Section 812. TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION ZONE OPERATIONS

812.01. Description. This work consists of protecting, regulating, warning, guiding, and maintaining traffic through and around the Construction Influence Area (CIA). This work includes furnishing, operating, and removing traffic control devices.

The Department will provide, install, and maintain traffic control devices outside the CIA.

812.02. Materials. Provide material in accordance with the following:

- Temporary Traffic Signs ................................................................. 922
- Channelizing Devices ...................................................................... 922
- Temporary Pavement Markings ..................................................... 922
- Lighting Devices ........................................................................... 922
- Temporary Traffic Signals .............................................................. 922
- Traffic Regulator Equipment ........................................................... 922
- Portable Changeable Message Sign .............................................. 922
- Temporary Concrete Barrier ........................................................... 922
- Temporary Attenuation ................................................................... 922
- Conspicuity Tape ............................................................................ 922

812.03. Construction.

A. Contractor Notification. Notify the Engineer at least 72 hours, or as otherwise required by the contract, before starting work or installing initial traffic control devices on the project.

B. Changes in Stage Construction Plans. Provide written notice to the Engineer before making changes in stage construction. If the Department accepts the changes, the Engineer will provide written approval to the Contractor.

C. Deficient Traffic Control Operations. The Engineer will give written notification to the Contractor of deficient, inadequate, or improperly placed traffic control devices, or unsafe conditions within the CIA. This notification will include a statement of the required corrective action and timeframe for completion of the corrective action. Failure to make corrections within the timeframe required may result in the following actions by the Engineer:

1. Stop work on the project until the Contractor completes corrective action; and
2. Order corrective action by others in accordance with subsection 107.07, subsection 108.05, and in the interest of public safety.
D. Placing Traffic Control Devices. Provide and maintain traffic control devices meeting the requirements in the ATSSA Quality Guidelines for Work Zone Traffic Control Devices.

Apply and place traffic control devices within the CIA in accordance with the MMUTCD, as shown on the plans, or as directed in writing by the Engineer.

Do not place commercial or Contractor identification signs within the highway right-of-way.

Display only traffic control devices relevant to conditions. Cover, remove, modify, or move existing temporary or permanent signs with inapplicable legends. Do not place temporary signs not in use, with the sign face parallel to traffic.

Inspect traffic control devices daily to ensure devices are relevant, in place, positioned, aligned, and oriented as required. Record inspections and make the records available to the Engineer upon request. The Department may take possession of the inspection records at project completion.

Maintain lights on traffic control devices in working order at all times without direction from the Engineer.

Ensure the actions of subcontractors regarding the condition, placement, maintenance, and removal of traffic control devices on the project are as required.

Remove temporary traffic control devices from the project if no longer required.

Temporary traffic control devices provided by the Contractor will remain the property of the Contractor.

1. Temporary Signs. Mount signs of 20 square feet or less on portable or ground driven sign supports. Mount larger signs on ground driven supports. Place ground driven sign systems as described in Standard Plan WZD-100 Series, or use another NCHRP-350 or the AASHTO Manual for Assessing Safety Hardware (MASH) accepted design.

Mount signs at a bottom height of at least 5 feet above the near edge of pavement and at least 5 feet above ground. If placing a sign behind a retaining wall, provide a bottom height of at least 5 feet above the top of the wall and provide a minimum height above the ground behind the wall to ensure visibility.
If erecting signs behind a curb, or within 6 feet of a pedestrian walkway, mount signs at a bottom height of at least 7 feet above ground.

For ground driven signs, if a secondary sign is required, mount the secondary sign below the primary sign with a bottom height 1 foot less than the bottom height required.

For portable signs requiring a secondary sign, mount on separate supports, at the required bottom height. Mount the primary portable sign above the secondary sign on separate supports. The Engineer will allow portable sign clusters if the total area measures no greater than 20 square feet.

Erect signs with supports vertical and the legend or symbol horizontal. Ensure signs do not vary from plumb by more than 2 inches over 4 feet.

The Department will allow the use flexible, roll-up signs only during daylight hours. The Department will not allow the use mesh signs.

Place and operate one Type A warning light, equipped with a one-way lens, on 4 feet by 4 feet diamond warning signs when required for that device by the FHWA Work Zone Acceptance letter.

For shoulders with no barrier walls, if removing temporary signs on portable supports, remove the sign stands from the uprights. Lay the sign flat, off the shoulder, and place the uprights facing downstream from traffic. Remove support stands and ballasts from the shoulder.

For shoulders with barrier walls, if removing temporary signs on portable supports, remove the sign stands from the uprights, and place against the barrier wall. Place the uprights facing downstream from traffic and place support stands and ballasts close to the barrier wall. Do not place sign covers on temporary sign systems on portable supports located on shoulders with no barrier walls.

Cover temporary signs on portable supports that straddle barrier wall, required to remain on the project while not in use. Remove sign covers from the roadway, or store against the barrier wall, when not in use.

For locations with guardrail, if conditions require temporary removal of temporary signs on portable supports, remove the sign stands from the uprights. Lay the sign behind the guardrail, and place support stands and ballasts close to the guardrail.
Do not obstruct or interfere with attenuation devices when storing temporarily removed temporary signs on portable supports.

2. **Sign Covers.** For permanent signs, other than overhead signs and signs larger than 60 square feet, cover the entire front of the sign panel. Mount the sign coverings using Department-approved methods to avoid damaging the sign sheeting. Do not apply fastening devices or covers directly to the reflective sheeting. Use spacers that provide 2 inches of air space between the cover and the sign face to protect the sheeting from damage.

Install Type I sign covers on Type I signs shown in the contract, to obscure conflicting information. Submit shop drawings of the Type I sign covers to the Engineer, and obtain the Engineer’s approval, before covering Type I signs on the project.

For temporary signs on fixed supports, cover the entire sign legend.

Do not use burlap or similar material to cover Department owned signs. The Contractor may use soft covers on other temporary signs.

Do not use sign plaque overlays that alter part of the legend or symbol.

3. **Sign Supports.** Place and construct sign supports to resist swaying, turning, or displacement. Provide fixed sign posts in accordance with subsection 919.04, except the Engineer will allow painted or galvanized steel posts.

Mount construction signs on portable sign support standards only if signs are to remain in place for 3 days or less, or as allowed by the Engineer if fixed supports are not possible.

4. **Supplemental Weights.** Maintain traffic control devices upright and aligned during use. Use sandbags, or a Department-approved alternate as supplemental weights to achieve stability.

5. **Channelizing Devices.** Install the lead-in signing and lighted arrow before installing channelizing devices. Install channelizing devices in the direction of traffic flow. Remove channelizing devices in the opposite direction of traffic flow. The reflective sheeting for all channelizing devices within the project limits must be the same ASTM type for the life of the project. Do not mix drums and cones within a traffic control signing sequence. Where lane closures are already in place, use the same type of channelizing devices to extend the closures.
The Engineer will allow the use of traffic cones only in the daytime. Ensure cones remain upright, in place, and do not interfere with traffic. If necessary, double-stack or weight the cones, without creating a hazard to traffic.

Use plastic drums with attached lights at night. Provide one Type D warning light on each plastic drum. Fasten the warning light to the top of the drum in accordance with subsection 922.07. Stand the plastic drums upright and stabilize them with weight to prevent overturning. Do not mount signs on drums.

6. **42-inch Channelizing Devices.** Provide and install 42-inch high, retro-reflective plastic channelizing devices as shown on the plans, or directed by the Engineer.

   a. **Daytime Use.** The Department will allow the daytime use of 42-inch channelizing devices for the following:
      
      i. Pavement marking, chip seal, microsurface, and crack-filling projects;
      
      ii. Projects of any duration where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance; or
      
      iii. Operations of 12 hours or less.

      The Department will allow the daytime use of 42-inch channelizing devices on tapers or tangents provided the distance between devices in feet is no greater than 1 times the work zone speed limit in mph in the tapers and 2 times the work zone speed limit in mph in the tangents.

   b. **Nighttime Use.** The Department will allow the nighttime use of 42-inch channelizing devices, in the tangent area only, on CPM pavement marking of any duration where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance. Place the devices a maximum distance of 50 feet apart. Do not attach lights.

      Place lighted plastic drums in the taper area, ensuring the device spacing does not exceed 1 times the work zone speed limit.

7. **Lighted Arrows.** If closing lanes, place a Type C lighted arrow on the shoulder at the beginning of the channelizing device taper. Ensure a bottom height of at least 7 feet for Type C panels. For narrow or non-existent shoulders, place the lighted arrow panel behind the channelizing devices as near the beginning of the taper.
as physically possible. Place the lighted arrow panel level and visible to oncoming traffic.

Ensure the arrow remains clearly legible at distances from 2,500 feet to 200 feet, from all traffic lanes and roadway entrances. Do not place the lighted arrow on a horizontal or vertical curve that might interfere with this legibility requirement. The Engineer will verify the legibility distances on a sunny day and a clear night.

If the lighted arrow is in use, secure the tires on the ground with wheel chocks, or elevate the trailer with the bottom of the tires above the ground. If the lighted arrow is not in use, park the device in accordance with subsection 812.03.G.5.

If the contract includes Type C lighted arrows, standby as a pay item, make a lighted arrow available for immediate use as a replacement unit. Locate the standby lighted arrow at the project or at a location approved by the Engineer.

8. **Type III Barricade.** Use Type III barricades to accentuate delineation or warning, and for total or partial road closures. For complete road closures, extend the barricades, with no gaps, across the roadway and shoulders, or from curb to curb.

Light Type III barricades during hours of darkness with two, Type C or Type D warning lights, fastened to the uprights above the top rail, provided these warning lights each weigh 3.3 pounds or less. Place construction signs, at the Type III barricades, behind the barricades on independent supports. Place the bottom of the signs above the top rail of the barricade. Ensure stripes on the retro-reflective sheeting slope downward in the direction of traffic. Place sheeting on both sides of Type III barricades if traffic approaches the barricade from both directions.

Do not place Type III barricades parallel to approaching traffic.

If through traffic is prohibited, use Type III barricades, including the required construction signs and lights. Arrange barricades and erect signs to allow the passage of local traffic and discourage through traffic. Install a sign with the required legend concerning permissible use by local traffic only.

9. **Temporary Concrete Barrier.** Place temporary concrete barriers before diverting traffic, or beginning work. Provide clean barriers, in sound structural condition. If placing temporary concrete barrier sections on the pavement, clean the pavement of any material that would reduce the friction between the barrier section and the
underlying pavement. During barrier installation, protect traffic by using or installing standard warning and channelizing devices. After placing end treatment, place barriers in the direction of the flow of traffic. Remove barriers in the direction opposite to traffic flow.

Link sections together, and pull barrier sections to fully engage the connection between sections. Ensure the gap between barrier sections, with the end-attachments fully engaged, does not exceed 4 inches. Maintain the barrier with end-attachments engaged and within 2 inches of the alignment shown on the plans.

Install Type B high intensity lights on temporary concrete barriers in accordance with Standard Plan R-126 Series.

If incomplete concrete barrier installations or removals expose barrier blunt ends to traffic inside the clear zone for more than 8 hours, make these ends crash worthy in accordance with Standard Plan R-126 Series, or as directed by the Engineer.

Install barrier reflector markers on the temporary concrete barrier. Remove dirt and other material that could diminish adhesion from the barrier before installing the reflectors. Install reflectors using the manufacturer’s recommended adhesive and installation procedures. Install the reflector near the center of the barrier section and at a height of 18 inches ±1 inch from the bottom of the barrier section to the top of the reflector. Provide a maximum longitudinal spacing of 20 feet. Ensure the color of the reflector matches the color of the edgeline pavement marking in that location.

If relocating or adjusting temporary concrete barrier, leave the existing reflector markers on concrete barrier intact if they are undamaged and the color is as required. If the reflector color is not as required, replace with the correct color reflector. Clean barrier reflector markers before placing the barrier back in operation.

Replace temporary concrete barrier sections structurally damaged during handling or by traffic. Repair non-structural damage that affects the performance of the section, using Department-approved concrete or mortar mix, if directed by the Engineer.

Remove and replace damaged barrier reflector markers. Position replacement markers directly in front of the damaged marker.

10. **Temporary Concrete Barrier Ending.** Place the temporary concrete barrier ending in accordance with Standard Plan R-126 Series and this subsection. Repair or replace damage to temporary concrete barrier endings.
a. **Detail 1.** Place the sloped temporary concrete barrier ending section as required for temporary concrete barrier placement.

b. **Detail 2.** Install impact attenuation systems in accordance with the manufacturer’s specifications. Do not use a sloped end section in combination with a Detail 2 ending.

Install sand module attenuator components as shown on Standard Plan WZD-175 Series. Install sand module attenuators as shown on the plans, as directed by the Engineer, or both.

Place attenuation systems on concrete, HMA, or compacted aggregate surface in accordance with the manufacturer's specifications. If the required base does not exist, construct the base pad, foundation, anchor block, and backup unit in accordance with the manufacturer’s specifications. Install the unit and connect to the backup and the front anchoring system as required.

Provide and install an object marker as shown on Standard Plan WZD-150 Series. Do not attach unapproved appurtenances to the attenuator.

Ensure an individual trained by the manufacturer in the installation of impact attenuator systems, is present during attenuator installation. The Department will not provide this individual.

Install the following in accordance with the manufacturer’s specifications:

i. Attenuator transition assemblies,
ii. Transition panels,
iii. End panels, and
iv. Other miscellaneous accessories required for connecting the attenuator to concrete barriers.

Provide written certification to the Engineer verifying attenuator installation as shown on the plans, and in accordance with the manufacturer’s specifications.

If using temporary anchors in new or existing pavement, remove anchors to at least 1 inch below final pavement grade and backfill with an epoxy material approved by the Engineer. For temporary anchors in temporary pavement, remove temporary anchors flush with the paved surface.
If concrete pads contain steel reinforcement, use equipment capable of drilling or coring through steel reinforcement to obtain the required depth for the concrete anchors.

Place cable anchorages and backups to meet the required attenuator alignment.

If the Engineer directs the replacement, repair, or realignment of attenuators, respond within 24 hours. If the Contractor fails to respond, or fails to complete repair work within 48 hours after notification, the Engineer may assign the work to others at the Contractor’s expense.

c. **Detail 3.** Ensure the temporary concrete barrier sections that extend past, and make contact with existing guardrail, are standard, full height sections. Do not use a sloped end section in combination with a Detail 3 ending.

d. **Detail 4.** Install Detail 4 endings in accordance with subsection 812.03.D.10.b and this subsection.

Refer to Standard Plan R-126 Series, Detail 4 to determine the offset between the toe of the existing concrete barrier wall and the attenuator.

Do not use a sloped end section in combination with a Detail 4 ending.

e. **Detail 5.** Install Detail 5 endings in accordance with subsection 812.03.D.10.b and this subsection.

Use an NCHRP 350, Test Level 3, or MASH accepted attenuation system.

Do not use a sloped end section in combination with a Detail 5 ending.

11. **Temporary Pavement Marking.** The requirements for placing temporary pavement markings differ depending on the situation involved.

Place 4-foot dashes spaced 50 feet apart, from center-to-center of the markings, when temporary pavement markings are placed in the configuration of permanent markings and traffic is driving in its normal lanes. However, place solid markings, not 4-foot dashes, to temporarily mark a solid edgeline.

When temporary pavement markings are used to facilitate traffic shifts or when used to delineate traffic in other than its normal lanes,
or both, place markings in the same configuration as permanent markings in accordance with section 811. However, the Contractor may substitute 4-inch wide markings where 6-inch wide markings are called for and 8-inch wide markings where 12-inch wide markings are called for. Place solid lines where solid line permanent markings are called for. Place skip or dotted lines at the normal length and with the normal gap.

a. **Temporary Pavement Marking – Type R.** Use temporary pavement marking Type R (removable tape) when temporary pavement markings must be placed on finished pavements and are not in the exact location as future permanent markings or at the discretion of the Engineer when temporary markings must be removed during the life of a project. Select Type R markings from the Qualified Products List.

   Replace Type R tape that fails, as directed by the Engineer, at no additional cost to the Department.

   When Type R tape is used as a 4-foot dash to temporarily mark finished pavement prior to the placement of permanent markings, offset it one foot from the permanent marking so that the permanent markings can be placed prior to the removal of the 4-foot dashes. Do not use 4-foot dashes to temporarily mark a solid edgeline.

   Between April 15 and November 1, place Type R tape not used as a 4-foot dash according to the manufacturer’s specifications for existing temperature and pavement condition. Use temporary pavement marking Type NR when temporary pavement marking must be placed between November 1 and April 15, or if the removal of the temporary marking will occur after December 1.

b. **Temporary Pavement Marking – Type NR.** Use temporary pavement marking Type NR (tape or paint) when temporary pavement markings must be placed on pavement to be removed or replaced during construction or when temporary markings line up exactly with the placement of permanent markings and the temporary pavement marking material is compatible with the material specified for the permanent markings. Select Type NR markings from the Qualified Products List.

   Place Type NR markings in accordance with section 811.

   Place Type NR markings, used as a 4-foot dash to temporarily mark finished pavement prior to the placement of permanent
markings, in the exact location as the permanent marking such that its removal is not necessary. Only use Type NR markings compatible with the permanent pavement marking material specified on the project as a 4-foot dash. Do not use 4-foot dashes to temporarily mark a solid edgeline.

**c. Temporary Raised Pavement Markings.** Select temporary raised pavement markers (TRPM) from the Qualified Products List.

Remove TRPM before applying subsequent layers of HMA or if they are no longer in the proper configuration for the associated pavement markings in use.

Install TRPM – Type 1, in accordance with the manufacturer's specifications, on chip seal projects.

Install TRPM – Type 3, in accordance with the manufacturer's specifications, to supplement Type R or Type NR temporary pavement marking as directed by the Engineer on the following:

i. Tangent sections,  
   ii. Traffic transitions,  
   iii. Run-arounds, and  
   iv. Crossovers.

**12. Pavement Marking Cover.** Provide and install temporary pavement marking cover, Type R, preformed black or gray tape, to cover existing pavement markings, as shown on the plans or directed by the Engineer. Use black pavement marking cover on HMA pavement, and gray pavement marking cover on portland cement concrete (PCC) pavement, in accordance with manufacturer's specifications. Do not use heat, solvents, or other additional adhesive to install pavement marking cover.

Ensure the tape completely masks the existing marking.

Replace pavement marking covers that come loose, or that do not meet contract requirements, as directed by the Engineer, and at no additional cost to the Department.

**13. Temporary Traffic Signals.** At least 14 days before starting construction on temporary traffic signals, contact the utility company and apply for temporary electric service. Provide electric service on the project and arrange for electric service removal when the project is complete.

Ground equipment with a resistance no greater than 10 ohms.
Perform work on signals in accordance with the contract, and to the requirements of the National Electrical Safety Code, the NEC, and the MDLEG for those items not identified in the contract.

Use signal lamps with brass bases in accordance with ITE Standards.

Use the type of traffic signal controller shown on the plans. Before using a traffic signal controller other than as shown on the plans, obtain the Engineer’s approval. Provide the Engineer-approved, alternate controller at no additional cost to the Department.

Provide, install, operate, inspect, maintain, disconnect, cover, and remove temporary traffic signals, and the required equipment and materials. Provide electric service equipment and the required wiring between the secondary service terminal, provided by the utility company, and the signal controller.

Place hoods over, or cover, signals until they are placed in service.

Install the required traffic signal timing for operating the temporary traffic signals.

Adjust traffic signal timing, as directed by the Engineer, to ensure the temporary traffic signal is operational. If the Engineer requires traffic signal timing changes, the Engineer will provide the locations and a signal-timing permit, for implementing the approved timing changes.

Maintain traffic signals installed or modified for construction for the duration of the project to ensure the signals perform as required. Disconnect and cover the signals when closing the roadway to traffic, as directed by the Engineer. Remove the temporary signals at the end of the contract.

Test equipment in operation, as a complete installation. Include sequence of operation, continuity, voltage, and ground resistance readings. Provide results of these tests to the Engineer before placing the installation into service.

Notify the Engineer before placing traffic signal installations in service.

The Department will not allow the substitution of a portable traffic signal system where temporary traffic signals are required.

14. **Temporary Portable Traffic Signal (PTS) System.** Provide the temporary portable traffic signal (PTS) system as shown on the plans. Each PTS system consists of two trailer-mounted, solar powered portable traffic signals with battery back-up.
Provide, install, program, and activate the signal system at the initial location. Provide hardwire or radio communication. Operate, inspect, maintain, clean, relocate, reactivate, reprogram, and remove the PTS system from the project.

Check the PTS system for required operation at 12-hour intervals when in use on the project. If PTS system failure occurs, provide traffic regulators to control traffic until the PTS system is operational. If the PTS system fails a second time within 30 calendar days of the first failure, remove the PTS system from the project and provide traffic regulators until the replacement PTS system is installed, activated, and operating as required.

The Contractor is responsible for repair or replacement of the PTS system.

Locate one system trailer on each end of the closure, on the shoulder, outside the travel lane. After positioning the trailer, rest the tires on the ground with wheel chocks or elevate the trailer, with the bottom of the tires above the ground. Delineate each trailer using three plastic drums wrapped with high intensity reflective sheeting.

If existing guardrail prevents a trailer from sitting completely on the shoulder, place PTS system in accordance with subsection 812.03.D.14.a and subsection 812.03.D.14.b.

a. **Open Lane Approach Side.** On the open lane approach side, if existing guardrail prevents the trailer from sitting completely on the shoulder, complete the following:
   i. Remove one panel of guardrail at the required PTS trailer location, at least 100 feet from the end of the temporary concrete barrier.
   ii. Slide the PTS trailer into the gap so the left tire is on the shoulder and the signal does not encroach into the open lane.
   iii. Place an ET Type or SKT Type extruder ending on both blunt guardrail ends.
   iv. After removing trailers, restore the guardrail to the original condition in accordance with section 807.

b. **Closed Lane Approach Side.** On the closed lane approach side if existing guardrail prevents the trailer from sitting completely on the shoulder, complete the following:
   i. Remove one extra guardrail panel where the temporary concrete barrier runs through the guardrail.
ii. Slide the PTS trailer into the extra opening in front of the temporary concrete barrier where it runs through the guardrail so the left tire is on the shoulder and the signal does not encroach into the open lane.

iii. After removing trailers, restore the guardrail to the original condition in accordance with section 807.

iv. No extruder ending is required on the closed lane approach side.

15. **Portable Changeable Message Signs.** Use portable changeable message signs (PCMS) as required. Delineate a deployed PCMS using three lighted plastic drums wrapped with high intensity reflective sheeting. Set lights to flash mode. If the PCMS is in use, rest the tires on the ground with wheel chocks or elevate the trailer, with the bottom of the tires above the ground. If a PCMS is not needed, turn it off and remove it from the immediate traffic area in accordance with subsection 812.03.G.5.

The Department will allow use of PCMS for either advance time notification for future events including closures and planned maintenance work or information including detours or alternative routes during current events; incident management; construction zone backups; or similar conditions.

Do not use generic, non-emergency safety messages. If power to the PCMS is lost, use the message “Drive Safely” only as a default message. Ensure message sequences consist of no greater than two messages with a 2-second display time for each message.

Do not use PCMS for the following:

a. Replacing MMUTCD required static signing or pavement markings;

b. Replacing a lighted arrow;

c. Advance notice of new traffic signals or signs; or

d. Advertising.

E. **Sign Removal (Permanent Signs).**

1. **Department-owned Permanent Signs.** Remove Department-owned permanent signs and supports as necessary to prevent damage. Remove, handle, store, and reinstall the signs in accordance with Department and manufacturer’s requirements. Store the permanent signs outside the work area at a site within the CIA, as directed by the Engineer. Reinstall Department-owned permanent signs and supports within one day of completing the
work, in accordance with section 810, unless otherwise directed by the Engineer.

Replace signs, supports, or foundations, damaged by Contractor operations at no additional cost to the Department.

2. **Permanent Signs Owned by Local Agencies.** Remove locally owned signs and supports before starting work in the area. Remove, handle, and store signs in accordance with the manufacturer's requirements. Store the permanent signs outside the work area within the CIA, as directed by the Engineer. The local agency that owns the sign is responsible for sign and support replacement and related costs.

3. **Logo Signs or Tourist Oriented Directional Signs.** Date stickers on the back of the signs identify Logo Signs and Tourist Oriented Directional Signs. Contact Michigan Logos, Inc. at (888) 645-6476 to arrange for removal, storage, and reinstallation of Logo Signs or Tourist Oriented Directional Signs within the CIA. Provide Michigan Logos, Inc. with at least two weeks notice.

F. **Pavement Marking Removal.** Remove pavement markings that conflict with proposed temporary traffic markings before making any changes in the traffic pattern. Place temporary pavement markings when removing or obscuring pavement markings for more than 24 hours before a change in the traffic pattern. Place Type R markings in accordance with subsection 812.03.D.11 before the close of the workday.

Do not use paint or bituminous bond coat to cover existing and inappropriate pavement markings. The Contractor may use tape only when authorized by the Engineer.

Use a vacuum attachment operating concurrently with the blast cleaning operation to remove residue and dust when removing markings by blast cleaning within 10 feet of an open lane. Properly dispose of collected residue and dust.

1. **Removal of Less than 5,000 Feet of Pavement Markings per Stage.** Obtain the Engineer's approval for one of the following removal methods and minimize damage to the surface texture of the pavement during removal.

   Use one or more of the following removal methods:
   
   a. Sandblasting using air or water;
   b. Shot blasting;
   c. High-pressure water;
d. Steam or superheated water; or
e. Mechanical devices such as grinders, sanders, scrapers, scarifiers, and wire brushes.

Immediately clean up any debris generated. The Department will not require continuous vacuuming equipment for pavement marking removal of less than 5,000 feet per stage.

2. **Removal of Greater than 5,000 Feet of Pavement Markings per Stage.** Remove pavement markings using self-propelled truck mounted removal equipment. The equipment must be capable of continuously vacuuming up the removal debris. If the removal equipment cannot collect all removal debris, operate a self-propelled sweeper immediately behind the removal equipment.

Obtain the Engineer's approval for one of the following removal methods and minimize damage to the surface texture of the pavement during removal:

a. Use self-propelled truck mounted removal equipment, except do not use water blasting for marking removal on asphalt pavement;

b. Use self-propelled truck mounted removal equipment for marking removal on concrete surfaces to be removed during construction; or

c. Use a self-propelled truck mounted water blaster for marking removal on concrete surfaces to remain in place.

G. **Maintaining Traffic Along Project.** Maintain traffic along the project in a safe and orderly manner.

1. **Traffic Maintained by Part-Width Intersection Construction.** If part-width construction is required, construct the new pavement on half an intersection at a time. Maintain through traffic on the remaining half intersection and shoulders. The contract may require temporary widening and surfacing of the shoulders.

2. **Access Provisions for Pedestrians and Local Traffic.** Use temporary roadways, culverts, railroad crossings, bridges, and other means approved by the Engineer to provide local traffic access to property adjacent to the project. Obtain the Engineer's approval for temporary culvert material, before placement. Provide railroad crossings for local traffic in accordance with subsection 107.20.

Use pavement gaps or other means approved by the Engineer to maintain two-way traffic across intersections. Provide a clear roadway on the cross road, at least 20 feet wide. The Engineer may
vary the pavement gap lengths based on the types of vehicles passing through the intersection.

The Engineer may allow closing a minor road or street intersection, with the approval of the local government agency.

Maintain pedestrian mobility within the CIA, as required by the contract. If access cannot be accommodated, provide temporary modifications or a clearly marked detour.

3. **Traffic Maintained on Shoulder.** If the contract requires maintenance of traffic on the shoulder, improve the shoulder as shown on the plans.

   Sweep shoulder and remove debris throughout the time the shoulder is used to maintain traffic. Properly dispose of collected debris.

   Maintain the shoulder as required. Ensure the availability of labor, material, and equipment to immediately repair and reconstruct the shoulder. Apply surfacing material and dust palliatives as directed by the Engineer.

4. **Shoulders Under Construction.** Ensure shoulder areas adjacent to open traffic lanes are in a safe and usable condition during non-working hours. Provide the following signs and channelizing devices:
   
   a. Install one W21-5, 48 inch by 48 inch “Shoulder Work” sign before the beginning of the unsatisfactory shoulder.
   
   b. Install the relevant W8-9a “Shoulder Drop-Off,” W8-4 “Soft Shoulder,” or W8-4a “Rough Shoulder” signs before the unsatisfactory shoulder and at no greater than 2,000-foot intervals along the non-compliant shoulder.
   
   c. Place plastic drums on the taper, as required by MMUTCD, Part 6, for shoulder closures, at the location where the unsatisfactory shoulder begins.
   
   d. Place channelizing devices at intervals directed by the Engineer along the length of the affected shoulder without encroaching on the required minimum lane width. Place the bases of channelizing devices at the same height as the travel lane.

5. **Storage Restrictions for Vehicles, Equipment, and Materials.** Park vehicles and store material in areas that provide minimum exposure to pedestrian and vehicular traffic.
   
   a. **Working Hours.** During working hours, park workers’ vehicles, idle construction equipment, and stored materials that cannot be removed from the project as follows:
i. At least 20 feet behind curb faces on roadways with barrier curb; and
ii. At least 30 feet from the pavement edge on roadways with shoulders or mountable curbs.

b. **Non-working Hours.** During non-working hours, remove workers’ vehicles, and obtain the Engineer’s approval to store idle construction equipment and materials that cannot be removed from the project as follows:
   i. At least 30 feet from the traffic lanes, if topography and right of way allow; or
   ii. Less than 30 feet from the traffic lanes if delineated by signs, lights, barricades, or concrete barriers.

   The Department will not make additional payment for devices used to delineate stored equipment and material.

6. **Maintaining Lights.** Do not mix different light styles or designs on a project.

   Position and maintain Type A, Type C, and Type D lights to ensure visibility on a clear night from a distance of 3,000 feet. Ensure the visibility of Type B, high intensity lights on a sunny day from a distance of 1,000 feet when the sun is not directly on or behind the light. Replace the power source if lights do not meet the visibility requirements. Provide and maintain Type C and Type D LED lights that at least meet the requirements in the MMUTCD and maintain the intensity requirement of 2 candelas in the field.

   Ensure lights work at the time of initial installation and at stage changes during the project. During the project, ensure at least 95 percent of the total number of active lights, work. Ensure that no more than three adjacent lights are non-operational at any time.

   Change power sources when directed by the Engineer. Replace damaged or non-functioning lights at no additional cost to the Department.

7. **Cleaning Traffic Control Devices.** Clean barrier reflectors, plastic drums, signs, barricades, and attached lights in operation on the project to ensure they meet required luminosity. Adjust cleaning frequency based on the exposure of the traffic control devices to unfavorable environmental conditions and the dirt accumulated on the devices.

8. **Traffic Regulators.** Provide traffic regulators for each direction of approaching traffic on primary and intermediate roads, if the
movement of traffic is restricted to alternating one-way traffic through the construction area. The Engineer may require intermediate traffic regulators.

Equip traffic regulators with the following:

a. High-visibility safety apparel;
b. “Stop/Slow” or “Stop/Stop” sign paddles; and
c. A two-way radio system and a standby back-up system, if traffic regulators are not visible to each other.

Notify and advise traffic regulators of information required to maintain traffic. Illuminate traffic regulator stations at night with an average luminance of 50 lux.

Provide traffic regulators and other traffic control devices, as approved by the Engineer, to move materials and equipment that may interfere with traffic. The Department will not make additional payment for providing traffic regulators and other traffic control devices necessary only for the Contractor’s convenience.

Ensure persons designated to regulate traffic receive training, no more than 12 months before performing traffic-regulating operations, on proper traffic regulating procedures. Ensure this training consists of at least viewing the video “Safely Regulating Traffic in Michigan” and reading the current MDOT handbook, Traffic Regulators Instruction Manual. Maintain documentation on persons trained and dates trained and provide to the Engineer upon request.

9. **Traffic Regulating Operations.** Ensure traffic regulating operations do not exceed 2 miles or stop traffic for more than 10 minutes at a time, unless otherwise directed by the Engineer.

H. **Lighting for Night Work.** Provide, install, and maintain fixed, portable, or equipment-mounted lighting systems to allow workers and inspectors to perform nighttime operations and inspections. Provide a power source capable of operating the lighting system.

Provide lighting and perform night work in accordance with subsection 706.03.I.2 and the contract. Submit a lighting plan to the Engineer for review and approval, before starting night work.

Provide lighting as specified in the current edition of MMUTCD, Part 6. Ensure lighting does not cause glare, shine, or directly face the eyes of oncoming drivers. After initial setup, drive through and observe the lighted area from each direction on the main roadway. Adjust lighting alignment if lights cause glare, shine, or directly face the eyes of oncoming drivers.
812.03

Provide backup lighting that meets specifications for the primary system to replace failed lights and equipment during nighttime operations. Maintain the backup equipment on the project and ensure availability during nighttime operations.

The Engineer will suspend nighttime operations, except traffic control, if lighting does not meet contract requirements.

I. **Chip Seal Surface Treatment and HMA Construction.** Maintain traffic during the placement of chip seals and HMA.

1. **General.** Complete rolling and allow the surface to cool before allowing traffic on chip seal treated and HMA surfaces. If shoulders cannot be used for two-way traffic, arrange for alternating one-way traffic around the roadway section being surfaced. Provide traffic control devices and traffic regulators to keep traffic off surfaced roadway sections and to provide safe travel.

   If conditions allow, and if the Engineer approves, route traffic away from sections of roadway being surfaced. Provide and maintain temporary routes in a condition approved by the Engineer, and at no additional cost to the Department.

2. **Chip Seal Surface Treatment.** Unless closing the road to traffic, treat half of the road width at a time. Do not allow traffic on the treated section of roadway for at least 30 minutes after completion of cover material application and rolling.

   If shown on the plans, provide a traffic regulator to direct alternating one-way traffic in accordance with subsection 812.03.G.8.

3. **Aggregate Surface and HMA.** To handle traffic during aggregate surface and HMA applications, divide the project into sections. The Engineer will determine the length of these sections. Keep traffic off the work area of each section during surface preparation, bond coat application, HMA placement, and rolling. Complete each section and open it to traffic, before closing the next section. Provide local traffic access to property along the project.

   During darkness, place and maintain lighted plastic drums wrapped with high intensity reflective sheeting to protect traffic. For windrow sections in the center of the travel way, install lighted plastic drums wrapped with high intensity reflective sheeting at the ends, along each side, and at the end of breaks where traffic passes through or crosses the windrow. Alternate the placement of drums along each side with no greater than 150 feet between the drums.
4. **Protection of Uncured Pavements.** Keep traffic off new HMA pavement by installing cones or drums on the tangent in addition to the traffic control devices specified in the MMUTCD. Install additional cones or drums to separate the traffic lane from the closed lane and conduct paving operations in the sequences shown in the contract. After finish rolling, or as directed by the Engineer, install at least two cones across each resurfaced lane at no greater than 600 foot intervals. Place additional cones or drums at crossroads and commercial driveways to direct the traffic to open travel lanes.

After completing compaction, if the air temperature is below 70 °F, open the pavement to traffic. If the air temperature is from 70 °F to 80 °F, keep traffic off the pavement for an additional hour. If the air temperature is greater than 80 °F, keep traffic off the pavement for 2 hours.

5. **Staggered Lane Endings with Vertical Longitudinal Joints.** To avoid uneven longitudinal joints, surface lanes within one load of the same ending point at the end of the day’s operation. The center lanes of two-way pavements with an odd number of lanes are excluded from this requirement.

Before starting HMA paving operations, furnish the required signs for emergency signing in case staggered lane endings, causing uneven longitudinal joints, must remain open to traffic overnight.

If uneven longitudinal joints remain open overnight, maintain traffic in accordance with the following:

a. If the points of ending of adjacent lanes are at least 250 feet apart, install temporary signs as required; and
b. If the points of ending of adjacent lanes are less than 250 feet apart, install lighted drums at 30-foot intervals along the length of each side of the affected pavement, and place W21-4 “Road Work Ahead” signs ahead of the pavement area.

6. **Tapered Overlapping Longitudinal Joints.** Unless delayed by inclement weather or otherwise approved by the Engineer, do not expose the tapered overlapping longitudinal joints to traffic for longer than 24 hours after placement. If using a tapered joint, place 48 inch by 48 inch W8-9b “Uneven Lanes” signs before, and at no greater than 2,000-foot intervals along the length of the joint before allowing traffic on the paved lane. Place at least two W8-9b “Uneven Lanes” signs in each direction. Leave these signs in place until the adjacent lane is constructed to the same elevation.
**812.03**

J. **Conspicuity Tape for Vehicles and Equipment in Work Zones.**

Equip vehicles and equipment in the work zone, and vehicles delivering materials or equipment to the project, with red and white conspicuity tape.

Apply one 2-inch wide horizontal stripe of conspicuity tape along at least 50 percent of each side of, and across the full width of the rear of the vehicle or equipment.

Delineate lighted arrow trailers and portable changeable message signs with 2 inch wide red and white conspicuity tape on each of the four sides where tape application is practical.

**812.04. Measurement and Payment.**

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Minor Traf Devices</td>
<td>Lump Sum</td>
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<tr>
<td>Traffic Regulator Control</td>
<td>Lump Sum</td>
</tr>
<tr>
<td>Sign, Type __, Temp, Prismatic, Furn</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sign, Type __, Temp, Prismatic, Oper</td>
<td>Square Foot</td>
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<tr>
<td>Sign Cover</td>
<td>Each</td>
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<tr>
<td>Sign Cover, Type 1</td>
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<tr>
<td>Lighted Arrow, Type __, Furn</td>
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<tr>
<td>Lighted Arrow, Type __, Oper</td>
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<tr>
<td>Lighted Arrow, Type C, Standby</td>
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<tr>
<td>Sign, Portable, Changeable Message, Furn</td>
<td>Each</td>
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<tr>
<td>Sign, Portable, Changeable Message, Oper</td>
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<tr>
<td>High Intensity Light, Type B, Furn</td>
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<td>High Intensity Light, Type B, Oper</td>
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<td>Plastic Drum, High Intensity, Lighted, Oper</td>
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<tr>
<td>Channelizing Device, 42 inch, Furn</td>
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<td>Channelizing Device, 42 inch, Oper</td>
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<tr>
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<td>Barricade, Type III, High Intensity, Oper</td>
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<td>Barricade, Type III, High Intensity, Lighted, Furn</td>
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<td>Barricade, Type III, High Intensity, Lighted, Oper</td>
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<td>Barricade, Type III, High Intensity, Double Sided, Oper</td>
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<td>Barricade, Type III, High Intensity, Double Sided, Lighted, Furn</td>
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<tr>
<td>Barricade, Type III, High Intensity, Double Sided, Lighted, Oper</td>
<td>Each</td>
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If the contract does not include pay items for improving the shoulder to maintain traffic, the Engineer will measure, and the Department will pay for shoulder improvements as extra work.

The Department will pay for additional traffic control devices if changes benefit the Department. The Department will not pay for additional devices required for the Contractor’s convenience unless the Contractor can show a benefit to the Department.

A. **Damage Compensation.** Notify the Engineer of damaged temporary traffic control devices. Before replacement and disposal, allow the Engineer to verify the condition of damaged temporary traffic control devices eligible for payment. The Department will pay as follows, for replacing temporary traffic control devices or equipment damaged by vehicular traffic, other than the Contractor’s vehicles and equipment, to the extent that replacement is required:

1. The **Furnished** unit price for devices paid for as furnished pay items;
2. The unit price for devices not paid for as **Furnished**;

623
3. The manufacturer's invoice cost for devices required by the Engineer and not included in the unit price for other relevant pay items;

4. One-third of the unit price for replacement pay items **Barricade, Type III, High Intensity** or **Barricade, Type III, High Intensity, Double Sided** required by the Engineer for each damaged board or panel;

5. The manufacturer’s invoiced cost for damaged equipment included in a lump sum pay item for maintaining traffic.

B. **Cleaning Traffic Control Devices.** The unit prices for traffic control devices include the cost of cleaning traffic control devices.

C. **Furnished Pay Items.** For pay items designated as furnished, the Engineer will measure, and the Department will pay for the maximum number of units required by the Engineer at one time on the project.

The Engineer will measure **Sign, Type __, Temp, Prismatic, Furn** as the total area of the maximum number of signs with dissimilar sign legends in use, at one time on the project. The unit price for **Sign Type __, Temp, Prismatic, Furn** includes the cost of portable and driven sign supports.

The unit prices for furnished pay items include the cost of the following:

1. Providing the item in operable condition with required equipment, supplemental weights, hardware, and labor;
2. Initially installing the item; and
3. Replacing items damaged by vehicular traffic other than by the Contractor's vehicles or equipment.

The Department will pay for furnished pay items once per project when placed into operation, unless the Engineer approves a price adjustment for an authorized extension of time.

D. **Operated Pay Items.** For pay items designated as operated, the Engineer will measure, and the Department will pay for the maximum number of units required by the Engineer at one time on the project.

The Engineer will measure **Sign, Type __, Temp, Prismatic, Oper** as the total area of the maximum number of signs with dissimilar sign legends in use, at one time on the project.

The unit prices for operated pay items, with the exception of **Conc Barrier, Temp Oper** and **TS, Temp, Oper**, include the cost of the following:

1. Operating;
2. Inspecting, and maintaining;
3. Relocating; and
4. Removing the item from the project.

E. **Minor Traffic Devices and Traffic Regulator Control.** The Department will make partial payments for *Minor Traffic Devices* and *Traffic Regulator Control* in accordance with Table 812-1. The Department will not allow claims for additional compensation for inconvenience or delay caused by Department-performed routine maintenance operations.

| Partial Payment Schedule for Minor Traffic Devices and Traffic Regulator Control |  
|---|---|
| Percent of Original Contract Amount Earned | Total Percent of Unit Price Paid |
| First Use | 50 |
| 50 | 75 |
| 90 | 100 |

1. **Minor Traffic Devices.** The unit price for *Minor Traffic Devices* includes the cost of the following:
   a. Providing, installing, maintaining, relocating, and removing traffic cones and other traffic devices, not shown on the plans;
   b. Maintaining local traffic;
   c. Removing, storing, and reinstalling Department-owned permanent signs and supports; and
   d. Installing reflective conspicuity tape on vehicles and equipment.

2. **Traffic Regulator Control.** The unit price for *Traffic Regulator Control* includes the cost of the following:
   a. Providing personnel;
   b. Providing and operating equipment; and
   c. Providing traffic regulator training in accordance with subsection 812.03.G.8.

F. **Temporary Roadway and Approaches.** The Department will pay separately for constructing and maintaining temporary roadways and approaches using the following relevant pay items:

1. Earth excavation,
2. Temporary culverts,
3. Temporary structures,
4. Temporary traffic control device,
5. Surfacing material, and
6. Dust palliatives.

G. **Sign Cover.** The Department will pay for the maximum number of sign covers required, at one time on the project. The unit price for *Sign*
Cover includes the cost of furnishing, installing, removing, and relocating the sign covers.

The Engineer will only measure approved materials and hardware for payment.

The unit price for Sign Cover, Type I includes the cost of providing shop drawings, fabricating, furnishing, installing, removing, and relocating sign covers.

H. Lighted Arrow, Type C, Standby. The Department will pay for Lighted Arrow, Type C, Standby only if the pay item is shown on the plans. The cost of providing a fully operable unit and placing it on standby, readily available to replace a damaged unit, is included in the unit price for Lighted Arrow, Type C, Standby. The Department will only pay once for the standby unit during the project.

The Department will allow the use of the standby unit to replace a unit removed from service for maintenance, but will not pay for replacing the standby unit.

I. Sign, Portable, Changeable Message, Operated. The unit price for Sign, Portable, Changeable Message, Oper includes the cost of programming and operating the signs in accordance with subsection 812.04.E. The Department will pay separately for the cost of delineating each trailer with three plastic drums as Plastic Drums, High Intensity, Lighted, Furn and Plastic Drums, High Intensity, Lighted, Oper.

J. Plastic Drums, High Intensity, Lighted, Furnished. The unit price for Plastic Drums, High Intensity, Lighted, Furn includes the cost of providing and installing drums, each with supplemental weights and one Type D light.

K. Barricade, Type III, High Intensity, Lighted, Furnished and Barricade, Type III, High Intensity, Double Sided, Lighted, Furnished. The unit prices for Barricade, Type III, High Intensity, Lighted, Furn, and Barricade, Type III, High Intensity, Double Sided, Lighted, Furn include the cost of providing and installing barricades, each with supplemental weights, and two Type C or Type D lights.

L. Concrete Barrier, Temporary.

1. Furnish Barrier. The unit price for Conc Barrier, Temp, Furn includes the cost of providing and installing concrete barriers in the initial location with barrier reflector markers attached.

The Engineer will measure and the Department will pay for providing and installing one Type B High Intensity Light, Furn and
one **Type B High Intensity Light, Oper** on the concrete barrier approaching taper or tangent breakpoint, as shown on in the plans or Standard Plan R-126 Series.

2. **Operate Barrier.** The unit price for **Conc Barrier, Temp, Oper** includes the cost of operating, maintaining, and removing concrete barrier from the project.

3. **Adjust Barrier.** The unit price for **Conc Barrier, Temp, Adj** includes the cost of moving the temporary concrete barrier and tapers, including barriers and tapers located outside the roadbed, laterally to a new alignment on the same roadbed.

4. **Relocate Barrier.** The Engineer will not measure a temporary concrete barrier move as **Conc Barrier, Temp, Relocated** if it involves work defined in subsection 812.04.L.3.

   The unit price for **Conc Barrier, Temp, Relocated** includes the cost of relocating temporary concrete barrier longitudinally on the same roadbed, or to another roadbed, including temporarily storing the barrier. Temporary storage of the barrier includes removing, loading and hauling the barrier to a temporary storage site followed by reloading, hauling, and re-installation in the new location.

5. **Barrier Reflector Replacement.** The unit price for **Conc Barrier Reflector Replacement** includes the cost of removing damaged markers from temporary concrete barrier sections after initial placement, and providing and installing new barrier reflectors.

M. **Temporary Concrete Barrier Ending.** The Engineer will measure and the Department will pay for temporary concrete barrier endings specified for Detail 1 and Detail 3 as **Conc Barrier, Temp**. The Department will pay for removing and reconstructing guardrail required for Detail 3 in accordance with section 807.

The Engineer will measure, and the Department will pay for temporary concrete barrier endings specified for Detail 2, Detail 4, and Detail 5 in accordance with subsection 812.04.M.1 through subsection 812.04.M.4.

1. **Furnish Barrier Ending.** The unit price for **Conc Barrier Ending, Temp, Furn** includes the cost of the following:

   a. Providing and delivering attenuators to the project as shown on the plans, or directed by the Engineer;
   b. Constructing attenuator base pads, foundations, anchor blocks, and backup units;
   c. Installing the hardware, appurtenances, and attenuators;
d. Connect the unit to the backup and to the front anchoring system;
e. Providing and installing transition assemblies, transition panels, end panels, and other miscellaneous accessories for connecting to concrete barrier;
f. Ensuring an individual, trained by the manufacturer in the installation of impact attenuator systems, is present during attenuator installation; and
g. Providing and installing an object marker to the nose of the attenuator.

2. **Operate Barrier Ending.** The unit price for **Conc Barrier Ending, Temp, Oper** includes the cost of the following:
   a. Repairing the attenuator during construction;
   b. Removing the attenuator from the existing location;
   c. Removing attenuator base pads, foundations, anchor blocks and backups units from the existing location;
   d. Constructing new attenuator base pads, foundations, anchor blocks, and backups at the new location;
   e. Transporting and reinstalling the attenuator in accordance with the manufacturer’s specifications at the new location;
   f. Ensuring an individual trained by the manufacturer in the installation of impact attenuator systems, is present during attenuator installation;
   g. Removing and disposing of the attenuators; and
   h. Removing and disposing of attenuator base pads, foundations, anchor blocks, backups, and associated hardware.

3. **Adjust Barrier Ending.** The unit price for **Conc Barrier Ending, Temp, Adj** includes the cost of moving the temporary concrete barrier ending, including those located outside the roadbed, laterally to a new alignment on the same roadbed.

4. **Relocate Barrier Ending.** The unit price for **Conc Barrier Ending, Temp, Relocated** includes the cost of moving temporary concrete barrier longitudinally on the same roadbed, or to another roadbed including temporarily storing the barrier ending. Temporary storage of the barrier endings includes removing, loading and hauling the endings to a temporary storage site followed by reloading, hauling, and re-installation in the new location.

N. **Temporary Pavement Markings.**

1. **General.** The Department will pay for the removal of longitudinal markings as **Pavt Mrkg, Longit, Rem**, of the width required. The
unit prices for **Pav Mrkg, Longit, Rem** pay items include the cost of removing existing longitudinal permanent markings and temporary Type NR markings, including tapers, and transitions.

The Department will pay for removing special markings as **Rem Spec Mrkg**, in accordance with subsection 811.04.D.

The Engineer will measure temporary pavement markings, of the type required, as the actual length of equivalent 4-inch line placed. The Engineer will not measure the skips in dashed lines regardless of the type or width of markings.

The Department will not pay separately for removing markings that do not meet the requirements of subsection 922.06.

2. **Non-Removable (Type NR) Pavement Markings.** The unit price for the relevant **Pav Mrkg, Temp, NR** pay items include the cost of providing and placing temporary pavement markings.

3. **Removable (Type R) Pavement Markings.** The unit prices for **Pav Mrkg, Type R, 4 inch, (color), Temp** and **Pav Mrkg Cover, Type R, (color)** include the cost of providing, placing, removing and disposing of temporary pavement marking.

4. **Temporary Raised Pavement Markers.** The unit prices for **Raised, Pavt Marker, Temp** pay items include the cost of providing, installing, maintaining, removing and disposing of raised pavement markers.

O. **Part Width Intersection Construction.** The Engineer will measure, and the Department will pay for **Part Width Intersection Construction** by the number of intersections required by the contract. The Engineer will measure intersections as one unit regardless of the number of legs or the number of construction stages.

The unit price for **Part Width Intersection Construction** includes the cost of providing additional temporary traffic control measures and operations specified for the work performed in the intersection.

The Department will pay separately for earth excavation, temporary traffic control devices, surfacing materials, and dust palliatives for the construction and maintenance of temporary roadways required for part width intersection construction.

P. **Dust Palliative.** The Engineer will measure, and the Department will pay for **Dust Palliative, Applied** by weight of calcium chloride, based on the concentration of solids or solution delivered, as indicated on the delivery report or as determined by testing.
The Engineer will not measure additives combined with the gravel before, or at the time of gravel surface placement for payment as Dust Palliative, Applied.

Q. Culvert, Temporary. The unit price for Culv, Temp includes the cost of constructing and maintaining temporary culverts, and removing them before project completion.

R. Traffic Signal (TS), Temporary. The Department will reimburse the Contractor, based on paid utility company invoices, for the cost to provide secondary service on the project. Reimbursable costs include the cost of installing and removing wood poles, wiring, transformers, and electricity for the signals.

A signal system required to maintain one lane of traffic on a bi-directional roadway is considered one location.

The unit price for TS, Temp, Furn includes the cost of providing and installing all components required to provide a complete and operating unit, per location shown on the plans.

The unit price for TS, Temp, Oper includes the cost of the following for each temporary traffic signal within the project limits:

1. Operating, including signal timing changes directed by the Engineer;
2. Inspecting;
3. Maintaining;
4. Disconnecting;
5. Covering; and
6. Removing the temporary traffic signals.

S. Portable Traffic Signal (PTS) System. The Department will not make additional payments for traffic regulating, signing arrow boards, and lighting systems for traffic regulator stations operated at night due to a temporary PTS system failure.

1. Furnish PTS System. The unit price for PTS System, Temp, Furn includes the cost of the following:
   a. Providing, installing, programming, and activating temporary PTS systems in the initial required location;
   b. Two trailer-mounted, solar powered portable traffic signals with battery back-up;
   c. Radio linked communications with hardwire capabilities and conflict monitoring; and
   d. Removing or modifying guardrail to place trailers.
2. **Operate PTS System.** The unit price for **PTS System, Temp, Oper** includes the cost of the following:
   a. Operating;
   b. Inspecting, and maintaining;
   c. Delineating with conspicuity tape;
   d. Relocating, reactivating, and reprogramming;
   e. Removing the system from the project;
   f. Removing or modifying guardrail; and
   g. Replacing guardrail.

The Department will pay separately for the cost of delineating each PTS trailer with three plastic drums as **Plastic Drums, High Intensity, Furn** and **Plastic Drums, High Intensity, Oper**.

T. **Lighting for Night Work.** The unit price for **Ltg for Night Work** includes the cost of submitting a lighting plan and providing, installing and maintaining lighting for the entire project. The Department will not make adjustments in the lump sum price, regardless of the number or type of lighting systems required to complete night work in accordance with subsection 812.03.H, and as directed by the Engineer.

U. **Price Adjustments for Authorized Extensions of Time.** The Department will not adjust the unit price for **TS, Temp, Furn** for authorized extensions of time.

The Department will not make price adjustments for temporary traffic control devices during authorized extensions of time if liquidated damages are assessed in accordance with subsection 108.07 and subsection 108.08. If liquidated damages are not assessed, the Department will adjust unit prices for the following:

1. **TS, Temp, Oper;**
2. **PTS System, Temp, Oper;**
3. Items designated as Furnished, Operated, or Standby, unless otherwise specified; and
4. Items measured as lump sum if they are used or required on the worksite during authorized extensions of time except that **Minor Traffic Devices** will not be adjusted when conspicuity tape is the only minor traffic control device in service or required during the authorized extension of time.

The Department will use the following formula to calculate the unit price adjustments using either calendar or working days for both original contract time and additional days:
812.04

\[ \left( \frac{a}{b} \right) c = adjustment \]  

Formula 812-1

Where:

- \( a \) = Additional days an item was in use or on standby during the authorized extension of time,
- \( b \) = Original contract time, and
- \( c \) = Original unit price.

If an authorized extension of time extends a work day project into the next construction season, including seasonal shutdown periods during which a traffic control item is on standby or in use, the Department will apply the following extensions. For seasonal shutdown periods, the original contract time will be the calendar days between the first work day and the expiration of the original contract completion. The Department will determine the number of additional days the item is on standby or in use in calendar days.