

7.0 APPENDICES:

Appendix A

Figure 1 – Vicinity Map

Figure 2 – Location Map

Figure 3 – Seagrass Survey Area

Figure 4 – Seagrass Survey Data Map

Figure 5 – Contour Map

Appendix B

Approved Sampling Plan

Appendix C

Table 1: Transects 1-9 and 12-13 Seagrass Survey Results, Data Analysis

Table 2: Post-Hole Sample Analysis of Transects 10 and 11

Appendix D

Soil Test Report

Appendix E

Aerial Image Analysis, Seagrass Distribution from 2005 to Present

Figure 1 – 2005 Aerial Image Analysis of PA 62

Figure 2 – 2005 Aerial Image Analysis of PA 63

Figure 3 – 2006 Aerial Image Analysis of PA 62

Figure 4 – 2006 Aerial Image Analysis of PA 63

Figure 5 – 2008 Aerial Image Analysis of PA 62

Figure 6 – 2008 Aerial Image Analysis of PA 63

Figure 7 – 2009 Aerial Image Analysis of PA 62

Figure 8 – 2009 Aerial Image Analysis of PA 63

Figure 9 – 2010 Aerial Image Analysis of PA 62

Figure 10 – 2010 Aerial Image Analysis of PA 63

Appendix A

Figure 1 – Vicinity Map

Figure 2 – Location Map

Figure 3 – Seagrass Survey Area

Figure 4 – Seagrass Survey Data Map

Figure 5 – Contour Map

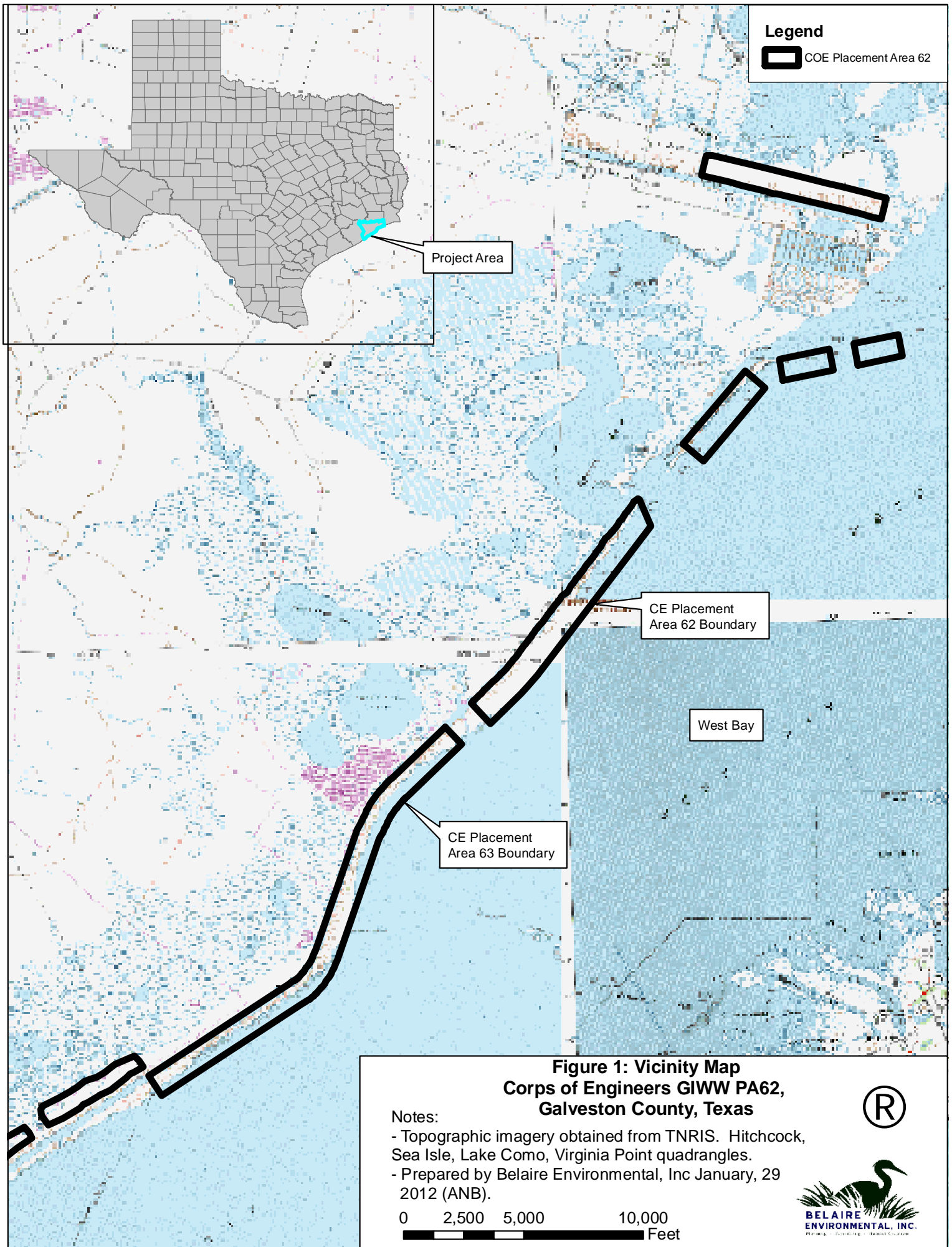


Figure 2: Location Map
Corps of Engineers GIWW PA62,
Galveston County, Texas



Notes:

- Imagery obtained from TNRIS, Galveston, County, 2009
- Prepared by Belaire Environmental, Inc January, 31 2012 (ANB).
- For planning purposes only; not for construction.

0 2,500 5,000 10,000
 Feet



Legend

- CE Channels
- Texas Counties
- ▭ COE Placement Areas



**Figure 3: Seagrass Survey Area
Corps of Engineers GIWW PA62,
Galveston County, Texas**



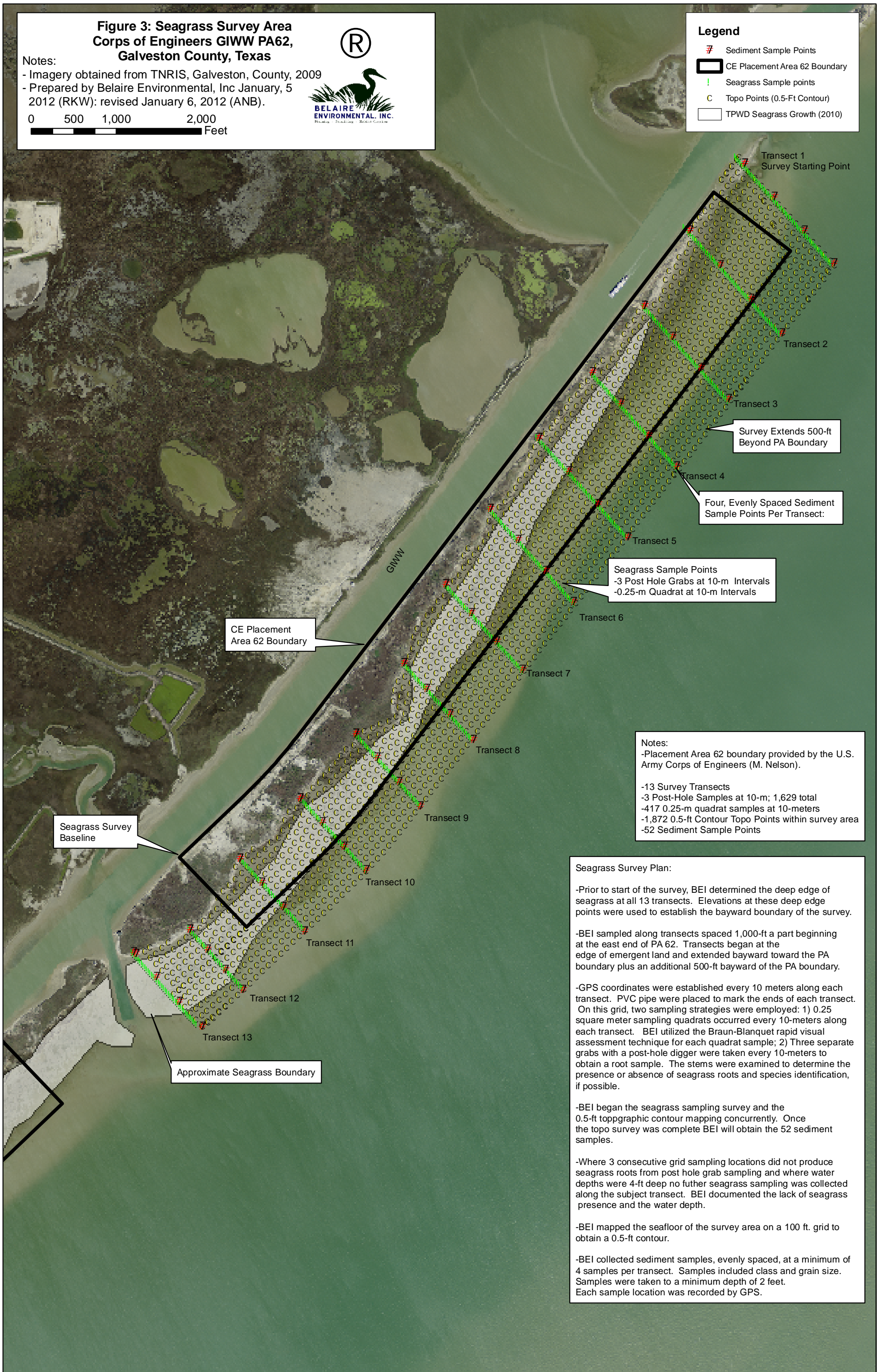
Notes:

- Imagery obtained from TNRIS, Galveston, County, 2009
- Prepared by Belaire Environmental, Inc January, 5 2012 (RKW); revised January 6, 2012 (ANB).

0 500 1,000 2,000
Feet

Legend

- Sediment Sample Points
- CE Placement Area 62 Boundary
- Seagrass Sample points
- Topo Points (0.5-Ft Contour)
- TPWD Seagrass Growth (2010)



Survey Extends 500-ft Beyond PA Boundary

Four, Evenly Spaced Sediment Sample Points Per Transect:

Seagrass Sample Points
-3 Post Hole Grabs at 10-m Intervals
-0.25-m Quadrat at 10-m Intervals

CE Placement Area 62 Boundary

Seagrass Survey Baseline

Approximate Seagrass Boundary

- Notes:**
- Placement Area 62 boundary provided by the U.S. Army Corps of Engineers (M. Nelson).
 - 13 Survey Transects
 - 3 Post-Hole Samples at 10-m; 1,629 total
 - 417 0.25-m quadrat samples at 10-meters
 - 1,872 0.5-ft Contour Topo Points within survey area
 - 52 Sediment Sample Points

Seagrass Survey Plan:

- Prior to start of the survey, BEI determined the deep edge of seagrass at all 13 transects. Elevations at these deep edge points were used to establish the bayward boundary of the survey.
- BEI sampled along transects spaced 1,000-ft apart beginning at the east end of PA 62. Transects began at the edge of emergent land and extended bayward toward the PA boundary plus an additional 500-ft bayward of the PA boundary.
- GPS coordinates were established every 10 meters along each transect. PVC pipe were placed to mark the ends of each transect. On this grid, two sampling strategies were employed: 1) 0.25 square meter sampling quadrats occurred every 10-meters along each transect. BEI utilized the Braun-Blanquet rapid visual assessment technique for each quadrat sample; 2) Three separate grabs with a post-hole digger were taken every 10-meters to obtain a root sample. The stems were examined to determine the presence or absence of seagrass roots and species identification, if possible.
- BEI began the seagrass sampling survey and the 0.5-ft topographic contour mapping concurrently. Once the topo survey was complete BEI will obtain the 52 sediment samples.
- Where 3 consecutive grid sampling locations did not produce seagrass roots from post hole grab sampling and where water depths were 4-ft deep no further seagrass sampling was collected along the subject transect. BEI documented the lack of seagrass presence and the water depth.
- BEI mapped the seafloor of the survey area on a 100 ft. grid to obtain a 0.5-ft contour.
- BEI collected sediment samples, evenly spaced, at a minimum of 4 samples per transect. Samples included class and grain size. Samples were taken to a minimum depth of 2 feet. Each sample location was recorded by GPS.

Figure 4: Survey Results Map
Approximate 383-Ac Seagrass Survey Area
Corps of Engineers GIWW PA62,
Galveston County, Texas

Notes:
 - Imagery obtained from TNIRIS, Galveston, County, 2009.
 - Prepared by Belaire Environmental, Inc February 6, 2012 (ANB).
 - Elevation data obtained with RTK GPS and provided in NAVD 88 datum.
 - For planning purposes only, not for construction.
 - Seagrass survey, topo survey, and sediment sample collection performed concurrently from January 9 to January 16, 2012.

0 150 300 600 900 Feet



Legend

- Sediment Sample Locations
- Edge of Seagrass Points
- Seagrass_Survey_Points
- Approx. Dredge Material Boundary
- Survey Acreage
- Survey Transects
- Edge of Seagrass
- CE Placement Area 62 & 63

Seagrass Data Key
Braun-Blanquet Abundance Scores

- 0= Species absent from quadrat
- 0.1=Species represented by a solitary short shoot, <5% cover
- 0.5=Species represented by a few (<5%) short shoots, <5% cover
- 1= Species represented by many (>5%) short shoots, <5% cover
- 2= Species represented by many (>5%) short shoots, 5%-25% cover
- 3= Species represented by many (>5%) short shoots, 25%-50% cover
- 4= Species represented by many (>5%) short shoots, 50%-75% cover
- 5= Species represented by many (>5%) short shoots, 75%-100% cover

Belaire Environmental, Inc. Data Key

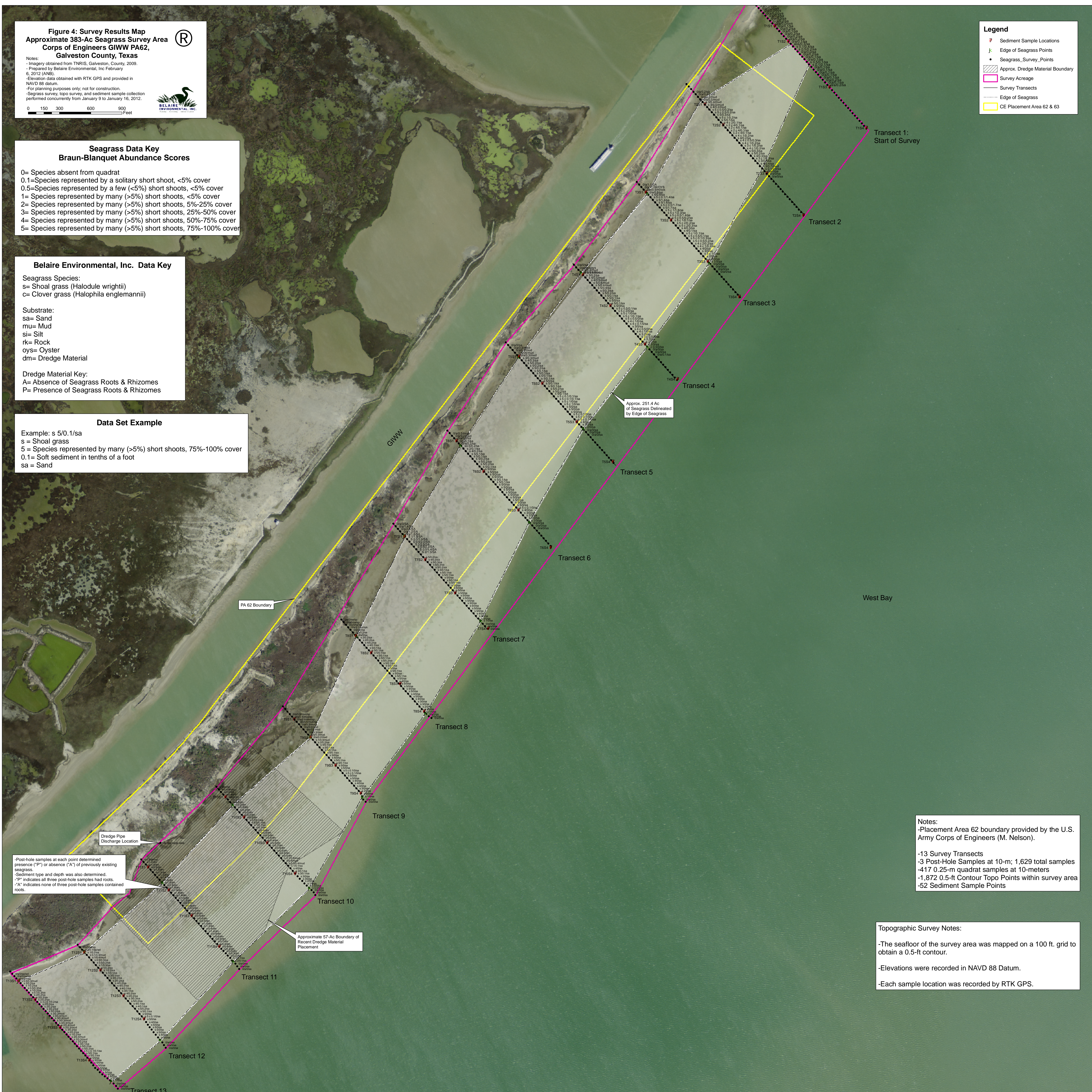
Seagrass Species:
 s= Shoal grass (*Halodule wrightii*)
 c= Clover grass (*Halophila englemannii*)

Substrate:
 sa= Sand
 mu= Mud
 si= Silt
 rk= Rock
 oys= Oyster
 dm= Dredge Material

Dredge Material Key:
 A= Absence of Seagrass Roots & Rhizomes
 P= Presence of Seagrass Roots & Rhizomes

Data Set Example

Example: s 5/0.1/sa
 s = Shoal grass
 5 = Species represented by many (>5%) short shoots, 75%-100% cover
 0.1 = Soft sediment in tenths of a foot
 sa = Sand



Transect 1:
Start of Survey

Transect 2

Transect 3

Transect 4

Transect 5

Transect 6

Transect 7

Transect 8

Transect 9

Transect 10

Transect 11

Transect 12

Transect 13

West Bay

PA 62 Boundary

Dredge Pipe Discharge Location

-Post-hole samples at each point determined presence ("P") or absence ("A") of previously existing seagrass.
 -Sediment type and depth was also determined.
 -"P" indicates all three post-hole samples had roots.
 -"A" indicates none of three post-hole samples contained roots.

Approximate 57-Ac Boundary of Recent Dredge Material Placement

Approx. 251.4 Ac of Seagrass Delineated by Edge of Seagrass

Notes:
 -Placement Area 62 boundary provided by the U.S. Army Corps of Engineers (M. Nelson).
 -13 Survey Transects
 -3 Post-Hole Samples at 10-m; 1,629 total samples
 -417 0.25-m quadrat samples at 10-meters
 -1,872 0.5-ft Contour Topo Points within survey area
 -52 Sediment Sample Points

Topographic Survey Notes:
 -The seafloor of the survey area was mapped on a 100 ft. grid to obtain a 0.5-ft contour.
 -Elevations were recorded in NAVD 88 Datum.
 -Each sample location was recorded by RTK GPS.