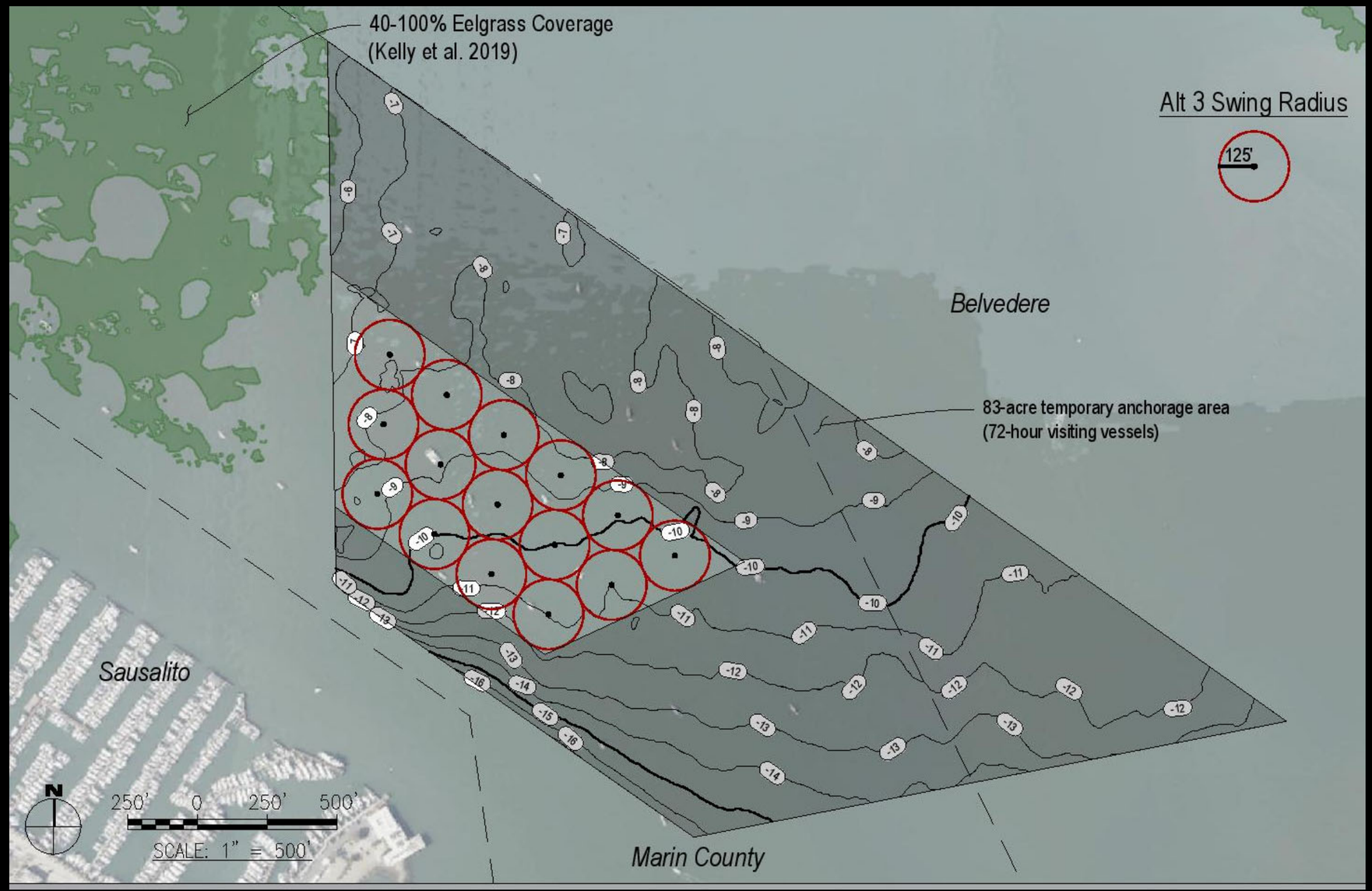
Richardson Bay Mooring Field

Preferred Alternative and Mooring System Analysis

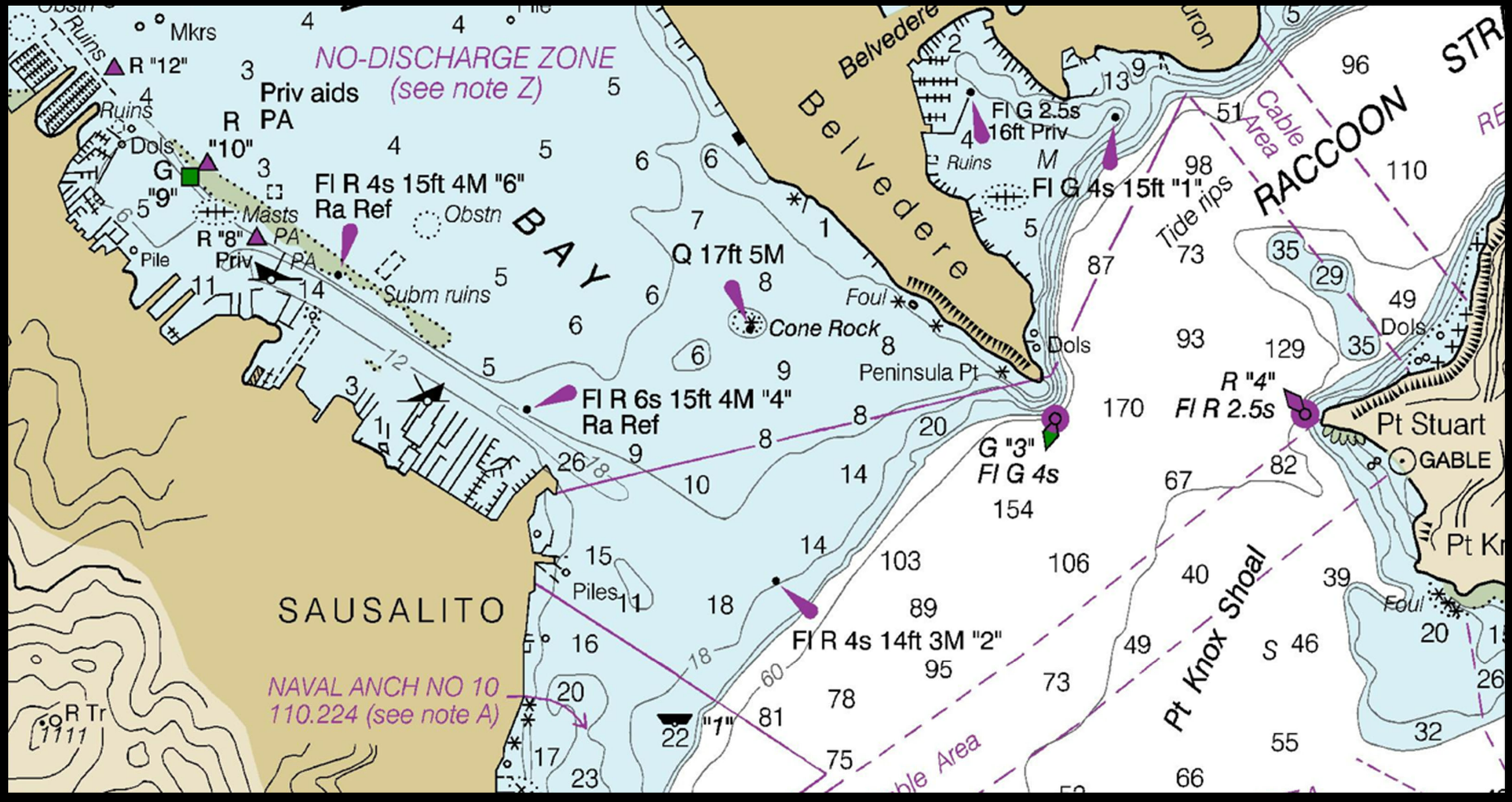
May 12, 2022

→ Preferred Alternative

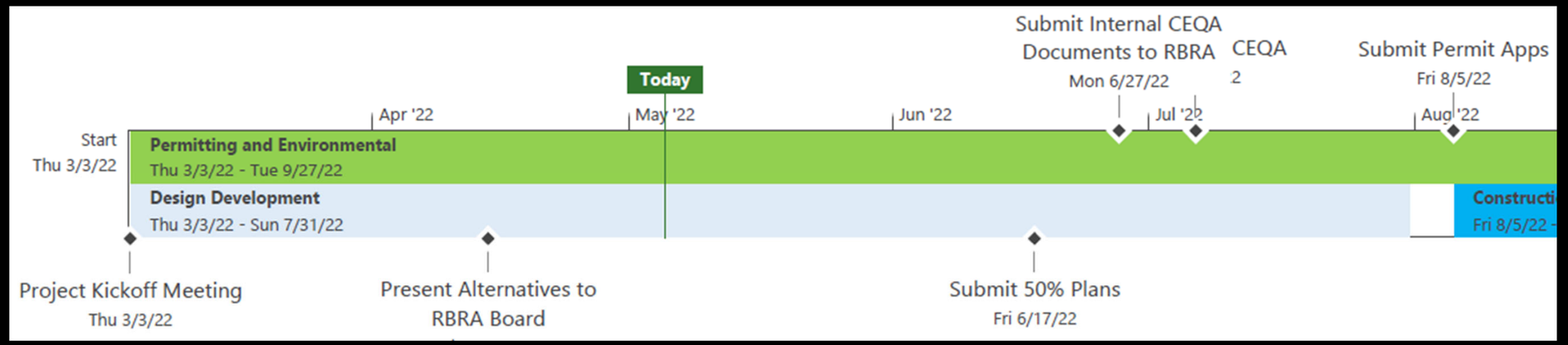
- Hybrid of Alternatives 1 and 3 presented at April 2022 RBRA Meeting
- 15 moorings total (with 125’ radius) and no overlapping of moorings
- No moorings within eelgrass habitat area
- At least 100 foot offset from navigation channel
- All moorings are within Marin County jurisdictional waters

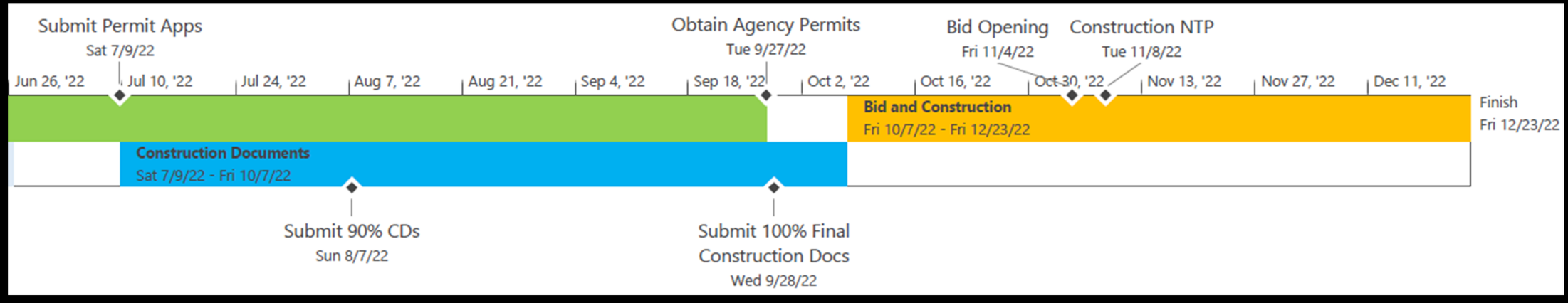


→ Preferred Alternative



→ Project Schedule

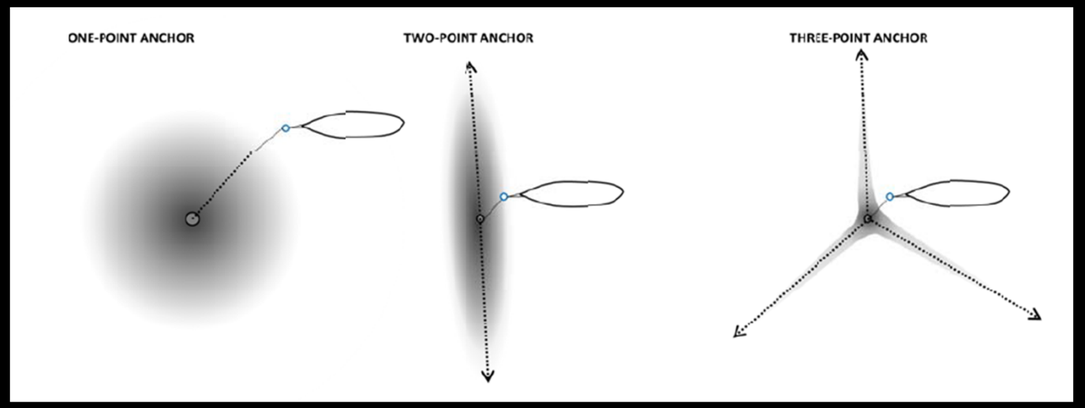




- Permitting/environmental efforts critical path for project
- Mooring installation before end of the year

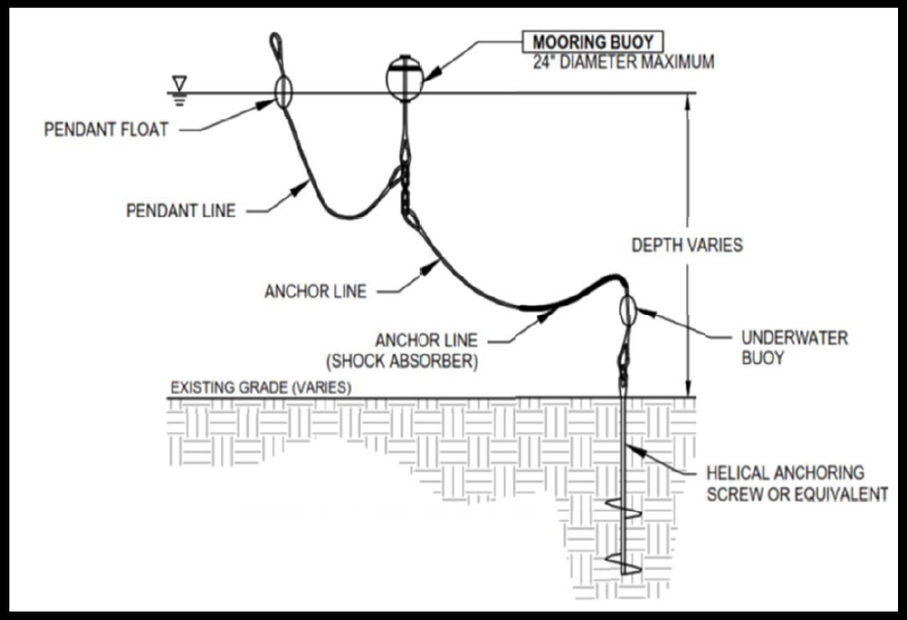
→ Mooring System Development

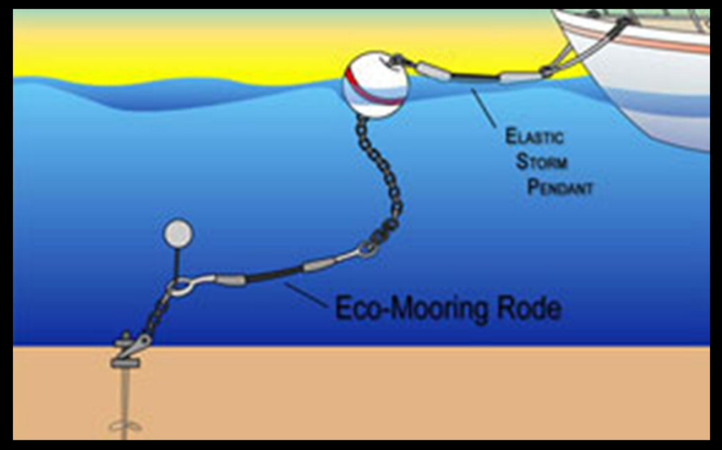
"Conventional"



"Conservation"

- "Conventional" anchor/chain mooring
  - One-, two-, and three-point anchors
- "Conservation" elastic mooring
  - Various manufacturers: Seaflex, Eco-mooring, and StormSoft





→ Mooring System Development

Mooring Design Parameters (125’ Radius Mooring)

Maximum Water depth = 20 feet at Extreme High Water

Conventional Mooring

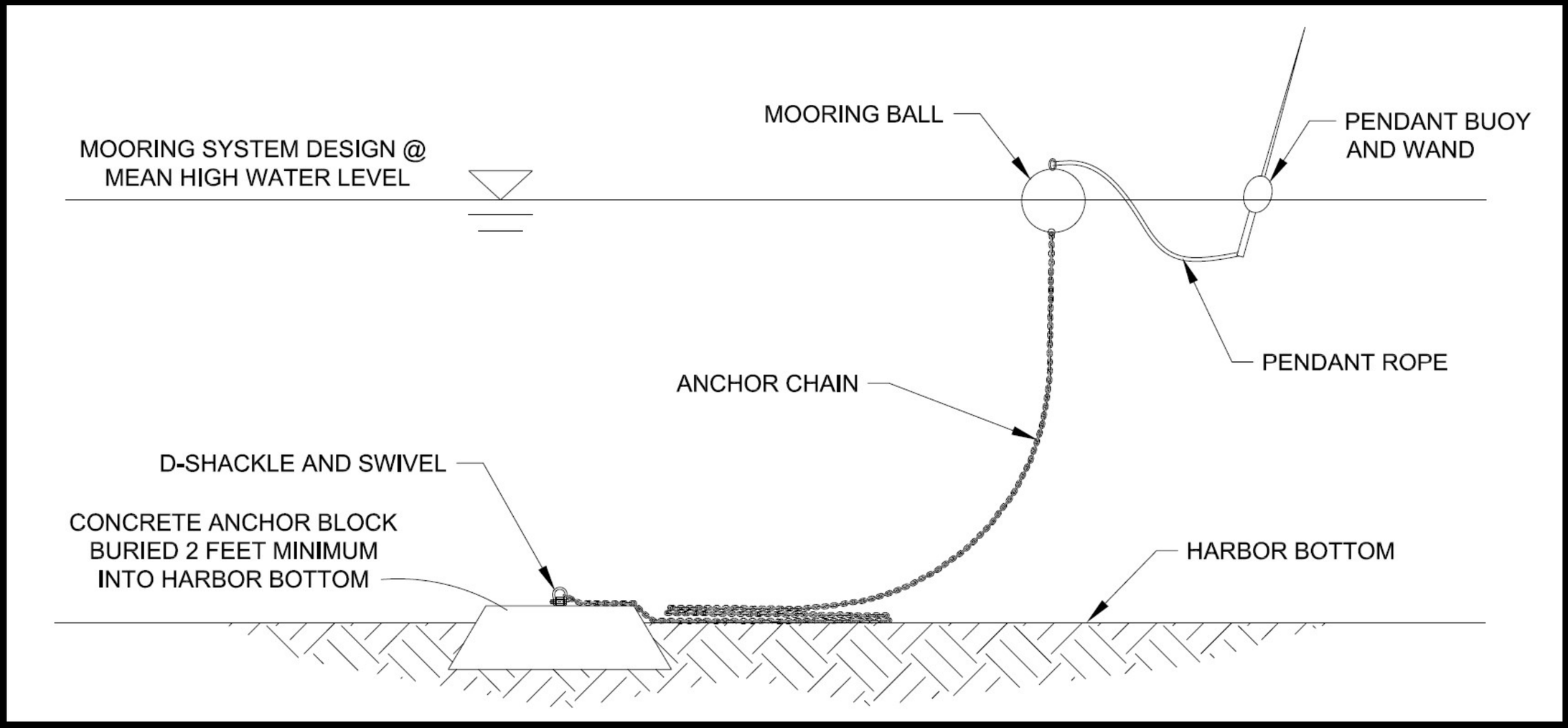
- Scope: ~3:1 (Range 2.5H:1V to 4H:1V)
- Pendant Length: 10 feet
- Maximum boat length: 50 feet
- 10’ Buffer within mooring circle varies depending on vessel size

Conservation Mooring

- Scope: ~1.5:1 (Range 1H:1V to 2H:1V)
- Pendant Length: 10 feet
- Maximum boat length: 50 feet
- ~35 foot buffer within mooring circle for 50 foot vessel, varies for smaller vessels depending on size

→ Mooring System Development

Conventional Mooring - Traditional (Anchor Block w/ Chain Rode)



→ Mooring System Development

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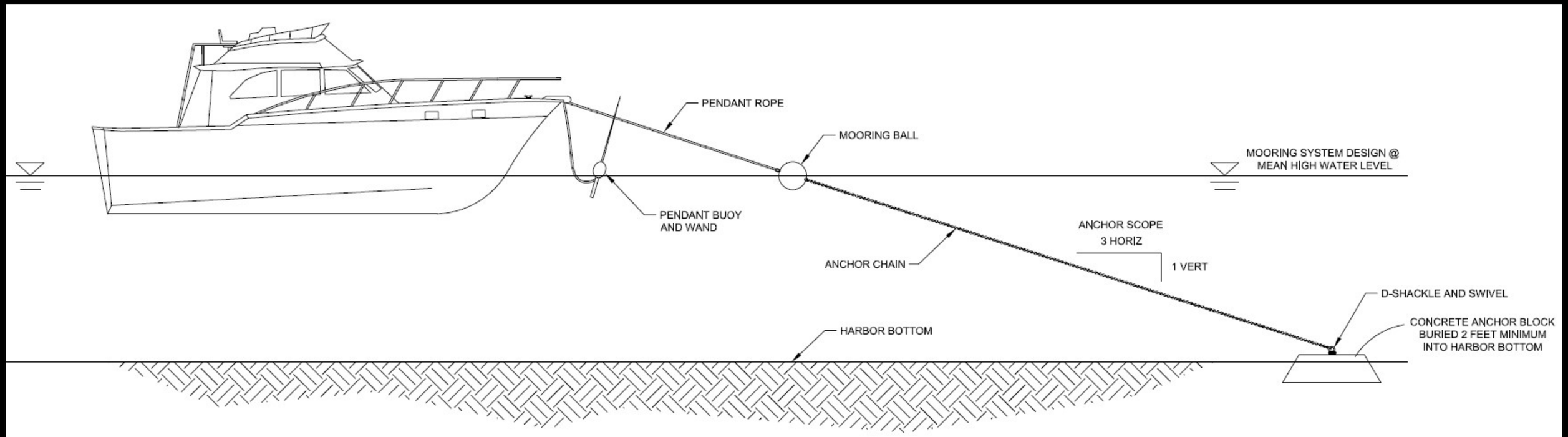
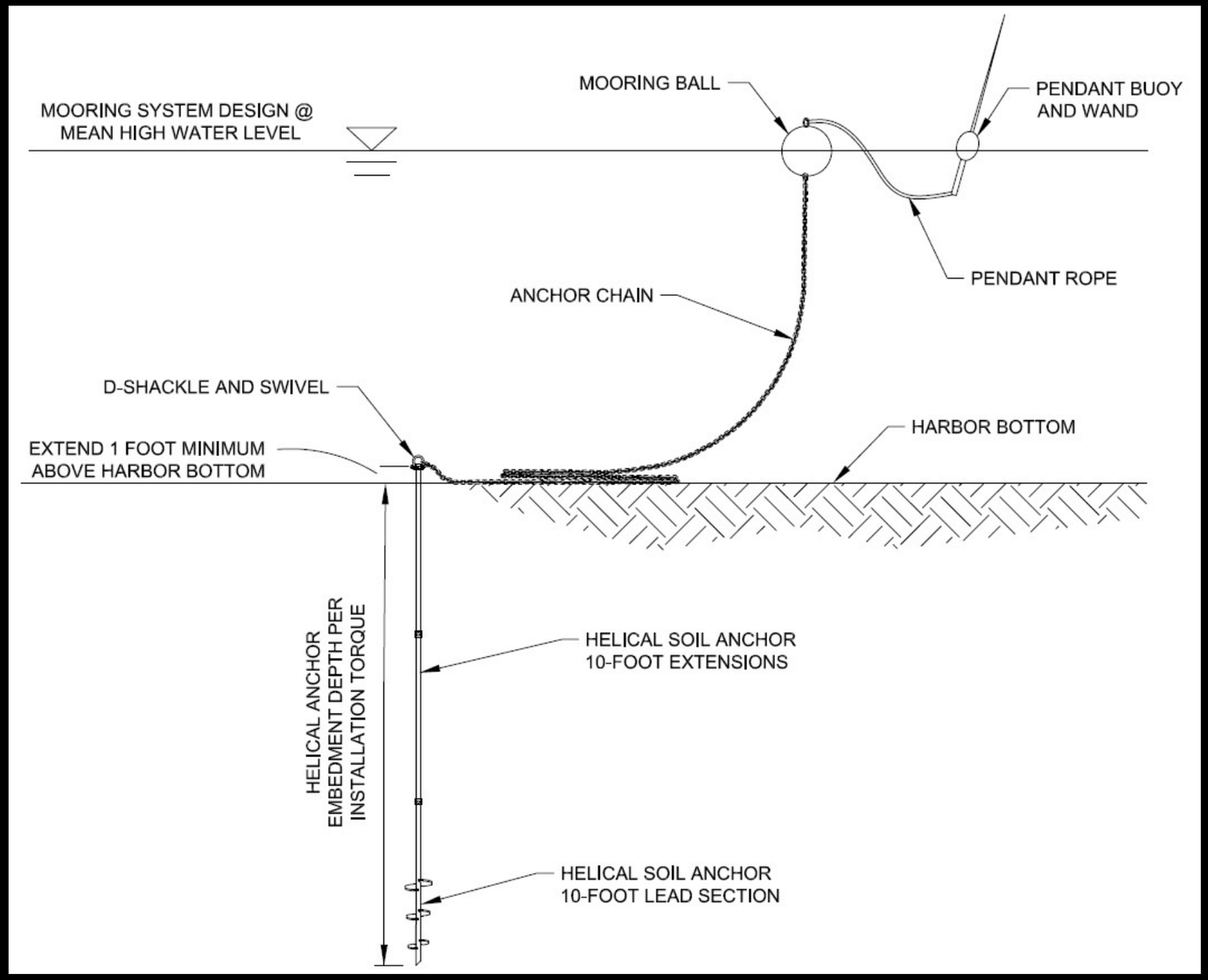


- Mooring Scope: ~3:1 (Range 2.5H:1V to 4H:1V)
- Pendant Length: 10 feet
- Max boat length: 50 feet

→ Mooring System Development

Conventional Mooring – Hybrid (Helical Anchor w/ Chain Rode)



- Mooring Scope: ~3:1
  (Range 2.5H:1V to 4H:1V)
- Pendant Length: 10 feet
- Maximum boat length: 50 feet

→ Mooring System Development

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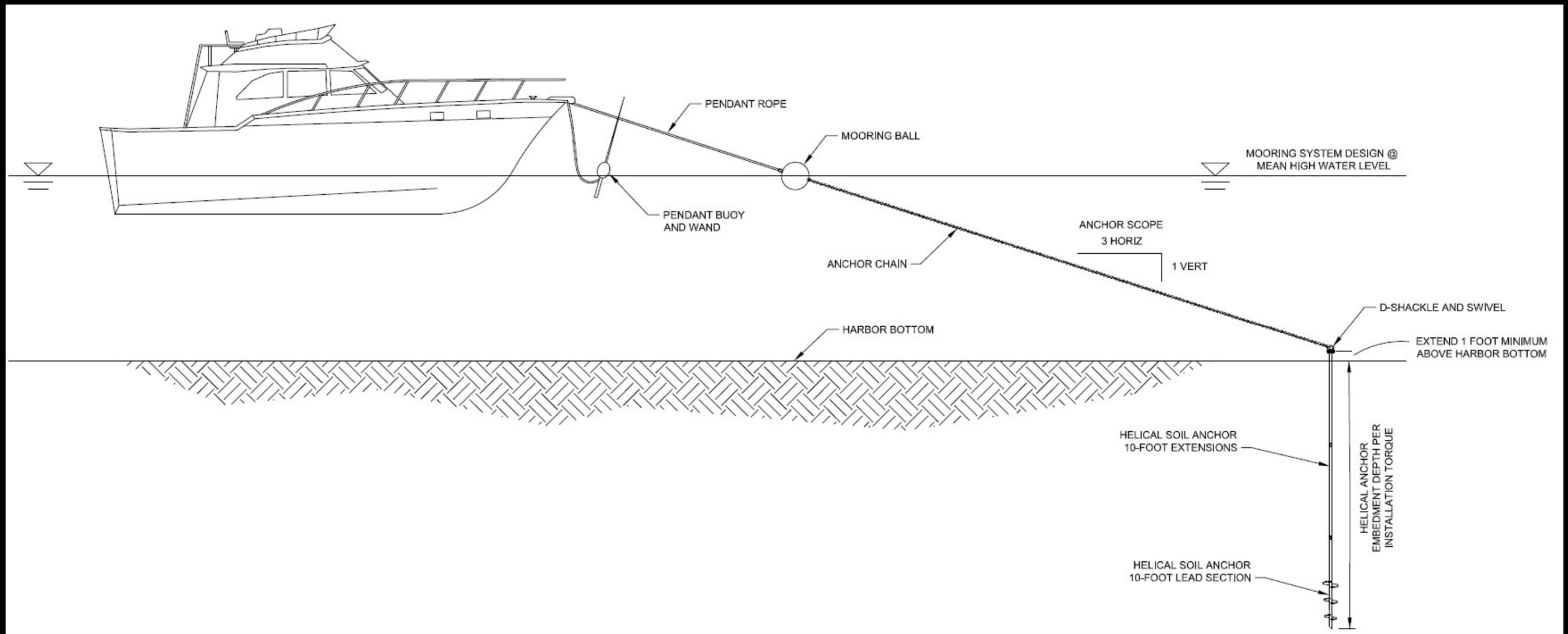
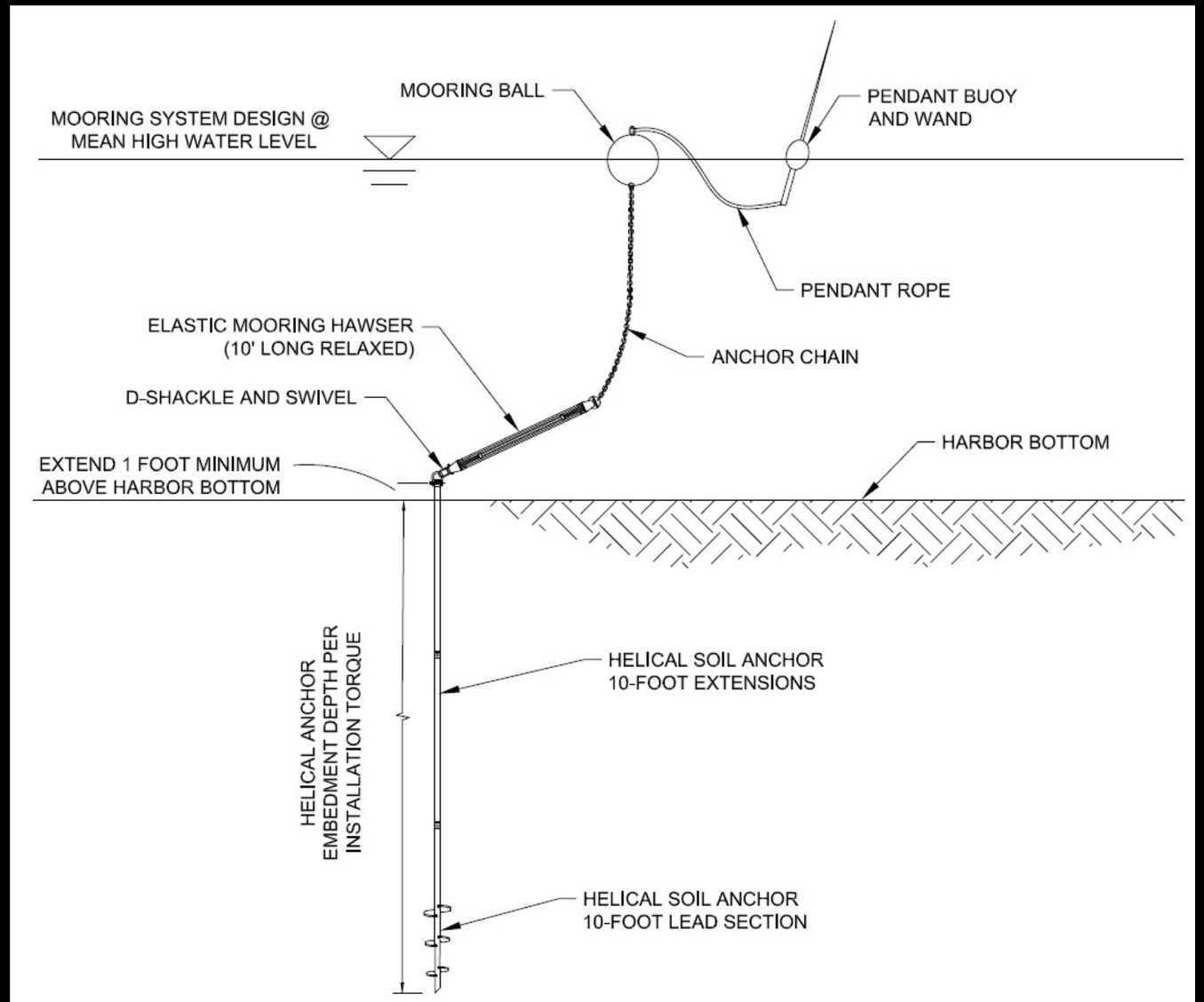
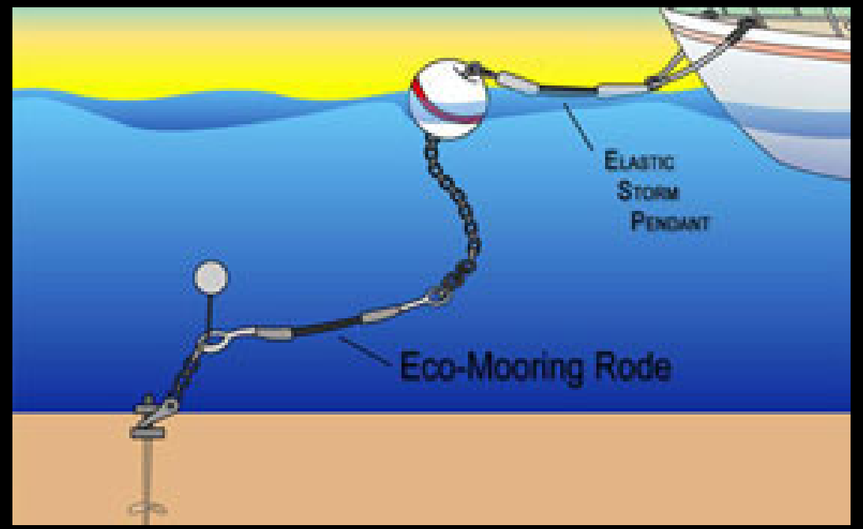


→ Mooring System Development

Conservation Mooring – Traditional (Helical Anchor w/ Elastic Rode)

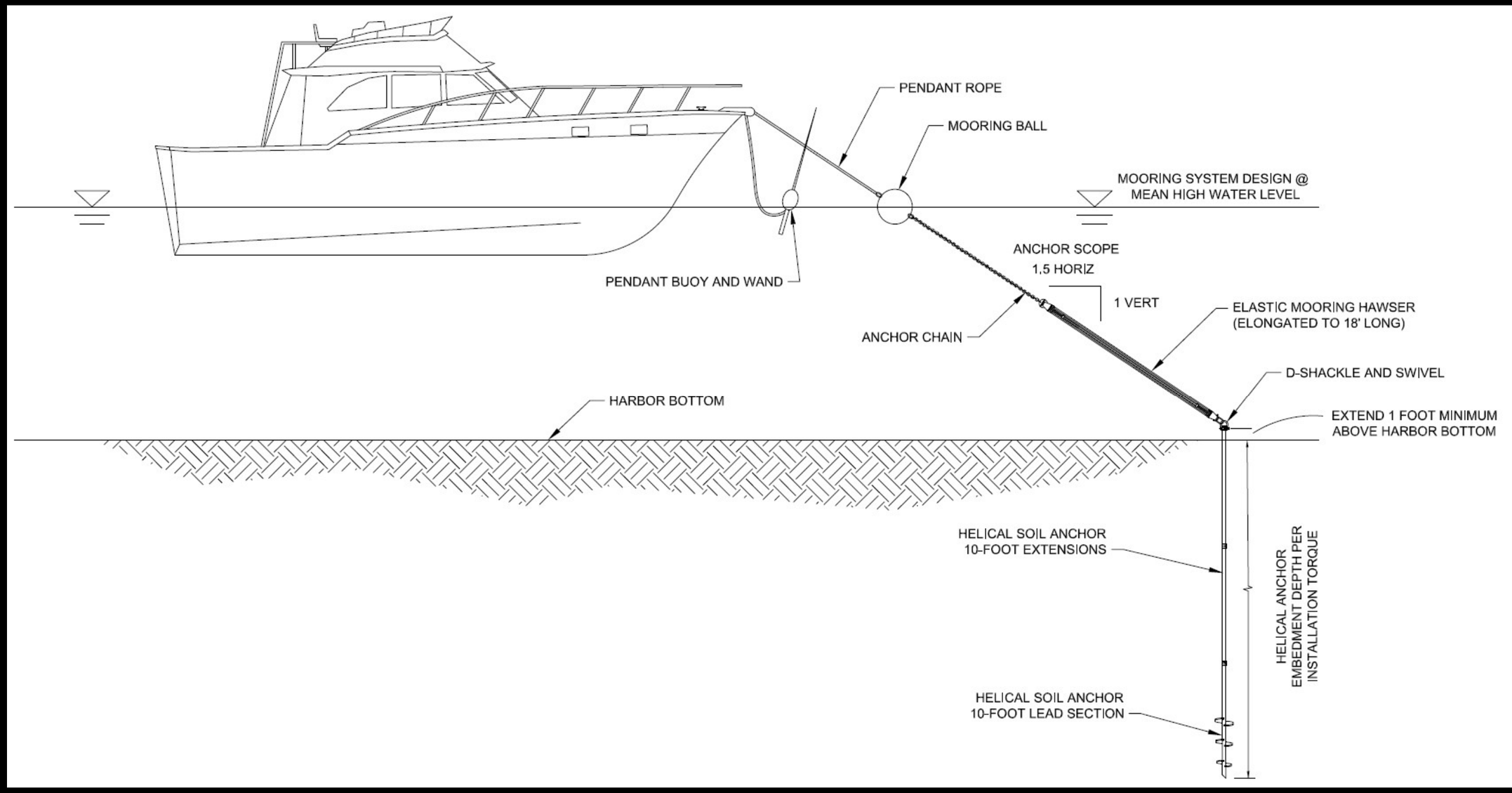




- Mooring Scope: ~1.5:1 (Range 1H:1V to 2H:1V)
- Pendant Length: 10 feet
- Maximum boat length: 50 feet

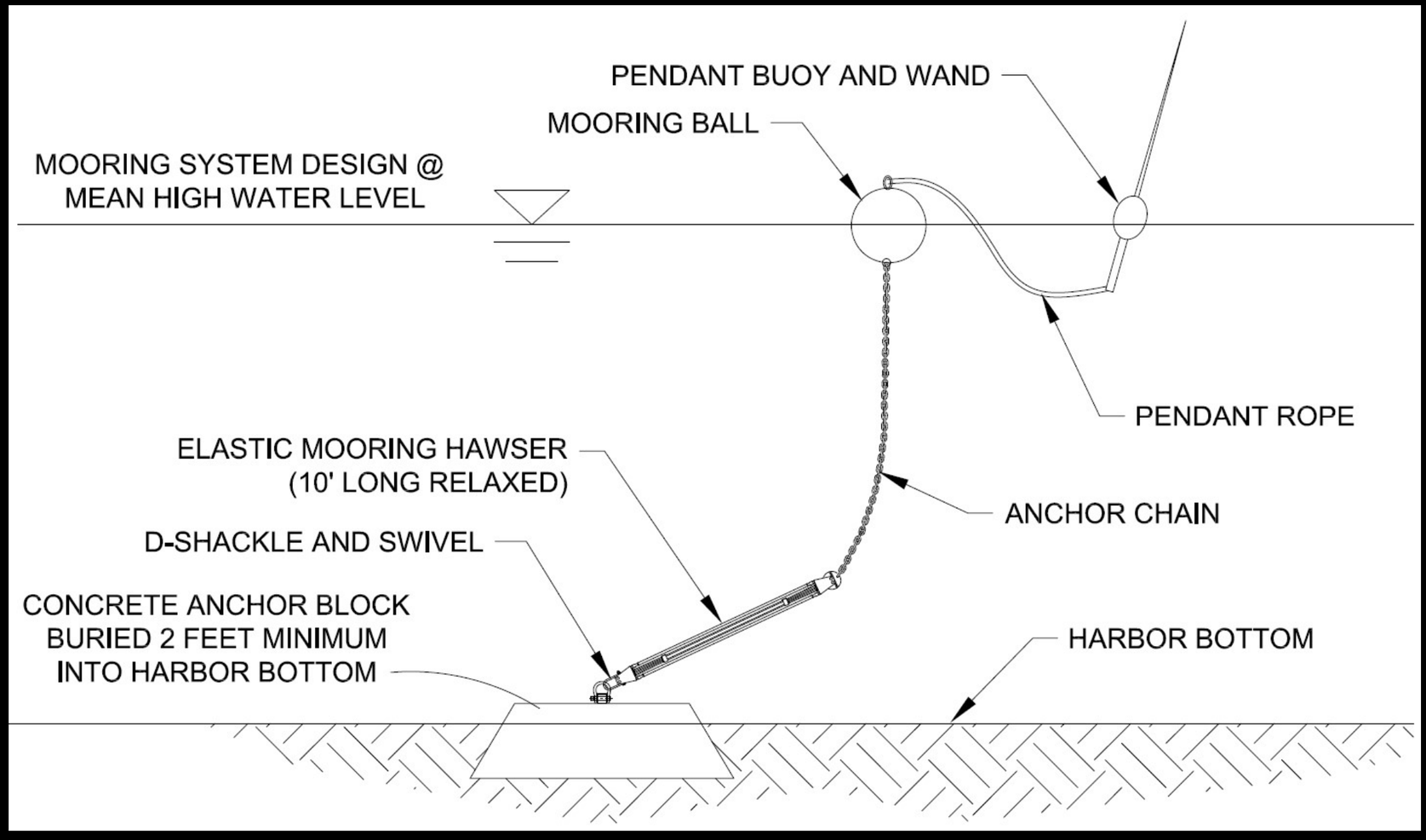
→ Mooring System Development

Conservation Mooring – Traditional (Helical Anchor w/ Elastic Rode)



→ Mooring System Development

Conservation Mooring – Hybrid (Anchor Block w/ Elastic Rode)



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- Pendant Length: 10 feet
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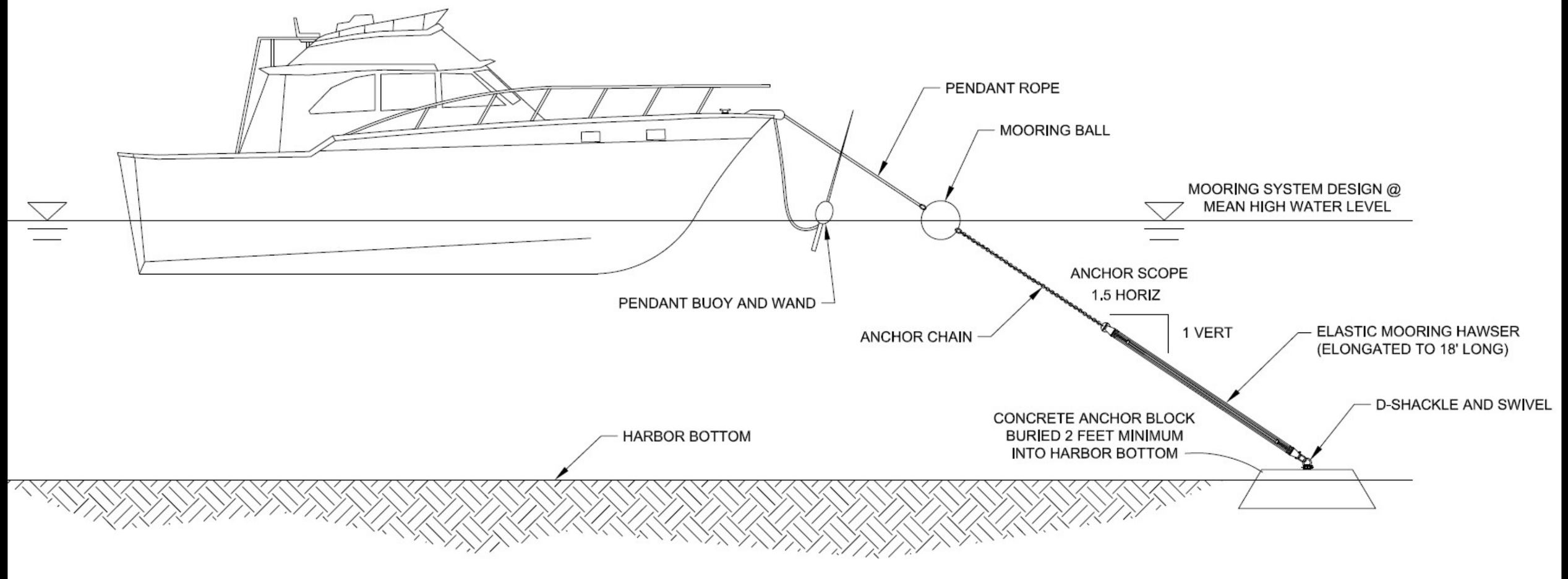
→ Mooring System Development

Conservation Mooring – Hybrid (Anchor Block w/ Elastic Rode)



→ Mooring System Development

Mooring System – Cost / Benefit Matrix

Type of Mooring System	Impact on Bottom	Holding Ability	Cost per Mooring
Conventional Mooring Block Anchor w/ Chain	Chain dragging and anchor block on harbor bottom	Concrete block may drag / requires pull test	Range $2,000 - $3,500 each mooring (total $30k to $52.5k)
Conventional (Hybrid) Helical Anchor w/ Chain	Chain dragging on harbor bottom	Holding capacity directly related to installation torque	Range $2,500 - $4,000 each mooring (total $37.5k to $60k)
Conservation Mooring Helical Anchor w/ Elastic	Minimal footprint on harbor bottom	Holding capacity directly related to installation torque	Range $4,500 - $6,500 each mooring (total $67.5k to $97.5k)
Conservation (Hybrid) Block Anchor w/ Elastic	Anchor block on harbor bottom	Concrete block may drag / requires pull test	Range $4,000 - $6,000 each mooring (total $60k to $90k)

- All moorings assume mooring ball, rope pendant, buoy and wand, max boat length of 50 feet

→Next Steps

- Develop and Submit Internal Draft IS / MND / CEQA Documents
- Develop and Submit Various Agency Permit Applications / Notifications