

Architect-Engineer Services for Vibracore Borings and Laboratory Testing

**Lovers Key Beach Nourishment Sand Search
Reconnaissance Level Geotechnical Investigation**

**Prepared for
Coastal Engineering Consultants Inc.**



**Prepared By
GFA International Inc.**



&

Amdrill Inc.



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Environmental ★ Geotechnical ★ Construction Materials Testing ★ Inspections ★ Code Compliance ★ Environmental Health & Safety

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January 25th, 2021

Attn: Mr. Michael Poff, P.E., President
Coastal Engineering Consultants, Inc.,
28421 Bonita Crossings Blvd
Bonita Springs, Florida 34135

RE:
**Architect-Engineer Services for Vibracore
Borings and Laboratory Testing
Lovers Key Beach Nourishment Sand Search
Reconnaissance Level Geotechnical Investigation
Lee County, Florida**



GFA International Inc. is pleased to submit this report regarding the completion of the vibracore field work and laboratory assessments for this project. In summary, this report includes a description of the work, a description of the equipment utilized, the vibracore sampling procedures, laboratory testing program and maps indicating coring locations.

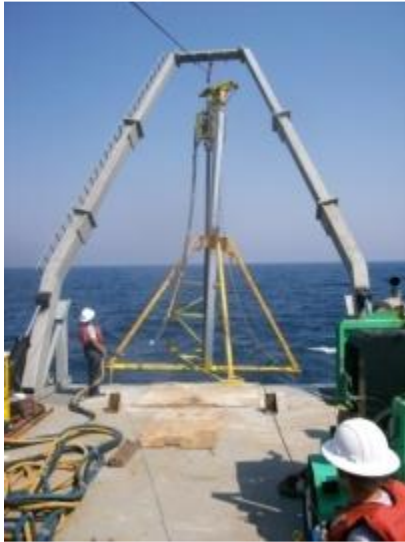
Overview

American Vibracore Services, a division of Amdrill Inc. , conducted vibracore sampling operations for this project to assess the sediment characteristics of shoaled material in designated areas determined by Coastal Engineering Consultants Inc., the Client.

Field work was conducted off Lovers Key, Florida October 5th through October 7th 2020. See Section 2.0, "Vibracore Location Maps" Figures 1-6 that indicate the broad study area as well as individual investigation areas 1, 2, 4, 5, and 6. Maps were generated in ESRI's ArcGIS software with a satellite imagery basemap. A total of 15 vibracores were collected to within project specifications of locations designated by the Client and following project guidelines. 11 cores were selected for laboratory assessment based on favorable material in areas 1, 2, and 6. Cores from areas 4 and 5 contained less favorable material as determined in the field and were not selected for laboratory analysis. A report of the coring and laboratory data is listed herein



Vibracore Sampling Program



Amdrill utilized the vessel “MV Thunderforce” as a work platform for vibracore operations. Amdrill’s large pneumatic vibracore machine was used to extract vibracore samples to specified depths determined by the Client or until refusal. A penetrometer was used to determine depth advancement into the seafloor bottom and the penetration rates were recorded. The “Penetrometer Reports” can be found available in this report in Section 7.0.

As built core locations were recorded during the core collection program by Amdrill and are reported in Florida State Plane Coordinate System, West Zone (NAD83) for horizontal control. Vertical control top of core elevations are expressed in NAVD 1988 provided by Ocean Surveys, Inc. after conducting a bathymetric survey of the study area June 20th through June 25th, 2020. Location data are reported as such in this report and on all laboratory data.

Core Processing

All cores collected from the project were split and logged by a Licensed Geologist in general compliance with American Society for Testing and Materials (ASTM) D 5434. Select layers were sampled per the lab assignments determined by the Client project representative upon review of the draft logs. One lengthwise half was used to extract the samples for lab analysis and the other half of the core was preserved for delivery to the Client. Both halves were wrapped in clear plastic (to preserve moisture and keep material in place) and labeled with boring names and depth intervals.

Photographing

Each core section was photographed in two (2) foot increments with adequate lighting and focus. Cores are displayed in Section 8.0 “Vibracore Photographs” of this report with a legible tape in 10th of a foot increments. Core photos are labeled with the vibracore name, top depth and bottom depth.

Laboratory Testing

Laboratory testing performed at GFA International Inc.’s Lab was conducted in the form of ASTM D 6913 Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis . The following sieve sizes were used in the gradation analysis of the selected samples: 3/4”, 5/8”, 7/16”, 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200 and 230. Each sample was analyzed for visual shell determination by estimating the concentration of shell retained on each individual sieve above the #4 and calculating the total weighted average. Munsell color determination of each sample were recorded in a moist state.

Carbonate content testing was performed on select samples determined by client. The carbonate testing was performed per the non ASTM acid digestion method suggested by Twenhofel and Tyler Method, 1941. The results of are noted on each vibracore log where applicable. Organic content testing was performed using the Loss on Ignition method and reported as total organic content.

In all, 45 gradation tests, 45 visual shell determinations, 45 carbonate content tests, 45 organic content tests, and 45 Munsell color determination were performed. Please find in Sections 5.0 "Sieve Graphs" and Section 6.0 "Sieve Tables" the results of the gradation testing program.

Reporting

This report serves as a compilation of all findings of the **Architect-Engineering Services for Vibracore Borings and Laboratory Testing for the Lovers Key Beach Nourishment Sand Search Reconnaissance Level Geotechnical Investigation Project Lee County, Florida**. The information contained herein meets or exceeds requirements established by the Client which was agreed upon by GFA International Inc. and reflects work completed to the most current standards and procedures unless otherwise requested. In addition, GFA International Inc. is dedicated to safe work practices and is pleased to report that all work related to this project was completed with zero reportable incidents.

Closing

We appreciate the opportunity to be of service on this project and look forward to a continued relationship.

Respectfully Submitted,

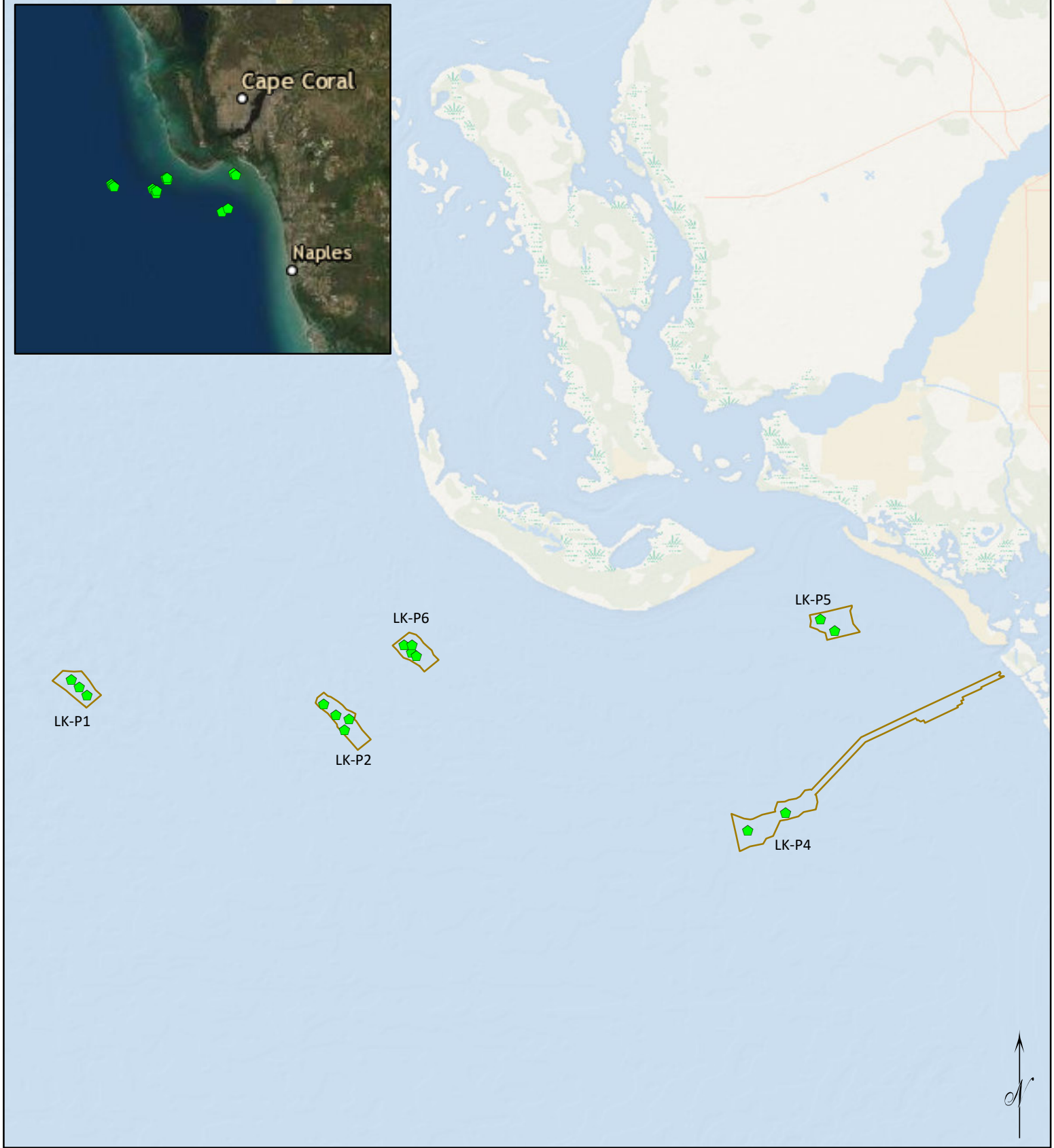


Frederick G Kaub P.G.



2.0 Vibracore Maps





LK-P1

LK-P2

LK-P6

LK-P5

LK-P4

Legend

- ◆ Vibracores
- 2020-06 OSI Recon Survey Limits

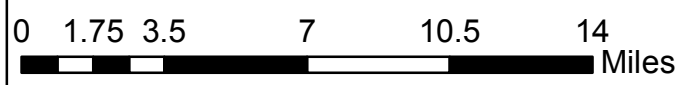


Figure 1

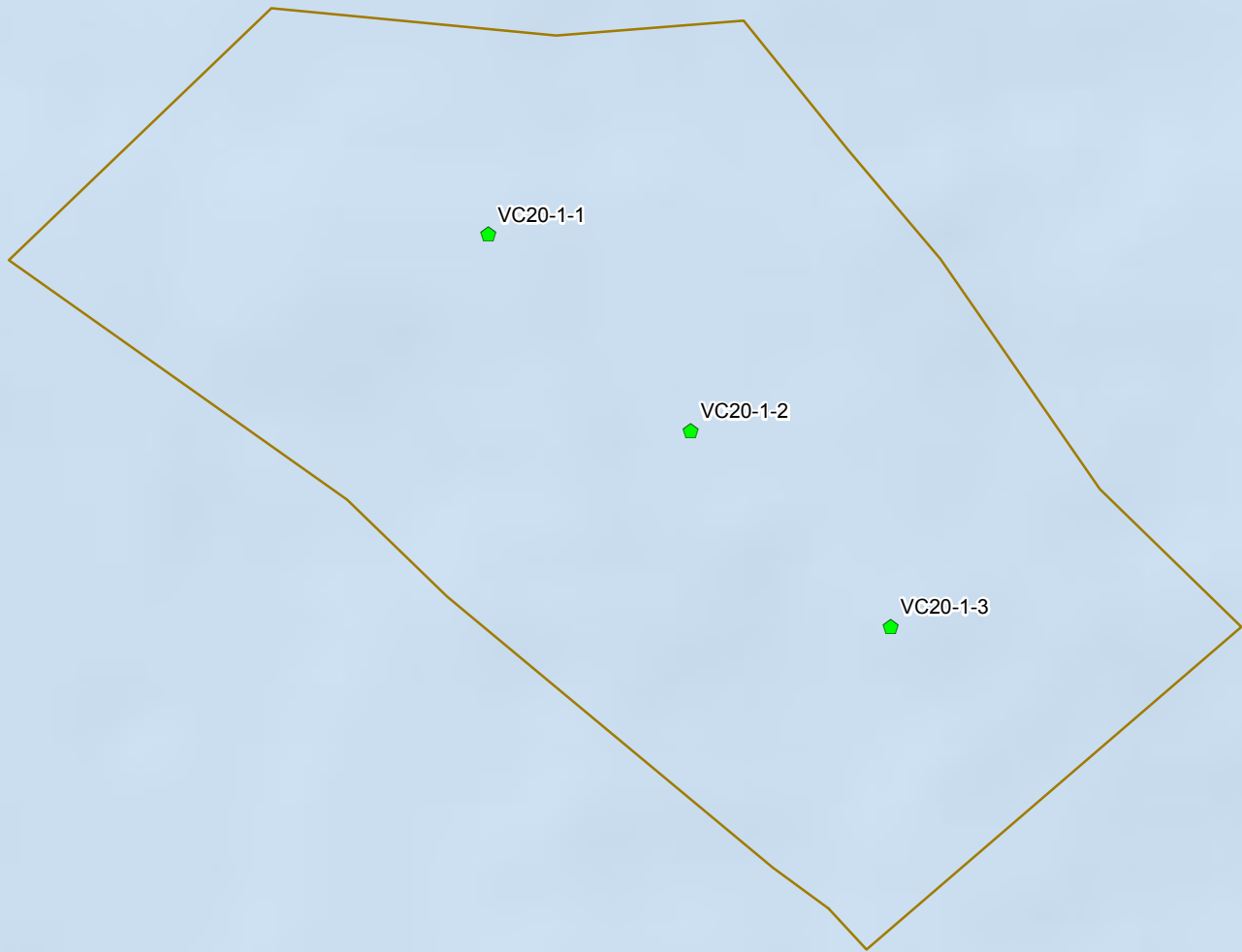
Lovers Key Beach Nourishment
Sand Search

General Investigation Area

Map created by GFA International Inc.





| Vibracore | Latitude | Longitude | Elevation |
|-----------|-----------|------------|-----------|
| VC20-1-1 | 26.385157 | -82.371143 | -36.1 |
| VC20-1-2 | 26.381090 | -82.366967 | -34.5 |
| VC20-1-3 | 26.377048 | -82.362837 | -31.6 |



- Notes:
- Coordinates are referenced to Florida State Plane Coordinate System, West Zone(0902), NAD 83
 - Geographical Coordinates are in decimal degrees referenced to NAD 83
 - Elevations are in feet referenced to NAVD88 (derived from OSI bathymetry Investigation)



Legend

-  Vibracores
-  2020-06 OSI Recon Survey Limits

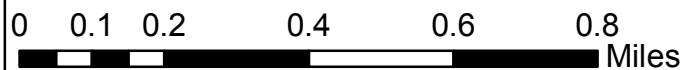
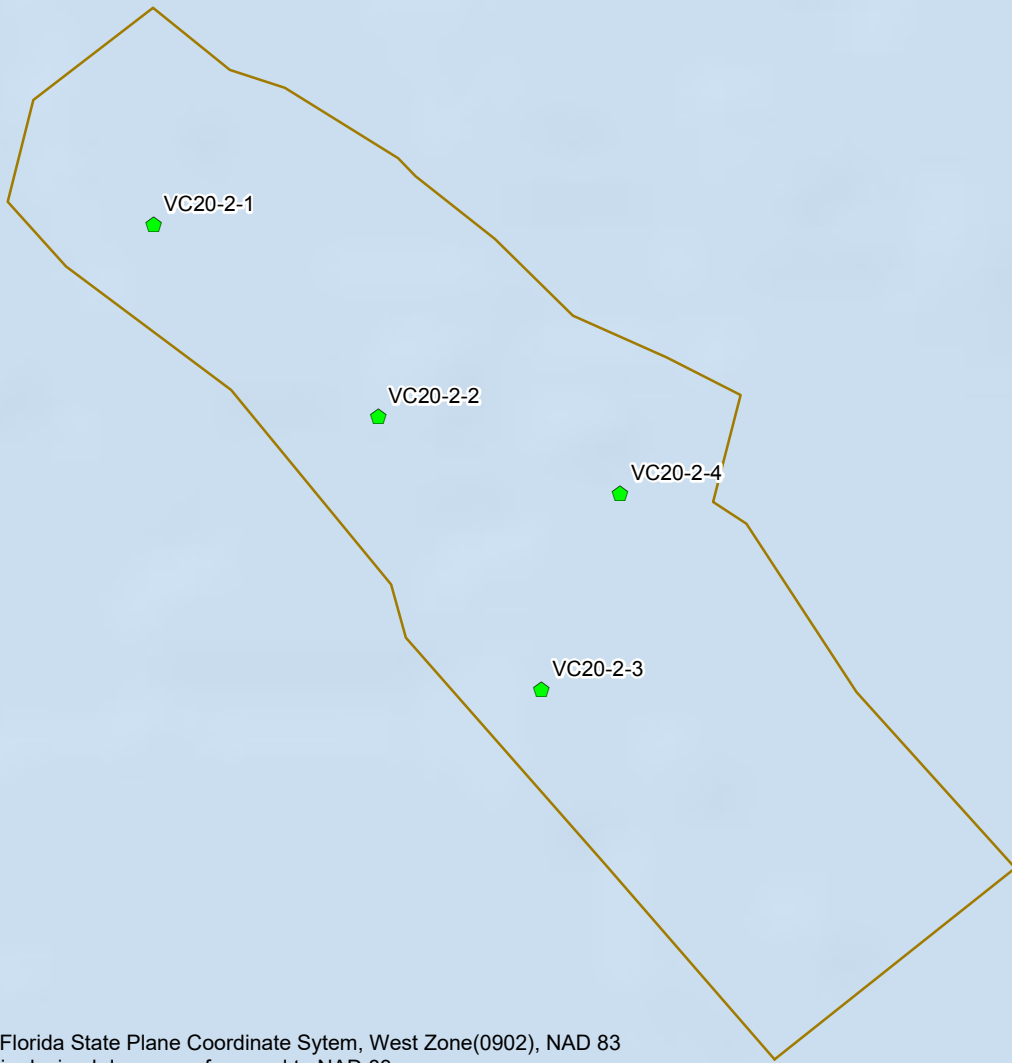


Figure 2

Lovers Key Beach Nourishment
Sand Search

Investigation Area 1

| Vibracore | Latitude | Longitude | Elevation |
|-----------|-----------|------------|-----------|
| VC20-2-1 | 26.372222 | -82.239350 | -37.2 |
| VC20-2-2 | 26.366734 | -82.232932 | -34.7 |
| VC20-2-3 | 26.358948 | -82.228266 | -37.4 |
| VC20-2-4 | 26.364542 | -82.226024 | -36.8 |



Notes:

- Coordinates are referenced to Florida State Plane Coordinate System, West Zone(0902), NAD 83
- Geographical Coordinates are in decimal degrees referenced to NAD 83
- Elevations are in feet referenced to NAVD88 (derived from OSI bathymetry Investigation)



Legend

- ◆ Vibracores
- 2020-06 OSI Recon Survey Limits

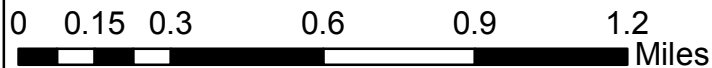
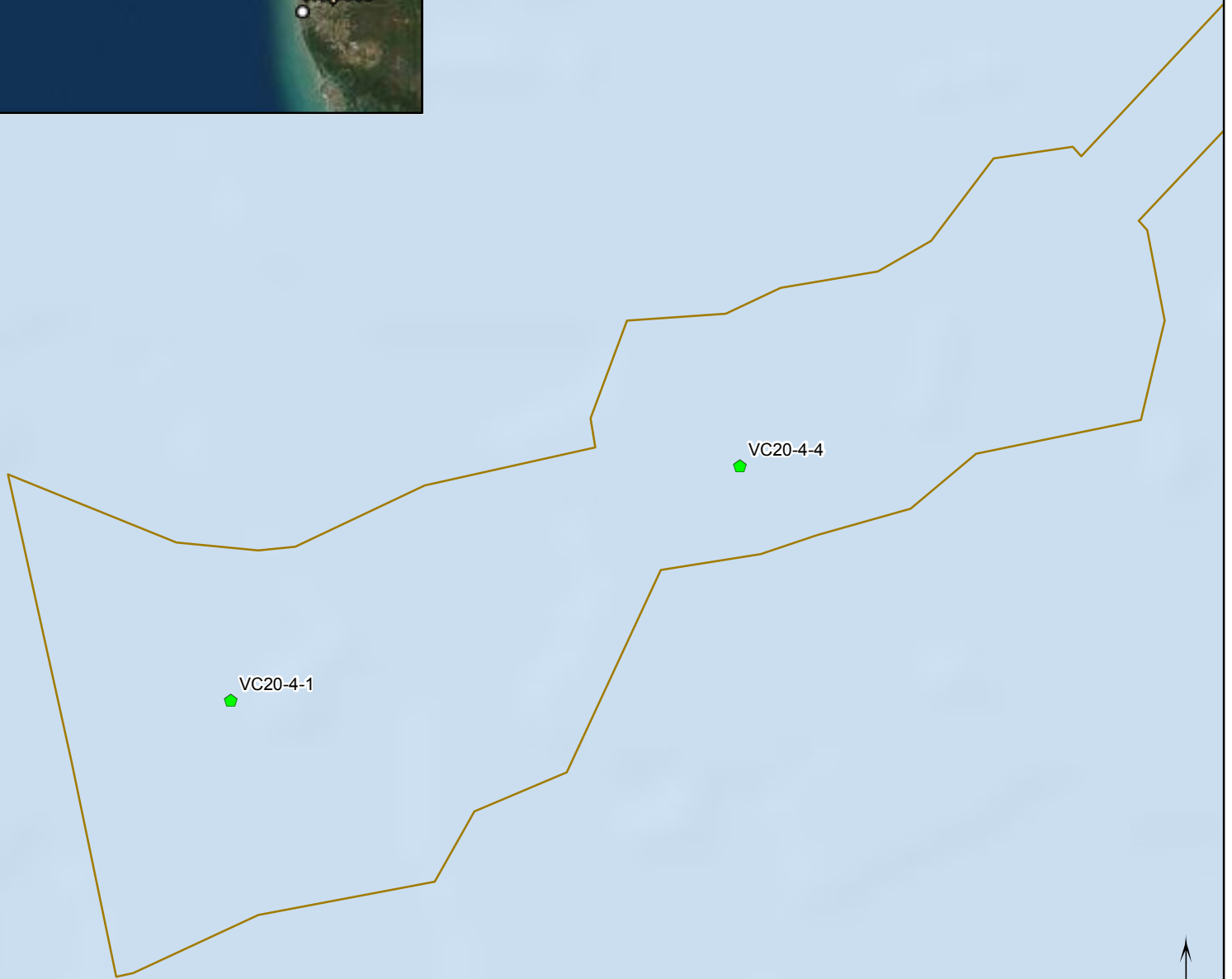
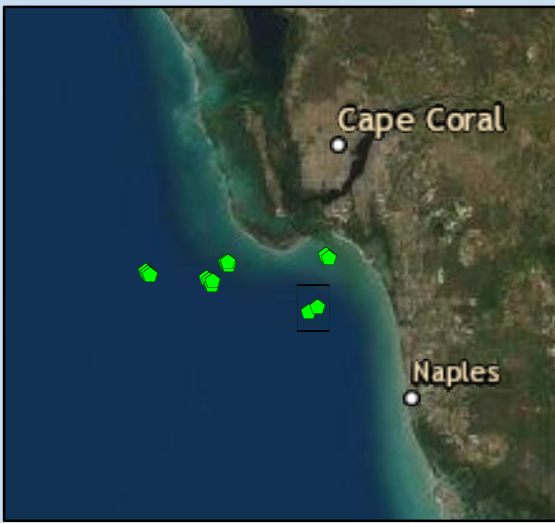


Figure 3

Lovers Key Beach Nourishment
Sand Search

Investigation Area 2

| Vibracore | Latitude | Longitude | Elevation |
|-----------|-----------|------------|-----------|
| VC20-4-1 | 26.306300 | -82.017600 | -40.1 |
| VC20-4-4 | 26.315406 | -81.997816 | -33.0 |



- Notes:
- Coordinates are referenced to Florida State Plane Coordinate System, West Zone(0902), NAD 83
 - Geographical Coordinates are in decimal degrees referenced to NAD 83
 - Elevations are in feet referenced to NAVD88 (derived from OSI bathymetry Investigation)



Legend

- ◆ Vibracores
- 2020-06 OSI Recon Survey Limits

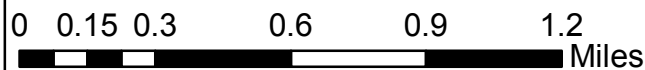
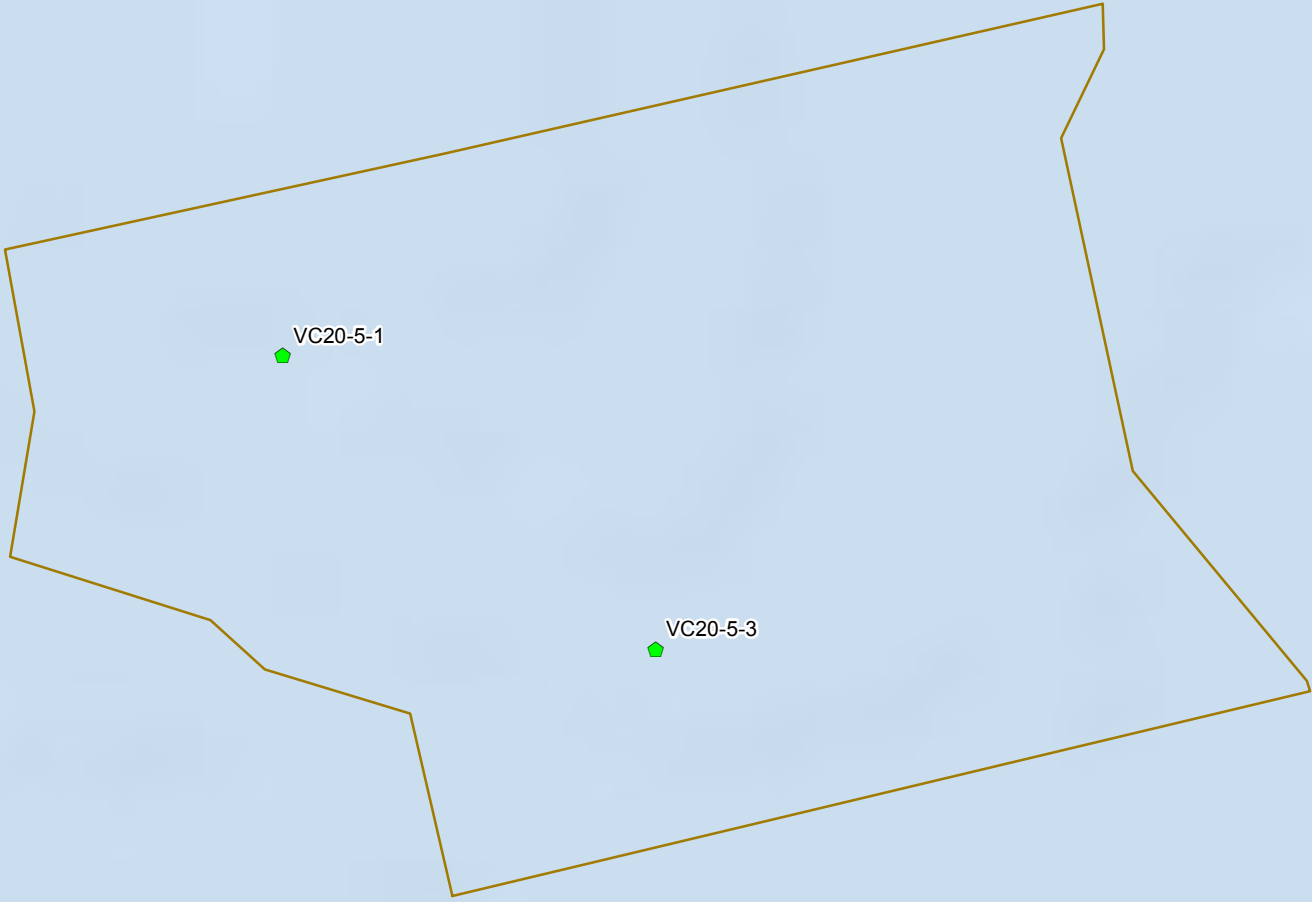


Figure 4

Lovers Key Beach Nourishment
Sand Search

Investigation Area 4

| Vibracore | Latitude | Longitude | Elevation |
|-----------|-----------|------------|-----------|
| VC20-5-1 | 26.416743 | -81.979771 | -15.0 |
| VC20-5-3 | 26.410864 | -81.972302 | -16.8 |



- Notes:
- Coordinates are referenced to Florida State Plane Coordinate Sytem, West Zone(0902), NAD 83
 - Geographical Coordinates are in decimal degrees referenced to NAD 83
 - Elevations are in feet referenced to NAVD88 (derived from OSI bathymetry Investigation)



Legend

- ◆ Vibracores
- 2020-06 OSI Recon Survey Limits

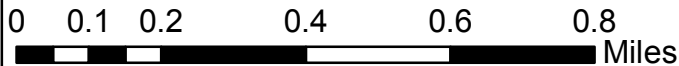
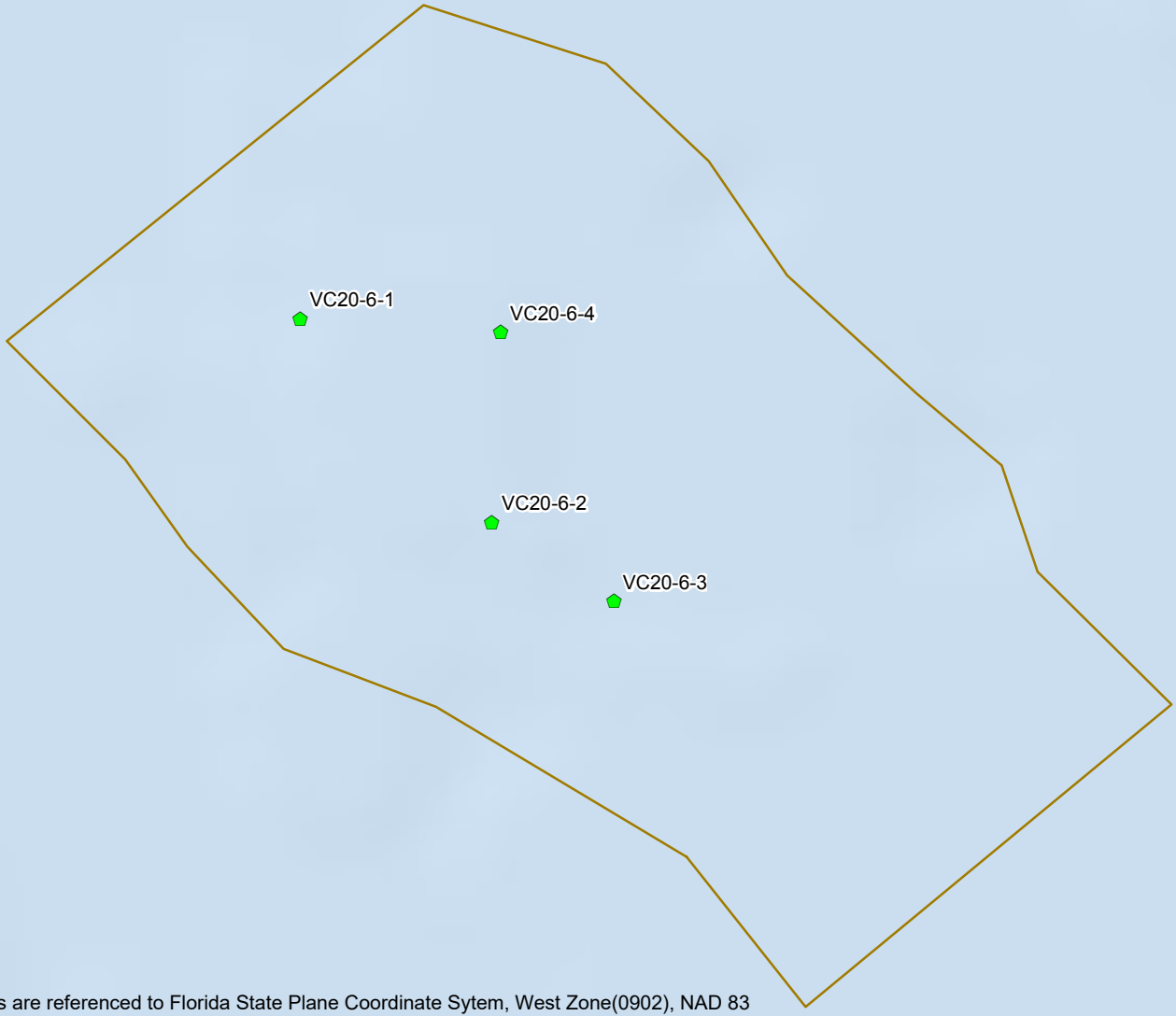


Figure 5

Lovers Key Beach Nourishment
Sand Search
Investigation Area 5

Map created by GFA International Inc.

| Vibracore | Latitude | Longitude | Elevation |
|-----------|-----------|------------|-----------|
| VC20-6-1 | 26.403439 | -82.197289 | -30.3 |
| VC20-6-2 | 26.399234 | -82.193346 | -28.6 |
| VC20-6-3 | 26.397616 | -82.190828 | -31.5 |
| VC20-6-4 | 26.403143 | -82.193165 | -29.6 |



Notes:
 - Coordinates are referenced to Florida State Plane Coordinate System, West Zone(0902), NAD 83
 - Geographical Coordinates are in decimal degrees referenced to NAD 83
 - Elevations are in feet referenced to NAVD88 (derived from OSI bathymetry Investigation)



Legend

- ◆ Vibracores
- 2020-06 OSI Recon Survey Limits

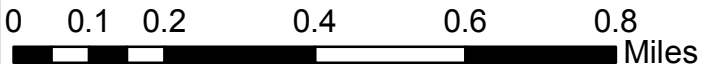


Figure 6
 Lovers Key Beach Nourishment
 Sand Search
 Investigation Area 6

Map created by GFA International Inc.

3.0 Granulometric Summary Table



Lovers Key Beach Nourishment Sand Search
Reconnaissance Level Geotechnical Investigation


| Vibracore | Sample Number | Sample Interval (In) | gINT Granularmetrics | | | | | | USC | Silt (%) | Carbonates (%) | Organics (%) | Shell (%) | Munsell Color | |
|-----------|---------------|----------------------|----------------------|-------|-------|-------|------------------------|--------|-------|----------|----------------|--------------|-----------|---------------|----------|
| | | | Size Class (wt%) | | | | Descriptive Statistics | | | | | | | Wet | |
| | | | Gravel | Sand | <#200 | <#230 | Mean (mm) | Verbal | | | | | | Verbal | Value |
| VC20-1-1 | S1 | 0" - 66.5" | 0.58 | 97.75 | 1.67 | 1.63 | 0.40 | M | SW | 1.63% | 19.70% | 0.69% | 0.58% | Light gray | 10YR 7/1 |
| | S2 | 66.5" - 133" | 0.10 | 96.70 | 3.20 | 3.06 | 0.18 | F | SP | 3.06% | 21.80% | 0.89% | 0.10% | Light gray | 10YR 7/1 |
| | S3 | 133" - 200" | 1.35 | 94.38 | 4.27 | 4.12 | 0.24 | F | SW | 4.12% | 22.10% | 1.17% | 1.35% | Light gray | 10YR 7/1 |
| | S4 | 176" - 200" | 0.12 | 95.71 | 4.17 | 4.03 | 0.23 | F | SP | 4.03% | 23.20% | 1.00% | 0.12% | Light gray | 10YR 7/1 |
| VC20-1-2 | S1 | 0" - 60" | 2.94 | 94.75 | 2.31 | 2.25 | 0.47 | M | SW | 2.25% | 24.10% | 0.70% | 2.94% | Light gray | 10YR 7/1 |
| | S2 | 60" - 120" | 0.20 | 95.58 | 4.22 | 4.15 | 0.35 | M | SW | 4.15% | 20.20% | 0.76% | 0.20% | Light gray | 10YR 7/1 |
| | S3 | 120" - 182" | 2.20 | 93.33 | 4.47 | 4.33 | 0.32 | M | SW | 4.33% | 18.90% | 0.83% | 2.20% | Light gray | 10YR 7/1 |
| | S4 | 158" - 182" | 1.87 | 94.86 | 3.27 | 3.11 | 0.30 | M | SW | 3.11% | 19.60% | 0.63% | 1.87% | Light gray | 10YR 7/1 |
| VC20-1-3 | S1 | 0" - 60" | 7.01 | 91.43 | 1.56 | 1.54 | 0.55 | C | SW | 1.54% | 24.00% | 0.69% | 7.01% | Light gray | 10YR 7/1 |
| | S2 | 60" - 120" | 0.19 | 96.92 | 2.89 | 2.83 | 0.36 | M | SW | 2.83% | 20.80% | 0.74% | 0.19% | Light gray | 10YR 7/1 |
| | S3 | 120" - 180.5" | 0.92 | 92.65 | 6.43 | 6.17 | 0.35 | M | SW-SM | 6.17% | 22.10% | 1.09% | 0.92% | Gray | 10YR 6/1 |
| | S4 | 156.5" - 180.5" | 0.48 | 91.41 | 8.11 | 7.75 | 0.36 | M | SW-SM | 7.75% | 17.20% | 0.88% | 0.48% | Gray | 10YR 6/1 |
| VC20-2-1 | S1 | 0" - 24" | 1.86 | 91.46 | 6.68 | 5.69 | 0.43 | M | SW-SM | 5.69% | 56.26% | 1.22% | 1.86% | Gray | 10YR 6/1 |
| | S2 | 24" - 51" | 1.34 | 93.53 | 5.13 | 4.46 | 0.45 | M | SW | 4.46% | 77.29% | 1.77% | 1.34% | Gray | 10YR 6/1 |
| | S3 | 51" - 75" | 3.72 | 92.80 | 3.48 | 3.12 | 0.52 | C | SW | 3.12% | 80.92% | 1.84% | 3.72% | Gray | 10YR 5/1 |
| | S4 | 0" - 51" | 2.98 | 92.02 | 5.00 | 4.39 | 0.50 | C | SW | 4.39% | 83.90% | 1.89% | 2.98% | Gray | 10YR 5/1 |
| VC20-2-2 | S1 | 0" - 8" | 1.08 | 91.36 | 7.56 | 5.77 | 0.22 | F | SP-SM | 5.77% | 71.50% | 1.83% | 1.08% | Gray | 10YR 6/1 |
| | S2 | 8" - 30" | 0.34 | 96.04 | 3.62 | 3.28 | 0.30 | M | SW | 3.28% | 90.08% | 1.96% | 0.34% | Gray | 10YR 6/1 |
| | S3 | 30" - 50" | 0.23 | 97.56 | 2.21 | 2.00 | 0.35 | M | SW | 2.00% | 90.70% | 1.78% | 0.23% | Gray | 10YR 6/1 |
| | S4 | 50" - 79" | 0.66 | 96.82 | 2.52 | 2.28 | 0.38 | M | SW | 2.28% | 82.06% | 1.93% | 0.66% | Gray | 10YR 6/1 |
| | S5 | 79" - 103.5" | 1.67 | 92.39 | 5.94 | 5.01 | 0.28 | M | SP-SM | 5.01% | 86.45% | 2.09% | 1.67% | Gray | 10YR 5/1 |
| | S6 | 0" - 79" | 0.65 | 96.20 | 3.15 | 2.79 | 0.32 | M | SW | 2.79% | 89.64% | 2.05% | 0.65% | Gray | 10YR 6/1 |

| Vibracore | Sample Number | Sample Interval (In) | gINT Granularmetrics | | | | | | USC | Silt (%) | Carbonates (%) | Organics (%) | Shell (%) | Munsell Color | |
|-----------|---------------|----------------------|----------------------|-------|-------|-------|------------------------|--------|-------|----------|----------------|--------------|-----------|---------------|----------|
| | | | Size Class (wt%) | | | | Descriptive Statistics | | | | | | | Wet | |
| | | | Gravel | Sand | <#200 | <#230 | Mean (mm) | Verbal | | | | | | Verbal | Value |
| VC20-2-3 | S1 | 0" - 56" | 0.48 | 93.57 | 5.95 | 5.44 | 0.33 | M | SW-SM | 5.44% | 89.20% | 1.88% | 0.48% | Gray | 10YR 5/1 |
| | S2 | 56" - 80" | 3.52 | 87.03 | 9.45 | 8.56 | 0.32 | M | SW-SM | 8.56% | 89.80% | 1.98% | 2.65% | Gray | 10YR 6/1 |
| VC20-2-4 | S1 | 0" - 19" | 0.25 | 95.46 | 4.29 | 3.69 | 0.37 | M | SP | 3.69% | 85.55% | 1.91% | 0.25% | Gray | 10YR 6/1 |
| | S2 | 19" - 28" | 4.95 | 88.96 | 6.09 | 5.05 | 0.43 | M | SW-SM | 5.05% | 85.20% | 1.85% | 4.95% | Gray | 10YR 5/1 |
| | S3 | 28" - 48" | 2.79 | 90.12 | 7.09 | 5.93 | 0.40 | M | SW-SM | 5.93% | 85.30% | 1.76% | 2.79% | Gray | 10YR 5/1 |
| | S4 | 48" - 72" | 5.18 | 87.47 | 7.35 | 6.48 | 0.47 | M | SW-SM | 6.48% | 88.10% | 1.81% | 5.18% | Gray | 10YR 5/1 |
| | S5 | 0" - 48" | 0.23 | 94.79 | 4.98 | 4.15 | 0.36 | M | SW | 4.15% | 84.30% | 1.56% | 0.23% | Gray | 10YR 5/1 |
| VC20-6-1 | S1 | 0" - 9" | 0.00 | 91.65 | 8.35 | 7.55 | 0.48 | M | SP-SM | 7.55% | 91.99% | 2.23% | 0.00% | Gray | 10YR 6/1 |
| | S2 | 9" - 26" | 0.00 | 91.56 | 8.44 | 7.73 | 0.54 | C | SP-SM | 7.73% | 90.34% | 2.68% | 0.00% | Gray | 10YR 6/1 |
| | S3 | 26" - 36" | 0.21 | 90.75 | 9.04 | 8.45 | 0.61 | C | SP-SM | 8.45% | 90.04% | 2.31% | 0.21% | Gray | 10YR 6/1 |
| | S4 | 36" - 60" | 0.83 | 93.36 | 5.81 | 5.38 | 0.80 | C | SP-SM | 5.38% | 92.94% | 2.29% | 0.83% | Gray | 10YR 6/1 |
| | S5 | 0" - 36" | 0.05 | 92.62 | 7.33 | 6.71 | 0.55 | C | SP-SM | 6.71% | 91.59% | 2.43% | 0.05% | Gray | 10YR 6/1 |
| VC20-6-2 | S1 | 0" - 26" | 0.98 | 96.89 | 2.13 | 1.98 | 0.41 | M | SW | 1.98% | 86.60% | 2.04% | 0.98% | Gray | 10YR 6/1 |
| | S2 | 26" - 48" | 0.16 | 95.75 | 4.09 | 3.75 | 0.30 | M | SP | 3.75% | 87.00% | 2.02% | 0.16% | Gray | 10YR 6/1 |
| | S3 | 48" - 72" | 1.53 | 83.86 | 14.61 | 12.77 | 0.32 | M | SM | 12.77% | 83.20% | 2.60% | 1.53% | Gray | 10YR 6/1 |
| | S4 | 0" - 48" | 0.61 | 96.65 | 2.74 | 2.53 | 0.37 | M | SW | 2.53% | 86.31% | 1.79% | 0.61% | Gray | 10YR 6/1 |
| VC20-6-3 | S1 | 0" - 13" | 7.03 | 89.28 | 3.69 | 3.38 | 0.57 | C | SW | 3.38% | 77.86% | 2.18% | 7.03% | Light Gray | 10YR 7/1 |
| | S2 | 13" - 26" | 4.92 | 89.05 | 6.03 | 5.36 | 0.46 | M | SW-SM | 5.36% | 86.22% | 2.37% | 4.92% | Gray | 10YR 6/1 |
| | S3 | 26" - 32" | 0.37 | 87.26 | 12.37 | 10.57 | 0.32 | M | SW-SM | 10.57% | 81.64% | 2.37% | 0.37% | Gray | 10YR 6/1 |
| | S4 | 32" - 56" | 16.71 | 63.86 | 19.43 | 16.96 | 0.67 | C | SM | 16.96% | 70.39% | 4.23% | 16.71% | Brown | 10YR 5/3 |
| | S5 | 0" - 56" | 4.57 | 89.80 | 5.63 | 4.99 | 0.48 | M | SW | 4.99% | 85.77% | 2.07% | 4.57% | Light Gray | 10YR 7/1 |
| VC20-6-4 | S1 | 0" - 40" | 0.00 | 90.59 | 9.41 | 8.75 | 0.34 | M | SW-SM | 8.75% | 87.55% | 2.12% | 0.00% | Gray | 10YR 6/1 |
| | S2 | 40" - 64" | 0.35 | 91.51 | 8.14 | 7.46 | 0.46 | M | SW-SM | 7.46% | 87.81% | 2.35% | 0.35% | Gray | 10YR 6/1 |

4.0 Vibracore Logs




Boring Designation VC20-1-1

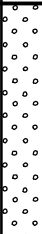





| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-1-1 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 4 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 4 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | UNDISTURBED (UD) 0 |
| 8. TOTAL DEPTH OF BORING 20.0 Ft. | | 15. DATE BORING 10-06-20 | | STARTED 10-06-20 |
| | | 16. ELEVATION TOP OF BORING -36.1 Ft. | | COMPLETED 10-06-20 |
| | | 17. TOTAL RECOVERY FOR BORING 16.6 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|--|
| -36.1 | 0.0 | | | | | |
| | | | Silica sand (m), with trace shell (up to 0.25" in size), large shell (1.5" dia in size) at 1.7', light gray (10YR-7/1), (SW). | | S1 | Sample #S1, Interval: 0" - 66.5" Mean Grain Size (mm): 0.40 Silt (%): 1.63 Gravel (%): 0.58 Carbonates (%): 19.70 |
| -41.6 | 5.5 | | Silica sand (f), with trace shell (up to 0.25" in size), light gray (10YR-7/1), (SP). | | S2 | Sample #S2, Interval: 66.5" - 133" Mean Grain Size (mm): 0.18 Silt (%): 3.06 Gravel (%): 0.10 Carbonates (%): 21.8 |
| -47.2 | 11.1 | | Silica sand (f), with trace shell (up to 0.5" in size), light gray (10YR-7/1), (SW). | | S3 | Sample #S3, Interval: 133" - 200" Mean Grain Size (mm): 0.24 Silt (%): 4.12 Gravel (%): 1.35 Carbonates (%): 22.10 |
| -50.8 | 14.7 | | Silica sand (f), with trace shell (up to 0.25" in size), light gray (10YR-7/1), (SP). | | S4 | Sample #S4, Interval: 176" - 200" Mean Grain Size (mm): 0.23 Silt (%): 4.03 Gravel (%): 0.12 Carbonates (%): 23.20 |
| -52.7 | 16.6 | | Silica sand (f), with trace shell (up to 0.25" in size), light gray (10YR-7/1), (SP). | | | |
| | | | Assumed not recovered, (NR). | | | |
| -56.1 | 20.0 | | End of Boring | | | |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21





Boring Designation VC20-1-2

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-1-2 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 4 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 4 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | UNDISTURBED (UD) 0 |
| 8. TOTAL DEPTH OF BORING 17.8 Ft. | | 15. DATE BORING 10-06-20 | | STARTED 10-06-20 |
| | | 16. ELEVATION TOP OF BORING -34.5 Ft. | | COMPLETED 10-06-20 |
| | | 17. TOTAL RECOVERY FOR BORING 15.1 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|---|---|--------|---------------|--|
| -34.5 | 0.0 | | | | | |
| | |  | Silica sand (m), with some shell (up to 1" in size), light gray (10YR-7/1), (SW). | | S1 | Sample #S1, Interval: 0" - 60" Mean Grain Size (mm): 0.47 Silt (%): 2.25 Gravel (%): 2.94 Carbonates (%): 24.10 |
| -39.5 | 5.0 |  | | | S2 | Sample #S2, Interval: 60" - 120" Mean Grain Size (mm): 0.35 Silt (%): 4.15 Gravel (%): 0.20 Carbonates (%): 20.20 |
| | |  | Silica sand (m), with trace fine shell, large shell (1.5" in size) at 14.1', light gray (10YR-7/1), (SW). | | S3 | Sample #S3, Interval: 120" - 182" Mean Grain Size (mm): 0.32 Silt (%): 4.33 Gravel (%): 2.20 Carbonates (%): 18.90 |
| | |  | | | S4 | Sample #S4, Interval: 158" - 182" Mean Grain Size (mm): 0.32 Silt (%): 3.11 Gravel (%): 2.20 Carbonates (%): 19.60 |
| -49.6 | 15.1 |  | Assumed not recovered, (NR). | | | |
| -52.3 | 17.8 |  | End of Boring | | | |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-1-3 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 4 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 4 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | UNDISTURBED (UD) 0 |
| 8. TOTAL DEPTH OF BORING 19.2 Ft. | | 15. DATE BORING 10-06-20 | | STARTED 10-06-20 |
| | | 16. ELEVATION TOP OF BORING -31.6 Ft. | | COMPLETED 10-06-20 |
| | | 17. TOTAL RECOVERY FOR BORING 15 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|---|--|--------|---------------|--|
| -31.6 | 0.0 | | | | | |
| -34.6 | 3.0 |  | Silica sand (m-c), with few shell (up to 0.5" in size), light gray (10YR-7/1), (SW). | | S1 | Sample #S1, Interval: 0" - 60" Mean Grain Size (mm): 0.55 Silt (%): 1.54 Gravel (%): 7.01 Carbonates (%): 24.00 |
| -41.6 | 10.0 |  | Silica sand (f-m), with trace fine shell, light gray (10YR-7/1), (SW). | | S2 | Sample #S2, Interval: 60" - 120" Mean Grain Size (mm): 0.36 Silt (%): 2.83 Gravel (%): 0.19 Carbonates (%): 20.80 |
| -46.6 | 15.0 |  | Silica sand (f-m) with silt, gray (10YR-6/1), (SW-SM). | | S3 | Sample #S3, Interval: 120" - 180.5" Mean Grain Size (mm): 0.35 Silt (%): 6.17 Gravel (%): 0.92 Carbonates (%): 22.10 |
| -50.8 | 19.2 |  | Assumed not recovered, (NR). | | S4 | Sample #S4, Interval: 156.5" - 180.5" Mean Grain Size (mm): 0.36 Silt (%): 7.75 Gravel (%): 0.48 Carbonates (%): 17.20 |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21


Boring Designation VC20-2-1






| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-2-1 | | LOCATION COORDINATES X = 26.372222 Y = -82.23935 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES 4 | | DISTURBED 4 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 7.0 Ft. | | 15. DATE BORING 10-06-20 | | STARTED 10-06-20 COMPLETED 10-06-20 |
| | | 16. ELEVATION TOP OF BORING -37.2 Ft. | | 17. TOTAL RECOVERY FOR BORING 6.3 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|--|
| -37.2 | 0.0 | | | | | |
| -39.2 | 2.0 | | Silica sand (m) with silt, trace shell (up to 0.75" in size), gray (10YR-6/1), (SW-SM). | | S1 | Sample #S1, Interval: 0" - 24" Mean Grain Size (mm): 0.43 Silt (%): 5.69 Gravel (%): 1.86 Carbonates (%): 56.26 |
| | | | Silica sand (m-c), with trace shell (up to 2.0" in size), gray (10YR-5/1), (SW). | | S2 | Sample #S2, Interval: 24" - 51" Mean Grain Size (mm): 0.45 Silt (%): 4.46 Gravel (%): 1.34 Carbonates (%): 77.29 |
| -43.5 | 6.3 | | | | S3 | Sample #S3, Interval: 51" - 75" Mean Grain Size (mm): 0.52 Silt (%): 3.12 Gravel (%): 3.72 Carbonates (%): 80.92 |
| -44.2 | 7.0 | X | Assumed not recovered, (NR). | | S4 | Sample #S4, Interval: 0" - 51" Mean Grain Size (mm): 0.50 Silt (%): 4.39 Gravel (%): 2.98 Carbonates (%): 83.90 |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21


Boring Designation VC20-2-2

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-2-2 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 6 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 6 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | UNDISTURBED (UD) 0 |
| 8. TOTAL DEPTH OF BORING 10.2 Ft. | | 15. DATE BORING 10-06-20 | | STARTED 10-06-20 |
| | | 16. ELEVATION TOP OF BORING -34.7 Ft. | | COMPLETED 10-06-20 |
| | | 17. TOTAL RECOVERY FOR BORING 8.6 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|---|--|--------|---------------|---|
| -34.7 | 0.0 | | | | | |
| -35.4 | 0.7 |      | Silica sand (f-m) with silt, trace shell (up to 1.0" in size), gray (10YR-6/1), (SP-SM). | | S1 | Sample #S1, Interval: 0" - 8" Mean Grain Size (mm): 0.22 Silt (%): 5.77 Gravel (%): 1.08 Carbonates (%): 71.50 |
| | | | Silica sand (m), with trace shell (up to 3.0" in size), gray (10YR-6/1), (SW). | | S2 | Sample #S2, Interval: 8" - 30" Mean Grain Size (mm): 0.30 Silt (%): 3.28 Gravel (%): 0.34 Carbonates (%): 90.08 |
| | | | Silica sand (m) with silt, trace shell (up to 0.5" in size), gray (10YR-5/1), (SP-SM). | | S3 | Sample #S3, Interval: 30" - 50" Mean Grain Size (mm): 0.35 Silt (%): 2.00 Gravel (%): 0.23 Carbonates (%): 90.70 |
| -41.3 | 6.6 | | Silica sand (m) with silt, little shell (up to 2.5" in size), gray (10YR-5/1), (SP-SM). | | S4 | Sample #S4, Interval: 50" - 79" Mean Grain Size (mm): 0.38 Silt (%): 2.28 Gravel (%): 0.66 Carbonates (%): 82.06 |
| -42.7 | 8.0 | | Assumed not recovered, (NR). | | S5 | Sample #S5, Interval: 79" - 103.5" Mean Grain Size (mm): 0.28 Silt (%): 5.01 Gravel (%): 1.67 Carbonates (%): 86.45 |
| -43.3 | 8.6 | | | | S6 | Sample #S6, Interval: 0" - 79" Mean Grain Size (mm): 0.32 Silt (%): 2.79 Gravel (%): 0.65 Carbonates (%): 89.64 |
| -44.7 | 10.0 | | End of Boring | | | |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Boring Designation VC20-2-3

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-2-3 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 2 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | 15. DATE BORING 10-06-20 |
| 8. TOTAL DEPTH OF BORING 6.7 Ft. | | 16. ELEVATION TOP OF BORING -37.4 Ft. | | 17. TOTAL RECOVERY FOR BORING 6.7 Ft. |
| 18. SIGNATURE AND TITLE OF INSPECTOR | | | | |


| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|--|
| -37.4 | 0.0 | | | | | |
| | | | Silica sand (m) with silt, trace shell (up to 0.75" in size), gray (10YR-5/1), (SW-SM). | | S1 | Sample #S1, Interval: 0" - 56" Mean Grain Size (mm): 0.33 Silt (%): 5.44 Gravel (%): 0.48 Carbonates (%): 89.20 |
| -43.2 | 5.8 | | | | S2 | Sample #S2, Interval: 56" - 80" Mean Grain Size (mm): 0.32 Silt (%): 8.56 Gravel (%): 3.52 Carbonates (%): 89.80 |
| -44.1 | 6.7 | | Silica sand (m) with silt, trace shell (up to 2.5" in size) & trace rock (up to 0.75" in size), gray (10YR-6/1), (SW-SM). | | | |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-2-4 | | LOCATION COORDINATES X = 26.364542 Y = -82.226024 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES | | DISTURBED 5 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 7.1 Ft. | | 15. DATE BORING | | STARTED 10-07-20 COMPLETED 10-07-20 |
| | | 16. ELEVATION TOP OF BORING -36.8 Ft. | | 17. TOTAL RECOVERY FOR BORING 6 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|--|
| -36.8 | 0.0 | | | | | |
| -38.4 | 1.6 | ••••• | Silica sand (m), with trace shell (up to 0.25" in size) & trace silt, gray (10YR-6/1), (SP). | | S1 | Sample #S1, Interval: 0" - 19" Mean Grain Size (mm): 0.37 Silt (%): 3.69 Gravel (%): 0.25 Carbonates (%): 85.55 |
| -39.2 | 2.4 | ••••• | Silica sand (m) with silt, trace shell (up to 1.5" in size), gray (10YR-5/1), (SW-SM). | | S2 | |
| | | ••••• | Silica sand (m) with silt, trace shell (up to 0.75" in size) & rock (3" in size) at 4.2', gray (10YR-5/1), (SW-SM). | | S3 | Sample #S2, Interval: 19" - 28" Mean Grain Size (mm): 0.43 Silt (%): 5.05 Gravel (%): 4.95 Carbonates (%): 85.20 |
| | | ••••• | | | | S4 |
| -42.8 | 6.0 | ••••• | | | S5 | Sample #S3, Interval: 28" - 48" Mean Grain Size (mm): 0.40 Silt (%): 5.93 Gravel (%): 2.79 Carbonates (%): 85.30 |
| -43.9 | 7.1 | X | Assumed not recovered, (NR). | | | |
| | | | End of Boring | | | |
| | | | | | | Sample #S4, Interval: 48" - 72" Mean Grain Size (mm): 0.47 Silt (%): 6.48 Gravel (%): 5.18 Carbonates (%): 85.20 |
| | | | | | | Sample #S5, Interval: 0" - 48" Mean Grain Size (mm): 0.48 Silt (%): 4.15 Gravel (%): 0.23 Carbonates (%): 84.30 |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

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|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-4-1 | | LOCATION COORDINATES X = 26.3063 Y = -82.0176 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 0 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | 15. DATE BORING |
| 8. TOTAL DEPTH OF BORING 20.0 Ft. | | 16. ELEVATION TOP OF BORING -40.1 Ft. | | STARTED 10-05-20 COMPLETED 10-05-20 |
| | | 17. TOTAL RECOVERY FOR BORING 16 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|--|--------|---------------|---------|
| -40.1 | 0.0 | | | | | |
| -40.9 | 0.8 | ••••• | Silica sand (f-m), very pale brown (10YR-7/4), (SP). | | | |
| -42.2 | 2.1 | ••••• | Silica sand (f-m) with silt, gray (10YR-6/1), (SP-SM). | | | |
| | | | Clay, dark grayish brown (10YR-4/2), (CL). | | | |
| -49.4 | 9.3 | | Clay, interbedded with very pale brown (10YR 3/2) sandy clay lenses, very dark grayish brown (10YR-3/2), (CL). | | | |
| -54.1 | 14.0 | | Sandy clay, trace rock (up to 1" in size), white (10YR-8/1), (CL). | | | |
| -56.1 | 16.0 | | Assumed not recovered, (NR). | | | |
| -60.1 | 20.0 | X | End of Boring | | | |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21






Boring Designation VC20-4-4

| | | | | |
|--|--|---|---|---|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-4-4 | | LOCATION COORDINATES X = 26.315406 Y = -81.997816 | | 9. SIZE AND TYPE OF BIT 4.0 In. 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) NAD 1983 VERTICAL NAVD 88 |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 11. MANUFACTURER'S DESIGNATION OF DRILL <input type="checkbox"/> AUTO HAMMER Vibracore <input type="checkbox"/> MANUAL HAMMER |
| 4. NAME OF DRILLER BM | | 12. TOTAL SAMPLES DISTURBED 0 UNDISTURBED (UD) 0 | | 13. TOTAL NUMBER CORE BOXES |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 14. ELEVATION GROUND WATER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 15. DATE BORING STARTED 10-05-20 COMPLETED 10-05-20 | | 16. ELEVATION TOP OF BORING -33.0 Ft. |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 17. TOTAL RECOVERY FOR BORING 14.5 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |
| 8. TOTAL DEPTH OF BORING 15.8 Ft. | | | | |


| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|---------|
| -33.0 | 0.0 | | | | | |
| -38.5 | 5.5 | ••••• | Silica sand (f-m) with silt, gray (10YR-6/1), (SP-SM). | | | |
| -46.3 | 13.3 | // | Clay, dark grayish brown (10YR-4/2), (CL). | | | |
| -47.5 | 14.5 | // | Sandy clay, with trace rock (up to 2.5" in size), gray (10YR-6/1), (CL). | | | |
| -48.9 | 15.9 | X | Assumed not recovered, (NR). | | | |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

| | | | | |
|--|--|--|---|---|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-5-1 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD) 0 0 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 15. DATE BORING STARTED COMPLETED 10-05-20 10-05-20 | | 16. ELEVATION TOP OF BORING -15.0 Ft. |
| 8. TOTAL DEPTH OF BORING 20.0 Ft. | | 17. TOTAL RECOVERY FOR BORING 11.4 Ft. | | 18. SIGNATURE AND TITLE OF INSPECTOR |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|---|--|--------|---------------|---------|
| -15.0 | 0.0 | | | | | |
| -17.4 | 2.4 |  | Silica sand (f-m) with silt, gray (10YR-5/1), (SP-SM). | | | |
| -18.3 | 3.3 |  | Silica sand (f-m) with silt, very pale brown (10YR-8/3), (SP-SM). | | | |
| -24.0 | 9.0 |  | Silty silica sand (f-m), gray (10YR-6/1), (SM). | | | |
| -26.4 | 11.4 |  | Clay, interbedded with light gray (10YR 7/1) sandy clay lenses, trace shell (up to 1.5" in size), organic inclusion from 9.0' - 9.7', dark grayish brown (10YR-4/2), (CL). | | | |
| -35.0 | 20.0 |  | Assumed not recovered, (NR). | | | |
| | | | End of Boring | | | |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-5-3 | | LOCATION COORDINATES X = 26.410864 Y = -81.972302 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES | | DISTURBED 0 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 20.0 Ft. | | 15. DATE BORING | | STARTED 10-05-20 COMPLETED 10-05-20 |
| | | 16. ELEVATION TOP OF BORING -16.8 Ft. | | 17. TOTAL RECOVERY FOR BORING 15.1 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|---------|
| -16.8 | 0.0 | | | | | |
| -18.4 | 1.6 | ↑↑↑↑ | Silty silica sand (f-m), gray (10YR-6/1), (SM). | | | |
| | | | Sandy clay, with trace to few shell (up to 2.0" in size), grayish brown (10YR-5/2), (CL). | | | |
| -31.9 | 15.1 | X | Assumed not recovered, (NR). | | | |
| -36.8 | 20.0 | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21


Boring Designation VC20-6-1

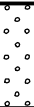
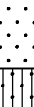


| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-6-1 | | LOCATION COORDINATES X = 26.403439 Y = -82.197289 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES 5 | | DISTURBED 5 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 5.9 Ft. | | 15. DATE BORING 10-05-20 | | STARTED 10-05-20 COMPLETED 10-05-20 |
| | | 16. ELEVATION TOP OF BORING -30.3 Ft. | | 17. TOTAL RECOVERY FOR BORING 5.1 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|---|--------|---------------|--|
| -30.3 | 0.0 | ••••• | Silica sand (m-c) with silt, trace fine shell (up to 0.5" in size) increasing with depth, gray (10YR-6/1), (SP-SM). | | S1 | Sample #S1, Interval: 0" - 9" Mean Grain Size (mm): 0.48 Silt (%): 7.55 Gravel (%): 0.0 Carbonates (%): 91.99 |
| | | ••••• | | | S2 | |
| -35.4 | 5.1 | ••••• | | | S3 | Sample #S2, Interval: 9" - 26" Mean Grain Size (mm): 0.54 Silt (%): 7.73 Gravel (%): 0.0 Carbonates (%): 90.34 |
| | | ••••• | | S4 | | |
| -36.2 | 5.9 | X | Assumed not recovered, (NR). | | S5 | Sample #S3, Interval: 26" - 36" Mean Grain Size (mm): 0.61 Silt (%): 8.45 Gravel (%): 0.21 Carbonates (%): 90.04 |
| | | | End of Boring | | | Sample #S4, Interval: 36" - 60" Mean Grain Size (mm): 0.80 Silt (%): 5.38 Gravel (%): 0.83 Carbonates (%): 92.94 |
| | | | | | | Sample #S5, Interval: 0" - 36" Mean Grain Size (mm): 0.55 Silt (%): 6.71 Gravel (%): 0.05 Carbonates (%): 91.59 |


FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Boring Designation VC20-6-2

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-6-2 | | | | |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | 12. TOTAL SAMPLES 4 |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | DISTURBED 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 14. ELEVATION GROUND WATER | | 15. DATE BORING 10-05-20 |
| 8. TOTAL DEPTH OF BORING 7.2 Ft. | | 16. ELEVATION TOP OF BORING -28.6 Ft. | | STARTED 10-05-20 |
| | | 17. TOTAL RECOVERY FOR BORING 6 Ft. | | COMPLETED 10-05-20 |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |


| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|---|---|--------|---------------|---|
| -28.6 | 0.0 | | | | | |
| -30.8 | 2.2 |  | Silica sand (m), trace fine shell (up to 0.25" in size), gray (10YR-6/1), (SW). | | S1 | Sample #S1, Interval: 0" - 26" Mean Grain Size (mm): 0.41 Silt (%): 1.98 Gravel (%): 0.98 Carbonates (%): 86.60 |
| -32.6 | 4.0 |  | Silica sand (m), trace fine shell (up to 0.25" in size), trace silt, gray (10YR-6/1), (SP). | | S2 | Sample #S2, Interval: 26" - 48" Mean Grain Size (mm): 0.30 Silt (%): 3.75 Gravel (%): 0.16 Carbonates (%): 87.00 |
| -34.6 | 6.0 |  | Silty silica sand (m), trace fine shell (up to 0.25" in size), gray (10YR-6/1), (SM). | | S3 | Sample #S3, Interval: 48" - 72" Mean Grain Size (mm): 0.32 Silt (%): 12.77 Gravel (%): 1.53 Carbonates (%): 83.20 |
| -35.8 | 7.2 |  | Assumed not recovered, (NR). | | S4 | Sample #S4, Interval: 0" - 48" Mean Grain Size (mm): 0.37 Silt (%): 2.53 Gravel (%): 0.61 Carbonates (%): 86.31 |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-6-3 | | LOCATION COORDINATES X = 26.397616 Y = -82.190828 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES | | DISTURBED 5 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 11.0 Ft. | | 15. DATE BORING | | STARTED 10-05-20 COMPLETED 10-05-20 |
| | | 16. ELEVATION TOP OF BORING -31.5 Ft. | | 17. TOTAL RECOVERY FOR BORING 6 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|--|--------|---------------|--|
| -31.5 | 0.0 | | | | | |
| -32.6 | 1.1 | ○ | Silica sand (c), with few fine shell (up to 0.25" in size), light gray (10YR-7/1), (SW). | | S1 | Sample #S1, Interval: 0" - 13" Mean Grain Size (mm): 0.57 Silt (%): 3.38 Gravel (%): 7.03 Carbonates (%): 77.86 |
| -34.2 | 2.7 | ○ | Silica sand (m) with silt, trace shell (up to 0.5" in size), gray (10YR-6/1), (SW-SM). | | S2 | |
| -35.7 | 4.2 | ○ | Silty silica sand (c), with little shell (up to 0.5" in size), brown (10YR-5/3), (SM). | | S3 | Sample #S2, Interval: 13" - 26" Mean Grain Size (mm): 0.46 Silt (%): 5.36 Gravel (%): 4.92 Carbonates (%): 86.22 |
| -37.0 | 5.5 | ○ | Silica sand (m), with trace shell (up to .5" in size), light gray (10YR-7/1), (SW). (Visually Classified USCS) | | S4 | |
| -37.5 | 6.0 | ○ | Silica sand (f-m), with few shell (up to 1" in size) & trace to few rock (up to 1.5" in size), light gray, (10YR-7/1), (SW). (Visually Classified USCS) | | S5 | Sample #S3, Interval: 26" - 32" Mean Grain Size (mm): 0.32 Silt (%): 10.57 Gravel (%): 0.37 Carbonates (%): 81.64 |
| | | X | Assumed not recovered, (NR). | | | Sample #S4, Interval: 32" - 56" Mean Grain Size (mm): 0.67 Silt (%): 16.96 Gravel (%): 16.71 Carbonates (%): 70.39 |
| -42.5 | 11.0 | | End of Boring | | | Sample #S5, Interval: 0" - 56" Mean Grain Size (mm): 0.48 Silt (%): 4.99 Gravel (%): 4.57 Carbonates (%): 85.77 |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/25/21

| | | | | |
|--|--|---|---|--|
| DRILLING LOG | | DIVISION Coastal Engineering Consultants Inc. | INSTALLATION Bonita Springs, Fl | SHEET 1 OF 1 SHEETS |
| 1. PROJECT Lovers Key Beach Nourishment Sand Search Lee County, Florida | |  | | |
| 2. BORING DESIGNATION VC20-6-4 | | LOCATION COORDINATES X = 26.403143 Y = -82.193165 | | 9. SIZE AND TYPE OF BIT 4.0 In. |
| 3. DRILLING AGENCY American Vibracore Services | | CONTRACTOR FILE NO. | | 10. COORDINATE SYSTEM/DATUM Geographic (Latitude/Longitude) |
| 4. NAME OF DRILLER BM | | 11. MANUFACTURER'S DESIGNATION OF DRILL Vibracore | | HORIZONTAL NAD 1983 VERTICAL NAVD 88 |
| 5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED | | DEG. FROM VERTICAL | BEARING | <input type="checkbox"/> AUTO HAMMER <input type="checkbox"/> MANUAL HAMMER |
| 6. THICKNESS OF OVERBURDEN 0.0 Ft. | | 12. TOTAL SAMPLES | | DISTURBED 2 UNDISTURBED (UD) 0 |
| 7. DEPTH DRILLED INTO ROCK 0.0 Ft. | | 13. TOTAL NUMBER CORE BOXES | | 14. ELEVATION GROUND WATER |
| 8. TOTAL DEPTH OF BORING 6.3 Ft. | | 15. DATE BORING | | STARTED 10-05-20 COMPLETED 10-05-20 |
| | | 16. ELEVATION TOP OF BORING -29.6 Ft. | | 17. TOTAL RECOVERY FOR BORING 5.4 Ft. |
| | | 18. SIGNATURE AND TITLE OF INSPECTOR | | |

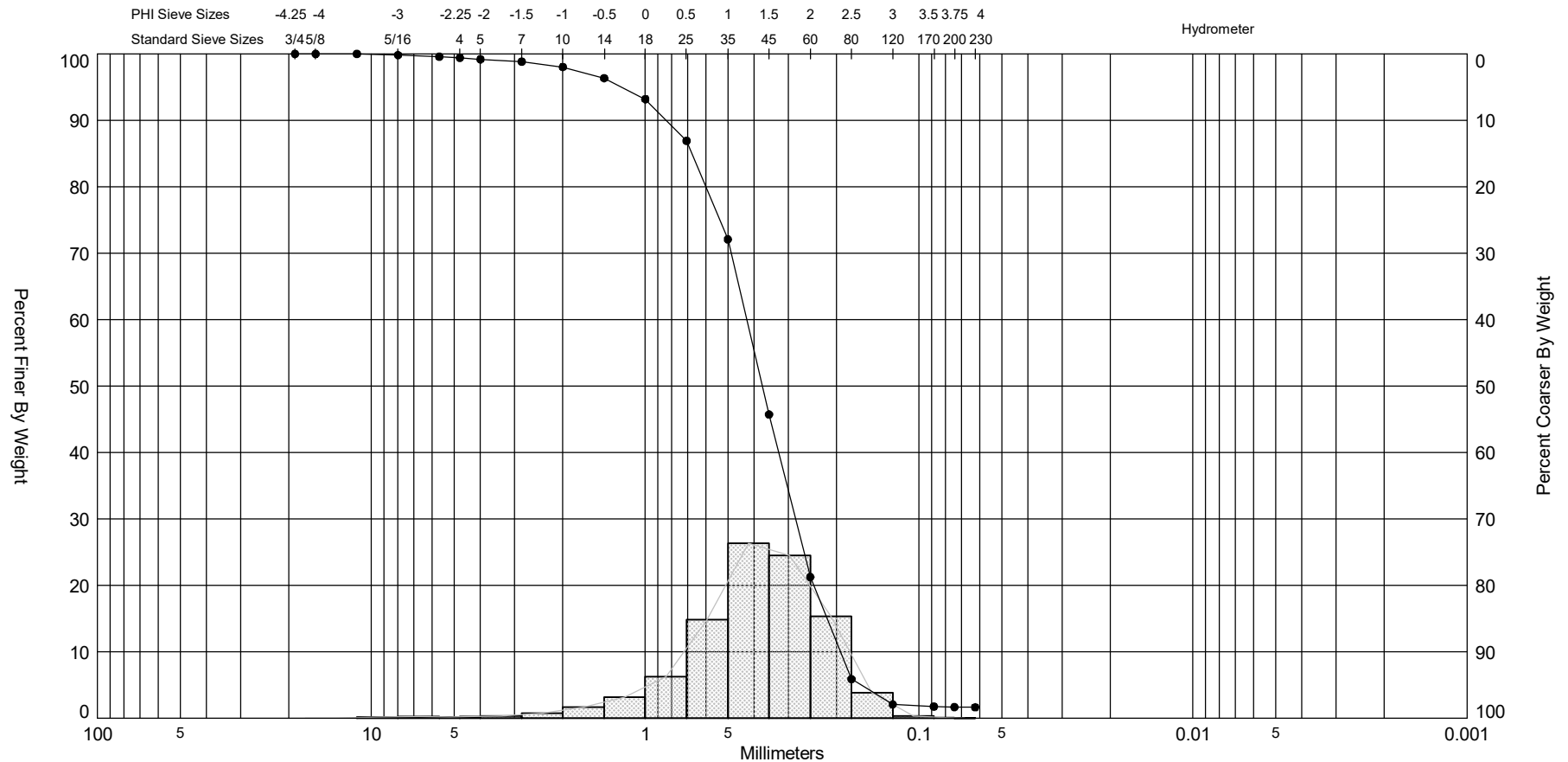
| ELEV. (ft) | DEPTH (ft) | LEGEND | CLASSIFICATION OF MATERIALS Depths and elevations based on measured values | % REC. | BOX OR SAMPLE | REMARKS |
|------------|------------|--------|--|--------|---------------|--|
| -29.6 | 0.0 | | | | | |
| | | ○ | Silica sand (f-m) with silt, trace fine shell (up to 0.25" in size), light gray (10YR-7/1), (SW-SM). | | S1 | Sample #S1, Interval: 0" - 40" Mean Grain Size (mm): 0.34 Silt (%): 8.75 Gravel (%): 0.00 Carbonates (%): 87.55 |
| | | ○ | Silica sand (f-m) with silt, few shell (up to 0.5" in size), light gray (10YR-7/1), (SW-SM). | | S2 | Sample #S2, Interval: 40" - 64" Mean Grain Size (mm): 0.46 Silt (%): 7.46 Gravel (%): 0.35 Carbonates (%): 87.81 |
| -34.6 | 5.0 | ○ | | | | |
| -35.0 | 5.4 | ○ | | | | |
| -35.9 | 6.3 | X | Assumed not recovered, (NR). | | | |
| | | | End of Boring | | | |

FLORIDA DEP ROSS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21


5.0 Sieve Graphs



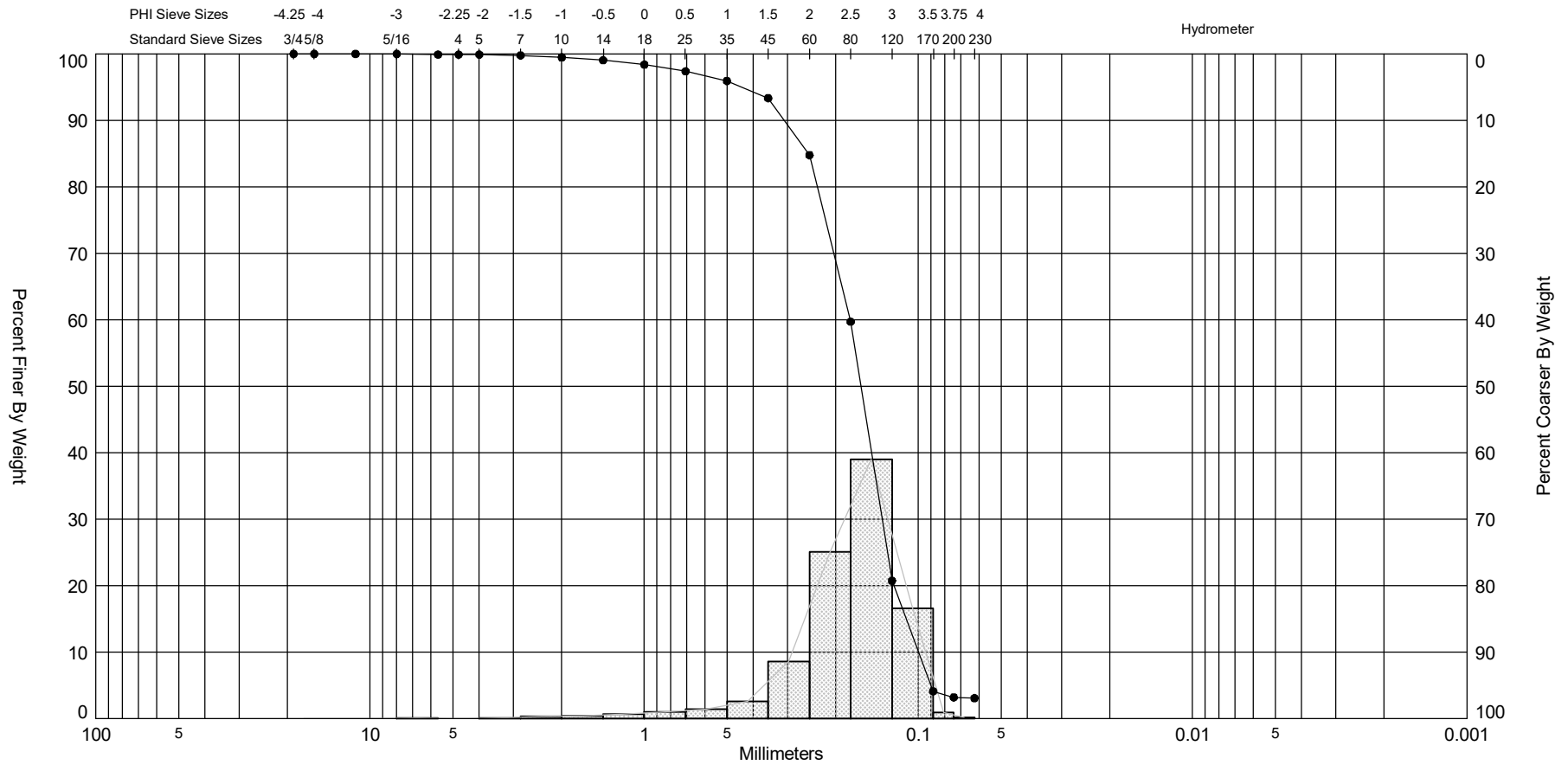
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-1 #S1 | —●— | -36.1 | SW | #200 - 1.67 #230 - 1.63 | 0.69 | 19.70 | 1.42 | 1.31 | -1.22 | 6.26 | 0.88 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 66.5" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  <div style="text-align: center;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | | Easting (X, ft): | 26.385157 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.371143 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

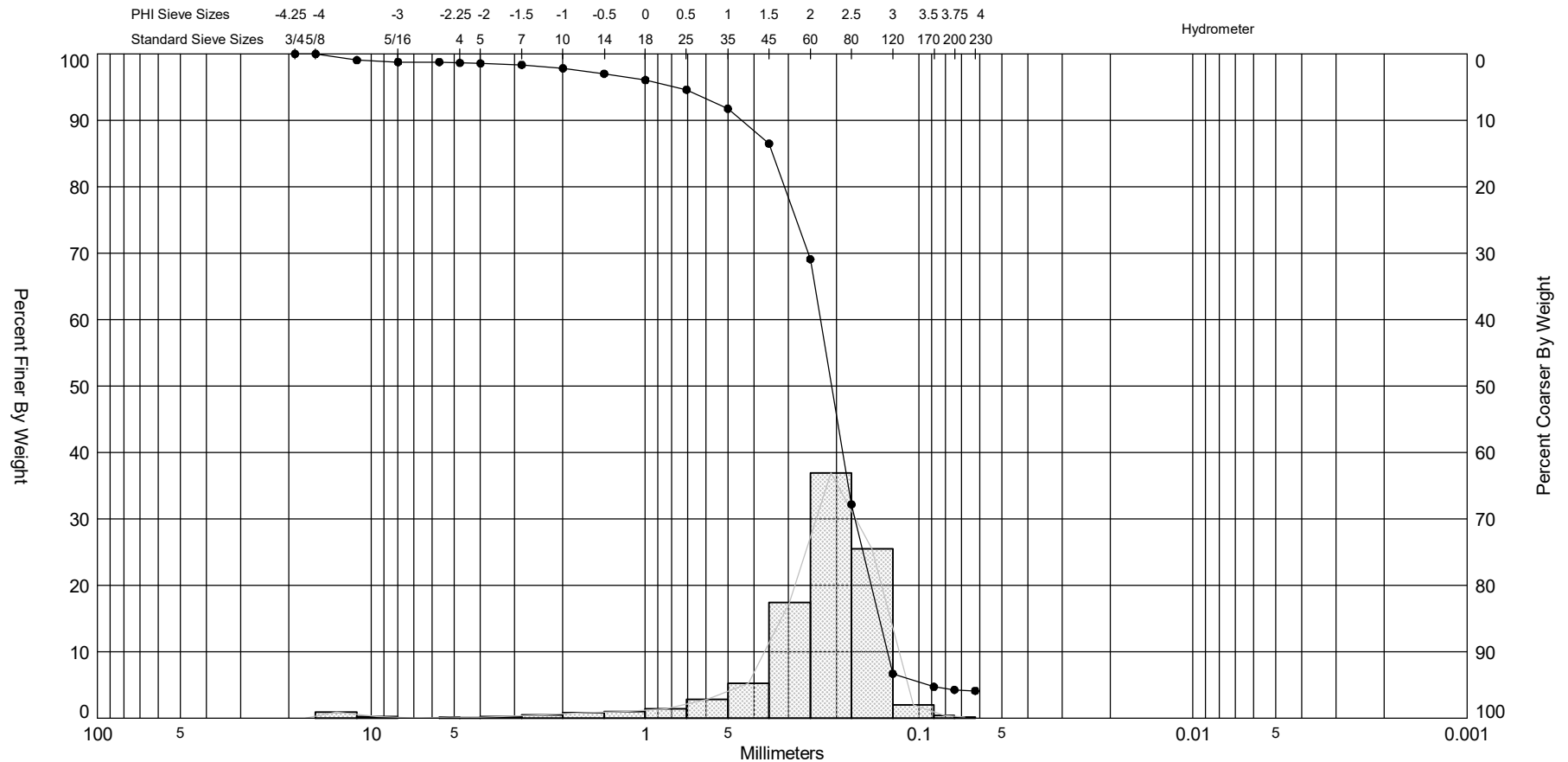
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|-------|------|--------------------|--|
| VC20-1-1 #S2 | —●— | -41.6 | SP | #200 - 3.20 #230 - 3.06 | 0.89 | 21.80 | 2.62 | 2.47 | -2.19 | 11.16 | 0.73 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 66.5" - 133" Material Description: Light gray poorly graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.385157 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.371143 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

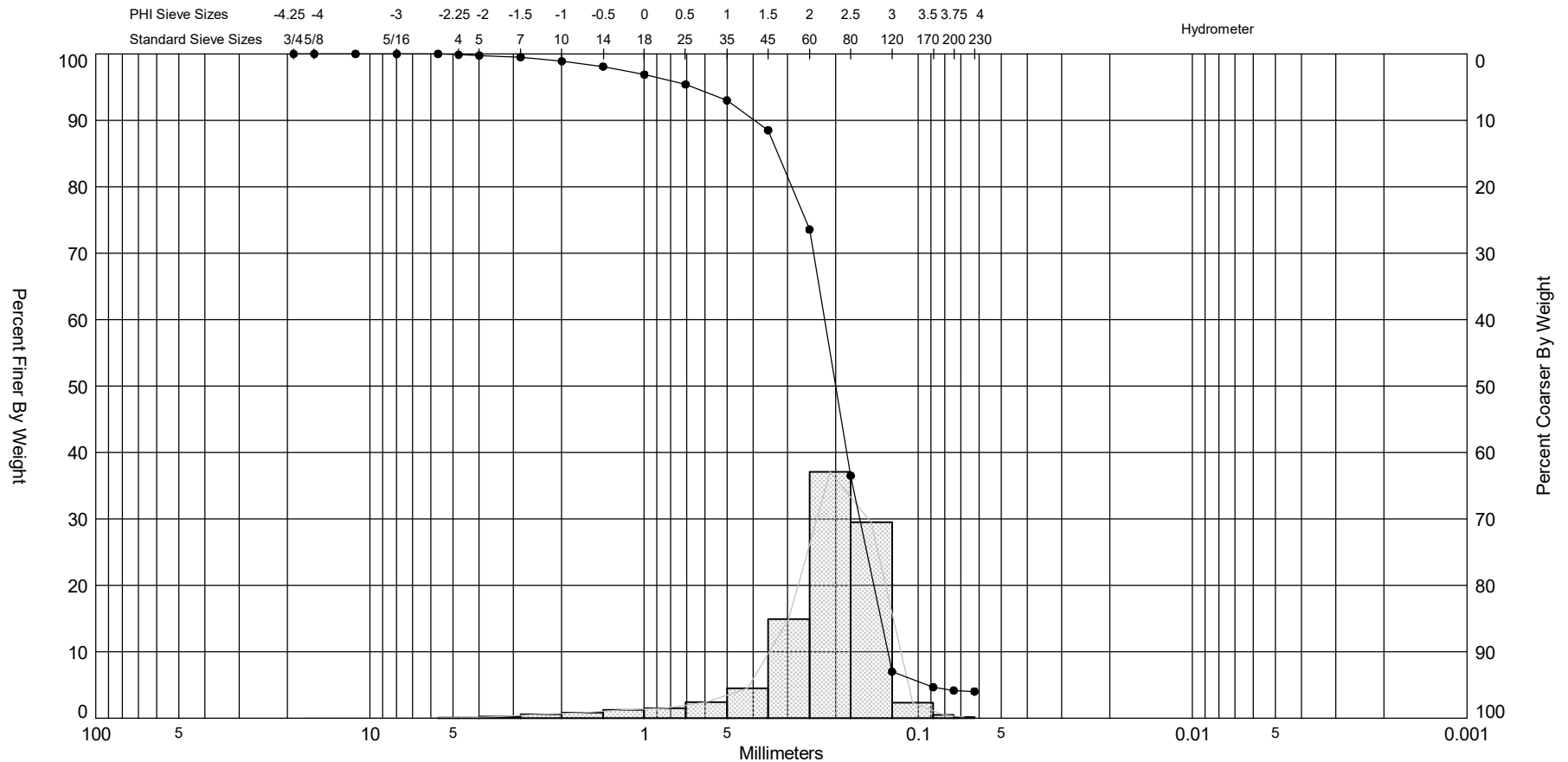
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|-------|------|--------------------|--|
| VC20-1-1 #S3 | —●— | -47.2 | SW | #200 - 4.27 #230 - 4.12 | 1.17 | 22.10 | 2.26 | 2.03 | -3.09 | 16.04 | 1 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 133" - 200" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.385157 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.371143 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

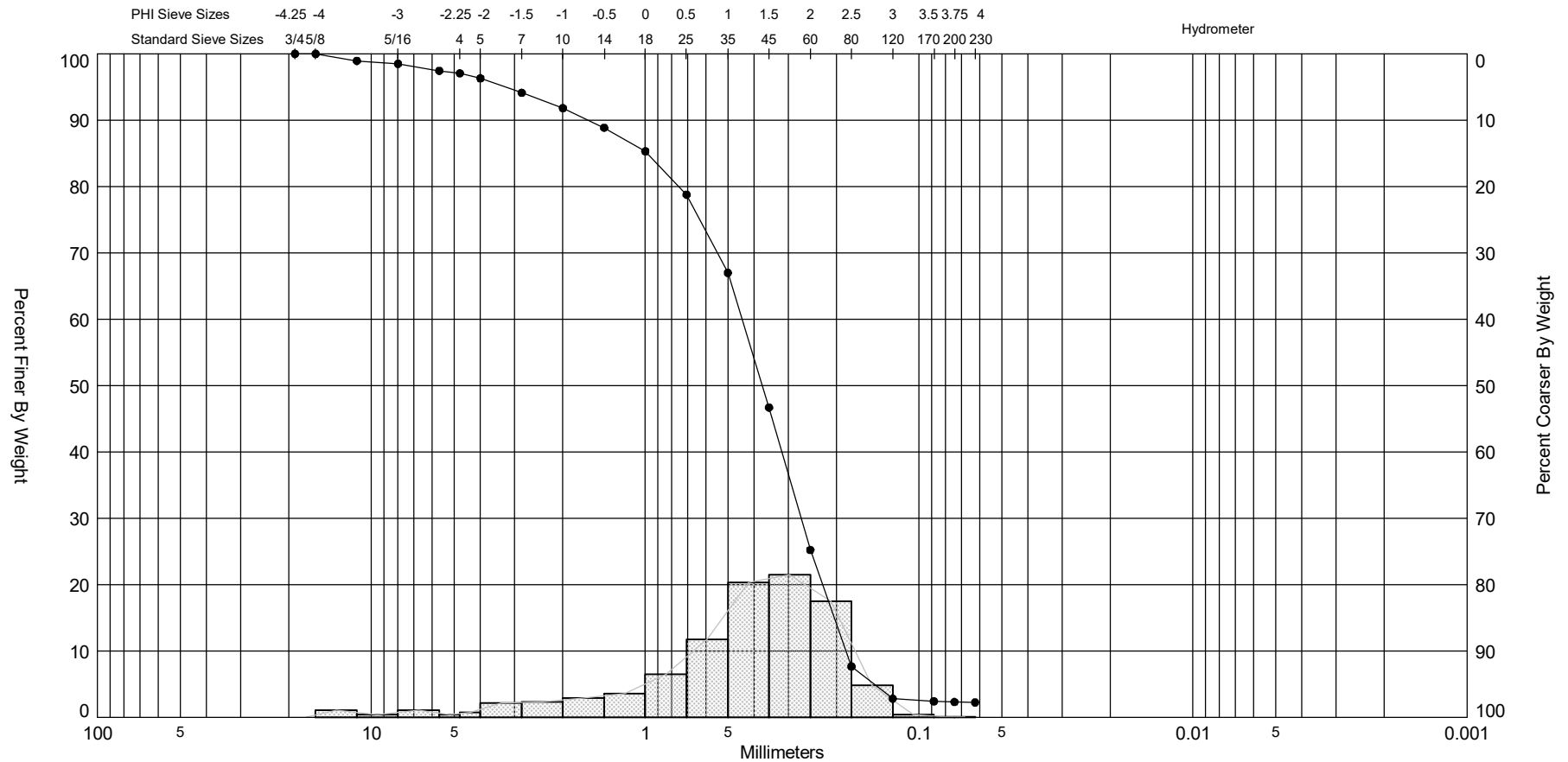
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-1 #S4 | —●— | -50.8 | SP | #200 - 4.17 #230 - 4.03 | 1.00 | 23.20 | 2.32 | 2.14 | -2.15 | 9.58 | 0.8 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 176" - 200" Material Description: Light gray poorly graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.385157 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.371143 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

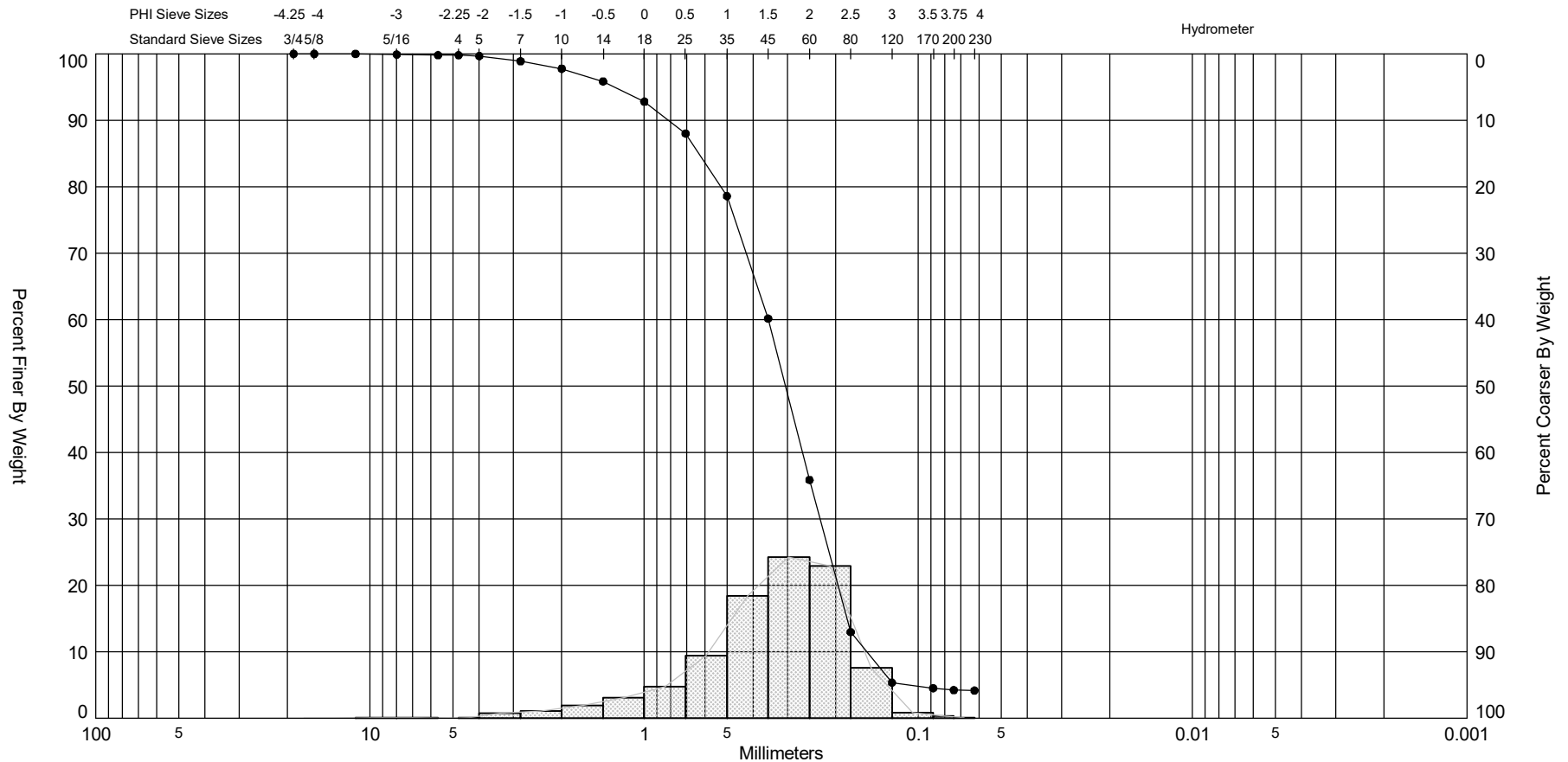
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-2 #S1 | —●— | -34.5 | SW | #200 - 2.31 #230 - 2.25 | 0.70 | 24.10 | 1.42 | 1.1 | -1.46 | 5.35 | 1.29 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 60" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.38109 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.366967 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

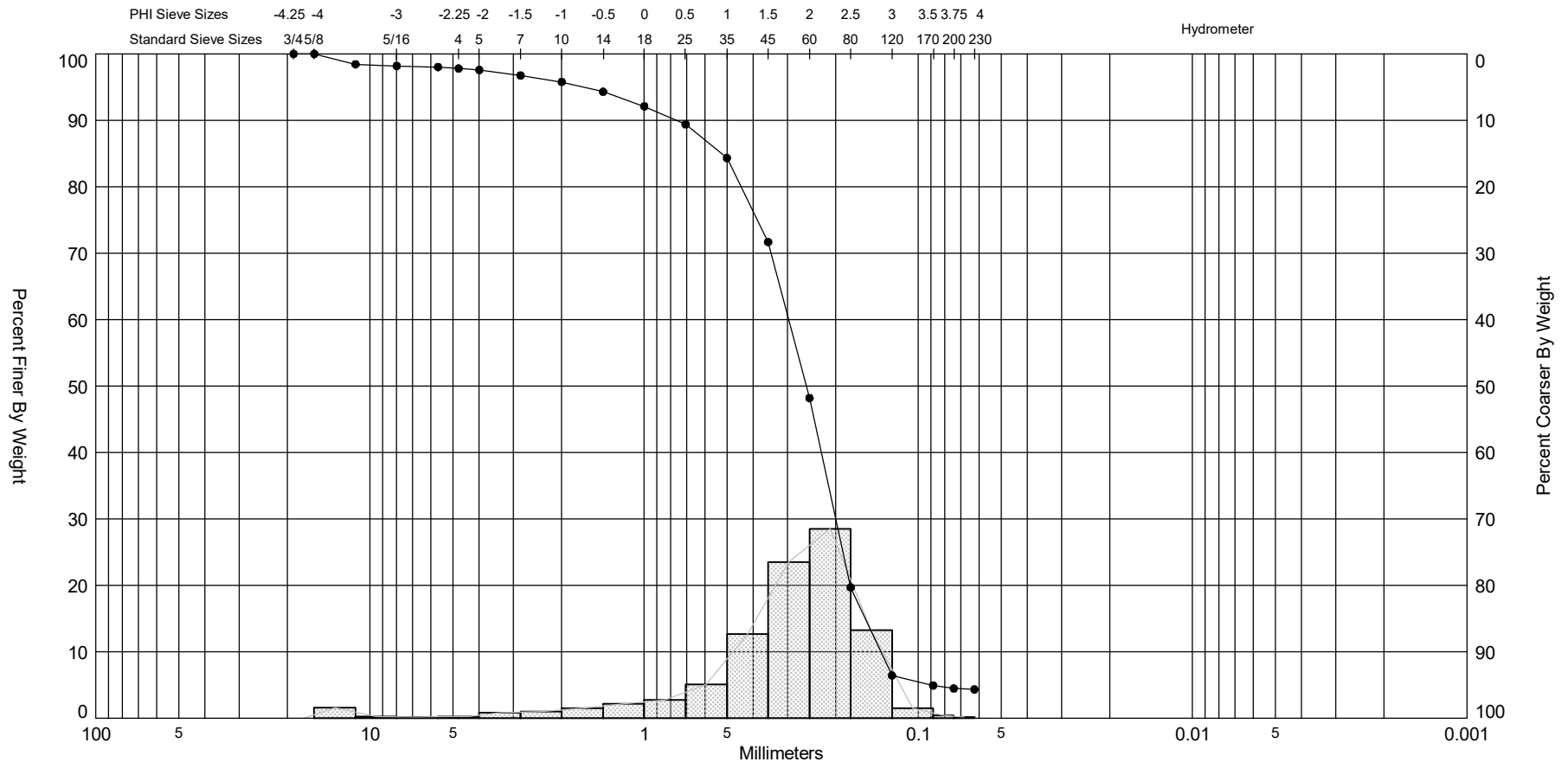
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-2 #S2 | —●— | -39.5 | SW | #200 - 4.22 #230 - 4.15 | 0.76 | 20.20 | 1.71 | 1.51 | -1.17 | 5.1 | 0.95 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 60" - 120" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.38109 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.366967 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

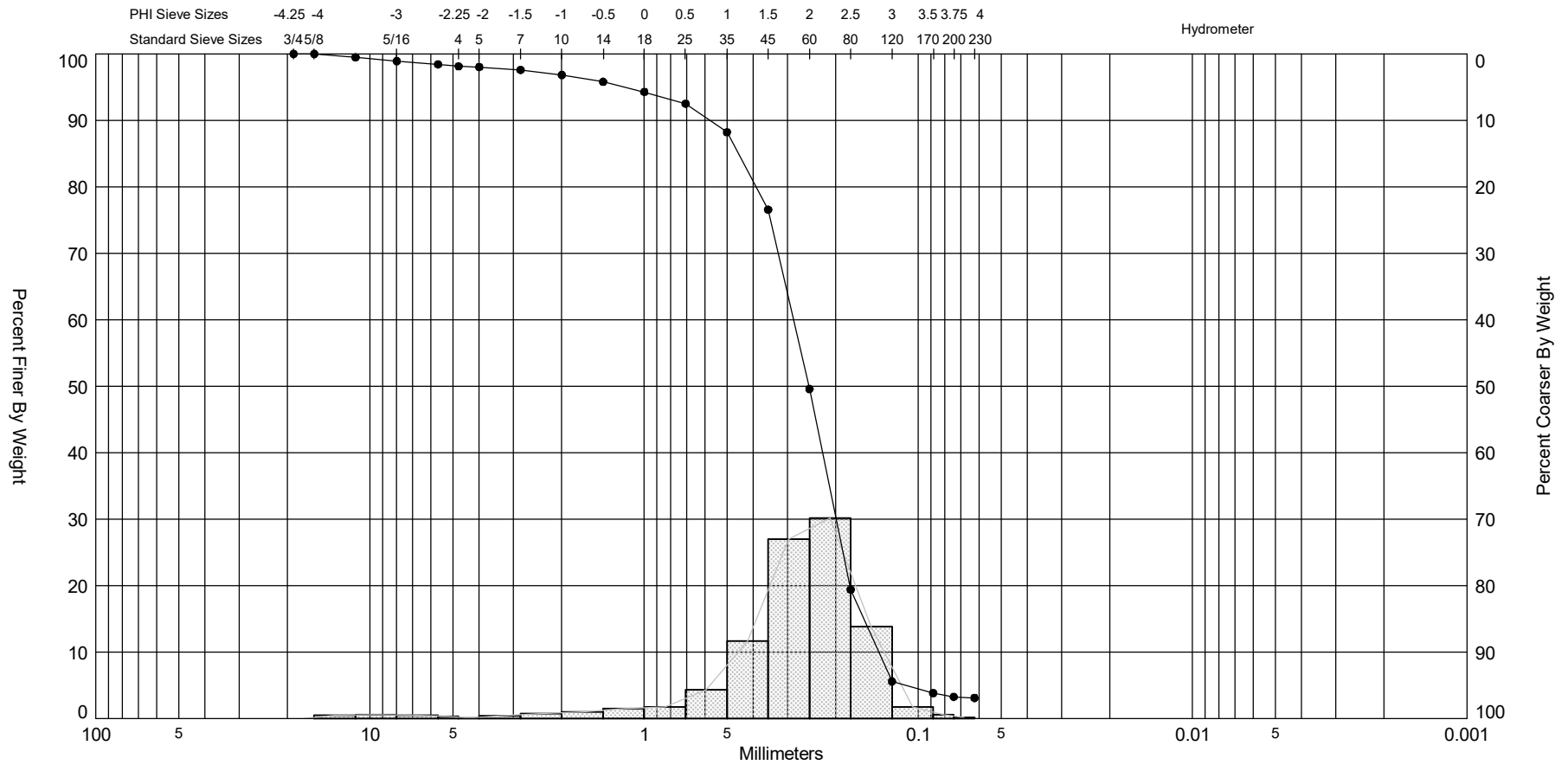
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-2 #S3 | —●— | -44.5 | SW | #200 - 4.47 #230 - 4.33 | 0.83 | 18.90 | 1.96 | 1.64 | -2.24 | 9.43 | 1.21 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 120" - 182" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.38109 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.366967 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

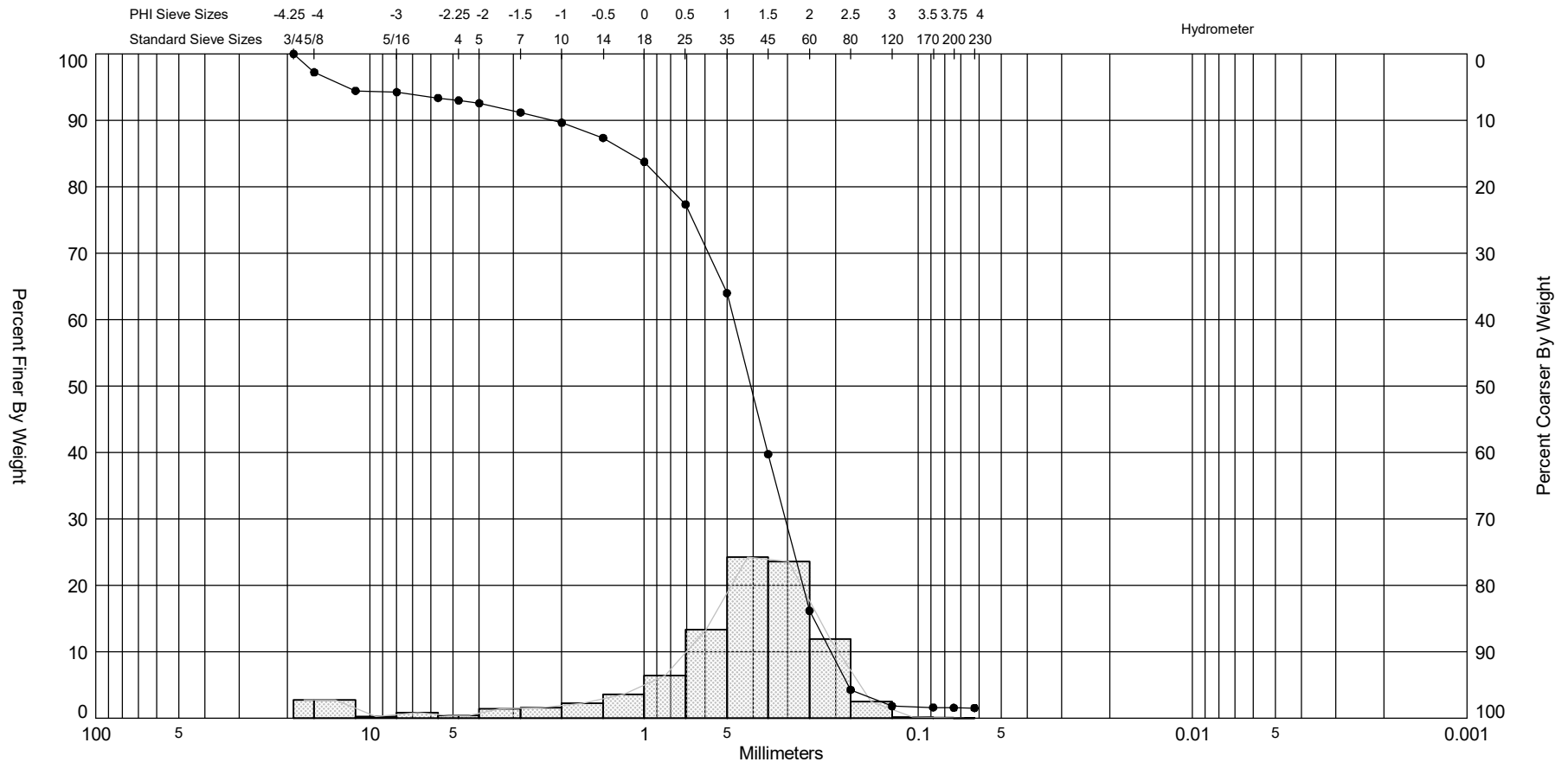
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|-------|------|--------------------|--|
| VC20-1-2 #S4 | —●— | -47.7 | SW | #200 - 3.27 #230 - 3.11 | 0.63 | 19.60 | 1.99 | 1.76 | -2.41 | 11.11 | 1.07 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 158" - 182" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  <div style="text-align: center;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | | Easting (X, ft): | 26.38109 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.366967 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

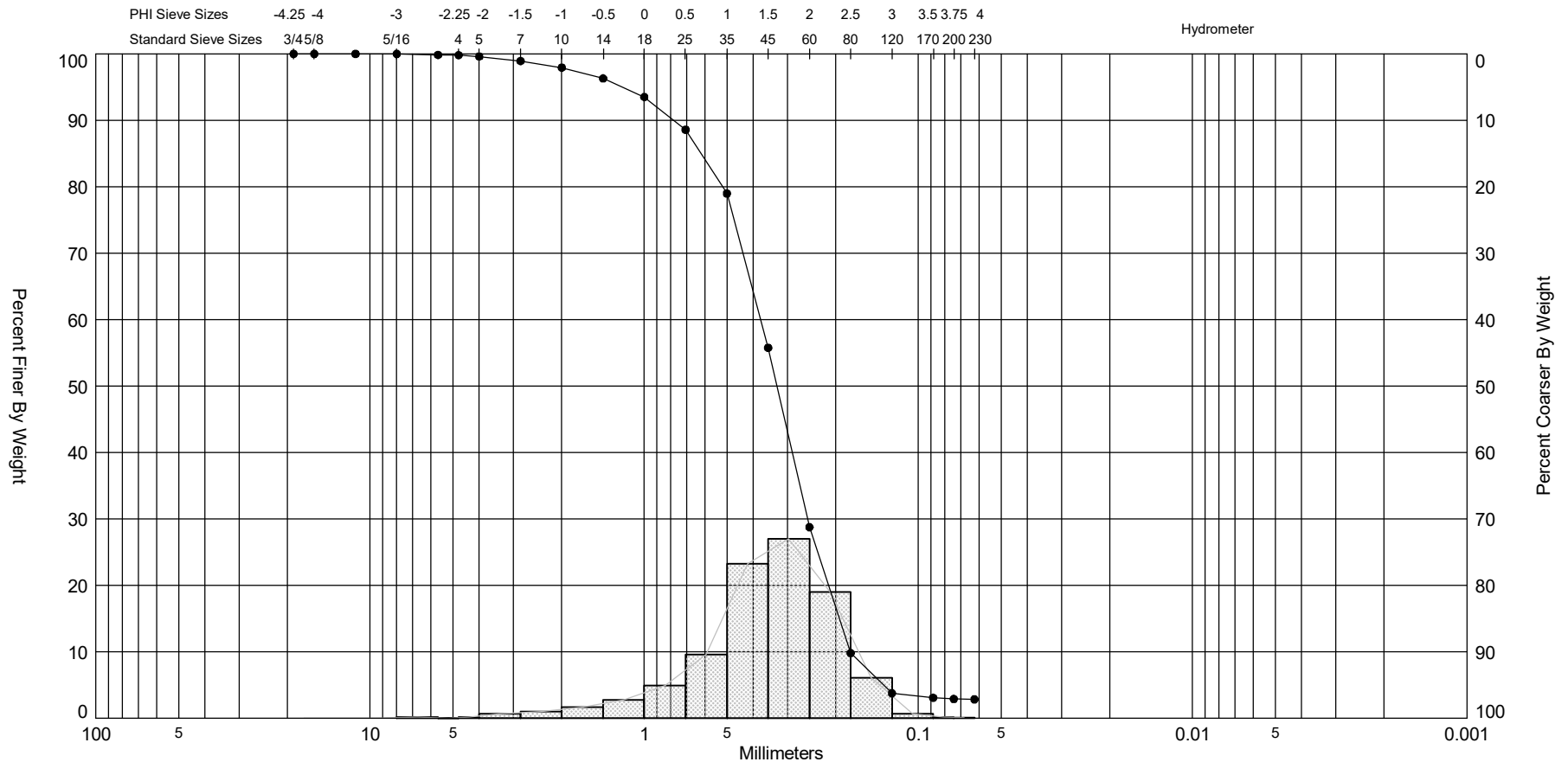
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-3 #S1 | —●— | -31.6 | SW | #200 - 1.56 #230 - 1.54 | 0.69 | 24.00 | 1.29 | 0.85 | -1.85 | 6.12 | 1.55 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 60" Material Description: Light gray well graded sand with few shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.377048 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.362837 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

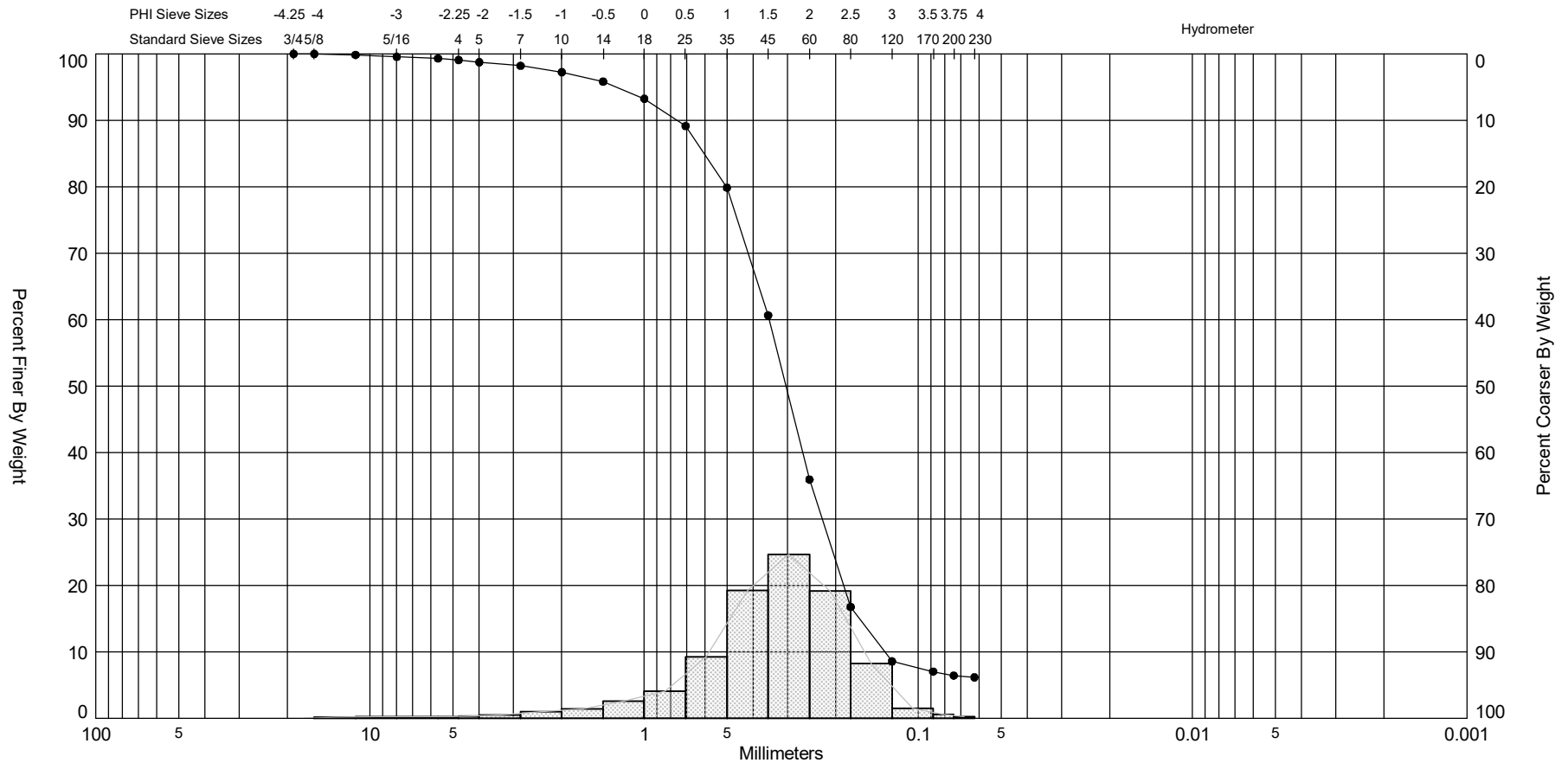
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-3 #S2 | —●— | -36.6 | SW | #200 - 2.89 #230 - 2.83 | 0.74 | 20.80 | 1.61 | 1.46 | -1.15 | 5.37 | 0.89 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 60" - 120" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.377048 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.362837 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

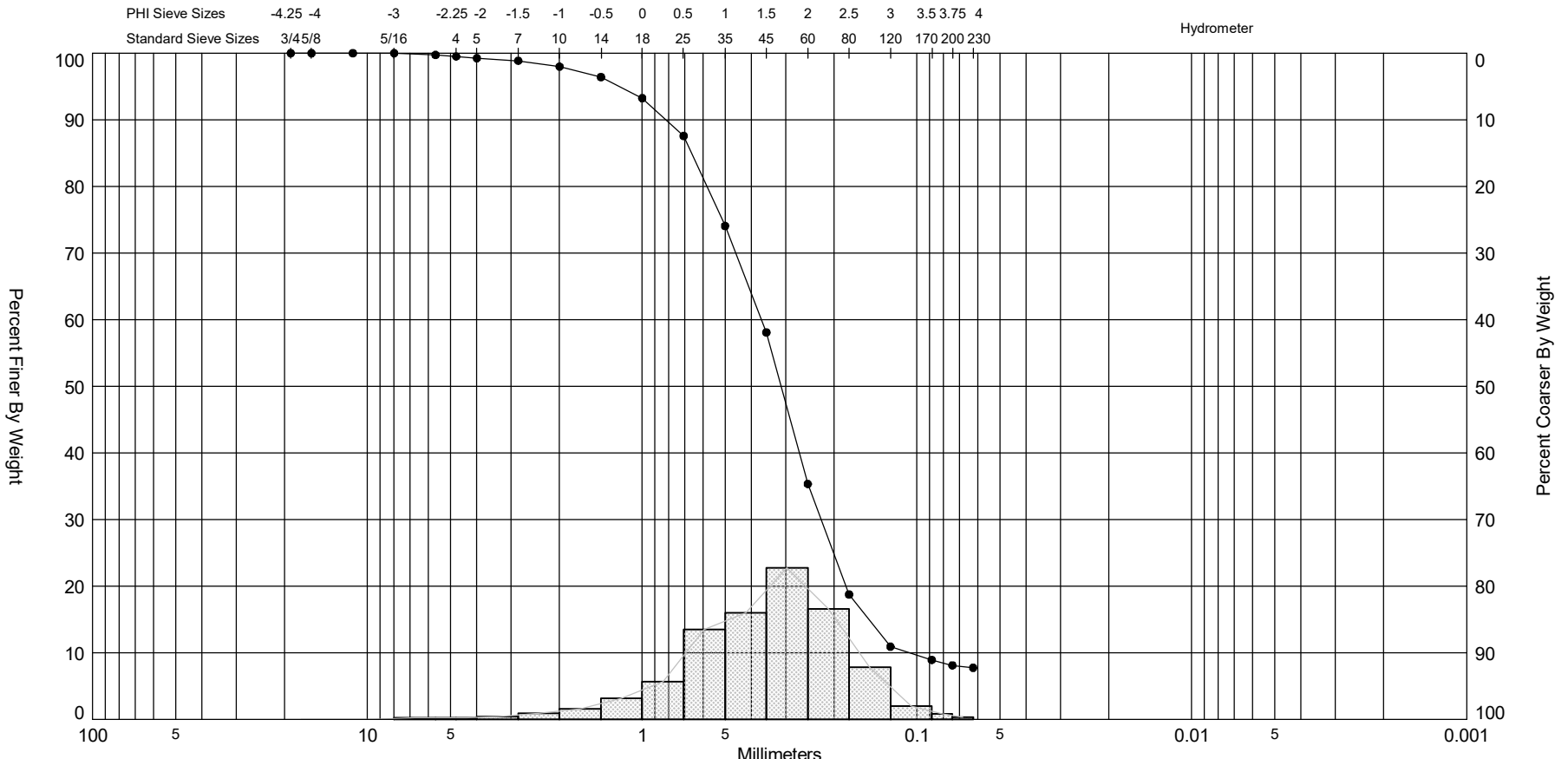
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|--------------------|--------------------|--|
| VC20-1-3 #S3 | —●— | -41.6 | SW-SM | #200 - 6.43 #230 - 6.17 | 1.09 | 22.10 | 1.72 | 1.51 | -1.43 | 6.94 | 1.02 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 120" - 180.5" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | Analysis Date: | 11-13-20 | |
| Depths and elevations based on measured values | | | | | | | | | | | Analyzed By: | LK | |
|  | | | | | | | | | | | Easting (X, ft): | 26.377048 | |
| | | | | | | | | | | | Northing (Y, ft): | -82.362837 | |
| | | | | | | | | | | | Horizontal System: | NAD 1983 | |
| | | | | | | | | | | | Vertical System: | NAVD 88 | |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

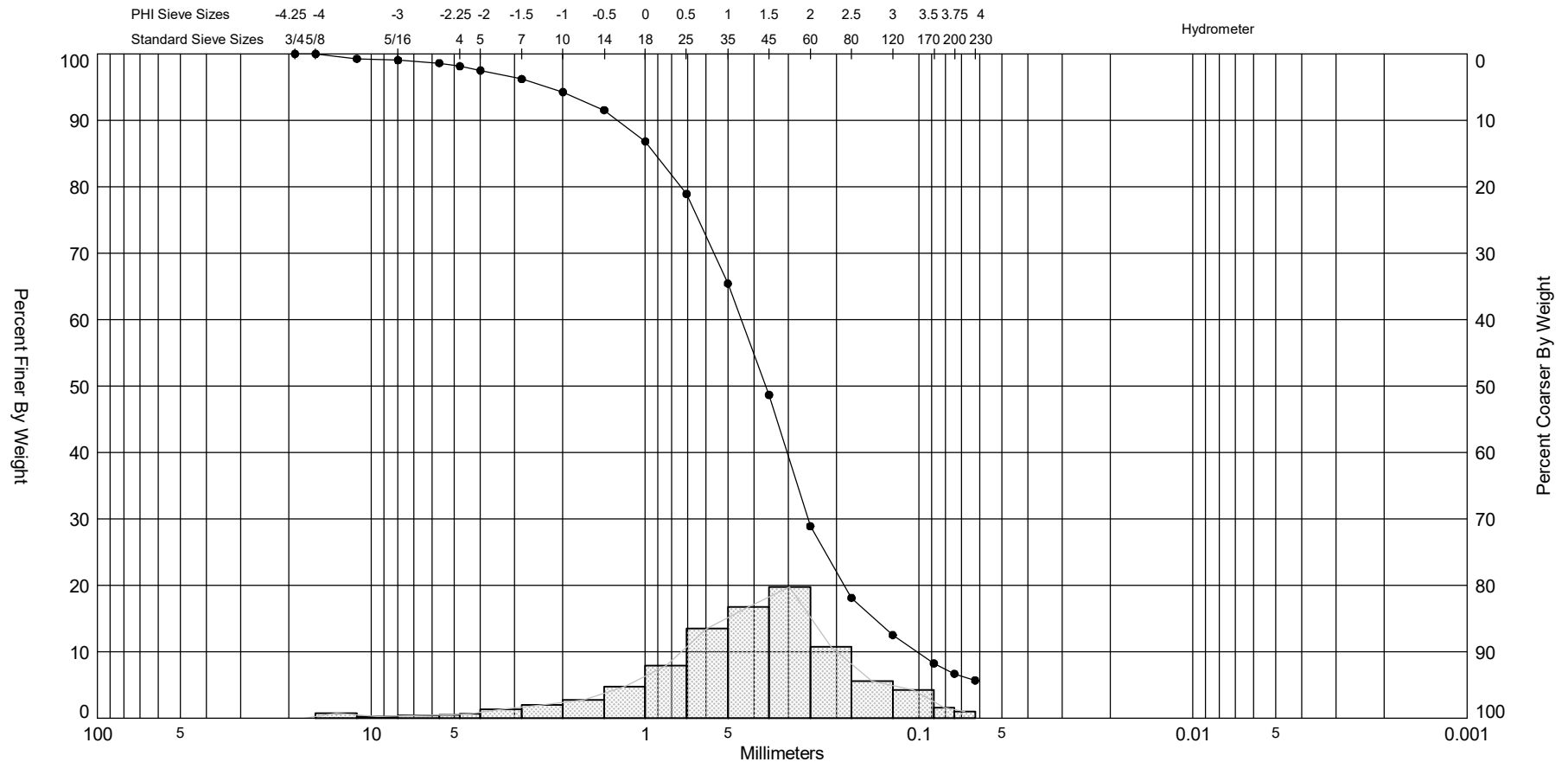
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | | |
|--------|------|--------|--------|---------------|--|--|
| Gravel | Sand | | | Silt and Clay | | |
| Coarse | Fine | Coarse | Medium | Fine | | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-1-3 #S4 | —●— | -44.6 | SW-SM | #200 - 8.11 #230 - 7.75 | 0.88 | 17.20 | 1.68 | 1.47 | -0.81 | 4.61 | 1 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 156.5" - 180.5" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-13-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.377048 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.362837 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

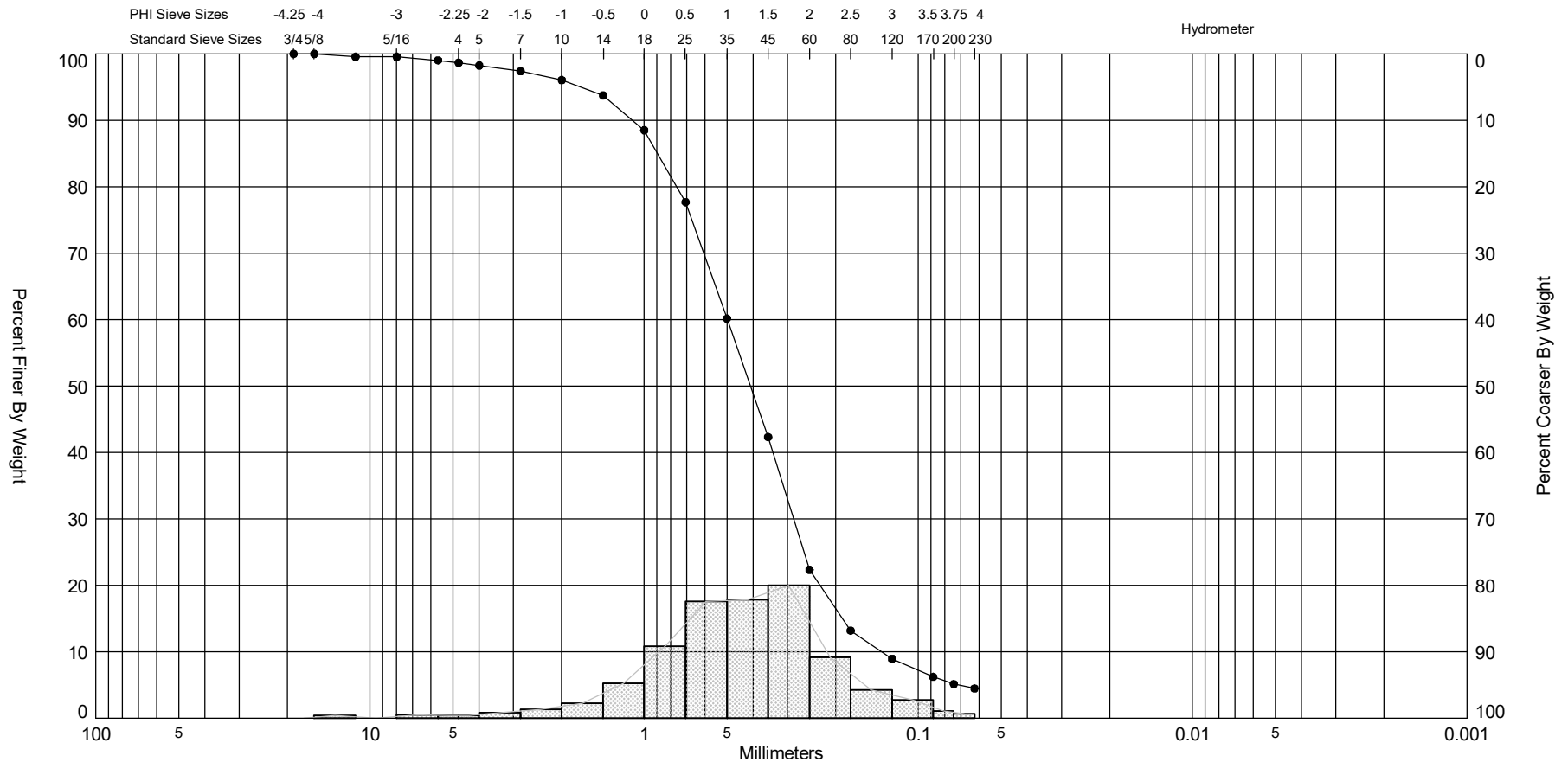
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|--------------------|--------------------|--|
| VC20-2-1 #S1 | —●— | -37.2 | SW-SM | #200 - 6.68 #230 - 5.69 | 1.22 | 56.26 | 1.46 | 1.23 | -0.87 | 4.62 | 1.31 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 24" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | Analysis Date: | 11-17-20 | |
| Depths and elevations based on measured values | | | | | | | | | | | Analyzed By: | LK | |
|  | | | | | | | | | | | Easting (X, ft): | 26.372222 | |
| | | | | | | | | | | | Northing (Y, ft): | -82.23935 | |
| | | | | | | | | | | | Horizontal System: | NAD 1983 | |
| | | | | | | | | | | | Vertical System: | NAVD 88 | |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

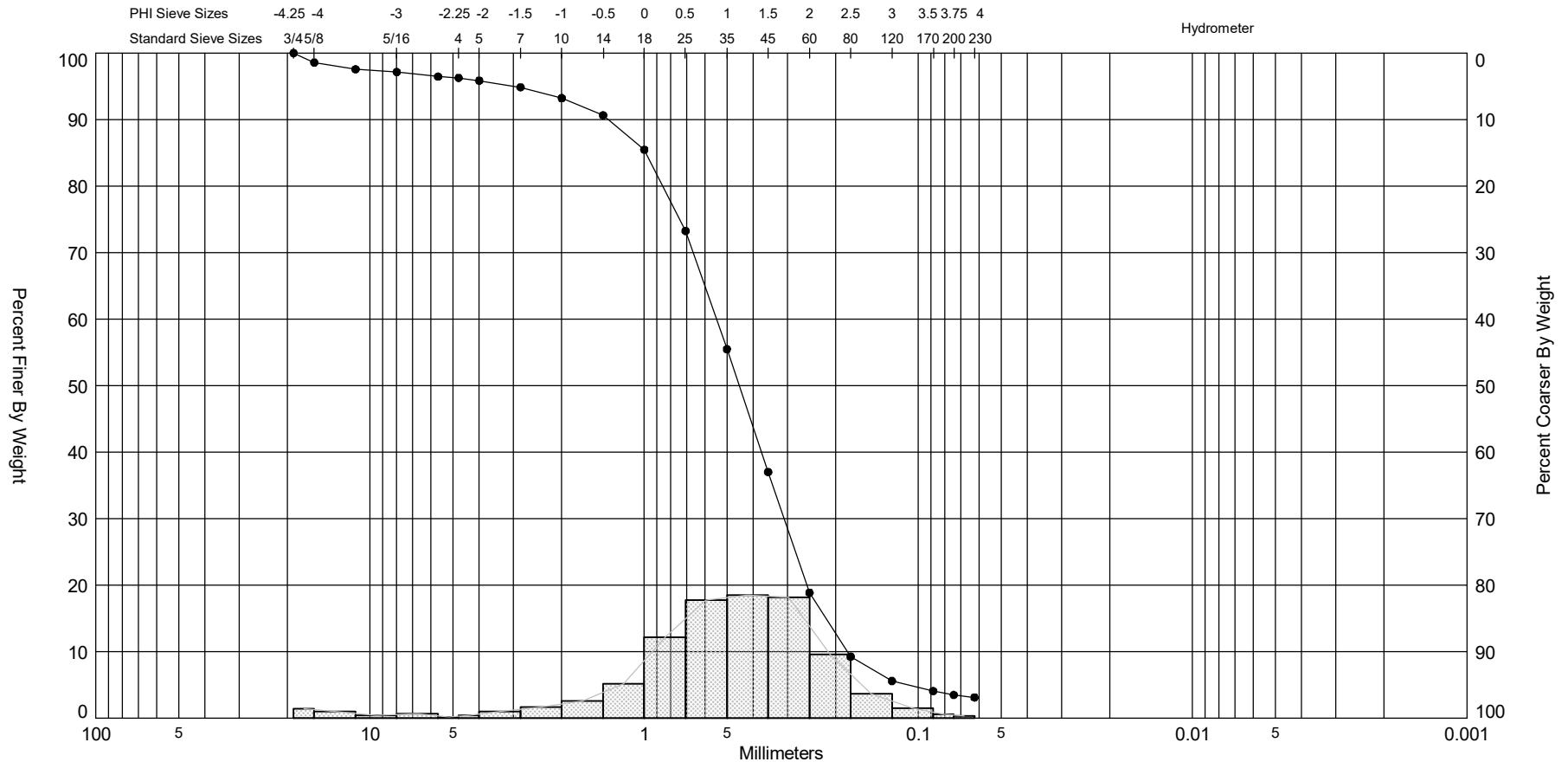
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-1 #S2 | —●— | -39.2 | SW | #200 - 5.13 #230 - 4.46 | 1.77 | 77.29 | 1.28 | 1.15 | -0.71 | 4.95 | 1.15 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 24" - 51" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.372222 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.23935 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

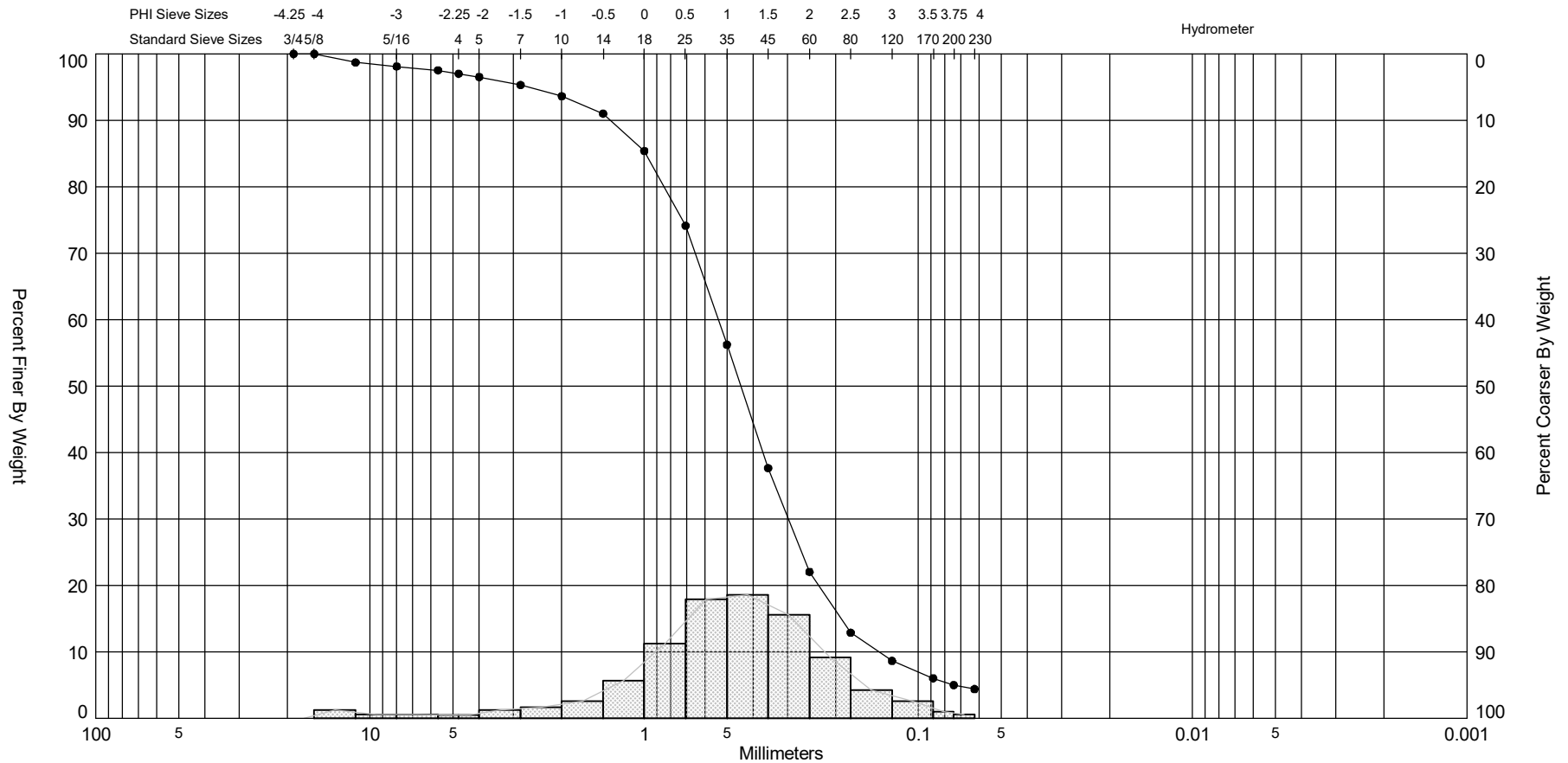
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-1 #S3 | —●— | -41.5 | SW | #200 - 3.48 #230 - 3.12 | 1.84 | 80.92 | 1.15 | 0.93 | -1.43 | 6.4 | 1.34 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 51" - 75" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.372222 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.23935 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

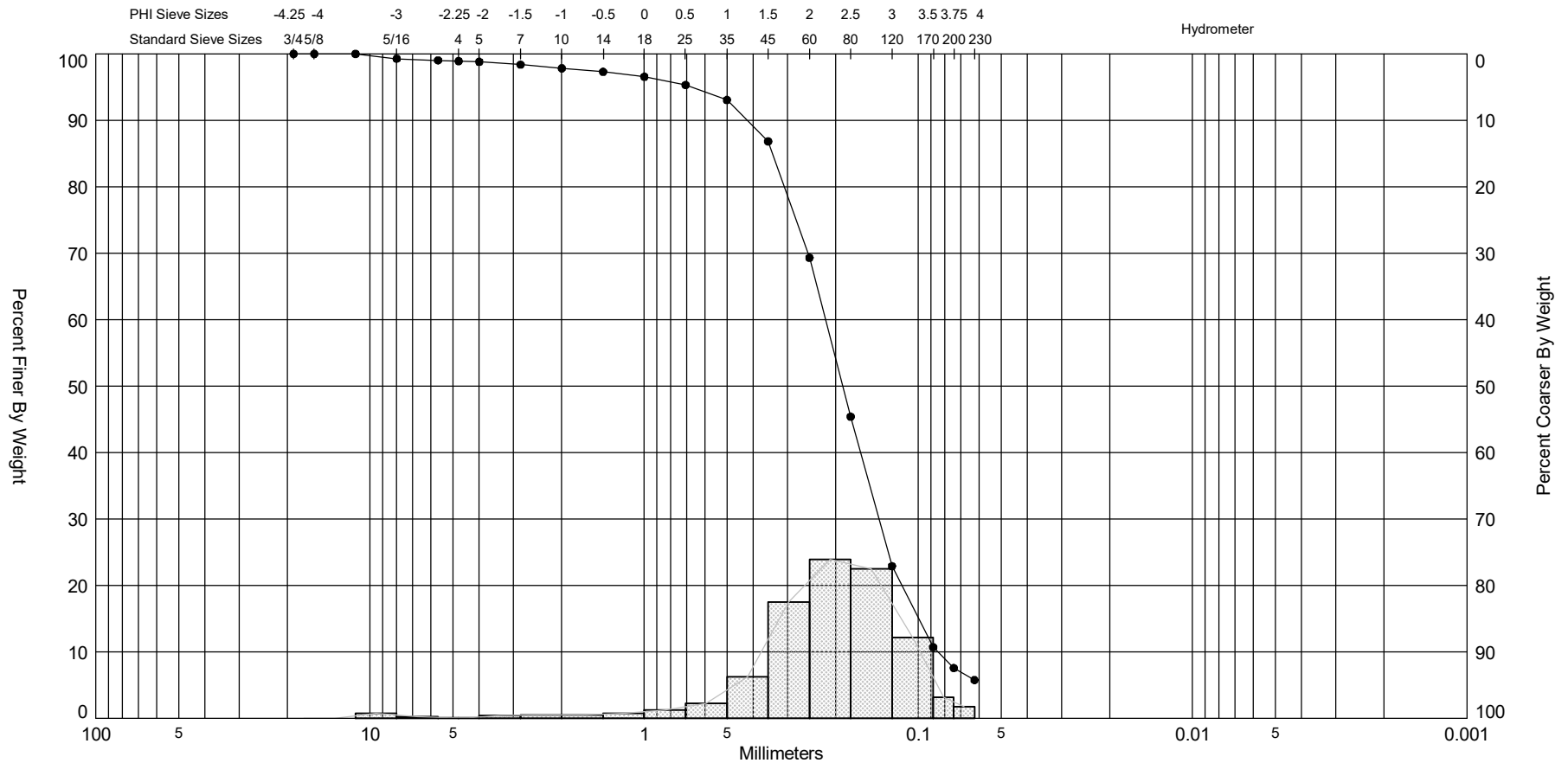
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-2-1 #S4 | —●— | -41.5 | SW | #200 - 5.00 #230 - 4.39 | 1.89 | 83.90 | 1.17 | 1 | -1 | 5.23 | 1.31 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 51" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.372222 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.23935 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

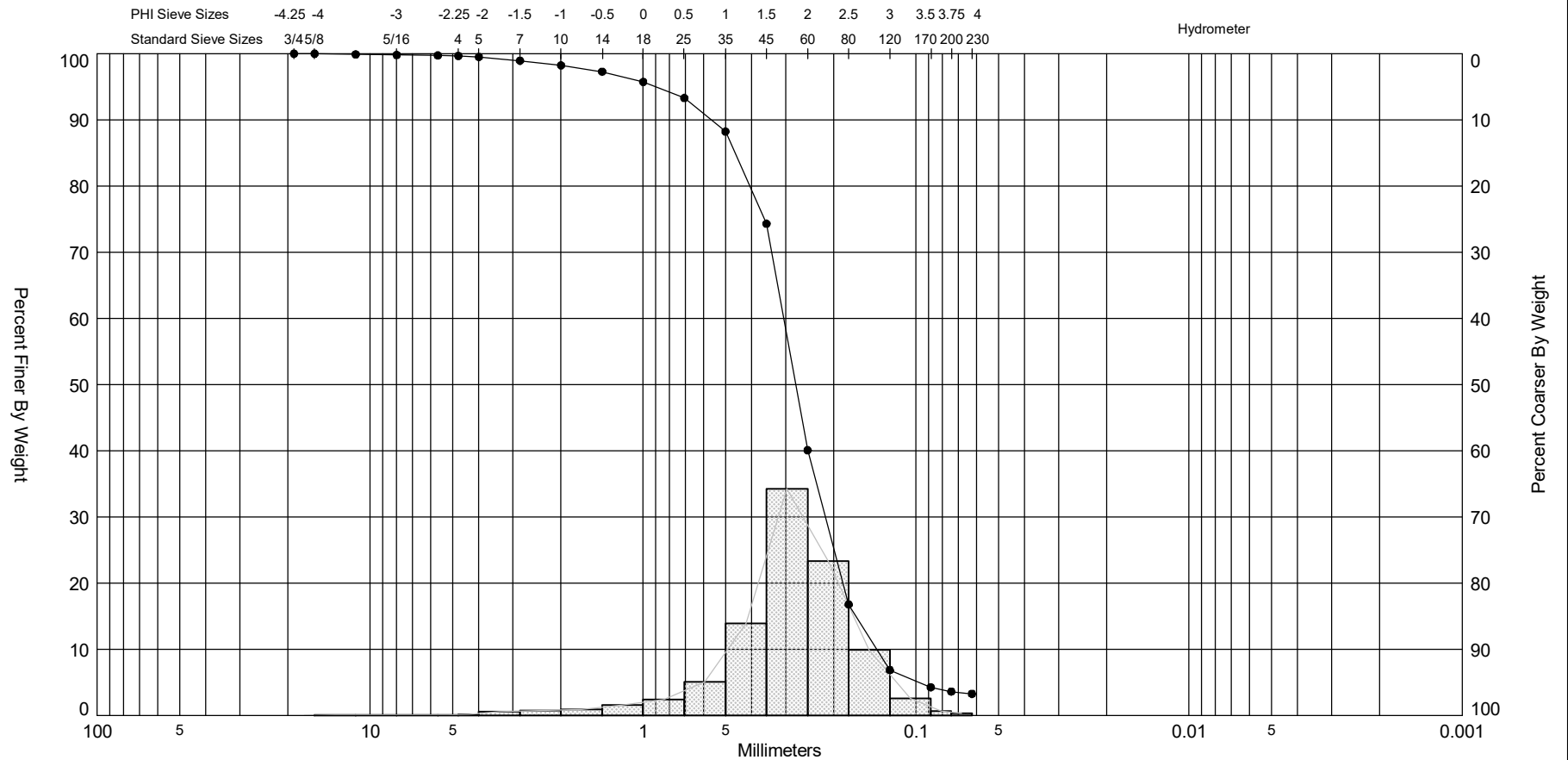
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|-------|------|--------------------|--|
| VC20-2-2 #S1 | —●— | -34.7 | SP-SM | #200 - 7.56 #230 - 5.77 | 1.83 | 71.50 | 2.4 | 2.21 | -2.1 | 10.42 | 1.05 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 8" Material Description: Gray poorly graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

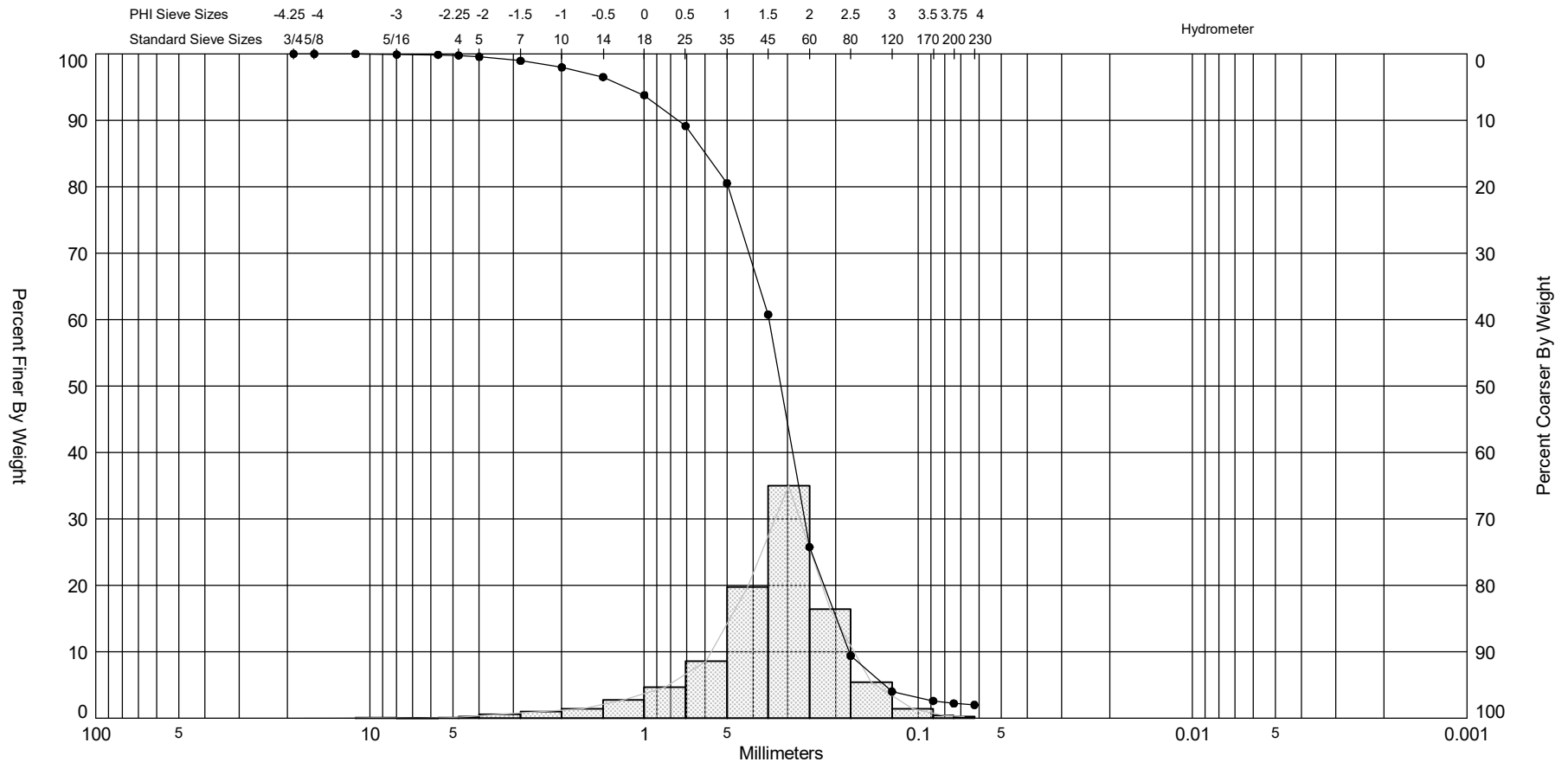
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-2 #S2 | —●— | -35.4 | SW | #200 - 3.62 #230 - 3.28 | 1.96 | 90.08 | 1.86 | 1.75 | -1.59 | 8.54 | 0.88 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 8" - 30" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

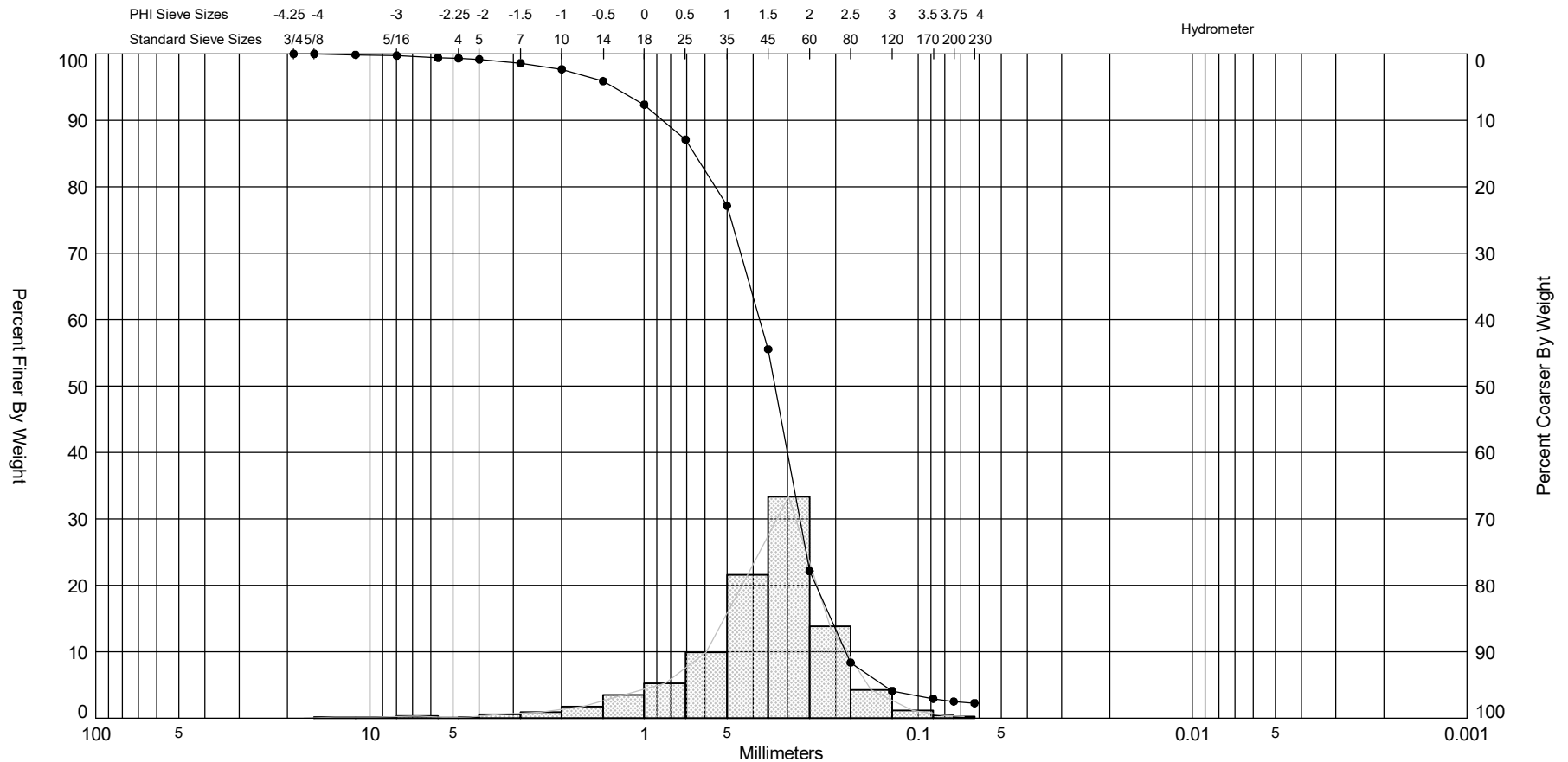
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-2-2 #S3 | —●— | -37.2 | SW | #200 - 2.21 #230 - 2.00 | 1.78 | 90.70 | 1.65 | 1.5 | -1.2 | 6.06 | 0.89 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 30" - 50" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

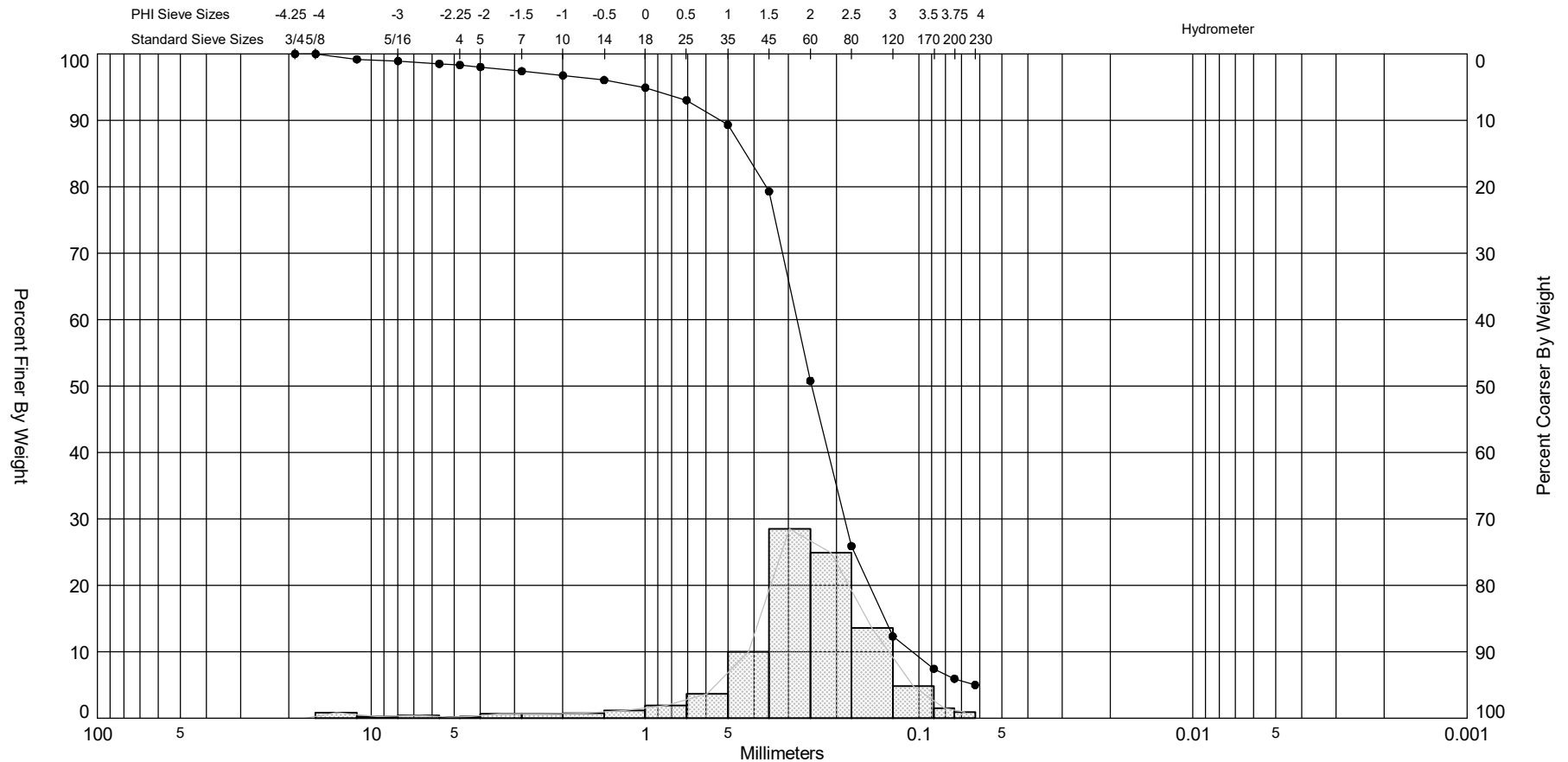
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-2 #S4 | —●— | -38.9 | SW | #200 - 2.52 #230 - 2.28 | 1.93 | 82.06 | 1.58 | 1.4 | -1.33 | 6.85 | 0.94 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 50" - 79" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

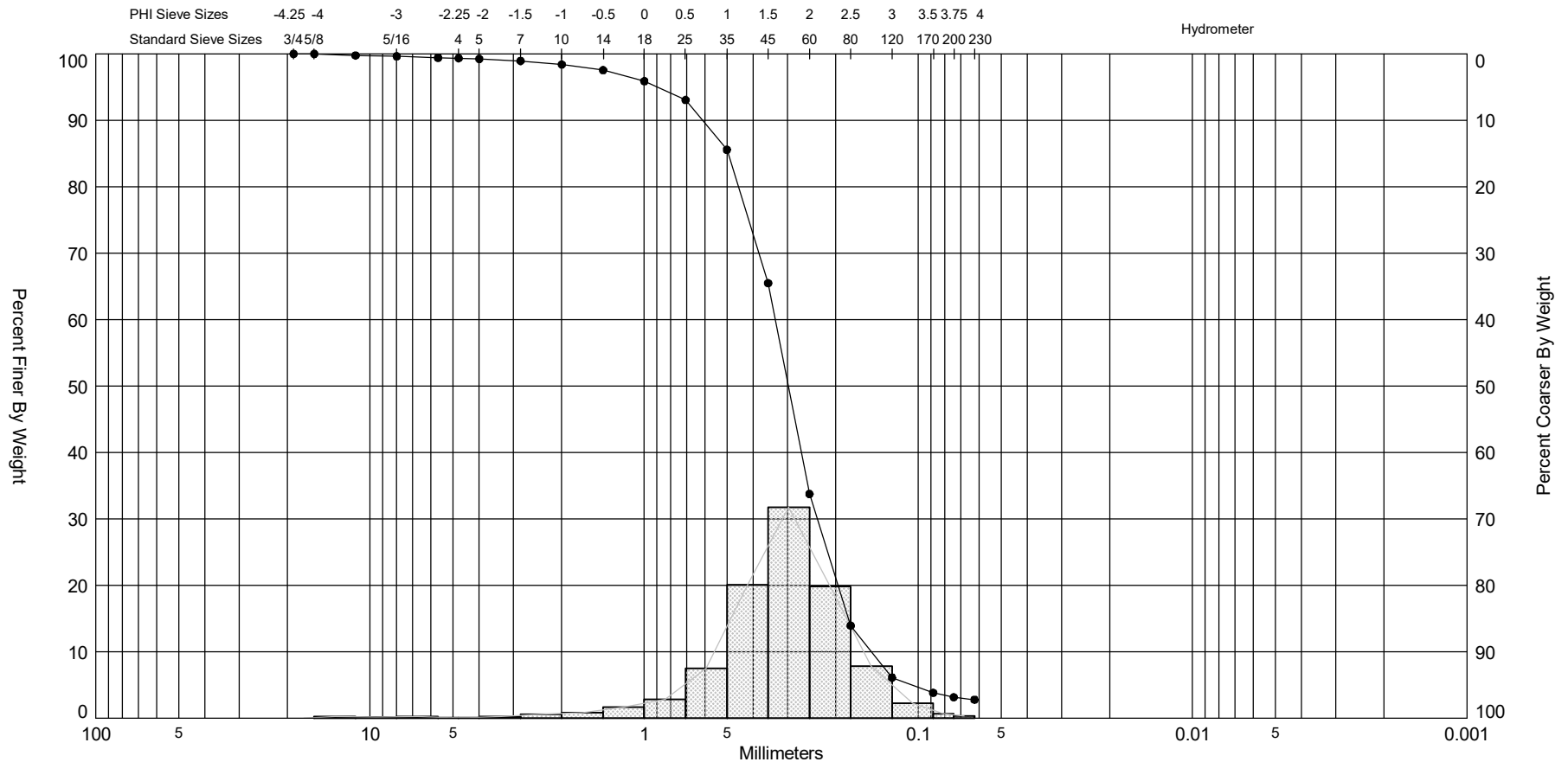
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|-------|------|--------------------|--|
| VC20-2-2 #S5 | —●— | -41.3 | SP-SM | #200 - 5.94 #230 - 5.01 | 2.09 | 86.45 | 2.02 | 1.84 | -2.19 | 10.56 | 1.12 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 79" - 103.5" Material Description: Gray poorly graded sand with silt, trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

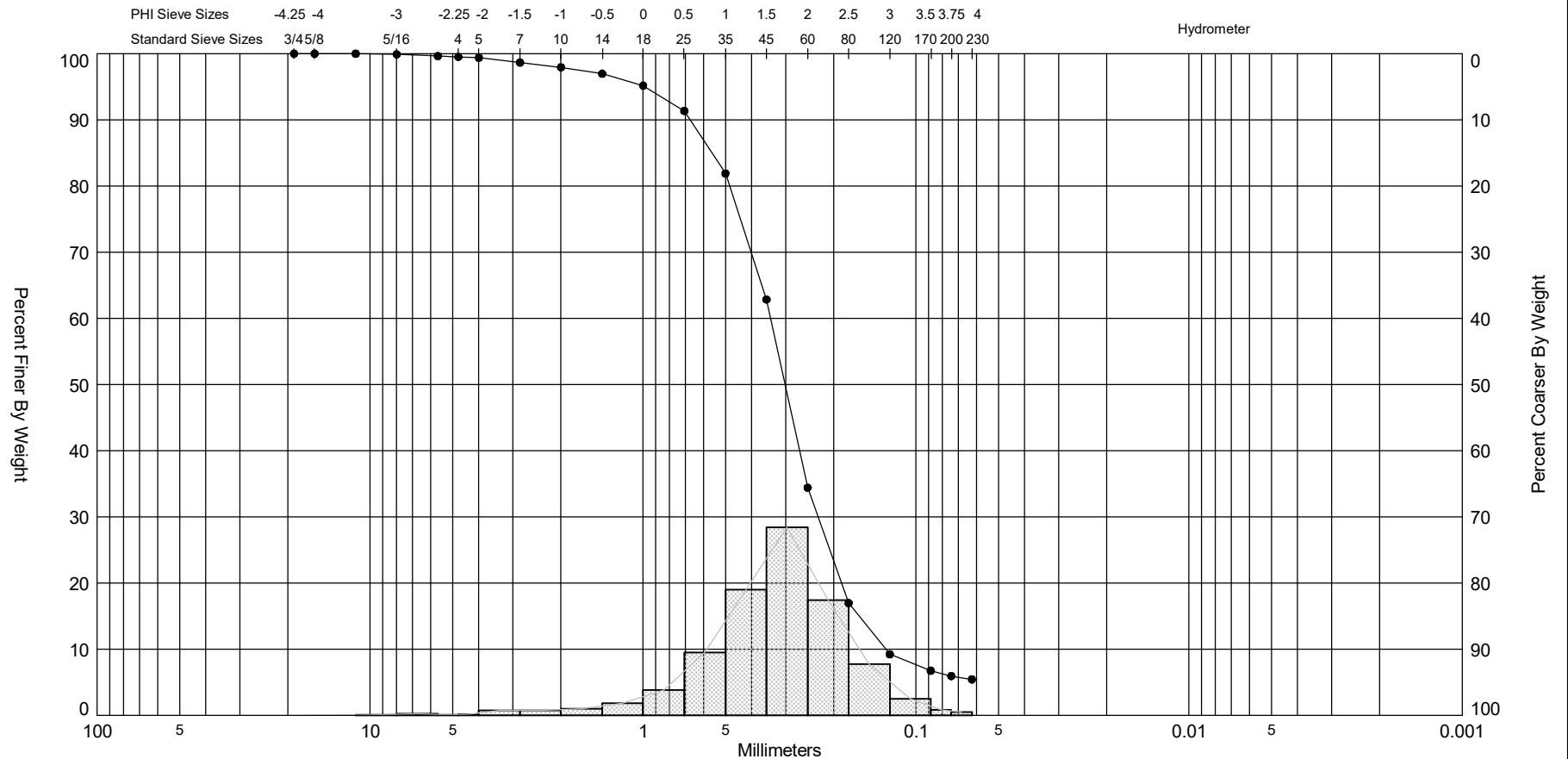
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-2 #S6 | —●— | -41.3 | SW | #200 - 3.15 #230 - 2.79 | 2.05 | 89.64 | 1.74 | 1.64 | -1.57 | 9.41 | 0.89 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 79" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.366734 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.232932 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

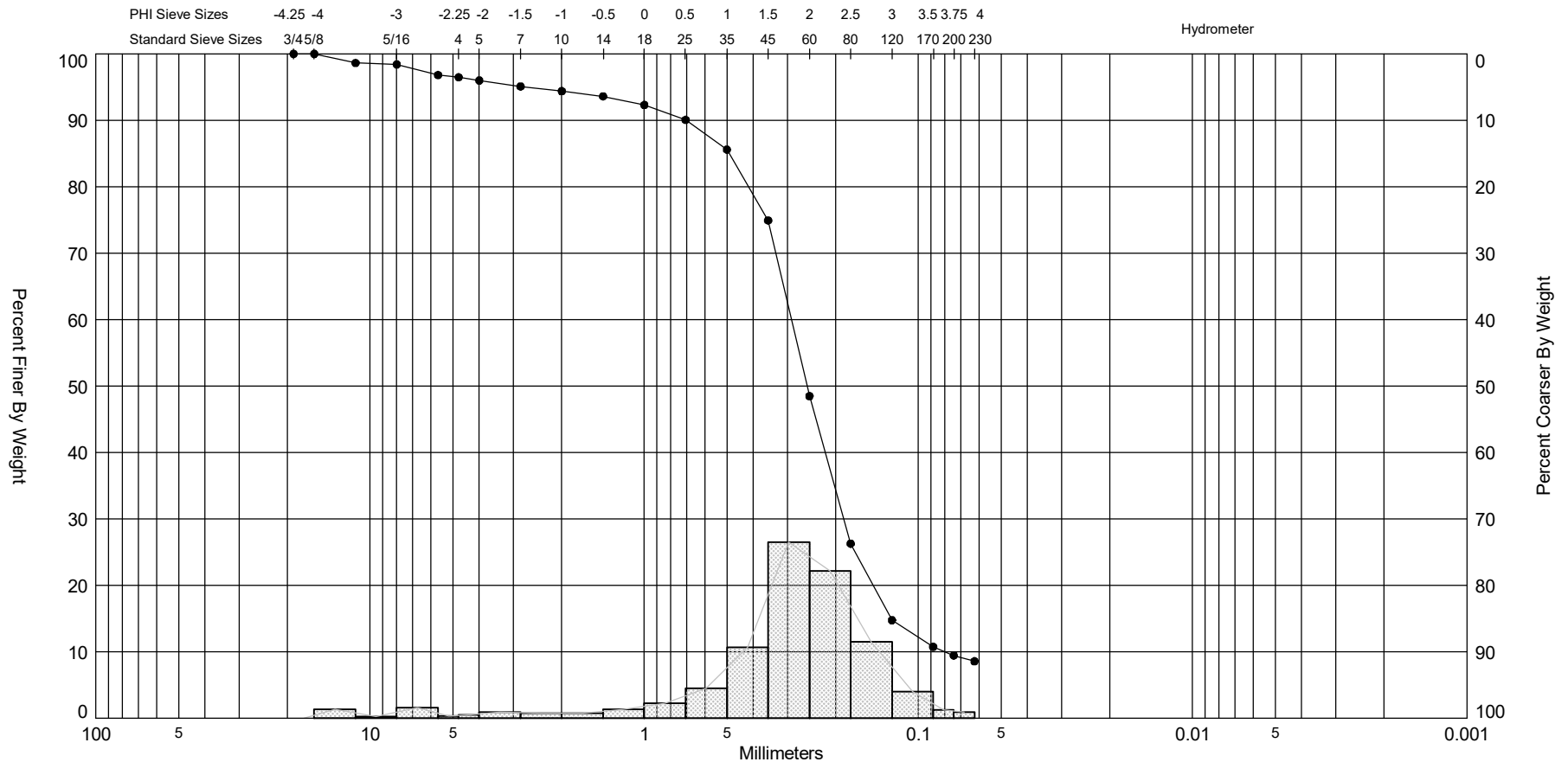
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|--------------------|--------------------|--|
| VC20-2-3 #S1 | —●— | -37.4 | SW-SM | #200 - 5.95 #230 - 5.44 | 1.88 | 89.20 | 1.73 | 1.59 | -1.12 | 6.36 | 0.94 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 56" Material Description: Gray well graded sand with silt, trace shell | | | | | | | | | | | Analysis Date: | 11-17-20 | |
| Depths and elevations based on measured values | | | | | | | | | | | Analyzed By: | LK | |
| <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | Easting (X, ft): | 26.358948 | |
| | | | | | | | | | | | Northing (Y, ft): | -82.228266 | |
| | | | | | | | | | | | Horizontal System: | NAD 1983 | |
| | | | | | | | | | | | Vertical System: | NAVD 88 | |

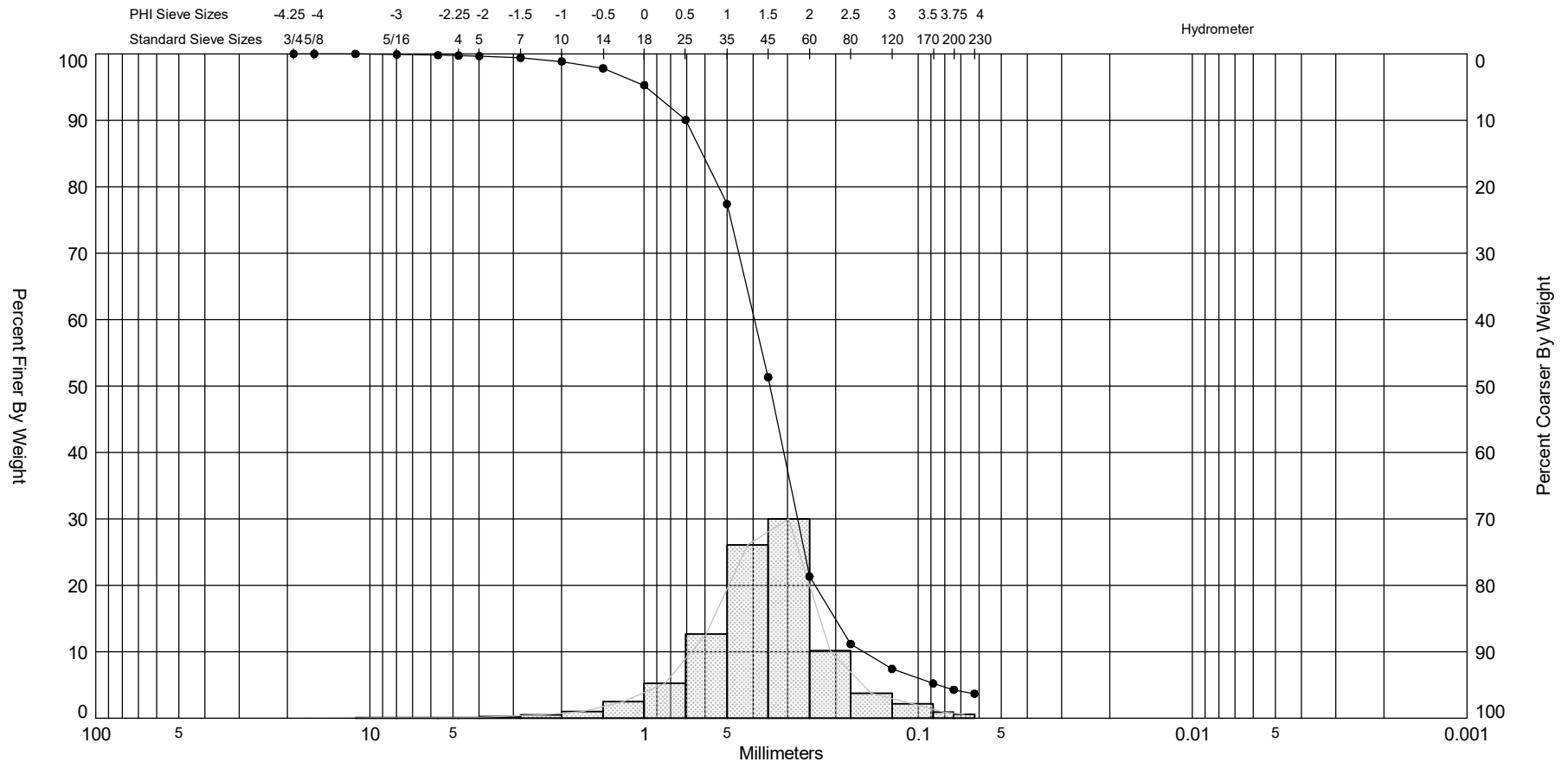
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-3 #S2 | —●— | -42.1 | SW-SM | #200 - 9.45 #230 - 8.56 | 1.98 | 89.80 | 1.97 | 1.65 | -2.03 | 7.97 | 1.35 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 56" - 80" Material Description: Gray well graded sand with silt, trace shell & rock | | | | | | | | | | | | Analysis Date: | 11-16-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.358948 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.228266 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

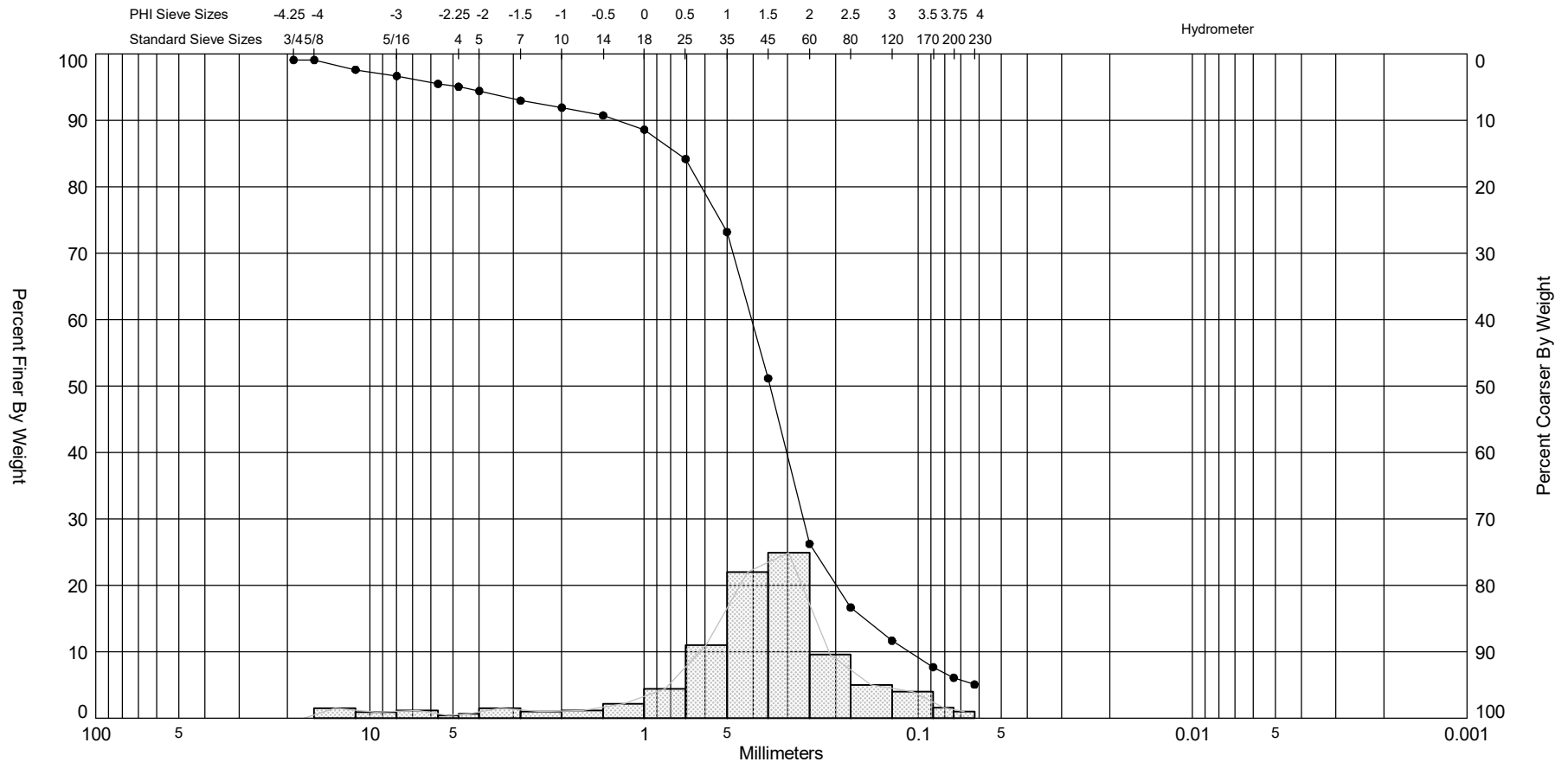
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-4 #S1 | —●— | -36.8 | SP | #200 - 4.29 #230 - 3.69 | 1.91 | 85.55 | 1.52 | 1.44 | -0.54 | 5.8 | 0.85 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 19" Material Description: Gray poorly graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-16-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.364542 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.226024 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

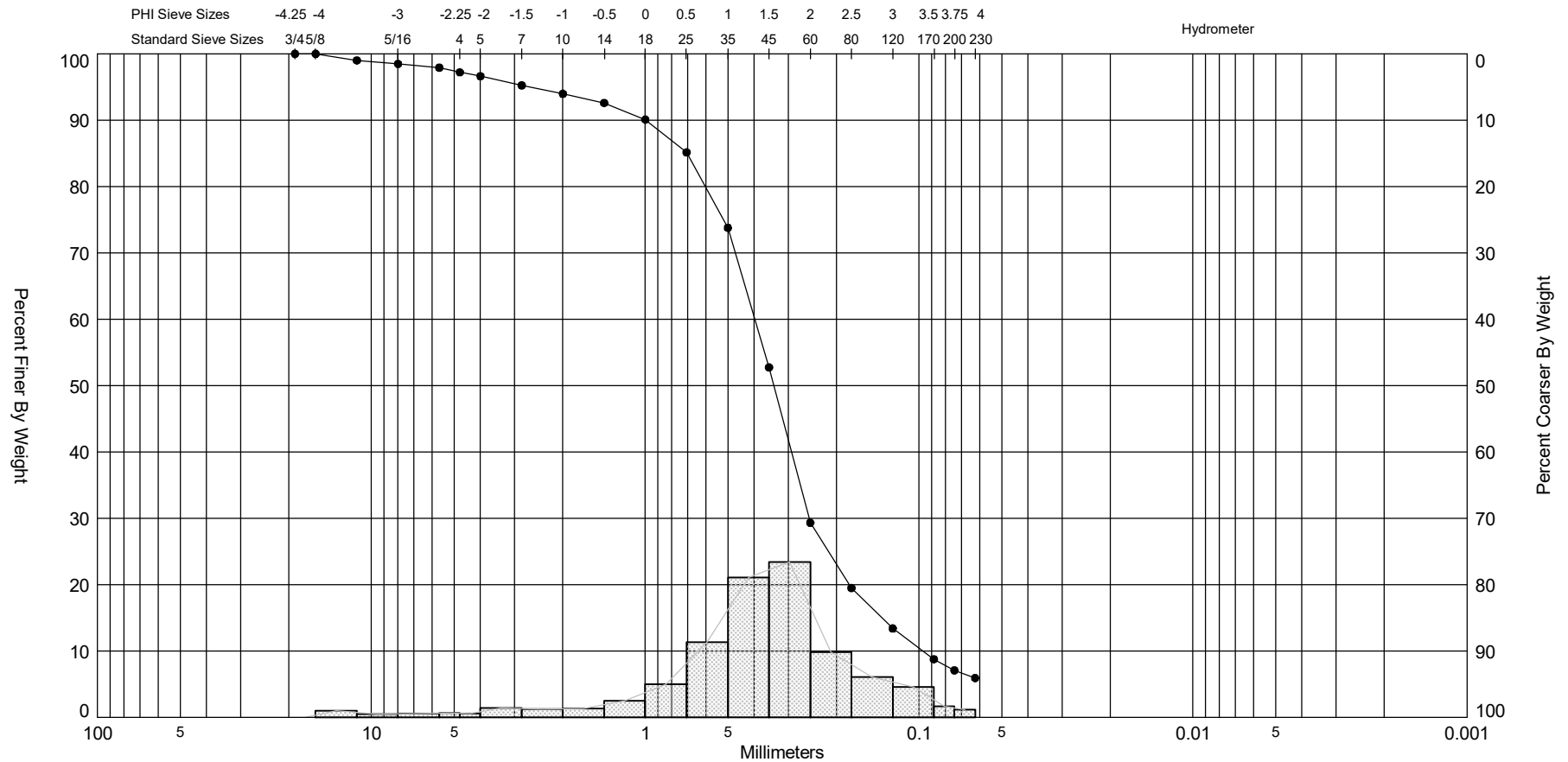
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|--------------------|--------------------|--|
| VC20-2-4 #S2 | —●— | -38.4 | SW-SM | #200 - 6.09 #230 - 5.05 | 1.85 | 85.20 | 1.52 | 1.21 | -1.35 | 5.93 | 1.39 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 19" - 28" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | Analysis Date: | 11-17-20 | |
| Depths and elevations based on measured values | | | | | | | | | | | Analyzed By: | LK | |
|  | | | | | | | | | | | Easting (X, ft): | 26.364542 | |
| | | | | | | | | | | | Northing (Y, ft): | -82.226024 | |
| | | | | | | | | | | | Horizontal System: | NAD 1983 | |
| | | | | | | | | | | | Vertical System: | NAVD 88 | |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

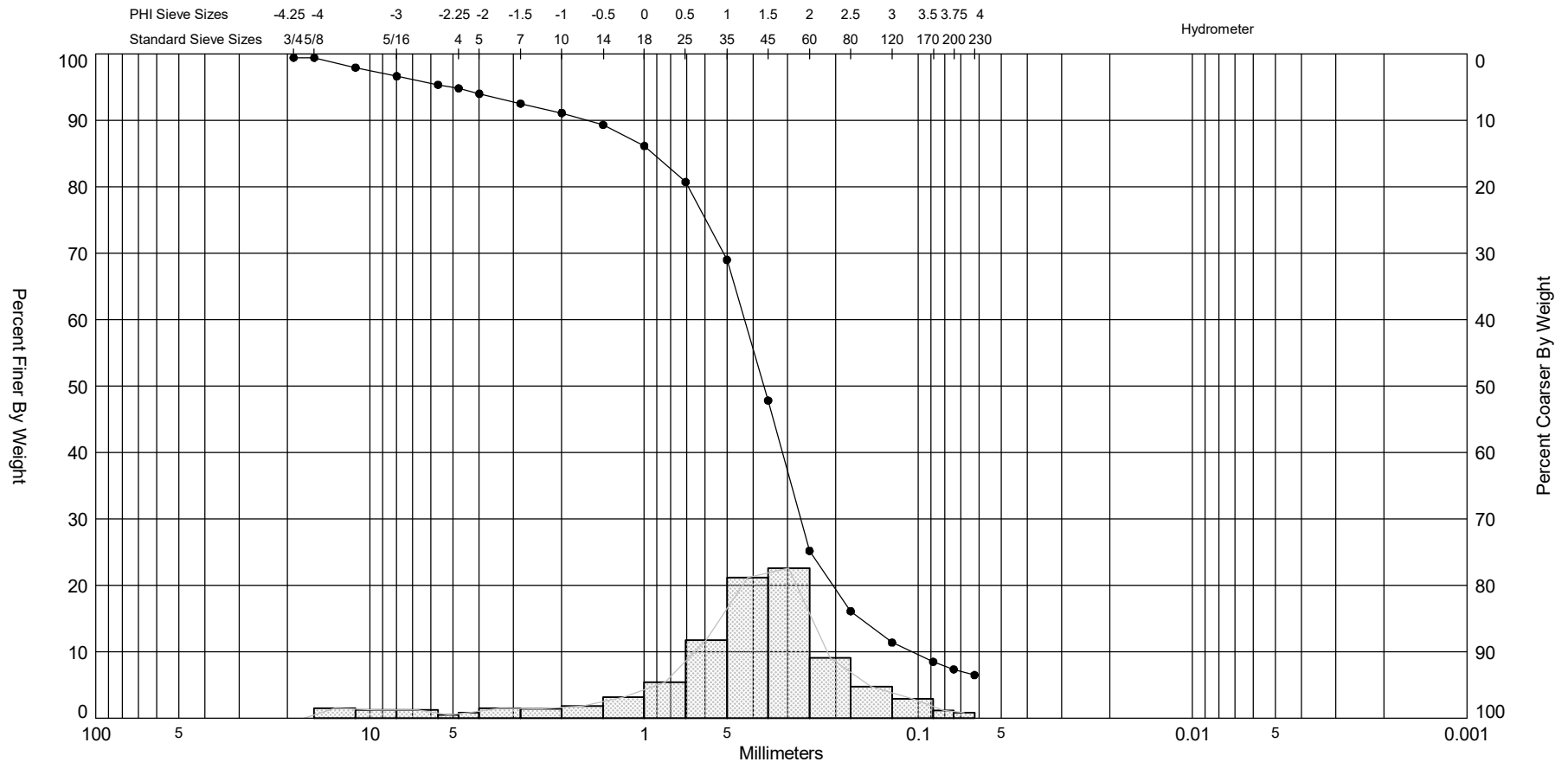
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-4 #S3 | —●— | -39.1 | SW-SM | #200 - 7.09 #230 - 5.93 | 1.76 | 85.30 | 1.56 | 1.34 | -1.28 | 5.9 | 1.32 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 28" - 48" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.364542 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.226024 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

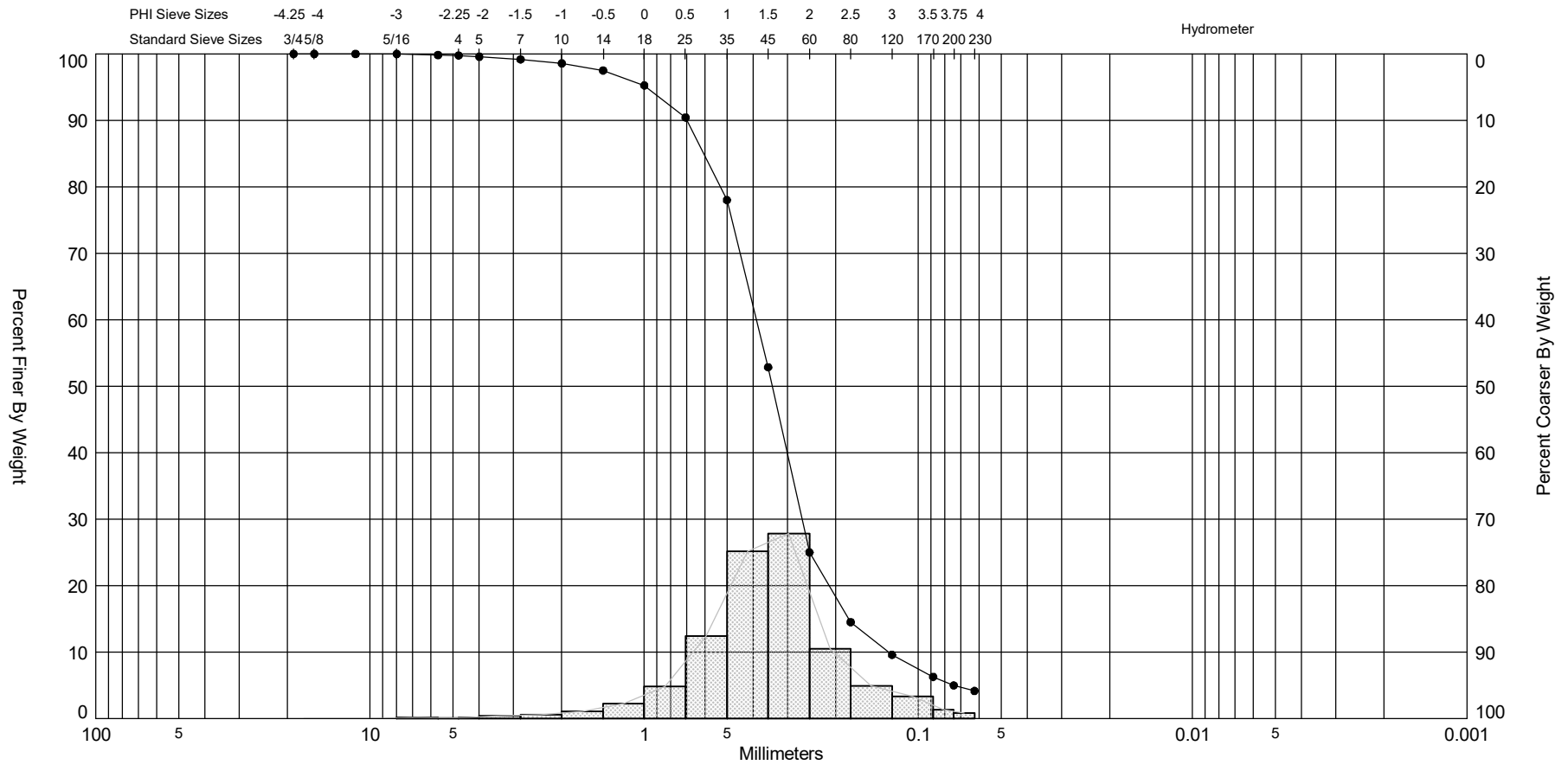
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-4 #S4 | —●— | -40.8 | SW-SM | #200 - 7.35 #230 - 6.48 | 1.81 | 88.10 | 1.45 | 1.08 | -1.29 | 5.28 | 1.44 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 48" - 72" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-16-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  <div style="text-align: center;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | | Easting (X, ft): | 26.364542 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.226024 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

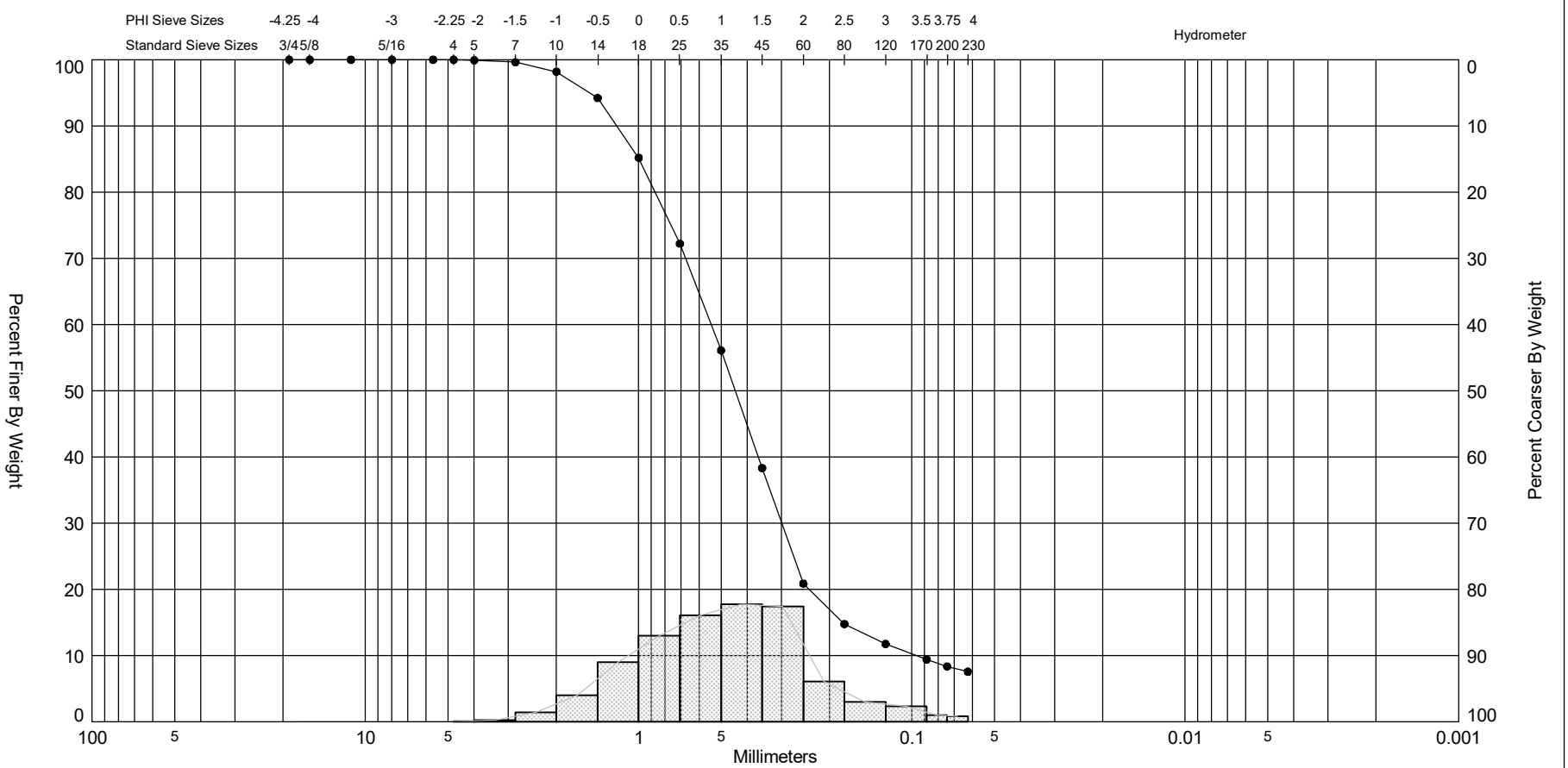
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-2-4 #S5 | —●— | -40.8 | SW | #200 - 4.98 #230 - 4.15 | 1.56 | 84.30 | 1.55 | 1.49 | -0.44 | 5.17 | 0.91 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 48" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-17-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.364542 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.226024 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

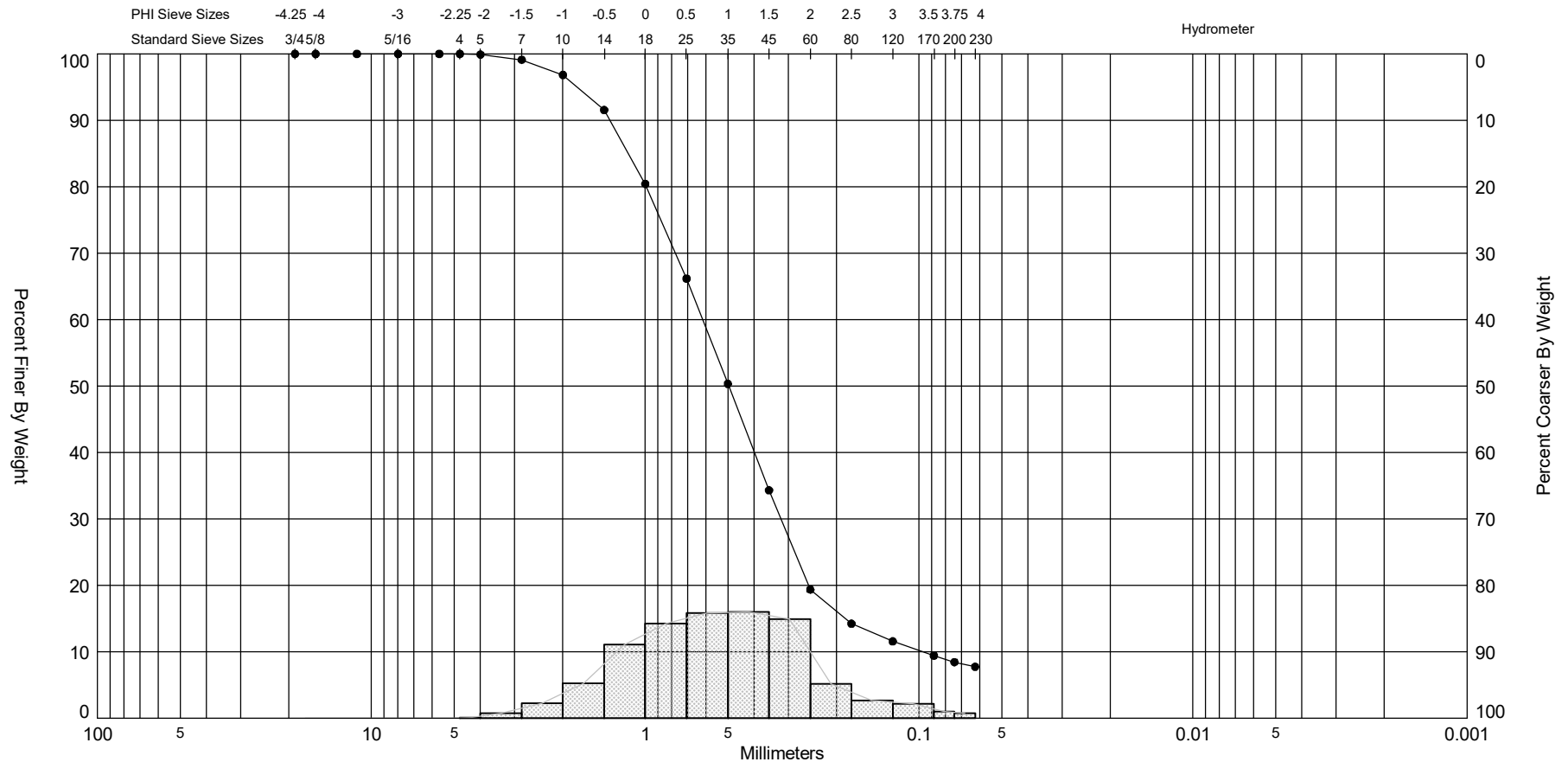
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-6-1 #S1 | —●— | -30.3 | SP-SM | #200 - 8.35 #230 - 7.55 | 2.23 | 91.99 | 1.17 | 1.05 | 0.16 | 3.08 | 1.04 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 9" Material Description: Gray poorly graded sand with silt | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.403439 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.197289 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

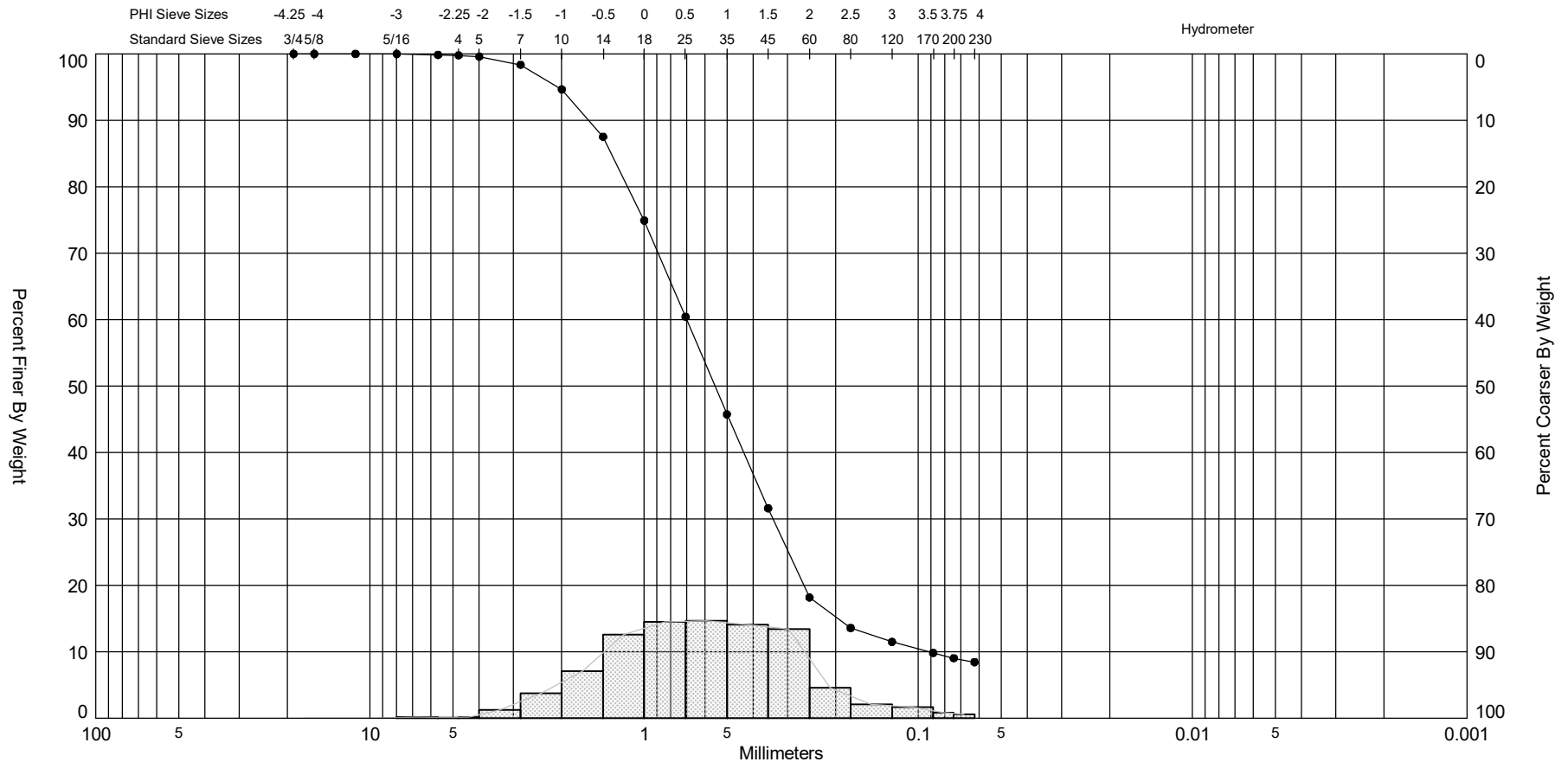
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-6-1 #S2 | —●— | -31.1 | SP-SM | #200 - 8.44 #230 - 7.73 | 2.68 | 90.34 | 1.01 | 0.9 | 0.19 | 3.01 | 1.09 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 9" - 26" Material Description: Gray poorly graded sand with silt | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.403439 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.197289 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

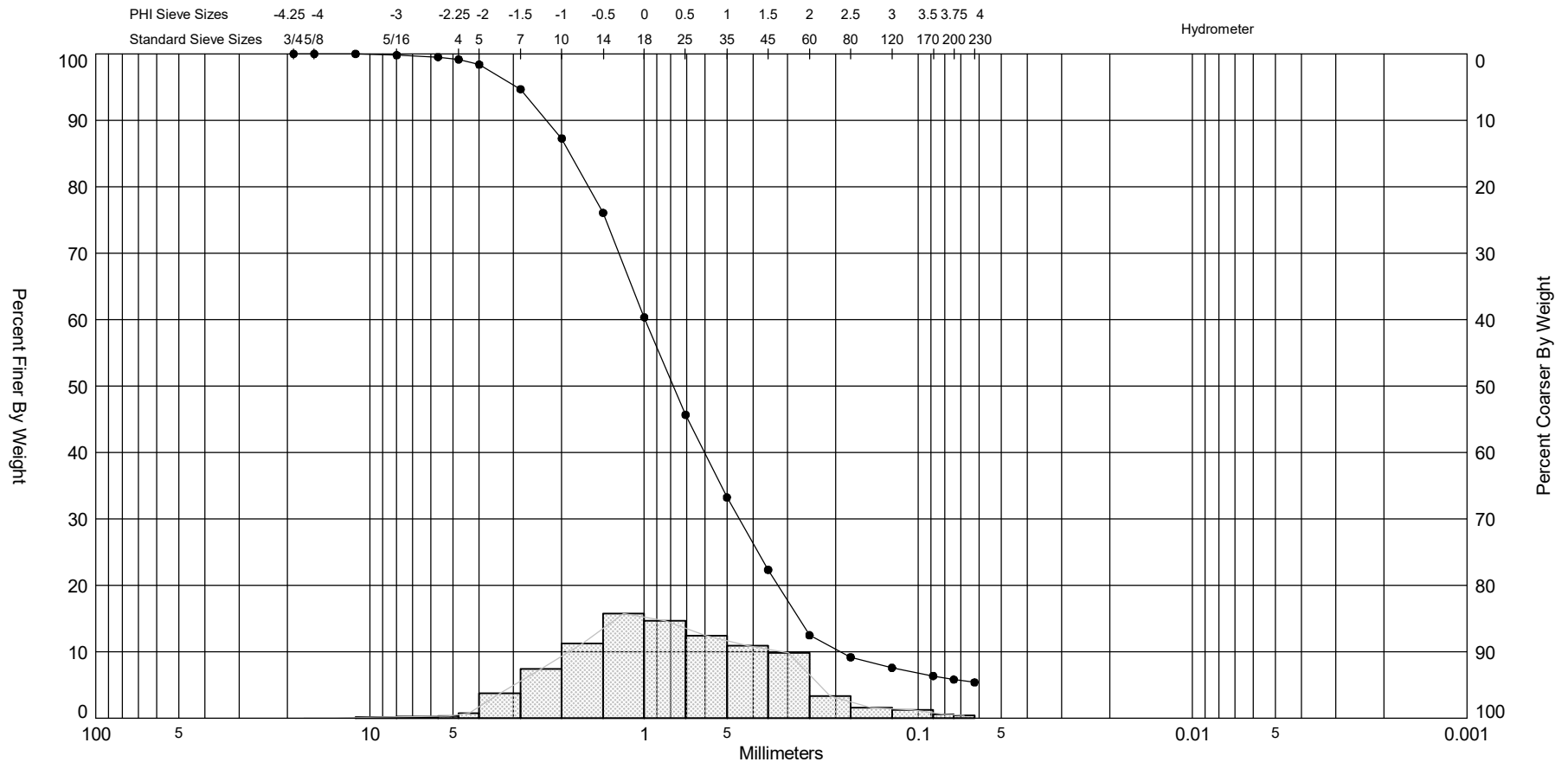
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-6-1 #S3 | —●— | -32.5 | SP-SM | #200 - 9.04 #230 - 8.45 | 2.31 | 90.04 | 0.85 | 0.72 | 0.15 | 2.98 | 1.13 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 26" - 36" Material Description: Gray poorly graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.403439 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.197289 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

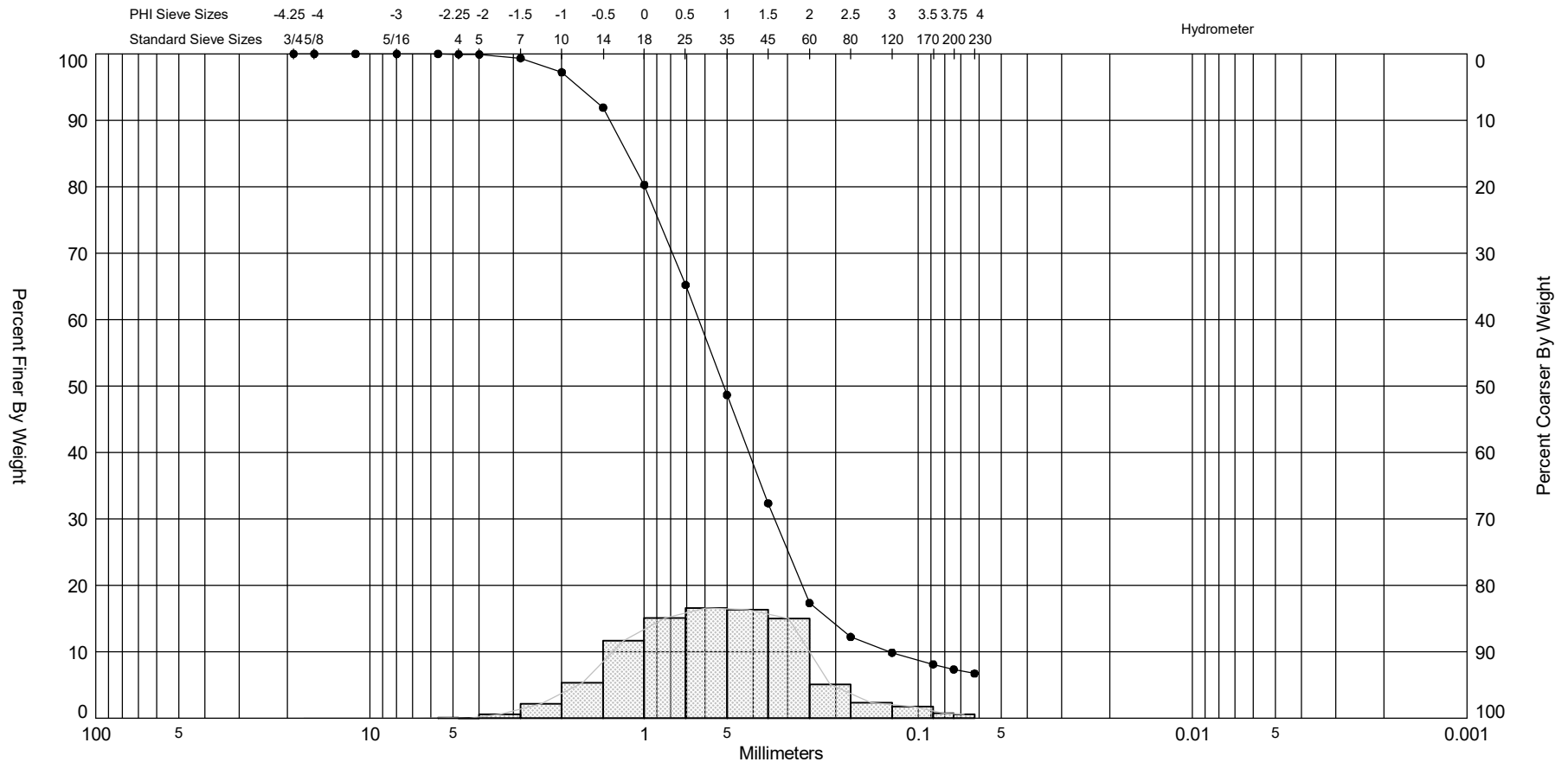
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-6-1 #S4 | —●— | -33.3 | SP-SM | #200 - 5.81 #230 - 5.38 | 2.29 | 92.94 | 0.35 | 0.33 | 0.22 | 2.93 | 1.22 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 36" - 60" Material Description: Gray poorly graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.403439 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.197289 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

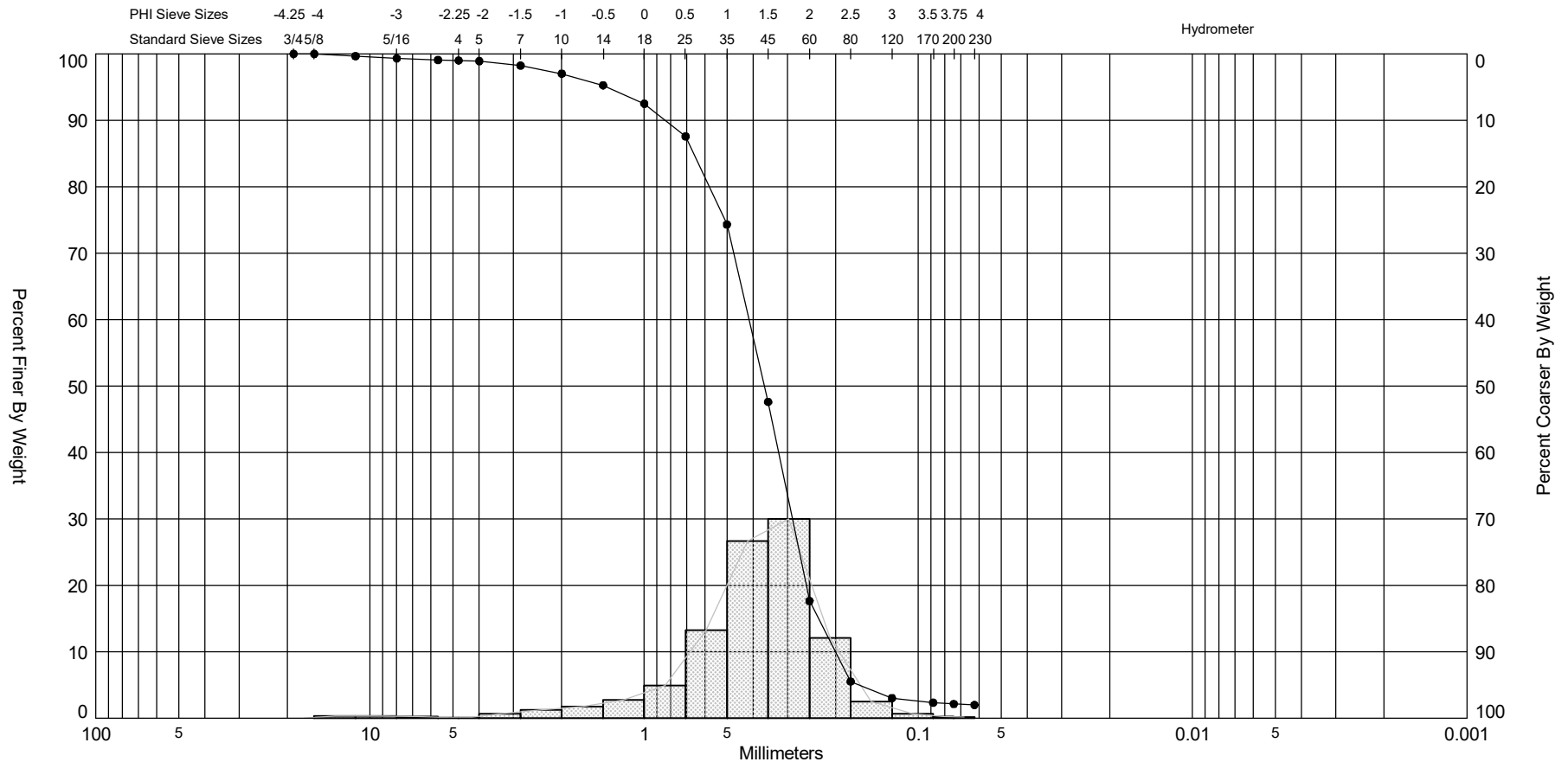
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|----------------------------|------------|--------------|--------|------|------|------|------|--------------------|--|
| VC20-6-1 #S5 | —●— | -33.3 | SP-SM | #200 - 7.33 #230 - 6.71 | 2.43 | 91.59 | 0.96 | 0.87 | 0.2 | 3.07 | 1.05 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 36" Material Description: Gray poorly graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  <div style="text-align: center;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | | Easting (X, ft): | 26.403439 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.197289 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

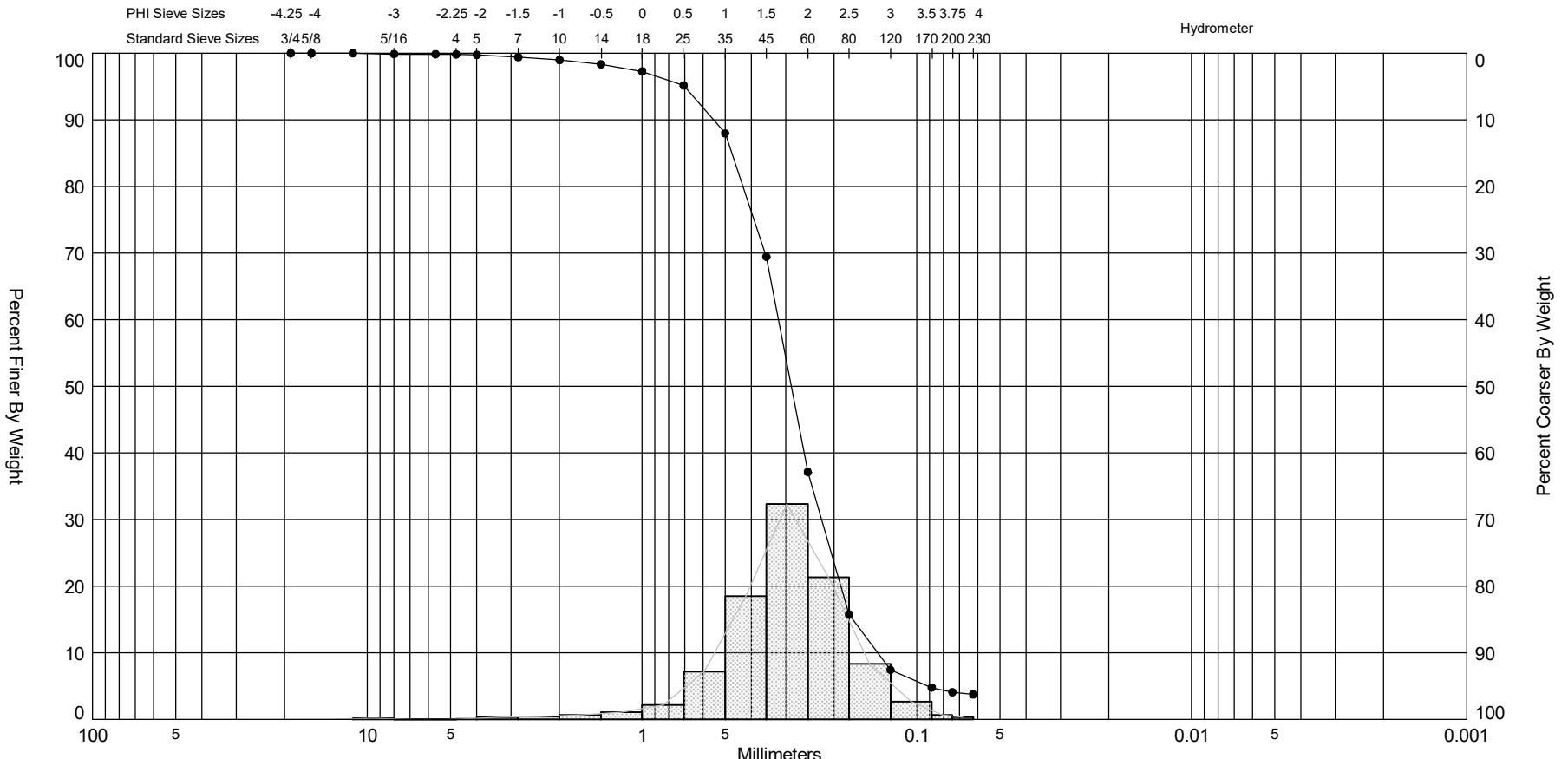
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-2 #S1 | —●— | -28.6 | SW | #200 - 2.13 #230 - 1.98 | 2.04 | 86.60 | 1.46 | 1.29 | -1.71 | 8.67 | 0.94 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 26" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.399234 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193346 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

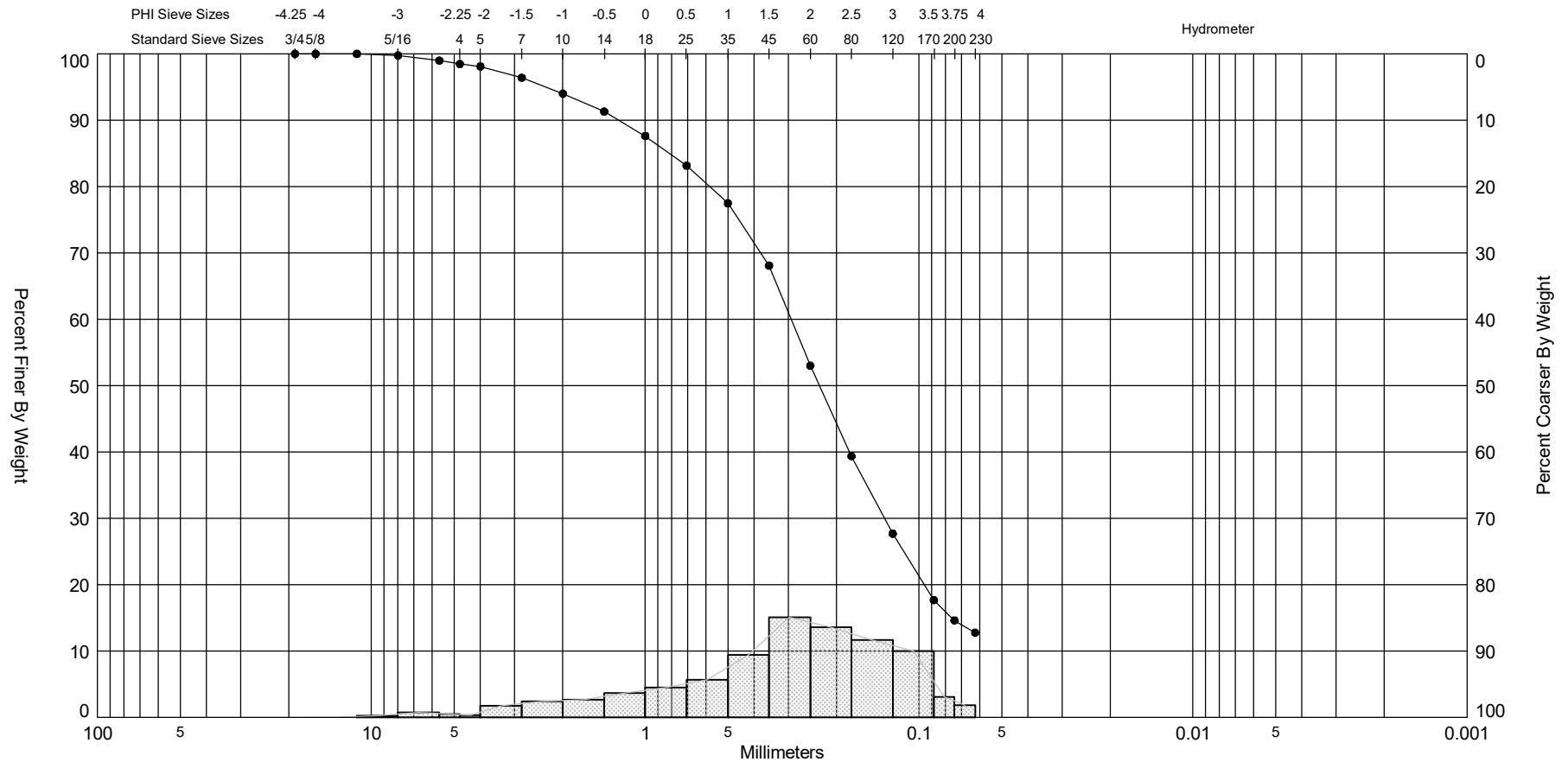
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

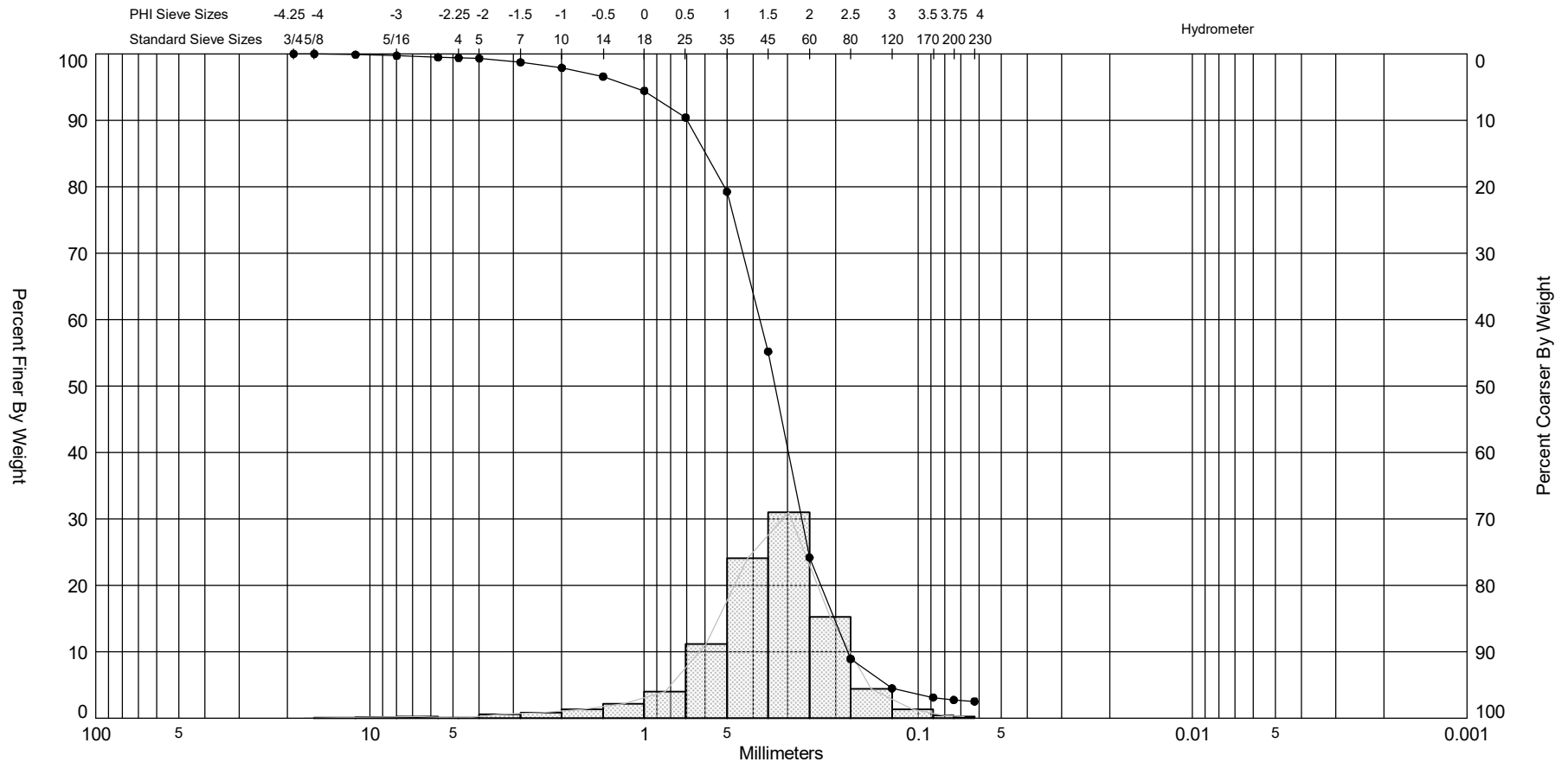
| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-2 #S2 | —●— | -30.8 | SP | #200 - 4.09 #230 - 3.75 | 2.02 | 87.00 | 1.8 | 1.73 | -1.09 | 7.41 | 0.8 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 26" - 48" Material Description: Gray poorly graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.399234 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193346 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

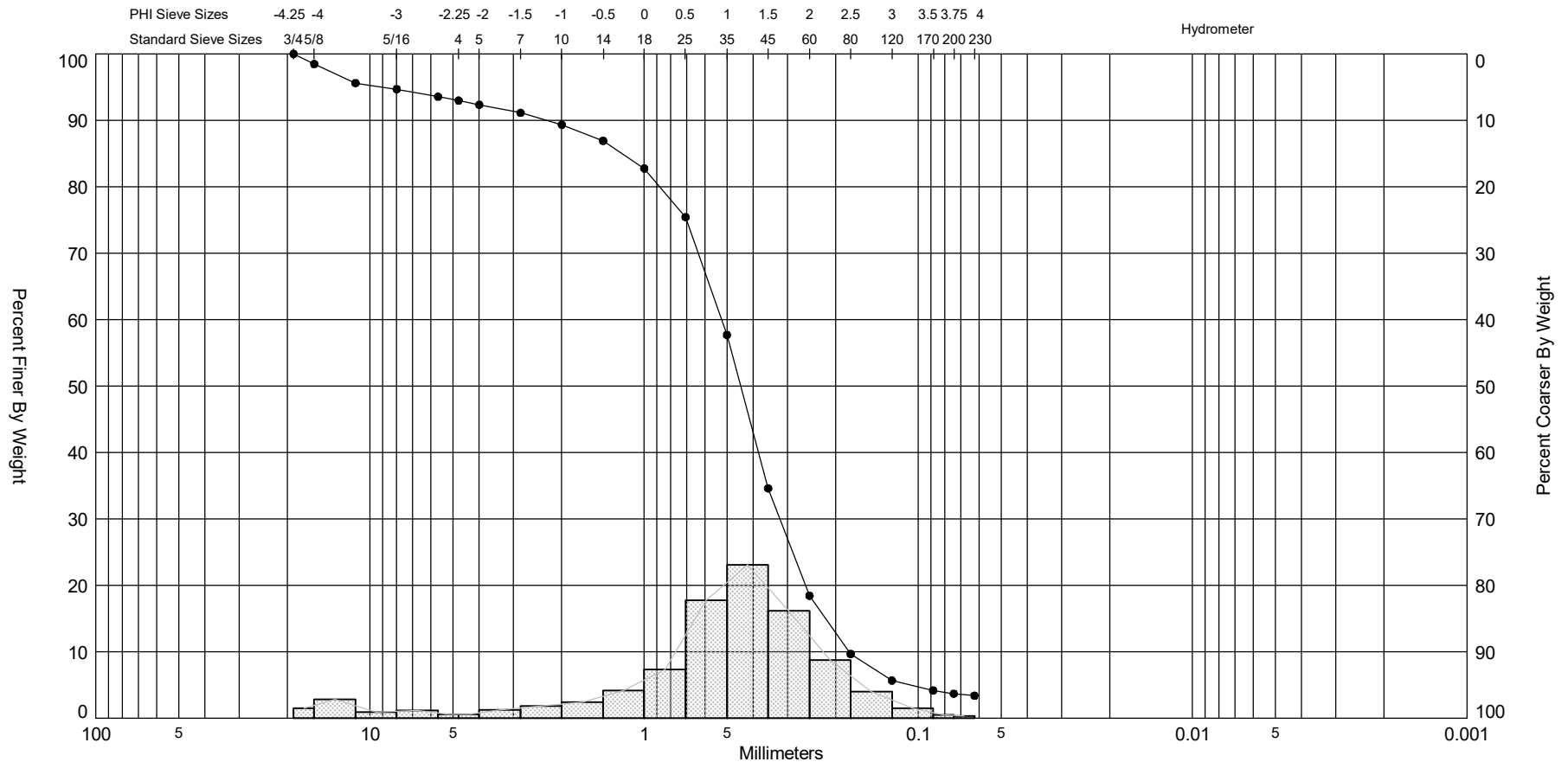
| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|------------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-2 #S3 | —●— | -32.6 | SM | #200 - 14.61 #230 - 12.77 | 2.60 | 83.20 | 2.11 | 1.64 | -0.92 | 3.52 | 1.45 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 48" - 72" Material Description: Gray silty sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.399234 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193346 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-2 #S4 | —●— | -32.6 | SW | #200 - 2.74 #230 - 2.53 | 1.79 | 86.31 | 1.58 | 1.45 | -1.41 | 7.88 | 0.89 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 48" Material Description: Gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.399234 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193346 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

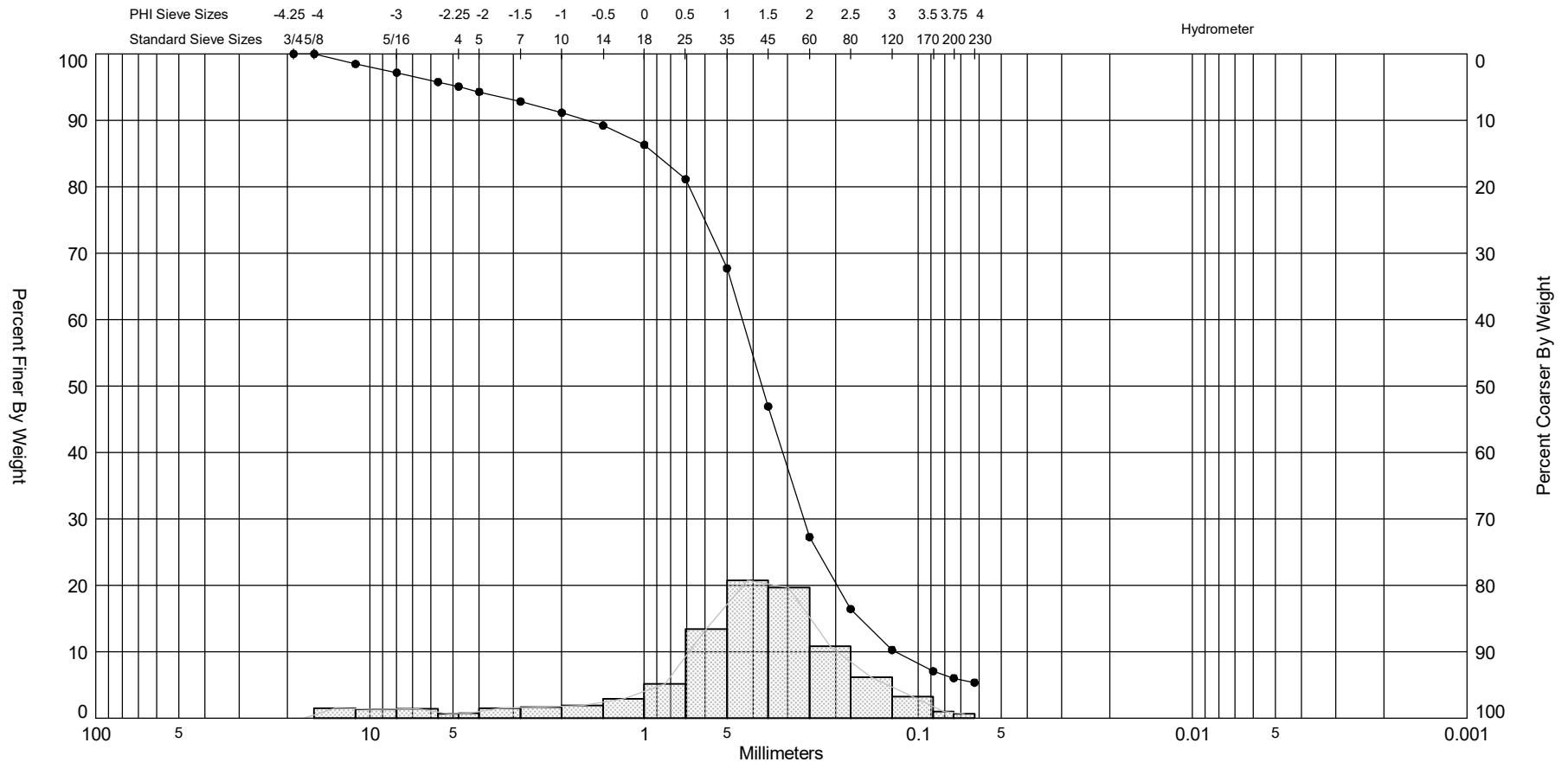
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-3 #S1 | —●— | -31.5 | SW | #200 - 3.69 #230 - 3.38 | 2.18 | 77.86 | 1.17 | 0.8 | -1.48 | 5.3 | 1.56 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 13" Material Description: Light gray well graded sand with few shell | | | | | | | | | | | | Analysis Date: | 11-20-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.397616 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.190828 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

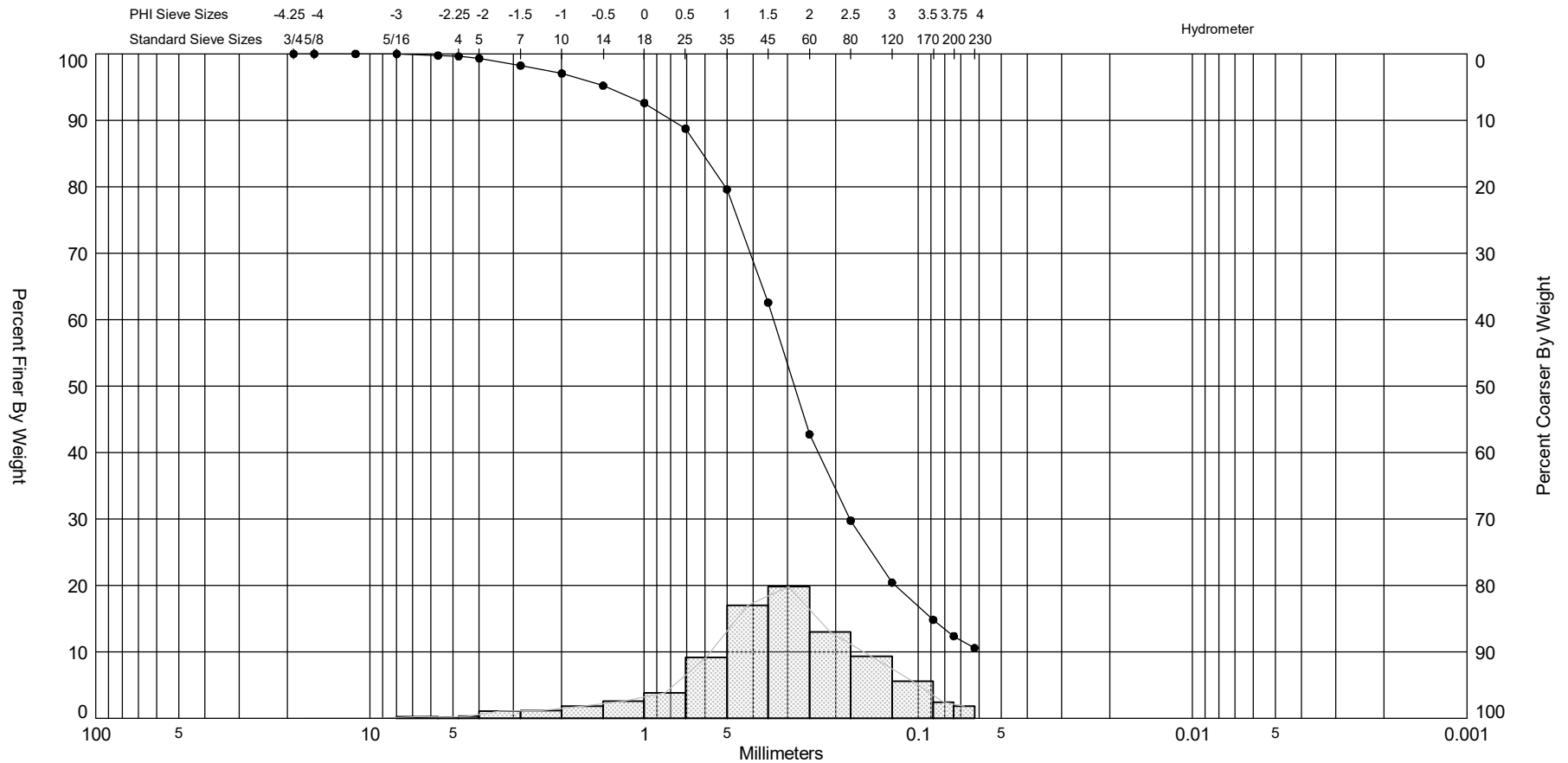
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-3 #S2 | —●— | -32.6 | SW-SM | #200 - 6.03 #230 - 5.36 | 2.37 | 86.22 | 1.43 | 1.12 | -1.33 | 5.14 | 1.46 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 13" - 26" Material Description: Gray well graded sand with silt, trace shell | | | | | | | | | | | | Analysis Date: | 11-20-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.397616 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.190828 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

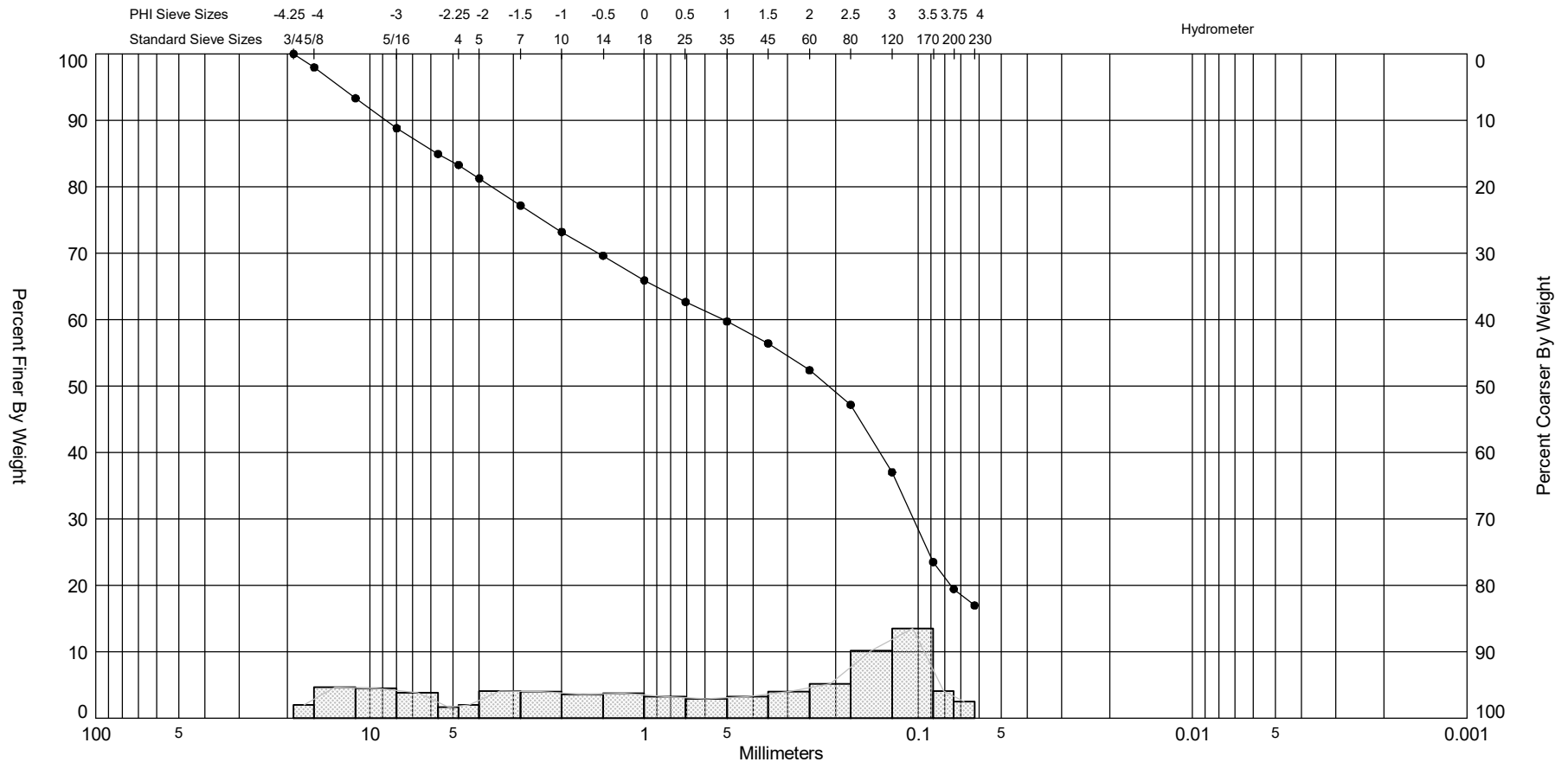
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|------------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-3 #S3 | —●— | -33.7 | SW-SM | #200 - 12.37 #230 - 10.57 | 2.37 | 81.64 | 1.82 | 1.63 | -0.68 | 4.06 | 1.16 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 26" - 32" Material Description: Gray well graded sand with silt, trace shell | | | | | | | | | | | | Analysis Date: | 11-20-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.397616 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.190828 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | | |

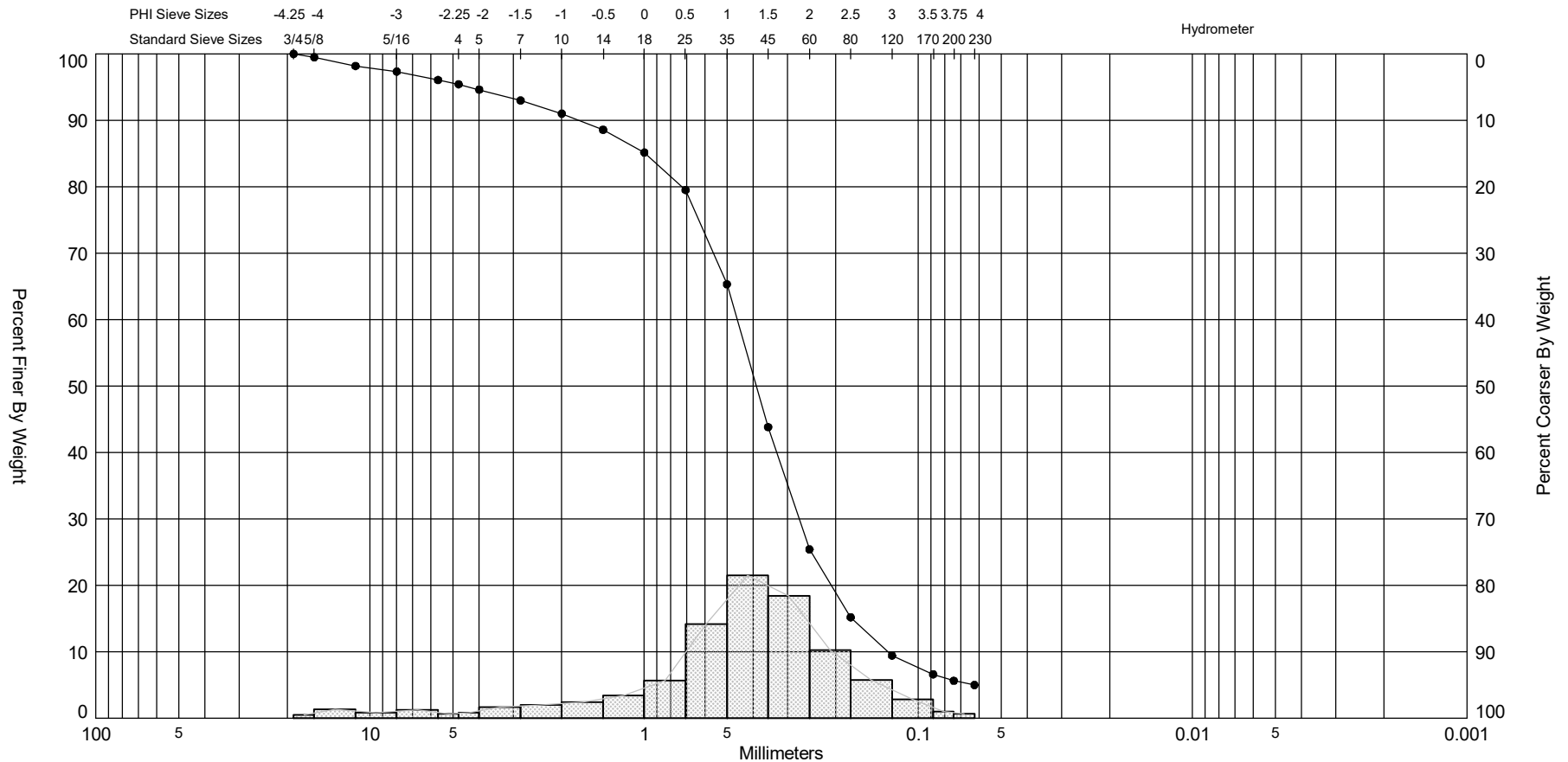
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|------|------------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-3 #S4 | —●— | -34.2 | SM | #200 - 19.43 #230 - 16.96 | 4.23 | 70.39 | 2.23 | 0.57 | -0.38 | 1.69 | 2.56 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 32" - 56" Material Description: Brown silty sand with little shell | | | | | | | | | | | | Analysis Date: | 11-20-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.397616 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.190828 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

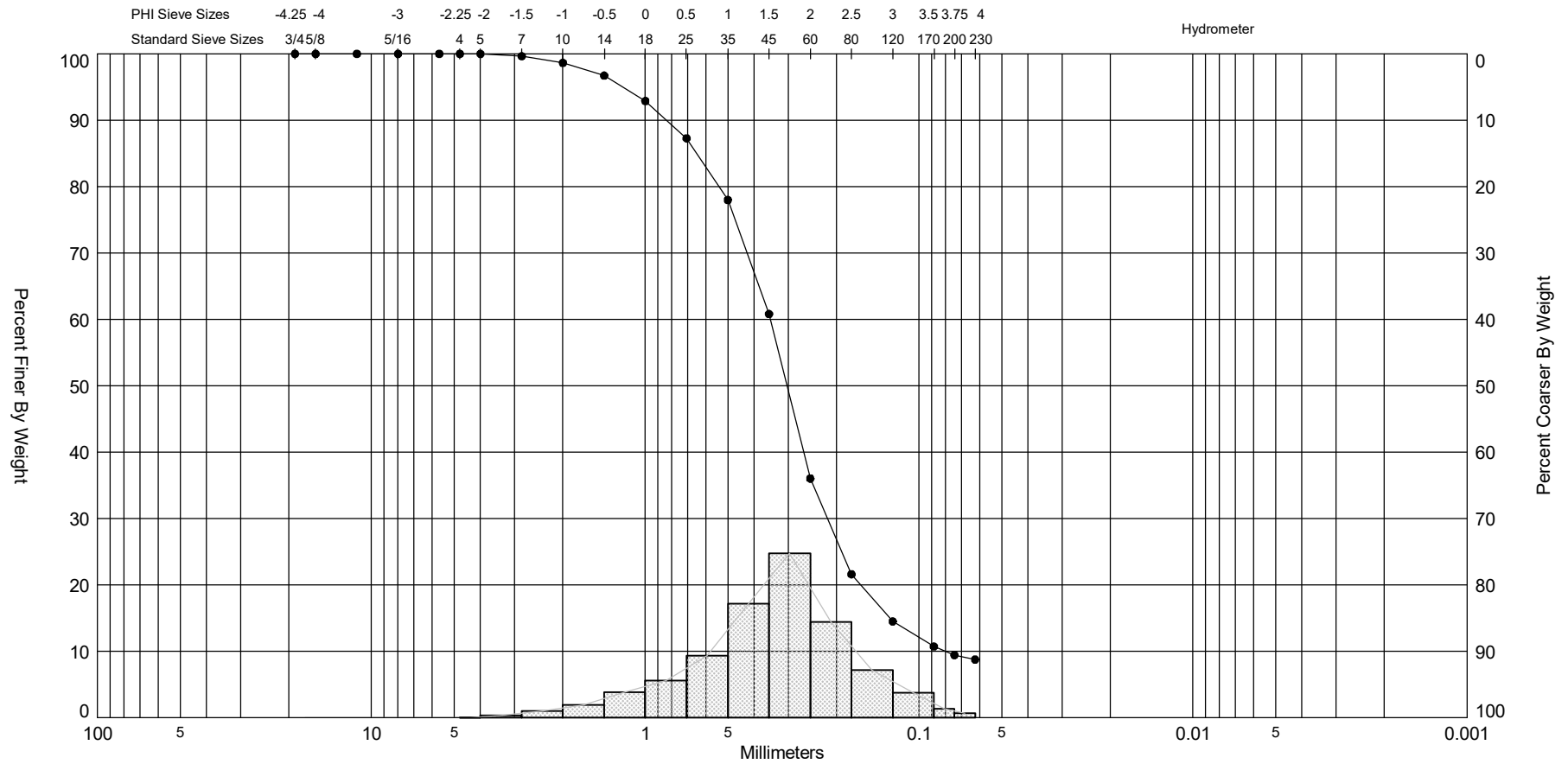
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-3 #S5 | —●— | -36.2 | SW | #200 - 5.63 #230 - 4.99 | 2.07 | 85.77 | 1.36 | 1.06 | -1.29 | 5.17 | 1.46 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 56" Material Description: Light gray well graded sand with trace shell | | | | | | | | | | | | Analysis Date: | 11-20-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  | | | | | | | | | | | | Easting (X, ft): | 26.397616 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.190828 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |
| <p style="text-align: center;">GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> | | | | | | | | | | | | | |

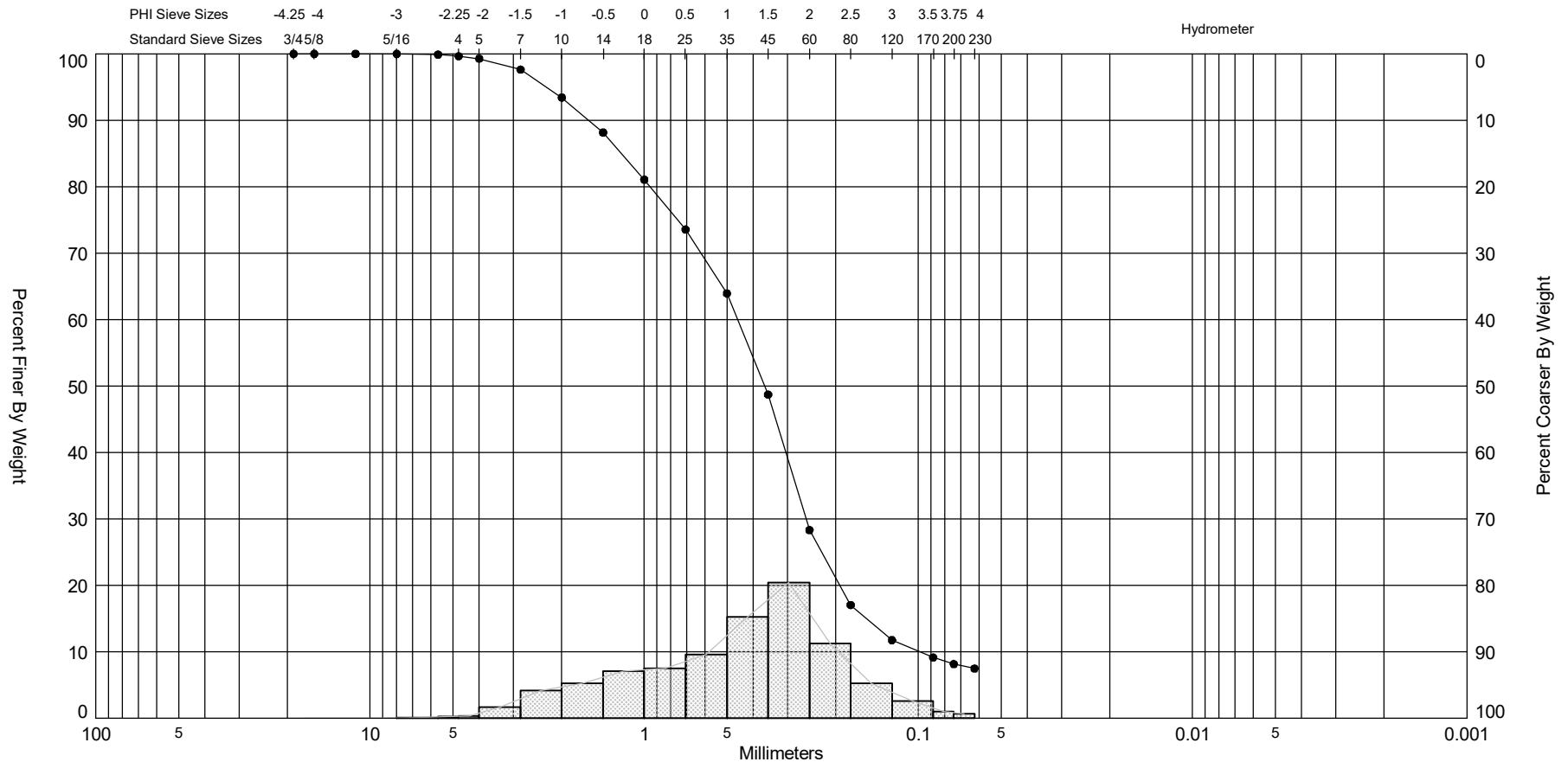
SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21




| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|--|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-4 #S1 | —●— | -29.6 | SW-SM | #200 - 9.41 #230 - 8.75 | 2.12 | 87.55 | 1.72 | 1.54 | -0.44 | 3.51 | 0.99 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 0" - 40" Material Description: Gray well graded sand with silt | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  <div style="text-align: center;"> <p>GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444</p> </div> | | | | | | | | | | | | Easting (X, ft): | 26.403143 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193165 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

SIEVE ANALYSIS LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21



| | | | | | |
|--------|------|--------|--------|------|---------------|
| Gravel | | Sand | | | Silt and Clay |
| Coarse | Fine | Coarse | Medium | Fine | |

| Sample | Symbol | Elev. (ft) | USCS | % Fines | % Organics | % Carbonates | Median | Mean | Skew | Kurt | Sort | Sample Information | |
|---|--------|------------|-------|----------------------------|------------|--------------|--------|------|-------|------|------|--------------------|--|
| VC20-6-4 #S2 | —●— | -32.9 | SW-SM | #200 - 8.14 #230 - 7.46 | 2.35 | 87.81 | 1.46 | 1.11 | -0.44 | 2.79 | 1.25 | Project Name: | Lovers Key Beach Nourishment Sand Search |
| Comments: Sample Interval: 40" - 64" Material Description: Gray well graded sand with silt & trace shell | | | | | | | | | | | | Analysis Date: | 11-19-20 |
| Depths and elevations based on measured values | | | | | | | | | | | | Analyzed By: | LK |
|  GFA International, Inc. 1215 Wallace Drive Delray Beach, FL 33444 | | | | | | | | | | | | Easting (X, ft): | 26.403143 |
| | | | | | | | | | | | | Northing (Y, ft): | -82.193165 |
| | | | | | | | | | | | | Horizontal System: | NAD 1983 |
| | | | | | | | | | | | | Vertical System: | NAVD 88 |

6.0 Sieve Tables



Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-1 #S1

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):

26.385157

Northing (ft):

-82.371143

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-36.1 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-7/1

Comments:

Sample Interval: 0" - 66.5" Material Description: Light gray well graded sand with trace shell

Dry Weight (g):

324.50

Wash Weight (g):

319.45

Pan Retained (g):

0.24

Sieve Loss (%):

0.00

Fines (%):

#200 - 1.67
#230 - 1.63

Organics (%):

0.69

Carbonates (%):

19.70

Shells (%):

0.58

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.58 | 0.18 | 0.58 | 0.18 |
| 3.5 | -2.50 | 5.66 | 0.74 | 0.23 | 1.32 | 0.41 |
| 4 | -2.25 | 4.76 | 0.57 | 0.18 | 1.89 | 0.58 |
| 5 | -2.00 | 4.00 | 0.69 | 0.21 | 2.58 | 0.80 |
| 7 | -1.50 | 2.83 | 1.22 | 0.38 | 3.80 | 1.17 |
| 10 | -1.00 | 2.00 | 2.57 | 0.79 | 6.37 | 1.96 |
| 14 | -0.50 | 1.41 | 5.48 | 1.69 | 11.85 | 3.65 |
| 18 | 0.00 | 1.00 | 10.22 | 3.15 | 22.07 | 6.80 |
| 25 | 0.50 | 0.71 | 20.39 | 6.28 | 42.46 | 13.08 |
| 35 | 1.00 | 0.50 | 48.13 | 14.83 | 90.59 | 27.92 |
| 45 | 1.50 | 0.35 | 85.56 | 26.37 | 176.15 | 54.28 |
| 60 | 2.00 | 0.25 | 79.40 | 24.47 | 255.55 | 78.75 |
| 80 | 2.50 | 0.18 | 49.87 | 15.37 | 305.42 | 94.12 |
| 120 | 3.00 | 0.13 | 12.37 | 3.81 | 317.79 | 97.93 |
| 170 | 3.50 | 0.09 | 1.03 | 0.32 | 318.82 | 98.25 |
| 200 | 3.75 | 0.07 | 0.26 | 0.08 | 319.08 | 98.33 |
| 230 | 4.00 | 0.06 | 0.13 | 0.04 | 319.21 | 98.37 |

| | | | | | | |
|-------|--------|--------|--------|--------|--------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.62 | 2.17 | 1.92 | 1.42 | 0.90 | 0.60 | -0.29 |

| | | | | | |
|-------------------|----------|---------|---------|----------|----------|
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis |
| | 1.31 | 0.40 | 0.88 | -1.22 | 6.26 |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granulometric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-1 #S2

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.385157

Northing (ft):
-82.371143

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-41.6 NAVD 88

USCS: **SP** Munsell: **Dry - 10YR-7/1** Comments: **Sample Interval: 66.5" - 133" Material Description: Light gray poorly graded sand with trace shell**

| Dry Weight (g): | Wash Weight (g): | Pan Retained (g): | Sieve Loss (%): | Fines (%): #200 - 3.20 #230 - 3.06 | Organics (%): | Carbonates (%): | Shells (%): |
|-----------------|------------------|--------------------------|-----------------|--|---------------------|----------------------|-------------|
| 194.70 | 189.40 | 0.11 | 0.28 | | 0.89 | 21.80 | 0.10 |
| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained | |
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3.5 | -2.50 | 5.66 | 0.20 | 0.10 | 0.20 | 0.10 | |
| 4 | -2.25 | 4.76 | 0.00 | 0.00 | 0.20 | 0.10 | |
| 5 | -2.00 | 4.00 | 0.00 | 0.00 | 0.20 | 0.10 | |
| 7 | -1.50 | 2.83 | 0.23 | 0.12 | 0.43 | 0.22 | |
| 10 | -1.00 | 2.00 | 0.61 | 0.31 | 1.04 | 0.53 | |
| 14 | -0.50 | 1.41 | 0.81 | 0.42 | 1.85 | 0.95 | |
| 18 | 0.00 | 1.00 | 1.29 | 0.66 | 3.14 | 1.61 | |
| 25 | 0.50 | 0.71 | 1.97 | 1.01 | 5.11 | 2.62 | |
| 35 | 1.00 | 0.50 | 2.80 | 1.44 | 7.91 | 4.06 | |
| 45 | 1.50 | 0.35 | 5.01 | 2.57 | 12.92 | 6.64 | |
| 60 | 2.00 | 0.25 | 16.71 | 8.58 | 29.63 | 15.22 | |
| 80 | 2.50 | 0.18 | 48.81 | 25.07 | 78.44 | 40.29 | |
| 120 | 3.00 | 0.13 | 75.92 | 38.99 | 154.36 | 79.28 | |
| 170 | 3.50 | 0.09 | 32.35 | 16.62 | 186.71 | 95.90 | |
| 200 | 3.75 | 0.07 | 1.75 | 0.90 | 188.46 | 96.80 | |
| 230 | 4.00 | 0.06 | 0.29 | 0.15 | 188.75 | 96.94 | |

| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis |
|------------|----------|---------|---------|----------|----------|
| Statistics | 2.47 | 0.18 | 0.73 | -2.19 | 11.16 |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-1 #S3

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):

26.385157

Northing (ft):

-82.371143

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-47.2 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-7/1

Comments:

Sample Interval: 133" - 200" Material Description: Light gray well graded sand with trace shell

Dry Weight (g):

169.10

Wash Weight (g):

162.90

Pan Retained (g):

0.38

Sieve Loss (%):

0.23

Fines (%):

#200 - 4.27
#230 - 4.12

Organics (%):

1.17

Carbonates (%):

22.10

Shells (%):

1.35

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 1.61 | 0.95 | 1.61 | 0.95 |
| 5/16" | -3.00 | 8.00 | 0.46 | 0.27 | 2.07 | 1.22 |
| 3.5 | -2.50 | 5.66 | 0.00 | 0.00 | 2.07 | 1.22 |
| 4 | -2.25 | 4.76 | 0.22 | 0.13 | 2.29 | 1.35 |
| 5 | -2.00 | 4.00 | 0.13 | 0.08 | 2.42 | 1.43 |
| 7 | -1.50 | 2.83 | 0.35 | 0.21 | 2.77 | 1.64 |
| 10 | -1.00 | 2.00 | 0.90 | 0.53 | 3.67 | 2.17 |
| 14 | -0.50 | 1.41 | 1.38 | 0.82 | 5.05 | 2.99 |
| 18 | 0.00 | 1.00 | 1.63 | 0.96 | 6.68 | 3.95 |
| 25 | 0.50 | 0.71 | 2.44 | 1.44 | 9.12 | 5.39 |
| 35 | 1.00 | 0.50 | 4.82 | 2.85 | 13.94 | 8.24 |
| 45 | 1.50 | 0.35 | 8.90 | 5.26 | 22.84 | 13.51 |
| 60 | 2.00 | 0.25 | 29.42 | 17.40 | 52.26 | 30.90 |
| 80 | 2.50 | 0.18 | 62.40 | 36.90 | 114.66 | 67.81 |
| 120 | 3.00 | 0.13 | 43.12 | 25.50 | 157.78 | 93.31 |
| 170 | 3.50 | 0.09 | 3.34 | 1.98 | 161.12 | 95.28 |
| 200 | 3.75 | 0.07 | 0.76 | 0.45 | 161.88 | 95.73 |
| 230 | 4.00 | 0.06 | 0.25 | 0.15 | 162.13 | 95.88 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.43

2.82

2.64

2.26

1.83

1.57

0.36

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

2.03

0.24

1

-3.09

16.04

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-1 #S4

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.385157

Northing (ft):
-82.371143

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-50.8 NAVD 88

USCS: **SP** Munsell: **Dry - 10YR-7/1** Comments: **Sample Interval: 176" - 200" Material Description: Light gray poorly graded sand with trace shell**

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 204.50 | Wash Weight (g): 196.90 | Pan Retained (g): 0.42 | Sieve Loss (%): 0.11 | Fines (%): #200 - 4.17 #230 - 4.03 | Organics (%): 1.00 | Carbonates (%): 23.20 | Shells (%): 0.12 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | -2.25 | 4.76 | 0.25 | 0.12 | 0.25 | 0.12 |
| 5 | -2.00 | 4.00 | 0.24 | 0.12 | 0.49 | 0.24 |
| 7 | -1.50 | 2.83 | 0.52 | 0.25 | 1.01 | 0.49 |
| 10 | -1.00 | 2.00 | 1.23 | 0.60 | 2.24 | 1.10 |
| 14 | -0.50 | 1.41 | 1.65 | 0.81 | 3.89 | 1.90 |
| 18 | 0.00 | 1.00 | 2.49 | 1.22 | 6.38 | 3.12 |
| 25 | 0.50 | 0.71 | 3.03 | 1.48 | 9.41 | 4.60 |
| 35 | 1.00 | 0.50 | 4.88 | 2.39 | 14.29 | 6.99 |
| 45 | 1.50 | 0.35 | 9.21 | 4.50 | 23.50 | 11.49 |
| 60 | 2.00 | 0.25 | 30.58 | 14.95 | 54.08 | 26.44 |
| 80 | 2.50 | 0.18 | 75.75 | 37.04 | 129.83 | 63.49 |
| 120 | 3.00 | 0.13 | 60.32 | 29.50 | 190.15 | 92.98 |
| 170 | 3.50 | 0.09 | 4.81 | 2.35 | 194.96 | 95.33 |
| 200 | 3.75 | 0.07 | 1.01 | 0.49 | 195.97 | 95.83 |
| 230 | 4.00 | 0.06 | 0.29 | 0.14 | 196.26 | 95.97 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.43 | 2.85 | 2.70 | 2.32 | 1.95 | 1.65 | 0.58 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 2.14 | 0.23 | 0.8 | -2.15 | 9.58 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-2 #S1

Analysis Date: 11-13-20

Analyzed By: LK

| | | | |
|----------------------------------|-------------------------------------|--|---|
| Easting (ft): 26.38109 | Northing (ft): -82.366967 | Coordinate System: Geographic (Latitude/Longitude) | Elevation (ft): -34.5 NAVD 88 |
|----------------------------------|-------------------------------------|--|---|

| | | |
|--------------------|-----------------------------------|--|
| USCS: SW | Munsell: Dry - 10YR-7/1 | Comments: Sample Interval: 0" - 60" Material Description: Light gray well graded sand with trace shell |
|--------------------|-----------------------------------|--|

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 281.90 | Wash Weight (g): 276.80 | Pan Retained (g): 0.08 | Sieve Loss (%): 0.42 | Fines (%): #200 - 2.31 #230 - 2.25 | Organics (%): 0.70 | Carbonates (%): 24.10 | Shells (%): 2.94 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 2.97 | 1.05 | 2.97 | 1.05 |
| 5/16" | -3.00 | 8.00 | 1.24 | 0.44 | 4.21 | 1.49 |
| 3.5 | -2.50 | 5.66 | 2.99 | 1.06 | 7.20 | 2.55 |
| 4 | -2.25 | 4.76 | 1.10 | 0.39 | 8.30 | 2.94 |
| 5 | -2.00 | 4.00 | 2.12 | 0.75 | 10.42 | 3.70 |
| 7 | -1.50 | 2.83 | 6.13 | 2.17 | 16.55 | 5.87 |
| 10 | -1.00 | 2.00 | 6.53 | 2.32 | 23.08 | 8.19 |
| 14 | -0.50 | 1.41 | 8.30 | 2.94 | 31.38 | 11.13 |
| 18 | 0.00 | 1.00 | 10.06 | 3.57 | 41.44 | 14.70 |
| 25 | 0.50 | 0.71 | 18.37 | 6.52 | 59.81 | 21.22 |
| 35 | 1.00 | 0.50 | 33.22 | 11.78 | 93.03 | 33.00 |
| 45 | 1.50 | 0.35 | 57.22 | 20.30 | 150.25 | 53.30 |
| 60 | 2.00 | 0.25 | 60.57 | 21.49 | 210.82 | 74.79 |
| 80 | 2.50 | 0.18 | 49.46 | 17.55 | 260.28 | 92.33 |
| 120 | 3.00 | 0.13 | 13.68 | 4.85 | 273.96 | 97.18 |
| 170 | 3.50 | 0.09 | 1.14 | 0.40 | 275.10 | 97.59 |
| 200 | 3.75 | 0.07 | 0.30 | 0.11 | 275.40 | 97.69 |
| 230 | 4.00 | 0.06 | 0.15 | 0.05 | 275.55 | 97.75 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.78 | 2.26 | 2.01 | 1.42 | 0.66 | 0.10 | -1.70 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.1 | 0.47 | 1.29 | -1.46 | 5.35 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-2 #S2

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.38109

Northing (ft):
-82.366967

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-39.5 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 60" - 120" Material Description: Light gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 296.40 | Wash Weight (g): 284.50 | Pan Retained (g): 0.09 | Sieve Loss (%): 0.11 | Fines (%): #200 - 4.22 #230 - 4.15 | Organics (%): 0.76 | Carbonates (%): 20.20 | Shells (%): 0.20 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.29 | 0.10 | 0.29 | 0.10 |
| 3.5 | -2.50 | 5.66 | 0.29 | 0.10 | 0.58 | 0.20 |
| 4 | -2.25 | 4.76 | 0.00 | 0.00 | 0.58 | 0.20 |
| 5 | -2.00 | 4.00 | 0.38 | 0.13 | 0.96 | 0.32 |
| 7 | -1.50 | 2.83 | 2.33 | 0.79 | 3.29 | 1.11 |
| 10 | -1.00 | 2.00 | 3.30 | 1.11 | 6.59 | 2.22 |
| 14 | -0.50 | 1.41 | 5.67 | 1.91 | 12.26 | 4.14 |
| 18 | 0.00 | 1.00 | 9.09 | 3.07 | 21.35 | 7.20 |
| 25 | 0.50 | 0.71 | 14.16 | 4.78 | 35.51 | 11.98 |
| 35 | 1.00 | 0.50 | 27.91 | 9.42 | 63.42 | 21.40 |
| 45 | 1.50 | 0.35 | 54.69 | 18.45 | 118.11 | 39.85 |
| 60 | 2.00 | 0.25 | 71.98 | 24.28 | 190.09 | 64.13 |
| 80 | 2.50 | 0.18 | 67.89 | 22.90 | 257.98 | 87.04 |
| 120 | 3.00 | 0.13 | 22.57 | 7.61 | 280.55 | 94.65 |
| 170 | 3.50 | 0.09 | 2.46 | 0.83 | 283.01 | 95.48 |
| 200 | 3.75 | 0.07 | 0.88 | 0.30 | 283.89 | 95.78 |
| 230 | 4.00 | 0.06 | 0.20 | 0.07 | 284.09 | 95.85 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.21 | 2.43 | 2.24 | 1.71 | 1.10 | 0.71 | -0.36 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.51 | 0.35 | 0.95 | -1.17 | 5.1 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-2 #S3

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.38109

Northing (ft):
-82.366967

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-44.5 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 120" - 182" Material Description: Light gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 278.50 | Wash Weight (g): 267.30 | Pan Retained (g): 0.33 | Sieve Loss (%): 0.19 | Fines (%): #200 - 4.47 #230 - 4.33 | Organics (%): 0.83 | Carbonates (%): 18.90 | Shells (%): 2.20 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 4.33 | 1.55 | 4.33 | 1.55 |
| 5/16" | -3.00 | 8.00 | 0.69 | 0.25 | 5.02 | 1.80 |
| 3.5 | -2.50 | 5.66 | 0.48 | 0.17 | 5.50 | 1.97 |
| 4 | -2.25 | 4.76 | 0.64 | 0.23 | 6.14 | 2.20 |
| 5 | -2.00 | 4.00 | 0.56 | 0.20 | 6.70 | 2.41 |
| 7 | -1.50 | 2.83 | 2.34 | 0.84 | 9.04 | 3.25 |
| 10 | -1.00 | 2.00 | 2.69 | 0.97 | 11.73 | 4.21 |
| 14 | -0.50 | 1.41 | 4.15 | 1.49 | 15.88 | 5.70 |
| 18 | 0.00 | 1.00 | 6.10 | 2.19 | 21.98 | 7.89 |
| 25 | 0.50 | 0.71 | 7.56 | 2.71 | 29.54 | 10.61 |
| 35 | 1.00 | 0.50 | 14.07 | 5.05 | 43.61 | 15.66 |
| 45 | 1.50 | 0.35 | 35.23 | 12.65 | 78.84 | 28.31 |
| 60 | 2.00 | 0.25 | 65.43 | 23.49 | 144.27 | 51.80 |
| 80 | 2.50 | 0.18 | 79.38 | 28.50 | 223.65 | 80.31 |
| 120 | 3.00 | 0.13 | 36.93 | 13.26 | 260.58 | 93.57 |
| 170 | 3.50 | 0.09 | 4.23 | 1.52 | 264.81 | 95.08 |
| 200 | 3.75 | 0.07 | 1.25 | 0.45 | 266.06 | 95.53 |
| 230 | 4.00 | 0.06 | 0.37 | 0.13 | 266.43 | 95.67 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.47 | 2.64 | 2.41 | 1.96 | 1.37 | 1.01 | -0.73 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.64 | 0.32 | 1.21 | -2.24 | 9.43 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-2 #S4

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.38109

Northing (ft):
-82.366967

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-47.7 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 158" - 182" Material Description: Light gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 199.50 | Wash Weight (g): 193.70 | Pan Retained (g): 0.14 | Sieve Loss (%): 0.14 | Fines (%): #200 - 3.27 #230 - 3.11 | Organics (%): 0.63 | Carbonates (%): 19.60 | Shells (%): 1.87 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 1.03 | 0.52 | 1.03 | 0.52 |
| 5/16" | -3.00 | 8.00 | 1.15 | 0.58 | 2.18 | 1.09 |
| 3.5 | -2.50 | 5.66 | 0.94 | 0.47 | 3.12 | 1.56 |
| 4 | -2.25 | 4.76 | 0.61 | 0.31 | 3.73 | 1.87 |
| 5 | -2.00 | 4.00 | 0.18 | 0.09 | 3.91 | 1.96 |
| 7 | -1.50 | 2.83 | 0.87 | 0.44 | 4.78 | 2.40 |
| 10 | -1.00 | 2.00 | 1.53 | 0.77 | 6.31 | 3.16 |
| 14 | -0.50 | 1.41 | 2.07 | 1.04 | 8.38 | 4.20 |
| 18 | 0.00 | 1.00 | 3.01 | 1.51 | 11.39 | 5.71 |
| 25 | 0.50 | 0.71 | 3.54 | 1.77 | 14.93 | 7.48 |
| 35 | 1.00 | 0.50 | 8.60 | 4.31 | 23.53 | 11.79 |
| 45 | 1.50 | 0.35 | 23.22 | 11.64 | 46.75 | 23.43 |
| 60 | 2.00 | 0.25 | 53.84 | 26.99 | 100.59 | 50.42 |
| 80 | 2.50 | 0.18 | 60.21 | 30.18 | 160.80 | 80.60 |
| 120 | 3.00 | 0.13 | 27.55 | 13.81 | 188.35 | 94.41 |
| 170 | 3.50 | 0.09 | 3.49 | 1.75 | 191.84 | 96.16 |
| 200 | 3.75 | 0.07 | 1.13 | 0.57 | 192.97 | 96.73 |
| 230 | 4.00 | 0.06 | 0.32 | 0.16 | 193.29 | 96.89 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.17 | 2.62 | 2.41 | 1.99 | 1.53 | 1.18 | -0.24 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.76 | 0.30 | 1.07 | -2.41 | 11.11 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-3 #S1

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.377048

Northing (ft):
-82.362837

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-31.6 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 0" - 60" Material Description: Light gray well graded sand with few shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 320.90 | Wash Weight (g): 316.10 | Pan Retained (g): 0.10 | Sieve Loss (%): 0.01 | Fines (%): #200 - 1.56 #230 - 1.54 | Organics (%): 0.69 | Carbonates (%): 24.00 | Shells (%): 7.01 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 8.91 | 2.78 | 8.91 | 2.78 |
| 7/16" | -3.50 | 11.31 | 8.90 | 2.77 | 17.81 | 5.55 |
| 5/16" | -3.00 | 8.00 | 0.69 | 0.22 | 18.50 | 5.77 |
| 3.5 | -2.50 | 5.66 | 2.78 | 0.87 | 21.28 | 6.63 |
| 4 | -2.25 | 4.76 | 1.23 | 0.38 | 22.51 | 7.01 |
| 5 | -2.00 | 4.00 | 1.33 | 0.41 | 23.84 | 7.43 |
| 7 | -1.50 | 2.83 | 4.42 | 1.38 | 28.26 | 8.81 |
| 10 | -1.00 | 2.00 | 4.98 | 1.55 | 33.24 | 10.36 |
| 14 | -0.50 | 1.41 | 7.35 | 2.29 | 40.59 | 12.65 |
| 18 | 0.00 | 1.00 | 11.58 | 3.61 | 52.17 | 16.26 |
| 25 | 0.50 | 0.71 | 20.55 | 6.40 | 72.72 | 22.66 |
| 35 | 1.00 | 0.50 | 42.88 | 13.36 | 115.60 | 36.02 |
| 45 | 1.50 | 0.35 | 77.76 | 24.23 | 193.36 | 60.26 |
| 60 | 2.00 | 0.25 | 75.64 | 23.57 | 269.00 | 83.83 |
| 80 | 2.50 | 0.18 | 38.19 | 11.90 | 307.19 | 95.73 |
| 120 | 3.00 | 0.13 | 7.93 | 2.47 | 315.12 | 98.20 |
| 170 | 3.50 | 0.09 | 0.59 | 0.18 | 315.71 | 98.38 |
| 200 | 3.75 | 0.07 | 0.17 | 0.05 | 315.88 | 98.44 |
| 230 | 4.00 | 0.06 | 0.09 | 0.03 | 315.97 | 98.46 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.47 | 2.01 | 1.81 | 1.29 | 0.59 | -0.04 | -3.60 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 0.85 | 0.55 | 1.55 | -1.85 | 6.12 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-3 #S2

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.377048

Northing (ft):
-82.362837

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-36.6 NAVD 88

USCS: **SW** Munsell: **Dry - 10YR-7/1** Comments: **Sample Interval: 60" - 120" Material Description: Light gray well graded sand with trace shell**

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 410.10 | Wash Weight (g): 398.90 | Pan Retained (g): 0.21 | Sieve Loss (%): 0.05 | Fines (%): #200 - 2.89 #230 - 2.83 | Organics (%): 0.74 | Carbonates (%): 20.80 | Shells (%): 0.19 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.61 | 0.15 | 0.61 | 0.15 |
| 4 | -2.25 | 4.76 | 0.15 | 0.04 | 0.76 | 0.19 |
| 5 | -2.00 | 4.00 | 0.79 | 0.19 | 1.55 | 0.38 |
| 7 | -1.50 | 2.83 | 2.79 | 0.68 | 4.34 | 1.06 |
| 10 | -1.00 | 2.00 | 4.09 | 1.00 | 8.43 | 2.06 |
| 14 | -0.50 | 1.41 | 6.74 | 1.64 | 15.17 | 3.70 |
| 18 | 0.00 | 1.00 | 11.42 | 2.78 | 26.59 | 6.48 |
| 25 | 0.50 | 0.71 | 20.20 | 4.93 | 46.79 | 11.41 |
| 35 | 1.00 | 0.50 | 39.44 | 9.62 | 86.23 | 21.03 |
| 45 | 1.50 | 0.35 | 95.21 | 23.22 | 181.44 | 44.24 |
| 60 | 2.00 | 0.25 | 110.73 | 27.00 | 292.17 | 71.24 |
| 80 | 2.50 | 0.18 | 77.73 | 18.95 | 369.90 | 90.20 |
| 120 | 3.00 | 0.13 | 24.82 | 6.05 | 394.72 | 96.25 |
| 170 | 3.50 | 0.09 | 2.77 | 0.68 | 397.49 | 96.93 |
| 200 | 3.75 | 0.07 | 0.77 | 0.19 | 398.26 | 97.11 |
| 230 | 4.00 | 0.06 | 0.22 | 0.05 | 398.48 | 97.17 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.90 | 2.34 | 2.10 | 1.61 | 1.09 | 0.74 | -0.27 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.46 | 0.36 | 0.89 | -1.15 | 5.37 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-3 #S3

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.377048

Northing (ft):
-82.362837

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-41.6 NAVD 88

USCS:
SW-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 120" - 180.5" Material Description: Gray well graded sand with silt & trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 262.20 | Wash Weight (g): 246.60 | Pan Retained (g): 0.55 | Sieve Loss (%): 0.01 | Fines (%): #200 - 6.43 #230 - 6.17 | Organics (%): 1.09 | Carbonates (%): 22.10 | Shells (%): 0.92 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.40 | 0.15 | 0.40 | 0.15 |
| 5/16" | -3.00 | 8.00 | 0.76 | 0.29 | 1.16 | 0.44 |
| 3.5 | -2.50 | 5.66 | 0.61 | 0.23 | 1.77 | 0.68 |
| 4 | -2.25 | 4.76 | 0.64 | 0.24 | 2.41 | 0.92 |
| 5 | -2.00 | 4.00 | 0.86 | 0.33 | 3.27 | 1.25 |
| 7 | -1.50 | 2.83 | 1.42 | 0.54 | 4.69 | 1.79 |
| 10 | -1.00 | 2.00 | 2.51 | 0.96 | 7.20 | 2.75 |
| 14 | -0.50 | 1.41 | 3.73 | 1.42 | 10.93 | 4.17 |
| 18 | 0.00 | 1.00 | 6.73 | 2.57 | 17.66 | 6.74 |
| 25 | 0.50 | 0.71 | 10.81 | 4.12 | 28.47 | 10.86 |
| 35 | 1.00 | 0.50 | 24.31 | 9.27 | 52.78 | 20.13 |
| 45 | 1.50 | 0.35 | 50.41 | 19.23 | 103.19 | 39.36 |
| 60 | 2.00 | 0.25 | 64.78 | 24.71 | 167.97 | 64.06 |
| 80 | 2.50 | 0.18 | 50.27 | 19.17 | 218.24 | 83.23 |
| 120 | 3.00 | 0.13 | 21.53 | 8.21 | 239.77 | 91.45 |
| 170 | 3.50 | 0.09 | 3.96 | 1.51 | 243.73 | 92.96 |
| 200 | 3.75 | 0.07 | 1.60 | 0.61 | 245.33 | 93.57 |
| 230 | 4.00 | 0.06 | 0.70 | 0.27 | 246.03 | 93.83 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.55 | 2.29 | 1.72 | 1.13 | 0.78 | -0.34 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.51 | 0.35 | 1.02 | -1.43 | 6.94 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-1-3 #S4

Analysis Date: 11-13-20

Analyzed By: LK

Easting (ft):
26.377048

Northing (ft):
-82.362837

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-44.6 NAVD 88

USCS: **SW-SM** Munsell: **Dry - 10YR-6/1** Comments: **Sample Interval: 156.5" - 180.5" Material Description: Gray well graded sand with silt & trace shell**

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 190.40 | Wash Weight (g): 176.50 | Pan Retained (g): 0.39 | Sieve Loss (%): 0.25 | Fines (%): #200 - 8.11 #230 - 7.75 | Organics (%): 0.88 | Carbonates (%): 17.20 | Shells (%): 0.48 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.50 | 0.26 | 0.50 | 0.26 |
| 4 | -2.25 | 4.76 | 0.42 | 0.22 | 0.92 | 0.48 |
| 5 | -2.00 | 4.00 | 0.48 | 0.25 | 1.40 | 0.74 |
| 7 | -1.50 | 2.83 | 0.76 | 0.40 | 2.16 | 1.13 |
| 10 | -1.00 | 2.00 | 1.69 | 0.89 | 3.85 | 2.02 |
| 14 | -0.50 | 1.41 | 2.96 | 1.55 | 6.81 | 3.58 |
| 18 | 0.00 | 1.00 | 6.04 | 3.17 | 12.85 | 6.75 |
| 25 | 0.50 | 0.71 | 10.77 | 5.66 | 23.62 | 12.41 |
| 35 | 1.00 | 0.50 | 25.79 | 13.55 | 49.41 | 25.95 |
| 45 | 1.50 | 0.35 | 30.40 | 15.97 | 79.81 | 41.92 |
| 60 | 2.00 | 0.25 | 43.29 | 22.74 | 123.10 | 64.65 |
| 80 | 2.50 | 0.18 | 31.60 | 16.60 | 154.70 | 81.25 |
| 120 | 3.00 | 0.13 | 14.93 | 7.84 | 169.63 | 89.09 |
| 170 | 3.50 | 0.09 | 3.75 | 1.97 | 173.38 | 91.06 |
| 200 | 3.75 | 0.07 | 1.58 | 0.83 | 174.96 | 91.89 |
| 230 | 4.00 | 0.06 | 0.68 | 0.36 | 175.64 | 92.25 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.68 | 2.31 | 1.68 | 0.96 | 0.63 | -0.28 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.47 | 0.36 | 1 | -0.81 | 4.61 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-1 #S1

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.372222

Northing (ft):

-82.23935

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-37.2 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 0" - 24" Material Description: Gray well graded sand with silt & trace shell

Dry Weight (g):

506.20

Wash Weight (g):

481.20

Pan Retained (g):

3.20

Sieve Loss (%):

0.12

Fines (%):

#200 - 6.68
#230 - 5.69

Organics (%):

1.22

Carbonates (%):

56.26

Shells (%):

1.86

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 3.70 | 0.73 | 3.70 | 0.73 |
| 5/16" | -3.00 | 8.00 | 1.10 | 0.22 | 4.80 | 0.95 |
| 3.5 | -2.50 | 5.66 | 2.20 | 0.43 | 7.00 | 1.38 |
| 4 | -2.25 | 4.76 | 2.40 | 0.47 | 9.40 | 1.86 |
| 5 | -2.00 | 4.00 | 3.20 | 0.63 | 12.60 | 2.49 |
| 7 | -1.50 | 2.83 | 6.60 | 1.30 | 19.20 | 3.79 |
| 10 | -1.00 | 2.00 | 9.90 | 1.96 | 29.10 | 5.75 |
| 14 | -0.50 | 1.41 | 13.70 | 2.71 | 42.80 | 8.46 |
| 18 | 0.00 | 1.00 | 23.90 | 4.72 | 66.70 | 13.18 |
| 25 | 0.50 | 0.71 | 40.00 | 7.90 | 106.70 | 21.08 |
| 35 | 1.00 | 0.50 | 68.30 | 13.49 | 175.00 | 34.57 |
| 45 | 1.50 | 0.35 | 84.90 | 16.77 | 259.90 | 51.34 |
| 60 | 2.00 | 0.25 | 100.10 | 19.77 | 360.00 | 71.12 |
| 80 | 2.50 | 0.18 | 54.50 | 10.77 | 414.50 | 81.88 |
| 120 | 3.00 | 0.13 | 28.30 | 5.59 | 442.80 | 87.48 |
| 170 | 3.50 | 0.09 | 21.70 | 4.29 | 464.50 | 91.76 |
| 200 | 3.75 | 0.07 | 7.90 | 1.56 | 472.40 | 93.32 |
| 230 | 4.00 | 0.06 | 5.00 | 0.99 | 477.40 | 94.31 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.69

2.18

1.46

0.65

0.18

-1.19

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.23

0.43

1.31

-0.87

4.62

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-1 #S2

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.372222

Northing (ft):

-82.23935

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-39.2 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 24" - 51" Material Description: Gray well graded sand with trace shell

Dry Weight (g):

313.90

Wash Weight (g):

301.10

Pan Retained (g):

1.10

Sieve Loss (%):

0.03

Fines (%):

#200 - 5.13
#230 - 4.46

Organics (%):

1.77

Carbonates (%):

77.29

Shells (%):

1.34

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 1.40 | 0.45 | 1.40 | 0.45 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 1.40 | 0.45 |
| 3.5 | -2.50 | 5.66 | 1.60 | 0.51 | 3.00 | 0.96 |
| 4 | -2.25 | 4.76 | 1.20 | 0.38 | 4.20 | 1.34 |
| 5 | -2.00 | 4.00 | 1.30 | 0.41 | 5.50 | 1.75 |
| 7 | -1.50 | 2.83 | 2.70 | 0.86 | 8.20 | 2.61 |
| 10 | -1.00 | 2.00 | 4.20 | 1.34 | 12.40 | 3.95 |
| 14 | -0.50 | 1.41 | 7.20 | 2.29 | 19.60 | 6.24 |
| 18 | 0.00 | 1.00 | 16.50 | 5.26 | 36.10 | 11.50 |
| 25 | 0.50 | 0.71 | 33.90 | 10.80 | 70.00 | 22.30 |
| 35 | 1.00 | 0.50 | 55.10 | 17.55 | 125.10 | 39.85 |
| 45 | 1.50 | 0.35 | 56.00 | 17.84 | 181.10 | 57.69 |
| 60 | 2.00 | 0.25 | 62.70 | 19.97 | 243.80 | 77.67 |
| 80 | 2.50 | 0.18 | 28.70 | 9.14 | 272.50 | 86.81 |
| 120 | 3.00 | 0.13 | 13.30 | 4.24 | 285.80 | 91.05 |
| 170 | 3.50 | 0.09 | 8.60 | 2.74 | 294.40 | 93.79 |
| 200 | 3.75 | 0.07 | 3.40 | 1.08 | 297.80 | 94.87 |
| 230 | 4.00 | 0.06 | 2.10 | 0.67 | 299.90 | 95.54 |

| | | | | | | |
|-------|--------|--------|--------|--------|--------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.80 | 2.35 | 1.93 | 1.28 | 0.58 | 0.21 | -0.77 |

| | | | | | |
|-------------------|----------|---------|---------|----------|----------|
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis |
| | 1.15 | 0.45 | 1.15 | -0.71 | 4.95 |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-1 #S3

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.372222

Northing (ft):

-82.23935

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-41.5 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 51" - 75" Material Description: Gray well graded sand with trace shell

| | | | | | | | |
|-----------------|------------------|-------------------|-----------------|--|---------------|-----------------|-------------|
| Dry Weight (g): | Wash Weight (g): | Pan Retained (g): | Sieve Loss (%): | Fines (%): #200 - 3.48 #230 - 3.12 | Organics (%): | Carbonates (%): | Shells (%): |
| 381.80 | 370.80 | 0.80 | 0.03 | | 1.84 | 80.92 | 3.72 |

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 5.38 | 1.41 | 5.38 | 1.41 |
| 7/16" | -3.50 | 11.31 | 3.92 | 1.03 | 9.30 | 2.44 |
| 5/16" | -3.00 | 8.00 | 1.60 | 0.42 | 10.90 | 2.85 |
| 3.5 | -2.50 | 5.66 | 2.60 | 0.68 | 13.50 | 3.54 |
| 4 | -2.25 | 4.76 | 0.70 | 0.18 | 14.20 | 3.72 |
| 5 | -2.00 | 4.00 | 1.60 | 0.42 | 15.80 | 4.14 |
| 7 | -1.50 | 2.83 | 3.80 | 1.00 | 19.60 | 5.13 |
| 10 | -1.00 | 2.00 | 6.30 | 1.65 | 25.90 | 6.78 |
| 14 | -0.50 | 1.41 | 9.80 | 2.57 | 35.70 | 9.35 |
| 18 | 0.00 | 1.00 | 19.80 | 5.19 | 55.50 | 14.54 |
| 25 | 0.50 | 0.71 | 46.60 | 12.21 | 102.10 | 26.74 |
| 35 | 1.00 | 0.50 | 67.90 | 17.78 | 170.00 | 44.53 |
| 45 | 1.50 | 0.35 | 70.50 | 18.47 | 240.50 | 62.99 |
| 60 | 2.00 | 0.25 | 69.30 | 18.15 | 309.80 | 81.14 |
| 80 | 2.50 | 0.18 | 36.70 | 9.61 | 346.50 | 90.75 |
| 120 | 3.00 | 0.13 | 14.00 | 3.67 | 360.50 | 94.42 |
| 170 | 3.50 | 0.09 | 5.80 | 1.52 | 366.30 | 95.94 |
| 200 | 3.75 | 0.07 | 2.20 | 0.58 | 368.50 | 96.52 |
| 230 | 4.00 | 0.06 | 1.40 | 0.37 | 369.90 | 96.88 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.19 | 2.15 | 1.83 | 1.15 | 0.43 | 0.06 | -1.57 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 0.93 | 0.52 | 1.34 | -1.43 | 6.4 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-1 #S4

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.372222

Northing (ft):

-82.23935

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-41.5 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 0" - 51" Material Description: Gray well graded sand with trace shell

Dry Weight (g):

409.80

Wash Weight (g):

393.20

Pan Retained (g):

1.40

Sieve Loss (%):

0.00

Fines (%):

#200 - 5.00
#230 - 4.39

Organics (%):

1.89

Carbonates (%):

83.90

Shells (%):

2.98

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 5.30 | 1.29 | 5.30 | 1.29 |
| 5/16" | -3.00 | 8.00 | 2.40 | 0.59 | 7.70 | 1.88 |
| 3.5 | -2.50 | 5.66 | 2.40 | 0.59 | 10.10 | 2.46 |
| 4 | -2.25 | 4.76 | 2.10 | 0.51 | 12.20 | 2.98 |
| 5 | -2.00 | 4.00 | 2.00 | 0.49 | 14.20 | 3.47 |
| 7 | -1.50 | 2.83 | 5.00 | 1.22 | 19.20 | 4.69 |
| 10 | -1.00 | 2.00 | 6.90 | 1.68 | 26.10 | 6.37 |
| 14 | -0.50 | 1.41 | 10.70 | 2.61 | 36.80 | 8.98 |
| 18 | 0.00 | 1.00 | 23.10 | 5.64 | 59.90 | 14.62 |
| 25 | 0.50 | 0.71 | 46.10 | 11.25 | 106.00 | 25.87 |
| 35 | 1.00 | 0.50 | 73.40 | 17.91 | 179.40 | 43.78 |
| 45 | 1.50 | 0.35 | 76.10 | 18.57 | 255.50 | 62.35 |
| 60 | 2.00 | 0.25 | 64.00 | 15.62 | 319.50 | 77.96 |
| 80 | 2.50 | 0.18 | 37.50 | 9.15 | 357.00 | 87.12 |
| 120 | 3.00 | 0.13 | 17.40 | 4.25 | 374.40 | 91.36 |
| 170 | 3.50 | 0.09 | 10.70 | 2.61 | 385.10 | 93.97 |
| 200 | 3.75 | 0.07 | 4.20 | 1.02 | 389.30 | 95.00 |
| 230 | 4.00 | 0.06 | 2.50 | 0.61 | 391.80 | 95.61 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.75

2.33

1.91

1.17

0.46

0.06

-1.41

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1

0.50

1.31

-1

5.23

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S1

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):
26.366734

Northing (ft):
-82.232932

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-34.7 NAVD 88

USCS:
SP-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 0" - 8" Material Description: Gray poorly graded sand with silt & trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 240.80 | Wash Weight (g): 229.20 | Pan Retained (g): 2.10 | Sieve Loss (%): 0.08 | Fines (%): #200 - 7.56 #230 - 5.77 | Organics (%): 1.83 | Carbonates (%): 71.50 | Shells (%): 1.08 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 1.70 | 0.71 | 1.70 | 0.71 |
| 3.5 | -2.50 | 5.66 | 0.60 | 0.25 | 2.30 | 0.96 |
| 4 | -2.25 | 4.76 | 0.30 | 0.12 | 2.60 | 1.08 |
| 5 | -2.00 | 4.00 | 0.30 | 0.12 | 2.90 | 1.20 |
| 7 | -1.50 | 2.83 | 1.00 | 0.42 | 3.90 | 1.62 |
| 10 | -1.00 | 2.00 | 1.30 | 0.54 | 5.20 | 2.16 |
| 14 | -0.50 | 1.41 | 1.30 | 0.54 | 6.50 | 2.70 |
| 18 | 0.00 | 1.00 | 1.80 | 0.75 | 8.30 | 3.45 |
| 25 | 0.50 | 0.71 | 3.00 | 1.25 | 11.30 | 4.69 |
| 35 | 1.00 | 0.50 | 5.40 | 2.24 | 16.70 | 6.94 |
| 45 | 1.50 | 0.35 | 15.00 | 6.23 | 31.70 | 13.16 |
| 60 | 2.00 | 0.25 | 42.20 | 17.52 | 73.90 | 30.69 |
| 80 | 2.50 | 0.18 | 57.60 | 23.92 | 131.50 | 54.61 |
| 120 | 3.00 | 0.13 | 54.20 | 22.51 | 185.70 | 77.12 |
| 170 | 3.50 | 0.09 | 29.30 | 12.17 | 215.00 | 89.29 |
| 200 | 3.75 | 0.07 | 7.60 | 3.16 | 222.60 | 92.44 |
| 230 | 4.00 | 0.06 | 4.30 | 1.79 | 226.90 | 94.23 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 3.28 | 2.95 | 2.40 | 1.84 | 1.58 | 0.57 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 2.21 | 0.22 | 1.05 | -2.1 | 10.42 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S2

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):
26.366734

Northing (ft):
-82.232932

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-35.4 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 8" - 30" Material Description: Gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 351.00 | Wash Weight (g): 339.70 | Pan Retained (g): 0.50 | Sieve Loss (%): -0.09 | Fines (%): #200 - 3.62 #230 - 3.28 | Organics (%): 1.96 | Carbonates (%): 90.08 | Shells (%): 0.34 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.40 | 0.11 | 0.40 | 0.11 |
| 5/16" | -3.00 | 8.00 | 0.30 | 0.09 | 0.70 | 0.20 |
| 3.5 | -2.50 | 5.66 | 0.20 | 0.06 | 0.90 | 0.26 |
| 4 | -2.25 | 4.76 | 0.30 | 0.09 | 1.20 | 0.34 |
| 5 | -2.00 | 4.00 | 0.50 | 0.14 | 1.70 | 0.48 |
| 7 | -1.50 | 2.83 | 2.00 | 0.57 | 3.70 | 1.05 |
| 10 | -1.00 | 2.00 | 2.50 | 0.71 | 6.20 | 1.77 |
| 14 | -0.50 | 1.41 | 3.30 | 0.94 | 9.50 | 2.71 |
| 18 | 0.00 | 1.00 | 5.50 | 1.57 | 15.00 | 4.27 |
| 25 | 0.50 | 0.71 | 8.50 | 2.42 | 23.50 | 6.70 |
| 35 | 1.00 | 0.50 | 17.80 | 5.07 | 41.30 | 11.77 |
| 45 | 1.50 | 0.35 | 48.90 | 13.93 | 90.20 | 25.70 |
| 60 | 2.00 | 0.25 | 120.10 | 34.22 | 210.30 | 59.91 |
| 80 | 2.50 | 0.18 | 81.80 | 23.30 | 292.10 | 83.22 |
| 120 | 3.00 | 0.13 | 34.80 | 9.91 | 326.90 | 93.13 |
| 170 | 3.50 | 0.09 | 9.10 | 2.59 | 336.00 | 95.73 |
| 200 | 3.75 | 0.07 | 2.30 | 0.66 | 338.30 | 96.38 |
| 230 | 4.00 | 0.06 | 1.20 | 0.34 | 339.50 | 96.72 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.36 | 2.54 | 2.32 | 1.86 | 1.47 | 1.15 | 0.15 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.75 | 0.30 | 0.88 | -1.59 | 8.54 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S3

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.366734

Northing (ft):

-82.232932

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-37.2 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 30" - 50" Material Description: Gray well graded sand with trace shell

Dry Weight (g):

384.60

Wash Weight (g):

377.20

Pan Retained (g):

0.50

Sieve Loss (%):

-0.05

Fines (%):

#200 - 2.21
#230 - 2.00

Organics (%):

1.78

Carbonates (%):

90.70

Shells (%):

0.23

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.40 | 0.10 | 0.40 | 0.10 |
| 3.5 | -2.50 | 5.66 | 0.10 | 0.03 | 0.50 | 0.13 |
| 4 | -2.25 | 4.76 | 0.40 | 0.10 | 0.90 | 0.23 |
| 5 | -2.00 | 4.00 | 0.80 | 0.21 | 1.70 | 0.44 |
| 7 | -1.50 | 2.83 | 2.30 | 0.60 | 4.00 | 1.04 |
| 10 | -1.00 | 2.00 | 3.80 | 0.99 | 7.80 | 2.03 |
| 14 | -0.50 | 1.41 | 5.60 | 1.46 | 13.40 | 3.48 |
| 18 | 0.00 | 1.00 | 10.50 | 2.73 | 23.90 | 6.21 |
| 25 | 0.50 | 0.71 | 17.90 | 4.65 | 41.80 | 10.87 |
| 35 | 1.00 | 0.50 | 33.10 | 8.61 | 74.90 | 19.47 |
| 45 | 1.50 | 0.35 | 76.00 | 19.76 | 150.90 | 39.24 |
| 60 | 2.00 | 0.25 | 134.60 | 35.00 | 285.50 | 74.23 |
| 80 | 2.50 | 0.18 | 63.00 | 16.38 | 348.50 | 90.61 |
| 120 | 3.00 | 0.13 | 20.70 | 5.38 | 369.20 | 96.00 |
| 170 | 3.50 | 0.09 | 5.40 | 1.40 | 374.60 | 97.40 |
| 200 | 3.75 | 0.07 | 1.50 | 0.39 | 376.10 | 97.79 |
| 230 | 4.00 | 0.06 | 0.80 | 0.21 | 376.90 | 98.00 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.91

2.30

2.02

1.65

1.14

0.80

-0.22

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.5

0.35

0.89

-1.2

6.06

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S4

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.366734

Northing (ft):

-82.232932

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-38.9 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 50" - 79" Material Description: Gray well graded sand with trace shell

| | | | | | | | |
|-----------------|------------------|-------------------|-----------------|--|---------------|-----------------|-------------|
| Dry Weight (g): | Wash Weight (g): | Pan Retained (g): | Sieve Loss (%): | Fines (%): #200 - 2.52 #230 - 2.28 | Organics (%): | Carbonates (%): | Shells (%): |
| 468.30 | 458.20 | 0.80 | -0.04 | | 1.93 | 82.06 | 0.66 |

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.60 | 0.13 | 0.60 | 0.13 |
| 5/16" | -3.00 | 8.00 | 0.60 | 0.13 | 1.20 | 0.26 |
| 3.5 | -2.50 | 5.66 | 1.50 | 0.32 | 2.70 | 0.58 |
| 4 | -2.25 | 4.76 | 0.40 | 0.09 | 3.10 | 0.66 |
| 5 | -2.00 | 4.00 | 0.80 | 0.17 | 3.90 | 0.83 |
| 7 | -1.50 | 2.83 | 2.60 | 0.56 | 6.50 | 1.39 |
| 10 | -1.00 | 2.00 | 4.30 | 0.92 | 10.80 | 2.31 |
| 14 | -0.50 | 1.41 | 8.40 | 1.79 | 19.20 | 4.10 |
| 18 | 0.00 | 1.00 | 16.60 | 3.54 | 35.80 | 7.64 |
| 25 | 0.50 | 0.71 | 24.60 | 5.25 | 60.40 | 12.90 |
| 35 | 1.00 | 0.50 | 46.60 | 9.95 | 107.00 | 22.85 |
| 45 | 1.50 | 0.35 | 101.20 | 21.61 | 208.20 | 44.46 |
| 60 | 2.00 | 0.25 | 156.30 | 33.38 | 364.50 | 77.83 |
| 80 | 2.50 | 0.18 | 64.60 | 13.79 | 429.10 | 91.63 |
| 120 | 3.00 | 0.13 | 19.90 | 4.25 | 449.00 | 95.88 |
| 170 | 3.50 | 0.09 | 5.50 | 1.17 | 454.50 | 97.05 |
| 200 | 3.75 | 0.07 | 2.00 | 0.43 | 456.50 | 97.48 |
| 230 | 4.00 | 0.06 | 1.10 | 0.23 | 457.60 | 97.72 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.90 | 2.22 | 1.96 | 1.58 | 1.05 | 0.66 | -0.37 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.4 | 0.38 | 0.94 | -1.33 | 6.85 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S5

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.366734

Northing (ft):

-82.232932

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-41.3 NAVD 88

USCS:

SP-SM

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 79" - 103.5" Material Description: Gray poorly graded sand with silt, trace shell

Dry Weight (g):

281.20

Wash Weight (g):

268.90

Pan Retained (g):

1.50

Sieve Loss (%):

0.11

Fines (%):

#200 - 5.94
#230 - 5.01

Organics (%):

2.09

Carbonates (%):

86.45

Shells (%):

1.67

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 2.30 | 0.82 | 2.30 | 0.82 |
| 5/16" | -3.00 | 8.00 | 0.70 | 0.25 | 3.00 | 1.07 |
| 3.5 | -2.50 | 5.66 | 1.20 | 0.43 | 4.20 | 1.49 |
| 4 | -2.25 | 4.76 | 0.50 | 0.18 | 4.70 | 1.67 |
| 5 | -2.00 | 4.00 | 0.80 | 0.28 | 5.50 | 1.96 |
| 7 | -1.50 | 2.83 | 1.80 | 0.64 | 7.30 | 2.60 |
| 10 | -1.00 | 2.00 | 1.80 | 0.64 | 9.10 | 3.24 |
| 14 | -0.50 | 1.41 | 2.00 | 0.71 | 11.10 | 3.95 |
| 18 | 0.00 | 1.00 | 3.20 | 1.14 | 14.30 | 5.09 |
| 25 | 0.50 | 0.71 | 5.30 | 1.88 | 19.60 | 6.97 |
| 35 | 1.00 | 0.50 | 10.40 | 3.70 | 30.00 | 10.67 |
| 45 | 1.50 | 0.35 | 28.20 | 10.03 | 58.20 | 20.70 |
| 60 | 2.00 | 0.25 | 80.20 | 28.52 | 138.40 | 49.22 |
| 80 | 2.50 | 0.18 | 70.00 | 24.89 | 208.40 | 74.11 |
| 120 | 3.00 | 0.13 | 38.20 | 13.58 | 246.60 | 87.70 |
| 170 | 3.50 | 0.09 | 13.70 | 4.87 | 260.30 | 92.57 |
| 200 | 3.75 | 0.07 | 4.20 | 1.49 | 264.50 | 94.06 |
| 230 | 4.00 | 0.06 | 2.60 | 0.92 | 267.10 | 94.99 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.86

2.53

2.02

1.58

1.27

-0.04

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.84

0.28

1.12

-2.19

10.56

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-2 #S6

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.366734

Northing (ft):

-82.232932

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-41.3 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 0" - 79" Material Description: Gray well graded sand with trace shell

Dry Weight (g):

523.40

Wash Weight (g):

510.20

Pan Retained (g):

1.10

Sieve Loss (%):

0.06

Fines (%):

#200 - 3.15
#230 - 2.79

Organics (%):

2.05

Carbonates (%):

89.64

Shells (%):

0.65

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 1.20 | 0.23 | 1.20 | 0.23 |
| 5/16" | -3.00 | 8.00 | 0.70 | 0.13 | 1.90 | 0.36 |
| 3.5 | -2.50 | 5.66 | 1.20 | 0.23 | 3.10 | 0.59 |
| 4 | -2.25 | 4.76 | 0.30 | 0.06 | 3.40 | 0.65 |
| 5 | -2.00 | 4.00 | 0.60 | 0.11 | 4.00 | 0.76 |
| 7 | -1.50 | 2.83 | 1.50 | 0.29 | 5.50 | 1.05 |
| 10 | -1.00 | 2.00 | 2.90 | 0.55 | 8.40 | 1.60 |
| 14 | -0.50 | 1.41 | 4.40 | 0.84 | 12.80 | 2.45 |
| 18 | 0.00 | 1.00 | 8.70 | 1.66 | 21.50 | 4.11 |
| 25 | 0.50 | 0.71 | 14.90 | 2.85 | 36.40 | 6.95 |
| 35 | 1.00 | 0.50 | 39.20 | 7.49 | 75.60 | 14.44 |
| 45 | 1.50 | 0.35 | 105.10 | 20.08 | 180.70 | 34.52 |
| 60 | 2.00 | 0.25 | 166.00 | 31.72 | 346.70 | 66.24 |
| 80 | 2.50 | 0.18 | 103.80 | 19.83 | 450.50 | 86.07 |
| 120 | 3.00 | 0.13 | 40.90 | 7.81 | 491.40 | 93.89 |
| 170 | 3.50 | 0.09 | 12.00 | 2.29 | 503.40 | 96.18 |
| 200 | 3.75 | 0.07 | 3.50 | 0.67 | 506.90 | 96.85 |
| 230 | 4.00 | 0.06 | 1.90 | 0.36 | 508.80 | 97.21 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

3.24

2.45

2.22

1.74

1.26

1.04

0.16

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.64

0.32

0.89

-1.57

9.41

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-3 #S1

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.358948

Northing (ft):

-82.228266

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-37.4 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 0" - 56" Material Description: Gray well graded sand with silt, trace shell

Dry Weight (g):

362.88

Wash Weight (g):

344.08

Pan Retained (g):

0.88

Sieve Loss (%):

0.02

Fines (%):

#200 - 5.95
#230 - 5.44

Organics (%):

1.88

Carbonates (%):

89.20

Shells (%):

0.48

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.36 | 0.10 | 0.36 | 0.10 |
| 3.5 | -2.50 | 5.66 | 0.96 | 0.26 | 1.32 | 0.36 |
| 4 | -2.25 | 4.76 | 0.42 | 0.12 | 1.74 | 0.48 |
| 5 | -2.00 | 4.00 | 0.46 | 0.13 | 2.20 | 0.61 |
| 7 | -1.50 | 2.83 | 2.67 | 0.74 | 4.87 | 1.34 |
| 10 | -1.00 | 2.00 | 2.58 | 0.71 | 7.45 | 2.05 |
| 14 | -0.50 | 1.41 | 3.55 | 0.98 | 11.00 | 3.03 |
| 18 | 0.00 | 1.00 | 6.52 | 1.80 | 17.52 | 4.83 |
| 25 | 0.50 | 0.71 | 13.83 | 3.81 | 31.35 | 8.64 |
| 35 | 1.00 | 0.50 | 34.41 | 9.48 | 65.76 | 18.12 |
| 45 | 1.50 | 0.35 | 69.05 | 19.03 | 134.81 | 37.15 |
| 60 | 2.00 | 0.25 | 103.23 | 28.45 | 238.04 | 65.60 |
| 80 | 2.50 | 0.18 | 63.27 | 17.44 | 301.31 | 83.03 |
| 120 | 3.00 | 0.13 | 28.15 | 7.76 | 329.46 | 90.79 |
| 170 | 3.50 | 0.09 | 8.93 | 2.46 | 338.39 | 93.25 |
| 200 | 3.75 | 0.07 | 2.89 | 0.80 | 341.28 | 94.05 |
| 230 | 4.00 | 0.06 | 1.86 | 0.51 | 343.14 | 94.56 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.56

2.27

1.73

1.18

0.89

0.02

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.59

0.33

0.94

-1.12

6.36

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-3 #S2

Analysis Date: 11-16-20

Analyzed By: LK

Easting (ft):

26.358948

Northing (ft):

-82.228266

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-42.1 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 56" - 80" Material Description: Gray well graded sand with silt, trace shell & rock

Dry Weight (g):

402.89

Wash Weight (g):

370.59

Pan Retained (g):

2.20

Sieve Loss (%):

0.00

Fines (%):

#200 - 9.45
#230 - 8.56

Organics (%):

1.98

Carbonates (%):

89.80

Shells (%):

2.65

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 5.50 | 1.37 | 5.50 | 1.37 |
| 5/16" | -3.00 | 8.00 | 0.90 | 0.22 | 6.40 | 1.59 |
| 3.5 | -2.50 | 5.66 | 6.40 | 1.59 | 12.80 | 3.18 |
| 4 | -2.25 | 4.76 | 1.40 | 0.35 | 14.20 | 3.52 |
| 5 | -2.00 | 4.00 | 1.90 | 0.47 | 16.10 | 4.00 |
| 7 | -1.50 | 2.83 | 3.60 | 0.89 | 19.70 | 4.89 |
| 10 | -1.00 | 2.00 | 2.90 | 0.72 | 22.60 | 5.61 |
| 14 | -0.50 | 1.41 | 3.10 | 0.77 | 25.70 | 6.38 |
| 18 | 0.00 | 1.00 | 5.30 | 1.32 | 31.00 | 7.69 |
| 25 | 0.50 | 0.71 | 9.00 | 2.23 | 40.00 | 9.93 |
| 35 | 1.00 | 0.50 | 18.00 | 4.47 | 58.00 | 14.40 |
| 45 | 1.50 | 0.35 | 43.00 | 10.67 | 101.00 | 25.07 |
| 60 | 2.00 | 0.25 | 106.60 | 26.46 | 207.60 | 51.53 |
| 80 | 2.50 | 0.18 | 89.40 | 22.19 | 297.00 | 73.72 |
| 120 | 3.00 | 0.13 | 46.50 | 11.54 | 343.50 | 85.26 |
| 170 | 3.50 | 0.09 | 16.10 | 4.00 | 359.60 | 89.26 |
| 200 | 3.75 | 0.07 | 5.20 | 1.29 | 364.80 | 90.55 |
| 230 | 4.00 | 0.06 | 3.60 | 0.89 | 368.40 | 91.44 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.95

2.56

1.97

1.50

1.07

-1.42

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.65

0.32

1.35

-2.03

7.97

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-4 #S1

Analysis Date: 11-16-20

Analyzed By: LK

Easting (ft):

26.364542

Northing (ft):

-82.226024

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-36.8 NAVD 88

USCS:

SP

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 0" - 19" Material Description: Gray poorly graded sand with trace shell

Dry Weight (g):

395.30

Wash Weight (g):

384.10

Pan Retained (g):

1.70

Sieve Loss (%):

0.43

Fines (%):

#200 - 4.29
#230 - 3.69

Organics (%):

1.91

Carbonates (%):

85.55

Shells (%):

0.25

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.36 | 0.09 | 0.36 | 0.09 |
| 3.5 | -2.50 | 5.66 | 0.41 | 0.10 | 0.77 | 0.19 |
| 4 | -2.25 | 4.76 | 0.23 | 0.06 | 1.00 | 0.25 |
| 5 | -2.00 | 4.00 | 0.26 | 0.07 | 1.26 | 0.32 |
| 7 | -1.50 | 2.83 | 1.07 | 0.27 | 2.33 | 0.59 |
| 10 | -1.00 | 2.00 | 2.12 | 0.54 | 4.45 | 1.13 |
| 14 | -0.50 | 1.41 | 4.13 | 1.04 | 8.58 | 2.17 |
| 18 | 0.00 | 1.00 | 10.05 | 2.54 | 18.63 | 4.71 |
| 25 | 0.50 | 0.71 | 20.61 | 5.21 | 39.24 | 9.93 |
| 35 | 1.00 | 0.50 | 50.10 | 12.67 | 89.34 | 22.60 |
| 45 | 1.50 | 0.35 | 103.01 | 26.06 | 192.35 | 48.66 |
| 60 | 2.00 | 0.25 | 118.61 | 30.01 | 310.96 | 78.66 |
| 80 | 2.50 | 0.18 | 40.21 | 10.17 | 351.17 | 88.84 |
| 120 | 3.00 | 0.13 | 14.81 | 3.75 | 365.98 | 92.58 |
| 170 | 3.50 | 0.09 | 8.67 | 2.19 | 374.65 | 94.78 |
| 200 | 3.75 | 0.07 | 3.69 | 0.93 | 378.34 | 95.71 |
| 230 | 4.00 | 0.06 | 2.37 | 0.60 | 380.71 | 96.31 |
| | | | | | | |
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.56 | 2.26 | 1.94 | 1.52 | 1.05 | 0.74 | 0.03 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.44 | 0.37 | 0.85 | -0.54 | 5.8 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-4 #S2

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):
26.364542

Northing (ft):
-82.226024

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-38.4 NAVD 88

USCS: **SW-SM** Munsell: **Dry - 10YR-5/1** Comments: **Sample Interval: 19" - 28" Material Description: Gray well graded sand with silt & trace shell**

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 412.10 | Wash Weight (g): 394.40 | Pan Retained (g): 2.90 | Sieve Loss (%): 0.05 | Fines (%): #200 - 6.09 #230 - 5.05 | Organics (%): 1.85 | Carbonates (%): 85.20 | Shells (%): 4.95 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 3.80 | 0.92 | 3.80 | 0.92 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 3.80 | 0.92 |
| 7/16" | -3.50 | 11.31 | 6.00 | 1.46 | 9.80 | 2.38 |
| 5/16" | -3.00 | 8.00 | 3.90 | 0.95 | 13.70 | 3.32 |
| 3.5 | -2.50 | 5.66 | 4.90 | 1.19 | 18.60 | 4.51 |
| 4 | -2.25 | 4.76 | 1.80 | 0.44 | 20.40 | 4.95 |
| 5 | -2.00 | 4.00 | 2.60 | 0.63 | 23.00 | 5.58 |
| 7 | -1.50 | 2.83 | 6.00 | 1.46 | 29.00 | 7.04 |
| 10 | -1.00 | 2.00 | 4.30 | 1.04 | 33.30 | 8.08 |
| 14 | -0.50 | 1.41 | 4.90 | 1.19 | 38.20 | 9.27 |
| 18 | 0.00 | 1.00 | 8.80 | 2.14 | 47.00 | 11.40 |
| 25 | 0.50 | 0.71 | 18.20 | 4.42 | 65.20 | 15.82 |
| 35 | 1.00 | 0.50 | 45.30 | 10.99 | 110.50 | 26.81 |
| 45 | 1.50 | 0.35 | 90.80 | 22.03 | 201.30 | 48.85 |
| 60 | 2.00 | 0.25 | 102.70 | 24.92 | 304.00 | 73.77 |
| 80 | 2.50 | 0.18 | 39.40 | 9.56 | 343.40 | 83.33 |
| 120 | 3.00 | 0.13 | 20.60 | 5.00 | 364.00 | 88.33 |
| 170 | 3.50 | 0.09 | 16.40 | 3.98 | 380.40 | 92.31 |
| 200 | 3.75 | 0.07 | 6.60 | 1.60 | 387.00 | 93.91 |
| 230 | 4.00 | 0.06 | 4.30 | 1.04 | 391.30 | 94.95 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.57 | 2.06 | 1.52 | 0.92 | 0.51 | -2.23 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.21 | 0.43 | 1.39 | -1.35 | 5.93 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-4 #S3

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.364542

Northing (ft):

-82.226024

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-39.1 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 28" - 48" Material Description: Gray well graded sand with silt & trace shell

Dry Weight (g):

501.24

Wash Weight (g):

475.14

Pan Retained (g):

3.90

Sieve Loss (%):

-0.05

Fines (%):

#200 - 7.09
#230 - 5.93

Organics (%):

1.76

Carbonates (%):

85.30

Shells (%):

2.79

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 4.90 | 0.98 | 4.90 | 0.98 |
| 5/16" | -3.00 | 8.00 | 2.70 | 0.54 | 7.60 | 1.52 |
| 3.5 | -2.50 | 5.66 | 2.90 | 0.58 | 10.50 | 2.09 |
| 4 | -2.25 | 4.76 | 3.50 | 0.70 | 14.00 | 2.79 |
| 5 | -2.00 | 4.00 | 2.90 | 0.58 | 16.90 | 3.37 |
| 7 | -1.50 | 2.83 | 6.90 | 1.38 | 23.80 | 4.75 |
| 10 | -1.00 | 2.00 | 6.40 | 1.28 | 30.20 | 6.03 |
| 14 | -0.50 | 1.41 | 6.90 | 1.38 | 37.10 | 7.40 |
| 18 | 0.00 | 1.00 | 12.50 | 2.49 | 49.60 | 9.90 |
| 25 | 0.50 | 0.71 | 24.90 | 4.97 | 74.50 | 14.86 |
| 35 | 1.00 | 0.50 | 56.90 | 11.35 | 131.40 | 26.21 |
| 45 | 1.50 | 0.35 | 105.50 | 21.05 | 236.90 | 47.26 |
| 60 | 2.00 | 0.25 | 117.30 | 23.40 | 354.20 | 70.66 |
| 80 | 2.50 | 0.18 | 49.40 | 9.86 | 403.60 | 80.52 |
| 120 | 3.00 | 0.13 | 30.50 | 6.08 | 434.10 | 86.61 |
| 170 | 3.50 | 0.09 | 23.20 | 4.63 | 457.30 | 91.23 |
| 200 | 3.75 | 0.07 | 8.40 | 1.68 | 465.70 | 92.91 |
| 230 | 4.00 | 0.06 | 5.80 | 1.16 | 471.50 | 94.07 |

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.79

2.22

1.56

0.95

0.55

-1.40

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.34

0.40

1.32

-1.28

5.9

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-4 #S4

Analysis Date: 11-16-20

Analyzed By: LK

| | | | |
|---------------|----------------|---------------------------------|-----------------|
| Easting (ft): | Northing (ft): | Coordinate System: | Elevation (ft): |
| 26.364542 | -82.226024 | Geographic (Latitude/Longitude) | -40.8 NAVD 88 |

| | | |
|-------|----------------|--|
| USCS: | Munsell: | Comments: |
| SW-SM | Dry - 10YR-5/1 | Sample Interval: 48" - 72" Material Description: Gray well graded sand with silt & trace shell |

| | | | | | | | |
|-----------------|------------------|-------------------|-----------------|----------------------------|---------------|-----------------|-------------|
| Dry Weight (g): | Wash Weight (g): | Pan Retained (g): | Sieve Loss (%): | Fines (%): | Organics (%): | Carbonates (%): | Shells (%): |
| 600.40 | 566.70 | 4.80 | 0.07 | #200 - 7.35 #230 - 6.48 | 1.81 | 88.10 | 5.18 |

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 3.40 | 0.57 | 3.40 | 0.57 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 3.40 | 0.57 |
| 7/16" | -3.50 | 11.31 | 9.00 | 1.50 | 12.40 | 2.07 |
| 5/16" | -3.00 | 8.00 | 7.80 | 1.30 | 20.20 | 3.36 |
| 3.5 | -2.50 | 5.66 | 7.70 | 1.28 | 27.90 | 4.65 |
| 4 | -2.25 | 4.76 | 3.20 | 0.53 | 31.10 | 5.18 |
| 5 | -2.00 | 4.00 | 4.90 | 0.82 | 36.00 | 6.00 |
| 7 | -1.50 | 2.83 | 8.90 | 1.48 | 44.90 | 7.48 |
| 10 | -1.00 | 2.00 | 8.50 | 1.42 | 53.40 | 8.89 |
| 14 | -0.50 | 1.41 | 10.80 | 1.80 | 64.20 | 10.69 |
| 18 | 0.00 | 1.00 | 19.00 | 3.16 | 83.20 | 13.86 |
| 25 | 0.50 | 0.71 | 32.60 | 5.43 | 115.80 | 19.29 |
| 35 | 1.00 | 0.50 | 70.40 | 11.73 | 186.20 | 31.01 |
| 45 | 1.50 | 0.35 | 127.10 | 21.17 | 313.30 | 52.18 |
| 60 | 2.00 | 0.25 | 135.80 | 22.62 | 449.10 | 74.80 |
| 80 | 2.50 | 0.18 | 54.60 | 9.09 | 503.70 | 83.89 |
| 120 | 3.00 | 0.13 | 28.40 | 4.73 | 532.10 | 88.62 |
| 170 | 3.50 | 0.09 | 17.40 | 2.90 | 549.50 | 91.52 |
| 200 | 3.75 | 0.07 | 6.80 | 1.13 | 556.30 | 92.65 |
| 230 | 4.00 | 0.06 | 5.20 | 0.87 | 561.50 | 93.52 |

| | | | | | | |
|-------|--------|--------|--------|--------|--------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.51 | 2.01 | 1.45 | 0.74 | 0.20 | -2.33 |

| | | | | | |
|-------------------|----------|---------|---------|----------|----------|
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis |
| | 1.08 | 0.47 | 1.44 | -1.29 | 5.28 |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-2-4 #S5

Analysis Date: 11-17-20

Analyzed By: LK

Easting (ft):

26.364542

Northing (ft):

-82.226024

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-40.8 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-5/1

Comments:

Sample Interval: 0" - 48" Material Description: Gray well graded sand with trace shell

| | | | | | | | |
|-----------------|------------------|-------------------|-----------------|--|---------------|-----------------|-------------|
| Dry Weight (g): | Wash Weight (g): | Pan Retained (g): | Sieve Loss (%): | Fines (%): #200 - 4.98 #230 - 4.15 | Organics (%): | Carbonates (%): | Shells (%): |
| 433.51 | 418.31 | 1.90 | 0.21 | | 1.56 | 84.30 | 0.23 |

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.70 | 0.16 | 0.70 | 0.16 |
| 4 | -2.25 | 4.76 | 0.30 | 0.07 | 1.00 | 0.23 |
| 5 | -2.00 | 4.00 | 0.80 | 0.18 | 1.80 | 0.42 |
| 7 | -1.50 | 2.83 | 1.70 | 0.39 | 3.50 | 0.81 |
| 10 | -1.00 | 2.00 | 2.60 | 0.60 | 6.10 | 1.41 |
| 14 | -0.50 | 1.41 | 4.70 | 1.08 | 10.80 | 2.49 |
| 18 | 0.00 | 1.00 | 9.70 | 2.24 | 20.50 | 4.73 |
| 25 | 0.50 | 0.71 | 20.90 | 4.82 | 41.40 | 9.55 |
| 35 | 1.00 | 0.50 | 53.90 | 12.43 | 95.30 | 21.98 |
| 45 | 1.50 | 0.35 | 109.00 | 25.14 | 204.30 | 47.13 |
| 60 | 2.00 | 0.25 | 120.80 | 27.87 | 325.10 | 74.99 |
| 80 | 2.50 | 0.18 | 45.50 | 10.50 | 370.60 | 85.49 |
| 120 | 3.00 | 0.13 | 21.30 | 4.91 | 391.90 | 90.40 |
| 170 | 3.50 | 0.09 | 14.40 | 3.32 | 406.30 | 93.72 |
| 200 | 3.75 | 0.07 | 5.60 | 1.29 | 411.90 | 95.02 |
| 230 | 4.00 | 0.06 | 3.60 | 0.83 | 415.50 | 95.85 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.75 | 2.43 | 2.00 | 1.55 | 1.06 | 0.76 | 0.03 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 1.49 | 0.36 | 0.91 | -0.44 | 5.17 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-1 #S1

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.403439

Northing (ft):
-82.197289

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-30.3 NAVD 88

USCS:
SP-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 0" - 9" Material Description: Gray poorly graded sand with silt

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 256.10 | Wash Weight (g): 238.60 | Pan Retained (g): 1.86 | Sieve Loss (%): -0.01 | Fines (%): #200 - 8.35 #230 - 7.55 | Organics (%): 2.23 | Carbonates (%): 91.99 | Shells (%): 0.00 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | -2.25 | 4.76 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | -2.00 | 4.00 | 0.23 | 0.09 | 0.23 | 0.09 |
| 7 | -1.50 | 2.83 | 0.71 | 0.28 | 0.94 | 0.37 |
| 10 | -1.00 | 2.00 | 3.69 | 1.44 | 4.63 | 1.81 |
| 14 | -0.50 | 1.41 | 10.17 | 3.97 | 14.80 | 5.78 |
| 18 | 0.00 | 1.00 | 23.12 | 9.03 | 37.92 | 14.81 |
| 25 | 0.50 | 0.71 | 33.26 | 12.99 | 71.18 | 27.79 |
| 35 | 1.00 | 0.50 | 41.25 | 16.11 | 112.43 | 43.90 |
| 45 | 1.50 | 0.35 | 45.54 | 17.78 | 157.97 | 61.68 |
| 60 | 2.00 | 0.25 | 44.68 | 17.45 | 202.65 | 79.13 |
| 80 | 2.50 | 0.18 | 15.66 | 6.11 | 218.31 | 85.24 |
| 120 | 3.00 | 0.13 | 7.67 | 2.99 | 225.98 | 88.24 |
| 170 | 3.50 | 0.09 | 6.06 | 2.37 | 232.04 | 90.61 |
| 200 | 3.75 | 0.07 | 2.67 | 1.04 | 234.71 | 91.65 |
| 230 | 4.00 | 0.06 | 2.05 | 0.80 | 236.76 | 92.45 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.40 | 1.88 | 1.17 | 0.39 | 0.05 | -0.60 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.05 | 0.48 | 1.04 | 0.16 | 3.08 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-1 #S2

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.403439

Northing (ft):
-82.197289

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-31.1 NAVD 88

USCS: **SP-SM**
Munsell: **Dry - 10YR-6/1**

Comments:
Sample Interval: 9" - 26" Material Description: Gray poorly graded sand with silt

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 259.90 | Wash Weight (g): 241.30 | Pan Retained (g): 1.69 | Sieve Loss (%): -0.08 | Fines (%): #200 - 8.44 #230 - 7.73 | Organics (%): 2.68 | Carbonates (%): 90.34 | Shells (%): 0.00 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | -2.25 | 4.76 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | -2.00 | 4.00 | 0.27 | 0.10 | 0.27 | 0.10 |
| 7 | -1.50 | 2.83 | 2.01 | 0.77 | 2.28 | 0.88 |
| 10 | -1.00 | 2.00 | 5.95 | 2.29 | 8.23 | 3.17 |
| 14 | -0.50 | 1.41 | 13.73 | 5.28 | 21.96 | 8.45 |
| 18 | 0.00 | 1.00 | 28.90 | 11.12 | 50.86 | 19.57 |
| 25 | 0.50 | 0.71 | 37.06 | 14.26 | 87.92 | 33.83 |
| 35 | 1.00 | 0.50 | 41.14 | 15.83 | 129.06 | 49.66 |
| 45 | 1.50 | 0.35 | 41.70 | 16.04 | 170.76 | 65.70 |
| 60 | 2.00 | 0.25 | 38.79 | 14.92 | 209.55 | 80.63 |
| 80 | 2.50 | 0.18 | 13.40 | 5.16 | 222.95 | 85.78 |
| 120 | 3.00 | 0.13 | 6.90 | 2.65 | 229.85 | 88.44 |
| 170 | 3.50 | 0.09 | 5.58 | 2.15 | 235.43 | 90.58 |
| 200 | 3.75 | 0.07 | 2.54 | 0.98 | 237.97 | 91.56 |
| 230 | 4.00 | 0.06 | 1.85 | 0.71 | 239.82 | 92.27 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.33 | 1.81 | 1.01 | 0.19 | -0.16 | -0.83 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 0.9 | 0.54 | 1.09 | 0.19 | 3.01 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-1 #S3

Analysis Date: 11-19-20

Analyzed By: LK

| | | | |
|-----------------------------------|-------------------------------------|--|---|
| Easting (ft): 26.403439 | Northing (ft): -82.197289 | Coordinate System: Geographic (Latitude/Longitude) | Elevation (ft): -32.5 NAVD 88 |
|-----------------------------------|-------------------------------------|--|---|

| | | |
|-----------------------|-----------------------------------|--|
| USCS: SP-SM | Munsell: Dry - 10YR-6/1 | Comments: Sample Interval: 26" - 36" Material Description: Gray poorly graded sand with silt & trace shell |
|-----------------------|-----------------------------------|--|

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 290.80 | Wash Weight (g): 267.10 | Pan Retained (g): 0.98 | Sieve Loss (%): -0.04 | Fines (%): #200 - 9.04 #230 - 8.45 | Organics (%): 2.31 | Carbonates (%): 90.04 | Shells (%): 0.21 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.42 | 0.14 | 0.42 | 0.14 |
| 4 | -2.25 | 4.76 | 0.18 | 0.06 | 0.60 | 0.21 |
| 5 | -2.00 | 4.00 | 0.57 | 0.20 | 1.17 | 0.40 |
| 7 | -1.50 | 2.83 | 3.57 | 1.23 | 4.74 | 1.63 |
| 10 | -1.00 | 2.00 | 10.81 | 3.72 | 15.55 | 5.35 |
| 14 | -0.50 | 1.41 | 20.71 | 7.12 | 36.26 | 12.47 |
| 18 | 0.00 | 1.00 | 36.71 | 12.62 | 72.97 | 25.09 |
| 25 | 0.50 | 0.71 | 42.11 | 14.48 | 115.08 | 39.57 |
| 35 | 1.00 | 0.50 | 42.73 | 14.69 | 157.81 | 54.27 |
| 45 | 1.50 | 0.35 | 41.07 | 14.12 | 198.88 | 68.39 |
| 60 | 2.00 | 0.25 | 39.05 | 13.43 | 237.93 | 81.82 |
| 80 | 2.50 | 0.18 | 13.35 | 4.59 | 251.28 | 86.41 |
| 120 | 3.00 | 0.13 | 6.14 | 2.11 | 257.42 | 88.52 |
| 170 | 3.50 | 0.09 | 4.77 | 1.64 | 262.19 | 90.16 |
| 200 | 3.75 | 0.07 | 2.33 | 0.80 | 264.52 | 90.96 |
| 230 | 4.00 | 0.06 | 1.72 | 0.59 | 266.24 | 91.55 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.24 | 1.75 | 0.85 | 0.00 | -0.36 | -1.05 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 0.72 | 0.61 | 1.13 | 0.15 | 2.98 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-1 #S4

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.403439

Northing (ft):
-82.197289

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-33.3 NAVD 88

USCS:
SP-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 36" - 60" Material Description: Gray poorly graded sand with silt & trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 282.10 | Wash Weight (g): 268.80 | Pan Retained (g): 1.81 | Sieve Loss (%): 0.02 | Fines (%): #200 - 5.81 #230 - 5.38 | Organics (%): 2.29 | Carbonates (%): 92.94 | Shells (%): 0.83 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.57 | 0.20 | 0.57 | 0.20 |
| 3.5 | -2.50 | 5.66 | 0.75 | 0.27 | 1.32 | 0.47 |
| 4 | -2.25 | 4.76 | 1.01 | 0.36 | 2.33 | 0.83 |
| 5 | -2.00 | 4.00 | 2.21 | 0.78 | 4.54 | 1.61 |
| 7 | -1.50 | 2.83 | 10.46 | 3.71 | 15.00 | 5.32 |
| 10 | -1.00 | 2.00 | 20.89 | 7.41 | 35.89 | 12.72 |
| 14 | -0.50 | 1.41 | 31.64 | 11.22 | 67.53 | 23.94 |
| 18 | 0.00 | 1.00 | 44.31 | 15.71 | 111.84 | 39.65 |
| 25 | 0.50 | 0.71 | 41.45 | 14.69 | 153.29 | 54.34 |
| 35 | 1.00 | 0.50 | 35.09 | 12.44 | 188.38 | 66.78 |
| 45 | 1.50 | 0.35 | 30.69 | 10.88 | 219.07 | 77.66 |
| 60 | 2.00 | 0.25 | 27.86 | 9.88 | 246.93 | 87.53 |
| 80 | 2.50 | 0.18 | 9.30 | 3.30 | 256.23 | 90.83 |
| 120 | 3.00 | 0.13 | 4.50 | 1.60 | 260.73 | 92.42 |
| 170 | 3.50 | 0.09 | 3.44 | 1.22 | 264.17 | 93.64 |
| 200 | 3.75 | 0.07 | 1.55 | 0.55 | 265.72 | 94.19 |
| 230 | 4.00 | 0.06 | 1.21 | 0.43 | 266.93 | 94.62 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 1.82 | 1.38 | 0.35 | -0.47 | -0.85 | -1.54 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 0.33 | 0.80 | 1.22 | 0.22 | 2.93 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-1 #S5

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.403439

Northing (ft):
-82.197289

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-33.3 NAVD 88

USCS:
SP-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 0" - 36" Material Description: Gray poorly graded sand with silt & trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 320.50 | Wash Weight (g): 299.60 | Pan Retained (g): 1.50 | Sieve Loss (%): -0.28 | Fines (%): #200 - 7.33 #230 - 6.71 | Organics (%): 2.43 | Carbonates (%): 91.59 | Shells (%): 0.05 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | -2.25 | 4.76 | 0.16 | 0.05 | 0.16 | 0.05 |
| 5 | -2.00 | 4.00 | 0.11 | 0.03 | 0.27 | 0.08 |
| 7 | -1.50 | 2.83 | 1.78 | 0.56 | 2.05 | 0.64 |
| 10 | -1.00 | 2.00 | 6.86 | 2.14 | 8.91 | 2.78 |
| 14 | -0.50 | 1.41 | 17.01 | 5.31 | 25.92 | 8.09 |
| 18 | 0.00 | 1.00 | 37.28 | 11.63 | 63.20 | 19.72 |
| 25 | 0.50 | 0.71 | 48.31 | 15.07 | 111.51 | 34.79 |
| 35 | 1.00 | 0.50 | 53.04 | 16.55 | 164.55 | 51.34 |
| 45 | 1.50 | 0.35 | 52.27 | 16.31 | 216.82 | 67.65 |
| 60 | 2.00 | 0.25 | 48.14 | 15.02 | 264.96 | 82.67 |
| 80 | 2.50 | 0.18 | 16.39 | 5.11 | 281.35 | 87.78 |
| 120 | 3.00 | 0.13 | 7.54 | 2.35 | 288.89 | 90.14 |
| 170 | 3.50 | 0.09 | 5.61 | 1.75 | 294.50 | 91.89 |
| 200 | 3.75 | 0.07 | 2.50 | 0.78 | 297.00 | 92.67 |
| 230 | 4.00 | 0.06 | 1.99 | 0.62 | 298.99 | 93.29 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.13 | 1.74 | 0.96 | 0.18 | -0.16 | -0.79 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 0.87 | 0.55 | 1.05 | 0.2 | 3.07 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-2 #S1

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):

26.399234

Northing (ft):

-82.193346

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-28.6 NAVD 88

USCS:

SW

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 0" - 26" Material Description: Gray well graded sand with trace shell

Dry Weight (g):

410.10

Wash Weight (g):

402.60

Pan Retained (g):

0.46

Sieve Loss (%):

0.04

Fines (%):

#200 - 2.13
#230 - 1.98

Organics (%):

2.04

Carbonates (%):

86.60

Shells (%):

0.98

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

1.36

0.33

1.36

0.33

5/16"

-3.00

8.00

1.44

0.35

2.80

0.68

3.5

-2.50

5.66

0.93

0.23

3.73

0.91

4

-2.25

4.76

0.29

0.07

4.02

0.98

5

-2.00

4.00

0.47

0.11

4.49

1.09

7

-1.50

2.83

2.74

0.67

7.23

1.76

10

-1.00

2.00

4.96

1.21

12.19

2.97

14

-0.50

1.41

7.15

1.74

19.34

4.72

18

0.00

1.00

11.36

2.77

30.70

7.49

25

0.50

0.71

20.22

4.93

50.92

12.42

35

1.00

0.50

54.43

13.27

105.35

25.69

45

1.50

0.35

109.46

26.69

214.81

52.38

60

2.00

0.25

122.94

29.98

337.75

82.36

80

2.50

0.18

49.73

12.13

387.48

94.48

120

3.00

0.13

10.21

2.49

397.69

96.97

170

3.50

0.09

2.82

0.69

400.51

97.66

200

3.75

0.07

0.86

0.21

401.37

97.87

230

4.00

0.06

0.59

0.14

401.96

98.02

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.60

2.07

1.88

1.46

0.97

0.63

-0.45

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.29

0.41

0.94

-1.71

8.67

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-2 #S2

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.399234

Northing (ft):
-82.193346

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-30.8 NAVD 88

USCS:
SP

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 26" - 48" Material Description: Gray poorly graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 359.40 | Wash Weight (g): 346.90 | Pan Retained (g): 0.70 | Sieve Loss (%): 0.08 | Fines (%): #200 - 4.09 #230 - 3.75 | Organics (%): 2.02 | Carbonates (%): 87.00 | Shells (%): 0.16 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.45 | 0.13 | 0.45 | 0.13 |
| 3.5 | -2.50 | 5.66 | 0.06 | 0.02 | 0.51 | 0.14 |
| 4 | -2.25 | 4.76 | 0.07 | 0.02 | 0.58 | 0.16 |
| 5 | -2.00 | 4.00 | 0.28 | 0.08 | 0.86 | 0.24 |
| 7 | -1.50 | 2.83 | 1.31 | 0.36 | 2.17 | 0.60 |
| 10 | -1.00 | 2.00 | 1.53 | 0.43 | 3.70 | 1.03 |
| 14 | -0.50 | 1.41 | 2.28 | 0.63 | 5.98 | 1.66 |
| 18 | 0.00 | 1.00 | 3.75 | 1.04 | 9.73 | 2.71 |
| 25 | 0.50 | 0.71 | 7.72 | 2.15 | 17.45 | 4.86 |
| 35 | 1.00 | 0.50 | 25.81 | 7.18 | 43.26 | 12.04 |
| 45 | 1.50 | 0.35 | 66.55 | 18.52 | 109.81 | 30.55 |
| 60 | 2.00 | 0.25 | 116.18 | 32.33 | 225.99 | 62.88 |
| 80 | 2.50 | 0.18 | 76.76 | 21.36 | 302.75 | 84.24 |
| 120 | 3.00 | 0.13 | 29.93 | 8.33 | 332.68 | 92.57 |
| 170 | 3.50 | 0.09 | 9.51 | 2.65 | 342.19 | 95.21 |
| 200 | 3.75 | 0.07 | 2.50 | 0.70 | 344.69 | 95.91 |
| 230 | 4.00 | 0.06 | 1.24 | 0.35 | 345.93 | 96.25 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.46 | 2.49 | 2.28 | 1.80 | 1.35 | 1.11 | 0.51 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.73 | 0.30 | 0.8 | -1.09 | 7.41 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-2 #S3

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.399234

Northing (ft):
-82.193346

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-32.6 NAVD 88

USCS:
SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 48" - 72" Material Description: Gray silty sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 274.70 | Wash Weight (g): 242.99 | Pan Retained (g): 3.37 | Sieve Loss (%): 0.00 | Fines (%): #200 - 14.61 #230 - 12.77 | Organics (%): 2.60 | Carbonates (%): 83.20 | Shells (%): 1.53 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.70 | 0.25 | 0.70 | 0.25 |
| 3.5 | -2.50 | 5.66 | 2.10 | 0.76 | 2.80 | 1.02 |
| 4 | -2.25 | 4.76 | 1.40 | 0.51 | 4.20 | 1.53 |
| 5 | -2.00 | 4.00 | 1.00 | 0.36 | 5.20 | 1.89 |
| 7 | -1.50 | 2.83 | 4.70 | 1.71 | 9.90 | 3.60 |
| 10 | -1.00 | 2.00 | 6.60 | 2.40 | 16.50 | 6.01 |
| 14 | -0.50 | 1.41 | 7.40 | 2.69 | 23.90 | 8.70 |
| 18 | 0.00 | 1.00 | 10.10 | 3.68 | 34.00 | 12.38 |
| 25 | 0.50 | 0.71 | 12.32 | 4.48 | 46.32 | 16.86 |
| 35 | 1.00 | 0.50 | 15.57 | 5.67 | 61.89 | 22.53 |
| 45 | 1.50 | 0.35 | 25.77 | 9.38 | 87.66 | 31.91 |
| 60 | 2.00 | 0.25 | 41.47 | 15.10 | 129.13 | 47.01 |
| 80 | 2.50 | 0.18 | 37.42 | 13.62 | 166.55 | 60.63 |
| 120 | 3.00 | 0.13 | 32.05 | 11.67 | 198.60 | 72.30 |
| 170 | 3.50 | 0.09 | 27.52 | 10.02 | 226.12 | 82.32 |
| 200 | 3.75 | 0.07 | 8.46 | 3.08 | 234.58 | 85.39 |
| 230 | 4.00 | 0.06 | 5.04 | 1.83 | 239.62 | 87.23 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 3.64 | 3.13 | 2.11 | 1.13 | 0.40 | -1.21 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.64 | 0.32 | 1.45 | -0.92 | 3.52 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-2 #S4

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):
26.399234

Northing (ft):
-82.193346

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-32.6 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 0" - 48" Material Description: Gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 396.90 | Wash Weight (g): 386.80 | Pan Retained (g): 0.30 | Sieve Loss (%): -0.09 | Fines (%): #200 - 2.74 #230 - 2.53 | Organics (%): 1.79 | Carbonates (%): 86.31 | Shells (%): 0.61 |
|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.47 | 0.12 | 0.47 | 0.12 |
| 5/16" | -3.00 | 8.00 | 0.65 | 0.16 | 1.12 | 0.28 |
| 3.5 | -2.50 | 5.66 | 0.96 | 0.24 | 2.08 | 0.52 |
| 4 | -2.25 | 4.76 | 0.35 | 0.09 | 2.43 | 0.61 |
| 5 | -2.00 | 4.00 | 0.27 | 0.07 | 2.70 | 0.68 |
| 7 | -1.50 | 2.83 | 2.36 | 0.59 | 5.06 | 1.27 |
| 10 | -1.00 | 2.00 | 3.29 | 0.83 | 8.35 | 2.10 |
| 14 | -0.50 | 1.41 | 5.22 | 1.32 | 13.57 | 3.42 |
| 18 | 0.00 | 1.00 | 8.47 | 2.13 | 22.04 | 5.55 |
| 25 | 0.50 | 0.71 | 16.00 | 4.03 | 38.04 | 9.58 |
| 35 | 1.00 | 0.50 | 44.22 | 11.14 | 82.26 | 20.73 |
| 45 | 1.50 | 0.35 | 95.57 | 24.08 | 177.83 | 44.80 |
| 60 | 2.00 | 0.25 | 123.11 | 31.02 | 300.94 | 75.82 |
| 80 | 2.50 | 0.18 | 60.60 | 15.27 | 361.54 | 91.09 |
| 120 | 3.00 | 0.13 | 17.58 | 4.43 | 379.12 | 95.52 |
| 170 | 3.50 | 0.09 | 5.38 | 1.36 | 384.50 | 96.88 |
| 200 | 3.75 | 0.07 | 1.53 | 0.39 | 386.03 | 97.26 |
| 230 | 4.00 | 0.06 | 0.82 | 0.21 | 386.85 | 97.47 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 2.94 | 2.27 | 1.99 | 1.58 | 1.09 | 0.79 | -0.13 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.45 | 0.37 | 0.89 | -1.41 | 7.88 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-3 #S1

Analysis Date: 11-20-20

Analyzed By: LK

Easting (ft):
26.397616

Northing (ft):
-82.190828

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-31.5 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 0" - 13" Material Description: Light gray well graded sand with few shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 417.00 | Wash Weight (g): 404.10 | Pan Retained (g): 0.80 | Sieve Loss (%): 0.10 | Fines (%): #200 - 3.69 #230 - 3.38 | Organics (%): 2.18 | Carbonates (%): 77.86 | Shells (%): 7.03 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 6.40 | 1.53 | 6.40 | 1.53 |
| 7/16" | -3.50 | 11.31 | 11.90 | 2.85 | 18.30 | 4.39 |
| 5/16" | -3.00 | 8.00 | 3.80 | 0.91 | 22.10 | 5.30 |
| 3.5 | -2.50 | 5.66 | 4.80 | 1.15 | 26.90 | 6.45 |
| 4 | -2.25 | 4.76 | 2.40 | 0.58 | 29.30 | 7.03 |
| 5 | -2.00 | 4.00 | 2.60 | 0.62 | 31.90 | 7.65 |
| 7 | -1.50 | 2.83 | 5.10 | 1.22 | 37.00 | 8.87 |
| 10 | -1.00 | 2.00 | 7.50 | 1.80 | 44.50 | 10.67 |
| 14 | -0.50 | 1.41 | 10.10 | 2.42 | 54.60 | 13.09 |
| 18 | 0.00 | 1.00 | 17.30 | 4.15 | 71.90 | 17.24 |
| 25 | 0.50 | 0.71 | 30.50 | 7.31 | 102.40 | 24.56 |
| 35 | 1.00 | 0.50 | 74.00 | 17.75 | 176.40 | 42.30 |
| 45 | 1.50 | 0.35 | 96.30 | 23.09 | 272.70 | 65.40 |
| 60 | 2.00 | 0.25 | 67.40 | 16.16 | 340.10 | 81.56 |
| 80 | 2.50 | 0.18 | 36.60 | 8.78 | 376.70 | 90.34 |
| 120 | 3.00 | 0.13 | 16.70 | 4.00 | 393.40 | 94.34 |
| 170 | 3.50 | 0.09 | 6.20 | 1.49 | 399.60 | 95.83 |
| 200 | 3.75 | 0.07 | 2.00 | 0.48 | 401.60 | 96.31 |
| 230 | 4.00 | 0.06 | 1.30 | 0.31 | 402.90 | 96.62 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 3.22 | 2.14 | 1.80 | 1.17 | 0.51 | -0.15 | -3.16 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 0.8 | 0.57 | 1.56 | -1.48 | 5.3 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-3 #S2

Analysis Date: 11-20-20

Analyzed By: LK

Easting (ft):
26.397616

Northing (ft):
-82.190828

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-32.6 NAVD 88

USCS:
SW-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 13" - 26" Material Description: Gray well graded sand with silt, trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 315.30 | Wash Weight (g): 300.30 | Pan Retained (g): 1.30 | Sieve Loss (%): 0.19 | Fines (%): #200 - 6.03 #230 - 5.36 | Organics (%): 2.37 | Carbonates (%): 86.22 | Shells (%): 4.92 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 4.80 | 1.52 | 4.80 | 1.52 |
| 5/16" | -3.00 | 8.00 | 4.10 | 1.30 | 8.90 | 2.82 |
| 3.5 | -2.50 | 5.66 | 4.40 | 1.40 | 13.30 | 4.22 |
| 4 | -2.25 | 4.76 | 2.20 | 0.70 | 15.50 | 4.92 |
| 5 | -2.00 | 4.00 | 2.50 | 0.79 | 18.00 | 5.71 |
| 7 | -1.50 | 2.83 | 4.60 | 1.46 | 22.60 | 7.17 |
| 10 | -1.00 | 2.00 | 5.30 | 1.68 | 27.90 | 8.85 |
| 14 | -0.50 | 1.41 | 6.10 | 1.93 | 34.00 | 10.78 |
| 18 | 0.00 | 1.00 | 9.20 | 2.92 | 43.20 | 13.70 |
| 25 | 0.50 | 0.71 | 16.30 | 5.17 | 59.50 | 18.87 |
| 35 | 1.00 | 0.50 | 42.30 | 13.42 | 101.80 | 32.29 |
| 45 | 1.50 | 0.35 | 65.50 | 20.77 | 167.30 | 53.06 |
| 60 | 2.00 | 0.25 | 62.00 | 19.66 | 229.30 | 72.72 |
| 80 | 2.50 | 0.18 | 34.20 | 10.85 | 263.50 | 83.57 |
| 120 | 3.00 | 0.13 | 19.40 | 6.15 | 282.90 | 89.72 |
| 170 | 3.50 | 0.09 | 10.10 | 3.20 | 293.00 | 92.93 |
| 200 | 3.75 | 0.07 | 3.30 | 1.05 | 296.30 | 93.97 |
| 230 | 4.00 | 0.06 | 2.10 | 0.67 | 298.40 | 94.64 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 2.53 | 2.11 | 1.43 | 0.73 | 0.22 | -2.22 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.12 | 0.46 | 1.46 | -1.33 | 5.14 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-3 #S3

Analysis Date: 11-20-20

Analyzed By: LK

Easting (ft):
26.397616

Northing (ft):
-82.190828

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-33.7 NAVD 88

USCS:
SW-SM

Munsell:
Dry - 10YR-6/1

Comments:
Sample Interval: 26" - 32" Material Description: Gray well graded sand with silt, trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 295.10 | Wash Weight (g): 268.60 | Pan Retained (g): 4.10 | Sieve Loss (%): 0.20 | Fines (%): #200 - 12.37 #230 - 10.57 | Organics (%): 2.37 | Carbonates (%): 81.64 | Shells (%): 0.37 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7/16" | -3.50 | 11.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/16" | -3.00 | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.5 | -2.50 | 5.66 | 0.70 | 0.24 | 0.70 | 0.24 |
| 4 | -2.25 | 4.76 | 0.40 | 0.14 | 1.10 | 0.37 |
| 5 | -2.00 | 4.00 | 0.90 | 0.30 | 2.00 | 0.68 |
| 7 | -1.50 | 2.83 | 3.20 | 1.08 | 5.20 | 1.76 |
| 10 | -1.00 | 2.00 | 3.50 | 1.19 | 8.70 | 2.95 |
| 14 | -0.50 | 1.41 | 5.40 | 1.83 | 14.10 | 4.78 |
| 18 | 0.00 | 1.00 | 7.70 | 2.61 | 21.80 | 7.39 |
| 25 | 0.50 | 0.71 | 11.40 | 3.86 | 33.20 | 11.25 |
| 35 | 1.00 | 0.50 | 27.00 | 9.15 | 60.20 | 20.40 |
| 45 | 1.50 | 0.35 | 50.30 | 17.05 | 110.50 | 37.44 |
| 60 | 2.00 | 0.25 | 58.50 | 19.82 | 169.00 | 57.27 |
| 80 | 2.50 | 0.18 | 38.30 | 12.98 | 207.30 | 70.25 |
| 120 | 3.00 | 0.13 | 27.50 | 9.32 | 234.80 | 79.57 |
| 170 | 3.50 | 0.09 | 16.60 | 5.63 | 251.40 | 85.19 |
| 200 | 3.75 | 0.07 | 7.20 | 2.44 | 258.60 | 87.63 |
| 230 | 4.00 | 0.06 | 5.30 | 1.80 | 263.90 | 89.43 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | 3.39 | 2.75 | 1.82 | 1.13 | 0.76 | -0.46 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.63 | 0.32 | 1.16 | -0.68 | 4.06 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-3 #S4

Analysis Date: 11-20-20

Analyzed By: LK

Easting (ft):
26.397616

Northing (ft):
-82.190828

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-34.2 NAVD 88

USCS:
SM

Munsell:
Dry - 10YR-5/3

Comments:
Sample Interval: 32" - 56" Material Description: Brown silty sand with little shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|-----------------------------|
| Dry Weight (g): 279.50 | Wash Weight (g): 240.20 | Pan Retained (g): 8.10 | Sieve Loss (%): 0.00 | Fines (%): #200 - 19.43 #230 - 16.96 | Organics (%): 4.23 | Carbonates (%): 70.39 | Shells (%): 16.71 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|-----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 5.70 | 2.04 | 5.70 | 2.04 |
| 7/16" | -3.50 | 11.31 | 13.00 | 4.65 | 18.70 | 6.69 |
| 5/16" | -3.00 | 8.00 | 12.60 | 4.51 | 31.30 | 11.20 |
| 3.5 | -2.50 | 5.66 | 10.80 | 3.86 | 42.10 | 15.06 |
| 4 | -2.25 | 4.76 | 4.60 | 1.65 | 46.70 | 16.71 |
| 5 | -2.00 | 4.00 | 5.70 | 2.04 | 52.40 | 18.75 |
| 7 | -1.50 | 2.83 | 11.40 | 4.08 | 63.80 | 22.83 |
| 10 | -1.00 | 2.00 | 11.10 | 3.97 | 74.90 | 26.80 |
| 14 | -0.50 | 1.41 | 10.00 | 3.58 | 84.90 | 30.38 |
| 18 | 0.00 | 1.00 | 10.40 | 3.72 | 95.30 | 34.10 |
| 25 | 0.50 | 0.71 | 9.10 | 3.26 | 104.40 | 37.35 |
| 35 | 1.00 | 0.50 | 8.20 | 2.93 | 112.60 | 40.29 |
| 45 | 1.50 | 0.35 | 9.20 | 3.29 | 121.80 | 43.58 |
| 60 | 2.00 | 0.25 | 11.30 | 4.04 | 133.10 | 47.62 |
| 80 | 2.50 | 0.18 | 14.50 | 5.19 | 147.60 | 52.81 |
| 120 | 3.00 | 0.13 | 28.40 | 10.16 | 176.00 | 62.97 |
| 170 | 3.50 | 0.09 | 37.80 | 13.52 | 213.80 | 76.49 |
| 200 | 3.75 | 0.07 | 11.40 | 4.08 | 225.20 | 80.57 |
| 230 | 4.00 | 0.06 | 6.90 | 2.47 | 232.10 | 83.04 |

| | | | | | | |
|------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| | | 3.44 | 2.23 | -1.23 | -2.36 | -3.68 |
| Moment | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| Statistics | 0.57 | 0.67 | 2.56 | -0.38 | 1.69 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-3 #S5

Analysis Date: 11-20-20

Analyzed By: LK

Easting (ft):
26.397616

Northing (ft):
-82.190828

Coordinate System:
Geographic (Latitude/Longitude)

Elevation (ft):
-36.2 NAVD 88

USCS:
SW

Munsell:
Dry - 10YR-7/1

Comments:
Sample Interval: 0" - 56" Material Description: Light gray well graded sand with trace shell

| | | | | | | | |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|
| Dry Weight (g): 577.60 | Wash Weight (g): 552.90 | Pan Retained (g): 3.30 | Sieve Loss (%): 0.14 | Fines (%): #200 - 5.63 #230 - 4.99 | Organics (%): 2.07 | Carbonates (%): 85.77 | Shells (%): 4.57 |
|----------------------------------|-----------------------------------|----------------------------------|--------------------------------|--|------------------------------|---------------------------------|----------------------------|

| Sieve Number | Sieve Size (Phi) | Sieve Size (Millimeters) | Grams Retained | % Weight Retained | Cum. Grams Retained | C. % Weight Retained |
|--------------|------------------|--------------------------|----------------|-------------------|---------------------|----------------------|
| 3/4" | -4.25 | 19.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5/8" | -4.00 | 16.00 | 2.90 | 0.50 | 2.90 | 0.50 |
| 7/16" | -3.50 | 11.31 | 7.60 | 1.32 | 10.50 | 1.82 |
| 5/16" | -3.00 | 8.00 | 4.80 | 0.83 | 15.30 | 2.65 |
| 3.5 | -2.50 | 5.66 | 7.40 | 1.28 | 22.70 | 3.93 |
| 4 | -2.25 | 4.76 | 3.70 | 0.64 | 26.40 | 4.57 |
| 5 | -2.00 | 4.00 | 4.70 | 0.81 | 31.10 | 5.38 |
| 7 | -1.50 | 2.83 | 9.40 | 1.63 | 40.50 | 7.01 |
| 10 | -1.00 | 2.00 | 11.40 | 1.97 | 51.90 | 8.99 |
| 14 | -0.50 | 1.41 | 14.00 | 2.42 | 65.90 | 11.41 |
| 18 | 0.00 | 1.00 | 19.90 | 3.45 | 85.80 | 14.85 |
| 25 | 0.50 | 0.71 | 32.50 | 5.63 | 118.30 | 20.48 |
| 35 | 1.00 | 0.50 | 82.00 | 14.20 | 200.30 | 34.68 |
| 45 | 1.50 | 0.35 | 124.20 | 21.50 | 324.50 | 56.18 |
| 60 | 2.00 | 0.25 | 106.30 | 18.40 | 430.80 | 74.58 |
| 80 | 2.50 | 0.18 | 59.00 | 10.21 | 489.80 | 84.80 |
| 120 | 3.00 | 0.13 | 33.30 | 5.77 | 523.10 | 90.56 |
| 170 | 3.50 | 0.09 | 16.30 | 2.82 | 539.40 | 93.39 |
| 200 | 3.75 | 0.07 | 5.70 | 0.99 | 545.10 | 94.37 |
| 230 | 4.00 | 0.06 | 3.70 | 0.64 | 548.80 | 95.01 |

| | | | | | | |
|-------------------|----------|---------|---------|----------|----------|--------|
| Phi 5 | Phi 16 | Phi 25 | Phi 50 | Phi 75 | Phi 84 | Phi 95 |
| 4.00 | 2.46 | 2.02 | 1.36 | 0.66 | 0.10 | -2.12 |
| Moment Statistics | Mean Phi | Mean mm | Sorting | Skewness | Kurtosis | |
| | 1.06 | 0.48 | 1.46 | -1.29 | 5.17 | |

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-4 #S1

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):

26.403143

Northing (ft):

-82.193165

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-29.6 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 0" - 40" Material Description: Gray well graded sand with silt

Dry Weight (g):

383.10

Wash Weight (g):

351.92

Pan Retained (g):

2.33

Sieve Loss (%):

0.00

Fines (%):

#200 - 9.41
#230 - 8.75

Organics (%):

2.12

Carbonates (%):

87.55

Shells (%):

0.00

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.00

0.00

0.00

0.00

4

-2.25

4.76

0.00

0.00

0.00

0.00

5

-2.00

4.00

0.04

0.01

0.04

0.01

7

-1.50

2.83

1.32

0.34

1.36

0.35

10

-1.00

2.00

3.86

1.01

5.22

1.36

14

-0.50

1.41

7.33

1.91

12.55

3.28

18

0.00

1.00

14.69

3.83

27.24

7.11

25

0.50

0.71

21.50

5.61

48.74

12.72

35

1.00

0.50

35.65

9.31

84.39

22.03

45

1.50

0.35

65.80

17.18

150.19

39.20

60

2.00

0.25

94.86

24.76

245.05

63.97

80

2.50

0.18

55.28

14.43

300.33

78.39

120

3.00

0.13

27.29

7.12

327.62

85.52

170

3.50

0.09

14.46

3.77

342.08

89.29

200

3.75

0.07

4.98

1.30

347.06

90.59

230

4.00

0.06

2.53

0.66

349.59

91.25

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.89

2.38

1.72

1.09

0.68

-0.28

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.54

0.34

0.99

-0.44

3.51

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

Granularmetric Report

Depths and elevations based on measured values



GFA International, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Project Name: Lovers Key Beach Nourishment Sand Search

Sample Name: VC20-6-4 #S2

Analysis Date: 11-19-20

Analyzed By: LK

Easting (ft):

26.403143

Northing (ft):

-82.193165

Coordinate System:

Geographic (Latitude/Longitude)

Elevation (ft):

-32.9 NAVD 88

USCS:

SW-SM

Munsell:

Dry - 10YR-6/1

Comments:

Sample Interval: 40" - 64" Material Description: Gray well graded sand with silt & trace shell

Dry Weight (g):

314.70

Wash Weight (g):

293.90

Pan Retained (g):

1.96

Sieve Loss (%):

0.23

Fines (%):

#200 - 8.14
#230 - 7.46

Organics (%):

2.35

Carbonates (%):

87.81

Shells (%):

0.35

Sieve Number

Sieve Size (Phi)

Sieve Size (Millimeters)

Grams Retained

% Weight Retained

Cum. Grams Retained

C. % Weight Retained

3/4"

-4.25

19.03

0.00

0.00

0.00

0.00

5/8"

-4.00

16.00

0.00

0.00

0.00

0.00

7/16"

-3.50

11.31

0.00

0.00

0.00

0.00

5/16"

-3.00

8.00

0.00

0.00

0.00

0.00

3.5

-2.50

5.66

0.35

0.11

0.35

0.11

4

-2.25

4.76

0.76

0.24

1.11

0.35

5

-2.00

4.00

1.12

0.36

2.23

0.71

7

-1.50

2.83

5.23

1.66

7.46

2.37

10

-1.00

2.00

13.20

4.19

20.66

6.56

14

-0.50

1.41

16.57

5.27

37.23

11.83

18

0.00

1.00

22.41

7.12

59.64

18.95

25

0.50

0.71

23.61

7.50

83.25

26.45

35

1.00

0.50

30.22

9.60

113.47

36.06

45

1.50

0.35

47.95

15.24

161.42

51.29

60

2.00

0.25

64.21

20.40

225.63

71.70

80

2.50

0.18

35.46

11.27

261.09

82.96

120

3.00

0.13

16.63

5.28

277.72

88.25

170

3.50

0.09

8.24

2.62

285.96

90.87

200

3.75

0.07

3.11

0.99

289.07

91.86

230

4.00

0.06

2.16

0.69

291.23

92.54

Phi 5

Phi 16

Phi 25

Phi 50

Phi 75

Phi 84

Phi 95

2.60

2.15

1.46

0.40

-0.21

-1.19

Moment

Mean Phi

Mean mm

Sorting

Skewness

Kurtosis

Statistics

1.11

0.46

1.25

-0.44

2.79

GRANULARMETRIC REPORT LOVERS KEY.GPJ FL DEP ROSS.GDT 1/7/21

7.0 Penetrometer Reports



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-1-1

Date 10/06/2020

Top of Hole Elevation -36.1'

Coordinate System
Latitude / Longitude

Start Time 11:05:36

End Time 11:37:55

Penetration 20.0'

Latitude 26.385157

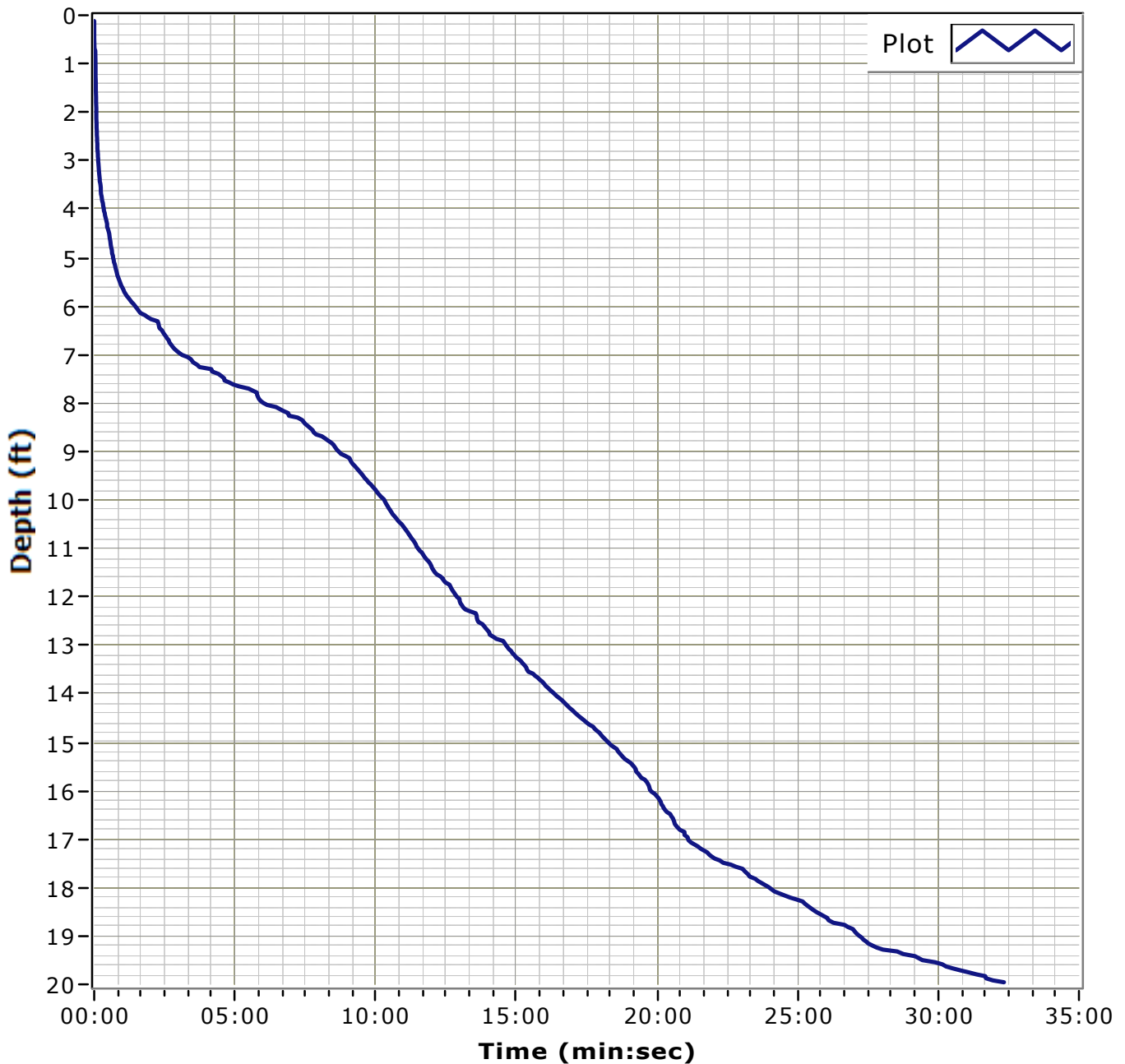
Total Time 00:32:19

Recovery 16.6'

Longitude -82.371143

Time to Penetrate Last Foot 00:05:12

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-1-2

Date 10/06/2020

Top of Hole Elevation -34.5'

Coordinate System

Latitude / Longitude

Start Time 14:11:03

End Time 15:00:20

Penetration 17.8'

Latitude 26.381090

Total Time 00:49:16

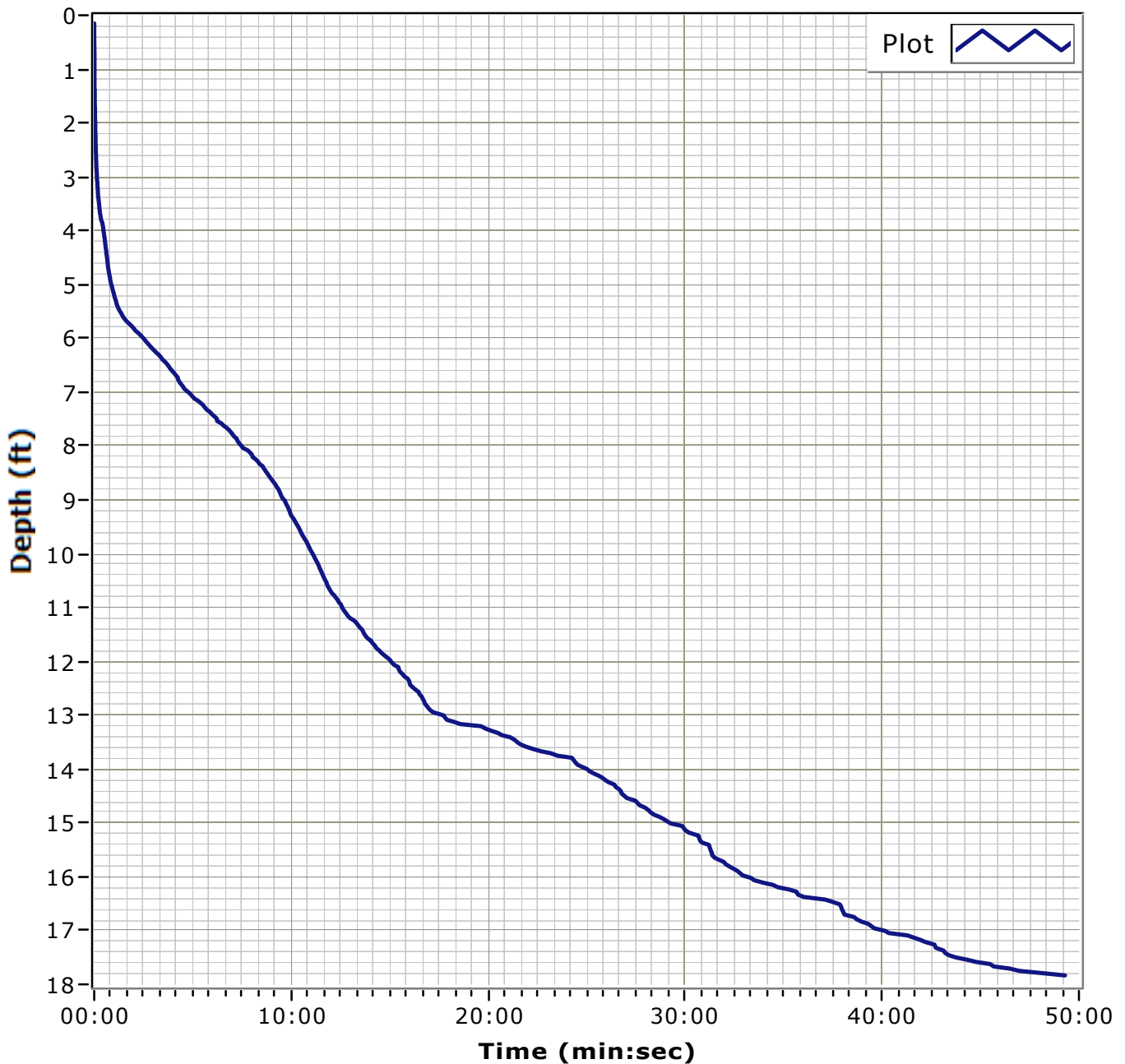
Recovery 15.1'

Longitude -82.366967

Time to Penetrate 00:10:18

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-1-3

Date 10/06/2020

Top of Hole Elevation -31.6'

Coordinate System

Latitude / Longitude

Start Time 15:57:10

End Time 16:42:06

Penetration 19.2'

Latitude 26.377048

Total Time 00:44:56

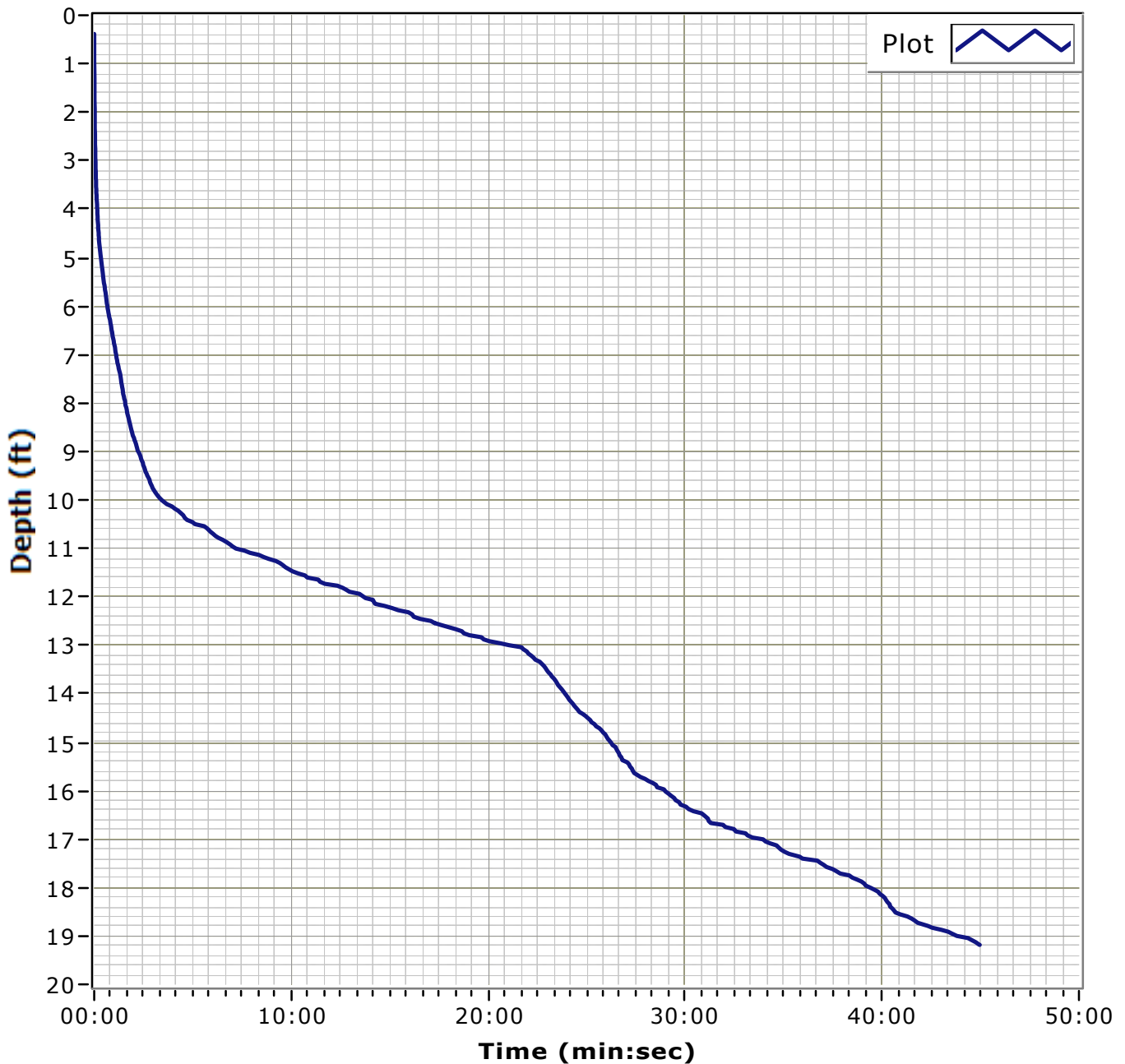
Recovery 15'

Longitude -82.362837

Time to Penetrate 00:04:53

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-2-1

Date 10/06/2020

Top of Hole Elevation -37.2'

Coordinate System

Latitude / Longitude

Start Time 18:05:18

End Time 18:08:22

Penetration 7.0'

Latitude 26.372222

Total Time 00:03:04

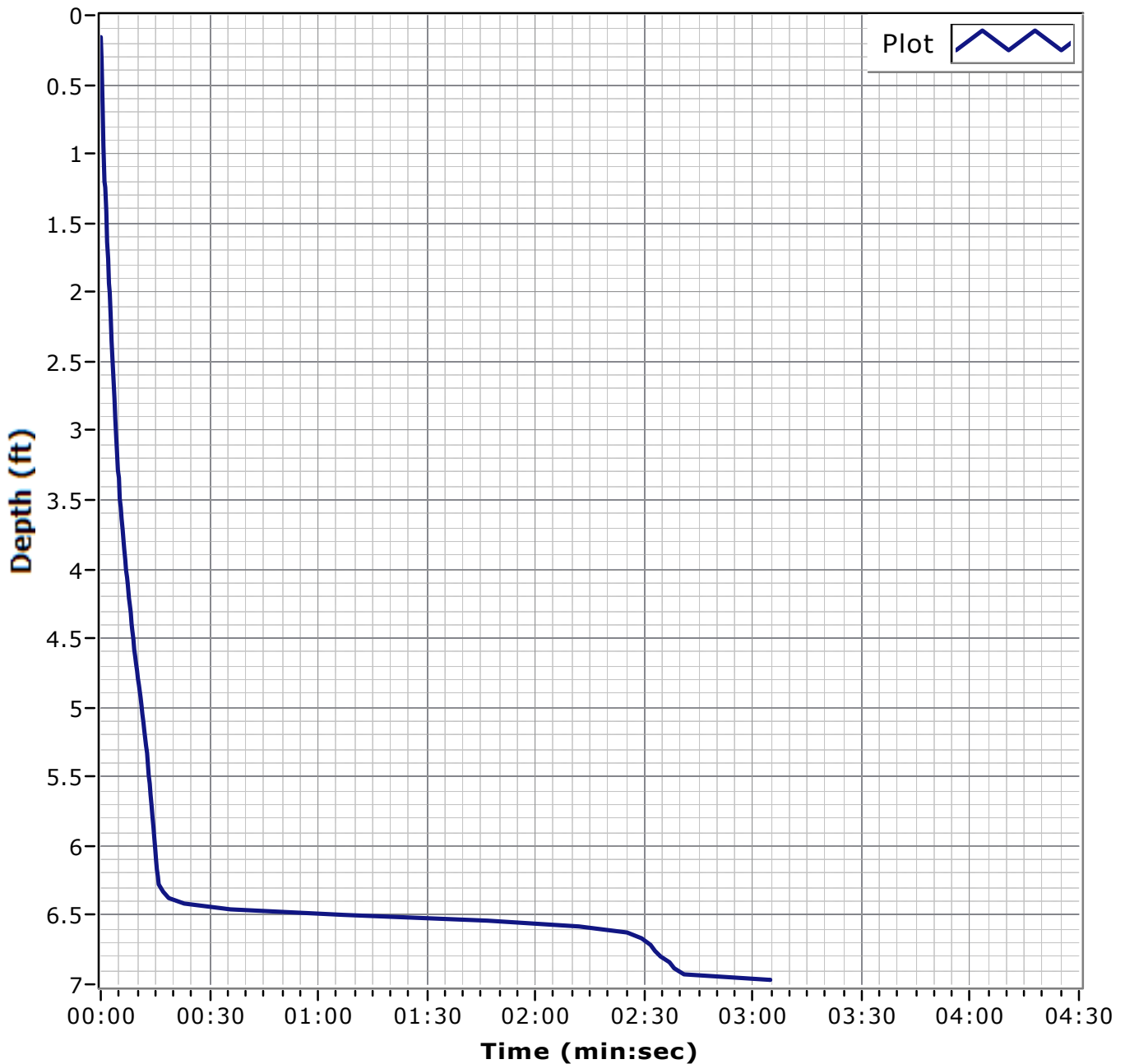
Recovery 6.3'

Longitude -82.239350

Time to Penetrate 00:02:49

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-2-2

Date 10/06/2020

Coordinate System

Latitude / Longitude

Start Time 18:45:17

End Time 18:46:59

Top of Hole Elevation -34.7'

Penetration 10.2'

Latitude 26.366734

Total Time 00:01:41

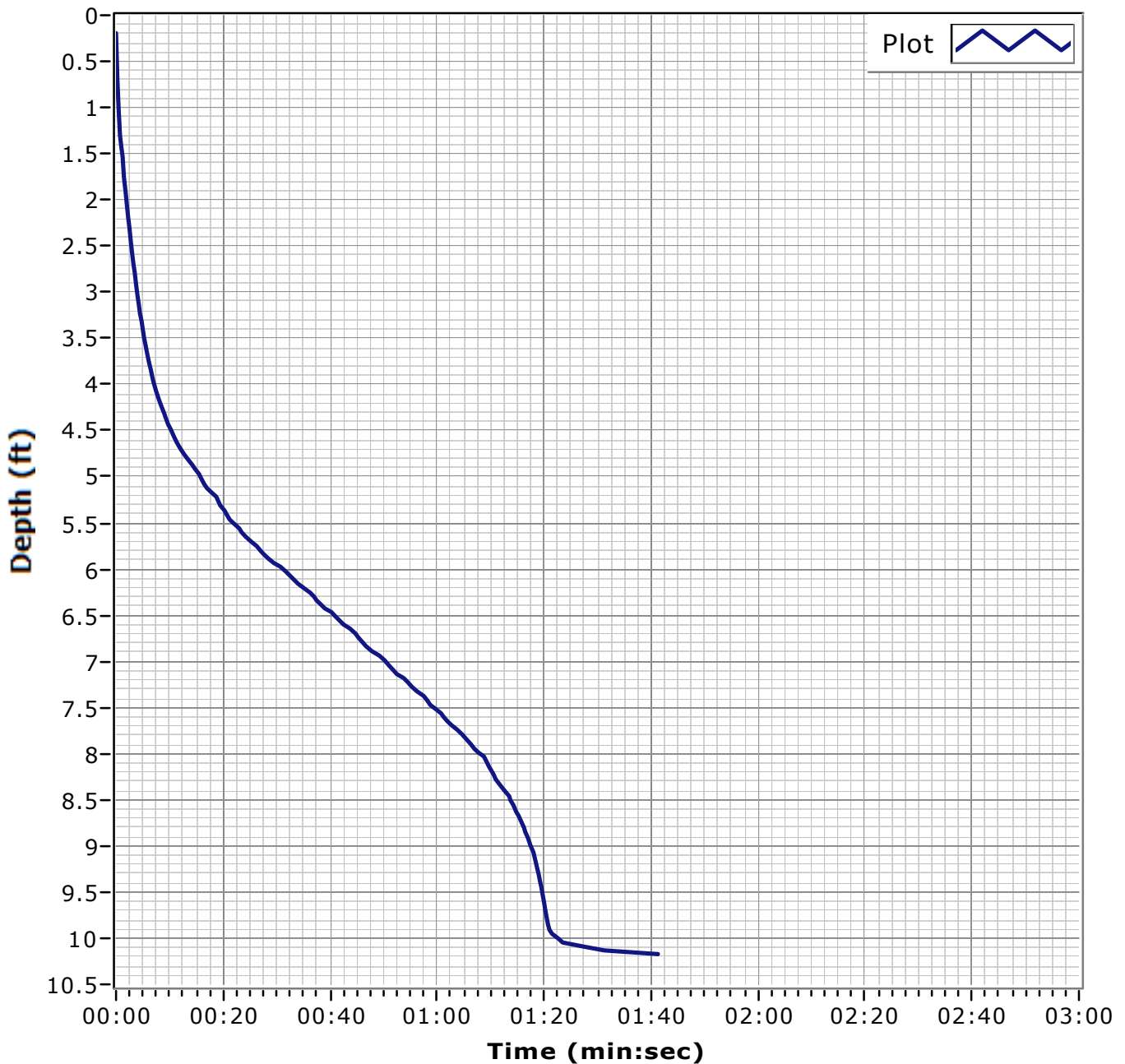
Recovery 8.6'

Longitude -82.232932

Time to Penetrate 00:00:22

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-2-3

Date 10/06/2020

Top of Hole Elevation -37.4'

Coordinate System

Latitude / Longitude

Start Time 19:02:31

End Time 19:04:09

Penetration 5.6'

Latitude 26.358948

Total Time 00:01:38

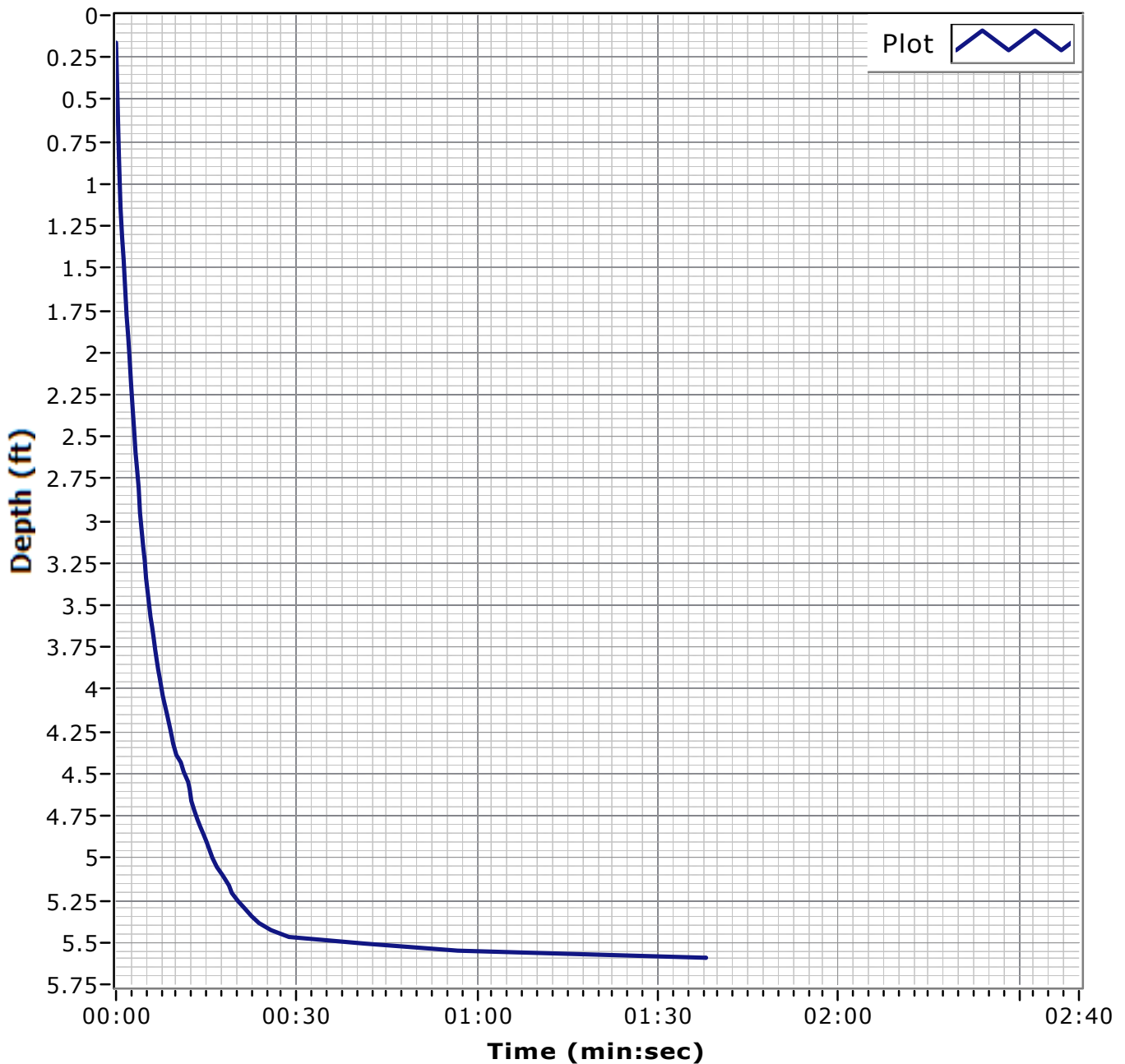
Recovery 6.7'

Longitude -82.228266

Time to Penetrate 00:01:25

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-2-4

Date 10/07/2020

Top of Hole Elevation -36.8'

Coordinate System

Latitude / Longitude

Start Time 12:42:22

End Time 12:45:23

Penetration 7.1'

Latitude 26.364542

Total Time 00:03:00

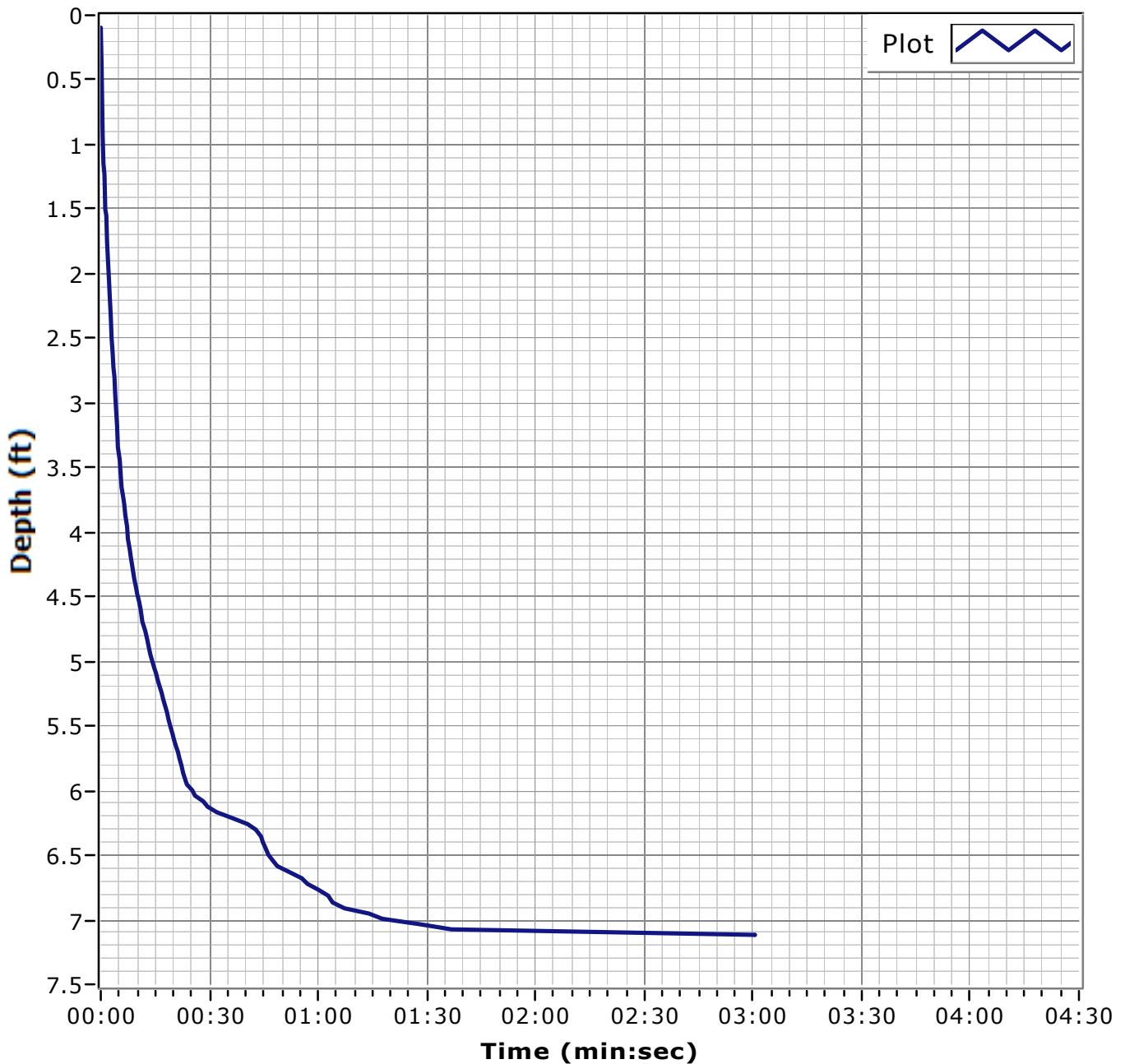
Recovery 6'

Longitude -82.226024

Time to Penetrate 00:02:31

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-4-1

Date 10/05/2020

Top of Hole Elevation -40.1'

Coordinate System

Latitude / Longitude

Start Time 10:52:18

End Time 10:53:46

Penetration 20.0'

Latitude 26.306300

Total Time 00:01:28

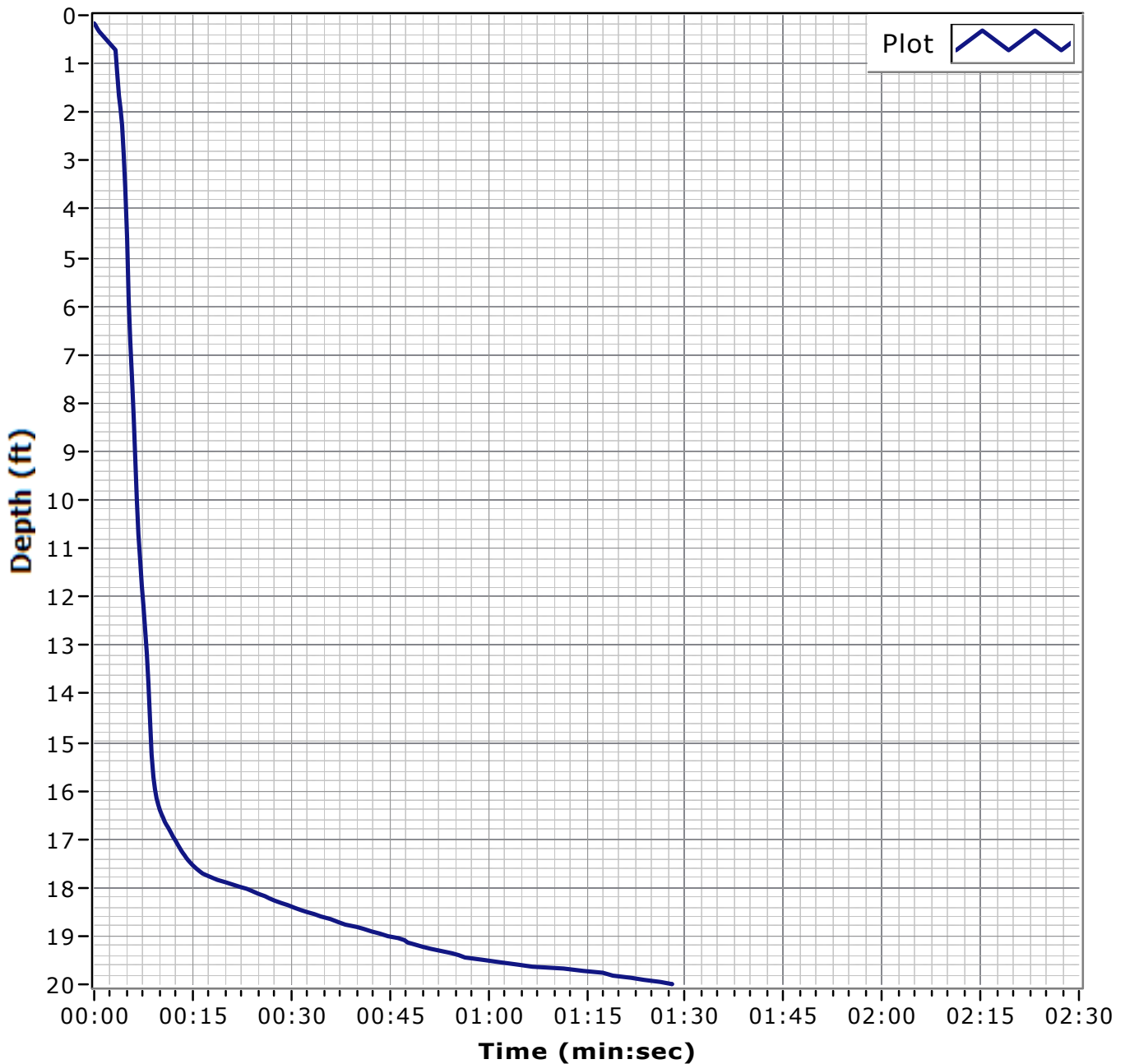
Recovery 16'

Longitude -82.017600

Time to Penetrate 00:00:43

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-4-4

Date 10/05/2020

Top of Hole Elevation -33.0'

Coordinate System

Latitude / Longitude

Start Time 10:22:07

End Time 10:24:15

Penetration 15.8'

Latitude 26.315406

Total Time 00:02:07

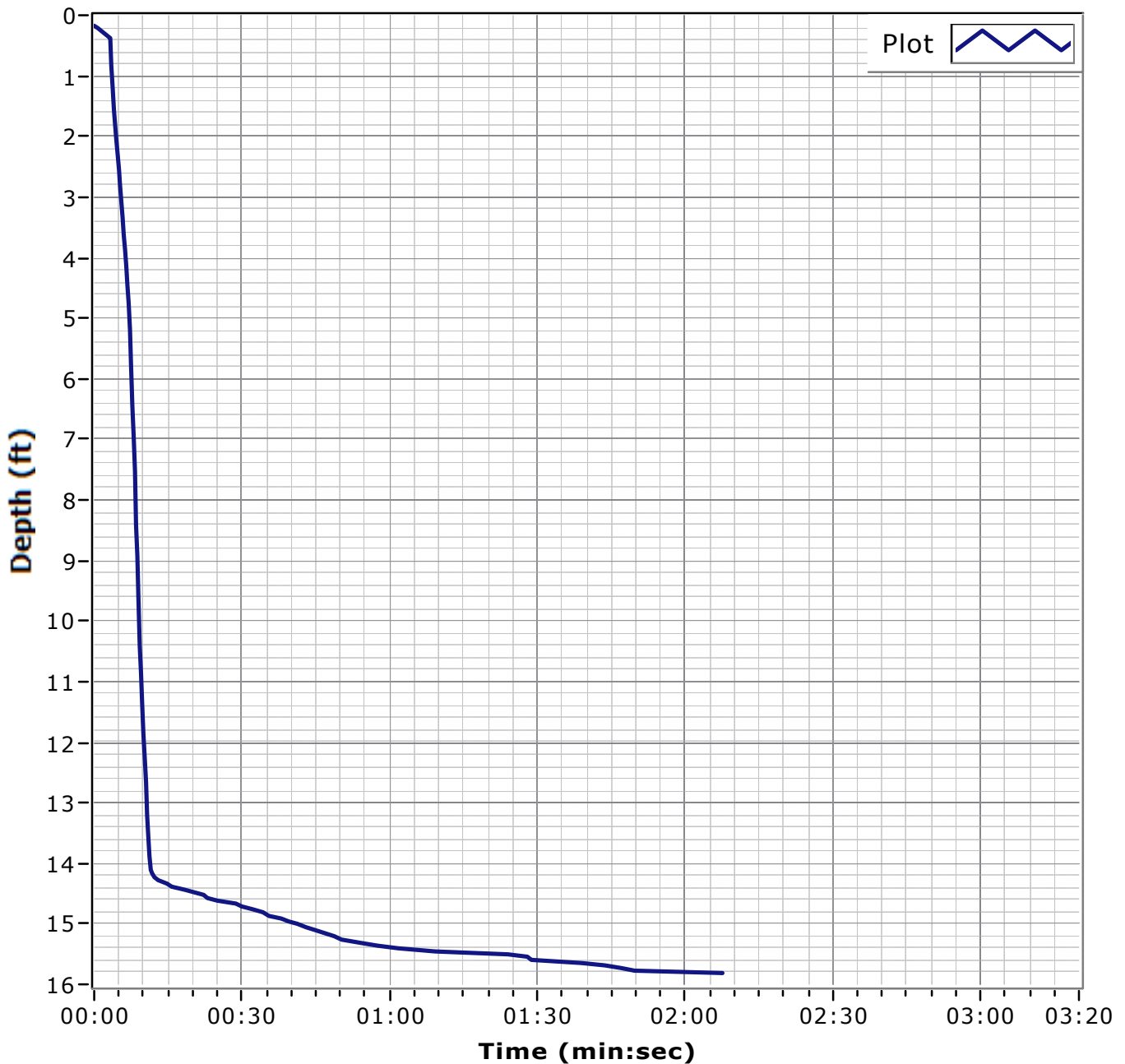
Recovery 14.5'

Longitude -81.997816

Time to Penetrate 00:01:33

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-5-1

Date 10/05/2020

Top of Hole Elevation -15.0'

Coordinate System

Latitude / Longitude

Start Time 08:42:29

End Time 08:42:48

Penetration 20.0'

Latitude 26.416743

Total Time 00:00:19

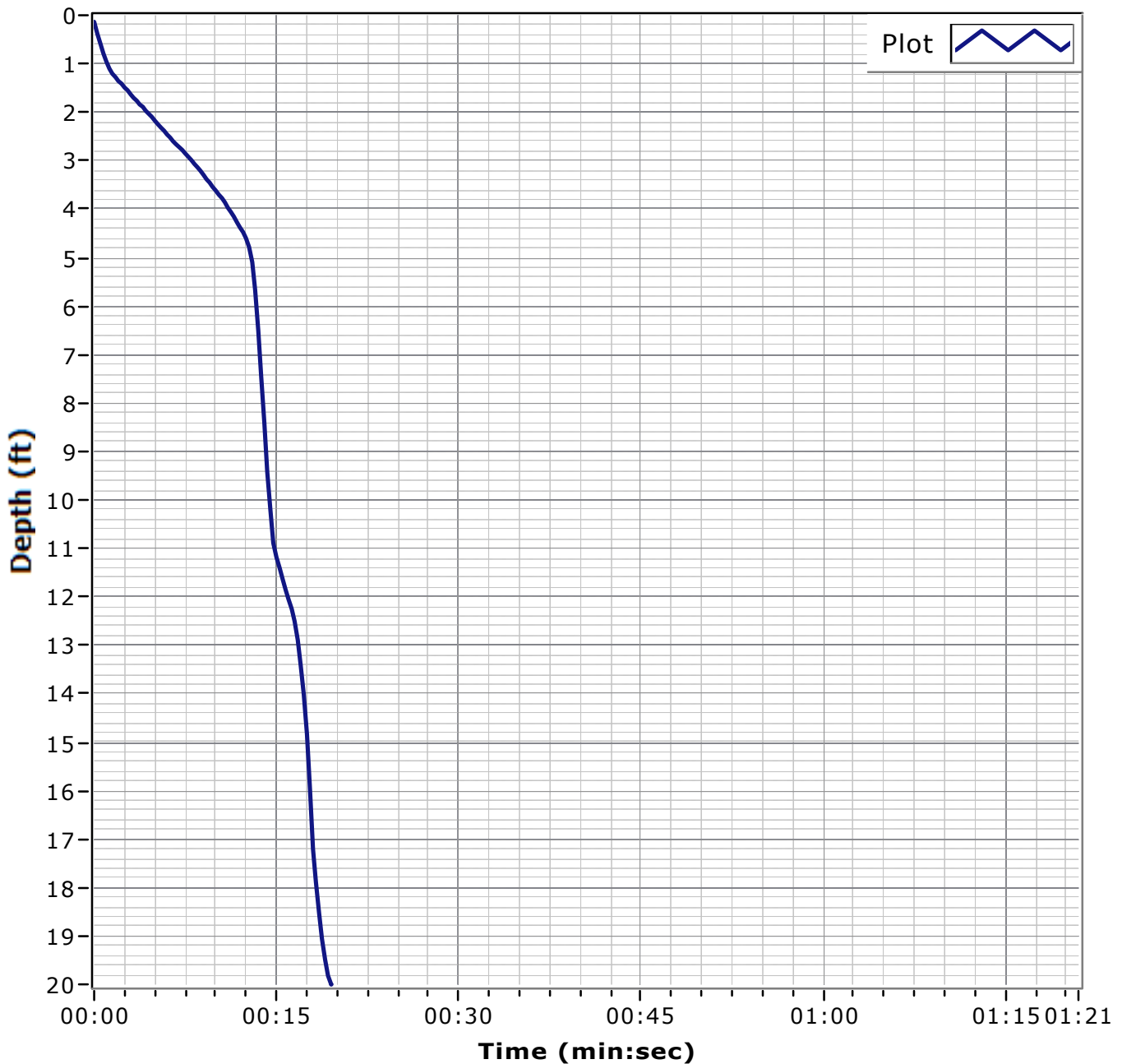
Recovery 11.4'

Longitude -81.979771

Time to Penetrate 00:00:00

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-5-3

Date 10/05/2020

Coordinate System

Latitude / Longitude

Start Time 15:19:50

End Time 15:20:55

Total Time 00:01:05

Top of Hole Elevation -16.8'

Penetration 20.0'

Recovery 15.1'

Latitude 26.410864

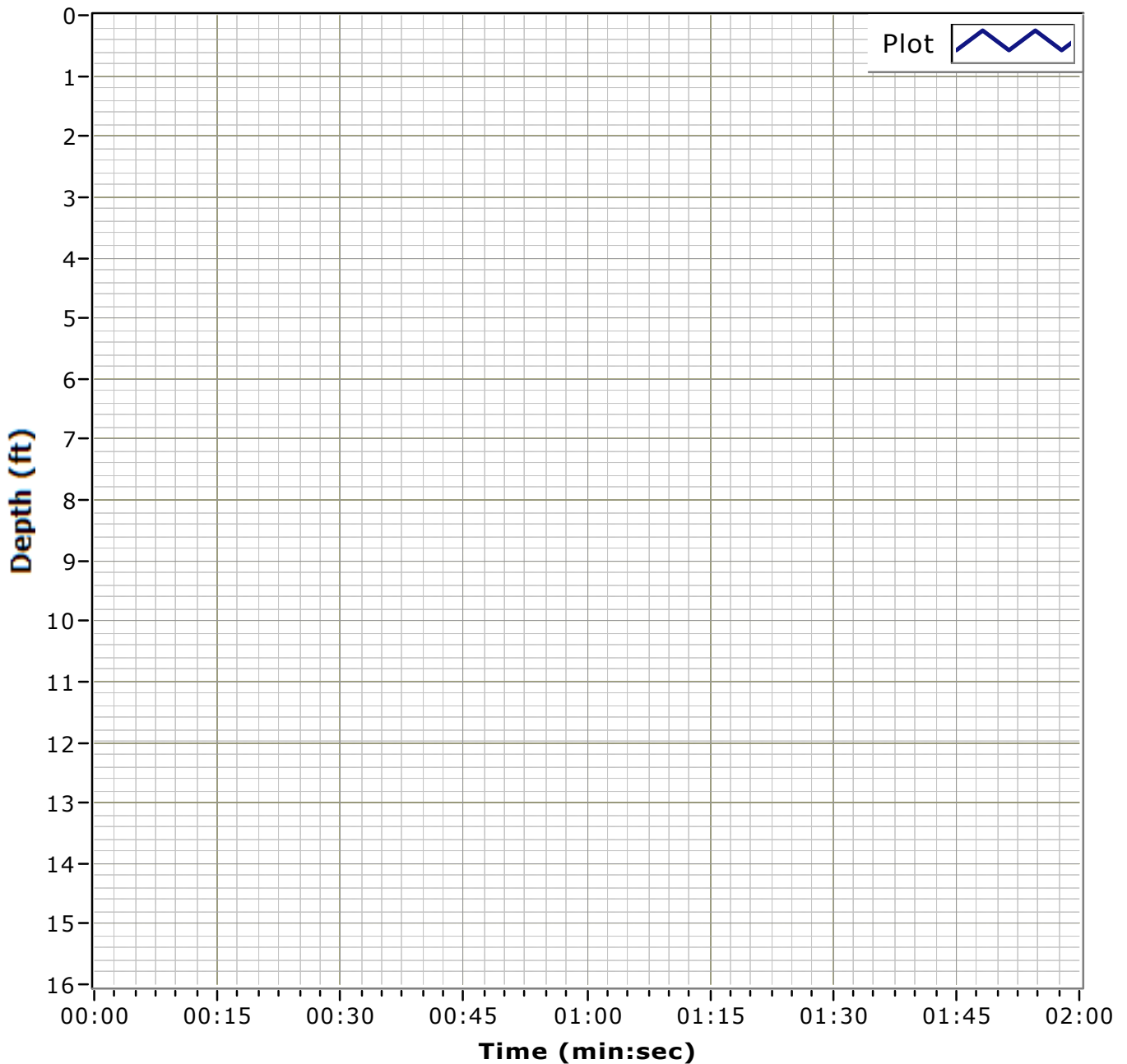
Longitude -81.972302

Time to Penetrate 00:00:48

Last Foot

Comments

Problems with graph display



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-6-1

Date 10/05/2020

Top of Hole Elevation -30.3'

Coordinate System

Latitude / Longitude

Start Time 14:00:38

End Time 14:01:12

Penetration 5.9'

Latitude 26.403439

Total Time 00:00:34

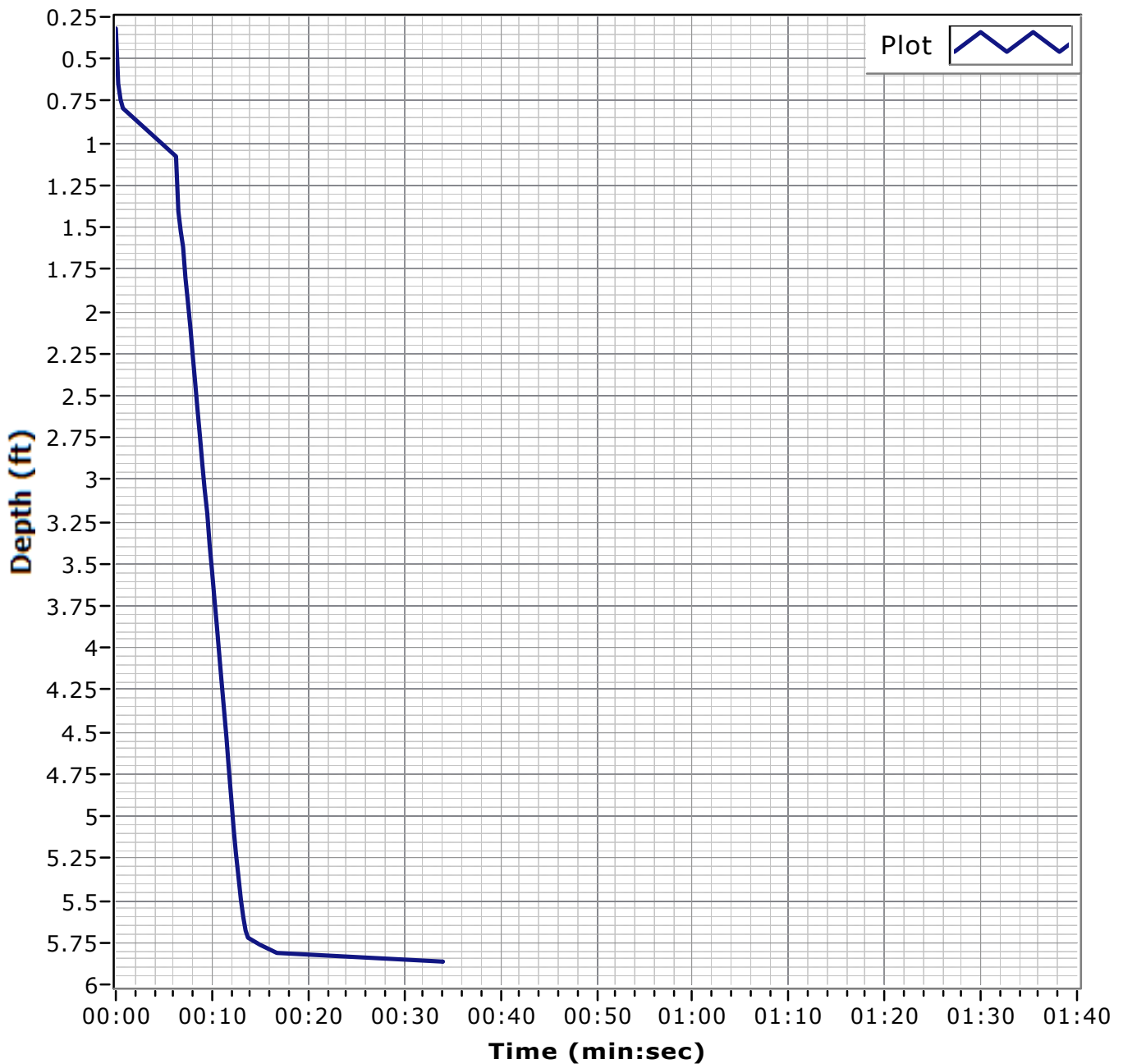
Recovery 5.1'

Longitude -82.197289

Time to Penetrate 00:00:22

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-6-2

Date 10/05/2020

Top of Hole Elevation -28.6'

Coordinate System

Latitude / Longitude

Start Time 14:43:02

End Time 14:44:22

Penetration 7.2'

Latitude 26.399234

Total Time 00:01:19

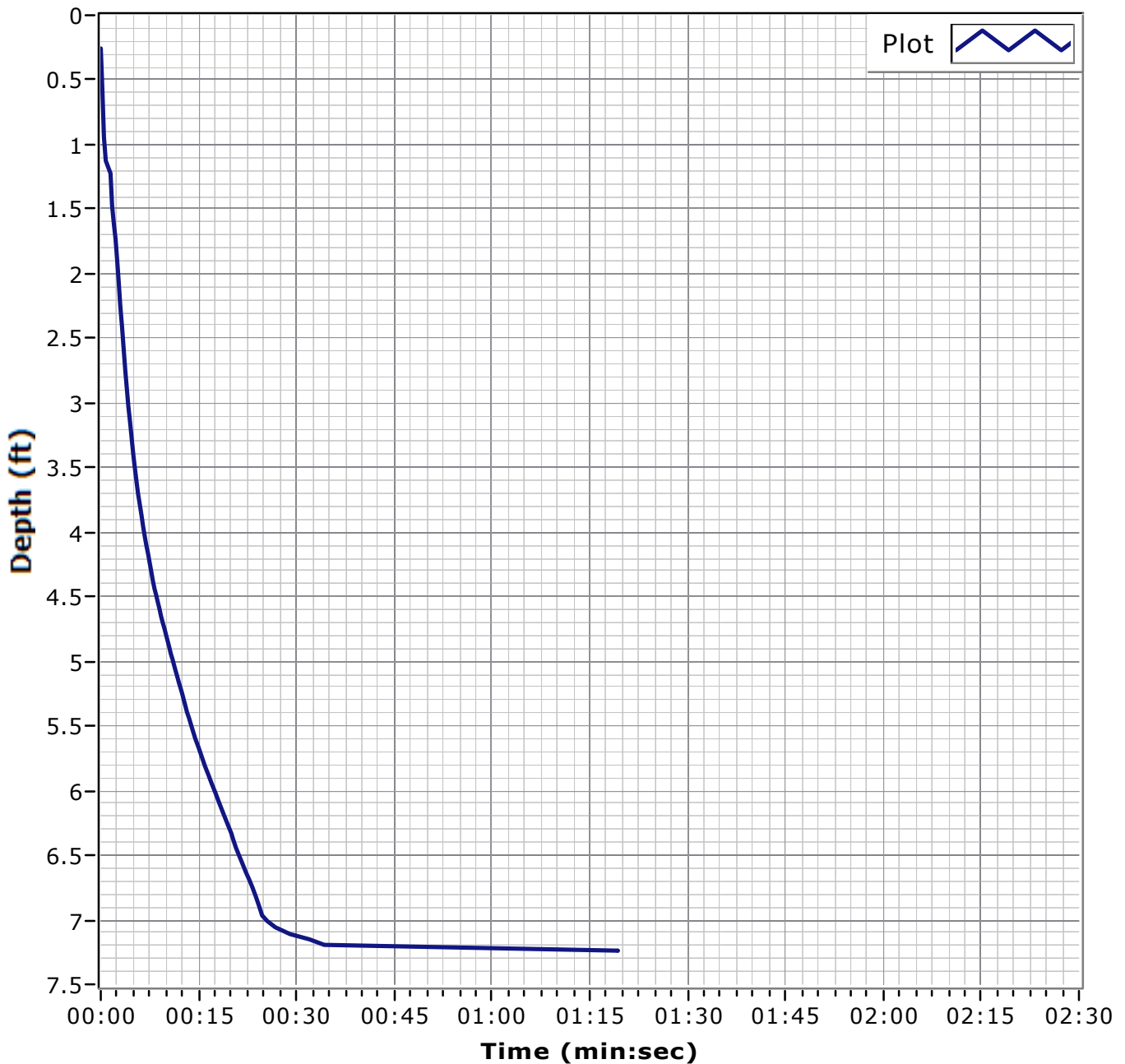
Recovery 6'

Longitude -82.193346

Time to Penetrate 00:00:59

Last Foot

Comments



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-6-3

Date 10/05/2020

Top of Hole Elevation -31.5'

Coordinate System

Latitude / Longitude

Start Time 13:38:22

End Time 13:38:52

Penetration 11.0'

Latitude 26.397616

Total Time 00:00:30

Recovery 6.0'

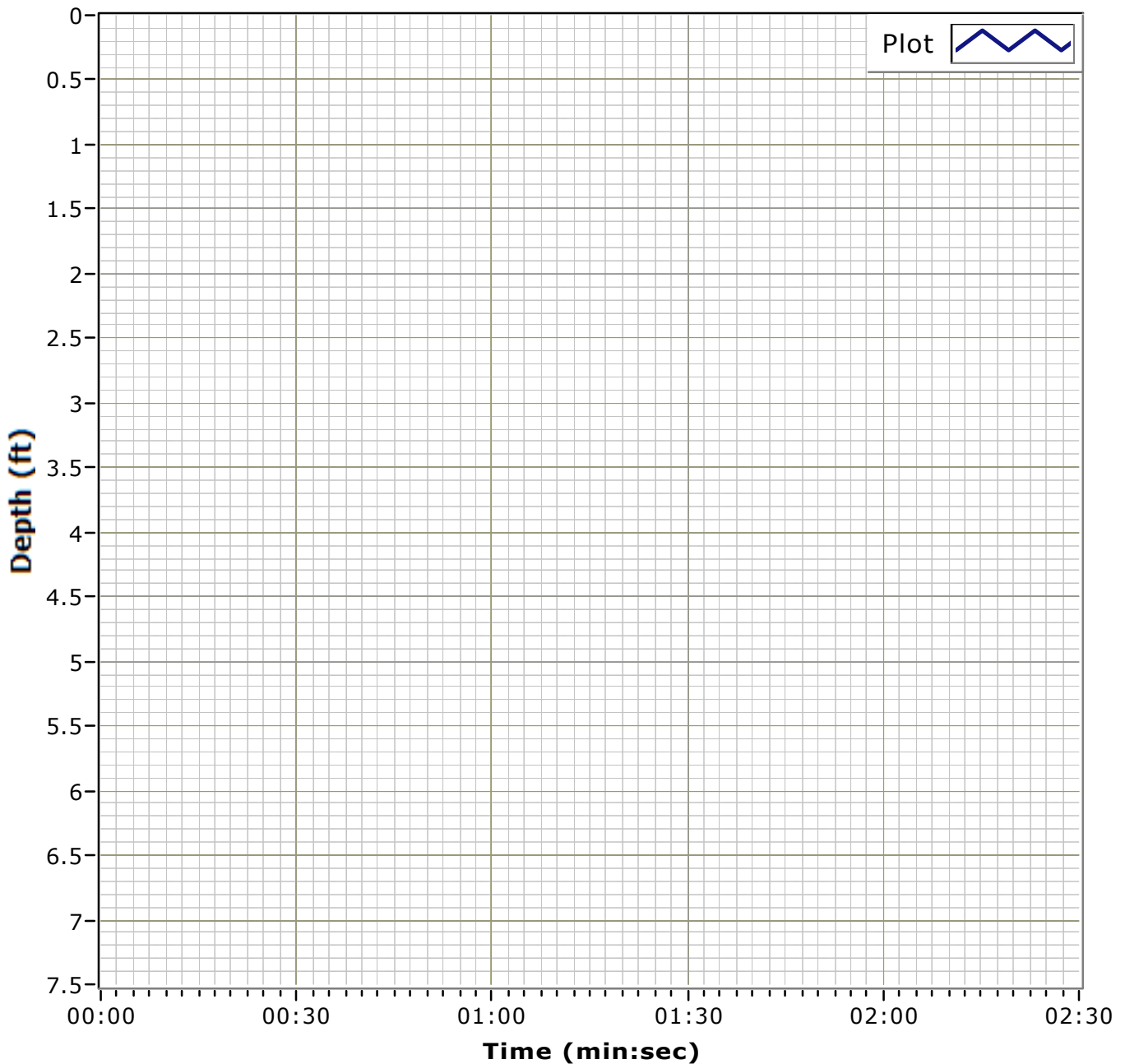
Longitude -82.190828

Time to Penetrate 00:00:00

Last Foot

Comments

Problems with graph display



Project

Lovers Key
Beach Nourishment Sand Search
2020



Core Identifier VC20-6-4

Date 10/05/2020

Top of Hole Elevation -29.6'

Coordinate System

Latitude / Longitude

Start Time 15:36:16

End Time 15:37:31

Penetration 6.3'

Latitude 26.403143

Total Time 00:01:15

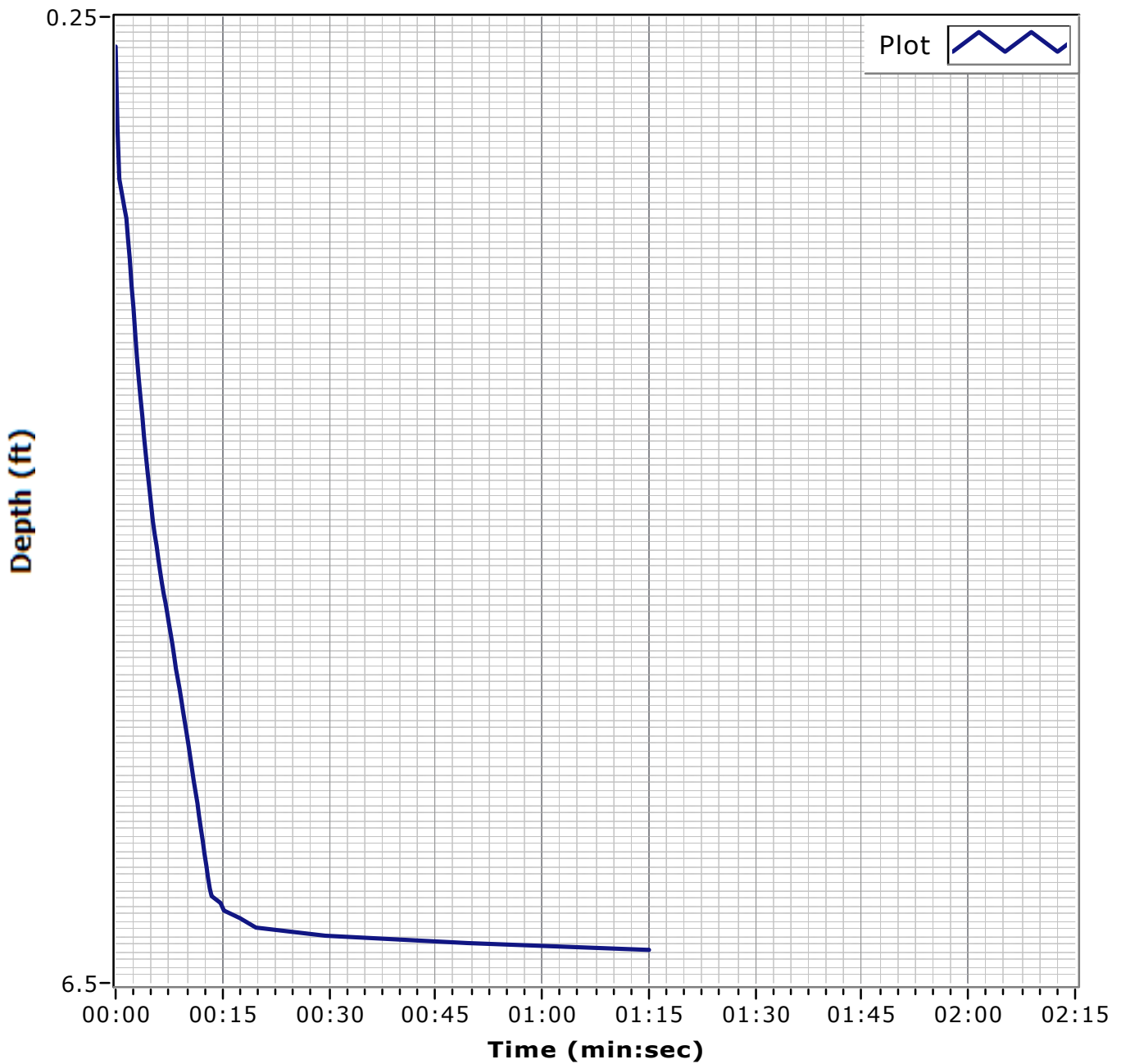
Recovery 5.4'

Longitude -82.193165

Time to Penetrate 00:01:03

Last Foot

Comments



8.0 Vibracore Photographs





Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-1-1

Top of Core
Elevation
NAVD 88
-36.1 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-1-2

Top of Core
Elevation
NAVD 88
-34.5 Ft

Scale in Tenths of Feet



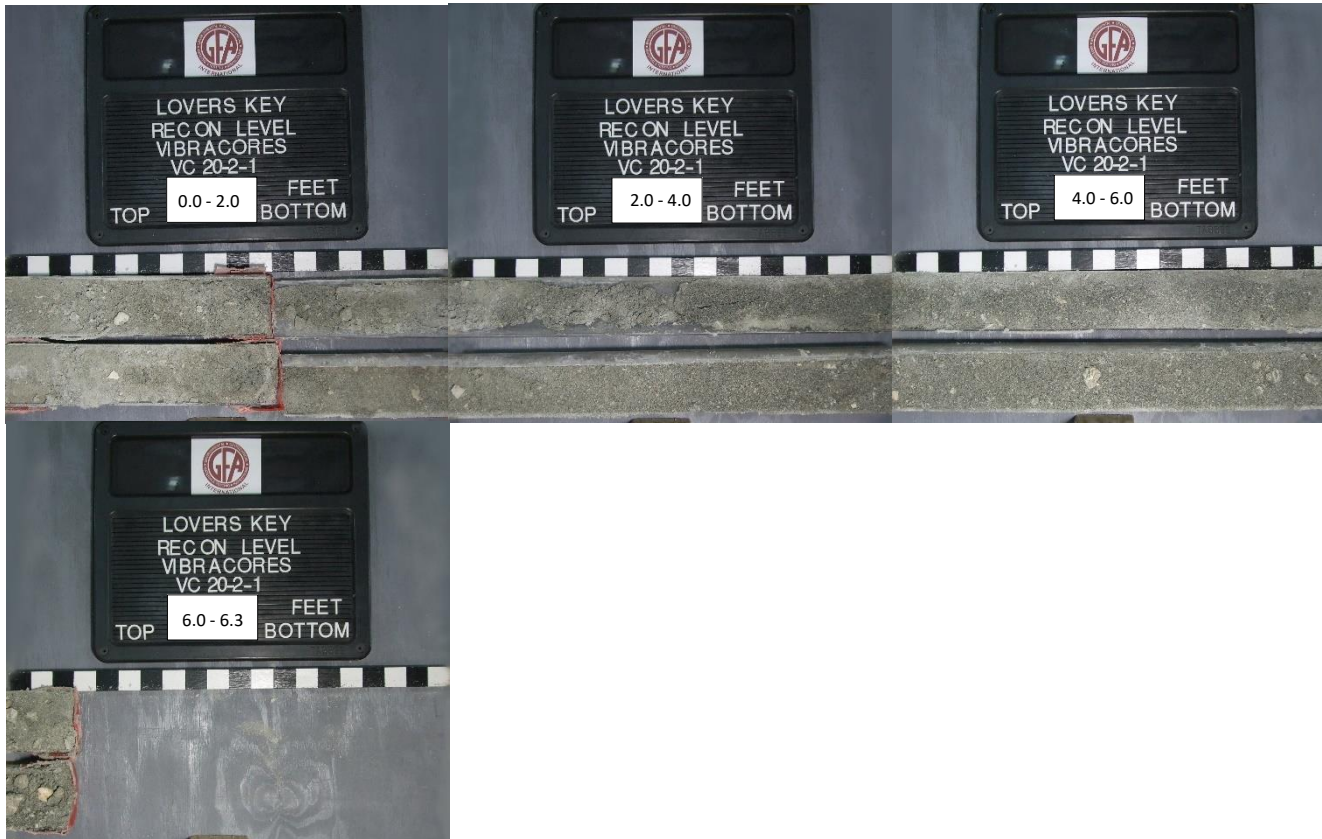
Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-1-3

Top of Core
Elevation
NAVD 88
-31.6 Ft

Scale in Tenths of Feet



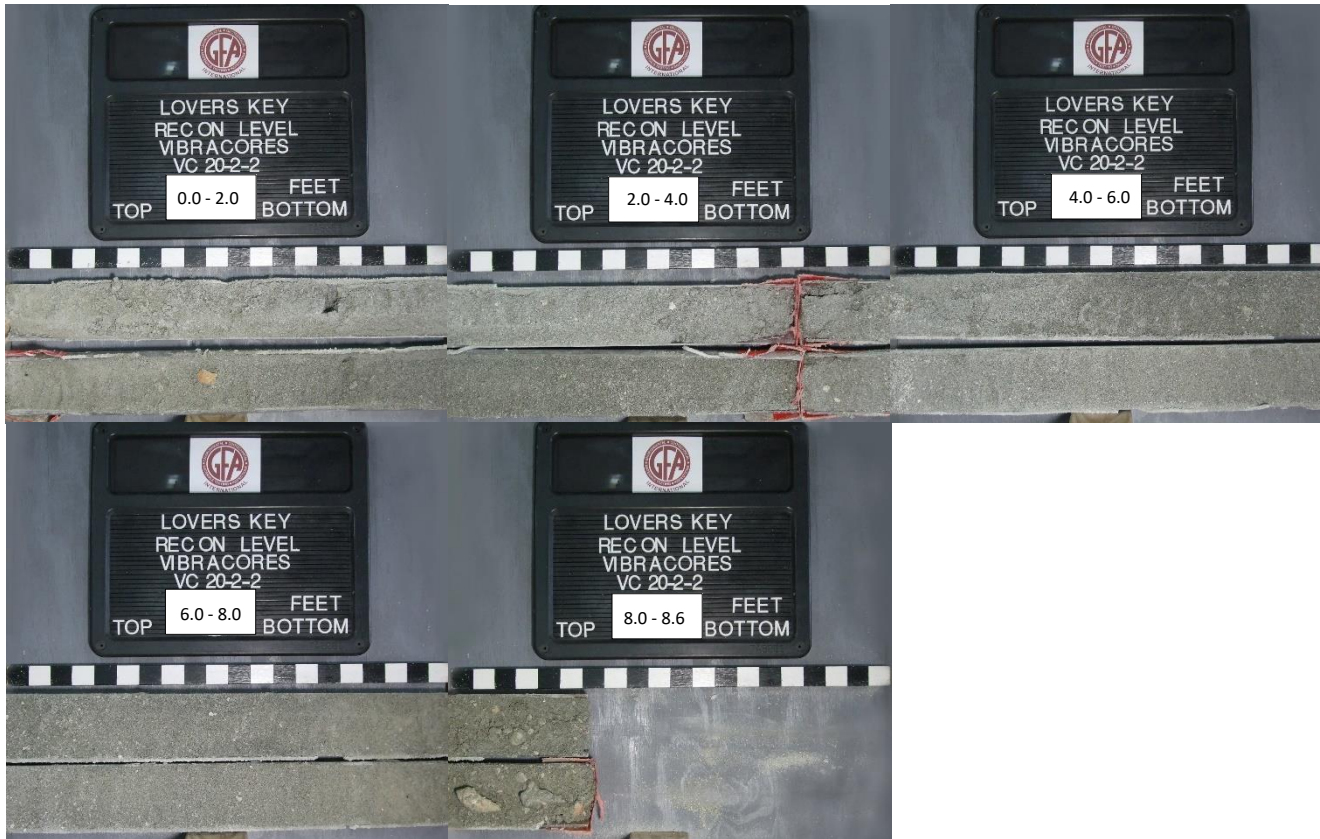
Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-2-1

Top of Core
Elevation
NAVD 88
-37.2 Ft

Scale in Tenths of Feet



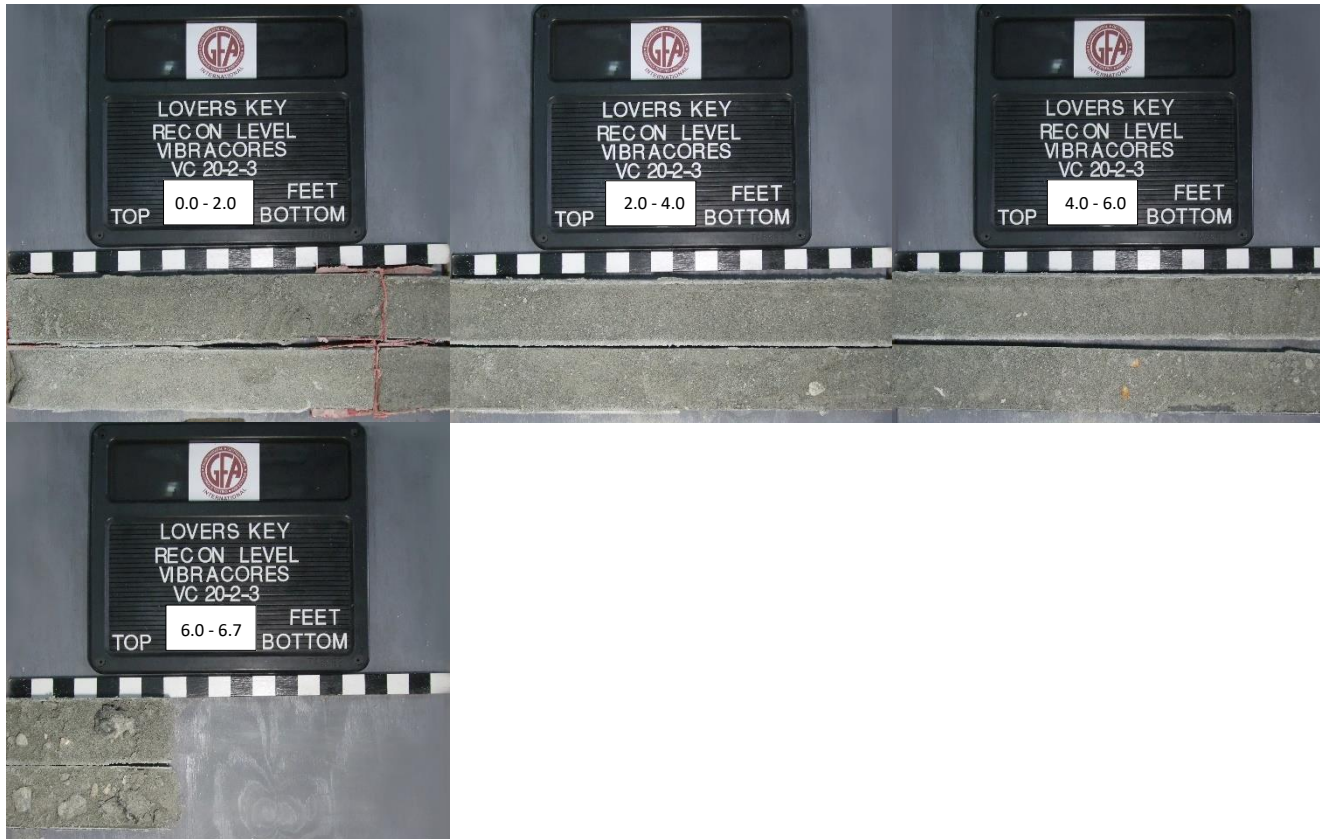
Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-2-2

Top of Core
Elevation
NAVD 88
-34.7 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-2-3

Top of Core
Elevation
NAVD 88
-37.4 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-2-4

Top of Core
Elevation
NAVD 88
-36.8 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-4-1

Top of Core
Elevation
NAVD 88
-40.1 Ft

Scale in Tenths of Feet



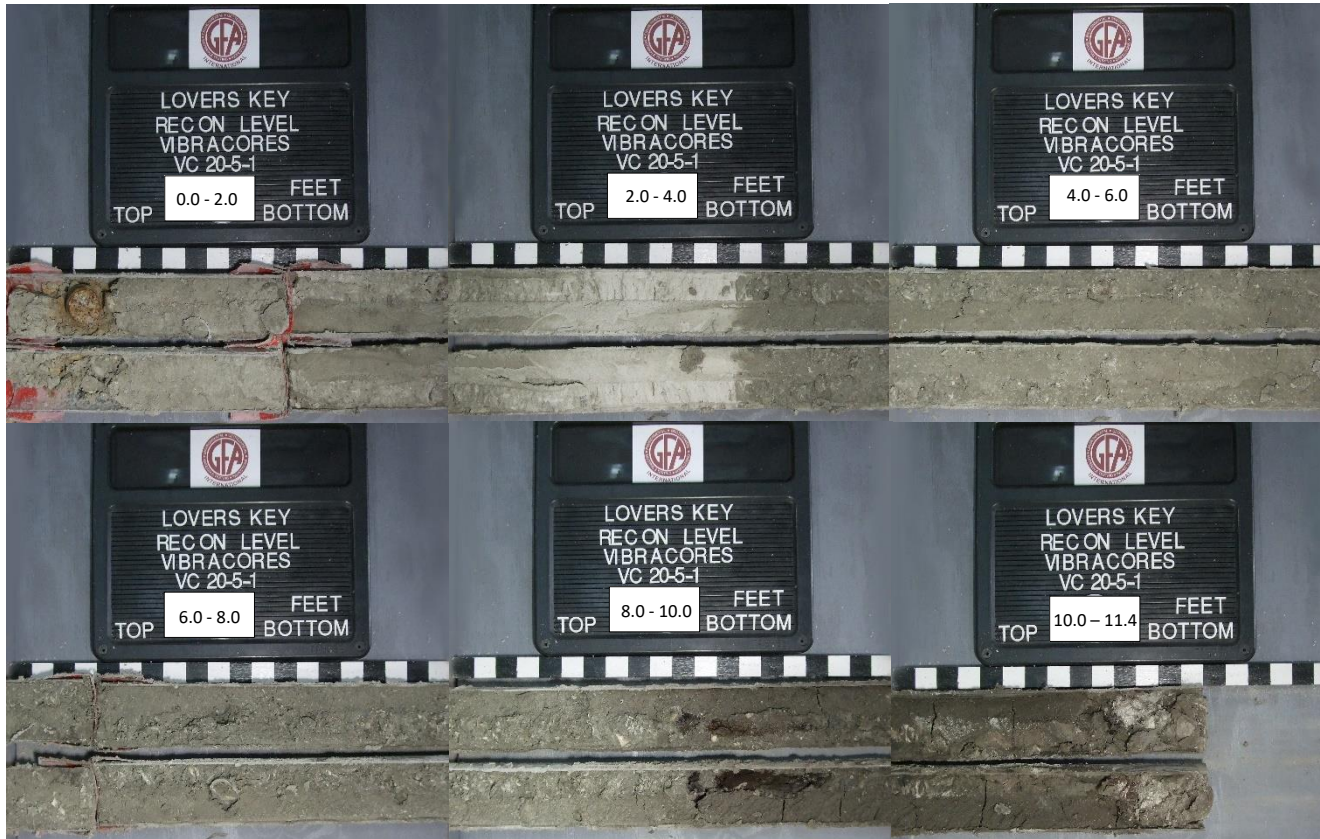
Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-4-4

Top of Core
Elevation
NAVD 88
-33.0 Ft

Scale in Tenths of Feet



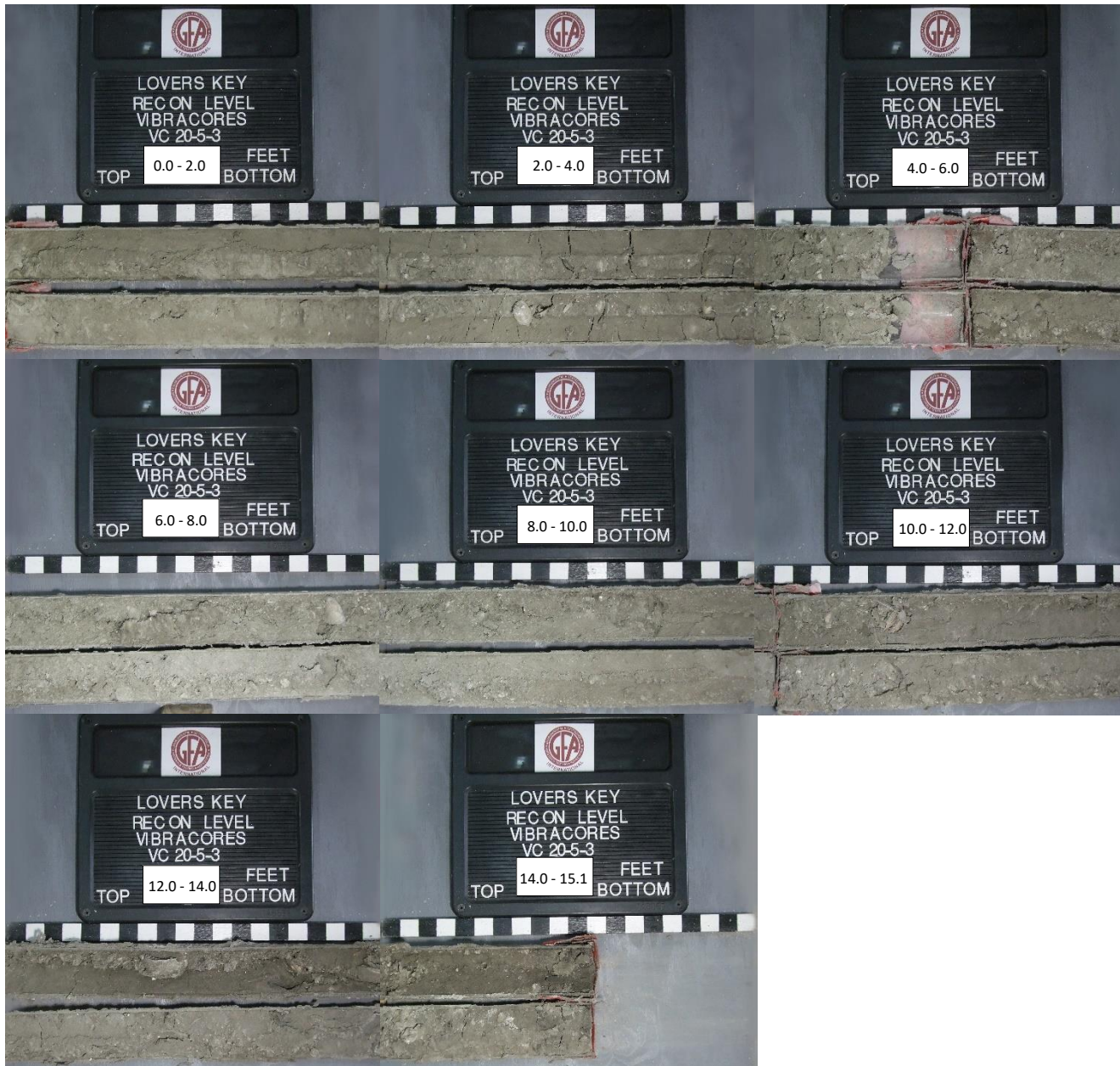
Lovers Key Beach Nourishment Sand Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-5-1

Top of Core
Elevation
NAVD 88
-15.0 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-5-3

Top of Core
Elevation
NAVD 88
-16.8 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-6-1

Top of Core
Elevation
NAVD 88
-30.3 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-6-2

Top of Core
Elevation
NAVD 88
-28.6 Ft

Scale in Tenths of Feet



Lovers Key Beach
Nourishment Sand
Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-6-3

Top of Core
Elevation
NAVD 88
-31.5 Ft

Scale in Tenths of Feet



Lovers Key Beach Nourishment Sand Search

Reconnaissance Level
Geotechnical Investigation
2020

VC20-6-4

Top of Core
Elevation
NAVD 88
-29.6 Ft

Scale in Tenths of Feet