



WATER RESOURCES DIVISION POLICY AND PROCEDURES

NUMBER: WRD-007
TITLE: PART 353, MEASURING HEIGHTS AND SLOPES OF DUNES
PAGE: 1 OF 3

ISSUE:

Section 35316(4) of Part 353, Sand Dunes Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), requires the Department of Environment Quality (DEQ) to develop guidelines describing the method to be used when measuring slopes within designated critical dune areas (CDA). The previous procedure had not been updated since 1996.

DEFINITIONS:

"Clinometer" is a handheld instrument that measures angles and slopes in degrees and percents. This instrument is one of the approved instruments for slope measurement.

"Survey stakes" are standard height stakes usually four feet in height and usually having one-foot markings on the post.

POLICY:

This policy describes how dune slopes are measured to promote consistency in determining the steepness of slopes within designated CDAs. CDAs across the state exhibit a wide range of terrain conditions. Early in the program, it was decided that the height of a dune feature would be one of the criteria used to distinguish between significant and insignificant alterations of dunes. This procedure includes the method used to determine the height of a dune feature.

PROCEDURE:

Responsibility

Action

Critical Dune Program Staff

1. During the site inspection, staff determines whether the dune(s) proposed to be altered by the project is/are over six feet in height at any point throughout the overall feature. Depending on the project, there may be multiple dunes requiring height determination.

**WATER RESOURCES DIVISION
POLICY AND PROCEDURES**

NUMBER: WRD-007
TITLE: Part 353, Measuring Heights and Slopes of Dunes
PAGE: 2 OF 3

Critical Dune Program Staff
(continued)

2. The lower six feet of a larger dune feature should not be isolated when making the height measurement. Dunes undulate; can rise a few feet, level off, and then rise again. View all sides of the dune to determine whether one side is taller or if the feature is part of a larger dune. The entire dune feature is to be considered in making the height determination.
 - a) If the feature is greater than six feet in height at any point, continue with the site inspection. The lower six feet of larger dune features will be included when making height and slope measurements.
 - b) If the dune is six feet or less in height, is isolated, and not attached to a larger feature, the dune would generally be considered "insignificant," and its steepness of slope is not a factor in determining if the feature can be impacted. All sides must be less than six feet in height. Record dune measurements on the project review report, field notes, or cross section supplied with application.
3. **For dune features with a consistent slope:** Place survey stakes at the toe and highest point of the slope being measured, perpendicular to the ground surface.
4. Standing at either the toe or top of the dune being measured, place the clinometer with the site-line aligned with the top of the survey stake. Keeping both eyes open, look through the clinometer simultaneously through and alongside the housing, adjusting the angle of the clinometer until the horizontal sighting line aligns to the top of the survey stake opposite you. Percentage readings are on the right scale.

Once the DEQ approves another tool for measurement of slopes, follow the manufactures' directions.

5. Take the slope measurement, in percent, parallel to the ground surface using the survey stakes, which will accurately reflect the slope of the dune. Please note: the height of the clinometer above the ground and the height of the point being viewed through the clinometer above the ground must be the same to collect an accurate measurement.

**WATER RESOURCES DIVISION
POLICY AND PROCEDURES**

NUMBER: WRD-007
TITLE: Part 353, Measuring Heights and Slopes of Dunes
PAGE: 3 OF 3

Critical Dune Program Staff
(continued)

6. For dune features where the slope is not consistent from crest to toe, more than one slope measurement needs to be taken. Determine where the slope changes; each segment should be measured. If the segment is of limited extent, its slope may be considered insignificant (even if the slope is steeper than 1:3 or 33 1/3%) and that segment's steepness is not a factor in the evaluation.
7. Record all slope measurements on the site inspection form and/or field notes.

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Date: 7/25/11

Last Reviewed By: _____
Name and Title

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