

**Delaware Department of Transportation  
Division of Transportation Solutions  
Design Guidance Memorandum**

**Memorandum Number 01-28**

- |                          |                           |                                  |
|--------------------------|---------------------------|----------------------------------|
| 1. Road Design Manual    | 2. Bridge Design Manual   | 3. Utilities Design Manual       |
| 4. Real Estate Manual    | 5. Standard Specification | 6. Standard Construction Details |
| 7. Traffic Design Manual |                           |                                  |

---

Title: Directional Tactile Surface Indicators  
(DTSI) for Bicycle Ramps

Effective date: October 19, 2020

Sections to Implement:

|                                                         |                                                             |                                                  |
|---------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="checkbox"/> Project Development | <input checked="" type="checkbox"/> Planning                | <input checked="" type="checkbox"/> DTC          |
| <input checked="" type="checkbox"/> Bridge              | <input checked="" type="checkbox"/> Engineering Support     | <input checked="" type="checkbox"/> Traffic      |
| <input type="checkbox"/> Team Support                   | <input checked="" type="checkbox"/> Maintenance & Operation | <input checked="" type="checkbox"/> Construction |
| <input type="checkbox"/> Utilities                      |                                                             |                                                  |

**I. Purpose:**

Certain road/intersection designs include a bicycle ramp which allows bicyclists to seamlessly connect from an on-road bicycle facility or shared bicycle/motor vehicle travel lane to a multi-use path. As stated in NCHRP Report 672: Roundabouts: An Informational Guide 2<sup>nd</sup> Edition (page 6-74); “Since bike ramps can be confusing for pedestrians with vision impairments, detectable warnings should be included on the ramp.”

These bicycle ramps are intended for bicyclists only, not pedestrians or motor vehicles. As such, a Detectable Warning System (DWS) different than truncated domes are desired. Truncated domes are intended to convey a message to pedestrians that they will be leaving or encountering a hazard within a circulation path and will be entering a hazardous area (such as the road, shoulder, or crosswalk that contain motor vehicles). The truncated domes are used where a pedestrian may be crossing the roadway, or in the case of the end of a pedestrian facility, must enter the roadway.

For bicycle ramps, the message that is intended to be conveyed to pedestrians is “this is not intended for you to enter.” Therefore, a different form of DWS is needed other than truncated domes. This policy establishes the new type of DWS which is termed the Directional Tactile Surface Indicator (DTSI) and provides guidance for its use.

**II. Design Guidance:**

The AASHTO Guide for the Development of Bicycle Facilities 2012, Fourth Edition and NCHRP Report 672: Roundabouts: An Informational Guide 2<sup>nd</sup> Edition, section 6.8.2.2,

provides installation guidance and exhibits 6-67 and 6-68 for placement examples of the DWS pattern where a bicyclist is to enter or exit a shared shoulder or bicycle lane parallel and adjacent to a sidewalk or shared use path at a depth of 12 inches from the edge of the pedestrian route. The DTSI are to be located on the approach or exit bike ramp and parallel to the pedestrian route of travel to identify to the pedestrian the continued direction of travel per exhibits 6-67 and 6-68. The DTSI is to be applied full width as designated by the Engineer for cuing a pedestrian route or to separate designated bike/pedestrian routes.

Installation and design of the material will be paid in accordance with item number 705007, Sidewalk Surface Detectable Warning System meeting the pattern shown below and labeling the surface as Directional Tactile Surface Indicators (DTSI):

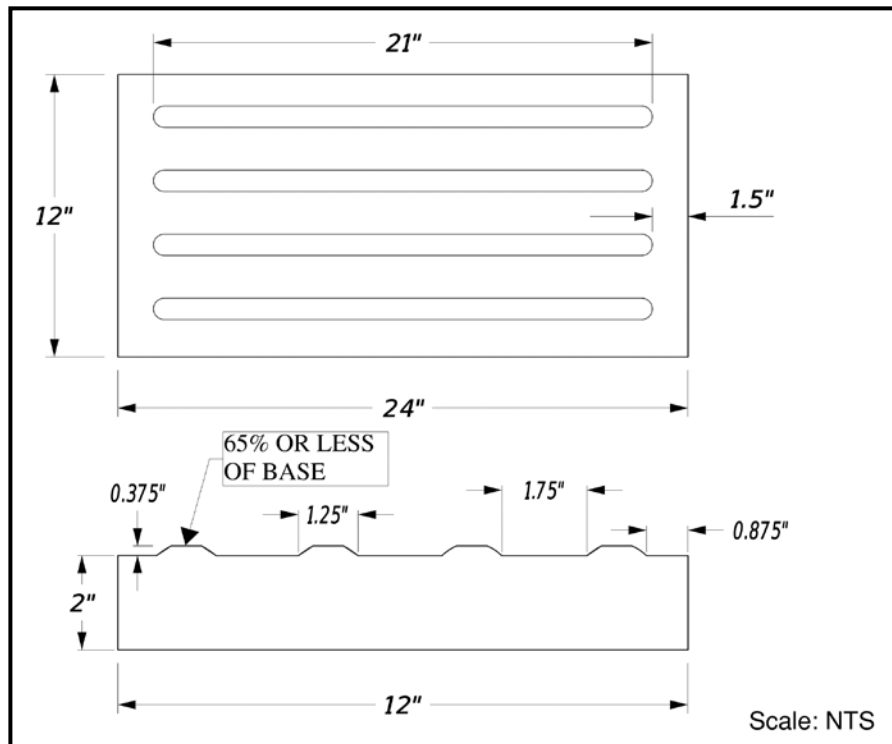


Figure 1

DTSI are only to be used on bicycle ramps that are not intended to be used by pedestrians. If the ramp is intended to be shared by both pedestrians and bicyclists, the truncated domes shall be used.

### III. Justification:

The DTSI pattern intends to provide a consistent guide cue for the visually impaired pedestrian by providing an identifiable pattern for use on bicycle ramps that are not intended for use by pedestrians. This will assist pedestrians and supplement the identification of potential hazards as defined in section 3.9; Pedestrian Accessibility Standards for Facilities in the Public Right-of-Way, February 2018.

Prepared by: Engineering Support

Date: October 14, 2020

  
\_\_\_\_\_

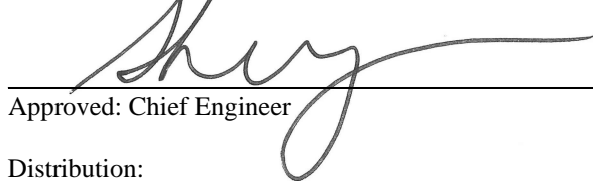
Recommended by: Engineering Support

10/14/2020  
Date

  
\_\_\_\_\_

Reviewed by: Deputy Director - Design

10/14/2020  
Date

  
\_\_\_\_\_

Approved: Chief Engineer

10/19/2020  
Date

Distribution:

- Assistant Directors
- Transportation Solution
- Maintenance & Operations District Engineers
- Planning
- Construction
- Consultants
- DelDOT Internet