



**Cape Velero Estates
Home Owners
Association**

**SWG-2005-00696
Project Vicinity Map
Boating Improvement Project
Aransas County, Texas**

USGS 15-Min. Quadrangle; Beeville, TX
Scale: 1:100,000



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environmental planning and permitting consultants

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Rockport, Texas 78382

FIGURE 1

DATE: 05/09/2024

GAI Project No. 221132



Cape Velero Estates
Home Owners
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SWG-2005-00696
Project Location Map
Boating Improvement Project
Aransas County, Texas

USGS 7.5-Min. Quadrangle; Bayside SE & Rockport, TX
Scale: 1:24000

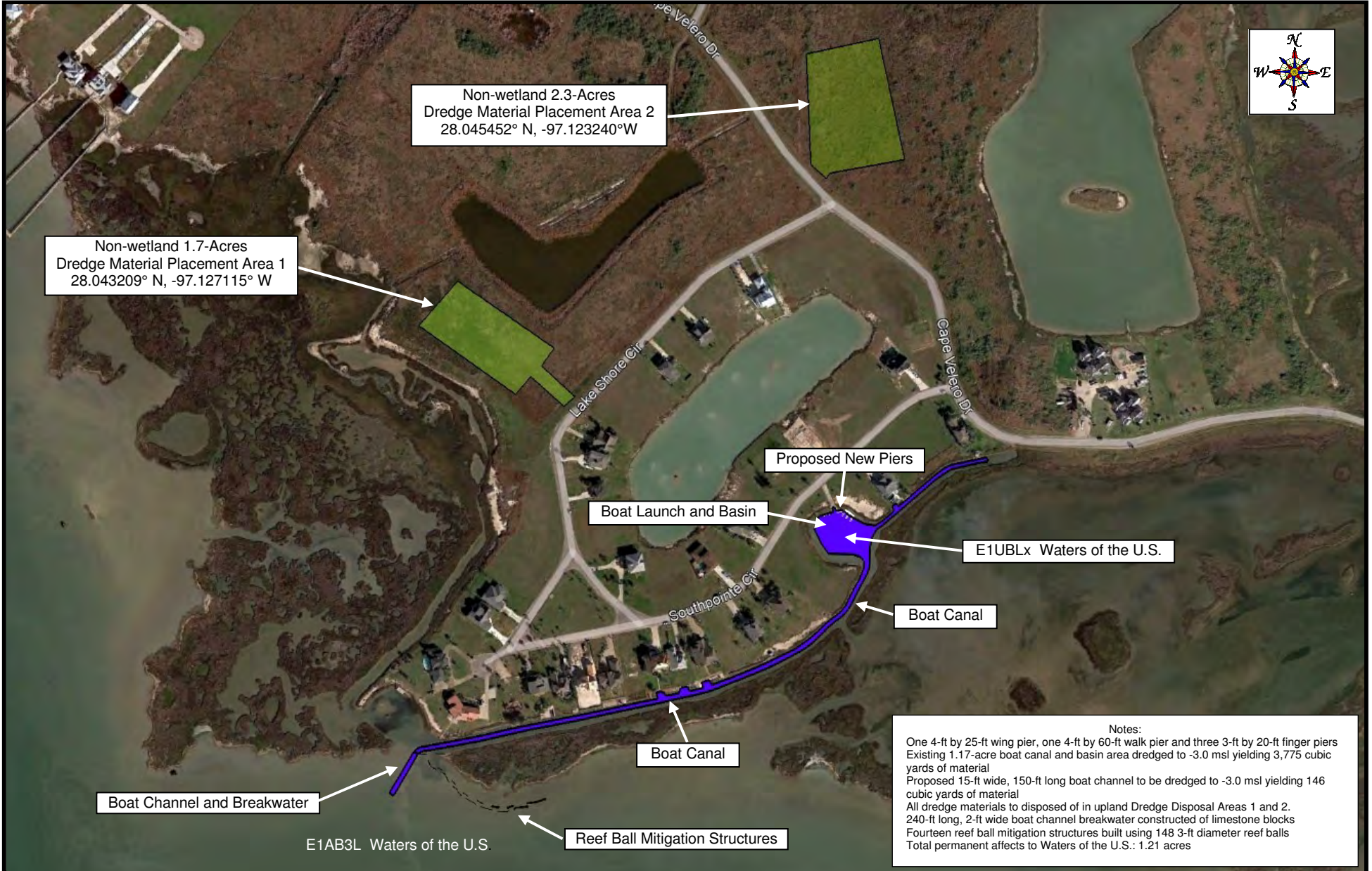


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FIGURE 2

DATE: 05/09/2024

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Notes:
 One 4-ft by 25-ft wing pier, one 4-ft by 60-ft walk pier and three 3-ft by 20-ft finger piers
 Existing 1.17-acre boat canal and basin area dredged to -3.0 msl yielding 3,775 cubic yards of material
 Proposed 15-ft wide, 150-ft long boat channel to be dredged to -3.0 msl yielding 146 cubic yards of material
 All dredge materials to be disposed of in upland Dredge Disposal Areas 1 and 2.
 240-ft long, 2-ft wide boat channel breakwater constructed of limestone blocks
 Fourteen reef ball mitigation structures built using 148 3-ft diameter reef balls
 Total permanent affects to Waters of the U.S.: 1.21 acres

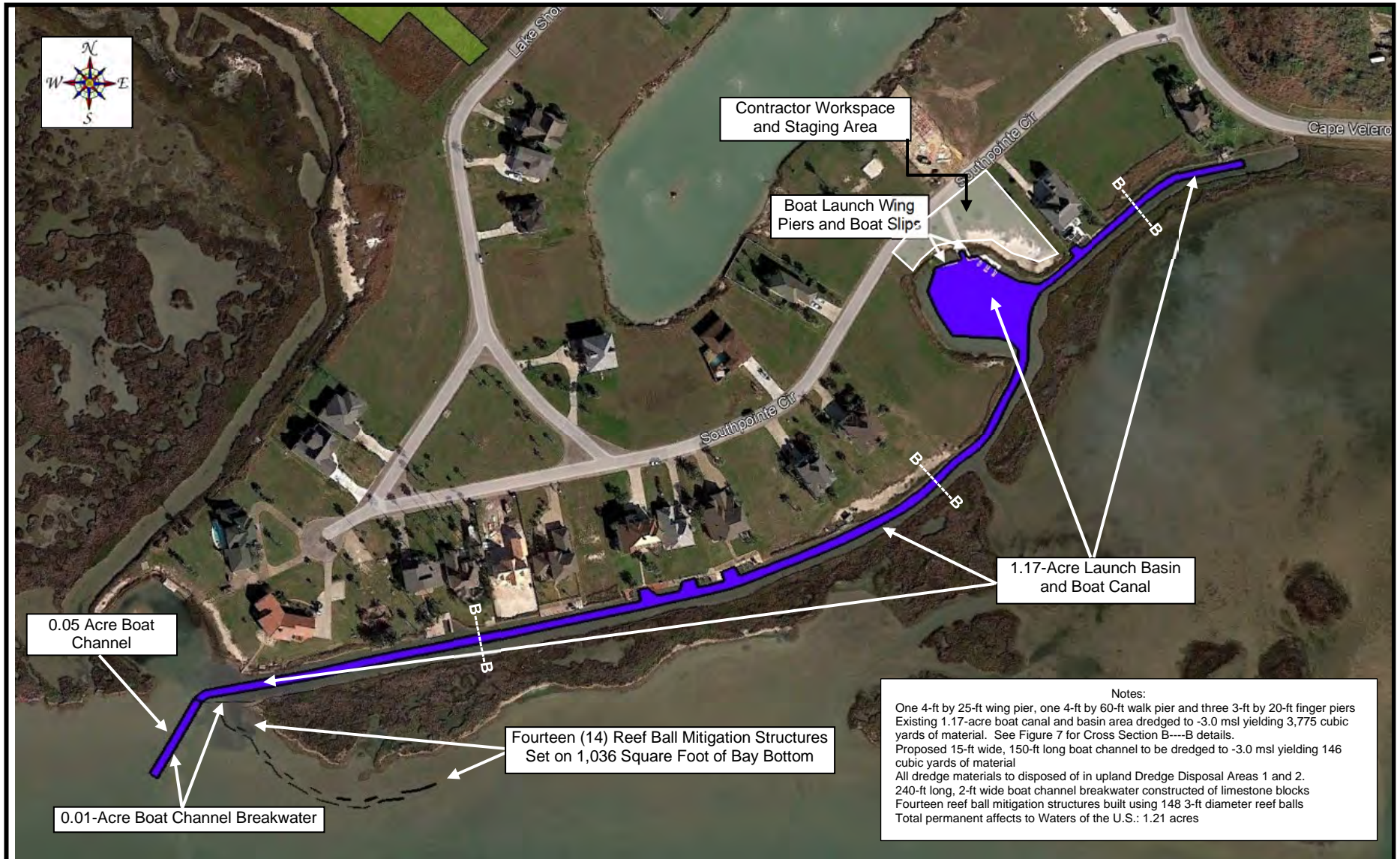
**Cape Velero Estates
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**SWG-2005-00696
 Project Overview Aerial
 Boating Improvement Project
 Aransas County, Texas**
 Source: Google Earth Satellite Photography; 2022
 Scale: 1:222



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FIGURE 3
 DATE: 5/06/2024
 GAI Project No. 221132



Cape Velero Estates
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**SWG-2005-00696
Project Detail Map
Boating Improvement Project
Aransas County, Texas**

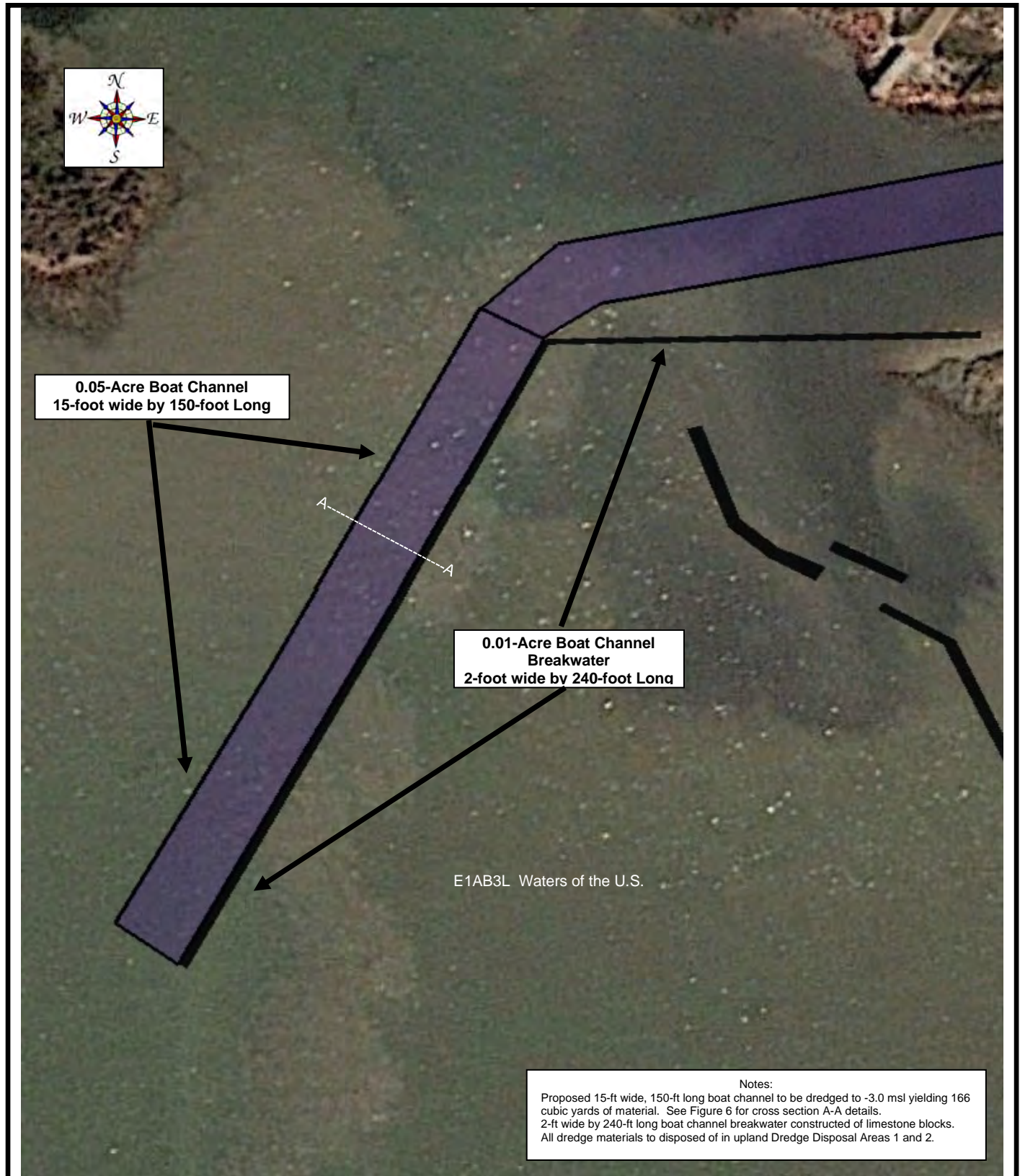
Source: Terrain Navigator Satellite Photography; 2022
Scale: 1:145



FIGURE 4

DATE: 5/06/2024

GAI Project No. 221132



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**SWG-2005-00696
Boat Channel Detail Aerial
Boating Improvement Project
Aransas County, Texas**

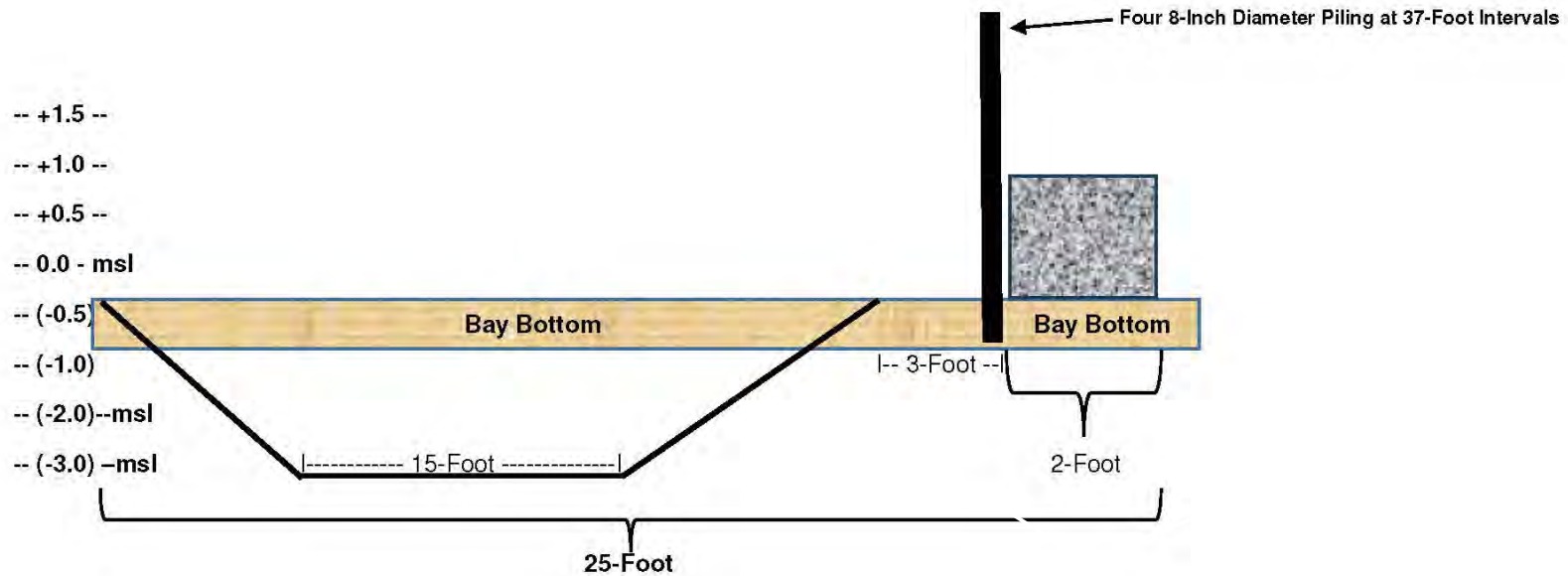
Source: Terrain Navigator Satellite Photography: 2022
Scale: 1:20

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FIGURE 5

DATE: 5/06/2024

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Notes:

Msl: mean sea level

For planning and permitting purposes only.

Minor variances could occur during construction.

The permittee is proposing to fill 0.01 acres of bay bottom below the average high tide line for a breakwater to decrease sedimentation of the proposed channel and to place substrate for establishment of oysters and create fish habitat.

The permittee will install a turbidity curtain around the construction area until excavation and material placement is finished and turbidity has settled to protect adjacent resources.

Breakwater material will consist of one (1) row of limestone blocks 2-foot square by 5-foot in length.

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Cross Section A-A
Boat Channel and Breakwater Cross Section
Boating Improvement Project
Aransas County, Texas



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FIGURE 6

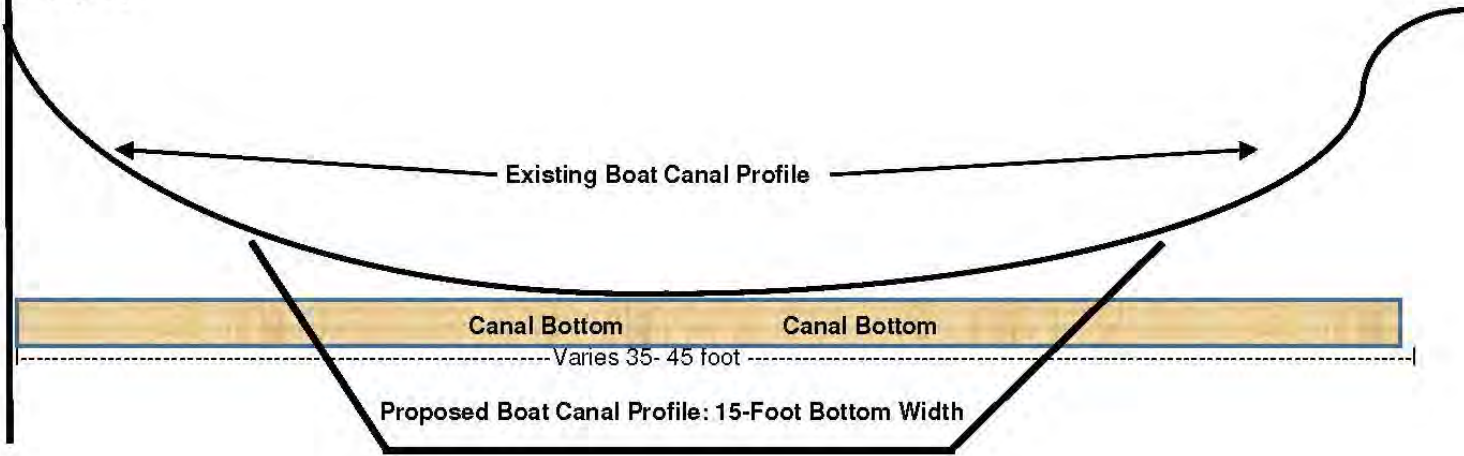
DATE: 5/06/2024

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Residential Side of Boat Canal

Marsh Side of Boat Canal

+1.5 - mean sea level (msl)
 +1.0 - msl
 +0.5 - msl
 0.0 - msl
 (-0.5) - msl
 (-1.0) - msl
 (-1.5) - msl
 (-2.0) - msl
 (-3.0) - msl



Notes:

For planning and permitting purposes only.

1.5:1 slope cut of boat canal sides.

Minor variances could occur during construction.

The permittee will install a turbidity curtain around the construction area until excavation and material placement is finished and turbidity has settled to protect adjacent resources.

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SWG-2005-00696
 Cross Section B-B
 Boat Canal Cross Section
 Boating Improvement Project
 Arkansas County, Texas
 Not to Scale



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FIGURE 7

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**SWG-2005-00696
Boat Launch Pier Additions
Boating Improvement Project
Aransas County, Texas**

Source: Terrain Navigator Satellite Photography, 2017
Scale: 1:564

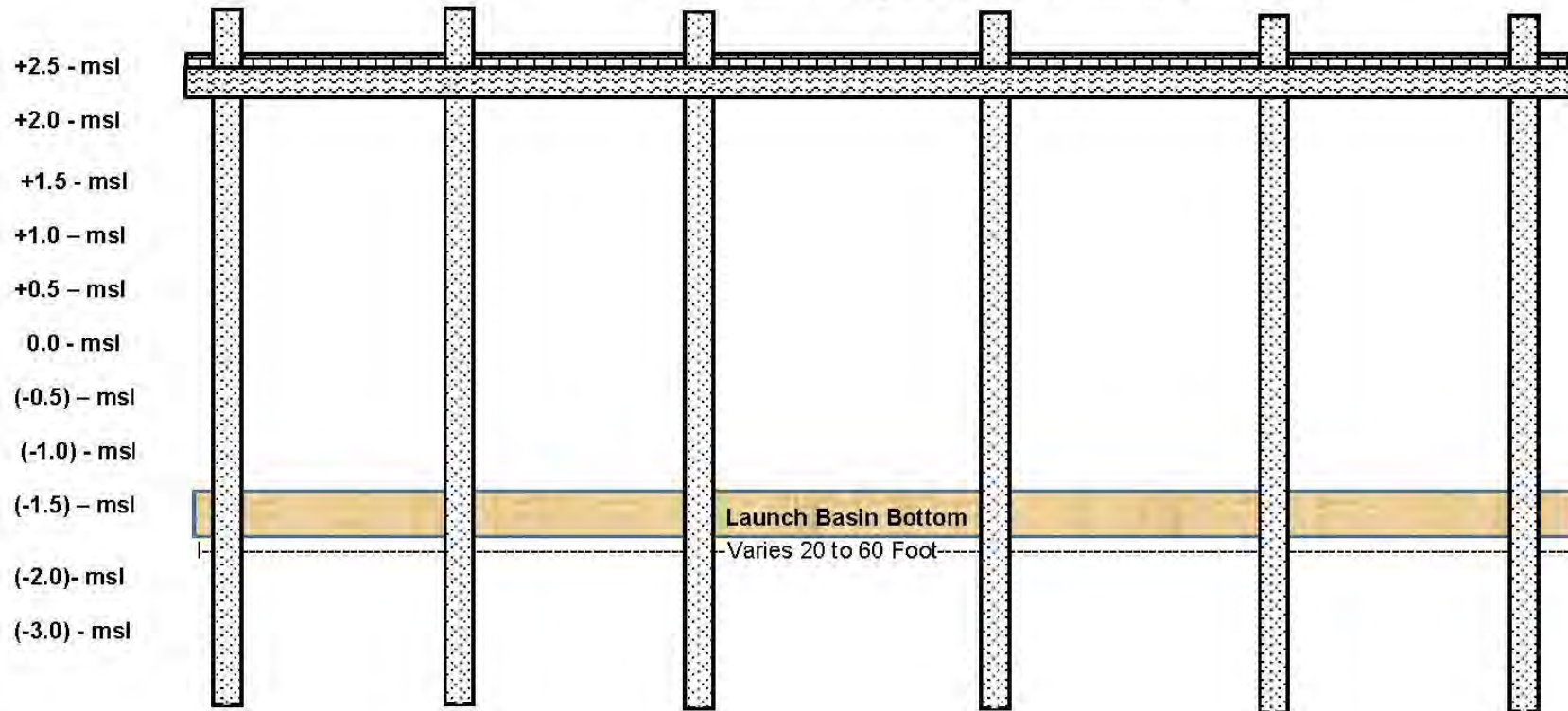
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FIGURE 8

DATE: 5/06/2024

GAI Project Number: 221132

8-Inch Diameter Treated Piles set on Four Foot Centers
 2x10 Treated Stringers, with 2x6 Treated Deck Boards



- Notes:
- For planning and permitting purposes only.
 - msl: elevation in mean sea level
 - Support piling will be driven by a drop weight operated off a small barge
 - Piling set 4-Foot into mud line
 - 1-Inch Gap Left between Deck Boards, or Flow-Thru Decking will be used.
 - Minor variances could occur during construction.

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SWG-2005-00696
 Pier Construction Typical Cross Section
 Boating Improvement Project
 Aransas County, Texas

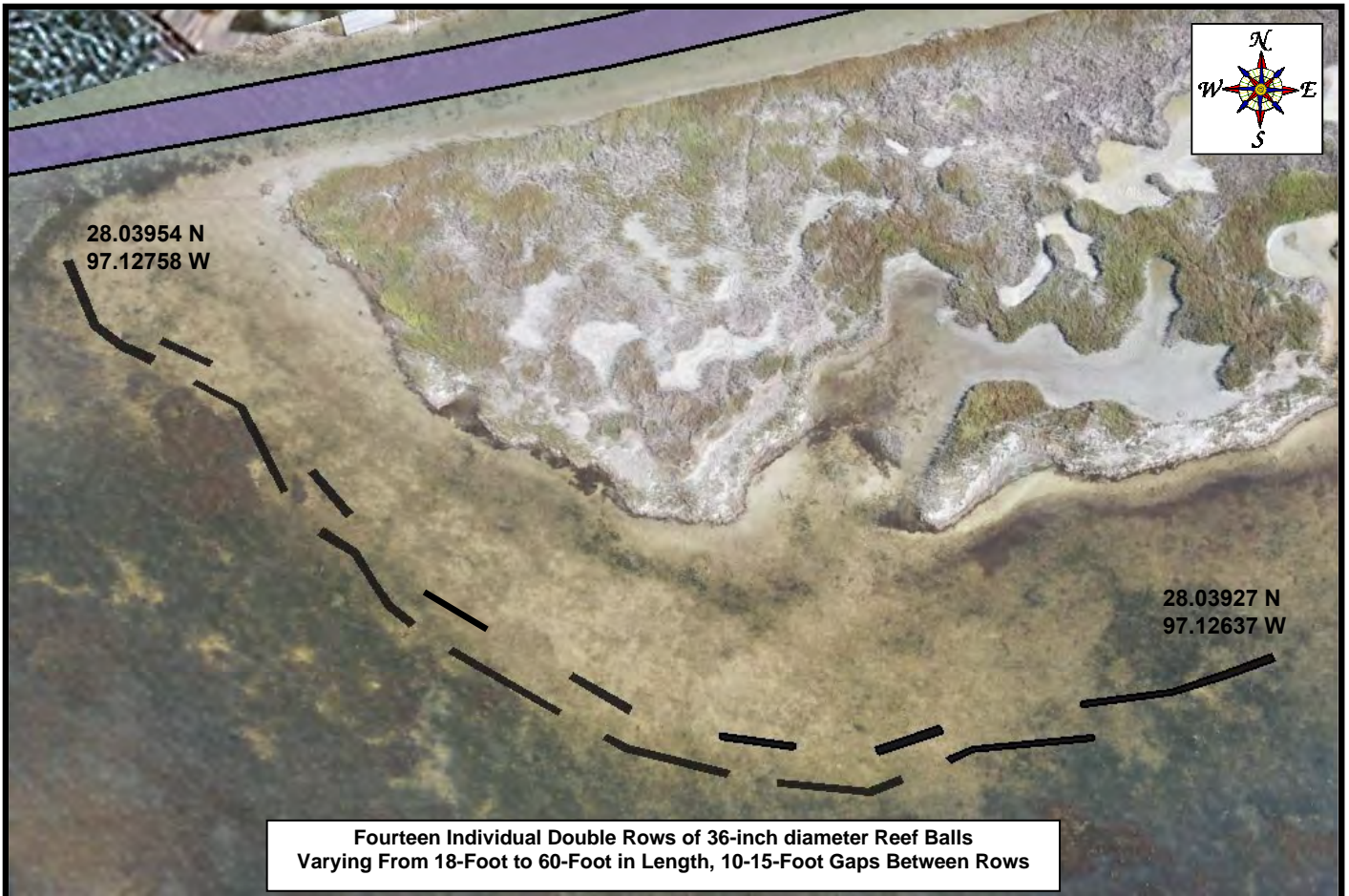


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FIGURE 9

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SWG-2005-00696
Living Shoreline Mitigation Structure
Double Row of 36-Inch Reef Balls
3-Foot Edge to Edge Offset

Source: August 15, 2023 Drone Photography
and
Google Image of Reef Ball Installation 2022

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FIGURE 10
DATE: 5/06/2024
GAI Project Number: 221132

**MITIGATION PLAN
SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS**

PROJECT IMPACTS SUMMARY

The primary resource impact of the proposed dredging and channel breakwater installation is direct impact to widgeon grass (*Ruppia maritima*) and minor occurrence of turtle grass (*Thalassia testudinum*), assessed at a total of 5,615 square feet (ft). Both species above will be referenced as “seagrasses” in the following text.

MITIGATION OPTIONS

In accordance with 33 CFR 332, when compensatory mitigation is required to compensate for a project’s unavoidable impacts to aquatic resources, the district engineer, when evaluating compensatory mitigation options, will consider what would be environmentally preferable to offset the authorized impacts. In general, the required compensatory mitigation should be located in the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services. The hierarchy of mitigation options to be considered should include:

1. Mitigation bank credits.
2. In-lieu fee program credits.
3. Permittee responsible under a watershed approach.
4. Permittee responsible mitigation through an on-site and in-kind mitigation.
5. Permittee responsible mitigation through an off-site and/or out-of-kind mitigation.

Mitigation Bank Credits and In-Lieu Fee Program Credits

The U.S. Army Corps of Engineers (USACE) - Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) for the Galveston District was checked for approved available mitigation banks or In-lieu fee programs within the greater Aransas Bay watershed (HUC 12100405).

There are no USACE approved mitigation banks or in-lieu fee programs located in HUC 12100405, or any adjacent HUCs.

GAI is aware of the proposed Port Bay Mitigation Bank, but this bank is no longer listed in RIBITS and may have been abandoned by the sponsor. GAI understands this bank sought to develop credits for freshwater and estuarine emergent wetlands, which even if available, would not be appropriate to offset impacts to seagrasses.

Permittee Responsible Mitigation

Permittee responsible mitigation proposals should follow the hierarchy of options in steps 3, 4, and 5 listed above.

**MITIGATION PLAN
SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS
(CONTINUED)**

Mitigating impacts to seagrasses is problematic since on-site or near-site locations suitable for the establishment of seagrass typically already has seagrass; direct restoration usually conflicts with the proposed project, and creation of suitable submerged grounds for seagrass development typically fails due to lack of one or more of the key growth factors.

Based upon a review of the compiled research on seagrasses published by the USACE⁽¹⁾, the key factors for seagrass growth include:

1. Water clarity: High turbidity and/or high total suspended solids (TSS) reduces water clarity and light penetration through the water column and lowers seagrass photosynthesis rates.
2. Salinity: Estuarine and marine seagrass grow better at 25 to 40 parts per thousand (ppt) concentration.
3. Temperature: Seagrass grows best in warmer water temperatures just like terrestrial plants.
4. Carbon dioxide (CO₂) concentration: Higher atmospheric CO₂ increases the CO₂ concentration in water which boosts seagrass photosynthesis rates.
5. Sediment grain size and type: Affects rooting, rhizome extension, and nutrient availability.
6. Sediment organic matter concentrations: High levels of dead and decaying organic matter can smother live seagrass.

Mitigation of seagrass impacts through creation, requires excavation to sustained inundation of intertidal fringe wetlands, exposed mud or sand flats, or uplands adjacent to estuarine waters. The key growth factor that results in failure of creation efforts is the sterility of sediments at the final excavation depth, and sediment type. It's impossible to fertilize submerged sediments, as a result, it can take years of conditioning through natural processes to establish a nutrient load sufficient for seagrass survival. Secondly, the sediment type at final depth will affect seagrass establishment and survival. High sand sediment concentrations aid rhizome establishment and extension, but do not hold sufficient nutrients. Inversely, high clay content sediments typically have better capability for nutrient exchange but impede seagrass establishment and rhizome extension.

Mitigation of seagrass impacts through restoration or enhancement requires altering existing negative conditions. The improvement of conditions for one or more of the key growth factors results in expansion of existing seagrass beds and colonization of previously non-vegetated submerged bottoms.

PROPOSED MITIGATION PLAN

1. Mitigation Objective

The mitigation objective is to compensate for direct impact to submerged aquatic vegetation (SAV), primarily widgeon grass (*Ruppia maritima*), and a minor occurrence of turtle grass (*Thalassia testudinum*), assessed at a total of 5,615 square feet (sqft), at a minimum compensatory mitigation ratio of 3:1.

**MITIGATION PLAN
SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS
(CONTINUED)**

The objective will be accomplished by creating improvement in water quality conditions at the mitigation site that results in a minimum increase of 16,845 sqft of additional SAV covered submerged lands through expansion and colonization of existing SAV resources.

2. Site Selection

As discussed above in the Mitigation Options, the permittee has considered mitigation alternatives in accordance with 33 CFR 332 and determined that on-site/near-site permittee responsible mitigation has the greatest likelihood of success.

The project's proposed mitigation action is at an area of bay bottoms that are immediately east of the proposed community boat channel into Port Bay. Figure 1 (attached) illustrates the proposed location relative to the community boating improvement project.

3. Site Protection Instrument

The proposed mitigation location is on submerged lands controlled by the Texas General Land Office (TXGLO). Acquisition of a State Lands Easement from the TXGLO is a necessary component to authorize the proposed project and mitigation and this easement would be the protective instrument for the mitigation site.

4. Baseline Information

The proposed location has ongoing scour of the bay bottom and erosion of emergent wetlands which results in high turbidity, high TSS, and smothering of existing seagrass on the bay bottom.

Figure 2 (attached) illustrates the transition and changes to this shoreline from 1995 to 2022. What is now submerged lands was, in recent history, emergent wetland.

This improvement in water quality conditions will be accomplished by installing breakwaters to dissipate wave energy scour to propagate seagrass establishment between the breakwater structures and emergent wetland shoreline. By minimizing scour of the bay bottom and wave impact erosion of the wetland shoreline, the potential improvement in water clarity should allow for propagation and/or expansion of submerged grasses within shallow waters behind the breakwater. Secondly, the breakwater should slow or stop the continuing loss of the emergent wetland and may allow for some recovery of the emergent wetlands.

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SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS
(CONTINUED)**

5. Determination of Credits

The proposed impacts and mitigation are for submerged aquatic vegetation. The permittee is not aware of any procedure for a determination of functional value to establish a mathematical debit/credit requirement. The permittee proposes to use the direct impact in square foot and 3:1 compensatory mitigation ratio as the debit/credit procedure. The assessed project impacts for SAV are 5,615 sqft, mitigation of these impacts at a 3:1 ratio requires 16,845 sqft of increased SAV presence. The proposed mitigation area is 29,000 sqft and SAV are either not present or minimal in presence and coverage.

6. Mitigation Work Plan

The permittee proposes to install fourteen (14) individual wave breaks varying from 18 to 60-ft in length, using 3-ft diameter reef balls, to create a 445-ft long by 10-ft wide reef ball breakwater.

As shown on Figure 1, the intent is to install the reef balls where areas of bare bay bottom interface with existing submerged aquatic vegetation. The installation will be a double row of 36-inch diameter reef balls installed on a staggered 4-ft offset, using approximately 148 reef balls.

The reef ball mitigation structure will be installed concurrently with the dredging of the boat channel into Port Bay. A drone will be used to obtain aerial photographs of the location and document bare bay bottom locations. The perimeter of the installation area will be established by wading the shallow waters to verify bottom conditions and set survey stakes. The excavator will work from east to west, tracking over the line of installation to the east end, then working westward to complete the breakwaters before commencing on the channel dredging component of the project. The reef balls will be delivered to the installation location using the small barges, and the amphibious excavator will be used to lift and set the reef balls in the desired location.

7. Maintenance Plan

The proposed mitigation effort is a single effort activity that has no inherent maintenance requirement after installation. The breakwaters will be a hazard to navigation and visual markers to identify the location of these breakwaters for the boating public may require replacement at times. A condition to maintain markers on these structures should be a component of permit.

8. Performance Standards

The mitigation performance standard is to document a long-term increase of 16,900 square ft of submerged grass coverage in the shallow waters north of the reef ball structure. The pre-mitigation extent of existing submerged grasses will be documented by drone photography that will be geo-rectified and imported into a GIS format program for measurements of coverage. Post-installation monitoring of

**MITIGATION PLAN
SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS
(CONTINUED)**

success and extent of submerged grass coverage will be documented by drone photography that will be geo-rectified and imported into a GIS format program for measurements of coverage.

9. Monitoring Requirements

The project proponent/responsible party cannot control all the aspects and conditions leading to successful establishment of submerged grasses. Drought, excessive rainfall, tropical storm tidal surge or direct impact can and will alter the growing conditions for submerged grasses; therefore, the responsible party is requesting a 5-year performance period with submittal of annual monitoring reports.

10. Long-term Management Plan

The long-term management plan is the same as the maintenance plan as discussed above in Item 7.

11. Adaptive Management Plan

Adaptive management plans are to address complexities in mitigation plans where one or more components of the mitigation plan does not perform as anticipated, and modifications to the plan or components are required to achieve the mitigation objective.

The proposed mitigation action is not complex, and the Permittee has a high level of confidence that the breakwaters will work as intended to dissipate wave energy, prevent scour, and reduce shoreline erosion, but the Permittee cannot control or further influence the other water quality conditions, particularly salinity levels, that will affect the extension and propagation of SAV. This is why the Permittee proposes a larger than needed mitigation area, such that lower levels of SAV expansion and propagation will still achieve the desired extent of SAV covered submerged lands by the end of the proposed monitoring period.

12. Financial assurances

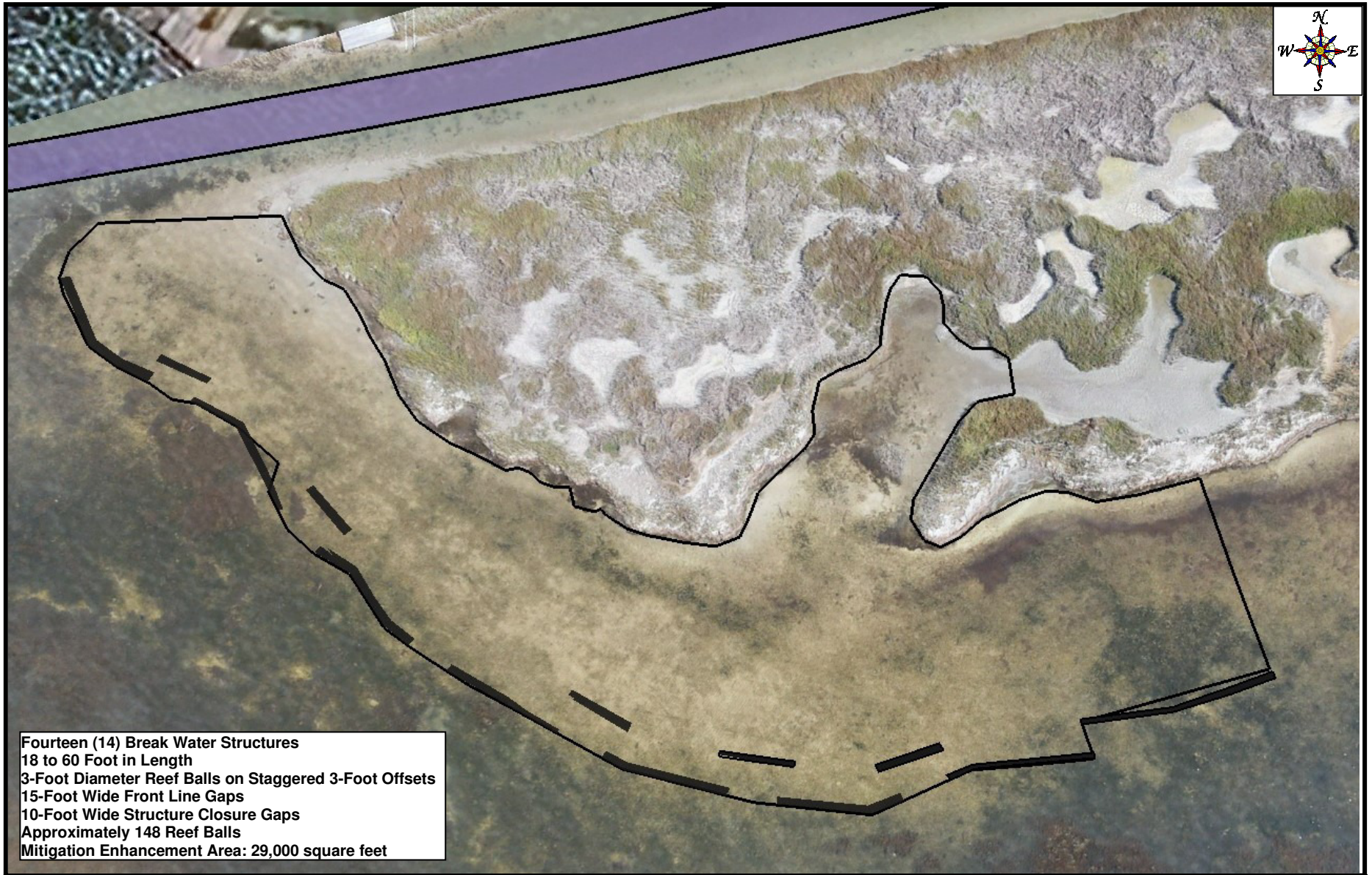
A financial assurance is required in the event a mitigation proponent, typically a wetland mitigation bank Sponsor, fails to complete the proposed mitigation work plan for which credits were advanced to the Sponsor, such that funds would be available to the U.S. Army Corps of Engineers, working through the third-party conservator to implement the mitigation plan if abandoned by the mitigation Sponsor.

In this instance the permittee is proposing structural installations to improve water quality to meet the mitigation objective and proposes that a permit condition requiring implementation of the mitigation plan in advance of the work authorized by the permit will suffice rather than some type of financial holding held by an uninvolved non-governmental party.

**MITIGATION PLAN
SWG-2005-00696
BOATING IMPROVEMENT PROJECT
CAPE VELERO ESTATES HOME OWNERS ASSOCIATION
ARANSAS COUNTY, TEXAS
(CONTINUED)**

REFERENCES

- (1) United States Army Corps of Engineers - Environmental Factors Affecting Coastal and Estuarine Submerged Aquatic Vegetation (SAV): U.S. Army Research and Development Center; EL SR-21-6, September 2021



Fourteen (14) Break Water Structures
18 to 60 Foot in Length
3-Foot Diameter Reef Balls on Staggered 3-Foot Offsets
15-Foot Wide Front Line Gaps
10-Foot Wide Structure Closure Gaps
Approximately 148 Reef Balls
Mitigation Enhancement Area: 29,000 square feet

**Cape Velero Estates Home
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**SWG-2005-00696
Aquatic Resources Mitigation Map
Living Shoreline, Wave Break Structures
Boating Improvement Project
Aransas County, Texas**

Source: August 2023 Drone Photography

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FIGURE 1

DATE: 5/07/2024



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Emergent Wetland Loss-Shoreline Retreat 1995-2017
SWG-2005-00696
Boating Improvement Project
Port Bay
Aransas County, Texas
Source: Google Earth Aerial Photography



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FIGURE 2
DATE: 5/07/2024