

# HYDRAULIC DESIGN ADVISORY

## HDA 05-02.2

DATE: MARCH 15, 2005

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### **SUBJECT: CHANGE IN PROCEDURE FOR DETERMINING MEAN HIGH & LOW TIDE ELEVATIONS**

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Due to changes implemented by NOAA on their Internet web site, it has become necessary to modify, somewhat, the procedure currently shown in Chapter 13, Shore Protection, Section 13.2.5, Determination of Mean High/Low Tide Levels, of the VDOT DRAINAGE MANUAL. A copy of the revised procedure and sample calculation has been inserted below. The shaded text reflects the changes from the September 13, 2006 version of this HDA made necessary by changes to NOAA's web site. This information will be incorporated into the next formal revision to the Drainage Manual. The previous Hydraulic Design Advisory HDA 05-02.1 is voided with the issuance of this revision.

### 13.2.5 Determination of Mean High/Low Tide Levels

It is frequently necessary to determine Mean High Water (MHW) and Mean Low Water (MLW) levels as a requisite for obtaining various federal, state, and/or local environmental permits. The National Oceanic and Atmospheric Administration (NOAA) publishes such information for the east and west coasts of North America and the Gulf of Mexico. Unfortunately, the elevations shown in these publications are predicated on local, mean lower low water (MLLW) datum instead of National Geodetic Vertical Datum of 1929 (NGVD 29) or the newer North American Vertical Datum of 1988 (NAVD 88). A series of geodetic bench marks have been established which permit conversion of mean low water datum to the more meaningful NGVD 29 and/or NAVD 88 Datum. A table of these tidal bench marks for Virginia, including the Chesapeake Bay and its tributaries, is located on NOAA's internet web site at the URL address:

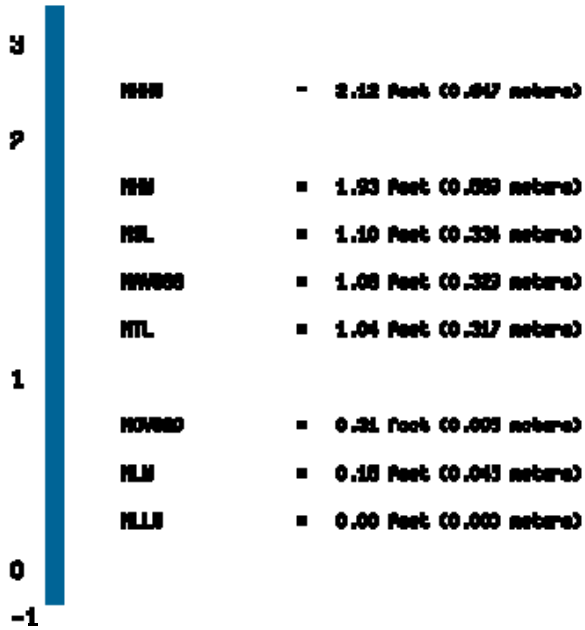
[http://tidesandcurrents.noaa.gov/station\\_retrieve.shtml?type=Bench%20Mark%20Data%20Sheets&state=Virginia&id1=863](http://tidesandcurrents.noaa.gov/station_retrieve.shtml?type=Bench%20Mark%20Data%20Sheets&state=Virginia&id1=863)

To determine the MHW and MLW elevations, proceed as follows:

- (1) Go to the web site shown above and scroll up or down the table of the Tidal Bench Marks until you find the one closest to the location in which you are interested. Click on the link.
- (2) The screen will change to show information for the site selected. Scroll down until you see a link designated as "National Geodetic Vertical Datum (NGVD 29)" and click on it. You may also click on "Datums Page" in the top left hand corner and it will take you to the same spot on the page.
- (3) The screen will change again, displaying a graph showing pertinent tide levels including MHW (Mean High Water), MLW (Mean Low Water) and usually a correction factor for both NGVD-29 and NAVD-88 datums. The MHW and MLW values shown on the graph are in terms of local MLLW (Mean Lower Low Water) datum and must be converted to either NGVD-29 or NAVD-88 datums. An example graphic display is shown below.
- (4) If you want MHW and MLW elevations in terms of NAVD-88 datum, subtract the correction factor shown for NAVD-88 datum from the values shown for MHW and MLW.

### Elevation Information

**PIID:** 040448  
**VI:** 3457  
**Station ID:** 883849  
**Epoch:** 1983-2001  
**Date:** Wed Feb 19 14:34:40 EST 2008



The NAVD 88 and the NGVD 29 elevations related to MLLW were computed from Bench Mark, TIDAL 7 STA 81, at the station.

Displayed tidal datums are Mean Higher High Water (MHHW), Mean High Water (MHW), Mean Tide Level (MTL), Mean Sea Level (MSL), Mean Low Water (MLW), and Mean Lower Low Water (MLLW) referenced on 1983-2001 Epoch.

**Example: Find the mean low and high water elevations on the James River near Claremont, Virginia in terms of NAVD-88 datum.**

Step 1 Consult NOAA's internet web site, locate link for the tidal benchmark for the James River near Claremont and click on it.

Step 2 When the screen changes, scroll down the page until you get to the link "National Geodetic Vertical Datum (NGVD 29)" and click on it.

Step 3 When the graphic is displayed note that MHW = 1.93 ft and MLW = 0.15 ft. in terms of local, MLLW datum and that the NAVD-88 correction factor is 1.08 ft.

Step 4 Subtract the NAVD-88 correction factor of 1.08 ft. from both values to get MHW and MLW in terms of NAVD-88 datum.

$$\text{MHW} = 1.93 - 1.08 = 0.85 \text{ ft. Use } 0.9 \text{ ft. for Mean High Water (MHW)}$$

$$\text{MLW} = 0.15 - 1.08 = -0.93 \text{ ft. Use } -0.9 \text{ ft. for Mean Low Water (MLW)}$$

Answer: Mean Low Water (MLW) elevation = -0.9 ft.

Mean High Water (MHW) elevation = 0.9 ft.