ADDRESSING CONCERNS FOR LANDFILL FLOODING
Having a concern for flooding at a landfill is not the same as having flooding at the landfill. To address the concern for flooding at landfills, a number of options are available;

- Require the landfill’s Regulatory Agency Inspector to perform a comprehensive Condition Survey of the landfill and prepare/submit a Condition Survey Report documenting the existing conditions at the landfill, or
- Require the Owner/Operator of the landfill to perform a comprehensive Condition Survey of the landfill and prepare/submit a Condition Survey Report documenting the existing conditions at the landfill, or
- Establish Taskforce Teams of present Regulatory Landfill inspectors (local, state, and/or federal employees in the solid waste inspection position) to complete Condition Surveys at the landfill(s), or
- Establish Taskforce Teams of Solid Waste Industry professionals (public and/or private employees) to complete a comprehensive Condition Survey at the landfill(s)

American Society of Civil Engineers and SWANA are a couple organizations that may have professionals willing to assist; local and state chapters are likely present

FLOOD PROTECTION
- There is a regulatory Minimum Standard of flood protection required at a given landfill = a Minimum Design Standard (actual design standard can exceed the min. standard if adopted by the Owner)
- Flood Protection design features can include levees, channels, walls, receiving basins, dams, or similar, etc.
- Emergency flood protection measures can include dike or levee building, sandbag wall building or slope armoring, rock slope armoring, etc.

STORMWATER PROTECTION
- There is a regulatory Minimum Standard for control of stormwater RUNON and RUNOFF at a landfill
- Stormwater control design features can include pipes, flumes, channels, culverts, ditches, retention and/or detention basins, or similar, etc.
- Emergency flood protection measures can include channel building, dike or levee building, sandbag channel building, or breaching of dikes and levees to release flooding

FLOOD IMPACTS
There are a multitude of impacts that can occur from flooding of a landfill site; they will vary from site to site depending on site specific conditions. The following are some key concern elements

- Landfill Environmental Control System Operations (LCRS, GCCS, CCCS, etc.)
  o Are all of the Control Systems operating and operating normally? (electrical supply is susceptible to interruption of service in hurricanes and flooding)
  o Have any of the Control Systems been damaged? – Inspection Required (the control systems are key to the protection of public health and the environment)
- Flooding Outside of the Landfill
Landfill Flooding Basics

Courtesy of Monterey Regional Waste Management District

- Access to the landfill disposal area may not be possible due to the flooding around the landfill – Inspection Required
- Landfill Support Facilities (scales, offices, maintenance shop, etc.) may not be accessible and may be damaged – Inspection Required
- Electrical infrastructure (transformers, switchboards, control panels, etc.) may not be operating and may be damaged – Inspection Required
- Water Supply Wells or Drinking Water Supply Pipelines may not be operating and may be damaged – Inspection Required (damage to public water supply is a serious concern)
- Sanitary Sewer pipelines or Septic Tanks/Leachfields may not be operating and may be damaged – Inspection Required (sewage release is a serious concern)
- LFG Migration Monitoring System may be damaged – Inspection Required
- Groundwater Monitoring System may be damaged – Inspection Required
- Leachate Impoundments may be damaged – Inspection Required (leachate release is a serious concern)
- Liquid Waste Impoundments may be damaged – Inspection Required (liquid waste release is a serious concern)
- Flood Protection Levees on the perimeter of the landfill may be damaged – Inspection Required

- Flooding Inside the Landfill (inside the ‘waste footprint’)
  - Access roads on the landfill may not be passable due to flooding, saturation, or damaged – Inspection Required
  - GCCS likely not operating and damaged – Inspection Required
  - LFG generation will be suppressed in flooded areas of the landfill for a matter of months-couple years
  - LCRS likely overwhelmed if flooded and may not be operating and may be damaged – Inspection Required
  - Flooding on the landfill or in the LCRS/GCCS can be addressed by pumping provided there is an appropriate ‘disposal’ location to pump to (e.g., sanitary sewer, lined impoundment, etc.)

CLEANUP PHASE

- Landfill Owners/Operators often have heavy equipment that is useful in the cleanup phase; Cities/Counties may wish to engage them to assist in cleanup early in the cleanup phase (first or second week)
- Landfills will be a key component of the Cleanup Plan; they are an ‘essential facility’ in the endeavor
- Landfills typically are limited in active disposal capacity volume to small areas of liner and thus, may need to build new liner areas to be able to accept all the waste associated with cleanup.
- They may have 2 to 5 years of ‘disposal capacity’ available over current lined areas. The amount of waste from the cleanup process will likely be much more than available landfill capacity (a decade or more of capacity).
- Not having disposal capacity for the cleanup will negatively affect the cleanup and recovery process of the community.
- Alternate or Interim Accommodations may be necessary - Interim waste receiving areas that are unlined; re-opening a closed landfill; allowing a vertical expansion above a permit height on an existing landfill, or other means.