and number of the Utility Service Protections Center is: MISS UTILITY = 1 (800) 257-7777

Utilities which are non-participants in MISS UTILITY may be encountered.

**GP – SECTION 5
CONTROL OF THE WORK**

On page 35 of the Standard Specifications

GP-5.14 FILING OF CLAIM BY CONTRACTOR

ADD : As paragraph (e) :

- (e) The chief of the Bureau of Engineering and Construction, as referee, shall decide any and all claims. The written decision of the Chief of the Bureau of Engineering and Construction shall be final and binding unless disputed in writing to the Director of Public Works within 30 days of delivery to the parties.

GP-5.15 DISPUTES

DELETE : In its entirety.

INSERT : The following :

- A. Subject to, and without in any way enlarging or limiting the other provisions of this Contract, the parties to any agreement which adopts by reference these Specifications, do appoint the County Administrative Officer as “Arbiter” pursuant to the Maryland Uniform Arbitration Act.
- B. The parties further grant the County Administrative Officer the right to delegate this responsibility and authority in writing to a registered Professional Engineer, independent of the Bureau of Engineering and Construction, or to any other independent person, agency or association.
- C. The decisions of the “Arbiter” shall be final and binding on both parties, subject only to such appeals as are established by the Maryland Uniform Arbitration Act.
- D. No dispute is to be brought before the County Administrative Officer under this provision which has not first been reviewed and decided by the Chief of Engineering and Construction, serving as referee.

GP-SECTION 7
LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

On page 38 of the Standard Specifications.

GP-7.01 COMPLIANCE WITH THE LAWS

DELETE : Paragraph (c) in its entirety.

INSERT : The following :

- (c) Although Baltimore County, Maryland is exempt from the requirements and provisions of Title 21 of COMAR, direct references to specific COMAR articles contained in Standard Specifications are adopted as if copied herein, unless this conflicts with the Charter or public local laws of Baltimore County, Maryland.

On page 41 of the Standard Specifications.

GP-7.07 DETOURS

ADD : The following as second paragraph:

Before using a specified or approved detour route, the Contractor shall notify the Traffic Engineering and Transportation Planning Bureau (410-887-3554) seven (7) days in advance of road closure. The Traffic Engineering and Transportation Planning Bureau will issue a road closure permit notifying the necessary governmental agencies.

On page 53 of the Standard Specifications.

GP-7.31 SMALL BUSINESS PROCUREMENTS

DELETE : In its entirety.

INSERT : The following :

If the solicitation for bid indicates that this procurement has been designated for a small business set-aside, notice will be provided in the Special Provisions or as an attachment to the Proposal.

**GP – SECTION 8
PROSECUTION AND PROGRESS**

On page 57 of the Standard Specifications.

GP-8.05 LIMITATIONS OF OPERATIONS

ADD : The following as second paragraph:

No work, except for emergencies, shall be done on Saturdays, Sundays or holidays without the prior approval of the Engineer. Approval to work on Saturdays, Sundays and holidays shall be obtained 48 hours in advance.

**GP-SECTION 9
PAYMENT**

DELETE : In its entirety :

INSERT : The following :

This section does not apply to this Contract.

TERMS AND CONDITIONS

TC SECTION 4 CONTROL OF WORK

TC-4.01 WORKING DRAWINGS.

(a) General.

On page 96 of the Standard Specifications.

ADD: The following after the last paragraph.

Four (4) sets of working drawings shall be submitted for review of the Engineer. The submittal should be sent to Attention: Design Division Section Chief, The Bureau of Traffic Engineering and Transportation Planning, 111 West Chesapeake Avenue, Room 326, Towson, Maryland 21204.

If the County will be working on an SHA project, the Contractor will be required to follow the SHA submittal requirements and will be required to have all submittals approved before starting the project. Otherwise, the Contractor can submit four (4) sets of working drawings to the County as required above.

TC SECTION 7

PAYMENT

DELETE: In its entirety.

INSERT: The following:

GP-Section 9 (Payment) is not applicable to this Contract. The provisions of TC-Section 7 shall apply.

TC-7.01 MEASUREMENT OF QUANTITIES

For all items of work, other than those to be paid by lump sum, after the work is completed and before final payment is made, the Engineer will make final measurements to determine the quantities of various items of work performed as the basis for final settlement. The Contractor in case of unit price items will be paid for the actual amount of work performed and for the actual amount of materials in place, in conformance with the Specifications and final measurements. All work completed under the Contract will be measured by the Engineer in conformance with the standards of weights and measures recognized by the National Bureau of Standards.

All longitudinal measurements for area will be made along the actual surface and not horizontally, and no deductions will be made for individual fixtures having an area of 9 square feet or less. For all transverse measurements for area of base course and pavements, the dimensions to be used in calculating the pay area will be the neat dimensions shown on the Plans or ordered in writing by the Engineer.

Structure measurements shall conform to the neat lines shown on the Plans or as directed in writing, unless otherwise provided for elsewhere in the Contract Documents.

Volumes of excavation, tamped fill, and borrow pits will be calculated per cubic yard from the cross section and the use of average end area formulas. Volumes of other work such as masonry, removal of masonry, etc. will be calculated using arithmetical formulas. Where the volume is bounded by varying dimensions and there are no simple volumetric formulas applicable, frequent cross sections will be taken and the cubic yard volume computed from average end area formulas.

Cement will be measured by weight.

All items which are measured by the linear foot such as pipe culverts, traffic barrier, underdrains, etc. will be measured parallel to the base or foundation upon which such structures are placed unless otherwise specified in the Contract Documents.

The term gauge when used in connection with the measurement of uncoated steel sheet and light plates shall mean the U.S. Standard Gauge, except that when reference is made to the measurement of galvanized or aluminum sheets used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing, the term gauge shall mean that specified in M 36, M 167, M 196 or M 197.

When the term gauge refers to the measurement of wire, it shall mean the Washburn & Moen wire gauge as referenced in the New Departure Handbook. A tolerance of plus or minus 0.003 inch shall apply.

The term ton shall mean the short ton consisting of 2000 pounds avoirdupois. All materials, which are specified by the ton, shall be weighed on accurate, approved scales conforming to the requirements of the National Bureau of Standards Handbook 44. A digital recorder and printout shall be required on all truck scales. The digital recorder shall produce a printed record of the gross, tare, net weights, the time, date, truck identification, and Contract number. Provisions shall be made so that the scales may not be manually manipulated during the process. The system shall be interlocked to allow printing only when the scale has come to rest.

Except for computer operated scales, all weights shall be certified by a bonded weigh person supplied by the Contractor, producer, or supplier. The security bond shall be one hundred thousand dollars (\$100,000).

If the material is shipped by rail, the car weight shall be accepted but the payment will be limited to the actual weight of material. Car weight will not be acceptable for material to be passed through mixing plants.

All materials for which measurements are obtained by the cubic yard shall be hauled in approved vehicles and measured at the point of delivery. No allowance will be made for the settlement of material in transit. Approved vehicles for this purpose shall be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. Unless all approved vehicles are of uniform capacity, each approved vehicle shall bear a plainly legible identification mark indicating the specific approved capacity. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.

When requested by the Contractor and approved by the Engineer in writing, material specified to be measured by the cubic yard may be weighed, and the weight will be converted to cubic yard for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Laboratory and shall be agreed to by the Contractor before the method of measurement of pay quantities will be approved by the Engineer.

Liquid asphalt material delivered for the project will be measured by volume in each railroad tank car, tank truck, distributor tank, or drums in which it is delivered. The measurements will be taken when the asphalt material is of a uniform temperature and free from air bubbles, and the temperature of the material will be recorded.

The volumetric measurement of the asphalt material will be based upon a temperature of 60 F.

Reference is made to D 1250, Petroleum Measurement Tables.

Only the quantity of asphalt material actually placed in the work and accepted will be considered in determining the amount due the Contractor.

Timber will be measured by the thousand board foot measurement (MBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term lump sum when used, as an item of payment, will mean complete payment for the unit of work described.

When complete structure or structural unit (in effect, lump sum work) is specified as the unit measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured in hours of actual working time, moving in and moving out costs, if any, and necessary traveling time of the equipment within the limits of the project except when special conditions make some other method of measurement desirable.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIAL

When the Contractor requests payment allowance for materials, the following terms and conditions shall apply:

- (a) For superstructure members delivered on the project site, an allowance of 100 percent of the material cost plus freight charges as invoiced may be made provided the cost does not exceed 90 percent of the Contract price of the applicable Contract item. The allowance will be based upon validated invoices or bills for material including freight charges, and a copy thereof shall be made a part of the documented records for the project.
- (b) For reinforcement steel, piling, pipe, traffic barrier, signs and sign assemblies, and other nonperishable material in storage on the project, but excluding aggregates, cement, seed, plants, fertilizer or other perishable items, an allowance of 100 percent of the invoiced cost of the material plus freight charges to the Contractor may be made provided the cost does not exceed 90 percent of the Contract price of the applicable Contract item. Such material shall be delivered and stock-piled at the project site after being tested by the Administration and found to have conformed to the Specifications or to have been accepted under an approved certification program prior to the allowance.
- (c) No allowance will be made for fuels, form lumber, falsework, temporary structures, or other materials of any kind, which will not become an integral part of the finished construction. No payment for stored material will be made if it is anticipated that the material will be incorporated into the work within 30 days of the written request. Only end product manufactured material or fully fabricated products that are awaiting installation or incorporation into the finished work are eligible for prepayment. Components, elements, or ingredients of a finished product are not eligible for prepayment.
- (d) Material for which an allowance is requested shall be stored in an approved manner in areas within the State of Maryland where damage is not likely to occur. If any of the stored materials are lost or become damaged in any manner, the Contractor shall be responsible for repairing or replacing the damaged materials. The value of the lost or damaged material will be deducted from the Contractor's subsequent estimates until replacement has been accomplished. The request for allowances for any materials stored on private property within the State of Maryland shall be accompanied by a release from the owner and/or tenant of such property agreeing to permit the removal of the materials from the property at no cost to the Administration. The material shall be clearly marked with the Administration's Contract number on individual units. If the material is normally shipped to the project in bundles or other forms of packaging, the Administration's Contract number shall be clearly marked or affixed to the package. When the material is not stored at the actual project site, the material shall be physically separated by fencing or equivalent barrier from other materials stored at the same site. The material shall be accessible to the Administration at all times.

When it is considered impractical to store materials on the actual project, the Engineer may approve storage areas in the vicinity of the actual project which will be considered at the project site.

When storage of the materials within the State of Maryland is not practical, approval shall be obtained from the District Engineer for storage elsewhere. Storage of materials outside the State of Maryland will be subject to the conditions set forth in this provision and limited to materials exceeding twenty-five thousand dollars (\$25,000), which are designed and fabricated exclusively for use on a specific project.

- (e) Material for which payment has been made either wholly or partially shall not be removed from the approved location until such time that it is to be incorporated into the work unless authorized by the Engineer.
- (f) The Contractor shall submit a written request for payment to the District Engineer at least two weeks prior to the estimate cutoff date established by the District Engineer. The following items shall accompany the written request for payment:

 - (1) Consent of surety specifying the material type and the item(s) in which the material is to be used.
 - (2) Validated invoices with the signature of an officer of the company supplying the material showing actual cost.
 - (3) A notarized statement from the Contractor attesting that the invoices as submitted do not include charges or fees for placing, handling, erecting, or any other charges or markups other than the actual material cost, sales tax(es), if applicable, and freight charges.
 - (4) Bills of lading showing delivery of the material. The request for allowances for any materials stored on property outside the State of Maryland shall be accompanied by a release from the owner or tenant of such property agreeing to permit verification by the Inspector that the material is stored at the approved location, and to permit the removal of the materials from the property at no cost to the Administration.
 - (5) Inspection test reports, certifications and/or a written statement from the Inspector attesting to the inspection and approval of the material. Upon receipt of the above by the District Engineer and verification by the Inspector that the material is stored at the approved location, the District Engineer will authorize payment.
 - (6) A statement explaining why the material can not be stored on the project, if the Contractor is requesting to store material at a location other than the project site. The statement shall include the methods of storage, separation, and identification to be used by the Contractor. The Contractor shall provide a method of inventory control and withdrawal, which is satisfactory to the Administration, and shall be used by the Contractor to monitor materials not stored on the project.
 - (7) A breakdown of the Contract line item bid unit price showing the relationship of the cost of the stored material to the costs of all other materials, labor, and components of the work included in the Contract line item unit price bid by the Contractor.

Upon receipt of the above by the District Engineer and verification by the Inspector that the material is stored at the approved location, the District Engineer will authorize payment.

The Contractor shall pay the material provider the amount shown on the invoice within 10 days of receipt of payment from the Administration. Evidence of payment shall be provided to the Administration. Failure to make invoice payments as specified will be cause to deduct the monies from future estimates and/or deny future stored materials payment requests.

Copies of all pertinent data shall be made by the Contractor and distributed to the Inspector for retention as part of the documented records for the project.

TC-7.03 FORCE ACCOUNT WORK

When the Contractor is required to perform work as a result of changes to the Contract for which there are no applicable unit prices in the Contract, the Engineer and the Contractor shall make every effort to come to an agreed price for the performance of such work. If an agreement cannot be reached, the Engineer may, in writing, order the work done on a Force Account basis, to be compensated in accordance with the following:

- (a) **Labor.** For all labor and for foremen in direct charge of the specific operations, the Contractor shall receive the rate of wage agreed upon in writing before beginning work for each and every hour that said labor and foremen are actually engaged in such work, to which cost shall be added an amount equal to the percentage of the sum shown below. No additional allowance will be considered for Bond, insurance, taxes, or other fringe benefits.

Highway Contracts	65%
Utility Contracts	75%

- (b) **Materials.** For materials accepted by the Engineer and used for the work, the Contractor shall receive the actual cost of such materials delivered to the site. This cost includes transportation charges paid by him, exclusive of machinery rentals, to which cost shall be added an amount equal to twenty percent (20%) plus the prevailing Maryland State sales tax.

(c) **Subcontractors.**

- (1) When an item of work is performed on a Force Account basis by a subcontractor who is approved for this work by the Engineer, an amount equal to 10 percent (10%) of the total cost shall be added to the final payment for such Force Account work.
- (2) The amount of compensation thus realized by the additional 10 percent (10%) of the cost of the work performed shall be considered as full compensation to the Prime Contractor for the administration of the work performed by the subcontractor under the Force Account basis.
- (3) No additional compensation will be allowed unless the Contract embraces work requiring the use of particular trades or specialty subcontractors to do the work. The assignment of work from one contractor to another to equalize their workloads does not qualify the Contractor to whom the work has been assigned as a subcontractor under the intent of these specifications.

- (d) **Equipment.** For any machinery or special equipment approved for us (other than small tools), including fuel and lubricants, the Contractor shall receive the rental rates and

operating cost agreed upon in writing before such work is begun for the actual time such equipment is authorized on the work. The rental rate and operating cost, including fuel and lubricant but excluding operators, shall be the current rates from the Rental Blue Book for the Construction Equipment and/or the Rental Blue Book for the Older Construction Equipment both published by Primedia.

- (1) Rental rate shall be based on the weekly rate converted into hours.
To compute hourly rate, use:

8 hours per day
40 hours per week
176 hours per month

- (2) Both rental rate and operating rate will be subject to area adjustment per the Rental Rate Blue Book for Construction Equipment and/or The Rental Rate Blue Book for Older Construction Equipment. No other allowances or additions will be paid.
- (3) Rental rate will be applied to both idle time and operating time authorized. Operating rate will be applied to operating time only.

(e) Superintendence. No additional allowance shall be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

(f) Compensation. The compensation as set forth above shall be received by the Contractor as payment in full for extra work done on a Force Account basis. At the end of each day, the Contractor's representative and Inspector shall compare records of the cost of work as ordered on a Force Account basis.

(g) Statements.

No payment will be made for work performed on a force account basis until the Contractor furnishes the Engineer duplicate itemized statements of the cost of such force account work detailed as to the following:

- (1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman;
- (2) Designation, dates, daily hours, total hours, rental rate and extension for each unit of machinery and equipment;
- (3) Quantities of materials, prices and extensions;
- (4) Transportation of materials;
- (5) Payments of items under (g)(1) shall be accomplished by copies of certified payrolls. Under (g)(2) original receipted invoices for rentals must be provided if requested by the procurement officer. Paragraphs (g)(3) and (g)(4) shall be accompanied by original receipted invoices for materials used and transportation charges. If, however, the materials used in the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the original invoices the statements shall contain or be accompanied by an affidavit of the Contractor which shall certify that such materials were taken from his stock, that the quantity claimed was actually used

and that the price and transportation of the material as claimed represent actual cost. Any request for payment under this Section shall be submitted in the order outlined by the above.

TC-7.04 SCOPE OF PAYMENT

- (a) Payments to the Contractor will be made for the actual quantities of contract items performed in accordance with the Plans and Specifications and if, upon completion of the construction, these actual quantities show either an increase or decrease from the quantities given in the bid schedule, the contract unit prices will still prevail, except as provided in GP-4.04 or contract modifications.
- (b) After the work is completed and before Final Payment is made, the Engineer shall make final measurements for all items of work, other than those paid by lump sum, to determine the quantities of various items of work performed as the basis for final settlement. In case of unit price items, the Contractor will be paid, in accordance with these Specifications, for the actual amount of work performed and for actual amount of materials in place as shown by the final measurements. All work completed under the Contract shall be measured by the Engineer according to the standards of weights and measures recognized by the National Institute of Standards and Technology.
- (c) Except as herein provided, the Contractor shall accept the compensation as herein provided:
 - 1. In full payment for furnishing all materials, lab, or tools equipment and incidentals necessary to the completed work and for performing all work contemplated and embraced under the Contract;
 - 2. For all loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work and until its final acceptance by the Engineer;
 - 3. For all risks of every description connected with the prosecution of the work; and
 - 4. For all expenses incurred in consequence of the suspension of the work as herein authorized.
- (d) Where the "Basis of Payment" clauses in the Specifications relating to any unit price in the bid schedule require that the said unit price cover, and be considered, compensation for certain work or material essential to the item, this same work or material shall not also be measured or paid for under any other pay item which may appear elsewhere in the Specifications.
- (e) The payment of any partial estimate or of any retained percentage except by and under the approved final estimate and voucher, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damages due to such defects.

TC-7.05 PROGRESS PAYMENTS

- (a) Current Estimates.

- (1) **Lump Sum Contracts.** If requested by the Administration, the Contractor shall furnish an acceptable breakdown of the lump sum Contract price showing the amount included therein for each principal category of the work. Said breakdown shall be in such detail so as to provide a basis for estimating monthly progress payments.
- (2) **Monthly Estimates.** Each month the Administration will pay the Contractor for the Contract value of the work satisfactorily performed during the preceding calendar month, including authorized extras and additions less 5 percent. The 5 percent of the total Contract value retained by the Administration will not be released until final payment (unless partially released in a semi-final payment). Current estimates will be based upon the procurement officer's estimate of quantity (including materials and/or equipment complete in place) satisfactorily performed. In the instance of lump sum items, the procurement officer's estimate shall be the proper fraction of the lump sum items satisfactorily performed during the preceding month. All quantities, estimates, and fractions will be reasonably accurate approximations and are subject to correction (a) in subsequent current estimates, (b) in any semi-final estimate and, (c) in final payment. Any and/or all partial payments may be withheld in the event current requirements of the Specifications have not been complied with by the Contractor. Should either the procurement officer or the Contractor be of the opinion that any estimates, quantities and/or fractions (either as to an individual current estimate or accumulations thereof) do not represent a reasonably accurate approximation of actual work, then details questioned shall be reviewed and then any corrections adjusted for in the next current estimate.

Deferred Monthly Payment. Should the amount(s) due the Contractor for any one month be less a Five Hundred dollars (\$500.00), payment will be deferred until such time as the amount(s) due the Contractor under subsequent estimates, combined with that month for which the amount(s) due was less than \$500.00, shall equal Five Hundred dollars (\$500.00) or more.

(b) Semi-Final Estimate Payments.

- (1) Upon completion of the project and the acceptance by the Administration of the project for maintenance, the Administration, at the Contractor's request and with consent of surety, will pay the Contractor, within 45 calendar days of said request, what is hereby known as a semi-final estimate payment. Such a semi-final estimate payment will be based upon (a) quantities the Administration has computed and set up as proposed final quantities and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities, which the Administration sets forth as proposed final quantities, shall be so designated. To arrive at the amount of semi-final estimate payment there shall be deducted from the apparent estimated value of the Contract (a) total of all amounts previously paid to the Contractor as current estimates and (b) sums deemed chargeable against the Contractor properly deductible, including liquidated damages, and as a retainage, and an amount equal to 2 percent of the total value or \$2,000.00, whichever is greater.
- (2) In cases where there has been substantial completion of the project and there are remaining only inconsequential or minor work items such as painting, seeding, mulching, or planting to be completed and such items cannot be completed for an extended period of time because of seasonal or weather

conditions, here shall be made a semi-final inspection and if the work completed is found by the Administration to be satisfactory, then there is deemed to be partial acceptance on the entire project except for the uncompleted work items. Upon the above referred to partial acceptance, the Administration, within 45 days from such partial acceptance, upon request of the Contractor and with consent of surety, shall pay to the Contractor, what is hereby known as a partial semi-final estimate payment. Such a semi-final estimate payment will be based upon (a) quantities the Administration has computed and set up as proposed final quantities and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities, which the Administration sets forth as proposed final quantities, shall be so designated. To arrive at the amount of semi-final estimate payment, there shall be deducted from the apparent estimated value of the Contract (a) total of all amounts previously paid to the Contractor as current estimates, and (b) sums deemed chargeable against the Contractor properly deductible, including liquidated damages, and as a retainage, a sum equal to 2 percent of the total value of the Contract. [Said retainage is not to be less than Two Thousand dollars (\$2,000)].

TC-7.06 FINAL ACCEPTANCE AND FINAL PAYMENT

- (a)** When the Contractor has completed a Contract, and it has been accepted for maintenance in accordance with the provisions of GP-5.13, the Engineer will promptly proceed:
 - (1)** To make any necessary final surveys;
 - (2)** To complete any necessary computation of quantities; and
 - (3)** To submit to the Contractor, within 60 days after final completion and acceptance of the project by the procurement officer for maintenance, for his consideration, a tabulation of the proposed final quantities. This tabulation shall be accompanied by a statement setting forth: (a) the additional work performed under change orders and/or supplemental agreements; (b) the authorized extension of time; (c) the number of days which have been charged against the Contractor as having been used to complete the Contract, and (d) any deductions, charges or liquidated damages which have been made or imposed.
- (b)** The Contractor shall then have a period of 20 calendar days, dating from the date upon which he received the aforementioned tabulation from the Engineer, in which:
 - (1)** To decide whether or not he will accept final payment upon such a basis, and
 - (2)** To notify the Engineer, in writing, of his decision. The Contractor may request an additional period up to 10 calendar days in which to notify the Engineer of his decision. In the event, the Contractor notifies the Engineer that he protests final payment on such a basis, that notification shall outline the reason(s) for said protest.
- (c)** Upon receipt of a notification of acceptance as provided for in paragraph (b) above (or in the event of no response), the County shall prepare the Final Estimate and Final Payment Forms and submit the Final Payment check to the Contractor. Such action by the County shall be deemed to constitute acceptance and final payment.

- (d) If, under the provisions of paragraph (b) above, the Contractor notifies the Engineer of his protest and non-acceptance of the data submitted to him, the Engineer shall pay the Contractor a semi-final estimate, or an additional semi-final estimate in the event a semi-final estimate has already been paid based upon the data noted in paragraph (a) above, with deductions for all prior payments. A retainage equal to 1.5 percent of the total value of the Contract shall be withheld by the Engineer. The acceptance of such semi-final estimate, or additional semi-final estimate, shall not be considered as a waiver on the part of the Contractor of his right to pursue his protest and press for acceptance and final payment.
- (e) In the event the Contractor does not accept the data submitted to him as described in paragraph (a) above and/or has outstanding a claim filed in accordance with GP-5.14, the procurement officer and the Contractor shall confer at mutually convenient times and endeavor to reconcile all points of disagreement expeditiously. If such reconciliation is accomplished, the Engineer will promptly proceed with acceptance and final payment on the reconciled basis and in accordance with the provisions of paragraph (c) above. If reconciliation is not accomplished within 30 days, the decision of the Engineer shall be submitted to the Director of Public Works as a dispute for arbitration in accordance with GP-5.15 Disputes.
- (f) All prior partial estimates and payments shall be subject to correction at the time of acceptance and final payment and if the Contractor has been previously overpaid, the amount of such overpayment shall be set forth in the Final Payment forms and the Contractor hereby agrees that he will reimburse the Administration for such overpayment within six months of receipt of such advice, and his surety will not be granted release from obligations under the terms of the Contract until reimbursement has been made in full. It is further agreed that the County can withhold the overpayment from other accounts due and payable to the Contractor.
- (g) Payment for the full apparent value of the Contract thus determined shall become due and payable to the Contractor within ninety (90) days after acceptance of the project by the procurement officer for maintenance, as hereinafter provided. Contractor's acceptance of final payment shall be considered a general release of all claims against the County arising out of, or in any way connected with, this Contract.

TC-7.07 LATE PAYMENTS

Notwithstanding any other provision in this Contract, the Contractor hereby waives the right to predecision interest.

TC-7.08 ELIMINATED ITEMS

Should any Contract items contained in the Invitation for Bids be found unnecessary for the proper completion of the work contracted, the Engineer may, upon written order to the Contractor, eliminate such Contract items from the Contract and no allowance will be made for items so eliminated in making final payment to the Contractor except for material costs incurred prior to notification of the elimination of the items.

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.00 - GENERAL

INSERT: The following after the second paragraph.

If it is necessary to close a road to facilitate a work activity, the Contractor shall request a road closure by first contacting the appropriate project manager, as listed on the plans, to request the closure. If approved, the Contractor must submit a detour plan a minimum three weeks before the road is to be closed.

Two-way traffic shall be maintained at all times, using flaggers to control alternating directions if necessary. A minimum ten (10) foot travel lane is required at all times.

Provisions shall be made for safe maintenance of pedestrian and bicycle traffic, subject to approval of the County Inspector.

Sidewalks must be properly signed as being closed and alternate pedestrian crossing must be provided and maintained at all times. If a sidewalk is to remain open after a work activity, it must be filled with a temporary passable fill material, which has been approved by the Inspector prior to the Contractor being able to use said material to maintain pedestrian walkways. Removal of this fill material will be incidental to the installation of the sidewalk or maintenance of traffic for a particular work assignment.

Access shall be maintained to all driveways unless permission for closure is granted by the property owner/manager. However, accessibility for emergency vehicles shall be maintained at all times.

An arrowboard shall be used for every lane closure of more than fifteen (15) minutes duration and shall be placed as in the approved TCP.

All Contractor vehicles stopped in the travel way shall have four-way flashers, and prominently mounted yellow strobe lights for no more than fifteen (15) minutes.

No hazardous materials or equipment shall be stored within public right-of-way.

Pavement excavation shall be limited to a maximum of half the roadway surface at any time.

Reflectorized traffic drums shall be placed on the traffic side of any excavation and at the ends of trenches in intervals not to exceed 10 feet.

Excavated materials shall be stored on the furthest side of the roadway from moving traffic whenever possible, out of sightlines that could create unsafe conditions.

All excavation(s) in the roadway shall be paved to level grade or plated before the end of any day's work and the roadway reopened to its full cross-section.

If the roadway is plated, "STEEL PLATES AHEAD" signs shall be placed approximately 250 feet in advance of any steel plates. Plated excavations will remain plated until the excavation is paved to level grade.

If it is necessary to restrict parking to facilitate a work activity, it is the Contractor's responsibility to take appropriate steps that are necessary to restrict parking.

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION.

INSERT: The following after the section's last paragraph.

Work Restrictions.

Work performed under this Contract shall normally be done between sunrise and sunset. No work involving lane closure or other roadway occupation that reduces traffic capacity, shall be performed between 06:30 to 09:00 hours and 15:30 to 18:30 hours of any weekday. Full traffic carrying capacity shall be restored at the end of each workday. (In the event that the Contractor may be required to work during non-work times or non-work week days, the Engineer may grant a specific exceptions to the permitted work times.)

No work shall be permitted, in or out of the travel way, on Saturdays, Sundays, or County Holidays, except as specifically authorized by the Engineer.

Work is not permitted on the holidays indicated below:

- New Year's Day, January 1
- Memorial Day, the last Monday in May
- Independence Day, July 4
- Labor Day, the first Monday in September
- Thanksgiving Holiday, the fourth Thursday and the fourth Friday in November
- Christmas Day, December 25

When **accelerated work, critical work, emergency work or night work** requires immediate execution, prior verbal consent to work on the otherwise prohibited days or time of day may be requested of the Engineer by the Contractor.

When a temporary lane or shoulder closure is in effect, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings, if necessary, and shall discuss traffic control and the Traffic Control Plan including procedures to be implemented for lane closures for the Contractor's traffic signal construction.

All lane closures shall be in conformance with the approved TCP and under the direction of the Contractor's Traffic Manager and the Engineer.

The Engineer has the authority to select which TCP is to be implemented and/or modified as deemed necessary. The Inspector has the authority to order the Contractor to stop work and

vacate the public right-of-way if the appropriate work zone traffic controls are not in compliance with an approved TCP.

Temporary lane or shoulder closures shall be restored at the end of the closure period and no travel lane shall be reduced to less than 10 feet. Before opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction being assessed on the bill submitted for payment in conformance with the following chart and is in addition to the requirements specified in TC-4.02.

ELAPSED TIME, MINUTES	<i>DEDUCTION</i>
1 - 5	\$ 50.00
Over 5	\$ 50.00 per Minute (In addition to the Original 5 minutes)

Work on State Maintain Roadways

Work assignments which require the Contractor to work on or adjacent to a state maintained roadway must contact the SHA District 4 Traffic office at 410-321-2780 for the work restrictions and required TCP of the SHA. MOT on SHA roadways must adhere to the current MOT policies of SHA. No additional compensation will be given for MOT on SHA maintained roadways and will be paid for under the items as bid in this Contract.

104.01.04 MEASUREMENT AND PAYMENT

DELETE: In its entirety.

INSERT: the following:

(a) Method 1 – Minor Maintenance of Traffic

Minor Maintenance of Traffic will be paid for at a fixed price of \$1000 per each assigned task and will be full compensation for all material, labor, equipment, tools, and incidentals necessary to for the maintenance traffic.

This item will be paid for all other roadways in the County not listed as an arterial roadway in this section (see below).

(b) Method 2 – Major Maintenance of Traffic

Major Maintenance of Traffic will be paid for at a fixed price of \$2000 per each assigned task and will be full compensation for all material, labor, equipment, tools, and incidentals necessary for the maintenance traffic.

This item will be paid for roadways classified as **arterial roadways** in this section (see the list below for Baltimore County). All Maryland State Highways will be considered arterial roadways. Additional roads may be added at the discretion of the Engineer.

ARTERIAL ROADWAYS

Academy Rd	German Hill Rd	Merritt Ave	Rossville Blvd
Allegheny Ave	Glynowings Dr	Merritt Blvd	Ruxton Rd
Back River Neck Rd	Golden Ring Rd	Merrymans Mill Rd	S Marlyn Ave
Bellona Ave	Goucher Blvd	Middle River Rd	Seminary Ave
Bloomsbury Ave	Graces Quarters Rd	Middleborough Rd	Shawan Rd
Bosley Ave	Greenspring Ave	Milford Mill Rd	Shawan Rd
Bosley Rd	Hammonds Ferry Rd	Monkton Rd	Silver Spring Rd
Bowleys Quarters Rd	Hazelwood Ave	Mt Carmel Rd	Slade Ave
Bradshaw Rd	Hillen Rd	N Marlyn Ave	Smith Ave
Brenbrook Dr	Hillendale Heights Rd	Nicodemus Rd	Sollers Point Rd
Burke Ave	Hillsway Ave	North Point Rd	Stemmers Run Rd
Campbell Blvd	Holabird Ave	Old Bosley Rd	Stevenson La
Carroll Island Rd	Hollins Ferry Rd	Old Court Rd	Sulphur Spring Rd
Central Ave	Honeygo Blvd	Old Harford Rd	Taylor Ave
Chesaco Ave	Ingleside Ave	Owings Mills Blvd	Timber Grove Rd
Church Rd	Johnnycake Rd	Padonia Rd	Timonium Rd
Cowenton Ave	Joppa Rd	Painters Mill Rd	Towsontown Blvd
Cromwell Bridge Rd	Kenwood Ave	Paradise Ave	Trumps Mill Rd
Crosby Rd	Klausmier Rd	Patterson Ave	Tuften Ave
Daisy Ave	Knecht Ave	Peninsula Expwy	Virginia Ave
Delvale Ave	Lake Ave	Pennsylvania Ave	Walker Ave
Dolfield Blvd	Lansdowne Rd	Perry Hall Blvd	Waltham Woods Rd
Dundalk Ave	Leeds Ave	Pot Spring Rd	Walther Blvd
E Cherry Hill Rd	Lillian Holt Dr	Proctor La	Warren Rd
Ebenezer Rd	Lyons Mill Rd	Providence Rd	Winands Rd
Edmondson Ave	Mace Ave	Putty Hill Ave	Windsor Mill Rd
Fairmount Ave	Maiden Choice La	Radecke Ave	
Forest Park Ave	Marriottsville Rd	Red Run Blvd	
Franklin Blvd	McClean Blvd	Rolling Rd	
Fullerton Ave	McDonogh Rd	Rolling Rd	

NOTE: Additional roadways may be added at the discretion of the Engineer.

**CATEGORY 100
PRELIMINARY**

SECTION 107 CONSTRUCTION STAKEOUT

INSERT: After the first paragraph.

107.03.10 TRAFFIC SIGNAL CONSTRUCTION STAKEOUT

After the notice to proceed for installation of Traffic Control Devices, the Contractor shall arrange a meeting with the Engineer to stake out all items indicated on the sketches, plans, and in the Special Provisions before any work assignment begins. Any dimensional or quantity changes resulting from the stakeout shall not be designated or indicated as a change order, or a cause for increase in time for work assignment completion as stated in the Contract Documents.

107.04 MEASUREMENT AND PAYMENT.

INSERT: After the first paragraph.

Intersection Utility Stakeout. Intersection Utility Stakeout for Traffic Control Devices will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents. (refer to Special Provisions – Category 875 - UTILITY CONNECTIONS AND UTILITY STAKEOUT)

**CATEGORY 200
GRADING**

SECTION 205 TEST PIT EXCAVATION

205.04 MEASUREMENT AND PAYMENT.

DELETE: In its entirety.

INSERT: The following.

Test Pit Excavation (Outside Roadway)

Test Pit Excavation (Outside Roadway) will be measured and paid for at the Contract unit price per cubic yard for the material actually removed from within the limits specified. The payment will be full compensation for all material, labor equipment, tools and incidentals necessary to complete the work. Tamped backfill will not be measured, but will be incidental to the Contract unit price per cubic yard for Test Pit Excavation.

Test Pit Excavation (In Roadway)

Test Pit Excavation (In Roadway) will be measured and paid for at the Contract unit price per cubic yard for the material actually removed from within the limits specified. The payment will be full compensation for all material, labor equipment, tools and incidentals necessary to complete the work. Tamped backfill in roadway will be required to meet the requirements for subbase compaction and any pavement to be replaced must meet the existing pavement cross section. The tamped backfill and any pavement to be replaced will not be measured, but will be incidental to the Contract unit price per cubic yard for Test Pit Excavation.

**CATEGORY 200
GRADING**

**SECTION 206 - REMOVAL OF EXISTING PAVEMENT,
SIDEWALK, PAVED DITCHES, CURB OR COMBINATION
CURB AND GUTTER, AND MONOLITHIC MEDIAN**

206.01 DESCRIPTION

CHANGE: In the third line the words “curb or combination curb and gutter” to read “curb, combination curb and gutter, or monolithic median”.

206.03 CONSTRUCTION

CHANGE: In the second line, these words “curb or combination curb and gutter” to read “curb, combination curb and gutter or monolithic median”.

206.03.01 BROKEN MATERIAL

CHANGE: In the second line, the words “curb or combination curb and gutter” to read “curb, combination curb and gutter or monolithic median”.

206.04 MEASUREMENT AND PAYMENT

DELETE: In its entirety.

INSERT: The following:

The payment for the items listed below will be full compensation for all work specified regardless of the type or depth of the material removed and for all labor, equipment, tools, and incidentals necessary to complete the work.

Remove Existing Curb and Gutter will be measured and paid per linear foot.

Remove Existing Sidewalk will be measured and paid per square foot.

Remove Existing Monolithic Median less than 4 feet wide will be measured and paid per linear foot.

These payment items will only be measured and paid for if that item which was removed is not being replaced by the that same item.

**CATEGORY 500
PAVING**

**SECTION 550 — NONTOXIC WATERBORNE PAVEMENT
MARKING PAINTS**

550.01 DESCRIPTION. This work shall consist of furnishing and applying Nontoxic Waterborne Pavement Marking Paints (fast-dry, 60-second no-track) to pavement surfaces as specified in the Contract Documents or as directed by the Engineer.

550.02 MATERIALS.

Nontoxic Waterborne Pavement Marking Paints

951.01

All nontoxic waterborne pavement marking paints shall be approved by the National Transportation Product Evaluation Program (NTPEP) Northeast regional facility.

550.03 CONSTRUCTION.

550.03.01 Application. The location, width, and type of marking shall be as specified in the Contract Documents, or as directed by the Engineer.

- (a) The paint shall be applied when the ambient and pavement surface temperatures are in conformance with the manufacturer's recommendations, and when relative humidity levels will assure the 60-second no-track requirement.

Pavement surfaces shall be dry and free of glaze, oil, dirt, grease, and other contaminants prior to application of pavement markings. Surfaces not conforming to these requirements shall be cleaned by the Contractor to a width equal to 4-6 in. wider than the width of the marking to be applied.

At the discretion of the Engineer, existing pavement markings shall be cleaned or removed prior to retracing with new markings.

- (b) Existing pavement markings which conflict with new or altered traffic patterns shall be completely removed from the surface of the pavement. The Contractor's method of removal shall not damage the pavement surface and shall be as approved by the Engineer. Any damage incurred shall be the responsibility of the Contractor to repair and/or replace the pavement at no additional cost to the Administration.
- (c) Applying pavement markings over longitudinal joints is prohibited unless absolutely necessary for symmetry, uniformity, and continuity of the marking layout. They shall preferably be offset 2 in. from longitudinal construction joints.
- (d) The paints shall be reflectorized for night visibility by the addition of reflective beads which are applied into the surface of the wet paint by the pressurized method before the paint dries and sets.
- (e) Waterborne paint markings applied to new bituminous asphalt surfaces shall be reapplied once the first application is fully cured. Footage counters will be allowed to record both applications.
- (f) The Contractor shall protect the markings until dry by placing guards or warning devices as approved by the Engineer and in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). In the event that the wet marking is damaged by a crossing vehicle,

the marking shall be reapplied. Marks left on the pavement by the vehicle shall be removed by the Contractor at no additional cost to the Administration. For pavements in service, the Contractor will be permitted to close only one lane of traffic at a time.

- (g) The Contractor shall remove and dispose of all empty containers and other debris related to the striping operations from the project site.

550.03.02 Formulation Selection. The Contractor shall select, purchase, and apply paint from an approved list of formulations conforming to these Specifications, which is maintained by the Administration's Office of Materials and Technology for the current list of prequalified materials. The current approved paint list is located elsewhere in this Contract.

550.03.03 Reflective Beads. The Contractor shall apply reflective beads uniformly across the surface of the stripe at the rate of 7 to 9 lb/gal of paint. For the majority of the striping season, a 50/50 BLEND of large and standard reflective beads will be required. At the onset of winter, and/or at the discretion of the Engineer, the use of the 50/50 BLEND may be terminated until such time as the district's snow plowing responsibilities are over.

550.03.04 Thickness. When the 50/50 BLEND of reflective beads is used, the paint shall be applied at a wet film thickness of 18 \pm 1 mil. When standard beads are used alone, the paint shall be applied at a wet film thickness of 14 \pm 1 mil. Material usage will be tracked by the Administration, and when compared to distance striped, a five-inch line should yield approximately 214 ft/gal for the 50/50 BLEND, or 257 ft/gal for standard beads. Low yields will be considered sufficient cause for restriping.

550.03.05 Dry Time. The applied paint shall dry to a no-track condition within 60 seconds.

The no-track time shall not be exceeded when the ambient and pavement temperatures are between 40 and 120 F, and the relative humidity is less than 80%, providing the pavement is dry. The no-track time shall be determined by passing over the applied line at approximately 30 degrees with a standard passenger car or pickup truck. When viewed from a distance of 50 ft, the pavement surface shall show no evidence of the paint being picked up and redeposited on the pavement by the vehicle.

550.03.06 Retroreflectance. Retroreflectance shall be determined using a retroreflectometer supplied by the Contractor. The instrument shall have a geometry of illumination angle of 86.5 degrees and an observation angle of 1.5 degrees. The instrument shall be standardized daily in conformance with the manufacturer's recommendations.

At the time of the paint application, the minimum retroreflectance values shall be 250 and 150 millicandellas/lux/square meter for white and yellow, respectively.

550.03.07 Field Test Strip. Before beginning work each day or when changing colors, the Contractor shall place a minimum of 200 ft of paint for a test strip at a location specified by the Engineer. The test strip will be evaluated by the Engineer for distribution and bonding of beads, thickness of paint stripe, retroreflectance, and dry time as specified in MSMT 729.

The Contractor will be authorized to proceed only if the markings on the test strip conform to the specified criteria.

550.03.08 Equipment. The equipment used for application of the paint shall be capable of applying waterborne traffic paint which has been approved by the Administration.

The Contractor shall provide access to the paint application equipment for inspection by the Engineer. The equipment shall be approved by the Engineer prior to start of work.

The paint carriage on the left side of the paint truck shall have four paint guns and three bead guns. The paint carriage on the right side of the paint truck shall have two paint guns and two bead guns. All paint guns shall be equipped with material spray shrouds.

All 10 in. lines shall be applied using two paint guns and two bead guns. The Contractor shall not be permitted to raise the paint carriage in order to paint these lines with one paint gun and one bead gun.

The footage counter used to measure pavement markings shall be calibrated and a notarized certification shall be submitted to the Engineer prior to application.

550.03.09 Quality Assurance/Quality Control (QA/QC). The Contractor shall submit a proposed Quality Control Plan, according to Quality Control Plan Requirements, in writing to the Engineer for approval at least two weeks prior to the prestriping meeting. The Plan shall contain procedures for random sampling as specified in MSMT 729, and shall show how the Contractor proposes to control the equipment and material to ensure conformance with the Specifications. The Plan shall contain personnel qualifications, inspection and record keeping methods, and minimum frequencies of sampling and testing as specified in MSMT 729. The Plan shall also detail when and how corrective action will be taken for unsatisfactory striping practices and deviations from the material Specifications. Any deviations from the Quality Control Plan shall be cause for immediate shut down of striping operations, and a meeting with the Contractor's representative, the Administration's representative, and the Statewide Pavement Marking Coordinator (or designee) will be required prior to re-start of striping.

- (a) Commencement. Striping operations shall begin only after approval of the Contractor's Quality Control Plan by the Engineer.
- (b) Technicians. Quality Control technicians shall have a current SHA qualification document card.
- (c) Records. The Contractor shall maintain complete records of actions taken to correct problems, and Quality Control inspection results, and shall submit copies to the Engineer daily. The Contractor shall identify where quality control tests were performed.

(d) Quality Assurance. The Administration will provide Quality Assurance by:

- (1) Conducting independent sampling and testing separate from the Contractor.
- (2) Periodically observing tests performed by the Contractor.
- (3) Directing the Contractor to take additional samples and/or perform additional tests at any time and at any location.
- (4) Monitoring the Contractor's conformance with the Quality Control plan.

The Contractor shall provide SHA-qualified technicians for Quality Control testing. The technicians shall demonstrate to the Engineer that they have a thorough knowledge of sampling and testing procedures as specified in MSMT 729. Quality Control shall be performed during striping operations according to the approved Quality Control Plan. Only Administration-approved technicians will be permitted to obtain samples or perform tests.

Quality Control test results shall be submitted to the Engineer at the end of each work day for that day's work.

Should it be determined that a qualified technician has become delinquent in his or her duties (i.e.: failed to perform tests, failed to submit documents to the Engineer at the end of the day, or falsified results), the technician's qualifications shall become invalid and a resolution or requalification shall be required. All striping operations shall be suspended until such time as the Contractor provides a qualified replacement.

The Contractor's Quality Control Technician shall select a minimum of two sites per linear mile for each marking type (i.e.: yellow edgeline, white edgeline, skipline, turn lane line, etc.) for retroreflectance measurement. The technician shall mark the site locations for future reference. An average of five readings shall be taken at each site to determine conformance with these Specifications.

NOTE: Center skiplines on Expressway/Freeway routes are exempt from the retroreflectance measurement requirement, and shall be inspected visually at night.

Quality Assurance (QA) Testing performed by the Administration will assure that all markings on the project compare favorably with those obtained on the test strip, and will provide the basis for final acceptance.

Random Independent Assurance Audits (IAA) will be performed by the Administration's Office of Materials and Technology (OMT) to ensure the accuracy and accountability of both the Administration's and the Contractor's technicians and equipment.

550.03.10 Observation Period. The Contractor shall be responsible for any defects in materials and workmanship of the waterborne paint markings for a period of 180 days for durable, 60 days for non-durable materials from the date the pavement is opened to traffic.

During the 60-day observation period, the waterborne pavement marking material shall show no signs of failure due to blistering, bleeding, crumbling, staining, discoloration, poor adhesion, or loss of reflectivity.

The Contractor will not be held responsible for waterborne paint markings damaged by snow removal equipment.

550.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for furnishing and placing of all materials, and for all labor, equipment, tools, testing, pavement preparation, and incidentals necessary to complete the work.

Nontoxic Waterborne Pavement Marking Paint and the Removal of Existing Pavement Markings will be measured and paid for at the Contract unit price for one or more of the items listed below, unless otherwise specified in the Contract Documents.

- (a) Nontoxic Waterborne Pavement Marking Paint will be measured and paid for per striped linear foot for the color and width specified in the Contract Documents.
- (b) Removal of Existing Pavement Markings will be measured and paid for per striped linear foot, regardless of width.
- (c) Removal of Existing Pavement Marking Letters, Symbols, Arrows, and Numbers will be paid for per each.

550.04.01 Removal, Replacement, or Corrective Actions. Any additional cost for removal, including Maintenance of Traffic (M.O.T.) shall be the responsibility of the Contractor. In addition, the current road-users fee will be applied if traffic disruption occurs during corrective actions.

**CATEGORY 500
PAVING**

**SECTION 554 — LEAD FREE REFLECTIVE THERMOPLASTIC
PAVEMENT MARKINGS BY EXTRUDED METHOD**

554.01 DESCRIPTION. This work shall consist of the preparation and application of lead free reflective thermoplastic pavement markings to roadway surfaces as specified in the Contract Documents or as directed by the Engineer.

554.02 MATERIALS.

Lead Free Reflective Thermoplastic Pavement Markings 951.04

554.03 CONSTRUCTION.

554.03.01 Quality Assurance/Quality Control. The Contractor shall submit a proposed Quality Control Plan, according to the Quality Control Plan requirements, in writing to the Engineer and approved 30 days prior to the start of work and before the prestriping meeting. The plan shall contain procedures of random sampling as specified in MSMT 729 and shall show how the Contractor proposes to control the equipment and material to ensure conformance with the Specifications. The plan shall contain personnel qualifications, inspection and record keeping methods, and minimum frequencies of sampling and testing as specified in MSMT 729. The plan shall also detail when and how corrective action will be taken for unsatisfactory construction practices and deviations from the Specifications.

- (a) Placement.** The pavement marking placement operation shall not begin until the Engineer has approved the Quality Control Plan.
- (b) Technicians.** Quality control technicians shall have a current Administration qualification document that they can present to the Engineer.
- (c) Records.** The Contractor shall maintain complete records of quality control inspection results, as well as any action taken to correct problems, and shall submit copies to the Engineer daily.
- (d) Quality Assurance.** The Administration will provide quality assurance by:
 - (1)** Conducting independent sampling and testing separate from the Contractor.
 - (2)** Periodically observing testing performed by the Contractor.
 - (3)** Directing the Contractor to take additional samples at any time and at any location.
 - (4)** Monitoring the Contractor's conformance with the Quality Control Plan.

Qualified Technicians. The Contractor shall provide Administration qualified technicians for quality control testing. The technicians shall demonstrate to the Engineer that they have a thorough knowledge of sampling and testing procedures as specified in MSMT 729. Quality control shall be performed during striping operations according to the approved Quality Control Plan. The Contractor shall identify where quality control tests were performed. Any deviations from the Quality Control Plan shall be cause for immediate suspension of the striping operations and a meeting will be required prior to re-start of striping. Only Contractor's Technicians qualified by the Administration shall be permitted to obtain samples or perform tests. Quality control test results shall be submitted to the Engineer at the end of each work

day for that day's work. Should a qualified technician become delinquent in their duties (i.e., failed to have all the proper test equipment on the site, or has failed to perform tests, or failed to submit documents to the Engineer at the end of the day, or reported information that varies substantially from the Administration's results), then the technician's qualification shall become invalid and the technician shall be replaced with another approved qualified technician.

Testing performed by the Administration will provide the basis for final acceptance.

Independent Assurance Sampling and Testing (IAST) will be performed by the Administration to assure that all markings on the project compare favorably with those obtained on the test strip.

554.03.02 Application Equipment. An oil or air jacketed kettle shall be utilized for uniform melting and heating of the thermoplastic material. The kettle shall provide continuous mixing and agitation of the material. The kettle and the applicator shall be equipped with an automatic thermostatic device to provide positive temperature control.

The equipment shall be constructed so that all mixing and conveying parts, up to and including the application apparatus, maintains the material at the specified temperature. Conveying parts of the applicator between the reservoir and the application apparatus shall be constructed to prevent clogging and accumulation. The applicator shall be capable of containing a minimum of 200 lb. of molten thermoplastic material.

The kettle and applicator shall be constructed and arranged to conform to the requirements of the National Board of Fire Underwriters (NBFU), the National Fire Protection Association (NFPA), and State and local authorities.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer.

The applicator shall apply the surface dressing beads to the molten thermoplastic marking by means of a bead dispenser or other mechanical conveying method dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system for the thermoplastic material so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 5 to 12 in. as specified in the Contract Documents.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of thermoplastic material.

554.03.03 Cleaning Pavement Surfaces. Pavement surfaces shall be dry and free of oil, dirt, grease and other contaminants prior to application of pavement markings. Surfaces not in conformance with these Specifications shall be cleaned by the Contractor to a width 4 to 6 in. wider than the marking to be applied.

Existing pavement markings which conflict with new or altered traffic patterns shall be completely removed. The Contractor's method of removal shall not damage the pavement surface and shall be as approved by the Engineer. Any pavement damage incurred shall be repaired or replaced by the Contractor at no additional cost to the Administration.

554.03.04 Application. The ambient and surface temperatures shall be at least 50 F and rising at the time of application.

Applying pavement markings over longitudinal joints is prohibited.

Thermoplastic pavement markings shall be extruded onto the pavement surface. Only the extruded method of application shall be permitted.

Thermoplastic pavement markings shall conform to the following:

- (a) **Temperature.** The molten material temperature shall be between 400 and 440 F unless otherwise recommended by the manufacturer.
- (b) **Primer.** A primer shall be used if thermoplastic is applied to portland cement concrete. Any primer used shall be compatible with the thermoplastic material.
- (c) **Thickness.** The pavement markings shall yield a solid thickness of 90 mils above the roadway surface across the middle two-thirds of the line width when tested as specified in MSMT 729. Variation from this range will be used for the price adjustment specified in 553.04.01.
- (d) **Glass Beads.** Glass beads shall be uniformly applied to the surface of the molten thermoplastic at the minimum rate of 7 to 9 lb/100 ft², as specified in MSMT 729.
- (e) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white) when demonstrated visually by the Contractor with the color chip specified, as determined by the Engineer.
- (f) **Retroreflectance.** The in-place retroreflectance of the pavement markings shall equal or exceed the millicandellas/lux/square meter values shown in the following table. These are minimum values anytime within the first 30 days. The retroreflectance of the pavement markings shall be determined using a certified calibrated 15 m geometry retroreflectometer supplied by the Contractor and tested as specified in MSMT 729. An average of five readings shall be used at each site to determine conformance with these Specifications and as specified in MSMT 729. The instrument shall be standardized daily in conformance with the manufacturer's recommendations.

MINIMUM RETROREFLECTANCE

COLOR	RETROREFLECTIVITY	CORRECTIVE ACTION
White	equal to or greater than 250	None
Yellow	equal to or greater than 150	
White	less than 250	Necessary corrective actions, including grinding if necessary, and re-tracing
Yellow	less than 150	

(g) **Width.** The traveled way lane widths and the width of longitudinal lines shall be as specified in the Contract Documents. Lane widths shall be measured from the center line of the traveled way. When measurements are taken from existing longitudinal lines, the point of reference shall be the center of the line or the center of the space between dual lines. The proposed traveled way lane widths shall be in compliance when they have an acceptable appearance and do not deviate more than 2 in. from the proposed lane width.

(h) **Alignment.** Markings shall be placed in a straight and uniform manner. The lane line width shall be in compliance when it is visually in alignment and has an acceptable appearance and varies by no more than 3/8 in. in any 40 ft section of traveled way.

Longitudinal alignment shall be maintained through all intersections and breaks, even though the lines themselves will discontinue.

Noncompliance during striping operations shall be just cause to suspend the operation. A meeting shall be held to review the Quality Control Plan to assure that continued operations will be in compliance. Areas of noncompliance will be identified by the Engineer and correction of alignment will be as defined in the Quality Control Plan. Any incorrect markings shall be completely removed by corrective actions.

(i) **Layout Markings.** Any layout markings which detract from the overall appearance or function of the final markings as determined by the Engineer shall be removed by the Contractor at no additional cost to the Administration.

554.03.05 Quality Control Test Strip. Before beginning work with each color, the Contractor shall place a 200 to 300 ft cumulative quality control test strip, that conforms to Specifications at a location to be determined by the Engineer. Authorization to proceed will be given when the Engineer determines that the quality control test strip conforms to the Contract Documents.

554.03.06 Responsibility. The Contractor shall protect the markings until dry by placing warning devices as specified in the Manual on Uniform Traffic Control Devices (MUTCD) and as approved by the Engineer. In the event that the uncured marking is crossed by a vehicle, the marking shall be reapplied. Marks left on the pavement by the vehicle shall be removed by the Contractor at no additional cost to the Administration.

554.03.07 Observation Period. The Contractor shall be responsible for any defects in materials and workmanship of the thermoplastic markings for a period of 180 days from the date the pavement is opened to traffic.

During the 180 day observation period, the thermoplastic pavement marking material shall show no signs of failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, chipping, spalling, poor adhesion to the pavement materials, and loss of reflectivity,

A minimum of 95 percent of the applied markings shall remain intact during the observation period as determined by the Engineer.

When required, removal of pavement markings shall be performed by the Contractor with no damage to the pavement surface. Any damage incurred shall be the responsibility of the Contractor to repair or replace the pavement surface as determined by the Engineer.

554.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all materials, labor, equipment, tools, testing, pavement preparation, and incidentals necessary to complete the work.

Lead Free Reflective Thermoplastic Pavement Markings and the Removal of Existing Pavement Markings will be measured and paid for at the Contract unit price for one or more of the items listed below, unless otherwise specified in the Contract Documents.

- (a) Lead Free Reflective Thermoplastic Pavement Markings will be measured and paid for per striped linear foot for the color and width specified in the Contract Documents.
- (b) The Removal of Existing Markings associated with the installation of the Reflective Thermoplastic Pavement Markings shall be paid for separately as specified in the Special Provisions Section 558 of the Contract Documents.

554.04.01 Price Adjustment for Film Thickness. The unit price for Lead Free Reflective Thermoplastic Pavement Markings will be per striped linear foot based on MSMT 729 calculations for thickness, and will be adjusted in conformance with the following table:

MIL THICKNESS	PERCENT OF PAYMENT - UNIT PRICE
80 – 95 mils	100
75 – 79 mils	90
70 – 74 mils	88
Less than 70 mils	Retrace to achieve a thickness of 80 to 95 mils. Retrace thickness shall be 30 mils min.

Note 1: The Engineer may require the Contractor to remove excess material thickness.

Note 2: Removal of excess material and retracing pavement markings shall be performed at no additional cost to the Administration.

554.04.02 Removal, Replacement, or Corrective Actions. Any additional cost (including M.O.T.) for the removal of markings which are incorrectly or inaccurately installed shall be at no additional cost to the Administration. In addition, the current road users fee will be applied since traffic disruption occurs during corrective actions.

**CATEGORY 500
PAVING**

**SECTION 556 HEAT APPLIED PERMANENT PREFORMED
THERMOPLASTIC PAVEMENT MARKINGS**

556.01 DESCRIPTION. This work shall consist of furnishing and installing heat applied permanent preformed thermoplastic pavement markings as specified in the Contract Documents or as directed by the Engineer.

556.02 MATERIALS.

Thermoplastic Material

951.06

556.03 CONSTRUCTION.

Application. Permanent preformed thermoplastic pavement markings shall be applied to clean and dry hot mix asphalt (HMA), open-grade friction courses (OGFC), stone matrix asphalt (SMA) or portland cement concrete (PCC) pavements using a propane fueled heat gun in conformance with manufacturer's recommendations. The markings shall be capable of being applied at a minimum pavement and ambient temperature of 32 F. When specified by the manufacturer, a primer or sealer shall be used when applying the markings to portland cement concrete pavements.

Packaging. The material shall be handled for shipping, unloading and storage as recommended by the manufacturer. Each shipping package shall be marked with the following information:

- (a) Manufacturer's name.
- (b) Description of item.
- (c) Date of manufacture.
- (d) Contractor's name.
- (e) Purchase order number.
- (f) Lot number.
- (g) Color.

Place line markings in the same direction as the flow of traffic. No line marking over longitudinal joints shall be permitted.

Retroreflectance. The in-place retroreflectance shall meet or exceed the values shown in Table 1. The retroreflectance of the pavement marking shall be determined using a calibrated retroreflectometer certified and supplied by the Contractor. Five readings shall be taken at each of a minimum of five random locations and the results averaged to determine conformance.

TABLE 1
MINIMUM INITIAL REFLECTANCE

SPECIFICATION	WHITE	YELLOW
Entrance Angle, Degrees	86.5	86.5
Observation Angle, Degrees	1.5	1.5
Specific Luminance, mcd/m2/lux	250	150

Quality Assurance/Quality Control. The Contractor shall perform quality control sampling and testing and maintain appropriate records. The Contractor shall release the information upon the Engineer's request, and relinquish all records to the Engineer upon completion of the work.

The Administration will perform quality assurance sampling and testing. Measurement and testing performed by the Administration will provide the basis for final acceptance of the construction phase. The Contractor shall be required to remove and correct any deviations of the materials and/or pavement markings, symbols, etc., greater than specified in these provisions or pavement marking plan at no cost to the Administration.

556.04 MEASUREMENT AND PAYMENT.

Heat applied permanent preformed Thermoplastic pavement markings will be measured and paid for as follows:

Furnish and Install Thermoplastic Pavement Markings – Letter & symbols or Number
per each

Furnish and Install Thermoplastic Pavement Markings – Lines -- per linear ft.
for color/width specified

The payment will be full compensation for the sealers, primers, delivery, unloading, storage, and all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 500
PAVING**

**SECTION 557 REMOVABLE PREFORMED
PAVEMENT MARKINGS**

557.01 DESCRIPTION. This work shall consist of furnishing and installing removable preformed reflective pavement markings on pavement surfaces. These materials include line marking tape and preformed letters, numbers, arrows and symbols.

557.02 MATERIALS.

Removable Preformed Pavement Marking Material 951.02 or as approved by the Office of Materials and Research.

557.03 CONSTRUCTION. Removable preformed pavement markings shall be applied in conformance with these Specifications, as specified in the Contract Documents and in conformance with the manufacturer's recommendations. Sizes and dimensions shall be as specified in the Contract Documents.

Before the application of the markings, the pavement surface shall be clean, dry and free of all contaminants, including curing compound, loose particles and dirt. Existing residual pavement markings shall be completely removed.

Markings shall be applied to newly paved surfaces before traffic is permitted on the pavement.

Line markings shall be applied in the same direction as the flow of traffic. Applying line markings over existing markings or longitudinal joints is prohibited.

557.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all materials, labor, equipment, tools and incidentals necessary to complete the work.

Furnishing and Installing Removable Preformed Line Markings (Yellow or White) will be measured and paid for per linear foot for the color and width specified in the Contract Documents

The Removal of Existing Markings associated with the installation of the Removable Preformed Line Markings shall be paid for separately as specified in the Special Provisions Section 558 of the Contract Documents.

**CATEGORY 500
PAVING**

SECTION 558 REMOVAL OF EXISTING PAVEMENT MARKINGS

558.01 DESCRIPTION. This work shall consist of removal of existing pavement markings on pavement surfaces. This work will include removal of any type or width of line marking and the removal of any type of letters, numbers, arrows, and symbols.

558.02 MATERIALS. Not Applicable

558.03 CONSTRUCTION.

Removal of existing pavement markings shall be accomplished by the Contractor using equipment and methods specifically approved by the Engineer.

Markings shall not be removed by "painting out" with black paint nor shall it result in excessive scarring of the pavement. No more 3/8-inch depth of scarred pavement will be allowed.

Any damage to the pavement or pavement joint materials caused by the removal of existing pavement markings on pavement surfaces shall be repaired by the Contractor at no cost to the County by methods specifically approved by the Engineer.

Whenever using the approved method for the removal of existing pavement markings on pavement surfaces, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a traffic pattern that will mislead or misdirect the motorists. When these operations are completed, the markings shall be cleaned to remove residue or debris resulting from the cleaning work.

The Contractor shall be responsible for sweeping and adequately cleaning up of any debris after completion of the markings removal.

At least 90 percent (90%) of painted markings shall be removed. For plastic markings removal and removable preformed pavement markings, 100 percent (100%) of the marking shall be removed.

Improperly placed markings, incorrect markings installed, or markings that fail during construction, within a 90 day observation period, and/or the warranty period shall be 100 percent (100%) removed by the Contractor at no cost to the County and reinstalled properly as directed by the Engineer.

Unless permitted by the Engineer, where existing markings are removed, the new markings must be reapplied the same day as the existing markings are removed. Failure to meet these requirements may result in assessment of one day Liquidated Damages for each calendar day the markings have not been replaced.

558.04. MEASUREMENT AND PAYMENT.

Removal of Existing Pavement Markings will be measured after the markings have been satisfactorily removed and accepted by the Engineer and are paid as follows: Per contract unit price

Remove Existing Pavement Markings – Lines, any Width -- per linear foot

Remove Existing Pavement Markings- Arrow, symbols, numbers or Letter -- per each

The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 600
SHOUDLERS**

SECTION 610 - SIDEWALKS

603.04 MEASUREMENT AND PAYMENT

On page 511 of the Standard Specifications.

DELETE: 610.04 In its Entitety

INSERT: The Following:

610.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all excavation, backfill, disposal of excess or unsuitable material, forms, reinforcement when specified, joints, sealer, compaction, curing, finishing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. The removal and disposal of unsuitable material will be measured and paid for at the Contract unit price for Class 2 Excavation, which price shall include the cost of using suitable excavation as replacement material. When Borrow or Selected Backfill is authorized as replacement material, payment will be made at the Contract unit price bid for the respective items.

610.04.01 Concrete Sidewalks will be measured and paid for at the Contract unit price per square foot of finished surface.

When the existing sidewalk is removed and replaced with a new sidewalk, the cost to remove the existing sidewalk will be incidental to the Contract unit price for sidewalk.

610.04.02 Hot Mix Asphalt Sidewalks will be measured and paid for at the Contract unit price per ton for the mixture placed.

610.04.03 Concrete Sidewalk for a Handicap Ramps will be measured and paid for at the Contract unit price per square foot of finished surface.

When the existing sidewalk is removed and replaced with a new concrete sidewalk for a handicap ramp, the cost to remove the existing sidewalk will be incidental to the Contract unit price for the new concrete sidewalk for a handicap ramp.(Note: all new handicap ramps shall include detectable warning surfaces-see section 610).

CATEGORY 600
SHOUDLERS

DETECTABLE WARNING SURFACES

DESCRIPTION. This work shall consist of furnishing and installing detectable warning surfaces as specified in the Contract Documents or as directed by the Engineer. The detectable warning surface shall conform to the most recent accessibility guidelines of the Americans with Disabilities Act(ADA).

MATERIALS. The detectable warning surface material shall be approved by the Engineer prior to use on a project. The Contractor shall submit the proposed source of supply and specific product to the Engineer for approval.

CONSTRUCTION. The detectable warning system shall be either surface applied or cast in place. The Contractor shall install the system in conformance with the manufacturer's recommendation.

MEASUREMENT AND PAYMENT. The detectable warning surface will be measured and paid for at the Contract unit price per square foot. The payment will be full compensation for furnishing, installing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The sidewalk on which the detectable warning surface is placed shall be measured and paid for at the Contract price for the pertinent sidewalk item.

**CATEGORY 800
TRAFFIC**

SECTION 801 CONCRETE FOUNDATIONS

801.02 MATERIALS.

On page 574 of the Standard Specifications.

CHANGE: In the second line the wording "Concrete Mix No. 2" to read "Concrete Mix No. 6"

801.04 MEASUREMENT AND PAYMENT

On page 575 of the Standard Specifications.

Concrete for cabinet bases will paid for and be measured as follows:

NEMA Type 5 cabinet - **1.5 cubic yards** of concrete as specified in detail MD 816.01.

NEMA Type 6 cabinet - **2.0 cubic yards** of concrete as specified in detail MD 816.02.

CATEGORY 800 TRAFFIC

SECTION 804 — GROUNDING

On page 577 of the Standard Specifications.

804.01 DESCRIPTION.

ADD: As the last sentence to the paragraph: “ Grounding of overhead communication cable messenger cable attached to an utility company owned pole shall also conform to the utility company’s requirements.

804.03 CONSTRUCTION.

804.03.01 Equipment Grounding System

CHANGE: In the last line the terminology "conduit system, grounding conductors, ground rods and terminations." to read "conduit system, span wire, steel poles, grounding conductors, communications cable steel spans, ground rods, steel span wire back guying, steel span wire pole to pole guying, and steel span wire slack spans and terminations."

INSERT: As the second paragraph.

Grounding for overhead communications cable shall be to all of the following when present: at the telephone and catv cables support span wires, at the ground wire of a multigrounded system, at the neutral wire of a multigrounded system, and at the ground of a secondary circuit with approved span wire grounding clamps. Grounding to the overhead communication cable support span at utility company owned poles shall be with a vise type body clamp equipped with jaws having teeth to pierce the insulation, without stripping the jacket on the overhead communications cable span wire, and operated by a single hexagonal head bolt.

804.03.05 Terminations

INSERT: After the first paragraph.

Overhead communication cable shall be made with connectors installed at the first attachment on a utility company owned pole in the following method: at the last attachment on the pole, at every fifth attachment between the first and last attachment on the pole, at each attachment where power, catv and telephone cables continue onto differing poles, at each attachment where power catv and telephone cables converge onto the same pole, at attachments on poles equal to ¼ mile or more and, at where more than one separate attachment or guy is on the same pole. Grounding connectors shall be installed to the overhead communications cable, to the telephone and catv cables support span wires when present, to the ground wire of a multigrounded system, to the neutral wire of a multigrounded system and to the ground of a secondary circuit. The ground wire between clamps shall be stapled every twelve (12) inches.

**CATEGORY 800
TRAFFIC**

**SECTION 805 — ELECTRICAL CONDUIT AND
FITTINGS**

On page 581 of the Standard Specifications

805.03.10 Conduit Installation Under Existing Paved Areas (Bored).

INSERT: The following after the first paragraph of section 805.03.10.

All conduit used for boring will be **Bore Duct.** If scheduled 80 polyvinyl chloride conduit (PVC) is to be used in place of the Bore Duct, the Contractor must first get written approval from the Engineer.

805.03.11 Conduit Installation – Inside of Buildings.

Conduits shall be installed at the direction of the Engineer or as specified on the construction drawings. EMT conduit will be used for this type work and shall be installed conforming to NEC requirements unless otherwise specified. Junction boxes will be used and are covered in Section 811.

**CATEGORY 800
TRAFFIC**

SECTION 807 — ELECTRICAL SERVICE EQUIPMENT

807.03 CONSTRUCTION.

ADD: The following as the second paragraph.

Where remote service equipment for lighting is specified on the Plans, the Contractor shall furnish and install a NEMA 3R rainproof enclosure; a 60 amp, 2 pole circuit breaker; a 60 amp, 2 pole electrically held lighting contractor; two 2 pole 20 amp circuit breakers for feeder circuits; photocell; attachment hardware for attaching the unit to a utility pole, wood post or sign structure; and all incidentals necessary to provide a complete lighting control unit. The complete unit shall be UL listed for a service entrance.

On page 578 of the Standard Specifications

INSERT: A two (2) inch to four (4) inch adapter for underground electrical services will not be measured and the cost shall be incidental to the contract unit price for furnishing and installing control and distribution equipment as specified in the Contract Documents.

**CATEGORY 800
TRAFFIC**

SECTION 809 — TRENCHING AND BACKFILLING

On page 585 of the Standard Specifications

809.03 CONSTRUCTION.

CHANGE: In the first paragraph second line the wording "CAUTION: SHA ELECTRICAL LINE BURIED BELOW" to read " CAUTION: BALT. CO TRAFFIC ELECTRICAL LINE BURIED BELOW 410-887-8601 ".

**CATEGORY 800
TRAFFIC**

**SECTION 810 - ELECTRICAL CABLE, WIRE,
AND CONNECTORS**

ADD: After **810.03.09 Micro-Loop Probes.**

810.03.10 Communication Cable. Communication cable shall be installed into wood poles and in steel poles, traffic signal cabinets, signal structures, conduits and steel span wire rings as specified in the Contract Documents.

Where shown on the plans, overhead communication cable shall be installed on utility owned poles with an attachment suspension clamp. The Contractor shall arrange a pre-installation meeting before the proposed attachment work begins on the utility owned pole with the utility pole owner representative(s), the Inspector and the Engineer. In addition, the Contractor shall arrange a post-installation/verification inspection, after completion of an attachment, on the utility owned pole with the utility pole owner representative(s), the Inspector and the Engineer.

Attachments to utility owned poles shall be installed in accordance to the utility pole owner's requirements and as shown on the plans to a minimum of ten (10) feet below primary electrical cables or other facilities carrying 750 volts or more. A minimum communication cable vertical clearance of 25 feet shall be maintained above railroads and 18 feet for all other vertical clearances.

An angle attachment to utility owned pole shall have reinforcement strap. Attachment bolts to utility owned poles shall not project more than 1½ inches beyond the final attachment nut.

Overhead communication cable installed in steel poles, traffic signal cabinets, signal structures, conduits and steel span wire rings shall have the integral steel span wire removed without cuts or damage to the jacket surrounding the communication cable.

Dead end termination of overhead communication cable shall have the integral steel span wire exposed and terminated with a strandwise device for **County work assignments only.** If the work assignment is being done for **SHA**, then the latest and most current SHA specifications will be followed.

Vertical cable runs mounted on wood utility owned poles shall be installed in electrical conduit.

810.03.11 Disconnect, Pullback & Reroute Cables. Existing cables shall be manipulated as called for on the plans or as directed by the Engineer

ADD: After **810.03.04 Micro-Loop Probes.**

810.04.04 Disconnect, Pullback & Reroute Cables will be measured at the contract cost per linear foot and will be for one or as many cables as are rerouted(i.e. not per cable).

**CATEGORY 800
TRAFFIC**

SECTION 811 – ELECTRICAL HANDHOLES, MANHOLES, PULL AND JUNCTION BOXES

On page 589 of the Standard Specifications.

811.02.03 Pull and Junction Boxes.

ADD: After Cast Iron.

16 –gauge steel, ANSI 61 gray polyester powder finish

On page 590 of the Standard Specifications.

811.04 MEASUREMENT AND PAYMENT.

ADD: As the second paragraph.

Pull Boxes and Junction Boxes can be any standard size from 4 inch x 4 inch x 4 inch to 12 inch x 12 inch x 6 inch. They will be measured and paid for furnishing and install the pull box or junction box (any size) at the Contract unit price per each. The payment will be full compensation for all hardware for the conduit connections, all hardware for the mounting of the junction box, and for all labor equipment, tools, and incidentals to complete the work.

**CATEGORY 800
TRAFFIC**

SECTION 813 - SIGNS

On page 591 of the Standard Specifications.

813.02 MATERIALS.

ADD: The following after the Materials list.

The Contractor shall supply a square tube sign post for ground mounted signs with the following specifications:

The Post

The post is ten (10) foot in length and be 2 inches by 2 inches square.

The post is made of 14 gauge steel that meets ASTM A653 and FHWA approval.

The post is hot dipped galvanized zinc coating conforming to coating designation G-90.

The post meets all requirements for NCHRP 350.

The post has 7/16 inch holes punched 1 (one) inch on center on all four sides 48 inches from the top and 12 inches up from the bottom.

The post must have a strength of 2.42 lbs./foot.

The Anchor

The anchor is three (3) foot in length and be 2-1/4 inches by 2-1/4 inches square.

The anchor is made of 14 gauge steel that meets ASTM A653 and FHWA approval.

The anchor is hot dipped galvanized zinc coating conforming to coating designation G-90.

The anchor meets all requirements for NCHRP 350.

The anchor has 7/16 inch holes punched 1 (one) inch on center on all four sides.

The bottom of the anchor must have a v-pointed bottom on two of the four sides. On two of parallel sides, the anchor should be cut on a 45 degree angle one inch up from the bottom.

The anchor must have a strength of 2.77 lbs./foot.

The Contractor must also supply all associated hardware necessary to install the posts and signs on this type of square tube sign post.

**CATEGORY 800
TRAFFIC**

SECTION 814 – SIGNAL HEADS

On page 592 of the Standard Specifications.

814.03 CONSTRUCTION.

ADD: The following after the first paragraph.

Relocating Existing Signal Head (Any Type). Existing signal heads shall be relocated as specified on the signal drawings or as directed the Engineer. This work shall include relocating a signal head from its original location to the new location, which shall include aiming, and adjusting of the signal head.

814.04 MEASUREMENT AND PAYMENT.

DELETE: In its entirety

INSERT: The following:

The installation of new Light Emitting Diode (L.E.D) units which may replace the lens and light bulb of one or more sections of the traffic signal head will not be compensated for and will incidental to the items in this section. The L.E.D. will be supplied by the County and is to be installed in the signal head(s) as per the plans and/or as directed by the Engineer.

The Contractor will be supplied with the L.E.D. units and will be responsible for any damage to unit. If the Contractor damages a unit, it will be the Contractor's responsibility to replace the L.E.D. unit at the Contractor's expense with the same make, model and vendor of the original L.E.D. unit supplied by the County.

814.04.01 Furnished and Installed Signal Heads.

Aluminum, Polycarbonate, and Optically Programmed Signal Heads and Pedestrian Signal Indications furnished and installed will be measured and paid for at the Contract unit price per each section of signal head type and size as specified in the Contract Documents. The payment will be full compensation for all lenses, mounting hardware, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

814.04.02 Installed Signal Heads.

Aluminum, Polycarbonate, and Optically Programmed Signal Heads and Pedestrian Signal Indications (to include audible pedestrian signals) installed will be measured and paid for at the Contract unit price per each section of signal head type and size as specified in the Contract Documents. The payment will be full compensation for transportation, mounting, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

814.04.03 Relocating Existing Signal Head (Any Type).

This work will be measured and paid for at the Contract unit price per each. The

payment will be full compensation for relocating the existing signal head assembly and for all materials, equipment, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

SECTION 816 – TRAFFIC SIGNAL CONTROLLERS AND CABINETS

On page 594 of the Standard Specifications.

816.03.02 Pole Mounted Traffic Signal Controllers.

INSERT: The following after the first paragraph.

Pole mounted cabinets shall be mounted 27 inches above grade.

NEMA Type 5 cabinets will have a 3 inch LB installed in the conduit run from the bottom of the cabinet to the pole.

A pole mounted cabinet will mounted to the pole with two (2) - ¾ inch type 201 stainless steel attachment straps per mounting bracket.

**CATEGORY 800
TRAFFIC**

SECTION 817 - PUSH BUTTON AND PUSH BUTTON SIGNS

On page 595 of the Standard Specifications.

817.01 DESCRIPTION.

ADD: The following sentence to end of first paragraph.

In addition, work may consist of installing County furnished pedestrian push button assemblies and push button signs at locations specified in the Contract Documents.

On page 595 of the Standard Specifications.

817.04 MEASUREMENT AND PAYMENT.

DELETE: In its entirety

INSERT: The following:

817.04.01 Furnishing and Installation of Push Button and Push Button Sign will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all drilling of holes, mounting hardware, sign, labor, equipment, tools, and incidentals necessary to complete the work.

817.04.02 Installation of County supplied Push Button Assembly and Push Button Sign will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all drilling of holes, mounting hardware, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

**SECTION 818 MAST ARMS AND MAST ARM POLES -
SINGLE, TWIN AND TRIPLE**

DESCRIPTION. This work shall consist of furnishing and/or installing galvanized traffic signal mast arms and mast arm poles at locations specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Materials shall conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals except as noted. All welding shall conform to American Welding Society (AWS) Structural Welding Code D1.1 - Steel, Tubular Structures.

Mast Arm(s) and Mast Arm Pole(s)

Refer to MD SHA Details: 801.01, 818.01, 818.02, 818.03, 818.06, 818.07, 818.08, 818.09, 818.10, 818.11, 818.12, 818.13, 818.14, 818.19.

Note: A modified mast arm design is shown in MD SHA Detail 818.13 – 01 (modified) for use with low overhead utility clearances. This pole may be requested by the Engineer for use with any project. See Section 852 Measurement and Payment for payment for this modified Mast Arm Pole

Each mast arm(s) and mast arm pole structure furnished shall consist of a design from a steel pole shaft with a steel base plate and flange plate, steel mast arm shaft(s) with steel flange plate(s), four flange bolts per mast arm, four anchor bolts and miscellaneous hardware.

- (a) All mast arm poles shall be designed to support, at the free end of the mast arm, a minimum vertical downward dead load of 150 lbs. and a minimum horizontal wind load applied at a right angle to the mast arm of 700 lbs. Design stress for the mast arm pole and all its components shall not exceed 55 percent of yield strength of the material used, equivalent to a 1.8 factor of safety.
 - (b) The mast arms and mast arm poles shall be manufactured from steel tubing conforming to ASTM A 595 Grade A or equal. Each mast arm and mast arm pole shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the mast arm or mast arm pole, with no transverse welds. The longitudinal weld shall be finished to form a smooth outside surface and the wall of the mast arms and mast arm poles shall be of uniform thickness including the welded area. The mast arms and mast arm poles shall be round or multi-sided (8 sides or more) in cross section and be uniformly tapered from butt to tip with a 1 inch reduction in diameter for each 7 feet in length (0.14 in./ ft.). Mast arms shall be of a two piece design for all mast arms 50 foot and 60 foot in length. Mast arms shall be of a three piece design for all mast arms 70 foot in length. Any combination of two piece of 50 foot and 60 foot arms of the same butt diameter shall fit together and any combination of two or three piece of 60 foot and 70 foot mast arms in sequence shall fit together. The bolted splice for two or three piece mast arms shall be as specified in the Contract Documents.
- (1) 50 foot mast arms shall have a butt section of 30 feet in length.

- (2) 60 foot and 70 foot mast arms shall have a butt section of 35 feet in length.
 - (3) 38 foot single piece mast arms shall be 9 inch outside diameter at the flange plate and shall be made of 7 gauge (0.179 in.) thickness steel.
 - (4) 50 foot two piece mast arm butt sections shall be 10 inch outside diameter at the flange plate and shall be made of 3 gauge (0.250 in.) thickness steel.
 - (5) 60 foot two piece and 70 foot three piece mast arm butt sections shall be 12 inch outside diameter at the flange plate and shall be made of 3 gauge (0.250 in.) thickness steel.
 - (6) All first extension section of two and three piece mast arms shall be made of 7 gauge (0.179 in.) thickness steel. The second extension section of three piece mast arms shall be made of 11 gauge (0.1196 in.) thickness steel.
 - (7) Single 27 foot mast arm pole designed with a 38 foot mast arm length shall be 12 inch outside diameter at the base plate and shall be made of 7 gauge (0.179 in.) thickness steel.
 - (8) Single 27 foot mast arm pole designed with a 50 foot mast arm length shall be 13 inch outside diameter at the base plate and shall be made of 3 gauge (0.250 in.) thickness steel.
 - (9) Single 27 foot mast arm pole designed with 60 foot or 70 foot mast arm lengths shall be 15 inch outside diameter at the base plate and shall be made of zero gauge (0.312 in.) thickness steel.
 - (10) Twin 27 foot mast arm poles designed with 50 foot mast arm lengths shall be 13 inch outside diameter at the base plate base and shall be made of 3 gauge (0.250 in.) thickness steel.
 - (11) Twin 27 foot mast arm poles designed with mast arm lengths for one mast arm of 50 foot and the remaining mast arm of 60 foot or 70 foot shall be 15 inch outside diameter at the base plate and shall be made of zero gauge (0.312 in.) thickness steel.
 - (12) Triple 27 foot mast arm pole designed with mast arm lengths for one mast arm of 38 foot, second mast arm of 60 or 70 foot and the third mast arm of 50 foot shall have 15 inch outside diameter at the base plate and shall be made of zero gauge (0.312 in.) thickness steel.
- (c) The material for mast arm pole base plate shall conform to ASTM A 709, Grade 36 and shall be of sufficient size and strength. The base plate shall be secured to the lower end of the mast arm pole by two continuous electric arc welds. The base plate shall telescope the mast arm pole with one weld on the inside of the base plate at the end of the mast arm pole shaft. The remaining weld shall be located on the outside of the base plate, around the circumference of the mast arm pole. The weld connection shall develop the full strength of the adjacent mast arm pole shaft to resist bending action. All base plates shall be fabricated with the holes for anchor bolts to the size and location dimensions as shown in the details in the Standard Specifications.
- (d) All mast arms and mast arm poles shall be furnished with flange plate(s) as noted in the

details in the Standard Specifications. These attachments, including the bolts, shall be connected in such a manner as to develop the minimum guaranteed yield and ultimate tensile strength for the mast arm and mast arm pole. This assembly shall be capable of transferring the maximum moment being carried by the mast arm without distortion or rotation of the mast arm or the attachment. Flange plate(s) shall be connected by the use of 4 bolts. The size of the plates and bolts shall be as shown in the details in the Standard Specifications. Four (1-1/2 inch O.D.) rubber grommets shall be furnished for each mast arm to accommodate signal heads wiring access.

- (e) The mast arm flange plate shall be secured to the lower end of the mast arm pole by two continuous electric arc welds. The mast arm flange plate shall telescope the mast arm with one weld located on the inside of the flange plate at the end of the mast arm. The remaining weld shall be located on the outside surface of the flange plate around the circumference of the mast arm pole. The weld connections shall develop the full strength of the adjacent mast arm to resist bending action.
- (f) Mast arm flange plates and mast arm pole flange plates surfaces shall be plane to within 1/16 inch and shall be free of any buildup of galvanizing (drips, runs, etc.) which would prevent intimate contact between the connecting surfaces.
- (g) Access hole frames shall be welded into the mast arm pole as detailed in MD 818.11. A galvanized steel cover, conforming to ASTM A 709, Grade 36, shall cover the access hole frame. The access hole cover's top shall be secured to the access hole frame by a hinge fabricated from 0.063 inch stainless steel using a 0.120 inch diameter stainless steel hinge pin. The hinge shall be secured to the access hole frame by two (1/4 in.-20 UNC) hex head stainless steel bolts or three (0.25 in. x 0.75 in.) long security pin button head stainless screws. The hinge shall be secured to the access hole cover by two (1/4 in. - 20 UNC) hex head stainless steel bolts and lock nuts or three (0.188 stainless steel pop rivets. A slotted opening shall be provided at the bottom of the access hole cover to allow for attachment of a furnished one (1/4 in. - 20 UNC) hex head stainless steel bolt into the access hole frame face.
- (h) A 3/8 inch diameter X 1 inch stud copper servit post for two #6 AWG stranded wire shall be furnished into the bottom of the access hole frame.
- (i) Mast arm poles shall be provided with entranceways for cable as noted on the appropriate detail. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 3 inch rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in the details in the Standard Specifications
- (j) "J" hooks shall be installed as follows, located 1 foot above the highest mast arm T dimension.
 - (1) A single "J" hook shall be welded inside the pole for single mast arm poles.
 - (2) Two "J" hooks shall be welded inside the pole for twin mast arm poles and triple mast arm poles.
- (k) All mast arms, mast arm poles, access hole frames and hardware, except materials

manufactured from stainless steel or cast aluminum, shall be hot dipped galvanized. The galvanized coating shall conform to the thickness, adherence, and quality requirements of ASTM A 123 or A 153 for hardware. Threaded components shall be chased and cleaned after galvanizing. All internally threaded components shall be tapped the minimum amount required to permit assembly on the coated externally threaded fastener. Internally threaded components shall be provided with a lubricant, which shall be clean and dry to the touch.

- (l) Each mast arm pole shall be furnished with four removable ornamental anchor bolt covers made of cast aluminum. Bolt holes for attaching the bolt covers to the base plate shall be drilled at the location obtained by following the diagonal line of the base plate until it intersects the bolt circle diameter. Then proceed tangentially along the bolt circle diameter a distance equal from the anchor bolt center to the bolt slot center to locate the bolt attachment location as detailed MD 818.14. Attachment to the base shall be made using hex head stainless steel bolts (1/4 in.- 20 UNC). The removable ornamental anchor bolt covers may be made of zinc die cast or UV inhibiting plastic; however, the Engineer, as part of the cut sheet submittal process, must approve the alternate anchor bolt covers.
- (m) Each mast arm extension section and mast arm pole shall be furnished with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the outside of the pole shaft or mast arm end with 3 hex head stainless steel bolts (1/4 in.- 20 UNC). All mast arm caps shall have inside diameter one inch. larger than the outside diameter of mast arm end. The mast arm end shall have one (1) hex head stainless steel bolt (1/4 in.- 20 UNC) bolted through the cap and the mast arm and secured with one (1) stainless steel nylon insert locknut.
- (n) Each mast arm and mast arm pole shall have an identification plate mechanically attached, oriented such that the identification plate may be read from a ground observation position, as specified in the Contract Documents.
 - (1) Single piece mast arms and the butt section of two and three piece mast arms shall have the identification plate attached 6 inches above the flange plate.
 - (2) Each extension section of two and three piece mast arms shall have the identification plate attached 6 inches from the larger diameter end.
 - (3) Poles shall have the identification plate attached 6 inches above the bottom flange plate.
- (o) Recessed hub type, galvanized malleable iron plugs shall be inserted flush into all mast arm pole couplings.

Anchor Bolts.

Refer to MD SHA Details: 801.01, 818.01, 818.06, 818.07, 818.08, 818.09, 818.10, 818.14, 818.19.

- (a) Each mast arm pole anchor bolt shall be made of steel in accordance with ASTM M 314, Grade 55 SI or ASTM F1554 Grade 55.
- (b) Anchor bolt threads shall be of cut thread design with a minimum 9 inches of threads at

the top.

- (c) A 90 degree ell bend 6 inches in length shall be part of the overall bolt length.
- (d) The diameter of the anchor bolt shall be stamped into the top of the threaded end of each anchor bolt.
- (e) Each anchor bolt shall be provided with two anchor bolt nuts and two flat washers.
 - (1) Anchor bolt nuts shall conform to ASTM A 194 grade 2 or 2H or ASTM A 563 A, D, or DH.
 - (2) All nuts shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener.
 - (3) Washers shall conform to ASTM F436.
- (f) All nuts, washers, and the top 12 inches of all anchor bolts shall be hot dipped or mechanically galvanized. The galvanized coating shall conform to the thickness, adherence, and quality requirements of ASTM A 123 or ASTM A 153 for hardware.

All high strength bolts (of a given length), nuts (of a given size) and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials. The use of foreign made fasteners is prohibited!

Alternate Design. Alternate mast arm and mast arm pole designs will be considered provided the following qualifications are observed:

- (a) Alternate mast arm designs may use sectional construction provided each section has a minimum length of 30 feet except for the outer most section.
- (b) Overlap between sections shall be minimum 18 inches.
- (c) Bolt circle diameters shall be as specified in the Contract Documents.
- (d) Alternate post designs may be straight (not tapered) sections and shall have a base diameter equal to, or no greater than one (1) inch more than, those values shown on the details in the Standard Specifications.
- (e) Alternate designs shall be structurally equivalent to the original design and physical requirements of these specifications. Calculations demonstrating structural equivalency and supporting pole drawings for these designs must be submitted for approval by the Engineer as part of the cut sheet submittal process.

MEASUREMENT AND PAYMENT.

- (a) Method 1 - **Furnishing and installing** galvanized traffic signal mast arms and mast arm poles.

Furnish and install for mast arm(s) and mast arm(s) poles will be measured and paid for at the contract unit price per each type of pole and mast arm(s) size as specified in the Contract Document. The payment will be full compensation for furnishing & installing all

materials including labor, equipment, materials, tools, and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in section 801.

Modified Mast Arm Adjustment (per Mast Arm) will be will be measured and paid for at the contract unit price per each mast arm regardless of its length as specified in the Contract Document.

(b) Method 2 - Installing galvanized traffic signal mast arms and mast arm poles.

Mast arm(s) and mast arm(s) poles will be furnished by Baltimore County and installed by the Contractor. The installation of the mast arm(s) and mast arm(s) poles will be measured and paid for at the contract unit price per each type of mast arm pole(s) and mast arm(s) size installed as specified in the Contract Documents. The payment will be full compensation for the installation and all materials including labor, equipment, materials, tools, and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in section 801.

Tag Details

Single Mast Arm Pole

Mfg.: _____ [1]	Contract. #: _____ [2]
Pole Height: _____ [3]	
Arm Sizes: _____ [4]	
Anchor Bolts: _____ [5]	Bolt Circle: _____ [8]
Flange Bolts: _____ [7]	

One Piece Mast Arm

Mfg.: _____ [1]	Contract #: _____ [2]
Arm Length: _____ [6]	
Flange Bolts: _____ [7]	

Two or three Piece Mast Arm - Butt Section

Mfg.: _____	[1]	Contract #: _____	[2]
Butt For Arms: _____	[4]		
Flange Bolts: _____	[7]		
Connection Bolt: _____	[9]		

Two or three Piece Mast Arm - Extension Section

Mfg.: _____	[1]	Contract #: _____	[2]
Extension Arm: _____	[6]		
Connection Bolt: _____	[9]		

Twin Mast Arm Pole (Identical Size Flange Plates)

Mfg.: _____	[1]	Contract #: _____	[2]
Pole Height: _____	[3]		
Arm Sizes: _____	[4]		
Anchor Bolts: _____	[5]	Bolt Circle: _____	[8]
Flange Bolts: _____	[7]		

**Twin Mast Arm Pole
(Different Size Flange Plates)**

Mfg.: _____ [1]	Contract #: _____ [2]
Pole Height: _____ [3]	
Left Arm Sizes: _____ [4]	
Right Arm Sizes: _____ [4]	
Anchor Bolts: _____ [5]	Bolt Circle: _____ [8]
Left Arm Flange Bolts: _____ [7]	
Right Arm Flange Bolts: _____ [7]	

**Triple Mast Arm Pole
(Different Size Flange Plates)**

Mfg.: _____ [1]	Contract #: _____ [2]
Pole Height: _____ [3]	
Left Arm Sizes: _____ [4]	
Center Arm Sizes: _____ [4]	
Right Arm Sizes: _____ [4]	
Anchor Bolts: _____ [5]	Bolt Circle: _____ [8]
Left Arm Flange Bolts: _____ [7]	
Center Arm Flange Bolts: _____ [7]	
Right Arm Flange Bolts: _____ [7]	

Tag Reference

- [1]** Name of the manufacturer of the mast arm or mast arm pole.

- [2]** County Contract Number of the mast arm or mast arm pole.

[3] 27 foot height.

[4] Mast Arm Size and Orientation¹

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	38'
3 GA	50'
0 GA	60' or 70'

¹For **twin mast arm poles with identical size flange plates**, indicate L & R preceding the 50' mast arm size; For **twin mast arm poles with different size flange plates**, indicate either 50' or 60'-70' mast arm sizes in the corresponding Left Arm Size or Right Arm Size as oriented by the line bisecting the acute angle formed by the two mast arm pole flange plates. For **triple mast arm poles with different size flange plates**, indicate either 50', 60'-70' or 38' mast arm sizes in the corresponding Left Arm Size, Center Arm Size or Right Arm Size as oriented by the centerline of the mast arm pole center flange plate.

[5] Anchor Bolts

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	1-½" x 60" & 2 washers
3 GA	1-¾" x 90" & 2 washers
0 GA	2" x 90" & 2 washers

[6] Mast Arm Length -

<u>Constructed Extension for arm length</u>	<u>Indicate</u>
50'	50'
60'	60'-70'
70'	70'

[7] Flange Bolt Size²

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	1-¼" x 4" & washer
3 GA	1-½" x 5" & washer
0 GA	1-¼" x 6-½" & 2 flat washers & lock washer

[8] Bolt Circle

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	16" Diameter.

²For **twin mast arm poles with identical size flange plates**, indicate L & R preceding the 1-½" x 5" & washer Flange Bolt Size; For **twin mast arm poles with different size flange plates**, indicate either 1-½" x 5" & washer or 1-¼" x 6-½" & 2 flat washers & lock washer flange bolt sizes in the corresponding Left Flange Bolt Size or Right Flange Bolt Size as oriented by the line bisecting the acute angle formed by the two mast arm pole flange plate. For **triple mast arm poles with different size flange plates**, indicate either 1-½" x 5" & washer, 1-¼" x 6-½" & 2 flat washers & lock washer or 1-¼" x 4" & washer flange bolt sizes in the corresponding Left Flange Bolt Size, Center Flange Bolt Size or Right Flange Bolt size as oriented by the centerline of the mast arm pole center flange plate.

3 GA
0 GA

18" Diameter
22" Diameter

[9] Connection Bolt Size

Two or three Piece Arm Size

Indicate³

50'
60'
70'

5/8" x Var.
5/8" x Var.
5/8" x Var.

³Length to be determined by the successful bidder.

**CATEGORY 800
TRAFFIC**

SECTION 819 STEEL SPAN WIRE

819.01 DESCRIPTION.

On page 597 of the **Standard Specifications**.

CHANGE: In the second line the terminology “signal head or sign mountings, interconnect runs, or for tethering purposes” to read “signal head or sign mountings, interconnect runs, backguying, overhead communications cable pole to pole guying, overhead communications cable slack, spans overhead communications cable, false dead ends or for tethering purposes”

819.03 CONSTRUCTION.

On page 597 of the **Standard Specifications**.

CHANGE: In the first line the terminology “The span wire shall be attached to poles” to read “The span wire shall be attached to signal structures”.

ADD: After the third paragraph: “Overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans shall be installed on all utility owned poles in accordance with the utility pole owner’s requirements. Ram head type guy hooks shall be installed for overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans on all utility owned poles. Wrap type guy grips shall be used to terminate the ends of overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans. Strandvise devices shall not be used to terminate the steel span wire ends of overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans.”

**CATEGORY 800
TRAFFIC**

SECTION 820—GENERAL ELECTRICAL WORK AND TESTING

On page 598 of the Standard Specifications.

820.03.03 Traffic Signal Testing.

ADD: After the fourth paragraph.

820.03.05 CONTINUITY OF OPERATION

During the modification and/or interconnection of existing traffic signals or signal systems, the Contractor shall take every precaution to assure that disturbance of the normal signal operation is minimized. Also, the Contractor shall submit to the Engineer a Schedule of Construction Staging and shall obtain approval before performing any modification work. The Schedule of Construction Staging shall describe the sequence of events by which the continuity of signal operation will be preserved when transferring from the existing to the new equipment. At no time will the entire signal be turned off without prior approval of the Engineer. The Contractor shall not make any changes in the operational functioning, phasing, or timing of any traffic signal without written direction to do so by the Engineer.

820.03.06 TURN-ON AND TESTING PROCEDURE

Under the direct supervision of the Engineer, the Contractor shall follow the procedures listed below when activating traffic signal equipment.

New Installations:

After installation of a new traffic signal, the Contractor shall activate the traffic control signal by:

- (1) testing the total operation of the signal equipment
- (2) placing the signal on flashing operation for an introductory period of not less than seventy-two (72) hours; then
- (3) placing the signal on standard color operation in the presence of the Engineer. Local controller timings and daily program shall be provided by the Engineer and implemented by County Forces. **Modified Installations:**

At locations where existing traffic control signals have been modified, the new equipment should be tested (as far as possible) without colors showing to traffic. The old equipment shall be retained in place and operational until it is reasonably certain that the new equipment will perform.

The transfer to the new system shall be performed in the presence of the Engineer during off-peak traffic periods, and should be coordinated with a gap in the traffic. The switchover from the old to the new equipment should be conducted without letting the signals go dark. If conflicting indications could result during the switch over, a brief period of flashing operation should be used.

Testing of the new equipment shall then be completed with the system fully operational. The old signal equipment shall be retained on-site and operational until the Engineer directs removal.

**CATEGORY 800
TRAFFIC**

**SECTION 822 - REMOVE AND RELOCATE EXISTING
SIGNS AND SIGN STRUCTURES**

DELETE: In its entirety

INSERT: The following.

822.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for removing and relocating existing signs and sign structures, removing existing concrete foundations, backfilling and compacting existing holes left after sign removal and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

822.04.01 Remove Existing Sign (any size and/or type) will be measured and paid for at the Contract unit price per each. Removal of sign, sign supports, and concrete foundations will not be measured but the cost will be incidental to the Contract unit price for removing the sign(s).

This item will not be measured when the signs are to be removed as part of the item - Remove and Dispose of Existing Signal Equipment per Assignment.

822.04.02 Relocate Existing Sign (any size and/or type) will be measured and paid for at the Contract unit price per each. Removal and disposal, or removal and relocation of the sign support will not be measured but the cost will be incidental to the Contract unit price for relocating the sign(s).

**CATEGORY 800
TRAFFIC**

**SECTION 823 - REMOVE AND RELOCATE OR DISPOSAL
OF ROADWAY LIGHTING STRUCTURES**

DELETE: In its entirety

INSERT: The following.

823.04 MEASUREMENT AND PAYMENT.

823.04.01 Remove and Dispose of Roadway Lighting will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the removal and disposal of the lighting structure and fixture, removal of existing concrete foundation and all material, labor, equipment, tools, and incidental necessary to complete the work.

823.04.02 Remove and Relocate Roadway Lighting Structure will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the removal, storage, reinstallation, connection to existing lighting circuits, removal of existing concrete foundation and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800 TRAFFIC

SECTION – 826 CATALOG CUTS AND WORKING DRAWINGS

DESCRIPTION. This work shall consist of the Contractor preparing and transmitting submittals to demonstrate the performance of the work will be in accordance with the Contract Documents. Submittal schedules, catalog cuts, shop drawings, installation methods, manufacturer's certifications, photometric data and working drawings shall be furnished on all Contractor furnished items for highway signing, sign lighting, highway lighting and traffic signals. Stakeouts of the sign locations shall be submitted for all sign structure locations as specified in the Contract Documents.

MATERIALS. Not Applicable.

CONSTRUCTION.

SUBMITTAL REQUIREMENTS. Submittals shall be scheduled and coordinated with the Contractor's construction schedule. A complete submittal schedule and list of required submittals shall be submitted with the first submittal, but no later than two weeks after the letter of award. The schedule for submission of submittals shall be arranged so that related equipment items are submitted concurrently. If the Contractor is unable to complete the requirements of this Special Provision within three (3) months from the letter of award will be withdrawn.

The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment. Shop drawings for closely related items such as a sign and its support structures shall be submitted together.

SUBMITTAL DOCUMENTS. Contractor's drawings shall be neat in appearance, legible and explicit to enable proper review to ensure Contract compliance. They shall be complete and detailed to show fabrication, assembly and installation details, wiring and control diagrams, catalog data, pamphlets, descriptive literature, and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine, or system provided and its intended manner of use. If the Contractor's drawings deviate from the Contract Documents, the Contractor shall so advise the Engineer in writing with the submittal and state the reason therefor.

No portion of the work requiring a Contractor's drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished, which does not conform to approved Contractor's drawings, shall be at the Contractor's risk. The County will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

Shop drawings shall show types, sizes, accessories, layouts including plans, elevations and sectional views, component, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and installed. In case of fixed mechanical and electrical equipment, layout drawings, drawn to scale, shall be submitted to show required clearances for operation, maintenance and replacement of parts. Manufacturer's certified performance curves, catalog cuts, pamphlets, descriptive

literature, installation and application recommendations, shall be provided and indicate conformance to the Contract documents. Certifications shall be originals.

Manufacturer's catalog product and equipment data shall be certified and shall include materials type, performance characteristics, voltage, phase, capacity, and similar data. Provide wiring diagrams when applicable. Indicate catalog, model and serial numbers representing specified equipment. Provide complete component information to verify all specified required items. Installation recommendations and instructions shall provide written Manufacturer's detail step by step preparation and installation of the materials, and products including recommended tolerances and space for maintenance and operation.

Catalog cuts for sign luminaries shall have photometric data attached for each sign to be illuminated. Photometric printouts shall include the sign number, the illumination on a one foot grid covering the entire sign face, the average illumination, the maximum to minimum uniformity ratio, and a working drawing for the sign face attached.

Catalog cuts for roadway luminaries shall have a photometric data attached showing the initial illumination levels for a typical section of the project where luminaries will be installed. The printout shall be for a row of points between two of the luminaries spaced at twenty (20) foot along the center of each travel lane.

The Contractor shall submit working drawings as required for changes, substitutions, Contractor designed items, and Contractor designed methods of construction. Requirements for working drawings will be listed in appropriate Specification Sections and in Special Provisions. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine or system described and its intended use. Review and approval of such drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract.

Working drawings and calculations as submitted shall be sealed, dated and signed by a Professional Engineer registered in the State of Maryland.

The review and approval of Contractor's drawings by the Administration shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor shall be responsible for the verification and accuracy of all dimensions and insuring that all Contractor furnished items are compatible, and conform to all design and performance criteria. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

SUBMITTAL PROCESS. Each Contractor's drawing submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor:

"By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and I have checked and coordinated each item with other applicable approved drawings and Contract requirements."

With the first submittal, submit a Contractor's drawing submittal schedule, listing by Specification Section number, all submittals required and approximate date submittal will be forwarded

For original submittal and each subsequent resubmittal that may be required, submit seven (7) copies of catalog descriptions, shop drawings, working drawings, photometric data. Manufacturer's certifications, method of construction and manufacturer's installation recommendations for approval to:

Mr. Greg Carski, Section Chief
Traffic Engineering Design Section
Baltimore County Government
111 West Chesapeake Avenue, Room 326
Towson, Maryland 21204

Each submittal shall have a transmittal page that indicates the Contractor's and Subcontractor's address and telephone numbers.

The first page of the first set of catalog description, working drawing and material certifications shall be stamped in red with the following (sets 2 to 7 may photocopied and must be legible photocopies of the first set). Submittals in packages of multiple items need the identification only on the exterior. In such instances the identification shall include page and catalog item numbers for items submitted for approval.

Baltimore County Bureau of Traffic Engineering and Transportation Planning	
SUBMITTAL PACKAGE #_____DATED	
SHA #_____FAP #	
ITEM #_____THIS ITEM CONTAINS_____PAGES	
ITEM DESCRIPTION	
ACCEPTED	
ACCEPTED AS NOTED	
REJECTED - REVISE & RESUBMIT	
REVIEWER'S NAME	DATE

All pertinent Contract Document information shall be filled in the spaces provided

All submittals for approval shall have the following identification data, as applicable contained thereon or permanently adhered thereto.

- (a) Drawing title, drawing number, revision number, and date of drawing and revision.
- (b) Applicable Contract Drawing Numbers and Specification Section and Paragraph Numbers.

The Contractor shall indicate the submittal package by sequential numbering, date of submittal, SHA Contract number, item number, item description and number of pages for each item submitted. Catalog, product data or brochure submittals containing various products, sizes and materials shall be underscored or highlighted to indicate the salient features required to meet the specifications. Likewise, items not applicable to the Contract shall be marked "not applicable" or crossed out.

If one or more of the items in such a submittal are not approved, resubmittal of only the unapproved items is required highlighted to show the particular item being submitted. Resubmittals shall bear the original submittal number and be lettered sequentially with each resubmittal.

Three (3) copies of all Contractor's submittals will be returned to the Contractor, (2) copies will be forwarded to the Traffic Signal Supervisor, one (1) copy will be kept by the Engineer, and one (1) copy will be filed in the Traffic Engineering Office files.

Each submittal shall be in accordance with the Contractor's drawings submission schedule. Allow thirty days for checking and appropriate action by the Engineer.

Contractor's drawings will be returned, marked with one of the following classifications:

ACCEPTED: no corrections, no marks

ACCEPTED NOTED: a few minor corrections. Resubmit a corrected copy to the Engineer.

Resubmit drawings as per original submission with corrections noted. Allow thirty days for checking and appropriate action by the Engineer.

REJECTED – REVISE & RESUBMIT: requires corrections or is otherwise not in accordance with the Contract documents. No items shall be fabricated. Correct and resubmit drawings as per original submission. Allow thirty days for checking and appropriate action by the Engineer.

MEASUREMENT AND PAYMENT. Catalog cuts, manufacturer's certifications, photometric data and working drawings will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents.

**CATEGORY 800
TRAFFIC**

**SECTION 850 CUTTING, CLEANING, GALVANIZING AND
CAPPING MAST ARM AND STRAIN POLES**

DESCRIPTION. This work shall consist of cutting, cleaning, galvanizing, and capping mast arms/poles and strain poles to the as specified in the Contract Documents.

MATERIALS.

Poles for Mast Arm(s)-	As specified in the Contract Documents.
Mast Arm(s)	- As specified in the Contract Documents.
Strain Pole(s)	- As specified in the Contract Documents.

CONSTRUCTION.

- (a) **Strain Poles.** Strain Pole shall be sawcut as required. Affected area shall be cleaned inside and outside the pole with a wire brush and sprayed with cold galvanizing compound on the cleaned area and then a matching size pole cap shall be placed.
- (b) **Mast Arms and Poles.** Mast arm shall be sawcut to the required length. Affected area shall be cleaned inside and outside with a wire brush and sprayed with cold galvanizing compound on the cleaned area and then a matching size cap shall be placed.

MEASUREMENT AND PAYMENT. Cutting, cleaning, galvanizing, and capping of mast arms/poles will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

SECTION 851 PAINTING NEW AND EXISTING STRUCTURES

DESCRIPTION. This work shall consist of painting new and existing galvanized steel, stainless steel and aluminum structures including exposed anchor bolts, flange bolts, nuts, washers, stainless steel bands and conduits as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Materials shall conform to any one of the following paint systems or as approved by the Engineer.

Paint System:

- (A) Spot Primer. Paint meeting the requirements of a zinc rich spot primer shall have a dry film thickness of 3 to 5 mils.
- (B) Prime Coat. Paint meeting the requirements of a two component polyamide epoxy shall have a dry film thickness of 4 to 6 mils.
- (C) Finish Coat. Paint meeting the requirements of a two component aliphatic polyurethane shall have a dry film thickness of 2 to 4 mils.

Materials shall conform to any one of the following paint systems:

	Manufacturer	Spot Primer	Prime Coat	Finish Coat
1.	Sherwin Williams	Zinc Clad B 69AHS	Tile Clad II Epoxy B62 Series/B60V70	H S Polyurethane B65 Series/B60V30
2.	Ameron	Amercoat 68 HS	Amercoat 385	Amercoat 450 HS
3.	Davis Frost	P-281	E-375	Shinethane HS
4.	Courtaulds Coatings	Interzinc 308	Interseal 670	Interthane 990
5.	Carboline	Carboline 858	Carboline Penetrating Sealer	Carboline 133 HB
6.	DuPont	Corlar Epoxy Zinc	Dual Build Epoxy	Imoron Polyurethane

- (D) **Alternative finish systems as approved by the Engineer.**

CONSTRUCTION. The Painting Contractor shall be pre-qualified by the Administration's Office of Materials and Research to provide cleaning and painting of any structure.

The Contractor will be provided with the appropriate color information with the Notice To Proceed (NTP) for the task.

Shop Painting. Shop painting of new structures (less than six months old) shall conform to the

following:

Structures shall be galvanized and protected from exposure to contaminants such as oil, salts, etc. during storage and/or transportation. The structures shall be brush blasted conforming to SSPC-SP7 no earlier than 12 hours before application of the first coat. Additional surface preparation and coating application shall be in accordance with manufacturer's recommendations. The finish coating shall be non-porous when checked with a holiday detector approved by the Engineer.

Field Painting. Field painting of existing structures (6 months or later) shall conform to the following:

All existing painted structures shall be cleaned to insure that all paint is removed to either galvanized surface or bare metal. Before painting, all cleaned surfaces shall be approved by the Office of Materials and Research.

- (a) Solvent cleaning conforming to SSPC-SP1 shall be used to remove foreign matter such as oil, grease, soil, and other contaminants from galvanized. In the solvent cleaning operations, the contaminated solvent shall be removed before it evaporates by wiping or rinsing with clean solvent to prevent leaving a film of contaminants spread over the surface.
- (b) Loose rust and paint shall be removed by either hand tool cleaning conforming to SSPC-SP2 or by power tool cleaning conforming to SSPC-SP3.
- (c) Spot primer shall be used on rusted areas cleaned to bare metal.

The contractor shall notify Mr. Gregory Carski at 410-887-3554 at least seven days prior to the cleaning and painting of any structures. Structures shall be painted within 24 hours after surface preparation. The finish coating shall be non-porous when checked with a holiday detector approved by the Engineer.

MEASUREMENT AND PAYMENT. Painting of new structures will be measured and paid for at the Contract unit price per each structure. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Painting and cleaning of existing structures will be measured and paid for at the contract unit price per each structure cleaned and painted. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

GALVANIZED TRAFFIC SIGNAL STRAIN POLES

DESCRIPTION. This work shall consist of furnishing and/or installing galvanized traffic signal strain poles at locations specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Materials shall conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals except as noted. All welding shall be in accordance with the American Welding Society (AWS) Structural Welding Code D1.1 - Steel, Tubular Structures.

Strain Pole(s)

Refer to MD SHA Details: 801.01, 818.01, 818.03, 818.04, 818.11, 818.14, 818.15, 818.20.

Each strain pole furnished shall consist of a design from a steel shaft with a steel base plate, four anchor bolts and miscellaneous hardware.

- (a) The strain pole shaft shall be manufactured from steel tubing conforming to ASTM A 595 Grade A or equal. Each strain pole shaft shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the strain pole shaft, with no transverse welds. The longitudinal weld shall be finished to form a smooth outside surface and the wall of the strain pole shaft shall be uniform in thickness including the welded area. The strain pole shaft shall be round or multi-sided (eight sides or more) in cross section and be uniformly tapered from butt to tip with approximately a one inch reduction in diameter for each seven feet in length (0.14 in./ ft.).
 - (1) All 30 foot strain poles shall be 12 inches outside diameter at the base plate and shall be made of zero gauge (0.312 in.) thickness steel.
 - (2) All 32 foot strain poles shall be either 12 inches or 14 inches outside diameter at the base plate and shall be made of double zero gauge (0.625 in.) thickness steel.
- (b) All strain poles shall be furnished with a base plate with a minimum 10 inch opening. The material shall meet the requirements of ASTM A 709, Grade 36 and shall be of sufficient size and strength. The base plate shall be secured to the lower end of the strain pole shaft by two continuous electric arc welds. The base plate shall telescope the strain pole shaft with one weld on the inside of the base plate at the end of the strain pole shaft. The remaining weld shall be located on the outside of the base plate around the circumference of the strain pole shaft. The weld connection shall develop the full strength of the adjacent strain pole shaft to resist bending action. All base plates shall be fabricated with the holes for anchor bolts to the size and location dimensions as shown in the details in the Standard Specifications.
- (c) Access hole frames shall be welded into the strain pole as detailed in MD 818.11. A galvanized steel cover, conforming to ASTM A 709, Grade 36 shall cover the access hole frame. The access hole cover's top shall be secured to the access hole frame by a

hinge fabricated from 0.063 inch stainless steel using a 0.120 inch diameter stainless steel hinge pin. The hinge shall be secured to the access hole frame by two (1/4 in.- 20 UNC) hex head stainless steel bolts or three 0.25 inch X 0.75 inch long security pin button head stainless steel screws. The hinge shall be secured to the access hole cover by two (1/4 in.- 20 UNC) hex head stainless steel bolts and lock nuts or three 0.188 stainless steel pop rivets. A slotted opening shall be provided at the bottom of the access hole cover to allow for attachment of a furnished (1/4 in.- 20 UNC) hex head stainless steel bolt into the access hole frame face.

- (d) A 3/8 inch diameter X 1 inch stud copper servit post for two #6 AWG stranded wire shall be furnished into the bottom of the access hole frame.
- (e) Strain poles shall be furnished with entranceways for cable as detailed in MD 818.15. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 3 inch rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in the details in the Standard Specifications.
- (f) A "J" hook shall be welded near the top of the strain pole shaft for cable support.
- (g) All strain poles, access hole frame and hardware, except materials manufactured from stainless steel or cast aluminum, shall be hot dipped galvanized. The galvanized coating shall conform to the thickness, adherence and quality requirements of ASTM A 123 or ASTM A 153 for hardware. Threaded components shall be chased and cleaned after galvanizing. All internally threaded components shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener. Internally threaded components shall be provided with a lubricant, which shall be clean and dry to the touch.
- (h) Each strain pole shall be furnished with four removable ornamental anchor bolt covers made of cast aluminum. Bolt holes for attaching the bolt covers to the base plate shall be drilled at the location obtained by following the diagonal line of the base plate until it intersects the bolt circle diameter, then proceeding tangentially from the bolt circle diameter a distance equal to the Anchor Bolt Center to Bolt Slot Center Distance as detailed in MD 818.14. Attachment to the base shall be made using hex head stainless steel bolts (1/4 in.- 20 UNC).). The removable ornamental anchor bolt covers may be made of zinc die cast or UV inhibiting plastic; however, the Engineer, as part of the cut sheet submittal process, must approve the alternate anchor bolt covers.
- (i) Each strain pole shall be furnished with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the inside or outside of the pole shaft with three hex head stainless steel bolts (1/4 in. – 20 UNC).
- (j) Each strain pole shall have an identification plate mechanically attached, oriented such that the identification plate may be read from a ground observation position as specified in the Contract Documents..
- (k) Recessed hub type, galvanized malleable iron plugs shall be inserted flush into all strain pole couplings.

Anchor Bolts.

Refer to MD SHA Details: 801.01, 818.01, 818.14, 818.15, 818.19.

- (a) Each strain pole anchor bolt shall be made of steel and conform to ASTM 314, Grade 55 SI.
- (b) Anchor bolt threads shall be of cut thread design with a minimum 9 inches of threads at the top.
- (c) A 90 degree ell bend 6 inches in length shall be part of the overall bolt length.
- (d) The diameter of the anchor bolt shall be stamped into the top of the threaded end of each anchor bolt.
- (e) Each anchor bolt shall be provided with two anchor bolt nuts and two flat washers.
 - (1) Anchor bolt nuts shall conform to ASTM A 194 grade 2 or 2H or ASTM A 563 A, D, or DH.
 - (2) All nuts shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener.
 - (3) Washers shall conform to ASTM F 436.
- (f) All nuts, washers and the top 12 inches of all anchor bolts shall be hot dipped or mechanically galvanized. The galvanized coating shall conform to the thickness, adherence and quality requirements of ASTM A 123 or ASTM A 153 for hardware.

All high strength bolts (of a given length), nuts (of a given size) and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials. The use of foreign made fasteners is prohibited.

Alternate Design.

Alternate strain pole designs will be considered provided the following qualifications are observed:

- (a) Alternate strain pole designs shall be of one piece construction.
- (b) Bolt circle diameters shall be followed.
- (c) Alternate strain pole designs shall have base plate dimensions equal to those values shown on the details in the Standard Specifications.
- (d) Single straight pipe sections are not acceptable.
- (e) Alternate designs shall be structurally equivalent to the original design and physical requirements of these specifications. Calculations demonstrating structural equivalency and supporting pole drawings for these designs must be submitted for approval by the Engineer as part of the cut sheet submittal process.

MEASUREMENT AND PAYMENT.

(a) Method 1 - Furnishing and installing galvanized traffic signal strain poles.

Furnish and install for strain poles will be measured and paid for at the contract unit price per each type of strain pole as specified in the Contract Document. The payment will be full compensation for furnishing & installing all materials including labor, equipment, materials, tools, and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in section 801.

(b) Method 2 - Installing galvanized traffic signal strain poles.

Strain poles will be furnished by Baltimore County and installed by the Contractor. The installation of the strain poles will be measured and paid for at the contract unit price per each type of strain pole installed as specified in the Contract Document. The payment will be full compensation for the installation and all materials including labor, equipment, materials, tools, and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in section 801.

Tag Detail

Mfg.: <u> [1] </u>	contract #: <u> [2] </u>	
Pole Diameter: <u> [3] </u>	Height: <u> [4] </u>	Gauge: <u> [5] </u>
Anchor Bolts: <u> [6] </u>	Bolt Circle: <u> [7] </u>	

Tag Reference

- [1]** Name of the manufacturer of the strain pole.
- [2]** County Contract Number of the strain pole.
- [3]** Pole outside diameter at the base: 12" O.D. or 14" O.D.
- [4]** Pole height: 30' or 32'
- [5]** Pole gauge: 0 GA or 00 GA
- [6]** Anchor bolt size: 1-3/4" Dia. x 90" Length or 2-1/4" Dia. x 96" Length
- [7]** Bolt circle diameter: 16" Dia. or 22" Dia.

CATEGORY 800

TRAFFIC

GALVANIZED TRAFFIC SIGNAL PEDESTAL POLES AND TRANSFORMER BASES

DESCRIPTION. This work shall consist of furnishing and/or installing galvanized traffic signal pedestal poles and transformer bases at locations specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Materials shall conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals except as noted. All welding shall conform to American Welding Society (AWS) Structural Welding Code D1.1 - Steel, Tubular Structures.

Pedestal Poles

Refer to MD SHA Details: 818.16, 818.17, 821.01.

Each pedestal pole's height shall be determined by the total height of the pedestal pole including the transformer base.

- (a) **10 foot** pole height shall consist of a 103 inch steel shaft with a steel base plate plus a 17 inch transformer base.
- (b) **14 foot** pole height shall consist of a 151 inch steel shaft with a steel base plate plus a 17 inch transformer base.

Each pedestal pole furnished shall consist of a design from a steel shaft with a steel base plate, transformer base and all miscellaneous hardware.

- (a) The pedestal pole shaft shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the pedestal pole shaft, with no transverse welds. The longitudinal weld shall be finished to form a smooth outside surface and the wall of the pedestal pole shaft shall be uniform in thickness including the welded area. The pedestal pole shaft shall be round or multi-sided (less than eight sides not acceptable) in cross section. **14 foot units** shall be uniformly tapered from butt to tip with a 1 inch reduction in diameter for each 7 feet in length (0.14 in./ ft). **10 foot units** shall not be tapered.
 - (1) All **10 foot** pedestal pole shafts shall be 4-1/2 inch outside diameter, Schedule 40 pipe, and conform to A 501.
 - (2) All **14 foot** pedestal pole shafts shall be 7-1/2 inch outside diameter at the base and shall be made of 11 gauge (0.119 in.) thickness steel conforming to ASTM A 595, Grade A or equivalent.

- (b) The base plate material shall meet the requirements of ASTM A 709, Grade 36. The base plate shall be secured to the lower end of the pedestal pole shaft by two continuous electric arc welds. The base plate shall telescope the pedestal pole shaft with one weld on the inside of the base plate at the end of the pedestal pole shaft. The remaining weld shall be located on the outside of the base plate at the top of the pedestal pole shaft. The weld connection shall develop the full strength of the adjacent pedestal pole shaft to resist bending action. All bases plate shall be fabricated with the holes for anchor bolts to the size and location dimensions as shown in MD 818.16 and MD 818.17.
- (c) **14 foot** pedestal poles shall be furnished with entrance ways for cable as noted on the appropriate detail. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 2 inch rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in MD 818.17.
- (d) All pedestal poles and hardware, except materials manufactured from stainless steel or cast aluminum shall be hot dipped galvanized. The galvanized coating shall conform to the thickness, adherence, and quality requirements of ASTM A 123 and ASTM A 153 for hardware. Threaded components shall be chased and cleaned after galvanizing. All internally threaded components shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener. Internally threaded components shall be provided with a lubricant, which shall be clean and dry to the touch.
- (e) Each pedestal pole shall be furnished with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the side of the pole with three hex head type 304 stainless steel bolts (1/4 in.-20 UNC).
- (f) Each pedestal pole shall have an identification plate mechanically attached 6 inches above the pedestal pole base plate and oriented so that the identification plate may be read from a ground observation position as specified in the Contract Documents.
- (g) Recessed hub type, galvanized malleable iron plugs shall be inserted flush into all couplings.

Transformer Bases

Refer to MD SHA Details: 818.18, 821.01.

- (a) Akron Foundry Company, Union Metal Company, Valmont Industries, or as approved by the Engineer will manufacture all transformer bases.
- (b) Each transformer base shall be furnished with four hex head bolts, four hex head nuts and all associated hardware as shown on MD 821.01 and MD 821.02 for fastening the pedestal pole base plate to the top of the transformer base. All bolts shall conform to ASTM A 325 specifications and shall be galvanized.

Anchor Bolts

Refer to MD SHA Details: 801.01, 821.01.

- (a) Each pedestal pole anchor bolt shall be made of steel conforming to ASTM M 314, Grade 55 SI or ASTM F1554 Grade 55.
 - (b) Anchor bolt threads shall be of cut thread design with a minimum 6 inches of threads at the top.
 - (c) A 90 degree ell bend 4 inches in length shall be part of the overall 40 inch bolt length.
 - (d) The diameter of the anchor bolt shall be stamped into the top of the threaded end of each anchor bolt.
 - (e) Each anchor bolt shall be provided with two attached heavy hex nuts and two attached flat washers.
- (1) DH. Anchor bolt nuts shall conform to ASTM A 194, grade 2 or 2H, or ASTM A 563,A, D, or
- (2) All nuts shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener.
 - (3) Washers shall conform to ASTM F 436.
 - (f) All nuts, washers, and the top 12 inches of all anchor bolts shall be hot dipped or mechanically galvanized. The galvanized coating shall conform to the thickness, adherence, and quality requirements of ASTM A 123 or ASTM A 153 for hardware.

All high strength bolts (of a given length), nuts (of a given size), and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials.

MEASUREMENT AND PAYMENT.

- (a) Method 1 - **Furnishing and installing** galvanized traffic signal pedestal poles and transformer bases.

Pedestal poles and transformer bases will be measured and paid for at the Contract unit price per each type of pedestal pole and transformer base furnished and installed as specified in the Contract Document. The payment will be full compensation for furnishing and installing of the pedestal pole and transformer base and all materials, labor, equipment, tools and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in Section 801.

- (b) Method 2 - **Installing** galvanized traffic signal pedestal poles and transformer bases.

Pedestal poles and transformer bases will be furnished by Baltimore County and installed by the Contractor. The installation of the pedestal poles and transformer bases will be measured and paid for at the Contract unit price per each type of pedestal pole and transformer base installed as specified in the Contract Document. The payment will be full compensation for the installation of the pedestal pole and transformer base and all materials, labor, equipment, tools and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in Section 801.

Tag Detail

Mfg.:	<u> [1] </u>	Contract #:	<u> [2] </u>
Pole Diameter:	<u> [3] </u>	Height:	<u> [4] </u>
		Gauge:	<u> [5] </u>
Anchor Bolts:	<u> [6] </u>	Bolt Circle:	<u> [7] </u>

Tag Reference

- [1] Name of the manufacturer of the pedestal pole.
- [2] County Contract Number of the pedestal pole.
- [3] Pole outside diameter at the base: 4-½" O.D. or 7-½" O.D.
- [4] Pole height⁴: 10' or 14'
- [5] Pole gauge: Schedule 40 or 11 GA
- [6] Anchor bolt size: 1" Dia. x 40" Length
- [7] Bolt circle diameter: 12" Dia.

1 Pole height includes the height of the pedestal pole and transformer base. Typically, the transformer base is 17 inches in height, which corresponds, to **10 foot** pole having a height of 103 inches; and a 14 foot pole having a height of 151 inches

**CATEGORY 800
TRAFFIC**

**EQUIPMENT TURN ON, EQUIPMENT AND MATERIALS -
PICK UP, REMOVING, RETURNING, MAINTAINING,
SALVAGING, AND DISPOSAL**

DESCRIPTION. This work shall consist of pick up of County and/or Administration furnished materials, delivery of salvaged material and equipment to County and/or Administration, disposal of existing material and equipment, and maintenance of existing equipment as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Not applicable

CONSTRUCTION. The Contractor shall notify the County Inspector at the Baltimore County Signal Shop at 410-887-8601 or by the Inspector's cell phone (Contact the Inspector for his cell phone number) every day the Contractor is working at a work assignment. This will allow the Inspector to complete an inspector's daily report (IDR) for all construction completed each working day. Work performed without this notification will be treated as unauthorized work.

Equipment Turn On. The Contractor shall notify the Inspector within ten (10) working days before scheduled turn-on of the project to allow the County and/or Administration to install any additional traffic control device(s).

The Contractor shall notify the Inspector five (5) working days before the scheduled turn-on of the project for a pre-turn-on inspection.

The Contractor shall contact and arrange for all parties (i.e. - County maintenance and inspection personnel, police details, utility company, if necessary appropriate SHA personnel) involved with the equipment turn-on and schedule a date and time for that turn-on subject to the Inspector's approval.

Pick-Up of Furnished Materials. The Contractor shall notify the appropriate facility a minimum of 72 hours in advance of the anticipated pick up or delivery of materials. The Facilities for pick-up or delivery are listed below:

SHA Sign & Signal Shop
7491 Connelley Drive
Hanover, Maryland 21076
Signal Phone - 410-787-7667
Signal Phone – 410-787-7670

County Sign & Signal Shop
12200 C Long Green Pike
Glen Arm, Maryland 21057
Phone - 410-887-8601

County Pole Yard
Baltimore Landfill
Beaver Dam Road
Cockeysville, MD 21030
Phone - 410-887-8601

The Contractor shall be responsible for the transportation, labor, equipment, tools and incidentals necessary to obtain and load any County and/or Administration furnished materials.

Materials not furnished by the County and/or Administration shall be furnished by the Contractor.

Removal and Salvage of the Existing Material and Equipment.

Materials salvaged by the Contractor shall be delivered to a facility (see facilities mentioned in pick-up of furnished materials) in the same condition as they existed in the field and unloaded as directed by the Inspector.

The Contractor shall tag all materials to be salvaged. The tag shall indicate the location from which the materials were removed and the County's and/or Administration's Contract number.

Materials to be salvaged shall include controllers and cabinets, galvanized and wood structures, and streetlighting equipment. Any loss in value due to damaged or missing material will be deducted from the Contractor's payment.

Concrete foundations shall be removed as specified in 207.03.01. All holes caused by this removal shall be backfilled, compacted and restored to surrounding conditions.

The Contractor shall be responsible for disposal of all material not salvaged.

Removal and Disposal of Existing Material and Equipment.

All existing hard rubber detectors and handholes not shown on the Plans shall be removed and the holes shall be backfilled, compacted and restored to surrounding conditions. The sidewalk where handholes are removed shall be reconstructed to the nearest tooled joint or expansion joint. The roadway where hard rubber detectors are removed shall be reconstructed in conformance with Administration utility patch repair standards.

Existing inductive loop detectors and magnetic detectors not shown on the Plans shall be disconnected.

Concrete foundations shall be removed as specified in 207.03.01. All holes caused by this removal shall be backfilled, compacted and restored to surrounding conditions.

The Contractor shall be responsible for disposal of all material not salvaged.

Storage of Materials. Materials shall be bundled, stored, and protected in conformance with the manufacturer's recommendations or as approved by the Engineer.

Maintenance of Materials and Equipment. The maintaining agency will continue maintenance of any existing signals until the Contractor places new equipment into operation.

When the Contractor's work requires adjustments to the traffic control devices to maintain the minimum County and/or Administration standards, the adjustments to the traffic control devices shall be made within 4 hours of verbal notification by the Engineer and/or Inspector. If the Contractor fails to comply within this time, the County will perform the adjustments and deduct the cost of the adjustments from the Contractor's payment.

Existing signals shall remain in their original condition until the new signals have been completed,

satisfactorily tested and its operation accepted by the Engineer.

The Contractor shall maintain the continuous operation of vehicular and pedestrian detectors. If the Contractor damages any detector, it shall be repaired or replaced as directed by the Engineer. If the any vehicular and pedestrian detectors are damaged by the Contractor and are not scheduled to be replaced, the Contractor shall replace any damaged detector at no cost to the County. If the Contractor fails to repair any damaged detector(s), the County will perform the repairs and deduct the cost of the repairs from the Contractor's payment.

All traffic signals shall be operational and actuated as specified in the Contract Documents.

The Contractor shall plan the work to minimize interference with any existing traffic control device(s).

MEASUREMENT AND PAYMENT.

Equipment Turn On. Equipment Turn On will not be measured. This cost will be incidental to other pertinent items specified in the Contract Documents.

Pick-Up of Furnished Materials. Pick-up of County and/or Administration furnished materials will not be measured. This cost will be incidental to other pertinent items specified in the Contract Documents.

Removal and Salvage Existing Cabinet and Controller

Base Mounted Cabinets will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal of the foundation for the base mounted cabinet, the disposal of any materials not salvaged, and the delivery of the base mount cabinet to the appropriate facility listed in this provision shall be incidental to this item.

Pole Mounted Cabinets will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of any materials not salvaged, and the delivery of the pole mount cabinet to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Salvage Strain Poles, Mast Arms & Mast Arm Pole, Wood Poles, Signal Heads, and Signs

Removal and Salvage Strain Pole will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal of the foundation for the strain pole, the disposal of any materials not salvaged, and the delivery of the strain pole to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Salvage Mast Arm(s) and Mast Arm Pole will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal of the foundation for the mast arm(s) and mast arm pole, the disposal of any materials not salvaged, and the delivery of the mast arm(s) and mast arm pole to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Salvage Wood Pole will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of any materials not salvaged and the delivery of the wood pole to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Salvage Signal Head (any type) will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of any materials not salvaged and the delivery of the signal head to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Salvage Sign (any size and/or type) will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of any materials not salvaged and the delivery of the sign to the appropriate facility listed in this provision shall be incidental to this item.

Removal and Disposal of Existing Material and Equipment. Removal and disposal of existing material and equipment and any materials not salvaged will be paid for at a fixed price of \$3500 for each assigned task. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal of all foundations for cabinets, strain poles, mast arm(s) and mast arm poles (not being salvaged), and the disposal of all materials not salvaged will be included in this pay item.

Removal Existing Signal Handbox will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of all materials not salvaged shall be incidental to this item. This item will only be used in isolated cases such as loop repair tasks, maintenance work, and minor repair tasks.

Removal a Foundation (Any Type) will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The disposal of all materials not salvaged shall be incidental to this item. This item will only be used in isolated cases such as loop repair tasks, maintenance work, and minor repair tasks.

Maintenance of Existing Equipment. Material storage, cable sealing and handling, adjustments to maintain minimum County and/or Administration standards on existing signals made necessary by new signal or geometric modifications, and Contractor repair of any damaged detector caused as a result of Contractor's error will not be measured. This cost will be incidental to other pertinent items specified in the Contract Documents.

Inspection. Inspections will not be measured. This cost will be incidental to other pertinent items specified in the Contract Documents.

CATEGORY 800
TRAFFIC

AS-BUILT FOR TRAFFIC SIGNAL

DESCRIPTION. This work shall consist of providing As-Built construction plans for Traffic Signal related work as specified in the Contract Documents or as directed by the Engineer. This work shall be submitted before the final acceptance of the project.

MATERIALS. The Contractor shall submit the As-Built plan and construction details on a CD utilizing the latest operating system format used by Baltimore County Bureau Of Traffic Engineering and Transportation Planning. The Contractor shall also provide a mylar original of the As-Built plan(s).

CONSTRUCTION. As-built construction information shall indicate the exact location and size of all conduits, poles, pedestals, handholes, and detectors chart to within six (6) inches of actual location as dimensioned and referenced to physical features. The As- Built drawing should also contain the intersection's wiring diagram and phasing chart. A construction details listing shall also be provided.

The Contractor shall submit As-Built information in Intergraph's Microstation Powerdraft 2004 computer aided design drafting (CADD) environment, adhering to the latest CADD practices and procedures developed by the Baltimore County Bureau Of Traffic Engineering and Transportation Planning. The latest standard CADD practices and procedures which includes a level manager program can be obtained by contacting Mr. William Fox, Division of Traffic Engineering-410-887-3554. If available, the County will furnish the Contractor with the existing traffic signal plans in Microstation format on a CD or through e-mail.. The Contractor shall submit As-Built plans only in Microstation Powerdraft 2004 format as required in the Contract Documents using one of the following methods as determined by the Administration:

If no updated plan(s) is available, the contractor shall resurvey and As-Built.

If a hard copy of the plan(s) is available and no CADD file is available, the contractor shall digitize existing plans and As-Built.

If a hard copy of the plan(s) and a CD(s) are available, the contractor shall use existing plan on disk and As-Built.

Upon approval of the submitted As-Built information, the Administration will assume ownership of the final drawings and CD.

As-Built for Traffic signal plans shall have a 1"=20' scale.

If an As-Built for a system is required, the Contractor shall provide As-Built showing all system equipment using a 1"=50' scale or a different scale, if approved by the Engineer. The Contractor shall provide necessary detail at the intersection as it relates to the system.

MEASUREMENT AND PAYMENT. Costs associated with providing As-Built plans will not be measured for payment but will be paid for at the contract unit price per each as specified below:

1. Resurvey and As-Built.
2. Digitize existing plans and As-Built.
3. Use existing plan on disk and As-Built.

The payment will be full compensation for all materials and equipment necessary to complete the work and submitting the final product in Microstation Powerdraft 2004.

In the event that bid items as specified above for As-Built submittal are not used, the Contractor shall submit a hard copy of the As-Built plan(s) to the Baltimore county Division of Traffic Engineering and the cost for this shall be incidental to other pertinent bid items in the Contract Documents.

**CATEGORY 800
TRAFFIC**

**INSTALLING AND RELOCATING WOOD POLES AND INSTALLING,
REMOVING AND / OR ADJUSTING BACK GUYS**

DESCRIPTION. This work shall consist of installing wood poles and installing, removing and/or adjusting back guys as specified in the Contract Documents or as directed by the Engineer.

MATERIALS.

40 foot Class II Wood Pole	As supplied by Baltimore County.
Steel Span Wire	950.09 and Special Provision 819.
8 foot Back Guy Anchor	As supplied by Baltimore County.
Guy Guard	As supplied by Baltimore County.

CONSTRUCTION.

Installing 40 Foot Wood Pole. The wood pole shall be installed minimum of eight (9) feet deep in virgin soil.

Installing, Removing and/or Adjusting a Back Guy. The back guy anchor will be installed as per the manufacturer's installation instructions. The back guying will be as directed by the Engineer.

MEASUREMENT AND PAYMENT. The payment will be full compensation for installing and relocating wood poles and installing, removing and/or adjusting back guys and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Furnish and Install 40 Foot Wood Pole will be measured and paid for at the Contract unit price per each. The payment will be full compensation for installing a wood pole and for all material, labor, equipment, tools and incidentals necessary to complete the work.

Furnish and Install Back Guy will be measured and paid for at the Contract unit price per each. The payment will be full compensation for installing back buy guards, and for all material, labor, equipment, tools and incidentals necessary to complete the work.

The span wire used in the installation of the back guying of any type pole will be measured and paid for as specified in Special Provision 819.

Adjust Existing Back Guy will be measured and paid for at the Contract unit price per each. The payment will be full compensation for making all adjustments to the existing back guys and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The span wire used in the adjusting of the back guying of any type pole will be measured and paid for as specified in Special Provision 819.

Removal of Existing Back Guy will be measured and paid for at the Contract unit price per each. The payment will be full compensation for removal disposal of all materials related to the removal of an existing back guy and anchors and for all material, labor, equipment, tools and incidentals necessary to complete the work.

This item will not be measured when the back guy is to be removed as part of item – Remove and Dispose of Existing Signal Equipment per Assignment.

**CATEGORY 800
TRAFFIC**

**INSTALLING VIDEO DETECTION CABLING AND INSTALLING VIDEO DETECTION
CAMERA AND HOUSING**

DESCRIPTION. This work shall consist of installing video detection cabling and installing video detection camera and housing as specified in the contract documents or as directed by the engineer.

MATERIALS.

Video Detection Cabling	As supplied by Baltimore County.
Video Detection Camera and Housing	As supplied by Baltimore County.
Mounting Hardware	As supplied by Baltimore County.

CONSTRUCTION.

Installing Video Detection Cabling. The video detection cabling shall be installed from the location of the video camera and housing location to the termination of the cable in the control cabinet. A ten (10) feet coil of wire should be left at both ends of the cable to allow the County forces to complete the installation of the cabling.

Installing Video Detection Camera and Housing. The video detection camera and housing will be installed as per the manufacturer's installation instructions. The placement of the video detection camera and housing will be as per the plans or as directed by the Engineer.

County forces will be responsible for completing the termination of all cables at the camera and in the control cabinet. The Contract will make sure that the camera and housing are mounted securely and has a ten (10) foot coil of additional cable at both the camera mounting location and control cabinet location.

MEASUREMENT AND PAYMENT. The payment will be full compensation for installing the video detection cabling and installing video detection camera and housing (including the mounting of the camera and housing to the traffic signal structure) and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Installing Video Detection Cabling will be measured and paid for at the Contract unit price per linear foot. The payment will be full compensation for installing the video detection cabling and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Installing Video Detection Camera and Housing will be measured and paid for at the Contract unit price per each. The payment will be full compensation for installing video detection camera and housing (including the mounting of the camera and housing to the traffic signal structure), and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**CATEGORY 800
TRAFFIC**

GALVANIZED TRAFFIC SIGNAL PEDESTRIAN POLES

DESCRIPTION. This work shall consist of furnishing and installing a four (4) inch galvanized steel conduit for pedestrian pushbutton pedestals at locations specified in the Contract Documents or as directed by the Engineer.

MATERIALS.

Four inch galvanized steel conduit
Four inch galvanized steel conduit cap
A pedestrian pushbutton sign as specified on the signal drawing
A pedestrian pushbutton
Conduit as specified on the signal drawing
Concrete Foundation as specified in the Ped. Push Button Pole Detail

Pedestrian Pushbutton Poles

Refer to Detail on Ped. Push Button Pole Detail.

MEASUREMENT AND PAYMENT.

Furnishing and Installing galvanized traffic signal pedestrian pushbutton poles.

Pedestrian pushbutton poles will be measured and paid for at the Contract unit price per each pedestrian pushbutton pole furnished and installed as specified in the Contract Document. The payment will be full compensation for furnishing and installing of the four (4) inch galvanized steel conduit and cap, the pedestrian pushbutton sign, the pedestrian pushbutton, the concrete foundation, and all materials, labor, equipment, tools and incidentals necessary to complete the work.

Conduit will be measured and paid for as specified in Section 805.

**CATEGORY 800
TRAFFIC**

**UTILITY CONNECTIONS AND
UTILITY CONSTRUCTION STAKEOUT**

DESCRIPTION. This work shall consist of utility connections, utility stakeout, and construction stakeout as specified in the Contract Documents or as directed by the Engineer.

The Contractor's attention is called to the requirements of sections GP – 5.05, GP 7.13, and GP 7.17 of the Maryland Department of Transportation General Provisions for Construction Contracts.

MATERIALS.

Disconnect Switches and Utility Connections

950.13.10

CONSTRUCTION. The Contractor shall arrange a meeting with the utility company representatives, the Engineer and the Inspector as specified in the Contract Documents to establish a schedule for utility connections before any control equipment or material is installed.

The Contractor shall stakeout the proposed construction as indicated on the Plans and allow the County Inspector to verify the locations of all proposed facilities before construction begins. Existing utilities have been generally located and shown on the Plans, as they are believed to exist; however, the County assumes no responsibility for the accuracy of these locations.

The Contractor shall notify the appropriate agencies listed below within a minimum of 72 hours (excluding weekends and holidays) in advance of the Contractor's anticipated beginning of any underground work.

- (a) Request a MISS UTILITY (1-800-257-777) stakeout and possess a valid MISS UTILITY clearance ticket number for any underground work.
- (b) Contact all utilities within the limits of the project that are not a member of MISS UTILITY and obtain a stakeout of their respective facilities.
- (c) Request the Baltimore County Traffic Signal Operations to stakeout County maintained traffic signal facilities. They may be contacted at 410-887-8601 between the hours of 7:30 a.m. to 4:00 p.m.
- (d) Request the Office of Traffic and Safety Signal Operations Section to stakeout Maryland State Highway Administration maintained traffic signal facilities. They may be contacted at 410-787-7650 between the hours of 7:30 a.m. to 4:00 p.m.
- (e) Request the County and/or Administration's District Utility Engineer to stakeout their lighting facilities.

The Contractor shall plan the work to minimize interference with any existing traffic control device.

Should the Contractor, during construction, encounter any underground or overhead utilities that were not previously known the Contractor must notify the Engineer immediately. The Contractor shall also take all necessary precautions to protect all utilities and maintain continuance of service

until said utilities can be relocated.

The Contractor shall locate all existing utilities and be responsible for their safety. Should any utilities become damaged or destroyed due to operations of the Contractor, the damage or destroyed components shall be replaced or repaired as necessary to restore the utility to a satisfactory operating condition. These repairs or replacements shall be at no additional expense to the County or the owner of the utility company. The Engineer should be notified immediately of any damage to existing utilities or traffic control devices. The Contractor shall also take all necessary precautions to protect all utilities and maintain continuance of service, if possible, until said utilities can be repaired by the Contractor or by owner of said utility.

Existing signals shall remain in their original condition until the new signals have been completed, satisfactorily tested and its operation accepted by the Engineer.

The Contractor shall not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of a utility company's facilities. The Contractor shall be responsible for the utility service connection to the utility company supplied point of service. The Contractor is responsible to apply for and electrical permit from Baltimore County Permits and Development Management (PADM) and have the service inspected and approved by that agency.

The Contractor shall make the necessary arrangements with the utility companies to insure having needed utilities available at the time of turn on. Any utility energization, connection or disconnection delays will not be considered a valid reason for any work time extension claim. Difficulties in securing utility company services are to be reported to the Engineer at the earliest possible time.

MEASUREMENT AND PAYMENT.

Utility Connection. Utility control and distribution equipment connections will be measured and paid for as specified in 807.04.01.

All utility company energization, connection or disconnection costs will be the responsibility of the Baltimore County Bureau of Traffic Engineering and Transportation Planning.

It shall be the Contractor's responsibility to obtain any electrical permits and arrange for final inspection, through the County's Department of Environmental Protection for all installation of electrical services. Payments for such services shall be incidental to the item associated with installation of the control and distribution.

The application, inspection and approval of the electrical permit from Baltimore County's PADM will not be measured, but the cost will be incidental to other pertinent items as specified in the Contract Documents.

Prior to the turn-on of a traffic signal system, the County will have formally notified the appropriate electric utility company and arrange for service. The general location of the service drop will be shown on the Plans or sketches that accompany individual work orders. It is the responsibility of the Contractor to notify the utility company several days before turn-on, so that the service power feed may be installed and the meter be provided.

For some traffic signal installations, it may be necessary to secure cables or equipment to existing utility poles. In this event, the County will secure a formal Attachment Agreement with the appropriate utility company. In performing such attachments, the Contractor shall adhere to the locations and attachment methods detailed in the agreements.

Utility Construction Stakeout. Utility Construction Stakeout will not be measured, but the cost will be incidental to other pertinent items as specified in the Contract Documents.

All expenses likely to be incurred by the Contractor as a result of working around or protecting utilities as well as cooperating with the owners of the utility will not be measured, but the cost will be incidental to other pertinent items as specified in the Contract Documents.

**CATEGORY 900
MATERIALS**

SECTION 950 — TRAFFIC MATERIALS

950.06 ELECTRICAL CABLE AND WIRE.

CHANGE: In the first line the terminology "**ELECTRICAL CABLE AND WIRE**" to read "**ELECTRICAL AND COMMUNICATION CABLE, ELECTRICAL WIRE.**"

950.06.04 Ground Wire and Rods.

CHANGE: In the first line, "Ground wire shall be of the size...in the Contract Documents." to "Ground wire shall be a bare 6 AWG medium drawn copper wire with 7 strands."

On page 715 of the Standard Specifications.

950.06.08 Voice grade Communication Cable.

CHANGE: In the first line the terminology "**Voice Grade Communication Cable,**" to read "**Communication Cable.**"

ADD: After the first paragraph.

Overhead communication cable hardware shall be non-corroding, standard type telecommunication currently used in industry for overhead installation. Overhead communication cable in-line attachment suspension clamps shall be designed for "Figure Eight" cable having 1 bolt design with a "J-hook" for installation and include a through-bolt of the size and length required by the utility pole owner. Overhead communication cable suspension hardware, for other than for in-line use, shall be appropriate to the "turning angle" of the cable at the point of the installation, including the use of corner suspension clamps where necessary and shall include a through-bolt of the size and length required by the utility pole owner. Strandwise devices shall not be used.

Identification tag shall conform to 810.03.05. On corner and turning angles the tag shall be secured to the hardware with a stainless steel self-cinching cable tie. Identification tag shall be made of brass and read "Balt. Co. Traffic" and of the size 1-1/4 inch x 1-1/4 inch.

950.06.09 Electric Service Wire.

DELTE: In its entirety

INSERT: The following.

Electric service wire for traffic signals, intersection control beacons, and hazard identification beacons, shall have three individual type 4 AWG THWN wires and shall be 19 stranded. Electric service wire for luminaries mounted on traffic signal structures shall have a two conductor 12 AWG THWN wires and each wire shall be 7 stranded. Electric Service wire color identification by spray paint, tape, heat shrink tubing or any other after manufacturing method will not be accepted in conforming to the specified color requirements.

**CATEGORY 900
MATERIALS**

SECTION 950 – TRAFFIC MATERIALS

950.13.10 Disconnect Switches and Utility Connections.

INSERT: After first paragraph and before the second paragraph.

Unless otherwise specified in the Contract Documents, the disconnect external switch mechanism handle shall have provisions to be secured in the **ON** position by a padlock furnished by the County.

CATEGORY 900 MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.01 FAST-DRY NONTOXIC WATERBORNE PAINT (60-second no-track).

Material shall be a ready-mixed, pigmented binder emulsified in water and capable of anchoring reflective beads which are applied separately.

Paint shall not contain any hazardous material listed in the Environmental Protection Agency Code of Federal Regulations (CFR) 40, Section 261.24, Table 1, and shall be compatible with cleaning solvents used in equipment cleaning.

951.01.02 Paint Physical Requirements. Paint shall conform to the manufacturer's formulations and shall be controlled from batch to batch. Unless otherwise noted, paint shall be tested in conformance with Federal Test Method Standard No. 141, and shall conform to the requirements listed below.

The Contractor shall provide the Administration with the manufacturer's certified analysis in conformance with TC-1.02 of the Standard Specifications. The manufacturer shall directly provide a certified analysis in conformance with TC-1.02 when materials are purchased by the Administration.

(a) Viscosity. Viscosity shall be 80 \pm 10 KU when tested in conformance with D 562 at 77 F.

(b) Directional Reflectance. Directional reflectance, when determined without reflective beads, shall be a minimum of 80 percent for white and 50 percent for yellow when tested in conformance with E 97.

(c) Color.

(1) Production. The color of the dry paint film of the production sample shall essentially match the color chips (Nos. 37886 or 33538) in Federal Standard 595 when compared instrumentally.

(2) Control. Control sample color matching determinations will be made using a Pacific Scientific Color Machine and the C.I.E. Chromaticity Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the dry paint film sample:

	STANDARD CHIP		DELTA TOLERANCE	RANGE
WHITE (37886)	X	0.330	\pm 0.020	0.310 - 0.350
	Y	0.340	\pm 0.020	0.320 - 0.360
YELLOW (33538)	X	0.480	\pm 0.030	0.450 - 0.510
	Y	0.450	\pm 0.030	0.420 - 0.480

(d) Dry Opacity. Dry opacity shall have a minimum contrast ratio of 0.98 when tested in conformance with Federal Test Method 4121, Procedure B using a 0.015 in. Bird Applicator or 0.030 Doctor Blade.

(e) Bleeding Ratio. Bleeding ratio shall be a minimum of 0.95 when tested as specified in Federal Specification TT-P-85, Modified. The asphalt-saturated felt shall conform to Federal Specification HH-R-590 or HH-R-595.

- (f) **Flexibility.** The pigmented binder shall not display cracking or flaking when subjected to the flexibility test of TT-P-85, with the exception that the panels shall be 35 to 31 gauge (0.0078 to 0.0112 in.) tin plate approximately 3 x 6 in. The tin plates shall be lightly buffed with steel wool and thoroughly cleaned with solvent and dried before being used for the test.
- (g) **Total Solids.** Total solids shall be a minimum of 70 percent by weight when tested in conformance with Federal Test Method 4041.1, Volatile and Nonvolatile Content (ordinary lab oven).
- (h) **Settling Rate.** Settlement rating shall not be less than 8 when tested in conformance with Federal Test Method 4208 and the following:
- The 1 pt sample containers will be visually inspected, resealed, and placed in an inverted position for one hour. They will then be set upright for at least one hour, and then stored without vibration for five days in an oven maintained at 120 F. The test will be conducted after the containers have been allowed to cool at room temperature for four hours.
- (i) **Weight per Gallon.** The weight per gallon shall be within ± 0.3 lb/gal of the sample of the material which was tested on the NTPEP Northeast Test Deck.

951.01.02 Reflective Bead Physical Requirements. Each lot of beads shall be sampled in conformance with the MSMT Sample Frequency Guide and shall be submitted to the Laboratory for testing and approval prior to use.

Reflective beads shall conform to M 247 and the following:

GRADATION SIEVE SIZE	PERCENT PASSING		
	Bead Blend	Standard Beads	Large Beads
12 (1.70 mm)	100		100
14 (1.40 mm)	98 - 100		95 - 100
16 (1.18 mm)	48 - 70		80 - 95
18 (1.00 mm)	28 - 50		10 - 40
20 (0.85 mm)	5 - 25	100	0 - 5
30 (0.60 mm)	0 - 5	75 - 95	
50 (0.30 mm)		15 - 35	
100 (0.15 mm)		0 - 5	

- (1) **Refractive Index.** Reflective beads shall be colorless, clean, transparent, and free of milkiness or excessive air bubbles. The refractive index shall be 1.50 to 1.52 when tested in conformance with MSMT 211.
- (2) **Roundness.** Reflective beads shall be smooth, spherical in shape, free of sharp angular scars, scratches, or pits, and shall contain a minimum of 60 percent silica. Beads shall have a minimum average roundness of 75 percent when tested in conformance with D 1155, Procedure A. Beads larger than 20 mesh will be tested by visual examination.
- (3) **Adherence Coating.** Reflective beads shall be coated for adherence and embedment, and shall "pass" when tested as specified in MSMT 619. Moisture resistant coating will not be required.

951.01.03 Prequalification. Paint manufactures desiring to have their paint formulations approved for application on the Administration's roadways shall have their formulations evaluated on the National Transportation Product Evaluation Program (NTPEP) Northeast Test Deck for pavement marking materials. This evaluation shall be performed at 6-month intervals. Only those formulations which are approved for use will be considered candidates for selection.

When test data from the NTPEP Northeast Test Deck has been compiled and evaluated, a list of formulations conforming to all criteria will be prepared by the Structures and Pavement Inspection Division and the Laboratory of the Administration's Office of Materials and Technology. Only the NTPEP results will be considered.

951.01.04 Material Acceptance. Only Laboratory approved and stamped materials conforming to this Specification shall be used. For materials purchased by the Administration, any deviation from specifications shall result in a rejection of the entire batch. Materials shipped without prior approval shall be retrieved at no expense to the Administration.

Final acceptance for paints purchased for application by Administration personnel shall be contingent upon successful application and drying of the paint when applied by one of the Administration's Linestriping paint trucks. Therefore, prior to the award, the successful bidder shall furnish and deliver 200 gallons of each color of paint to a location designated by the Administration's Office of Maintenance for testing.

The paint manufacturer shall provide access for the Administration's representative to collect samples of the paint from each production batch. Each sample shall be accompanied by a certified analysis in conformance with TC 1.02, showing compliance with the physical and chemical requirements of this Specification, the recommended paint temperature at the spray gun, and certification that any paint supplied during the Contract period shall be identical in composition to the material submitted for initial testing. Conformity with these requirements will be determined by the Laboratory. The paint manufacturer shall reimburse the Administration for the cost of sampling and shipment of the samples if sampled by the Administration's representative.

951.01.05 Composition. Samples of shipments will be subject to random tests such as X-ray analysis, infrared spectroscopy, ultraviolet spectral analysis, atomic absorption spectroscopy, etc.

951.01.05 Certification. The manufacturer shall certify that any paint supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast Test Deck, and identify the formulas by referring to the code used on the deck. Any paint which fails to conform to the identical formulation on the Northeast Test Deck will be rejected.

The Contractor or the manufacturer (when purchased by the Administration) shall also provide the following:

- (a) Certification in conformance with TC-1.02.
- (b) Material Safety Data Sheets for all materials submitted for testing and use.
- (c) The name or the type of colorant material used to make the nonleaded yellow color to indicate compliance with this Specification. The Administration will keep the paint composition and chemical analysis information confidential.
- (d) Application temperature ranges and optimum temperatures of paints for fast drying when measured at the spray gun nozzle.
- (e) A facility, in operation, capable of producing the paint in the quantity and quality required by the Administration.
- (f) A laboratory capable of performing the required tests. This laboratory will be subject to the Administration's approval.

951.01.08 Administration Purchased Materials.

Delivery.

- (a) Paint.** Paint shall be supplied in 55 gal drums conforming to IC Specification 17-h, with removable lids. Lids shall have reusable, leak-proof gaskets and outside locking rings or clamps.

Each drum shall contain 50 gallons of paint based on volume at 77 F. Material information, including color, shall be clearly marked on the outside of each drum.

Paint shall not skin, curdle, settle or be unusable or difficult to apply within 12 months of the date of manufacture.

For the duration of the Contract, the successful bidder shall have the capability of delivering a minimum of 3000 gals of the required paint within 15 calendar days after receipt of a purchase order. A purchase order shall be deemed to be received by the Vendor on the day sent when submitted by facsimile transmission. Deliveries to the Administration facilities shall be made between 7:30 AM and 3:00 PM any day except Saturday, Sunday, and legal holidays.

- (b) Reflective Beads.** Reflective beads shall be shipped in 50 lb., moisture resistant bags, with complete identification information imprinted on the outside.

Reflective beads shall not absorb moisture in storage, and shall remain free of clusters or lumps for a minimum of 12 months from the date of manufacture.

For the duration of the Contract, the successful bidder shall have the capability of delivering a minimum of 44 000 lbs. of the required reflective beads within 15 calendar days after receipt of a purchase order. A purchase order shall be deemed to be received by the Vendor on the day sent when submitted by facsimile transmission. Deliveries to the Administration facilities shall be made between 7:30 AM and 3:00 PM any day except Saturday, Sunday, and legal holidays.

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- (c) Notification of delivery.** A notification of delivery and estimated time of arrival shall be given to the specific delivery location at least two working days prior to the expected delivery date. Failure to provide proper notification may result in a lengthy unloading delay, which will be at no additional cost to the Administration.

Liquidated Damages. Delivery shall be made within 15 calendar days after receipt of a purchase order.

With the understanding that pavement markings are a traffic safety delineation device, and that the Administration has a responsibility to the motoring public to ensure that adequate markings are present at all times, it follows that late deliveries of pavement marking materials could indirectly result in hazardous driving conditions for those motorists.

Inasmuch as this responsibility can be very expensive to maintain, the Administration will deduct the sum of \$300.00 per day from moneys due the Vendor, not as a penalty, but as liquidated damages for each scheduled shipment not delivered within the time specified. Saturdays, Sundays, and legal holidays will be excluded from the computations for the assessment of Liquidated Damages.

Failure to deliver within the specified period shall automatically constitute sufficient reason to allow the Administration to obtain comparable material on the open market. Any increased cost over the Contract price will be charged to the Contractor's account.

**CATEGORY 900
MATERIALS**

SECTION 951 — PAVEMENT MARKING MATERIALS

951.05 LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS. All materials composing the reflective thermoplastic material shall be lead free. Reflective thermoplastic material shall be homogeneously composed of pigment, filler, resins and glass beads and shall conform to the following.

951.05.01 Reflective Thermoplastic Components.

(a) Composition.

COMPONENT	TEST METHOD	COLOR	
		WHITE	YELLOW
Binder, % min	Certified	18.0	18.0
Premixed Reflective Beads, % min	MSMT 614	30.0	30.0
Titanium Dioxide, % min	X-Ray Fluorescence	10.0	N/A
Calcium Carbonate Inert fillers, % max	D 34	42.0	*
Yellow Pigment, %	—	N/A	*

* Amount of yellow pigment, calcium carbonate and filler shall be at the option of the manufacturer, provided all other requirements are in conformance.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-Ray Fluorescence, ICP, or comparable method capable of this level of detection. Diarylide type pigments shall only be used when the manufacturer or pavement marking material application temperature does not exceed 392 F.

(b) Binders. The binder shall be alkyd consisting of maleic modified glycerolester of resin and other plasticisers.

(c) Titanium Dioxide. The titanium dioxide shall be rutile type.

951.05.02 Reflective Thermoplastic.

(a) Physical Properties.

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Bond Strength, psi min.	MSMT 614	180
Cracking Resistance		No Cracks
Softening Point, F		215 ±15

(b) **Specific Gravity.** The specific gravity of the white and yellow pavement marking material shall be 1.7 to 2.2 when tested in conformance with D 153, Method A at 77 F.

(c) **Color.** After heating for 4 ±0.5 hours at 425 ±3 F, the thermoplastic shall be as specified in E 1347 and the following:

(1) **Production.** The color of the cured thermoplastic material film of the production sample shall match the Federal Standard 595 Color chips specified when compared by instrumental measurement.

(2) **Control.** Control color matching determinations will be made using a Pacific Scientific Color Machine, and an observation angle of 2°, and the CIE Chromaticity Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the cured thermoplastic film sample:

	WHITE Color No. 17886		YELLOW Color No. 13538	
	X	Y	X	Y
Standard Chip	0.310	0.330	0.480	0.450
Delta Tolerance	±0.020	±0.020	±0.030	±0.030

(3) Reflectance.

COLOR	TEST METHOD	DAYLIGHT REFLECTANCE at Degree	PERCENT MIN
White	Fed Std 595 No. 17886	45 - 0	80
Yellow	Fed Std 595 No. 13538	45 - 0	50

(d) Yellowing Index. The yellowing index of the white material shall not exceed 8 prior to QUV and 15 after QUV when tested in accordance with E 313.

951.05.03 Glass Beads Physical Requirements. The glass beads shall conform to M 247 and the following:

GRADATION SIEVE SIZE	PERCENT PASSING
	STANDARD BEADS
0.85 mm (No. 20)	100
0.60 mm (No. 30)	75 - 95
0.30 mm (No. 50)	15 - 35
0.15 mm (No. 100)	0 - 5

Glass beads shall be colorless, clean, transparent, and free of milkiness, excessive air bubbles, and essentially free of sharp angular scarring or scratching. The beads shall be spherical in shape and shall contain a minimum of 60 percent silica. Roundness shall be 75 percent minimum when tested as specified in D 1155, Procedure A.

Glass beads shall have a 1.50 minimum refractive index when tested in conformance with MSMT 211.

Glass beads shall not absorb moisture in storage and shall remain free of clusters or lumps.

951.05.04 Field Testing. Materials conforming to this specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administration's Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology (OMT).

951.05.05 Sampling for Preapproval. Sources supplying thermoplastic material and glass beads shall be submitted by the Contractor to the Engineer for approval in conformance with the Contract Documents.

Each lot of thermoplastic material will be sampled at the source and tested by the Administration over two construction seasons. If 95 percent of the lots tested conform to Specifications, source samples will no longer be required and the manufacturer may ship directly to the project. All shipments shall be accompanied by a manufacturer's certification in conformance with TC-1.02 and shall include the following:

- (a) Manufacturer's name.
- (b) Place of manufacture.
- (c) Material color.
- (d) Date of manufacture (month-year).
- (e) Lot identification.
- (f) Size/quantity of lot represented.

Random samples will be taken on the project in conformance with the MSMT Sample Frequency Guide and tested for conformance with these specifications. Nonconformance may result in the suspension from the certification program until conformance is reestablished. To reestablish conformance, the manufacturer shall achieve a 95 percent approval level from samples taken at the manufacturer's facility and tested by the Administration prior to shipment to Administration projects.

Each lot of glass beads shall be sampled in conformance with the MSMT Sample Frequency Guide and shall be submitted to the OMT for testing and approval prior to use.

Sampling will be by batch or lot which is defined as a maximum of 44 000 lbs of material.

951.05.06 Certification. The Contractor shall furnish notarized certification as specified in TC-1.02. The manufacturer shall certify that any reflective thermoplastic materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Reflective thermoplastic materials which fail to conform will be rejected.

The manufacturer shall also provide the following:

- (a) Material Safety Data Sheets for all materials submitted for testing and use.
- (b) A facility, presently in operation, capable of producing the reflective thermoplastic materials in the quantity and quality required by the Administration.
- (c) A laboratory subject to the Administration's approval which is capable of performing the required tests.

CATEGORY 900 MATERIALS

SECTION 951 PAVEMENT MARKING MATERIALS

951.06 HEAT APPLIED PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL. The material shall be highly durable retroreflective polymeric materials designed for use as transverse lines, numbers, legends, symbols and arrow markings subjected to high traffic volumes and severe wear conditions such as shear action from crossover or encroachment.

The applied material shall adhere to hot mix asphalt (HMA), open-grade friction courses (OGFC), stone matrix asphalt (SMA), portland cement concrete (PCC), and any existing pavement markings when applied using normal heat from a propane fueled heat gun in conformance with manufacturer's recommendations.

The applied material shall be capable of conforming to pavement contours, breaks and faults, shall not be affected by weather conditions, and shall remain in place on pavement surfaces without being displaced by traffic.

The material shall have a minimum shelf life of one year.

The material shall conform to the requirements of the MUTCD and the following:

(a) Composition. The material shall consist of polymeric materials, pigments, binders and glass beads distributed throughout the entire cross-sectional area. The thermoplastic material shall conform to M 249 with the exception of the relevant differences for the material being supplied in the preformed state.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-ray diffraction, ICP, or comparable method capable of this level of detection. Nonleachable lead based pigments will not be permitted. Diarylide type pigments shall only be used when the manufacture or pavement marking material application temperature does not exceed 392 F.

(b) Color. Preformed markings shall consist of film with pigments selected and blended to match Federal Standard 595 color chip Nos. 17778 and 13538 for white and yellow respectively.

(c) Frictional Resistance. The surface of the applied material shall provide a minimum average skid resistance value of 50 BPN when tested in conformance with E 303.

(d) Patchability. The material shall be capable of use for patching worn areas of the same type in conformance with manufacturer's recommendations.

(e) Thickness. The minimum thickness, without adhesive, shall be 120 mils.

(f) Adhesion. The material shall retain a minimum of 65 percent (65%) adhesive bond after 100 cycles of freeze-thaw when tested in conformance with C 666, Method B.

(g) Beads.

(1) Index of Refraction. All beads shall meet the general requirements of M 247, Type I, and shall have a minimum index of refraction of 1.50 when tested using the liquid oil immersion method specified in MSMT 211.

(2) Acid Resistance. A maximum of 15 percent (15%) of the beads shall show a formation of a distinct opaque white layer on the entire surface after exposure to a 1 percent solution (by weight) of sulfuric acid in conformance with MSMT 211.

Field Testing. Materials conforming to this Specification shall be field tested at AASHTO regional test facilities, such as National Transportation Product Evaluation Program (NTPEP), for performance.

Materials performing satisfactorily throughout the test period, including exhibiting a minimum retained reflectance of 100 mcd/m²/lux at the completion of the testing, will be placed on the Prequalified Materials List maintained by the Office of Materials and Research.

Certification. Any marking material supplied during this Contract shall be identical in composition to the material submitted for initial testing. Samples submitted for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.02.

**CATEGORY 900
MATERIALS**

SECTION 951 PAVEMENT MARKING MATERIALS

951.08 REMOVABLE PREFORMED PAVEMENT MARKING MATERIAL. Removable preformed pavement marking material shall remain in place on the pavement surface without being displaced by traffic or affected by weather conditions. The material shall be capable of being removed without the use of heat, solvents, grinding or sand blasting, and shall not leave an objectionable residue.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

951.08.01 White and Yellow. Removable preformed pavement marking materials shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition and the following:

- (a) **Composition.** The marking material shall consist of a mixture of polymeric materials, pigment and glass beads distributed uniformly throughout the surface.
- (b) **Color.** The color of the marking materials shall match Federal Test Standard No. 595A, latest edition for the following:

White	-	17778
Yellow	-	13538

- (c) **Glass Beads.** Glass beads shall conform to the General Requirements of M 247 and have a minimum refractive index of 1.90 when tested as specified in MSMT 211.
- (d) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.
- (e) **Certification.** Samples submitted to the Office of Materials and Research (OMR) for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.02.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMR.

- (f) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested over an 180 day period as specified in MSMT 723 for conformance with the following:

- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2.
- (3) Residue Remaining at Time of Removal (day & night) - minimum rating of 2.
- (4) Durability, Appearance and Night Visibility - minimum weighted rating of 4.
- (5) Loss or movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on the OMR's Prequalified Materials List. The material shall conform to all criteria for a minimum period of 120 days to be considered satisfactory.

951.08.02 Black.

Composition. The nonreflective, patterned black line masking tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments and inorganic fillers distributed throughout its base cross-sectional area, with a matte black nonreflective top layer. The patterned surface shall have a minimum of 20 percent of the surface area raised and coated with nonskid particles. The channels between the raised areas shall be substantially free of particles. The film shall be precoated with a pressure sensitive adhesive. A nonmetallic medium shall be incorporated to facilitate removal.

Skid Resistance. The surface of the patterned, nonreflective black line mask shall provide an initial average skid resistance value of 60 BPN when tested in conformance with E 303.

Thickness. The patterned material, without adhesive, shall have a minimum caliper of 0.065 in. at the thickest portion of the patterned cross-section, and a minimum caliper of 0.02 in. at the thinnest portion of the cross-section.

Adhesion. The manufacturer shall demonstrate that the properly applied black line mask adheres to the roadway and existing stable roadway markings under climatic and traffic conditions normally encountered in the construction work zone.

Removability. The manufacturer shall show that the black line mask can be manually removed after its intended use, intact or in large pieces, at temperatures above 40 F without the use of heat, solvents, grinding or sand or water blasting. The black line mask shall remove cleanly from existing markings that are adequately adhered to the pavement surface.

Performance Requirements. When applied in accordance with the of the manufacturer's recommendations, the black line mask shall provide a neat, durable masking that will not flow or distort due to temperature if the pavement surface, or underlying markings remain stable. The black line mask shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage which will significantly impair the intended usage of the tape throughout its useful life, and shall show no significant tearing or other signs of poor adhesion.

Packaging. Preformed pavement markings shipping package shall conform to the manufacturer's shipping requirements to prevent damage during delivery and unloading of all shipments. The shipping package shall be marked with the following information placed on each container:

- (a) Description of item.
- (b) Date of manufacture.
- (c) Successful Bidder's Name.
- (d) Purchase Order Number.
- (e) Lot Number.
- (f) Color.
- (g) Installation Instructions.