Woods Hole Group 81 Technology Park Drive E. Falmouth, MA 02536 USA TELEPHONE: 508.540.8080 FAX: 508.540.1001 www.woodsholegroup.com

March 24, 2015

Fay Rubin, Project Manager
Earth Systems Research Center
Eight College Road
University of New Hampshire
Durham, New Hampshire 03824

Re: Summary of Additional Data Required to Support an Appeal of Preliminary Flood Insurance Rate Map (FIRM) number 33015CO432F in the Town of Rye, NH (dated March 5, 2015).

Dear Fay:

The Woods Hole Group has reviewed the letter requesting additional data for in the Town of York, Maine, Community No. 230159 dated March 5, 2015. The following are the Woods Hole Group, Inc. responses to the requests and comments made in your letter. The responses are numbered corresponding to the comment/request number in the original letter. Also included with this Response to Comments document are the revised CHAMP runs for both the intact and failed structure cases as well as the revised GIS shapefiles.

If there are any questions in regards to the responses to the comments or there is need for additional data, please feel free to contact myself, Mitchell Buck, via phone (508-495-6210) or email (mbuck@whgrp.com).

Sincerely,

Mitchell Buck

Mitchell Buck, P.E.
Coastal Engineer
Woods Hole Group

CC: John Grace, CFM
FEMA Region I
99 High Street, Sixth Floor
Boston, MA 02110

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Comment 1: *Assumption of no structural failure is not in accordance with FEMA's Guidelines and Standards. Section D.2.10 of FEMA's* ***Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update (2007)*** *contains guidance as to treatment of coastal structures in the flood insurance study. FEMA does not limit the evaluation of structural failure based on a condition of waves being 3 feet. Section D.2.10.1 provides detailed engineering guidance for structures to be considered as surviving the 1-percent-annual-chance event. Section D.2.10.2 provides guidance to consider erosion and wave analysis for both intact and failed structure cases, and then mapping the more hazardous case. Section D.2.10.3.1 details either coastal structure be remove completely from the transect, or estimate the partial collapse of the structure where appropriate. The approaches to partial failure of the coastal structure defined in section D.2.10.3.2 are only recommended simple geometric approaches. A different failure mode can be considered if support material is provided.* ***Please submitted revised engineering analysis and mapping at transect TR-39 (TR-42 in AECOMs models)***.

Response: The engineering analysis was reevaluated to consider both the intact and failed structure cases to determine which case was more conservative to use for mapping. The profile for transect TR-39 was edited to include more detail from the 2011 LIDAR data set in the vicinity of the seawall as shown in Figure 1. For the failed structure case, the seawall was failed on a 1V:1.5H slope at the toe of the seawall based on the FEMA Guidelines Update (2007). For either case, the elevation of the total water level (TWL = SWEL1% + setup) was below the elevation of the toe of the structure (10.40 feet NAVD88) indicating that there was no water depth for waves to propagate through and directly impact the structure. Therefore, both the intact and failed structure cases analyzed using the WHAFIS and Runup2.0 modules (incorporating Comment 2 below) in CHAMP.

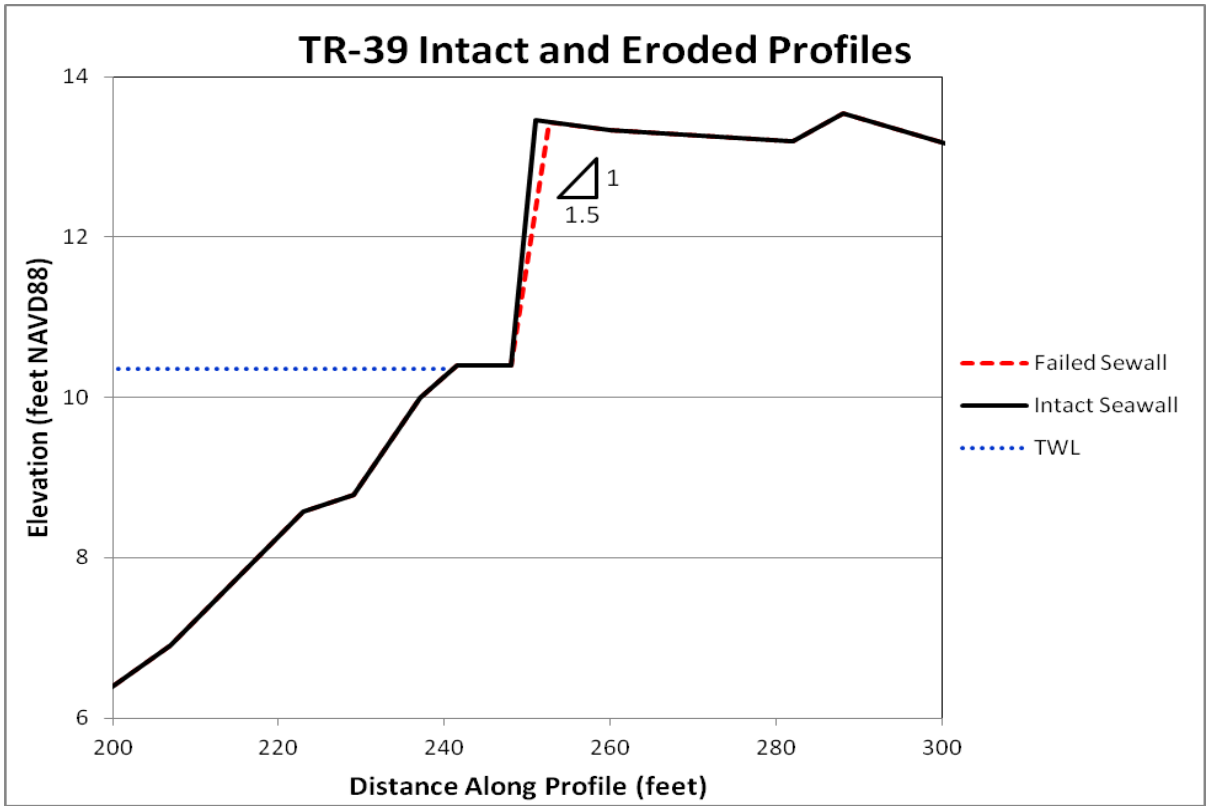

Figure 1. Profiles for intact and failed seawall cases.

The WHAFIS and Runup2.0 results for the intact structure case are shown in Figure 2. The WHAFIS Results indicate that a VE (El. 12) Zone transitions into a short AE Zone (El. 11) on the beach landward of the seawall toe. Runup 2.0 calculated an $R_{2\%}$ of 3.53 ft (3.48 ft previously) that results in a wave runup elevation of 11.89 ft NAVD88; this is below the crest of the Intact seawall. The results for both WHAFIS and Runup2.0 are similar in that a narrow AE Zone extends landward of the VE Zone on the beach; however, this AE Zone is too small to be mapped. Therefore, conservative judgment was used to extend VE Zone to the landward limit of the AE Zone in either case. The Runup 2.0 results are more conservative and would be mapped for the intact seawall case. The BFE of this shorebound VE Zone would be 12 ft NAVD88 (rounded runup elevation), which is the same as was originally mapped in the appeal.

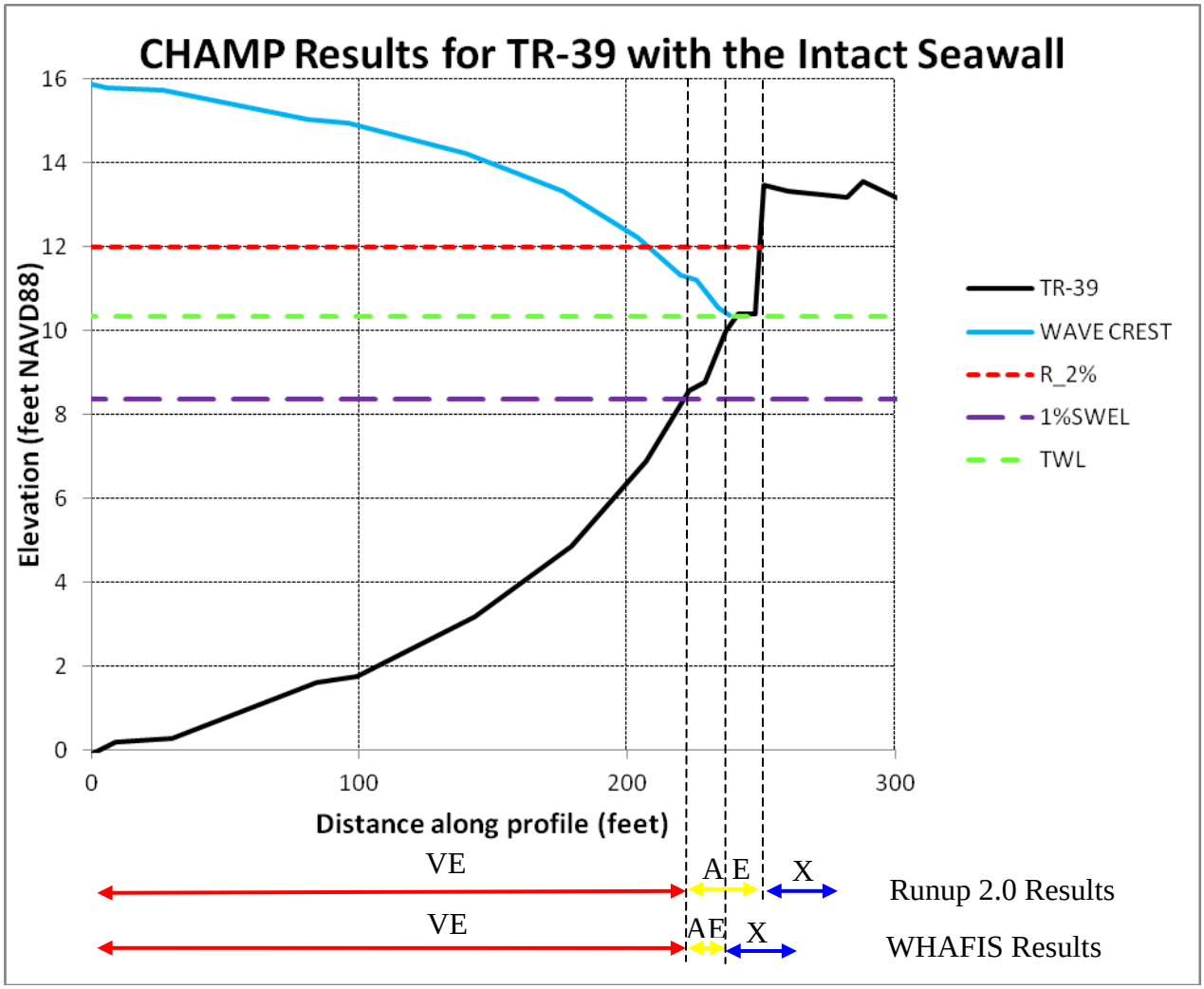

Figure 2. WHAFIS and Runup 2.0 Results for Intact Structure Case.

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The WHAFIS and Runup2.0 results for the failed strucutre case are shown in Figure 3. For the failed seawall case, the WHAFIS and Runup2.0 results yielded nearly identical results to the intact case since the TWL was below the elevation of the seawall toe. The runup was calculated to be 3.53 ft NAVD88 yielding a runup elevation of 11.89 ft that is below the crest of the failed seawall slope. Similarly, the Runup 2.0 results are more conservative and would be mapped for the failed seawall case. The BFE of this shorebound VE Zone would be 12 ft NAVD88, which is what was originally mapped in the appeal. The full CHAMP database containing the WHAFIS and Runup2.0 results for the intact (TR-42I) and failed (TR-42F) structure cases are included with the data package.

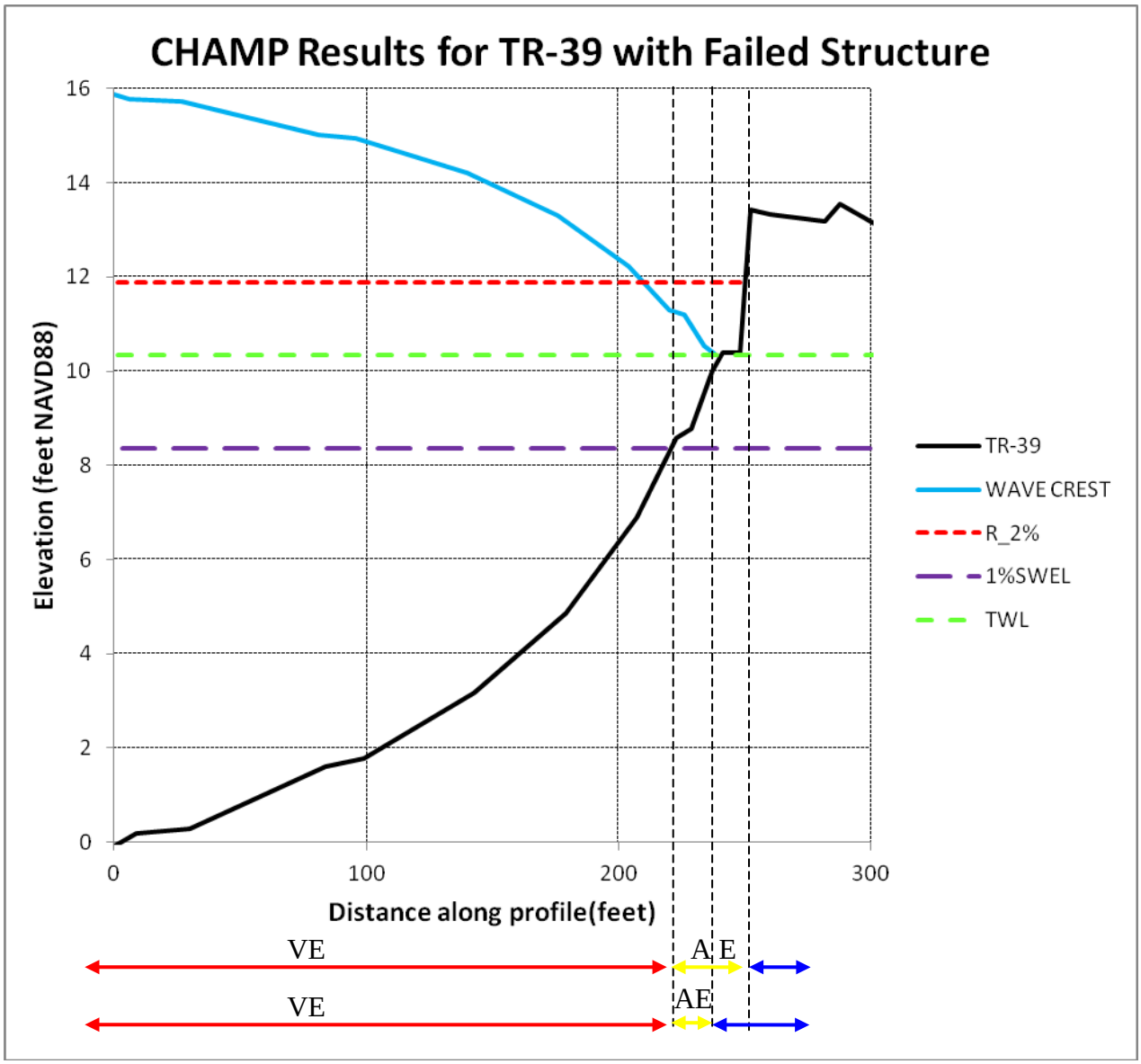

Figure 3. WHAFIS and Runup 2.0 Results for Failed Structure Case.

Based on the results of the CHAMP results for both the Intact and Failed Seawall cases, a VE Zone with a BFE of 12 ft NAVD88 would be mapped (based on Runup 2.0) on the beach to the seawall. This result does not change the mapping from the original appeal.

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Comment 2: *WHAFIS modeling was found to be incorrect as to the input obstruction card utilized. The OF card for an open coast beach is more appropriate than the IF card, because the transect in question is very short and exposed to open water. In addition, the card at the end of the transect was not set up appropriately.* ***Please provide correction or justification to the input obstruction card utilized.***

Response: The input obstruction card has been changed from "IF" for Inland Fetch to "OF" for Overwater Fetch and WHAFIS was rerun as stated in Comment 1.

Comment 3: *Revision to floodplain mapping is not inclusive of LiMWA. The revised mapping submitted for the Town of Rye does not contain revisions to the location of the LiMWA. FEMA has developed a guidance document, Operating Guidance (OG-13-13) with respect to LiMWA that should be considered to develop the LiMWA line. Please provide S_LiMWA.shp as part of the submitted mapping.*

Response: Woods Hole Group reviewed the FEMA Operating Guidance document (OG-13-13) related to LiMWA delineation and determined that a LiMWA should not be mapped for this transect reach since the inland VE Zone limit is delineated using runup based on Item 4 of OG-13-13:

> "The LiMWA should not be shown on the FIRM in areas where the inland VE limit is delineated based on the Primary Frontal Dune (PFD) or wave runup and/or wave overtopping. This may result in LiMWA segments, and a discontinuous LiMWA, on the FIRM. The LiMWA should not be shifted so as to be immediately landward of the mapped VE/AE Zone boundary. This guidance supersedes guidance in PM 50 which states it may be advantageous to continue the LiMWA across runup-dominated areas, and which states the LiMWA should be delineated immediately landward of the VE/AE Zone boundary in PFD and wave overtopping VE Zones."

This guidance also allows discontinuous LiMWA sections. Therefore, the LiMWA line for the TR-39 Transect Reach was removed from the GIS shapefile "S_LiMWA.shp" and a copy of this shapefile is provided with this letter.

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