

Tc SUPERSEDED BY EC 11-018 EFFECTIVE 9/21/11 S10-60 EI		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 09-015
Title: STANDARD SPECIFICATIONS §729-15 ARROW PANELS AND §729-16 PORTABLE VARIABLE-MESSAGE SIGNS			
Distribution: ☒ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32)		☐ Surveyors (33) ☒ Consultants (24) ☒ Contractors (39) ☐ _____ Approved:  James F. Tynan, P.E. Deputy Chief Engineer (Construction) 5-8-09 Date	

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective upon signature.
- This EI does not supersede any other issuance.
- The revisions issued with this EI will be incorporated into a future update of the Standard Specifications.

PURPOSE:

- The purpose of this EI is to issue minor revisions to Standard Specification §729-15 Arrow Panels and §729-16 Portable Variable-Message Signs.

TECHNICAL INFORMATION:

- MP 08-02 *Materials Procedure for Obtaining Approved List Acceptance for §729-15 Arrow Panels and §729-16 Portable Variable-Message Signs* is being issued concurrently via EB 09-002.
- Some specific Manual of Uniform Traffic Control Devices (MUTCD) requirements were removed from the specification and replaced with a reference to the MUTCD.
- AASHTO National Transportation Product Evaluation Program (NTPEP) testing performance requirements are being added as an objective standard for evaluation of devices.
- Contractors/Suppliers may place a non-retroreflective logo or name and telephone number on the back of the arrow panel/portable variable-message sign or on its trailer.
- Portable variable-message sign controls shall be located in a lockable compartment.
- This revision should have no significant cost impact.

IMPLEMENTATION:

- Main Office Design Quality Assurance Bureau will insert the standard specification shelf note beginning with projects submitted for the letting of 09/03/09.
- This issuance applies to on-going construction contracts and those contracts let prior to the inclusion of the shelf note in the contract proposal. Engineers-in-Charge should provide a copy of this EI to the contractor and file a copy of this EI in the contract records as documentation of the change in accordance with the Contract Administration Manual (CAM) §104-02.

BACKGROUND:

Standard Specifications Section 729 *Temporary Traffic Control Devices* was issued via EI 07-001. Major revisions to Standard Specification Section 619 Work Zone Traffic Control were issued via EI 07-006. The previous version of §729-15 and §729-16 based acceptance on an Approved List. When the Department reviewed the data submitted to establish the Approved List, it was determined that only a few models met the requirements for PVMS legibility distance. This would have made a significant number of units owned by contractors unusable. In order to provide appropriate units and to allow contractors to continue to use units they already own, the specification was modified to allow a shorter legibility distance when used on highways with lower speed limits. This is in conformance with the MUTCD, which has requirements to display a series of messages for a minimum time interval, which in effect establishes a legibility distance requirement based on speed.

CONTACT:

Direct questions regarding this EI to Tom Melander, Office of Construction, via e-mail (TMelander@dot.state.ny.us) or at (518) 457-6472.

TEMPORARY TRAFFIC CONTROL DEVICES

Make the following changes to the Standard Specifications of May 4, 2006, as modified by EI 07-001.

Pages 7 through 9 of 10 **Delete** §729-15 *Arrow Panels* and §729-16 *Portable Variable-Message Signs* and **Replace** them with the following:

729-15 ARROW PANELS

SCOPE. This specification covers the material and performance requirements for arrow panels. Arrow panels are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Arrow panels shall be signs with a matrix of illuminated elements capable of either flashing or sequential arrow displays that meets the requirements of the MUTCD. Arrow panels shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment.

Arrow panels shall not bear any advertising message or any other message that is not related to traffic control. A nonretroreflective logo or name and telephone number of the contractor or supplier may be located on the back of the arrow panel or on the arrow panel trailer. The logo shall not exceed 0.1 m². The name and telephone number shall not exceed 50 mm in height. The rear face of the arrow panel shall contain one or more clear lamp(s) to indicate that the arrow board is operating properly.

Truck-Mounted Series B. Arrow panels consist of a 1500 mm x 750 mm rectangular panel mounted at a minimum of 1.5 m above the roadway. The arrow display shall be legible at a minimum distance of 1200 m on a bright, sunny day or a clear night when the sight line is unobstructed.

Trailer-Mounted or Truck-Mounted Series C. Arrow panels consist of a 2400 mm x 1200 mm rectangular panel mounted at a minimum of 2.1 m above the roadway for trailer mounted arrow panels and 1.5 m above the roadway for truck mounted arrow panels. Arrow panels shall be powered by self-contained engine-driven generator systems, capable of energizing the arrow displays for 72 hours unattended and shall be capable of being powered by 110V AC supply; solar-powered, capable of energizing the arrow displays continuously for 21 days unattended; or powered by a truck. Arrow panel operation controls shall be mounted in a lockable enclosure. The arrow display shall be legible at a minimum distance of 1600 m on a bright, sunny day or a clear night when the sight line is unobstructed.

TESTING. Manufacturers or material suppliers desiring to have Truck-Mounted Series B arrow panels considered for inclusion on the Approved List shall submit a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days.

Manufacturers or material suppliers desiring to have Trailer-Mounted or Truck-Mounted Series C arrow panels considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director of the Materials Bureau in Albany for initial field testing. Field testing will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days.

TEMPORARY TRAFFIC CONTROL DEVICES

BASIS OF APPROVAL. Truck-Mounted Series B arrow panels meeting the requirements of this specification and having satisfactory initial field test results will be placed on the Approved List.

Trailer-Mounted or Truck-Mounted Series C arrow panels meeting the requirements of this specification and satisfactory initial field test results, as well as satisfactory NTPEP test results will be placed on the Approved List. Trailer-Mounted or Truck-Mounted Series C arrow panels for which NTPEP test results have not been submitted may be provisionally placed on the Approved List for a maximum of one year. Arrow panels on the Approved List that have repeated poor evaluations will be removed from the Approved List.

BASIS OF ACCEPTANCE. Arrow panels will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

729-16 PORTABLE VARIABLE-MESSAGE SIGNS (PVMS)

SCOPE. This specification covers the material and performance requirements for variable-message signs. Variable-message signs are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Portable variable-message signs (PVMS) shall meet the requirements of the MUTCD and be tested by the AASHTO National Transportation Product Evaluation Program (NTPEP) demonstrating the PVMS meets the requirements of this specification and the MUTCD.

The PVMS shall be trailer mounted and equipped for use on public highways in accordance with NYS Vehicle and Traffic Law. The unit shall operate primarily from a solar-powered electrical system and shall be capable of energizing the message display for a minimum of 21 days without auxiliary charge. The electrical system shall consist of batteries and a solar array panel and on-board auxiliary charging system to enable the batteries to be recharged via a 110V AC connection.

The PVMS shall have a 3 line display with a minimum of 8 characters per line, and shall be capable of displaying 3 separate messages in a cyclical sequence. Characters shall be a minimum of 450 mm high. PVMS messages shall be legible from a distance of 275 m or more for highways with a posted pre-construction speed limit of 50 mph or greater. PVMS messages shall be legible from a distance of 200 m for highways with a posted pre-construction speed limit of 45 mph or less. PVMS shall not bear any advertising message or any other message that is not related to traffic control. A nonretroreflective logo or name and telephone number of the contractor or supplier may be located on the back of the PVMS or on the PVMS trailer. The logo shall not exceed 0.1 m². The name and telephone number shall not exceed 50 mm in height.

The PVMS shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment. The sign controller shall have programmable memory capable of storing messages pertinent to planned construction activities, including emergency messages. The controller shall be equipped with 14 day calendar programming capability, providing the ability to start and stop the display of a minimum of three (3) different messages on a repeating schedule without an operator present. The controller shall be capable of producing an accurate log of all messages and the times they were displayed. The controller shall have programmable messages, display rate, and display interval settings. The controller shall blank the sign if the output voltage drops below the manufacturer's recommended output level.

The PVMS shall be equipped with control software using a Microsoft Windows operating system. The Contractor shall supply the Engineer with two copies of operating instructions for the PVMS and the control software. Electronic copies of software instructions are acceptable.

A. Light-Emitting Diode (LED) Type. The LED type PVMS shall have light-emitting diodes arranged in arrays and the arrays shall be arranged in a matrix for each character to be 7 pixels high by 5 pixels wide. The LED display shall have the ability to display characters at a minimum height of 450 mm. The controller shall provide a means of dimming the pixels.

TEMPORARY TRAFFIC CONTROL DEVICES

B. Hybrid Flip-Disk Type. The hybrid, flip-disk type PVMS shall have pixels consisting of individual electromagnetic disks with at least two (2) high-output amber LEDs. The disk face shall be covered with yellow prismatic retroreflective sheeting or an approved equal. The PVMS shall operate using both flip-disk and light-emitting diode (LED) during nighttime and low-light periods. The hybrid flip disk type shall be arranged in a matrix of 7 disks high by 5 disks wide for each character.

C. Cellular Communications Option. The PVMS with cellular communications shall be equipped with a cellular telephone with cellular service and a modem capable of remotely operating the control software. The phone numbers for PVMS on a contract shall be sequential whenever possible to facilitate remote control of multiple devices. The unit shall accept a land line telephone connection mode without rewiring or modification.

D. Radar Option. The PVMS with radar shall be equipped with a radar speed detection option, providing the system with the ability to determine the speed of an approaching vehicle and interrupt the programmed sequence with a special default message displaying the vehicle's speed. The unit shall collect and store vehicle speed data for retrieval.

E. NTCIP Communication Protocol Option. PVMS units that will be operated by the Department, typically from a Transportation Management Center (TMC), shall be equipped with communications and control systems that are National Transportation Communications for ITS Protocol (NTCIP) compliant.

TESTING. Manufacturers or material suppliers desiring to have PVMS considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the PVMS conforms to this specification and the requirements of the MUTCD, and provide a PVMS to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of PVMS operation during various light conditions for brightness, legibility, and angularity. The initial testing process requires a minimum of 30 calendar days.

BASIS OF APPROVAL. PVMS meeting the specification, having satisfactory NTPEP test results, and having satisfactory initial field test results will be placed on the Approved List.

PVMS meeting the specification and having satisfactory initial field test results, that do not have NTPEP test results may be provisionally placed on the Approved List for a maximum of one year. PVMS on the approved list that have repeated poor evaluations will be removed from the Approved List.

BASIS OF ACCEPTANCE. PVMS will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

TEMPORARY TRAFFIC CONTROL DEVICES

Make the following changes to the Standard Specification of May 1, 2008.

Pages 1027 and 1028 **Delete** §729-15 Arrow Panels and §729-16 Portable Variable-Message signs and **Replace** it with the following:

729-15 ARROW PANELS

SCOPE. This specification covers the material and performance requirements for arrow panels. Arrow panels are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Arrow panels shall be signs with a matrix of illuminated elements capable of either flashing or sequential arrow displays that meets the requirements of the MUTCD. Arrow panels shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment.

Arrow panels shall not bear any advertising message or any other message that is not related to traffic control. A nonretroreflective logo or name and telephone number of the contractor or supplier may be located on the back of the arrow panel or on the arrow panel trailer. The logo shall not exceed 1 square foot. The name and telephone number shall not exceed 2 inch height. The rear face of the arrow panel shall contain one or more clear lamp(s) to indicate that the arrow board is operating properly.

Truck-Mounted Series B. Arrow panels consist of a 60 inch x 30 inch rectangular panel mounted at a minimum of 5 feet above the roadway. The arrow display shall be legible at a minimum distance of 3/4 mile on a bright, sunny day or a clear night when the sight line is unobstructed.

Trailer-Mounted or Truck-Mounted Series C. Arrow panels consist of a 96 inch x 48 inch rectangular panel mounted at a minimum of 7 feet above the roadway for trailer mounted arrow panels and 5 feet above the roadway for truck mounted arrow panels. Arrow panels shall be powered by self-contained engine-driven generator systems, capable of energizing the arrow displays for 72 hours unattended and shall be capable of being powered by 110V AC supply; solar-powered, capable of energizing the arrow displays continuously for 21 days unattended; or powered by a truck. Arrow panel operation controls shall be mounted in a lockable enclosure. The arrow display shall be legible at a minimum distance of 1.0 mi on a bright, sunny day or a clear night when the sight line is unobstructed.

TESTING. Manufacturers or material suppliers desiring to have Truck-Mounted Series B arrow panels considered for inclusion on the Approved List shall submit a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days.

Manufacturers or material suppliers desiring to have Trailer-Mounted or Truck-Mounted Series C arrow panels considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the arrow panel conforms to this specification and the requirements of the MUTCD, and provide an arrow panel to the Director of the Materials Bureau in Albany for initial field testing. Field testing will include evaluation of arrow panel operation during various light conditions for brightness, legibility, and angularity. The review process requires a minimum of 30 calendar days.

TEMPORARY TRAFFIC CONTROL DEVICES

BASIS OF APPROVAL. Truck-Mounted Series B arrow panels meeting the requirements of this specification and having satisfactory initial field test results will be placed on the Approved List.

Trailer-Mounted or Truck-Mounted Series C arrow panels meeting the requirements of this specification and satisfactory initial field test results, as well as satisfactory NTPEP test results will be placed on the Approved List. Trailer-Mounted or Truck-Mounted Series C arrow panels for which NTPEP test results have not been submitted may be provisionally placed on the Approved List for a maximum of one year. Arrow panels on the Approved List that have repeated poor evaluations will be removed from the Approved List.

BASIS OF ACCEPTANCE. Arrow panels will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

729-16 PORTABLE VARIABLE-MESSAGE SIGNS (PVMS)

SCOPE. This specification covers the material and performance requirements for variable-message signs. Variable-message signs are defined by NCHRP 350 as a Category IV device.

MATERIAL REQUIREMENTS. Portable variable-message signs (PVMS) shall be tested by the National Transportation Product Evaluation Program (NTPEP) of the American Association of State and Highway Transportation Officials (AASHTO) demonstrating the arrow panel meets the requirements of this specification and the MUTCD. The PVMS shall be trailer mounted and equipped for use on public highways in accordance with NYS Vehicle and Traffic Law. The unit shall operate primarily from a solar-powered electrical system and shall be capable of energizing the message display for a minimum of 21 days without auxiliary charge. The electrical system shall consist of batteries and a solar array panel and on-board auxiliary charging system to enable the batteries to be recharged via a 110V AC connection.

The PVMS shall have a 3 line display with a minimum of 8 characters per line, and shall be capable of displaying 3 separate messages in a cyclical sequence. Characters shall be a minimum of 18 inches high. PVMS messages shall be legible from a distance of 900 feet or more in advance of the PVMS on highways with a posted pre-construction speed limit of 50 mph or greater. PVMS messages shall be legible from a distance of 680 feet or more in advance of the PVMS on highways with a posted pre-construction speed limit of 45 mph or less. PVMS shall not bear any advertising message or any other message that is not related to traffic control. A nonretroreflective logo or name and telephone number of the contractor or supplier may be located on the back of the PVMS or on the PVMS trailer. The logo shall not exceed 1 square foot. The name and telephone number shall not exceed 1/2 inch in height.

The PVMS shall be equipped with a sign control console, mounted in a lockable, weather-resistant compartment. The sign controller shall have programmable memory capable of storing messages pertinent to planned construction activities, including emergency messages. The controller shall be equipped with 14 day calendar programming capability, providing the ability to start and stop the display of a minimum of three (3) different messages on a repeating schedule without an operator present. The controller shall be capable of producing an accurate log of all messages and the times they were displayed. The controller shall have programmable messages, display rate, and display interval settings. The controller shall blank the sign if the output voltage drops below the manufacturer's recommended output level.

The PVMS shall be equipped with control software using a Microsoft Windows operating system. The Contractor shall supply the Engineer with two copies of operating instructions for the PVMS and the control software. Electronic copies of software instructions are acceptable.

A. Light-Emitting Diode (LED) Type. The LED type PVMS shall have light-emitting diodes arranged in arrays and the arrays shall be arranged in a matrix for each character to be 7 pixels high by 5 pixels wide. The LED display shall have the ability to display characters at a minimum height of 18 inches. The controller shall provide a means of dimming the pixels.

TEMPORARY TRAFFIC CONTROL DEVICES

B. Hybrid Flip-Disk Type. The hybrid, flip-disk type PVMS shall have pixels consisting of individual electromagnetic disks with at least two (2) high-output amber LEDs. The disk face shall be covered with yellow prismatic retroreflective sheeting or an approved equal. The PVMS shall operate using both flip-disk and light-emitting diode (LED) during nighttime and low-light periods. The hybrid flip disk type shall be arranged in a matrix 7 disks high by 5 disks wide for each character at a minimum height of 18 inches.

C. Cellular Communications Option. The PVMS with cellular communications shall be equipped with a cellular telephone with cellular service and a modem capable of remotely operating the control software. The phone numbers for PVMS on a contract shall be sequential whenever possible to facilitate remote control of multiple devices. The unit shall accept a land line telephone connection mode without rewiring or modification. PVMS units with cellular communications shall be equipped with communications and control systems that are National Transportation Communications for ITS Protocol (NTCIP) compliant.

D. Radar Option. The PVMS with radar shall be equipped with a radar speed detection option, providing the system with the ability to determine the speed of an approaching vehicle and interrupt the programmed sequence with a special default message displaying the vehicle's speed. The unit shall collect and store vehicle speed data for retrieval.

E. NTCIP Communication Protocol Option. PVMS units that will be operated by the Department, typically from a Transportation Management Center (TMC) shall be equipped with communications and control systems that are National Transportation Communications for ITS Protocol (NTCIP) compliant.

TESTING. Manufacturers or material suppliers desiring to have PVMS considered for inclusion on the Approved List shall submit test results from the AASHTO National Transportation Product Evaluation Program (NTPEP), a material certification that the PVMS conforms to this specification and the requirements of the MUTCD, and provide a PVMS to the Director, Materials Bureau in Albany for initial field testing. Field testing will include evaluation of PVMS operation during various light conditions for brightness, legibility, and angularity. The initial testing process requires a minimum of 30 calendar days.

BASIS OF APPROVAL. PVMS meeting the specification, having satisfactory NTPEP test results, and having satisfactory initial field test results will be placed on the Approved List.

PVMS meeting the specification and having satisfactory initial field test results, that do not have NTPEP test results may be provisionally placed on the Approved List for a maximum of one year. PVMS on the approved list that have repeated poor evaluations will be removed from the Approved List.

BASIS OF ACCEPTANCE. PVMS will be accepted on the basis of the product appearing on the Approved List and a material certification that the product meets this specification and is the same as the one appearing on the Approved List.

Received: ___/___/___

Responded: ___/___/___

(EIS Administration, only)

CRITICAL ISSUANCE JUSTIFICATION

☒ EB or ☒ EI

Proposed Topic:

15
EI 09-00x **STANDARD SPECIFICATIONS
§729-15 ARROW PANELS AND §729-16 PORTABLE VARIABLE-MESSAGE SIGNS**

EB 09-002 **MATERIALS PROCEDURE MP 08-02 PROCEDURE FOR OBTAINING APPROVED
LIST ACCEPTANCE FOR §729-15 Arrow Panels and §729-16 Portable Variable-Message Signs**

Request for "Critical" Determination

Clearance review is implementing a change which is (check appropriate box):

- ☐ Necessitated by a legal issue or mandate
- ☐ Addresses a critical safety issue
- ☐ Produces significant cost savings
- ☒ Is a process change needed to deliver economic recovery projects
- ☐ Is a directive of Executive Management

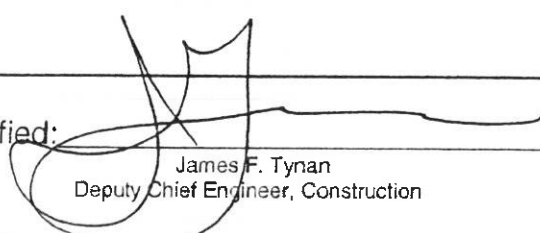
Explanation: Please give a brief description of how/why your issuance meets the above criteria.

The EI contains revised specifications for Arrow Panels and PVMS. EI 07-001, issued in January 2007 and effective with Lettings of September 2007 issued a new Standard Specification for PVMS and Arrow Panels that included an Approved List. When the Materials Procedure to evaluate these devices was drafted, it became apparent that many of the PVMS currently owned by Contractors do not meet the current material requirements of Section 729.

The revised Standard Specifications will create a 2 tiered specification, which will result in 8 models of PVMS being placed on the Approved List for use in higher speed applications permanently, 6 models being placed on the list provisionally, and 22 models being placed on the Approved List for use only in lower speed applications. The Arrow Panel specification was revised for consistency, as both items are tested and approved in a similar manner.

Without this modification of the Standard Specifications, the Approved List will have to be posted with only 4 PVMS Models, which will cause rejection of any unit that is not on the Approved List for use on any contract let since September 2007. Contractors would have to replace significant numbers of devices, which are not readily available. This would have a significant negative impact on the industry's ability to deliver the capital program.

☒ Justified / ☐ Not Justified:


James F. Tynan
Deputy Chief Engineer, Construction

Date: 4-8-09



**MEMORANDUM
DEPARTMENT OF TRANSPORTATION**

TO: Regional Construction Engineers, Regions 1-11
Regional Design Engineers, Regions 1-11
Regional Traffic Engineers, Regions 1-11
Regional Transportation System Operators, Regions 1-11
G. Christian, Office of Structures, Pod 43
R. Sack, Office of Technical Services, Pod 33
D. D'Angelo, Office of Design, Pod 23
R. Selover, Office of Transportation Systems Maintenance, Pod 51
D. Clements, Traffic Safety and Mobility, Pod 42
J. Rondinaro, Materials Bureau, Pod 33
C. Nusca, EIS Administrator, Pod 23
T. Herritt, FHWA, HDA-NY
C. Waite, NYS Thruway Authority, 200 So. Blvd., Albany, 12201
K. Morrison, AGC, 10 Airline Drive, Suite 203, Albany, NY 12205
D. Richardson, General Contractors Association, 60 E. 42nd Street, NY, NY 10165

FROM: J. Tynan, Office of Construction, 50 Wolf Rd, Pod 51 *Original signed by JFT*

**SUBJECT: Draft EI – UPDATED STANDARD SPECIFICATIONS §729-15 ARROW PANELS AND
§729-16 PORTABLE VARIABLE-MESSAGE SIGNS**

DATE: December 9, 2008

Attached is a draft Engineering Instruction issuing minor changes and ensuring consistency with approval list acceptance procedures for arrow panels and portable variable-message signs.

Please provide any comments you may have to Thomas Melander by January 21, 2009. In your response, please separate and differentiate between your comments and your disagreements. If you have any questions, please contact Tom Melander, via e-mail (TMelander@dot.state.ny.us) or at (518) 457-7778.

JFT:BKD:TM
Attachments