Upper Barataria Risk Reduction Project

Sunset Levee Improvements

September 9, 2019

LAFOURCHE BASIN LEVEE DISTRICT
STATE OF LOUISIANA
UNION · JUSTICE · CONFIDENCE
VACHERIE, LA

GREENUP INDUSTRIES

BKI

GIS ENGINEERING LLC

AGENDA

- Background
- Progress to date
  - Sunset Levee Drone/Topographic Survey
  - Sunset Levee Survey Findings- Subsidence
  - Sunset Levee Survey Findings- Elevations
- Funding
- Proposed Levee Improvements
- Sunset Levee Construction Costs
- Questions

BACKGROUND

- Sunset Levee is located in St. Charles Parish, LA, consisting of existing earthen levees adjacent to Bayou Des Allemands, Bayou Gauche, and the Paradis Canal which were constructed by Sunset Levee District nearly 100 years ago and have been consolidating and strengthening over time, undergoing numerous maintenance lifts and expansions during life of the system.

- Survey elevation data from 2014 by Shaw Coastal showed a wide range of crown elevations, from below elevation +5.0 to approximate elevation +8.0 in some spots.

- In 2015, PSI performed Geotechnical field work and analysis for a 1% level of risk reduction, but not an interim level of risk reduction for El. +7.5

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PROGRESS TO DATE

Sunset Levee Drone/Topographic Survey

- At request of St. Charles Parish, LBLD conducted surveys of the Sunset Levee from Paradis Pump Station to Tippy Pump Station

- Conducted drone survey (photogrammetric) and GPS topographic survey for comparison to 2014 survey conducted by Shaw Coastal

  Purpose was two-fold:

  1. Investigate possible subsidence
  2. Guide future decision-making for levee lifts

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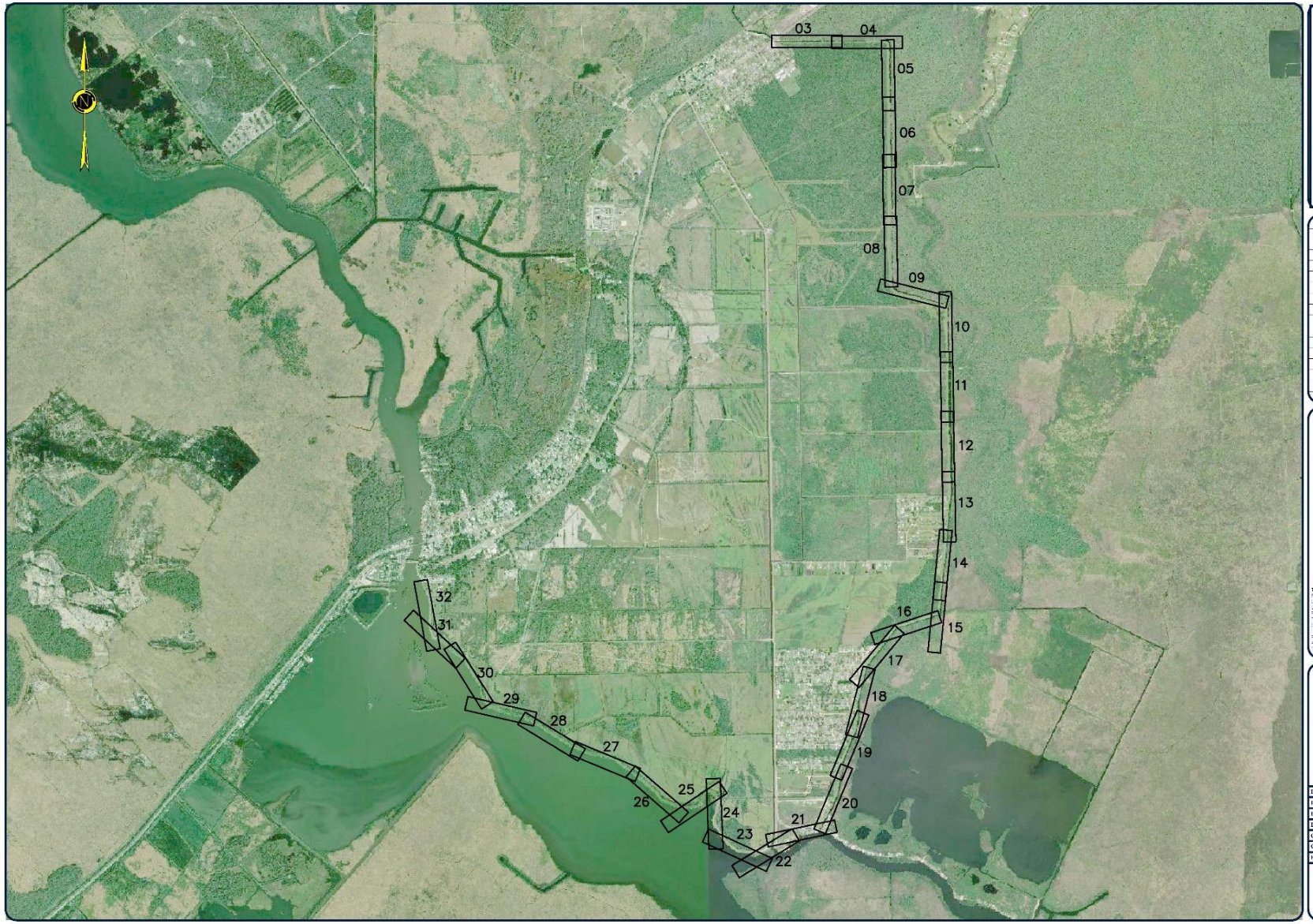

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REVISIONS

No.	Description	Date

THIS DRAWING HAS BEEN REDUCED TO ONE HALF SIZE

SEGMENT 2
SUNSET LEVEE SURVEY

PAGE LAYOUT

Project number	
Date	JUNE 2019
Designed by	KC/ CM
Drawn by	JS/ CM
Checked by	JP/ CM
Checked by	GM
Plot Date	JUNE 2019

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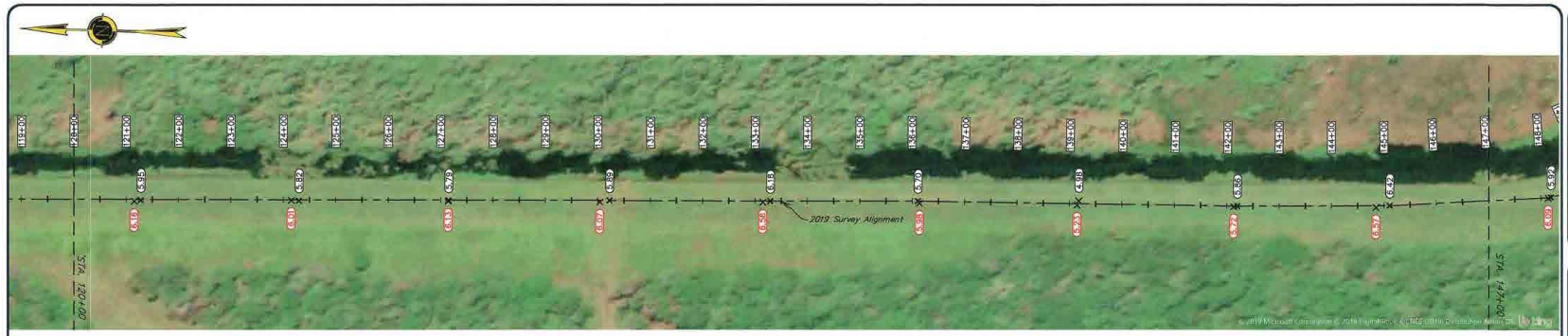
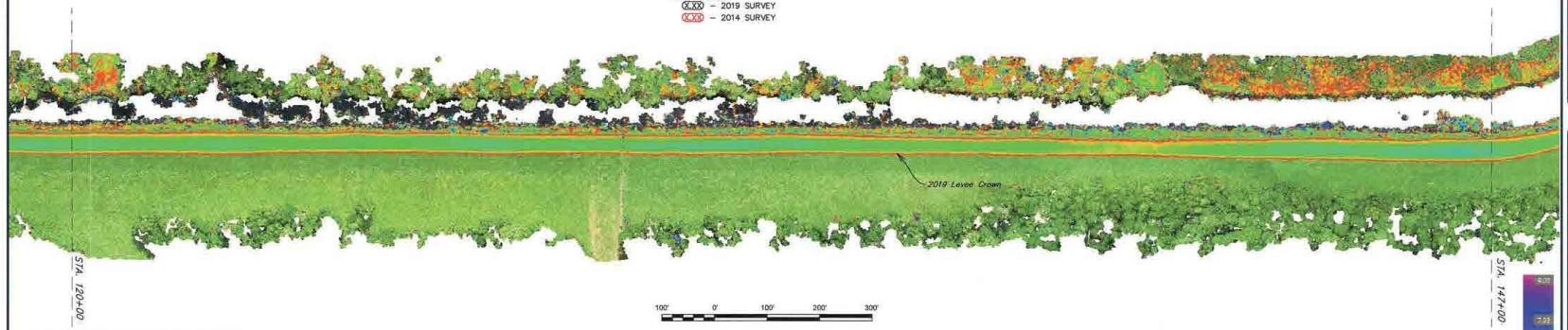


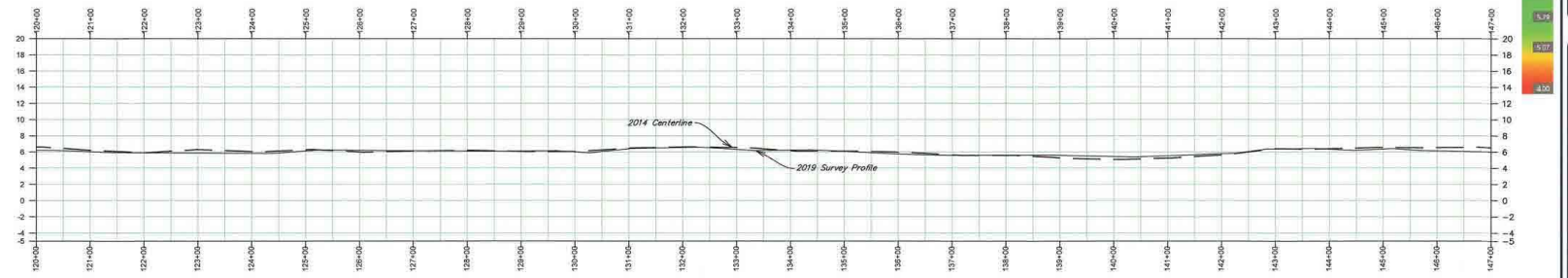
TRADITIONAL TOPOGRAPHIC POINTS

POINT LEGEND
(XXX) – 2019 SURVEY
(XXX) – 2014 SURVEY

100' 0' 100' 200' 300'



PHOTOGRAMMETRIC POINT CLOUD



CENTERLINE PROFILE

VERTICAL SCALE
15' 0' 15' 30' 45'

HORIZONTAL SCALE
100' 0' 100' 200' 300'

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SEGMENT 2
SUNSET LEVEE SURVEY

PLAN & PROFILE

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Date	JUNE 2019
Designed by	KG CM
Drawn by	JS CM
Checked by	JP CM
Checked by	OM
Plot Date	JUNE 2019

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LA FOURCHE BASIN LEVEE DISTRICT
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ELEVATION TABLE

STATION	ELEVATION 2019 (FT. NAVD 88)
0+00	5.21
5+77	5.87
9+77	6.37
15+32	7.4
19+93	8.25
25+48	8.2
30+07	7.73
35+17	7.98
40+41	7.43
45+69	7.7
50+33	6.79
55+68	7
60+63	6.91
65+22	6.31
70+13	7.03
80+13	6.39
85+14	8
90+19	6.78
95+02	6.48
100+20	6.79
104+89	6.56
110+16	6.24

LEGEND:

Subsidence

- -0.5 or Less
- -0.49 to -0.33
- -0.32 to -0.01

Positive

- 0 to 0.32
- 0.33 to 0.49
- 0.5 or Greater

NOTE:

1. Negative Numbers signify lower elevations in the 2019 survey compared to the 2014 survey.
2. All points in this spreadsheet from the 2019 survey were measured using GPS equipment unless marked with an asterisk (*). Points marked with an asterisk were measured using photogrammetry.

ELEVATION TABLE

STATION	ELEVATION 2014 (FT. NAVD 88)	ELEVATION 2019 (FT. NAVD 88)	Δ
115+15	6.91		0.01
115+20		6.92	
118+15	6.51		-0.05
118+48		6.46	
121+16	6.16		-0.21
121+28		5.95	
124+15	6.01		-0.19
124+30		5.82	
127+15	6.13		-0.34
127+15		5.79	
130+05	6.07		-0.18
130+22		5.89	
133+15	6.56		-0.38
133+29		6.18	
136+11		5.7	0.28
136+15	5.98		
139+15	5.23		-0.25
139+18		4.98	
142+13	5.72		0.14
142+20		5.86	
144+85	6.57		-0.15
145+11		6.42	
148+14	6.09		-0.17
148+19		5.92	
151+19	5.16		-0.21
151+19		4.95	
154+22	5.16		-0.10
154+41		5.06	
157+24	4.95		-0.09
157+47		4.86	
160+25	4.86		-0.14
160+43		4.72	
163+23	5.62		-0.27
163+23		5.35	
166+15		6.07	-0.06
166+25	6.13		
168+63	5.93		-0.08
168+79		5.85	
172+27		7.08	-0.14
172+88	7.22		
178+63	6.08		0.12
178+75		6.2	
182+12	6.17		-0.36
182+30		5.81	
187+23	5.86		-0.20
187+45		5.66	
190+23	5.59		-0.28
190+62		5.31	
193+22	6.04		-0.25
193+33		5.79	
196+27	7		-0.14
196+27		6.86	
200+27		6	-0.14
200+31	6.14		
205+28		5.81	-0.02
205+28	5.83		

ELEVATION TABLE

STATION	ELEVATION 2014 (FT. NAVD 88)	ELEVATION 2019 (FT. NAVD 88)	Δ
211+29	6.4		-0.30
211+42		6.1	
217+27	5.35		-0.29
217+34		5.06	
223+31	5.84		-0.01
223+42		5.83	
229+34		6.63	0.24
229+34	6.39		
235+39	6.52		-0.13
235+67		6.39	
241+44	6.74		-0.27
241+50		6.47	
247+44	7.06		-0.26
247+49		6.8	
254+79	15.23		-8.87
254+79		6.36	
259+33		6.43	-0.36
259+42	6.79		
265+32		7.36	-0.40
265+43	7.76		
271+41		6.48	-0.52
271+43	7		
277+43	7.74		0.29
277+43		8.03	
283+44	6.98		0.04
283+51		7.02	
289+45	5.95		-0.21
289+62		5.74	
295+27		4.98	-0.46
295+45	5.44		
301+82	6.11		-0.31
301+82		5.8	
307+36	6.4		-0.27
307+54		6.13	
313+35	7.56		-0.27
313+62		7.29	
320+23		6.92	-0.19
320+31	7.11		
325+37	7.53		0.34
325+37		7.87	
331+39	8.33		-0.22
331+61		8.11	
337+38	7.27		0.10
337+38		7.37	
343+38	6.52		0.04
343+57		6.56	
349+38	6.73		-0.39
349+62		6.34	
355+46	7.06		-0.26
355+82		6.8	
361+44	7.07		-0.36
361+59		6.71	
368+24	6.98		-0.18
368+59		6.8	
373+40	7.44		0.11
373+40		7.55	

ELEVATION TABLE

STATION	ELEVATION 2014 (FT. NAVD 88)	ELEVATION 2019 (FT. NAVD 88)	Δ
379+40	6.81		0.02
379+49		6.83	
386+91		7.74	0.62
387+21	7.12		
391+22		7.45	0.12
391+44	7.33		
394+46	7.65		0.00
394+48		7.65	
397+41	6.71		0.01
397+63		6.72	
401+22	6.79		-0.12
401+22		6.67	
406+49	7.49		0.06
406+52		7.55	
411+61	7.25		0.81
411+62		8.06	
413+92	5.02		0.13
413+92		5.15*	
416+17	4.12		0.37
416+17		4.49*	
418+76	3.44		0.10
418+76		3.54*	
421+51		6.1	0.16
421+58	5.94		
426+83		6.24	-0.18
426+91	6.42		
432+83	6.94		-0.08
432+87		6.86	
438+04	6.38		-0.03
438+04		6.35	
444+05		12.33	-0.24
444+06	12.57		
449+87	6.46		-0.34
449+88		6.12	
455+07	6.47		-0.24
455+24		6.23	
460+05		6.54	-0.07
460+06	6.61		
464+86		5.9	-0.12
464+90	6.02		
469+24	7.59		-0.12
469+24		7.47	
473+61		7.77	-0.06
473+65	7.83		
479+15		7.15	0.14
479+19	6.99		
484+37	6.15		0.01
484+41		6.16	
489+11	6.84		0.16
489+12		6.8	
493+74		7.41	-0.23
493+77	7.64		
498+45	6.84		-0.21
498+45		6.63	
503+22	7.41		-0.07
503+22		7.34	

ELEVATION TABLE

STATION	ELEVATION 2014 (FT. NAVD 88)	ELEVATION 2019 (FT. NAVD 88)	Δ
508+41		6.28	-0.05
508+44	6.33		
513+46		7.02	-0.04
513+48	7.06		
518+49	7.22		-0.16
518+49		7.06	
523+49		5.95	-0.31
523+52	6.26		
529+52		5.73	-0.30
529+56	6.03		
533+10	6.08		-0.02
533+11		6.06	
538+68	6.29		-0.09
538+73		6.2	
543+45		7.97	-0.07
543+49	8.04		
547+78	6.64		-0.11
547+78		6.53	
552+42	6.13		-0.28
552+45		5.85	
556+99		7.07	-0.08
556+99	7.15		
562+15		6.61	-0.10
562+17	6.71		
567+45		7.27	-0.02
567+47	7.29		
572+66		6.24	-0.14
572+67	6.38		
578+51		5.96	-0.16
578+52	6.12		
582+32	7.04		0.34
582+40		7.38	
587+58	7.23		-0.14
587+58		7.09	
592+17	7.16		-0.47
592+17		6.69	
597+46		6.1	-0.25
597+49	6.35		
602+15		6.45	-0.03
602+18	6.48		
607+43	6.57		-0.25
607+48		6.32	
612+38		7.68	-0.32
612+39	8		
617+62		7.96	-0.34
617+64	8.3		
622+79		7.3	-0.31
622+81	7.61		
627+64	7.08		-0.32
627+94		6.76	
633+21		7.13	
638+47		6.45	
645+48		6.56	

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Sunset Levee Survey Findings - Subsidence

- The survey indicated that approximately 85% of levee has subsided by less than 3” since 2014.

- Most of the remainder subsided less than 6”, with only two points of comparison being more than 6” lower. We suspect one of those is due to an anomaly in the 2014 survey.

- Potential sources of minor error:
  - 2019 survey shots were sometimes a few feet away from 2014 shots
  - Field crew reported that the levee centerline was not always the highest point
  - GPS equipment has a ± 1” margin of error

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Sunset Levee Survey Findings - Elevations

- Approximately 4% of the levee alignment has a crown elevation less than +5 ft NAVD88.

- Approximately 23% of the levee alignment has a crown elevation less than +6 ft NAVD88.

FUNDING

- CPRA has $3.5M GOMESA funds in its Annual Plan to fund improvements to the Sunset Levee
  - $1.2M in FY 2020 (current FY)
  - $2.3M in FY 2021

- LBLD requested CPRA in the last meeting (September 5, 2019) for commitment on $2.3M in FY 2021 funds; CPRA told that they will look at the request.

PROPOSED LEVEE IMPROVEMENTS

- LBLD proposed an option to self-perform some or all of construction at the last LBLD committee meeting (September 4, 2019) to use GOMESA funds to lift Sunset Levee to interim +7.5 ft elevation
  - Expedite start of construction
  - Potential cost savings
- Flood fighting will be necessary across Hwy 306 and north of Tippy Pump Station
- Engineering & design, geotechnical analyses, supplemental survey, permitting, and construction management for Sunset Levee fees estimated to be approximately $500K
- LBLD will require an IGA or addendum to IGA for Segment 1 (currently under review by CPRA)

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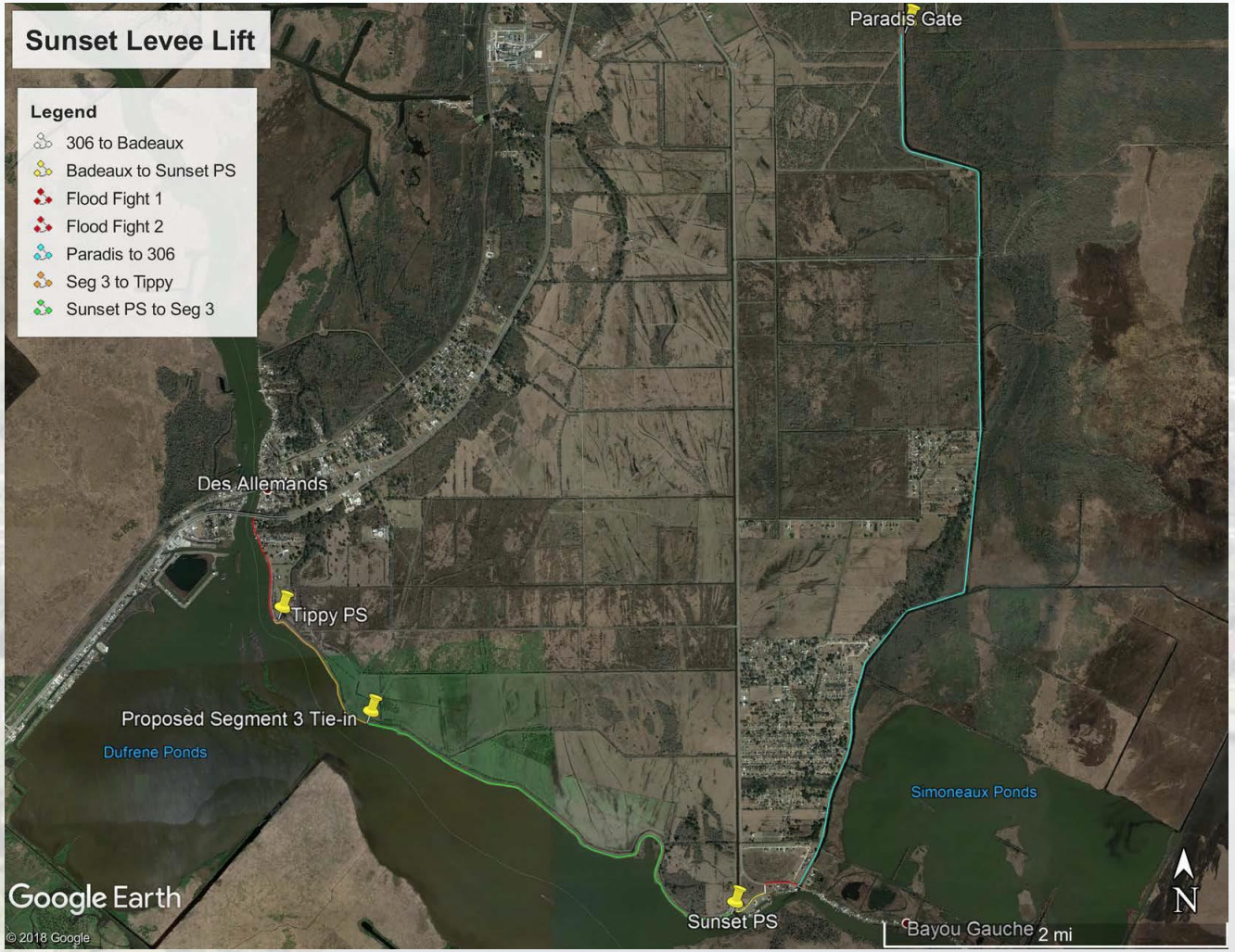
PROPOSED LEVEE IMPROVEMENTS

Raise Sunset Levee to +7.5 ft



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PROPOSED LEVEE IMPROVEMENTS

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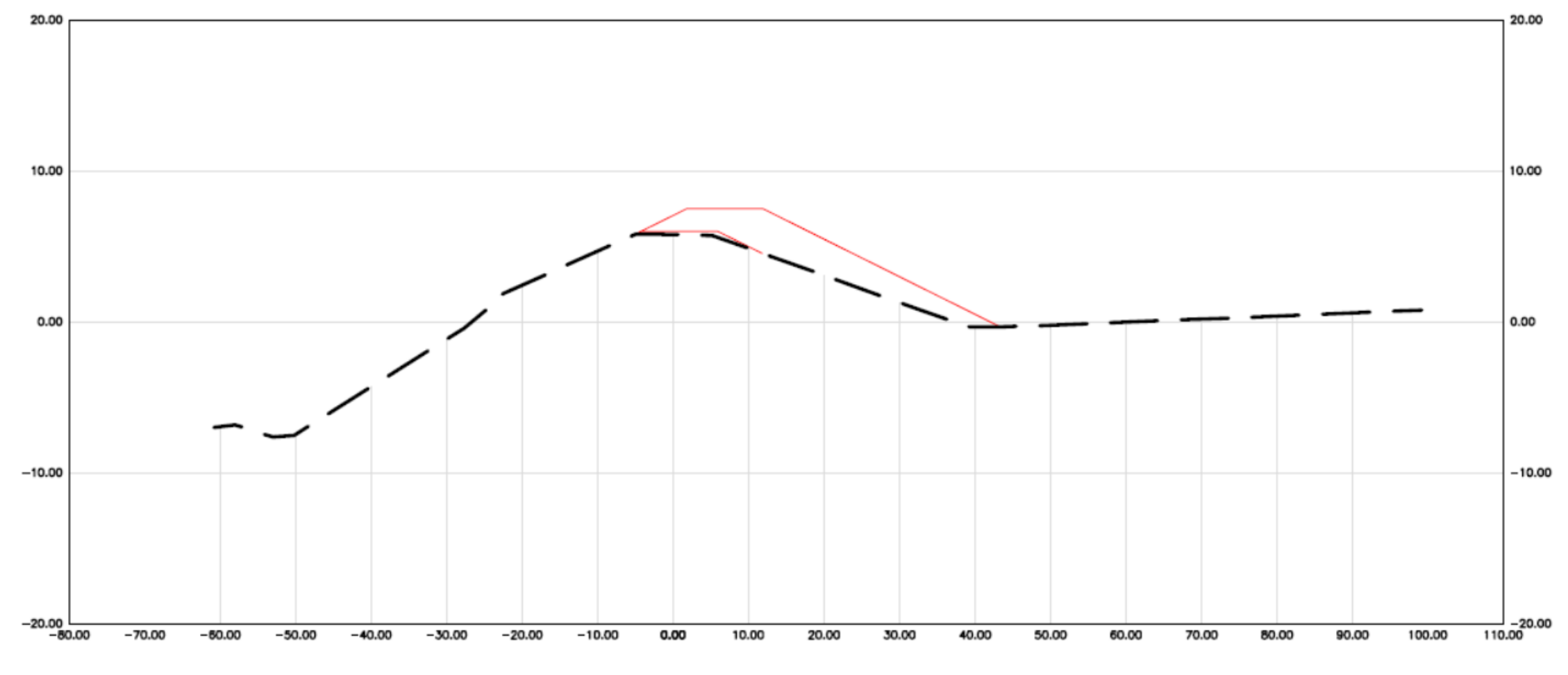

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SUNSET LEVEE CONSTRUCTION COSTS

Sub-segment	Required fill (CY) (Net Section)	Estimated Cost @ $25/CY
Paradis Gate to Hwy 306	68,723	$ 1,718,075
Hwy 306 to Badeaux Lane Levee	3,090	$ 77,250
Badeaux Lane Levee to Sunset PS	3,620	$ 90,500
Sunset PS to Segment 3	35,485	$ 887,125
Segment 3 to Tippy PS	8,780	$ 219,500
Total	**119,698**	**$ 2,992,450**
Total + 10% Mob/Demob		**$ 3,291,695**
+5% Contingency		**$ 3,456,280**

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QUESTIONS?

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