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# WETLAND DELINEATION REPORT

## Greenwich Bay Marina – East Yard

### Warwick, Rhode Island

February 2024

GZA File No. 03.35315.00



#### PREPARED FOR:

Safe Harbor Marina  
125 Wharf Road  
Warwick, Rhode Island

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## **1.0 INTRODUCTION**

GZA was retained by Safe Harbor Marina (SHM, Client) to perform a wetland delineation at their Greenwich Bay Marina, East Yard (Site) in Warwick, Rhode Island. On December 1, 2023, GZA wetland scientists conducted a wetland delineation, identifying and placing marker flags along wetland boundaries by examining the dominant vegetation, soils, and evidence of hydrology at several locations on the Site. On December 7, 2023, the flags were located in the field using a handheld GPS to provide a detailed sketch map.

## **2.0 WETLAND ASSESSMENT AND DELINEATION METHODOLOGY**

GZA's wetland assessment and delineation methodology is consistent with the Rhode Island Coastal Resources Management Council (CRMC) Program – Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast, the Rhode Island Freshwater Wetlands Act (RI General Law Sections 2-1-18 et. seq.), and the Federal Clean Water Act. The delineation was conducted in accordance with the US Army Corps of Engineers (USACE) Regional Supplement (Northcentral / Northeast), the 1987 Routine Onsite Determination criteria, and Appendix 2: Specific Criteria for Identifying Wetland Edges in Rhode Island Department of Environmental Management's (RIDEM's) Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act (herein referred to as "the Rules") (<https://rules.sos.ri.gov/regulations/part/250-150-15-1>).

The wetland delineation was completed by a qualified wetland biologist in accordance with Guidelines for Qualified Professionals: Wetland Delineations, published by RIDEM in April 1994. Wetland boundaries were demarcated in the field with flags or other applicable markers at approximate 20 to 50-foot intervals.

GZA surveyed the locations of the wetland flags in sufficient detail to include in an existing conditions site plan. The survey was performed using a Leica CS35/GS16 GNSS Smart Antenna GPS unit with Real Time Kinematic (RTK) positioning.

## **3.0 WETLAND OBSERVATIONS**

Three distinct wetland complexes, and a manmade shoreline were identified across the marina property. The attached figure illustrates the location of the shoreline and wetlands; labeled as Wetland A, Wetland B, and Wetland C. Wetlands A, B, and C were delineated based on observations of the dominance of hydrophytic vegetation, wetland hydrology, and hydric soils. The manmade Shoreline was determined on the basis of CRMC Program "Red Book" definitions.

### WETLAND A

This Forested / Scrub-Shrub and Estuarine Emergent wetland is located on the western side of the Site and continues to the western side of the parcel. This wetland is partially located on 6 lots owned by SHM (Warwick Tax Assessor Map 359, Lots 293, 556, 555, 291, 552, and 553). Based on observation, GZA assumes the wetland extends onto additional, privately owned lots. This wetland creates an arc-like shape with Warwick Cove in the center (see attached figure for an illustration). The southern end of this wetland terminates at the western edge of the manmade shoreline by way of a steel bulkhead. Based on data collected during the GPS RTK survey, GZA estimates the wetland to cover approximately 2.67-acres.



The majority of Wetland A features the shrub species of pussy willow (*Salix discolor*) and silky dogwood (*Cornus amomum*) as the predominant vegetation. Tree species are present but generally limited to the margin of the wetland complex and include eastern cottonwood (*Populus deltoides*), big tooth aspen (*Populus grandidentata*), and red oak (*Quercus rubrum*). Ground cover species were found to be densely arranged and predominantly Japanese knotweed (*Reynoutria japonica*), garlic mustard (*Alliaria petiolate*), common reed (*Phragmites australis*), salt meadow cordgrass (*Spartina patens*) and raspberry (*Rubus sp.*). This wetland was delineated based on observations of the dominance of hydrophytic vegetation, wetland hydrology, and hydric soils.

#### WETLAND B

This isolated forested wetland is located to the west of Wetland A. The wetland is located on 2 lots owned by SHM (Warwick Tax Assessor Map 359, Lots 291 and 552). Based on data collected during the GPS RTK survey, GZA estimates the wetland to cover approximately 0.98-acres.

This wetland does not have a surface hydraulic connection to Wetland A. A large depression is located in the southern part of this wetland and could potentially be identified as a vernal pool. The vegetation in this wetland is predominantly canopy species including red oak, red maple, (*Acer rubrum*), and big tooth aspen. The understory is a sparse shrub population including silky dogwood, highbush blueberry (*Vaccinium corybosum*), and black cherry (*Prunus serotina*). Ground cover species included raspberry, greenbrier (*Smilax rotundifolia*), goldenrod (*Solidago sp.*), swamp dewberry (*Rubus hispidus*), and cinnamon fern (*Osmundastrum cinnamomeum*). This wetland was delineated based on observations of the dominance of hydrophytic vegetation, wetland hydrology, and hydric soils.

#### WETLAND C

This Scrub-Shrub and Estuarine Emergent wetland is located along the eastern side of the Marina. The wetland is partially located on 7 lots owned by SHM (Warwick Tax Assessor Map 359, Lots 389, 391, 392, 393, 394, 395, and 396). Based on observation, GZA assumes the wetland extends onto additional, privately owned lots. This wetland is located between the Marina facilities and a portion of Warwick Cove. The southern end of this wetland terminates at the eastern edge of the manmade shoreline by way of a steel bulkhead. Based on data collected during the GPS RTK survey, GZA estimates the wetland to cover approximately 0.16-acres of SH property (assumed to extend further north, increasing its size).

Wetland C includes a tidal wetland with predominately woody and emergent vegetation including hightide bush (*Iva frutescens*), pussy willow, beach plum (*Prunus maritima*), Japanese knotweed, poison ivy (*Toxicodendron radicans*) and salt meadow cordgrass. This wetland was delineated based on observations of the dominance of hydrophytic vegetation, wetland hydrology, and hydric soils.

#### MANMADE SHORELINE

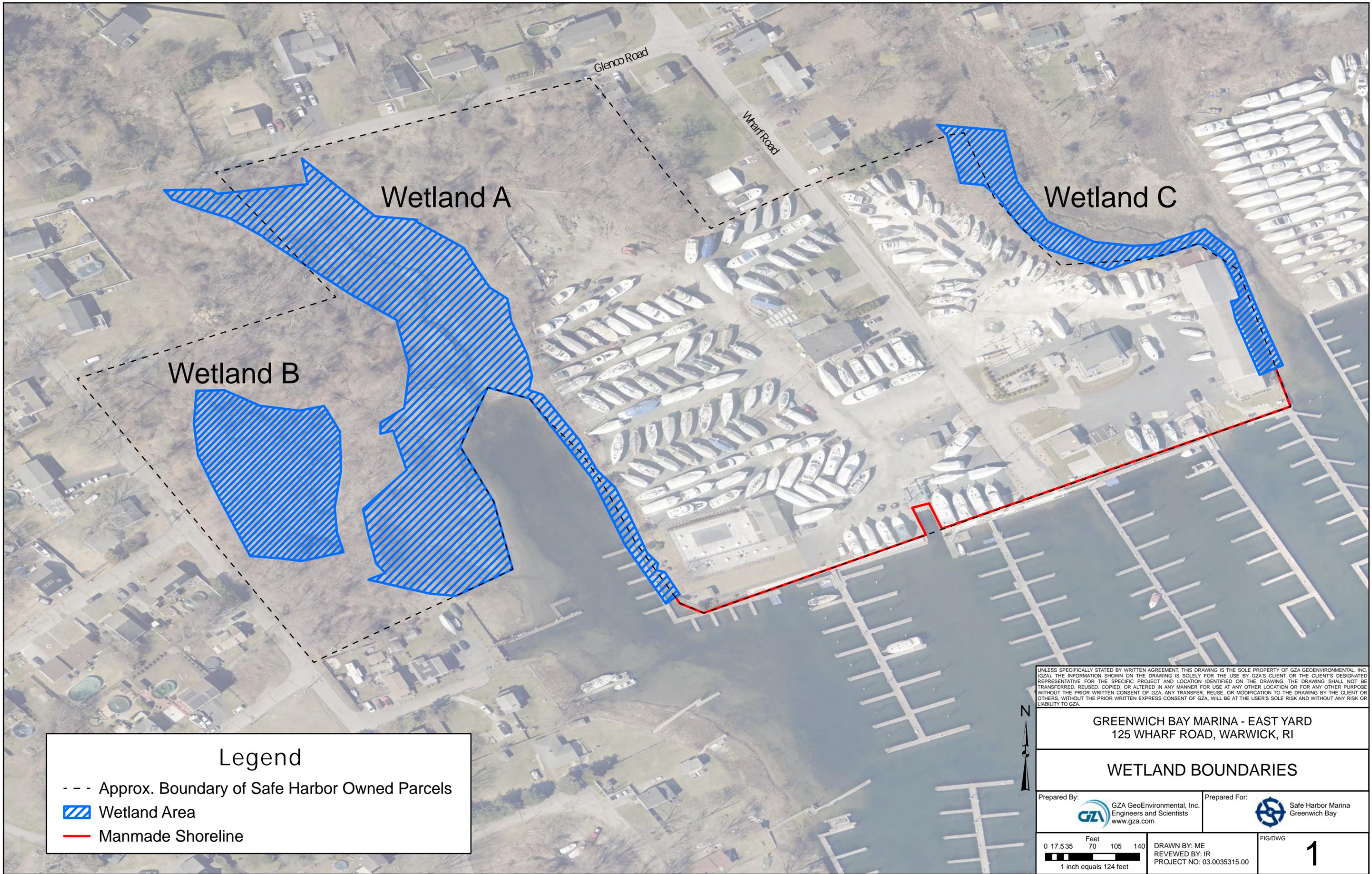
The manmade shoreline located along the southern boundary of the Marina property, adjacent to Warwick Cove. The wetland is partially located on 5 lots owned by SHM (Warwick Tax Assessor Map 359, Lots 389, 549, 388, 292, and 293). This shoreline terminates at Wetland A to the west and Wetland C to the east. Based on data collected during the GPS RTK survey, GZA estimates the shoreline to run approximately 60-linear feet.



The manmade shoreline is characterized by a concentration of constructed shoreline protection and marina facility structures to an extent that the natural shoreline features are no longer dominant. The shoreline is predominately comprised of a series of bulkheads and hardened structures. The manmade shoreline determination was made on the basis of the CRMC Program “Red Book” definition; *“Manmade shoreline’ means those shorelines that are characterized by concentrations of shoreline protection structures and other alterations, to the extent that natural shoreline features are no longer dominant. They most commonly abut Type 3, 5, and 6 waters.”* (1.2.2.F). This shoreline abuts Type 3 waters.



**ATTACHMENT A**  
**WETLAND BOUNDARY MAP**



Wetland A

Wetland C

Wetland B

Glenco Road

Wharf Road

Legend

- - - Approx. Boundary of Safe Harbor Owned Parcels
- Wetland Area
- Manmade Shoreline

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

GREENWICH BAY MARINA - EAST YARD  
125 WHARF ROAD, WARWICK, RI

WETLAND BOUNDARIES

Prepared By: GZA GeoEnvironmental, Inc.  
Engineers and Scientists  
www.gza.com

Prepared For: Safe Harbor Marina  
Greenwich Bay

0 17.5 35 Feet  
70 105 140  
  
1 inch equals 124 feet

DRAWN BY: ME  
REVIEWED BY: IR  
PROJECT NO: 03.0035315.00

FIG/DWG  
**1**



**ATTACHMENT B**  
**VEGETATION SPECIES OBSERVED**



## Dominant Vegetation Species Observed

	Common Name	Scientific Name	U.S.F.W Rating
Trees	Eastern Cottonwood	<i>Populus deltoides</i>	FAC
	Big-Tooth Aspen	<i>Populus grandidentata</i>	FACU
	Red Oak	<i>Quercus rubrum</i>	FACU
	Red Maple	<i>Acer rubrum</i>	FAC
Shrubs & Vines	Pussy Willow	<i>Salix discolor</i>	FACW
	Silky Dogwood	<i>Cornus amomum</i>	FACW
	Highbush Blueberry	<i>Vaccinium corymbosum</i>	FACW
	Black Cherry	<i>Prunus serotina</i>	FACU
	Hightide Bush	<i>Iva frutescens</i>	FACW
	Beach Plum	<i>Prunus maritima</i>	NL
	Poison Ivy	<i>Toxicodendron radicans</i>	FAC
Ground Cover	Japanese Knotweed	<i>Reynoutria japonica</i>	FACU
	Garlic Mustard	<i>Alliaria petiolata</i>	FACU
	Common Reed	<i>Phragmites australis</i>	FACW
	Raspberry	<i>Rubus sp.</i>	FAC
	Salt Meadow Cordgrass	<i>Spartina patens</i>	FACW
	Greenbrier	<i>Smilax rotundifolia</i>	FAC
	Goldenrod	<i>Solidago sp.</i>	FAC
	Swamp Dewberry	<i>Rubus hispidus</i>	FACW
	Cinnamon Fern	<i>Osmundastrum cinnamomeum</i>	FACW

Notes:

1. Wetland ratings FAC, FACW, and OBL are considered wetland indicators
2. FACU and UPL ratings are non-wetland
3. NL = not listed by USFW and are considered non-wetland plants unless otherwise noted



**ATTACHMENT C**  
**PHOTOGRAPHIC LOG**



# Wetland Delineation - Photographic Log

<b>Client Name:</b> Safe Harbor Marinas		<b>Site Location:</b> Greenwich Bay Marina – East Yard Warwick, Rhode Island	<b>Project No.:</b> 03.0035315.00
<b>Photo No.</b> 1	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b>  Northwest			
<b>Description:</b>  View of Wetland A; open estuarine water in left foreground, forested and scrub-shrub vegetation in background and right foreground.			

<b>Photo No.</b> 2	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b>  East			
<b>Description:</b>  View of Wetland A; interface between Wetland A and the western end of the anmade horeline.			



# Wetland Delineation - Photographic Log

<b>Client Name:</b> Safe Harbor Marinas		<b>Site Location:</b> Greenwich Bay Marina – East Yard Warwick, Rhode Island	<b>Project No.:</b> 03.0035315.00
<b>Photo No.</b> 3	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> View of Wetland B; freshwater wetland system characterized by woody forest vegetation and leafy groundcover.			

<b>Photo No.</b> 4	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> View of Wetland C; delineated wetland edge coincides with the eastern edge of the existing building.			



# Wetland Delineation - Photographic Log

<b>Client Name:</b> Safe Harbor Marinas		<b>Site Location:</b> Greenwich Bay Marina – East Yard Warwick, Rhode Island	<b>Project No.:</b> 03.0035315.00
<b>Photo No.</b> 5	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b> Southwest			
<b>Description:</b> View of Wetland C; northern portion of the wetland characterized by woody & emergent scrub-shrub vegetation, marina facility seen in the background.			

<b>Photo No.</b> 6	<b>Date:</b> 12-7-23		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> View of unmade shoreline; bulkhead structural feature and timber docks.			



## **ATTACHMENT D**

### **NATURAL RESOURCE SURVEY AND ASSESSMENT LIMITATIONS**



## **USE OF REPORT**

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of the Safe Harbor Marina (Client) for the stated purpose(s) and location(s) identified in the agreement. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

## **STANDARD OF CARE**

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

## **LIMITS TO OBSERVATIONS**

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.
5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.
6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

## **RELIANCE ON INFORMATION FROM OTHERS**

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

## **COMPLIANCE WITH REGULATIONS AND CODES**

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.



**NEW INFORMATION**

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

**ADDITIONAL SERVICES**

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.



GZA GeoEnvironmental, Inc.