

Temporary Traffic Control Guidelines for Utility Work



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NDDOT
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Introduction

Utility work and maintenance operations within public right-of-way require careful consideration of the orderly flow of vehicular and pedestrian traffic. These circumstances merit consideration since the resulting traffic is not typical of the normal pattern. The motorists should be sufficiently warned in time to think, react, and be guided around the work area while a flow of traffic is maintained.

This handbook serves to provide minimum guidelines of temporary traffic control (TTC) for utility work. Certain cases may require more TTC than what is provided here. If questions arise contact the district office. Also, use the most recent issue for all referenced technical manuals, current Utility Occupancy Application and Permit, and NDDOT specification; including interim publications unless otherwise approved by the NDDOT.

An emergency situation may arise where immediate action to protect the safety of the general public requires work to be done on a street or highway where full compliance with the provisions of this handbook cannot be immediately provided. Nothing in this handbook will be interpreted as requiring a person or agency to delay such immediate action.

All traffic control and warning devices are to meet standards set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) as approved by the Federal Highway Administration. This manual is based on MUTCD 2009 edition and future revisions to the MUTCD may invalidate this handbook.

The on-site supervisor has direct responsibility to ensure that motorists and pedestrians are adequately warned. Furthermore, the supervisor will take any necessary actions, such as requesting law enforcement assistance when safety and orderly traffic flow are jeopardized.

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Definitions

The following definitions apply to this handbook.

Activity Area—Temporary traffic control zone area where the work actually takes place. It consists of the work space, traffic space and one or more buffer spaces. (See page 8.)

Advanced Warning Area—Temporary traffic control zone area between the first warning sign and the transition area; tells traffic what to expect ahead. (See page 8.)

Arrow Boards—A sign with a matrix of elements capable of either flashing or sequential displays. This sign shall provide additional warning and directional information to assist in merging and controlling road users through or around a TTC zone.

Barricade—A portable device used to control road users by closing, restricting, or delineating all or a portion of the right-of-way. Barricades are classified as Type 1, Type 2, or Type 3 and shall conform in according to Section 6F in MUTCD.

Buffer Space—Longitudinal and lateral space which provides a margin of safety for both the driver and the workers. It is important that the buffer space be free of equipment, workers, material and vehicles. (See page 8.)

Clear Zone—The total roadside border area, starting at the edge of the traveled way, that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a non-recoverable, traversable slope with a clear run-out area at its toe.

Cone—A traffic channelizing device used to guide the motorist around the work area; minimum of 28-inch cones are required.

Crashworthy—A characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard either the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" or Manual for Assessing Safety Hardware (MASH).

Drum—A traffic channelizing device constructed of lightweight, deformable materials. (See page 5.)

High-Level Warning Device—A device used to supplement other traffic control measures, by providing additional notice to the motorist. The device consists of a minimum of two flags with or without flashing warning lights attached to a warning sign. The height of the lowest tip of the flag and/or light shall be at least 8 feet.

Definitions (cont.)

Low-Volume Street or Highway—Any street or highway with an Annual Daily Traffic (ADT) of 400 vehicles per day or less. This data is available from the NDDOT.

Reflectorization—Requires that signs shall be reflectorized to show the same shape and color both day and night.

Retroreflectorization—Takes place when light is returned. Specifically the retroreflective properties of traffic signs cause the light from vehicle headlights to be redirected back to the vehicle, thereby making the traffic sign visible to the driver at night.

Termination Area—Traffic Control Zone area located beyond the activity or work area; allows motorists to resume normal driving. (See page 8.)

Traffic Control Zone—Area located between the first advance warning sign and the end of the termination area.

Transition Area—Traffic Control Zone area between the advance warning area and buffer space; allows traffic to move out of its normal path. (See page 8.)

Abbreviations

ADT—Average Daily Traffic

MUTCD—Manual on Uniform Traffic Control Devices

TTC—Temporary Traffic Control

Traffic Control Devices and Methods

General Information

All traffic control devices shall be in place before any work begins. All traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, traffic control devices that are no longer appropriate shall be removed or covered. Traffic control devices shall be placed in a traffic lane only when the lane is to be fully or partially blocked.

A work site where the motorist's view is limited by physical objects, such as hills, curves, side roads, etc., require additional warning devices or flaggers.

A motor vehicle such as a truck may be used as a buffer to oncoming traffic. Emergency flashers and other warning lights on the vehicle may be used to alert motorists. However, any vehicle used as a buffer shall be regarded as a supplement, not a substitute, for appropriate warning and traffic control devices preceding the vehicle. Permission must be obtained if the use of a vehicle as a buffer violates any local government ordinance.

If pedestrians are subject to entering the work area, proper controls and warning devices for pedestrians are to be used. Also, pedestrian pathways shall be maintained at all times. If closed, facilitate easy detour that conforms with Americans With Disabilities Act (ADA) guidelines for both temporary sidewalks and ramps or use the standard shown in this book. Pedestrians shall be protected from all hazards.

Work Duration

Definitions of five categories of work durations used in this handbook:

1. **Long-term stationary** is work that occupies a location more than three days.
2. **Intermediate-term stationary** is work that occupies a location more than one daylight period up to three days, or nighttime work lasting more than one hour.
3. **Short-term stationary** is daytime work that occupies a location for more than one hour within a single daylight period.

4. **Short duration** is work that occupies a location up to one hour.

5. **Mobile** is work that moves intermittently or continuously.

Note: TTC for Long-term stationary utility-work operation may need additional TTC devices or new TTC layout. Consult with the district for your TTC plan.

Flaggers

To help control traffic flow around the work area, flaggers are required when lane closures cause two directions of traffic to occupy the same lane. Flaggers should be knowledgeable in flagging operations and have passed the written examination found at <http://www.ndflaggertraining.com>. A uniformed law enforcement officer may be used in lieu of a flagger.

Night Operations

Night work uses combination of flashing arrow panels, barricades with warning lights and other recommended MUTCD nighttime TTC devices. All traffic control devices must be visible to the motorist by either being illuminated or retroreflectorized.

Maintenance

All traffic control devices shall be appropriately maintained. If defective devices are encountered, they should be corrected immediately and documented.

High-Visibility Clothing

All workers who are exposed to traffic, work vehicles or construction equipment within the TTC zone are required to wear retroreflective clothing in accordance with ANSI/ISEA 107, Performance Class 2 or Class 3 requirements.

Ensure that retroreflective clothing is the outermost garment, in a clean condition, and closed in both the front and rear. Replace retroreflective clothing as necessary to maintain visibility and reflectivity.

During times of low visibility, require all workers to wear Class 3 retroreflective clothing.

Flagging Procedures



Properly Trained Flaggers

- Clear message to drivers as shown
- Allows distance for drivers to react
- Coordinate with other flaggers

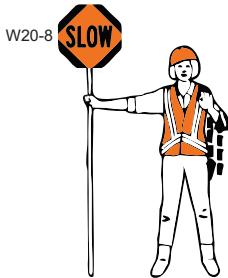
Properly Equipped Flaggers

- Approved sign paddles
- Approved safety vest
- Reflective night equipment
- Approved hard hat



Proper Flagging Stations

- Good approach sight distance
- Highly visible to traffic
- Never stand in moving traffic lane
- Stand in a location that enables escape from errant vehicles



Proper Advance Warning Signs

- Always use warning signs
- Allow reaction distance from signs
- Remove signs if not flagging

Minimum Spacing of Advanced Warning Signs

ADVANCED WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft.)*		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 to 50 mph)	360	360	360
Rural - High Speed (over 50 to 65 mph)	720	720	720
Urban Expressway and Freeway (55 to 60 mph)	850	1,350	2,200
Rural Expressway and Freeway (70 to 75 mph)	1,000	1,500	2,640
Interstate/4-Lane Divided (Maint. and Surveying)	750	1,000	1,500

* The column headings A, B, and C are the dimensions between Advanced Warning Signs. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest from the TTC zone.)

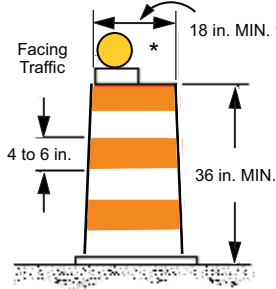
Warning Signs—Construction and maintenance warning signs are used extensively in street and highway work zones. As a general rule, these signs are located on the right-hand side of the street or highway.

Size—Required standard size for advance warning signs in work zone is 48 inches by 48 inches. (see Part 6 of the MUTCD for additional information).

Mounting—Standards for height and lateral clearance of roadside signs are included in Part 6 of the MUTCD. Signs mounted on barricades or temporary supports may be at lower heights, but the bottom of the sign shall not be less than one foot above the pavement elevation.

Retroreflectivity and Illumination—All signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night. The requirement for sign illumination shall not be considered to be satisfied by street or highway lighting. Specific minimum requirements can be found in Part 2 of the MUTCD.

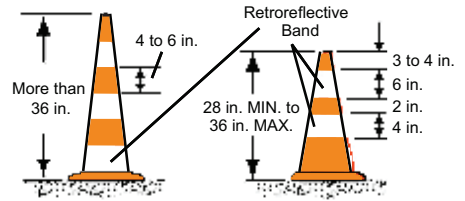
Channelizing Devices



DRUM

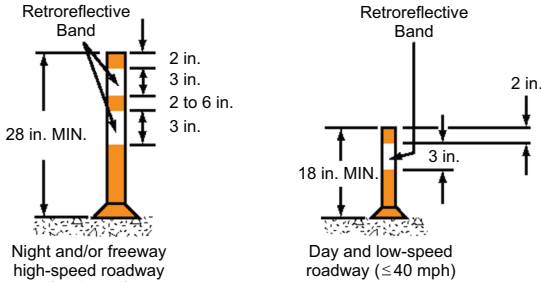
* Warning lights (optional)

Channelizing Devices (cont.)

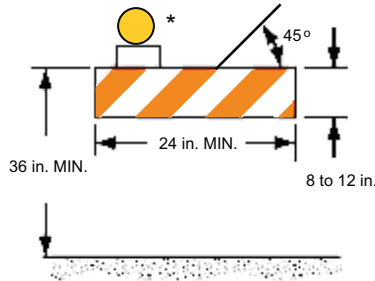


CONES

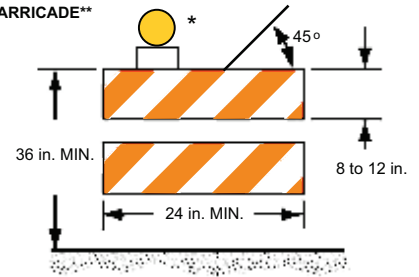
Night and/or Freeway
High-Speed Roadway
(≥ 45 mph)



TUBULAR MARKERS



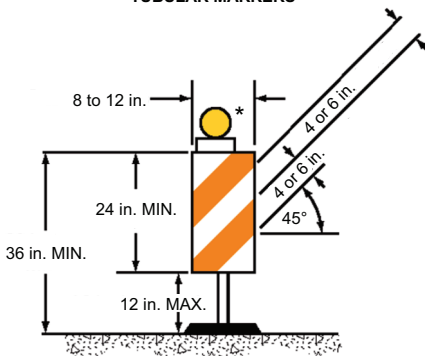
TYPE I BARRICADE**



TYPE II BARRICADE**

* Warning lights (optional)

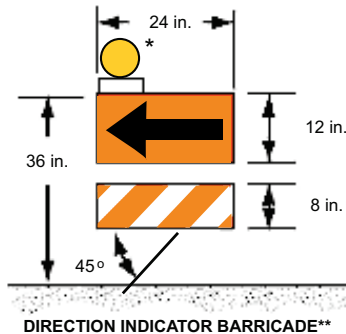
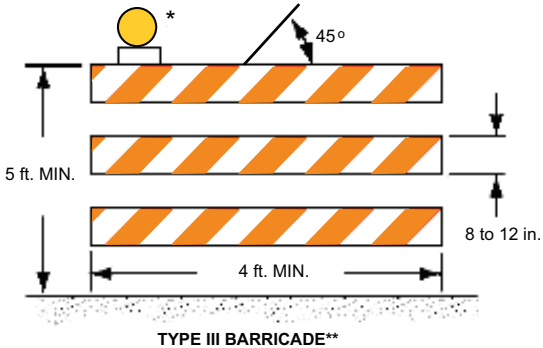
** Rail stripe widths shall be 6 inches, with the exception that 4 inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.



VERTICAL PANEL

* Warning lights (optional)

Channelizing Devices (cont.)



* Warning lights (optional)

** Rail stripe widths shall be 6 inches, with the exception that 4 inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

Lighting Devices

Lighting devices for short term utility and maintenance work zones are designed to supplement the signs and channelizing devices used in these zones. Typical lighting devices include warning lights, flashing vehicle lights, and flashing arrow panels.

Warning Lights—Warning lights may be used to supplement retroreflectorized signs, barriers, and channelizing devices. The principal types and use of warning lights are:

1. Low Intensity Flashing Lights (Type A) – Used to warn of an isolated hazard at night. Normally mounted on barricades and drums.
2. High Intensity Flashing Lights (Type B) – Normally mounted on advanced warning signs to draw attention to a hazard both day and night.
3. Steady-Burn Lights (Type C) and 360-degree Steady-Burn Lights (Type D) – Used in a series to delineate the edge of the traveled way and channelize traffic at night. When used to delineate a curve, Type C and Type D warning lights should only be used on devices on the outside of the curve.

Floodlights—When nighttime work is being performed, floodlights should be used to illuminate the work area. Except in emergency situations, flagger stations shall be illuminated at night.

Floodlighting shall not produce a disabling glare condition for approaching road users, flaggers, or workers. Desired illumination levels vary depending upon the nature of task involved. An average horizontal luminance of 5 foot candles can be adequate for general activities. Tasks requiring high levels of precision and extreme care can require an average horizontal luminance of 20 foot candles.

Stopping Sight Distance as a Function of Speed

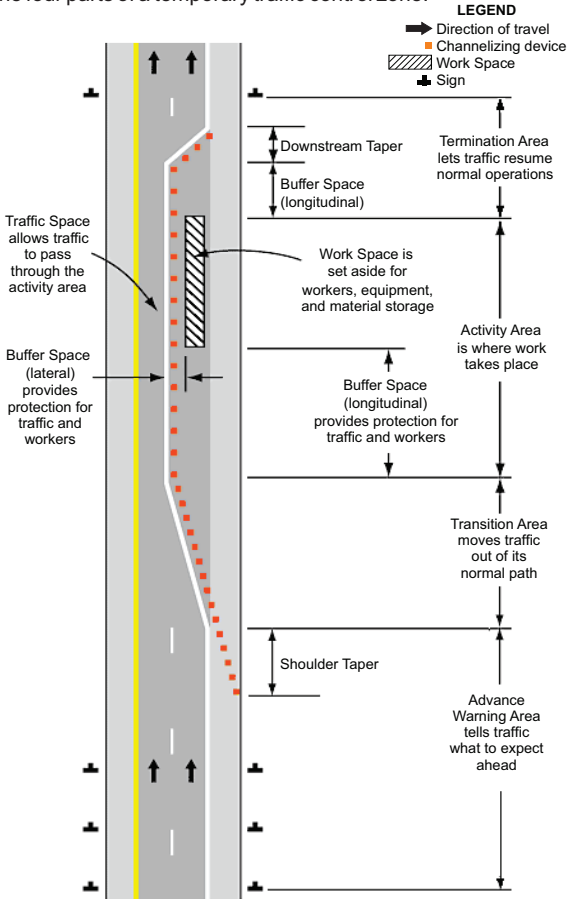
Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed limit.

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Components of a Temporary Traffic Control Zone

The temporary traffic control zone is the distance between the first advance warning sign and the point beyond the work area where traffic is no longer affected. Below is a diagram showing the four parts of a temporary traffic control zone.



Taper Length Criteria for Work Zones

There are five types of tapers used in work zone traffic control. The length of each type of taper is based on formulas using the speed of the traffic and the width of the offset. The following are the five types of tapers and their lengths.

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

Type of Taper	Taper Length (L)
Merging Taper	at least L
Shifting Taper	at least 0.5L
Shoulder Taper	at least 0.33L
One-Lane, Two-Way Traffic Taper	50 ft. min. 100 ft. max.
Downstream Taper	50 ft. min., 100 ft. max. per lane

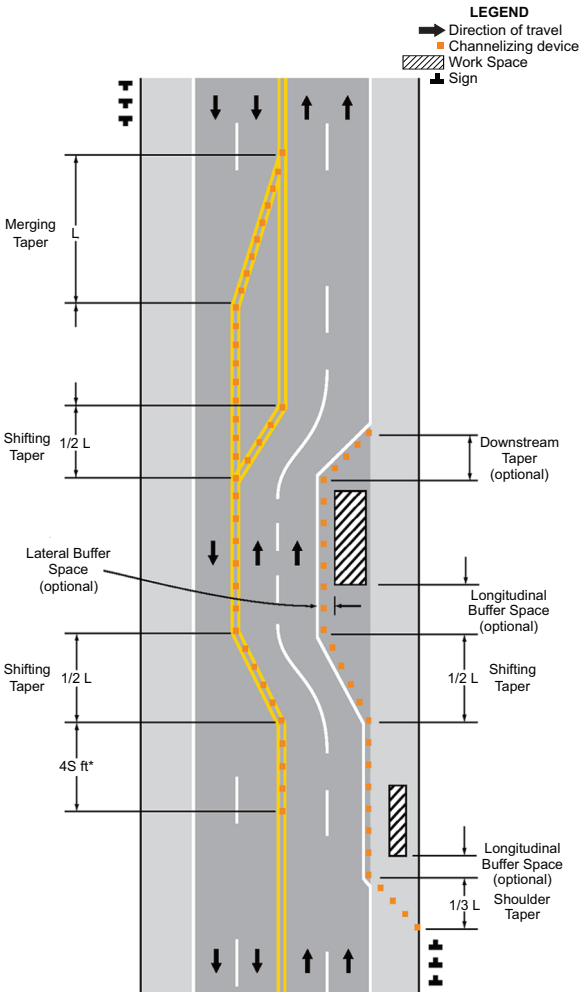
TABLE FOR TAPER LENGTHS

Speed Limit MPH*	Taper Lengths (L), ft.		
	12 ft.**	11 ft.**	10 ft.**
15	45	41	38
20	80	73	67
25	125	115	104
30	180	165	150
35	245	225	204
40	320	293	267
45	540	495	450
50	600	550	500
55	660	605	550
60	720	660	600
65	780	715	650
70	840	770	700
75	900	825	750

* Posted speed limit.

** Width of offset.

Types of Tapers and Buffer Spaces












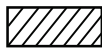



*S = speed in mph

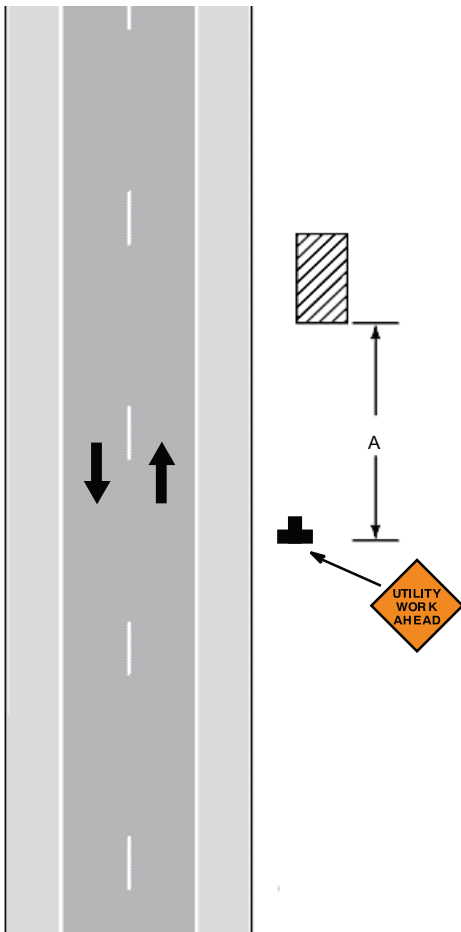
Typical Application Diagrams

The diagrams on the following pages represent examples of the application of principles and procedures for safe and efficient traffic control in work zones, but are not intended to be standards. It is not possible to include illustrations to cover every situation which will require work area protection. These typical temporary traffic control layouts are not intended as a substitute for engineering judgement and should be altered to fit the conditions of a particular site.

Legend

-  Arrow panel
-  Arrow panel support or trailer (shown facing down)
-  Channelizing device
-  Direction of traffic
-  Flagger
-  High level warning device (flag tree)
-  Sign (shown facing left)
-  Surveyor
-  Truck-mounted attenuator (TMA)
-  Type III barricade
-  Warning lights
-  Work space
-  Work vehicle

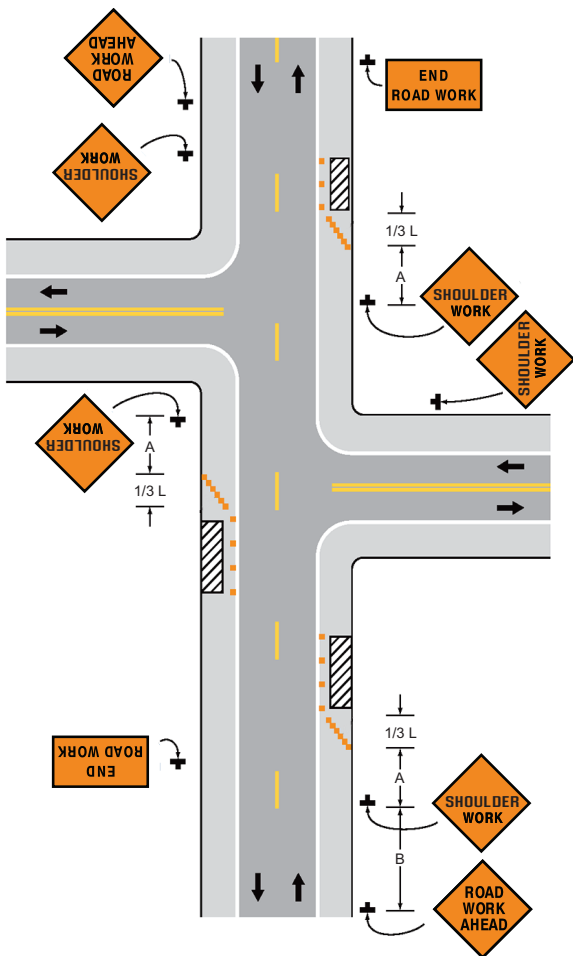
Work Beyond Shoulders



Notes for *Work Beyond Shoulders* TTC Layout:

1. The UTILITY WORKAHEAD sign may be omitted where the work space is behind a barrier, more than two feet behind the curb, or 15 feet or more from the edge of the roadway.
2. The UTILITY WORKAHEAD sign may be replaced with the ROAD WORK AHEAD sign or the SHOULDER WORK AHEAD sign.
3. Where the activity is spread out over a distance of more than two miles, place advance warning sign every one mile.
4. An advance warning sign shall be used if the work will be performed immediately adjacent to the shoulder, if equipment will cross or move along the roadway, or if the activity may distract motorists.
5. For short-term, short-duration, or mobile operation; all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights are used.

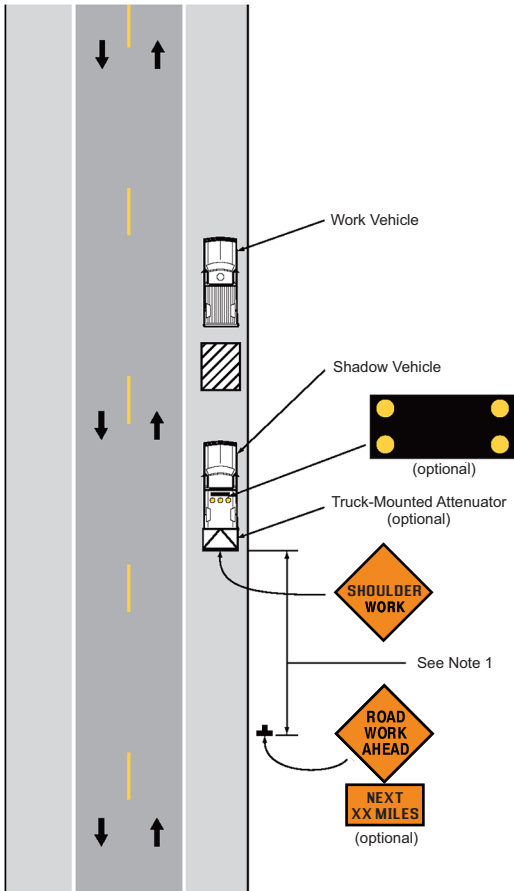
Work on the Shoulders



Notes for *Work on the Shoulders* TTC Layout:

1. UTILITY WORK AHEAD sign may be used instead of SHOULDER WORK sign.
2. For short duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
3. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

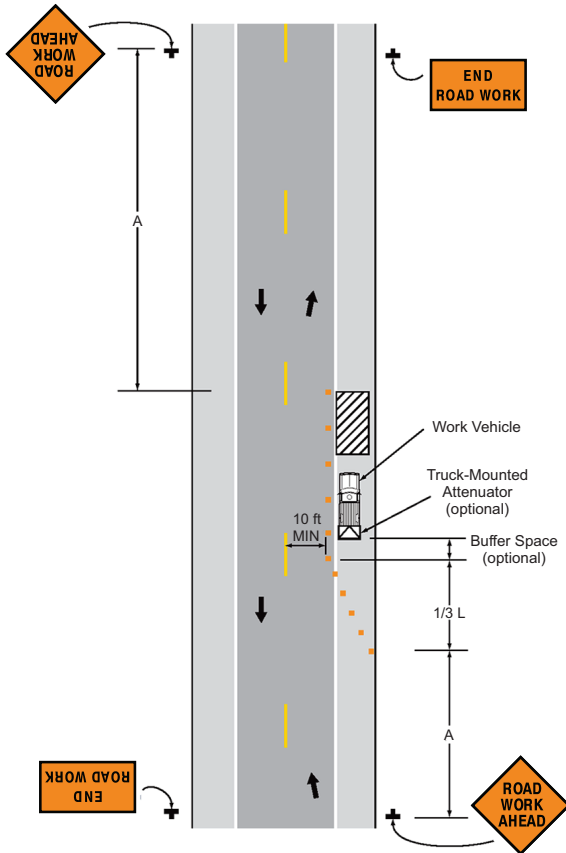
Short-Duration or Mobile Operation on a Shoulder



Notes for *Short-Duration or Mobile Operation on a Shoulder* TTC Layout:

1. In situations where multiple work locations within a limited distance make it practical to place stationary signs, the distance between the advance warning sign and the work should not exceed three miles.
2. Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights.
3. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights. However, they cannot be used as a warning device.
4. The UTILITY WORK AHEAD sign may be used instead of the ROAD WORK AHEAD sign.

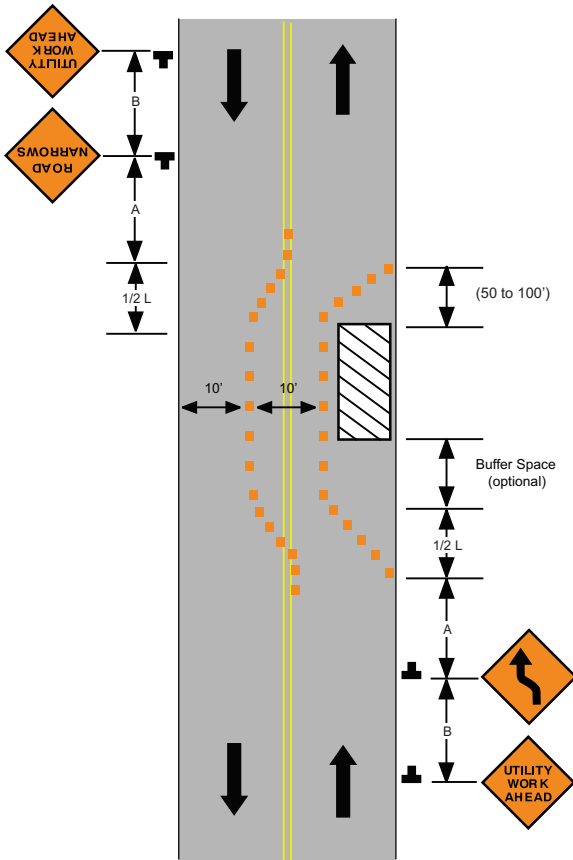
Shoulder Work With Minor Encroachment



Notes for *Shoulder Work With Minor Encroachment* TCC Layout:

1. Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted by use of closely-spaced channelizing devices, provided that the minimum lane width of 10 feet is maintained.
2. Additional advance warning may be appropriate, such as a ROAD NARROWS sign.
3. Temporary traffic barriers may be used along the work space. All barrier devices, used longitudinally, should meet the crashworthy requirement. Do not use barriers for a merging taper. (See definition for crashworthy for the requirement.)
4. For short-duration work (less than one hour), the taper and channelizing devices may be omitted if a shadow vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.

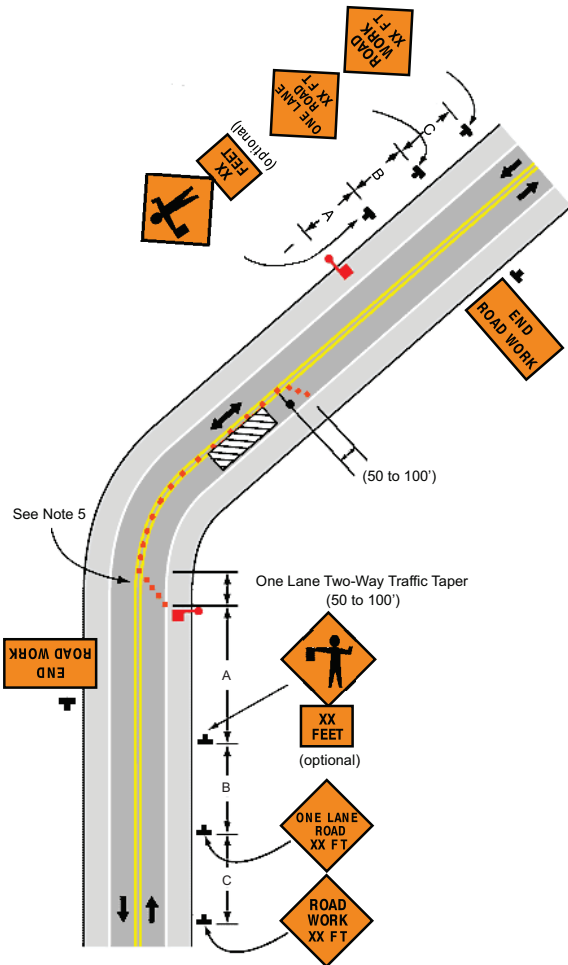
Work in Travel Lane on Minor Urban Street (Maintaining Two-Way Traffic)



Notes for *Work in Travel Lane on Minor Urban Street (Maintaining Two-Way Traffic)* TCC Layout:

1. A minimum lane width of 10 feet should be provided in both directions, this lane width should not extend beyond the edge of pavement. Lane width restriction signs may be required.
2. The UTILITY WORK AHEAD sign may be replaced with the ROAD WORK AHEAD sign.

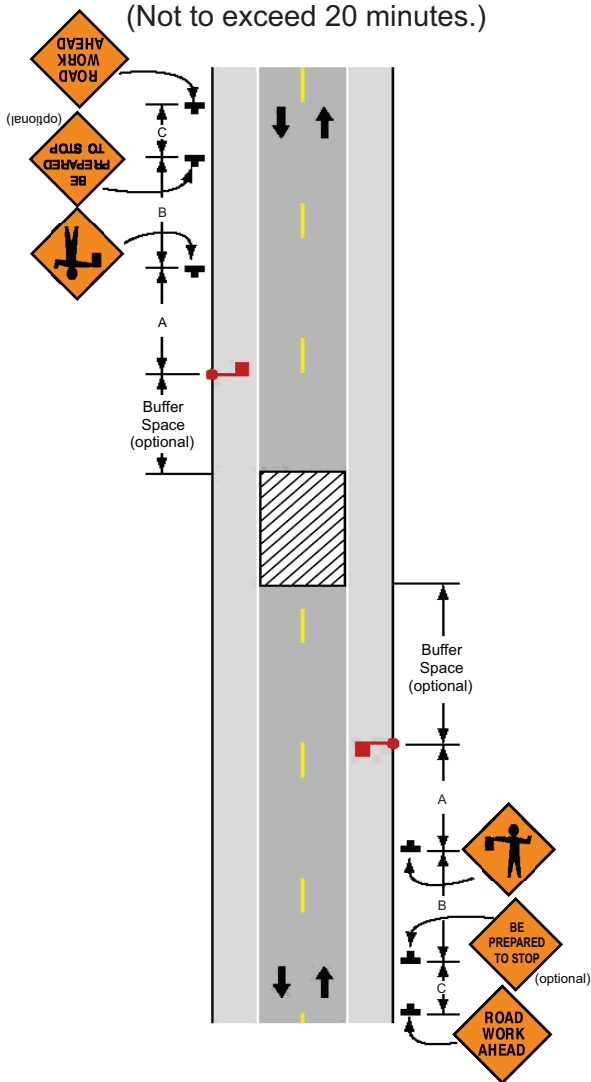
Lane Closure for Two-Lane Low-Volume Road (Two-Flagger Operation)



Notes for Lane Closure for Two-Lane Low-Volume Road (Two-Flagger Operation) TTC Layout:

1. A single flagger may be adequate for low volume applications. Where one flagger is used, such as for short work areas on straight roadways, the flagger must be visible to approaching traffic from both directions.
2. UTILITY WORK AHEAD sign may be used in place of ROAD WORK XX FT signs.
3. For operations of 60 minutes or less, the ROAD WORK XX FT sign may be omitted.
4. In situations where the work zone is on a horizontal or crest vertical curve, extend buffer space so that the two-way taper is placed before the curve to provide adequate stopping sight distance for the flagger and a queue of stopped vehicles.

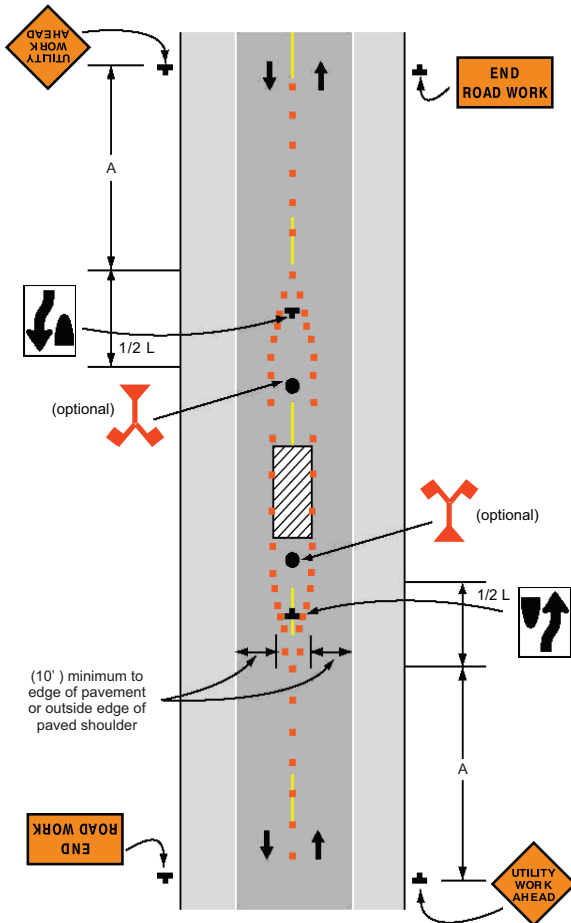
Temporary Street Closure (Not to exceed 20 minutes.)



Notes for *Temporary Street Closure (Not to exceed 20 minutes.)* TCC Layout:

1. Conditions represented are for work which requires closure during daytime hours only.
2. This application is intended for a planned temporary closure not to exceed 20 minutes on low speed streets.
3. UTILITY WORK AHEAD signs may be used in place of ROAD WORK AHEAD signs

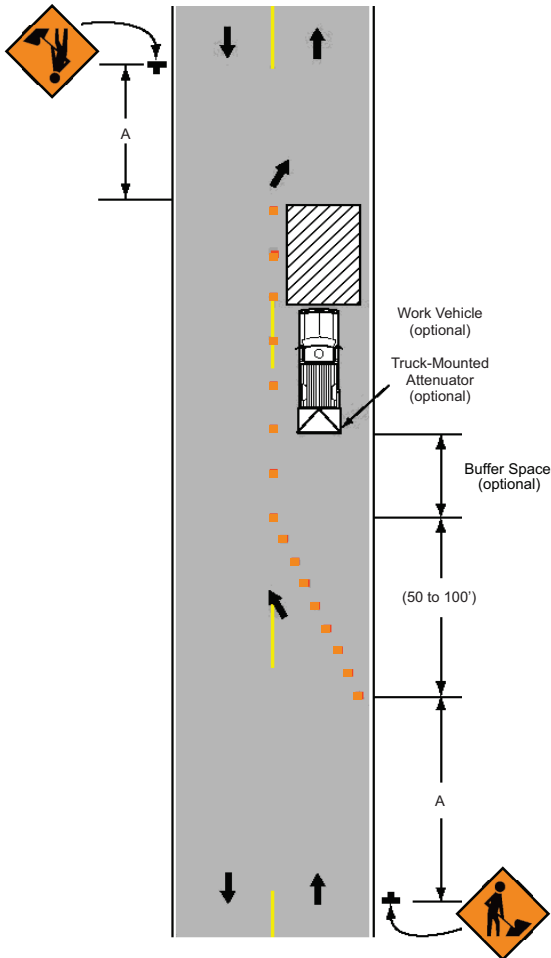
Work in Center of Minor Urban Street (Maintaining Two-Way Traffic)



Notes for *Work in Center of Minor Urban Street (Maintaining Two-Way Traffic)* TTC Layout:

1. A minimum lane width of 10 feet should be provided in both directions as measured from the channelizing devices to the edge of pavement.
2. The KEEP RIGHT symbol signs (R4-7) may be replaced with the KEEP RIGHT with arrow signs (R4-7a).
3. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

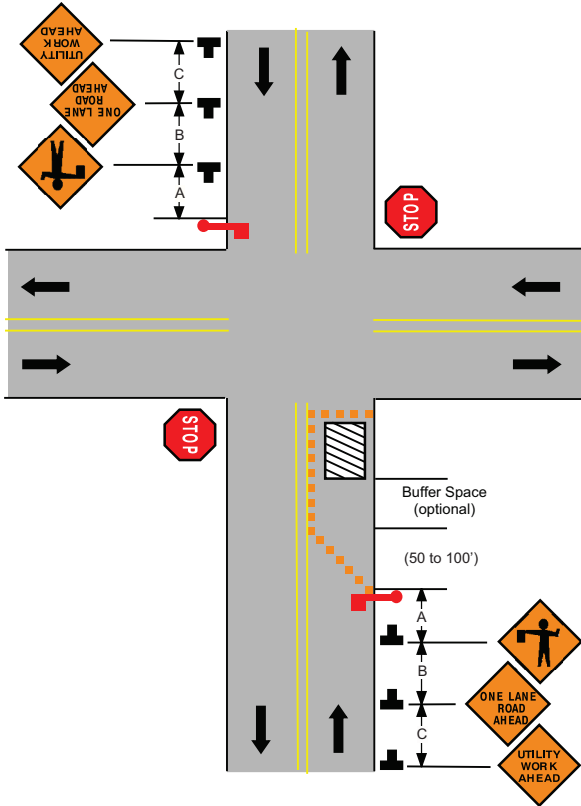
Lane Closure on a Minor Urban Street (No Flagger, Traffic Self-Regulating)



Notes for Lane Closure on a Minor Urban Street (No Flagger, Traffic Self-Regulating) TTC Layout:

1. This layout is **only** appropriate for low-volume, low-speed (30 mph or less) streets, such as local residential streets.
2. This procedure is not to be used in rural areas.
3. Traffic can regulate itself while volumes are low and the length of the work space is short, thus allowing traffic to readily see the roadway beyond.
4. Where traffic does not self-regulate effectively, use two-flagger operation in the layout on [page 15](#).
5. A ROAD WORK AHEAD sign may be used in place of WORKER sign (W21-1).

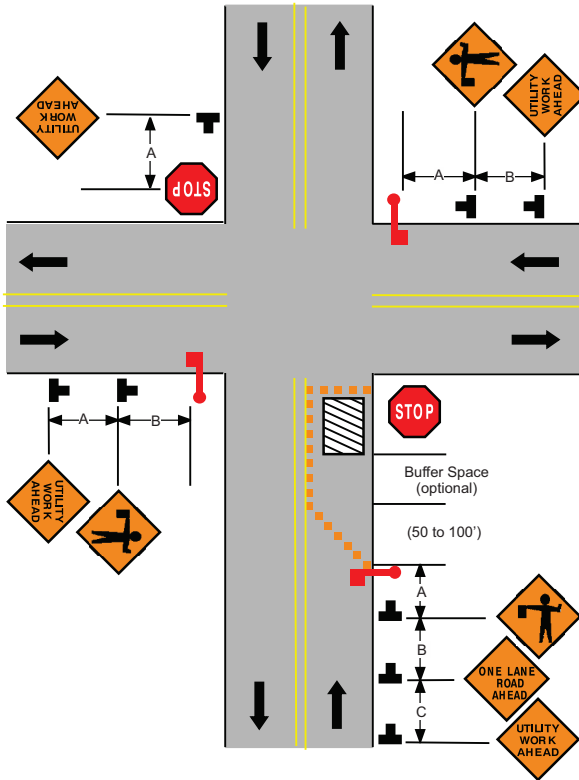
Lane Closure in Advance of Intersection (Two-Way Stop Control With Work on Major Roadway)



Notes for *Lane Closure in Advance of Intersection (Two-Way Stop Control With Work on Major Roadway)* TTC Layout:

1. Depending on traffic conditions, additional traffic control, such as flaggers and appropriate signage, may be needed on the cross road approaches.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

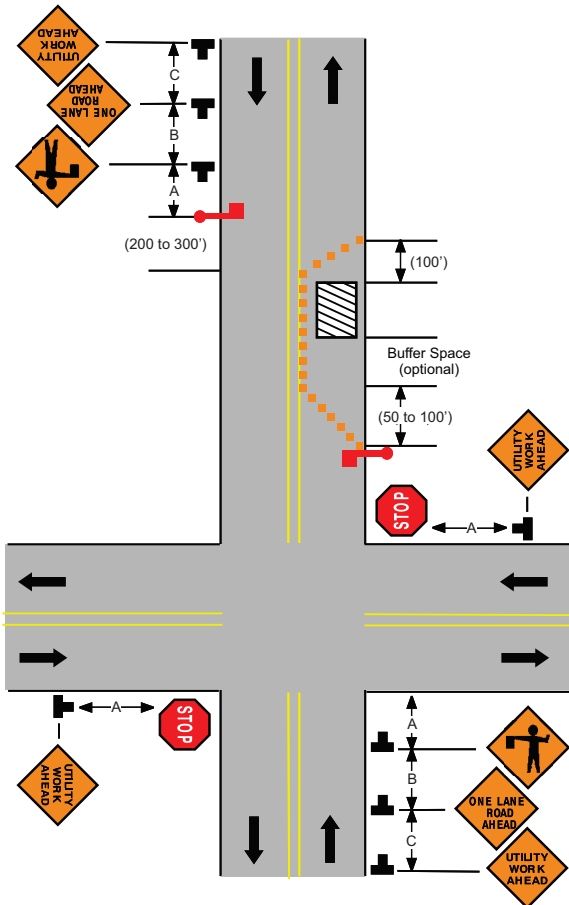
Lane Closure in Advance of Intersection (Two-Way Stop Control With Work on Stop-Controlled Approach)



Notes for Lane Closure in Advance of Intersection (Two-Way Stop Control With Work on Stop-Controlled Approach) TTC Layout:

1. Depending on traffic conditions, additional traffic control, such as flaggers and appropriate signage, may be needed on the cross road approaches.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

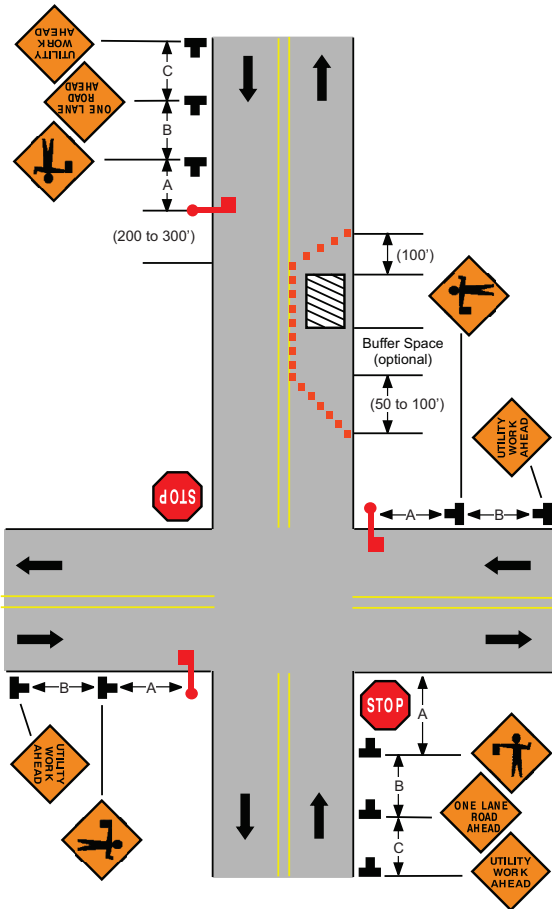
Lane Closure Beyond Intersection (Two-Way Stop Control With Work on Major Roadway)



Notes for *Lane Closure Beyond Intersection (Two-Way Stop control With Work on Major Roadway)* TTC Layout:

1. Depending on traffic conditions, additional traffic control, such as flaggers and appropriate signage, may be needed on the cross road approaches.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

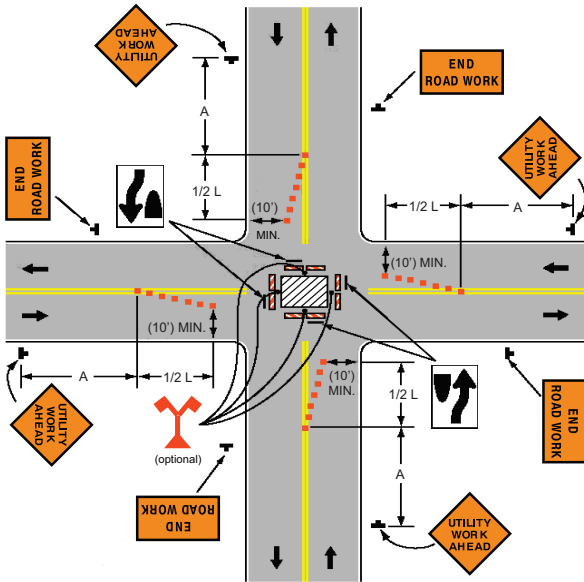
Lane Closure Beyond Intersection (Two-Way Stop Control With Work on Far Side of Stop Control)



Notes for Lane Closure Beyond Intersection (Two-Way Stop Control With Work on Far Side of Stop Control Approach) TTC Layout:

1. Depending on traffic conditions, additional traffic control, such as flaggers and appropriate signage, may be needed on the cross road approaches.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORKAHEAD signs.

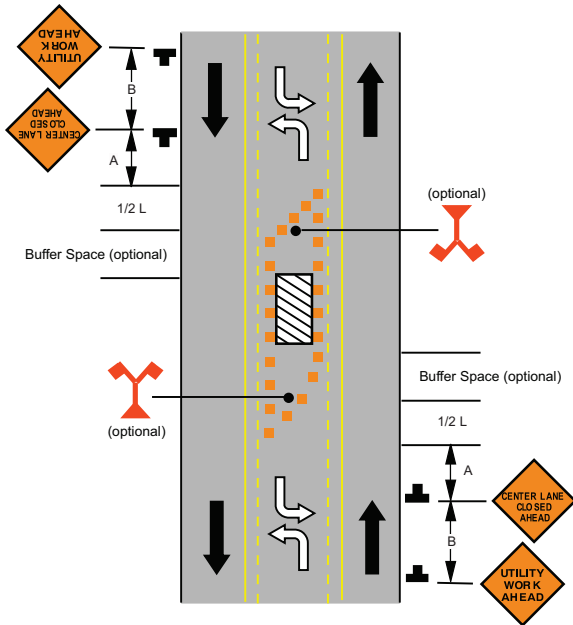
Closure in Center of Intersection



Notes for *Closure in Center of Intersection* TTC Layout:

1. Prohibit left turns as required by traffic conditions. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles.
2. A minimum of six channelizing devices shall be used for each taper.
3. For operations 20 minutes or less in duration, the channelizing devices may be eliminated if a flashing or revolving yellow light is displayed in the work space.
4. A high-level warning device should be placed in the work space, if there is sufficient room.
5. The KEEP RIGHT symbol signs (R4-7) may be replaced with the KEEP RIGHT with arrow signs (R4-7a).
6. ROAD WORK AHEAD sign may be used in place of UTILITY WORK AHEAD sign.

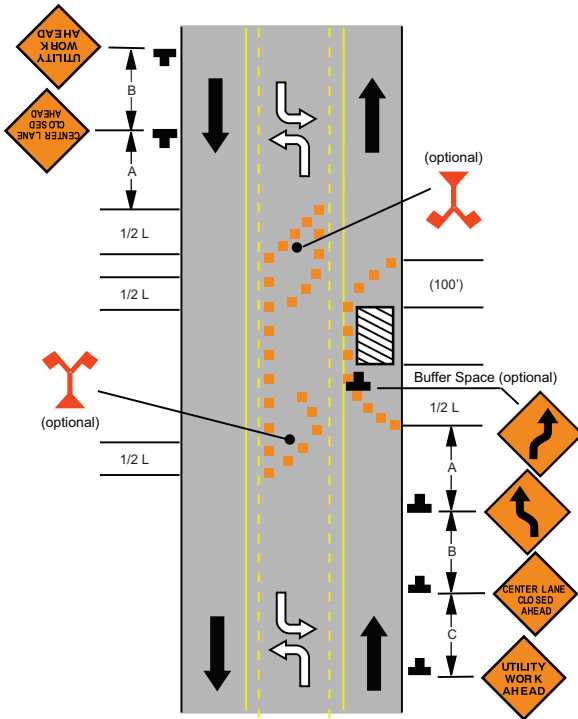
Center Turn Lane Closure on a Three-Lane, Two-Way Road



Notes for Center Turn Lane Closure on a Three-Lane, Two Way Road) TTC Layout:

1. High level warning devices (flag trees) may be used for added visibility.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

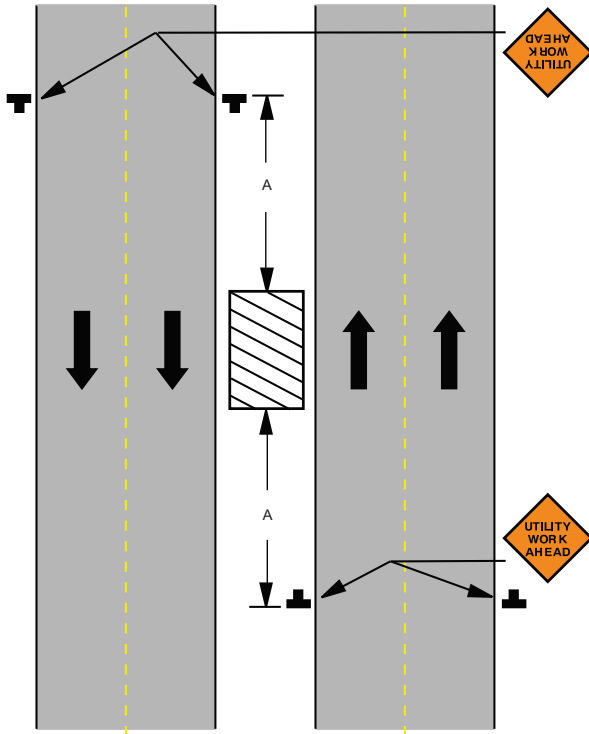
Lane Shift on a Three-Lane Two-Way Road



Notes for Lane Shift on a Three-Lane Two-Way Road TTC Layout:

1. High level warning devices (flag trees) may be used for added visibility.
2. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

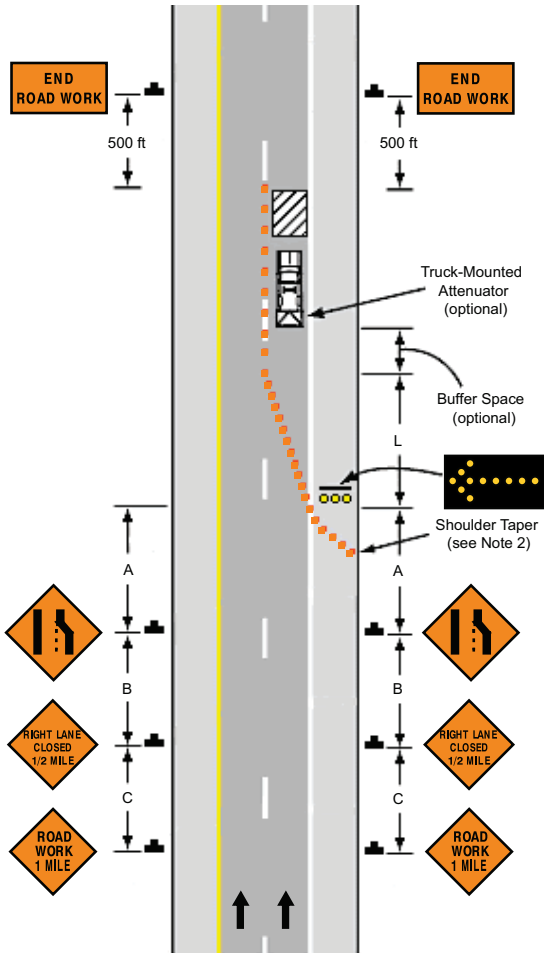
Four-Lane Divided Highway Traffic Control Device Placement Work Area in Median



Notes for *Four-Lane Divided Highway Traffic Control Device Placement Work Area in Median* TTC Layout:

1. No parking of vehicles/equipment is allowed on the roadway shoulder on either side.
2. The UTILITY WORK AHEAD sign may be omitted where the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.
3. For short-term, short-duration or mobile operation, all signs may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
4. ROAD WORK AHEAD signs may be used in place of UTILITY WORK AHEAD signs.

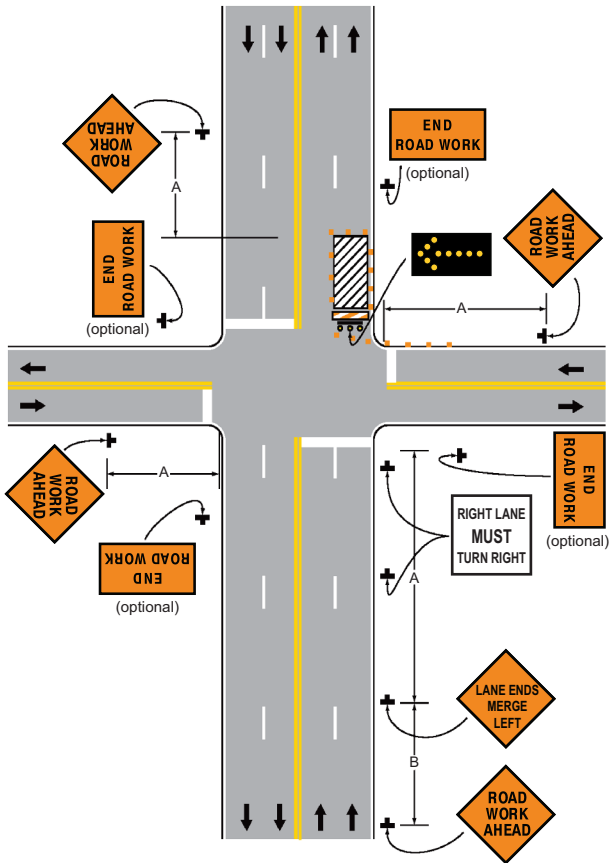
Lane Closure on Divided Highway



Notes for Lane Closure on Divided Highway TTC Layout:

1. A temporary white edge line is required along the channelizing devices for long term and intermediate work periods.
2. When paved shoulders, having a width of 8 feet or more, are closed; channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way. Length of taper should be $1/3L$.
3. UTILITY WORK AHEAD signs may be used in place of ROAD WORK AHEAD signs.

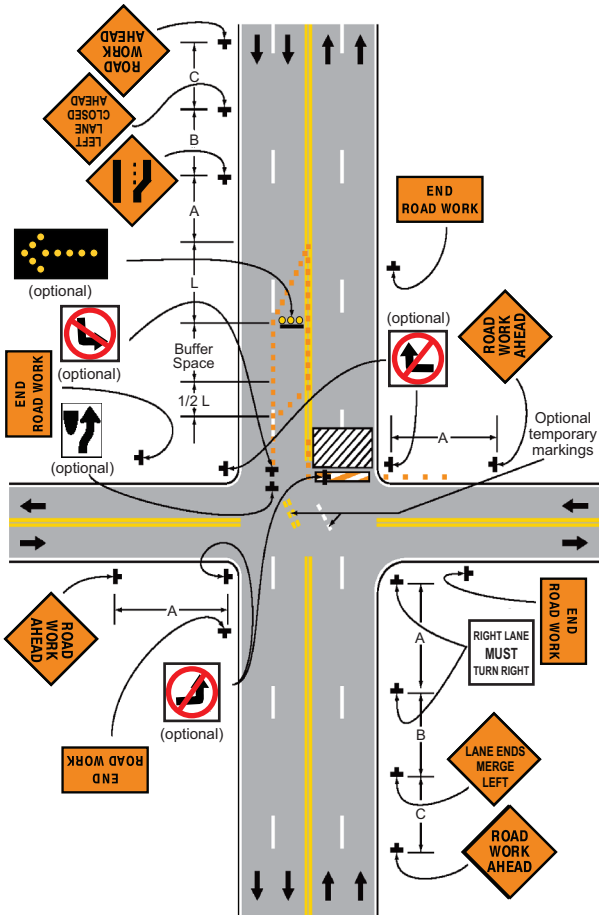
Right-Hand Lane Closure on the Far Side of an Intersection



Notes for *Right-Hand Lane Closure on the Far Side of an Intersection TTC Layout*:

1. If the work space extends across a crosswalk, the crosswalk should be closed using the pedestrian detour layout on [page 30](#).
2. Flashing warning lights may be used to call attention to the advance warning signs.
3. UTILITY WORK AHEAD signs may be used in place of ROAD WORK AHEAD signs.

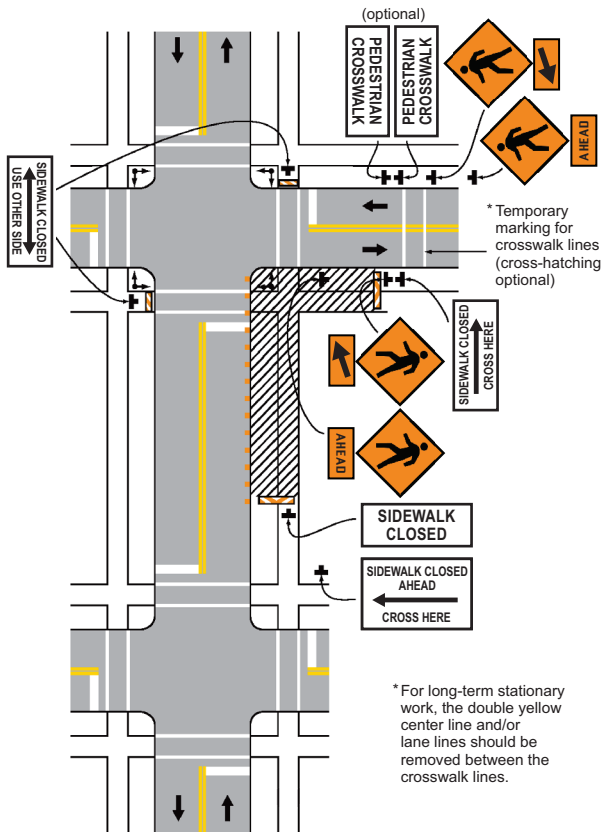
Half-Road Closure on the Far Side of an Intersection



Notes for Half-Road Closure on the Far Side of an Intersection TTC Layout:

1. If the work space extends across a crosswalk, the crosswalk should be closed using the pedestrian detour layout on [page 30](#).
2. For efficient and safe traffic flow, a left and/or right turn prohibition may be necessary to implement. In this case two turn prohibition signs are required.
3. UTILITY WORK AHEAD signs may be used in place of ROAD WORK AHEAD sign.

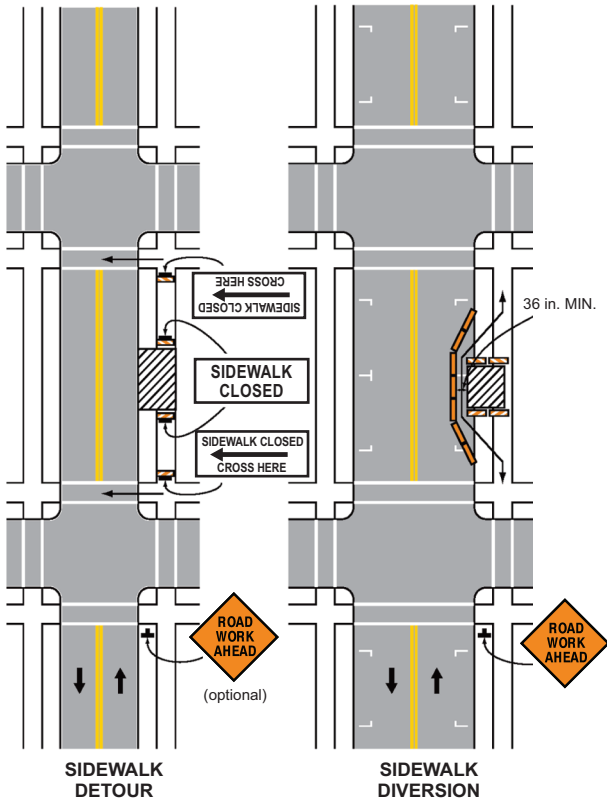
Crosswalk Closures and Pedestrian Detours



Notes for *Crosswalk Closures and Pedestrian Detours* TTC Layout:

1. Use this pedestrian detour layout when crosswalks are temporary closed for utility work.
2. Any temporary sidewalk should be firm, stable and non-slip surface.
3. For additional information see *Temporary Curb Ramps* on [page 32](#).

Sidewalk Detour or Diversion

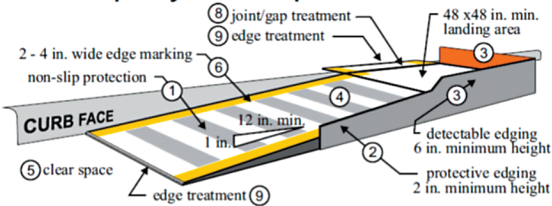


Notes for *Sidewalk Detour or Diversion* TTC Layout:

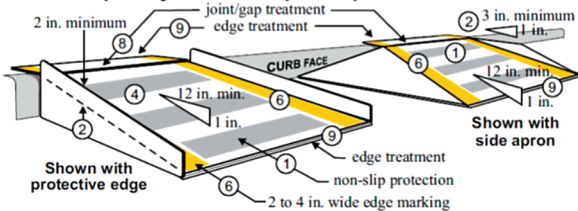
1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features.
2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion shall be used to separate the temporary sidewalks from vehicular traffic.
3. Audible information devices should be considered where midblock closings and changed crosswalk area caused inadequate communication to be provided to pedestrians who have visual disabilities.
4. For additional information see *Temporary Curb Ramps* on [page 32](#).

Temporary Curb Ramps

Temporary Curb Ramp - Parallel to Curb



Temporary Curb Ramp - Perpendicular to Curb



Notes for Temporary Curb Ramps TTC Layout

1. Curb ramps shall be 48 inches minimum width with a firm, stable and non-slip surface.
2. Protective edging with a 2-inch minimum height shall be installed when the curb ramp or landing platform has a vertical drop of 6 inches or greater or has a side apron slope steeper than 1:3 (33%). Protective edging should be considered when curb ramps or landing platforms have a vertical drop of 3 inches or more.
3. Detectable edging with 6-inch minimum height and contrasting color shall be installed on all curb ramp landings where the walkway changes direction (turns).
4. Curb ramps and landings should have a 1:50 (2%) max cross-slope.
5. Clear space of 48 x 48 inches minimum shall be provided above and below the curb ramp.
6. The curb ramp walkway edge shall be marked with a contrasting color 2 to 4 inch wide marking. The marking is optional where color contrasting edging is used.
7. Water flow in the gutter system shall have minimal restriction.
8. Lateral joints or gaps between surfaces shall be less than 0.5 inch width.
9. Changes between surface heights should not exceed 0.5 inch. Lateral edges should be vertical up to 0.25 inch high, and beveled at 1:2 between 0.25 inch and 0.5 inch height.

Best Practice Recommendations

Preparation for TTC Operation:

- Determine the type of roadway, work space, and duration of work.
- Select hours of work to avoid peak traffic periods.
- Select the appropriate TTC layout(s) in this handbook.
- Certain cases may require either modifications to typical layouts in the handbook or a new layout. Use MUTCD guideline to develop a layout and consult with NDDOT.

Quality Control During the TTC Operation:

- Establish routine schedule for inspecting TTC devices
- Remove immediately any damaged/non-conforming TTC devices.
- Use qualified flaggers (See Flagger Section in this handbook for more information)
- Allow for buffer space free of any obstructions.
- Install devices beginning with the first device the motorist will see.
- Immediately remove TTC devices as soon as work is completed, beginning with the last device seen by the motorist.

Minimum Documentation:

- Starting and ending time of work.
- Location of work.
- Type, condition and placement of traffic control devices.
- Names of personnel involved in TTC Operation.
- Retain record for all inspection reports including any incidents during this operation.
- Report any change to the initial TTC layout and reason for change.

Supervisor's Checklist:

- Familiarized yourself with this handbook and Part 6 of MUTCD.
- Establish a plan for maintaining TTC devices and identify who is responsible in the field.
- Give TTC plan layout for all personnel dealing with TTC in the field.

Contact Information

Contact the nearest district office for assistance in traffic control planning.

Bismarck District
218 South Airport Road
Bismarck, ND 58504-6003
(701) 328-6950
Fax: (701) 328-6933

Devils Lake District
316 6th St. S.E.
Devils Lake, ND 58301-3628
(701) 665-5100
Fax: (701) 328-0329

Dickinson District
1700 3rd Ave. W.
Suite 101
Dickinson, ND 58601-3009
(701) 227-6500
Fax: (701) 227-6505

Williston District
605 Dakota Parkway W.
P.O. Box 698
Williston, ND 58802-0698
(701) 774-2700
Fax: (701) 774-2704

Valley City District
1524 8th Ave. S.W.
Valley City, ND 58072-4200
(701) 845-8800
Fax: (701) 845-8804

Minot District
1305 Hwy. 2 Bypass E
Minot, ND 58702-7922
(701) 857-6925
Fax: (701) 857-6932

Grand Forks District
1951 N. Washington
P.O. Box 3077
Grand Forks, ND 58208-3077
(701) 787-6500
Fax: (701) 787-6515

Fargo District
503 38th St. S.
Fargo, ND 58103-1198
(701) 239-8900
Fax: (701) 239-8915

Standard Signs



G20-2



R4-7



R4-7a



W1-4R



W1-4L



W3-4



W4-2



W5-1



W9-3



W20-1



W20-4



W20-5



W20-7



W21-1



W21-7

Sign Sizes:

- Use 48" x 48" for all diamond signs
- Use 48" x 24" for G20-2 sign
- Use 36" x 48" for R4-7 and R4-7a signs