

## CHAPTER 4M. LANE-USE CONTROL SIGNALS

### Section 4M.01 Application of Lane-Use Control Signals

Support:

01 Lane-use control signals are special overhead signals that permit or prohibit the use of specific lanes of a street or highway or that indicate the impending prohibition of their use. Lane-use control signals are distinguished by placement of special signal faces over a certain lane or lanes of the roadway and by their distinctive shapes and symbols. Supplementary signs are sometimes used to explain their meaning and intent.

02 Lane-use control signals are most commonly used for reversible-lane control, but are also used in certain non-reversible lane applications and for toll plaza lanes (see Section 4K.02).

Guidance:

03 *An engineering study should be conducted to determine whether a reversible-lane operation can be controlled satisfactorily by static signs (see Section 2B.26) or whether lane-use control signals are necessary. Lane-use control signals should be used to control reversible-lane operations if any of the following conditions are present:*

- A. *More than one lane is reversed in direction;*
- B. *Two-way or one-way left turns are allowed during peak-period reversible operations, but those turns are from a different lane than used during off-peak periods;*
- C. *Other unusual or complex operations are included in the reversible-lane pattern;*
- D. *Demonstrated crash experience occurring with reversible-lane operation controlled by static signs that can be corrected by using lane-use control signals at the times of transition between peak and off-peak patterns; and/or*
- E. *An engineering study indicates that the safety and efficiency of the traffic operations of a reversible-lane system would be improved by lane-use control signals.*

Standard:

04 **Pavement markings (see Section 3B.03) shall be used in conjunction with reversible-lane control signals.**

Option:

05 Lane-use control signals may also be used if there is no intent or need to reverse lanes, but there is a need to indicate the open or closed status of one or more lanes, such as:

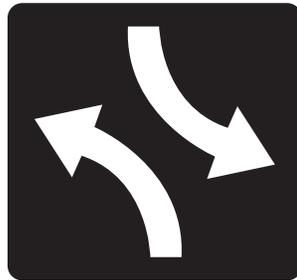
- A. On a freeway, if it is desired to close certain lanes at certain hours to facilitate the merging of traffic from a ramp or other freeway;
- B. On a freeway, near its terminus, to indicate a lane that ends;
- C. On a freeway or long bridge, to indicate that a lane may be temporarily blocked by a crash, breakdown, construction or maintenance activities, or similar temporary conditions; and
- D. On a conventional road or driveway, at access or egress points to or from a facility, such as a parking garage, where one or more lanes of the access or egress are opened or closed at various times.

### Section 4M.02 Meaning of Lane-Use Control Signal Indications

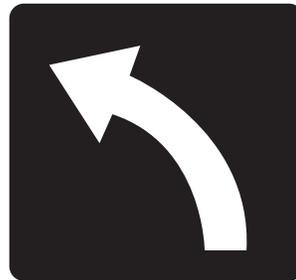
Standard:

01 **The meanings of lane-use control signal indications shall be as follows:**

- A. **A steady DOWNWARD GREEN ARROW signal indication shall mean that a road user is permitted to drive in the lane over which the arrow signal indication is located.**
- B. **A steady YELLOW X signal indication shall mean that a road user is to prepare to vacate the lane over which the signal indication is located because a lane control change is being made to a steady RED X signal indication.**
- C. **A steady WHITE TWO-WAY LEFT-TURN ARROW signal indication (see Figure 4M-1) shall mean that a road user is permitted to use a lane over which the signal indication is located for a left turn, but not for through travel, with the understanding that common use of the lane by oncoming road users for left turns is also permitted.**
- D. **A steady WHITE ONE WAY LEFT-TURN ARROW signal indication (see Figure 4M-1) shall mean that a road user is permitted to use a lane over which the signal indication is located for a left turn (without opposing turns in the same lane), but not for through travel.**
- E. **A steady RED X signal indication shall mean that a road user is not permitted to use the lane over which the signal indication is located and that this signal indication shall modify accordingly the meaning of other traffic controls present.**

**Figure 4M-1. Left-Turn Lane-Use Control Signals**

Two-way left-turn arrow



One-way left-turn arrow

White arrows on an opaque 30 x 30-inch background

### Section 4M.03 Design of Lane-Use Control Signals

#### Standard:

- 01 All lane-use control signal indications shall be in units with rectangular signal faces and shall have opaque backgrounds. Nominal minimum height and width of each **DOWNWARD GREEN ARROW**, **YELLOW X**, and **RED X** signal face shall be 18 inches for typical applications. The **WHITE TWO-WAY LEFT-TURN ARROW** and **WHITE ONE WAY LEFT-TURN ARROW** signal faces shall have a nominal minimum height and width of 30 inches.
- 02 Each lane to be reversed or closed shall have signal faces with a **DOWNWARD GREEN ARROW** and a **RED X** symbol.
- 03 Each reversible lane that also operates as a two-way or one-way left-turn lane during certain periods shall have signal faces that also include the applicable **WHITE TWO-WAY LEFT-TURN ARROW** or **WHITE ONE WAY LEFT-TURN ARROW** symbol.
- 04 Each non-reversible lane immediately adjacent to a reversible lane shall have signal indications that display a **DOWNWARD GREEN ARROW** to traffic traveling in the permitted direction and a **RED X** to traffic traveling in the opposite direction.
- 05 If in separate signal sections, the relative positions, from left to right, of the signal indications shall be **RED X**, **YELLOW X**, **DOWNWARD GREEN ARROW**, **WHITE TWO-WAY LEFT-TURN ARROW**, **WHITE ONE WAY LEFT-TURN ARROW**.
- 06 The color of lane-use control signal indications shall be clearly visible for 2,300 feet at all times under normal atmospheric conditions, unless otherwise physically obstructed.
- 07 Lane-use control signal faces shall be located approximately over the center of the lane controlled.
- 08 If the area to be controlled is more than 2,300 feet in length, or if the vertical or horizontal alignment is curved, intermediate lane-use control signal faces shall be located over each controlled lane at frequent intervals. This location shall be such that road users will at all times be able to see at least one signal indication and preferably two along the roadway, and will have a definite indication of the lanes specifically reserved for their use.
- 09 All lane-use control signal faces shall be located in a straight line across the roadway approximately at right angles to the roadway alignment.
- 10 On roadways having intersections controlled by traffic control signals, the lane-use control signal face shall be located sufficiently far in advance of or beyond such traffic control signals to prevent them from being misconstrued as traffic control signals.
- 11 Except as provided in Paragraph 12, the bottom of the signal housing of any lane-use control signal face shall be a minimum of 15 feet and a maximum of 19 feet above the pavement grade.

#### Option:

- 12 The bottom of a lane-use control signal housing may be lower than 15 feet above the pavement if it is mounted on a canopy or other structure over the pavement, but not lower than the vertical clearance of the structure.
- 13 Except for lane-use control signals at toll plazas (see Section 4K.02), in areas with minimal visual clutter and with speeds of less than 40 mph, lane-use control signal faces with nominal height and width of 12 inches may be used for the **DOWNWARD GREEN ARROW**, **YELLOW X**, and **RED X** signal faces, and lane-use control signal faces with nominal height and width of 18 inches may be used for the **WHITE TWO-WAY LEFT-TURN ARROW** and **WHITE ONE-WAY LEFT-TURN ARROW** signal faces.

- 14 Other sizes of lane-use control signal faces larger than 18 inches with message recognition distances appropriate to signal spacing may be used for the DOWNWARD GREEN ARROW, YELLOW X, and RED X signal faces.
- 15 Non-reversible lanes not immediately adjacent to a reversible lane on any street so controlled may also be provided with signal indications that display a DOWNWARD GREEN ARROW to traffic traveling in the permitted direction and a RED X to traffic traveling in the opposite direction.
- 16 The signal indications provided for each lane may be in separate signal sections or may be superimposed in the same signal section.

#### **Section 4M.04 Operation of Lane-Use Control Signals**

##### **Standard:**

- 01 All lane-use control signals shall be coordinated so that all the signal indications along the controlled section of roadway are operated uniformly and consistently. The lane-use control signal system shall be designed to reliably guard against showing any prohibited combination of signal indications to any traffic at any point in the controlled lanes.
- 02 For reversible-lane control signals, the following combination of signal indications shall not be simultaneously displayed over the same lane to both directions of travel:
- A. DOWNWARD GREEN ARROW in both directions,
  - B. YELLOW X in both directions,
  - C. WHITE ONE WAY LEFT-TURN ARROW in both directions,
  - D. DOWNWARD GREEN ARROW in one direction and YELLOW X in the other direction,
  - E. WHITE TWO-WAY LEFT-TURN ARROW or WHITE ONE WAY LEFT-TURN ARROW in one direction and DOWNWARD GREEN ARROW in the other direction,
  - F. WHITE TWO-WAY LEFT-TURN ARROW in one direction and WHITE ONE WAY LEFT-TURN ARROW in the other direction, and
  - G. WHITE ONE WAY LEFT-TURN ARROW in one direction and YELLOW X in the other direction.
- 03 A moving condition in one direction shall be terminated either by the immediate display of a RED X signal indication or by a YELLOW X signal indication followed by a RED X signal indication. In either case, the duration of the RED X signal indication shall be sufficient to allow clearance of the lane before any moving condition is allowed in the opposing direction.
- 04 Whenever a DOWNWARD GREEN ARROW signal indication is changed to a WHITE TWO-WAY LEFT-TURN ARROW signal indication, the RED X signal indication shall continue to be displayed to the opposite direction of travel for an appropriate duration to allow traffic time to vacate the lane being converted to a two-way left-turn lane.
- 05 If an automatic control system is used, a manual control to override the automatic control shall be provided.

##### *Guidance:*

- 06 *The type of control provided for reversible-lane operation should be such as to permit either automatic or manual operation of the lane-use control signals.*

##### **Standard:**

- 07 If used, lane-use control signals shall be operated continuously, except that lane-use control signals that are used only for special events or other infrequent occurrences and lane-use control signals on non-reversible freeway lanes shall be permitted to be darkened when not in operation. The change from normal operation to non-operation shall occur only when the lane-use control signals display signal indications that are appropriate for the lane use that applies when the signals are not operated. The lane-use control signals shall display signal indications that are appropriate for the existing lane use when changed from non-operation to normal operations. Also, traffic control devices shall clearly indicate the proper lane use when the lane control signals are not in operation.

##### **Support:**

- 08 Section 2B.26 contains additional information concerning considerations involving left-turn prohibitions in conjunction with reversible-lane operations.