Sea Level Rise and Coastal Storms:
Avoiding risk and damage to industrial facilities in the Coastal Zone

Draft Goals and Questions for Discussion at Sept 12, 2018 Regulatory Advisory Committee Meeting

Background

- 7 *Del. C.* § 7014(c)(5) requires any CZA Conversion Permit to include **"A plan to prepare the site for potential impacts of sea-level rise and coastal storms over the anticipated useful life of the facility and infrastructure in connection with the applied-for use."**
- The RAC will need to help determine the components of a plan submitted with a conversion permit application.
- By the terms of the Act, the combined effects of both sea-level rise and coastal storms must be considered.
- Potential goals of such a plan, along with outstanding questions, are identified below for discussion by the RAC.

Goals of a Sea Level Rise and Coastal Storm Plan

- Demonstrate compliance with existing county/municipal requirements
- Avoid risk of damage to the site (including facilities and infrastructure) from the combined effects of flooding and sea level rise over lifespan of facility
- Avoid risk of damage to areas that have been remediated
- Avoid environmental and public health consequences resulting from flood damage to the site over its lifespan
- Ensure access for both operations and emergency services to the site during flood events over the lifespan of facility
- Ensure that strategies to reduce risk of flooding on the site do not adversely affect adjacent properties

Questions a Plan might address

General

- What is the lifespan of the facility?
- Does the facility need to be staffed during a major storm?
- Is there currently a flood management/emergency plan in place?

Existing Conditions

- What is the existing flood risk on site, as demonstrated by FEMA 1% and .2% maps as well as historic flood events?
    - Map the 1% and .2% chance flood zone as demonstrated by the FEMA maps
    - Map historic high water lines
    - Depict the Limit of Moderate Wave Action (LiMWA) zones on a map
- Are there existing structures on site that will remain? Are these structures flood-proofed in any way?
- What is existing flood risk to ingress/egress routes?

    - Provide map
- What is the condition of the shoreline? Are there areas of erosion?
- What is the historic erosion rate of the shoreline?
- Have there been flood events on site in the past? Have these events caused damage or issues?
- Are there derelict structures within the flood areas as referenced above?
- Are there areas of contaminated or remediated soils within the mapped flood areas as referenced above?

Future Conditions

- What is the future flood risk on site according to existing maps?
    - Which areas will be subject to the moderate and high sea level rise scenarios as specified by the DE SLR Technical Workgroup?
    - What is the combined effect of 3' sea level rise and coastal storms as depicted by the state Flood Risk Adaptation Map?
- What is the future flood risk on site using additional modeling techniques?
    - What is the likely future shoreline condition, for the lifespan of the facility, incorporating sea level rise?
    - Additional modeling of sea level rise combined with coastal storms could be used to give a better picture of flood zones and effects of wave action

Consequences of Flooding After Site Development

- Are there areas of contaminated or remediated soils or derelict structures within any of these mapped future flood areas? If so, what are they?
    - Will wave action threaten the operation or function of the remedy?
    - Will shoreline erosion threaten operation or function of the remedy?
    - What is the likelihood of release of hazardous substances from soil with periodic inundation?
    - What is the likelihood of release of hazardous substances from soil with permanent inundation?
    - What features does the plan include to eliminate or minimize these impacts?
- If structures or infrastructure are within any mapped flood risk zone (existing or future):
    - Have structures been located out of areas subject to:
        - Permanent inundation by sea level rise over its lifespan?
        - Future flooding over its lifespan when sea level rise is taken into consideration?
        - Wave action over its lifespan?
- How have structures been designed to maintain operability during a storm?
    - If structures are located within any of the areas referenced above, are electric and mechanical systems elevated and floodproofed? Is the structure elevated above base flood elevation plus sea level rise and/or floodproofed?
- How have structures and infrastructure been designed to minimize risk of leaks or spills resulting from flood events?
- Will grading and site changes at this site affect the vulnerability of nearby parcels to flooding?
- How can green infrastructure techniques be employed to reduce risk of flooding and/or shoreline erosion?

- How will access be ensured for operational needs and emergency services for the lifespan of the facility, including during storms or flood events?

Questions for RAC to Consider

- Geographic scope of plan
    - Site only vs. site and surrounding areas (roads and adjacent parcels)
- Scope
    - Structures and infrastructure only vs. including remediation areas
- Anticipated Facility Life
    - Set a minimum lifespan threshold vs. let applicant determine
- Reporting and Monitoring Requirements
    - Require routing monitoring and reporting?