

Chapter 9 - Construction Traffic

2-900 General

This chapter covers control and safety related to construction traffic. It includes information about public relations, specifications, detours, construction signs, channelizing devices, trafficperson, etc. It does not cover permanent traffic control, such as placing new signs or signals, and does not cover general work safety, such as incident reporting or the use of personal safety equipment. Incident reporting is covered in Volume 1, Chapter Fourteen, "Project Incidents and Complaints". Personal safety is covered throughout the *Manual*. The *Manual* does not currently include the construction or installation of permanent traffic controls.

2-901 Public Relations

2-902 Press Releases

The Department must make every effort to keep the traveling public aware of the infrastructure program and inform them of lane and road closures, detours, etc., well in advance of planned activities. The Department informs the public through press releases distributed through the media.

The Department prepares a press release at the beginning of a project and at least one week prior to any significant traffic change, such as a major stage shift. Contract specifications generally require that a contractor provide a minimum of seven days notice for major changes to traffic operations, such as lane or road closures, traffic shifts, detours, etc. The Chief Inspector informs the Project Engineer of significant traffic changes.

The press release includes the location of the project, project cost, a brief description of the work and how it will affect the traveling public. It should include the duration the roadway will be affected, as well as any pertinent information that may help alleviate possible delays. If the media should be notified, the preparation of the press release should become a top priority of the project staff. If a detour is involved, the Project Engineer should provide sketches of it. The Project Engineer sends the press release to the Manager of Construction Operations such that it is received at least one week before the planned activity.

If the project cannot provide written notification seven days prior to the event, District supervisory personnel should telephone the Office of Construction with an explanation of the circumstances.

2-903 Daily Traffic Reports

The District provides a daily traffic report that is sent to the Department's Operations Center and to Public Relations so that radio announcements can be made. The Chief Inspector telephones the District by 8 A.M. so that the information can be compiled and distributed by 8:15 A.M. for the day's work.

2-904 Weekly Traffic Reports

The Public Relations Office publishes a statewide Weekly Traffic Report for internal use that lists allowable, temporary lane closures. Project Engineers must submit update information to the District Traffic Report Coordinator. The Coordinator gathers information from all District projects and forwards it to the Public Relations Office.

2-905 Specifications

2-906 Maintenance and Protection of Traffic

“Maintenance and protection of traffic” may refer to Article 9.71 of the *Standard Specifications*, titled “Maintenance and Protection of Traffic,” or to the scheme for maintaining and protecting traffic in the contract plans and special provisions.

2-906A General

Traffic control is governed by the scheme for maintaining and protecting traffic in the plans and special provisions or, if there is no scheme, by the provisions in Article 9.71 of the *Specifications*. The contractor may request to deviate from either the scheme or *Specifications*. If a scheme exists, the contractor may offer an alternative that involves no additional cost to the Department and is acceptable to the Engineer. If the contractor wishes to deviate from the *Specifications*, a schedule may be submitted showing a proposed sequence of operations and a compatible method of maintaining traffic. The submission must be in writing, with suitable documentation to delineate cost savings or safety-effective measures that will be accomplished by the change.

Any request for a deviation in the specification for maintenance and protection of traffic must be approved by the Office of Construction prior to implementation. A copy of the written request from the contractor (and any other pertinent information) is faxed to the District Liaison Engineer and, if appropriate, to the Office of Traffic for review. The Office of Construction contacts the assigned traffic engineer for assistance in reviewing the request, and the District is contacted once the review is complete.

The contractor supplies a list of employees who will be responsible for performing necessary corrective work during and after normal working hours. This list should be made available to local or State police so the contractor can be contacted in emergency situations.

When a District reviews construction plans, consideration should be given to whether solid lane lines would be beneficial to traffic flow during stage construction operations. If the District feels solid lane lines would be beneficial, it should be brought to the attention of the responsible designer so that appropriate plans can be provided.

Approval from the State Traffic Commission (STC) is needed for most reduced speed limits. STC approval may be needed for signalization and other temporary traffic control measures if they are not directly related to the construction activities.

2-906B Payment

Inspectors' Daily Reports should list all items chargeable to the Maintenance and Protection of Traffic item.

The contract item Maintenance and Protection of Traffic is paid for as a lump sum. Generally, the item covers operational costs for material and devices furnished by the contractor under other contract items. Specifically, the price includes all costs for labor, equipment and services involved in the erection, maintenance, moving, adjusting, cleaning,

relocating, and storing of signs, barricades, drums, traffic cones, and delineators furnished by the contractor, as well as all costs involved in the maintenance of traffic lanes and detours.

The item Maintenance and Protection of Traffic does not include the costs for furnishing and placing pavement markings; furnishing signs, drums, barricades, traffic cones, and delineators; or furnishing and placing borrow, gravel fill, crushed stone, bituminous concrete for patching, and pipe. These items are paid for under the appropriate contract items. If contract items necessary for maintenance and protection of traffic are not included in the contract, plans, or special provisions, then the necessary items are paid for as extra work.

The standard policy for proportional payments paid monthly under the contract item is to divide the number of contract days into the lump-sum dollar amount of the item and multiply the result by the number of contract days in the month. The monthly payment should be adjusted up or down based on the following.

- The contractor does not perform during the winter shutdown period and no maintenance and protection of traffic work is performed.
- It is foreseeable that the contractor will not complete the contract within the allowable days, and the delay is the result of contractor operations.

2-906C Contractor Nonperformance

The District Office should be notified immediately if the contractor will not correct a deficiency in the maintenance and protection of traffic. A meeting is held with the Project or Supervising Engineer, the Inspector, and the contractor to determine the corrections required. The provisions of Articles 1.07.07 and 9.71.01 of the *Standard Specifications* are reviewed with the contractor.

A time frame is given to the contractor to perform the work. If the contractor fails to perform the work within the required period, the State may perform or arrange for others to perform the work. The cost of the work performed by the State or others is deducted from the contractor's payment estimates.

2-907 Public Safety

Unless otherwise provided for under the contract, the roadway and its appurtenances must be kept open to traffic from the beginning of construction operations until final acceptance of the project. The contractor is responsible for keeping the portion of roadway under construction in such condition that traffic will be adequately accommodated, except for the removal of snow and ice, which is the responsibility of the Department.

The contractor is responsible for keeping the section of road being used by the general public free of irregularities and obstructions of any character that present a hazard or annoyance to them. Unless otherwise provided for under the contract, the contractor must incur all costs associated with maintenance work until relieved of responsibility. However, if a section of the project has not been disturbed by the contractor, the contractor is not held responsible for any incurred costs for repair of the undisturbed section. Payment in this case is as extra work.

2-908 Potholes

All necessary precautions must be taken to protect the traveling public during patching operations. The Chief Inspector must keep proper documentation of the location of the pothole, amount of labor and equipment hours and total quantity of material placed.

2-909 Roadway Trenches

Any section of roadway under construction that is being used by the traveling public must be maintained free of potholes, ruts, trenches, bumps or ridges. At the end of the work day any closed section of roadway returned to the traveling public must be brought back to its proper grade. The final 2 in. (50 mm) must be completed with temporary cold patch material or hot bituminous concrete mix.

2-910 Low Bridge Clearance

The Bridge Safety Unit inspects bridges for vertical clearances. Both bridges within the project limits and bridges on project detours need to be inspected. Signage must be posted in advance of a structure that does not meet clearance standards, to forewarn traffic of the overhead clearance.

2-911 Storage of Equipment and Material

The contractor is required to store or place equipment and materials in locations that are not hazardous to the traveling public. The contractor must place or store material and equipment 30 ft. (10 m) or more from the edge of the travelway. An alternative is to locate the material and equipment behind a barrier system. If the alternative is used, the equipment and material must be a minimum of 3 ft. (1 m) farther away from the barrier than the barrier's maximum deflection. Figures 2-9.7 and 2-9.8 provide characteristics of operating guide rail and median barriers, respectively.

The storage requirements apply to construction signs, traffic drums, cones, etc., if not in use for lane or shoulder closures. These devices should be broken down and stored as described above. They should not be stored by leaning them against the traffic side of bridge parapets, rails or concrete barriers. It is not acceptable to place signs in a grassy area, turn them backwards or sideways, and not break them down.

At the end of each work day, all temporary construction signs must be picked up and removed to a safe storage area. If a signing pattern is to be reinstalled daily, suitable temporary marks should be placed on the roadway surface to ensure the repeated placement of the proper sign at the proper location.

2-912 Removal and Reinstallation of Rail Systems

Contract items for removing and resetting existing rail systems must be completed at the end of each work day for every linear foot (meter) run where a hazardous situation exists. Situations that could present a hazard are offsets less than 30 ft. (9 m) from the edge of a travel lane, steep or vertical drop-offs, or fixed structures.

2-913 Limitation of Operations

A construction project on existing highways affects the traveling public. The Department has committed to the public to perform the work with minimum impact. Thus, limits are placed on the period the contractor can interfere with traffic. Limitations are based on the traffic volumes on a section of highway.

“Limitation of Operations” is the title of Article 1.08.04 of the *Standard Specifications*, concerned with conducting the work so as to produce the least interference with traffic. Specific limits on contractor operations, such as permissible hours of operation, are described in the contract's special provisions.

If called for by the contract, the contractor develops contingency plans for unanticipated problems such as equipment breakdowns, lack of material, etc. The plans must be approved by the District Office.

2-913A Requests for Changes

Requests to change the limitation of operations specifications for a project must be submitted in writing, through the District Office, to the Office of Construction. A request must follow the guidelines below.

- The request must include a description of the work to be performed, the reasons for the change, and any pertinent information regarding dates, times, and duration.
- The request must be submitted with enough time for it to be reviewed and a press release issued.
- The contractor must attach a copy of the pertinent specifications and indicate the sections that are proposed to be changed.
- The District must include a copy of the most recent hourly traffic counts by week and include any comments concerning the request. The District can request the traffic counts from Traffic and should maintain a file of the counts in the District for reference.
- The District must attach any previous press release that approved the same request as the current one.
- The District must include the detour route, if a detour is required. If a local road is to be detoured or used as part of the detour route, the District must attach the concurrence of the towns affected. The concurrence must be in writing.
- The District shall consider taking credit from the contractor when the change in specifications would allow the contractor an advantage in completing contract work under less restrictive terms (fewer days, fewer stages, day instead of night work, etc.).

The checklist shown in Figure 2-9.9, Request for Change to Contract Traffic Specifications, is used for compiling the information needed for a request. Approved requests are only for the dates and times specified in the approval.

2-913B Expressway Projects

All lanes must be open on expressway projects during the peak hours of 6:00 A.M. to 9:00 A.M. and 3:00 P.M. to 6:00 P.M., Monday through Friday. In addition, expressway projects include holiday restrictions. Contract special provisions list the holidays.

2-913C Inspection

As construction progresses, project personnel should monitor all activities that may affect traffic operations. The Chief Inspector must review the contractor's plans daily to ensure that scheduled work can be completed and that the roadway can be opened to traffic within the period allowed by the contract.

The inspection staff must monitor the contractor's production rate to assure completion within the allowable time limits. If it becomes apparent that the contractor will not be able to open the roadway as required, the inspection staff must notify the contractor in writing to modify operations so that the roadway can be reopened on time. In addition, the inspection staff must notify the District Office of the problems encountered and actions being taken by the contractor, so that further action and direction may be taken if needed.

For example, a contractor may have a six-hour period in which to pave two lanes of a roadway. The Inspector should act, if at the end of two hours and 45 minutes, it is apparent that the contractor will not reach his planned ending station for the day's paving, and the contractor shows no sign of ending the first pass and beginning the second pass. The

Inspector should give written directions to the contractor to end the first pass, begin the second and be off the road by the time stipulated in the contract. At the same time, the Inspector should notify the District of the problem.

When notified of a potential problem, the District must evaluate the actions being taken and determine if other action is required. District supervisory personnel (Project Engineer or Supervising Engineer) should be dispatched to the site to ensure all possible corrective actions are being taken. The District must determine whether the actions are sufficient to clear the roadway in time and, if they are not, immediately notify the Office of Construction. The notification should be made by telephone to the Supervising Engineer for the respective District or, if not available, any Supervising Engineer in the office. If the District feels the actions are adequate, no notification is necessary, but the project should be closely monitored to ensure further problems do not develop.

2-913D Liquidated Damages

If the contractor violates the limitation of operations provisions of the contract, the District must immediately investigate the facts surrounding the violation. At a minimum, the investigation should consider the following.

- Did the contractor (and Inspector) adequately plan the work?
- Was progress monitored and were adjustments made during the day to ensure timely completion?
- Was the contractor directed to alter the work to ensure timely completion? Was it in writing? Did the contractor comply?
- Were there any mitigating circumstances (equipment breakdowns, accidents, etc.)?
- Could anything different have been done to avoid interference with the traffic during restricted periods?
- What was the duration of the violation of the limitation of operations provisions? What was the impact of the violation (length of backup, amount of congestion, etc.)?

On completion of the investigation, the District must submit a complete report to the Office of Construction. The report should include all details relevant to the incident and a recommendation on whether a sanction should be applied. Sanctions include daily liquidated damage charges, if applicable. Administrative actions may be taken as deemed appropriate. The District must substantiate the reasons for its recommendation. The report and recommendation must be submitted within three working days of the incident.

It is not the intention of the Department to penalize contractors for minor infringements of the contract limitations or for incidents that do not adversely affect the motoring public. The procedures must be followed, however, when the contractor's operations violate the contract provisions and cause a significant impact on the flow of traffic.

2-914 Speed Limits

If a reduced speed limit is desirable over an extended period, the Division of Traffic Engineering prepares a report for the approval of the State Traffic Commission (STC). If it is approved, the reduced speed limit becomes effective when the signs are posted. The signs are the standard black-on-white speed limit signs. For long-term activities, the signs for the normal speed limit should be removed.

STC approval is not needed for activities extending over a portion of a day. Orange-and-black speed limit signs are used for posting the reduced speed limit.

The Office of Construction can request the STC to grant immediate approval of a reduced speed limit for an unforeseen situation. A special meeting will be held to approve the new temporary speed limit. The signs used are the standard black-on-white signs.

2-915 Business Access

Construction projects can significantly affect access to businesses. Project personnel must be proactive in mitigating business disruptions.

- Several days before construction affects a business, the Chief Inspector or Project Engineer should meet with the businesses that will be affected and explain what will be done, how long it will take, how business access will be maintained, etc.
- If detours or street closures will be implemented, signs stating, “Business Open—Local Access Maintained,” must be provided.
- In all cases, access is maintained to all business properties. If necessary, temporary driveways are constructed. Temporary access is paved if it is in use for more than five days or through a weekend.

The Inspector should give special attention to ensuring business access is signed properly. Signs should be Code D-7 signs (“Business Access” signs) for both temporary and permanent access in construction areas. The signs should be installed on posts at heights that allow the signs to be visible but that prevent the signs from interfering with sight distances. In areas of two-way traffic, the signs should be mounted back to back so that one is visible from each direction.

2-916 Traffic Control Patterns

Traffic control patterns are used for the following:

- to divert traffic on all types of roadways away from a specific work zone,
- to protect work crews and inspection personnel from motorists entering a work zone,
- to maintain traffic at reasonable speeds around or through a work zone, and
- to alert or warn motorists of a work zone and to lead them through it.

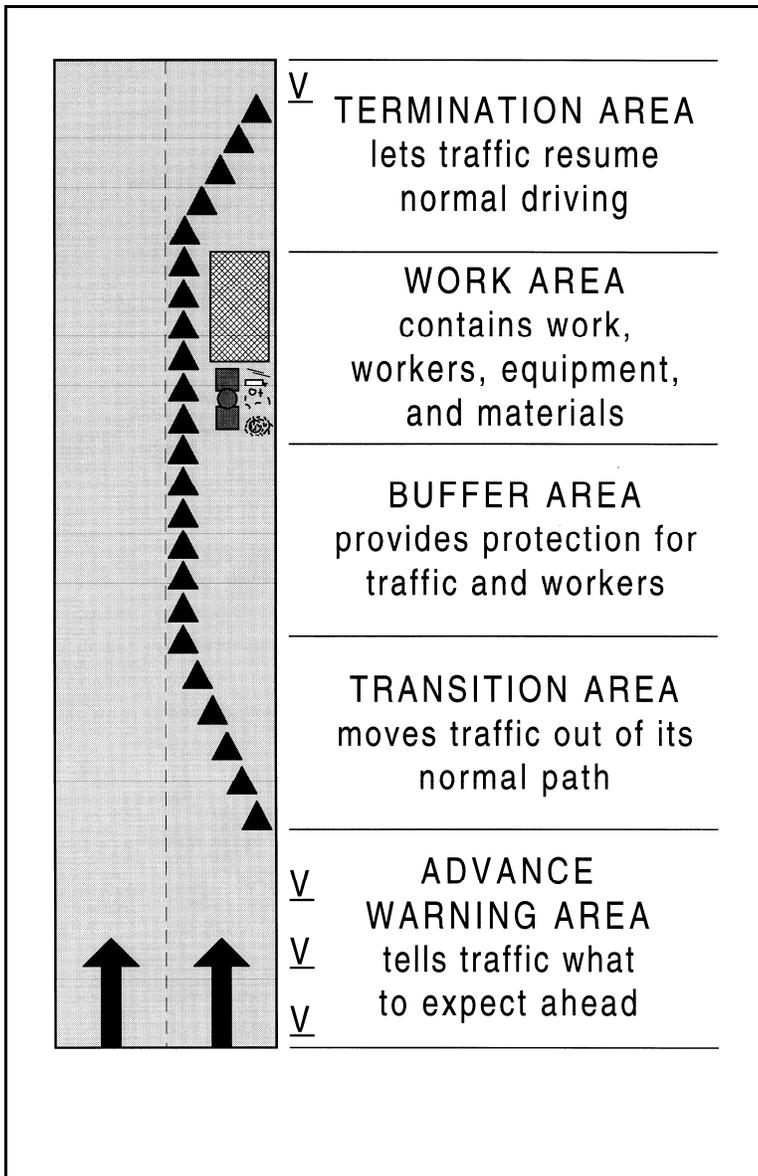
Project plans and special provisions may contain both standard and custom traffic control patterns. The details spell out types and locations of signs and other channelizing devices. Some standard traffic control patterns are shown in Figures 2-9.12 through 2-9.40. They illustrate typical situations. Figure 2-9.1 illustrates terms that apply to work zone traffic control patterns.

Actual field conditions must be considered before applying the patterns. Adjustments may be made by the Engineer before placing a pattern, as explained later in this section. During placement, any existing signs that are in conflict with the traffic control pattern should be removed, covered or turned so that traffic can not read them. After placement, the Inspector should review the pattern from a motorist's standpoint and direct the contractor to make any required adjustments to achieve a safe working pattern.

2-916A Temporary Patterns

Figure 2-9.1

Terms for Work Zone Traffic Control Patterns



A temporary traffic control pattern normally is in effect for the period allowed within the limitation of operations for daily traffic, typically 6 to 12 hours. The contractor must schedule operations and equipment to set up, maintain, and remove a temporary traffic control pattern within the allowed period. A temporary traffic control pattern consists of a combination of the following:

- construction signs mounted on legs
- trailer-mounted arrow boards
- trailer-mounted changeable message signs
- traffic cones
- traffic drums
- portable impact attenuation systems located at the work site

Custom signs may be required and effective under specific conditions or locations. After a temporary pattern is in effect, it should be checked periodically by both the contractor and inspection personnel for corrections or replacements.

2-916B Permanent Patterns

Permanent traffic control patterns are those that are not taken down on a daily basis. They are in place 24 hours a day. Permanent patterns consist of the same combination of channelizing devices as for temporary patterns, together with post-mounted construction signs and secured arrow boards or changeable message signs.

Typical lead-in post-mounted signs must be installed prior to implementation of a stage shift or extended closure. The signs should be covered

until the pattern is affected. Cones, drums and leg-mounted signs should be properly weighted for extended use. Permanent sign patterns can include barricade warning lights on post-mounted signs and channelizing devices at the discretion of the Inspector.

Permanent sign patterns must be monitored at least weekly for any repairs or alterations. Arrow boards and changeable message signs must be protected by either portable concrete barrier curb or sand barrels.

2-916C Detours

Traffic control patterns for detours often are customized for the location and geometry of the detour. Detour plans usually are included in the contract specifications and drawings. It is important that detour signing and delineation is explicit, and it must guide the motorist back to the original route without confusion. Post-mounted signs should be large enough, contain minimal wording, and be placed at locations so that the motorist can be prepared to follow the prescribed detour.

2-916D Night Patterns

Traffic control patterns for standard lane closures are essentially the same for day and night operations. It may be necessary to adjust the spacing between channelizing devices at night to compensate for reduced visibility. It may be advisable to use additional arrow boards or changeable message signs and portable impact attenuation systems at night if the highway geometry and conditions warrant use. During nighttime operations, the contractor's vehicles are prohibited from traveling against traffic when their headlights are on and they are within a traffic control pattern.

2-916E Adjustments

The standard traffic control plans and patterns indicate the locations and spacings of signs and devices under ideal conditions. It is desirable to have signs and devices installed as shown on the standard plans and patterns, but sometimes adjustments are needed.

Adjustments to the standard signing plans and patterns can be made only at the direction of the Engineer. Installations should consider abutting properties, driveways, side roads, and the vertical and horizontal curvature of the roadway. If adjustments are made to the standard patterns, the adjustments should be to improve the visibility of the signing and devices and to control traffic better.

The Engineer may require that a traffic control pattern be located significantly in advance of the construction work site to provide better sight line to the signing and safer traffic operations through the work zone. The Engineer may order the spacing between signs and devices to be increased or decreased as conditions dictate.

Any adjustments in the traffic control patterns are done by the contractor's forces and are at no extra cost to the State. Additional signs or devices required by the Engineer are paid at the contract unit prices for the items involved.

2-917 Tapers

A taper intended to shift traffic should be installed on a tangent section of roadway. Taper lengths may be reduced by the Engineer to a minimum of:

For speed limits greater than 40 mph (65 km/h)

$$L = \frac{W \times S}{1.6} \quad (L = W \times S)$$

and ,for speed limits of 40 mph (65 km/h) or less, to a minimum of:

$$L = \frac{S \times S \times W}{155} \quad (L = \frac{S \times S \times W}{60})$$

- where: L = taper length in feet (meters)
 S = speed limit in miles per hour (kilometers per hour)
 W = lateral shift (width of lane or offset) in feet (meters)

2-918 Buffer Space

A buffer space should be provided between the transition taper and the work area. It should be free of equipment, workers, material and parked vehicles. On multilane highways with posted speeds of 45 mph (72 km/h) or more, the length of the buffer space should be at least 350 ft. (110 m).

2-919 Sign Placement

Signs usually are placed on the right side of the roadway. However, if a traffic lane is impeded on a multilane highway, signs should be installed on both sides of the roadway, if the median width is sufficient. On one-way roads, such as off ramps, the same sign may be installed on both sides of the road, if the sight distance to the sign on the right side is restricted.

2-920 Inspection Responsibilities

The contractor furnishes signs, barricades, traffic cones, and traffic delineators to forewarn traffic of the construction. The State or the contractor provides the pavement markings, warning devices, and signs needed to safeguard and guide the traveling public through detours ordered by the Engineer or included in the approved scheme for maintenance of traffic. The contractor erects, maintains, moves, adjusts, relocates and stores the signs, barricades, traffic cones and delineators when, where and as directed by the Engineer.

The safe and proper handling of traffic is the contractor's responsibility. It is the responsibility of the State inspection forces to see that the contractor provides for the safe movement of traffic. However, inspection forces should be careful not to issue instructions that shift the burden of responsibility to themselves or the State. State inspection forces must enforce the requirements of the contract and call the contractor's attention to any dangerous situations that may arise.

The Chief Inspector supervises the handling of traffic when traffic is maintained over all or a portion of the project. The Inspector's goal should be to ensure safety and minimize delays and inconvenience to the traveling public and to adjacent property owners and businesses consistent with the prosecution of the work. The Inspector sees that the traveled roadways are of sufficient width, drained, reasonably smooth, and in suitable condition at all times.

The Chief Inspector must maintain good records of installed traffic control patterns. The records should include dates and times of day that inspections are made, statements of conditions found, a complete list of the types, sizes and locations of devices, orders to the contractor to make changes or corrections, the times and dates devices are removed or modified, photographs of installed patterns that are expected to remain for long periods, and comments explaining variations from standard procedures. The records are maintained in the Inspector's Daily Report. Traffic control is a contractual responsibility of the contractor, but the State could also become liable due to its actions or inactions.

2-920A General Inspection

The items below are part of the overall inspection responsibilities for construction traffic.

- The Inspector must review the contract plans and special provisions relating to maintenance and protection of traffic. The Inspector must review the construction site for problem areas so that needed adjustments or improvements are identified.
- The project must be reviewed before erecting signs. The Chief Inspector should make suggestions, through the Project Engineer to the Assistant District Engineer, for special conditions not anticipated in design needed to improve the safety of the work force or the traveling public. The Engineer should direct special attention to signing for business access. All changes in the contract requirements must be approved by the Division of Traffic or the consultant designer.
- Throughout construction the Inspector must monitor the signs, flashers, drums, cones, pavement markings, delineators, etc., and direct the contractor to repair and maintain the devices as necessary. The Inspector should ensure that all devices are properly spaced, clean, the correct color, and as reflective as required. Periodic inspections should be made during both the day and night.
- The Inspector ensures that the traveling public is treated in a courteous manner by the trafficperson, inspection forces, and contractor's forces.
- Special attention must be paid to the construction area and its approaches after winter storms. If traffic devices are displaced, damaged, or dirtied by snow removal operations, they must be made serviceable as soon as possible.

2-920B Traffic Flow

Traffic flow should receive special attention from project personnel because of its importance and because of the Department's commitment to minimize interference with traffic. The Inspector must, at a minimum, follow the guidelines below:

- review signing patterns when they are established;
- periodically inspect signing and the resulting traffic queues during the work day;

- adjust or add signs to improve traffic flows and to reduce impacts;
- notify the District Office of significant problems; and
- review the use of trafficperson and add trafficperson if needed, such as at signalized intersections.

If significant traffic backups occur, the Inspector should consider ordering the contractor to reopen closed lanes to allow traffic to pass, but only if the lanes can be reopened safely. If practicable, adjustments should be made to the construction process to minimize effects on the traveling public and on the adjacent property owners and businesses.

If significant problems occur, the Inspector should notify supervisory personnel or the District Office. If additional help is needed, the District Office should request it from the Office of Traffic.

2-920C Lane Closures

A traffic control pattern must be installed before starting any contract operation that interferes or conflicts with any travel lane or shoulder. To provide for traffic control during lane closures, the guidelines below should be followed.

- The contractor must inspect all traffic control devices daily and correct any deficiencies.
- Existing pavement markings and signs must be removed, covered, or turned so that traffic cannot read them, if they conflict with the traffic control plans or contract drawings. At the completion of the project, the existing striping and signage must be reestablished as directed by the Engineer.
- Traffic control devices that are not needed for current work must be removed or covered from the sight of motorists.
- The contractor is required to install and remove all temporary pavement markings during and between construction stages, as indicated on the plans or as ordered by the Engineer.
- The contractor is responsible for maintaining a clear and safe travelway for vehicles. Storage of material, equipment, or debris outside of the designated work area is not permitted.
- If work on adjacent projects is occurring simultaneously, the contractor must maintain coordination for proper traffic flow.

2-921 Detours

The Contract provides a detour when a portion of a State highway is closed because of construction or reconstruction.

2-921A Detour of a State Highway to a Town Road

The procedure below is for a detour of a State highway to a town road.

- The need for a detour is determined during the preliminary review of the plans for the proposed construction. The Manager of Traffic Engineering selects the layout of the detour.
- The Manager of Traffic Engineering informs the appropriate town official of the pending detour. (Additional information is provided to the town officials later in the process.)

- The Manager of Traffic Engineering arranges a meeting with the town official and the District Maintenance Manager to select, inspect, and agree on local roads to be used for the detour.
- The designer, in conjunction with the Office of Construction, decides on including the detour signing and temporary roadway improvements in the contract or having them performed by the Office of Maintenance.
- The District Engineer sends correspondence about the detour schedule to the principal administrative town official and the local fire and police departments. In addition, the District Engineer notifies the District Maintenance Manager and notifies the public transportation companies and ambulance services operating within the area that may be affected by the detour. The District Engineer keeps these parties informed of any changes concerning the detour during its use, as well as notifying them of the detour's termination.
- After the detour is no longer required, the town road is restored to a condition comparable to that existing before the detour was established. Preliminary and final condition reports of the roadway are performed.

2-921B Detour of a State Highway to Another State Highway

The same procedure is used for a detour of a State highway to a State highway as is used for a detour of a State highway to a town road (see above), except that it is not necessary to consult the town officials.

2-921C Detour of a Town Road to Another Town Road

The same procedure is used for a detour of a town road to a town road as is used for a detour of a State highway to a town road (see above), except for the following:

- The principal administrative town official requests the Commissioner, in writing, to establish a detour diverting traffic from the town road.
- It is not necessary to consult with the town official concerning maintenance or other work on the road used as a detour.

“Principal administrative town official,” as used here, refers to the Mayor or City Manager of a city, Board of Selectmen or Town Manager of a town, or Warden of a borough.

2-921D Temporary Detours

The District Engineer, with the concurrence of the Office of Construction, may establish temporary detours that do not exceed 48 hours duration. The District Engineer determines the sign requirements for temporary detours and is responsible for placing and removing the signs. After a detour, the District Engineer ensures that the local roads are restored to conditions at least as good as those prevailing before the detour.

On establishing a temporary detour, the District Engineer notifies the appropriate town officials, who in turn, inform the local fire and police departments. In addition, the District Engineer provides the dates and hours that the detour will be in operation to the Manager of Traffic Engineering and the public transportation companies and ambulance services operating in the area.

2-921E Detour Operations

A detour can be made operational after all required agreements are executed; traffic control signing is installed; local officials, fire, police, etc., are notified; and the contractor is ready to start work. The Chief Inspector on each project must:

- inspect the location of all construction, warning and detour signs erected to ensure that they are properly installed; and
- arrange for the maintenance of the detour to safeguard the public against any hazards arising out of its use.

2-922 Construction Signs

2-922A Signs

Construction warning signs are furnished and erected by the contractor. The number, size and type of signs are set forth in the plans and special provisions.

The sheeting for signs used on expressway projects must be wide-angle reflective sheeting. The sheeting for other signs is encapsulated-lens reflective sheeting. One type of sheeting must be used throughout a project. If a project is predominantly an expressway project, with some work at ramp terminals or over at-grade roads, the wide-angle sheeting is used.

The use of unauthorized or unapproved signs is not to be permitted. All signs in any one signing pattern are mounted the same height above the roadway. Care should be taken so that weeds, shrubbery, construction materials, or equipment is not allowed to obscure any sign, light or barricade. Signs that do not apply to existing conditions should be removed or adjusted so that the legends are not visible to approaching traffic.

All legal signs closing the roadway to traffic, as shown on the plans or directed by the Engineer, must be erected before starting any work on the project. The signs remain in place until the final inspection has been held and all corrective work has been completed.

When construction warning signs are no longer required, the Assistant District Engineer or a representative directs the contractor to remove the signs. The contractor must remove them promptly.

2-922B Ordering

The Inspector should review the plans and specifications to determine if the types and quantities of signs are sufficient to do the work and are included in the contract. The Inspector should address any special conditions not addressed in the plans.

The Inspector should conduct a field review of all sign locations for possible conflicts and advise the contractor of changes. The Inspector should consult with the Engineer if changes are made to the signing and the effectiveness of the signing is questionable.

2-922C Placement

In determining the locations of the signs, the horizontal clearances should be checked to ensure that the signs will not be obstructed by other objects. Placement of the signs should be in accordance with traffic standards.

A field review of the signs should be made by both day and night to ensure that the project site is properly signed and that signs are legible and in good condition. Damaged or missing signs should be replaced as needed in a timely manner.

Review contract specifications for details of measurement and payment. Make necessary measurements for payment to the contractor.

2-922D 16-Series Signs

16-Series (“Construction Ahead”) signs must be installed on all projects. They should be installed on all roadways that enter the project limits. The signs should be installed in advance of traffic control patterns and, if practicable, at locations that allow the traveling public to exit the roadway before entering the project work limits. The sizes of the signs are as shown in the contract documents. The signs must be installed before any work can commence on the project and must not be removed until the contractor is relieved of physical responsibility for the project. Additional information about 16-Series signs is in Figure 2-9.10.

There are several types of construction projects that require legal blocking of the highway during the time the contractor is actively engaging in the work. The activities move quite rapidly along the highway, and there is no need for the semi permanent erection of 16-Series signs at both ends of the projects. For example, on joint sealing contracts the 16-Series signs are erected each morning and taken down at the end of the day's activities. The signs are erected the following working day and again taken down at the end of the working day. The location of the signs moves day to day as the contractor progresses in the work.

2-922E Inspection

Some important inspection guidelines about contractor-furnished signs are:

- The signs installed should be used in the position and for the purpose designed. Field changes should be made only after consultation with the District Office and the Division of Traffic.
- Individual signs should be used only if the wording is appropriate. Indiscriminate use of signs can be dangerous and confusing.
- Frequent checks by field forces should be made to ensure signs are in place, are legible, are lighted as needed, and are used only as authorized.
- If signing is needed for a detour or other specific situation, check with the District Office for plans from the Division of Traffic.
- There should be no delay in signing or re-signing situations as they develop.
- Advance detour signs used during intermittent periods of construction should be removed when they are no longer appropriate.
- Signs, barricades, and other channelizing devices used to control and direct traffic at temporary connections to sections of completed construction must be sufficient to provide for safe, continuous traffic movement at a reasonable speed.
- Partially completed sections of highway that are not officially open to traffic should be effectively closed with barricades.

The Chief Inspector ensures that all traffic directional signs are preserved. If they are disturbed by construction, the Inspector should have them reset as often as needed, so that they are visible and of use to traffic.

2-923 Barricade Warning Lights

In addition to what is required in the contract, the Engineer determines if any changes of barricade warning lights are needed. Temporary highway illumination should be a major consideration on detours, stage construction of structures, ramps, and local roads during construction. Traffic or the consultant designer should approve any changes.

The contractor furnishes and securely fastens the units to signs, barricades, and other objects in the numbers and for the lengths of time ordered by the Engineer. The contractor maintains and relocates the units and, upon final removal, disposes of them. Traffic devices should be kept clean and replaced if damaged.

2-924 Extended Shutdowns

If a contractor plans an extended shutdown (over 30 days) on projects such as signing, illumination, planting, etc., the District Engineer notifies the Manager of Construction Operations, who advises the Manager of Traffic Engineering. With the written concurrences of the contractor's insurance carrier, the Manager of Traffic Engineering may recommend the temporary removal of the construction signs. If the Manager of Construction Operations approves the recommendation, the District Engineer responsible for the project is directed to remove the construction signs as soon as possible after the temporary shutdown has been granted by the Office of Construction.

2-925 Changeable Message Signs

2-925A Portable Signs

Portable changeable message signs (PCMS) can display a variety of messages. They are used most frequently in high-density urban freeways but may be used on any road if highway alignment, traffic routing, or other conditions require advanced warning and information.

PCMSs typically are used in temporary traffic control to advise drivers of the following:

- ramp, lane or roadway closure;
- substantial drops in traffic speed;
- significant queuing and delays;
- adverse environmental conditions;
- changes in alignment or surface conditions; and
- accidents or incidents.

The contractor furnishes and maintains a trailer-mounted changeable message sign at the locations indicated by the plans or by the Engineer. The Inspector should direct the contractor to place the sign so that it is visible at least ½ mi. (0.8 km) in advance of the work zone. Other guidelines for placement are below.

- PCMSs typically should be placed in advance of any other traffic control signing and should not replace any required signing.

- If a PCMS is used for route diversion, it should be placed far enough in advance of the work site to allow traffic ample opportunity to exit the highway.
- PCMSs normally are placed on the shoulder. If practicable, they should be placed farther from the traveled lane.
- If two PCMSs are needed to communicate multiple messages, they should be placed on the same side of the road, separated by at least 1000 feet (300 meters).

The Inspector should refer to the traffic control plans included in the contract for the message that should be displayed. The Inspector may order the contractor to change the message as deemed necessary. PCMS messages should be readily understood by drivers and, thus, allow them adequate time to react. Guidelines for PCMS messages are:

- No more than two displays should be used within any message cycle.
- Each display should convey a single thought.
- Messages should be as brief as possible.
- Any abbreviations used should be readily understood.
- The entire message cycle should be readable at least twice at the posted speed, 85th percentile speed prior to starting work, or the anticipated operating speed.
- Messages must not scroll horizontally or vertically across the face of the sign.

A changeable message sign should not be used to provide a static message that can be as effectively communicated with a standard construction sign. For example, a changeable message sign should not be used to display “Road Construction Ahead” continuously. A changeable message sign should be discontinued as soon as the condition requiring the message is removed from the travelway.

The Inspector establishes a log of the message that is being displayed, the time, and the duration. The log should be included in Volume IV. The Department pays for the sign at the contract unit price per day that the sign is in operation. If a sign is in operation for part of a day, payment is for a full day.

2-925B Permanent Signs

There are permanent changeable message signs throughout the State. The signs may be used to forewarn drivers of work site activities. The Project Engineer should contact Traffic Operations in Newington to determine whether one of the signs should be used.

2-926 Arrow Boards

Arrow boards may be used in either the chevron mode or the caution mode. In the chevron mode, the arrow board displays a series of moving chevrons. The mode may be used for stationary or moving lane closures. In the caution mode, the four corner bulbs of the arrow board are set to flash. The mode should be used only for shoulder work, blocking the shoulder, or roadside work near the shoulder.

For a stationary lane closure, the arrow board should be located on the shoulder at the beginning of the taper. If the shoulder is too narrow for the arrow board to be completely off of the closed lane, it should be placed to use as much of the shoulder as practicable.

Arrow boards must not be used on a two-lane roadway for temporary one-lane operations. They must not be used on a multilane roadway to shift all lanes of traffic because unnecessary lane changing may result.

2-927 Channelizing Devices

2-927A Barricades

Type III barricades generally are used for the following:

- to temporarily block and secure a construction site from traffic during on and off peak hours,
- to delineate a road or bridge closure in conjunction with signing and flashers, or
- to temporarily close ramps.

Type III barricades should not be used as physical barriers to stop traffic completely. If a road or bridge closure or project contains a hazard where vehicles may enter the work zone, a solid concrete barrier system should be used. The number and position of Type III barricades may be varied by the Engineer to best suit field conditions.

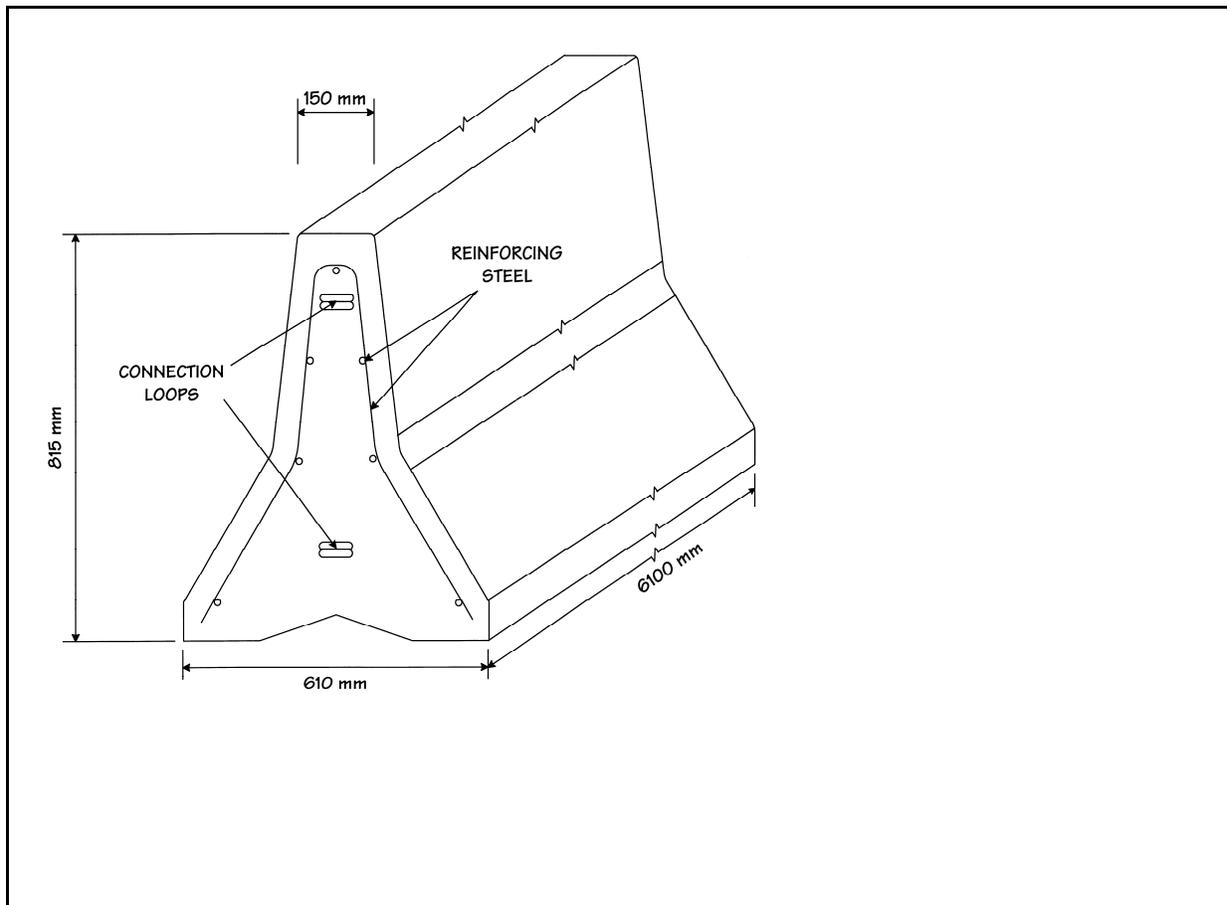
2-927B Temporary Precast Concrete Barrier Curb

Temporary precast concrete barrier curb (TPCBC) is used for the following:

- to channelize traffic through a work zone,
- to protect a work site from adjacent traffic,
- for extended road or bridge closures, and
- to protect a temporary installation of an arrow board or changeable message sign.

Figure 2-9.2 shows a section of TPCBC.

Figure 2-9.2 Temporary Precast Concrete Barrier Curb



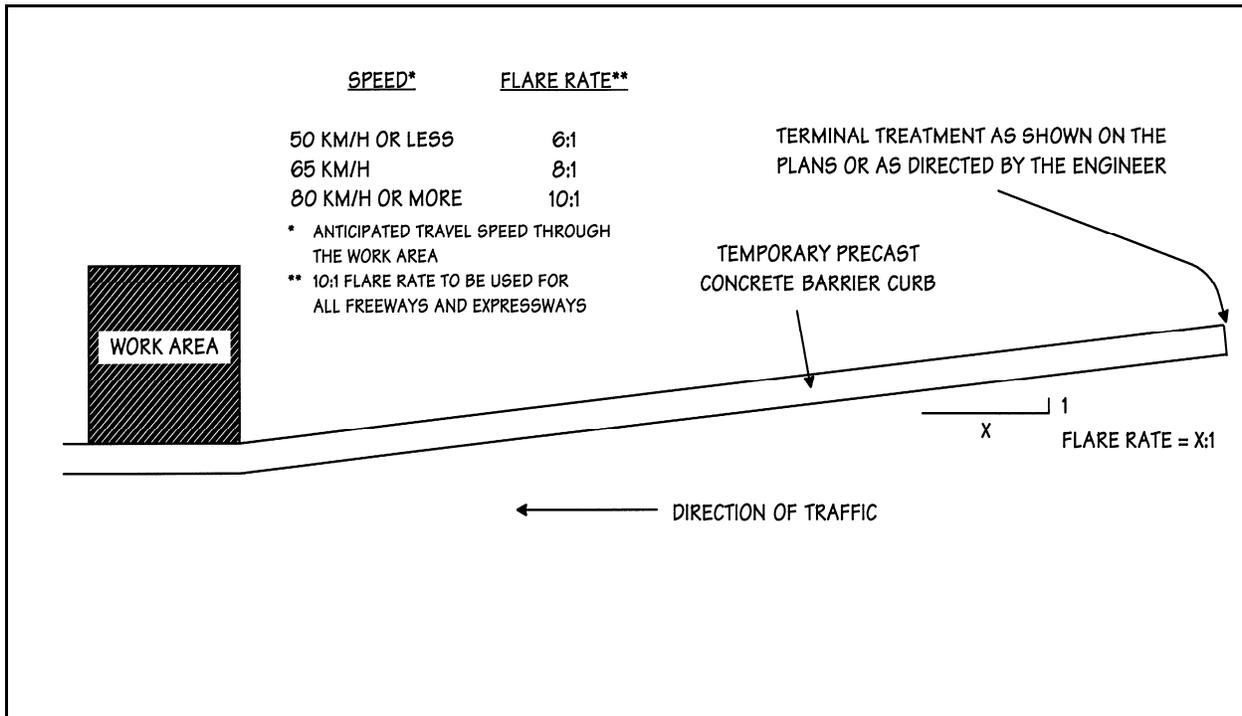
2-927C Installation

A typical TPCBC installation is shown in Figure 2-9.3.

2-927D Taper Length

Taper length is important when installing TPCBC. A rule of thumb is that barrier curb placed on an expressway or major highway is placed with a taper, or flare, of 1:10, a lateral offset of 24 in. (600 mm) for every 20 ft. (6 m) section of barrier curb. The taper should be changed to a larger offset per length only with the approval of the Engineer. Section 2-916E, "Adjustments", includes more information about modifying a taper. The Inspector, with the contractor, should review the field conditions and discuss placement of TPCBC prior to either a standard installation or one as described by the contract drawings.

Figure 2-9.3 Typical Temporary Precast Concrete Barrier Curb Installation



2-927E Delineation

It is important that temporary barrier curb be delineated properly for nighttime traffic. Field conditions generally dictate placement of DE-7, DE-7A and DE-7C delineators. If a shifted lane with barrier curb extends for a long distance, the required delineators may be reduced to 1 per 0.1 mi. (0.16 km). As a closure is reduced in length, the installations may be adjusted up to 1 per 20 ft. (6 m) length of barrier. Type DE-7C delineators must be used if a temporary barrier separates lanes with traffic moving in opposite directions.

All temporary barriers installed to separate opposing traffic lanes and traffic lanes from the work site should have delineators installed on them as follows:

- if the barrier is placed anywhere on the paved roadway surface, including shoulders; or
- if the barrier is off the paved surface but within 12 ft. (3.5 m) of the edge of a travel lane.

Highway or street illumination does not negate the need for the delineators.

The delineators must be Type DE-7, DE-7A, DE-7B or DE-7C, depending on the location at which they are installed. Silver delineators must be used to delineate the right-hand edge of the roadway, and yellow delineators must be used to delineate the left-hand edge of the roadway. If barrier is relocated, the type of delineator may need to be changed. The delineator change must be made the same day the barrier is relocated.

2-927F Attachment

TPCBC bridge sections must be affixed to a bridge deck by drilling and grouting dowels. Details for the attachment are in the contract drawings. It is imperative that both PCBC bridge and roadway sections be connected end to end to prevent movement of sections of barrier. The condition of the delineators must be monitored by the Inspector for replacement by the contractor. The Inspector should ensure that all temporary pavement markings are installed prior to using temporary barrier for shifting lanes.

2-927G End Treatments

There are various end treatments for TPCBC, including physical connection to an existing barrier, burying in a backslope, protecting by crash cushions, burying in a berm, or using a tapered or ramped concrete end section. Ends of barriers must be adequately treated using one of the prescribed systems.

2-927H Component Inspection for TPCBC

The following components should be inspected regularly.

- *Connection Rods.* Inspect for missing or misaligned rods. Ensure that the rods are not damaged. For older installations, ensure that the cotter pins are installed through the lower end of the connection rod. Figure 2-9.4 shows a TPCBC connection assembly with a threaded connection rod.
- *Connection Loops.* Inspect all connection loops at the end of TPCBC for breaks, cracks, and excessive deformation that prevents proper connection to the adjacent TPCBC section. Replace sections that have loop deficiencies. All barriers must be connected.
- *Concrete.* Inspect concrete for serious damage. Replace damaged sections as needed.

2-927I Payment for TPCBC

There are two possible pay items for TPCBC used for construction traffic control:

- Temporary Precast Concrete Barrier Curb, and
- Relocated Temporary Precast Concrete Barrier Curb.

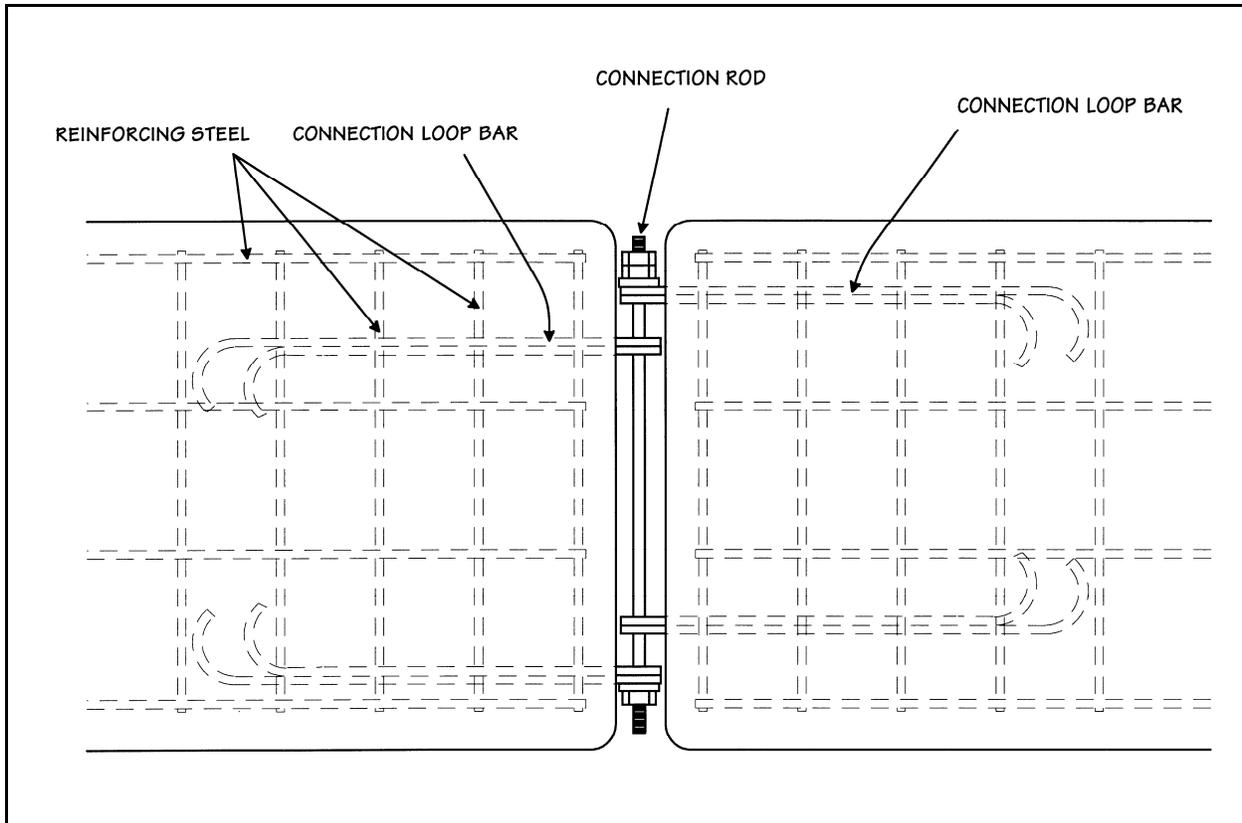
The original installation and final removal of barriers from the work site do not qualify for payment under Relocated Temporary Precast Barrier Curb. Payment for the work is under Temporary Precast Concrete Barrier Curb.

Payment under Relocated Temporary Precast Concrete Barrier Curb applies to the work listed below.

- Each barrier relocation at the work site for stage construction or maintenance and protection of traffic.
- Each removal of the barrier from the work site to a temporary storage area.
- Each retrieval of the barrier from a temporary storage area and installation at a project work site. The work site may be anywhere on the project (or projects for multiple contract projects).

There is no payment for costs associated with the temporary storage of barrier, such as for rental of storage space, rental or lease of concrete barrier, cost of security or insurance, etc.

Figure 2-9.4 Connection Assembly for Temporary Precast Concrete Barrier Curb



2-928 Impact Attenuation Modules (Sand Barrels)

Sand barrels with DE-9 delineators are used for the following:

- to protect blunt ends of temporary PCBC,
- to protect arrow boards and changeable message signs adjacent to travelways, and
- to protect incomplete portions of work.

If sand-barrel arrays are not proposed on the contract drawings but the field conditions warrant the installation, the item will be initiated immediately. Additional barrels can be authorized by the Chief Inspector. There must be no blunt ends at any time in the work zone. Type DE-9 delineators must be installed on the lead sand barrel in any sand-barrel array.

If an unprotected PCBC installation, arrow board, or changeable message sign is within 30 ft. (10 m) of the travelway, a sand-barrel array is required at the blunt or exposed end. The location of the blunt end (expressway, highway or secondary road) and the speed limit determine the number and size of the sand barrels. Guidelines for sand-barrel installations are available in the District. The guidelines use speed limits and lateral offsets for proper placement.

It may be necessary to install a sand-barrel array at a completed bridge parapet or median barrier curb during stage construction until the proposed metal beam rail systems can be completed.

Volume 2

2-929 42 Inch Traffic Cones

42 inch (one-meter) traffic cones are used for the following:

- within any lane closure on an expressway if the pattern extends for a long distance, and
- any nighttime lane closure on any State road.

Figure 2-9.5 shows a traffic cone.

Traffic cones, 42 inches (1 meter) in height should be reflectorized in a manner similar to the current traffic drums. The standard spacing can and should be adjusted to adapt to field conditions. Conditions that may warrant a decrease in the spacing length are poor sight line or localized work areas within a lane closure. It always is best to review a sign pattern and make the proper adjustments to cone spacing for maximum work zone safety for both traffic and personnel on site.

2-930 Traffic Drums

Traffic drums are used for the following:

- to channelize or delineate traffic flow through shorter patterns, generally on secondary roads, and
- to delineate a specific hazard or work zone.

Figure 2-9.6 shows a traffic drum.

Figure 2-9.6 Traffic Drum

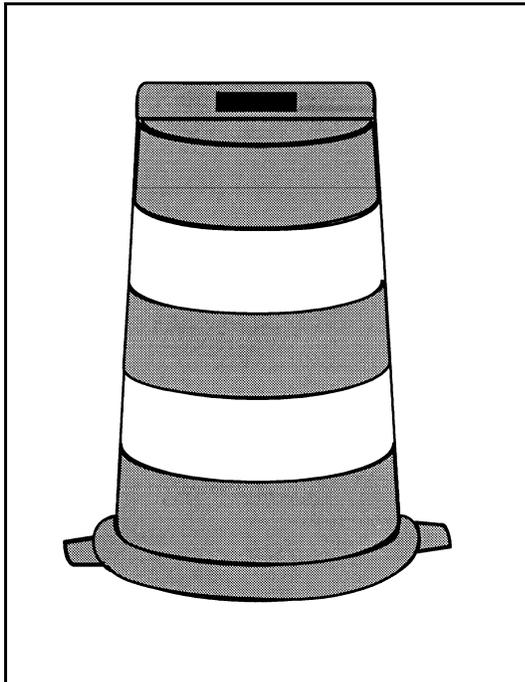
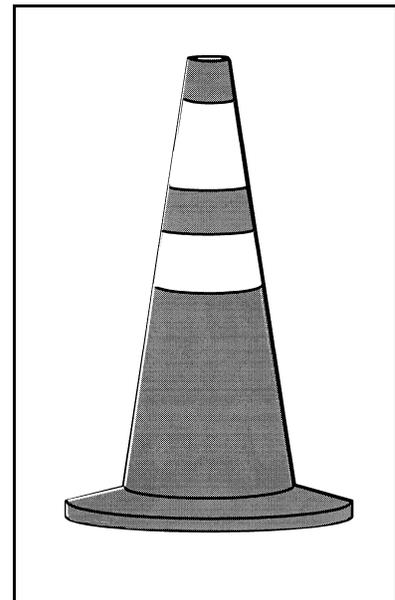


Figure 2-9.5 Traffic Cone



Drums are used in conjunction with advance warning signs and intermediate arrow signs in a lane or partial road closure. They should not be weighed down with materials that make them hazardous to motorists, pedestrians, or workers. Drums should be weighted at the base, not on the top. All drums should have drain holes to avoid water accumulation and freezing. The reflective sheeting must be kept clean, which is a responsibility of the contractor. Any drums that no longer perform as specified are to be replaced by the contractor at no cost to the State.

Barricade warning lights should not be used on plastic reflectorized drums. Type C steady-burn lights usually are ineffective and overpowered by the highly reflective sheeting required on plastic traffic drums. The District may review with the Office of Traffic special instances in which warning lights may be desirable.

2-931 Pavement Markings

The Chief Inspector should review the striping plans, any special requirements, and standard details prior to the beginning of work. He should compare field conditions with the striping and marking plans for conflicts and to ensure the compatibility with existing traffic patterns.

2-931A Painted Markings

Painted pavement markings are used as temporary markings on temporary pavement or on existing pavement that will be resurfaced or removed. The markings should be installed in accordance with traffic plans and specifications.

2-931B Temporary Plastic Markings

Temporary plastic pavement tape is used on permanent pavement when the interim markings do not coincide with the final markings or in temporary transition areas. It should not be used if painted pavement markings are acceptable. For example, paint is used for temporary markings when resurfacing limited access highway—tape is unacceptable. Preformed black line-mask tape is used temporarily to cover existing markings that are to remain after construction.

Temporary plastic pavement markings should be installed in accordance with traffic plans, specifications and current manufacturers' recommendations. They must be installed on a dry, clean pavement and within the correct temperature ranges.

Prior to the placement of plastic tape, the Inspector should identify the product that the contractor will use and verify that it is acceptable. The product can be identified by looking at the markings on the tape box or on the back of the tape. The Inspector should notify the contractor of any tape that becomes displaced or is not effective. The contractor must replace it within 24 hours.

2-931C Marking Removal

Removal should be in accordance with current standards and should not damage the existing pavement. Grinding is not permitted.

2-932 Portable Impact Attenuation Systems (Crash Trucks)

2-932A Use

The contractor indicates on the bid proposal the type of system proposed for use. The contractor must use the system as directed by the Inspector. The system is used instead of the item Trafficperson. The general guidelines for use are below.

- Only one system is authorized per critical sign pattern, such as sign patterns for left-lane closures, closures without shoulders, high-volume areas, and interchanges.
- Shoulder closures and right-lane closures generally can be implemented without use of an impact attenuation system.

- Crash trucks should be used in the following situations:
 - left-lane closures with minimal median widths for setting up advance warning signs and staging;
 - lane and shoulder closures on turning roadways or ramps or on mainlines if sight distances are minimal; and
 - closures where extensive turning movements or traffic congestion occurs.

The Inspector reviews the need for a portable impact attenuation system with the contractor. The Inspector directs the contractor to place the system in advance of the work zone where it is most visible to approaching traffic and effective in protecting workers.

2-932B Inspection

The Inspector makes a visual inspection of the system to ensure that it meets the requirements of the specifications. If the system is not new, the contractor must document or demonstrate that the system conforms to the requirements. A Material Certificate is required for each new system.

The system is mounted on a truck. The Inspector should inspect the truck for the following:

- the correct gross vehicle weight for the type of attenuation system,
- two flashing strobe lights mounted high enough to be fully visible from the rear, and
- an internally illuminated flashing arrow.

The flashing arrow must be a Type C arrow panel with a minimum size of 48 in. × 96 in. (1.2 m × 2.4 m), at least 15 panel lamps, mounted at least 7 ft. (2 m) above the pavement. It must have a minimum lighting distance of 1 mi. (1.6 km).

The attenuation system must have a DE-9 delineator attached to the front module with bolts or vandal-resistant hardware.

The Department pays for the system at the contract unit price per hour of use.

2-933 Trafficperson

2-933A General

Current contracts provide for the services of uniformed trafficperson as a contract item at the locations and for the periods ordered by the Engineer. Trafficperson are used for the control and direction of vehicular traffic and pedestrians. There are three types of Trafficperson.

- *Uniformed Flagger.* These trafficpersons are clothed or equipped (including headgear) so as to be readily distinguishable as trafficperson, per the specification requirements. With the exception of emergency situations, these flaggers are to have successfully completed a flagger training program approved by the Department.
- *Town or City Police Officers.* These trafficpersons are uniformed town or city police officers from the town or city police department in which the project is located. (If uniformed police officers are not available, a town constable may be used.)
- *State Police Officers.* These are uniformed, off-duty, sworn Connecticut State Police officers used to control traffic operations and promote increased safety to motorists on expressway construction sites. Services include the use of an official State Police vehicle and associated equipment.

Authorized trafficpersons normally render service within limits of the construction, within the right-of-way for the project, on detours stipulated in the contract, and on detours ordered by the Engineer. Trafficpersons are not authorized if they are furnished by the contractor beyond the period for which the Engineer deems necessary or at locations where traffic is unnecessarily restricted by the contractor's method of operation.

2-933B State Police Officers

State Police officers are the only type of trafficpersons that can be used on limited access highways.

- Only one State Police officer is authorized per critical sign pattern, such as sign patterns for left-lane closures, lane closures without shoulders, high volume areas, and interchanges.
- Shoulder closures and right-lane closures generally can be implemented without State Police presence. Likewise, in areas with moderate traffic and wide, unobstructed medians, left-lane closures can be implemented without trooper presence during daylight hours. General exceptions to this policy are:
 - Left-lane closures with minimal median width for setting up advance signs and staging.
 - Lane and shoulder closures on turning roadways, turning ramps, or mainlines where sight distances are minimal.
 - Closures where extensive turning movements or traffic congestion occurs.
- Any lane closures at night generally require a portable impact attenuation system and a State Police officer to install the sign pattern.
- If there is doubt that a trafficperson is required, the District Office should be contacted.

After the sign pattern is in place, the State Police officer should be stationed at the beginning of the pattern. If traffic starts backing up, the officer should move to the beginning of the waiting line of vehicles or at the work site, whichever location is more effective. The trafficperson should be out of the cruiser and assisting to control traffic.

2-933C Town or City Police Officers or Uniformed Trafficpersons

Town or city police officers and uniformed trafficpersons are restricted to roads without limited access.

2-933D Prior Approval

Project personnel will inform the contractor once a week in writing of the operations requiring trafficpersons. The District maintains copies of the communications. The State does not pay for trafficpersons deployed by contractors for their own convenience.

2-933E Work Control

Meetings should be held with the contractor to review the contract requirements and procedures for trafficperson services. All trafficpersons employed on the project must be authorized by the Chief Inspector or Project Engineer.

Trafficpersons are guided only by directions from the Chief Inspector, or a designated assistant, and shall not accept orders from the contractor or contractor's representative while assigned to traffic duty, even though they may be

furnished by the contractor. Trafficpersons shall be instructed in the manner of directing traffic and shall never leave the posts to which they are assigned without arranging for relief for the full periods of their absences.

A meeting is held at the beginning of each day or shift to coordinate trafficperson services. The contractor, the Inspector, and the trafficpersons who are on duty that day attend meeting. The contractor's operations and the allowable traffic restrictions in the contract are reviewed. The Inspector advises the trafficpersons of the times of allowable lane closures and the specifications stating that the contractor will provide the services as the Engineer may order.

If at the daily or shift meeting, or during the course of the work, the trafficpersons feel there is a hazard to traffic, they should inform the Inspector immediately so adjustments can be made. The Inspector reviews the problem, and with the District's approval, adjusts the restrictions in the contract for the operation. If the contractor is working on a ramp or turning roadway, the review should be done a minimum of two days in advance. If, in the opinion of the trafficpersons, the work can not be done safely without closing the ramp or turning roadway, the Inspector notifies the District so that the allowable hours for closure can be established. It is not acceptable for the trafficpersons to shut down ramps, etc., for the contractor's convenience. All changes must be approved by the District prior to implementation.

2-933F Operations

Trafficpersons who are ordered by the Engineer for a particular operation that is deferred because of inclement weather or other unforeseen circumstances are retained at their duty station for the minimum service period.

Chief Inspectors see that trafficpersons are equipped and instructed in accordance with the following regulations:

- Stop-slow paddles are be used instead of flags. The standard procedure for using paddles to direct traffic is in Figure 2-9.24.
- Only persons who are physically and mentally qualified and who understand their duties and realize their responsibility should be used as a trafficperson. They must be even tempered, decisive, and reliable.
- Trafficpersons should not be allowed to mingle with the workers while on duty or leave their posts without permission.
- The trafficpersons must stand just outside the approaching traffic lane, facing traffic, should be positioned so that the paddle is visible in the traffic lane for a distance of at least 500 ft. (150 m), and should be near enough to the work area so that there can be no doubt as to the purpose. The trafficpersons should not jeopardize personal safety and must be ready to stand clear and warn the workers in case an approaching vehicle does not stop.
- Trafficpersons should always be courteous, but firm, giving explanations about the hazards or delays in a few words. They must not lose their tempers or argue with the traveling public.

2-933G Documentation

See Volume 1, Chapter 20 for guidance on payment protocols for the Trafficperson item. State Police are to be paid by force account as outlined in Section 1-2005. All trafficpersons rendering services authorized or not, should be recorded in the project records. The following information should be documented:

- date,
- name,
- badge number,
- ordered by the Engineer or contractor,

- reason for services,
- duty station,
- function performed,
- arrival and departure times, and
- hours worked.

Reasons for unusual events should be recorded as well.

- If a trafficperson works through the lunch break, record the reason.
- If a trafficperson works outside the contractor's normal working hours, record the reason.
- If, during a day, a trafficperson works on another project before working on your project, record the project from which the trafficperson was transferred.

At least once a month, Project Engineers will check each project under their jurisdiction to verify that records are kept properly.

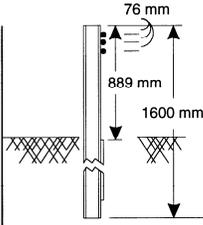
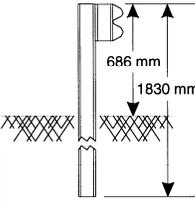
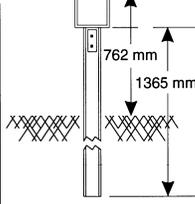
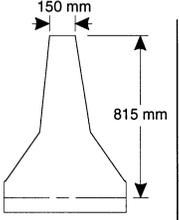
2-933H Payment

On each project, one inspector is designated to ensure proper payment of the Trafficperson item. The inspector reviews the Daily Reports for accuracy.

Payment is based on the documentation kept by project personnel. The contractor's log is not used. Differences between the Inspector's Reports and the monthly statement or receipted bill for trafficperson services must be investigated fully. Only Trafficperson services approved by the Engineer will be measured by the Engineer.

Refer to Volume 1, Chapter 20 for further guidance.

Figure 2-9.7 Characteristics of Operating Guide Rail

| | | | | |
|------------------------|---|---|--|---|
| |  |  |  |  |
| SYSTEM | Three-Cable Guide Railing (I-Beam Posts) | Metal Beam Rail (Type R-B) | Metal Beam Rail 200 x 150 Box Beam | Concrete Barrier |
| DEFLECTION* | 3.66 m | 1.25 m | 1.25 m | 0 |
| POST SPACING | 4900 mm | 1905 mm | 1830 mm | NA |
| TYPICAL POST | S75 x 8 | W150 x 13 | S75 x 8 | NA |
| BEAM | Three 19 mm dia. Steel Cables | Steel "W" Section | TS203 x 152 x 6.4 Steel Tube | NA |
| OFFSET BRACKETS | None | W150 x 13 | None | NA |
| MOUNTINGS | 8 mm dia. Steel Hook Bolt | 19 mm dia. Steel Bolt | Steel Paddles | NA |

* Based on an impact of 97 km/h and an impact angle of 25°.

Figure 2-9.8 Characteristics of Median Barriers

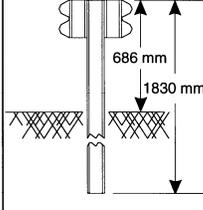
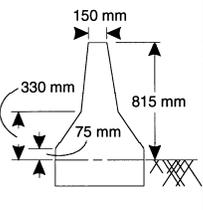
| | | |
|------------------------|---|--|
| |  |  |
| SYSTEM | Metal Beam Rail (Type MD-B) | Concrete Barrier |
| DEFLECTION | 1.25 m | 0 |
| POST SPACING | 1905 mm | |
| POST | W150 x 13 | |
| BEAM | Two Steel "W" Sections | |
| OFFSET BRACKETS | Two W150 x 13 | |
| MOUNTINGS | 19 mm dia. Steel Bolts | |

Figure 2-9.9
Request for Change to Contract Traffic Specifications

REQUEST FOR CHANGE TO CONTRACT TRAFFIC SPECIFICATIONS

Contract Number: _____ Project Engineer: _____

Contractor: _____ Field Office Number: _____

Contact Person: _____ Route Number: _____

Lane configuration, including shoulders:

Existing (available): _____

Proposed: _____

The following are attached:

- 1) Location (including direction, lanes, ramps and exits, if applicable) _____
- 2) Dates, times, duration of change _____
- 3) Type of work to be done _____
- 4) Reason for the change _____
- 5) Description of detour (if applicable) _____
- 6) Traffic counts with comments _____
- 7) Map showing detour (if applicable) _____
- 8) Current specification, highlighting proposed changes _____
- 9) Previous press release with similar request _____
- 10) Written town approval (if applicable) _____
- 11) Should credit apply? _____

OOO Comment Section:

2-934 Traffic Control During Construction Operations

2-934A General

The following guidelines will assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

2-934B Traffic Control Patterns

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic
- Duration of operation
- Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 20 through 25 (Figures 2-9.31 through 2-9.36) may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

2-934C Placement of Signs

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways,

advance warning signs may be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

2-934D Allowable Adjustment of Signs and Devices Shown on the Traffic Control Plans

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

| POSTED SPEED LIMIT MILES PER HOUR | MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE |
|--------------------------------------|---|
| 30 OR LESS | 180 |
| 35 | 250 |
| 40 | 320 |
| 45 | 540 |
| 50 | 600 |
| 55 | 660 |
| 65 | 780 |

2-934E Work Zone Safety Meetings

Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the contract requirements and discuss the Department’s procedures. Other work zone safety meetings during the course of the project should be scheduled as needed.

A Work Zone Safety Meeting Agenda, (see Section 2-934N), shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can’t be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction.

2-934F Installing and Removing Traffic Control Patterns

Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.

Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.

Stopping traffic may be allowed:

- As per the contract for such activities as blasting, steel erection, etc.
- During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
- To move slow moving equipment across live traffic lanes into the work area.

Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, State Police may use traffic slowing techniques, including the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed and/or removed, the two TMAs and sign crew should continue to install or remove the pattern as described in Section 2-934B and traffic shall be allowed to resume their normal travel.

The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.

Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.

Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

2-934G Use of High Mounted Internally Illuminated Flashing Arrow

On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If

On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.

The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.

The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.

The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

If the required number of Flashing Arrows is not available, the traffic control pattern shall not be installed.

2-934H Use of Truck Mounted Impact Attenuator Vehicles (TMAs)

For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.

On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.

Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the “flashing arrow” mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, both TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the “caution” mode when traveling in the closed lane.

A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs may be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the “caution” mode when in the closed lane.

TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled “Type ‘D’ Portable Impact Attenuation System”. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.

TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, then it should be paid at the specified hourly rate for “Type ‘D’ Portable Impact Attenuation System”. When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for “High Mounted Internally Illuminated Flashing Arrow”. If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a “Type ‘D’ Portable Impact Attenuation System” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a “High Mounted Internally Illuminated Flashing Arrow”.

If the required number of TMAs is not available, the pattern shall not be installed.

2-934I Use of State Police Officers

State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction. At least one Officer should be used per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed medians, left lane closures can be implemented without State Police presence. Certain situations may require State Police presence, if one is available, even though the general guidelines above indicate otherwise. Examples of this include: nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur.

Once the pattern is in place, the State Police Officer should be positioned in a nonhazardous location at the beginning of the pattern or at one of the work areas not protected by a TMA. If traffic backs up beyond the beginning of the pattern, then the State Police Officer should be repositioned prior to the backup to give warning to the oncoming motorists. Where State Police Officer and TMA are in close proximity to each other, the TMA should be placed to protect the State Police Officer's vehicle from oncoming traffic.

Other functions of the State Police Officer(s) shall include:

- *Assisting entering/exiting construction vehicles within the work area.
- *Enhancing worker visibility/safety for workers in close proximity to the open travel lane(s).
- Speed control of traffic within the work area.
- Enforcement of speed and other motor vehicle laws within the work area.

Typically, the State Police Officer should be out of the vehicle for the functions marked with an asterisk (*).

2-934J Use of (Remote Controlled) Changeable Message Signs

For lane closures on limited access roadways, one Changeable Message Sign shall be used in advance of the traffic control pattern. Prior to installing the pattern, the Changeable Message Sign shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The Changeable Message Sign shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional Changeable Message Sign shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.

On non-limited access roadways, the use of Changeable Message Signs for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Changeable Message Sign.

The advance Changeable Message Sign is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the Changeable Message Sign cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position.

The advance Changeable Message Sign shall be adequately protected if it is used for a continuous duration of 36 hours or more.

When the Changeable Message Signs are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.

The Changeable Message Sign generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).

The Changeable Message Sign should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).

Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

Section 2-934O contains the messages that are allowed on the Changeable Message Sign. For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

If the required number of Changeable Message Signs is not available, the pattern shall not be installed.

2-934K Use of (Remote Control) Changeable Message Signs With Radar

(Remote Control) Changeable Message Signs with Radar shall be used when specified, or as directed by the Engineer.

The typical placement of a (Remote Control) Changeable Message Sign with Radar is in the work zone portion of the traffic control pattern.

The typical usage of the (Remote Control) Changeable Message Sign with Radar is to display a message when a preset speed is exceeded. The sign will blank when no vehicles are present.

The preset speed for activating the message should be set 5-10 MPH above the posted, or desired, speed.

Section 2-934O contains the messages that are allowed on the (Remote Controlled) Changeable Message Sign with Radar. For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

2-934L Use of Traffic Drums and Traffic Cones

Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.

Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 72-hour duration.

Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

2-934M General Requirements for Traffic Control

If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available, the traffic control pattern shall not be installed.

The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.

Failure of the Contractor to have the required minimum number of signs and equipment, which results in their not being installed, shall not be a reason for a time extension.

In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

2-934N Work Zone Safety Meeting Agenda

- 1) Review Project scope of work and time.
- 2) Review Article 1.08, Prosecution and Progress of the Special Provisions.
- 3) Review Article 9.70, Trafficperson of the Specifications.
- 4) Review Article 9.71, Maintenance and Protection of Traffic of the Special Provisions, including "Work Zone Safety Procedures".
- 5) Review Contractor's schedule and method of operations.
- 6) Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
- 7) Open discussion of work zone questions and issues.
- 8) Discussion of review and approval process for changes in contract requirements as they relate to work zone areas.

| <u>Message No.</u> | <u>Frame 1</u> | <u>Frame 2</u> | <u>Message No.</u> | <u>Frame 1</u> | <u>Frame 2</u> |
|--------------------|----------------------------|-----------------|--------------------|-----------------------------|------------------|
| 1 | LEFT LANE CLOSED | MERGE RIGHT | 9 | LANES CLOSED AHEAD | REDUCE SPEED |
| 2 | 2 LEFT LANES CLOSED | MERGE RIGHT | 10 | LANES CLOSED AHEAD | USE CAUTION |
| 3 | LEFT LANE CLOSED | REDUCE SPEED | 11 | WORKERS ON ROAD | REDUCE SPEED |
| 4 | 2 LEFT LANES CLOSED | REDUCE SPEED | 12 | WORKERS ON ROAD | SLOW DOWN |
| 5 | RIGHT LANE CLOSED | MERGE LEFT | 13 | EXIT XX CLOSED | USE EXIT YY |
| 6 | 2 RIGHT LANES CLOSED | MERGE LEFT | 14 | EXIT XX CLOSED USE YY | FOLLOW DETOUR |
| 7 | RIGHT LANE CLOSED | REDUCE SPEED | 15 | 2 LANES SHIFT AHEAD | USE CAUTION |
| 8 | 2 RIGHT LANES CLOSED | REDUCE SPEED | 16 | 3 LANES SHIFT AHEAD | USE CAUTION |

Figure 2-9.10 Traffic Control Plan
Series 16 Signs

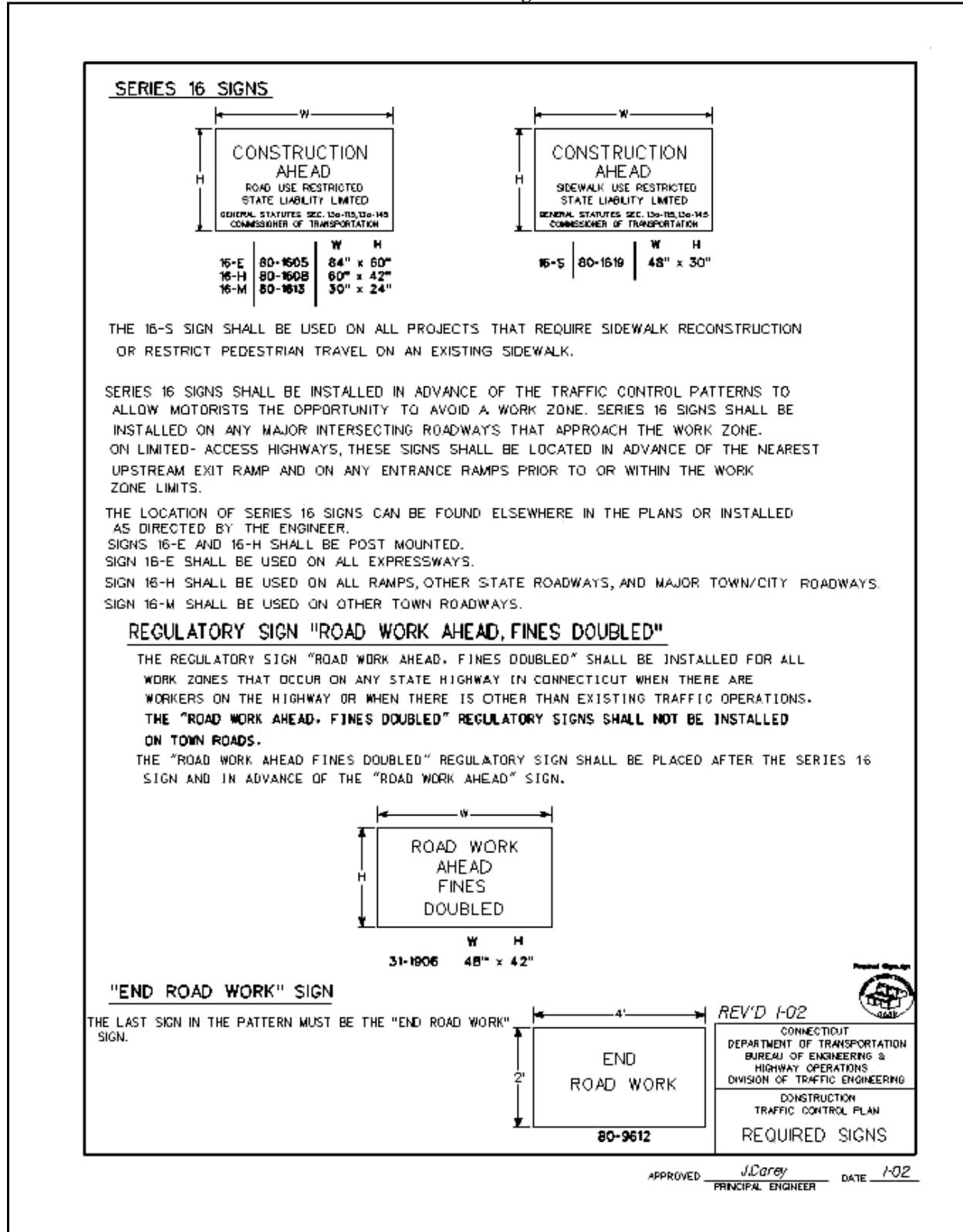


Figure 2-9.11 Traffic Control Plan
Notes (Construction)

NOTES FOR TRAFFIC CONTROL PLANS

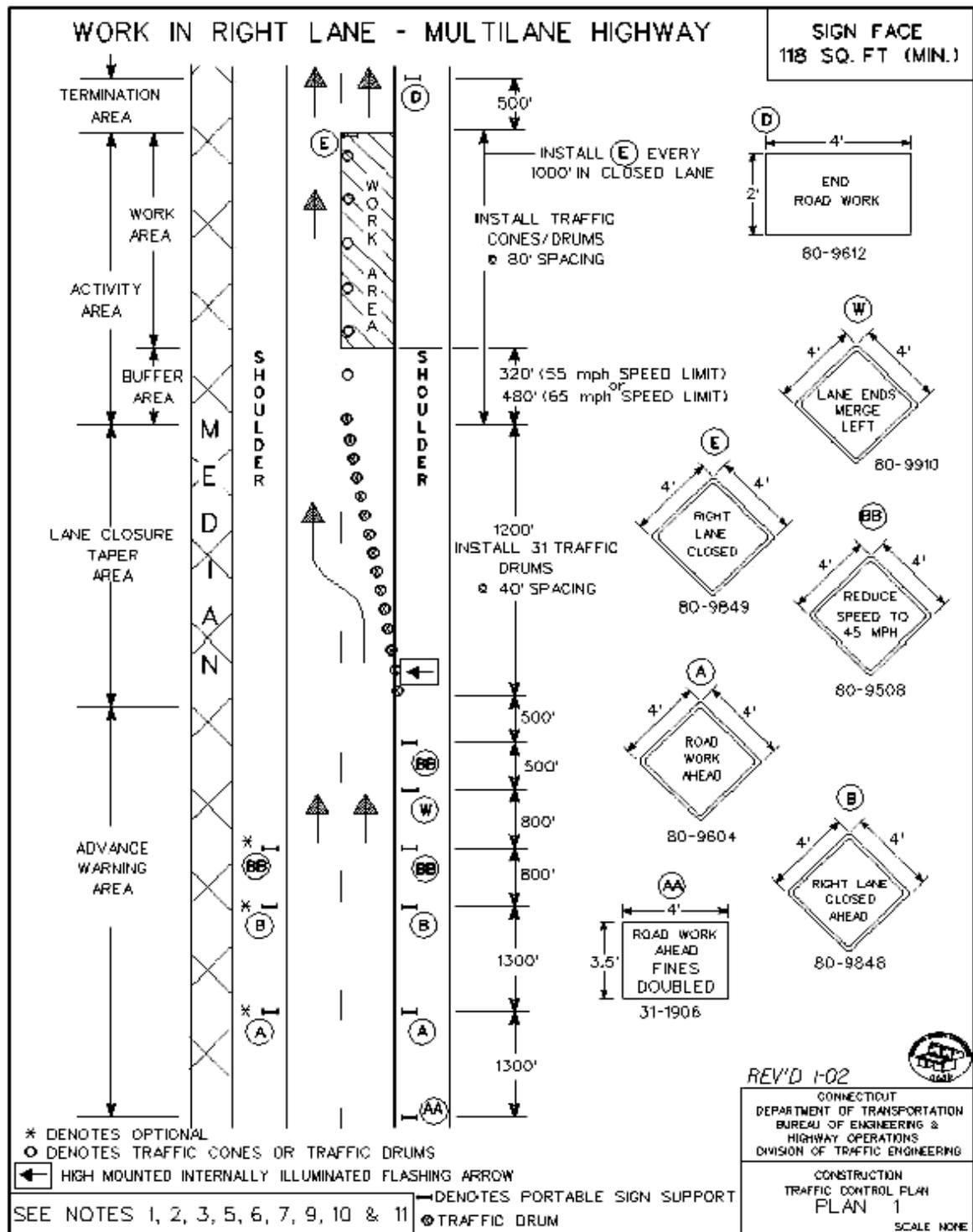
1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A) AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE #1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. A CHANGEABLE MESSAGE SIGN MAY BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
5. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 72 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
6. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA WILL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS REOPENED TO ALL LANES OF TRAFFIC.
7. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED AND TEMPORARY PAVEMENT MARKINGS THAT DEPICT THE PROPER TRAVEL PATHS SHALL BE INSTALLED.
8. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 200' ON LOW SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
9. FOR LANE CLOSURES ONE (1) MILE OR LONGER, A "REDUCE SPEED TO 45 MPH" SIGN SHALL BE PLACED AT THE ONE MILE POINT AND AT EACH MILE THEREAFTER.
10. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
11. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.

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| CONNECTICUT DEPARTMENT OF TRANSPORTATION BUREAU OF ENGINEERING & HIGHWAY OPERATIONS DIVISION OF TRAFFIC ENGINEERING |
| CONSTRUCTION TRAFFIC CONTROL PLAN NOTES |

NOTES.004

Figures 2-9.12 Traffic Control Plan 1
Work in Right Lane—Multilane Highway



APPROVED J. Corey DATE 1-02
PRINCIPAL ENGINEER

Figure 2-9.13 Traffic Control Plan 2
Work in Right Two Lanes—Multilane Highway

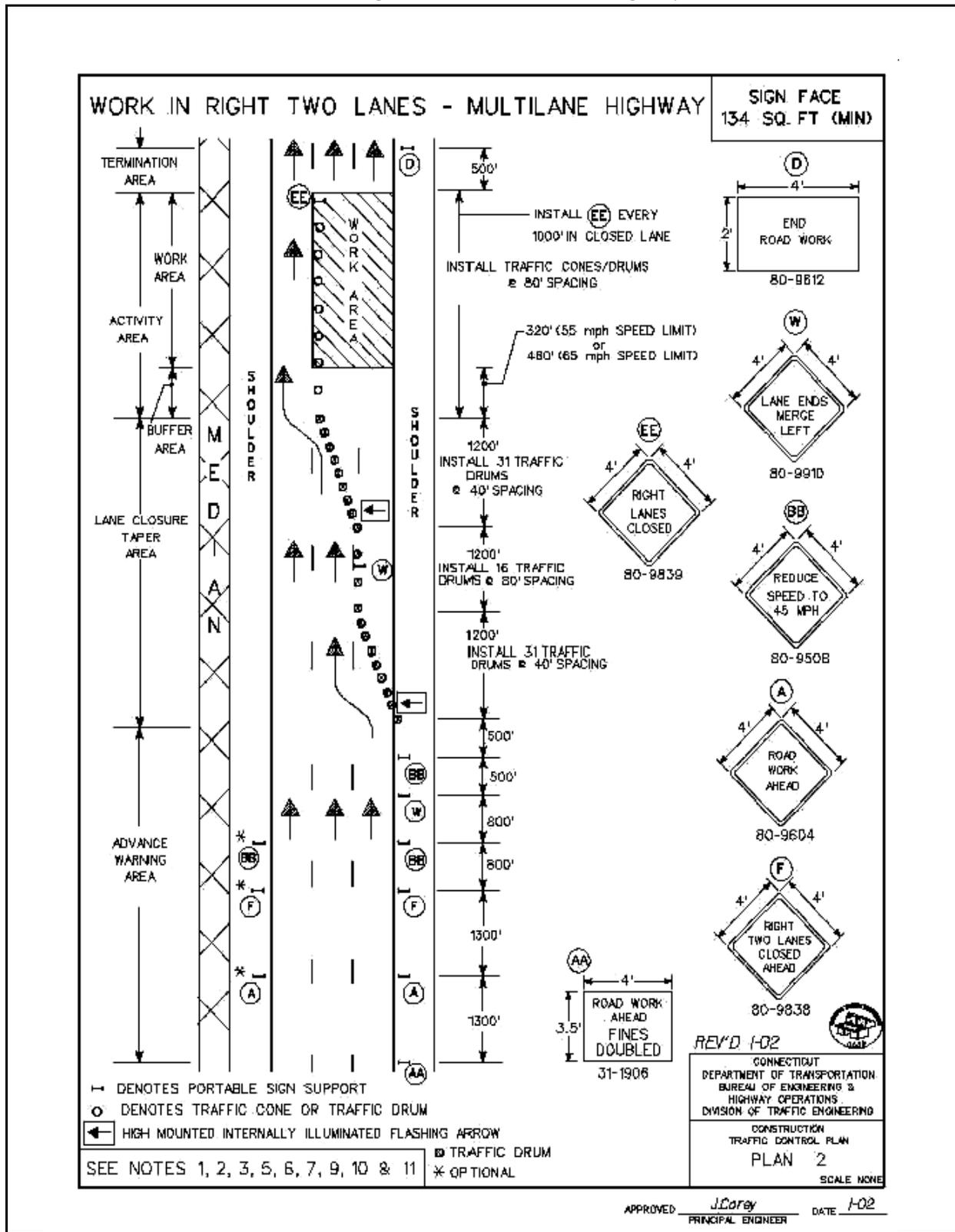


Figure 2-9.14 Traffic Control Plan 3
Work in Left Lane—Multilane Highway

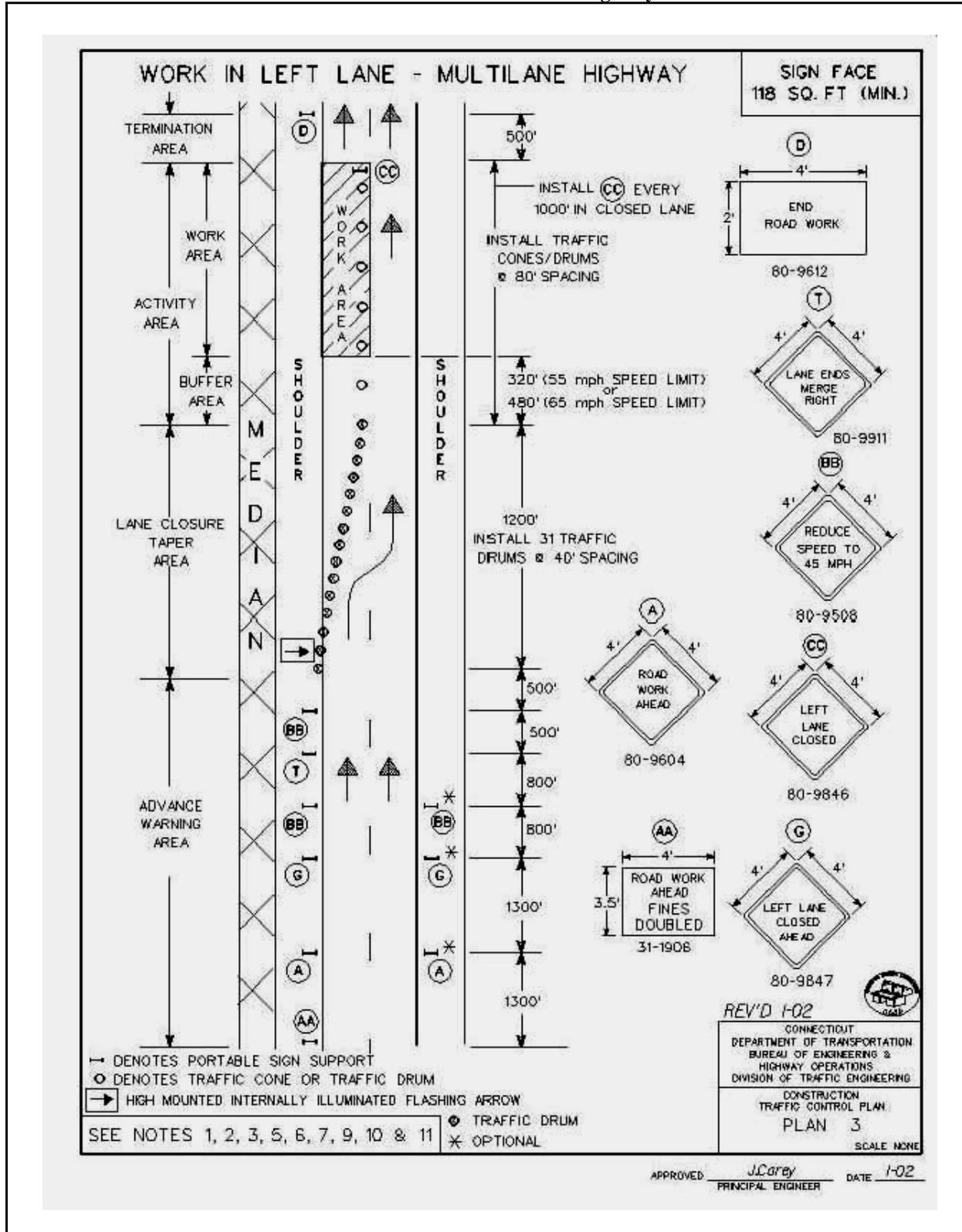


Figure 2-9.15 Traffic Control Plan 4
Work in Left Two Lanes—Multilane Highway

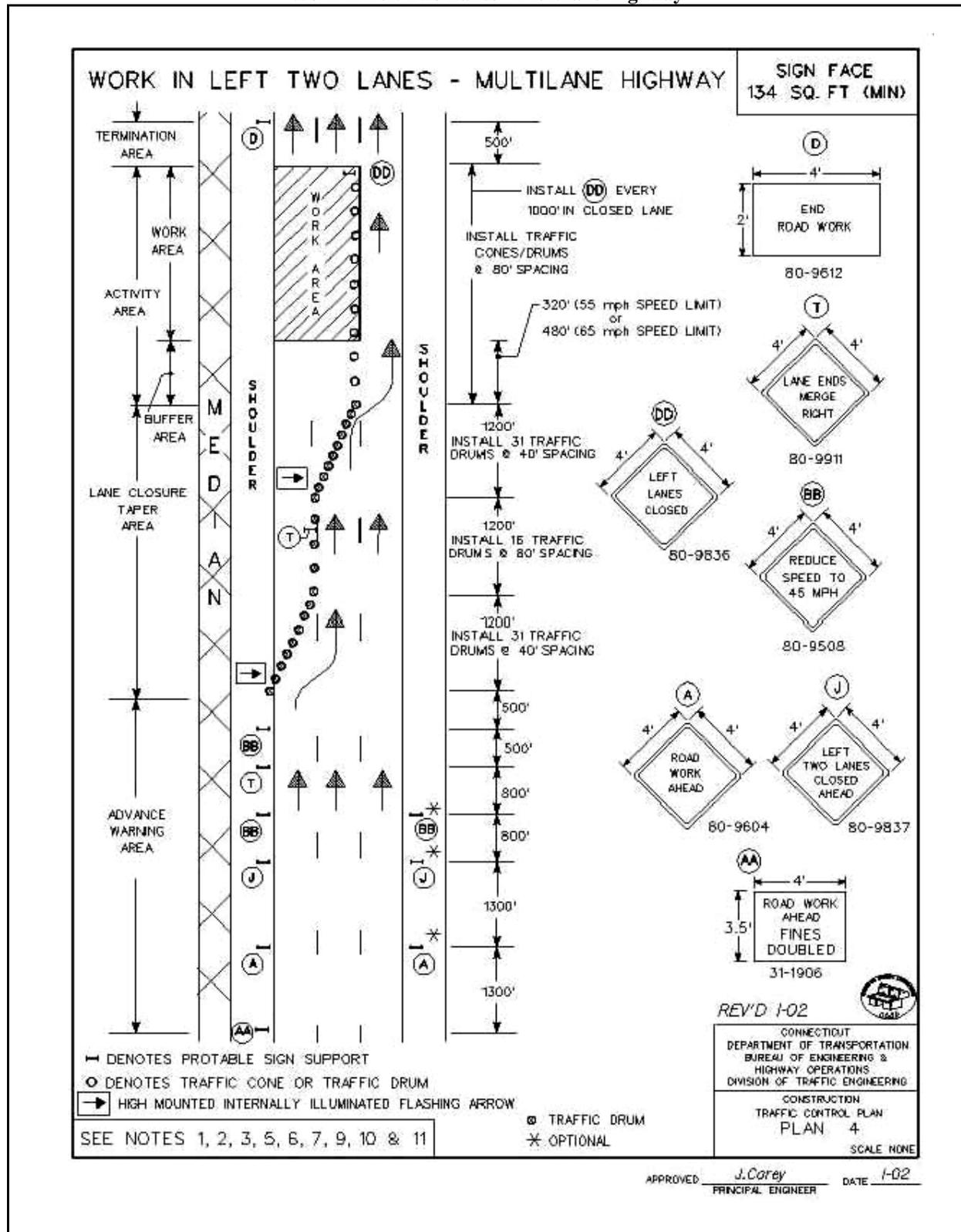


Figure 2-9.16 Traffic Control Plan 5
Work in Left and Center Lane—Multilane Highway (Utilizing Shoulder)

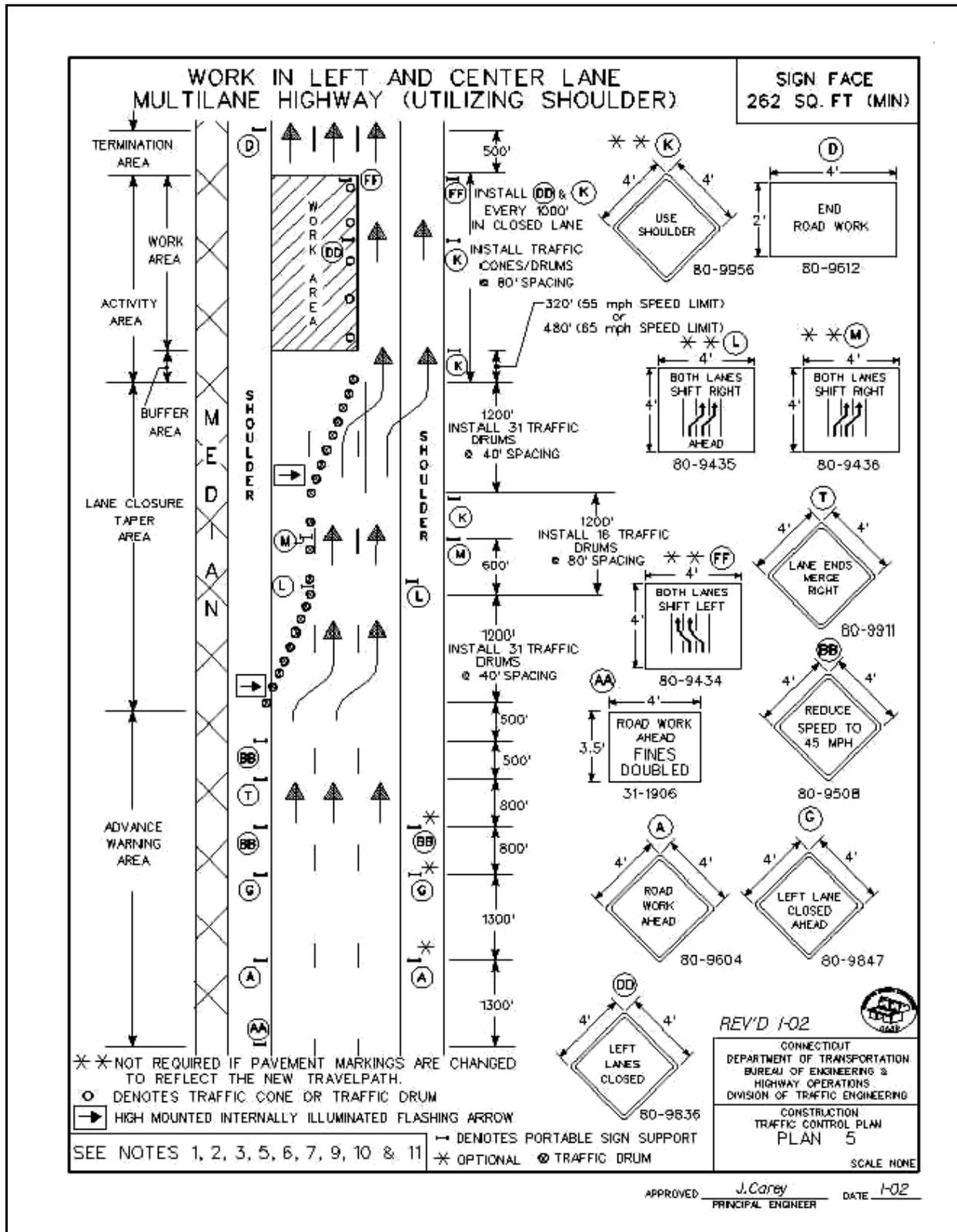


Figure 2-9.17 Traffic Control Plan 6
Work in Shoulder Area—Multilane Highway

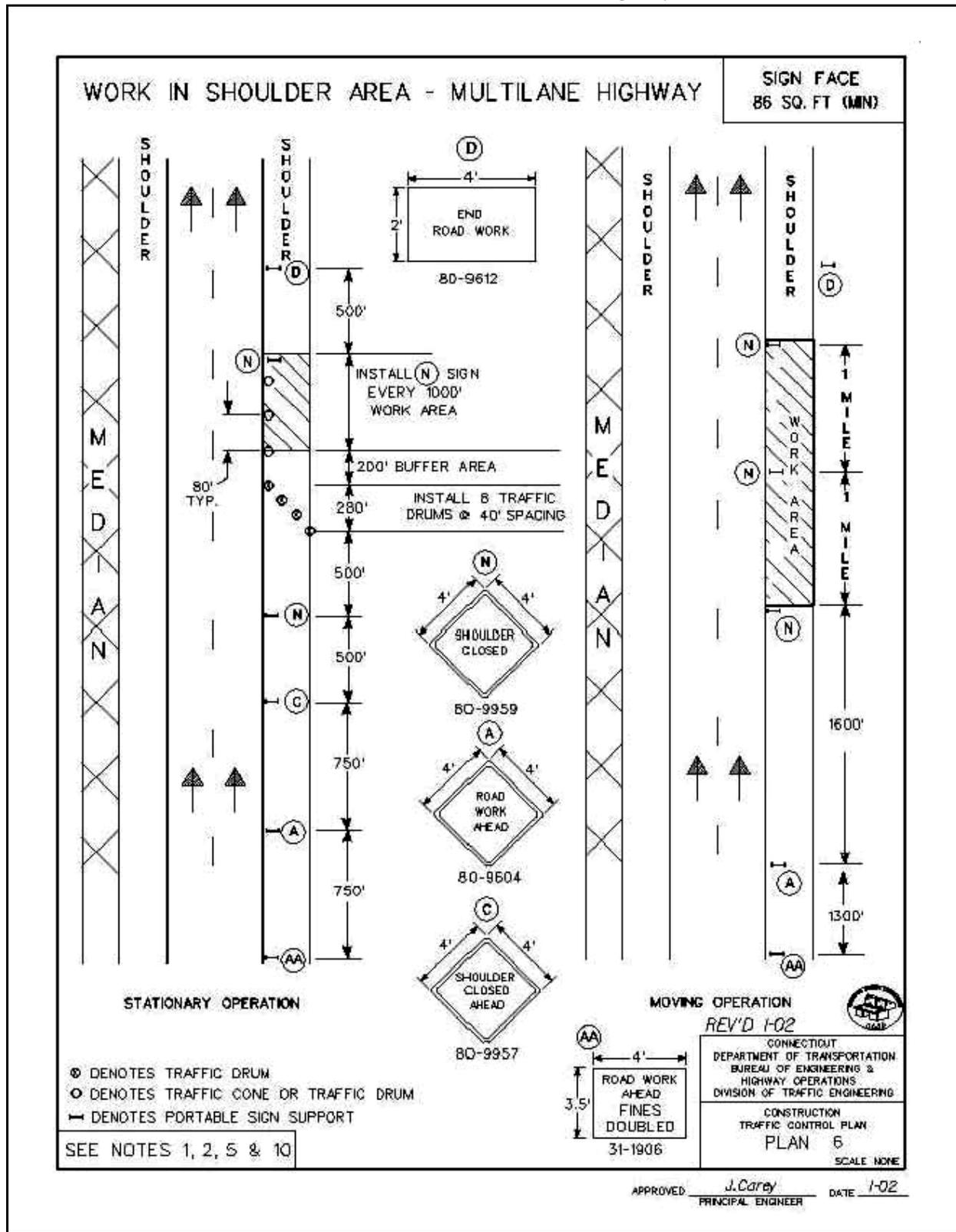


Figure 2-9.18 Traffic Control Plan 7
Work in Ramp Gore Area

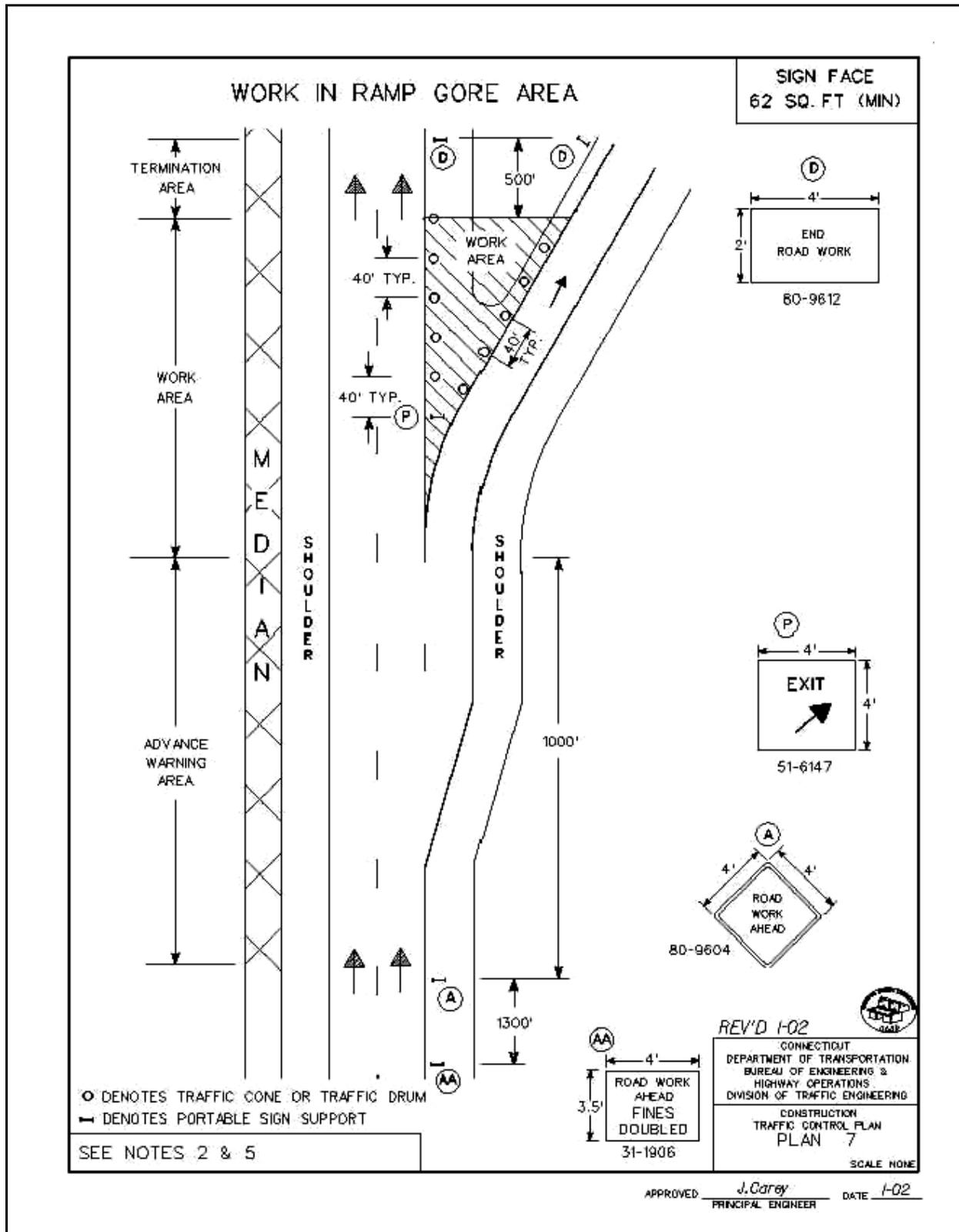


Figure 2-9.19 Traffic Control Plan 8
Typical Ramp Treatments for Mainline Lane Closure—Multilane Highway

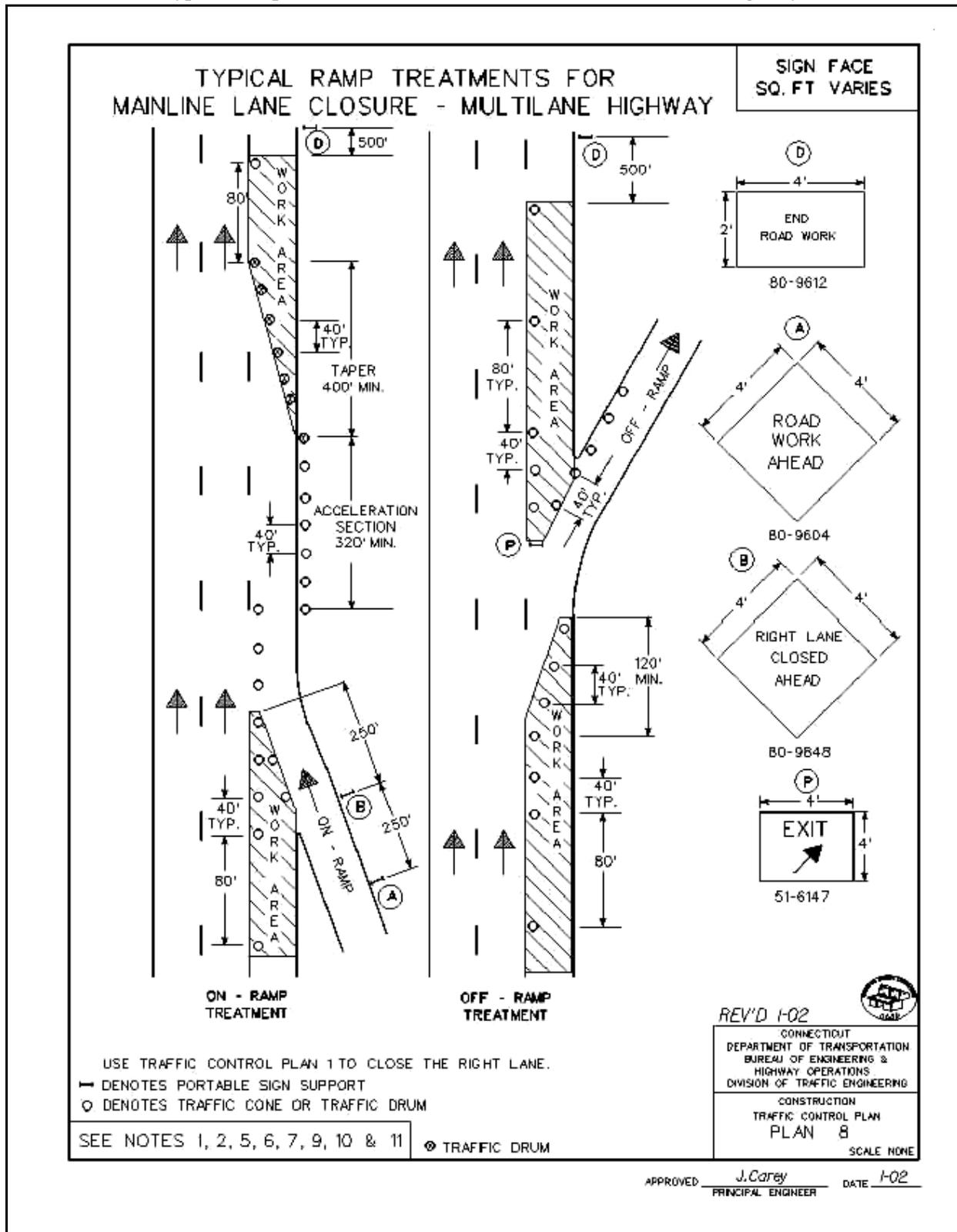


Figure 2-9.20 Traffic Control Plan 9
Work on Turning Roadways/Ramps

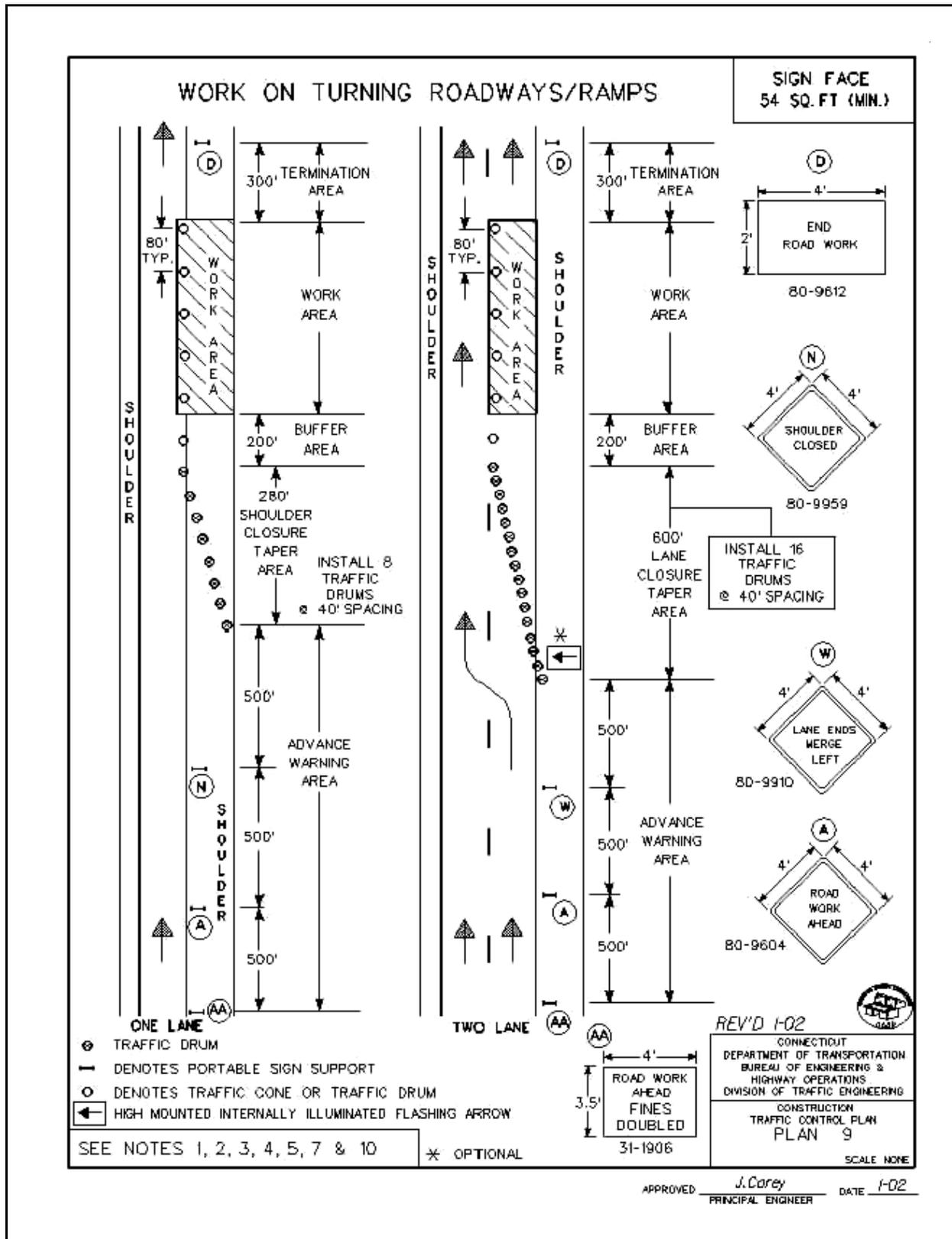


Figure 2-9.21 Traffic Control Plan 10
Work in Right Lane—Four-Lane Undivided Highway

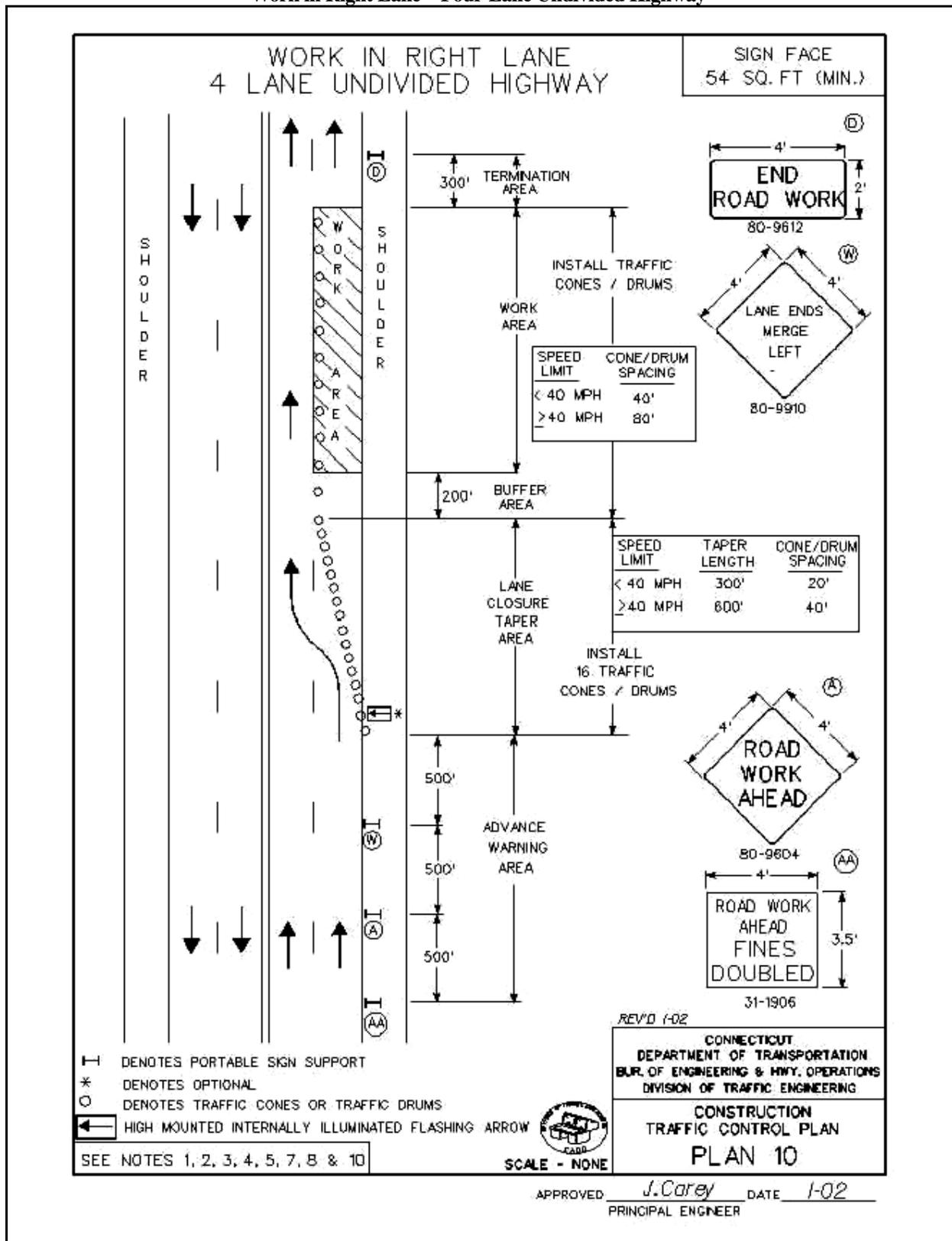


Figure 2-9.22 Traffic Control Plan 11
Work in Left Lane—Four-Lane Undivided Highway

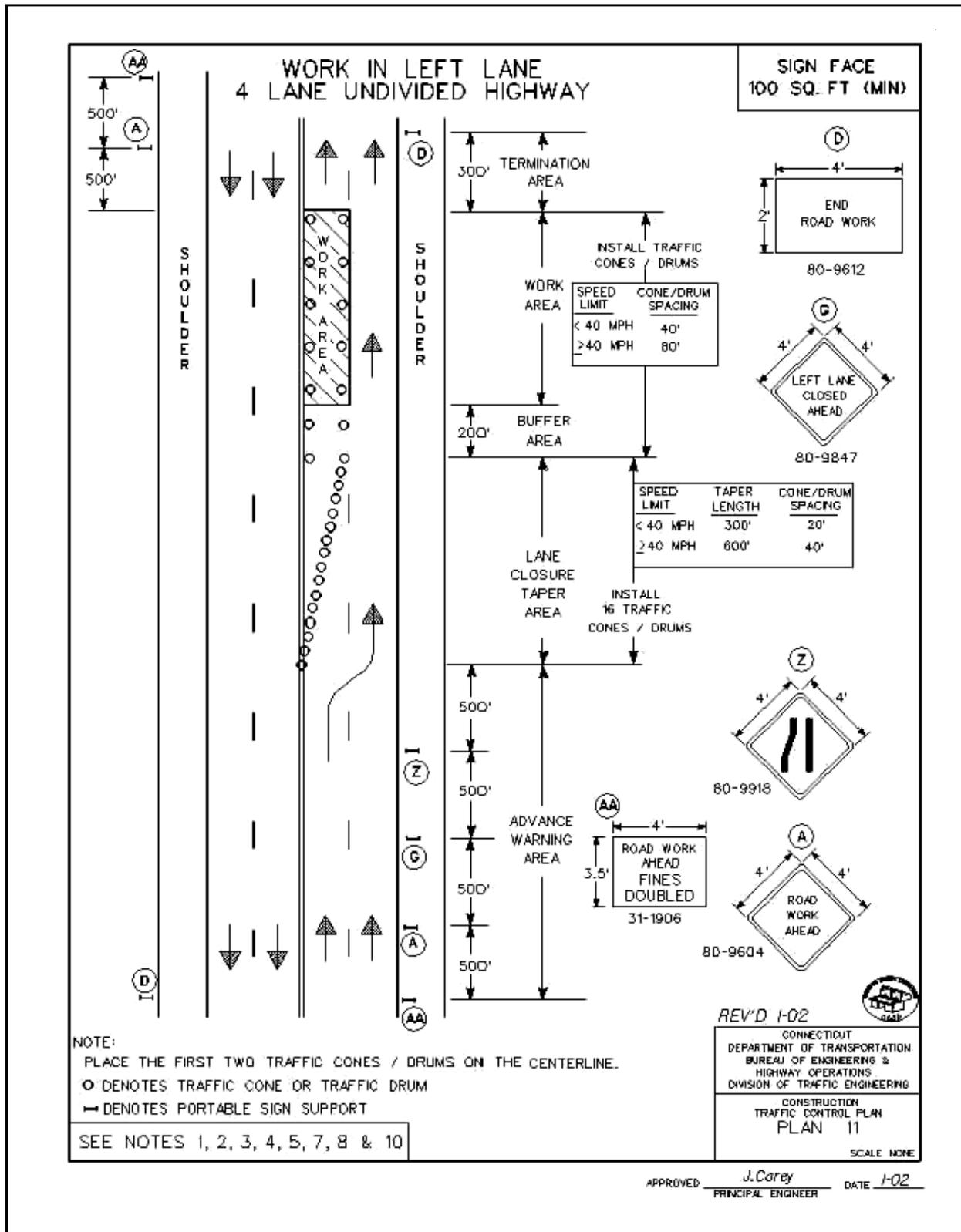


Figure 2-9.23 Traffic Control Plan 12
Work in Both Lanes—Four-Lane Undivided Highway

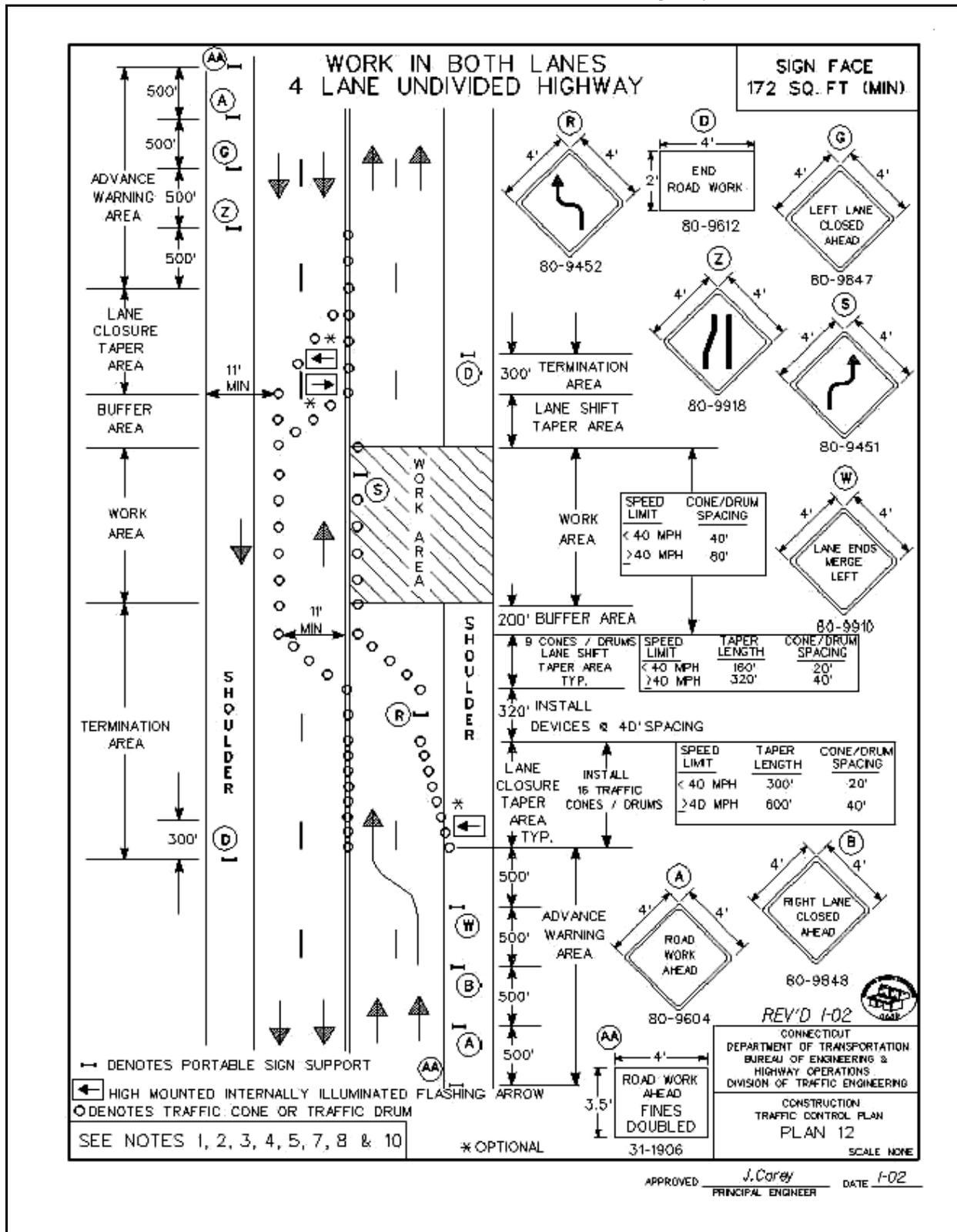


Figure 2-9.24 Traffic Control Plan 13
Work in Travel Lane and Shoulder—Two-Lane Highway
Alternating One-Way Traffic Operations

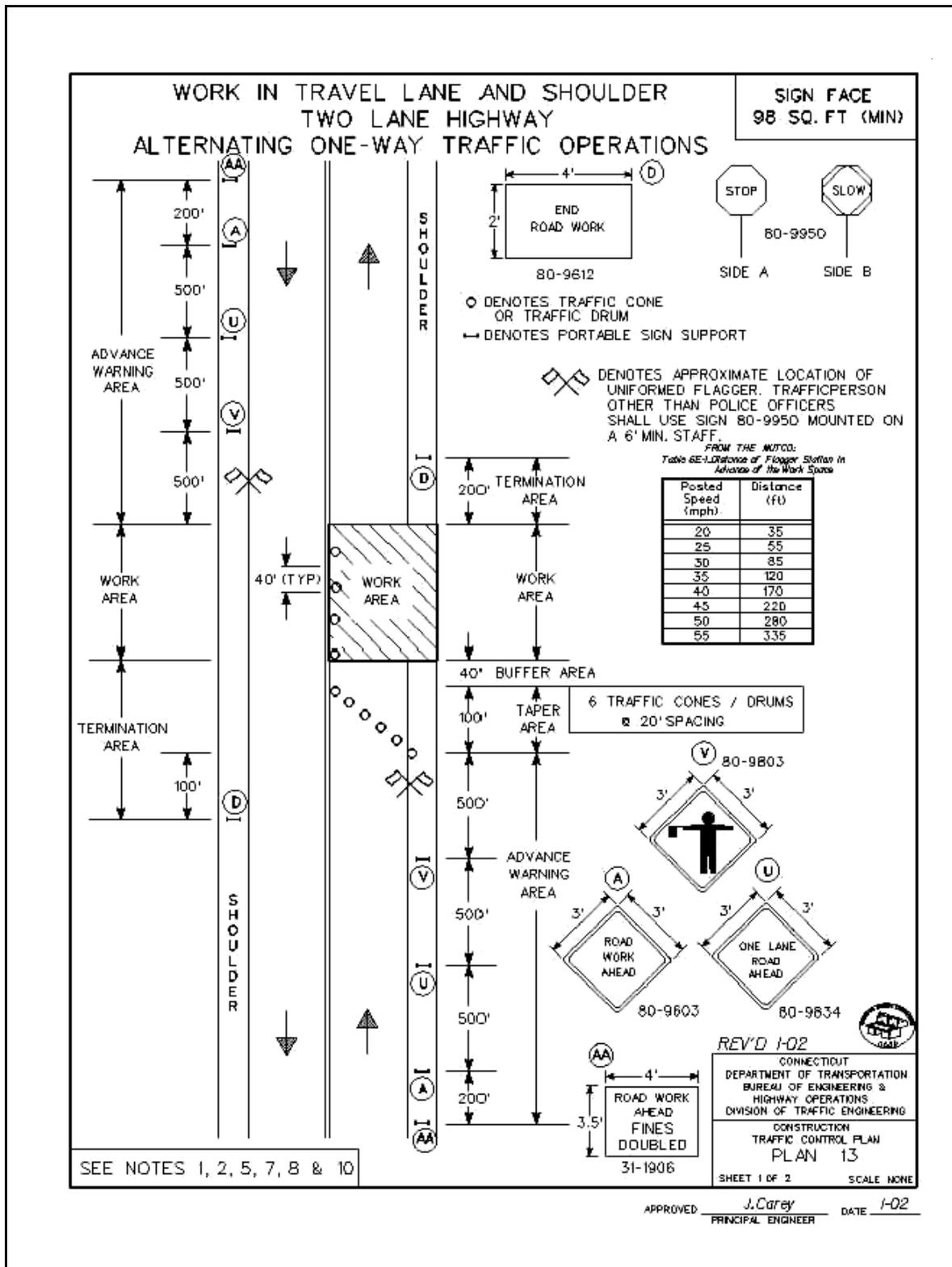


Figure 2-9.24 Traffic Control Plan 13 (continued)
Work in Travel Lane and Shoulder—Two-Lane Highway

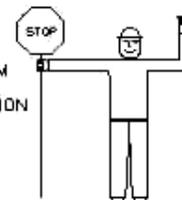
WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.04 FLAGGER PROCEDURES IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TYPICAL DETAIL SHEET ENTITLED "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

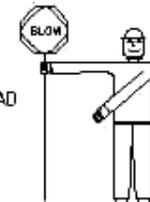
A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



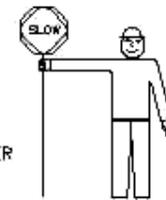
B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



SEE NOTES 1, 2, 5, 7, 8 & 10

REV'D 1-02

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 13

SHEET 2 OF 2 SCALE NONE

APPROVED: J. Carey DATE 1-02
PRINCIPAL ENGINEER

Figure 2-9.25 Traffic Control Plan 14
Work in Shoulder—Two-Lane Highway

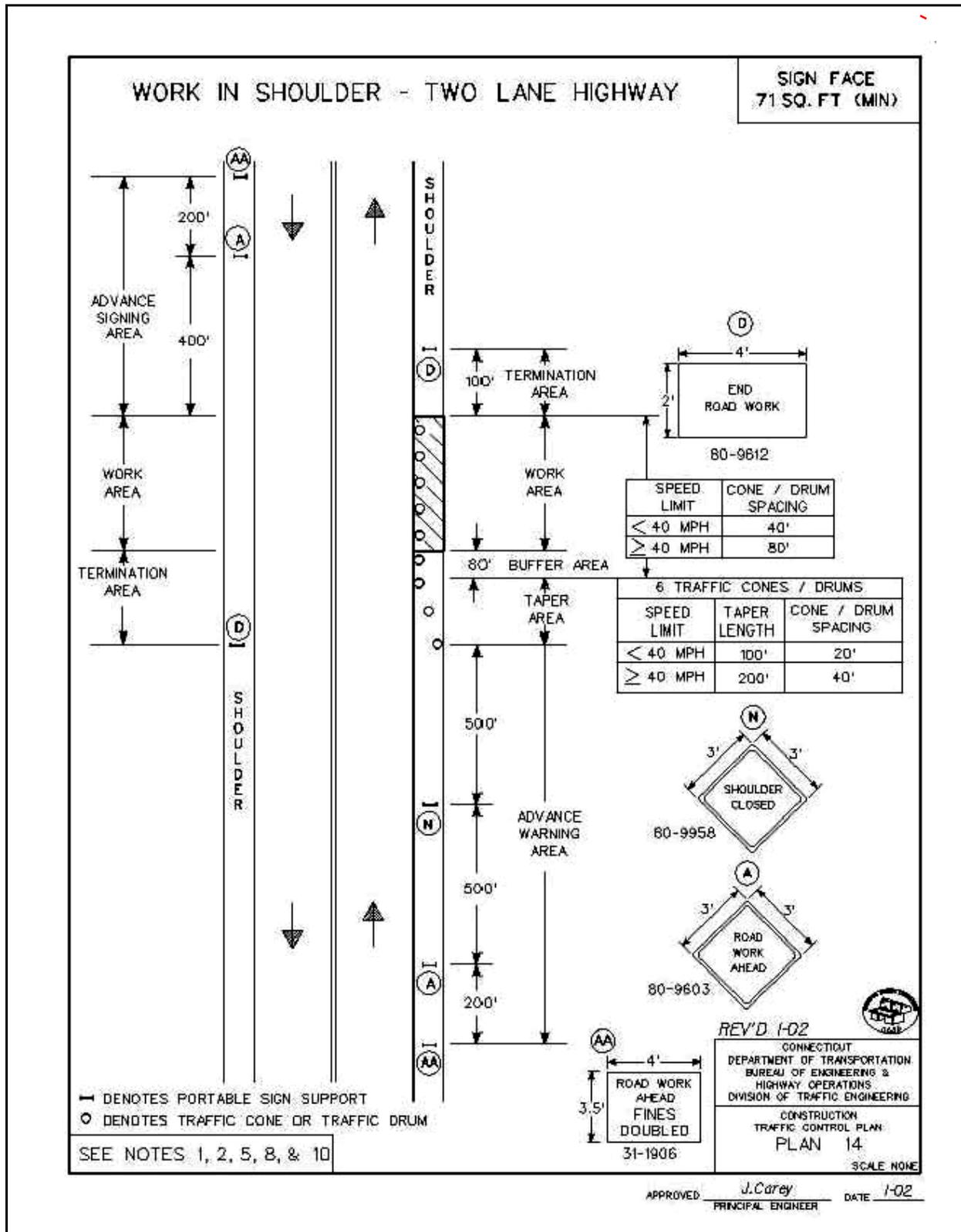


Figure 2-9.26 Traffic Control Plan 15
Work in Travel Lane and Shoulder—Two-Lane Highway

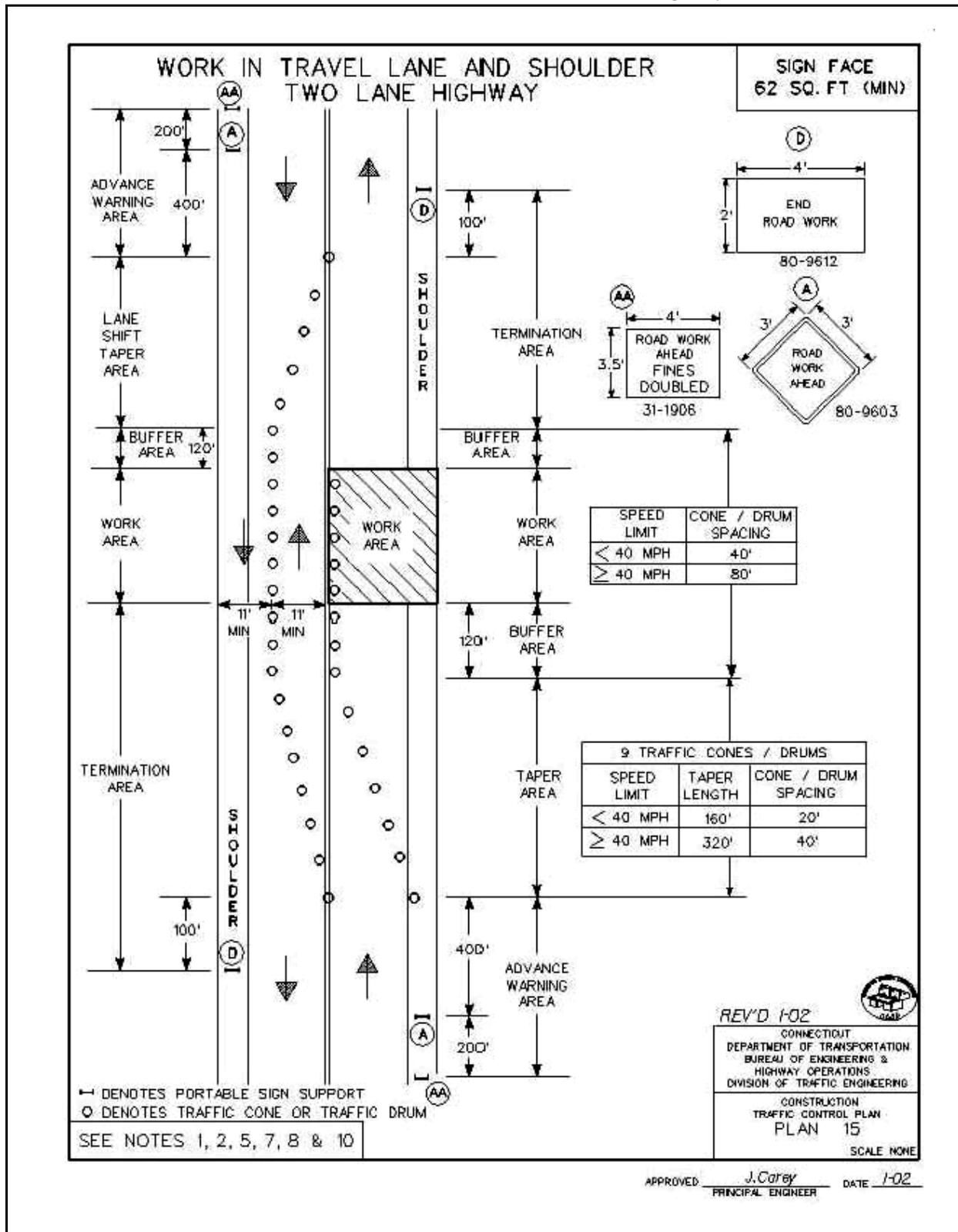


Figure 2-9.28 Traffic Control Plan 17
Work in Middle of Roadway at Intersection

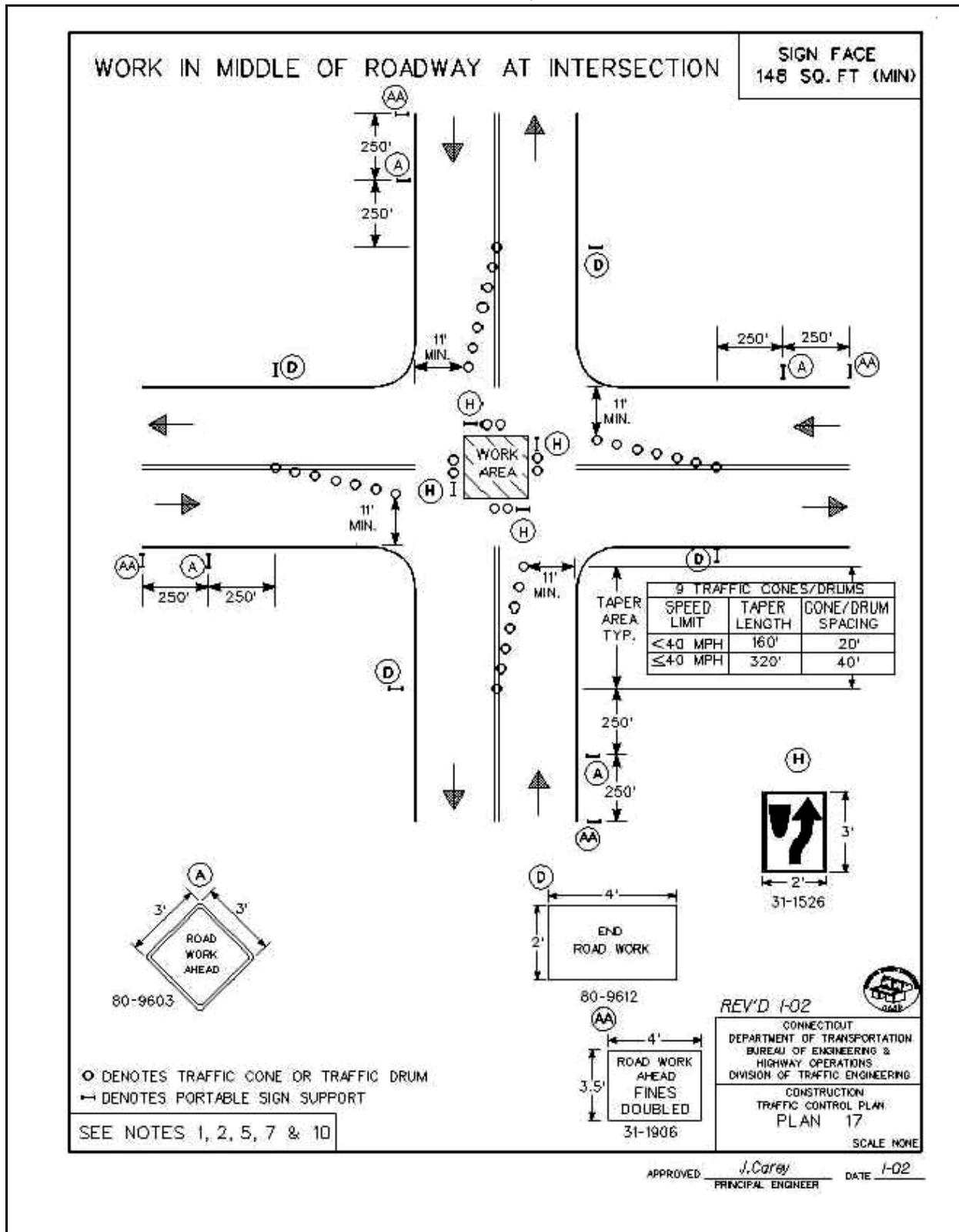


Figure 2-9.29 Traffic Control Plan 18
Work in Travel Lane and Shoulder—Two-Lane Highway
Alternating One-Way Traffic Operation—Stop Sign Control

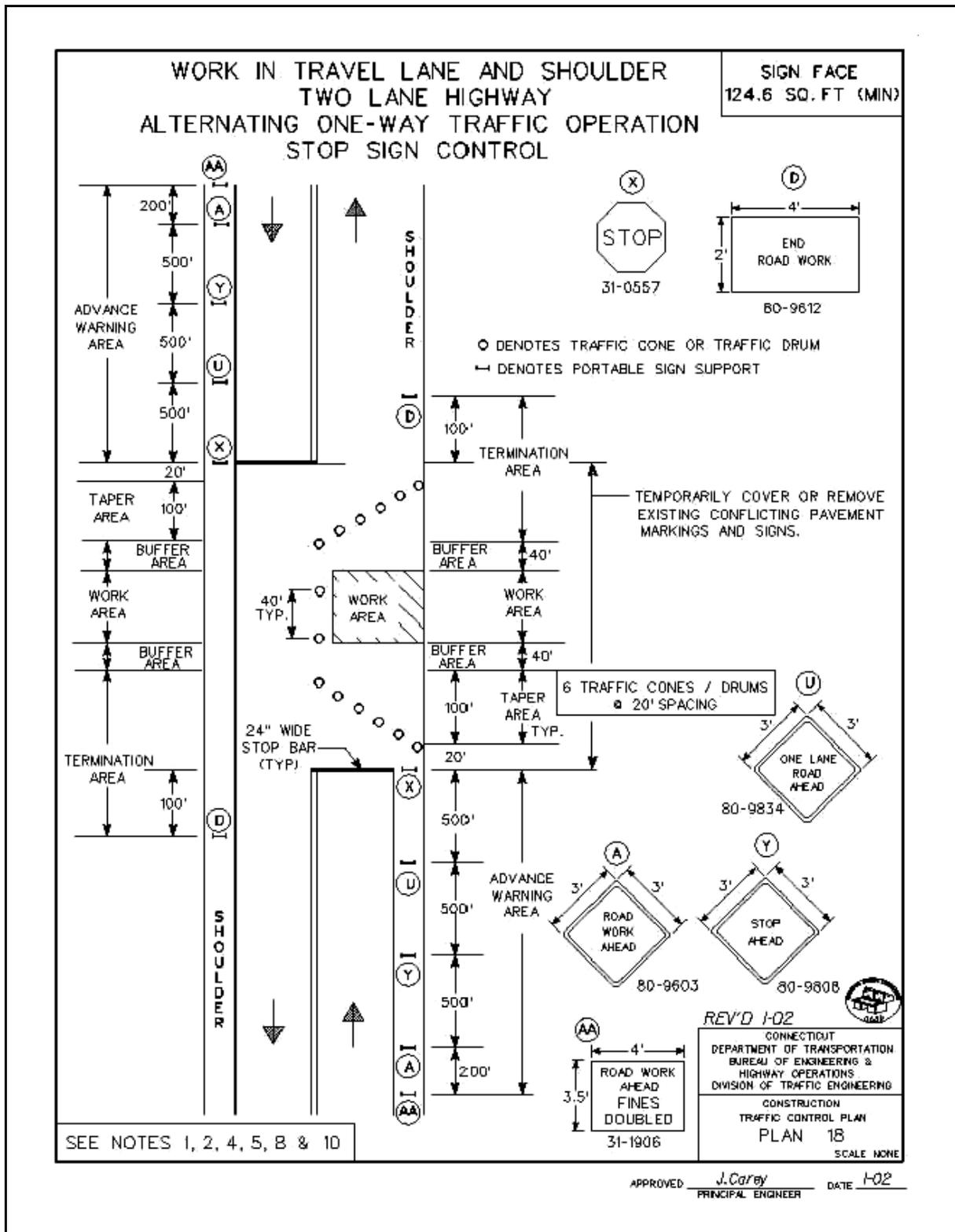


Figure 2-9.30 Traffic Control Plan 19
Moving Operation on Right Shoulder—Multilane Highway and Secondary Roadways

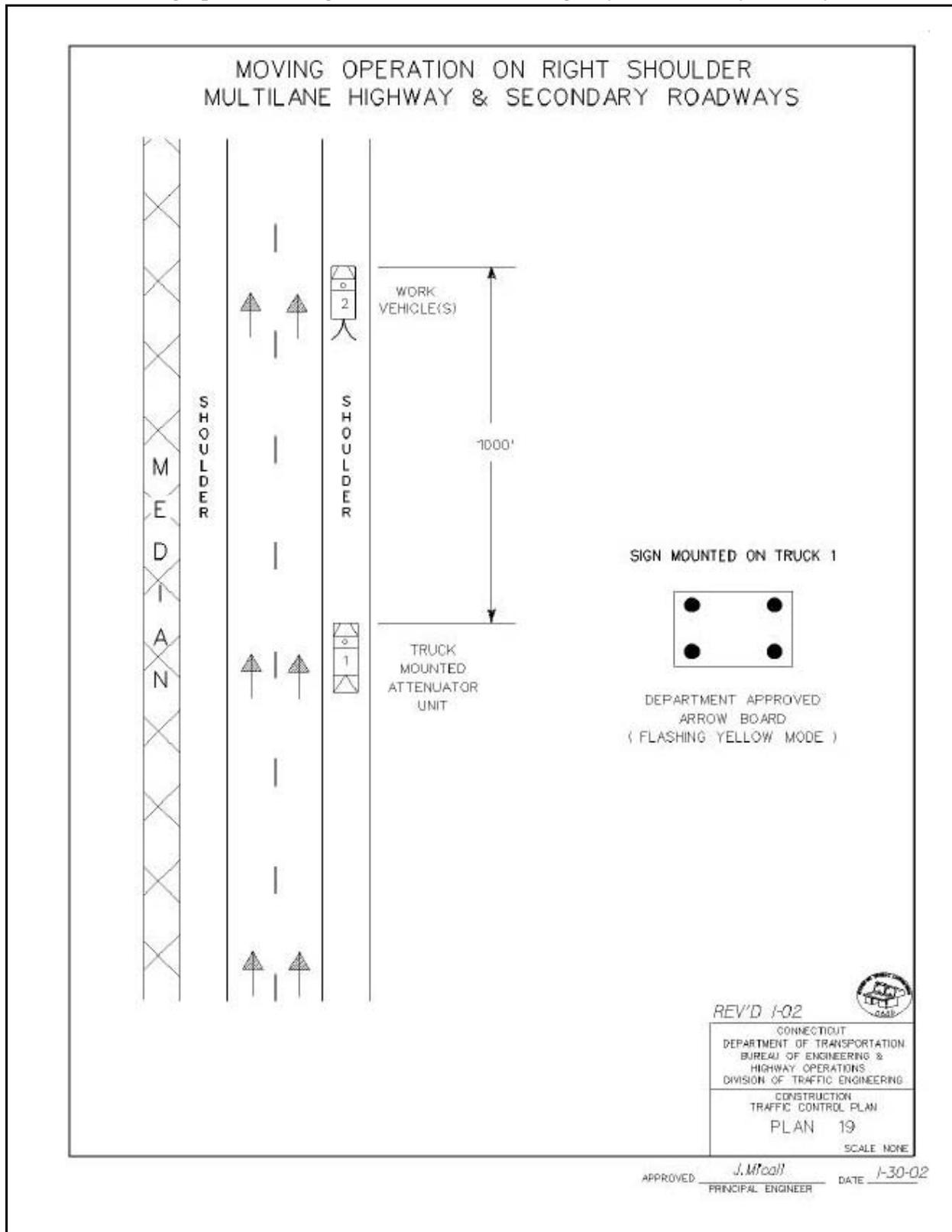


Figure 2-9.31 Traffic Control Plan 20
Moving Operation in Right Lane and Outside Shoulder at the Same Time—Multilane Highway

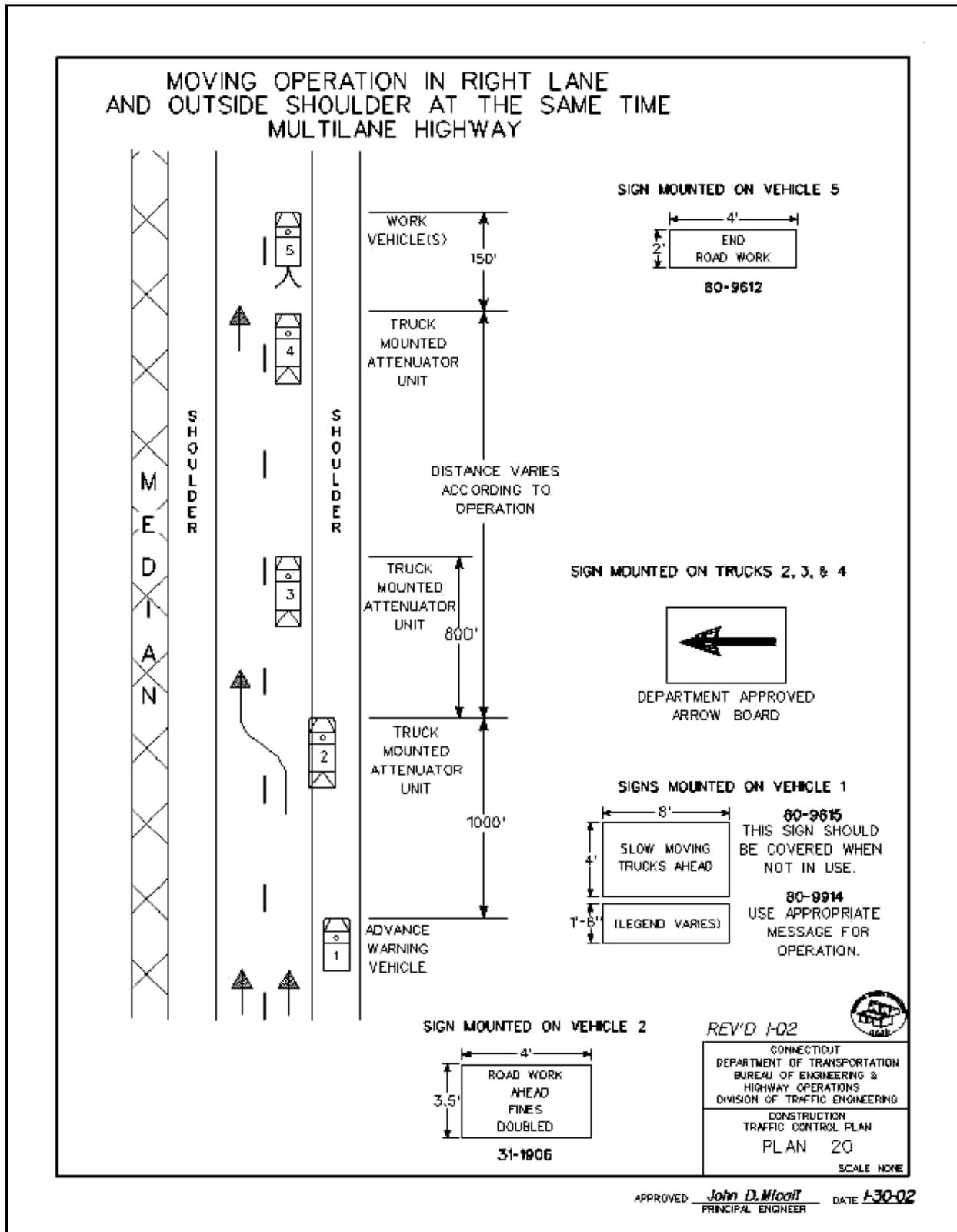


Figure 2-9.32 Traffic Control Plan 21
Moving Operation in Left Lane and Inside Shoulder at the Same Time—Multilane Highway

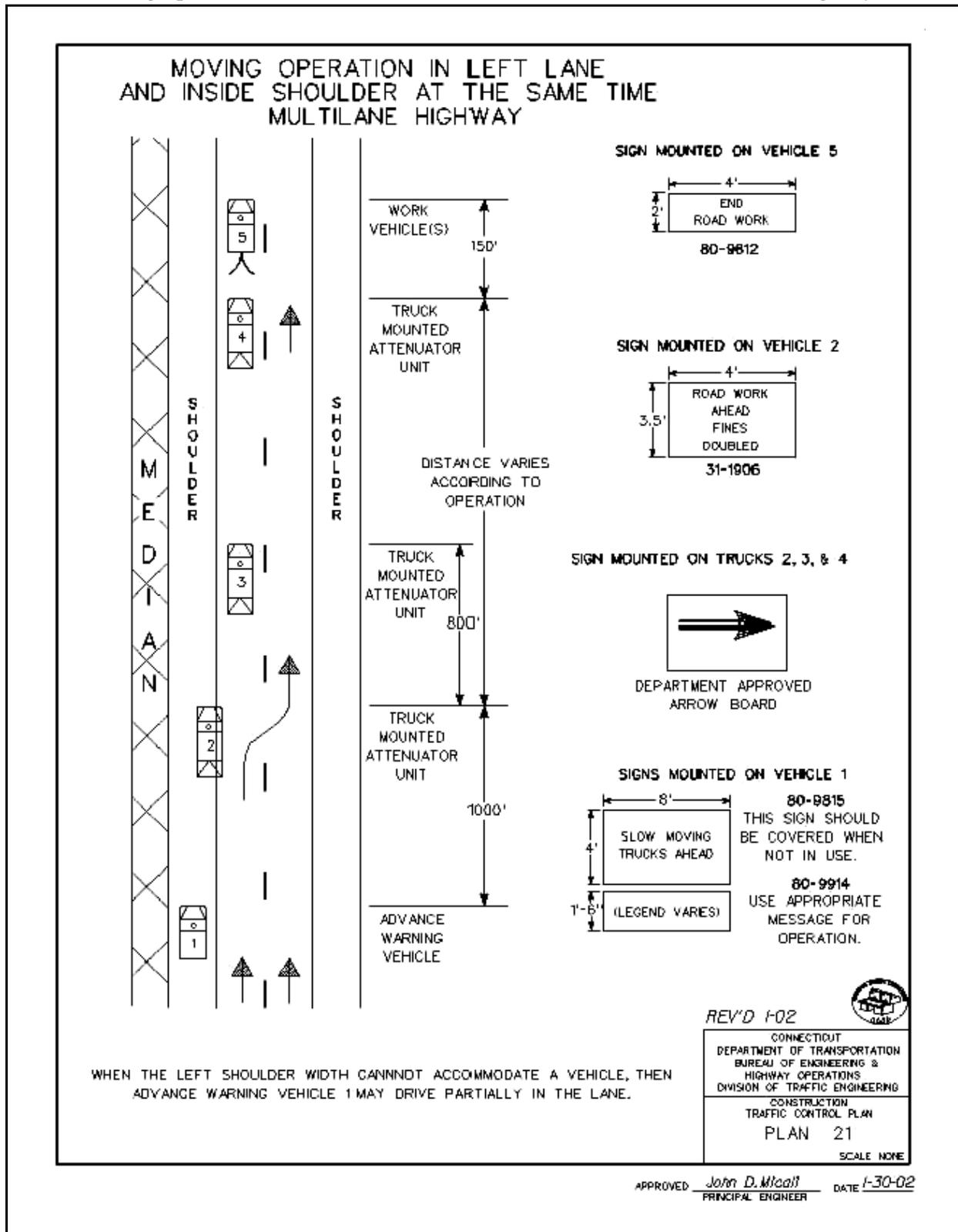
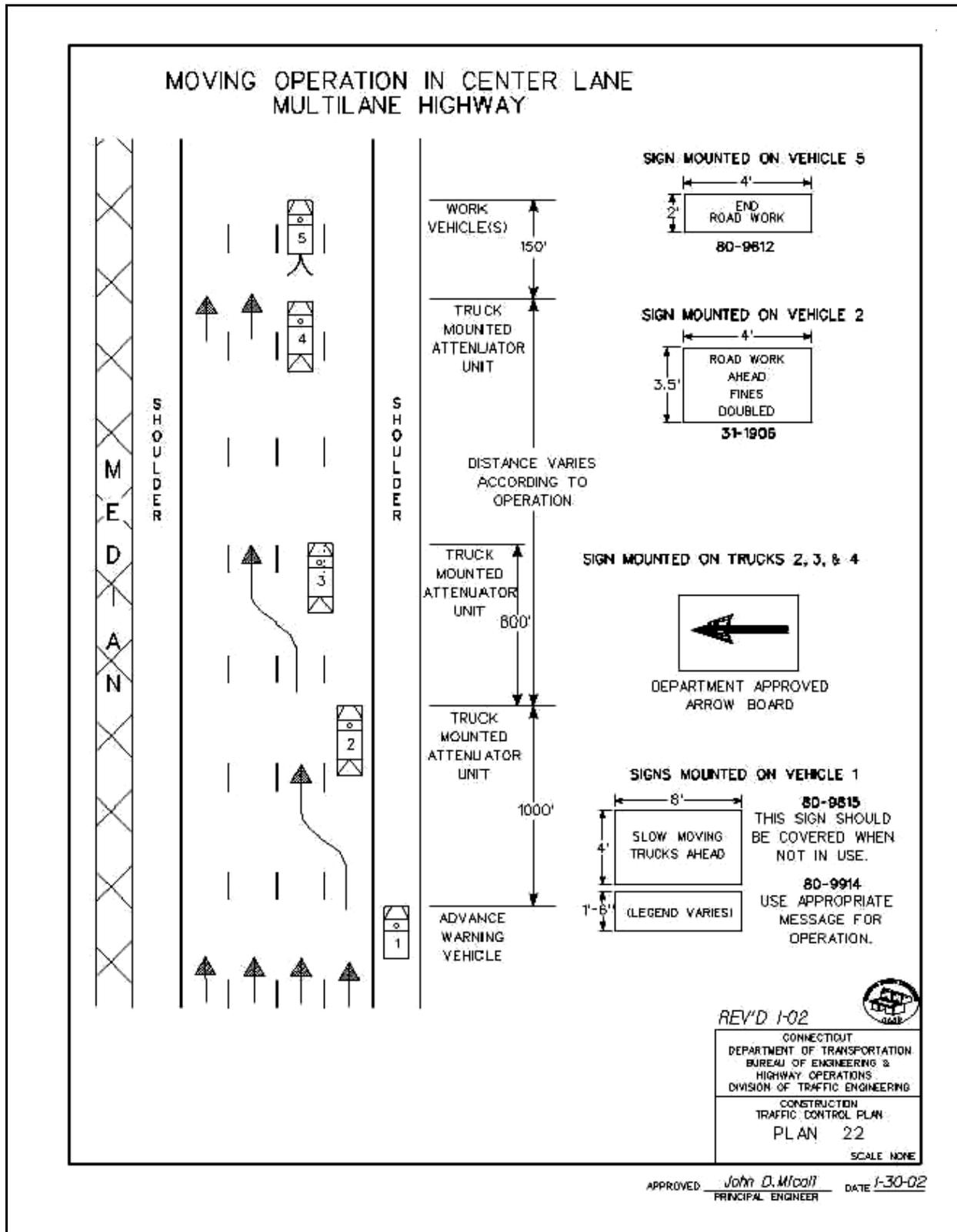


Figure 2-9.33 Traffic Control Plan 22
Moving Operation in Center Lane—Multilane Highway



Figures 2-9.34 Traffic Control Plan 23
Moving Operation in Center Lane—Multilane Highway

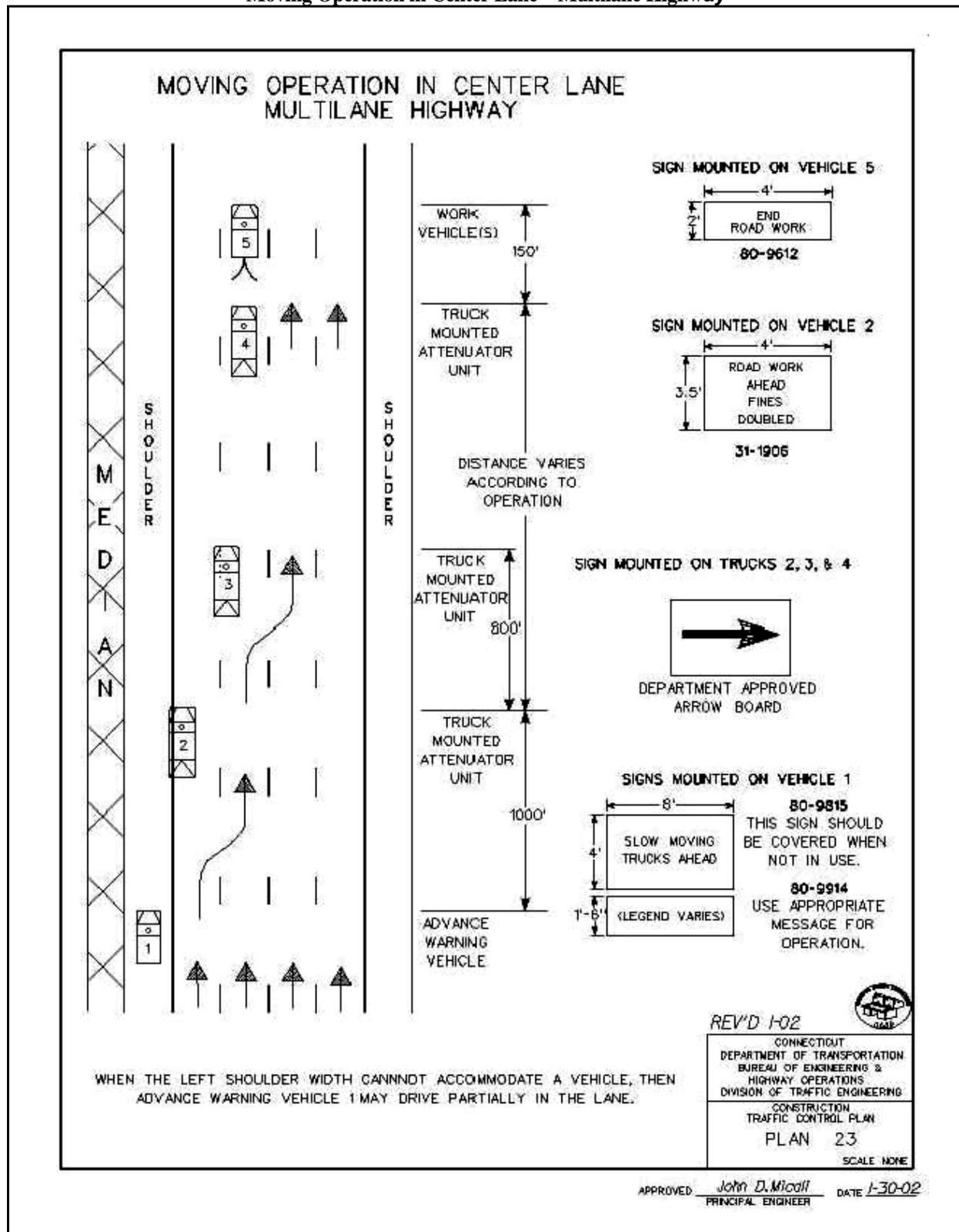


Figure 2-9.35 Traffic Control Plan 24
Moving Operation—Two-Lane Highway

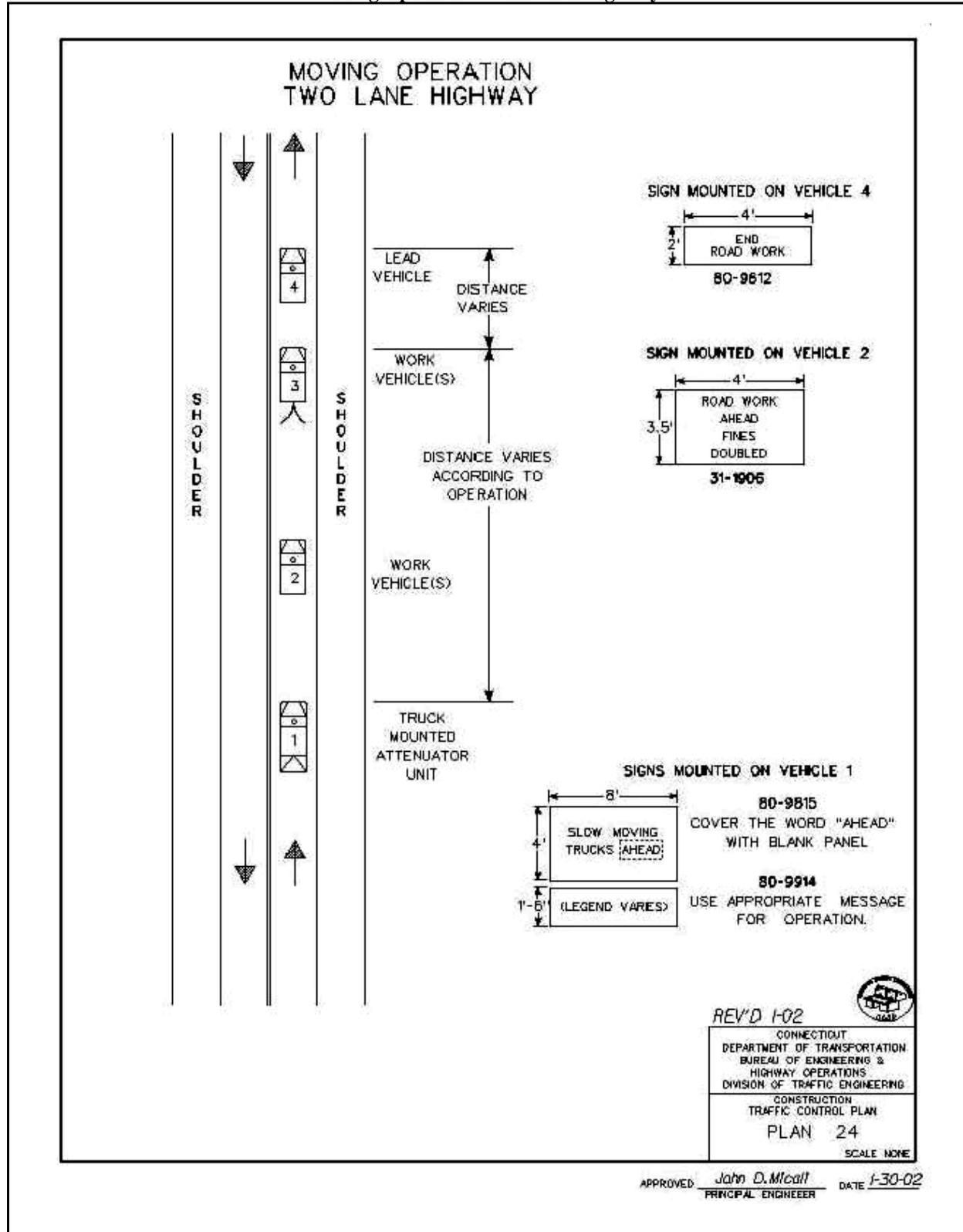


Figure 2-9.36 Traffic Control Plan 25
Mowing Operation—Multilane Highway

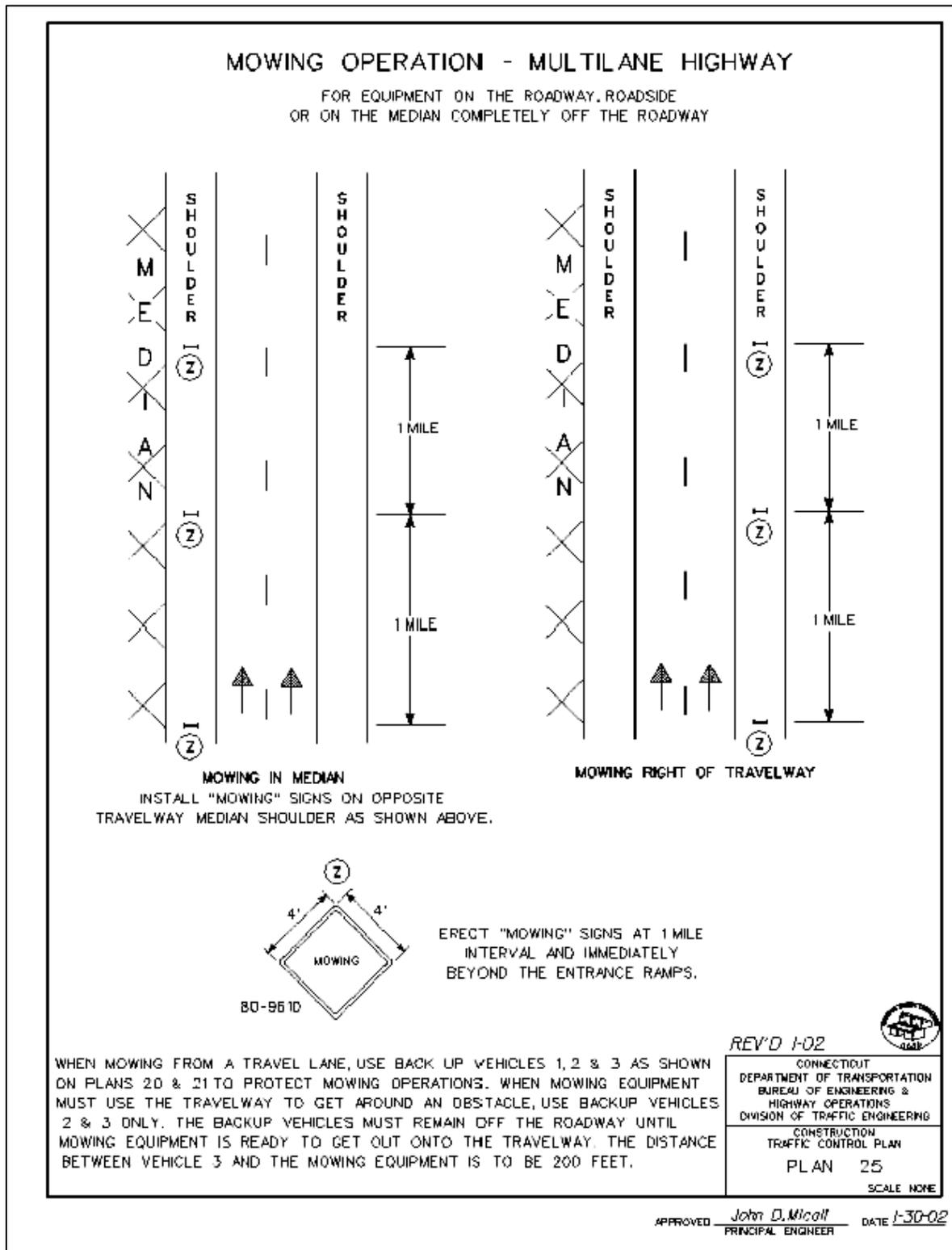


Figure 2-9.37 Traffic Control Plan—H.O.V. Plan 1
Work in Restricted Lane (Stationary Closure)

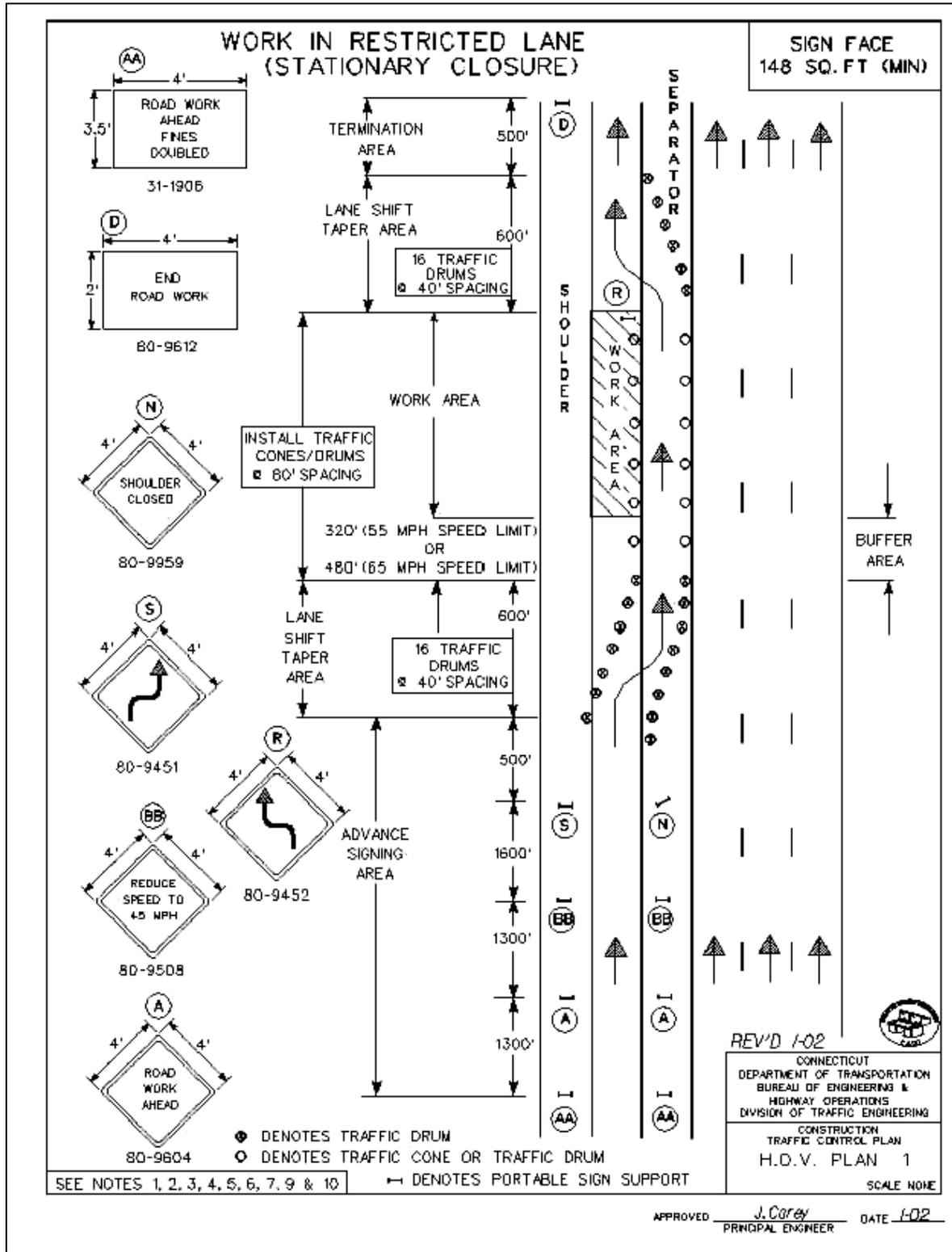


Figure 2-9.38 Traffic Control Plan—H.O.V. Plan 2
Work in Separator of Restricted Lane (Stationary Closure)

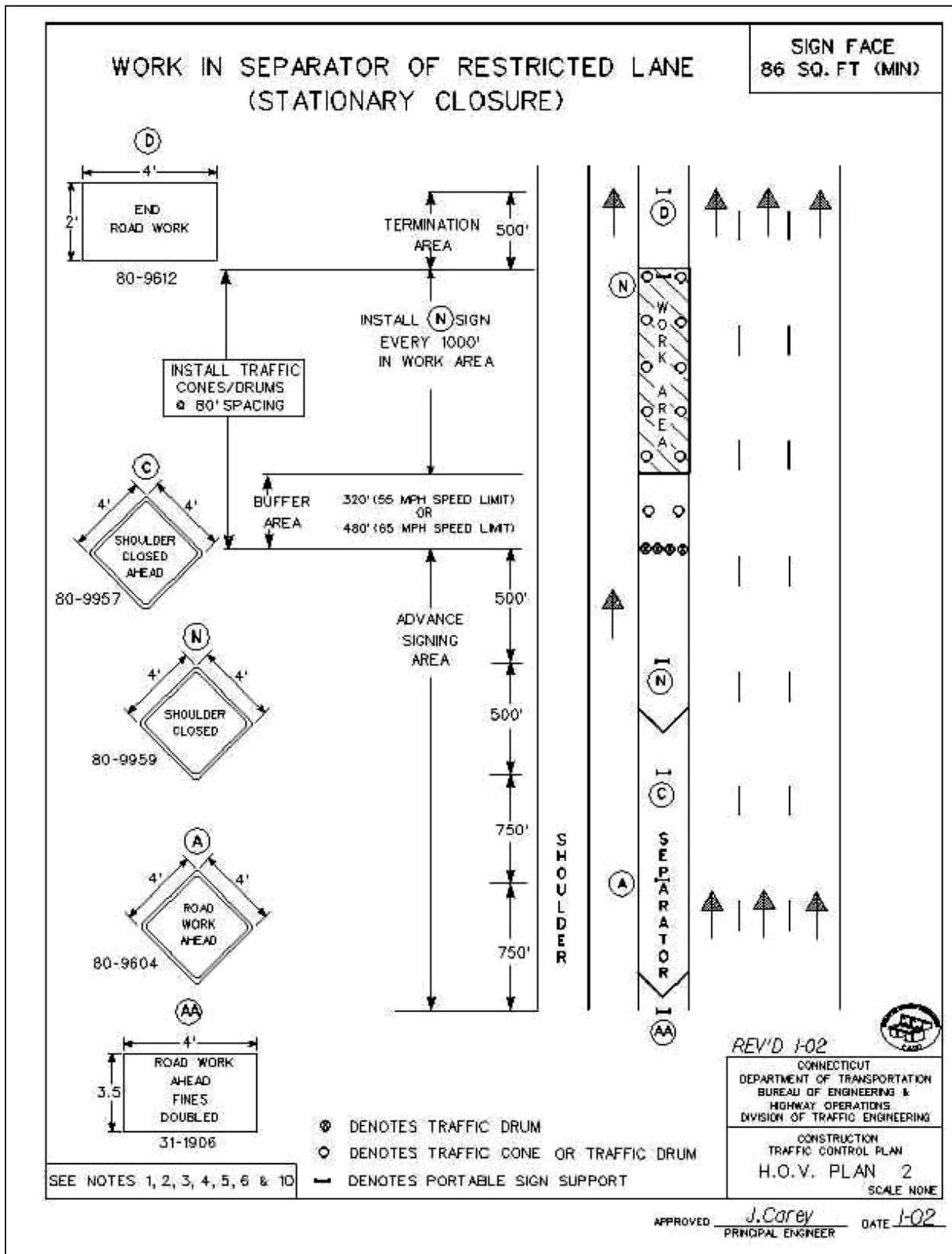


Figure 2-9.39 Traffic Control Plan—H.O.V. Plan 3
Work in Left Shoulder of Restricted Lane (Stationary Closure)

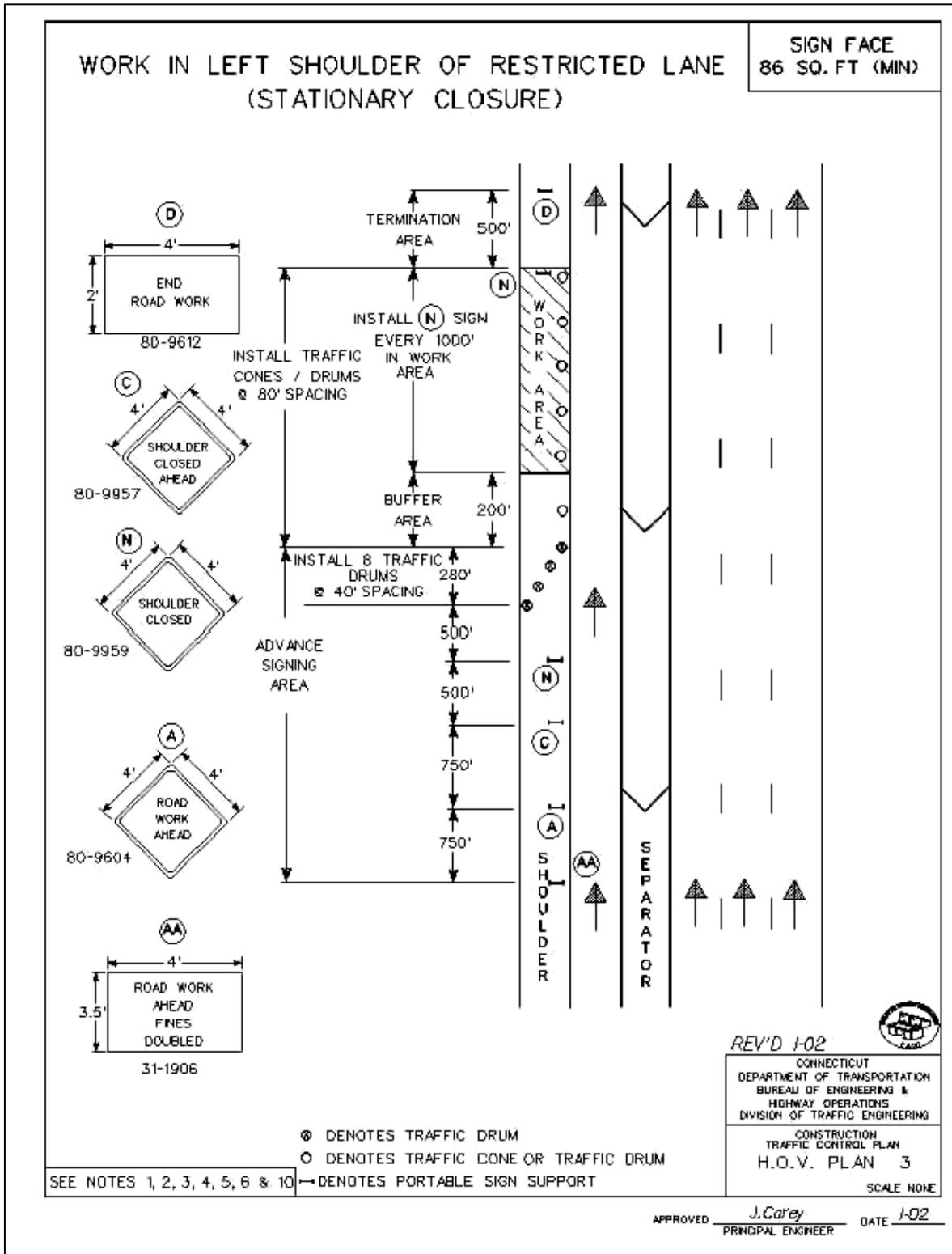


Figure 2-9.40 Traffic Control Plan—H.O.V. Plan 4
Moving Operation in Restricted Lane

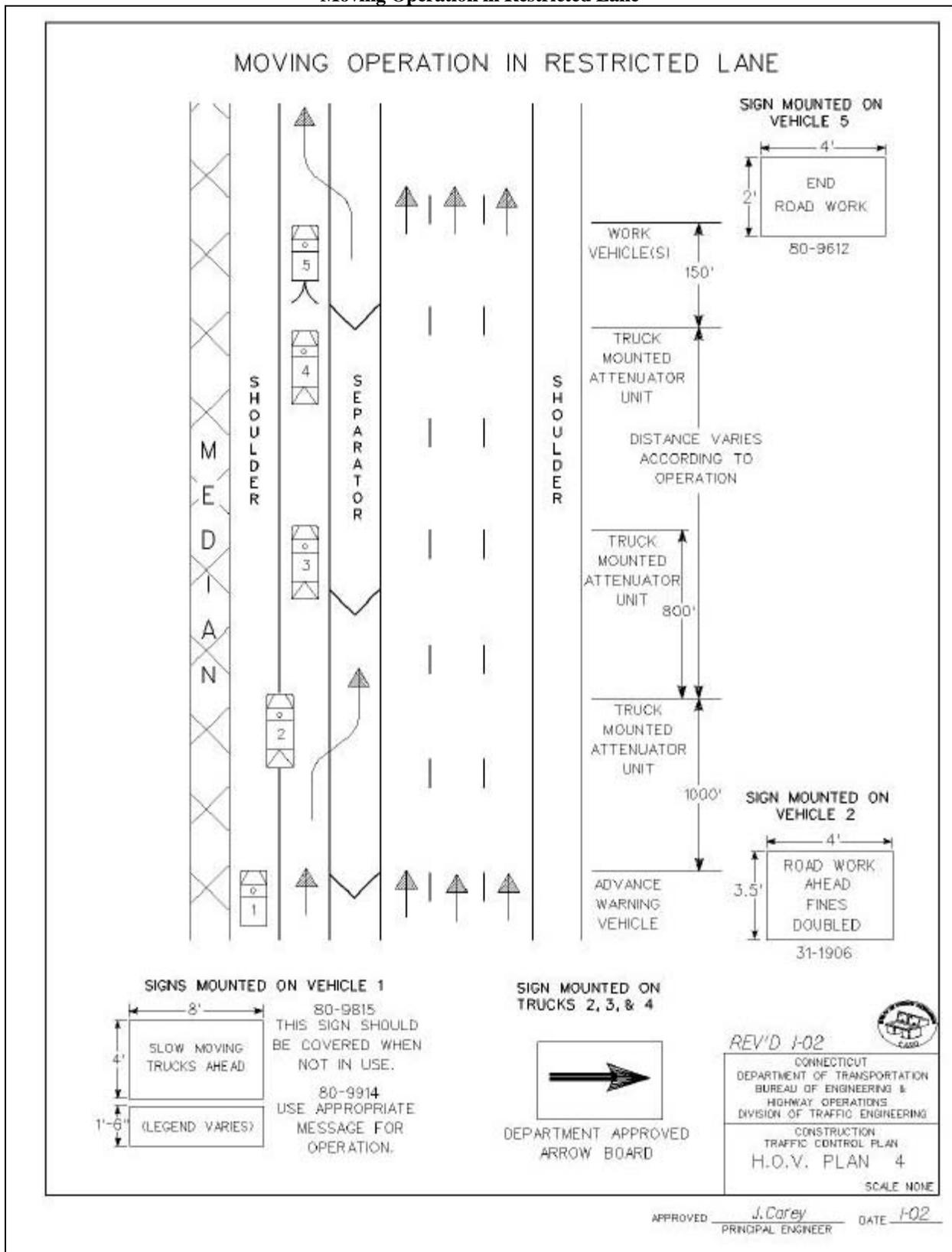


Figure 2-9.40 Traffic Control Plan—H.O.V. Plan 4
Moving Operation in Restricted Lane

