

**Summary of Review Comments of FEMA’s 2013 Draft Coastal Flood Studies
and Flood Map for the City of Belvedere**

| Comment # | Comment | Recommendation | Reference Page in Report |
|------------------|---|--|---------------------------------|
| B-1 | FEMA’s smooth surface assumption for Transects 48, 49, 50, 51, 52, 53, 54, 55, 56, and 57 appeared to be overly conservative and unjustified. Further, FEMA did not consider the effects of buildings and/or other structures on wave energy dissipation in the wave runup analysis. | It is recommended that FEMA re-examine the shore roughness of these transects and reconsider the effects of structures on wave energy dissipation in the wave runup analysis, as they were considered by FEMA in the overland wave propagation analysis. A reduction factor of 0.6-0.9 may be appropriate for these transects. | Pg 7 |
| B-2 | FEMA assumed that the reduction factor due to presence of berm was not applicable to the wave runup transects in southern Marin County. Examination of the profiles of the transects analyzed for wave runup showed that a berm-like reduction factor may be applicable to Transect 56. | It is recommended that FEMA reconsider a berm-like reduction factor for Transect 56. | Pg 7 |
| B-3 | Toe elevation for Transect 50 appears to be arbitrary and toe elevation for Transect 59 appears to be unreasonable. | It is recommended that FEMA re-examine the toe elevations of these transect profiles and revise the analyses accordingly. | Pg 8 |
| B-4 | The approach of using the maximum dynamic water level (DWL) from the 31-year annual maxima total water level (TWL) in the wave overtopping analysis seems arbitrary. | It is recommended that FEMA define a non-arbitrary approach. | Pg 9 |
| B-5 | Review of FEMA’s calculations of DWL shows that some of the wave setup calculations appeared to be not correct. | It is recommended that FEMA re-examine the DWL calculations for transects analyzed using the TAW runup method. | Pg 9 - 10 |
| B-6 | Barrier crest elevation for Transect 49 appears to be unreasonable. | It is recommended that FEMA re-examine the crest elevation of this transect profile and revise the analysis accordingly. | Pg 10 |
| B-7 | Treating Transect 56 as a “bermed slope” may be more reasonable than treating this transect as a “non-bermed slope” with overtopping. | It is recommended that FEMA reconsider the analysis approach with respect to treatment of the transect slope as a “bermed slope” or “non-bermed slope”. | Pg 10 |
| B-8 | The barrier onshore slope used in the wave overtopping analysis should be the runup slope estimated based on the given specific SWEL and wave condition, not the mean runup slope averaged from the 31-year annual maximum runup slopes. | It is recommended that FEMA re-examine the slopes used in the wave overtopping analyses and revise the analyses accordingly. | Pg 10 |
| B-9 | It is unclear how the barrier onshore slope of 0.15 for Transect 59 was estimated by FEMA. This transect had a higher DWL (9.05 ft NAVD88) than its crest elevation (8.4 ft NAVD88), conducting wave overtopping analysis for this transect appears to be pointless. | It is recommended that FEMA provide the elevation range used for estimating the barrier onshore slope for Transect 59 in the wave overtopping analysis and explain the need for wave overtopping analysis for a transect that has a higher DWL than its crest elevation. | Pg 10 |
| B-10 | It is unclear how FEMA calculated the barrier backshore slope. | It is recommended that FEMA provide a graph in its documentation showing how the barrier backshore slope was | Pg 10 |

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| | | calculated. | |
| B-11 | Observed tidal data at long-term stations were not directly used in the statistical analysis to derive the 1% stillwater elevation (SWEL). It seems unreasonable that the FEMA-derived 1% SWEL was about 1 ft higher than the highest tidal level recorded at the San Francisco tidal gage over the last 150 years. | It is recommended that the reasonableness of the statistically derived 1% SWEL be examined in light of the observed tidal data at the San Francisco Bay station and other long-term tidal gage stations. A more reasonable approach may be to derive the 1% SWEL at long-term tidal gage stations based on statistical analysis of the observed tidal data, and then derive the 1% SWEL at non-gaging locations using the model-simulated stillwater elevation difference between gaging stations and non-gaging locations. | Pg 11 - 12 |
| B-12 | It is unclear how FEMA derived the hourly wave crest elevation (WCE) and 1% WCE. | It is recommended that FEMA describe the methods for estimating hourly WCE and 1% WCE. | Pg 12 |
| B-13 | The rationale for using the maximum wind speeds and direction data from the Oakland Airport station occurring at the times of the 31 SWEL annual maxima for Scenario 1 in the overland wave propagation analysis and the rationale for using the maximum wind speeds and direction data occurring at the times of the 31 wave height annual maxima for Scenario 2 were not well justified. | It is recommended that FEMA provide rationale to justify using these data. | Pg 12, 13 |
| B-14 | As a statistical value, FEMA's 1% TWL could not be broken down into its component SWEL and wave condition. Therefore, wave runup height was unknown under the statistical 1% TWL condition. FEMA's flood zone designation based on the runup heights for the 31 runup annual maxima that were used to derive the 1% TWL seems not straightforward and arbitrary. | It is recommended that FEMA re-examine how the wave runup VE zone mapping criteria were applied. | Pg 15 |
| B-15 | There should be a boundary line separating the VE and AE Zones for a transect having a 3 ft runup height. | It is recommended that FEMA re-examine how the wave runup VE zone mapping criteria were applied. | Pg 15 |
| B-16 | It is unclear how FEMA delineated the boundary line perpendicular to the shoreline between VE and AE Zones. | It is recommended that FEMA provide the criteria used for delineating the boundary line perpendicular to the shoreline between VE and AE Zones. | Pg 15 |
| B-17 | It is unclear how FEMA delineated the boundary line perpendicular to the shoreline between two different BFEs. | It is recommended that FEMA provide the criteria used for delineating the boundary line perpendicular to the shoreline between two different BFEs. | Pg 15 |