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## **SUPPLEMENTARY TECHNICAL SPECIFICATIONS**

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**Edition 2011**

**SUPPLEMENTARY SPECIFICATIONS  
FOR STATE AID PROJECTS  
  
FOR  
  
NORMAL AVENUE PEDESTRIAN IMPROVEMENTS  
  
MONTCLAIR STATE UNIVERSITY  
  
IN THE TOWNSHIP OF MONTCLAIR  
  
COUNTY OF ESSEX**

**SPECIFICATIONS TO BE USED**

The 2007 Standard Specifications for Road and Bridge Construction, of the New Jersey Department of Transportation and as amended herein, shall govern the construction of this project.

**GENERAL**

Whenever any section, subsection, subpart or subheading is amended by such terms as changed to, deleted or added it is construed to mean that it amends that section, subsection, subpart or subheading of the 2007 Standard Specifications unless otherwise noted.

Whenever reference to page number is made, it is construed to refer to the 2007 Standard Specifications unless otherwise noted.

Henceforth in this supplementary specification whenever reference to the State, Department, ME, RE or Inspector is made, it is construed to mean the particular municipality or county executing this contract.

## **DIVISION 100 - GENERAL PROVISIONS**

### **SECTION 101 - GENERAL INFORMATION**

#### **101.03 TERMS**

THE FOLLOWING IS ADDED:

PARCEL. Property to be acquired for transportation purposes, described by metes and bounds.

#### **101.04 INQUIRIES REGARDING THE PROJECT**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Direct inquiries regarding the various types of work to the following representatives of the Department:

##### **1. Before Award of the Contract**

Mr. Christopher J. Nash, P.E.  
Boswell Engineering  
330 Phillips Avenue  
South Hackensack, New Jersey 07606  
Phone (201) 373-8904  
Fax (201) 641-1831

All inquiries must include the following:

- a. Name of the company;
- b. Telephone number, fax number, and contact person; and
- c. Specifics of the inquiry, including anticipated impacts.

The Department will investigate the information provided in the inquiry and then respond through an addendum only if determined to be necessary.

##### **2. After Award of the Contract**

Mr. Christopher J. Nash, P.E.  
Boswell Engineering  
330 Phillips Avenue  
South Hackensack, New Jersey 07606  
Phone (201) 373-8904  
Fax (201) 641-1831

## **SECTION 105 - CONTROL OF WORK**

### **105.07 COOPERATION WITH UTILITIES**

THE FOLLOWING IS ADDED BEFORE THE FIRST PARAGRAPH:

The corporations, companies, agencies, or municipalities owning or controlling the utilities, and the name, title, address, and telephone number of their local representative are as listed in Appendix B.

Bidders are advised to verify the above information; its accuracy and completeness are not guaranteed.

## **SECTION 159 – TRAFFIC CONTROL**

### **159.03.08 Traffic Direction**

#### **B. Police**

THE ENTIRE SECTION IS CHANGED TO:

Police Traffic Directors will be the University of Montclair State Campus Police. The Contractor shall be responsible for notifying the University representative of the work plan no less than 48 hours prior to commencement of construction activities. The Owner will coordinate with Campus Police accordingly. If the Contractor fails to provide the proper notice, they will not be permitted to work without the presence of Campus Police. The name, telephone number, and email of the representative is listed below:

Mr. Adam McGuire  
Assistant Project Manager  
Capital Planning & Project Management  
University of Montclair State  
Phone: (973) 655-7789  
Email: mcguirea@mail.montclair.edu

### **159.04 MEASUREMENT AND PAYMENT**

If the contractor fails to deliver to the job site or provide the traffic control devices listed below, payment is subject to being withheld. The following signs shall be the minimum required for the project.

Construction Signs, 48" X 48" (W20-1A) ..... 8 Unit

Construction Signs, 48" X 24" (G20-2A) ..... 2 Unit

Construction Identification Signs, 84" X 42"  
("On or About" – Start Date of Construction) ..... 2 Unit

## **DIVISION 400 – PAVEMENTS**

### **SECTION 401 – HOT MIX ASPHALT (HMA) COURSES**

#### **ALTERNATE SUBSECTIONS 401.03.03 H, I AND J FOR STATE AID PROJECTS**

##### **401.03.03 H AIR VOIDS ACCEPTANCE PLAN**

THIS SUBSECTION IS REPLACED BY THE FOLLOWING:

##### **H. Air Void Requirements.**

Pavement lots are defined as approximately 15,000 square yards of pavement in Surface area. If pavement lot area is less than 5000 square yards, the Regional District Local Aid Office may waive the air voids requirements.

The RE will designate an independent testing agency (Laboratory) to perform the quality assurance sampling, testing and analysis. The Laboratory is required to be accredited by the AASHTO Accreditation Program ([www.amrl.net](http://www.amrl.net)). The Laboratory's accreditation must include AASHTO T 166 and AASHTO T 209.

The Laboratory Technician who performs the quality assurance sampling shall be certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Plant Technologist, Level 1.

The Laboratory will determine air voids from 5 (Five) 6 inch diameter cores taken from each lot in random locations within the traveled way and at least one core in each travel lane. The Laboratory will determine air voids of cores from the values for the maximum specific gravity of the mix and the bulk specific gravity of the core. The Laboratory will determine the maximum specific gravity of the mix according to NJDOT B-3 and AASHTO T 209, except that minimum sample size may be waived in order to use a 6-inch diameter core sample. The Laboratory will determine the bulk specific gravity of the compacted mixture by testing each core according to AASHTO T 166.

The Laboratory will calculate the in-place air voids of each completed lot outside the acceptable range of 2 percent air voids to 8 percent air voids.

The RE will assess a reduction in lot due to nonconformance to air voids according to the Table 401.03.03-3.

<b>Table 401.03.03-3 Reduction for Nonconformance to Air Voids Requirements</b>	
<b>Lot Average Air Void Value (Five Samples)</b>	<b>Reduction Per Lot (Percent of Lot)</b>
0.0 to 1.9	10
2.0 to 8.0	0
8.1 to 9.0	5
9.1 to 10.0	15
10.1 to 12.0	30
Over 12.0	Remove & Replace

If the average air voids for the lot is greater than 12.0 percent, remove and replace the lot. The replacement work is subject to the same requirements as the initial work.

#### **401.03.03 I THICKNESS REQUIREMENTS**

THIS SUBSECTION IS DELETED. IN NO INSTANCE WILL A COMPACTED AVERAGE THICKNESS OF LESS THAN 1.25 INCHES BE ACCEPTABLE.

#### **REPLACE 401.03.03.J WITH THE FOLLOWING:**

- J. Ride Quality Requirements.** The Department may evaluate the HMA surface course placed in travel lanes using the International Roughness Index (IRI) according to ASTM E 1926. Other areas will be tested with a ten foot straight edge. The Department will use the measured IRI and straight edge to compute pay adjustment (PA). The PA will be negative for defective work.

The RE will designate an independent testing agency to perform the ride quality testing and analysis. The testing agency is required to comply with certification requirements according to NJDOT R-1.

The Department will calculate the Pay Adjustment (PA) as specified in Table 401.03.03-7 and will base PA on lots of 0.01mile length for each travel lane.

##### **1. Smoothness Measurement.**

The testing agency will test the longitudinal profile of the HMA surface course for ride quality with a Class 1 Inertial Profiling System according to AASHTO MP 11 approved according to AASHTO PP 49.

The testing agency will test the full extent of the pavement in the direction of travel in each wheel path. The single IRI value reported for each 0.01-mile lot of pavement is the average of 3 runs.

## 2. Other Areas.

In addition to the above, a 10-foot straightedge shall be used for the following areas: transverse profile of the finished riding surface, longitudinal and transverse profile of shoulders and ramps, utility hardware, drainage inlets and manholes, and any other areas so designated in the Special Provisions. Any areas that have more than a 1/4-inch deviation between any two contact points of the straightedge shall be corrected by the Contractor using infrared heating to rework the material in a manner approved by the Engineer. Following correction, the area will be retested to verify compliance, each individual non-complying location will be assessed \$250 negative PA.

## 3. Control Testing.

Perform control testing during HMA placement to ensure compliance with the ride quality requirements specified in Table 401.03.03-7.

## 4. Preparation for IRI Testing.

Provide the necessary traffic control when the testing agency performs IRI testing. Perform required mechanical sweeping of the surface course before IRI testing. To facilitate auto triggering on laser profilers, place a single line of preformed traffic marking tape perpendicular to the roadway baseline 300 feet before the beginning of each lane to be tested.

## 5. Acceptance.

The Engineer will determine acceptance and make payment adjustments based on the following:

### i. Pay Adjustment.

The pay equations in Table 401.03.03-7 express the pay adjustment in dollars per lot of 0.01 mile. For lots of any other length, the Engineer will scale the pay adjustment up or down in proportion to the actual length of the lot. IRI numbers are in inches per mile.

**Table 401.03.03-7 Pay Equations for IRI Ride Quality for 0.01 Mile**

Local Roadways with Posted Speed $\geq$ 45 MPH	IRI $\leq$ 100	PA = \$0
	100 < IRI $\leq$ 170	PA = (IRI - 100) $\times$ (- \$1.43)
	IRI > 170	Remove & Replace
Local Roadways with Posted Speed < 45 MPH	IRI $\leq$ 120	PA = \$0
	120 < IRI $\leq$ 220	PA = (IRI - 120) $\times$ (- \$1.00)
	IRI > 220	Remove & Replace

ii. Retest provision.

After testing, if the IRI exceeds the Remove and Replace value (RRV) in Table 401.03.03-7, the testing agency will retest the lot. The testing agency will average the IRI values from the initial test and the retest to determine the final result.

iii. Removal and Replacement.

If the average IRI is greater than the RRV after a retest is performed, remove and replace the lot. Any replacement work is subject to the same requirements as the initial work. If only a small percentage (less than 8 percent) of paving lots falls under the RRV, the RE may allow the contractor to submit a plan for corrective action. If the contractor's plan for corrective action is not approved, the RE may require removal and replacement, or may allow the lot to remain in place and the lot will be subject to the pay adjustment as computed in table 401.03.03-7. If the contractor's plan for corrective action is approved and the lot is reworked, the testing agency will test and evaluate it as a new lot that must meet the same requirements as the initial work.



## **DIVISION 600 - MISCELLANEOUS CONSTRUCTION**

### **SECTION 602 – DRAINAGE STRUCTURES**

#### **602.03.03 SETTING CASTINGS, RESETTING CASTINGS, AND RECONSTRUCTING INLETS AND MANHOLES**

THE FOLLOWING IS ADDED AFTER THE LAST PARAGRAPH:

Existing inlet and manhole castings which are no longer required become the property of the Owner.

#### **602.03.07 CURB PIECES**

THE FOLLOWING IS ADDED AFTER THE LAST PARAGRAPH:

All curb pieces will be NJDEP-compliant, Campbell Foundry Pattern No. 2618N4W2 with "DUMP NO WASTE – DRAINS TO WATERWAYS" on the top of the curb piece or approved equal/equivalent.

### **SECTION 606 – SIDEWALKS, DRIVEWAYS, AND ISLANDS**

THE FOLLOWING IS ADDED TO THIS SECTION:

#### **PAVER SIDEWALKS & DRIVEWAYS**

##### **606.01 DESCRIPTION**

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

This Section describes the requirements for constructing paver sidewalks and driveways as shown on the plans or as directed by the RE.

##### **606.02 MATERIALS**

###### **606.02.01 Materials.**

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Provide materials as specified:

- A. Pavers: "Prest" Pavers as manufactured by Hanover Architectural Products (Hanover, PA), or approved equal, high density, hydraulically pressed concrete pavers, manufactured to 1/8" tolerances and produced by subjecting the concrete mix to 1,000 pounds per square inch over the entire surface area.

The concrete pavers shall be fabricated of Coplay Cement, Type I, Buff. Aggregates should be a blend from 200 mesh to 5/8" with a light gray color. The aggregate used should have a PA S.R.L. Test of H and a specific gravity of 2.79 and absorption of 2.60. The aggregates should be washed with no deleterious substances, with no think of elongated pieces. The aggregates should have an L.A. abrasion test of 21 and L.A. rattles loss test of 21.8% (at 500 revolutions). Most specifically, the aggregates should have a wash test of less than 1%. This includes materials lost by washing the aggregate, even those finer than 200 mesh. Mix should be prepared in a stationary mixer to a 5" slump, mixed a maximum of 2 minutes and placed in the mold in a homogenous state. The whole of the paver is to be of the same design and a single mix system. Hydraulic pressure to be employed should be a minimum of 800,000 pounds without the use of any vibration.

The top surface finish shall be Tudor of Hanover Architectural Products, or approved equal. The concrete pavers are to be integrally colored with custom blended shades as prepared by Hanover Architectural Products, or approved equal, and to be chosen by the Owner prior to ordering.

- B. Soil reinforcement: Geotextile fabric reinforcing Miragrid 500x, manufactured by Mirafi or approved equal (if shown on the detail) and must conform with Subsection 919.01.
- C. Base material: Dense-graded aggregate base course as shown on the contract plans. Dense-graded aggregate base course material must be obtained from an approved commercial source and conform to Section 901.10. Concrete for the base course where required shall be Class B concrete conforming to the requirements of applicable portions of Section 903.03.
- D. Leveling course, setting bedding material: Must comply with ASTM C33 or AASHTO M43, #10 graded clean course non-masonry concrete sand. Compact all setting bed material to 95% maximum density as determined by AASHTO T99, Method C. All depths are as indicated on the Contract Plans.
- E. Joint fill material: Polymeric joint sand by Gator Maxx (Alliance Gator) or approved equal.
- F. Edging material: PVC edging shall be Bulldog-Edg as manufactured by Oly-Ola Edgings, Inc. or approved equal.
- G. Backfill: Suitable non-organic soils with a moisture content which enables compaction to the specified densities. Unsuitable soils are organic soils and those soils with the USCS Classification Symbol of CH, OH, MH, OL, TP, CL and with a plasticity index (PI) greater than 25 are also considered unsuitable soils.

### **606.03.03 DETECTABLE WARNING SURFACES**

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Materials for Detectable Warning Surfaces will be safety red, unless otherwise directed by the RE, and should appear uniform in color after curing. The surface coating material will be an abrasion, UV and chemical resistant, and capable of adhering to existing or new portland cement concrete surfaces. The minimum final dry coat thickness will be 40 mils.

The cured coating will exhibit the following minimum coefficients of friction when tested according to ASTM D 1894:

<i>Static coefficient of friction</i>	<i>Dynamic coefficient of friction</i>
Dry 0.95 – 0.99	Dry 0.91 – 0.95
Wet 1.39 – 1.42	Wet 1.27 – 1.36

The Detectable Warning Surfaces shall be a “cast-in-place” type and shall be FIRETRUCK RED. The Detectable Warning Surfaces shall be installed in accordance with the details provided and the latest version of the Public Rights-of-Way Accessibility Guidelines (PROWAG).

A list of acceptable Manufacturers is as follows:

<u>Product Type</u>	<u>Manufacturer</u>	<u>Phone No.</u>
Cast in Place Systems	ADA Solutions	1-800-372-0519
Step Safe	Transpo Industries	1-800-321-7870
Armor-Tile Tactile Systems	Engineered Plastics, Inc.	1-800-682-2525

Or alternative products, subject to the review and approval of Essex County or designee. All areas determined to have been damaged or not to be in conformance with the Specifications of Plans shall be removed and replaced at no additional compensation to the University.

The Contractor shall submit shop drawings for review and approval by the RE and shall not commence the installation of the detectable warning surfaces until the shop drawings have been approved.

THE FOLLOWING IS ADDED TO THIS SECTION:

**The Contractor shall construct all sidewalks, handicap ramps and pedestrian facilities within the public right-of-way or easements in full compliance with the “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public “Right-of-Way” located at <http://www.access-board.gov/prowac/nprm.htm> as published in the Federal Register on July 26, 2011 and the Manual on Uniform Traffic Control Devices (MUTCD). Workmanship and materials shall be in conformance with the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction as amended and supplemented by County and/or Municipal requirements. The Contractor is notified that the improperly constructed ramps and facilities, as determined by the Municipality and/or County, will require replacement with compliant ramps and facilities at the sole cost and expense of the Contractor.**

## 606.03.02 Concrete Sidewalks, Driveways, and Islands

THE FOLLOWING SUBSECTION IS ADDED:

### 606.03.04 Paver Sidewalks

- A. Examination: a geotechnical engineer will examine the areas and conditions under which the brick paver walkways are to be erected and notify the design engineer in writing of conditions detrimental to the proper and timely completion of the work. Work is not to proceed until unsatisfactory conditions have been corrected. If subsurface water (water table) is found, install a chimney drain as approved by the RE.
- B. Excavate to the lines and grades shown on the plans as specified in 202.03.03. Over-excavation not approved by the owner or duly appointed owner's representative will not be paid for and replacement with compacted fill and/or paving system components will be required at the contractor's expense. Do not disturb base beyond the lines shown. The contractor is be responsible for the stability of the excavation and its' influence on adjacent properties and structures.
- C. Base preparation: Excavate base soil as required for footing or base dimension shown on the construction drawings, or as directed by the RE. The project geotechnical engineer will examine the base soil to ensure that the actual foundation soil strength meets or exceeds that required on the construction drawings. Soil not meeting the required strength will be sufficiently removed to the satisfaction of the RE and backfilled with suitable material. Over-excavated areas are to be filled with suitable compacted backfill.
- D. Geotextile fabric: Set geotextile fabric where specified to provide extra contiguous fabric to be wrapped up and around the base course and below the setting bed. Install the fabric in accordance with the manufacturer's specifications.
- E. Base course preparation: Place base material as shown on the construction drawings with a minimum thickness of 4 inches. Install base materials upon undisturbed soils, or foundation soils prepared as described above. Compact the material to provide a level, hard surface on which to place the leveling course and the paver course. Install PVC edging where directed and hammered into place with 10" long spikes. Set all pavers on a concrete sub-base, 4" thick. Allow for a 1" setting bed.
- F. Leveling course and setting bed: Spread bedding material evenly over the entire area to be paved, screened to a minimum level that will provide a minimum 1" thickness when the pavers are placed and vibrated in place. Protect screened and leveling course from damage until covered with paver units.
- G. Installation of pavers: Lay paving units in patterns indicated on construction drawings. When not indicated, place as directed by RE. Maintain desired pattern and provide a uniform 1/16" to 1/8" joints between units. Fill gaps at the edge of the paved surfaces with paving units cut to fit with a maximum tolerance of 1/8" gaps from cut edge to adjacent edge. Provide cut units with straight even surfaces free from cracks or chips.

Vibrate paver units to their final level with 3 or more passes of a vibrating plate compactor. After first pass of compactor brush sand over the surface and vibrate into the joints with additional passes of the plate compactor. Completely fill joints. After final vibrating, the surface must be true to grade and not vary by more than 1/4" when tested with a 10'-0" straight edge at any location on the surface. Laying of pavers shall be done by experienced crew members. Lay pavers hand tight with care taken to maintain straight and true lines. Cut the brick pavers, where necessary, with a masonry saw. Obtain the RE approval to determine whether spalled, honeycombed, chipped or otherwise defective materials shall be repaired or be cause for rejection. Repair of brick pavers, if allowed, shall be done in a manner satisfactory to the RE. All units will be handled, stored and shipped in such a manner as to eliminate the danger of chipping, cracks, fractures and excessive bending stresses as recommended by the manufacturer or approved by the RE. Inspect brick paving units upon arrival at the work site to determine conformance to dimensional tolerances, as well as shipment damage. Additionally, inspect prior to placement to determine any damage which may have occurred during storage.

- H. Submittals: Submit full size samples of each type of unit proposed for use, with manufacturer's technical data. The average compressive strength of the test samples shall not be less than 8,500 psi.

#### **606.04 MEASUREMENT AND PAYMENT**

THE FOLLOWING IS ADDED TO THE LIST OF PAY ITEMS:

<i>Item</i>	<i>Pay Unit</i>
RESET PAVER SIDEWALK	SQUARE YARD

#### **SECTION 607 – CURB**

##### **607.03.02 CONCRETE VERTICAL CURB AND CONCRETE SLOPING CURB**

##### **D. Placing Concrete.**

THE SECOND SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Do not construct concrete curb between November 1 to March 15, except as approved by the RE. When placing concrete, adhere to the limitations specified in 504.03.02.C.

##### **607.03.08 BELGIAN BLOCK CURB**

Construct Belgian Block Curb in accordance with the requirements set forth for granite curb and those shown on the construction details.

#### **607.04 MEASUREMENT AND PAYMENT**

THE FOLLOWING IS ADDED:

*Item*

*Pay Unit*

BELGIAN BLOCK CURB

LINEAR FOOT

Concrete foundation required for placing Belgian Block Curb is included in the Belgian Block Curb item.

## SECTION 610 – TRAFFIC STRIPES, TRAFFIC MARKINGS, AND RUMBLE STRIPS

### 610.03.02 THERMOPLASTIC TRAFFIC MARKINGS

THE SUBPART HEADING AND THE ENTIRE TEXT IS CHANGED TO:

#### 610.03.02 TRAFFIC MARKING LINES, TRAFFIC MARKING SYMBOLS AND TRAFFIC MARKING ROUTE SYMBOLS

**A. Marking Plan.** At least 20 days before beginning the work, submit to the RE for approval a striping and marking plan that includes:

1. Schedule of operations for applying traffic markings,
2. Number and type of equipment,
3. Manufacturer's recommendations for use of the materials, including mixing ratios and application temperatures.
4. Details on the means and methods for surface preparation
5. Details on the means and methods for pre-marking

**B. Surface Preparation.** Immediately before striping and marking the pavement surface, clean the surface of dirt, oil, grease, and foreign material, including curing compound on new concrete. Clean the surface 2 inches beyond the perimeter of the stripes and markings to be placed.

**C. Applying Traffic Markings.** Place preformed thermoplastic or hot extruded thermoplastic traffic stripes and markings on thoroughly dry surfaces and during dry weather conditions. Apply using equipment and procedures that produce stripes and markings of the specified color, width, and thickness with well-defined edges, uniform retroreflectivity, and proper bonding to the pavement. Apply the thermoplastic material as follows:

1. **Preformed Thermoplastic.** Melt the preformed thermoplastic tape to bond the traffic stripes and markings permanently in position according to the manufacturer's recommendations.

Meet the minimum initial retroreflectance value, as specified in 610.03.01.D for thermoplastic tape, by applying additional glass beads to the hot-wet material in a uniform pattern as necessary.

2. **Extruded Thermoplastic.** Uniformly heat the thermoplastic material. When the ambient and surface temperatures are at least 50 °F, apply the melted material at a temperature of between 400 and 425 °F. Extrude the thermoplastic traffic markings on the HMA or concrete pavement ensuring a thickness of  $90 \pm 1$  mils.

Immediately after, or in conjunction with the thermoplastic extrusion, uniformly apply glass beads to the wet material at a minimum rate of 10 pounds per 100 square feet of markings. Apply glass beads by mechanical means only.

**D. Performance.** Ensure that the traffic markings show no fading, lifting, cracking, chipping for any reason including but not limited to traffic wear, maintenance activities including

but not limited to traffic wear, maintenance activities including snow plowing, until Acceptance. Ensure that 60 days after application, traffic markings have a minimum retroreflectance value of:

375 millicandelas per square meter per lux for white traffic markings

250 millicandelas per square meter per lux for yellow traffic markings

**E. Defective Markings.** Replace thermoplastic traffic markings that are determined by the RE before Acceptance to be defective or that are damaged during construction. Remove defective markings as specified in 610.03.08.

Replace the entire area of thermoplastic traffic markings determined to be less than the required thickness, to have incorrect color or width, to have failed to bond to the pavement, or to have chipped or cracked. The minimum replacement area is an individual word or symbol, or for longitudinal lines the entire length from where the deficiency first occurs to where it no longer exists.

The RE will determine initial retroreflectance as follows:

Provide the RE with a Reflectometer that meets a 30 meter geometry as specified in ASTM E 1710, capable of measuring wet and dry conditions as specified in ASTM E 2176 and ASTM E 2177, and has been certified by the manufacturer as being calibrated within the last two years. The RE will test the retroreflectance of traffic markings. Replace traffic markings that do not meet the retroreflectance values indicated in 610.03.02.D.

**F. Opening to Traffic.** Complete each application of thermoplastic traffic markings and allow to thoroughly dry before opening to traffic. The RE will determine when the traveled way can be opened to traffic.

#### **610.04 MEASUREMENT AND PAYMENT**

THE FOLLOWING ITEMS ARE THE RENAMED ITEMS:

<i>Item</i>	<i>Pay Unit</i>
TRAFFIC MARKINGS LINES, _____"	LINEAR FOOT
TRAFFIC MARKINGS SYMBOLS	SQUARE FOOT



**DIVISION 700 - ELECTRICAL**  
**SECTION 701 – GENERAL ITEMS**

**701.03 CONSTRUCTION**

THE FOLLOWING SUBSECTION IS ADDED

**701.03.16    Reset Existing Junction Box Casting**

Remove the existing junction box frame and cover, and the damaged portion of the wall as directed by the RE. Salvage junction box frame and cover for reuse. Reuse concrete as specified as 202.03.07A. Dispose of other material as specified in 201.03.09. Obtain RE approval to reuse the cover.

Reconstruct the walls to the elevation shown on the Plans. Ensure that the junction box frame is set to the correct elevation and held firmly in place. Place concrete, as specified in 504.03.02D, and in accordance with the limitations specified in 504.03.02C. Set the cover on the junction box frame. If the cover wobbles, grind to obtain a tighter fit.

**701.04 MEASUREMENT AND PAYMENT**

THE FOLLOWING IS ADDED TO THE LIST OF PAY ITEMS:

<i>Item</i>	<i>Pay Unit</i>
RESET EXISTING JUNCTION BOX CASTING	UNIT

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Resetting of electrical manhole castings will not be measured for payment, but the cost will be included in various Items in the project. Refer to Appendix B of the specification for appropriate procedure.

**SECTION 702 – TRAFFIC SIGNALS**

**702.03.07 PUSH BUTTON**

THE FOLLOWING IS ADDED TO THIS SECTION:

All pedestrian push buttons shall be ADA compliant and include the following features:

1. Push button locator tone;
2. A tactile arrow;
3. A speech walk message for the walking person indication;

4. A speech push button informational message;
5. Push button sign, as indicated on the Plan, with frame and braille features per MUTCD Section 4; and
6. Extension bracket to accommodate an unobstructed horizontal reach of 10" or less.

The Contractor shall be responsible for coordinating with Essex County of the final audible speech messages. No message shall be programmed and installed without County approval.

A list of acceptable Manufacturers is as follows:

<u>Product Type</u>	<u>Manufacturer</u>	<u>Phone No.</u>
BullDog III	Polara Engineering, Inc.	1-888-340-4872

Or alternative products, subject to the review and approval of Essex County or designee.

THE FOLLOWING SECTION IS ADDED:

## **SECTION 705 – RECTANGULAR RAPID FLASHING BEACONS**

### **705.01 DESCRIPTION**

This Section describes the requirements for providing and installing rapid rectangular flashing crosswalk beacons. Each Rectangular Rapid Flashing Beacon assembly (RRFB) shall consist of a solar panel with mount, controller enclosure that houses the energy management system, on-board user interface, wireless communications, and push button with voice message controller. The system shall conform to all provisions of the MUTCD, Interim Approval IA-11.

### **705.02 MATERIALS**

#### **705.02.01 Materials.**

The controller enclosure shall be constructed from aluminum with a lockable or tamper-proof hinged door. All electronics shall be mounted in the controller enclosure. A separate cabinet to house the controller for the push button with voice message shall not be required.

The overall weight of the controller enclosure shall not exceed 42 lbs (19 kg) and shall not exceed the approximate dimensions: 19.75" H x 11.1" W x 6" D (50.2cm H x 28.2cm W x 15.3cm D).

The lightbar housing shall be constructed from aluminum and shall have the approximate dimensions: 24" L x 1.5" D x 4.5" H (61.0 cm L x 3.8 cm D x 11.4 cm H).

Each lightbar shall have two light modules of approximately 7" wide by approximately 3" high. Each lightbar shall include a side-emitting pedestrian confirmation light on each end.

The lightbar shall be mounted to the pole using a separate bracket assembly to facilitate mounting two lightbars back to back (bi-directional) but still allow the lightbars to be pivoted independently of each other. The lightbar shall be able to pivot by approximately 40 degrees in order to aim the lightbar independent of the wire hole location on the pole.

The lightbar bracket shall be constructed from 3/16" galvanized steel and shall have both banding and bolting mounting options and shall be able to be mounted to all specified pole types.

The lightbar assembly shall open for access to the wiring connections for the LED modules. LED modules shall be rated to MIL-STD-810F, Method 506.4 for ingress protection.

#### **705.02.02 Mounting.**

The controller enclosure shall be furnished with two (2) mounting brackets for banding to 4" diameter or larger round poles.

#### **705.02.03 Configuration.**

The controller enclosure shall house an on-board user interface that provides on-site configuration adjustment, system status and fault notification, and system activation information.

The flash duration shall be adjustable in-the-field from 10 to 60 seconds in one second increments.

The system shall provide configurable nighttime intensity settings.

The system shall be capable of enabling or disabling ambient brightness auto-adjustment. This feature allows the system to provide optimal output brightness in relation to ambient light levels while always maintaining adherence to SAE J595 Class I specifications.

Flash duration and other in-the-field adjustable settings shall be automatically broadcast to all units in the system, except channel selection which shall be configured on each unit.

#### **705.02.04 Solar / Battery System.**

The system shall include one 50/60-watt solar panel supplied with mounting hardware. The controller enclosure shall house one 35 Ah sealed valve-regulated lead-acid battery. The battery shall be readily available from multiple suppliers and non-proprietary. Solar panel and battery system shall be 12 Volt DC (nominal).

#### **705.02.05 Operational Specifications.**

The intensity of the yellow indications directly perpendicular to the lens shall be a minimum of 1,800 Candela at full sun daylight conditions. The intensity shall be able to adjust to ambient light conditions, however during daylight operation the intensity shall meet the minimum specifications of the Society of Automotive Engineers (SAE) standard J595 Class I dated January 2005.

The color of the yellow indications shall meet the specifications of SAE standard J578 (Color Specification) dated December 2006.

The system, including the optional push button with voice message, shall have the capacity to operate 660 20- second activations per day year-round using the applicable peak sun hours insolation available at the installation location. The source of the insolation data shall be the NASA Atmospheric Data Center.

The controller enclosure shall have the capability to activate other solar engines by wireless communications within 500 feet (152 meters). The solar engine shall have unique channels that can be configured on-site to avoid activation of nearby systems.

The system shall use a dedicated light sensor to detect night and day states and apply any optionally-enabled intensity adjustments.

#### **705.02.06 Actuation.**

Activation of the System shall be via a Pushbutton located on each pole on each side of the crosswalk. The Pushbutton shall be manufactured by Polara Engineering. The pushbutton required will be 1-Polara Bulldog ADA compliant Pushbutton Mounted in a one piece 9x12 Frame with R10-25 sign, or approved equal. The system shall be actuated by pedestrian push buttons that shall have an LED indicator with Piezo control and shall be have an ADA compliant and MUTCD-2009 4E compliant for momentary operation

All RRFBs in the system shall initiate activation simultaneously within 150mS of actuation.

If an additional actuation occurs while the system is activated, the flash duration shall reset. For example, with the flash duration set to 20 seconds, if an additional actuation occurs after the RRFB has been activated for 15 seconds the RRFB shall continue for an additional 20 seconds, or 35 seconds in total.

If the RRFB has ceased operation, any subsequent actuation shall activate the RRFB without delay regardless of how recently the RRFB ceased operation.

### **705.02.07 Energy Balance.**

The manufacturer shall provide an energy balance worksheet consisting of (Energy In)/(Energy Out), ALR and System Autonomy calculations.

**Energy-In** is based on Electric charge, in Ah, entering the battery from the charger, accounting for:

The energy from the solar panel based on applicable peak sun hours insolation available at the installation location for the panel's inclination angle. The insolation figure used shall be the worst-case month of the calendar year. The source of the insolation data shall be the NASA Atmospheric Data Center.

Shading from nearby trees, buildings or other structures unique to a particular location are to be factored in and the calculations shall clearly show and justify the de-rating of the solar panel energy input.

Efficiency losses from the charger, including conversion efficiency of a Maximum Power Point Tracking (MPPT) Charger, where applicable.

MPPT Charger current boost, if applicable.

Battery charger efficiency losses.

**Energy-Out** is based on the sum of quiescent and operating load in all circuitry over 24 hours with an operating capacity of 300 20-second activations, including:

Baseline wireless over 24 hours.

Operating load of push button with voice message if applicable at rated operating capacity per activation.

Additional operating load of the wireless system per activation.

Operating load of lightbars including pedestrian indicators at rated intensity per activation. The number of lightbars and their electrical load details (volts, current and watts) shall be clearly indicated.

### **ALR**

System Array-to-Load (ALR) ratio shall be calculated as: Energy-In divided by Energy-Out as defined above. Systems shall be designed to a minimum Array-to-Load (ALR) ratio of 1.2.

### **Autonomy**

System autonomy shall be a minimum of 10 days or as recommended by the NASA Atmospheric Data Center for the location and shall be calculated by the following method:

(Temperature-derated battery capacity minus battery capacity unavailable due to Low Voltage Disconnect) divided by Daily total energy consumption with an operating capacity of 300 20-second activations (as calculated above).

#### **705.02.08 Qualifications.**

The product shall be FCC certified to comply with all 47 CFR FCC Part 15 Subpart B Emission requirements. The product shall be Buy American compliant. Manufacturer shall provide a 3 Year Limited Warranty. Manufacturer must be ISO 9001 certified.

Manufacturer:

Carmanah Technologies Corp.  
Model SC315 Gen III Solar RRFB  
Or approved equal.

#### **705.03 CONSTRUCTION**

Install RRFB assembly in accordance with the Contract Plans and Manufacturer's recommendations.

#### **705.04 MEASUREMENT AND PAYMENT**

The Department will measure and make payment for Items as follows:

<i>Item</i>	<i>Pay Unit</i>
RECTANGULAR RAPID FLASHING BEACON CROSSWALK SYSTEM	UNIT

All associated costs required to construct the high-intensity activated crosswalk beacons, utilizing the existing pedestal pole assembly and foundations, as shown in the Contract Documents, including but not limited to, lightbars, pedestrian push button, signage, solar panel, mounting hardware, and ancillary components, shall be included under the unit price bid for 'Rectangular Rapid Flashing Beacon Crosswalk System.'

## DIVISION 900 – MATERIALS

### SECTION 902 –ASPHALT

#### 902.02.03 MIX DESIGN

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Unless otherwise approved by the engineer, only one source of supply for hot mix asphalt surface course may be used on the project.

#### 902.02.04 SAMPLING AND TESTING

\*\*\*\*\*

***DETERMINATION OF CONFORMANCE TO THE VOLUMETRIC PROPERTIES BY SAMPLING AND TESTING AT THE HMA PLANT BY AN INDEPENDENT TESTING AGENCY AND/OR LABORATORY IS PREFERRED; HOWEVER, THE FOLLOWING CHANGES TO SUBSECTION 902.02.04 MAY BE USED AS AN ALTERNATE TO THE SAMPLING AND TESTING PROVISIONS LISTED IN SUBSECTION 902.02.04 TO DETERMINE CONFORMANCE TO THE SPECIFICATION REQUIREMENTS.***

\*\*\*\*\*

- F. Acceptance of HMA.** The Department may accept the HMA as specified in 902.02.04.A through 902-02.04,E by employing staff or an independent testing agency at the HMA plant during production. The inspector who performs the quality assurance sampling shall be certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Plant Technologist, Level 2.

Alternatively, the Department may accept the HMA by Certification of Compliance according to 106.07.

## **SECTION 903 – CONCRETE**

### **903.02.02 CHEMICAL ADMIXTURES**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Corrosion inhibitor products that are to be used in the fabrication of concrete Items will be as follows:

Calcium Nitrite Based as produced by  
W.R. Grace & Company  
2133 85<sup>th</sup> Street  
North Bergen, NJ 07047  
Telephone: 201-869-5220

Calcium Nitrite Based as produced by  
The Euclid Chemical Company  
5 Joanna Court  
East Brunswick, NJ 08816  
Telephone: 732-390-9770

Calcium Nitrite Based as produced by  
Master Builders Inc.  
798 Welsh Road  
Huntingdon Valley, PA 19006  
Telephone: 215-938-7501

Calcium Nitrite Based as produced by  
SIKA Corporation  
201 Polito Avenue  
Lyndhurst, NJ 07071  
Telephone: 800 - 933 - SIKa (7452)

Calcium Nitrite Based as produced by  
Great Eastern Technologies, LLC  
"Chem Strong CI"  
515 Route 528  
P. O. Box 3015  
Lakewood, NJ 08701  
Telephone: 888 - 452 – 9348



## **SECTION 912 – PAINTS, COATINGS, TRAFFIC STRIPES AND TRAFFIC MARKINGS**

### **912.03.02 Thermoplastic Traffic Markings**

THE SUBPART HEADING IS CHANGED TO:

### **912.03.02 Traffic Markings**

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

For traffic markings, use either preformed or hot extruded thermoplastic conforming to AASHTO M 249, except that for preformed thermoplastic, the minimum thickness requirement is 90 mils.

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## **APPENDIX A: PUBLIC UTILITIES**

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Revised 8/18

**TOWNSHIP OF MONTCLAIR  
PUBLIC UTILITIES**

The following is a list of all corporations, companies, agencies or municipalities owning or controlling the utilities in the vicinity of the project site, and the name, address and telephone number of their local representatives:

**WATER**

Montclair Water Department  
54 Watchung Avenue  
Montclair, New Jersey 07042  
Attn: Gary Obszarny, Director  
Tel: (973) 744-4600

**FIBER OPTICS**

Fibertech Networks  
9 N. Hockey Drive  
Mansfield, NJ 08022  
Attn: Mr. Alan R. Kothe  
Tel: (609) 203-3723

**GAS**

Public Service Electric and Gas Company  
40 Rock Avenue  
Plainfield, NJ 07063  
Attn: James Cavanagh  
Tel: (908) 668-3840

**CABLE**

Comcast  
800 Rahway Avenue  
Union, NJ 07083  
Attn: Bob Knoepfel  
Tel: (732) 602-7444

**ELECTRIC**

Public Service Electric and Gas Company  
150 Circle Avenue  
Clifton, New Jersey 07011  
Attn: Henry Gregerson  
Tel: (973) 365-2990

**TELEPHONE**

Verizon  
6000 Hadley Rd  
South Plainfield, New Jersey 07080  
Attn: Thomas Grabowski  
Tel: (908) 412-6169  
Email:thomas.j.grabowski@verizon.com

**SEWERS**

Montclair Sewer Department  
54 Watchung Avenue  
Montclair, New Jersey 07042  
Attn: Gary Obszarny, Director  
Tel: (973) 744-4600

Notification of major utilities for markout may be accomplished by calling Garden State Underground Location Service at 1-800-272-1000.

## **PSE&G's PROCEDURE FOR RESETTING OR REPLACING OF MANHOLE FRAMES AND COVERS.**

Please be advised that the following steps need to be maintained in order to meet local milling and paving schedules.

Once the contract has been awarded, your contractor should:

- Contact Public Service Electric & Gas (Engineering) 4 to 6 weeks prior to milling to discuss the scope of the project. Sufficient lead-time is essential in obtaining materials and coordinating schedules between PSE&G and local paving projects.
- Provide milling schedule. Project specific dates are required in hard copy.
- Conduct a walk through with job sponsor to identify resets and/or replacements. Please be advised that the final decision to replace facilities due to its condition resides with PSE&G.
- Provide reset elevations to PSE&G's contractor.

Once this information is received, the PSE&G job sponsor will order material (if required) in accordance with vendors lead time and schedule our contractor to complete manhole resets or replacements immediately following the milling process.

The successful contractor should proceed with care; damage to existing facilities or debris contaminating PSE&G manholes and or transformer vaults will be repaired or remedied at the contractor's expense.

Please be aware of the Underground Facilities Protection Act, codified NJSA 48:2-73 to 91, which requires contractors to notify "New Jersey One-Call" for utility markout "New Jersey One Call" Can be reached at 1-800-272-1000. PSE&G's contractor cannot begin work until four (4) business days after the markout request.

Please bring to the successful contractor's attention in New Jersey High Voltage Proximity Act, codified at N.J.S.A. 34:6-47.1 to 47.10, concerning precautions to be taken when working the proximity of high voltage wires.

In addition, we would also recommend that the contractor review the requirements for operators of construction equipment under the Occupational Safety and Health Act of 1970 (OSHA) and of Subpart "N", Paragraph 1926.550 of the Rules and Regulations issued thereunder and codified at 29 CFR 1926.550, which, in part, requires different working clearance than the State Law.

If you should have any questions, please contact me at (201) 330-6629 or [Richard.dwyer@pseg.com](mailto:Richard.dwyer@pseg.com).

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# APPENDIX B: STANDARD CONSTRUCTION DETAILS

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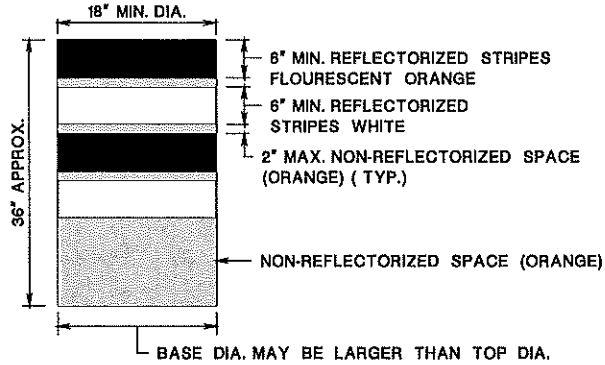
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BDC6D-ORIGINAL SHEET

ENSURE DRUMS ARE MADE OF ORANGE PLASTIC WITH A MINIMUM OF FOUR ALTERNATE FLOURESCENT ORANGE AND WHITE RETROREFLECTIVE STRIPES. IF THERE ARE NON-REFLECTORIZED SPACES BETWEEN THE STRIPES, THEY ARE TO BE NO MORE THAN 2" WIDE. ENSURE RETROREFLECTIVE SHEETING FOR STRIPES CONFORMS WITH ASTM D4956 TYPE VII OR VIII WITH S2 REQUIREMENTS.

ENSURE THE TOP OF THE DRUM IS NOT OPEN. CONSTRUCT DRUMS TO INHIBIT ROLLING IF KNOCKED OVER.

ENSURE THE REFLECTORIZED AREA OF DRUMS IS ROUND EXCEPT OTHER SHAPES, WHICH PROVIDE THE SAME VISIBILITY AS AN 18 INCH DIAMETER ROUND DRUM REGARDLESS OF ORIENTATION, MAY BE USED.



WHEN BALLAST IS REQUIRED BY THE RE, USE SAND. THE MAXIMUM WEIGHT OF THE BALLAST IS 50 LBS. AND IS TO BE LOCATED APPROXIMATELY AT GROUND LEVEL. ALTERNATE TYPES OF BALLAST MUST BE APPROVED BY THE RE.

#### DRUMS

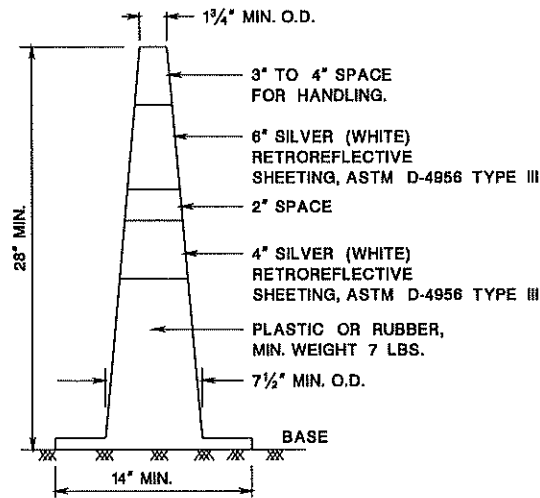
CD-159-1.1

#### NOTES:

TRAFFIC CONES MUST BE PREDOMINATELY ORANGE IN COLOR.

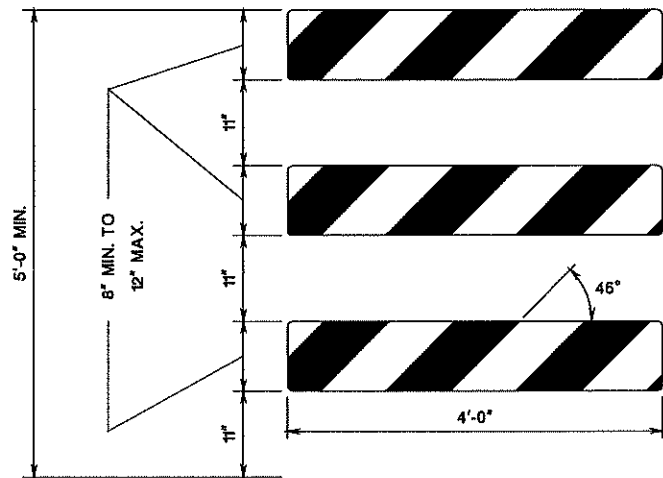
BASES MAY BE OF BREAKAWAY BALLASTED TYPE.

MINOR MANUFACTURER'S VARIATIONS MAY BE ACCEPTABLE UPON APPROVAL OF THE RE.



#### TRAFFIC CONES

CD-159-1.2



#### TYPE III BARRICADE - FRONT VIEW

#### NOTES:

1. ENSURE THE 8" MIN. x 48", TO 12" MAX. x 48" BARRICADE RAILS TO BE ATTACHED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.
2. ENSURE ORANGE AND SILVER (WHITE) STRIPES TO BE RETROREFLECTIVE SHEETING, ASTM D4956 TYPE III. ALTERNATE ORANGE AND SILVER (WHITE) STRIPES 6" WIDE SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS.
3. THE FRAMING, RAILS, AND BALLAST FOR BREAKAWAY BARRICADE TO BE NCHRP-350 CRASHED TESTED AND FHWA APPROVED.
4. IF NECESSARY, FABRICATE THE BALLAST AND PLACE ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

#### BREAKAWAY BARRICADES

CD-159-1.3

#### TRAFFIC CONTROL DEVICES

N.T.S.

CD-159-1

NEW JERSEY DEPARTMENT OF TRANSPORTATION

#### CONSTRUCTION DETAILS

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E5 - 1 [60" x 48"]  
(20 S.F.)



W50 - 1C [60" x 48"]  
(20 S.F.)



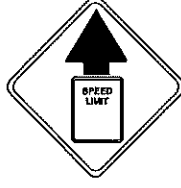
W5 - 4 [48" x 48"]  
(16 S.F.)



W(NJ)100 - 1(L OR R)  
48" x 48"  
(16 S.F.)



W9 - 3 [48" x 48"]  
(16 S.F.)



W3 - 5  
48" x 48"  
(16 S.F.)



W20 - 4F(M) [48" x 48"]  
(16 S.F.)



G20 - 5aP  
36" x 24"  
(6 S.F.)  
BLACK ON ORANGE



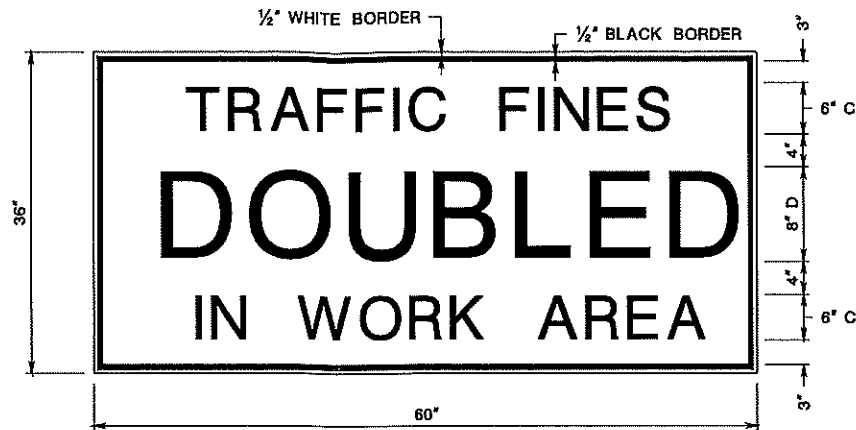
W20 - 10(G) [48" x 48"]  
(16 S.F.)



EP1  
60" x 36"  
(15 S.F.)  
BLACK ON ORANGE



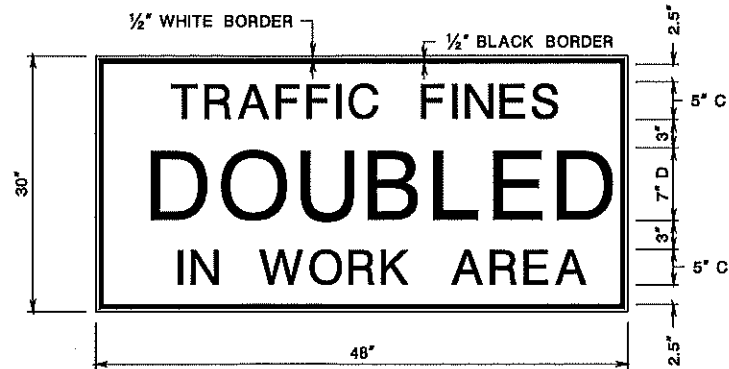
EP2  
60" x 36"  
(15 S.F.)  
BLACK ON ORANGE



**NOTE:**

MESSAGE TO BE BLACK LETTERS  
ON WHITE REFLECTIVE BACKGROUND.

R(NJ)5-17 60" x 36"  
(15 S.F.)



**NOTE:**

MESSAGE TO BE BLACK LETTERS  
ON WHITE REFLECTIVE BACKGROUND.

R(NJ)5-17 48" x 30"  
(10 S.F.)

**GENERAL NOTES:**

- DIMENSIONS, COLORS, AND DETAILS OF VARIOUS SIZE SIGNS, AND ACCESSORY PANELS TO FOLLOW STANDARDS IN THE CURRENT "STANDARD HIGHWAY SIGN PUBLICATION" AND THE CURRENT "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".
- LETTERS AND NUMERALS TO CONFORM TO THE CURRENT MANUAL, "STANDARD ALPHABETS FOR HIGHWAY SIGNS" U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.
- OBTAIN RE'S APPROVAL FOR THE DISTANCE TO BE USED ON THE ADVANCE WARNING SIGNS AND FOR THE SPEED LIMIT TO BE USED ON THE R2-1 SIGN.
- DISTANCE LEGEND: SIGN NUMBER FOLLOWED BY A LETTER AND DISTANCE, ARE THE SIGN PLACEMENTS FOR USE WITH TCD-3 THROUGH TCD-21 AND PROJECT SPECIFIC PLANS. ALL DISTANCES ARE FROM THE TRANSITION OR POINT OF RESTRICTION.

LETTER	DISTANCE
A	1500'
B	1000'
C	500'
D	1/2 MILE
E	1/4 MILE
F	1/8 MILE

**BACKING MATERIAL**

- USE ALUMINUM FLAT SHEET OF ALLOY AND TEMPER 5052-H38 OR 6061-T8:
  - 0.10" THICK FOR ALL CONSTRUCTION SIGNS EXCEPT SIGNS SHOWN MOUNTED ON BREAKAWAY BARRICADES.
  - 0.024" THICK FOR ALL CONSTRUCTION SIGNS SHOWN MOUNTED ON BREAKAWAY BARRICADES.

**TEMPORARY SIGN SUPPORTS**

- USE WELL SEASONED LUMBER SIGN SUPPORTS, FREE OF SPLITS, KNOTS AND WARPS, OR OF STEEL COMPONENTS.
- WOOD POSTS TO HAVE A UNIFORM CROSS-SECTION AND NOT TO EXCEED THE FOLLOWING DIMENSIONS FOR:

SINGLE POST = 4" x 6"  
TWO POSTS = 3" x 6" OR 4" x 5"  
THREE POSTS = 3" x 5" OR 4" x 4"

4" X 6" WOOD POSTS TO BE MODIFIED BY DRILLING 1 1/2 INCH DIAMETER HOLES 4 INCHES AND 18 INCHES ABOVE THE GROUND LINE AND PERPENDICULAR TO THE ROADWAY CENTERLINE.
- NO BRACING IS PERMITTED. VERTICAL CLEARANCES FOR SIGNS MOUNTED ON WOOD SUPPORTS TO BE 7 FOOT MINIMUM. EMBEDMENT DEPTH FOR THE WOOD POST NOT TO EXCEED 3.5 FEET.
- USE STEEL POSTS IN ACCORDANCE WITH THE STANDARD DETAIL FOR U-POST SIGN SUPPORT.
- TEMPORARY SIGN SUPPORTS NOT MEETING THIS CRITERIA TO BE SHIELDED BY A LONGITUDINAL BARRIER OR CRASH CUSHIONS.
- USE WOOD POST ONLY ON TEMPORARY SIGN SUPPORT.

**SIGN FACES**

- USE SIGN FACES OF ASTM D4956 TYPE VII OR VIII FLUORESCENT ORANGE SHEETING.

**FASTENING**

- SECURELY FASTEN ALL SIGNS TO THEIR SUPPORTS WITH BOLTS, NUTS, AND WASHERS, AS SPECIFIED.

**CONSTRUCTION SIGNS**  
N.T.S.

CD-159-7

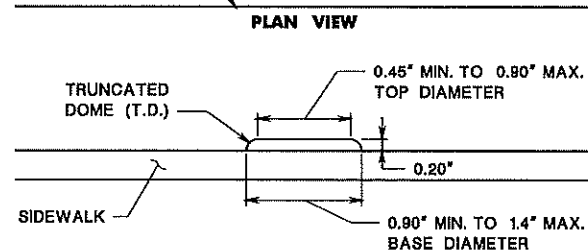
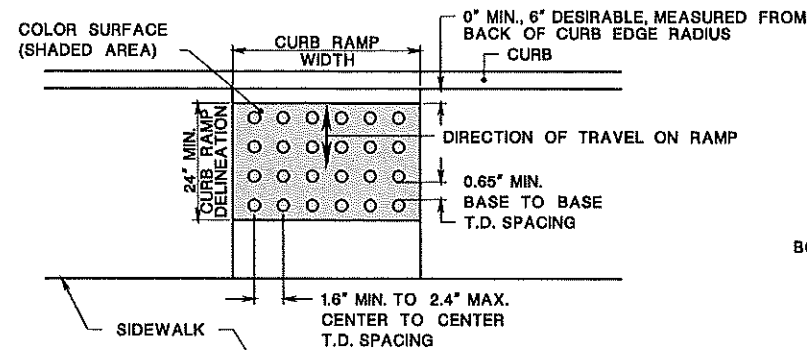
NEW JERSEY DEPARTMENT OF TRANSPORTATION

**CONSTRUCTION DETAILS**

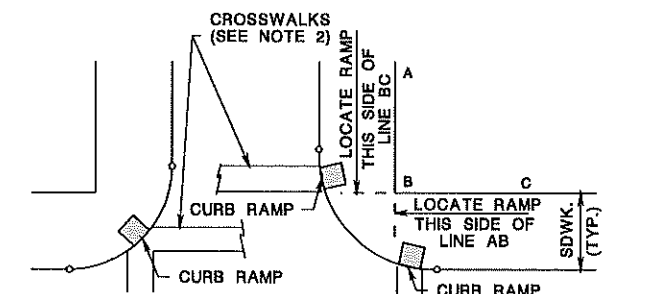
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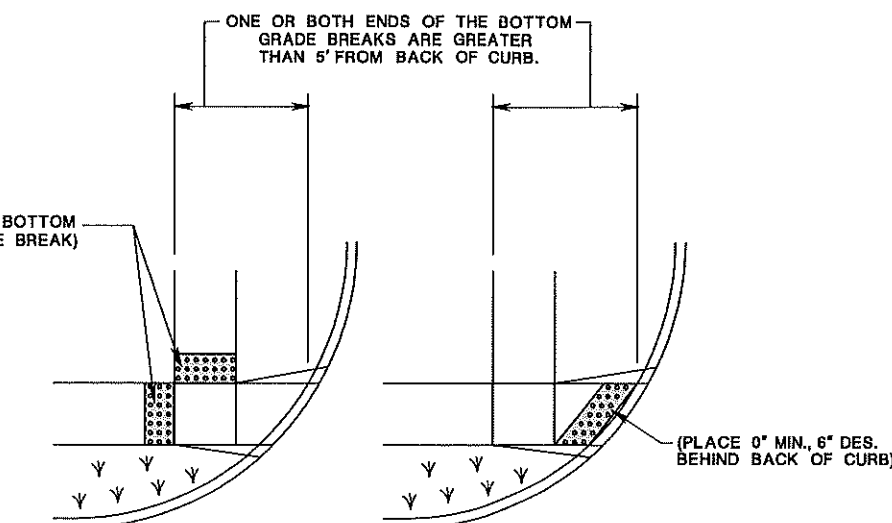
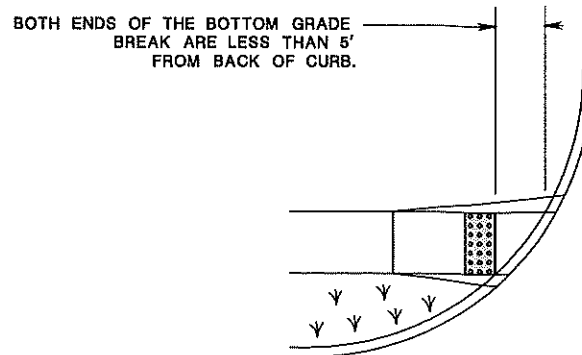
**DETECTABLE WARNING SURFACE**



**ALTERNATE TREATMENT**  
(SEE NOTE 5)

**PREFERRED TREATMENT**  
(SEE NOTE 5)

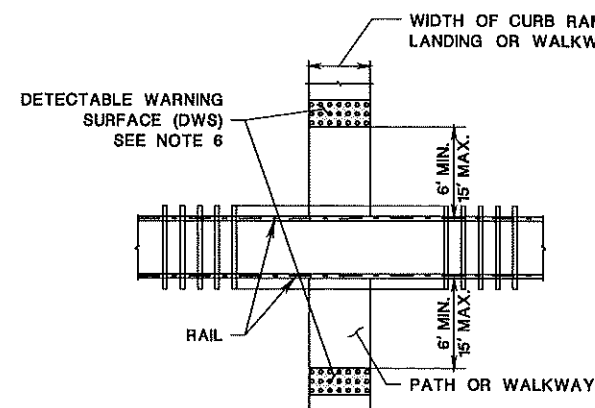
**LOCATION OF CURB RAMP TYPES 1, 2, 3, 4, & 7  
FOR CROSSING PARALLEL AND PERPENDICULAR  
TO HIGHWAY**



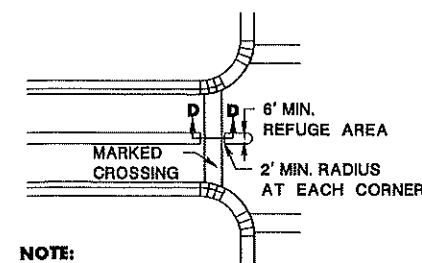
**PREFERRED TREATMENT**

**ALTERNATE TREATMENT**  
(SEE NOTE 7)

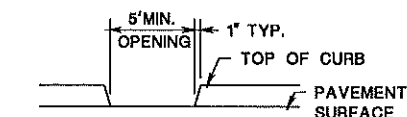
**PLACEMENT OF DETECTABLE WARNING SURFACE  
FOR CURB RAMP TYPE 5 AND 6**



**PEDESTRIAN RAILROAD CROSSING**

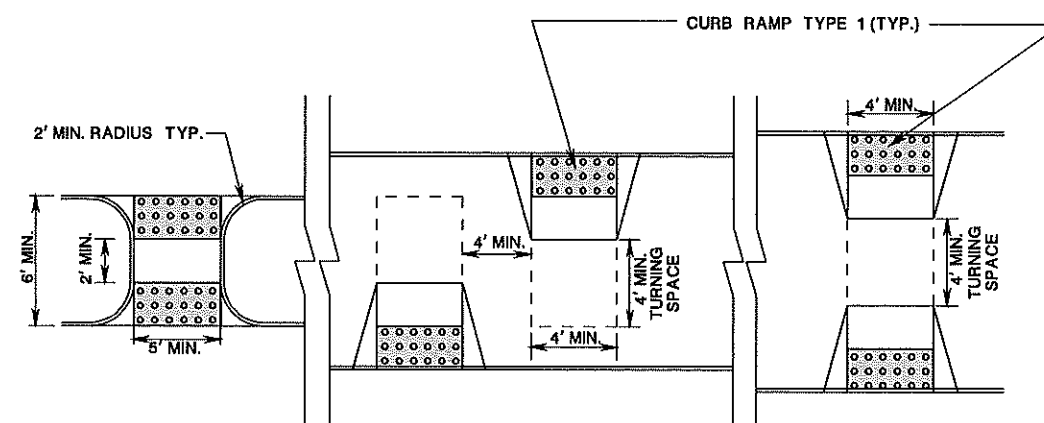


**NOTE:**  
WHERE PRACTICAL, END LEFT TURN ISLAND OR DIVISIONAL ISLAND BEFORE CROSSWALK TO ELIMINATE CUT-THROUGH



**NOTE:**  
5' MIN. WIDE OPENING TO BE FLUSH WITH ROADWAY PAVEMENT

**PEDESTRIAN REFUGE ISLAND WALKWAY  
OPENING AT INTERSECTIONS**



**NARROW ISLAND WIDTH**  
(SEE NOTE 3)

**MEDIUM ISLAND WIDTH**  
(SEE NOTE 4)

**LARGE ISLAND WIDTH**  
(SEE NOTE 4)

**PEDESTRIAN REFUGE ISLAND**

**DETECTABLE WARNING SURFACE  
N.T.S.**

- NOTES:**
1. KEEP TURNING SPACE, APPROACH SIDEWALK TRANSITIONS, AND CURB RAMP CLEAR OF OBSTRUCTIONS THAT PROTRUDE ABOVE THE SURFACE.
  2. CROSSWALKS AND STOP LINES MAY BE MARKED OR UNMARKED, SEE PLANS.
  3. FOR NARROW ISLAND WIDTH, SEE PEDESTRIAN REFUGE ISLAND WALKWAY OPENING AT INTERSECTIONS DETAIL.
  4. FOR MEDIUM AND LARGE ISLAND WIDTH, SEE CURB RAMP TYPE 1 ON CD-606-1.
  5. CONSTRUCT CURB RAMP TYPES 1, 2, 3, 4, & 7 PERPENDICULAR TO CURBLINE, AS SHOWN.
  6. IF A CURB RAMP IS REQUIRED, THE LOCATION OF THE DETECTABLE WARNING SURFACE MUST BE AT THE BOTTOM OF THE RAMP AND WITHIN THE REQUIRED DISTANCE FROM THE RAIL.
  7. A STANDARD DETECTABLE WARNING (DWS) SURFACE IS NOT AVAILABLE TO FIT THIS APPLICATION, AND THEREFORE ONE WILL NEED TO BE CUSTOMIZED. THE DWS SHOULD COVER THE ENTIRE WIDTH OF THE RAMP. THE ROWS OF DOMES ON THE DWS SHOULD FOLLOW THE DIRECTION OF TRAVEL OF THE RAMP, SO PEDESTRIANS WHO USE MOBILE DEVICES CAN TRACK BETWEEN THE DOMES.

CD-606-2.1

NEW JERSEY DEPARTMENT OF TRANSPORTATION

**CONSTRUCTION DETAILS**

CD-606-2

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**CURB RAMP TYPE 1**

0.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	2.50	2.50	9.00
4	4	3.33	3.33	10.67
5	5	4.17	4.17	12.33
6	6	5.00	5.00	14.00
7	7	5.83	5.83	15.67
8	8	6.67	6.67	17.33
9	9	7.50	7.50	19.00

1.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	2.78	2.27	9.05
4	4	3.70	3.03	10.73
5	5	4.63	3.79	12.42
6	6	5.56	4.55	14.10
7	7	6.48	5.30	15.78
8	8	7.41	6.06	17.47
9	9	8.33	6.82	19.15

2.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	3.13	2.08	9.21
4	4	4.17	2.78	10.94
5	5	5.21	3.47	12.68
6	6	6.25	4.17	14.42
7	7	7.29	4.86	16.15
8	8	8.33	5.56	17.89
9	9	9.38	6.25	19.63

3.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	3.57	1.92	9.49
4	4	4.76	2.56	11.33
5	5	5.95	3.21	13.16
6	6	7.14	3.85	14.99
7	7	8.33	4.49	16.82
8	8	9.52	5.13	18.65
9	9	10.71	5.77	20.48

4.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	4.17	1.79	9.95
4	4	5.56	2.38	11.94
5	5	6.94	2.98	13.92
6	6	8.33	3.57	15.90
7	7	9.72	4.17	17.89
8	8	11.11	4.76	19.87
9	9	12.50	5.36	21.86

5.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	5.00	1.67	10.67
4	4	6.67	2.22	12.89
5	5	8.33	2.78	15.11
6	6	10.00	3.33	17.33
7	7	11.67	3.89	19.56
8	8	13.33	4.44	21.78
9	9	15.00	5.00	24.00

6.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	6.25	1.56	11.81
4	4	8.33	2.08	14.42
5	5	10.42	2.60	17.02
6	6	12.50	3.13	19.63
7	7	14.58	3.65	22.23
8	8	15.00	4.17	23.17
9	9	15.00	4.69	23.69

7.0 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	8.33	1.47	13.80
4	4	11.11	1.96	17.07
5	5	13.89	2.45	20.34
6	6	15.00	2.94	21.94
7	7	15.00	3.43	22.43
8	8	15.00	3.92	22.92
9	9	15.00	4.41	23.41

**CURB RAMP TYPE 3**

0.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		2.50	2.50	9.00		0.91	0.91
4		3.33	3.33	10.67		1.91	1.91
5		4.17	4.17	12.33		2.91	2.91
6	2.75	5.00	5.00	14.00	2.75	3.91	3.91
7		5.83	5.83	15.67		4.91	4.91
8		6.67	6.67	17.33		5.91	5.91
9		7.50	7.50	19.00		6.91	6.91

1.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		2.78	2.27	9.05		1.72	1.72
4		3.70	3.03	10.73		2.72	2.72
5		4.63	3.79	12.42		3.72	3.72
6	3.0	5.56	4.55	14.10	3.0	4.72	4.72
7		6.48	5.30	15.78		5.72	5.72
8		7.41	6.06	17.47		6.72	6.72
9		8.33	6.82	19.15		7.72	7.72

2.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		3.13	2.08	9.21		1.34	1.34
4		4.17	2.78	10.94		2.34	2.34
5		5.21	3.47	12.68		3.34	3.34
6	3.5	6.25	4.17	14.42	3.5	4.34	4.34
7		7.29	4.86	16.15		5.34	5.34
8		8.33	5.56	17.89		6.34	6.34
9		9.38	6.25	19.63		7.34	7.34

3.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		3.57	1.92	9.49		1.75	0.62
4		4.76	2.56	11.33		3.68	1.29
5		5.95	3.21	13.16		5.60	1.97
6	2.75	7.14	3.85	14.99	2.75	7.53	2.64
7		8.33	4.49	16.82		9.45	3.32
8		9.52	5.13	18.65		11.38	4.00
9		10.71	5.77	20.48		13.30	4.67

4.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		4.17	1.79	9.95		1.39	0.49
4		5.56	2.38	11.94		3.31	1.16
5		6.94	2.98	13.92		5.24	1.84
6	3.0	8.33	3.57	15.90	3.0	7.16	2.52
7		9.72	4.17	17.89		9.09	3.19
8		11.11	4.76	19.87		11.01	3.87
9		12.50	5.36	21.86		12.94	4.54

5.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		5.00	1.67	10.67		0.66	0.23
4		6.67	2.22	12.89		2.58	0.91
5		8.33	2.78	15.11		4.51	1.58
6	3.5	10.00	3.33	17.33	3.5	6.43	2.26
7		11.67	3.89	19.56		8.36	2.93
8		13.33	4.44	21.78		10.28	3.61
9		15.00	5.00	24.00		12.20	4.29

6.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		6.25	1.56	11.81		1.85	0.65
4		8.33	2.08	14.42		3.78	1.33
5		10.42	2.60	17.02		5.70	2.00
6	4.0	12.50	3.13	19.63	4.0	7.62	2.68
7		14.58	3.65	22.23		9.55	3.35
8		15.00	4.17	23.17		11.47	4.03
9		15.00	4.69	23.69			

**CURB RAMP TYPE 2**

0-8 % GUTTER LINE PROFILE				
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET
3	3	1.50	1.50	7.00
4	4	1.50	1.50	7.00
5	5	1.50	1.50	7.00
6	6	1.50	1.50	7.00
7	7	1.50	1.50	7.00
8	8	1.50	1.50	7.00
9	9	1.50	1.50	7.00

1.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		2.78	2.27	9.05		1.04	0.81
4		3.70	3.03	10.73		2.17	1.71
5		4.63	3.79	12.42		3.31	2.60
6	2.75	5.56	4.55	14.10	2.75	4.45	3.49
7		6.48	5.30	15.78		5.58	4.39
8		7.41	6.06	17.47		6.72	5.28
9		8.33	6.82	19.15		7.86	6.17

2.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		2.78	2.27	9.05		0.82	0.64
4		3.70	3.03	10.73		1.96	1.54
5		4.63	3.79	12.42		3.09	2.43
6	3.0	5.56	4.55	14.10	3.0	4.23	3.32
7		6.48	5.30	15.78		5.37	4.22
8		7.41	6.06	17.47		6.50	5.11
9		8.33	6.82	19.15		7.64	6.00

3.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		2.78	2.27	9.05		0.39	0.30
4		3.70	3.03	10.73		1.53	1.20
5		4.63	3.79	12.42		2.66	2.09
6	3.5	5.56	4.55	14.10	3.5	3.80	2.98
7		6.48	5.30	15.78		4.94	3.88
8		7.41	6.06	17.47		6.07	4.77
9		8.33	6.82	19.15		7.21	5.66

4.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub>2L</sub> FEET
3		3.70	3.03	10.73		1.09	0.86
4		4.63	3.79	12.42		2.23	1.75
5		5.56	4.55	14.10		3.37	2.65
6	4.0	6.48	5.30	15.78	4.0	4.50	3.54
7		7.41	6.06	17.47		5.64	4.43
8		8.33	6.82	19.15		6.78	5.32
9							

5.0 % GUTTER LINE PROFILE							
H INCHES	W FEET	X <sub>1U</sub> FEET	X <sub>1L</sub> FEET	L <sub>1</sub> FEET	Y INCHES	X <sub>2U</sub> FEET	X <sub></sub>

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#### CURB RAMP TYPE 4

0.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	0.91	0.91	5.82
4			1.91	1.91	7.82
5			2.91	2.91	9.82
6			3.91	3.91	11.82
7			4.91	4.91	13.83
8			5.91	5.91	15.83
9			6.91	6.91	17.83
3			**	**	**
4			1.72	1.72	7.44
5	3.0	3.0	2.72	2.72	9.44
6			3.72	3.72	11.45
7			4.72	4.72	13.45
8			5.72	5.72	15.45
9			6.72	6.72	17.45
3			**	**	**
4			1.34	1.34	6.68
5			2.34	2.34	8.68
6			3.34	3.34	10.69
7	3.5	3.5	4.34	4.34	12.69
8			5.34	5.34	14.69
9			6.34	6.34	16.69
3			**	**	**
4			**	**	**
5			1.96	1.96	7.92
6			2.96	2.96	9.93
7			3.96	3.96	11.93
8			4.96	4.96	13.93
9			5.96	5.96	15.93

4.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	1.75	0.62	6.37
4			3.68	1.29	8.97
5			5.60	1.97	11.57
6			7.53	2.64	14.17
7			9.45	3.32	16.77
8			11.38	4.00	19.37
9			13.30	4.67	21.97
3			1.39	0.49	5.88
4			3.31	1.16	8.48
5	3.0	3.0	5.24	1.84	11.08
6			7.16	2.52	13.68
7			9.09	3.19	16.28
8			11.01	3.87	18.88
9			12.94	4.54	21.48
3			0.66	0.23	4.89
4			2.58	0.91	7.49
5			4.51	1.58	10.09
6			6.43	2.26	12.69
7	3.5	3.5	8.36	2.93	15.29
8			10.28	3.61	17.89
9			12.20	4.29	20.49
3			**	**	**
4			1.85	0.65	6.50
5			3.78	1.33	9.10
6			5.70	2.00	11.70
7			7.62	2.68	14.30
8			9.55	3.35	16.90
9			11.47	4.03	19.50

1.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	1.04	0.81	5.85
4			2.17	1.71	7.88
5			3.31	2.60	9.91
6			4.45	3.49	11.94
7			5.58	4.39	13.97
8			6.72	5.28	16.00
9			7.86	6.17	18.03
3			0.82	0.64	5.46
4			1.96	1.54	7.49
5	3.0	3.0	3.09	2.43	9.52
6			4.23	3.32	11.55
7			5.37	4.22	13.58
8			6.50	5.11	15.61
9			7.64	6.00	17.64
3			0.39	0.30	4.69
4			1.53	1.20	6.72
5			2.66	2.09	8.75
6			3.80	2.98	10.78
7	3.5	3.5	4.94	3.88	12.81
8			6.07	4.77	14.84
9			7.21	5.66	16.87
3			**	**	**
4			1.09	0.86	5.95
5			2.23	1.75	7.98
6			3.37	2.65	10.01
7			4.50	3.54	12.04
8			5.64	4.43	14.07
9			6.78	5.32	16.10

5.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	2.28	0.57	6.85
4			4.78	1.19	9.98
5			7.29	1.82	13.10
6			9.79	2.45	16.23
7			12.29	3.07	19.36
8			14.79	3.70	22.49
9			15.00	4.32	23.32
3			1.80	0.45	6.26
4			4.31	1.08	9.38
5	3.0	3.0	6.81	1.70	12.51
6			9.31	2.33	15.64
7			11.81	2.95	18.77
8			14.32	3.58	21.89
9			15.00	4.20	23.20
3			0.85	0.21	5.07
4			3.36	0.84	8.20
5			5.86	1.46	11.32
6			8.36	2.09	14.45
7	3.5	3.5	10.86	2.71	17.58
8			13.37	3.34	20.71
9			15.00	3.96	22.96
3			**	**	**
4			2.41	0.60	7.01
5			4.91	1.23	10.14
6			7.41	1.85	13.26
7			9.91	2.48	16.39
8			12.42	3.10	19.52
9			14.92	3.73	22.65

2.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	1.20	0.73	5.93
4			2.52	1.54	8.06
5			3.83	2.35	10.18
6			5.15	3.16	12.30
7			6.47	3.96	14.43
8			7.78	4.77	16.55
9			9.10	5.58	18.67
3			0.95	0.58	5.53
4			2.27	1.39	7.65
5	3.0	3.0	3.58	2.20	9.78
6			4.90	3.00	11.90
7			6.22	3.81	14.02
8			7.53	4.62	16.15
9			8.85	5.42	18.27
3			0.45	0.28	4.72
4			1.77	1.08	6.85
5			3.08	1.89	8.97
6			4.40	2.70	11.09
7	3.5	3.5	5.72	3.50	13.22
8			7.03	4.31	15.34
9			8.35	5.12	17.46
3			**	**	**
4			1.27	0.78	6.04
5			2.58	1.58	8.16
6			3.90	2.39	10.29
7			5.22	3.20	12.41
8			6.53	4.00	14.53
9			7.85	4.81	16.66

6.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	3.26	0.53	7.79
4			6.84	1.11	11.95
5			10.41	1.69	16.10
6			13.99	2.27	20.26
7			15.00	2.86	21.86
8			15.00	3.44	22.44
9			15.00	4.02	23.02
3			2.58	0.42	7.00
4			6.16	1.00	11.16
5	3.0	3.0	9.73	1.58	15.31
6			13.31	2.16	19.47
7			15.00	2.75	21.75
8			15.00	3.33	23.33
9			15.00	3.91	24.91
3			1.22	0.20	5.42
4			4.80	0.78	9.58
5			8.37	1.36	13.74
6			11.95	1.94	17.89
7	3.5	3.5	15.00	2.52	21.52
8			15.00	3.11	22.11
9			15.00	3.69	22.69
3			**	**	**
4			3.44	0.56	8.00
5			7.02	1.14	12.16
6			10.59	1.72	16.31
7			14.17	2.30	20.47
8			15.00	2.89	21.89
9			15.00	3.47	22.47

3.0 % GUTTER LINE PROFILE					
H INCHES	W FEET	Y INCHES	X <sub>20</sub> FEET	X <sub>21</sub> FEET	L <sub>2</sub> FEET
3	2.75	2.75	1.42	0.67	6.09
4			2.99	1.41	8.39
5			4.55	2.14	10.69
6			6.11	2.88	12.99
7			7.68	3.61	15.29
8			9.24	4.35	17.59
9			10.81	5.08	19.89
3			1.13	0.53	5.66
4			2.69	1.27	7.96
5	3.0	3.0	4.25	2.00	10.26
6			5.82	2.74	12.55
7			7.38	3.47	14.85
8			8.94	4.21	17.15
9			10.51	4.94	19.45
3			0.53	0.25	4.78
4			2.10	0.99	7.08
5			3.66	1.72	9.38
6			5.22	2.46	11.68
7	3.5	3.5	6.79	3.19	13.98
8			8.35	3.93	16.28
9			9.91	4.66	18.58
3			**	**	**
4			1.50	0.71	6.21
5			3.07	1.44	8.51
6			4.63	2.18	10.81
7			6.19	2.91	13.11
8			7.76	3.65	15.41
9			9.32	4.38	17.71

7.0 % GUTTER LINE PROFILE	
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LEGEND

	BREAKAWAY BARRICADES
	BREAKAWAY BARRICADES WITH SIGN
	CONSTRUCTION SIGNS
	DRUMS
	CONE
	CONSTRUCTION BARRIER CURB (TYPE SPECIFIED)
	DIRECTION OF TRAFFIC FLOW
	TRAFFIC DIRECTOR, FLAGGER
	TRAILER MOUNTED MOUNTED ARROW BOARD SHOWING CAUTION MODE
	ILLUMINATED FLASHING ARROW MOUNTED ON TOWING VEHICLE SHOWING ARROW PATTERN (LEFT, RIGHT, BOTH)
	TRAFFIC CONTROL TRUCK WITH MOUNTED CRASH CUSHION AND ARROW BOARD SHOWING CAUTION MODE
	TRAFFIC CONTROL TRUCK WITH MOUNTED CRASH CUSHION AND ARROW BOARD SHOWING ARROW PATTERN (LEFT, RIGHT, BOTH)
	TEMPORARY CRASH CUSHION, INERTIAL BARRIER SYSTEM
	TEMPORARY CRASH CUSHION, (ALL OTHER APPROVED)
	BUFFER ZONE
	WORK AREA
	PAINT STRIPING TRUCK OR OTHER OPERATING VEHICLE

GENERAL NOTES:

- ADVANCE WARNING SIGNS DISTANCES AND TAPER LENGTHS MAY BE EXTENDED, AT DIRECTION OF THE DEPARTMENT, TO ADJUST FOR REDUCED VISIBILITY DUE TO HORIZONTAL AND VERTICAL CURVATURE OF THE ROADWAY.
- THE APPROXIMATE LOCATIONS OF THE ILLUMINATED FLASHING ARROW BOARDS ARE SHOWN ON THE TRAFFIC CONTROL PLANS. THESE LOCATIONS MAY BE MODIFIED AS APPROVED BY RE TO ADJUST FOR VISIBILITY DUE TO HORIZONTAL OR VERTICAL CURVATURE OF THE ROADWAY OR TO POSITION AT A SAFER LOCATION. ILLUMINATED FLASHING ARROW BOARDS ARE TO BE USED FOR TEMPORARY LANE CLOSINGS AND AT LOCATIONS SHOWN ON THE TRAFFIC CONTROL PLANS.
- PRIOR TO ANY ROAD CONSTRUCTION, TRAFFIC CONTROL SIGNS AND DEVICES ARE TO BE IN PLACE.
- RAMPS AND/OR SIDE STREETS ENTERING THE ROADWAY AFTER THE FIRST ADVANCE WARNING SIGN ARE TO BE PROVIDED WITH AT LEAST ONE W20-IF SIGN (ROAD WORK AHEAD) AS A MINIMUM.
- ALL EXISTING ROAD SIGNS, PAVEMENT MARKINGS, AND / OR PLOWABLE PAVEMENT REFLECTORS WHICH CONFLICT WITH THE PROPOSED TRAFFIC CONTROL PLAN ARE TO BE COVERED, REMOVED, OR RELOCATED AS DIRECTED BY THE RE.
- CONFLICTING OR NON-OPERATING SIGNAL INDICATIONS ON EITHER THE EXISTING, TEMPORARY, OR PROPOSED TRAFFIC SIGNAL SYSTEMS ARE TO BE BAGGED OR COVERED.
- MAINTENANCE AND PROTECTION OF TRAFFIC TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES - PART VI STANDARDS AND GUIDES FOR TRAFFIC CONTROL FOR STREET AND HIGHWAY CONSTRUCTION, MAINTENANCE, UTILITY, AND INCIDENT MANAGEMENT OPERATIONS, UNLESS OTHERWISE NOTED IN THE PLANS AND SPECIFICATIONS.
- CONSTRUCTION SIGN W99-2 (GIVE US A BRAKE) TO BE LOCATED 200 FEET IN ADVANCE OF PROJECT LIMITS.
- A W1-6 (ARROW) SIGN MOUNTED ON A BREAKAWAY BARRICADE AND CENTERED ON THE CLOSED WIDTH TO BE LOCATED 100 FEET BEYOND EACH INTERSECTION OR MAIN ACCESS POINT WITHIN THE AREA OF A LANE OR SHOULDER CLOSURE.
- CONSTRUCTION SIGNS R11-4 (ROAD CLOSED TO THRU TRAFFIC) TO BE PLACED AT THE INTERSECTING STREETS WHICH ARE CLOSED TO TRAFFIC BECAUSE OF CONSTRUCTION.
- CONSTRUCTION SIGNS W8-9A (SYMBOL FOR UNEVEN PAVEMENT) AND W8-14A (GROOVED PAVEMENT) TO BE USED WHEN SUCH PAVEMENT CONDITIONS EXIST. THE PLACEMENT OF THESE SIGNS TO BE AS DIRECTED BY THE RE.
- MOVING WORK AREAS IN A LANE CLOSURE REQUIRE A TRAILER MOUNTED ILLUMINATED FLASHING ARROW TO REMAIN AT THE END OF THE TAPER, THE TRAFFIC CONTROL TRUCK WITH MOUNTED CRASH CUSHION THAT IS TO MOVE WITH THE WORK AREAS TO KEEP A 70 FEET MIN. AND 150 FEET MAX. BUFFER IN ADVANCE OF EACH WORK AREA.
- THE CONTRACTOR TO SUBMIT A PLAN FOR THE SAFE ACCESS OF CONSTRUCTION VEHICLES THROUGHOUT THE WORK SITE WHERE SPACE CONSTRAINTS PREVENT THE USE OF LANE CLOSURES. THE PLAN TO BE SUBMITTED TO THE RE AS SPECIFIED IN THE SPECIFICATIONS.
- BACKFILL ALL EXCAVATED AREAS WITHIN OR ADJACENT TO THE ROADWAY AND PLACE ON AT LEAST 6H:1V SLOPE BEFORE THE END OF EACH WORK DAY. OTHER EXCAVATED AREA WITHIN THE CLEAR ZONE ARE TO BE BACKFILLED.
- WHERE REQUIRED, THE CONTRACTOR IS TO MAKE PROVISIONS FOR MAINTAINING PEDESTRIAN CROSSING LOCATIONS AND TYPE AS DIRECTED BY THE RE.
- BITUMINOUS CONCRETE PLACED DURING THE VARIOUS CONSTRUCTION STAGES TO BE TRANSITIONED ON A MINIMUM 20H:1V SLOPE TO MEET THE ADJACENT EXISTING GRADE AT THE LONGITUDINAL AND TRANSVERSE LIMITS OF THE STAGE CONSTRUCTION AREAS UNLESS OTHERWISE NOTED ON THE STAGE CONSTRUCTION PLANS.
- THE PLACEMENT AND / OR RELOCATION OF CONSTRUCTION BARRIER CURB TO BE DONE DURING APPROVED OFF-PEAK HOURS WHEN TRAFFIC MAY BE REDUCED TO ONE LANE IN EACH DIRECTION.
- CONSTRUCTION ZONE SPEED LIMIT WILL BE DETERMINED BY THE BUREAU OF TRAFFIC ENGINEERING, REGIONAL TRAFFIC ENGINEER - WORK ZONE, AT THE TIME OF OR DURING CONSTRUCTION, AS REQUESTED BY THE RE.
- THE SPEED LIMIT, R2-1 (BLACK ON WHITE) WITH ADDED WORK ZONE PLATE (BLACK ON ORANGE) SIGNS TO BE LOCATED THROUGH WORK AREAS AS DIRECTED BY THE BUREAU OF TRAFFIC ENGINEERING, REGIONAL TRAFFIC ENGINEER - WORK ZONE.
- THE REDUCED SPEED AHEAD SIGN, W3-5(3) (BLACK ON ORANGE) TO BE LOCATED IN ADVANCE OF SPEED LIMIT R2-1 SIGNS WHICH REDUCE THE NORMAL POSTED SPEED LIMIT THROUGH THE CONSTRUCTION ZONE.
- TRAFFIC FINES DOUBLED IN WORK AREA R(N)5-17(8), 4 FEET BY 2.5 FEET SIGN TO BE LOCATED 500 FEET AFTER THE FIRST ADVANCE WARNING SIGN, (W20 SERIES) AT EACH WORK AREA LOCATED WITHIN URBAN AREAS. THIS SIGN TO ALSO BE USED ON PROJECTS REQUIRING MOVING OPERATIONS IN WHICH CASE THE SIGN IS TO BE MOUNTED ON A SLOW MOVING CONSTRUCTION VEHICLE.
- DO NOT CONSTRUCT THE FINAL HMA SURFACE PAVEMENT UNTIL THE FINAL STAGE OF THE PROJECT UNLESS OTHERWISE DIRECTED BY THE RE OR INDICATED ON THE PLANS. SET MANHOLES AND INLETS TO FINISHED GRADE AND CONSTRUCT TEMPORARY PAVEMENT RAMPS AROUND THEM WITH A MINIMUM 20H:1V SLOPE IN ALL DIRECTIONS USING HOT MIX ASPHALT PAVEMENT. THIS TEMPORARY MATERIAL WILL BE REMOVED IMMEDIATELY PRIOR TO PLACING THE SURFACE COURSE.

- PLACE TRAFFIC CONTROL DEVICES FOR LANE CLOSURES INCLUDING SIGNS, CONES, BARRICADES, ETC. AS SHOWN ON PLANS. NO SIGNS ARE TO BE PLACED WITHOUT ACTUAL LANE CLOSURES AND REMOVE IMMEDIATELY UPON REMOVAL OF THE CLOSURES.
- CONES MAY BE SUBSTITUTED FOR DRUMS AND INSTALLED UPON THE APPROVAL OF THE RE.
- TRAFFIC IMPACT NOTICES AND CHANGES

A. TERMS:  
WHEN THE FOLLOWING TERMS ARE USED, THE INTENT AND MEANING IS AS FOLLOWS:

I. IMPACTS TO NORMAL TRAFFIC FLOW - WORK THAT REQUIRES A PORTION OF THE PAVED ROADWAY BEING BLOCKED OR CLOSED WITH SAFETY DEVICES OR VEHICLES, INCLUDING, BUT NOT LIMITED TO, FULL OR PARTIAL LANE CLOSURES, FULL OR PARTIAL RAMP CLOSURES, SHOULDER CLOSURES, MOVING OPERATIONS SUCH AS TRAFFIC STRIPING OR SWEEPING, LANE SHIFTS, OR ALTERNATING TRAFFIC. THIS APPLIES EVEN WHEN DETOURS ARE PROVIDED.

II. TEMPORARY LANE CLOSURES - WORK DESCRIBED UNDER "IMPACTS TO NORMAL TRAFFIC FLOW" WHICH IS ROUTINELY SET UP AND REMOVED ON A DAILY BASIS.

III. PERMANENT LANE CLOSURES - WORK DESCRIBED UNDER "IMPACTS TO NORMAL TRAFFIC FLOW" WHICH REMAINS IN PLACE CONTINUOUSLY FOR 24 HOURS OR MORE.

B. ADVANCE NOTICES

FOR THE INITIAL START OF WORK THAT REQUIRES "IMPACTS TO NORMAL TRAFFIC FLOW", THE CONTRACTOR IS TO NOTIFY THE RE IN WRITING, ON THE ADVANCE FORM TO-103 PROVIDED BY THE DEPARTMENT, OF THE PROPOSED DATE. THE NOTICE IS TO BE SUBMITTED AT LEAST TWENTY-EIGHT CALENDAR DAYS, BUT NOT MORE THAN SIXTY CALENDAR DAYS, BEFORE THE PROPOSED DATE. START OF WORK THAT IMPACTS NORMAL TRAFFIC FLOW WILL NOT BE PERMITTED PRIOR TO THE DATE STATED IN THE NOTICE. THE CONTRACTOR IS TO CONFIRM, IN WRITING TO THE RE, THE PROPOSED DATE SEVEN (AND/OR FOURTEEN) CALENDAR DAYS BEFORE STARTING THE ESTABLISHMENT OF THE TRAFFIC CONTROL MEASURES FOR THE TRAFFIC IMPACT. THE CONTRACTOR IS TO IMMEDIATELY NOTIFY THE RE IF THE PROPOSED ESTABLISHMENT CANNOT BE COMPLETED ON THE PROPOSED DATE.

FOR A "PERMANENT LANE CLOSURE", THE CONTRACTOR IS TO NOTIFY THE RE IN WRITING, ON ADVANCE FORM TO-103, OF THE PROPOSED DATE A NEW TRAFFIC PATTERN WILL BE ESTABLISHED. THE NOTICE IS TO BE SUBMITTED AT LEAST TWENTY-EIGHT CALENDAR DAYS, BUT NOT MORE THAN SIXTY CALENDAR DAYS, IN ADVANCE OF THE PROPOSED DATE. START OF A NEW TRAFFIC PATTERN WILL NOT BE PERMITTED PRIOR TO THE DATE STATED IN THE NOTICE. THE CONTRACTOR IS TO CONFIRM, IN WRITING TO THE RE, THE PROPOSED DATE OF THE NEW TRAFFIC PATTERN SEVEN (AND/OR FOURTEEN) DAYS BEFORE STARTING TRAFFIC CONTROL MEASURES FOR THE ESTABLISHMENT OF THE NEW PATTERN. THE CONTRACTOR IS TO IMMEDIATELY NOTIFY THE RE IF THE PROPOSED ESTABLISHMENT CANNOT BE COMPLETED ON THE PROPOSED DATE.

STARTING THE ESTABLISHMENT OF A NEW PERMANENT TRAFFIC PATTERN IS TO BEGIN NO EARLIER THAN 11:00 PM FRIDAY AND BE COMPLETED AND READY FOR OPERATIONS BY 6:00 PM THE FOLLOWING SUNDAY. THE ESTABLISHMENT IS TO BE COMPLETED IN ACCORDANCE WITH THE LANE CLOSURE HOURS SPECIFIED IN THE CONTRACT.

ADVANCE NOTICES SENT PRIOR TO THE PRE-CONSTRUCTION MEETING ARE TO BE ADDRESSED TO THE CONTACT PERSON AS SPECIFIED IN SUBSECTION 101.04 OF THE SPECIAL PROVISIONS.

C. PROGRESS NOTICES

ALL "IMPACTS TO NORMAL TRAFFIC FLOW" SCHEDULED FOR THE SEVEN DAY PERIOD STARTING ON THE FOLLOWING MONDAY ARE TO BE SUBMITTED TO THE RE BY 9:00 AM OF EACH FRIDAY ON WEEKLY FORM TO-100 PROVIDED BY THE DEPARTMENT.

EACH DAY OF "TEMPORARY LANE CLOSURES" ARE TO BE SUBMITTED TO THE RE BY 9:00 AM THE DAY IN ADVANCE OF THE START OF THOSE OPERATIONS ON DAILY FORM TO-101 PROVIDED BY THE DEPARTMENT.

"TEMPORARY LANE CLOSURES" FOR WEEKENDS ARE TO BE SUBMITTED TO THE RE BY 9:00 AM ON THE IMMEDIATELY PRECEDING FRIDAY ON THE DAILY FORM TO-101 PROVIDED BY THE DEPARTMENT.

D. CHANGES TO THE SCHEDULED CLOSURES

REQUEST FOR A CHANGE TO THE TRAFFIC CONTROL REQUIREMENTS IN THE CONTRACT DOCUMENTS ARE TO BE SUBMITTED IN WRITING TO THE RE AS FOLLOWS:

CHANGES TO THE SCHEDULED HOURS FOR "TEMPORARY LANE CLOSURES" ARE TO BE SUBMITTED TO THE RE AT LEAST EIGHT CALENDAR DAYS IN ADVANCE OF WHEN THE CHANGE IS PROPOSED TO START.

OTHER PROPOSED CHANGES TO "TEMPORARY LANE CLOSURES" AND ALL CHANGES TO "PERMANENT LANE CLOSURES" ARE TO BE SUBMITTED TO THE RE AS SPECIFIED IN THE SPECIFICATIONS.

- WHERE MILLING OR HMA PAVING IS PERFORMED AND THE LANE IS TO BE RE-OPENED TO TRAFFIC EACH DAY, APPLY TEMPORARY TRAFFIC STRIPES.

NOTE TO DESIGNER:

THIS SHEET REQUIRES DESIGN SPECIFIC INFORMATION TO BE ADDED AND INCLUDED IN THE CONTRACT PLANS.

REMOVE THIS NOTE AFTER DESIGN SPECIFIC INFORMATION IS ADDED.

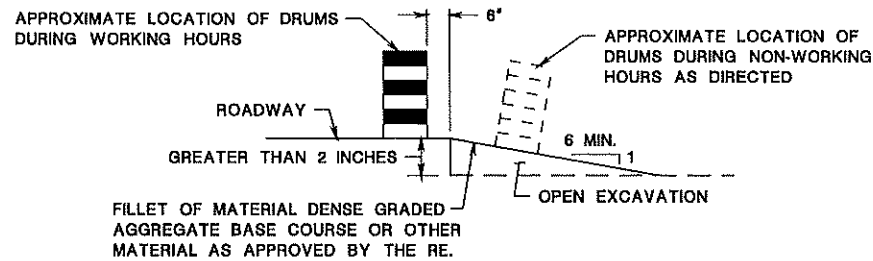
TCD-1

NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL DETAILS

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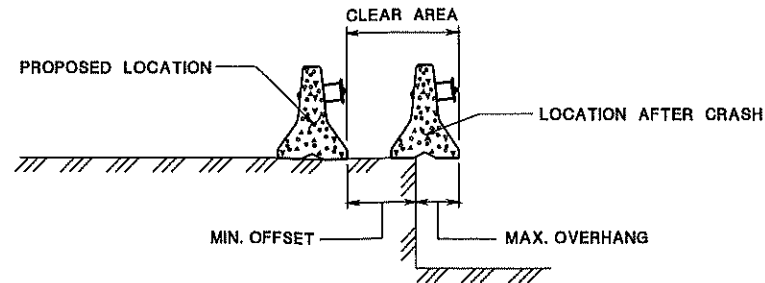
**NOTE:**  
ESCAPE RAMPS MUST BE CONSTRUCTED AND MAINTAINED DURING NON-WORKING HOURS WHERE A VERTICAL DROP GREATER THAN 2 INCHES EXISTS ADJACENT TO TRAVELED LANE.

#### ESCAPE RAMP DETAIL

REGULATORY APPROACH SPEED OF TRAFFIC MILES/HOUR	RECOMMENDED SIGHT DISTANCE TO BEGINNING OF CHANNELIZING TAPERS		
	DESIRABLE		MINIMUM
	RURAL FEET	URBAN FEET	RURAL AND URBAN FEET
25	375	525	150
30	450	625	200
35	525	725	250
40	600	825	325
45	675	925	400
50	750	1025	475
55	875	1150	550
60	1000	1275	650
65	1050		725

#### NOTES:

- AVOIDANCE MANEUVER IS FOR A SPEED, PATH, AND / OR DIRECTION CHANGE PRIOR TO THE BEGINNING OF CHANNELIZING TAPERS.
- RECOMMENDED DISTANCES BETWEEN TWO SEPARATE LANE CLOSURES ARE DOUBLE THE VALUES SHOWN ABOVE.
- RURAL AND URBAN ROAD DESIGNATIONS ARE AS DEFINED IN THE NJDOT STATE HIGHWAY STRAIGHT LINE DIAGRAMS.
- PROVIDE DESIRABLE VALUES WHEREVER POSSIBLE. IF IT IS NOT FEASIBLE OR PRACTICAL TO PROVIDE DESIRABLE VALUES BECAUSE OF HORIZONTAL OR VERTICAL CURVATURE OR IF RELOCATION OF THE TAPER IS NOT POSSIBLE, THEN MINIMUM VALUES CAN BE APPLIED. WHEN MINIMUM VALUES ARE USED, PAY SPECIAL ATTENTION TO THE USE OF SUITABLE TRAFFIC CONTROL DEVICES WHEN PROVIDING ADVANCED WARNING OF THE CONDITIONS THAT ARE LIKELY TO BE ENCOUNTERED.
- LOCATE TAPERS TO MAXIMIZE THE VISIBILITY OF THEIR TOTAL LENGTH.



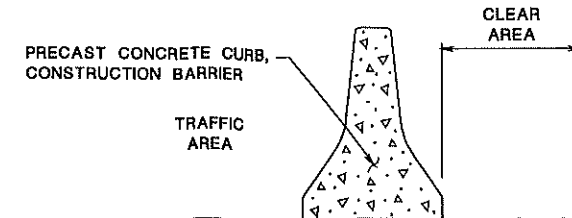
#### OPTIONAL CONNECTION TYPE B TREATMENT AT VERTICAL DROP OFF

STAGE	LOCATION	CONNECTION TYPE
	RTE. STA. TO STA.	

CONNECTION TYPE	MIN. OFFSET	MAX. OVERHANG	CLEAR AREA
B	12"	16"	28"

RECOMMENDED TAPER LENGTH AND SPACING FOR CHANNELIZING TAPERS					RECOMMENDED SPACING ALONG TANGENTS	
REGULATORY APPROACH SPEED OF TRAFFIC  MILES /HOUR	MINIMUM TAPER RATIO IN LENGTH PER FOOT OF WIDTH	MINIMUM TAPER LENGTH L – FOR LANE WIDTHS			MAXIMUM DEVICE (B) SPACING ALONG TAPERS IN FEET	MAXIMUM DEVICE (D) SPACING ALONG TANGENTS IN FEET
		10'	11'	12'		
25	10.5:1	105	115	125	25	50
30	15:1	150	165	180	30	60
35	20.5:1	205	225	245	35	70
40	27:1	270	300	325	40	80
45	45:1	450	495	540	45	90
50	50:1	500	550	600	50	100
55	55:1	550	605	660	55	110
60	60:1	600	660	720	60	120
65	65:1	650	715	780	65	130

**NOTE:**  
THE MAXIMUM DEVICE SPACING ALONG CURVES IS DEFINED FOR TAPERS (B) IN THE ABOVE TABLE.



#### NOTES:

- CHANGES TO THE PROPOSED CONNECTION TYPE AT ANY LOCATION MUST BE APPROVED BY THE DEPARTMENT.
- NO ROADWAY DROP OFFS, OBSTRUCTIONS, STORAGE OF MATERIALS, OR WORK WILL BE PERMITTED IN THE CLEAR AREA UNLESS APPROVED BY THE RE. EXCEPT ROADWAY DROP OFFS ARE PERMITTED ONLY WHEN USING THE OPTIONAL CONNECTION TYPE B TREATMENT AT VERTICAL DROP OFF.

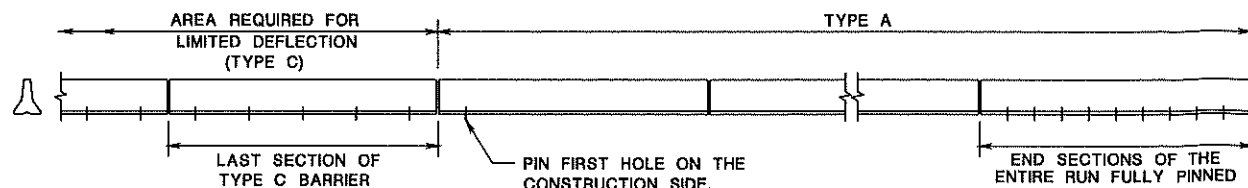
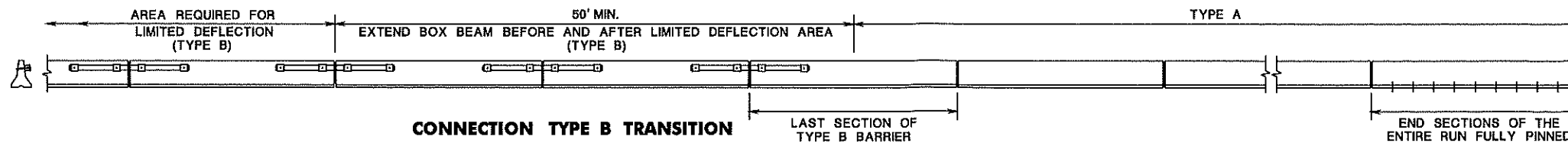
STAGE	LOCATION	CONNECTION TYPE
	RTE. STA. TO STA.	

CONNECTION TYPE	CLEAR AREA
A	41 INCHES
B	28 INCHES
C	11 INCHES

#### CONSTRUCTION BARRIER CURB CONNECTION TYPE AND CLEAR AREA

#### NOTE TO DESIGNER:

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REMOVE THIS NOTE AFTER DESIGN SPECIFIC INFORMATION IS ADDED.



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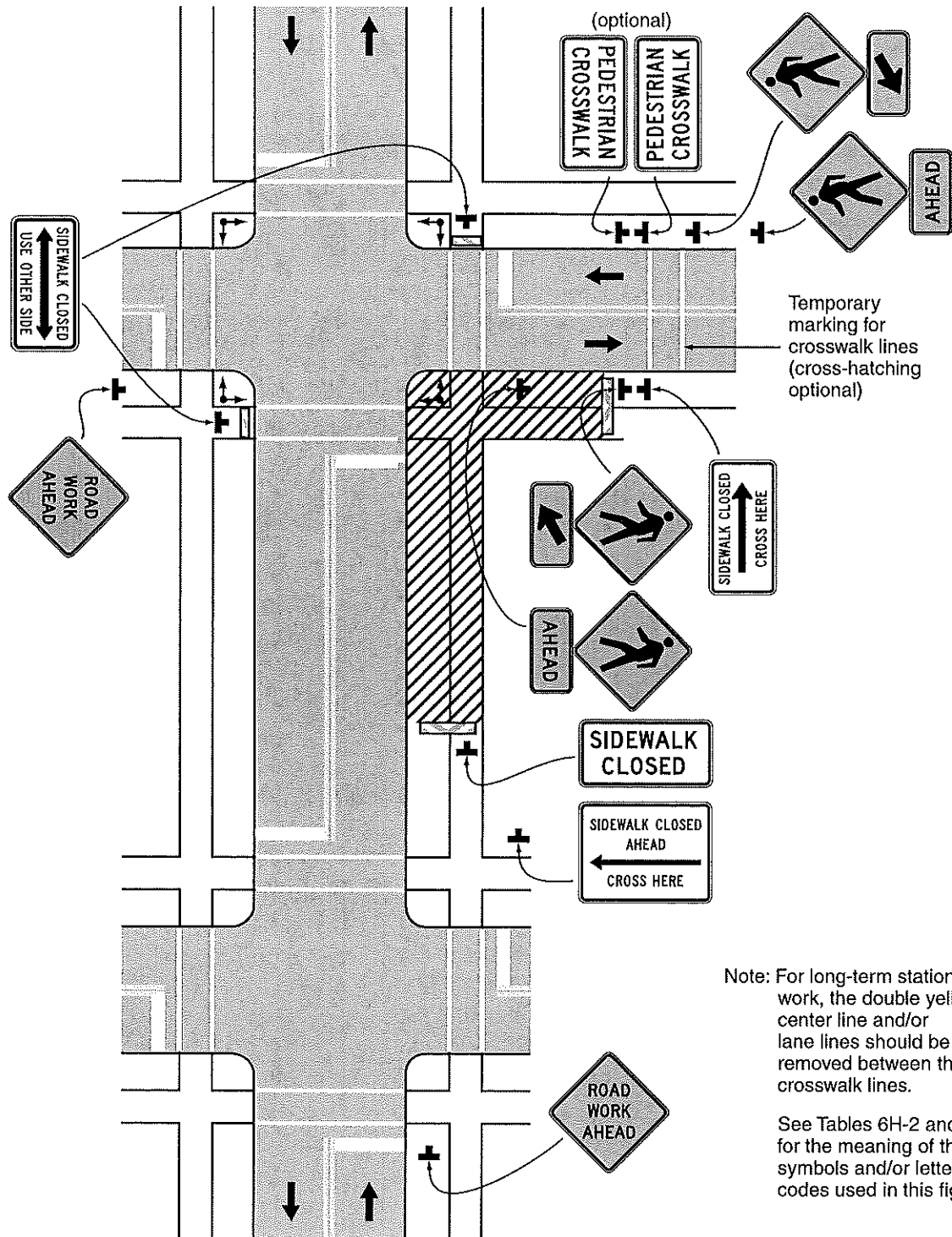
TCD-2

NEW JERSEY DEPARTMENT OF TRANSPORTATION

#### TRAFFIC CONTROL DETAILS





**Figure 6H-29. Crosswalk Closures and Pedestrian Detours (TA-29)****Typical Application 29**