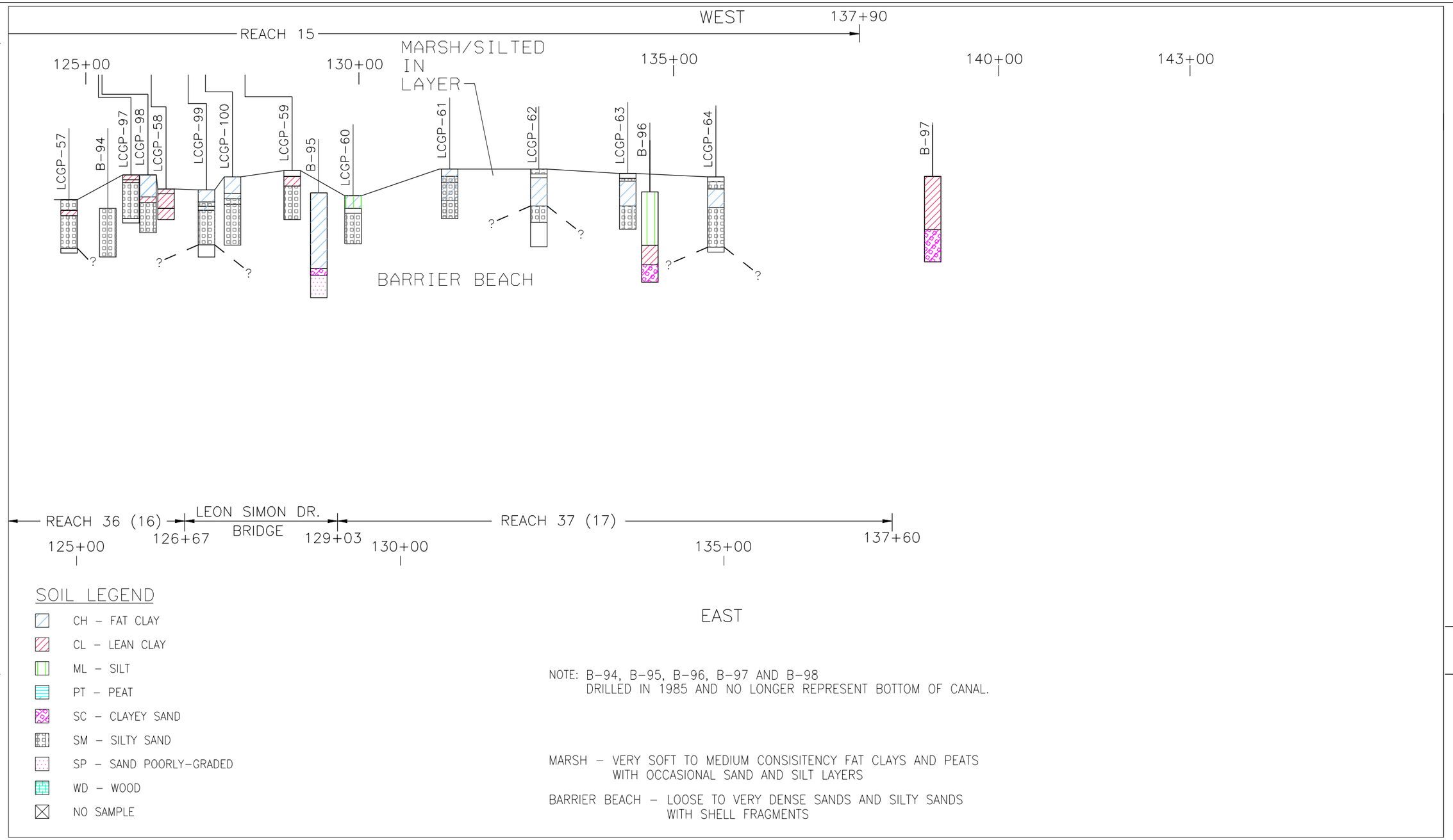


SOIL LEGEND

- CH – FAT CLAY
- CL – LEAN CLAY
- ML – SILT
- PT – PEAT
- SC – CLAYEY SAND
- SM – SILTY SAND
- SP – SAND POORLY-GRADED
- WD – WOOD
- NO SAMPLE

NOTE: B-94, B-95, B-96, B-97 AND B-98 DRILLED IN 1985 AND NO LONGER REPRESENT BOTTOM OF CANAL.

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

HORIZONTAL SCALE IN FEET

150 75 0 150 300 FT

NOTES:

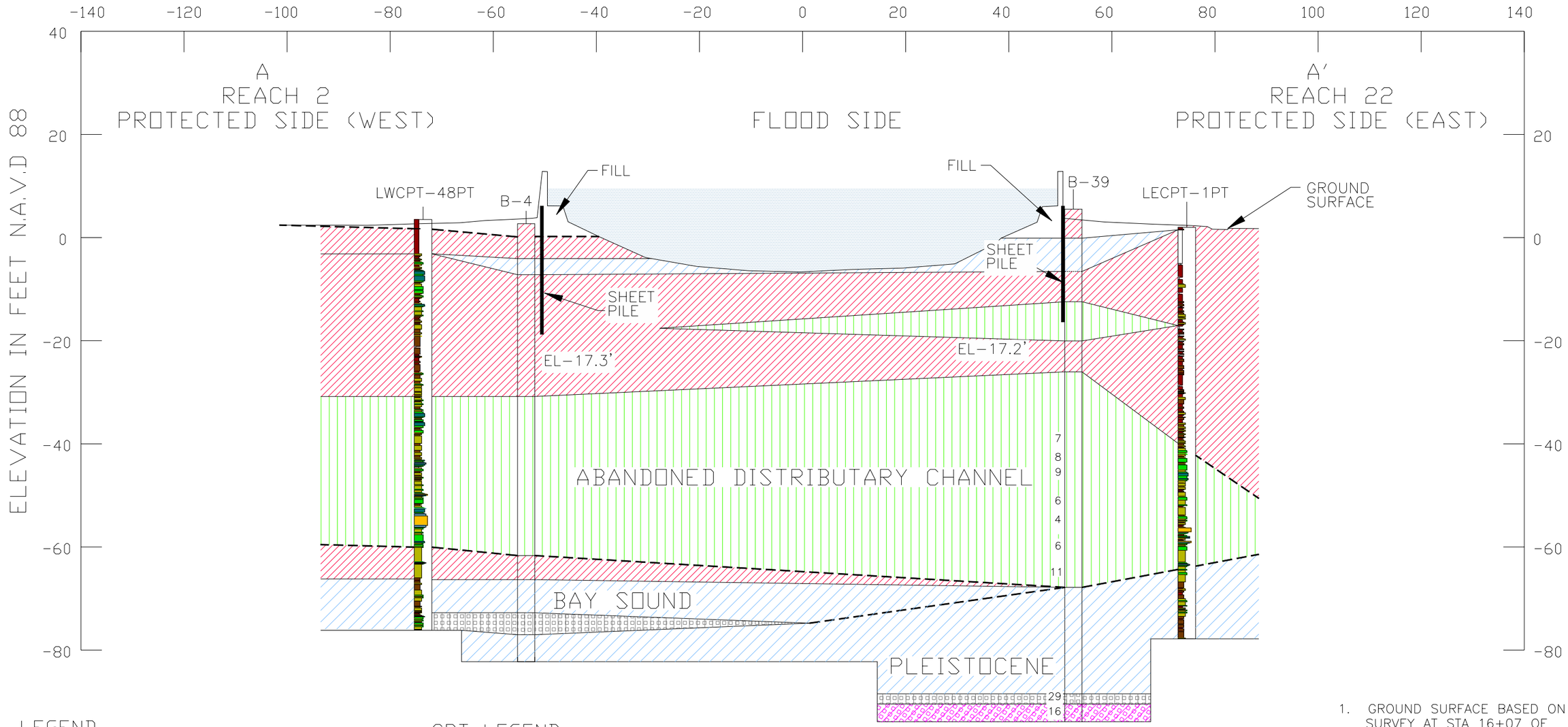
1. ELEVATIONS FOR B-SERIES BORINGS WERE ESTIMATED BASED ON CANAL CONDITIONS AT THE TIME THE BORINGS WERE COMPLETED (SEE DM 19A). BORINGS ARE SHOWN FOR REFERENCE ONLY AND NOT INCORPORATED INTO PROFILE.

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL
CANAL CL

SOIL AND GEOLOGIC PROFILE

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISANA

PLOT SCALE: 1 : 1
DATE: 11-06-09
FILE NO. PLATE 60



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

PLEISTOCENE – STIFF TO VERY STIFF CONSISTENCY OXIDIZED CLAYS INTERBEDDED WITH LAYERS AND LENSES OF DENSE TO VERY DENSE SILTS AND SANDS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

ABANDONDED DISTRIBUTARY CHANNEL FILL – SOFT TO MEDIUM CONSISTENCY SILT, LEAN CLAY AND FAT CLAY

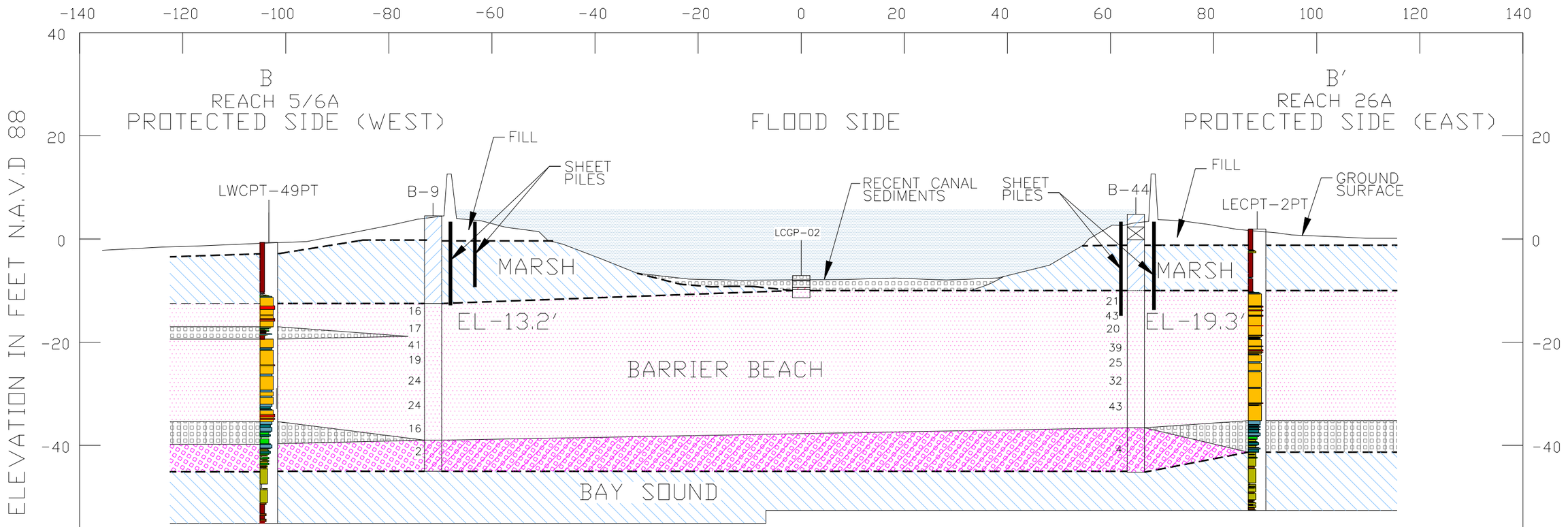
1. GROUND SURFACE BASED ON SURVEY AT STA 16+07 OF THE 2010 SURVEY BASELINE.
2. BORINGS/CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 2 FOR CROSS-SECTION LOCATION.

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION A-A'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 61



RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 41+13 OF 2010 SURVEY BASELINE.
2. BORINGS/CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 3 FOR CROSS-SECTION LOCATION.

CPT LEGEND

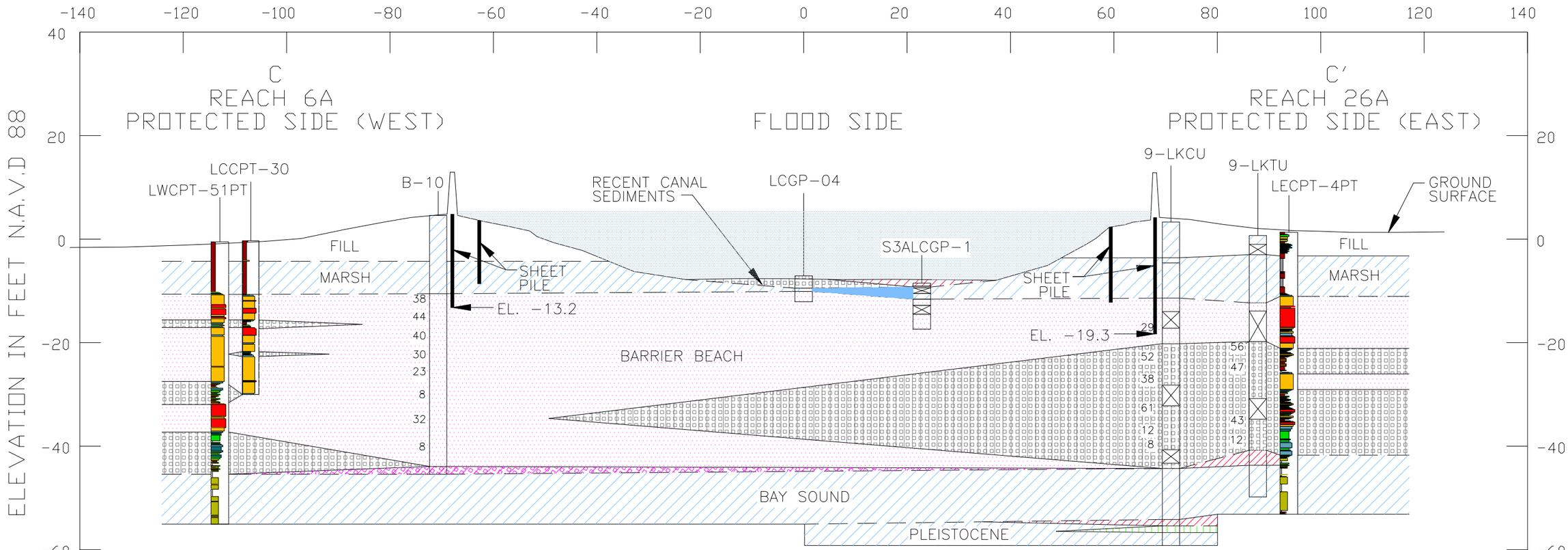
COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION B-B'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 62



RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

PLEISTOCENE – STIFF TO VERY STIFF CONSISTENCY OXIDIZED CLAYS INTERBEDDED WITH LAYERS AND LENSES OF DENSE TO VERY DENSE SILTS AND SANDS

SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 44+13 OF THE 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 4 FOR CROSS-SECTION LOCATION.

CPT LEGEND

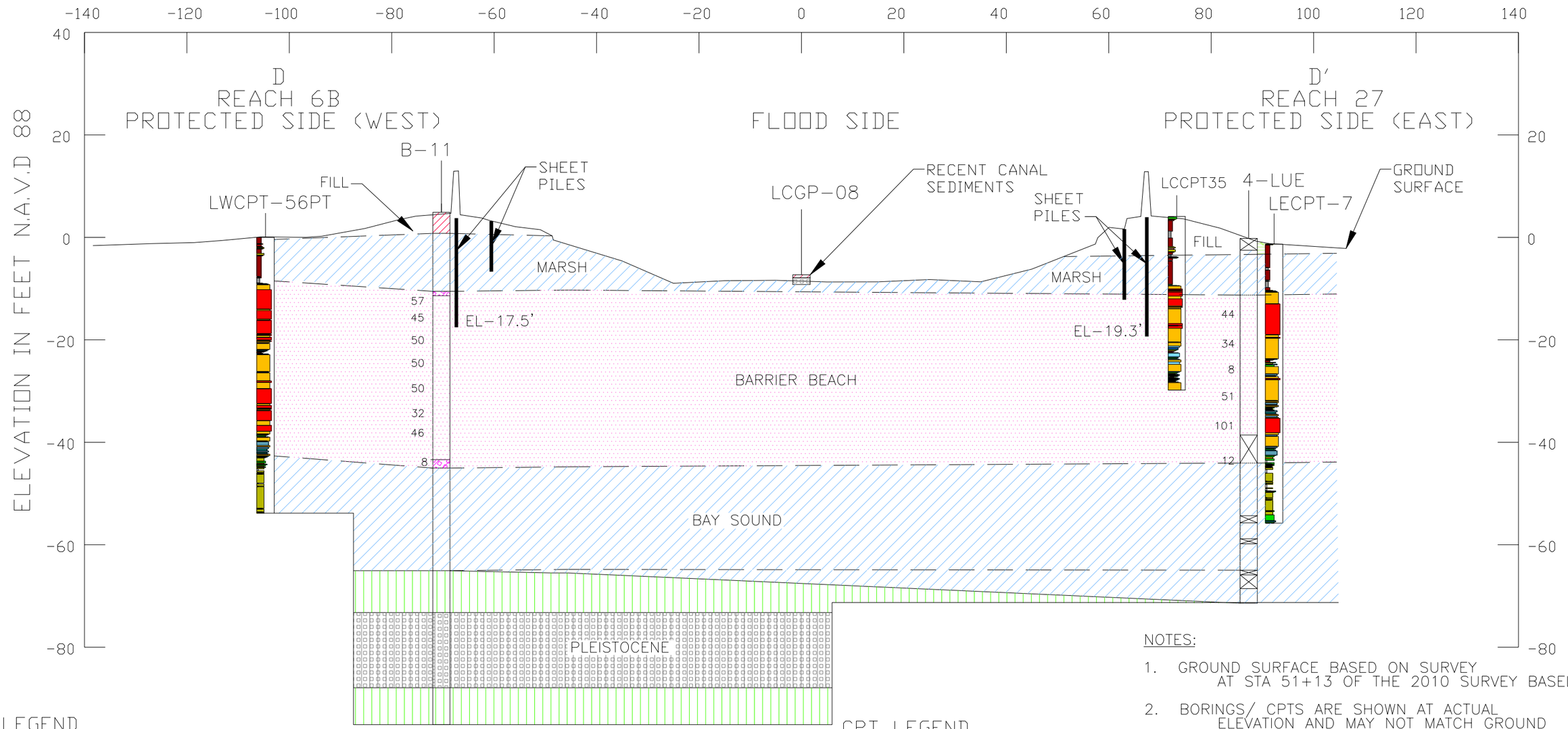
COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION C-C'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 63



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

PLEISTOCENE – STIFF TO VERY STIFF CONSISTENCY OXIDIZED CLAYS INTERBEDDED WITH LAYERS AND LENSES OF DENSE TO VERY DENSE SILTS AND SANDS

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 51+13 OF THE 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 4 FOR CROSS-SECTION LOCATION.
4. ELEVATION FOR B-79 ESTIMATED.

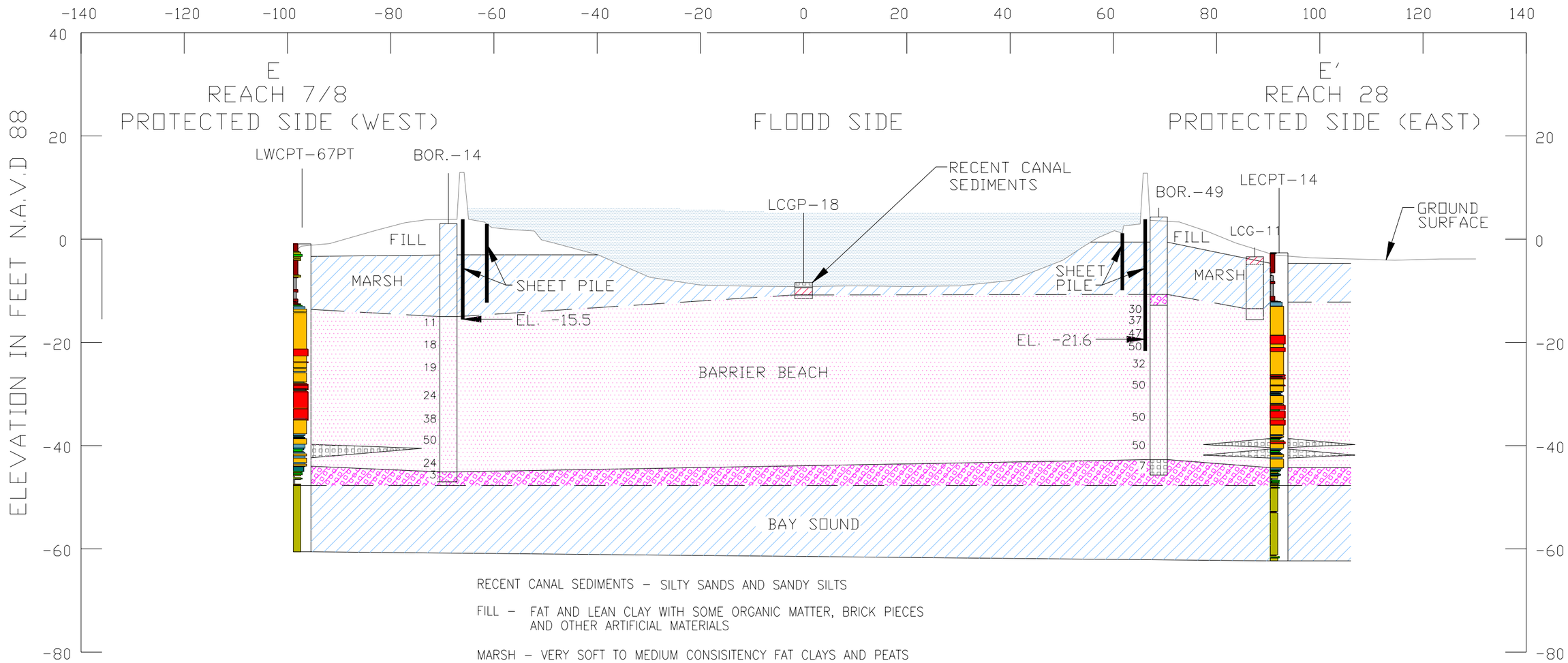
LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION D-D'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10

FILE NO. PLATE 64



RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

NOTES:

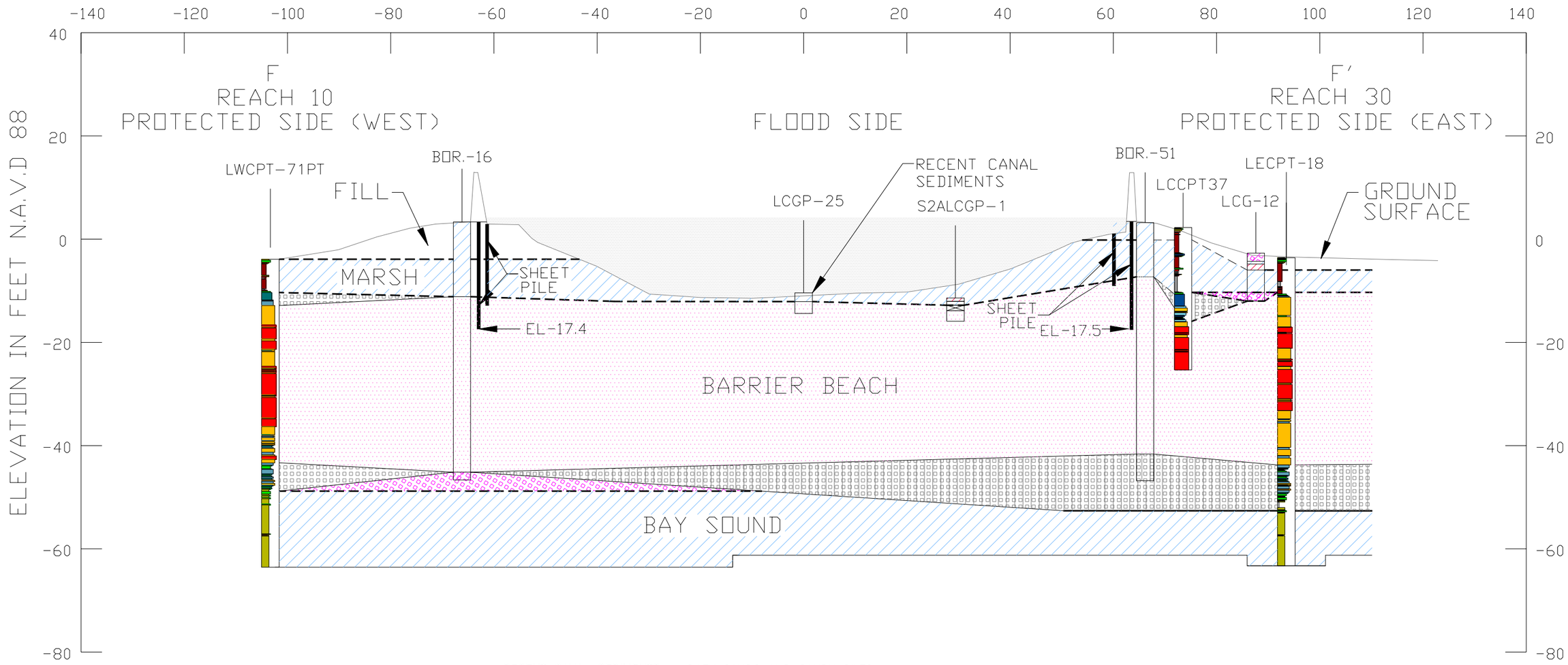
1. GROUND SURFACE BASED ON SURVEY AT STA 66+13 OF 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 5 FOR CROSS-SECTION LOCATION.
4. ELEVATION FOR B-82 ESTIMATED.

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION E-E'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 65



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 76+13 OF 2010 SURVEY BASELINE.
2. BORINGS/CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 6 FOR CROSS-SECTION LOCATION.

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

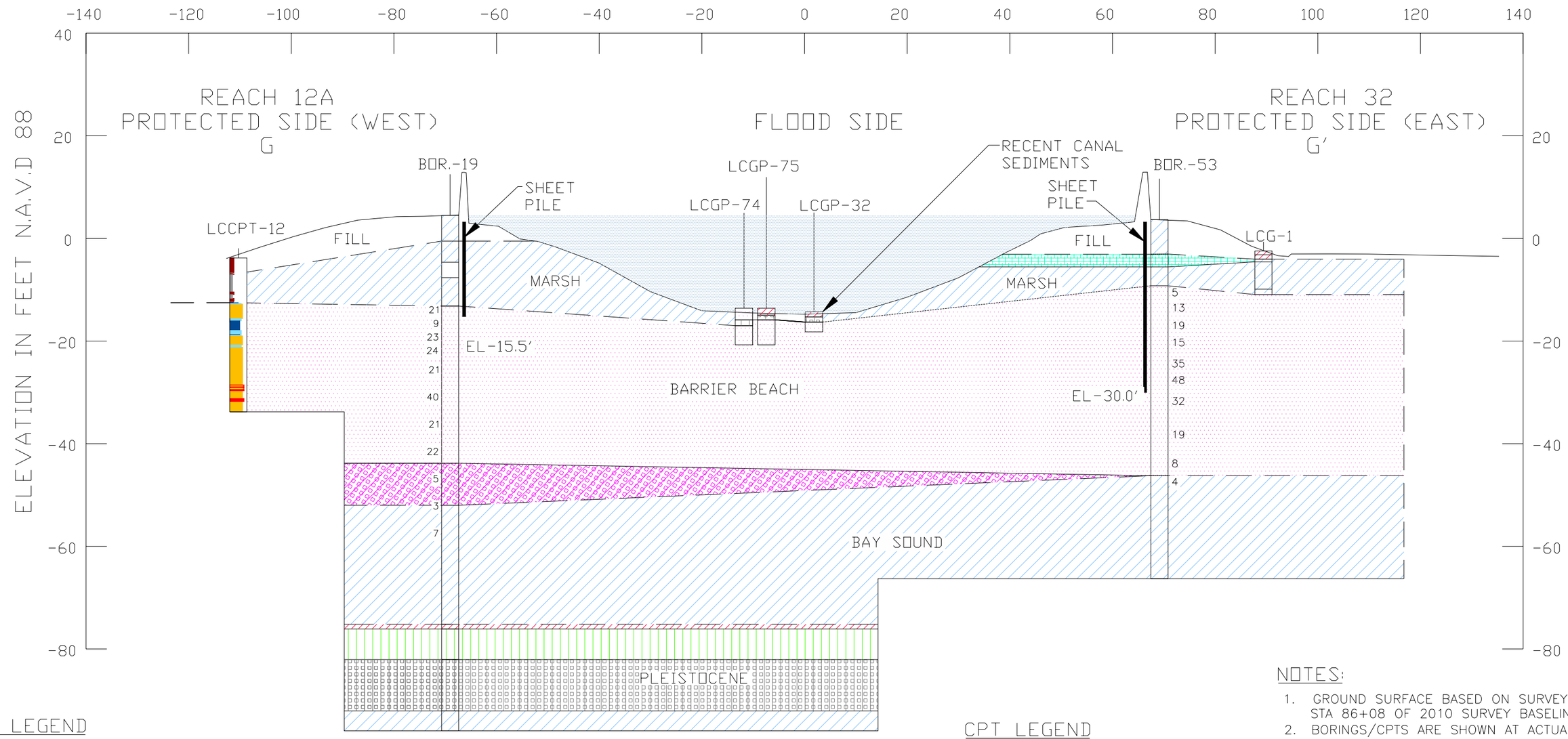
LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION F-F'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10

FILE NO. PLATE 66



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

PLEISTOCENE – STIFF TO VERY STIFF CONSISTENCY OXIDIZED CLAYS INTERBEDDED WITH LAYERS AND LENSES OF DENSE TO VERY DENSE SILTS AND SANDS

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 86+08 OF 2010 SURVEY BASELINE.
2. BORINGS/CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 7 FOR CROSS-SECTION LOCATION.
4. ELEVATION OF B-86 ESTIMATED.

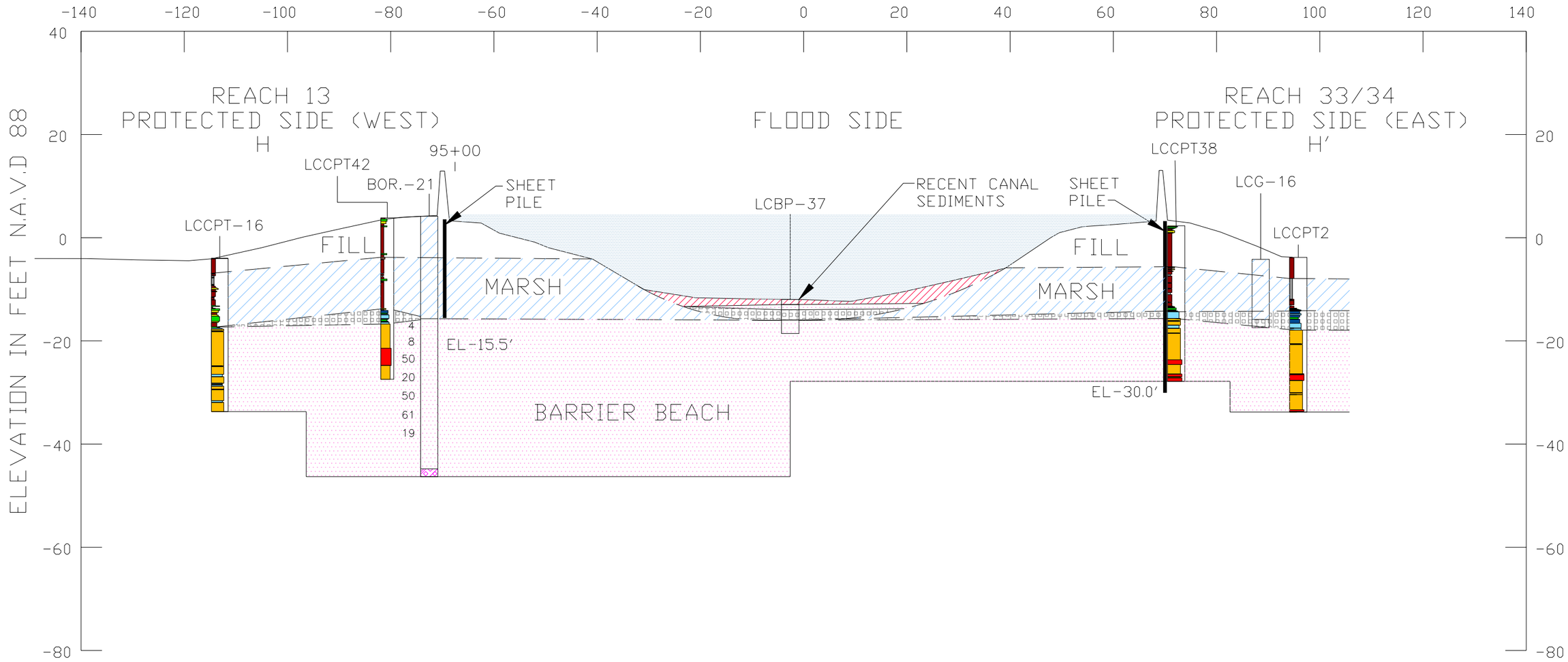
LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION G-G'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10

FILE NO. PLATE 67



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

NOTES:

1. GROUND SURFACE BASED ON SURVERY AT STA 94+14 OR THE 2010 SURVEY BASELINE.
2. BORINGS/CPTS ARE SHAWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.

NOTES (CONT'D):

3. SEE PLATE 7 FOR CROSS SECTION LOCATION.

CPT LEGEND

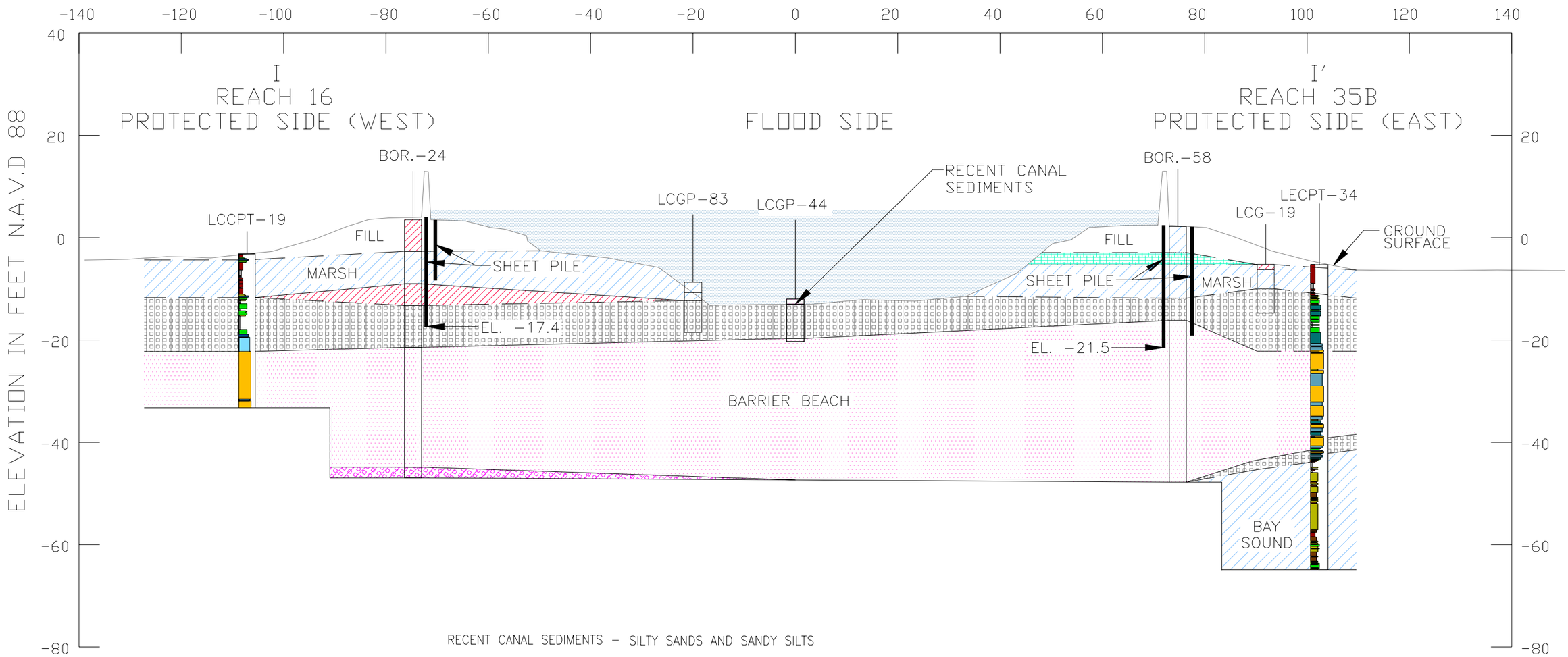
COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS SECTION H-H'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 68



RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

NOTES:

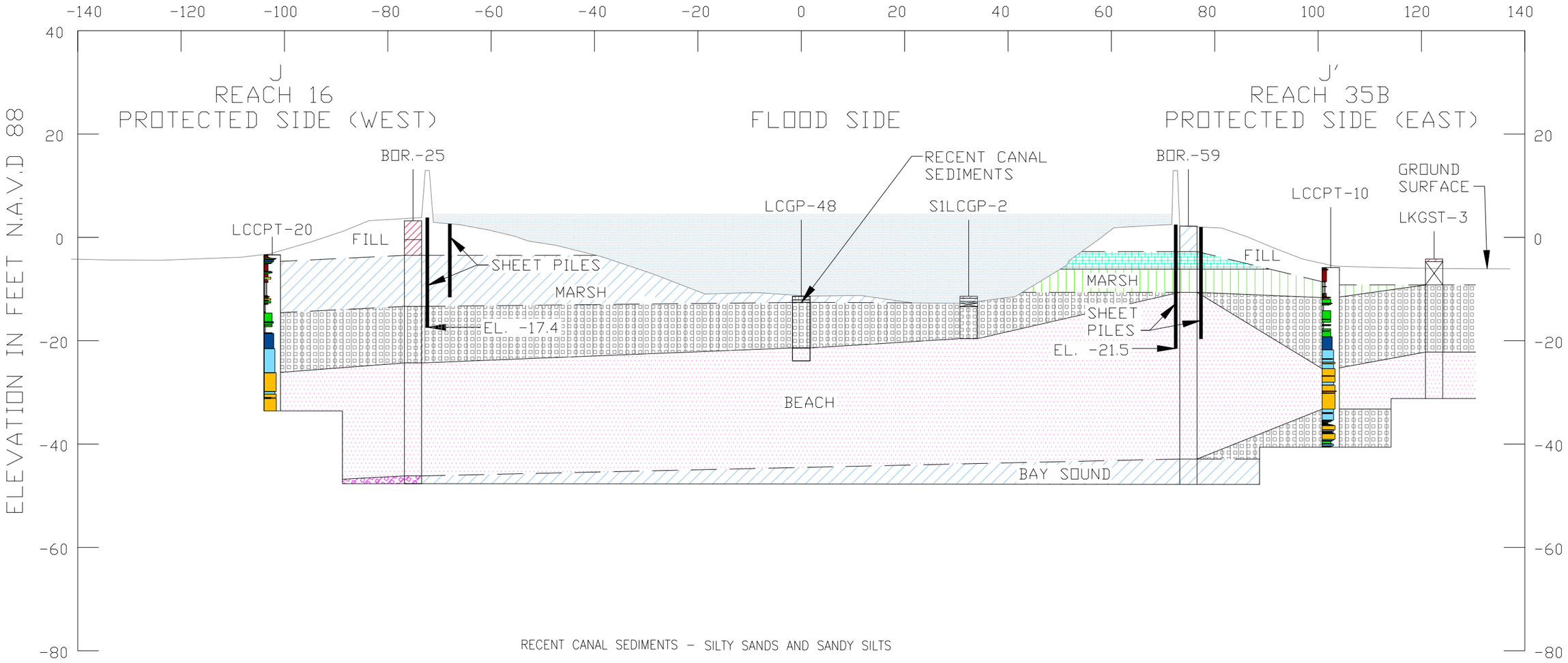
1. GROUND SURFACE BASED ON SURVEY AT STA 105+14 OF THE 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 8 FOR CROSS-SECTION LOCATION.

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION I-I'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 69



RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

NOTES:

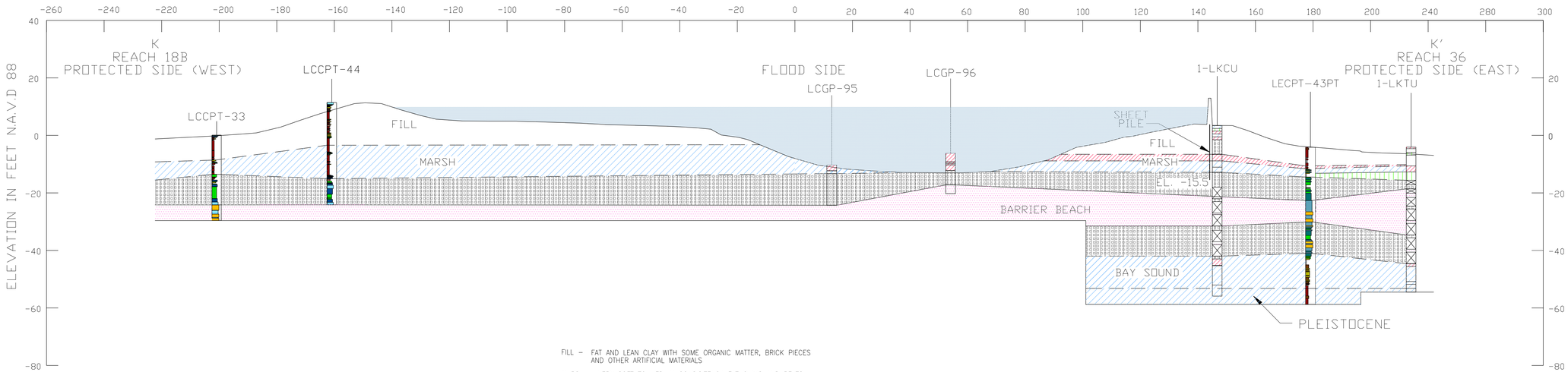
1. GROUND SURFACE BASED ON SURVEY AT STA 109+14 OF THE 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 8 FOR CROSS-SECTION LOCATION.

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION J-J'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 : 1
DATE: 08-30-10
FILE NO. PLATE 70



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

PLEISTOCENE – STIFF TO VERY STIFF CONSISTENCY OXIDIZED CLAYS INTERBEDDED WITH LAYERS AND LENSES OF DENSE TO VERY DENSE SILTS AND SANDS

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 123+50 OF 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 9 FOR CROSS-SECTION LOCATION.

CPT LEGEND

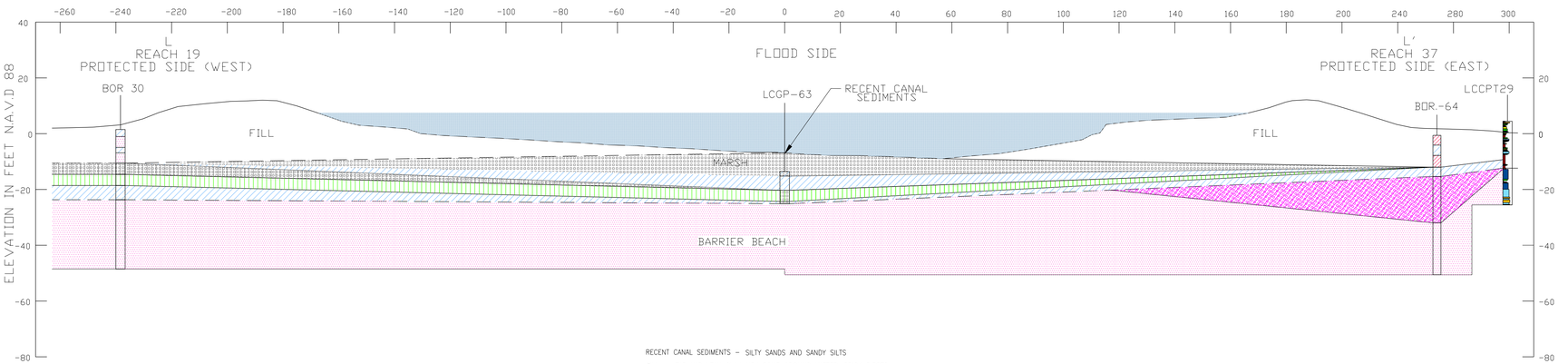
COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION K-K'

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORP OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1" = 4'
DATE: 08-30-10
FILE NO. PLATE 71



SOIL LEGEND

- CH - FAT CLAY
- CL - LEAN CLAY
- FILL - BRICK, SHELLS, ORGANICS, ETC - ARTIFICIALLY PLACED
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND POORLY-GRADED
- WD - WOOD
- NO SAMPLE

RECENT CANAL SEDIMENTS – SILTY SANDS AND SANDY SILTS

FILL – FAT AND LEAN CLAY WITH SOME ORGANIC MATTER, BRICK PIECES AND OTHER ARTIFICIAL MATERIALS

MARSH – VERY SOFT TO MEDIUM CONSISITENCY FAT CLAYS AND PEATS WITH OCCASIONAL SAND AND SILT LAYERS

BARRIER BEACH – LOOSE TO VERY DENSE SANDS AND SILTY SANDS WITH SHELL FRAGMENTS

BAY SOUND – MEDIUM TO STIFF CONSISTENCY FAT CLAY AND LEAN CLAY WITH SOME SILT AND SILTY SAND LAYERS, AND SHELLS

NOTES:

1. GROUND SURFACE BASED ON SURVEY AT STA 123+50 OF 2010 SURVEY BASELINE.
2. BORINGS/ CPTS ARE SHOWN AT ACTUAL ELEVATION AND MAY NOT MATCH GROUND SURFACE DUE TO OFFSET.
3. SEE PLATE 9 FOR CROSS-SECTION LOCATION.

CPT LEGEND

COLOR	SOIL BEHAVIOR TYPE
	SENSITIVE, FINE GRAINED
	ORGANIC SOILS-PEATS
	CLAY
	SILTY CLAY TO CLAY
	CLAYEY SILT TO SILTY CLAY
	SANDY SILT TO CLAYEY SILT
	SILTY SAND TO SANDY SILT
	SAND TO SILTY SAND
	SAND
	GRAVELLY SAND TO SAND

LAKE PONTCHARTRAIN AND VICINITY
LONDON AVENUE OUTFALL CANAL

SOIL AND GEOLOGIC CROSS-SECTION L-L'

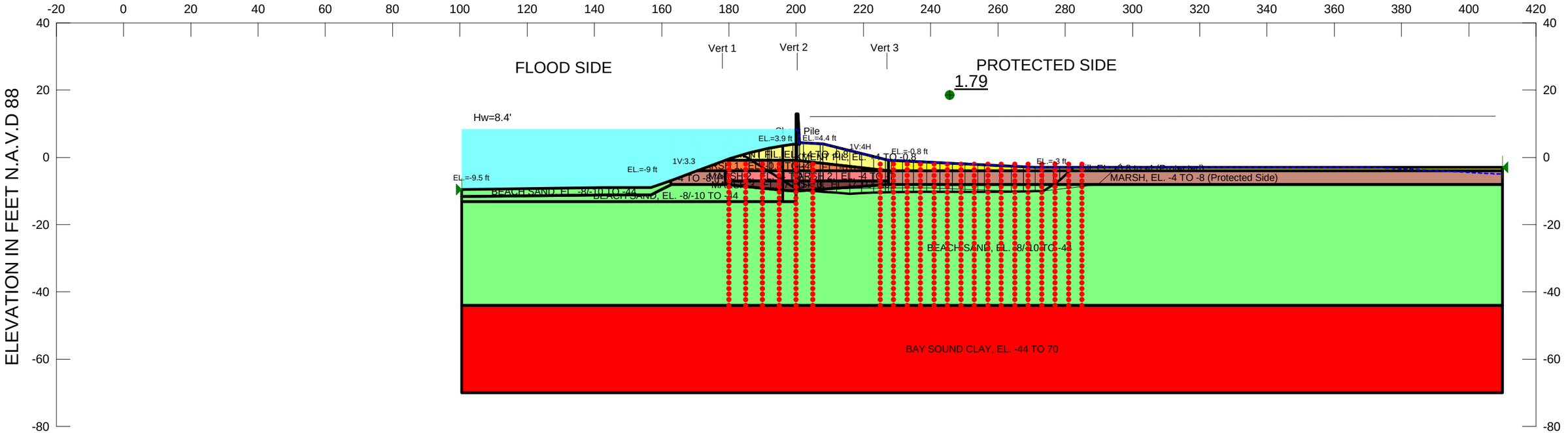
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLOT SCALE: 1 = 1
DATE: 08-30-13

FILE NO.
PLATE 72

APPENDIX O EXTREME WATER SURFACE PROFILE RESULTS

DISTANCE IN FEET



Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: Fill 1 Phi: 0 °
Name: MARSH 1, EL. -0.8 TO -4 Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 375 psf
Name: BEACH SAND, EL. -8/-10 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand
Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Clay Phi: 0 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: MARSH, EL. -4 TO -8 (Protected Side) Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 350 psf
Name: MARSH 2, EL. -4 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 96 pcf Cohesion Fn: Marsh 2/3 Phi: 0 °
Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 (protected) Cohesion Fn: Marsh 2/3 Phi: 0 °
Name: Fill, EL. -0.8 to -4 (Protected) Model: Undrained (Phi=0) Unit Weight: 109 pcf Cohesion: 500 psf

Name: Global Stability (Block)
File Name: Reach 6A.gsz Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Edited By: Middleton, Mark C MVN

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6A, STA.40+00 TO 47+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Block)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Block)

File Information

Created By: Liljegren, James
Revision Number: 291
Last Edited By: Middleton, Mark C MVN
Date: 4/15/2013
Time: 10:07:06 AM
File Name: Reach 6A.gsz
Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Solved Date: 4/15/2013
Last Solved Time: 10:16:44 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Block)

Kind: SLOPE/W
Parent: Gap Analysis (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Fn: Fill 1
Phi: 0 °
Phi-B: 0 °

MARSH 1, EL. -0.8 TO -4

Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 375 psf

BEACH SAND, EL. -8/-10 TO -44

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

BAY SOUND CLAY, EL. -44 TO 70

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Spatial Fn: Clay
Phi: 0 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH, EL. -4 TO -8 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 350 psf

MARSH 2, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion Fn: Marsh 2/3
Phi: 0 °
Phi-B: 0 °

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3 (protected)
Cohesion Fn: Marsh 2/3
Phi: 0 °
Phi-B: 0 °

Fill, EL. -0.8 to -4 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 109 pcf
Cohesion: 500 psf

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (410, -3) ft

Slip Surface Block

Left Grid
Upper Left: (180, -2) ft
Lower Left: (180, -44) ft
Lower Right: (205, -44) ft
X Increments: 5
Y Increments: 25
Starting Angle: 125 °
Ending Angle: 145 °
Angle Increments: 4
Right Grid
Upper Left: (225, -2) ft
Lower Left: (225, -44) ft
Lower Right: (285, -44) ft
X Increments: 15
Y Increments: 25
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Cohesion Functions

Marsh 2/3

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 350
Data Points: X (ft), Cohesion (psf)
Data Point: (179, 350)
Data Point: (200, 375)
Data Point: (227.4, 350)

Fill 1

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (179, 500)
Data Point: (200, 700)
Data Point: (227.4, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh 3 (protected)

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)
Data Point: (200, 103)
Data Point: (227.4, 101)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (179, -44, 530)
Data Point: (179, -70, 796)
Data Point: (200, -44, 744)
Data Point: (200, -70, 1022)
Data Point: (227.4, -44, 530)
Data Point: (227.4, -70, 796)
Data Point: (500, -44, 530)
Data Point: (500, -70, 796)
Data Point: (0, -44, 530)
Data Point: (0, -70, 796)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -4 TO -8 (Protected Side)	29,35,28,40,41,42,55	53.85
Region 2	Fill, EL. -0.8 to -4 (Protected)	4,37,5,22,21	230.67
Region 3	MARSH 1, EL. -0.8 TO -4	9,21,25	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	8047
Region 5	MARSH, EL. -4 TO -8 (Protected Side)	39,21,22,6,23	730.4
Region 6	BEACH SAND, EL. -8/-10 TO -44	11,10,23,6,8,7,12,20	10597.2
Region 7	EMBANKMENT FIL, EL. +4 TO -0.8	2,24,38,3,4,21,9	130.1
Region 8	EMBANKMENT FIL, EL. +4 TO -0.8	49,56,36,1,17,33,2,9,18	58.44
Region 9	BEACH SAND, EL. -8/-10 TO -44	42,55,54,53,15,16,12,20,11,10,19	293.97
Region 10	BEACH SAND, EL. -8/-10 TO -44	16,27,26,34,29,55,54,53,15	133.855
Region 11	MARSH 2, EL. -4 TO -7	32,25,21,39	82.2
Region 12	MARSH 3, EL. -7 TO -10	10,52,32,39,23	54.8
Region 13	MARSH 1, EL. -0.8 TO -4	18,9,25,30,40,28,49	80.8
Region 14	MARSH 2, EL. -4 TO -7	40,30,25,32,31,41	63
Region 15	MARSH 3, EL. -7 TO -10	41,31,32,52,10,19,42	43.9
Region 16	Sheet Pile	2,50,51,38,24	6.875

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	410	-3
Point 6	410	-8
Point 7	100.5	-44
Point 8	410	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	410	-70
Point 15	143.1	-11.2
Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	410	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44
Point 46	227.4	-70
Point 47	200	-70
Point 48	179	-70
Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9
Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.79	(235.022, 1.742)	37.56048	(184.091, 0.817716)	(282.545, -3)
2	13989	1.81	(235.022, 1.742)	38.791	(184.013, 0.793925)	(285.819, -3)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	185.0457	0.20096485	490.7804 3	348.5143 9	0	557.58
2	Optimized	186.2972 5	-0.60789325	517.0072 3	447.0482 2	0	569.5
3	Optimized	187.8323 5	-1.6	568.0684 8	620.8891 8	0	375
4	Optimized	190.308	-3.2	658.9187 3	800.3845 7	0	375
5	Optimized	191.7729	-4.146756	713.8511 3	908.9530 5	0	365.21
6	Optimized	192.2514	-4.455976	731.6999 4	942.3679 2	0	365.78
7	Optimized	194.2514	-5.740873	806.7652 1	1077.042 5	0	368.16
8	Optimized	196.1065	-6.931653	895.0768 4	1200.983 7	0	370.36
9	Optimized	197.6065	-7.8944975	986.1055 1	1306.352 8	0	372.15
10	Optimized	199.4169 5	-9.0566175	1073.214 8	1434.014 3	0	374.31
11	Optimized	199.9169 5	-9.3423775	1101.881 2	1586.817 2	0	374.9
12	Optimized	200.25	-9.415096	1005.553 8	1242.688	0	374.77
13	Optimized	200.75	-9.5242585	991.5047 1	1329.170 8	0	374.32
14	Optimized	201.5562	-9.70027	1001.947 2	1396.999 6	0	373.58
15	Optimiz	204.6285	-9.97684	1010.199	1460.547	260.00868	1.5687e-

	ed	5		4	6		005
16	Optimized	207.57235	-10.163415	1009.8557	1468.0372	264.53122	-1.8769e-005
17	Optimized	209.99245	-10.34131	1011.411	1439.1559	246.95862	-1.3112e-006
18	Optimized	213.9773	-10.63423	1014.4394	1377.3881	209.54853	-1.1125e-006
19	Optimized	217.72375	-10.712985	1005.5662	1315.565	178.97788	-9.5013e-007
20	Optimized	221.2318	-10.57758	984.60147	1210.0577	130.16722	-6.9104e-007
21	Optimized	224.73985	-10.442175	963.97856	1104.6644	81.225006	-4.312e-007
22	Optimized	226.94695	-10.35941	951.34774	1038.228	50.160316	7.2741e-007
23	Optimized	227.8424	-10.32964	946.47201	1039.4791	53.697672	7.787e-007
24	Optimized	229.94215	-10.28807	936.85758	1021.0776	48.62447	3.228e-006
25	Optimized	233.25685	-10.23435	922.34833	996.04087	42.546411	2.8245e-006
26	Optimized	236.864	-10.20773	908.5046	971.43421	36.332428	5.2682e-007
27	Optimized	240.7636	-10.208205	895.32375	949.91916	31.520676	-3.6074e-007
28	Optimized	244.5939	-10.212985	882.63572	929.1658	26.864154	-1.0046e-006
29	Optimized	248.3549	-10.222075	870.43154	909.49022	22.550538	-8.4319e-007
30	Optimized	252.1159	-10.231165	858.25396	889.84123	18.236923	-2.0868e-007
31	Optimized	254.9745	-10.24057	849.11852	875.03527	14.963041	-1.7108e-007
32	Optimized	258.2215	-10.242055	838.23019	857.66703	11.221864	-2.7405e-007
33	Optimized	262.25865	-10.206455	822.30648	831.86227	5.5170356	3.8569e-008
34	Optimiz	265.7952	-10.142005	806.3047	804.3257	0	0

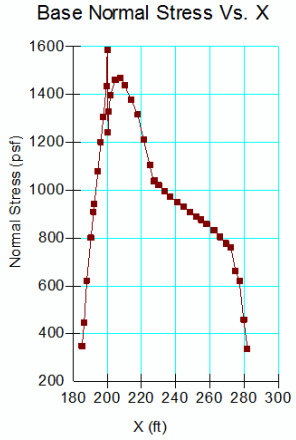
	ed			8	7		
35	Optimized	269.33175	-10.07756	790.30308	777.01545	0	0
36	Optimized	272.3017	-10.02344	776.86657	760.68358	0	0
37	Optimized	274.9891	-9.00077	703.94407	662.07586	0	0
38	Optimized	277.3953	-7.37996	580.39636	619.00536	0	350
39	Optimized	279.86805	-5.37996	403.03895	458.55249	0	350
40	Optimized	281.98275	-3.5	139.6656	337.67968	0	500

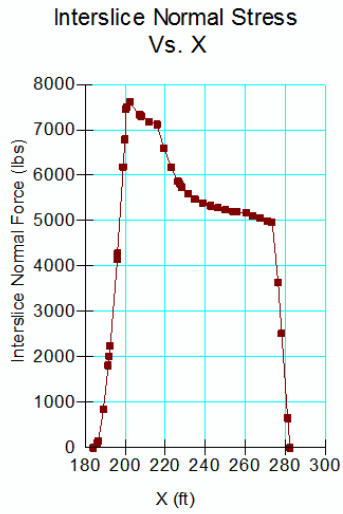
Slices of Slip Surface: **13989**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	13989	185.0067	0.098415	494.97622	343.87735	0	557.21
2	13989	186.1449	-0.69854725	521.17991	440.02205	0	568.05
3	13989	188.57485	-2.4	614.58712	694.85197	0	375
4	13989	191.42995	-4.39917	729.16659	917.90643	0	364.8
5	13989	193.57215	-5.89917	816.36524	1073.8892	0	367.35
6	13989	195.57215	-7.299585	898.77573	1219.5811	0	369.73
7	13989	197.5	-8.649481	1018.7793	1366.6732	0	372.02
8	13989	199.1924	-9.8345165	1094.1347	1497.1204	0	374.04
9	13989	199.6924	-10.184621	1115.5835	1572.9566	264.06449	1.5939e-005
10	13989	200.25	-10.4	1065.76	1409.98	198.73551	-1.0551e-006
11	13989	200.75	-10.4	1049.5	1486.76	252.45218	-1.791e-005
12	13989	202.75	-10.4	1043.9714	1534.4857	283.19855	-2.0092e-005
13	13989	206.25	-10.4	1030.0857	1520	282.85214	1.7063e-005

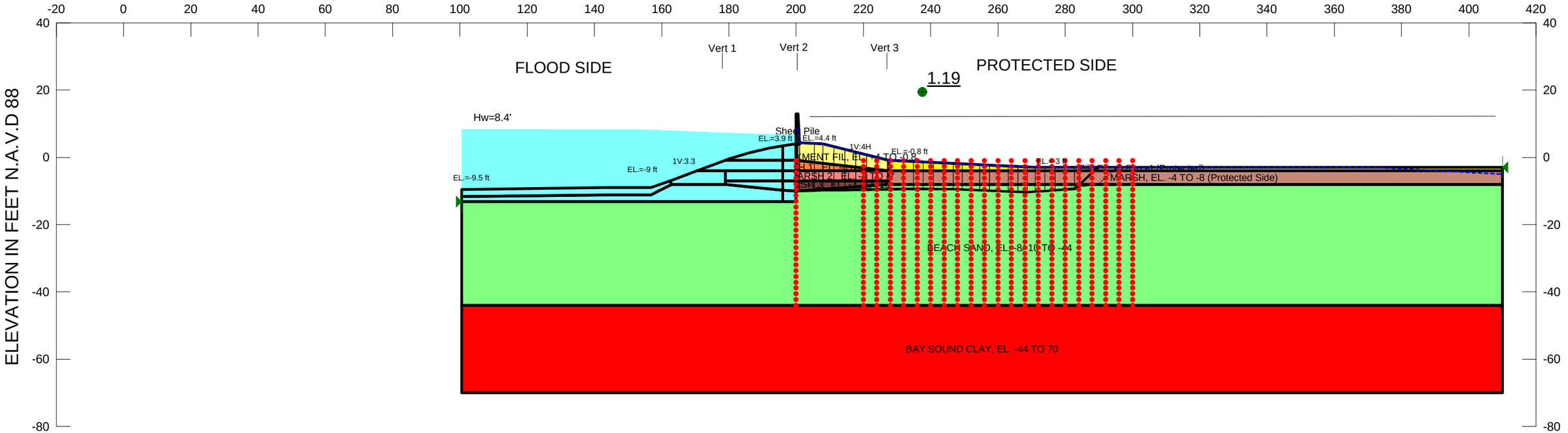
14	13989	209.61665	-10.4	1016.5671	1472.3197	263.1289	1.5874e-005
15	13989	212.85	-10.4	1004.0104	1391.4434	223.68456	-1.1875e-006
16	13989	216.08335	-10.4	991.91763	1310.6909	184.04381	-9.7706e-007
17	13989	219.31665	-10.4	980.22691	1230.0001	144.20664	-7.6563e-007
18	13989	222.55	-10.4	968.87639	1149.464	104.26233	2.8681e-006
19	13989	225.78335	-10.4	957.83515	1069.0207	64.193024	1.7659e-006
20	13989	229.08075	-10.4	946.73926	1038.0963	52.744984	3.5018e-006
21	13989	232.4423	-10.4	935.43491	1019.5036	48.537064	3.222e-006
22	13989	235.80385	-10.4	924.10081	1000.9109	44.34632	6.4328e-007
23	13989	239.1654	-10.4	912.70722	982.34796	40.207101	2.6692e-006
24	13989	242.52695	-10.4	901.31362	963.75528	36.050707	5.2288e-007
25	13989	245.88845	-10.4	889.92003	945.19235	31.911488	-3.6516e-007
26	13989	249.25	-10.4	878.49669	926.59967	27.772269	-3.1774e-007
27	13989	252.61155	-10.4	867.10309	908.00699	23.615875	-2.7031e-007
28	13989	255.97305	-10.4	855.7095	889.44406	19.476656	-2.2287e-007
29	13989	259.3346	-10.4	844.31591	870.85138	15.320262	-3.7428e-007
30	13989	262.69615	-10.4	832.92231	852.28845	11.181043	-2.7298e-007
31	13989	266.0577	-10.4	821.52872	833.69577	7.0246494	1.075e-008
32	13989	269.41925	-10.4	810.13512	815.10309	2.8682554	2.0114e-008
33	13989	272.575	-10.4	799.45763	805.9322	3.7380984	2.6123e-008

34	13989	275.525	-10.4	789.49153	806.10169	9.5898858	-2.3451e-007
35	13989	278.4301	-9.2	704.76308	693.70178	0	0
36	13989	282.2437	-6	448.82647	509.60204	0	350
37	13989	285.2231	-3.5	135.84029	317.942	0	500





DISTANCE IN FEET



Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: Fill 1 Phi: 0 °
Name: MARSH 1, EL. -0.8 TO -4 Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 375 psf
Name: BEACH SAND, EL. -8/-10 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand
Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Clay Phi: 0 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: MARSH, EL. -4 TO -8 (Protected Side) Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 350 psf
Name: MARSH 2, EL. -4 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 96 pcf Cohesion Fn: Marsh 2/3 Phi: 0 °
Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 (protected) Cohesion Fn: Marsh 2/3 Phi: 0 °
Name: Fill, EL. -0.8 to -4 (Protected) Model: Undrained (Phi=0) Unit Weight: 109 pcf Cohesion: 500 psf

Name: GAP Stability (Block)
File Name: Reach 6A.gsz Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Edited By: Middleton, Mark C MVN

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6A, STA.40+00 TO 47+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: GAP Stability (Block)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GAP Stability (Block)

File Information

Created By: Liljegren, James
Revision Number: 291
Last Edited By: Middleton, Mark C MVN
Date: 4/15/2013
Time: 10:07:06 AM
File Name: Reach 6A.gsz
Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Solved Date: 4/15/2013
Last Solved Time: 10:09:14 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

GAP Stability (Block)

Kind: SLOPE/W
Parent: Gap Analysis (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: Yes
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 8
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Fn: Fill 1
Phi: 0 °
Phi-B: 0 °

MARSH 1, EL. -0.8 TO -4

Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 375 psf

BEACH SAND, EL. -8/-10 TO -44

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

BAY SOUND CLAY, EL. -44 TO 70

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Spatial Fn: Clay
Phi: 0 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH, EL. -4 TO -8 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 350 psf

MARSH 2, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion Fn: Marsh 2/3
Phi: 0 °
Phi-B: 0 °

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3 (protected)
Cohesion Fn: Marsh 2/3
Phi: 0 °
Phi-B: 0 °

Fill, EL. -0.8 to -4 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 109 pcf
Cohesion: 500 psf

Slip Surface Limits

Left Coordinate: (100.5, -13.2) ft
Right Coordinate: (410, -3) ft

Slip Surface Block

Left Grid
Upper Left: (200, -1) ft
Lower Left: (200, -44) ft
Lower Right: (200, -44) ft
X Increments: 0
Y Increments: 25
Starting Angle: 135 °
Ending Angle: 135 °
Angle Increments: 1
Right Grid
Upper Left: (220, -1) ft
Lower Left: (220, -44) ft
Lower Right: (300, -44) ft
X Increments: 20
Y Increments: 25
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Cohesion Functions

Marsh 2/3

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 350
Data Points: X (ft), Cohesion (psf)
Data Point: (179, 350)
Data Point: (200, 375)
Data Point: (227.4, 350)

Fill 1

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (179, 500)
Data Point: (200, 700)
Data Point: (227.4, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh 3 (protected)

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)
Data Point: (200, 103)
Data Point: (227.4, 101)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (179, -44, 530)
Data Point: (179, -70, 796)
Data Point: (200, -44, 744)
Data Point: (200, -70, 1022)
Data Point: (227.4, -44, 530)
Data Point: (227.4, -70, 796)
Data Point: (500, -44, 530)
Data Point: (500, -70, 796)
Data Point: (0, -44, 530)
Data Point: (0, -70, 796)

Regions

	Points	Area (ft²)	Material
Region 1	29,35,28,40,41,42,55	53.85	
Region 2	4,37,5,22,21	230.67	Fill, EL. -0.8 to -4 (Protected)
Region 3	9,21,25	43.84	MARSH 1, EL. -0.8 TO -4
Region 4	13,7,8,14	8047	BAY SOUND CLAY, EL. -44 TO 70
Region 5	39,21,22,6,23	730.4	MARSH, EL. -4 TO -8 (Protected Side)
Region 6	11,10,23,6,8,7,12,20	10597.2	BEACH SAND, EL. -8/-10 TO -44
Region 7	2,24,38,3,4,21,9	130.1	EMBANKMENT FIL, EL. +4 TO -0.8
Region 8	49,56,36,1,17,33,2,9,18	58.44	
Region 9	42,55,54,53,15,16,12,20,11,10,19	293.97	
Region 10	16,27,26,34,29,55,54,53,15	133.855	
Region 11	32,25,21,39	82.2	MARSH 2, EL. -4 TO -7
Region 12	10,52,32,39,23	54.8	MARSH 3, EL. -7 TO -10
Region 13	18,9,25,30,40,28,49	80.8	
Region 14	40,30,25,32,31,41	63	
Region 15	41,31,32,52,10,19,42	43.9	
Region 16	2,50,51,38,24	6.875	Sheet Pile

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	410	-3
Point 6	410	-8
Point 7	100.5	-44
Point 8	410	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	410	-70
Point 15	143.1	-11.2
Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	410	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44
Point 46	227.4	-70
Point 47	200	-70
Point 48	179	-70
Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9
Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.19	(247.592, -1.35)	33.42092	(200, 12.9)	(289.683, -3)
2	1244	1.27	(247.592, -1.35)	35.006	(200, 12.9)	(295.866, -3)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	200.25	-10.01822	1046.9275	-123.17417	0	0
2	Optimized	200.75	-10.004879	1024.7754	1453.9627	247.7914	-1.3156e-006
3	Optimized	203.17825	-9.9400945	1013.3089	1493.5521	277.26856	1.6728e-005
4	Optimized	206.67825	-9.8613585	994.60186	1465.2373	271.72153	1.6394e-005
5	Optimized	209.61665	-9.815515	979.98378	1412.7043	249.8313	-1.7725e-005
6	Optimized	212.85	-9.765071	964.27435	1323.7048	207.51728	-1.1018e-006
7	Optimized	216.08335	-9.714627	948.99786	1234.7981	165.00685	-8.7601e-007
8	Optimized	219.31665	-9.664183	934.15431	1145.9842	122.30004	3.3645e-006
9	Optimized	222.55	-9.6137385	919.65092	1057.294	79.468244	2.186e-006
10	Optimized	225.78335	-9.563294	905.48769	968.66557	36.475763	-1.364e-006
11	Optimized	229.62105	-9.50342	888.93471	926.7052	21.806806	-8.1573e-007

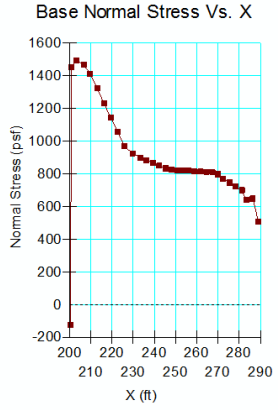
			1				
12	Optimized	233.33125	-9.469007	874.34259	900.39727	15.042675	-1.7206e-007
13	Optimized	236.3096	-9.469481	864.30348	883.87806	11.301391	-2.7576e-007
14	Optimized	239.28795	-9.469955	854.26437	867.35886	7.5601072	6.0647e-008
15	Optimized	242.2663	-9.470429	844.19169	850.83966	3.8382083	6.6326e-008
16	Optimized	245.24465	-9.470903	834.119	834.32046	0.11630934	-2.1507e-010
17	Optimized	248.0452	-9.52718	828.11863	823.24263	0	0
18	Optimized	250.66795	-9.63926	826.21394	822.51885	0	0
19	Optimized	253.29065	-9.75134	824.30926	821.79507	0	0
20	Optimized	256.01975	-9.860205	821.86181	820.45209	0	0
21	Optimized	258.85525	-9.965855	818.83093	817.77364	0	0
22	Optimized	261.69075	-10.071505	815.83529	815.13043	0	0
23	Optimized	264.5262	-10.177155	812.80441	812.45198	0	0
24	Optimized	267.36165	-10.282805	809.77353	809.80877	0.020347433	-1.064e-012
25	Optimized	269.9397	-10.2583	799.5425	798.76855	0	0

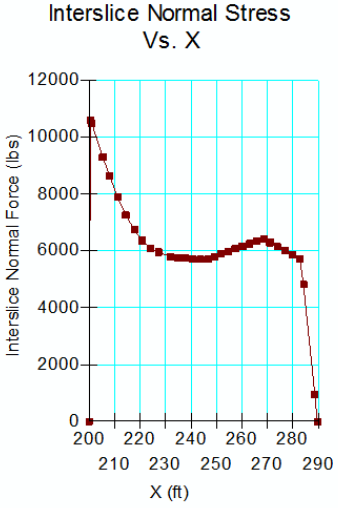
			25				
26	Optimized	272.5578	-10.083895	779.7886	770.99348	0	0
27	Optimized	275.4734	-9.8896425	757.78368	747.17478	0	0
28	Optimized	278.389	-9.6953895	735.81299	723.3903	0	0
29	Optimized	281.3046	-9.5011365	713.84229	699.57161	0	0
30	Optimized	283.521	-8.702005	656.46509	642.24249	0	0
31	Optimized	286.4408	-6	436.52618	648.5915	0	350
32	Optimized	289.1423	-3.5	131.20235	508.37937	0	500

Slices of Slip Surface: **1244**

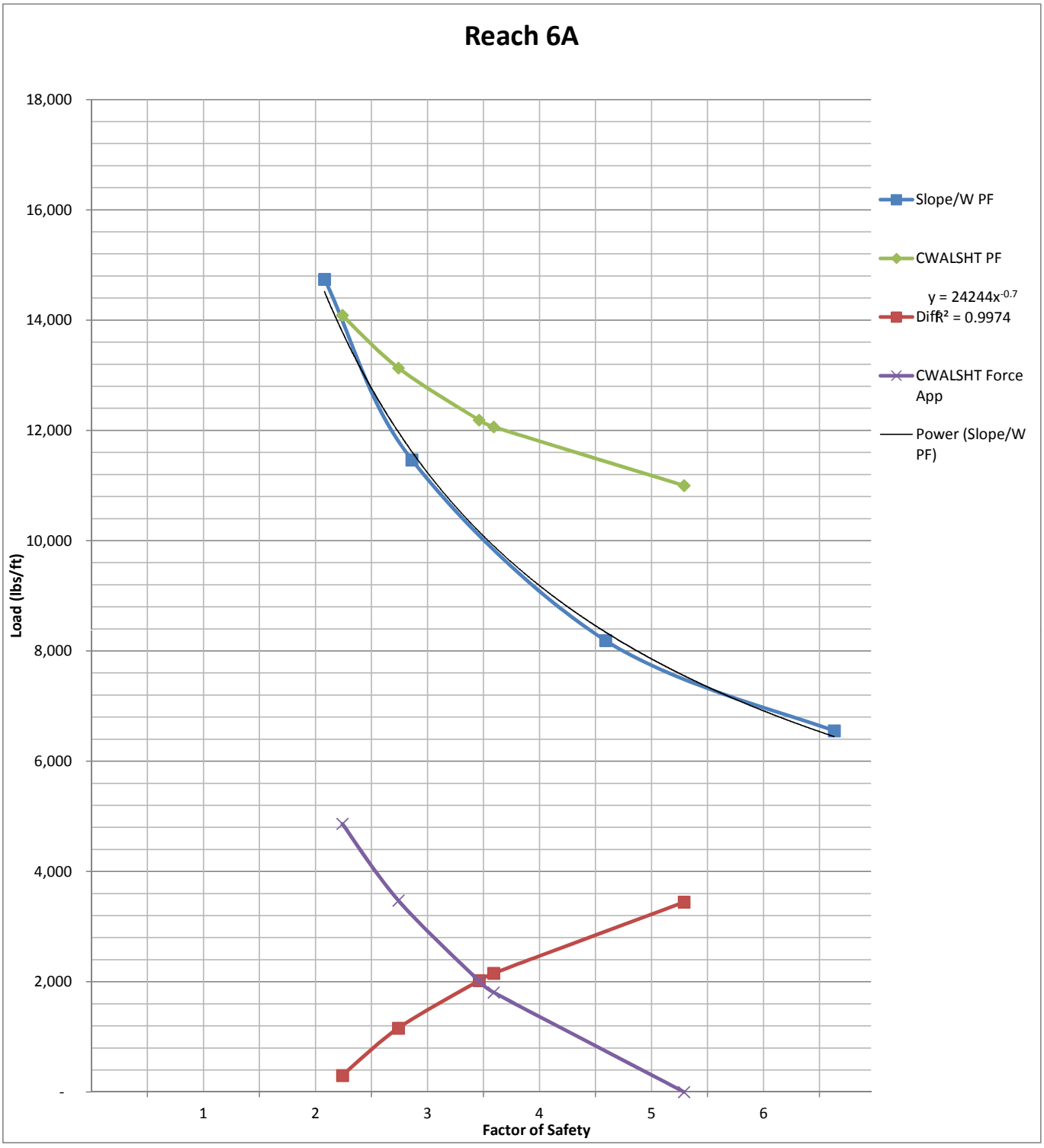
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1244	200.25	-9.6	1018.46	-57.248	0	374.77
2	1244	200.75	-9.6	996.82	1408.84	0	374.32
3	1244	203.24	-9.6	990.75893	1449.9554	0	372.04
4	1244	206.74	-9.6	977.97619	1425.9127	258.61626	-1.8348e-005
5	1244	209.61665	-9.6	966.46402	1379.7527	238.61234	-1.2668e-006
6	1244	212.85	-9.6	953.93824	1297.8867	198.57875	-1.0543e-006
7	1244	216.08335	-9.6	941.84546	1216.1135	158.34874	-8.4073e-007
8	1244	219.31665	-9.6	930.15474	1134.4331	117.94017	3.2449e-006
9	1244	222.55	-9.6	918.80422	1052.8764	77.406609	-4.1101e-007

10	1244	225.78335	-9.6	907.79391	971.41247	36.730195	-1.3736e-006
11	1244	228.9607	-9.6	897.15319	940.88317	25.247511	-9.4366e-007
12	1244	232.08215	-9.6	886.7413	923.51932	21.233804	-7.941e-007
13	1244	235.2036	-9.6	876.20125	906.15548	17.294082	-1.9799e-007
14	1244	238.325	-9.6	865.62917	888.82368	13.391354	-3.268e-007
15	1244	241.4464	-9.6	855.05709	871.45983	9.4701285	-1.0843e-007
16	1244	244.56785	-9.6	844.45297	854.09599	5.5673998	-7.5272e-008
17	1244	247.6893	-9.6	833.88089	836.76419	1.664671	-1.3967e-008
18	1244	250.8107	-9.6	823.27677	819.52849	0	0
19	1244	253.93215	-9.6	812.70469	802.42094	0	0
20	1244	257.0536	-9.6	802.10058	785.28136	0	0
21	1244	260.175	-9.6	791.5285	768.14177	0	0
22	1244	263.2964	-9.6	780.95641	751.03422	0	0
23	1244	266.41785	-9.6	770.38433	733.89464	0	0
24	1244	269.5393	-9.6	759.81225	716.75505	0	0
25	1244	272.79	-9.6	748.78698	708.19527	0	0
26	1244	276.17	-9.6	737.36686	708.19527	0	0
27	1244	279.55	-9.6	725.94675	708.19527	0	0
28	1244	282.93	-9.6	714.52663	708.19527	0	0
29	1244	286.31	-9.6	703.10651	708.37278	3.0404837	5.2525e-008
30	1244	288.9534	-8.8	644.23391	654.83991	6.1233747	9.3907e-009
31	1244	292.2903	-6	419.43501	598.8049	0	350
32	1244	295.2697	-3.5	123.73017	440.39303	0	500





Reach 6A ETL Surcharge Summary						
Iteration	**Distributed Load In CWALSHT (psf)**	**Force Applied in CWALSHT (lbs/ft)**	**CWALSHT Passive Force Calculated (lbs/ft)**	**Spencer's Passive Force Calculated (lbs/ft)**	**Difference in Forces (lbs/ft)**	**Factor of Safety**
1	0	0	10999	7554	3445	5.29
4	130	1807	12064	9909	2155	3.59
5	145	2015.5	12188	10168	2020	3.46
2	250	3475	13132	11972	1160	2.74
3	350	4865	14088	13786	302	2.24


Reach 6A
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
Load (lbs/ft)
1
2
3
4
5
6
Factor of Safety
Slope/W PF
CWALSHT PF
y = 24244x-0.7
R² = 0.9974
Diff
CWALSHT Force App
Power (Slope/W PF)

Reach 6A

HORIZONTAL DISTRIBUTED LOAD 145 PSF
FACTOR OF SAFETY FOR ACTIVE PRESSURE = 3.46
FACTOR OF SAFETY FOR PASSIVE PRESSURE = 3.46
PILE TIP -13.2

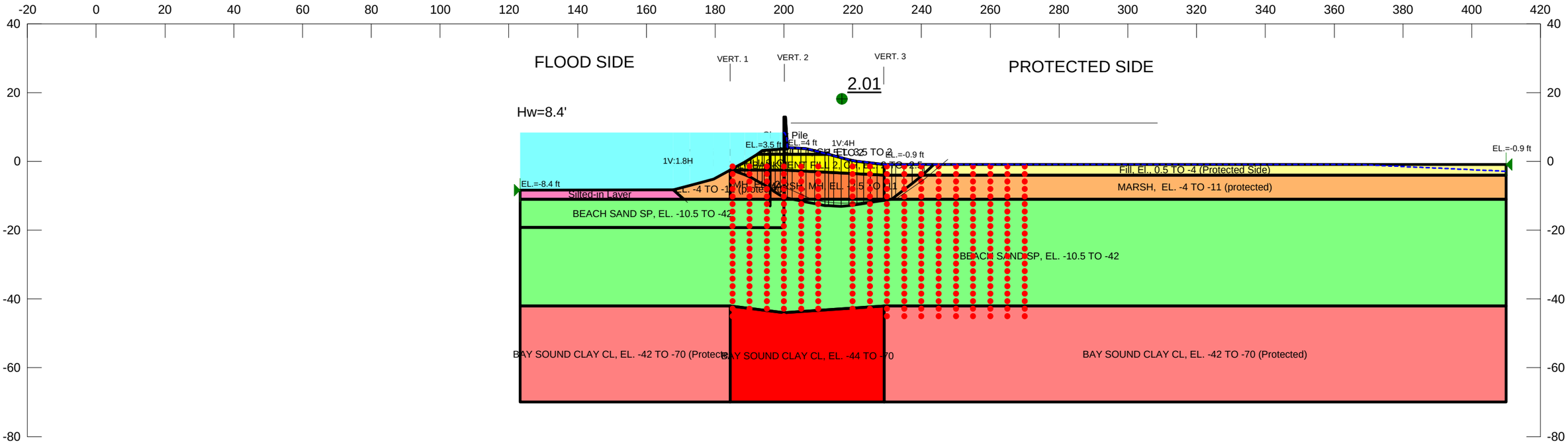
III.--WATER AND SOIL PRESSURES

		<----------SOIL		PRESSURES---------->	
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
13	0	0	0	0	0
12	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0
9	0	0	0	0	0
8.4	0	0	0	0	0
8	25	0	0	0	0
7	88	0	0	0	0
6	150	0	0	0	0
5	213	0	0	0	0
4.4	250	0	0	0	0
4.4	250	289	0	0	0
4	275	389	0	0	0
Ground Surface 3.9	281	399	0	0	0
3.9	281	399	0	0	289
3.22	324	469	0	0	360
3	338	492	0	0	383
2.9	344	502	0	0	383
2	400	594	0	0	395
1.02	462	698	0	0	433
1.02	462	696	0	0	433
1	463	698	2	0	433
0	525	796	109	0	467
-0.8	575	837	231	0	456
-1	588	841	267	0	447
-1.99	650	907	393	0	448
-1.99	650	907	393	0	448
Water Surface -2	650	908	393	0	448
-3	713	981	478	33	478
-4	713	1000	547	70	500
-5	713	993	590	104	521
-6	713	997	610	134	544
-7	713	1007	626	165	567
-8	713	1009	643	194	588
-9	713	1099	688	270	663
Slip Surface Bottom -10	713	1294	713	376	771
-11	713	1420	663	407	811
-11.54	713	1449	652	412	830
-12	713	1474	642	417	846
-13	713	1539	671	457	914
-13.37	713	1604	694	496	986
-15	713	1669	718	528	1063

			Left P.P.	**Area**
			0	39.4
			399	0
			469	295.12
			492	105.71
			502	49.7
			594	493.2
			698	633.08
			696	0
			698	13.94
Water Press	**Left P.P.**		796	747
			837	653.2
			841	167.8
			907	865.26
			907	0
			908	9.075
62.4	944.5			
124.8	1021.75			
187.2	1090.25			
249.6	1151.25			
312	1220.75			
374.4	1289.25			
436.8	1397.75			
499.2				
Total CWALSHT Passive Force			12,188	Exponential
	CWALSHT FoS		3.46	**significand** 24244 **exponent** -0.7
		Equation		
Total Slope/W Passive Force			10,168	
		Difference	2,020	
	Distributed Height		13.9	
	Distributed Load		145	

DISTANCE IN FEET

ELEVATION IN FEET N.A.V.D 88



Name: EMBANKMENT FILL 1, CH, EL. 3.5 TO 2 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 600 psf
Name: MARSH, MH, EL. -2.5 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: MARSH Phi: 0 °
Name: BEACH SAND SP, EL. -10.5 TO -42 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand
Name: BAY SOUND CLAY CL, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 °
Name: Fill, El., 0.5 TO -4 (Protected Side) Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 600 psf
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: EMBANKMENT FILL 2, CH, EL. 2 TO -2.5 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 500 psf Phi: 0 °
Name: MARSH, EL. -4 TO -11 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Marsh (protected) Phi: 0 °
Name: BAY SOUND CLAY CL, EL. -42 TO -70 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Bay Sound (Protected) Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 26A, STA. 37+00 TO 47+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Block)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: Global Stability (Block)
File Name: Reach 26A - Passive Resistance.gsz Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Edited By: Middleton, Mark C MVN

Global Stability (Block)

File Information

Created By: Liljegren, James
Revision Number: 271
Last Edited By: Middleton, Mark C MVN
Date: 4/15/2013
Time: 1:03:44 PM
File Name: Reach 26A - Passive Resistance.gsz
Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Solved Date: 4/15/2013
Last Solved Time: 1:12:28 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Block)

Kind: SLOPE/W
Parent: GAP Analysis (Seepage)
Method: Spencer
Settings
  PWP Conditions Source: Parent Analysis
Slip Surface
  Direction of movement: Left to Right
  Use Passive Mode: Yes
  Slip Surface Option: Block
  Critical slip surfaces saved: 1
  Optimize Critical Slip Surface Location: Yes
  Tension Crack
    Tension Crack Option: (none)
FOS Distribution
  FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
  Number of Slices: 30
  Optimization Tolerance: 0.01
  Minimum Slip Surface Depth: 0.1 ft
  Optimization Maximum Iterations: 4000
  Optimization Convergence Tolerance: 1e-007
  Starting Optimization Points: 8
  Ending Optimization Points: 16
  Complete Passes per Insertion: 1
  Driving Side Maximum Convex Angle: 5 °
  Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 600 psf

MARSH, MH, EL. -2.5 TO -11

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: MARSH
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -10.5 TO -42

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °

Fill, El., 0.5 TO -4 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 600 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Spatial Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 500 psf
Phi: 0 °
Phi-B: 0 °

MARSH, EL. -4 TO -11 (protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Fn: Bay Sound (Protected)
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (123.3, -8.4) ft
Right Coordinate: (410, -0.9) ft

Slip Surface Block

Left Grid
  Upper Left: (185, -1.5) ft
  Lower Left: (185, -45) ft
  Lower Right: (210, -45) ft
  X Increments: 5
  Y Increments: 20
  Starting Angle: 125 °
  Ending Angle: 145 °
  Angle Increments: 4
Right Grid
  Upper Left: (220, -1.5) ft
  Lower Left: (220, -45) ft
  Lower Right: (270, -45) ft
  X Increments: 10
  Y Increments: 20
  Starting Angle: 25 °
  Ending Angle: 45 °
  Angle Increments: 4

Cohesion Functions

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
  Curve Fit to Data: 100 %
  Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
  Data Point: (-11, 295)
  Data Point: (-4, 235)

Bay Sound (Protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
  Curve Fit to Data: 100 %
  Segment Curvature: 0 %
Y-Intercept: 500
Data Points: Y (ft), Cohesion (psf)
  Data Point: (-70, 785)
  Data Point: (-42, 500)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
  Curve Fit to Data: 100 %
  Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
  Data Point: (-100000, 0)
  Data Point: (0, 0)
  Data Point: (100000, 57735)
Estimation Properties

Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (184.4, 109)
Data Point: (200, 110)
Data Point: (229.1, 109)

Spatial Functions

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -42, 500)
Data Point: (184.4, -70, 785)
Data Point: (200, -44, 640)
Data Point: (200, -70, 910)
Data Point: (229.1, -42, 500)
Data Point: (229.1, -70, 785)

MARSH

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -4, 235)
Data Point: (184.4, -11, 295)
Data Point: (229.1, -4, 235)
Data Point: (229.1, -11, 295)
Data Point: (200, -2.5, 237)
Data Point: (200, -11, 313)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -10.5 TO -42	20,24,14,17,47,49,41	632.775
Region 2	BEACH SAND SP, EL. -10.5 TO -42	17,14,24,38,8,10,16,11,42,9	8299.625
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	1266.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, El., 0.5 TO -4 (Protected Side)	15,35,6,7	560.79
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	124.87
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9	Sheet Pile	12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region 11	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525
Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	1710.8
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	5065.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	48,2,3,28,39,41,49	80.64
Region 16	Silted-in Layer	1,2,48,49,47,46	122.055

Points

	X (ft)	Y (ft)
Point 1	123.3	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	0.5
Point 6	410	-0.9
Point 7	410	-4
Point 8	410	-11
Point 9	123.3	-42
Point 10	410	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	123.3	-19.2
Point 18	123.3	-70
Point 19	410	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	0
Point 35	229.1	-0.9
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8
Point 46	123.3	-10.6
Point 47	123.3	-11
Point 48	170.4	-10.6
Point 49	170.9	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.01	(214.441, -0.615)	23.91718	(184.484, -2.45421)	(243.672, -0.9)
2	9309	2.16	(214.441, -0.615)	23.44	(185.24, -2.03997)	(243.675, -0.9)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	185.91785	-2.939782	694.15895	695.38072	0	235
2	Optimized	187.97605	-3.6985925	728.13129	810.3071	0	235.83
3	Optimized	189.51605	-4.3729825	764.33853	917.98623	0	243.19
4	Optimized	191.36605	-5.2726325	815.30736	1041.863	0	252.9
5	Optimized	193	-6.1447575	865.56572	1175.5965	0	262.23
6	Optimized	193.95635	-6.655195	895.86522	1267.7026	0	267.73
7	Optimized	195.10635	-7.37423	938.82386	1316.9411	0	275.3

			9				
8	Optimized	196.75	-8.445096	1036.3305	1425.8831	0	286.57
9	Optimized	198.25	-9.422351	1101.6283	1524.137	0	296.93
10	Optimized	199.4957	-10.23392	1155.892	1605.5042	0	305.58
11	Optimized	199.9957	-10.55767	1182.8713	1756.3534	0	309.04
12	Optimized	200.25	-10.604535	1086.3853	1364.1478	0	309.31
13	Optimized	200.75	-10.696685	1072.5581	1469.12	0	309.83
14	Optimized	201.6979	-10.87138	1083.8021	1536.8248	0	310.8
15	Optimized	203.67625	-11.23597	1106.0099	1569.6508	267.68319	1.6153e-005
16	Optimized	205.67835	-11.632935	1127.6703	1596.8342	270.87189	-1.9224e-005
17	Optimized	207.66595	-12.076355	1151.7192	1611.5665	265.49296	1.6022e-005
18	Optimized	210.4085	-12.589455	1177.1936	1613.8195	252.08605	-1.3387e-006
19	Optimized	212.44255	-12.866985	1189.2972	1607.5087	241.4545	-1.2821e-006
20	Optimized	213.75175	-12.9770	1192.6997	1584.4779	226.19323	-1.201e-006

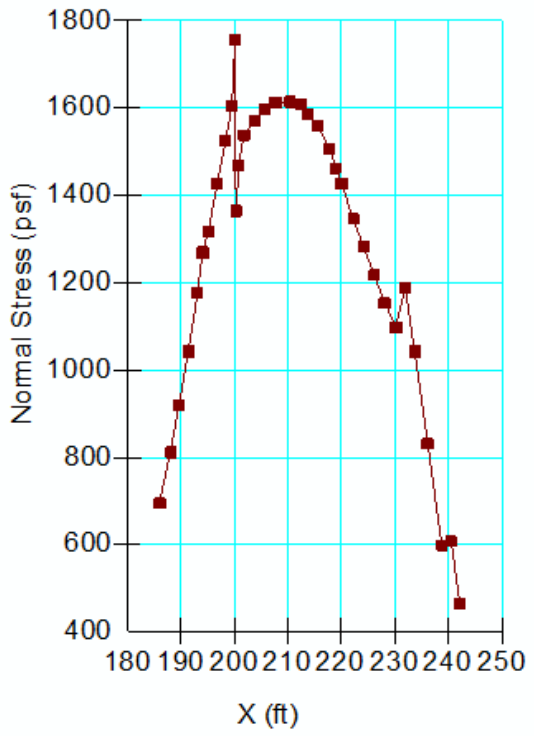
			3				
21	Optimized	215.5673	-13.056235	1192.7548	1557.6633	210.67999	-1.1184e-006
22	Optimized	217.71555	-12.997365	1183.2485	1505.5554	186.08397	-9.8781e-007
23	Optimized	218.8795	-12.91699	1174.9892	1461.9606	165.68302	-1.1751e-005
24	Optimized	220.0795	-12.739332	1160.5911	1426.5029	153.52426	-8.1487e-007
25	Optimized	222.1875	-12.4154	1134.4818	1345.4237	121.78733	3.3495e-006
26	Optimized	224.1625	-12.11192	1109.9595	1281.2653	98.903451	2.7193e-006
27	Optimized	226.1375	-11.808435	1085.4873	1217.0569	75.96178	2.0893e-006
28	Optimized	228.1125	-11.50495	1060.9149	1152.8485	53.077897	3.523e-006
29	Optimized	230.2172	-11.181535	1034.7439	1097.5133	36.239925	-1.3539e-006
30	Optimized	231.91605	-10.58371	988.63181	1188.7575	0	291.43
31	Optimized	233.70515	-9.2339825	886.1436	1042.1775	0	279.86
32	Optimized	236.1201	-7.386875	746.02885	831.24888	0	264.03
33	Optimized	238.79775	-5.231625	583.45628	597.4561	0	245.56

34	Optimized	240.5009	-3.8048	459.72451	607.27456	0	600
35	Optimized	242.2028	-2.2548	212.41731	464.56826	0	600

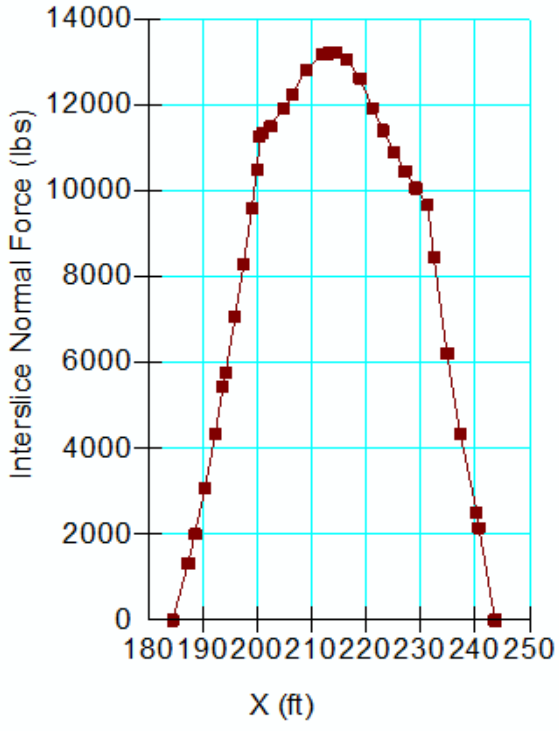
Slices of Slip Surface: **9309**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	9309	185.56855	-2.269986	660.12172	492.59763	0	500
2	9309	187.2485	-3.446317	715.30593	727.8222	0	235
3	9309	189.525	-5.040326	804.67297	940.74077	0	249.01
4	9309	191.375	-6.33571	878.88372	1117.1463	0	262.21
5	9309	193	-7.4735475	945.41872	1274.0158	0	273.92
6	9309	194.85	-8.7689315	1022.8002	1443.7731	0	287.35
7	9309	197.01815	-10.287085	1135.7442	1596.8323	0	303.23
8	9309	198.51815	-11.337395	1209.0457	1714.1181	291.60369	1.7608e-005
9	9309	199.5	-12.024895	1254.1214	1791.7307	310.38888	-6.2833e-005
10	9309	200.25	-12.375	1196.42	1611.76	239.79666	-1.273e-006
11	9309	200.75	-12.375	1179.9	1713.54	308.0972	-6.2301e-005
12	9309	201.9	-12.375	1179.1667	1763.8889	337.58953	-6.8263e-005
13	9309	203.7	-12.375	1178	1753.3889	332.20093	-6.7172e-005
14	9309	205.5	-12.375	1174.6667	1742.8889	328.06325	-6.6339e-005
15	9309	207.5	-12.375	1170.8182	1706.3636	309.19731	-6.252e-005
16	9309	209.7	-12.375	1165.5	1643.8182	276.15713	-1.959e-005
17	9309	211.9	-12.375	1159.9545	1581.2273	243.22192	-1.2912e-006
18	9309	213.96665	-12.375	1154.5347	1522.3451	212.35544	-1.1274e-006
19	9309	215.9	-12.375	1149.3105	1467.1554	183.50783	-9.7416e-007
20	9309	217.83335	-12.375	1144.0347	1411.9658	154.69008	-8.2114e-007
21	9309	220	-12.375	1138.0417	1356.875	126.34348	3.4752e-006
22	9309	222.1875	-12.375	1131.9494	1317.2152	106.96327	-5.6773e-007
23	9309	224.1625	-12.375	1126.3797	1292.8101	96.088625	2.6429e-006
24	9309	226.1375	-12.375	1120.8101	1268.4557	85.243209	2.3443e-006
25	9309	228.1125	-12.375	1115.2405	1244.0506	74.368561	2.0462e-006
26	9309	229.55	-12.375	1111.1111	1230.3333	68.832982	-3.6544e-007
27	9309	230.81935	-11.6875	1064.6434	1263.0427	114.54591	-6.0712e-007
28	9309	232.68145	-10.125	953.34575	1153.6016	0	287.5
29	9309	234.767	-8.375	821.1519	952.28056	0	272.5
30	9309	236.8526	-6.625	689.06824	750.99623	0	257.5
31	9309	238.93815	-4.875	557.38862	549.67517	0	242.5
32	9309	240.90455	-3.225	367.42153	524.7635	0	600
33	9309	242.7518	-1.675	120.86895	352.34713	0	600

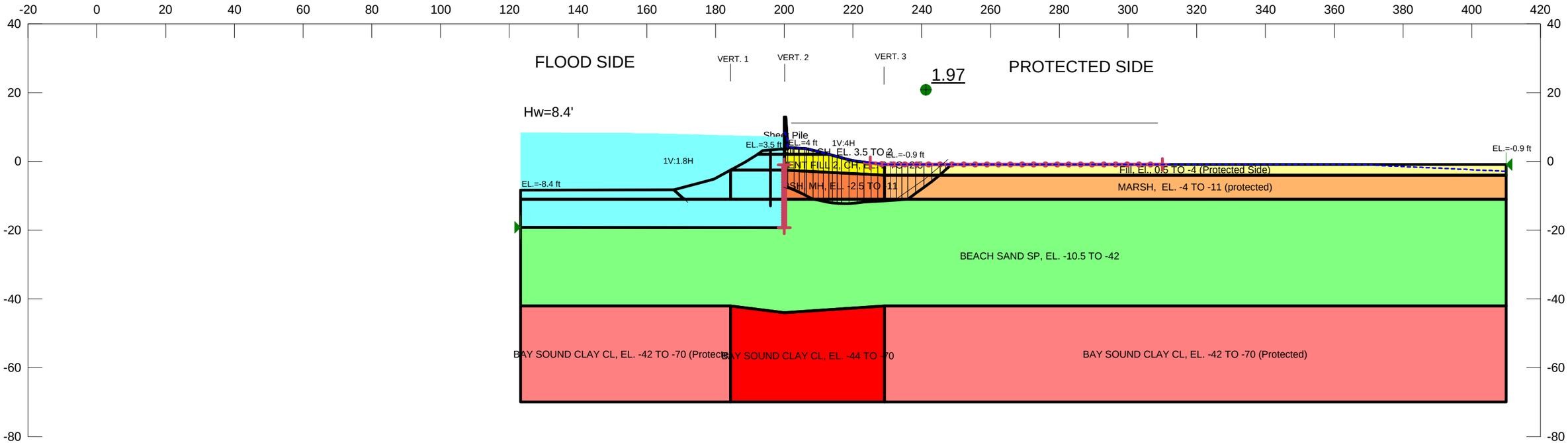
Base Normal Stress Vs. X



Interslice Normal Stress Vs. X



DISTANCE IN FEET



Name: EMBANKMENT FILL 1, CH, EL. 3.5 TO 2 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 600 psf
Name: MARSH, MH, EL. -2.5 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: MARSH Phi: 0 °
Name: BEACH SAND SP, EL. -10.5 TO -42 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand
Name: BAY SOUND CLAY CL, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 °
Name: Fill, El., 0.5 TO -4 (Protected Side) Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 600 psf
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: EMBANKMENT FILL 2, CH, EL. 2 TO -2.5 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 500 psf Phi: 0 °
Name: MARSH, EL. -4 TO -11 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Marsh (protected) Phi: 0 °
Name: BAY SOUND CLAY CL, EL. -42 TO -70 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Bay Sound (Protected) Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 26A, STA. 37+00 TO 47+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: GAP Stability (Entry/Exit)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: GAP Stability (Entry/Exit)
File Name: Reach 26A - Passive Resistance.gsz Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Edited By: Middleton, Mark C MVN

GAP Stability (Entry/Exit)

File Information

Created By: Liljegren, James
Revision Number: 271
Last Edited By: Middleton, Mark C MVN
Date: 4/15/2013
Time: 1:03:44 PM
File Name: Reach 26A - Passive Resistance.gsz
Directory: Y:\F&MHOME\Middleton\London Ave Canal\extreme water surface profile\
Last Solved Date: 4/15/2013
Last Solved Time: 1:07:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

GAP Stability (Entry/Exit)

Kind: SLOPE/W
Parent: GAP Analysis (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: Yes
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 600 psf

MARSH, MH, EL. -2.5 TO -11

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: MARSH
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -10.5 TO -42

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

Fill, El., 0.5 TO -4 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 600 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Spatial Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 500 psf
Phi: 0 °
Phi-B: 0 °

MARSH, EL. -4 TO -11 (protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Fn: Bay Sound (Protected)
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (200, -19.3) ft
Left-Zone Right Coordinate: (200, -1) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.43291) ft
Right-Zone Right Coordinate: (310, -0.9) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (123.3, -19.2) ft
Right Coordinate: (410, -0.9) ft

Cohesion Functions

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-11, 295)
Data Point: (-4, 235)

Bay Sound (Protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: Y (ft), Cohesion (psf)
Data Point: (-70, 785)
Data Point: (-42, 500)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109

Data Points: X (ft), Unit Weight (pcf)
Data Point: (184.4, 109)
Data Point: (200, 110)
Data Point: (229.1, 109)

Spatial Functions

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -42, 500)
Data Point: (184.4, -70, 785)
Data Point: (200, -44, 640)
Data Point: (200, -70, 910)
Data Point: (229.1, -42, 500)
Data Point: (229.1, -70, 785)

MARSH

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -4, 235)
Data Point: (184.4, -11, 295)
Data Point: (229.1, -4, 235)
Data Point: (229.1, -11, 295)
Data Point: (200, -2.5, 237)
Data Point: (200, -11, 313)

Regions

	Points	Area (ft²)	Material
Region 1	20,24,14,17,47,49,41	632.775	
Region 2	17,14,24,38,8,10,16,11,42,9	8299.625	BEACH SAND SP, EL. -10.5 TO -42
Region 3	15,7,8,38	1266.3	MARSH, EL. -4 TO -11 (protected)
Region 4	25,30,4,31,12,23,27	9.23	
Region 5	15,35,6,7	560.79	Fill, El., 0.5 TO -4 (Protected Side)
Region 6	25,27,23,13,40,39,29	52.06	
Region 7	23,26,5,34,35,15,13	124.87	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5
Region 8	23,12,32,22,33,26	17.1	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2
Region 9	12,36,37,22,32	7.1	Sheet Pile
Region 10	13,40,39,41,20,24,45	132.6	
Region 11	13,15,38,24,45	225.525	MARSH, MH, EL. -2.5 TO -11
Region 12	9,18,43,42	1710.8	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)
Region 13	16,44,19,10	5065.2	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)
Region 14	42,43,44,16,11	1206.9	BAY SOUND CLAY CL, EL. -44 TO -70
Region 15	48,2,3,28,39,41,49	80.64	
Region 16	1,2,48,49,47,46	122.055	

Points

	X (ft)	Y (ft)
Point 1	123.3	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	0.5
Point 6	410	-0.9
Point 7	410	-4
Point 8	410	-11
Point 9	123.3	-42
Point 10	410	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	123.3	-19.2
Point 18	123.3	-70
Point 19	410	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	0
Point 35	229.1	-0.9
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8
Point 46	123.3	-10.6
Point 47	123.3	-11
Point 48	170.4	-10.6
Point 49	170.9	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.97	(220.829, 25.292)	20.98563	(200, 12.8)	(248.702, -0.9)
2	11685	2.09	(220.829, 25.292)	38.306	(200, 12.8)	(248.781, -0.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	200.25	-7.204757	862.3235	-3.3870181	0	278.92
2	Optimized	200.75	-7.4083345	853.28405	1086.4576	0	280.45
3	Optimized	201.903	-7.787765	883.80892	1180.788	0	283.97
4	Optimized	203.5833	-8.63657	932.41259	1224.3123	0	289.74
5	Optimized	205.1379	-9.41881	982.5182	1292.1157	0	295.77
6	Optimized	206.1576	-9.92409	1014.8416	1343.5981	0	299.64
7	Optimized	207.40845	-10.51322	1052.3001	1372.7897	0	304.1
8	Optimized	209.16145	-11.157545	1090.6341	1460.7922	213.71092	-1.1351e-006
9	Optimized	210.62465	-11.490345	1107.9864	1461.1228	203.88336	-1.083e-006
10	Optimized	212.17165	-11.780805	1122.1341	1468.9528	200.23585	-1.0634e-006
11	Optimized	213.50855	-11.9858	1131.4682	1457.1188	188.01446	-9.9865e-007
12	Optimized	214.66905	-12.11675	1136.5261	1455.1325	183.94752	-9.7664e-007
13	Optimized	215.97295	-12.22269	1139.5837	1431.5887	168.58914	-8.9522e-007

14	Optimized	217.71245	-12.272225	1137.9806	1404.3155	153.76853	-1.091e-005
15	Optimized	218.81125	-12.268755	1134.7346	1372.45	137.24506	-9.7374e-006
16	Optimized	220.01125	-12.168615	1125.1496	1346.0301	127.52544	3.5078e-006
17	Optimized	222.2125	-11.983245	1107.4407	1281.7377	100.63044	2.7679e-006
18	Optimized	224.2375	-11.812715	1091.1034	1234.5466	82.81698	2.2785e-006
19	Optimized	226.2125	-11.660205	1076.0239	1188.4767	64.924705	-3.4476e-007
20	Optimized	228.1375	-11.525715	1062.1357	1147.2786	49.157277	7.1286e-007
21	Optimized	230.0351	-11.39314	1048.4801	1117.0738	39.602565	2.6284e-006
22	Optimized	231.7774	-11.273175	1036.0104	1102.0164	38.108599	5.5247e-007
23	Optimized	233.39175	-11.163905	1024.5767	1088.5433	36.931086	5.3529e-007
24	Optimized	235.0349	-11.052685	1012.9587	1074.8402	35.727291	-1.3359e-006
25	Optimized	237.0527	-10.162545	943.54561	1145.2475	0	287.82
26	Optimized	239.45085	-8.44666	813.25972	953.51133	0	273.11
27	Optimiz	241.80345	-6.69304	680.8883	760.78329	0	258.08

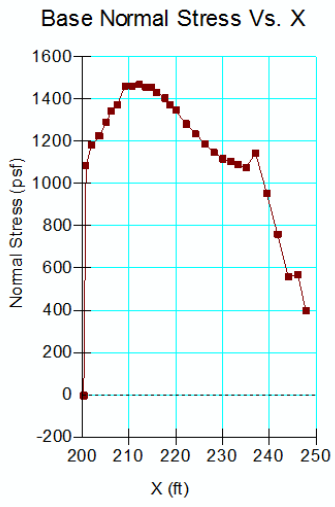
	ed						
28	Optimized	244.1232	-4.872115	544.35505	557.3049	0	242.48
29	Optimized	246.1554	-3.16686	348.41899	567.5273	0	600
30	Optimized	247.8528	-1.65562	114.8959	397.72232	0	600

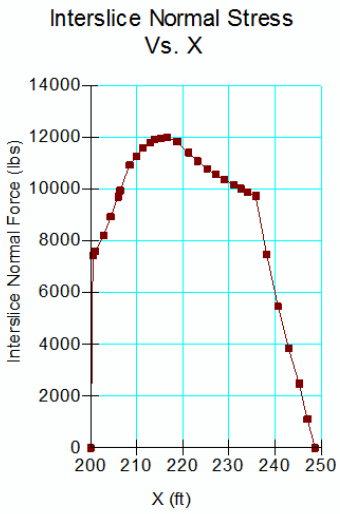
Slices of Slip Surface: **11685**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11685	200.25	-7.0152415	849.92588	19.896548	0	277.23
2	11685	200.75	-7.328364	848.0116	1039.8442	0	279.74
3	11685	201.9	-7.994044	891.49071	1161.4009	0	285.01
4	11685	203.7	-8.955966	953.70548	1260.0798	0	292.52
5	11685	205.5	-9.7992295	1007.5144	1347.2895	0	298.93
6	11685	207.48615	-10.596185	1057.6899	1406.9308	0	304.79
7	11685	209.31025	-11.23272	1095.0261	1450.4282	205.19149	-1.0892e-006
8	11685	210.78615	-11.66596	1118.5366	1470.568	203.24543	-1.0787e-006
9	11685	212.26205	-12.03584	1137.8495	1482.9686	199.25459	-1.0578e-006
10	11685	213.725	-12.34205	1153.1533	1487.7955	193.20575	-1.0256e-006
11	11685	215.175	-12.58711	1164.5475	1485.134	185.0907	-1.3128e-005
12	11685	216.625	-	1172.3214	1475.1699	174.84969	-9.2795e-

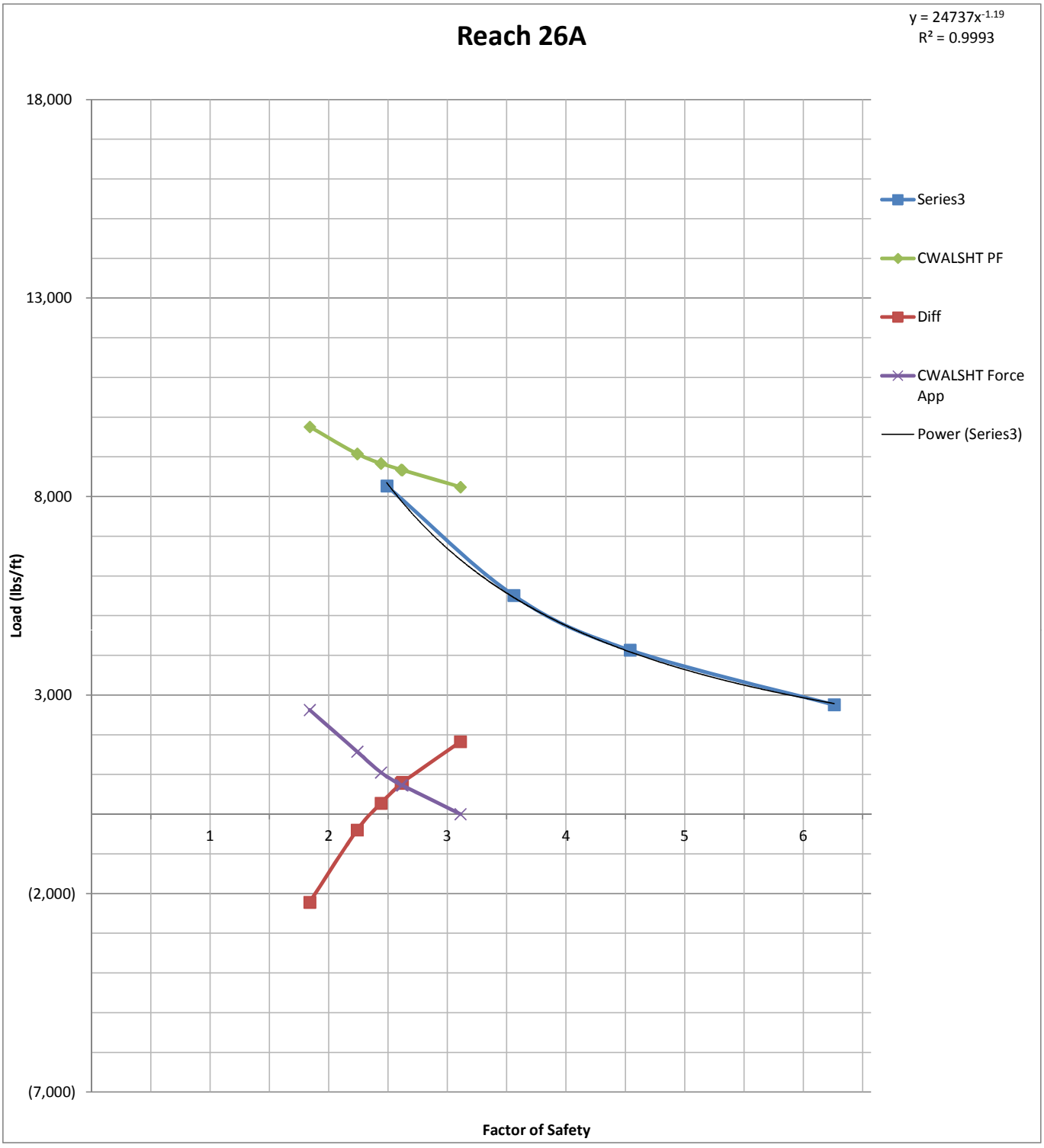
			12.777385				007
13	11685	218.075	-12.907715	1176.6705	1457.8717	162.35163	-8.6183e-007
14	11685	220	-12.98596	1176.1824	1428.7898	145.84296	-7.7408e-007
15	11685	221.99	-12.98798	1170.7904	1400.5581	132.65644	-7.0413e-007
16	11685	223.57	-12.90733	1161.3174	1377.5967	124.8689	-6.6278e-007
17	11685	225.15	-12.76093	1147.6876	1345.9074	114.44225	-6.073e-007
18	11685	226.73	-12.54802	1129.9502	1305.1741	101.16556	2.7821e-006
19	11685	228.31	-12.26747	1107.982	1254.9681	84.862448	-4.5053e-007
20	11685	230.09635	-11.8616	1077.5505	1197.4298	69.212359	1.9036e-006
21	11685	232.08905	-11.30654	1037.2419	1132.5962	55.052835	3.6553e-006
22	11685	233.8621	-10.71888	992.74373	1120.4004	0	292.59
23	11685	235.41555	-10.117796	944.99315	1065.4609	0	287.44
24	11685	236.96905	-9.436847	891.5119	1001.6082	0	281.6
25	11685	238.52255	-8.6712135	831.96224	928.21478	0	275.04
26	11685	240.076	-7.8150035	766.08992	844.502	0	267.7
27	11685	241.62945	-6.8609565	693.383	749.48492	0	259.52
28	11685	243.18295	-5.800029	613.23432	641.92823	0	250.43

29	11685	244.73645	-4.620794	524.82207	520.29644	0	240.32
30	11685	246.3301	-3.2706315	364.02576	561.2899	0	600
31	11685	247.96395	-1.7206315	124.74745	425.36333	0	600





Reach 26A ETL Surcharge Summary						
Iteration	**Distributed Load In CWALSHT (psf)**	**Force Applied in CWALSHT (lbs/ft)**	**CWALSHT Passive Force Calculated (lbs/ft)**	**Spencer's Passive Force Calculated (lbs/ft)**	**Difference in Forces (lbs/ft)**	**Factor of Safety**
1	0	0	8238	6412	1826	3.11
6	69	724.5	8666	7863	803	2.62
5	70	735	8674	7899	775	2.61
4	100	1050	8832	8558	274	2.44
3	150	1575	9075	9474	-399	2.24
2	250	2625	9755	11973	-2218	1.84


Reach 26A
y = 24737x^-1.19
R² = 0.9993
18,000
13,000
8,000
3,000
(2,000)
(7,000)
Load (lbs/ft)
1
2
3
4
5
6
Factor of Safety
Series3
CWALSHT PF
Diff
CWALSHT Force App
Power (Series3)

Reach 26A

HORIZONTAL DISTRIBUTED LOAD 69 PSF
FACTOR OF SAFETY FOR ACTIVE PRESSURE = 2.62
FACTOR OF SAFETY FOR PASSIVE PRESSURE = 2.62
PILE TIP -19.3

III.--WATER AND SOIL PRESSURES

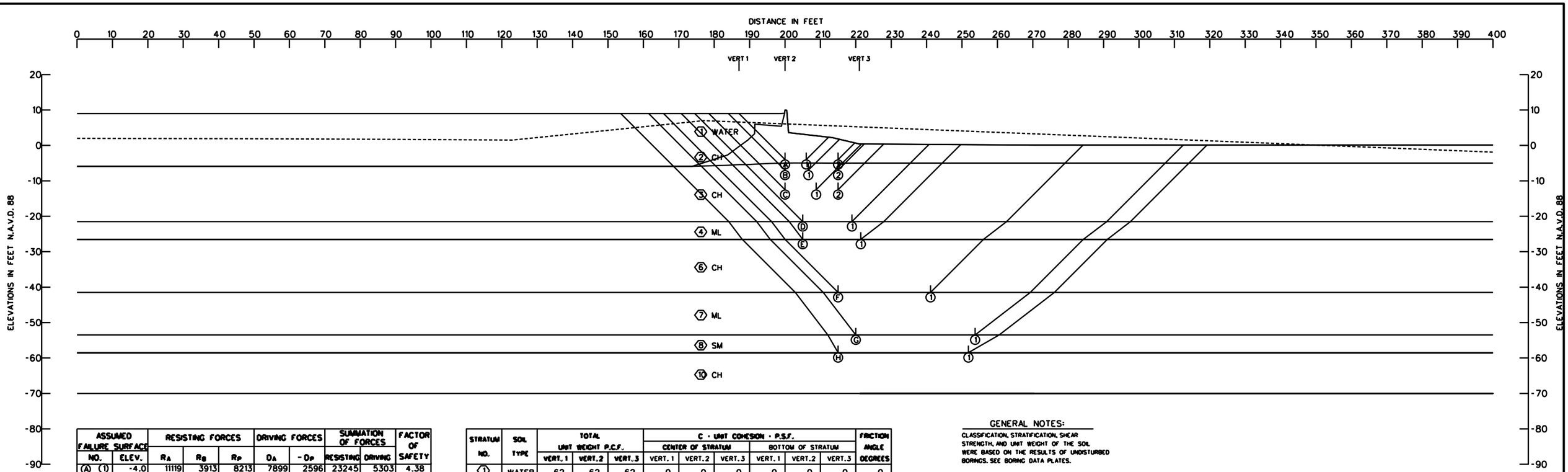
		<----------SOIL		PRESSURES---------->	
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
13	0	0	0	0	0
12	0	0	0	0	0
11	0	0	0	0	0
10	0	0	0	0	0
9	0	0	0	0	0
8.4	0	0	0	0	0
8	25	0	0	0	0
7	88	0	0	0	0
6	150	0	0	0	0
5	213	0	0	0	0
Ground Surface 4	275	0	0	0	0
4	275	382	0	0	0
3.5	306	417	0	0	0
3.5	306	417	0	0	382
3	338	470	0	0	403
2.5	369	522	0	0	416
2	400	575	0	0	429
1	463	680	0	0	468
0.53	492	785	0	0	489
0.53	492	729	0	0	489
0	525	785	56	0	513
-0.9	581	874	145	0	553
-1	581	881	152	0	557
-2	581	929	195	0	572
-2.42	581	877	282	0	520
Water Surface -2.42	581	877	282	0	529
-2.5	581	850	316	15	520
-3	581	735	455	128	443
-4	581	724	503	250	375
-5	581	744	519	288	386
-6	581	763	535	307	427
-6.75	581	787	539	315	457
Slip Surface Bottom -7	581	797	539	316	467
-8	581	838	549	331	508
-9	581	878	569	355	548
-10	581	919	576	377	589
-11	581	1004	556	399	629
-12	581	1147	539	422	689
-13	581	1228	553	449	748
-14	581	1280	579	477	808
-15	581	1335	603	504	867
-16	581	1390	628	532	932
-17	581	1448	652	559	1028
-17.09	581	1453	655	562	1036
-18	581	1506	677	587	1119
-19	581	1574	702	613	1186
-19.4	581	1650	725	623	1243
-21	581	1719	750	629	1301

		Left P.P.	Area
		382	0
		417	199.75
		417	0
		470	221.75
		522	248
		575	274.25
		680	627.5
		785	344.275
		729	0
		785	401.21
		874	746.55
		881	87.75
		929	905
		877	379.26
Water Press	Left P.P.	877	0
93.75	72.83		
125	450.9375		
187.5	885.75		
250	952.75		
312.5	1034.75		
359.375	833.2031		
375			

Total CWALSHT Passive Force			8,666	Slope/W Exponential Interpolation
	CWALSHT FoS		2.62	**significant** / **exponent**
		Equation		24737 / -1.19
Total Slope/W Passive Force			7,863	
		Difference	803	
	Distributed Height		11.6	
	Distributed Load		69	

APPENDIX P METHOD OF PLANES (MOP) STABILITY ANALYSIS

APPENDIX P.1 METHOD OF PLANES (MOP) HIGH WATER Q-CASE STABILITY ANALYSIS



ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
A 1	-4.0	11119	3913	8213	7899	2596	23245	5303	4.38
A 2	-4.0	11119	9750	6157	7899	1624	27026	6275	4.31
B 1	-7.0	11429	2800	10424	12041	5173	24653	6868	3.59
B 2	-7.0	11429	6241	8634	12041	3730	26304	8311	3.17
C 1	-12.5	12911	3673	13168	21636	11542	29752	10094	2.95
C 2	-12.5	12911	6241	13007	21636	10120	32159	11516	2.79
D 1	-21.5	18326	5710	20066	43547	27278	44102	16269	2.71
E 1	-26.5	20319	6794	25648	58951	40523	52761	18428	2.86
F 1	-41.5	34504	14642	40143	118901	94885	89289	24016	3.72
G 1	-53.5	45993	23771	61402	180678	154102	131166	26576	4.94
H 1	-58.5	52092	23805	82251	211211	183095	158148	28116	5.62

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F. CENTER OF STRATUM			C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM			FRICTION ANGLE DEGREES
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	
1	WATER	62	62	62	0	0	0	0	0	0	0
2	CH	118	116	118	650	650	650	650	650	650	0
3	CH	111	112	111	400	425	400	400	425	400	0
4	ML	90	90	90	200	200	200	200	200	200	15
5	CH	102	101	102	405	430	405	405	430	405	0
6	CH	102	101	102	482	510	482	560	590	560	0
7	ML	90	90	90	200	200	200	200	200	200	15
8	SM	122	122	122	0	0	0	0	0	0	30
9	CH	112	112	112	645	725	645	645	725	645	0
10	CH	112	112	112	710	792	710	775	860	775	0

GENERAL NOTES:

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTH, AND UNIT WEIGHT OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS. SEE BORING DATA PLATES.

NOTES

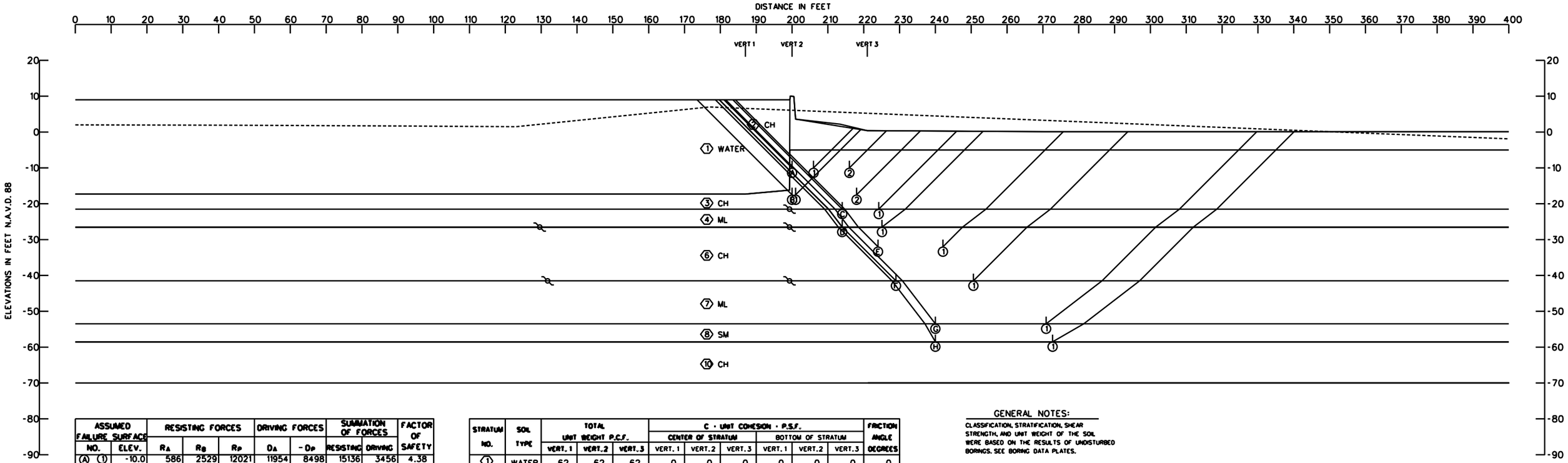
Φ -- ANGLE OF INTERNAL FRICTION, DEGREES
C -- UNIT COHESION, P.S.F.
▽ -- STATIC WATER SURFACE
D -- HORIZONTAL DRIVING FORCE IN POUNDS
R -- HORIZONTAL RESISTING FORCE IN POUNDS
A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
B -- AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK
P -- AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE

FACTOR OF SAFETY = $\frac{R_A + R_B + R_P}{D_A - D_P}$

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 1 Sta. 2+44 to Sta. 10+00
Protected Side Stability Analysis
Case: P/S Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 01-FEB-12



ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.		ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
Ⓐ	①	-10.0	586	2529	12021	11954	8498	15136	3456	4.38
Ⓐ	②	-10.0	586	6648	11009	11954	6591	18243	5363	3.40
Ⓑ	①	-17.5	1047	424	17837	22865	22390	19308	475	40.66
Ⓑ	②	-17.5	1047	7457	16904	22865	18398	25408	4467	5.69
Ⓒ	①	-21.5	12252	4109	20024	37231	27125	36385	10106	3.60
Ⓓ	①	-26.5	12791	4525	25642	51168	40452	42958	10716	4.01
Ⓔ	①	-32.0	21594	10136	30932	68908	57532	62662	11376	5.51
Ⓕ	①	-41.5	27238	12096	40202	107000	94727	79536	12273	6.48
Ⓖ	①	-53.5	40811	22065	61857	166672	154025	124733	12647	9.86
Ⓗ	①	-58.5	45311	21092	83268	195830	183015	149671	12815	11.68

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F.						FRICTION ANGLE DEGREES
					CENTER OF STRATUM			BOTTOM OF STRATUM			
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	118	116	118	650	650	650	650	650	650	0
③	CH	111	112	111	400	425	400	400	425	400	0
④	ML	90	90	90	200	200	200	200	200	200	15
⑤	CH	102	101	102	405	430	405	405	430	405	0
⑥	CH	102	101	102	482	510	482	560	590	560	0
⑦	ML	90	90	90	200	200	200	200	200	200	15
⑧	SM	122	122	122	0	0	0	0	0	0	30
⑨	CH	112	112	112	645	725	645	645	725	645	0
⑩	CH	112	112	112	710	792	710	775	860	775	0

GENERAL NOTES:

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTH, AND UNIT WEIGHT OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS. SEE BORING DATA PLATES.

NOTES

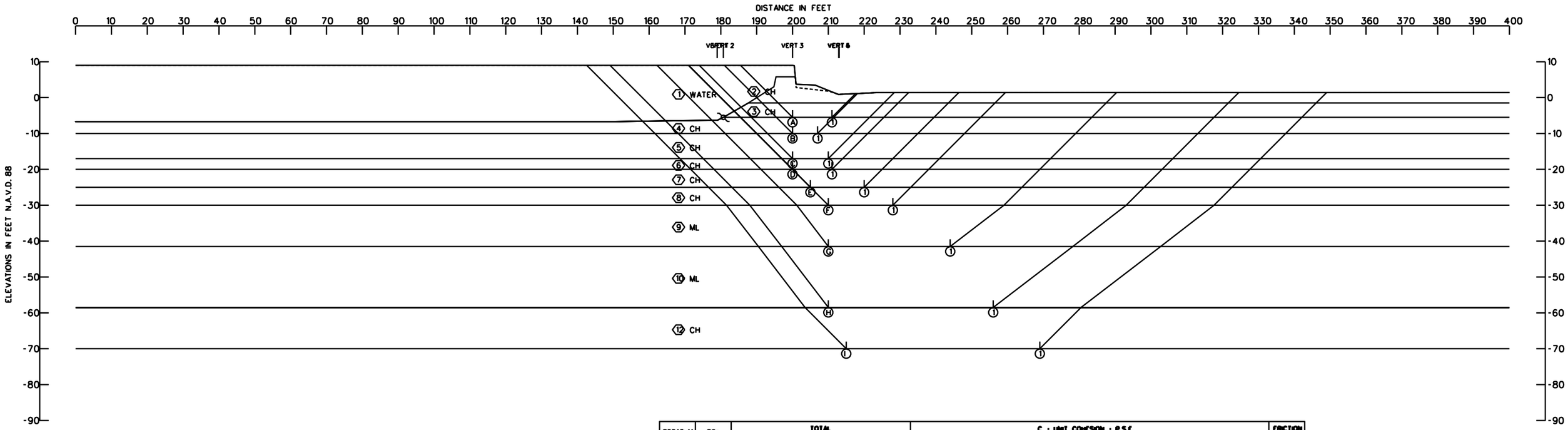
ϕ -- ANGLE OF INTERNAL FRICTION, DEGREES
C -- UNIT COHESION, P.S.F.
∇ -- STATIC WATER SURFACE
D -- HORIZONTAL DRIVING FORCE IN POUNDS
R -- HORIZONTAL RESISTING FORCE IN POUNDS
A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
B -- AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK
P -- AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE

FACTOR OF SAFETY = $\frac{R_A + R_B + R_P}{D_A - D_P}$

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 1 Sta. 2+44 to Sta. 10+00
Protected Side Stability Analysis
Case: P/S Gap Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 02-FEB-12



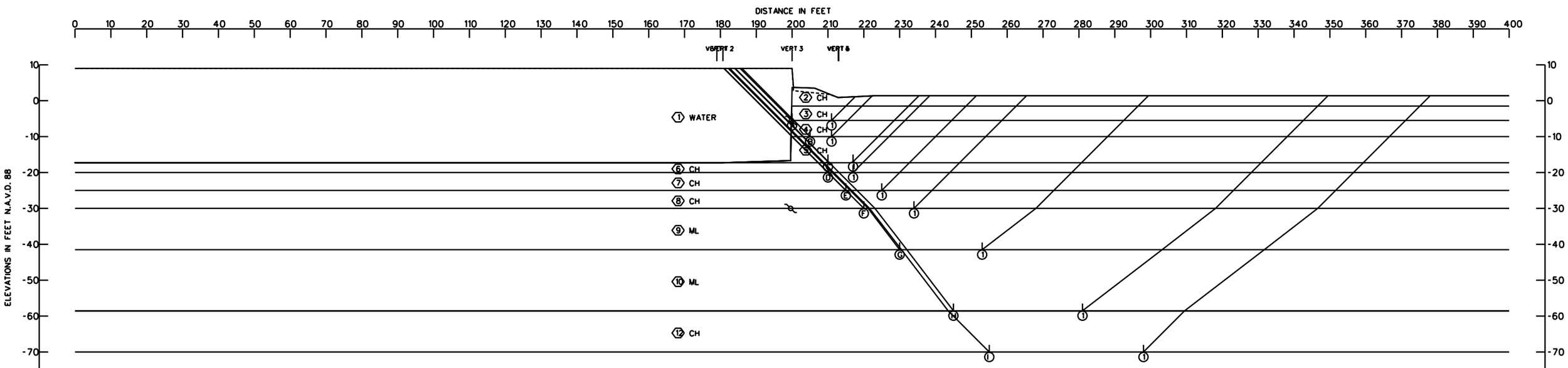
ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	DRIVING FORCES R_P	D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
A	1	-5.5	11817	3473	8722	9123	2510	24012	6613	3.63
B	1	-10.0	10966	2229	11369	15913	7753	24564	8160	3.01
C	1	-17.0	10564	3522	16069	30352	19408	30155	10944	2.76
D	1	-20.0	11187	4015	18113	37998	26324	33315	11674	2.85
E	1	-25.0	14886	5696	21639	53587	40578	42221	13009	3.25
F	1	-30.0	18743	7208	25399	71361	57484	51350	13877	3.70
G	1	-41.5	29990	28004	47599	122860	107389	105593	15471	6.83
H	1	-58.5	54414	32683	89636	227899	209503	176733	18396	9.61
1	1	-70.0	71057	0	105965	315637	296960	177022	18677	9.48

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	C - UNIT COHESION - P.S.F. CENTER OF STRATUM VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	BOTTOM OF STRATUM VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	FRICTION ANGLE DEGREES
1	WATER	62	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0
2	CH	116	116	116	116	116	900	900	825	900	900	900	900	825	900	900	0
3	CH	116	116	116	116	116	500	500	825	500	500	500	500	825	500	500	0
4	CH	117	117	117	117	117	285	285	300	285	285	306	306	323	306	306	0
5	CH	117	117	117	117	117	306	306	323	306	306	340	340	360	340	340	0
6	CH	117	117	117	117	117	340	340	360	340	340	353	353	374	353	353	0
7	CH	117	117	117	117	117	353	353	374	353	353	376	376	399	376	376	0
8	CH	117	117	117	117	117	376	376	399	376	376	400	400	425	400	400	0
9	ML	117	117	117	117	117	200	200	200	200	200	200	200	200	200	200	15
10	ML	117	117	117	117	117	200	200	200	200	200	200	200	200	200	200	15
11	CH	105	105	105	105	105	710	710	780	710	710	710	710	780	710	710	0
12	CH	105	105	105	105	105	710	710	780	710	710	820	820	890	820	820	0

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 2, STA. 10+00 TO 12+21
AND STA 13+88 TO 21+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 19-JAN-12



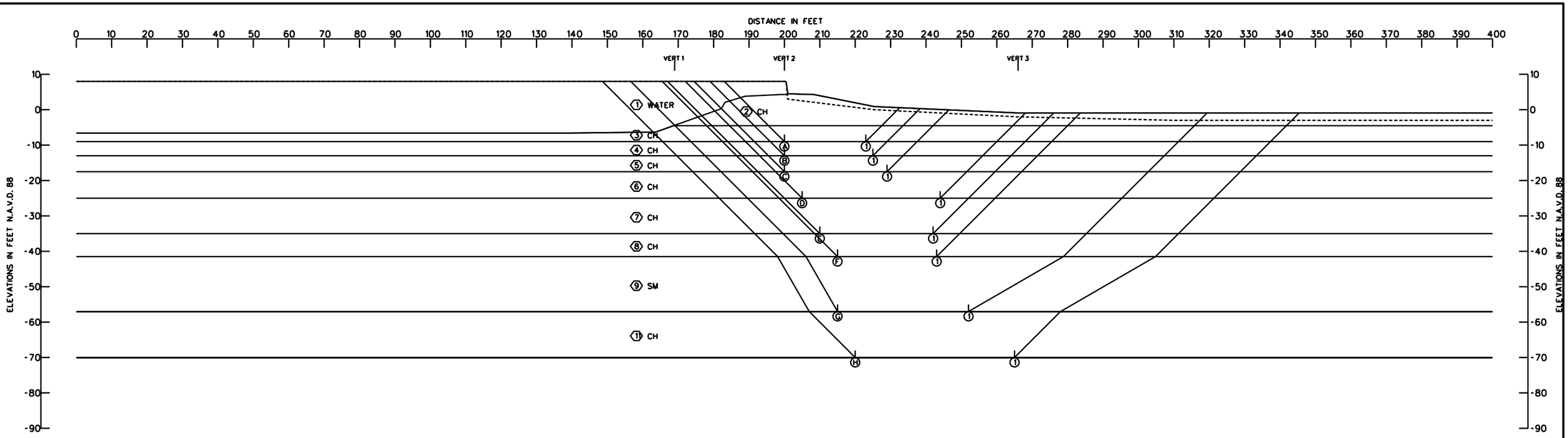
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
A 1	-5.5	335	3473	8722	6608	2510	12530	4098	3.06
B 1	-10.0	3808	1875	11680	12686	7209	17363	5477	3.17
C 1	-17.0	6339	2387	16069	25920	19585	24795	6335	3.91
D 1	-20.0	6698	2478	18089	32750	26549	27265	6201	4.40
E 1	-25.0	10234	3760	21619	46600	40613	35613	5987	5.95
F 1	-30.0	13995	5600	25379	63308	57484	44974	5824	7.72
G 1	-41.5	27726	18966	47578	113283	107389	94270	5894	15.99
H 1	-58.5	53559	25560	89615	215420	209503	168734	5917	28.51
I 1	-70.0	69061	0	105944	302879	296958	175005	5921	29.56

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.					C - UNIT COHESION - P.S.F. CENTER OF STRATUM					C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM					FRICTION ANGLE DEGREES
		VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	
1	WATER	62	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0
2	CH	116	116	116	116	116	900	900	825	900	900	900	900	825	900	900	0
3	CH	116	116	116	116	116	500	500	825	500	500	500	500	825	500	500	0
4	CH	117	117	117	117	117	285	285	300	285	285	306	306	323	306	306	0
5	CH	117	117	117	117	117	306	306	323	306	306	340	340	360	340	340	0
6	CH	117	117	117	117	117	340	340	360	340	340	353	353	374	353	353	0
7	CH	117	117	117	117	117	353	353	374	353	353	376	376	399	376	376	0
8	CH	117	117	117	117	117	376	376	399	376	376	400	400	425	400	400	0
9	ML	117	117	117	117	117	200	200	200	200	200	200	200	200	200	200	15
10	ML	117	117	117	117	117	200	200	200	200	200	200	200	200	200	200	15
11	CH	105	105	105	105	105	710	710	780	710	710	710	710	780	710	710	0
12	CH	105	105	105	105	105	710	710	780	710	710	820	820	890	820	820	0

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 2, STA. 10+00 TO 12+21
AND STA 13+88 TO 21+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: GAP STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 03-FEB-12



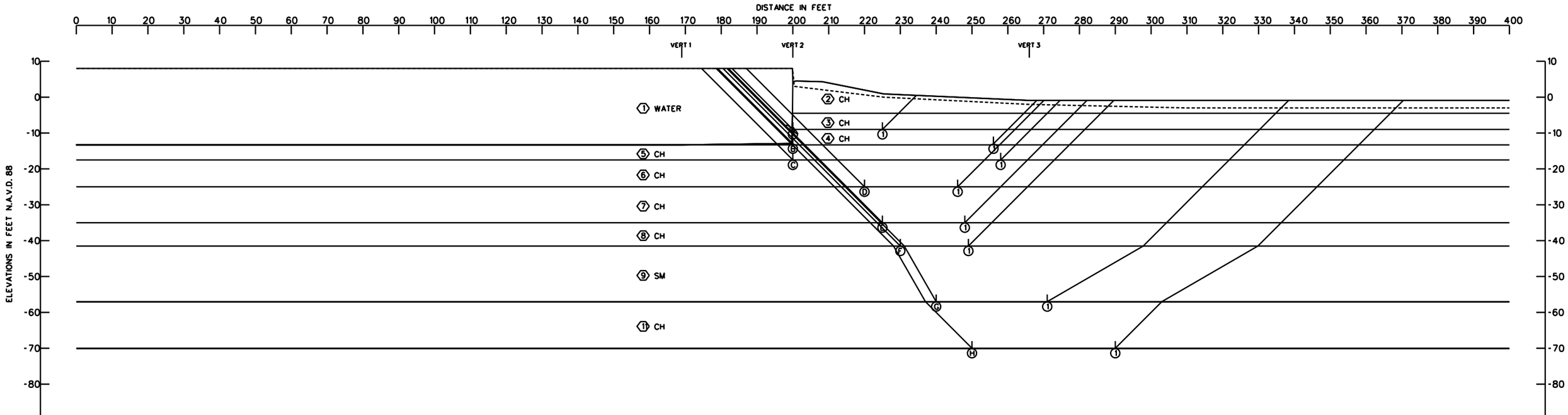
ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
A	1	-9.0	16507	11400	12134	13606	5629	40041	7977	5.02
B	1	-13.0	19070	12382	15642	21317	10740	47094	10577	4.45
C	1	-17.5	20178	11473	19428	31845	18375	51079	13470	3.79
D	1	-25.0	25121	15310	23684	53667	34126	64115	19541	3.28
E	1	-35.0	30958	12548	31298	90722	65644	74804	25078	2.98
F	1	-41.5	35476	10954	36222	119618	91111	82652	28507	2.90
G	1	-57.0	58060	23919	105927	207665	170656	187906	37009	5.08
H	1	-70.0	74883	34642	123743	302370	259737	233268	42633	5.47

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	VERT. 2	VERT. 3	C - UNIT COHESION - P.S.F. CENTER OF STRATUM VERT. 1	VERT. 2	VERT. 3	BOTTOM OF STRATUM VERT. 1	VERT. 2	VERT. 3	FRICTION ANGLE DEGREES
1	WATER	62	62	62	0	0	0	0	0	0	0
2	CH	117	117	117	760	760	760	760	760	760	0
3	CH	114	114	114	475	500	475	475	500	475	0
4	CH	114	114	114	475	500	475	475	500	475	0
5	CH	114	114	114	475	500	475	475	500	475	0
6	CH	98	98	98	380	400	380	380	400	380	0
7	CH	98	98	98	380	400	380	380	400	380	0
8	CH	98	98	98	380	400	380	380	400	380	0
9	SM	122	122	122	0	0	0	0	0	0	30
10	CH	112	112	112	580	715	580	580	715	580	0
11	CH	112	112	112	650	788	650	720	860	720	0
12	CH	112	112	112	720	860	720	720	860	720	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 3 Sta 21+00 to Sta 33+00
Protected Side Stability Analysis
Case: Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 20-JAN-12



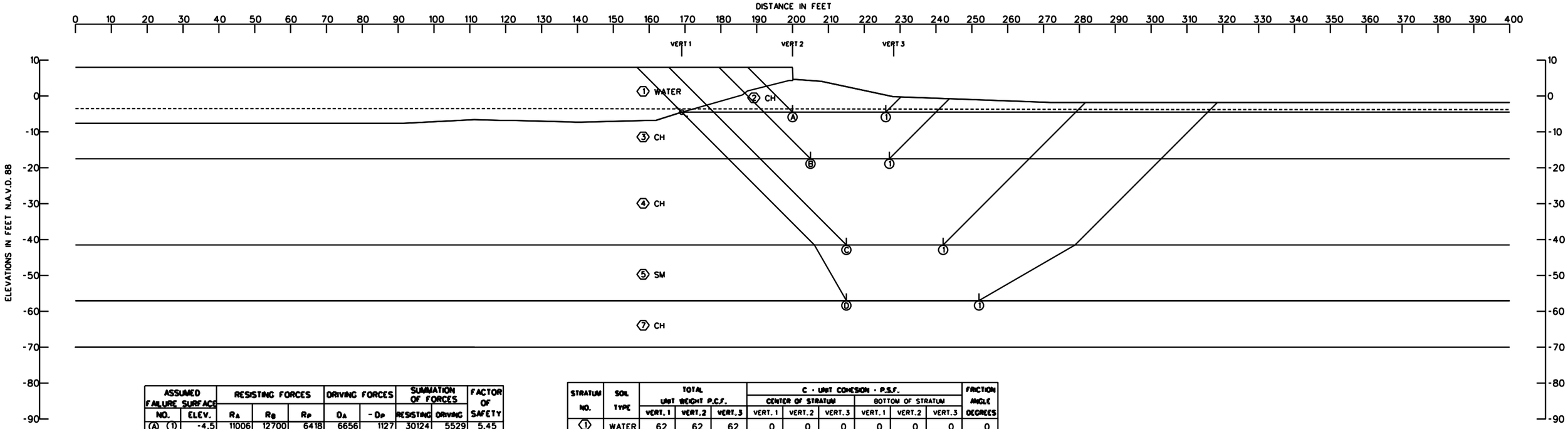
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
A 1	-9.0	205	12382	11997	9066	5479	24584	3587	6.85
B 1	-13.0	295	27406	13584	13860	8702	41285	5158	8.00
C 1	-17.5	4511	22690	17846	20925	16021	45047	4904	9.19
D 1	-25.0	18499	10140	23655	47872	33910	52294	13962	3.75
E 1	-35.0	21534	8946	31220	81608	64995	61700	16613	3.71
F 1	-41.5	25187	7373	36149	108268	90493	68709	17775	3.87
G 1	-57.0	50079	18671	106551	191474	170374	175301	21100	8.31
H 1	-70.0	65598	29071	124402	281988	259736	219071	22252	9.84

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F. CENTER OF STRATUM			C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM			FRICTION ANGLE DEGREES
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	
1	WATER	62	62	62	0	0	0	0	0	0	0
2	CH	117	117	117	760	760	760	760	760	760	0
3	CH	114	114	114	475	500	475	475	500	475	0
4	CH	114	114	114	475	500	475	475	500	475	0
5	CH	114	114	114	475	500	475	475	500	475	0
6	CH	98	98	98	380	400	380	380	400	380	0
7	CH	98	98	98	380	400	380	380	400	380	0
8	CH	98	98	98	380	400	380	380	400	380	0
9	SM	122	122	122	0	0	0	0	0	0	30
10	CH	112	112	112	580	715	580	580	715	580	0
11	CH	112	112	112	650	788	650	720	860	720	0
12	CH	112	112	112	720	860	720	720	860	720	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 3 Sta 21+00 to Sta 33+00
Protected Side Stability Analysis
Case: Gap Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 27-JAN-12



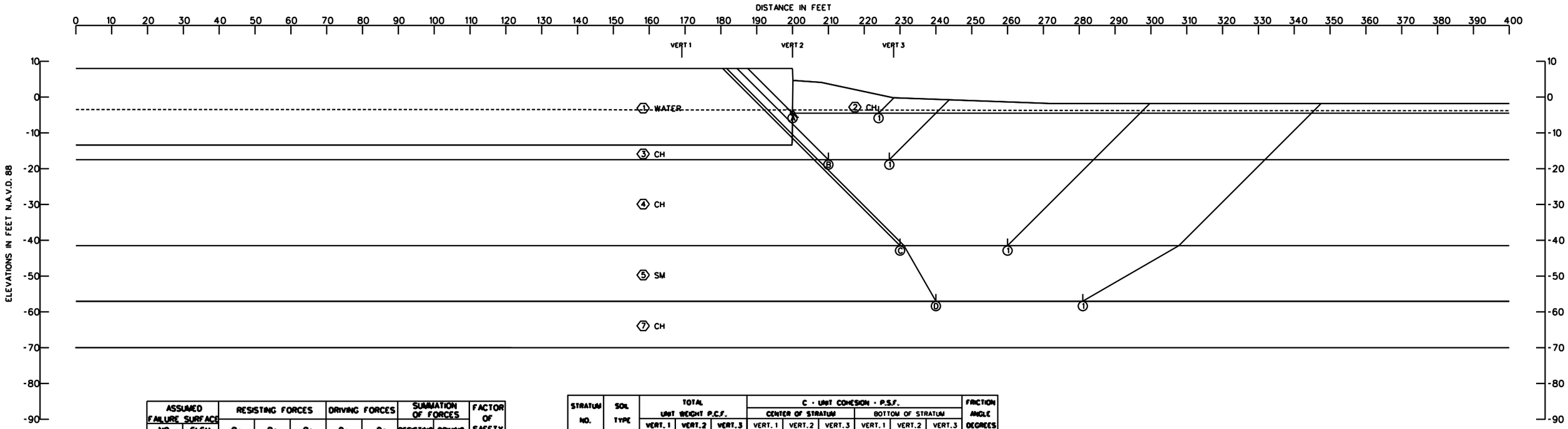
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
Ⓐ ①	-4.5	11006	12700	6418	6656	1127	30124	5529	5.45
Ⓑ ①	-17.5	21073	8550	18020	30596	16729	47643	13867	3.44
Ⓒ ①	-41.5	34738	10322	34694	117484	87456	79754	30028	2.66
Ⓓ ①	-57.0	61101	21877	105427	205163	165006	188405	40157	4.69

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F.						FRICTION ANGLE DEGREES
					CENTER OF STRATUM			BOTTOM OF STRATUM			
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	117	117	117	760	760	760	760	760	760	0
③	CH	114	114	114	475	500	475	475	500	475	0
④	CH	98	98	98	380	400	380	380	400	380	0
⑤	SM	122	122	122	0	0	0	0	0	0	30
⑥	CH	112	112	112	580	715	580	580	715	580	0
⑦	CH	112	112	112	650	788	650	720	860	720	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 4 Sta 33+00 to Sta 37+00
Protected Side Stability Analysis
Case: Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 31-JAN-12



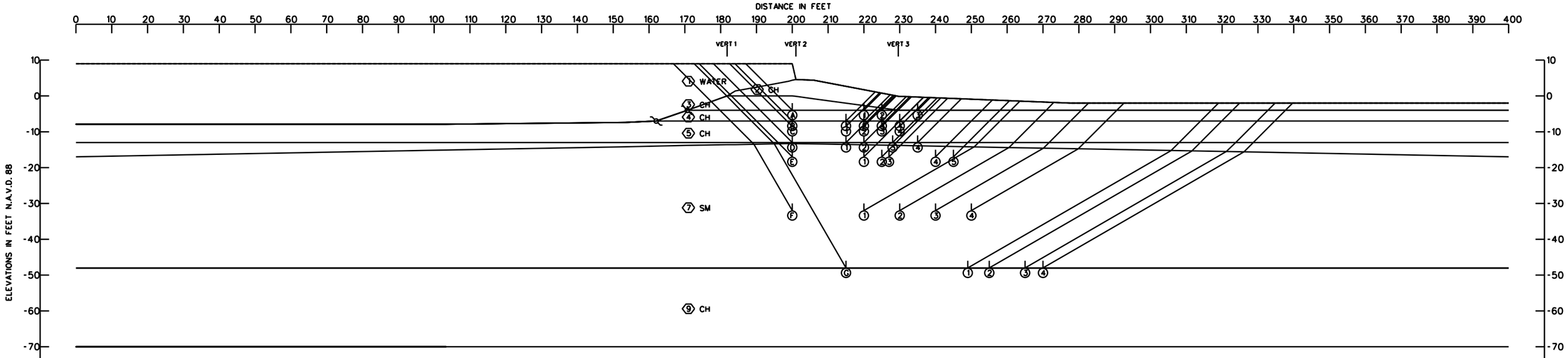
ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ	①	-4.5	14	11758	6525	4874	1292	18297	3582	5.11
Ⓑ	①	-17.5	9957	6577	18020	26879	16729	34554	10150	3.40
Ⓒ	①	-41.5	24643	11400	34694	106923	85845	70737	21078	3.36
Ⓓ	①	-57.0	50460	23780	104537	188354	164514	178777	23840	7.50

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	VERT. 2	VERT. 3	C - UNIT COHESION - P.S.F. CENTER OF STRATUM VERT. 1	VERT. 2	VERT. 3	BOTTOM OF STRATUM VERT. 1	VERT. 2	VERT. 3	FRICTION ANGLE DEGREES
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	117	117	117	760	760	760	760	760	760	0
③	CH	114	114	114	475	500	475	475	500	475	0
④	CH	98	98	98	380	400	380	380	400	380	0
⑤	SM	122	122	122	0	0	0	0	0	0	30
⑥	CH	112	112	112	580	715	580	580	715	580	0
⑦	CH	112	112	112	650	788	650	720	860	720	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 4 Sta 33+00 to Sta 37+00
Protected Side Stability Analysis
Case: Gap Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 31-JAN-12



ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ	①	-4.0	7291	9342	4967	6553	1517	21600	5036	4.29
Ⓐ	②	-4.0	7291	11623	4054	6553	1066	22968	5487	4.19
Ⓐ	③	-4.0	7291	16132	3546	6553	732	26969	5821	4.63
Ⓑ	①	-7.0	9499	7039	8105	10371	4284	24643	6087	4.05
Ⓑ	②	-7.0	9499	9342	7160	10371	3518	26001	6853	3.79
Ⓑ	③	-7.0	9499	11623	6519	10371	2861	27641	7510	3.68
Ⓑ	④	-7.0	9499	13882	6322	10371	2553	29703	7818	3.80
Ⓒ	①	-8.5	10606	7039	9206	12623	5720	26851	6903	3.89
Ⓒ	②	-8.5	10606	9342	8252	12623	4837	28200	7786	3.62
Ⓒ	③	-8.5	10606	11623	7823	12623	4122	30052	8501	3.54
Ⓒ	④	-8.5	10606	13882	7615	12623	3786	32103	8837	3.63
Ⓓ	①	-13.0	13943	4846	12494	20811	11323	31283	9488	3.30
Ⓓ	②	-13.0	13943	6410	11951	20811	10161	32304	10650	3.03
Ⓓ	③	-13.0	13943	8857	11570	20811	9073	34370	11738	2.93
Ⓓ	④	-13.0	13943	10958	11303	20811	8669	36204	12142	2.98
Ⓔ	①	-17.0	15193	6410	14213	29758	16635	35816	13123	2.73
Ⓔ	②	-17.0	15193	7947	13953	29758	15765	37093	13993	2.65
Ⓔ	③	-17.0	15193	8555	13860	29758	15519	37608	14239	2.64
Ⓔ	④	-17.0	15193	12458	13361	29758	14540	41012	15218	2.69
Ⓔ	⑤	-17.0	15193	13958	13170	29758	14191	42321	15567	2.72

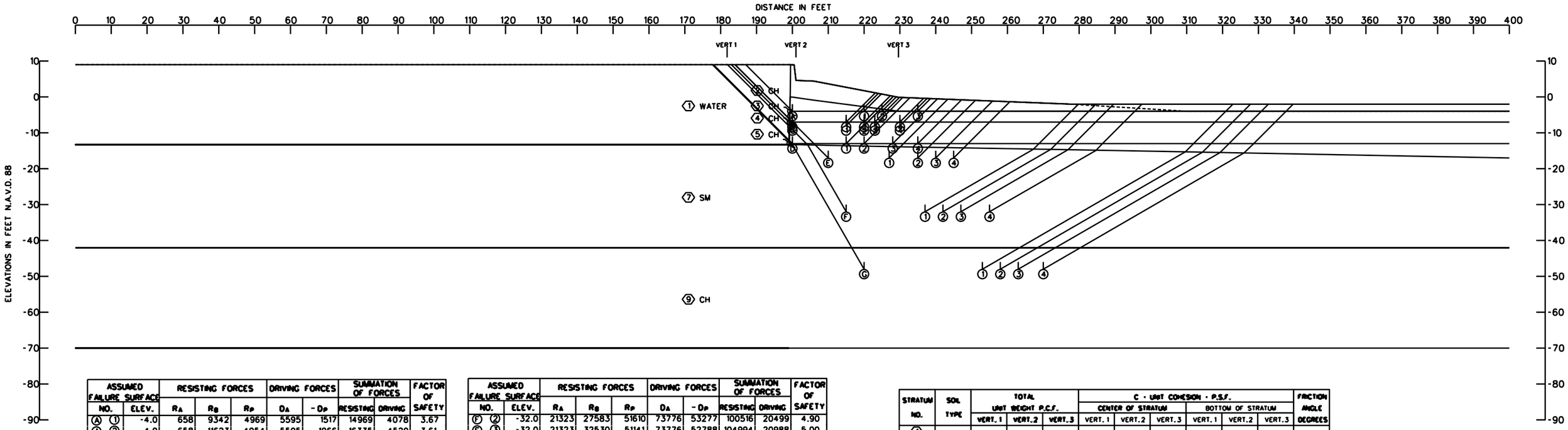
ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓕ	①	-32.0	27076	21681	53538	81545	56694	102295	24851	4.12
Ⓕ	②	-32.0	27076	31965	52946	81545	54848	111987	26697	4.19
Ⓕ	③	-32.0	27076	41991	51816	81545	53508	120883	28037	4.31
Ⓕ	④	-32.0	27076	51880	50796	81545	52548	129752	28997	4.47
Ⓖ	①	-48.0	53280	48792	116859	161542	124302	218931	37240	5.88
Ⓖ	②	-48.0	53280	56890	116327	161542	123825	226497	37717	6.01
Ⓖ	③	-48.0	53280	70078	115843	161542	123236	239201	38306	6.24
Ⓖ	④	-48.0	53280	76526	115788	161542	123038	245594	38504	6.38

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	VERT. 2	VERT. 3	C - UNIT COHESION - P.S.F. CENTER OF STRATUM VERT. 1	VERT. 2	VERT. 3	BOTTOM OF STRATUM VERT. 1	VERT. 2	VERT. 3	FRICTION ANGLE DEGREES
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	112	105	112	500	625	500	500	625	500	0
③	CH	107	107	107	475	475	475	475	475	475	0
④	CH	112	104	112	450	475	450	450	475	450	0
⑤	CH	112	111	112	450	475	450	450	475	450	0
⑥	CH	100	99	99	300	330	300	300	330	300	0
⑦	SM	122	122	122	0	0	0	0	0	0	30
⑧	CH	111	111	111	503	595	503	503	595	503	0
⑨	CH	111	111	111	652	895	652	802	895	802	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 5 Sta 37+00 to Sta 40+00
Protected Side Stability Analysis
Case: Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 25-JAN-12



ASSUMED FAILURE SURFACE NO.		ASSUMED FAILURE SURFACE ELEV.	RESISTING FORCES R_A	RESISTING FORCES R_B	RESISTING FORCES R_P	DRIVING FORCES D_A	DRIVING FORCES $-D_P$	SUMMATION OF FORCES RESISTING	SUMMATION OF FORCES DRIVING	FACTOR OF SAFETY
A	1	-4.0	658	9342	4969	5595	1517	14969	4078	3.67
A	2	-4.0	658	11623	4054	5595	1066	16335	4529	3.61
A	3	-4.0	658	16132	3546	5595	732	20336	4863	4.18
B	1	-7.0	741	7039	8108	8403	4284	15888	4119	3.86
B	2	-7.0	741	9342	7161	8403	3519	17244	4884	3.53
B	3	-7.0	741	10713	6638	8403	3095	18092	5308	3.41
B	4	-7.0	741	13882	6322	8403	2553	20945	5850	3.58
C	1	-8.0	765	7039	8842	9469	5217	16646	4252	3.91
C	2	-8.0	765	9342	7889	9469	4374	17996	5095	3.53
C	3	-8.0	765	10713	7483	9469	3913	18961	5556	3.41
C	4	-8.0	765	13882	7184	9469	3348	21831	6121	3.57
D	1	-13.0	846	4846	12495	15760	11323	18187	4437	4.10
D	2	-13.0	846	6410	11951	15760	10162	19207	5598	3.43
D	3	-13.0	846	8857	11570	15760	9073	21273	6687	3.18
D	4	-13.0	846	10958	11303	15760	8669	23107	7091	3.26
E	1	-17.0	9002	5298	13860	26207	15519	28160	10688	2.63
E	2	-17.0	9002	7701	13551	26207	14894	30254	11313	2.67
E	3	-17.0	9002	9201	13360	26207	14540	31563	11667	2.71
E	4	-17.0	9002	10701	13170	26207	14191	32873	12016	2.74
F	1	-32.0	21323	22602	52080	73776	53874	96005	19902	4.82

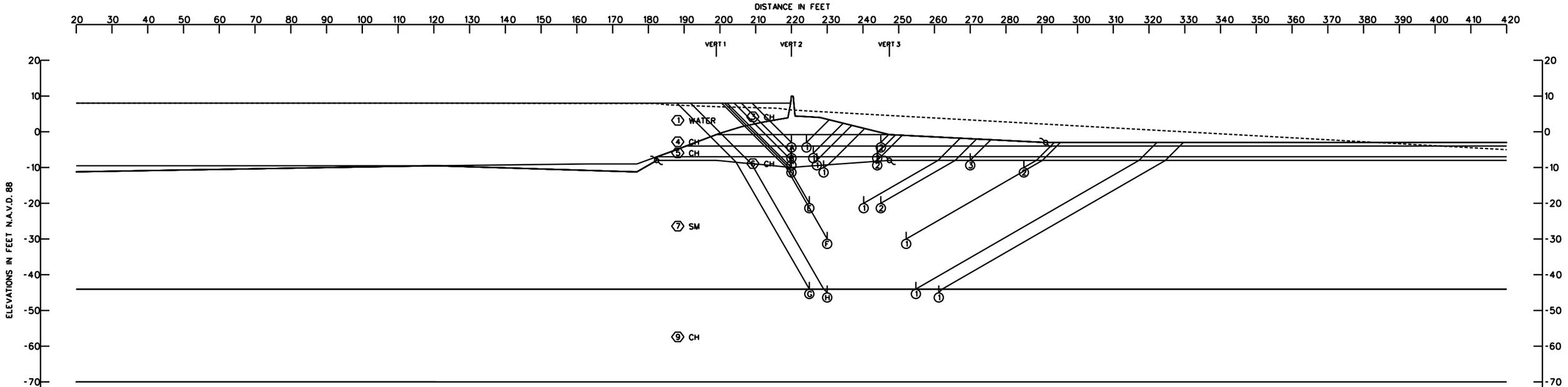
ASSUMED FAILURE SURFACE NO.		ASSUMED FAILURE SURFACE ELEV.	RESISTING FORCES R_A	RESISTING FORCES R_B	RESISTING FORCES R_P	DRIVING FORCES D_A	DRIVING FORCES $-D_P$	SUMMATION OF FORCES RESISTING	SUMMATION OF FORCES DRIVING	FACTOR OF SAFETY
F	2	-32.0	21323	27583	51610	73776	53277	100516	20499	4.90
F	3	-32.0	21323	32530	51141	73776	52788	104994	20988	5.00
F	4	-32.0	21323	40373	50694	73776	52185	112390	21591	5.21
G	1	-48.0	40046	50013	120493	153244	123966	210552	29278	7.19
G	2	-48.0	40046	57442	120181	153244	123614	217669	29630	7.35
G	3	-48.0	40046	64836	119941	153244	123326	224823	29918	7.51
G	4	-48.0	40046	75131	119815	153244	123031	234992	30213	7.78

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	TOTAL UNIT WEIGHT P.C.F. VERT. 2	TOTAL UNIT WEIGHT P.C.F. VERT. 3	C - UNIT COHESION - P.S.F. CENTER OF STRATUM VERT. 1	CENTER OF STRATUM VERT. 2	CENTER OF STRATUM VERT. 3	BOTTOM OF STRATUM VERT. 1	BOTTOM OF STRATUM VERT. 2	BOTTOM OF STRATUM VERT. 3	FRICTION ANGLE DEGREES
1	WATER	62	62	62	0	0	0	0	0	0	0
2	CH	112	105	112	500	625	500	500	625	500	0
3	CH	107	107	107	475	475	475	475	475	475	0
4	CH	112	104	112	450	475	450	450	475	450	0
5	CH	112	111	112	450	475	450	450	475	450	0
6	CH	100	99	99	300	330	300	300	330	300	0
7	SM	122	122	122	0	0	0	0	0	0	30
8	CH	111	111	111	503	595	503	503	595	503	0
9	CH	111	111	111	652	895	652	802	895	802	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 5 Sta 37+00 to Sta 40+00
Protected Side Stability Analysis
Case: Cap Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 02-FEB-12



ASSUMED FAILURE SURFACE NO.		ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	$-D_P$	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
A	1	-3.0	6716	1567	6942	4871	2568	15225	2303	6.61
A	2	-3.0	6716	9090	1585	4871	322	17391	4549	3.82
B	1	-6.0	8152	2271	7686	8127	4615	18109	3512	5.16
B	2	-6.0	8152	8737	3588	8127	1512	20477	6615	3.10
C	1	-8.0	9066	2639	8304	10748	6264	20009	4484	4.46
C	2	-8.0	9066	8737	4922	10748	2736	22725	8012	2.84
C	3	-8.0	9066	9931	4040	10748	1767	23037	8981	2.57
D	1	-10.0	9995	2752	8657	13747	7722	21404	6025	3.55
D	2	-10.0	9995	6318	3500	13747	2579	19813	11168	1.77
E	1	-20.0	15794	8513	12073	35697	19660	36380	16037	2.27
E	2	-20.0	15794	10625	11182	35697	18949	37601	16748	2.24
F	1	-30.0	24802	17863	28164	68722	44128	70829	24594	2.88
G	1	-44.0	42424	17753	74089	138170	100429	134266	37741	3.56
H	1	-45.0	44576	26083	75807	143083	104822	146466	38261	3.83

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F. VERT. 1	VERT. 2	VERT. 3	C · UNIT COHESION · P.S.F. CENTER OF STRATUM VERT. 1	VERT. 2	VERT. 3	BOTTOM OF STRATUM VERT. 1	VERT. 2	VERT. 3	FRICTION ANGLE DEGREES
1	WATER	62	62	62	0	0	0	0	0	0	0
2	WATER	90	90	90	0	0	0	0	0	0	20
3	CH	109	108	109	500	700	500	500	700	500	0
4	CH	101	101	101	350	375	350	350	375	350	0
5	CH	101	96	101	350	375	350	350	375	350	0
6	CH	101	103	101	350	375	350	350	375	350	0
7	SM	122	122	122	0	0	0	0	0	0	30
8	CH	109	109	109	530	744	530	530	744	530	0
9	CH	109	109	109	663	883	663	796	1022	796	0

GENERAL NOTES:

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTH, AND UNIT WEIGHT OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS. SEE BORING DATA PLATES.

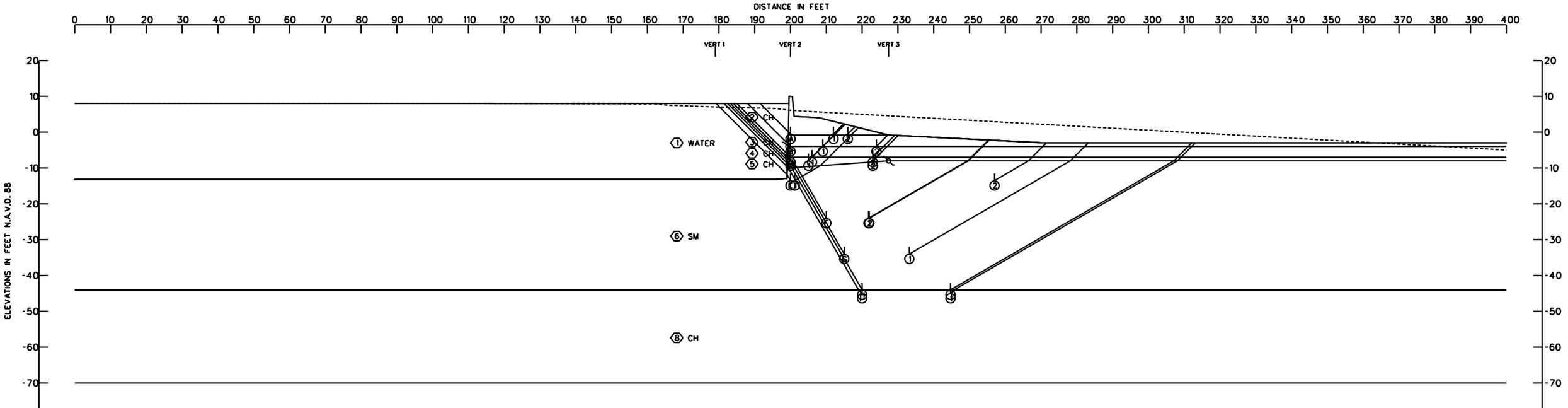
NOTES

Φ -- ANGLE OF INTERNAL FRICTION, DEGREES
C -- UNIT COHESION, P.S.F.
▽ -- STATIC WATER SURFACE
D -- HORIZONTAL DRIVING FORCE IN POUNDS
R -- HORIZONTAL RESISTING FORCE IN POUNDS
A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
B -- AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK
P -- AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE

FACTOR OF SAFETY = $\frac{R_A + R_B + R_P}{D_A - D_P}$

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 6A Sta 40+00 to Sta 47+00
Protected Side Stability Analysis
Case: Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 24-JAN-12



ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
Ⓐ ①	-0.5	826	7874	3387	2545	535	12087	2010	6.02
Ⓐ ②	-0.5	826	10265	2326	2545	276	13417	2269	5.91
Ⓑ ①	-4.0	517	3338	5954	4872	2573	9809	2299	4.27
Ⓑ ②	-4.0	517	8737	2290	4872	672	11544	4200	2.75
Ⓒ ①	-7.0	586	2234	8163	7475	5538	10983	1937	5.67
Ⓒ ②	-7.0	586	8384	4295	7475	2191	13265	5284	2.51
Ⓓ ①	-8.0	611	1864	8903	8472	6738	11378	1734	6.56
Ⓓ ②	-8.0	611	8384	4963	8472	2856	13958	5616	2.49
Ⓔ ①	-13.5	960	736	13274	15670	14144	14970	1526	9.81
Ⓔ ②	-13.5	960	13069	4076	15670	6199	18105	9471	1.91
Ⓕ ①	-24.0	10354	7794	17464	44049	28544	35612	15505	2.30
Ⓕ ②	-24.0	10354	7911	17421	44049	28509	35686	15540	2.30
Ⓖ ①	-34.0	19975	16615	38597	80638	57735	75187	22903	3.28
Ⓗ ①	-44.0	33231	13305	74722	128514	99519	121258	28995	4.18
Ⓘ ①	-45.0	34759	19887	76117	134455	104525	130763	29930	4.37

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F.						FRICTION ANGLE
					CENTER OF STRATUM			BOTTOM OF STRATUM			
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	DEGREES
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	109	108	109	500	700	500	500	700	500	0
③	CH	101	101	101	350	375	350	350	375	350	0
④	CH	101	96	101	350	375	350	350	375	350	0
⑤	CH	101	103	101	350	375	350	350	375	350	0
⑥	SM	122	122	122	0	0	0	0	0	0	30
⑦	CH	109	109	109	530	744	530	530	744	530	0
⑧	CH	109	109	109	663	883	663	796	1022	796	0

GENERAL NOTES:

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTH, AND UNIT WEIGHT OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS. SEE BORING DATA PLATES.

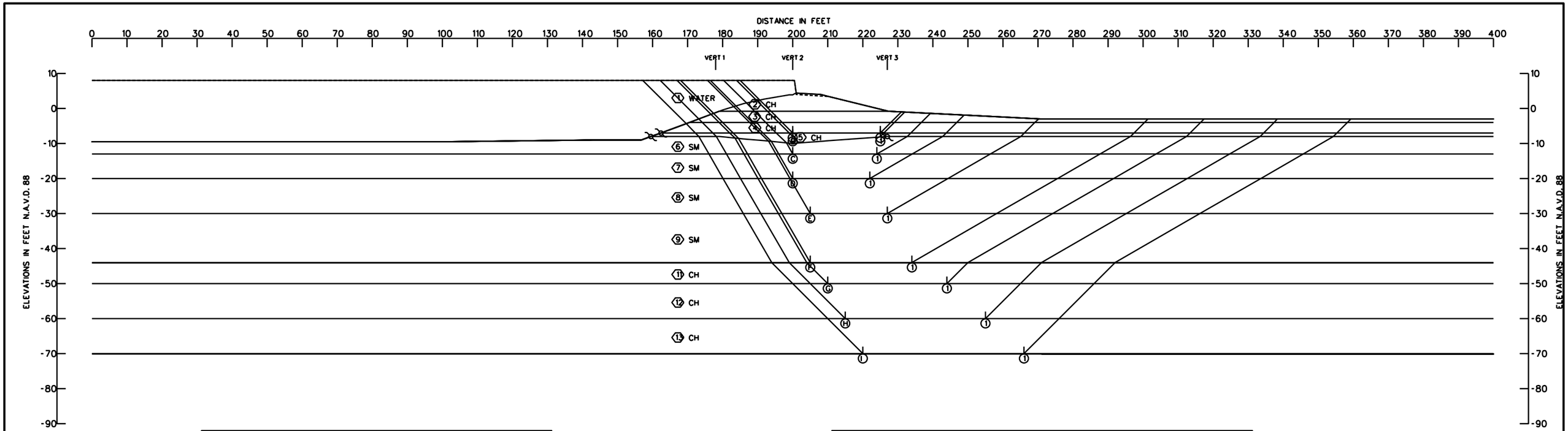
NOTES

ϕ -- ANGLE OF INTERNAL FRICTION, DEGREES
C -- UNIT COHESION, P.S.F.
∇ -- STATIC WATER SURFACE
D -- HORIZONTAL DRIVING FORCE IN POUNDS
R -- HORIZONTAL RESISTING FORCE IN POUNDS
A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
B -- AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK
P -- AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE

FACTOR OF SAFETY = $\frac{R_A + R_B + R_P}{D_A - D_P}$

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 6A Sta 40+00 to Sta 47+00
Protected Side Stability Analysis
Case: Gap Stability
March 2012

Lake Pontchartrain, LA & Vicinity
Hurricane Protection Project
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 03-FEB-12



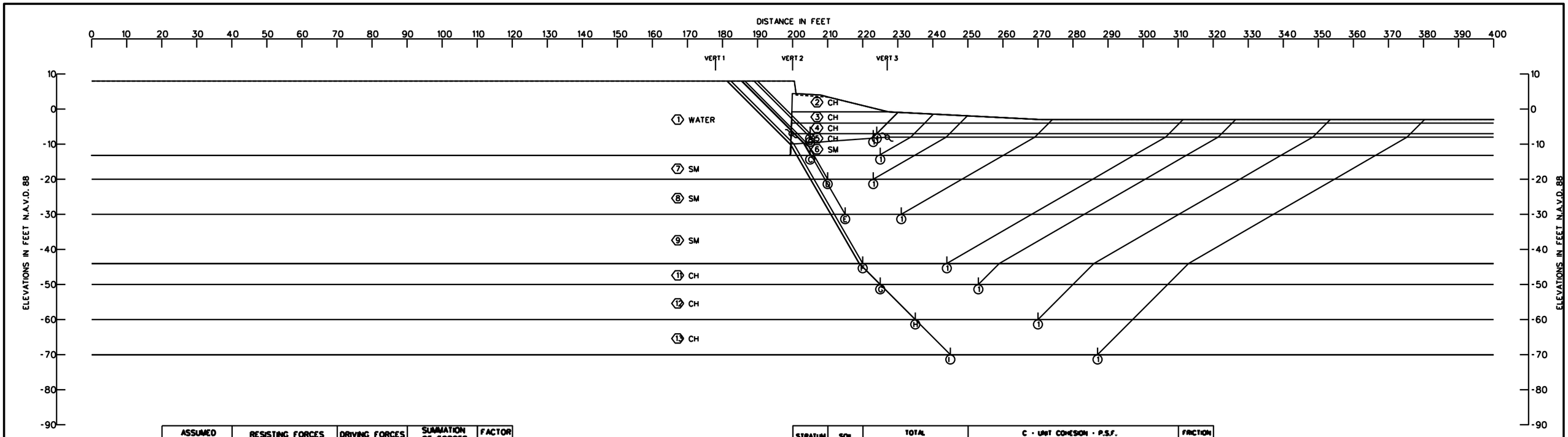
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
A 1	-7.0	8832	9086	5120	9264	2096	23038	7168	3.21
B 1	-8.0	9336	9086	5772	10626	2776	24194	7850	3.08
C 1	-13.0	11206	10103	9821	19103	7761	31130	11342	2.74
D 1	-20.0	14407	14656	20345	36028	19734	49408	16294	3.03
E 1	-30.0	23724	21759	43999	69561	45228	89482	24333	3.68
F 1	-44.0	41587	17287	97097	137795	100999	155971	36796	4.24
G 1	-50.0	50042	21255	102548	173497	131709	173845	41788	4.16
H 1	-60.0	63461	28349	114923	241197	191960	206733	49237	4.20
I 1	-70.0	78654	36821	129826	318120	263258	245301	54862	4.47

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F. CENTER OF STRATUM			C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM			FRICTION ANGLE DEGREES
		VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	VERT. 1	VERT. 2	VERT. 3	
1	WATER	62	62	62	0	0	0	0	0	0	0
2	CH	109	108	109	500	700	500	500	700	500	0
3	CH	109	101	109	500	375	500	500	375	500	0
4	CH	101	96	101	350	375	350	350	375	350	0
5	CH	101	103	101	350	375	350	350	375	350	0
6	SM	122	122	122	0	0	0	0	0	0	30
7	SM	122	122	122	0	0	0	0	0	0	30
8	SM	122	122	122	0	0	0	0	0	0	30
9	SM	122	122	122	0	0	0	0	0	0	30
10	CH	109	109	109	530	744	530	530	744	530	0
11	CH	109	109	109	561	776	561	591	808	591	0
12	CH	109	109	109	643	862	643	694	915	694	0
13	CH	109	109	109	745	968	745	796	1022	796	0
14	CH	109	109	109	796	1022	796	796	1022	796	0

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION
REPORT
REACH 6B, STA. 47+00 TO 59+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 23-JAN-12



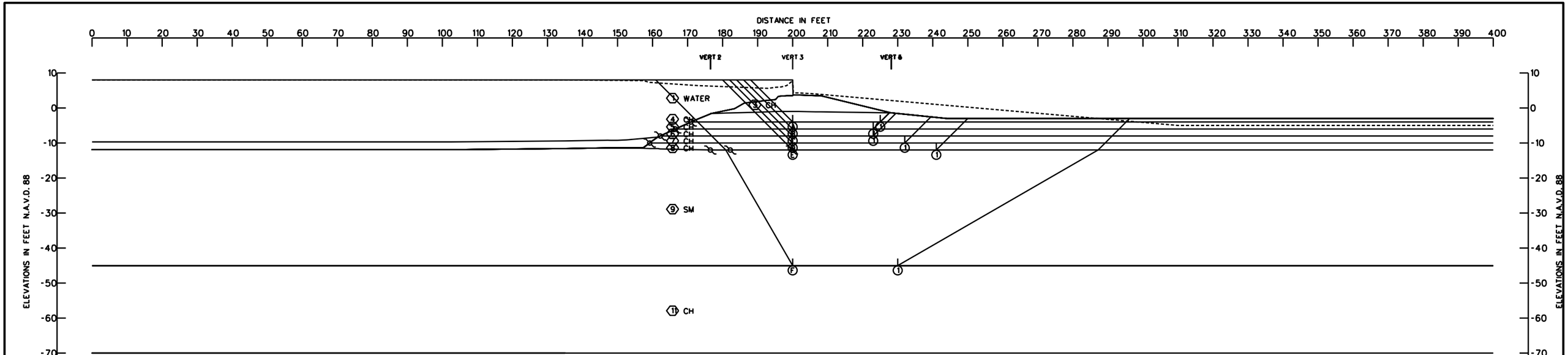
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
Ⓐ ①	-7.0	3936	6870	5174	7953	2188	15980	5765	2.77
Ⓑ ①	-8.0	3938	6517	5880	9111	2990	16335	6121	2.67
Ⓒ ①	-13.0	4125	8211	9745	16322	7664	22081	8658	2.55
Ⓓ ①	-20.0	9444	8341	20225	32209	19578	38010	12631	3.01
Ⓔ ①	-30.0	18601	15266	43586	64076	44659	77453	19417	3.99
Ⓕ ①	-44.0	36334	12914	96259	128051	99982	145507	28069	5.18
Ⓖ ①	-50.0	43015	16564	101998	161823	130939	161577	30884	5.23
Ⓗ ①	-60.0	55875	24290	114926	225172	191252	195091	33920	5.75
Ⓘ ①	-70.0	70775	33432	129824	298817	263185	234031	35632	6.57

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.			C - UNIT COHESION - P.S.F. CENTER OF STRATUM			C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM			FRICTION ANGLE DEGREES
		VERT. 1	VERT.2	VERT.3	VERT. 1	VERT.2	VERT.3	VERT. 1	VERT.2	VERT.3	
①	WATER	62	62	62	0	0	0	0	0	0	0
②	CH	109	108	109	500	700	500	500	700	500	0
③	CH	109	101	109	500	375	500	500	375	500	0
④	CH	101	96	101	350	375	350	350	375	350	0
⑤	CH	101	103	101	350	375	350	350	375	350	0
⑥	SM	122	122	122	0	0	0	0	0	0	30
⑦	SM	122	122	122	0	0	0	0	0	0	30
⑧	SM	122	122	122	0	0	0	0	0	0	30
⑨	SM	122	122	122	0	0	0	0	0	0	30
⑩	CH	109	109	109	530	744	530	530	744	530	0
⑪	CH	109	109	109	561	776	561	591	808	591	0
⑫	CH	109	109	109	643	862	643	694	915	694	0
⑬	CH	109	109	109	745	968	745	796	1022	796	0
⑭	CH	109	109	109	796	1022	796	796	1022	796	0

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6B, STA. 47+00 TO 59+00
PROTECTED SIDE STABILITY ANALYSIS.
CASE: GAP STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 30-JAN-12



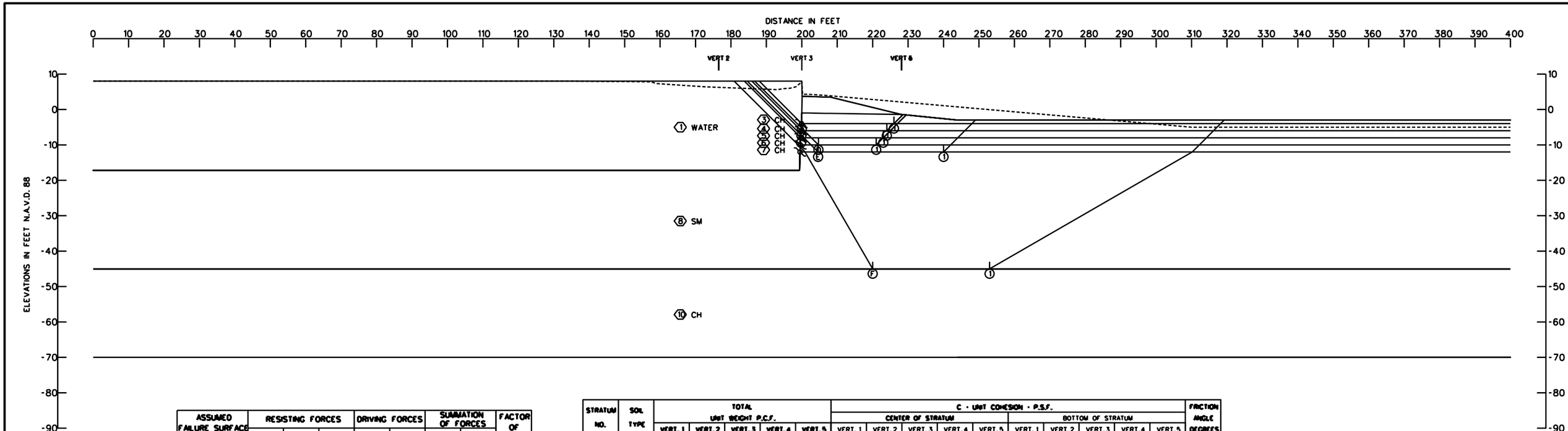
ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	
A 1	-4.0	6924	8552	2464	5551	446	17940	5105	3.51
B 1	-6.0	8022	7632	3824	7747	1341	19478	6406	3.04
C 1	-8.0	9141	7632	5606	10282	2398	22379	7884	2.84
D 1	-10.0	10253	10162	6708	13176	3001	27123	10175	2.67
E 1	-12.0	11356	7603	7360	16447	4059	26319	12388	2.12
F 1	-45.0	40851	23840	85007	138474	100556	149698	37918	3.95

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.					C - UNIT COHESION - P.S.F. CENTER OF STRATUM					C - UNIT COHESION - P.S.F. BOTTOM OF STRATUM					FRICTION ANGLE DEGREES
		VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	
1	WATER	62	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0
2	SM	122	122	122	122	122	0	0	0	0	0	0	0	0	0	0	30
3	CH	105	105	105	105	105	650	650	650	650	650	650	650	650	650	650	0
4	CH	96	96	105	96	96	600	450	450	450	600	600	450	450	450	600	0
5	CH	96	90	90	90	96	600	340	340	340	600	600	340	340	340	600	0
6	CH	104	104	90	104	104	320	320	340	320	320	320	320	340	320	320	0
7	CH	104	104	98	104	104	320	320	340	320	320	320	320	340	320	320	0
8	CH	96	96	98	96	96	300	300	340	300	300	300	300	340	300	300	0
9	SM	122	122	122	122	122	0	0	0	0	0	0	0	0	0	0	30
10	CH	111	111	108	111	111	790	790	800	790	790	790	790	800	790	790	0
11	CH	111	111	108	111	111	870	870	900	870	870	950	950	1000	950	950	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 7 Non-Rem Sta 59+00 to Sta 66+00
Protected Side Stability Analysis
Case: Global Stability
March 2012

Lake Pontchartrain, LA & Vicinity Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 30-JAN-12



ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF
NO.	ELEV.	R_A	R_B	R_P	D_A	$-D_P$	RESISTING	DRIVING	SAFETY
A 1	-4.0	97	8898	2298	4499	380	11293	4119	2.74
B 1	-6.0	71	7989	3658	6119	1222	11718	4897	2.39
C 1	-8.0	71	7700	5606	7990	2398	13377	5592	2.39
D 1	-10.0	3295	5244	6904	10873	4187	15443	6686	2.31
E 1	-12.0	3283	6109	7360	13553	4093	16752	9460	1.77
F 1	-45.0	33005	26082	92159	127120	100010	151246	27110	5.58

STRATUM NO.	SOIL TYPE	TOTAL UNIT WEIGHT P.C.F.					C - UNIT COHESION - P.S.F.										FRICTION ANGLE DEGREES
							CENTER OF STRATUM					BOTTOM OF STRATUM					
		VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	VERT. 1	VERT. 2	VERT. 3	VERT. 4	VERT. 5	
1	WATER	62	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0
2	CH	105	105	105	105	105	650	650	650	650	650	650	650	650	650	650	0
3	CH	96	96	105	96	96	600	450	450	450	600	600	450	450	450	600	0
4	CH	96	90	90	90	96	600	340	340	340	600	600	340	340	340	600	0
5	CH	104	104	90	104	104	320	320	340	320	320	320	320	340	320	320	0
6	CH	104	104	98	104	104	320	320	340	320	320	320	320	340	320	320	0
7	CH	96	96	98	96	96	300	300	340	300	300	300	300	340	300	300	0
8	SM	122	122	122	122	122	0	0	0	0	0	0	0	0	0	0	30
9	CH	111	111	108	111	111	790	790	800	790	790	790	790	800	790	790	0
10	CH	111	111	108	111	111	870	870	900	870	870	950	950	1000	950	950	0

London Ave. Canal
Outfall Canal Reevaluation Report
Reach 7 Non-Rem Sta 59+00 to Sta 66+00
Protected Side Stability Analysis
Case: Gap Stability
March 2012

Lake Pontchartrain, LA & Vicinity Hurricane Protection Project

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS 30-JAN-12