

Virginia Hurricane Evacuation Restudy 2007 Surge Zone Maps

The Federal Emergency Management Agency, Virginia Department of Emergency Management, and the U.S. Army Corps of Engineers are currently managing the Virginia Hurricane Evacuation Restudy. The original study was made public in 1992 and has been the basis for the assumptions in Virginia's hurricane planning and plans. The Virginia Hurricane Evacuation Study included storm surge mapping, evacuation clearance time estimates, vulnerable facilities identification, and an evacuation behavioral study, which assisted in establishing critical emergency management benchmarks for the planning and response to hurricanes in Virginia.

The Virginia Hurricane Evacuation Restudy is being conducted to update the various variables within the study to reflect today's technology, as well as demographic changes that have occurred in Virginia since the 1992 study.

Hurricane surge maps are graphic depictions of still water surge inundation that could occur from various categories of hurricanes. The surge map computer model depicts a composite maximum envelope of water for the each potential track of a hurricane of various categories. As such, the surge maps portray a very liberal interpretation of potential flooding from a worst-case hurricane scenario. Hurricane surge maps are different from the flood insurance maps that are more conservative and based on actual flood study results over a period of time. The flood maps are utilized as a tool for individual and community planning. The City's flood insurance maps are in the process of being modernized to incorporate new engineering and elevation data, but are being developed as a separate process and are not available at this time.

The new 2007 surge maps have been generated based upon updated runs of computer models that calculate surges that are generated from the various tracks and speeds of storms we may face as they approach our area. The basis for the new flood zones also reflect several changes from past mapping methodology. The base sea level datum for the maps have been updated to reflect the new National Geodetic Vertical Datum 1988 (NGVD88). As a planning assumption, high tide has been utilized for calculation purposes, instead of using mean tide. The new surge maps also include the enhanced elevation data made available by the City.

Previous maps combined category 1 and 2 storms and the new surge maps have been refined to show all four categories of storm surge, excluding category 5 hurricanes based upon the unlikelihood of such a storm at Virginia's latitude. The results of these adjustments and the review of new data have produced some significant changes in methodology for the maps in Hampton Roads and in particular, Virginia Beach.

The new surge maps for Virginia have produced some significant changes for Virginia Beach. The most significant change was an extensive expansion of the category 4 hurricane surge zones in the City's Kempsville and Princess Anne areas. Additional expansion of the surge zones was also evident in a number of other areas along the Lynnhaven River and other areas across the City. In terms of overall vulnerability, the City continues to have reasonable surge zones for the lower category 1 and 2 storms.

The lower category storms are the most likely of storms that the City will have to face. A major storm, category 3 or greater, is a much more unlikely event. The implications for these new maps will require a review of our emergency contingencies for a major storm and our plans for hurricanes in general. We must keep in perspective the relative risk of a major storm when we consider these new maps. Based upon Hurricane Katrina, the consideration of a major storm has been made more pressing for all hurricane prone communities.

Due to the increase in surge zones, all, but four of the City's schools, that were utilized as emergency shelters, can no longer be designated as Red Cross shelters because they are now located in category 4 surge zones. This change in surge zones should not impact our shelter operations in lower category storms, but for major storms we will need to have additional contingencies for shelter operations. The expansion of surge areas will cause the City to look closer at larger scale evacuations and proactive evacuation considerations based upon the additional surge areas and the populations that could be impacted during a major storm, including those populations needing transportation. The Municipal Center Complex is now located in a category 4 storm surge zone and the additional impacts across the City in major storm situations for the continuity of government and government services will require review.

An immediate consideration is to define the means for distributing the new surge map information to the public. Surge maps have been used as part of public outreach for many years, as the surge maps are an eye catching item in obtaining the public's interest. The information obtained from these maps is the basis for the City's Custom Hurricane Report, which is made available on the web for public access. A secondary consideration is to make the public aware of these changes, explain the ramifications, and disseminate an accurate assessment of this information for personal planning purposes. This information also offers the potential for incorporation into flood plain management issues for flood insurance efforts. We hope this information will be utilized to review risk assessment for the advancement of emergency planning in the community, not only for individuals, but for businesses as well.

Surge maps have been a part of the City of Virginia Beach's Emergency Public Information Program for many years. Residents have been told to use the surge and flood insurance maps as tools for the assessment of vulnerability and as a basis for contingency plans. These maps portray liberal interpretations of impacts and as the information is assessed, the relative risks of the varying categories of storms needs to be kept into perspective. These maps do not necessarily include rain flooding or wave action risks, which must be considered when using the maps as a planning tool. Conveying surge zone information is an important part of the learning and planning process, as well as asking residents to look at issues of isolation as part of their assessment process. The means and manner in which this information is explained makes the process more complex than just relaying basic emergency information.

Summary

The U.S. Army Corps of Engineers draft surge map for the City of Virginia Beach reflects a significant change to the City's surge zone projections. Previous planning assumptions for hurricane events were based on the fact that significant areas of the City were not located in surge zones, which provided for internal evacuation capabilities.

The new surge zone data indicates that the bulk of our emergency shelters are now located in category 4 flood zones and will no longer be certifiable as American Red Cross shelters. The basic elements of the sheltering program will need to be reviewed to reflect these changes. The City needs to decide if they want to utilize the facilities located outside of the lower category zones as emergency shelters/refuges.

The impact of a lower category storm, particularly a category 1 or category 2 still appears very manageable in terms of flood risks. However, the concepts of operations associated with a major storm will need to be reviewed. The expansion of the surge zones will have a drastic affect on the number of evacuees needing to leave the area due to flooding. The U.S. Army Corps of Engineers is in the midst of updating the Hurricane Evacuation Study and it would seem logical that the clearance times for a category 4 storm to increase well beyond the 27 hour clearance time. The U.S. Army Corps of Engineers has promised a quick review, but a complete analysis will probably not be available until next year. The immediate concern is to make the surge zone information available to the public for their consideration and planning.

Policy and planning issues:

- A review of Emergency Operations Plan will need to be conducted to review the new information. Plans for a major storm will also need to be reviewed to reflect the new surge zone information.
- The increased expansion of surge zones will cause changes in the evacuation warnings for major storms. The surge zone changes will also drive the decision-making times in conjunction with the state's time lines. The criticality of getting the population moving becomes more problematic when based upon increased flooding during a large category storm.
- Secondary issues, due to increased surge zones, will affect the transportation needs, special needs, and animal planning considerations that are now on the table.
- Public relations, emergency public information campaigns, and warning/proactive actions will need to be reviewed and plans developed to take into consideration changes in surge zones.
- COOP planning considerations should be reviewed due to the impact on government facilities based upon the new surge zone information, including the possible impact on the EOC.
- A strategy for releasing the storm surge zone information needs to be determined for coordination with VDEM, as well as surrounding jurisdictions.

(DRAFT) SURGE MAP COMMENTS

The City's surge map has been updated to reflect a more accurate vertical datum utilizing the National Geodetic Vertical Datum 1988 (NGVD88), as well as other planning assumptions. Based upon a quick review of the new surge map, the following surge zone changes were noted:

Bayside Area

Overall area remains outside of surge zones
Little Creek area category 2 surge zone seems more extensive

Cape Henry Area

General surge zone is similar to previous surge map
Further surge encroachment along the west side of Great Neck

Little Neck Area

Significant change in category 4 surge flooding
Central Virginia Beach Boulevard is now located in surge zone

Ocean Front Area

Atlantic Avenue is in low category 2 surge zone
Lake Crystal's category 4 flood zone has been expanded
Birdneck corridor has increased surge zone encroachment
Croatan has change in category flooding

Courthouse Complex

Courthouse Complex is now located in a category 4 surge zone
North Landing Road residential area is now located in a surge zone

Creeds Area

No significant change in surge zone

Blackwater Area

All areas are in a category 4 surge zone

Plaza/Green Run/Larkspur Areas

Extensive expansion of category 4 surge zone
All areas prone to flood

Kempsville Area

Increased expansion of category 4 surge zone

Indian River Area

Expanded surge zone

Dam Neck/Oceana Areas

Expanded surge zones with impact on residential areas

The completion of the Hurricane Evacuation Restudy is still a year away. The maps, however, are being made available to support current planning and educational efforts in Virginia.

Although, the dissemination of the new surge map information will generate additional questions and concerns that cannot be fully addressed until the Virginia Hurricane Evacuation Restudy is completed, it is felt that the dissemination of the new information is necessary for planning purposes.