



2216 Altamont Avenue
Ft. Myers, FL 33901
Phone: 239.332.5499
Fax: 239.332.2955

Memo

Date: August 7, 2021
To: QCDD Board of Supervisors
From: Albert Lopez
Re: Lake Repairs Initial Programming Report
CPH Job No.: Q0504

CPH has previously completed and distributed to the CDD its May 2021 “Stormwater Lakes Annual Assessment Report” (Assessment Report). Within that report were findings of deficiencies in the 30 lakes within the CDD ownership and jurisdiction. The Board has budgeted for repairs this upcoming fiscal year. As requested by the District, CPH has herein identified schematic improvement solutions.

The decision process is not an exact or certain process as the large variation in water levels make the selection and viability of littorals as an option, uncertain. We have attached photos of the various littorals proposed for visual consideration.

A 12’ wide littoral planting is proposed for erosion control in key locations around the ponds. The littoral planting will extend horizontally from 4’ upland of the pond control elevation to 8’ horizontally on the wetland side of the pond control elevation (CE). CPH is proposing four planting zones; the high elevation planting zone, 1’ above the CE, the mid elevation planting zone at CE, the low elevation planting zone 1-18” below CE and the deep planting zone from 18” -2’ below CE. All of the recommended plant species are native to South Florida and aggressive growers.



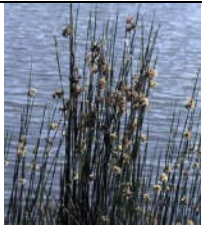




The high elevation planting zone, consists of sand cordgrass and muhly grass in an alternating pattern. Both are readily available in 1 gallon container size. We are recommending a minimum of 1 gallon container size, to create an immediate visible edge to the planting at the top of the slope. The sand cordgrass and muhly grass can take partial inundation until the pond levels drop to the CE level.

Soft rush and the native canna lily are proposed for the mid elevation level. They can take water inundation to a 6" depth, plus. The native canna lily is similar to the ornamental variety, and has yellow flowers in spring and early summer. The broad light green leaves will contrast nicely with the thin dark green leaves of the soft rush. The canna lily is proposed in 1 gallon pots, while the soft rush is proposed in 2" liners.

The lower level planting extends from 1' to 18" below CE. Pickerel weed is proposed for the 1' depth, and arrowhead/duck potato, is proposed for the 1'-18" depth. Pickerel weed has blue-violet flowers in spring and summer. It is a striking backdrop to the canna lily. The arrowhead is proposed in an alternating patter, with the pickerel weed at the 1' level, than the arrowhead wraps around the pickerel weed to the 18" depth. The pickerel weed has a white tree petal flower, on long stems that will appear above the pickerel weed flowers, in the spring and summer, and may continue in the fall. Both plants are proposed in 2" liners at 18" centers. The plants will be staggered to reduce the surface spacing between plants.

Bulrush is proposed for the deep elevation zone as it can take water inundation to a 24" depth. It is a very aggressive grower for erosion control and provides a wonderful habitat for aquatic life.

Picture have been provided below for your reference, and consideration.

			
Sand Cordgrass	Muhly grass	Canna Lily	Soft Rush
			
Pickerel Weed	Arrowhead	Bulrush	Canna, Pickerel Weed & Arrowhead

A bio-degradable erosion control blanket is recommended if planting is near or during the rainy season, to provide cover until the planting can take root and grow.

While we have specified what we believe to be the appropriate native plants, most adaptable to the circumstances and water level fluctuation, we are concerned about a significant investment in a littoral planting solution without the benefit of a pilot project to confirm viability, such as was proposed for the cancelled Quarry Golf Club hole #14 project this past May-June.

The District may elect one option over another given the visibility and consistency of materials at each repair location. The Quarry Golf Club may not want a riprap solution vs. a vegetated solution at prominent locations.

CPH has prepared three potential lake bank treatment options for the QCDD Board of Supervisors review and recommendations. These options are identified as:

Option 1 – Full riprap treatment from one foot above control elevation to \pm four feet below control elevation.

- Pros – Prevents erosion under almost any circumstances, long lasting, short installation time, low maintenance, increases property value.
- Cons – Typically costs more and is less attractive than native planting.

Option 2 – Littoral planting one foot above and two feet below control elevation for a total of twelve feet of littoral planting depth, with riprap starting two feet below control elevation, extending \pm two feet below lower littoral elevation.

- Pros – Provides shade, shelter and food for shallow water fish and other aquatic life, provides habitat for various forms of wildlife, creates a privacy buffer.
- Cons (all related to littoral plantings) – High maintenance cost the first few years, requires continuous littoral weed control maintenance, additional irrigation cost in drastic water fluctuation areas, breeding ground for unwanted pests or insects, rarely does it help property value, and may even lower property value if not maintained properly.

Option 3 – Littoral planting one foot above and two feet below control elevation with compacted fill material below littoral planting.

- Pros and Cons – same as Option 2 plus potential for erosion at low water season.

All areas preliminarily identified by CPH as potential Option 1 and Option 2 treatment areas are identified on the Initial Repairs Programming Exhibits



(attached). Option 3 has not been applied to any of the areas and requires further coordination. CPH has also prepared a preliminary programming cost estimate for each lake based on 2021 dollars which is reflected on the updated “Deficiencies Summary Report” (attached), whose origin and source information can be found in the aforementioned Assessment Report.

Although these are all considered suitable repair options, each one has an associated cost that could potentially limit the amount of repairs that can be done per fiscal year. CPH recommends the implementation of a pilot project to test the efficiency of Options 2 and 3 before a full repair plan is considered.

Once the Board of Supervisors has reviewed and approved the desired treatment option for each lake, CPH will need to know the spending limit set for fiscal year 2021 in order to prepare a proposal for final design and construction inspection services.

Note:

Each repair option provided has an approximate linear cost based on a 16’ to 20’ of width:

Option 1 = \$135.00 per LF

Option 2 = \$115.00 per LF

Option 3 = \$100.00 per LF

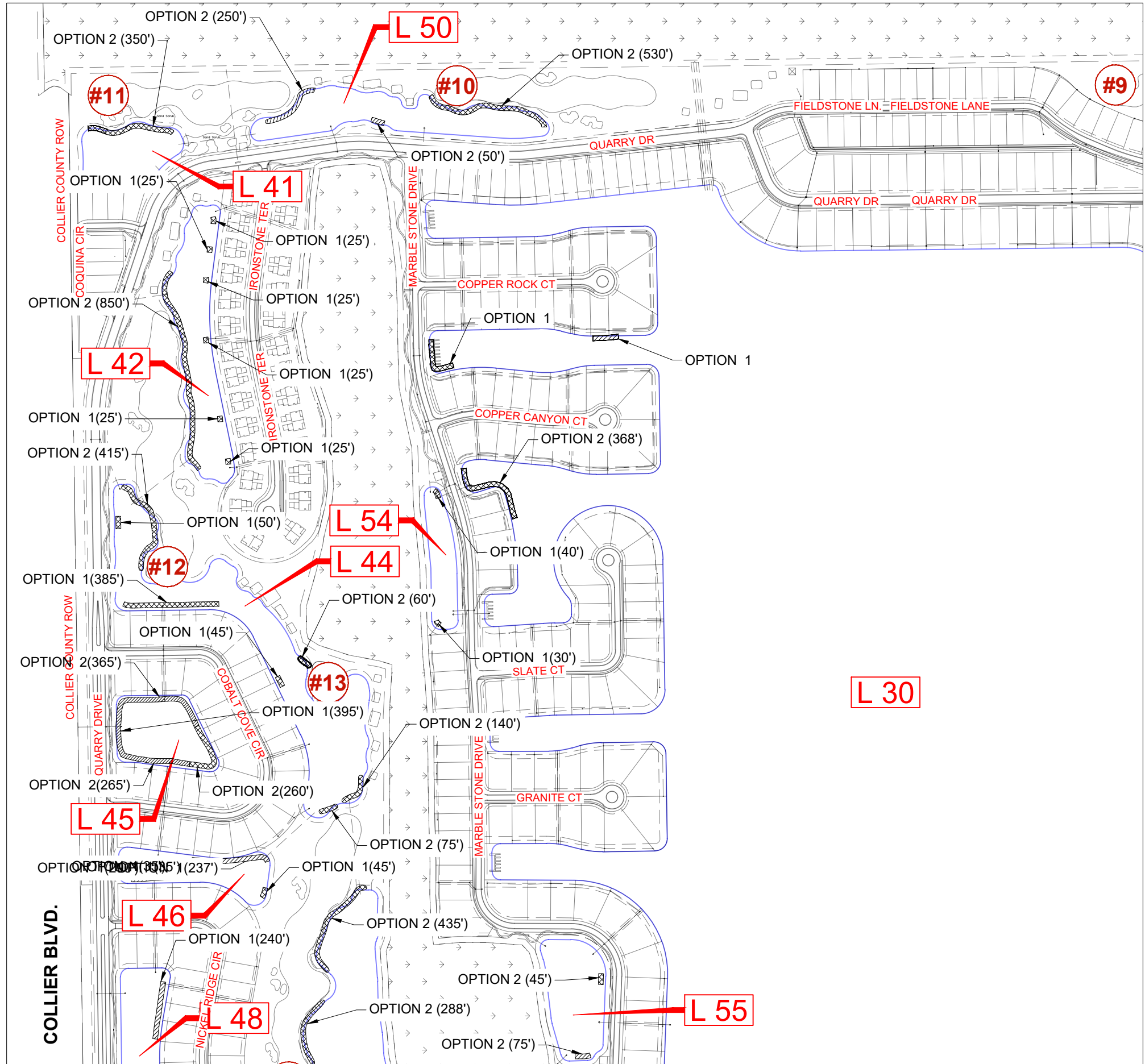
We request the District consider and decide the following items as programming continues to be refined for this and future fiscal year projects:

1. Should the 2021-2022 initial project be a full budget project or merely a lesser scoped pilot project to confirm viability and results?
2. Given the programming budget of \$1.8M +/- to complete the entire repair identified in the Assessment Report, how much does the District wish to budget each year in order to complete the project over a predetermined number of years? There are efficiencies in costs when construction occurs in larger projects.
3. Does the District wish to modify irrigation in either the pilot project or permanent projects?



4. Does the District prefer one treatment option over another and what criteria should be used to make selections?
5. Other items to consider in advancing a programming effort?
6. When would the District wish to have design complete in order to bid and award a contractor in order to beat the seasonal demand for contractors?
When would the optimal time to commence construction occur?

We hope to discuss this report and receive direction from the District at the upcoming meeting on August 16, 2021.



LEGEND

L ##

LAKE NUMBER

APPROX. LAKE LIMITS

#

GOLF COURSE HOLE #

[Cross-hatched box]

PRIORITY #1

[Diagonal-hatched box]

PRIORITY #2

No.	Date	Revision	No.	Date	Revision

**A Full Service A & E Firm**

Plans Prepared By
CPH, Inc.
2216 Altamont Avenue
Ft. Myers, FL 33901
Ph: 239.332.5499

State of Florida Licenses:
Engineer No. 3215
Surveyor No. LB7143
Architect No. AA2600926
Landscape No. LC000298

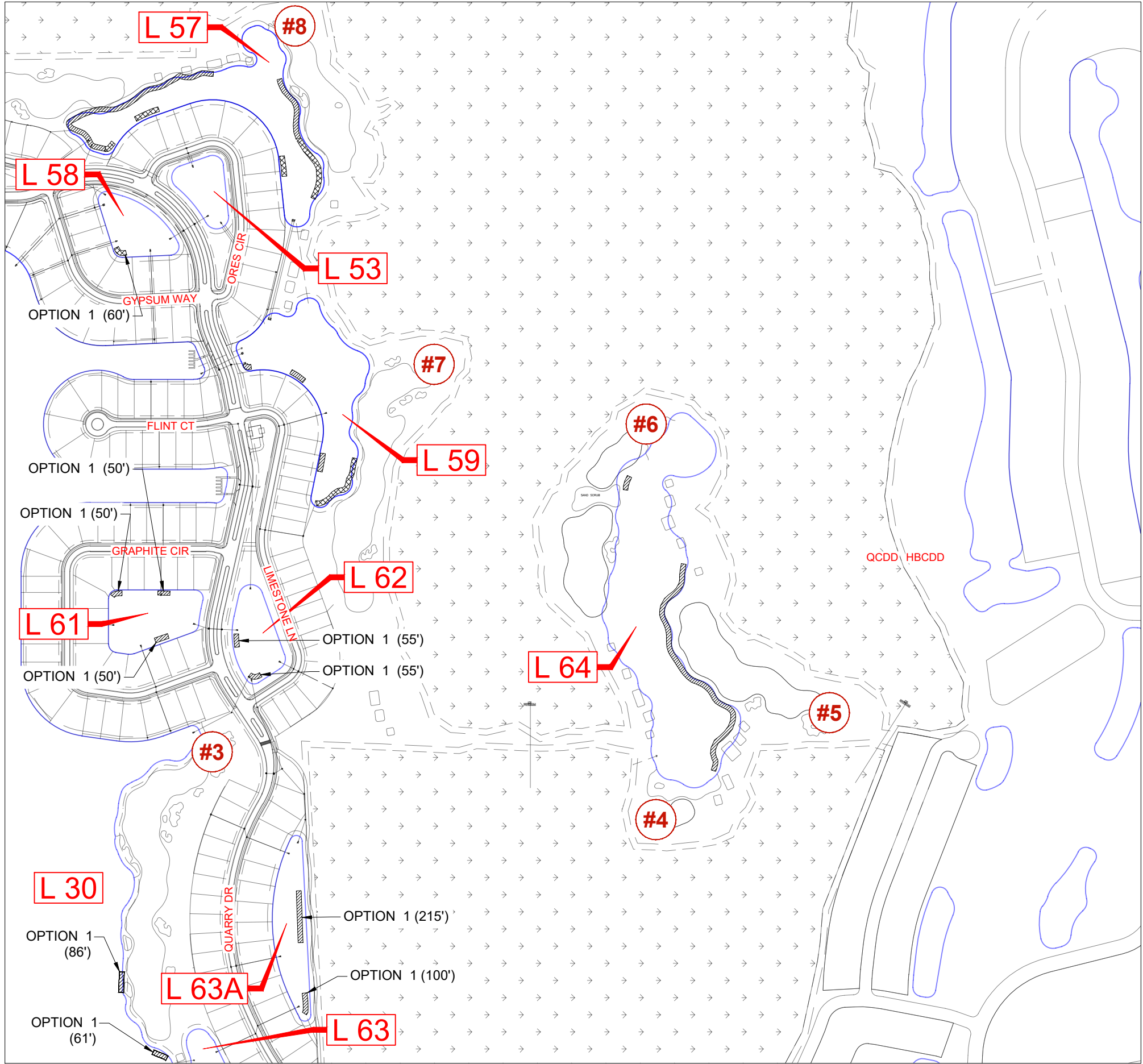
© 2021

Designed by:	A. LOPEZ
Drawn by:	J. ALLEN
Checked by:	A. LOPEZ
Date:	08/03/2021
Job No.	Q0509

THE QUARRY COMMUNITY
DEVELOPMENT DISTRICT
COLLIER COUNTY / FLORIDA

INITIAL REPAIRS
PROGRAMMING EXHIBIT

Sheet No.
EX-1



LEGEND

L ##

LAKE NUMBER

—

APPROX. LAKE LIMITS

#

GOLF COURSE HOLE #

PRIORITY #1

PRIORITY #2

NOTE:
LAKES 57, 59 AND 64 ARE OWNED BY THE QUARRY GOLF CLUB
AND ARE NOT INCLUDED ON THIS PROGRAMMING REPORT.

No.	Date	Revision	No.	Date	Revision

A Full Service A & E Firm
2216 Altamont Avenue
Ft. Myers, FL 33901
Ph: 239.332.5499
© 2021

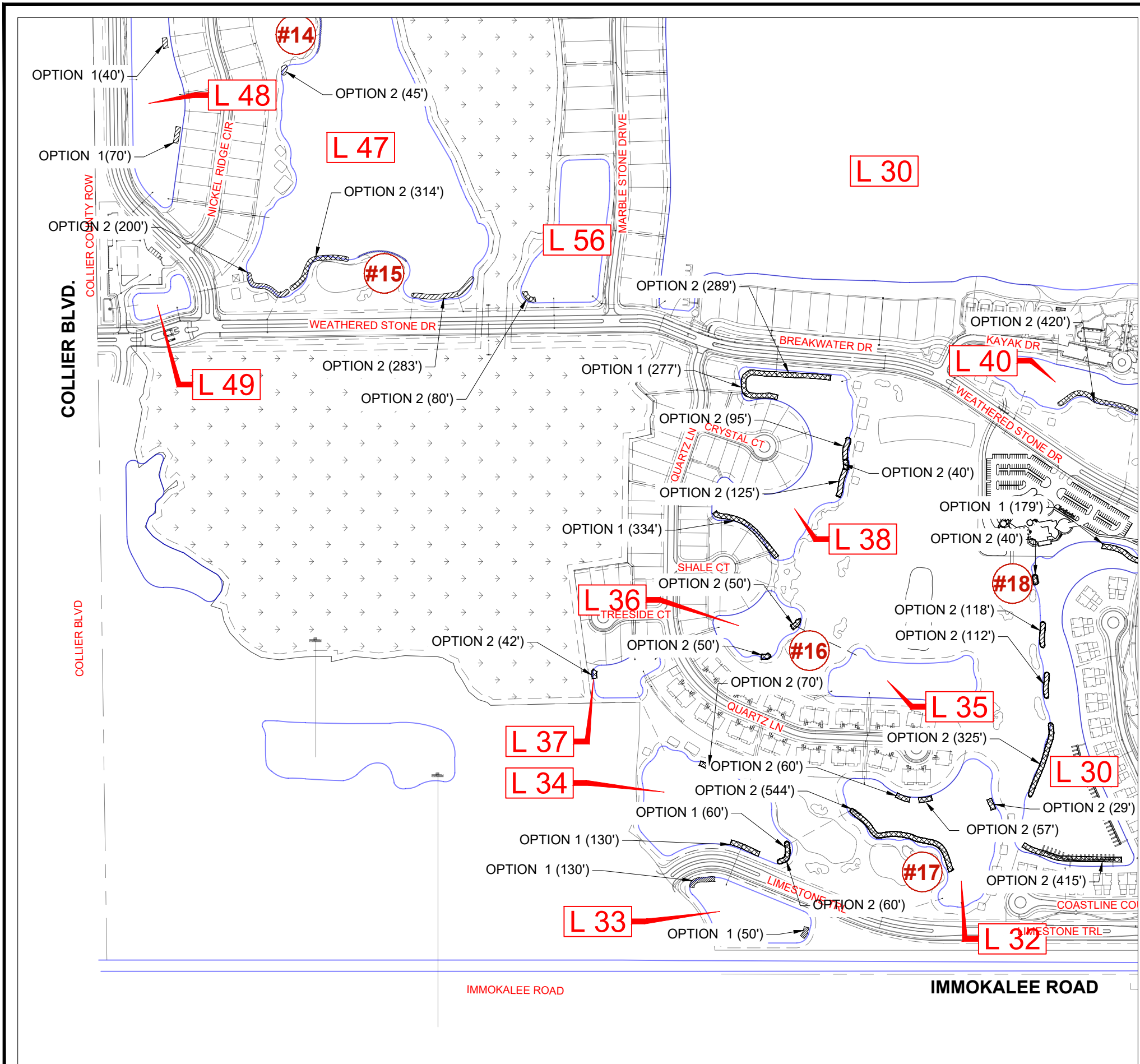
Plans Prepared by:
CPH, Inc.
State of Florida Licenses:
Engineer No. 3215
Surveyor No. LB7143
Architect No. AA26000926
Landscape No. LC000298

Designed by:	A. LOPEZ
Drawn by:	J. ALLEN
Checked by:	A. LOPEZ
Date:	08/03/2021
Job No.	Q0509

**THE QUARRY COMMUNITY
DEVELOPMENT DISTRICT
COLLIER COUNTY / FLORIDA**

**INITIAL REPAIRS
PROGRAMMING EXHIBIT**

Sheet No.
EX-2



LEGEND

L ##

LAKE NUMBER

APPROX. LAKE LIMITS

#

GOLF COURSE HOLE #

[Cross-hatched box]

PRIORITY #1

[Diagonal-hatched box]

PRIORITY #2

No.	Date	Revision	No.	Date	Revision
1			1		
2			2		
3			3		
4			4		
5			5		

A Full Service A & E Firm
2216 Altamont Avenue
Ft. Myers, FL 33901
Ph: 239.332.5499
www.cphcorp.com
© 2021

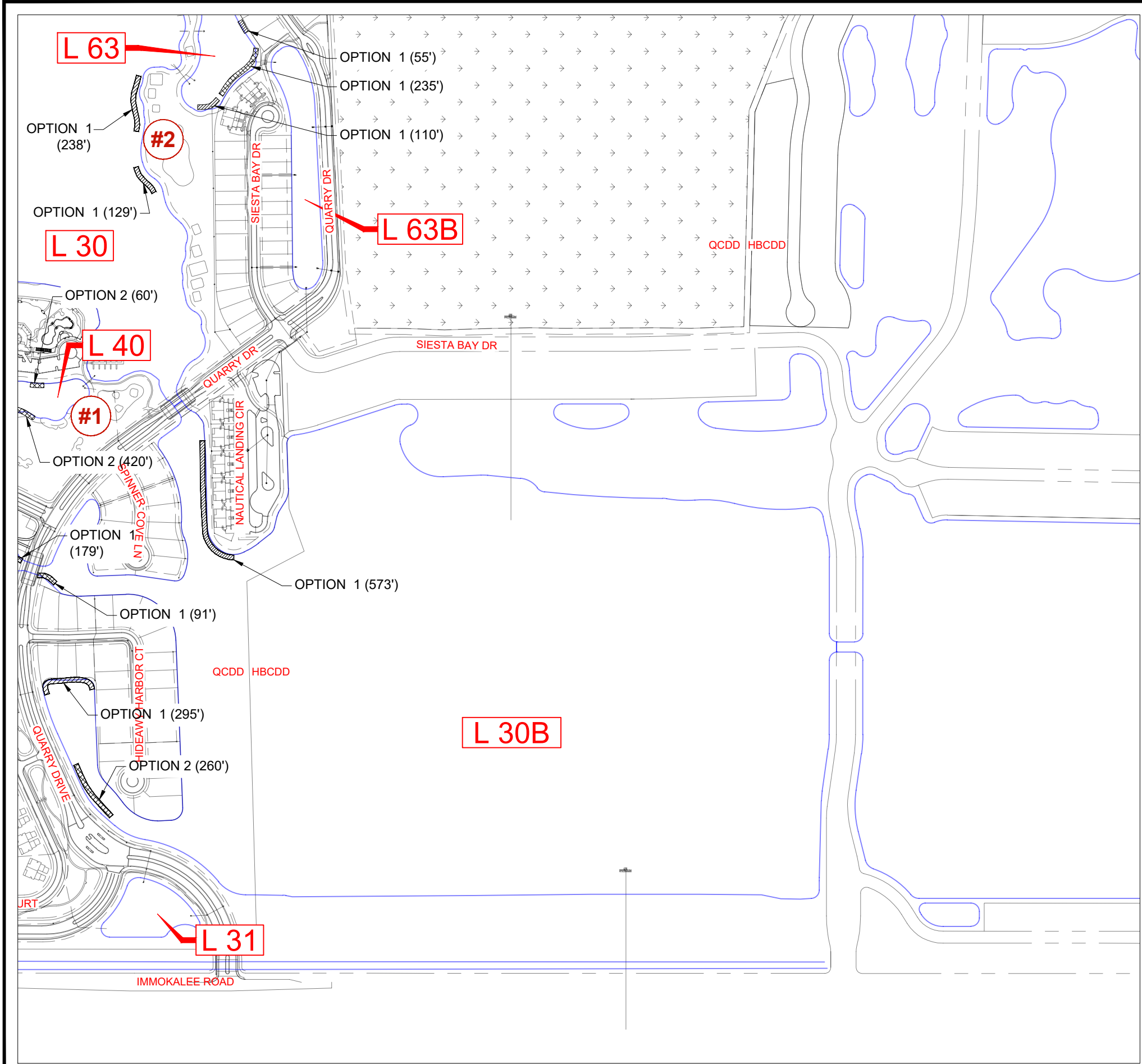
Plans Prepared By
CPH, Inc.
State of Florida Licenses:
Engineer No. 3215
Surveyor No. LB7143
Architect No. AA26000926
Landscape No. LC000298

Designed by: A. LOPEZ
Drawn by: J. ALLEN
Checked by: A. LOPEZ
Date: 08/03/2021
Job No. Q0509

**THE QUARRY COMMUNITY
DEVELOPMENT DISTRICT**
COLLIER COUNTY / FLORIDA

**INITIAL REPAIRS
PROGRAMMING EXHIBIT**

Sheet No.
EX-3



LEGEND

L ##

LAKE NUMBER

—

APPROX. LAKE LIMITS

#

GOLF COURSE HOLE #

PRIORITY #1

PRIORITY #2

No.	Date	Revision	No.	Date	Revision
1			1		
2			2		
3			3		
4			4		
5			5		

A Full Service A & E Firm

2216 Altamont Avenue
Ft. Myers, FL 33901
Ph: 239.332.5499

www.cphcorp.com

© 2021

Plans Prepared By:
CPH, Inc.

State of Florida Licenses:
Engineer No. 3215
Surveyor No. LB7143
Architect No. AA2600926
Landscape No. LC000298

Designed by:	A. LOPEZ
Drawn by:	J. ALLEN
Checked by:	A. LOPEZ
Date:	08/03/2021
Job No.	Q0509

**THE QUARRY COMMUNITY
DEVELOPMENT DISTRICT**

COLLIER COUNTY / FLORIDA

**INITIAL REPAIRS
PROGRAMMING EXHIBIT**

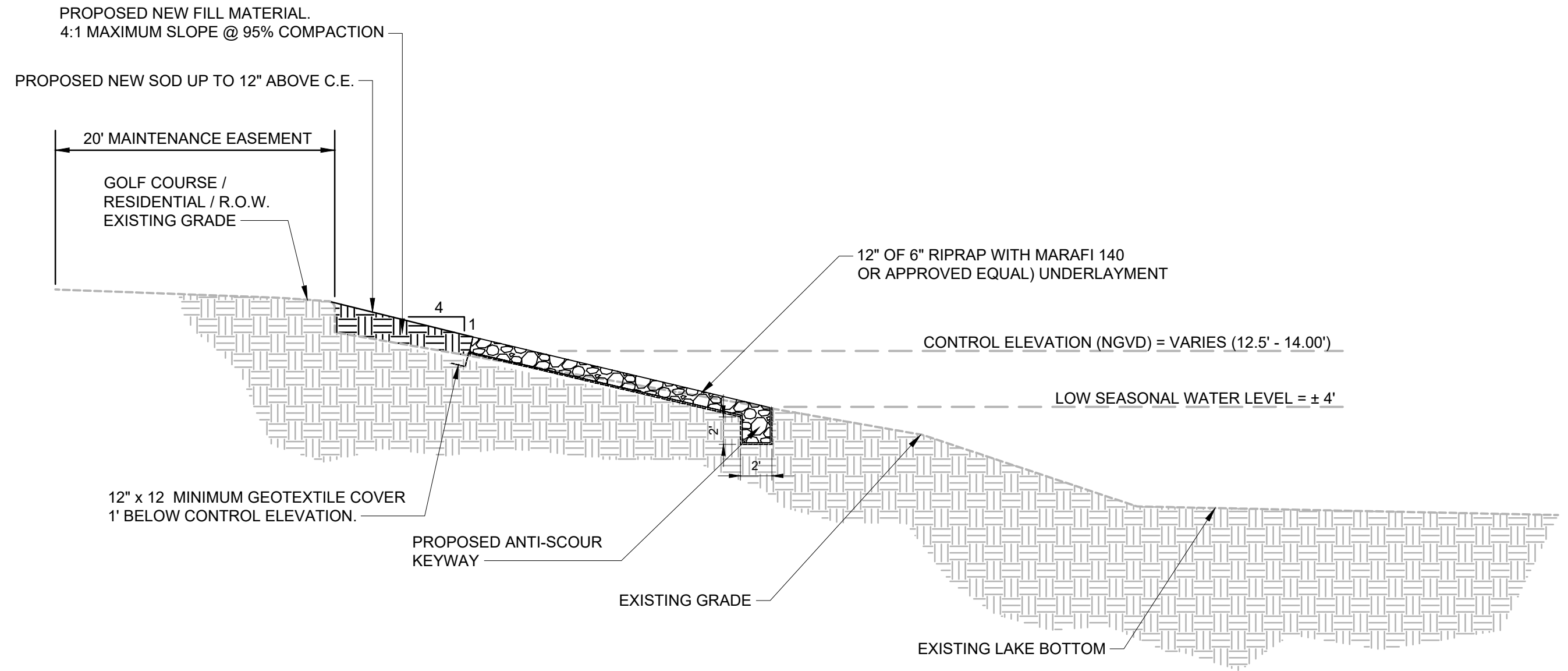
Sheet No.

EX-4

J:\Q0509\Civil\DWG\Report_Figures_and_Exhibits\Lake Exhibit For Cost Estimate\The Quarry CDD_Lake Inspection - Initial Programming Exhibit.dwg, 8/7/2021 3:13:45 PM, Lopez, Albert J.,

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS.

9



OPTION 1 - TYPICAL EROSION TREATMENT DETAIL
NTS

No.	Date	Revision	No.	Date	Revision
1			1		
2			2		
3			3		
4			4		



A Full Service A & E Firm

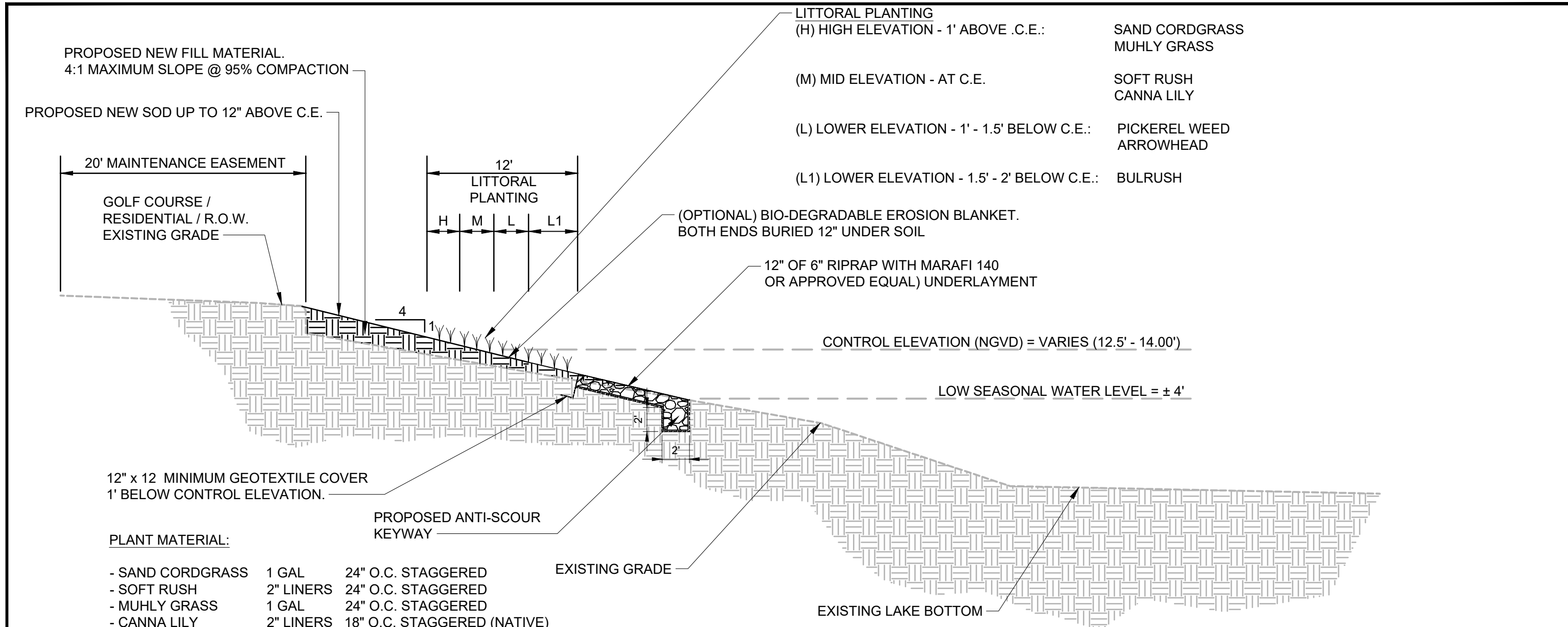
© 2021

Designed by: N/A
Drawn by: J. ALLEN
Checked by: A. LOPEZ
Date: 04/22/2021
Job No. Q0509

**THE QUARRY COMMUNITY
DEVELOPMENT DISTRICT
COLLIER COUNTY / FLORIDA**

**STORMWATER PONDS
EROSION CONTROL DETAILS**

Sheet No.
OPT1

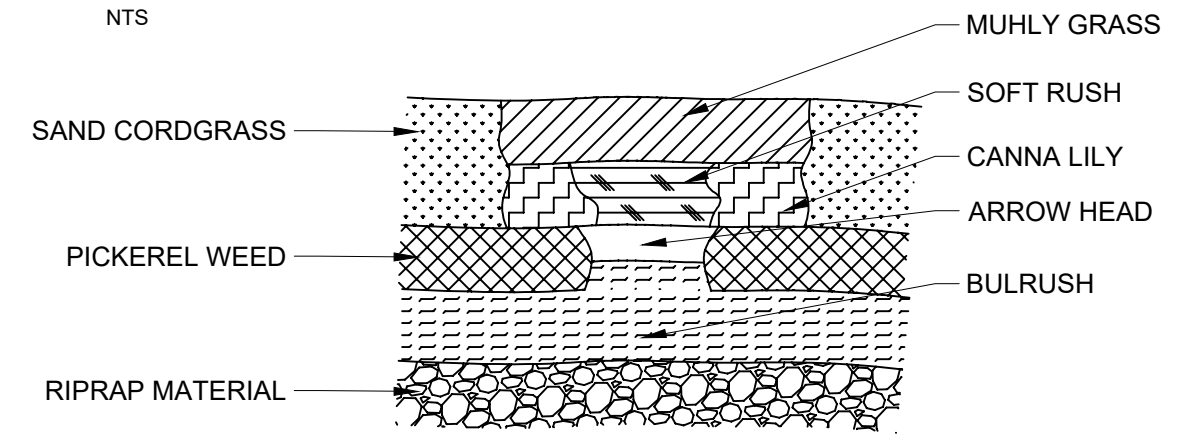


- LITTORAL PLANTING**
- | | |
|--|-------------------------------|
| (H) HIGH ELEVATION - 1' ABOVE C.E.: | SAND CORDGRASS
MUHLY GRASS |
| (M) MID ELEVATION - AT C.E. | SOFT RUSH
CANNA LILY |
| (L) LOWER ELEVATION - 1' - 1.5' BELOW C.E.: | PICKEREL WEED
ARROWHEAD |
| (L1) LOWER ELEVATION - 1.5' - 2' BELOW C.E.: | BULRUSH |

- PLANT MATERIAL:**
- | | | |
|------------------|-----------|-----------------------------|
| - SAND CORDGRASS | 1 GAL | 24" O.C. STAGGERED |
| - SOFT RUSH | 2" LINERS | 24" O.C. STAGGERED |
| - MUHLY GRASS | 1 GAL | 24" O.C. STAGGERED |
| - CANNA LILY | 2" LINERS | 18" O.C. STAGGERED (NATIVE) |
| - PICKEREL WEED | 2" LINERS | 18" O.C. STAGGERED |
| - ARROWHEAD | 2" LINERS | 18" O.C. STAGGERED |
| - BULRUSH | 2" LINERS | 24" O.C. STAGGERED |

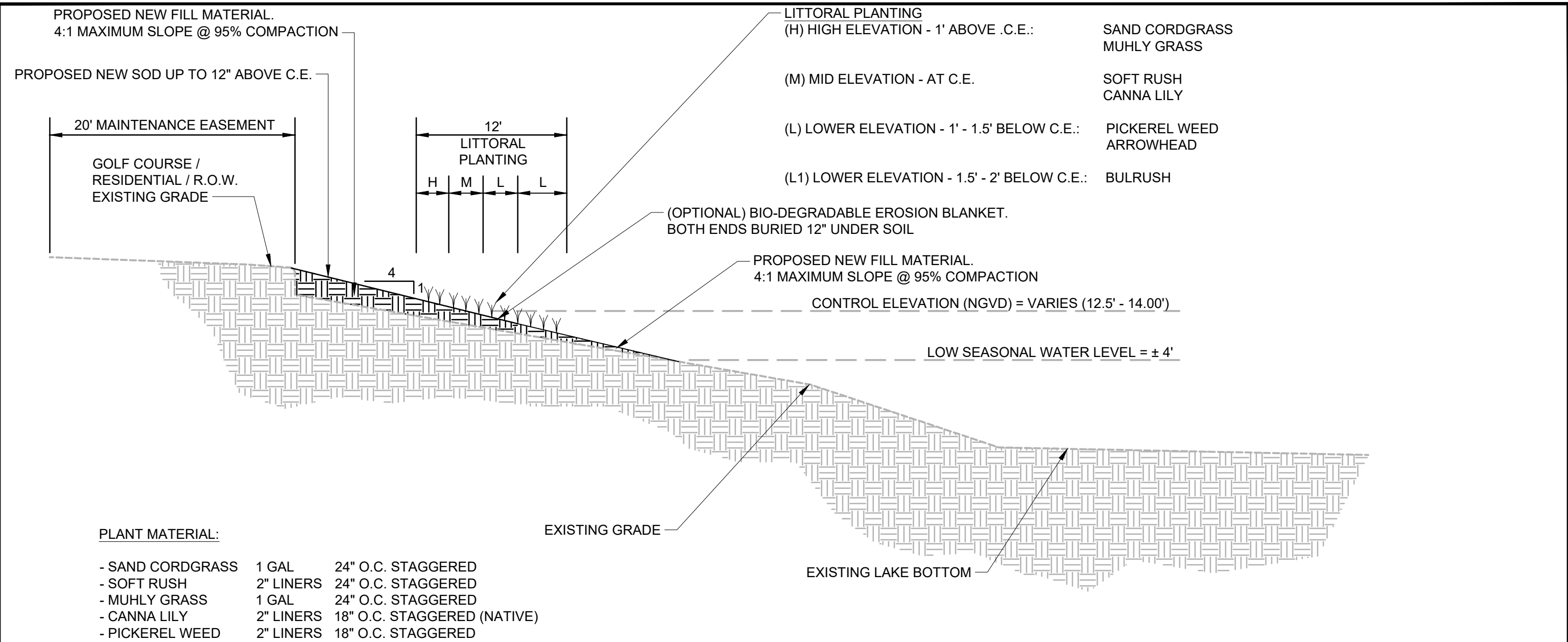
OPTION 2 - TYPICAL EROSION TREATMENT DETAIL WITH LITTORALS

NTS



TYPICAL LITTORAL PLANTING PATTERN - PLAN VIEW

NTS

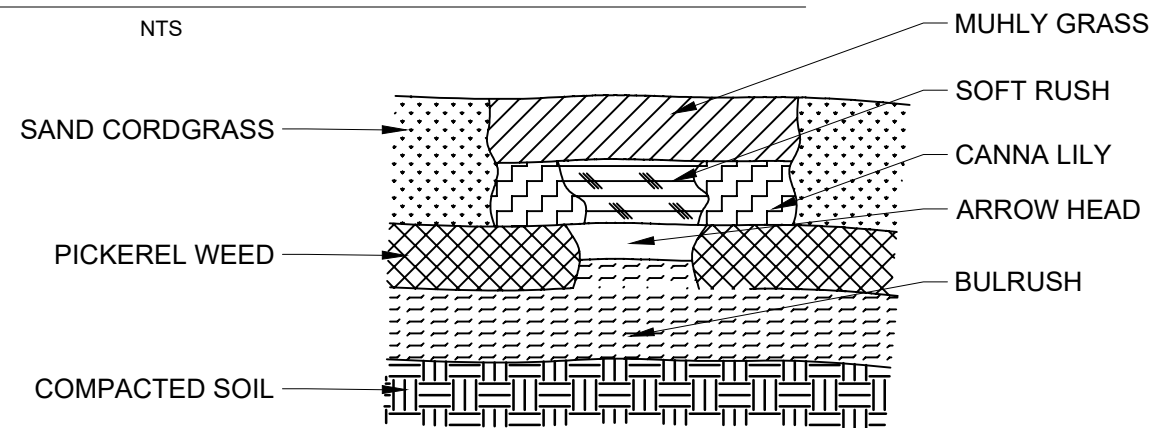


PLANT MATERIAL:

- | | | |
|------------------|-----------|-----------------------------|
| - SAND CORDGRASS | 1 GAL | 24" O.C. STAGGERED |
| - SOFT RUSH | 2" LINERS | 24" O.C. STAGGERED |
| - MUHLY GRASS | 1 GAL | 24" O.C. STAGGERED |
| - CANNA LILY | 2" LINERS | 18" O.C. STAGGERED (NATIVE) |
| - PICKEREL WEED | 2" LINERS | 18" O.C. STAGGERED |
| - ARROWHEAD | 2" LINERS | 18" O.C. STAGGERED |
| - BULRUSH | 2" LINERS | 24" O.C. STAGGERED |

OPTION 3 - TYPICAL EROSION TREATMENT DETAIL WITH LITTORALS

NTS



TYPICAL LITTORAL PLANTING PATTERN - PLAN VIEW

NTS

The Quarry CDD - Deficiencies Summary										8/05/2021
				Combined Shoreline						Preliminary OPC
Lake #	Lake Perimeter LF	Perimeter Adjacent to Golf Course LF	Adjacent to Residential / Preserve / R.O.W.	Priority #1 LF	Priority #2 LF	*Priority #3 LF	Total LF	Total %	Lake Bank Slope	
30	26,350	3,596	22,754	1,944	1,501	0	3,445	13%	4:1, 1:1	\$ 383,971.00
31	1,070	0	1,070	0	0	0	0	0%	4:1	
32	2,272	1,660	612	690	0	0	690	30%	4:1	\$ 80,185.20
33	1,279	0	1,279	0	180	0	180	14%	4:1	\$ 21,078.00
34	1,901	859	1,042	320	0	0	320	17%	4:1	\$ 42,111.60
35	1,555	1,010	545	0	0	335	335	22%	4:1	
36	1,023	521	502	100	0	390	490	48%	4:1	\$ 13,250.40
37	801	0	801	50	0	0	50	6%	4:1	\$ 5,838.00
38	2,940	945	1,995	940	220	0	1,160	39%	4:1	\$ 103,600.80
40	2,127	1,198	929	480	0	0	480	23%	4:1	\$ 63,388.80
41	1,155	632	523	350	0	150	500	43%	4:1	\$ 43,893.60
42	2,593	1,413	1,180	1,000	0	0	1,000	39%	4:1	\$ 131,254.80
44	4,668	2,777	1,891	1,170	0	0	1,170	25%	4:1	\$ 156,702.00
45	1,285	0	1,285	260	1,025	0	1,285	100%	4:1	\$ 164,594.40
46	1,562	238	1,324	115	527	0	642	41%	4:1	\$ 79,041.60
47	5,460	3,193	2,267	1,037	528	0	1,565	29%	4:1	\$ 194,008.80
48	2,646	0	2,646	0	350	0	350	13%	4:1	\$ 42,744.00
49	723	0	723	0	0	100	100	14%	4:1	
50	2,754	1,468	1,286	530	300	0	830	30%	4:1	\$ 109,243.20
53	851	0	851	0	0	0	0	0%	4:1	
54	1,301	0	1,301	70	0	0	70	5%	4:1	\$ 9,026.40
55	1,330	0	1,330	45	75	0	120	9%	4:1	\$ 15,339.60
56	1,704	0	1,704	80	0	0	80	5%	4:1	\$ 10,568.40
58	970	0	970	60	0	0	60	6%	4:1	\$ 7,770.00
61	1,122	0	1,122	0	150	0	150	13%	4:1	\$ 19,272.00
62	1,250	0	1,250	0	110	0	110	9%	4:1	\$ 13,450.80
63	1,382	728	654	235	165	0	400	29%	4:1	\$ 50,228.40
63A	1,618	0	1,618	0	315	0	315	19%	4:1	\$ 38,466.00
63B	2,185	0	2,185	0	0	0	0	0%	4:1	
Total	77,877	20,238	57,639	9,476	5,446	975	15,675	20%		
Golf Course Owned Lakes (For Information Only)										
57	3,504			483	1,087	0	1,570	45%	4:1	
59	2,407			300	190	700	1,190	49%	4:1	
64	3,953			0	1,100	0	1,100	28%	4:1	
Total	9,864			783	2,377	700	3,860	39%		

\$ 1,799,027.80

(382.23 AC.)

(18.62 AC.)

* Priority #3 refers to those areas requiring minimal erosion repair work or close monitoring to avoid future erosion issues



OPTION 1 TREATMENT EXAMPLE



OPTION 3 TREATMENT EXAMPLE

PICTURE (SEABREEZE EROSION SOLUTIONS)