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Martha's Vineyard Commission

Land Use Planning Committee

Minutes of the Meeting of September 25, 2006

Held in the Stone Building, New York Avenue, Oak Bluffs.

Commissioners Present: Christina Brown, John Breckenridge, Chris Murphy, Linda Sibley, Deborah Pigeon, Ned Orleans, Mimi Davison, Paul Strauss, Kathy Newman, Megan, Carlene Condon.

MVC Staff Present: Mark London, Paul Foley, Bill Wilcox

1. Martha's Vineyard Hospital (DRI 324-M) Preliminary Risk Assessment

Present for the Woods Hole Group: Leslie Fields

Present for the Applicant: Tim Walsh, Ken Chisholm, Marc Rowland, Tim Sweet.

Present for the Town: Ron DiOrio (Selectmen), Kerry Scott (Selectmen) Peter Martell (Emergency Management)

Project Location: 1 Hospital Road, Oak Bluffs, MA Map 5 Lot 18 (0.13 acres), Map 6 Lots 38 (1.43 acres), 39 (0.85 acres), 40 (0.38 acres), 41 (0.11 acres), 43 (0.29 acres) and Map 7 Lot 1 (9.8 acres). 12.99 acres total.

Proposal: Renovation, expansion and replacement of part of the existing hospital.

Leslie Fields of the Woods Hole Group (a Coastal Sciences and Engineering Firm) made a PowerPoint presentation of the preliminary results of the Risk Assessment Study they are carrying out of the Hospital Site. (See the PowerPoint presentation available in pdf format on the Commission's website.)

Overview and Status of the Risk Assessment

- Ms. Fields is here to show how Woods Hole Group is approaching the risk assessment.
- The Hospital began the DRI process by giving an informal preliminary presentation in 2004 to the MVC where some commissioners and members of the public questioned the appropriateness of rebuilding on the existing site due to its vulnerability to coastal storms.
- This eventually led to the Hospital and MVC agreeing to hire an independent expert to perform an objective Risk Assessment, which began in mid-August 2006.
- Traditional risk assessments explain Where, Why, and How, natural hazards affect communities, with the goal being to minimize any adverse affects.
- Minimization of adverse impacts will include ways to reduce loss of life and property, improve public safety, and reduce costs of rebuilding after a natural hazards event.
- Steps in MV Hospital Risk Assessment
 - Identify Natural Hazards
 - Profile Natural Hazards
 - frequency, intensity, extent of impact, etc..
 - Obtain info on hospital project
 - How will they be changing the site, the grading, where are the mechanicals, etc.

- Quantify the associated risks of each hazard
- Once the risks are identified and quantified they will suggest ways to manage risks through either:
 - Elimination
 - Mitigation
- Planning Process supported by existing data
- Provide a Decision-Making Tool
- It was noted that this is a specific site study, so the process is slightly different from an area plan.
- So far, the Woods Hole Group has compiled information and identified some risks, concentrating primarily on storm-related flooding.
- They will look at floods caused by hurricanes and nor'easters as well as risks of wind, snowstorms, wildfires, earthquakes, sea rise, and coastal change

Flooding From Storm Events

- There are two existing data sources for estimating the severity and impact of flooding: SLOSH and FIRM.
- SLOSH
 - The SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model of the National Weather Service and US Army Corps of Engineers computes storm surge heights from tropical storms.
 - SLOSH shows maximum flooding from hurricanes. It shows the worst-case scenario flooding at high tide, but not including the wave effects.
 - The SLOSH model was verified using hurricane Gloria high water data.
 - It is derived from a computer model that calculates the storm surge of 536 hypothetical storm events based on different track directions, forward speeds, and wind speeds. The map indicates the greatest surge level for any of the events in that category.
 - The events include tracking in a NW direction, which historically we do not see.
- FIRM
 - The FIRM (Flood Insurance Rate Maps) of the Federal Emergency Management Agency is based on historical tide gage data.
 - The FIRMs include the effects of hurricanes and nor'easters and shows areas of inundation during the 100-yr storm event.
 - FEMA developed surge levels for the 10-, 50-, 100-, and 500-year storms. They then model effects of waves and winds of 100-year storm. It shows the three following zones (does not indicate type of damage):
 - The VE or velocity zone is inundated in 100-year event with flooding and waves over 3 feet,
 - The AE zone has inundation during 100-yr event with waves under 3 feet,
 - The X500 zone will be flooded in a storm greater than 100-year but less than 500-year.
- A slide showing the storm track of all tropical storms that have tracked within 100 miles of Martha's Vineyard since 1850 shows the following:
 - Tropical Depression 34 events

- Tropical Storm 36 events
 - Category 1 Hurricane 21 events
 - Category 2 Hurricane 9 events
 - Category 3 Hurricane 4 events
- Hurricane frequency analysis (similar to the back side of bell curve)
 - Probability of occurrence shown on curve was based on wind speeds of historical hurricanes – not surge levels
 - Cat 1 has a 7.5 to 16.0% chance of hitting within 100 miles of MV in any given year.
 - Cat 4 has a 0.5 to 1.3% chance of hitting within 100 miles of MV in any given year.
 - This graph helps to quantify how often the Cat 1, 2, 3, and 4 flooding scenarios predicted by SLOSH modeling might occur.
 - Cat 2 storm flooding up to 9 feet and a Cat 4 storm flooding up to 16 feet (this does not include the wave action)
 - The Woods Hole Group will use the SLOSH model (worst case scenario – cautious) to estimate the risk at MV Hospital.
 - FEMA used 60 years of tide-gauge data from early 1930's to 1990's to develop stage frequency curve for south shore of Falmouth (ie. Surge levels for 10-, 50-, 100-, and 500-yr storms). They compared water elevations recorded during historical storms between Woods Hole and Vineyard Haven. Found that MV was always lower than Falmouth, and used this finding to scale down stage frequency curve for Vineyard Haven.
 - Storms of record on MV
 - 1938 tracked 110 nautical miles west of MV a Cat 2 moving 51 mph, a 40-year event on MV
 - 1944 tracked 55 nautical miles NW of MV as a Cat 1 moving 29 mph, a 48-year event on MV
 - 1954 tracked 80 nm West of MV as a Cat 2 moving 35mph, a 59-year event on MV.
 - FIRM map predicts VE zone water levels of 13 ft NGVD, and AE zone water levels of 9 ft NGVD during a 100-yr event. AE zone water levels on Brush Pond side of hospital site are 8 ft NGVD. Woods Hole Group will use FEMA FIRM data (in addition to SLOSH model data) to estimate risks to the MV Hospital.
 - RECAP flooding from coastal storms – FIRM and SLOSH model results present inundation scenarios caused by coastal storms. SLOSH analysis shows inundation from hurricanes only, and presents a worst case scenario (greatest storm surge possible from simulations of 536 hypothetical storms). FIRM analysis shows the effects of inundation and waves during a 100-yr storm (caused by hurricane or nor'easter). Both FIRM and SLOSH analyses will be used to evaluate risks at the hospital site.

Impact of Shoreline Change

- The Hospital site, and particularly the delineation of the different flood zones, can be impacted by shoreline change
- Shoreline Change Hazard
 - Net erosion along the Vineyard Haven Harbor shoreline has been 0.6 feet per year.

- Extrapolation of this rate over 100 years, would place the shoreline near the edge of Beach Road.
- The FEMA VE Zone would also move landward
- The FEMA AE Zone (Area of Inundation) would remain at the 9-foot contour.
- Mass CZM shows historical data from mid 1800's using four shoreline positions: 1897; 1955; 1976; 1994.

Impact of Sea Level Rise

- The hospital site, and especially the delineation of the flood zones, can also be affected by sea-level rise.
- Sea Level Rise in the past century has been measured locally as:
 - Woods Hole – 2.6mm/yr (.85 ft/century)
 - Nantucket – 3 mm/yr (.98 ft century)
 - Note: Rates of sea level rise are different all over the globe and country.
- The acceleration of sea-level rise is the subject of scientific and political debate.
 - Some researchers have seen a recent acceleration in rate of rise over last 10 years, but there are also decadal scale variations as seen in Woods Hole tide gage data.
 - Woods Hole Group maintains that it is too early to tell but will look into it in more detail.
- Projecting the last century's rate of rise would suggest the sea could rise 1 foot in the next century raising the still water (or area of inundation) to the 10 foot contour from 9 feet.

Risk Assessment Methodology

- Ms. Fields presented a Table that the Woods Hole Group proposes to use to assess the risk to the function of the hospital of various types of storm/flooding event, based on the SLOSH and FIRM models. For example, with major storms, the number of points of access to the site would be reduced from three to one.
- She asked for input to evaluate the potential impacts of all hazards on critical hospital services and systems
- WHG has requested from the ACE a more accurate depiction of the SLOSH model results.

Commissioner, Staff, Applicant, and Public Suggestions

- A map of the whole island showing the SLOSH and FIRM flood zones would be helpful to make clear what other areas are impacted in regards to access.
- The official data for predicting sea level rise was done in a study in 2001 by the Intergovernmental Panel on Climate Change. Apparently, it projected a 1- to 3-foot rise in next century (the actual IPCC 2001 estimates for global sea-level rise were 0.11 to 0.77 m over the next century). Their estimate will be revised in 2007. New information from NOAA and NASA suggests that the range of possible sea-level rise could be greater, due to the accelerated melting in Antarctica and Greenland. MAPC did a study of climate change on the Boston Region and suggested a Tufts professor as someone who could advise on what the scientific community considers the most reasonable range to work with.
- The consultant should clarify what a surge actually means to the site in terms of physical impact.
- Many of the specific storms discussed, which Vineyarders are familiar with, (e.g. 1938, 1944, 1954) were only category 1 or 2 storms, tracking well to the west of the Vineyard. The study should clearly explain what would happen if a category 3 storm tracked closer to and east of the Vineyard, was a direct hit.

- Forward speed is important indicator of surge level. A category 2 storm at fast speed can produce a higher surge than a 3 at a lower speed.
- The storm surge in a hurricane typically lasts 1-4 hours.
- The particular geography should be discussed. Can the tracking of hurricanes up Vineyard Sound be modeled? Vineyard Haven Harbor appears to be well protected from the average hurricane and nor'easters. The worst would be a hurricane tracking to the east bringing the winds and water back from the north.
- Clarify the definition of the word inundation. How much flooding for how long? What does that mean for those items listed in the table?

Conclusion

- Ms. Fields asked whether the list of services that need to be maintained to keep the hospital functioning in the impact table is complete. What are the impacts for each one?
- After the WHG has completed its initial analysis of the other risks, it would be useful to have a working session with WHG, the MVC, the hospital and its architect, and the Oak Bluffs emergency manager, to go through each of the risks to assess what the impacts would be on the hospital and how the impacts could be mitigate.
- Ms. Fields stated that "I don't think the WHG is ever going to come out and say 'this is a good spot or a bad spot'".

Adjourned 7:02 pm