



Summary of ASCE 24-14 and 7-22 Supplement 2 Standards and DEM Expectations

Overview

This document is intended to summarize DEM's understanding and expectations regarding the American Society of Civil Engineers (ASCE), [ASCE 24-14](#) and [ASCE 7-22 Supplement 2](#) flood design and construction standards. The ASCE design standards establish a Flood Hazard Area based on the 500-year flood plain for Risk Categories II, III, and IV structures which is intended to improve the performance of structures subjected to flood events and to meet the target reliabilities of the standards. An approach to calculating structural flood loading which accounts for flooding return periods is also included in the standards. As wastewater infrastructure is categorized as Risk Category III structures, per IBC 2018, the ASCE standards may require consideration.

Understanding the ASCE Standards

For Risk Categories II, III, and IV structures, the ASCE has increased the Flood Hazard Area from the 100-year floodplain (the Special Flood Hazard Area (SFHA)) to the 500-year flood plain (the SFHA and the shaded X-zone). ASCE 7-22 Supplement 2 recognizes the FEMA Flood Insurance Rate Maps (FIRMs) as the standard for defining the Base Flood Elevations (BFE) because of their widespread coverage and usage. However, since FIRMs do not account for sea level rise, increased precipitation, or other conditions, ASCE has added structural flood load requirements for areas identified in the 500-year flood zone (0.2% chance of annual exceedance).

The flood load requirements in Chapter 5 of ASCE 7-22 Supplement 2 have been updated from a 100-year hazard basis to a risk category targeted return period basis (100-year, 500-year, 750-year, and 1,000-year flood for Risk Categories I, II, III, and IV, respectively), the corresponding scaling to Risk Categories can be found in Table 5.3-1 below.

Table 5.3-1. Design Flood MRI Scaling Factors.

Risk Category	MRI (year)	Annual Exceedance Probability (AEP)	C _{MRI} Gulf of Mexico Coastal Sites ¹	C _{MRI} All Other Coastal Sites ¹	C _{MRI} Great Lakes Sites ²	C _{MRI} Riverine Sites
I	100	1.00%	1.00	1.00	1.00	1.00
II	500	0.20%	1.35	1.25	1.15	1.35
III	750	0.13%	1.45	1.35	1.20	1.45
IV	1,000	0.10%	1.50	1.40	1.25	1.50

¹Gulf Coast site scale factors are for coastlines of Texas, Louisiana, Mississippi, Alabama, and Florida west of 80.75 degrees W. All other coastlines shall be taken as Other.

²If flood loading is being considered on other lakes, the scale factors for riverine sites shall be used.

As the design flood for Risk Categories II, III, and IV structures are set at higher return periods than currently available flood maps, the above scaling factors can be used in place of requiring a site-specific study for each structure.

DEM Expectations

DEM has updated its wastewater infrastructure resiliency design guidance to incorporate the ASCE standards, where applicable. The following is intended to clarify DEM expectations regarding the ASCE standards.

The 500-year floodplain should be used to determine if the wastewater infrastructure is located within a Flood Hazard Area. Wastewater infrastructural systems located within the Flood Hazard Area, should be designed to resist the loads associated with the 750-year floodplain. Specific design requirements and equations can be found in Chapter 5.3 of ASCE 7-22 Supplement 2.

For the planning and design of all *expansions or upgrades of existing wastewater infrastructure*, consideration should be given to the feasibility of designing to the ASCE design standards. Designs must assess the environmental, financial, technical, and operational feasibility of designing to ASCE design standards. To expedite the planning and design approval process, coordination with DEM should occur early in the project development. DEM will assess projects on a case-by-case basis and approvals will be given based on the most practical design and best professional judgment.

Any *new infrastructure* (new WWTF or pump station) or *relocation of existing infrastructure* should be designed in accordance with ASCE design standards, where feasible.