From: Gerber, John
Sent: Wednesday, August 05, 2015 6:34 PM

Subject: RE: Flood Study

Rawls,

I appreciate the opportunity to review and comment on the flood study. I also forwarded the study to Tom Langan, PE, our primary lead for coastal studies for review. His comments are at the bottom of the page.

As discussed in the report, 44 CFR 60.3 (e) (6), (7) states community participating in the NFIP shall:

(6) Prohibit the use of fill for structural support of buildings within Zones V1–30, VE, and V on the community's FIRM;

(7) Prohibit man-made alteration of sand dunes and mangrove stands with-in Zones V1–30, VE, and V on the community's FIRM which would increase potential flood damage.

FEMA's Technical Bulletin 5/August 2008, Free of Obstructions Requirements for Buildings Located in Coastal High Hazard Areas, provides guidance concerning fill placed under or around an elevated building. It suggests that fill is limited to 2 feet to assist in drainage or support of parking slabs, patios, walkways or similar site elements. This guidance is to restrict or minimize fill that may lead to damaging flow diversion or wave ramping and deflection to elevated buildings and is generally not applied to vacant lots where no buildings are present that can experience the increase in potential flood damage.

There are no NFIP requirements to provide a "no-rise" study for development located in coastal areas. The "no-rise" standard is for development encroaching in the floodway area of riverine flood studies.

The Flood Study for Sunset Beach West report appears to be solid in the approach and is an analysis that is considered above the minimum NFIP requirements.

The NFIP, NC Building Code, and your local ordinance clearly prohibits fill in the VE Zone from being used as structural support. If fill material is being placed in the VE Zone there must be a way to ensure it is not considered structural. I suggest obtaining a detailed topo of the area BEFORE the fill material is placed because it is imperative the piling depth be determined using the natural grade and not the finished grade, unless the finished grade is lower.

Chapter 46 of the NC Residential Building Code states: Pile tip shall extend to a depth of not less than 8 feet below the natural grade or finished grade of the lot, whichever is lower. All pilings within the Ocean Hazard Area shall have a tip penetration of at least 5 feet below mean sea level or 16 feet below average original grade, whichever is least. Structures within the Ocean Hazard Area which are placed upon the site behind a line 60 times the annual erosion rate away

from the most seaward line of stable natural vegetation are exempt from this additional tip penetration requirement.

As you can see, the NC Residential Code references natural grade, average original grade or finished grade if it is lower. To accurately know where the natural or original grade starts, there must be a topo or other site survey that can be referenced after the fill and grading is complete. The final grading cannot be considered as a reference for the piling depths unless it is lower than the natural or original grades.

Below are Tom Langan's comments concerning the Flood Study for Sunset Beach West.

1. Based on Figure 4 it appears that the dune were considered a mound type system for the erosion calculations. In this type of scenario we would need to verify that the most landward peak of the mounded dune system was selected for the erosion assessment. Please document the type of dune system, ridge or mound, in the erosion assessment section of the report.
2. Please consider providing a table of the WHAFIS part 2 and or part 6 output for each transect for easier verification of the potential no-rise including a wave crest elevation difference column for the existing and proposed conditions. It is difficult to distinguish between the existing a proposed WHAFIS wave crest elevations on Figure 4, since they apparently are coincident for the majority of the WHAFIS profile.
3. There is proposed fill in the eroded profile for the erosion assessment at Transect 1. This fill could potentially be located in the primary frontal dune depending upon the location of the dune transition from steep to flat terrain. It would be advisable to include the primary frontal dune on a figure, even though the VE zone extents are derived from the WHAFIS controlling wave heights.
4. An assessment of the existing a proposed WHAFIS card types could not be performed based on the report. It would be helpful to include a figure of the existing and proposed land use in the report and a possible table relating each land use type to WHAFIS card type. The figures could also just display existing and proposed WHAFIS card values.

Overall the approach appears to be reasonable and consistent with the effective coastal flood study; however, we would need the actual WHAFIS modeling and supporting input and output data to perform a more complete assessment of the potential impacts of the development on the flood zones. Additionally, the starting wave conditions, SWEL plus setup values and selected dune toe for the erosion calculations (10-year SWEL) appear to be consistent with the effective WHAFIS model for Sunset Beach in Brunswick County.

It may be helpful to forward Tom's comments to Ms. Nelson since they are technical in nature and request she provide a response. Tom's phone number is 919-825-2328 if she would like to communicate directly with him.

Again, thank you for requesting the additional review to help ensure compliant and safe construction.

Please let me know if you have any questions,

John T. Gerber, PE, CFM
Senior Engineer
State NFIP Coordinator
North Carolina Division of Emergency Management Floodplain Mapping Program