

SPECIFICATION 638 – MAINTENANCE AND PROTECTION OF TRAFFIC

638-1 DESCRIPTION

638-1.01 Scope

a. This work shall consist of maintaining traffic and protecting the public from damage to persons and property throughout the project construction area for the duration of the contract. The contractor shall be required to maintain and protect through and local traffic within the limits of the project, including traffic on all existing roads and streets which intersect the project within the project limits, and access driveways, except as otherwise provided on the plans or other contract documents. Traffic shall be maintained from the time the contractor begins work at the project site until final acceptance of the project.

b. All work to be performed shall be as shown on the plans and contract documents, as specified herein and as directed by the Engineer.

c. The work includes furnishing, installing, moving, removing, and maintaining temporary construction signs, barricades, cone, drums, pavement marking, guard rails, concrete barriers, impact attenuators, traffic signals, highway lighting and other traffic control devices as may be required for the maintenance and protection of traffic. It includes providing the necessary flag persons with appropriate equipment for adequate traffic control on the traveled way during construction operations. It also includes making any necessary repairs and maintaining the existing and temporary roadways within the project limits as required providing a reasonably safe and smooth traveled way.

d. All traffic control devices and traffic control operations shall be in accordance with the “Manual de Dispositivos Uniformes para el Control del Tránsito en las Vías Públicas de Puerto Rico” adopted by the Puerto Rico Department of Transportation and Public Works (DTPW) and

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in particular with Part VI- “Controles de Tránsito para Operaciones de Construcción y Conservación en Calles y Carreteras” of this manual and/or with the Manual on Uniform Traffic Control Devices (MUTCD- FHWA) – Edition 2000.

e. The contractor is placed in notice that maintenance and protection of traffic over a highway during construction is considered as important as the construction itself. The contractor shall at all times conduct his operations in a manner to insure the convenience and safety of all travelers and abutting property owners as well as the safety of his own employees.

f. The contractor is also put in notice that he has the primary responsibility for providing the necessary traffic control devices and taking other appropriate measures for the protection of the public and his personnel. The fact that provisions may be included in the plans and other contract documents, or may be ordered by the Engineer, for the maintenance and protection of traffic during construction, including the payment for certain items under this specification, does not relieve the contractor of his responsibility under Articles 104.07, 107.08, 107.11 and 107.15 of the General Provisions. In the absence of specific provisions in the contract plans and specification, or instructions from the Engineer, the Contractor shall provide at his expense such additional devices and operational measures as may be necessary for the protection of the public and his employees.

638-2 MATERIALS

638-2.01 General

a. All traffic control devices shall conform to the design, dimensions, materials, color, fabrication and installation requirements specified on the plans, the “Manual de Dispositivos Uniformes para el Control del

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Tránsito”(MUTCD), the Manual de Señales de Tránsito (MST) of the DTPW, the standard drawings of the Authority, and the applicable standard specifications as may be modified by the specification and/or with the Manual on Uniform Traffic Control Devices (MUTCD- FHWA) – Edition 2000.

- b. All traffic control devices, whether new or used, shall be in good working condition and shall be subject to approval by the Engineer.
- c. Reflecting sheeting of the high intensity type, meeting the requirements of Article 613-2.02 of Specification 613 shall be used on all devices requiring reflectorization.
- d. All other materials whether paid under this specification or under other contract items, shall meet the requirements of their respective specifications.

638-2.02 Construction Signs

Sign panels may be made of aluminum, galvanized steel or marine plywood. Sign posts shall be metallic as shown on the standard drawings but wood supports may be used when so designed as to yield if impacted by moving vehicle. Nothing larger than 2”x 2” nominal size timber shall be used, except that 2”x 4” may be used with a 2” bored drilled 4”above level on the 4”side.

638-2.03 Barricades, Drums and Cones (limited use)

Barricades shall be constructed of wood or plastic. Drums shall be plastic with conic, round or square section, approximately 36 inches high and a minimum of 18 inches in diameter. Cones shall be used on low-volume, low-speed (40MPH or less) roadways only. Never shall be used on expressway, freeway or toll roads. They shall be a minimum of 28 inches in height with a broadened base, orange colored and shall be made of a material that can be struck without causing damage to the impacting vehicle. Barricades, drums and cones shall be marked and reflectorized in accordance with the

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requirements of Part VI of the MDUCT. The name and the telephone number of the Contractor shall be shown on the non-retro reflective surface of all types of channelizing devices. Both, the letters and numbers shall be non-retro reflective and not over 50 mm (2 in.) in height.

638-2.04 Temporary Pavement Markings

Temporary pavement markings shall comply with the following requirements:

- a. When placed on temporary pavement surfaces or on a layer of the pavement, which is to be subsequently covered, by another layer, reflectorized traffic paint or removable reflectorized traffic tape shall be used at the option of the Contractor.
- b. When placed on the final finished pavement surface, only removable reflectorized traffic tape shall be used.
- c. Reflectorized traffic paint shall conform to the appropriate requirements of Specification 639 - Painted Pavement Markings.
- d. Removable reflectorized traffic tape shall consist of glass spheres of a high optical quality imbedded into a polymeric bond film on a suitable backing that is precoated with a pressure sensitive adhesive and conforming to the following requirements:
 1. The glass spheres shall be uniform gradation and distributed evenly over the surface of the tape. The spheres adhesion shall be such that the spheres are not easily removed when the tape surface is scratched with the thumbnail.

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2. The color of the tape shall conform to the standard colors for pavement markings and shall be readily visible when viewed under vehicular headlights at night.
3. The tape shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to bituminous concrete or Portland cement concrete pavement surfaces without the use of heat, solvents or other additional adhesive means. It shall be immediately ready for traffic after application and shall be capable of being removed intact or in large strips either manually or with a recommended roll-up device upon completion of service. A non-metallic medium shall be incorporated to facilitate removal.
4. The tape, when applied in accordance with the manufacturer's recommended procedure, shall be of good appearance, free of cracks, and its edges shall be true, straight and unbroken. The tape shall be weather resistant, and shall show no appreciable fading, lifting or shrinkage during its useful life.

638-2.05 Temporary Post Mounted Guard Rail

Temporary post-mounted guard rail shall be of the corrugated steel beam type conforming to the requirements shown on the plans and Specification 606.

638-2.06 Temporary Concrete Barrier

Temporary concrete barrier sections shall be portable, shall be not less than 3 meters in length, and shall conform to the shape and dimensions shown on the plans, the Standard Drawings, MPT 3 to MPT 8 and to the applicable requirements of the Specification 610 – Concrete Barrier. Lifting devices shall not protrude from the sides of the barrier.

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638-2.07 Temporary Impact Attenuators

Temporary impact attenuators shall be the sand-filled plastic drum type conforming to Specification 620. They shall be installed as indicated on the plans or as ordered by the Engineer.

638-2.08 Temporary Traffic Signals

Temporary traffic signals shall conform to the requirements shown on the plans and to the appropriate sections of Specification 654 and 723. Used equipment such as signal heads controllers, poles and mast arms may be furnished, subject to approval by the Engineer, provided it is in good operating condition.

638-2.09 Temporary Highway Lighting

Temporary highway lighting shall conform to the requirements specified in the contract documents and to the appropriate sections of Specification 612 and 714.

638-2.10 Flashing Arrow Signs

Flashing arrow signs shall conform to the details shown on the plan and shall comply with the following requirements:

- a. Sign boards shall be rectangular in shape and finished in flat black enamel. They shall be either 4 feet high by 8 feet wide or 3 feet high by 6 feet wide as indicated in the contract documents. When no size is specified, the 4'x 8' size shall be approved.
- b. Lamps shall be mounted on the sign board in such a way as to be capable of forming each of the following patterns:

Pattern 1 – Flashing arrow left
Pattern 2 – Flashing arrow right
Pattern 3 - Sequential arrow left

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Pattern 4 – Sequential arrow right

Pattern 5 – Simultaneous mode

Pattern 6 – Caution mode

c. In the flashing arrow patterns all lamps forming the arrowhead and shaft shall flash on and off simultaneously. In the sequential arrow patterns, either arrowheads or arrow shall flash sequentially in the direction indicated or the arrow shall be formed sequentially from the shaft to the head in three steps. In the simultaneous mode, the lamps forming both left and right arrowheads and the lamps of the arrow shaft shall flash on and off simultaneously. The first light on the shaft next to the light on the arrowhead point shall remain unlit when that arrow head lights up. In the caution mode, a combination of four or more lamps shall flash on and off in a pattern that will not indicate direction.

d. There shall be no less than fifteen (15) lamps on the sign. These shall be either recess-mounted or each lamp provided with a hood or visor surrounding the upper half.

e. Lamps shall be 12 volt, sealed-beam units, yellow or amber color. Lamps shall be type PAR 46 but on the 3' x 6' size signs PAR 36 may be used. The lamps shall provide a minimum candlepower at design voltage of 8,800 on the 4' x 8' sign and 7,000 on the 3' x 6' signs.

f. Lamps shall be controlled by an electronic or electromechanical circuit that will provide between 30 and 45 complete operating cycles per minutes in each of the patterns specified. A dimmer control capable of varying the lamps voltage from 6 to 12 volts shall also be provided. The dimmer shall automatically dim the arrow board at night. The control switch box shall be lockable.

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638-2.11 Warning Lights

Warnings lights shall be of the steady burning type meeting the requirements of Part VI of the MUTCD.

638-2.12 Roadway Maintenance

Existing and temporary pavements shall be kept free of trash and debris and in good repair using materials compatible with the pavement.

638-3 CONSTRUCTION REQUIREMENTS

638-3.01 General

- a. The Contractor shall notify the Engineer before starting any work that might inconvenience or endanger traffic. Arrangements shall be made by the Contractor for closing the road, if required, and providing detours, signs barricades and other necessary appurtenances for the maintenance and protection of traffic prior to beginning the work.
- b. The Contractor shall follow the provisions for traffic maintenance indicated on the plans or ordered by the Engineer. The Contractor may submit alternative traffic maintenance plans for approval by the Engineer.
- c. The Contractor shall provide a traveled way suitable for two lanes of moving traffic, or more lanes when specified in the contract documents. The traveled way shall be kept reasonably smooth and hard at all times, and shall be well drained and free of potholes, bumps, irregularities and depressions that hold or retain water. The Contractor shall devote particular attention to all drainage facilities, keeping them fully operative at all times. This work will be paid for as maintenance as per paragraph 638-5.01g. except for damage caused by the Contractor.

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d. Construction operations shall be conducted in such way as to insure a minimum of delay to traffic. Construction operations on high volume highways may be restricted to off-peak periods of the day. Stopping traffic for more than five minutes shall not be permitted unless specifically authorized by the Engineer.

e. The Contractor shall keep the traveled way free of foreign objects such as spilled earth, rocks, timber, and other items that may fall from transporting vehicles.

f. Dusty conditions resulting from the Contractor's operations shall be corrected by the use of calcium chloride, water, or other means acceptable to the Engineer, at the Contractor's expense.

g. The Contractor shall provide and maintain at all times, safe and adequate pedestrian and vehicular ingress and egress to and from intersecting highways, houses, businesses, and other establishments at existing or new access points, consistent with the work, unless otherwise shown on the plans or authorized by the Engineer. This work shall be at the Contractor's expense.

h. Existing traffic signs and other traffic control devices within the project limits that are to remain shall be protected from damage by construction operations. Any such items lost or damaged because of negligence on the part of the Contractor shall be replaced at the Contractor's expense. Should temporary relocation of any such items be required because of construction operations, they shall be placed as directed by the Engineer at the Contractor's expense.

i. In the event of an unauthorized suspension of work by the Contractor or when a temporary suspension of work is ordered by the Engineer because of failure of the Contractor to comply with any of the contract provisions or to carry out any legitimate order of the Engineer, it shall be the

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Contractor's responsibility to maintain the traffic in accordance with the requirements of this specification. During the days on which such suspension is in effect, the cost of maintenance of traffic will be borne by the Contractor at no extra cost to the Highway Authority. Maintenance of traffic during any authorized suspension of work for reasons not attributable to the Contractor's fault or negligence will be paid for in accordance with this specification.

j. The Contractor shall not permit his employees to park their vehicles nor shall he store equipment or materials adjacent to the traveled way where it may be a hazard to traffic. A clear distance from the edge of the pavement consistent with the type of highway and space available shall be kept free of any such obstacles.

k. Whenever construction operations near the traveled way result in a hazardous condition to the traveling public, such as excavation and replacement of shoulders, the extent of such operations should be limited to work that can be replaced within a reasonable period of time. Once started, such work should progress continuously to completion within a reasonable extent of time.

l. Temporary traffic control devices shall remain in operation only as long as they are needed for traffic guidance and safety. Only those devices shall be in place as apply to conditions and operations in existence at a particular time.

m. All traffic control devices shall be cleaned, repainted, reflectorized or replaced as necessary to provide adequate visibility and legibility at all times. This work shall be at the Contractor's expense.

n. Any materials in good condition recovered from existing or temporary installations of guard rail, impact attenuators, traffic signals and highway lighting within the project limits may be incorporated into the final project

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location by the Contractor as called for in the plans and the Contractor will be compensated under the corresponding pay item. The use of the such materials shall be subject to approval by the Engineer.

o. The items for the maintenance and protection of traffic furnished by the Contractor under this specification are his property. The items shall be promptly removed from the project after they are no longer required except those items specifically indicated in the contract to remain after completion of construction.

638-3.02 Construction Signs

a. The Contractor shall furnish, erect, maintain, move and remove construction signs as required and as directed by the Engineer to adequately and safely inform and direct the traveling public.

b. The number of signs indicated in the MDUCT and the plans area a minimum and the Engineer may require additional signs. The Contractor shall have an adequate quantity of these signs on hand prior to starting construction operations for use as required.

c. All signs and markers shall be appropriate for actual existing conditions and shall be covered, moved removed, relocated or changed as required by changed conditions or as directed by the Engineer.

d. All signs shall be kept clean and in good condition for the duration of the contract. They shall be mounted at the required height on adequate supports and placed in proper position and alignment so as to give maximum visibility both day and night.

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- e. During non-working hours and following the completion of a particular construction operation, all warning signs, except those required to remain for the safety of the public, shall be removed or covered as indicated in the standard drawings.

638-3.03 Barricades, Drums and Cones

- a. The Contractor shall furnish, erect, maintain, move, replace and remove construction barricades, drums and cones where and as indicated on the plans, in the MDUCT, Part VI, or as directed by the Engineer.
- b. Where indicated on the plans or proposal, or directed by the Engineer, construction barricades shall be supplemented by approved steady burning lights as appropriate. The operation and maintenance of such lights shall be at the Contractor's expense.
- c. Whenever construction work results in a long-term stationary operation, temporary concrete barriers shall be used instead of plastic drums.

638-3.04 Temporary Pavement Markings

- a. The Contractor shall furnish, apply and, when so ordered, remove temporary pavement markings when shown on the plans or as ordered by the Engineer. Unless otherwise indicated in the contract documents, or ordered by the Engineer, any course of asphaltic concrete, including base courses, upon which traffic will be maintained shall be properly delineated as soon as completed. Concrete surfaces shall be marked prior to opening to traffic.
- b. Paint used for pavement delineation shall be applied in accordance with Specification 639. Traffic tape shall be applied in accordance with the manufacturer's recommendations. Any tape that fails to adhere to the

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pavement surface during the period of shall be replaced by the Contractor at no additional cost to the Highway Authority.

638-3.05 Removal of Pavement Markings

The Contractor shall remove existing and temporary pavement markings as shown on the plans or ordered by the Engineer. The existing pavement markings may be removed by grinding, sandblasting, scraping or any other method approved by the Engineer provided that it is conducted in such a manner that the pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist. Painting out pavement markings is not an acceptable method.

638-3.06 Temporary Guard Rail and Temporary Concrete Barrier

- a. The Contractor shall furnish, install and maintain temporary guard rails or concrete barriers of the types indicated and at the locations shown on the plans, the Standard Drawings, volumen I (sheets MPT 3-8) or ordered by the Engineer prior to diverting traffic or prior to beginning the construction work necessitating the use of such barriers.
- b. Temporary strong post type guard rail or concrete barrier shall be used when it is necessary to provide a barrier that will deflect or stop an impacting vehicle. They shall be moved and relocated as required by the construction operations and shall be removed when ordered by the Engineer. The sequence of removal shall be in the direction opposite to the traffic flow.

638-3.07 Temporary Impact Attenuator

- a. The contractor shall furnish, install and maintain temporary traffic impact attenuators of the inertial barrier type at the location shown on the plans or as ordered by the Engineer.

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The impact attenuator for each particular location shall be designed and erected in accordance with the manufacturer's recommendations. It shall not be removed until ordered by the Engineer.

b. Any impact attenuator modules damaged by impacting vehicles shall be promptly replaced. If the damage is caused by the Contractor's forces, the replacement shall be at the Contractor's expense.

638-3.08 Temporary Traffic Signals

a. The Contractor shall furnish and install temporary traffic signals as shown on the plans or as directed by the Engineer and shall maintain them in proper operation until their removal is approved. He shall be responsible for their continuous operation except for reasonable shut down during relocation and transfer operations if such are required.

b. The Contractor shall paint on each signal controller cabinet a sign indicating the telephone to be called for repairs in case of malfunctioning of the signal system.

c. If for any reason a signal is not functioning as required, the Contractor shall commence repair work on this signal within 4 hours after he has been notified of a malfunction. The Contractor shall provide adequate traffic control acceptable to the Engineer, at his own expense, during repair work and until the temporary traffic signal is restored to proper operation. If the Contractor fails complete the repair of a malfunctioning signal within a reasonable time, normally considered to be 24 hours, the Authority may opt to complete the necessary repairs and deduct the expenses incurred in such repairs from any monies due the Contractor.

d. The electric power consumption and the maintenance of the temporary traffic signals shall be at the Contractor's expense.

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- e. Any installed temporary traffic signal that is not in operation shall be bagged and have the power turned off.

638-3.09 Temporary Highway Lighting

- a. The Contractor shall furnish, install, operate and maintain temporary highway lighting as shown on the plans or as ordered by the Engineer and it shall remain in place and operation until its removal is ordered by the Engineer.
- b. The electric power consumption and the maintenance of the temporary highway lighting shall be a subsidiary obligation of the Contractor under the temporary highway lighting pay items.

638-3.10 Flashing Arrow Signs

- a. Each flashing arrow sign shall be mounted on a truck or on a trailer and shall be capable of operating while the vehicle is moving. It shall also be capable of being placed and maintained in operation at stationary locations as shown on the plans or as directed by the Engineer.
- b. Signs shall be mounted to provide a minimum of 7 feet between the bottom of the sign and the roadway.
- c. The electrical power to operate the sign shall be obtained from the vehicle on which the sign is mounted, from a generating plant mounted on the vehicle, or from self-contained batteries. Regardless of the source, the supply of electrical energy shall be capable of operating the sign in the manner specified.
- d. Where batteries are used as the primary source of power they shall be of sufficient capacity to provide, between chargings, 11 volts or more to each of the lamps for a period of at least 72 continuous hours of operation at full daylight intensity. Units that operate on battery power shall have a

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permanently mounted voltmeter which shall be wired so as to measure the voltage available to the lamps.

e. Trailer mounted units utilizing generators shall be equipped with storage batteries wired so that the units shall automatically switch to battery operation in the event of a generator failure. The standby batteries shall be of sufficient capacity to operate the units for a minimum of three hours in any pattern at 11 volts or greater.

638-3.11 Flag persons

a. The Contractor shall provide a sufficient number of competent flaggers in areas where construction equipment is operating in potential conflict with public traffic, regardless of the volume of traffic and the sight distances.

b. Whenever it becomes necessary to maintain traffic in two directions alternating in only one lane, the Contractor shall provide a sufficient number of flaggers of continuously control the alternating traffic and, if possible, provide two-way radio communication between the flaggers.

c. For daytime work, the flagger's vest, shirt, or jacket shall be orange, yellow, yellow-green, or a fluorescent version of these colors. For nighttime work, similar outside garments shall be retro reflective. The flagmen operate in conformance with the procedures and requirements of Part VI of the MUTCD.

638-4 METHOD OF MEASUREMENT

638-4.01 Individual Basis –The various devices required for the maintenance and protection of traffic will be measured as follows:

a. Construction signs will be measured by the square meter of area, computed to the nearest hundredth, for signs

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furnished, installed and accepted by the Engineer. Both fixed and portable signs will be measured for payment one time only, at the time of initial installation, except as provided under basis of payment. The relocation, removal, reinstallation and maintenance of temporary signs required for the maintenance of traffic during construction shall be a subsidiary obligation of the Contractor included in the contract unit price for this item.

b. Barricades (all types), cones drums and warning lights will be measured by the individual unit for the actual quantity of each furnished, installed and accepted by the Engineer. They will be measured one time only except as provided under the basis of payment. Their relocation, removal, reinstallation and maintenance as required for the maintenance of traffic should be a subsidiary obligation of the Contractor included in the contract unit price for this item.

c. Each construction sign, barricade, drum and cone accepted and certified for payment by the Engineer shall be identified as directed by the Engineer for inventory and control purposes.

d. The quantity of temporary pavement markings to be paid for will be the actual markings placed as shown on the plans or ordered by the Engineer, measured as follows:

1. Pavement lines or stripes will be measured in linear meters, to the nearest tenth of a meter, along their centerline and shall be based on a 4-inch width. The linear measurement of lines or stripes specified to be wider than 4 inches shall be adjusted in the ratio of the specified width to 4 inches.

2. For dashed lines, the skip or open space between dashes will not be measured for payment.

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3. Double lines will be measured separately as for single lines.
 4. Symbols and letters will be measured by each unit applied. A unit will consist of one letter or one symbol.
 5. The maintenance of temporary pavement markings throughout their period of need and use shall be an obligation of the contractor included in the contract unit price for this item.
 6. The removal of temporary pavement markings will be an obligation of the Contractor under this pay item and no separate measurement and payment will be made.
- e. The pay item for removal of pavement markings applies only on the removal of permanent markings existing prior to construction. The quantity to be paid for will be measured in linear meters to the nearest tenth of a meter. Measurement will be made as provided for temporary pavement markings in paragraph “d” above except that symbols and letters will also be measured linearly along their longest dimensions and not as units.
- f. The quantity of temporary guard rail to be paid for will be the linear meters, measured to the nearest tenth of a meter, of guard rail of each type installed as shown on the plans or ordered by the Engineer. Required end anchorages, including connections at structures, will not be measured separately, but shall be a subsidiary obligation included in the contract unit price for this item. Terminal sections will be measured as for regular rail sections.
- g. The quantity of temporary concrete barrier to be paid for will be the linear meters, measured to the nearest tenth of a meter, of barrier installed as shown on the plans or ordered

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by the Engineer. Required temporary end sections will be included in the linear measurement. Temporary concrete barrier will be measured for payment only once, at the time of initial installation, except as provided under basis of payment. The relocation, removal and reinstallation of temporary concrete barriers as may be required during construction shall be a subsidiary obligation of the Contractor included in the contract unit price for this item.

h. Temporary impact attenuators installed as shown on the plans or ordered by the Engineer, other than those which are a subsidiary obligation of concrete barrier under Specification 610, will be measured by each inertial barrier module required. Each module will be measured for payment only once, at the time of initial installation, except as provided under basis of payment. The relocation, removal and reinstallation of modules as may be required shall be a subsidiary obligation of the Contractor included in the contract unit price for this item.

i. Each temporary traffic signal installation shown on the plans will be measured as a unit. Each unit will include all the necessary components to provide a complete operating installation including the signal heads, controller, standards, wiring, hardware, detectors, other appurtenances and power consumption.

j. Temporary highway lighting will be measured and paid for as provided in Specification 612-Highway Lighting System.

k. Flashing arrow signs will be measured by full days (24 hours) of actual operation of each unit required by the Engineer and furnished by the Contractor, and accepted by the Engineer.

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l. Flagpersons will not be measured for direct payment but shall be a subsidiary obligation of the Contractor covered under other contract items.

m. Roadway maintenance items not covered by contract unit prices will be measured as required for force account work under Article 109.04 of the General Provisions.

638-5 BASIS OF PAYMENT

638-5.01 Payment

a. The quantities determined as provided above for construction signs, barricades (all types), cones, drums, warning lights, flashing arrow signs, temporary pavement markings, removal of pavement markings, temporary guard rail, temporary concrete barrier, temporary impact attenuators and temporary traffic signals will be paid for at the contract price per unit of measurement, respectively, for each of the particular pay items included in the bid schedule. The unit price shall be full compensation for all material, tools, equipment and labor necessary to complete each item as required by the plans and specifications, including erection, relocation, maintenance, operating costs, electric power costs, storage and removal.

b. Traffic control devices required for the maintenance of traffic that are removed from the project without the prior approval of the Engineer will not be considered for payment.

c. Any traffic control device that is damaged by traffic, vandalism or other cause attributable to negligence on the part of the Contractor will be repaired by force account or by agreed unit price, or will be replaced at the contract unit price when so ordered by the Engineer. However, no payment will be made for required repair or replacement of traffic control devices damaged by the Contractor's personnel or equipment,

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or as a result of negligence on his part, or for normal maintenance.

d. No payment will be made for the repair and maintenance of temporary traffic signals and highway lighting required because of malfunctioning, normal wear and tear, or damage caused by the Contractor's personnel or equipment. However, repairs to these items required by damage due to traffic accidents or other cause not attributable to the Contractor will be paid for on a force account or agreed price basis as may be agreed upon with the Engineer.

e. Items necessary for the construction of temporary detours shown on the plans or ordered by the Engineer will be paid for on the basis of the contract unit prices of the appropriate items included in the contract.

f. Roadway maintenance items ordered and accepted by the Engineer as per paragraph 638-3.01c will be paid for in accordance with the provisions of Article 109.04 of the General Provisions. However, roadway maintenance required because of construction deficiencies, or because of damage caused by the Contractor's operations or equipment, shall be undertaken by the Contractor at this expense.

g. When the contract does not include any maintenance of traffic pay items, any construction signs, barricades, cones, drums, temporary pavement markings, temporary guard rail, temporary concrete barrier, temporary impact attenuators, temporary traffic signals and any other traffic protection devices required to comply with Article 107.11 of the General Provisions shall be furnished, installed and maintained by the Contractor and will not be paid for directly but this work shall be a subsidiary obligation of the Contractor covered under other contract items.

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h. In the event that the Contractor fails to maintain traffic in a satisfactory manner in accordance with the requirements of Articles 104.7, 104.8 and 107.11 of the General Provisions and of this specification, and with the Violation Citation emitted by the Safety Office of the Authority, he will be assessed liquidated damages at the rate specified in the Article 108.09 of the General Provisions for each day for the violations indicated in the citation. The Engineer will notify the Contractor in writing of the effective date of the application of the penalty.

These fines or penalties are not reimbursable and are in addition to non-payment for items that the Contractor failed to provide and maintain under the requirements of this specification.

i. If the Contractor fails to maintain and project traffic adequately and safely for a period of 24 hours or more, the Engineer will correct the adverse conditions by any means he deems appropriate and will deduct the cost of such corrective work from any monies due the Contractor. The cost of this work shall be in addition to the liquidated damages and nonpayment for items specified above.

638-5.02 Pay Items

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Construction Signs.....	Square Meter
Barricades (All Types).....	Each
Cones.....	Each
Drums.....	Each
Temporary Pavement Markings – Stripes.....	Linear Meter
Temporary Pavement Markings – Symbols and Letters.....	Each
Removal of Pavement Marking.....	Linear Meter

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Temporary Guard Rail.....	Linear Meter
Temporary Concrete Barrier.....	Linear Meter
Temporary Impact Attenuators.....	Each Module
Temporary Traffic Signals.....	Each
Flashing Arrow Signs.....	Full Days (24 hours)
Warning Lights.....	Each