Living Shoreline Workshop

Some Engineering Considerations

Sponsored by:
UCONN ... NOAA ... CLEAR ...
CT Sea Grant ... DEEP ... GEI Consultants

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Thoughts by:
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Engineering Responsibilities

• Site Assessment
  • Identify cause and extent of shoreline damage
  • Characterize the site conditions

• Design of Shoreline Repairs
  • Slope stability
  • Required vegetation
  • Structural elements, if required

• Regulatory Coordination
  • Pre-application meeting
  • Prepare permit applications

• Construction Oversight
What is important to the Engineering Design to Maximize Success

- Wave Climate
- Soil Characteristics
- Design Slope Constraints
- Rely on Past Experience
- Selection of Proper Vegetation – We typically need HELP!
- Other Site Constraints - ICE
Historical Perspective: Industry Experience with Living Shorelines

- Chesapeake Bay Foundation
- Maryland DNR
- US Army Corps of Engineers

- Bio-solutions / Vegetated Shoreline Successful at Sites with < 2 mile fetch exposure – 2’ height, 2.5 sec wave
- Hybrid Solutions – Include Structural Toe protection at Sites with 2 mile fetch
- Structural Solutions required at sites with > 2 fetch
- No experience at sites experiencing ice flows
Recent RACE Design Experience in LIS

- Lagoon System:
  Southport, CT

- Post –Sandy Damage
- Historical Ice Cover
- Naturally Vegetated
- Historical Eroded Shoreline Fringe
- Tide Gate Controlled
Developmental Phase: Proposed Living Shoreline Site Improvements

- Limited Fetch – Minimum Wave Energy
- Site Highly Impacted by Winter Ice
- Concept Supported By DEEP
- Cost - $600 / lf
Actual Design and Construction Phase: Reality Sets In!

- Modified Design – Costs Too High
  - Design Modifications – Accommodates Ice Flows
  - DEEP Follow-up and Approval

- Decreased Costs - $250 / lf
Post – Construction Success

• Construction

• Current
Recent Experience of DOCKO, Inc.

- CT River Sites - Need to Accommodate Ice Conditions
ALTERNATIVE COASTAL STABILIZATION

• Structures can impact habitat, erosion conditions, wave reflections, etc.

• Examples:
  • Seawalls
  • Bulkheads
  • Revetments
  • Dunes
  • Vegetated Slopes
EROSION

Pre-Storm

Post-Storm
UTILIZING A SHORELINE FLOOD & EROSION CONTROL STRUCTURE TO PROTECT PROPERTY AND REMAP FLOOD ZONES

Highly regulated....

- State of Connecticut Department of Energy and Environmental Protection (DEEP)
- US Army Corps of Engineers
- Local P&Z
Shoreline Flood & Erosion Control “Structures”

• Repairs to existing structures can be authorized – bulkheads, seawalls, revetments

• New structures will only be considered if necessary, unavoidable, and there is no feasible less environmentally damaging solution for protection of:
  
  • Infrastructure (roads, utilities)
  • Water-dependent uses (marinas, terminals)
  • Inhabited structures constructed prior to 1995
  • Cemeteries
Shoreline Flood & Erosion Control Measures

- What are “feasible, less environmentally damaging alternatives”?
  - Structure relocation – Not Always Possible
  - Structure elevation - Not Always Necessary
  - Dune creation – Sometimes Attractive
  - Living shoreline – Low Energy Sites
    - This is a work in progress and clear direction and guidance on what the DEEP will accept as a “living shoreline” does not exist.
BULKHEADS – High Energy Site

WRONG WAY TO ANCHOR....

GOOD REASON TO HIRE A P.E.!!
SEAWALLS – Total Structural Alternative
REVETMENT
DUNE STABILIZATION
COASTAL STRUCTURES – VEGETATED SLOPES

- Required finished beach grade
- Snow fence
- Beach pea to be randomly dispersed in back dune
- AM, beachgrass plugs and culms in alternating rows @ 12" O.C., w/ three (3) culms per hole. Intersperse w/ seaside goldenrod clumps at no closer than 48" O.C., typ. See notes.

Elevation (NAVD 88)

- HTL EL: +31'
- MHHW EL: +13'

63' Varies across site

8" dia. core log (typ)