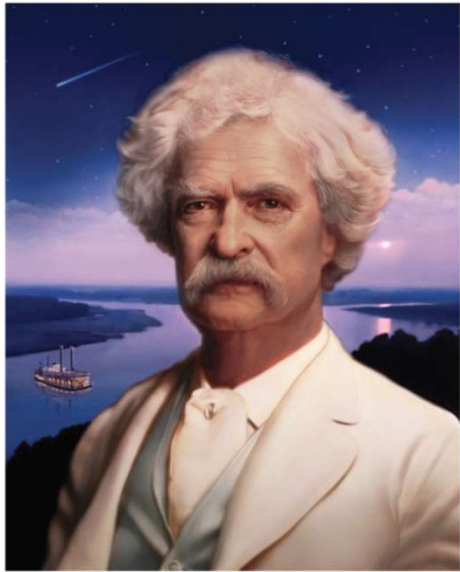


Work Zones in Urban Areas



Paul Albritton

Local Roads Conference
October 21, 2026



Backdrop

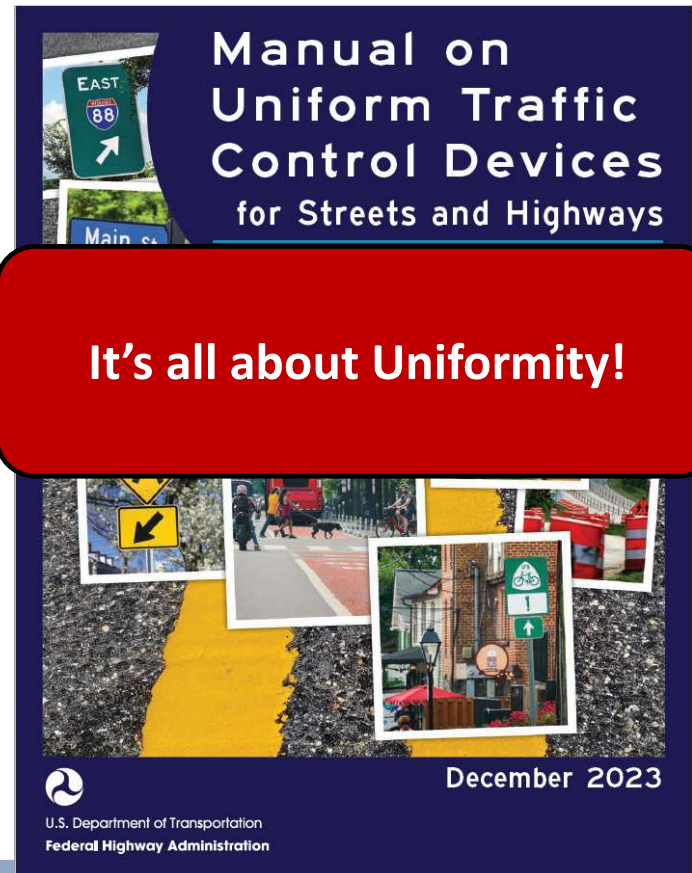
I am an old man and have known a great many troubles, but most of them never happened.

Mark Twain

And.. That is true, **MOST** never happen!



Manual on Uniform Traffic Control Devices



2023 MUTCD

- **Part 1** – General (Introduction and Definitions)
- **Part 2** – Signs
- **Part 3** – Markings
- **Part 4** – Signals
- **Part 5** – *Traffic Control Device Considerations for Automated Vehicles*
- **Part 6** – ***Temporary Traffic Control***
- **Part 7** – School Areas
- **Part 8** – Railroad and Light Rail Transit Grade Crossings
- **Part 9** – Bicycles

MUTCD Part 6 Introduction

PART 6

TEMPORARY TRAFFIC CONTROL



7 Fundamental Principles of TTC

1. General plans or guidelines should be developed to provide safety for road users
2. Road user movement should be inhibited as little as practical
3. Provide clear and positive guidance for road users
4. Routine day and night inspections should be performed (Document)



MUTCD 6A.02



Why Perform Inspections?



Iowa
LTA

Local Technical
Assistance Program

Why Perform Inspections?



Inspections



Local Technical Assistance Program



Fundamental Principles of TTC

5. Attention should be given to the maintenance of roadside safety
6. Each person from upper level management through field personnel should receive training
7. Good public relations should be maintained



Applicable Standards and References

State Requirements

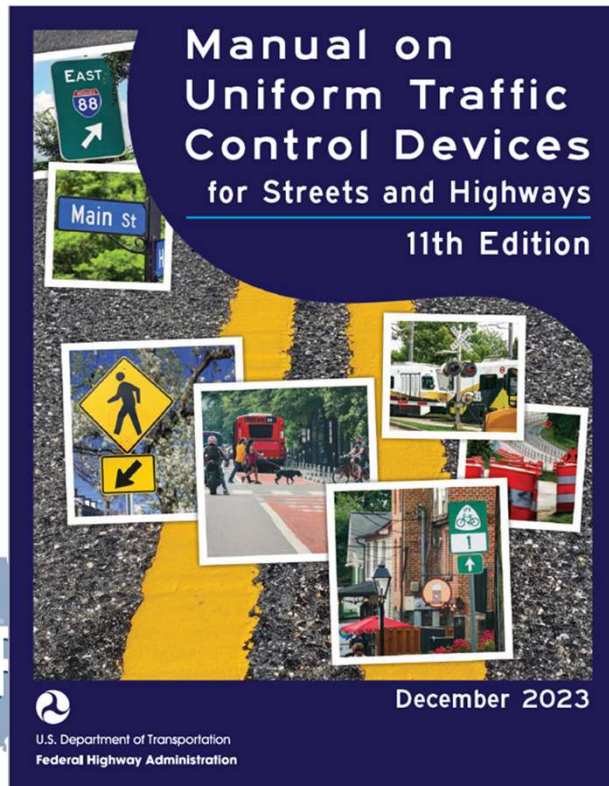
- On or near any road or street right-of-way, Iowa DOT requirements take precedence.

Local Requirements

- Cities and counties may adopt ordinances and policies.
- Meet or exceed MUTCD



Applicable Standards and References



- The MUTCD is the **minimum** standards only.
- May exceed the national standard.
- Check for recent revisions
- State and local policies
- Use most current version

Work Duration



Work Duration
MUTCD Part 6N

Work Duration

Length of time a work operation occupies a spot location.



Major factor in determining the;

- Number of devices
- Types of devices

Work Duration: 5 Categories

Mobile

Short Duration

Short Term Stationary

Intermediate Term Stationary

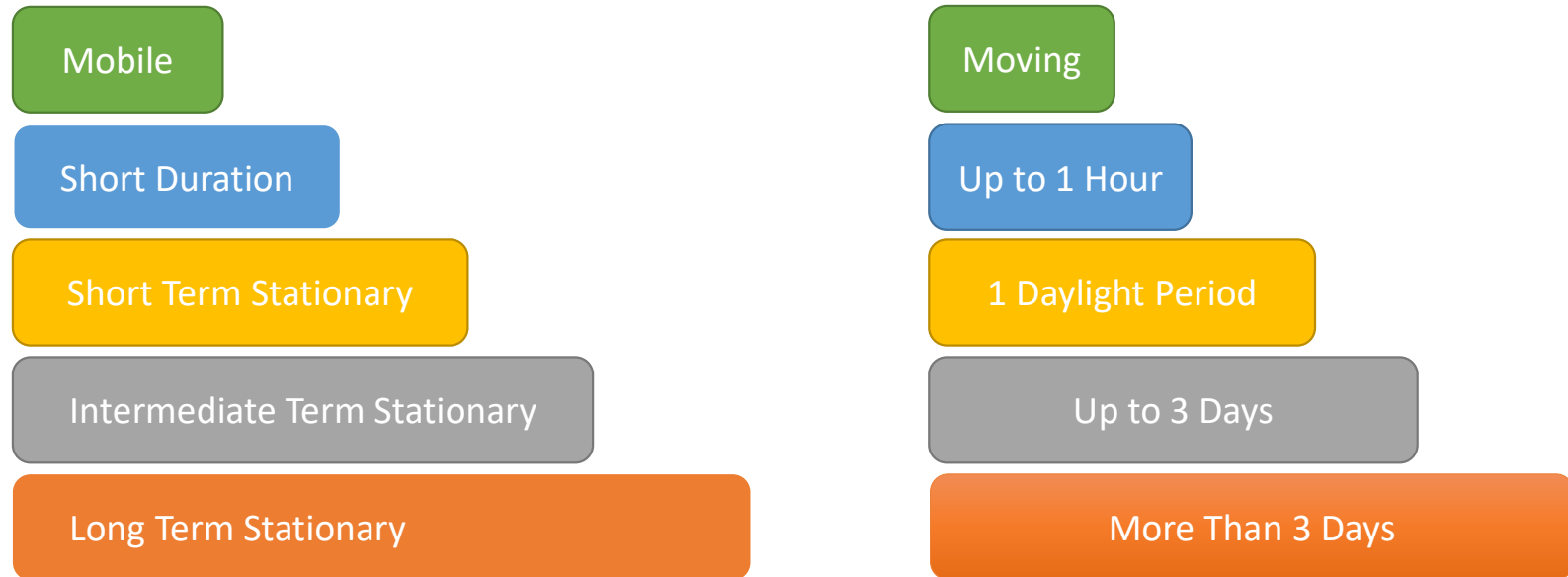
Long Term Stationary



MUTCD Section 6N.01.02



Work Duration: 5 Categories



Mobile

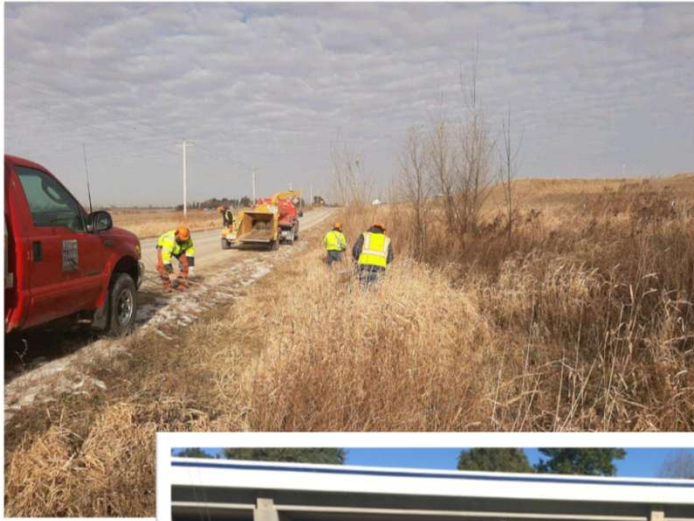


Local Technical
Assistance Program



Maintenance

Short Duration (< 1 hour)



Inspections



Intermediate-Term and Short Term Stationary

Concrete Patch (typically overnight)



Local Technical
Assistance Program

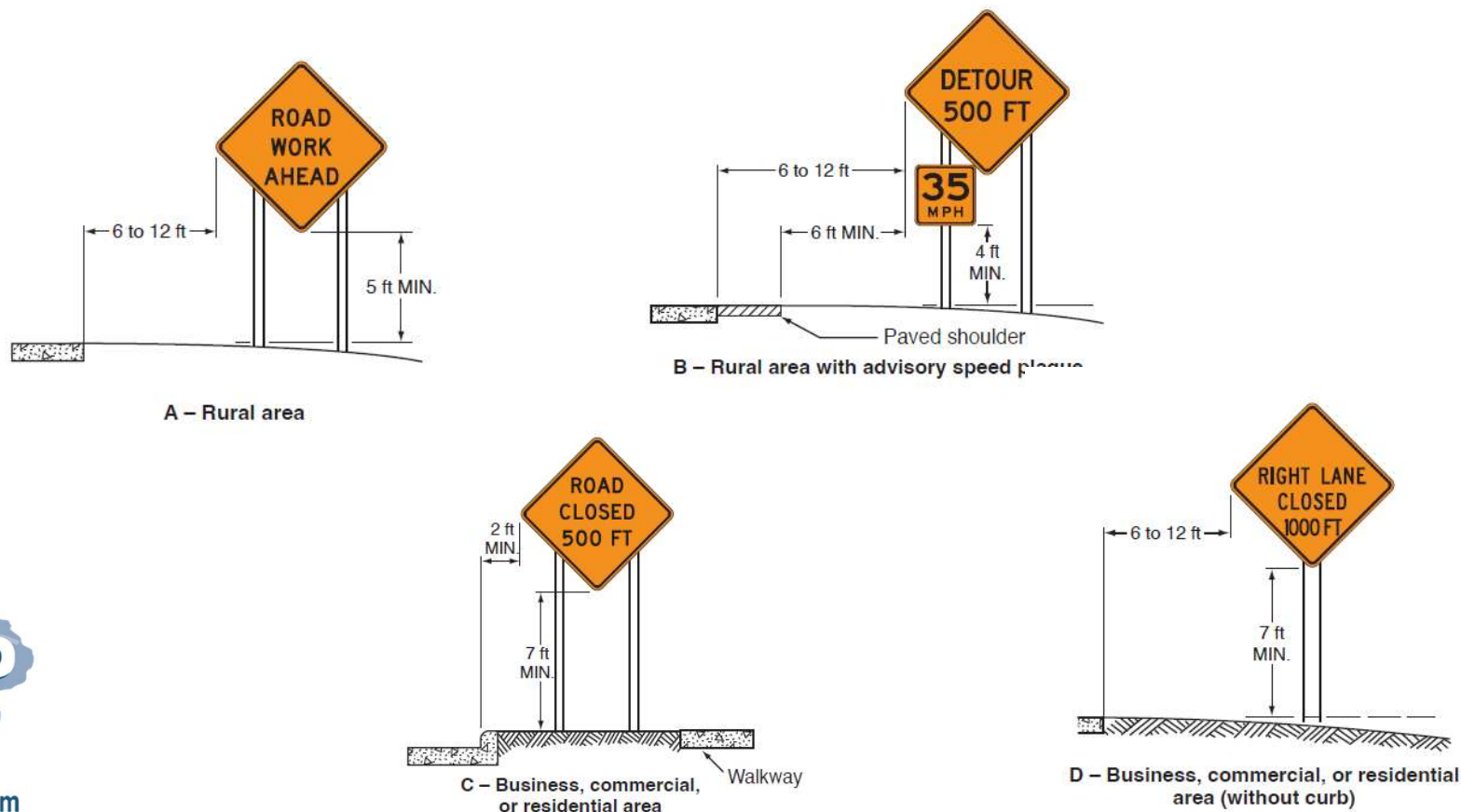
Asphalt Patch (one daylight period)



Long-Term Stationary



Figure 6F-1. Height and Lateral Location of Signs—Typical Installations



Work Duration Recap



LTAP

Local Technical
Assistance Program

Long-Term Stationary

- More than 3 days
- *Post mount signs*
- *Retro reflective*

Intermediate-Term Stationary

- More than 1 daylight period.
- Up to 3 days
- Nighttime work more than 1 hour
- *Retro reflective*



Work Duration Recap Details

Short-Term Stationary

- More than 1 hour
- Within a single daylight period

Short Duration

- Occupies location up to 1 hour
- *Strobe acceptable (maybe)*

Mobile

- Moves intermittently or continuously
- *Strobe acceptable (maybe)*



LTAP

Local Technical
Assistance Program

Work Duration

MUTCD 6N.01 as a caution;

“Safety in Short Duration or Mobile operations *should* not be compromised by using fewer devices simply because the operation will frequently change it’s location.”



Work Duration

MUTCD 6N.10

Support:

- During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work.
- Workers face hazards in setting up and taking down the TTC zone.
- Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.



Work Duration



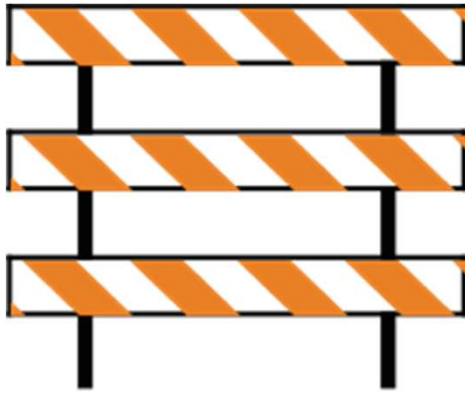
MUTCD 6N.11

Option: Considering these factors, simplified control procedures may be warranted for short-duration work.

A reduction in the number of devices may be offset by the use of other more dominant devices such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles.



Section 5 – Elements of a Work Zone



Major Elements of a Work Zone
MUTCD Part *6B*



Work Zone TTC Major Elements

A typical work zone is defined as extending from the first advance warning sign or vehicle with amber, high intensity strobe light to an End Road Work (G20-2) sign or where traffic returns to normal driving path.

MUTCD Section 6B



Work Zone TTC Major Elements

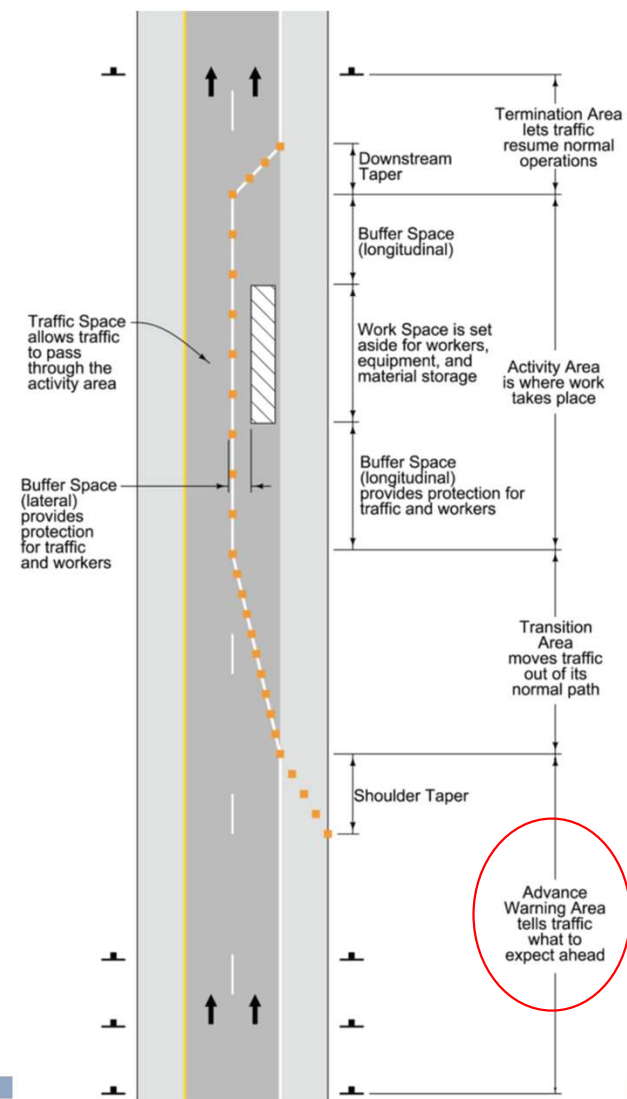
Most work zones
can be divided into
4 major areas.

Advance Warning

Transition

Activity

Termination



Work Zone TTC Major Elements



Advance Warning Area:

- Crucial to safety.
- All work zones should have.
- Road users know how to respond.



Work Zone TTC Major Elements



Advance Warning Area:

- Might be a vehicle with strobe
- Single sign
- Series of signs

Depends on type of road, traffic volumes, speed and degree of obstruction.



Advance Warning Area

“Typically, a 3 Step Process”

1st Attracts drivers attention
(General Information)

2nd Tells what lies ahead
(Description of Activity)

3rd Tells what must be done
(Specific Action)



Advance Warning Area



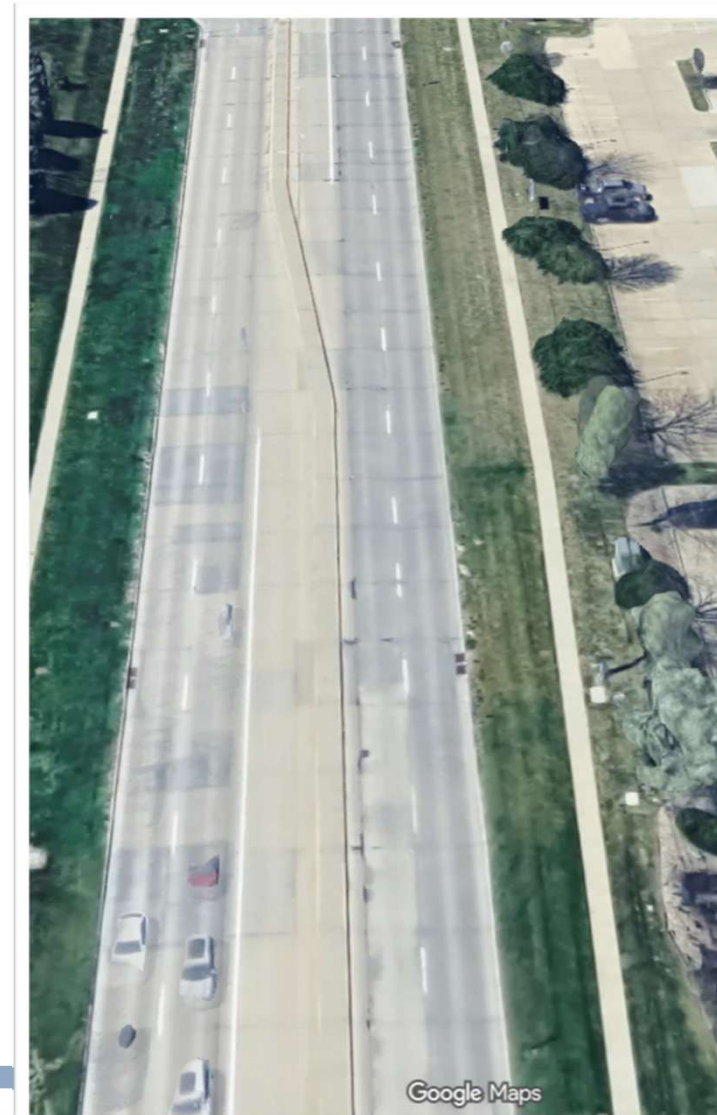
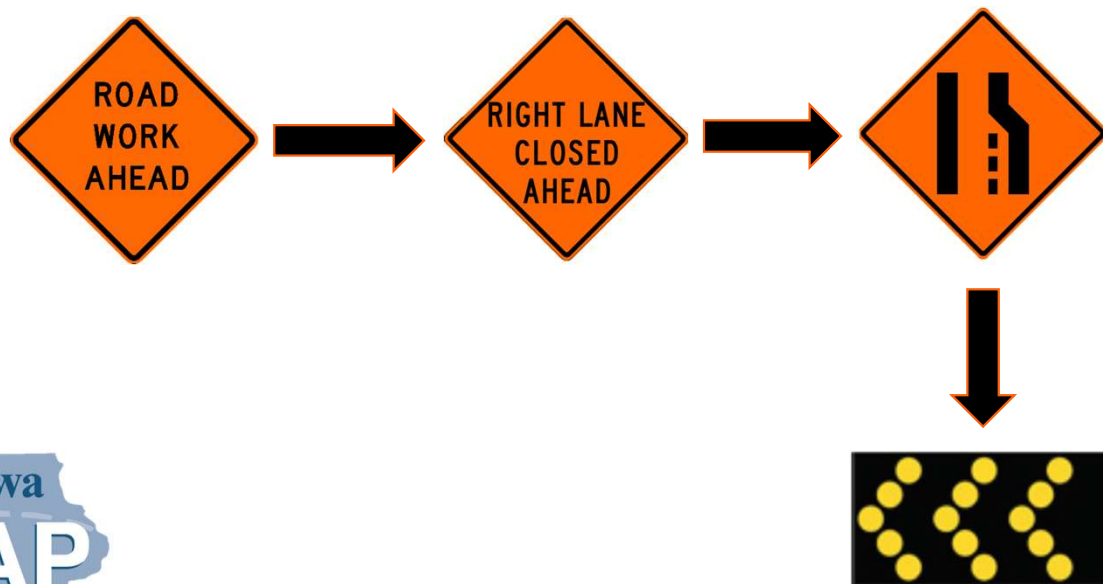
Advance Warning Area



Advance Warning Area



For Multi Lane Streets and Roads



MUTCD Section 6F.61

Arrow Boards

- Caution mode only for two-lane or shoulder applications.
- Multi-lane, use one for each closed lane.



Sequential Chevron (Merge Right)



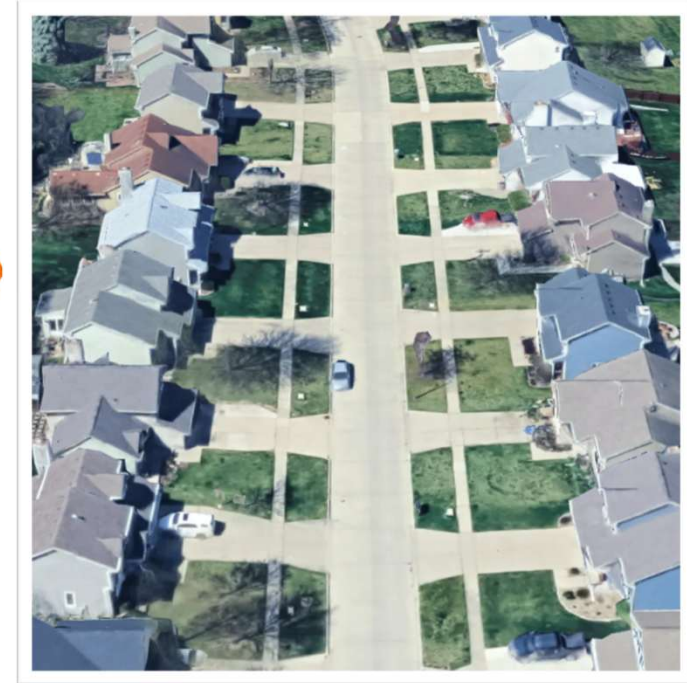
Flashing Caution

Alternating Diamond
Caution

For Two Lane Streets and Roads

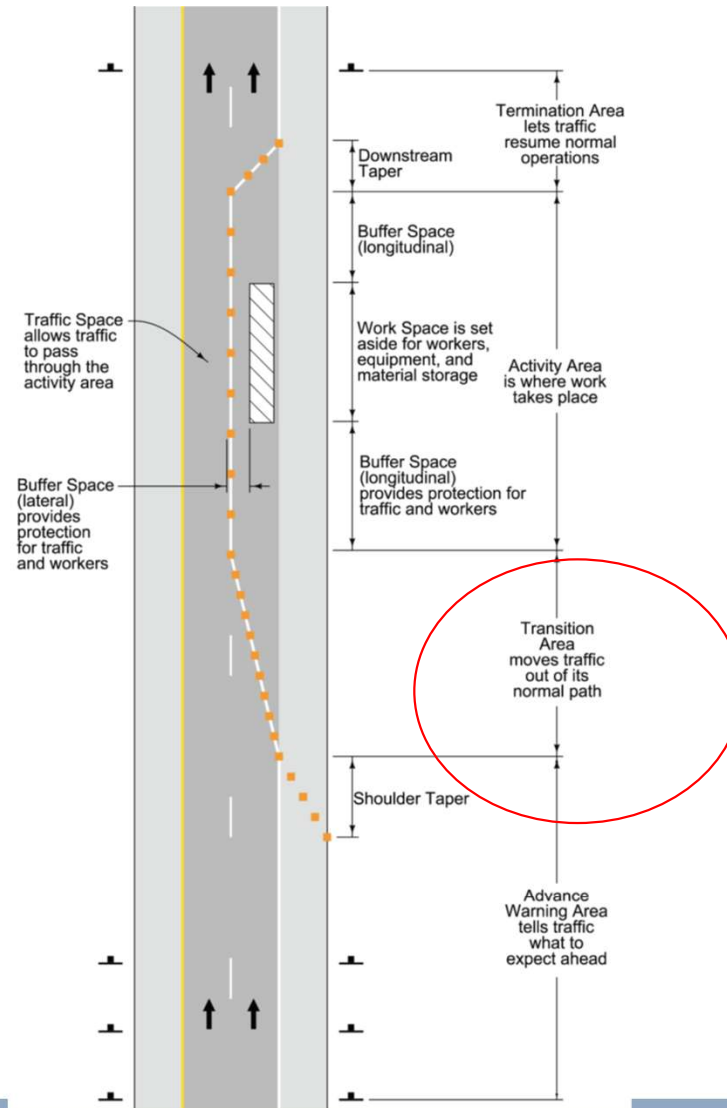
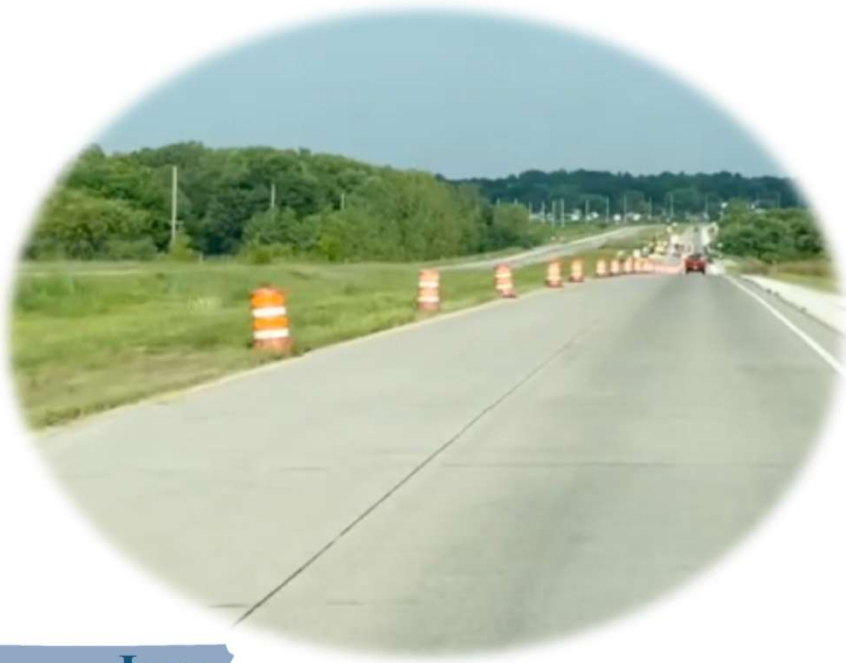


*On job and organization



Spacing of Signs

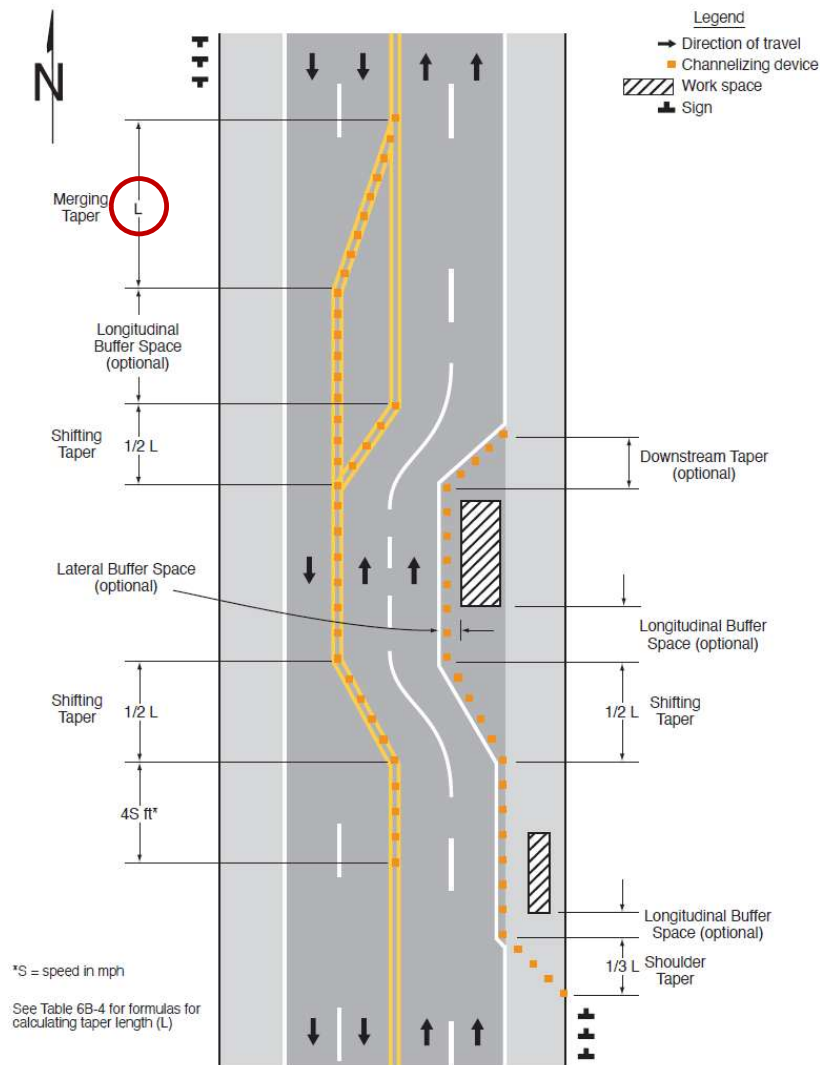
- Appropriate spacing is crucial for road users reaction to work zone signs.
- Spacing depends on several factors,
 - Speed of traffic
 - Type of roadway
 - Locations of intersections or major driveways
 - Vertical and horizontal alignment
 - Physical obstructions in the work area



Transition Area

- Traffic is directed from the normal, intended path to a new course, such as from one lane to another.
- Usually accomplished by tapers.
- Several types, depending on circumstances.
 - Merging Taper for multi-lane roadways
 - Others; Shifting, Shoulder and Downstream
 - One lane, two way for flagging and self regulating.

Figure 6B-2. Types of Tapers and Buffer Spaces



Tapers pg. 774

Everything based on "L"
(Which is the Merging Taper Length)
(Merging Taper for Multi Lane Streets and Roads)

Determining Taper Length

Table 6B-4. Formulas for Determining Taper Length

Speed (S)	Taper Length (L) in feet
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or more	$L = WS$

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

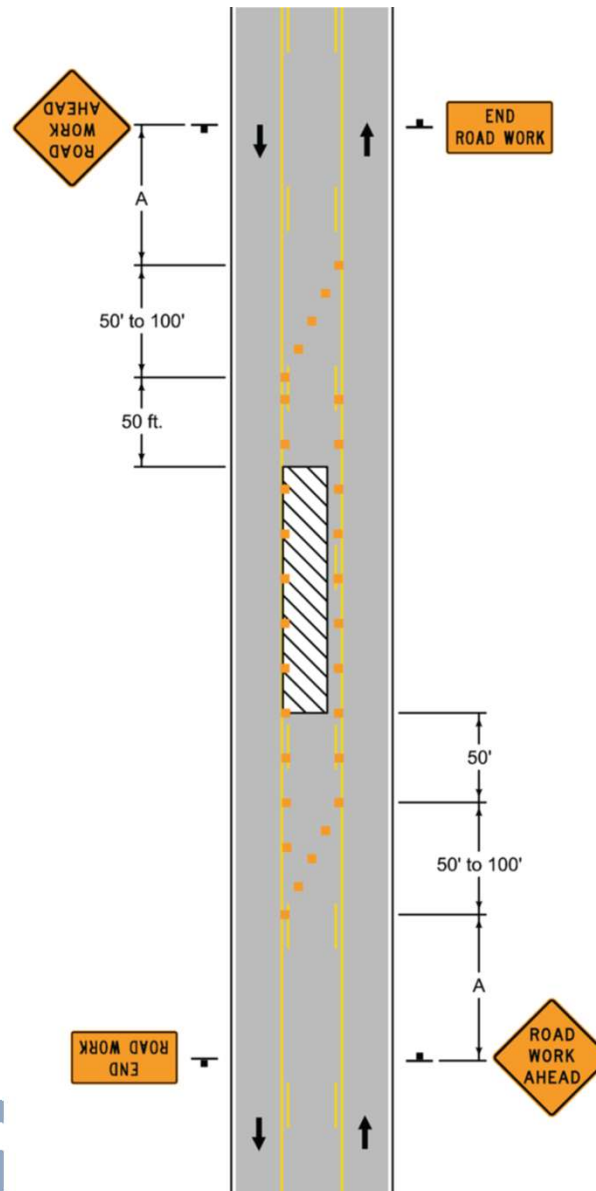
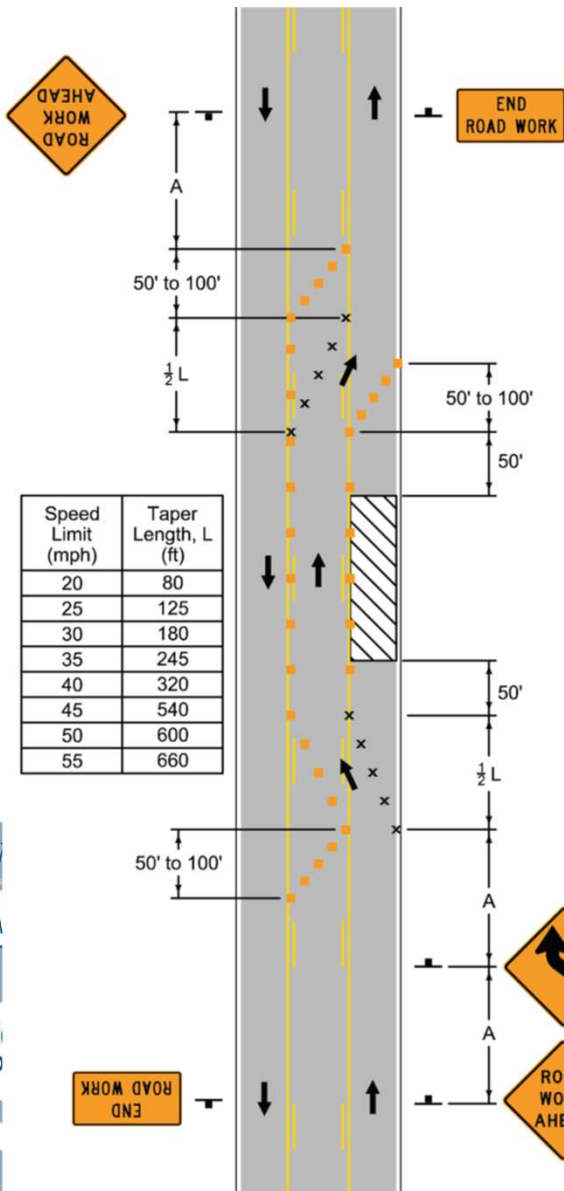
Table 6B-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	at least 0.5 L
Shoulder Taper	at least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	50 feet minimum, 100 feet maximum

Note: Use Table 6B-4 to calculate L

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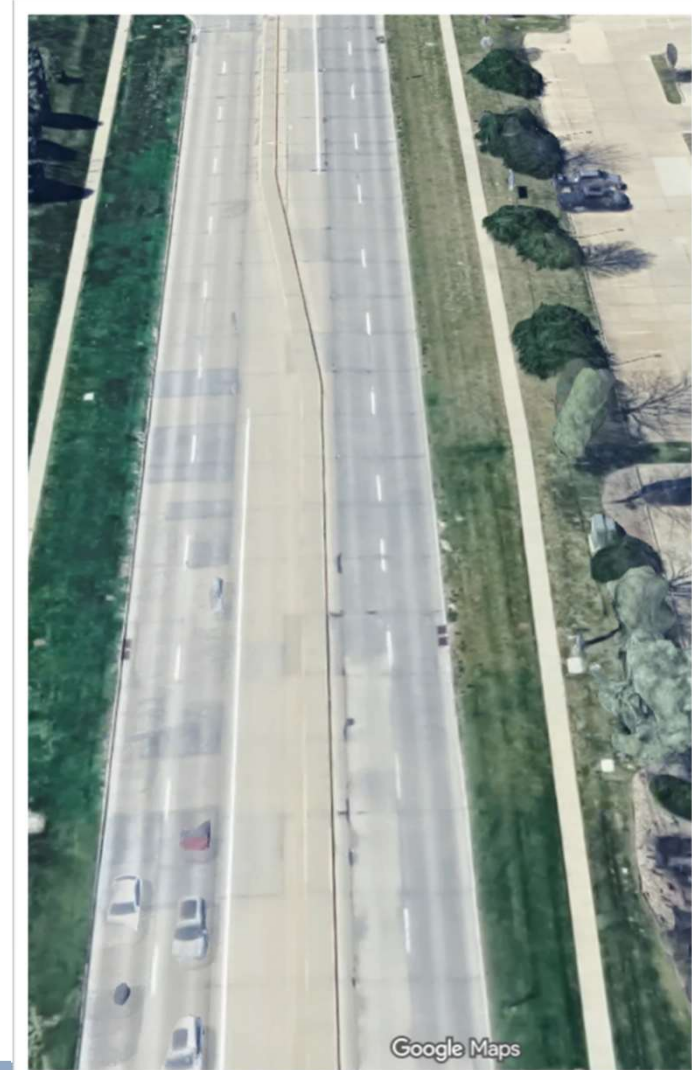


Lane Closure with Continuous Left Turn Lane



Table 1: Merging Taper Lengths for Lane Closure*

Speed Limit (mph)	Taper Length (L) (ft)	Number of Devices	Spacing of Devices (ft)
20	80	5	20
25	125	6	25
30	180	7	30
35	245	8	35
40	320	9	40
45	540	13	45
50	600	13	50
55	660	13	55



Urban Support (6b.08.03)

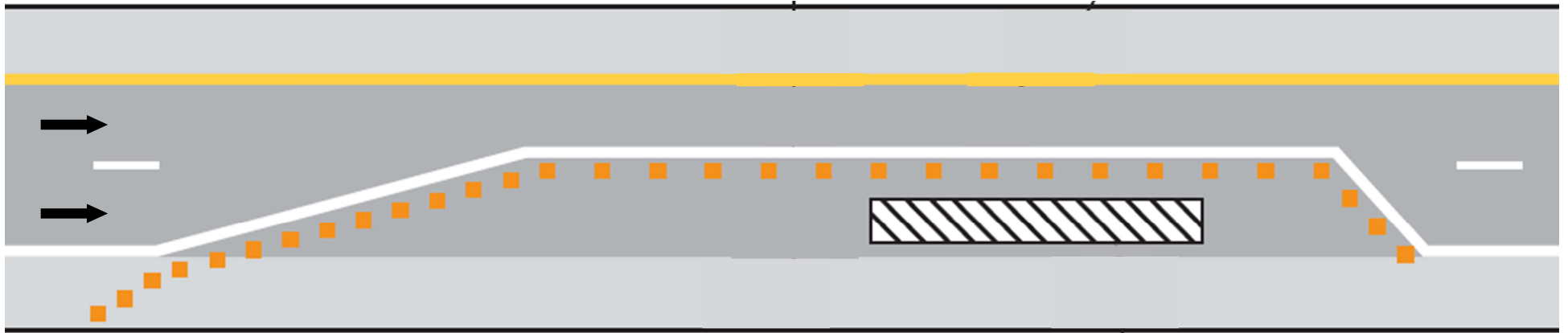
Longer tapers are not necessarily better than shorter tapers (particularly in urban areas with characteristics such as short block lengths or driveways) because extended tapers tend to encourage sluggish operation and to encourage drivers to delay lane changes unnecessarily. The test concerning adequate lengths of tapers involves observation of driver performance after TTC plans are put into effect.





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The spacing between cones, tubular markers, vertical panels, drums, and barricades should not exceed a distance in feet equal to 1 times the speed limit in mph when used for taper channelization, and should not exceed a distance in feet equal to 2 times the speed limit in mph when used for tangent channelization

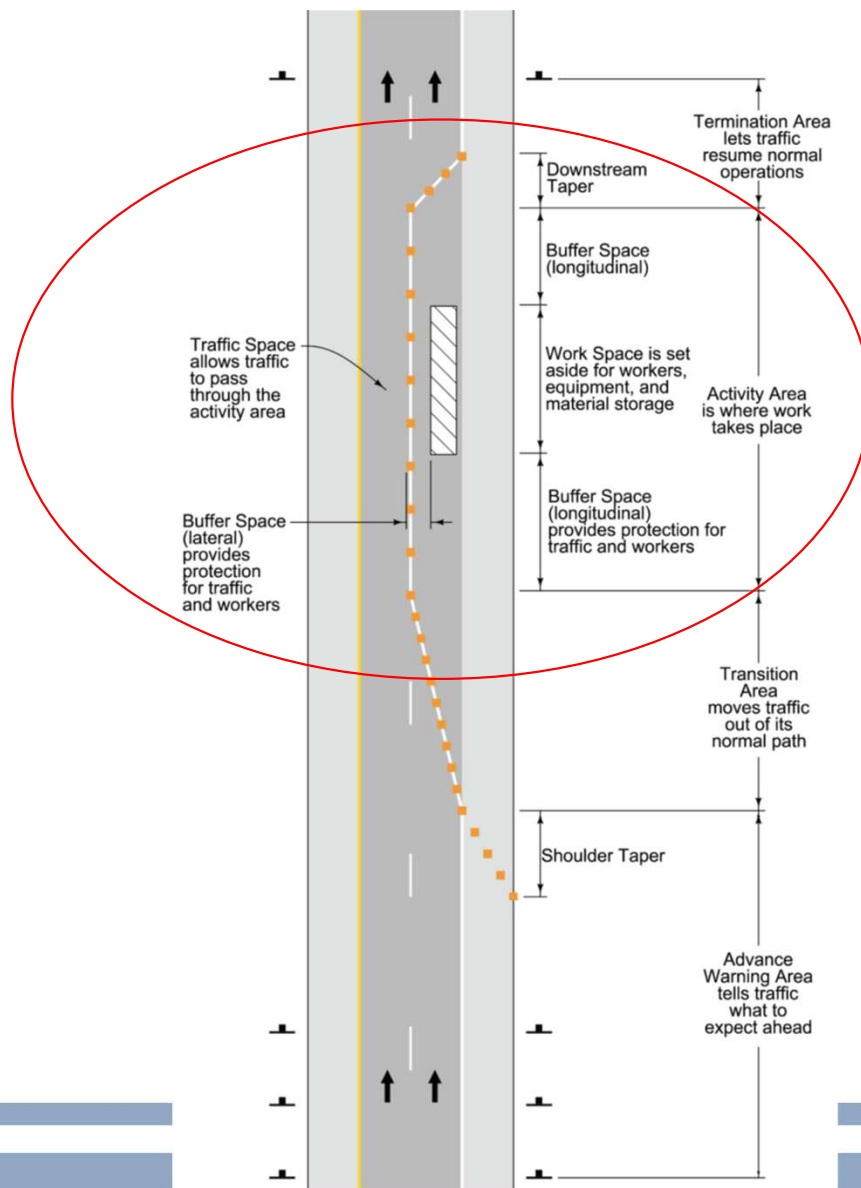
6K pg. 815

Activity Area

Activity Area can be divided into three main parts;

- Buffer Space(s)
- Work Space
- Traffic Space





Activity Area

Buffer Space

- Where ever worker are exposed to high speed traffic
- Neither work activity, storage of equipment, vehicles or material should occur within the buffer space.



Activity Area

Work Space

- Closed to traffic
- For materials, equipment and workers
- Secure and safe as possible



Activity Area

Traffic Space

- Occupied by motor vehicles and other road users
- Known as the open lane
- Workers should not hamper free movement of traffic in the open lane.



Work Space/Traffic Space

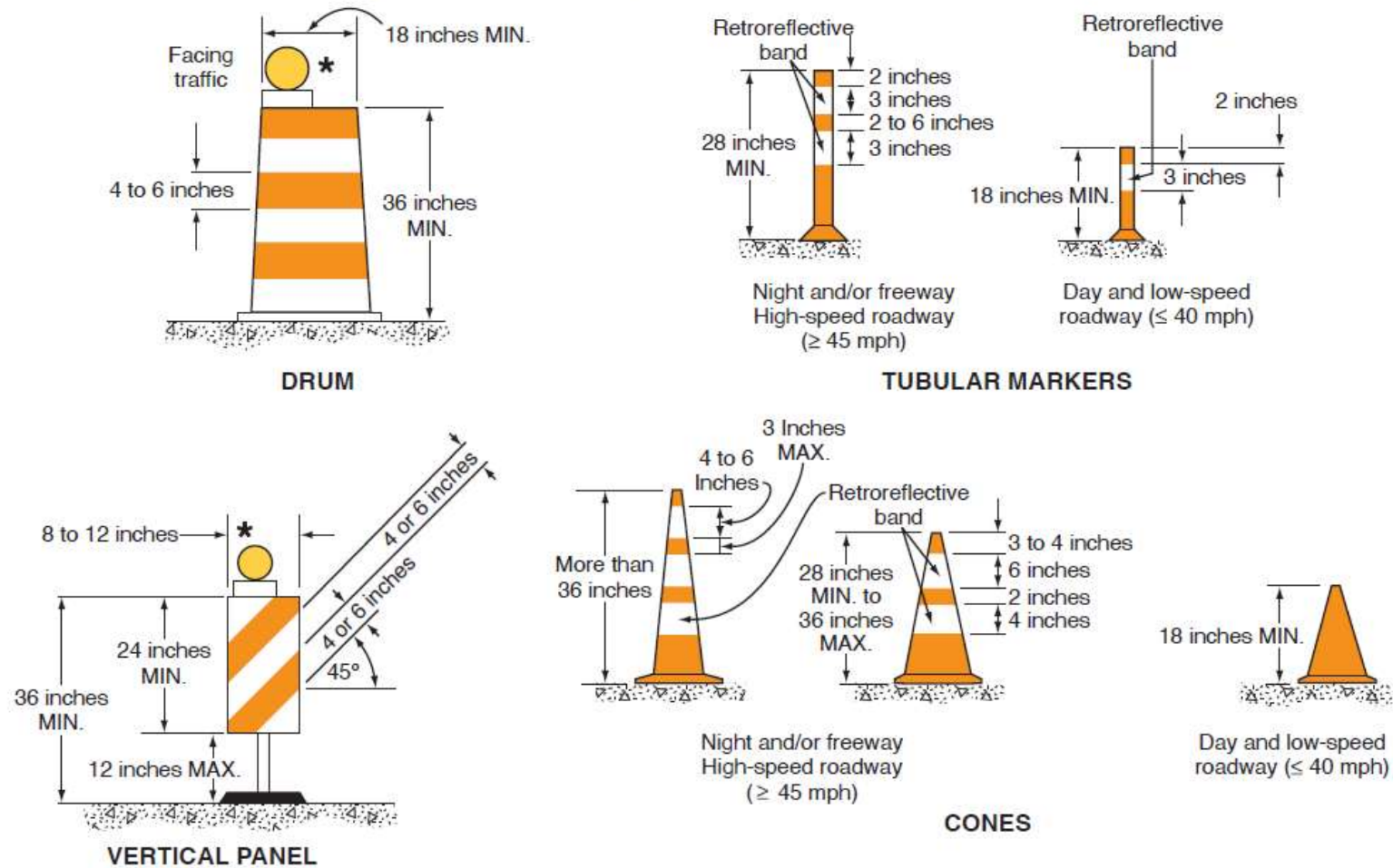


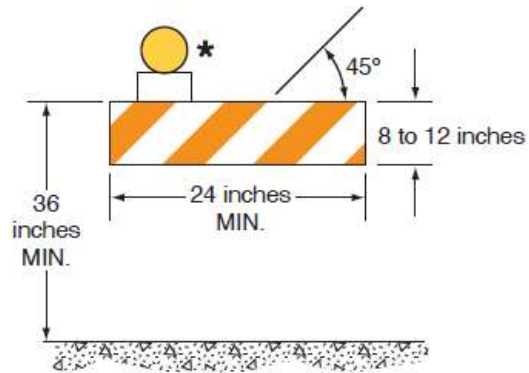
Channelizing Devices

Several devices used in tapers are;

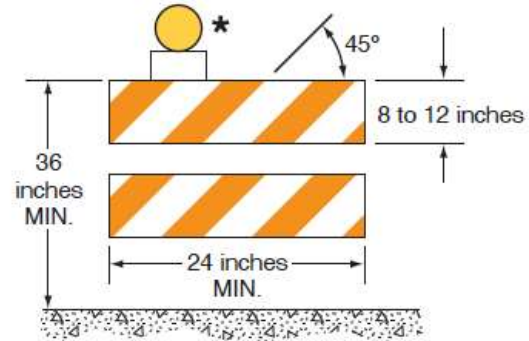
- Cones
- Vertical Panels
- Drums
- Barricades



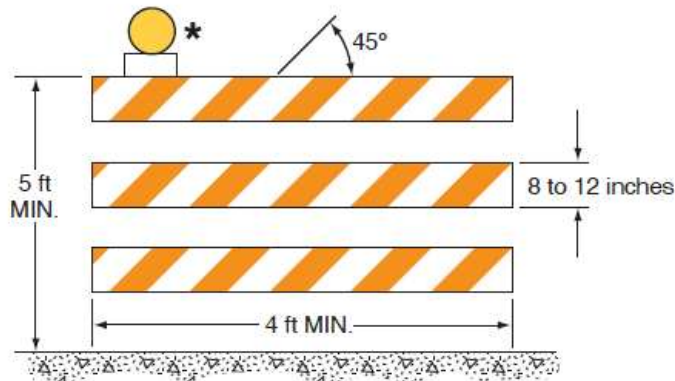
Figure 6K-1. Examples of Channelizing Devices



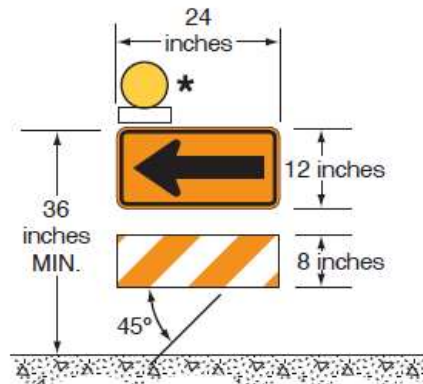
TYPE 1 BARRICADE **



TYPE 2 BARRICADE **



TYPE 3 BARRICADE **

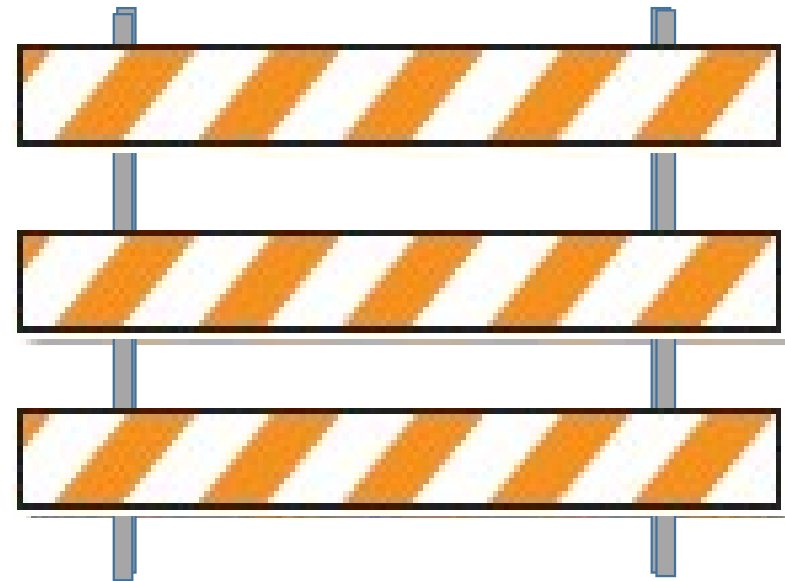


DIRECTION INDICATOR BARRICADE **

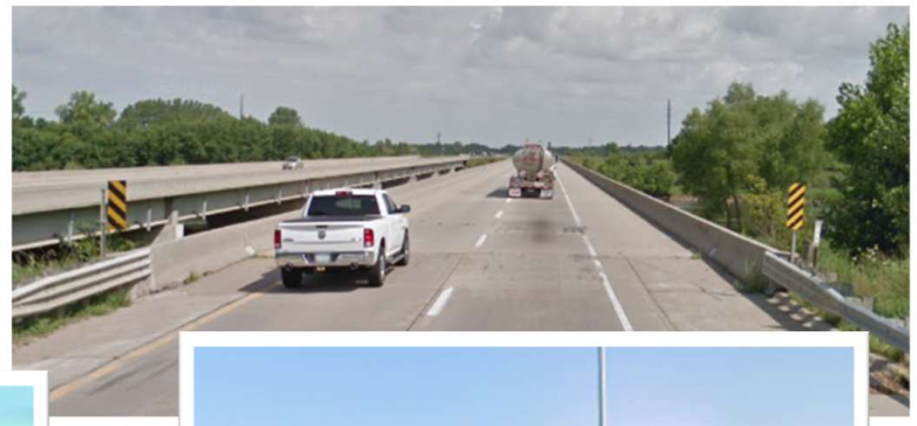
* Warning lights (optional)

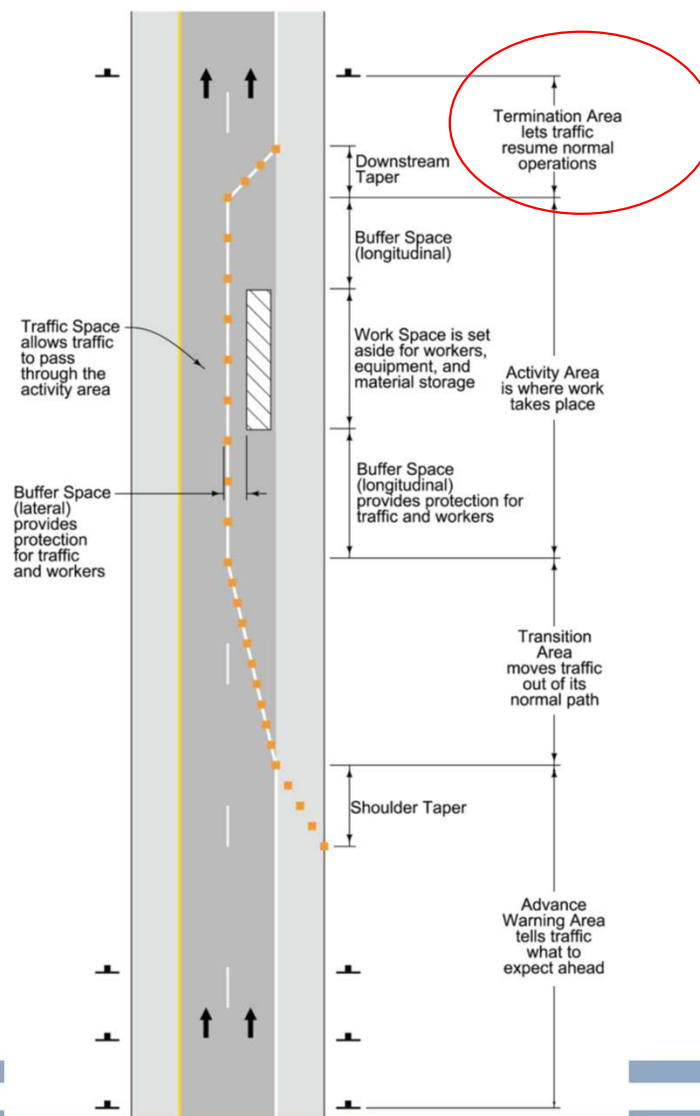
** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

Direction?



Direction?





Termination Area



- Begins at the end of the work space and extends to the “End Road Work” Sign, if posted.
- Sign is optional
- Downstream taper may be installed (Optional)

Sign Dimensions

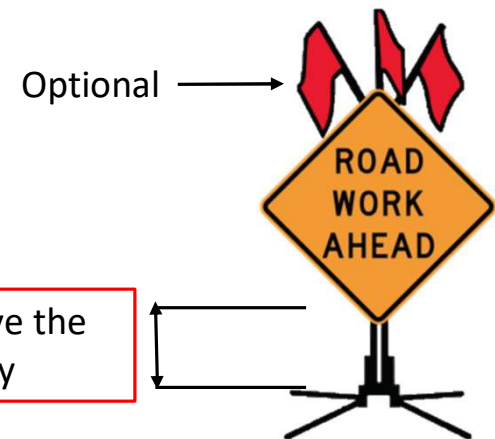
Based on Speed,

- High speed roadway (35 mph and above) Advance Warning Signs shall be at least 48 inches by 48 inches. In general, 7 inch uppercase letters
- Moderately low traffic volumes and speeds (25 to 35 mph) 36 inch by 36 inch, 5 inch uppercase letters.
- Low speed local roads and streets (25 mph or below) 30 inch by 30 inch may be allowed.

Sign Installation



- Consider position relative to roadway
- Consider spacing between signs
- Portable for 3 days or less
- Crashworthy



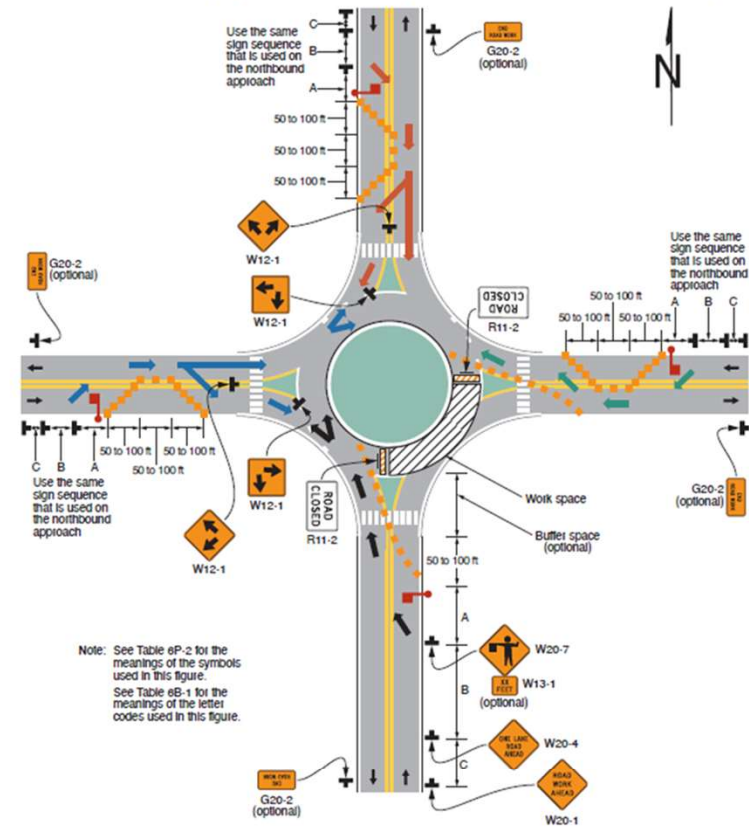
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Let's Talk Roundabouts (Circular Intersection)

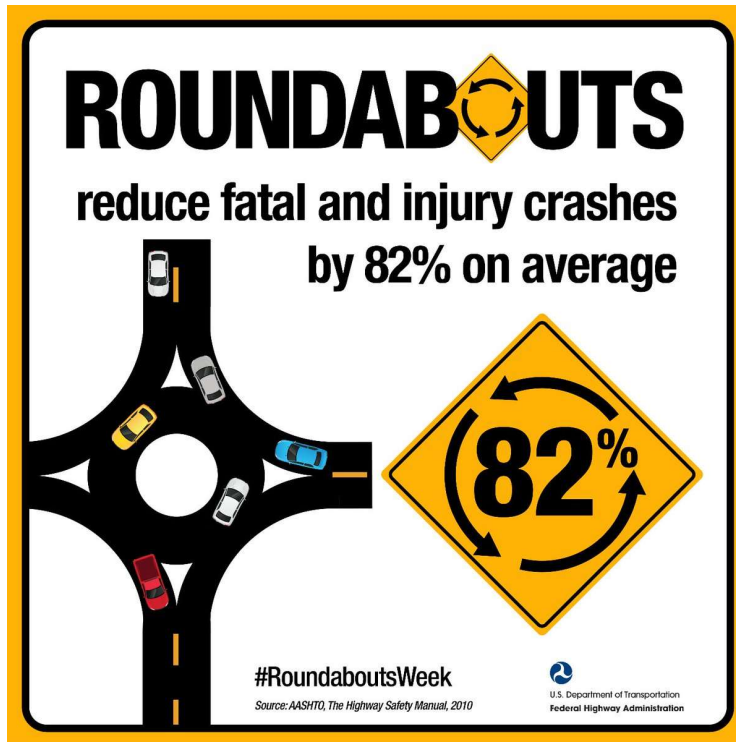


Figure 6P-53. Flagging Operation on a Single-Lane Circular Intersection (TA-53)



Typical Application 53

Let's Talk Roundabouts!



Roundabouts Reduce Crashes!!



City of Altoona, Iowa - Government [Follow](#)

March 17 at 3:48 PM ·

A message from the City,

Coming up on Wednesday, 3/19 between 9a.m. and 3p.m. there will be a temporary lane closer at the round-a-bout on 1st Ave N for utility work. We'll pass a long more information as it becomes available.





LEGEND

- Direction Of Traffic
- Traffic Sign
- 24" Cone
- Arrow Board
- Work Area

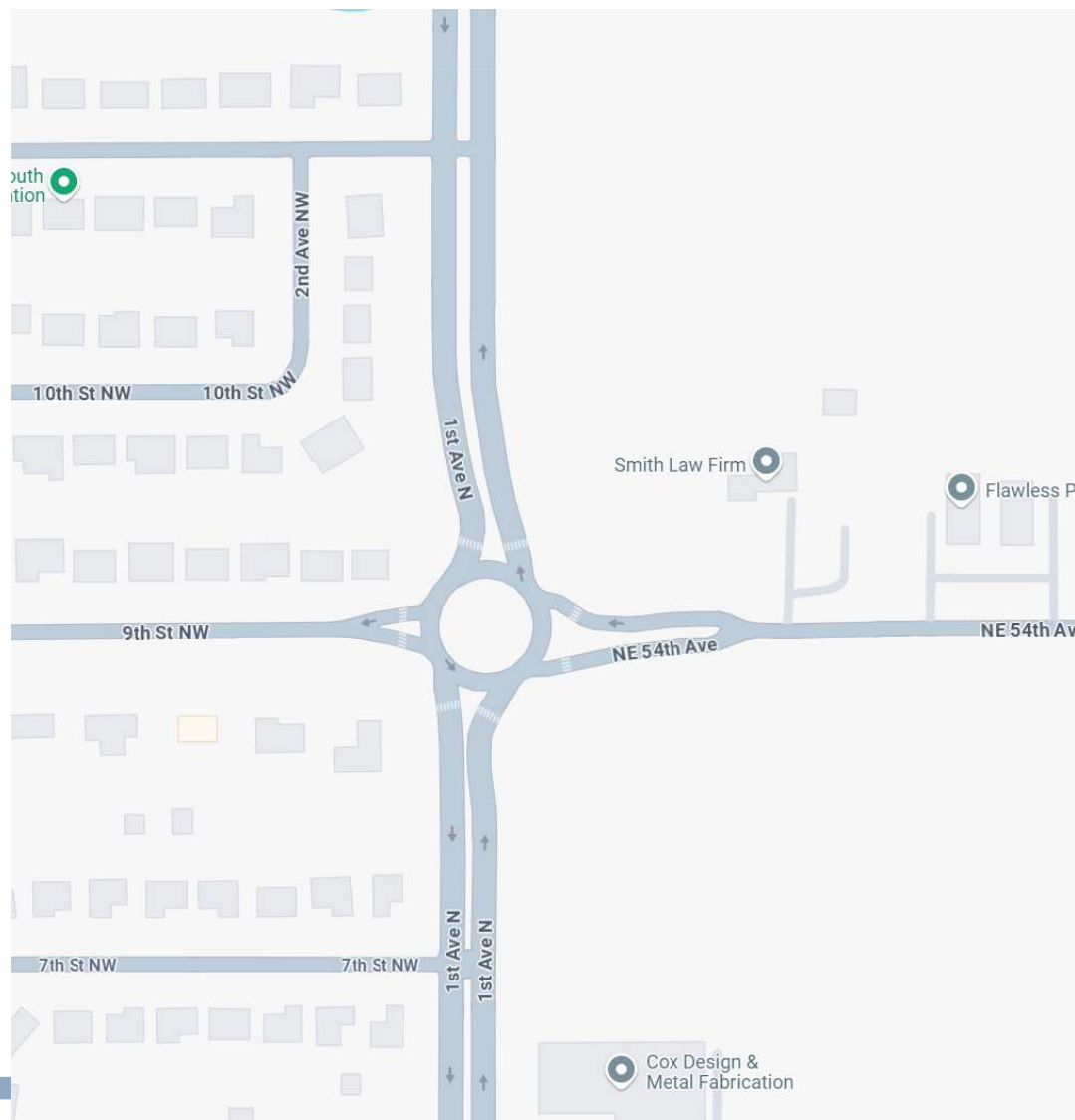
SPEED LIMIT (mph)	A	C
35 or less	250'	40'
40	500'	80'
45	700'	90'

* Speed Limit refers to regulatory speed limit before road work.

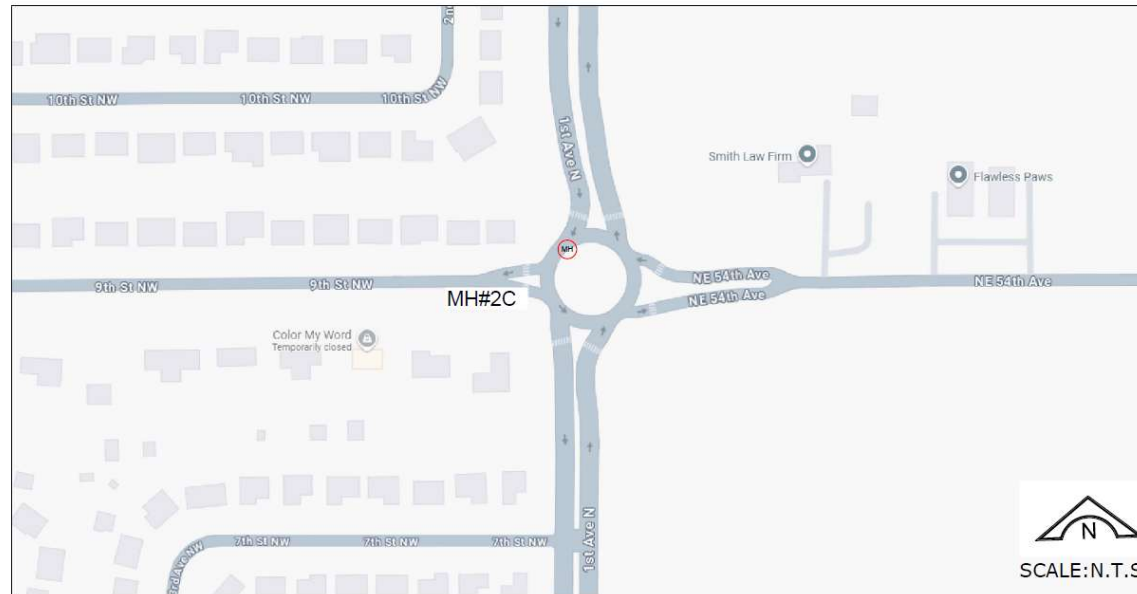


1st Ave N &
9th St NW
Altoona

**Telcom
Construction
Lane Closure**



WORK LOCATION

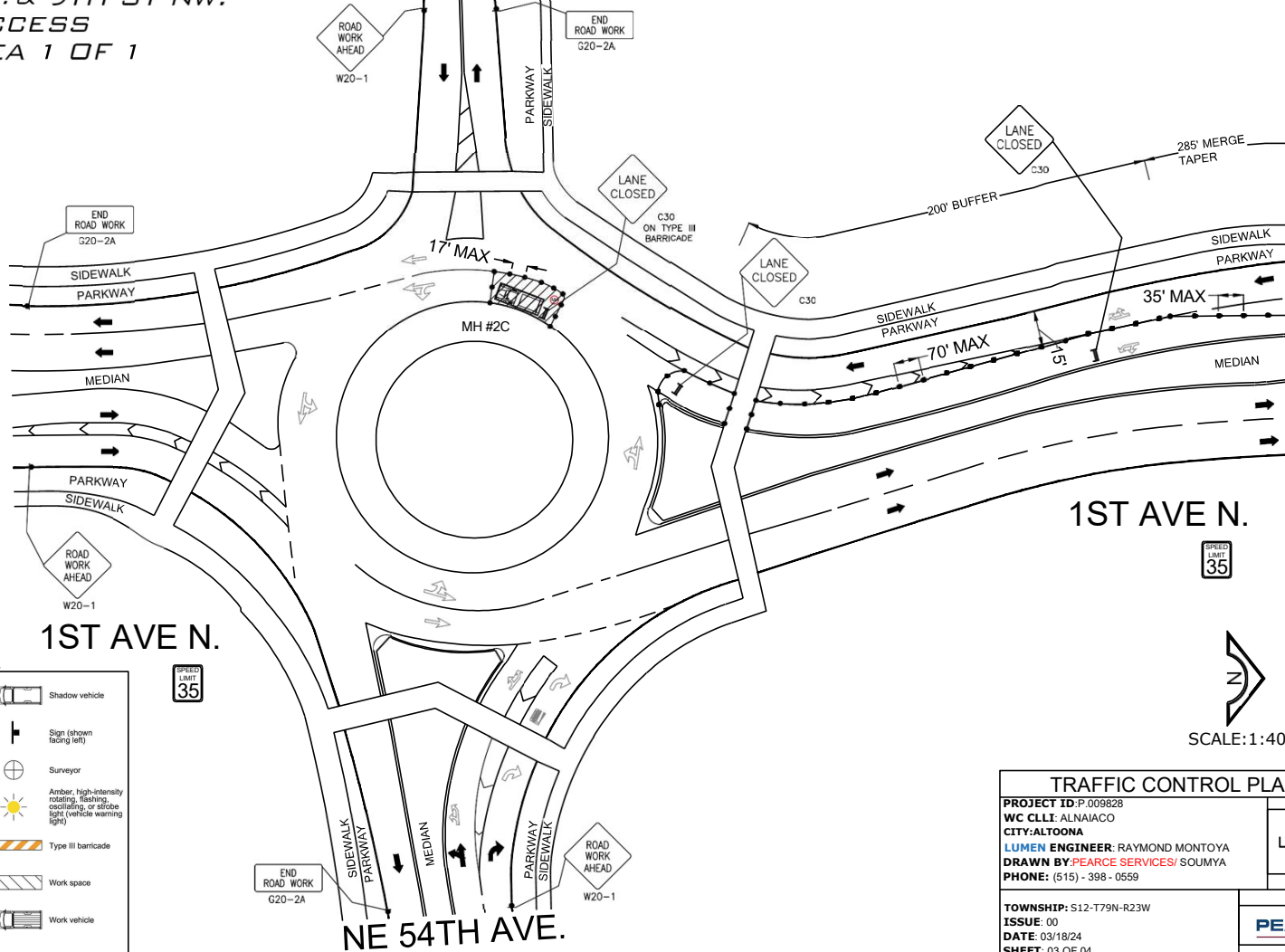


VICINITY MAP

TRAFFIC CONTROL PLAN	
PROJECT ID: P.009628 WC CLI: ALNAIACO DATE: 03/18/25 SCOPE: MH ACCESS	
LUMEN ENGINEER: RAYMOND MONTROYA DRAWN BY: PEARCE SERVICES/ SOUMYA PHONE: (515) - 393 - 0559 SHEET: 01 OF 4	ISSUE: 00
LUMEN	ADDRESS: 103 9TH ST NW, ALTOONA, IA 50009 CITY: ALTOONA TOWNSHIP: S12-T79N-R23W

103 9TH ST NW.
1ST AVE N. & 9TH ST NW.
MH#2C ACCESS
WORK AREA 1 OF 1

9TH ST NW.



LEGEND

	Arrow board		Shadow vehicle
	Arrow board support or trailer		Sign (shown facing left)
	Channelizing device		Surveyor
	Direction of traffic		Amber, high-intensity rotating, flashing, oscillating, or strobe light (vehicle warning light)
	Drum		Type III barricade
	Flagger		Work space
	Pedestrian channelizing device		Work vehicle
	Safety fence		

TRAFFIC CONTROL PLAN

PROJECT ID: P-009828
WC CLLT: ALNAIACO
CITY: ALTOONA
LUMEN ENGINEER: RAYMOND MONTROYA
DRAWN BY: PEARCE SERVICES/ SOUMYA
PHONE: (515) - 398 - 0559

LUMEN

TOWNSHIP: S12-T79N-R23W
ISSUE: 00
DATE: 03/18/24
SHEET: 03 OF 04

PEARCE
SERVICES

MATCHLINE A
SEE TC-04 OF TC-04



Work Zones & Pedestrian Access



Accommodation of Pedestrians and Bicyclists



- Trained person required for traffic control applications
- **Shall** advise in advance of sidewalk closures
- All devices **shall** be crashworthy and lighted for night work
- **Shall** be provided with comparable, safe path



Local T
Assista

Worker Safety



MUTCD Part 6C

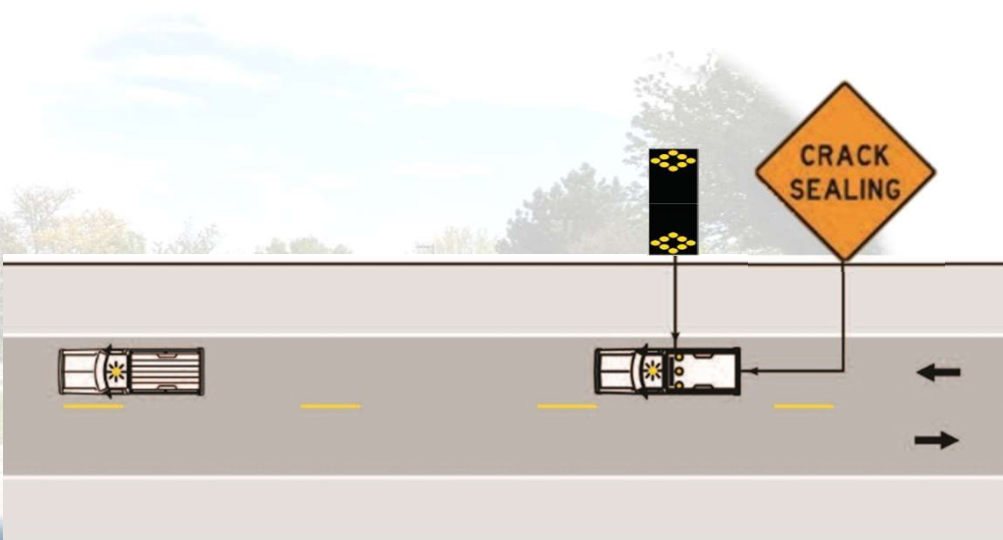
Worker Safety Considerations



May consider use of:

- Shadow vehicle
- Road closure
- Law enforcement
- Lighting
- Special devices (rumble strips, etc.)

Shadow Vehicles



- Used to warn traffic of the operation ahead
- Distance between work vehicle and shadow varies according to;
 - Terrain
 - Type of Work
 - Other Factors

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Worker Safety Considerations



Training -

- All workers should be trained on how to work next to motor vehicle traffic in a way that minimizes their vulnerability. (extent of training depends on job duties)
 - TTC setup/removal
 - Flagger safety
 - Night work

LTAP

Local Technical
Assistance Program

MUTCD Section 6C

Worker Safety Considerations



Worker Safety Considerations,

Standard:

All workers within the right-of-way who are within the TTC zone

- **Shall** wear high visibility safety apparel that meets ANSI 107 Class 2 (minimum)

Worker Safety Considerations

Worker Safety Considerations,

Standard:

The apparel background (outer) material color **shall** be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors.

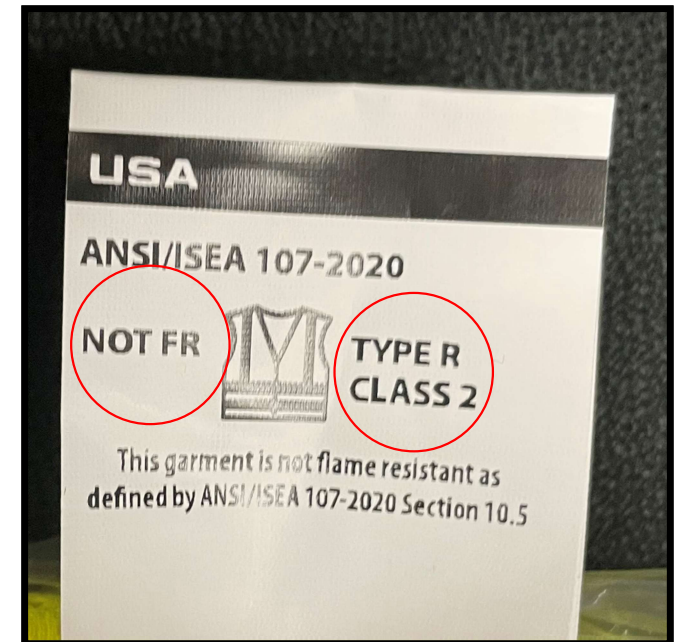


MUTCD Section 6C.05.01



Roadway Worker Safety

ANSI 107 Class 2 Vest and (Optional) Hat



Roadway Worker Safety

Additional Nighttime Recommendations

- Class 3 or
- ANSI 107 or later Class E pants or gaiters (with class 2)
- Highly visible retroreflectorized wristband or gloves (optional)



Roadway Worker Safety



Worker Safety Enforcement

- Occupational Safety & Health Administration (OSHA) may enforce worker safety recommendations in the MUTCD as well as OSHA's !!



Questions

