

# ALEXANDER ISLAND BORING SUMMARY SHEET

|                          |                      |
|--------------------------|----------------------|
| <b>BORING ID:</b>        | <u>13-B29</u>        |
| <b>BORING TYPE:</b>      | <u>Borrow Source</u> |
| <b>DEPTH:</b>            | <u>15'</u>           |
| <b>ELEVATION:</b>        | <u>26.23'</u>        |
| <b>X (US SURVEY FT):</b> | <u>3225406.03</u>    |
| <b>Y (US SURVEY FT):</b> | <u>13832775.88</u>   |
| <b>DEPTH TO WATER:</b>   | <u>2.40'</u>         |

Client: USACE-Galveston District Boring: 13-B29  
 Date/Time Drilling Begun: 12.5.13 / 1220 Date/Time Drilling Ended: 12.5.13 / 1320  
 Driller: Jason New Logger: Eddie Ficker Designated X (Easting): -95.0390568  
 Drill Rig: Mobile B57 Designated Y (Northing): 29.7259226 Z (Elevation):  
 Total depth: 15.0 Initial Water Encounter (Depth, date/time): 2.70 / 12.5.13 / 1230 Water Depth (15 min.): 2.40

220  
Probe Soil  
1320  
END

| Feet    | USCS Log | Sample Interval (ft) | Amount Material Obtained (in) | Sample Type Blow Counts | Number of Tubes | Pocket Pene. (tsf) | Shear Strength (tsf) | Description (SOIL TYPE, color, moisture, plasticity, consistency, density, inclusions, etc.) |
|---------|----------|----------------------|-------------------------------|-------------------------|-----------------|--------------------|----------------------|----------------------------------------------------------------------------------------------|
| 0       | SM       | 0-2                  | 12                            | ST                      | 1 B             | -                  | -                    | Silty SAND (F-C), Light Brownish Gray, Moist, V. Loose                                       |
| 2.4     |          | <del>2-4</del>       |                               |                         |                 |                    |                      |                                                                                              |
| 3.5     |          | 3-5                  | 13                            | SS<br>2-4-1             | 1 B             | -                  | -                    | SAA (F-M) Light Gray, Wet, V. Loose                                                          |
| 4.8     |          | <del>4-8</del>       |                               |                         |                 |                    |                      |                                                                                              |
| 6.8     |          | <del>6-8</del>       |                               |                         |                 |                    |                      |                                                                                              |
| 8-10    | SM       | 8-10                 | 15                            | SS<br>1-3-3             | 1 B             | -                  | -                    | Silty SAND (F-M) Light Gray, Wet, Loose; 9'4" to 9'9" Dark Clayey Gmy SAND (SC) Wet,         |
| 9.9     | SM       | 9.9-10               |                               |                         |                 |                    |                      | 2 9.9" Light Grayish Brown silty SAND (F-C), wet, V. Loose                                   |
| 13.5-15 | SM       | 13.5-15              | 15                            | SS<br>5-4-3             | 1 B             | -                  | -                    | SAA, Light Gray                                                                              |

Weather: Breezy, Overcast ~ 60°F, Light Rain  
 Comments: (F-C) = fine to coarse grained, V = Very (F-M) = fine to medium grained S.A.A. = Same as above



US Army Corps of Engineers, Southwestern Division  
 Galveston District  
 2000 Fort Point Road/P.O. Box 1229  
 Galveston, TX 77553-1229

Alexander Island  
 Houston Ship Channel  
 Baytown, TX



Quaternary Resource Investigations, L.L.C.  
 Government & Industry in Harmony with the Environment  
 13588 Florida Boulevard, Baton Rouge, Louisiana 70819

COPY OF PEGGY LAKE GEOTECH BH - PEGGY LAKE TEMPLATE GDT - 4/4/14 15:03 - F:\QRI DATA\TECHNICAL\JOBS (CURRENT)\AGE - GALVESTON\2012-12-20 GEOTECHNICAL\CONTRACT\TASK ORDER DY06 2013-09-10 ALEXANDER ISLAND\DELIVERABLES\ALEX



Quaternary Resource Investigations, LLC  
 13588 Florida Boulevard  
 Baton Rouge, LA 70820  
 Telephone: 225-292-1400  
 Fax: 225-292-1404

**BORING NUMBER 13-B29**

**CLIENT** USACE-Galveston District **PROJECT NAME** Alexander Island  
**PROJECT NUMBER** W912HY-13-D-0001-DY06 **PROJECT LOCATION** Alexander Island, Baytown, TX  
**DATE STARTED** 12/5/2013 12:20:00 PM **COMPLETED** 12/5/2013 1:20:00 PM **GROUND ELEVATION** 26.2342 ft **HOLE SIZE** 8.25 inches  
**DRILLING CONTRACTOR** QRI **NORTHING** 13832776 ft **EASTING** 3225406 ft  
**DRILLING METHOD** Hollow Stem Auger **DRILLING RIG MAKE/MODEL** Mobile B57 on Gemco Articulated Platform  
**LOGGED BY** Eddie Ficker **TOTAL DEPTH** 15 ft **GROUND WATER LEVEL** ▽ AT TIME OF DRILLING 2.70 ft / Elev 23.53 ft  
**WEATHER** cloudy, light rain, 60, breezy **▽ 24 HOURS AFTER DRILLING** 2.40 ft / Elev 23.83 ft

| GRAPHIC LOG | USCS SYMBOL | MATERIAL DESCRIPTION                                                 | DEPTH (ft) | SAMPLE TYPE | RECOVERY (in) | SPT BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) | FIELD TORVANE (tsf) | DRY UNIT WT. (pcf) | MOISTURE CONTENT (%) | ATTERBERG LIMITS |               |                  | MINUS #200 SIEVE CONTENT (%) | COMPRESSIVE STRENGTH (tsf) | FAILURE STRAIN (%) | CONFINING PRESSURE (psi) |  |
|-------------|-------------|----------------------------------------------------------------------|------------|-------------|---------------|---------------------------|-------------------|---------------------|--------------------|----------------------|------------------|---------------|------------------|------------------------------|----------------------------|--------------------|--------------------------|--|
|             |             |                                                                      |            |             |               |                           |                   |                     |                    |                      | LIQUID LIMIT     | PLASTIC LIMIT | PLASTICITY INDEX |                              |                            |                    |                          |  |
|             | SP          | SAND; fine to coarse grained, light brownish gray, moist, very loose | 0          | ST          | 12            |                           | -                 |                     |                    | 10                   |                  |               |                  | 4                            |                            |                    |                          |  |
|             |             | fine to medium grained, light gray, wet                              | 5          | NR          | 0             |                           |                   |                     |                    |                      |                  |               |                  |                              |                            |                    |                          |  |
|             |             |                                                                      | 5          | SS          | 13            | 2-4-1 (5)                 | -                 |                     |                    |                      | 27               |               |                  |                              |                            |                    |                          |  |
|             | SM          | Silty SAND; dark gray, wet                                           | 10         | SS          | 15            | 1-3-3 (6)                 | -                 |                     |                    | 38                   |                  |               | 36               |                              |                            |                    |                          |  |
|             |             | fine to coarse grained, light grayish brown, very loose              |            | NR          | 0             |                           |                   |                     |                    |                      |                  |               |                  |                              |                            |                    |                          |  |
|             |             | light gray                                                           | 15         | SS          | 15            | 5-4-3 (7)                 | -                 |                     |                    | 20                   |                  |               |                  |                              |                            |                    |                          |  |

Bottom of borehole at 15.0 feet.



| POINT | EASTING (X)  | NORTHING (Y)  | ELEV. (Z) | BORING          |
|-------|--------------|---------------|-----------|-----------------|
| 1     | 3,224,839.86 | 13,829,574.96 | 26.07     | 13-B01 SURVEYED |
| 2     | 3,224,468.96 | 13,829,647.11 | 27.56     | 13-B02 SURVEYED |
| 3     | 3,224,781.02 | 13,829,832.05 | 27.42     | 13-B03 SURVEYED |
| 4     | 3,225,085.04 | 13,829,951.90 | 28.02     | 13-B04 SURVEYED |
| 5     | 3,224,798.15 | 13,830,185.96 | 26.71     | 13-B05 SURVEYED |
| 6     | 3,225,137.02 | 13,830,319.06 | 27.97     | 13-B06 SURVEYED |
| 7     | 3,225,402.24 | 13,830,377.84 | 27.40     | 13-B07 SURVEYED |
| 8     | 3,225,137.84 | 13,830,656.99 | 27.34     | 13-B08 SURVEYED |
| 9     | 3,225,431.15 | 13,830,710.11 | 28.02     | 13-B09 SURVEYED |
| 10    | 3,225,763.04 | 13,830,892.08 | 27.75     | 13-B10 SURVEYED |
| 11    | 3,225,389.99 | 13,831,061.05 | 26.37     | 13-B11 SURVEYED |
| 12    | 3,225,579.86 | 13,831,378.86 | 26.12     | 13-B12 SURVEYED |
| 13    | 3,225,136.04 | 13,831,406.95 | 26.39     | 13-B13 SURVEYED |
| 14    | 3,225,382.99 | 13,831,732.99 | 28.30     | 13-B14 SURVEYED |
| 15    | 3,225,027.98 | 13,831,671.05 | 27.36     | 13-B15 SURVEYED |
| 16    | 3,224,743.97 | 13,831,628.99 | 25.72     | 13-B16 SURVEYED |
| 17    | 3,224,619.87 | 13,832,095.98 | 27.15     | 13-B17 SURVEYED |
| 18    | 3,224,819.95 | 13,832,313.05 | 29.49     | 13-B18 SURVEYED |
| 19    | 3,225,218.97 | 13,832,197.96 | 29.61     | 13-B19 SURVEYED |
| 20    | 3,225,789.02 | 13,832,191.02 | 24.98     | 13-B20 SURVEYED |
| 21    | 3,225,424.06 | 13,832,424.86 | 25.99     | 13-B21 SURVEYED |
| 22    | 3,225,960.93 | 13,832,420.96 | 23.86     | 13-B22 SURVEYED |
| 23    | 3,226,409.90 | 13,832,382.04 | 22.95     | 13-B23 SURVEYED |
| 24    | 3,226,641.04 | 13,832,554.90 | 23.17     | 13-B24 SURVEYED |
| 25    | 3,226,468.10 | 13,832,757.96 | 23.39     | 13-B25 SURVEYED |
| 26    | 3,226,192.06 | 13,832,587.05 | 23.82     | 13-B26 SURVEYED |
| 27    | 3,225,917.94 | 13,832,796.84 | 24.65     | 13-B27 SURVEYED |
| 28    | 3,225,689.17 | 13,832,584.94 | 24.74     | 13-B28 SURVEYED |
| 29    | 3,225,406.03 | 13,832,775.88 | 26.23     | 13-B29 SURVEYED |
| 30    | 3,225,210.96 | 13,832,605.92 | 27.31     | 13-B30 SURVEYED |
| 31    | 3,224,956.08 | 13,832,789.07 | 30.03     | 13-B31 SURVEYED |
| 32    | 3,224,892.10 | 13,832,575.99 | 29.78     | 13-B32 SURVEYED |
| 33    | 3,224,600.87 | 13,832,572.04 | 30.06     | 13-B33 SURVEYED |
| 34    | 3,228,153.92 | 13,827,285.05 | 25.73     | 13-P01 SURVEYED |
| 35    | 3,225,272.89 | 13,827,557.13 | 24.82     | 13-P02 SURVEYED |
| 36    | 3,224,485.02 | 13,828,683.79 | 23.82     | 13-P03 SURVEYED |
| 37    | 3,224,458.15 | 13,829,880.09 | 24.00     | 13-P04 SURVEYED |
| 38    | 3,225,186.78 | 13,830,885.15 | 27.81     | 13-P05 SURVEYED |

3,224,655.30 13,829,970.20 Via Exxon Mobil

3,225,009.40 13,830,410.30 Via Exxon Mobil

3,225,494.19 13,830,624.52 Via Exxon Mobil

3,225,508.40 13,831,329.60 Via QRI

3,225,326.00 13,831,726.80 Via QRI

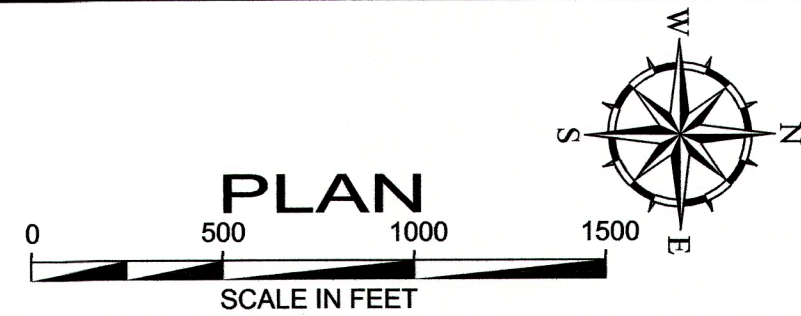
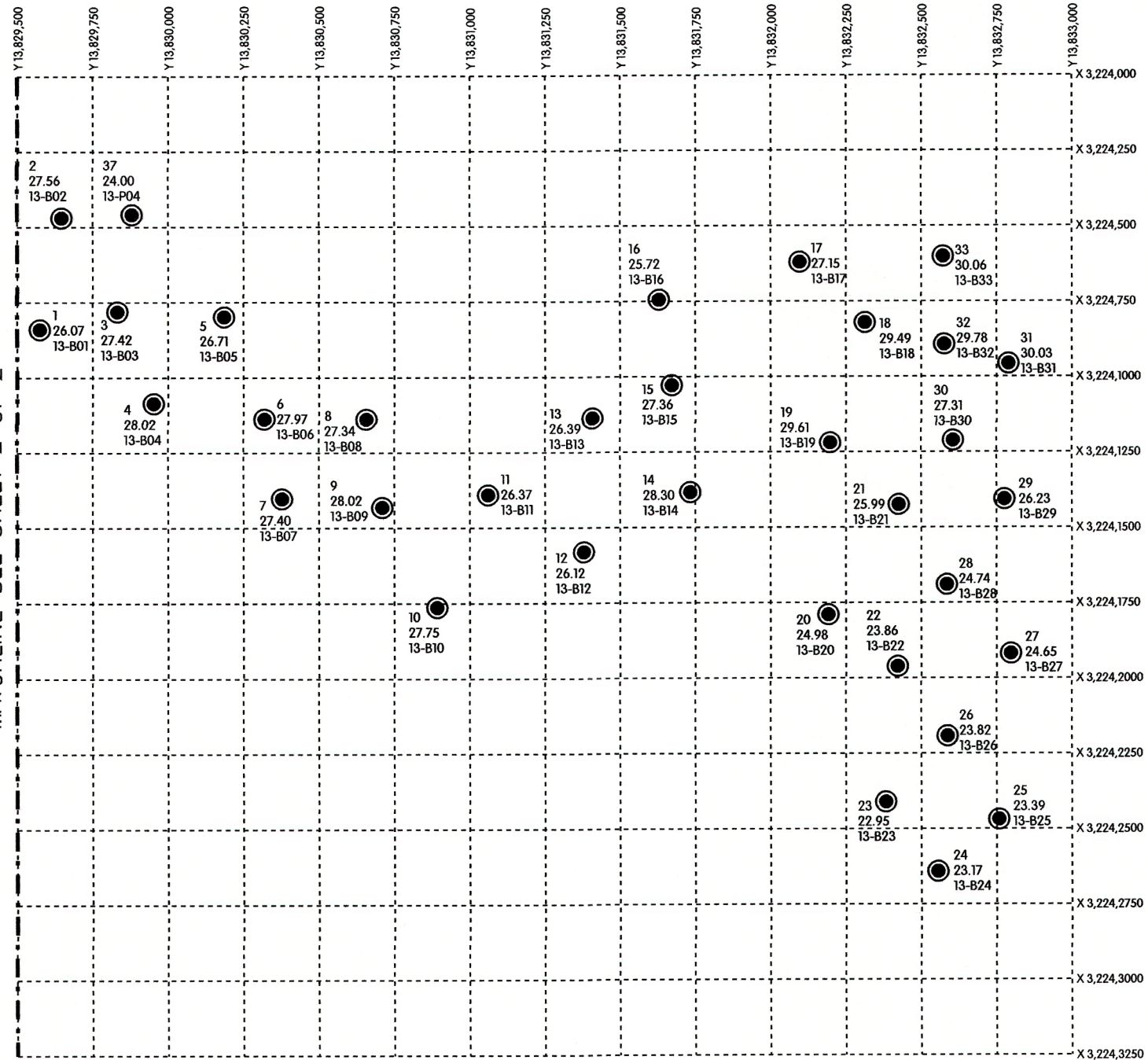
Removed from Contract

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3,226,407.90 13,832,440.70 Via QRI

MATCHLINE SEE SHEET 2 OF 2



**PROJECT BENCHMARK:**

HARRIS COUNTY FLOODPLAIN REFERENCE MARK NUMBER 070020, BRASS DISC IN THE WEST END OF THE NORTH HEADWALL PARK ROAD 1836 APPROXIMATELY 845 FEET SOUTHEAST OF HIGHWAY 134

ELEV. 3.68 FEET, NAVD 1988, 2001 ADJUSTMENT.

THE MONUMENT IS CONSTRAINED TO THE NGS PUBLISHED ELEVATION FOR THE NORTHEAST 2250 CORPS ARP ADJUSTED BY NGS IN 2001 AND AS PUBLISHED IN PID A06430 EPOCH DATE 1997.00

RYAN 2006 CORPS OF ENGINEERS MONUMENT BRASS DISC IN CONCRETE LOCATED AT THE NORTHWEST CORNER OF PEGGY LAKE PLACEMENT AREA.

ELEV. 4.34, NAVD 88

**NOTES:**

1. THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID COORDINATES (NAD 83), AS DERIVED FROM GPS OBSERVATIONS.

GPS OBSERVATIONS ARE BASED ON THE SMARTNET SYSTEM OPERATED BY LEICA GEOSYSTEMS UTILIZING SPIDERNET SOFTWARE TO OBTAIN CENTIMETER ACCURACIES. MEASUREMENTS WERE MADE UTILIZING LEICA VIVA GS15 AND GS12 RECEIVERS.

2. ALL BORING LOCATIONS ARE AS NOTED IN THE TABLE ABOVE.

3. SMARTNET ADJUSTED STATION COORDINATES ARE TIED TO NAD83 (NA2011) DATUM AS DEFINED BY THE NGS CORS DATASHEETS OF THOSE STATIONS HELD FIXED IN THE ADJUSTMENT. FULLY CONSTRAINED ADJUSTED COORDINATES ARE REPORTED TO BE ACCURATE TO ABOUT +/-0.5 CM IN HORIZONTAL AND +/- 1.5 CM IN VERTICAL AT 95% CONFIDENCE (2-SIGMA) LEVEL.

4. BORE HOLES WERE ADJUSTED IN THE FIELD BY QRI STAFF AND SURVEYED IN THAT LOCATION COORDINATES FOR THAT LOCATION ARE AS SHOWN IN THE TABLE ABOVE.

I, KEVIN DREW MCRAE, A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR, HEREBY CERTIFY THAT THIS SURVEY WAS PERFORMED ON THE GROUND BY ME OR UNDER MY SUPERVISION ON THIS THE 19TH DAY OF NOVEMBER, 2013.

*Kevin Drew McRae*

KEVIN DREW MCRAE  
REGISTERED PROFESSIONAL LAND SURVEYOR  
TEXAS REGISTRATION NO. 5485



| Rev. | Description | Date | By |
|------|-------------|------|----|
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|                                               |                |                                                                                        |                                                   |
|-----------------------------------------------|----------------|----------------------------------------------------------------------------------------|---------------------------------------------------|
| Drawn by: X                                   | Checked by: X  | Scale: AS SHOWN                                                                        | Approval: X                                       |
| Submitted by: X                               | Approved by: X | DAVID B. BROOKS, P.E., Chief, General Engineering                                      | BOBBY B. JOHNSON, P.E., Chief, Engineering Branch |
| U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS |                | PREPARED UNDER THE DIRECTION OF CHRISTOPHER W. SALLESE, Col., C.E., DISTRICT COMMANDER |                                                   |

BORING HOLE LOCATIONS  
TASK ORDER NO. DY08  
CONTRACT NO. W912HY13-D-0001  
ALEXANDER ISLAND PLACEMENT AREA  
PASADENA, TEXAS  
HARRIS COUNTY, TEXAS

Drawing No.:  
Sheet 1 of 2  
File No. xxx XXX-XXX

DRAWN BY: CTC    CHECKED BY: KDM

**KM Surveying, LLC**  
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DATE: 1/18/2014    BY: SUBSER    TIME: 2:54:30 PM    FILE: \$FILES

