DOC MAPPING

Depth of Cover Specialists

Utility Locating in Advance of Dredging Operations in the Sabine / Neches Waterway

A review of processes used, and lessons learned

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WEDA Gulf Coast CHAPTER

Project Overview

The Sabine–Neches Waterway

- Inland waterway approx. 45 miles long
- Approx. 30 miles offshore channel
- Currently 40’ deep
- $32 Billion in gross product
- No 1 bulk liquid cargo waterway in US
- Last deepened in 1962
- Current project deepening to 48’

Project Overview

The Project Scope

- Determine what infrastructure may be present that could impact dredging.
- Determine what needs to be removed or relocated to accommodate deepening.
- Determine if archeological resources are present in un-surveyed areas that may impact dredging.

The Process

The Steps

- Desktop Study
- Field Work / Surveys
- Data Review / Results

The Process

Step #1: Desktop Study

- Review permits and historical records
- Interface with utility companies and owners
- Utility naming conventions
- Results:
  - Approx. 150 potential utilities identified.
  - 34 utility owners
  - Liquid and gas pipelines
  - Power cables
  - Fiber optic cables
  - Abandoned in-place and removed

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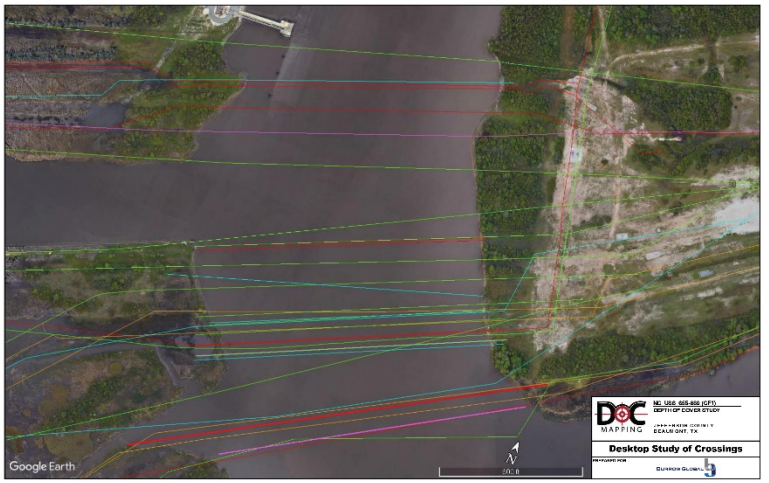


The Process

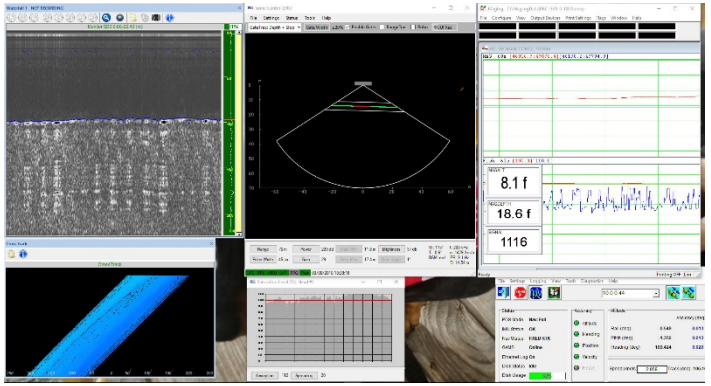
Step #2: Field Work

- Planning
  - Utility Specific Search
  - General Utility Search
  - Archeological Search
- Tools Used
  - Visual Shore Surveys
  - Multibeam Sonar
  - Electromagnetic Modeling
  - Towed Magnetometer
  - Sub-Bottom Profiler
  - Sidescan Sonar

The Process

Planning

- Utility Specific Search
  - Mapping existing utilities
    - Vis, MB Sonar, EM Locate, SBP
  - Determine status of removed / abandoned utilities
    - Vis, MB Sonar, Mag, SBP
- General Utility Search
  - Looking for utilities that didn't come up in Desktop Study
    - Vis, MB Sonar, SBP, 60Hz Locate
- Archaeology
  - Sidescan, Mag



The Tools

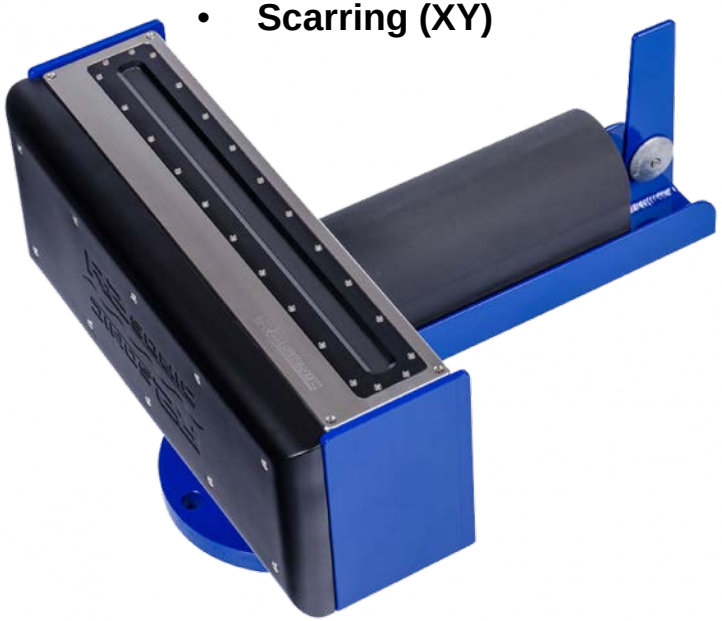
Visual Search / Shore Investigation (Vis)

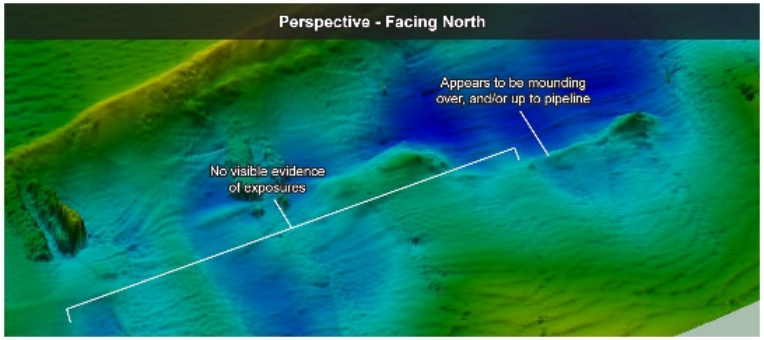
- **Search for evidence of existence of and ownership of utilities in the waterway.**

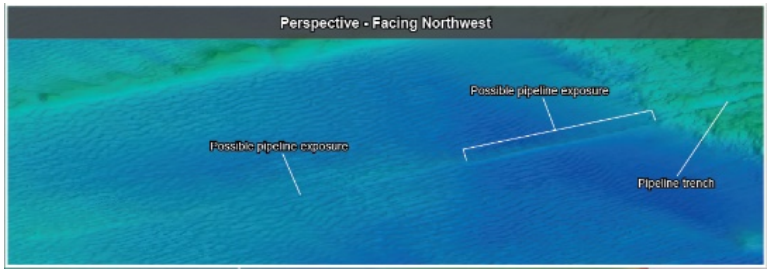
The Tools

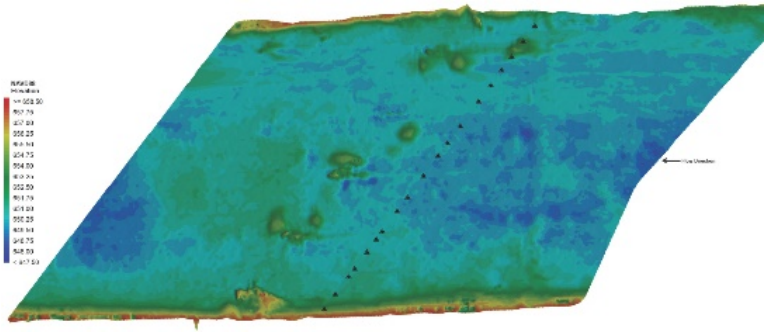
MultiBeam Sonar (MB)

- Determine channel elevation & profile
- Look for evidence of utilities
  - Exposures (XYZ)
  - Scarring (XY)









The Tools

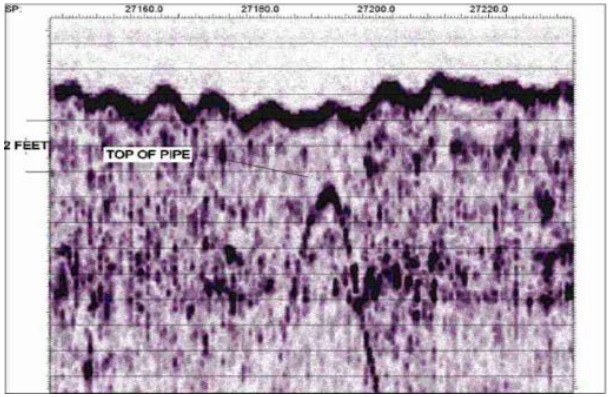
EM Locate / Modeling (EM)

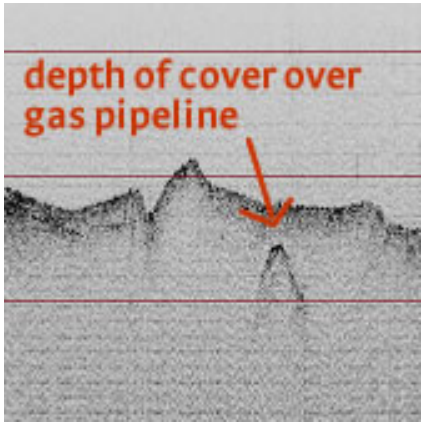
- **Determine position of utility (XYZ) using applied or intrinsic (60Hz) signal**
  - **RTK / Confidence Level / Highest Probability**

The Tools

Sub-Bottom Profiling (SBP)

- Determine position (XYZ) of utilities with no signal.
    - Non-conductive \ no physical connection.

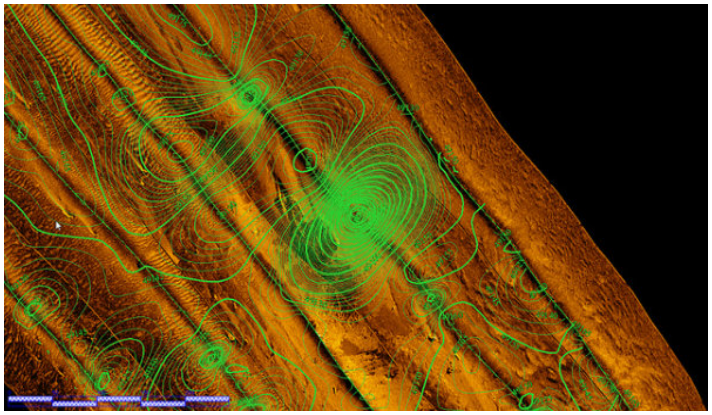


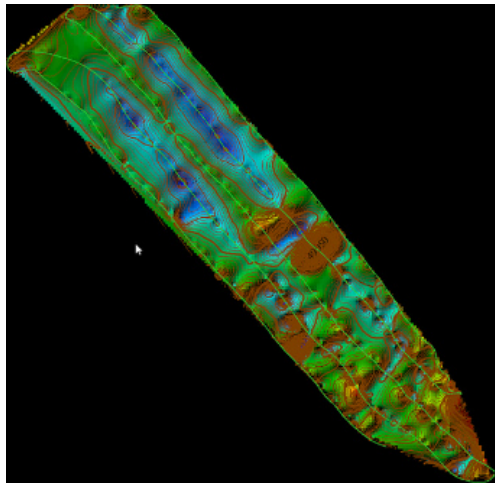


The Tools

Towed Magnetometer (Mag)

- Determine position of ferrous objects (XY)
- Determine presence of ferrous objects

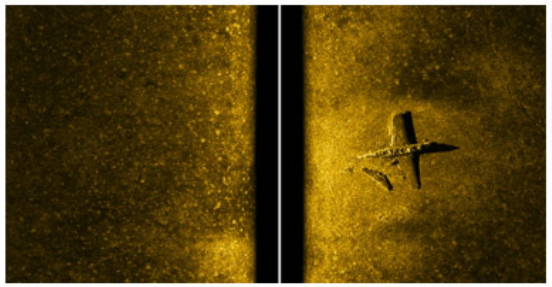


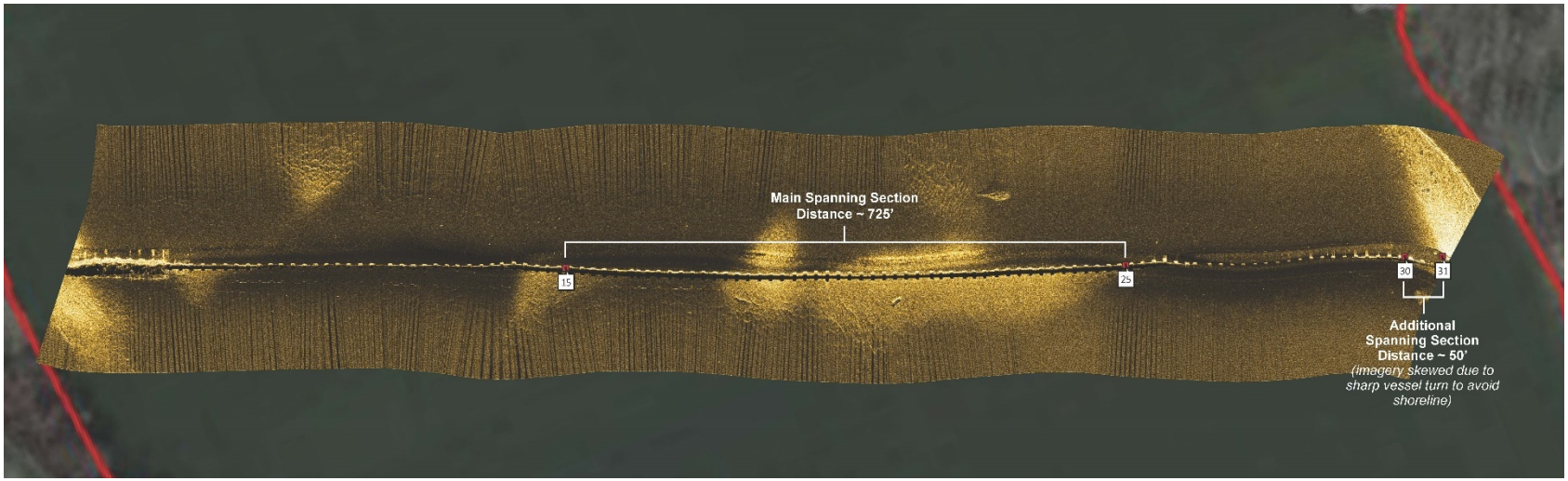


The Tools

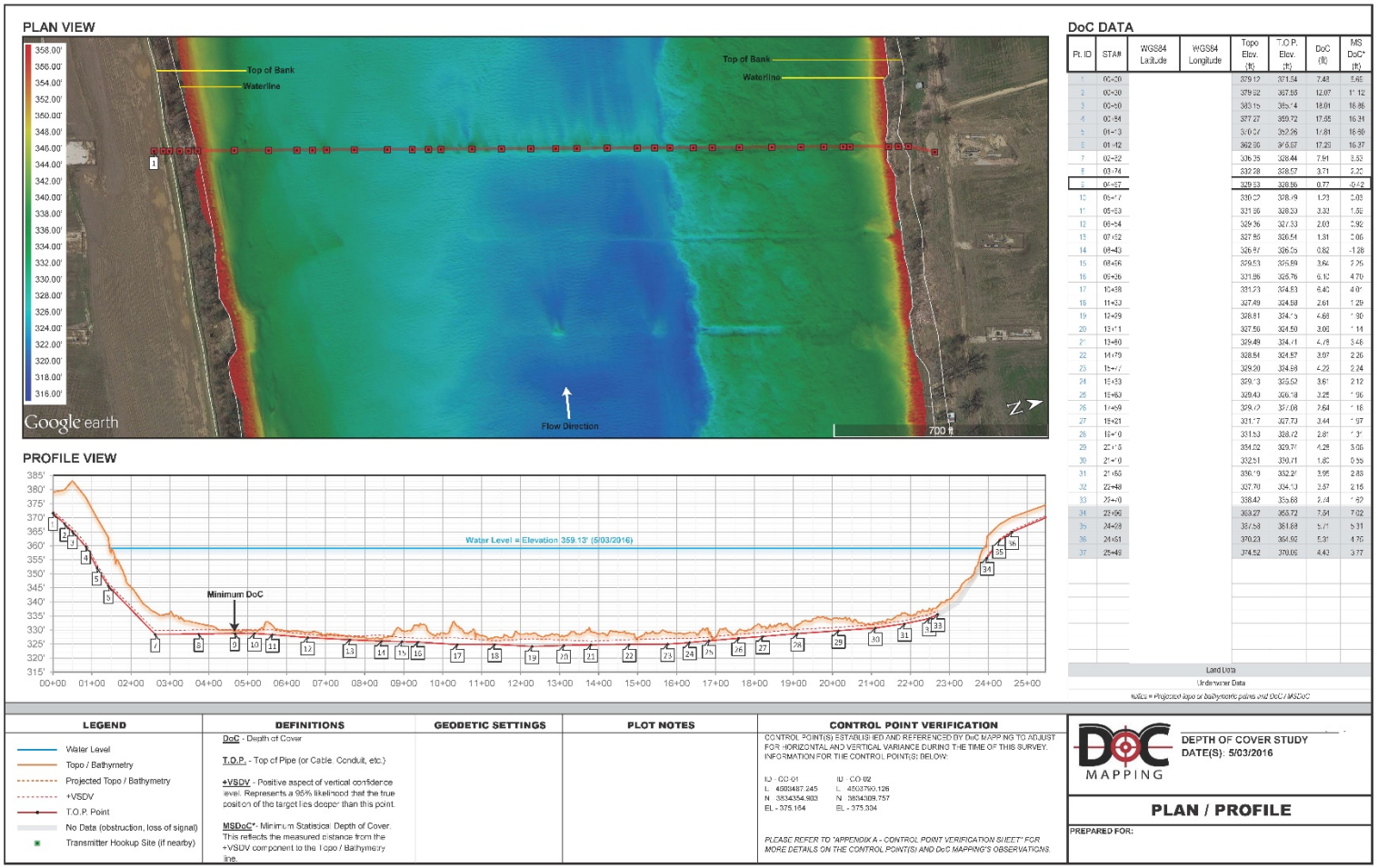
SideScan Sonar (SS)

- **Image seabed / riverbed in high detail**
- **Only used for archaeological survey**





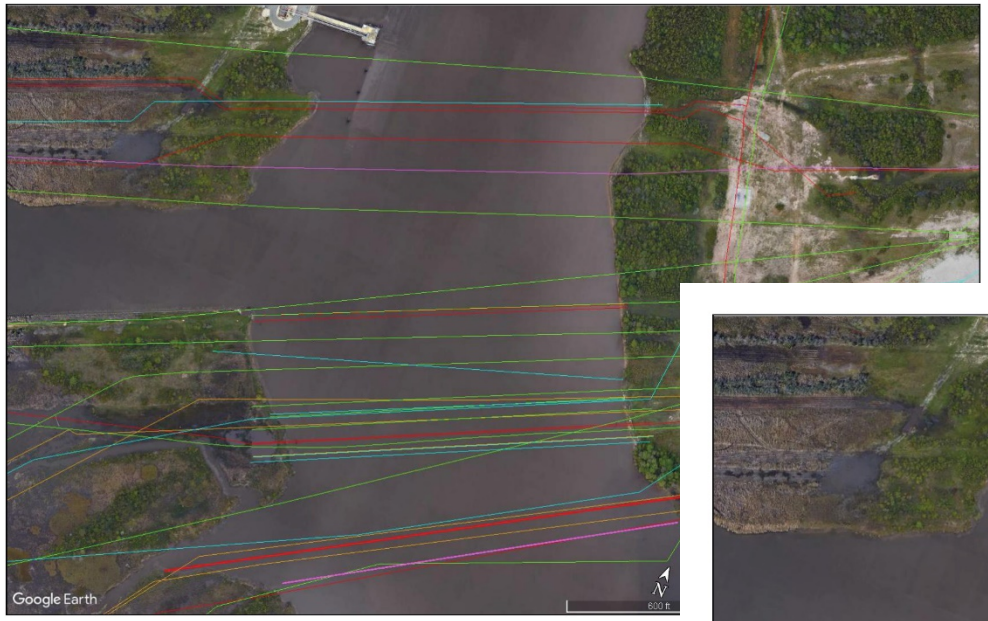
Data Review / Results

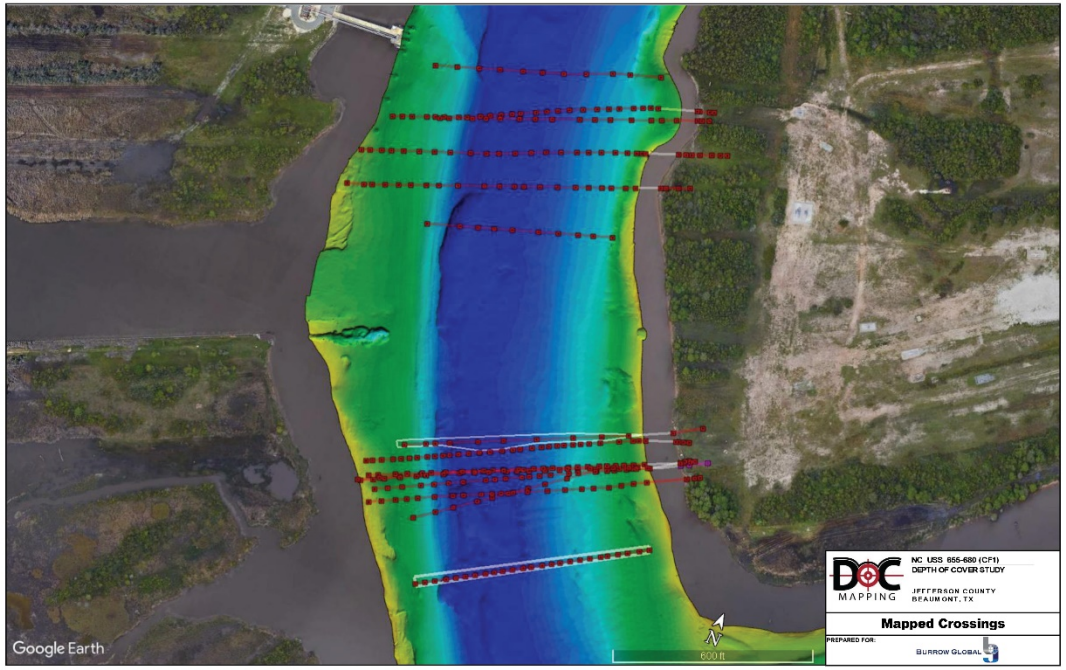


Pt. ID	STA#	WGS84 Latitude	WGS84 Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
1	00+00			379.12	371.54	7.48	5.65
2	00+20			379.92	367.85	12.07	11.12
3	00+50			383.15	365.14	18.01	16.86
4	00+84			377.27	359.72	17.55	16.34
5	01+13			370.01	352.96	17.81	16.60
6	01+42			362.96	346.67	17.29	16.37
7	02+22			336.35	328.44	7.91	5.53
8	03+74			332.28	328.57	3.71	2.20
9	04+57			329.33	328.56	0.77	-0.42
10	05+17			336.02	328.79	7.23	3.03
11	05+53			331.86	328.53	3.33	1.50
12	06+34			329.36	327.33	2.03	0.92
13	07+52			327.85	326.54	1.31	0.06
14	08+43			326.97	326.05	0.92	-1.26
15	08+96			329.53	325.89	3.64	2.25
16	09+26			331.86	325.76	6.10	4.70
17	10+38			331.23	324.83	6.40	4.97
18	11+23			327.49	324.88	2.61	1.29
19	12+29			328.81	324.13	4.68	3.30
20	13+11			327.56	324.50	3.06	1.14
21	13+80			329.49	324.71	4.78	3.46
22	14+79			328.84	324.57	3.97	2.26
23	15+17			328.90	324.68	4.22	2.24
24	15+53			329.13	325.52	3.61	2.12
25	15+63			329.40	326.18	3.25	1.96
26	17+69			329.12	327.08	2.04	1.16
27	18+21			331.17	327.73	3.44	1.97
28	18+70			331.53	328.12	3.41	1.31
29	21+16			334.02	329.71	4.28	3.06
30	21+70			332.51	330.71	1.80	0.55
31	21+85			336.19	332.21	3.98	2.83
32	22+48			337.70	334.13	3.57	2.15
33	22+70			338.42	335.68	2.74	1.62
34	23+56			363.27	353.72	7.54	7.02
35	24+08			367.58	361.68	5.91	5.31
36	24+51			370.23	364.92	5.31	4.75
37	25+49			374.52	370.05	4.43	3.77

Land Data
Underwater Data
NOTES = Projected topo or Bathymetric points and DoC / MSDoC

Data Review / Results





Data Review / Results

Results

- 75 miles of channel surveyed in 5 months
  - 45 miles inshore
  - 30 miles offshore
- 100 utilities located and mapped
- 20 utilities never installed or removed
- 16 utilities were duplicates
- 4 utilities discovered during G.U.S.

- ≈ 45 utilities are approved for dredging
- ≈ 60 utilities not approved for dredging

Lessons Learned

What did we learn?

- Utility naming conventions are important!
  - Flexible & consistent
- Good communication with owners is critical!
  - Needs to start well in advance
  - Needs to include discussions about
    - Historical data
    - Site access
    - Personnel to assist if needed
- Scheduling is important!
  - Start early
  - Account for weather, tides, access, etc.
- Teamwork and experience are important!

Find Out More

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