**Worksheet #2 - Determining the Best Available 500 year Elevation including a Wave Height Adjustment**

**Part I – Worksheet for Determining the Best Available 500 year Elevation including a Wave Height Adjustment Using Empirical Methodology**

Empirical Formula:

500 Year Elevation With Wave Height =

500 Year FIS Study Elevation + [.55 \* (500 Year FIS Study Elevation - Ground Surface Elevation)]

Diagram

Description automatically generated

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| **Wave Height Calculation Table for Critical Facilities in Coastal Zones** | | | | | |
| Effective FIRM | | | Preliminary FIRM | | |
| 500 Year Elevation  (circle datum) | Box 1A  NGVD 29 NAVD88 | FT | 500 Year Elevation | Box 2A  NAVD88 | FT |
| Ground Elevation | Box 1B  NGVD 29 NAVD88 | FT | Ground Elevation | Box 2B  NAVD88 | FT |
| Wave Height  (.55\*(Box 1A-Box 1B) | Box 1C | FT | Wave Height  (.55\*(Box 2A-Box 2B) | Box 2C | FT |
| 500 Year Elevation w/ Wave Height  (Box 1A + Box 1C) | Box 1D | FT | 500 Year Elevation w/ Wave Height  (Box 2A + Box 2C) | Box 2D  NAVD88 | FT |
| Vertical Datum - Resulting Elevations below must be in same datum, if conversion factor needed, note here:  NAVD88 = NGVD29 - \_\_\_\_\_ft. | Box 2E  NAVD88 | FT |  |  | Ft |
| ***Select highest Elevation from Effective (Box 1D or 1E)***  ***and Preliminary (Box 2D)***  ***Alll Elevations must be in NAVD88***  ***This is your Class IV 500-Year Elevation à***  ***ENTER RESULT IN WORKSHEET 1, BOX H*** | | | | Box 3A | FT  NAVD88 |

**Part II. Determining Wave Height Adjustment Using Detailed Analyses**

The empirical formula given in Part I, above, is a conservative estimate of the wave height adjustment to the preliminary and effective 500 year elevations in New Jersey’s coastal areas. If there are structures or protective works between a project and shoreline where waves break, additional analyses may be performed to further refine the wave runup using the following guidance documents: In areas where there are bulkheads, other houses, and structures between the water body and the proposed critical facility that can reduce wave height, there are more specific methodologies that could be used to analyze overland waves to determine the 500-year elevation including the wave height adjustment with more accuracy.

Determination of Wave Characteristics [https://www.fema.gov/sites/default/files/2020- 02/Determination\_Of\_Wave\_Characteristics\_Guidance\_Feb\_2019.pdf](https://www.fema.gov/sites/default/files/2020-%2002/Determination_Of_Wave_Characteristics_Guidance_Feb_2019.pdf%20)

Coastal Wave Runup and Overtopping [https://www.fema.gov/sites/default/files/2020- 02/Wave\_Runup\_and\_Overtopping\_Guidance\_Feb\_2018.pdf](https://www.fema.gov/sites/default/files/2020-%2002/Wave_Runup_and_Overtopping_Guidance_Feb_2018.pdf%20)

Coastal Wave Setup [https://www.fema.gov/sites/default/files/2020- 02/Coastal\_Wave\_Setup\_Guidance\_Nov\_2015.pdf](https://www.fema.gov/sites/default/files/2020-%2002/Coastal_Wave_Setup_Guidance_Nov_2015.pdf%20)

Overland Wave Propagation [https://www.fema.gov/sites/default/files/2020- 02/Coastal\_Overland\_Wave\_Propagation\_Guidance\_Nov\_2015.pdf](https://www.fema.gov/sites/default/files/2020-%2002/Coastal_Overland_Wave_Propagation_Guidance_Nov_2015.pdf)

These analyses should be performed by a licensed NJ Professional Engineer familiar with coastal erosion processes and the impact of wave loads on structures. It is recommended that the project designers contact the funding agency, the NFIP Coordinator’s Office, and the local Floodplain Administrator if these methodologies for determining wave height adjustments are pursued.

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| **Wave Height Calculation Table for Critical Facilities in Coastal Zones** | | | | | |
| Effective FIRM | | | Preliminary FIRM | | |
| 500 Year Elevation w/ Wave Height  (circle datum) | Box 4A  NGVD 29 NAVD88 | FT | 500 Year Elevation w/ Wave Height | Box 5A  NAVD88 | FT |
| Vertical Datum - Resulting Elevations below must be in same datum, if conversion factor needed, note here:  NAVD88 = NGVD29 - \_\_\_\_\_ft. | NAVD88 | FT |  |  |  |
| ***Select highest Elevation from Effective (Box 4A) and Preliminary (Box 5A)***  ***All Elevations Must be in NAVD88***  ***This is your Class IV 500-Year Elevation à***  ***ENTER RESULT IN WORKSHEET 1: LOCAL DESIGN FLOOD ELEVATION, BOX H*** | | | | Box 6A | FT  NAVD88 |
| ***ATTACH DOCUMENTATION OF ALL ANALYSES INCLUDING THE SIGNATURE AND SEAL OF A LICENSED NJ PROFESSIONAL ENGINEER TO THIS WORKSHEET*** | | | | | |