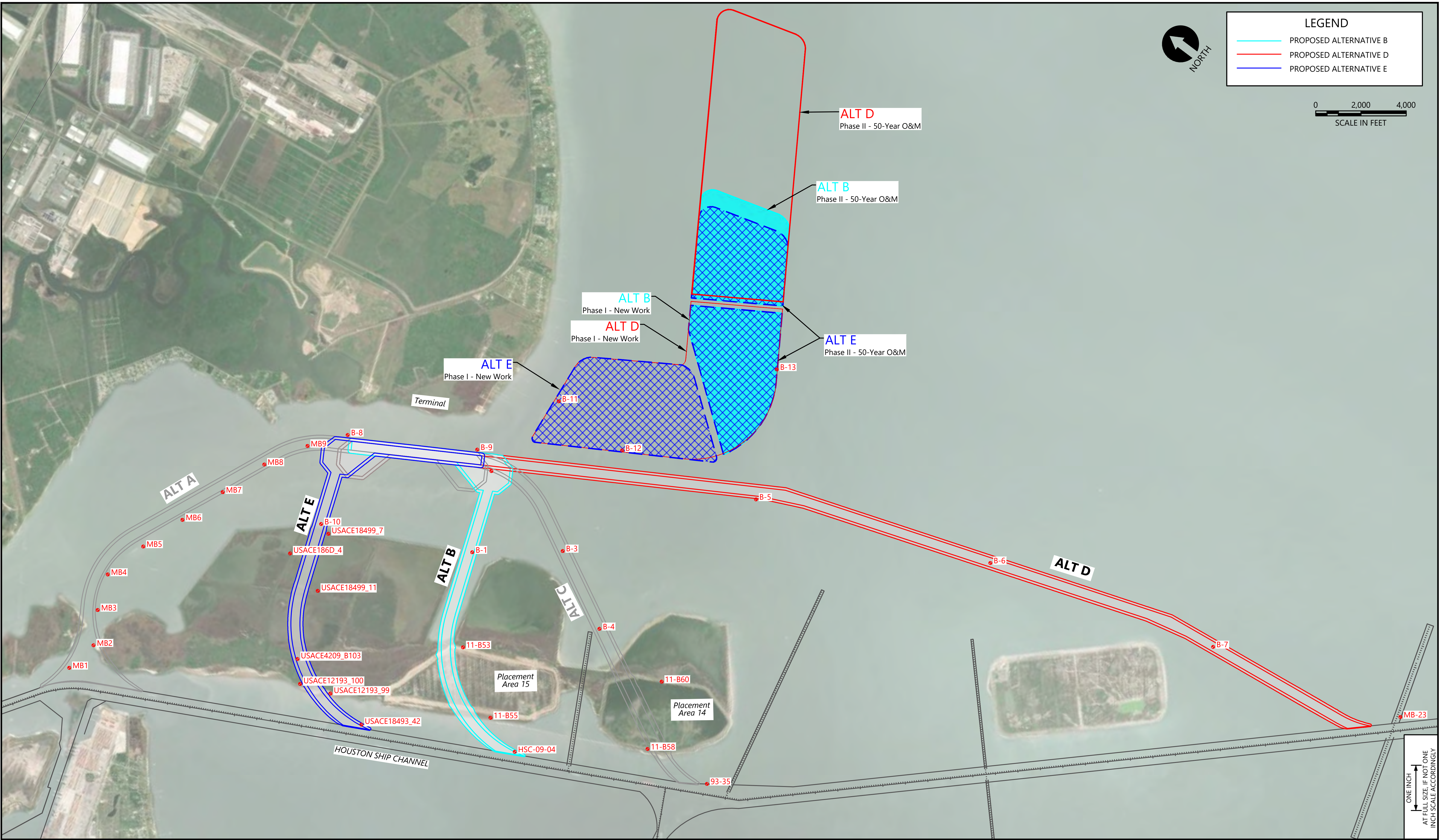
Attachment 1

Boring Locations Map



ANCHOR QEA

REV	DATE	BY	APP'D	DESCRIPTION
	8/20/24			FOR REFERENCE ONLY

REVISIONS

DESIGNED BY: I.FISHER
DRAWN BY: S.ESCALANTE
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: 8/20/24

CPNID DEEPWATER PROJECT
DREDGED MATERIAL MANAGEMENT

ALTERNATIVES OVERVIEW - BORING LOCATIONS

SHEET # 1 OF 1

K:\Projects\2823-Trans-Global Solutions Inc\Deepwater Project Engineering\2823-RP-006 Alts_Borings_Overview.dwg SITE PLAN

Aug 20, 2024 10:36am sescalante

Attachment 2

Boring Logs for 2023/2024

LOG OF BORING B-1

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 02.53"
W 94° 56' 24.69"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0	0			Water												
-5	5	☒	▨	Very soft gray SANDY FAT CLAY (CH)		WOR/ 18"		90								
		☒	▨	-w/ shell fragments @ 7.5'-9'		WOR/ 18"										
-10	10	☒	▨			WOR/ 18"		51								
		☒	▨			WOR/ 18"		48								
		☒	▨			WOR/ 18"		30								
-15	15	☒	▨			WOR/ 18"		35								
		☒	▨			WOR/ 18"		43							64	
-20	20	☒	▨			WOR/ 18"		48								
		☒	▨			WOR/ 18"										
		☒	▨			WOR/ 18"		43								
-25	25		▨													
		☒	▨			WOH/ 18"		74		80	45					
-30	30		▨													
		■	▨	-firm & w/ organic @ 33.5'-35'	(P)0.75			80	40				*			CU
-35	35															

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 8/6/2023
DATE BORING COMPLETED: 8/6/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-1

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 02.53"
W 94° 56' 24.69"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35			Stiff gray SANDY FAT CLAY (CH)												
					(P)1.75			32	91			1.11	15			
-40	40															
				Very stiff gray LEAN CLAY (CL) w/ ferrous nodules	(P)3.25			19	111	39	21	2.32	10			
-45	45															
					(P)3.00			21	109				*		95	CU
-50	50															
				Loose gray SILTY SAND (SM) w/ organic		10/6" 6/6" 4/6"		18								
-55	55															
				-medium dense @ 58.5'-60'		9/6" 13/6" 13/6"		24								
-60	60															
				-dense @ 63.5'-65' Bottom @ 65'		14/6" 15/6" 25/6"		22								
-65	65															
-70	70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/6/2023
DATE BORING COMPLETED:	8/6/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

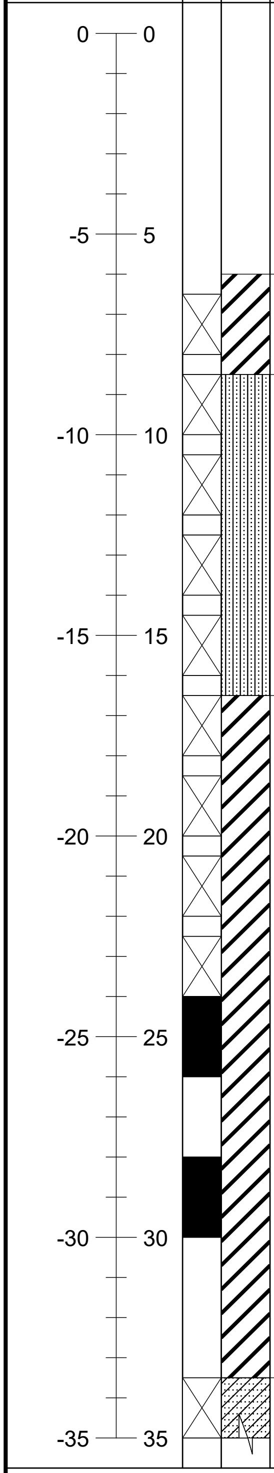
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-2

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 11.75"
W 94° 55' 44.27"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Water												
Very soft gray FAT CLAY (CH)		WOR/ 18"		35								
Very loose gray SILTY SAND (SM)		2/6" 1/6" 2/6"		25		0	NP				23	
		WOH/ 18"		24								
		WOR/ 18"										
-w/ clay pockets @ 14.5'-16'		3/6" 0/6" 1/6"		25								
Very soft gray FAT CLAY (CH) -w/ shell fragments @ 16.5'-18'		WOR/ 18"		45								
		WOR/ 18"		55								
-w/ shell fragments @ 20.5'-22'		WOR/ 18"		60								
		WOR/ 18"		61		70	41				96	
-stiff @ 24'-26'	(P)1.00			51	71			0.54	4 *			
-firm @ 28'-30'	(P)0.75			58	66				*			CU
Very soft gray SANDY LEAN CLAY (CL) w/ clay pockets		0/6" 2/6"		60								

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/7/2023
DATE BORING COMPLETED: 8/8/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-2

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 11.75"
W 94° 55' 44.27"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35		▨	Very soft gray SANDY LEAN CLAY (CL) w/ clay pockets		0/6"										
		☒	▥	Very loose gray SILTY SAND (SM) w/ clay pockets		1/6" 2/6" 1/6"										
-40	40		▥													
		☒	▥			2/6" 0/6" 2/6"		46								
-45	45		▥													
		☒	▧	Stiff gray FAT CLAY (CH) w/ sand pockets		0/6" 4/6" 5/6"		24								
-50	50		▧													
		☒	▧	-w/ gravel @ 53.5'-55'		0/6" 4/6" 6/6"		39								
-55	55		▧													
		☒	▥	Dense gray SILTY SAND (SM)		10/6" 16/6" 20/6"		18								
-60	60		▥													
		☒	▥	-very dense, w/ rocks @ 63.5'-65'		9/6" 26/6" 33/6"		18								
-65	65		▥													
		■	▧	Hard gray & brown FAT CLAY (CH)	(P)4.50+			30		67	41					
-70	70															

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/7/2023
DATE BORING COMPLETED: 8/8/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

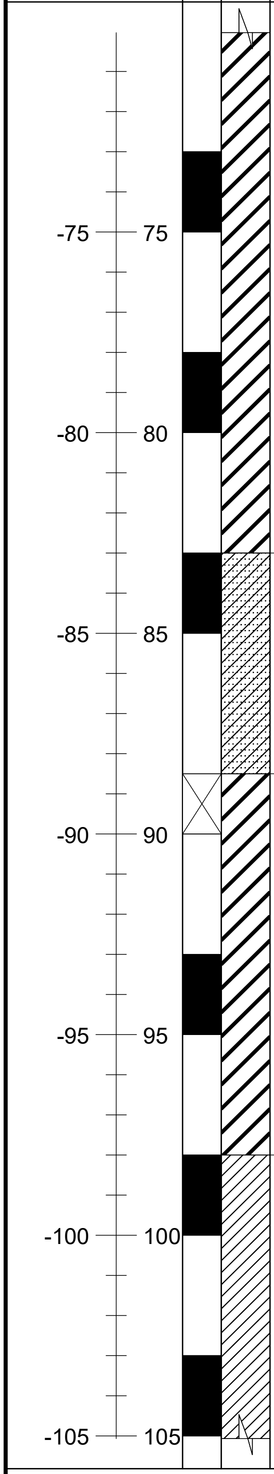
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-2

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 11.75"
W 94° 55' 44.27"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Hard gray & brown FAT CLAY (CH)												
-w/ ferrous nodules @ 73'-75'	(P)4.50+			18	116			4.52	8	25		
-slickensided @ 78'-80'	(P)4.50+			19	113							
Very stiff gray & brown SANDY LEAN CLAY (CL)	(P)3.25			20								
Very stiff brown FAT CLAY (CH)		7/6" 13/6" 7/6"										
-hard & gray @ 93'-95'	(P)4.50+			23	104			3.07	3			
Hard gray LEAN CLAY (CL) w/ sand pockets	(P)4.50+			18	113							
	(P)4.00			17		42	23					

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/7/2023
DATE BORING COMPLETED:	8/8/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-2

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 11.75"
W 94° 55' 44.27"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			Hard gray & brown LEAN CLAY (CL)												
			-brown @ 108'-115' -slickensided @ 108'-110'	(P)4.50+			25	102			1.64	2 *			
-110 / 110															
				(P)4.50+			21	109							
-115 / 115															
			Very dense blue SILTY CLAYEY SAND (SC-SM) w/ sand lens		8/6" 24/6" 28/6"		23								
-120 / 120															
			Hard brown FAT CLAY (CH)	(P)4.50+			21	104							
-125 / 125															
			-very stiff & gray @ 128'-150' -w/ sand seams @ 128'-140'	(P)3.50			27		59	30	2.09	3			
-130 / 130															
				(P)3.50			28	95							
-135 / 135															
				(P)3.50											
-140 / 140															

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/7/2023
DATE BORING COMPLETED:	8/8/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

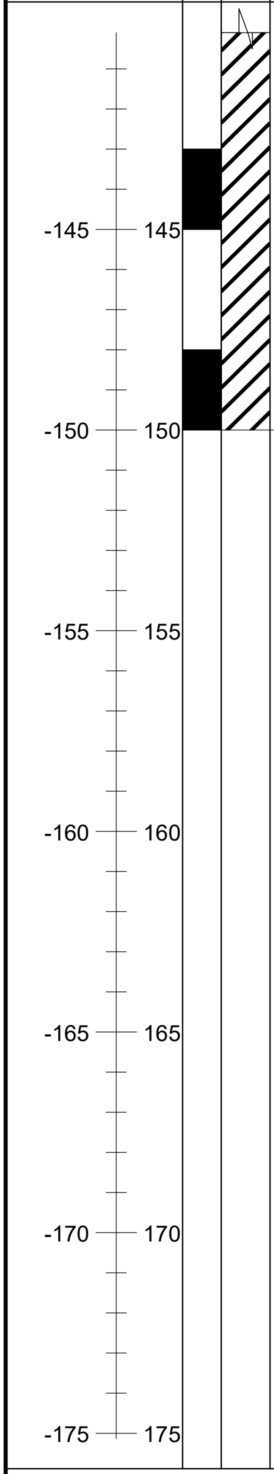
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-2

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 11.75"
W 94° 55' 44.27"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff gray FAT CLAY (CH)												
	(P)3.25			43	77							
	(P)3.50											
Bottom @ 150'												

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/7/2023
DATE BORING COMPLETED: 8/8/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-3

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 27.81"
W 94° 56' 02.95"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0	0			WATER												
-5	5															
		☒		Very soft gray FAT CLAY (CH)		WOR/ 18"		53								
-10	10															
		☒				WOR/ 18'		48								
		☒		Very soft gray SANDY LEAN CLAY (CL) w/ shell fragments		WOH/ 18"		25								
		☒				WOR/ 18"										
-15	15															
		☒				WOR/ 18"		23		33	15					
		☒		Very loose gray SILTY SAND (SM)		WOR/ 18"		22								
-20	20															
		☒				WOR/ 18"		23								
		☒		-w/ clay pockets @ 22.5'-24'		0/6" 0/6" 1/6"		21								
-25	25	☒		Firm brown FAT CLAY (CH)		0/6" 2/6" 5/6"		41		65	39					
		☒		-stiff @ 26.5'-28'		3/6" 3/6" 7/6"		32								
		☒		Loose gray SILTY SAND (SM) w/ shell fragments		4/6" 1/6" 0/6"		21							12	
-30	30															
		■		Hard gray FAT CLAY (CH) slickensided & w/ ferrous nodules	(P)4.50+			36	86	63	40					CU
-35	35															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/5/2023
DATE BORING COMPLETED:	8/5/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-3

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 27.81"
W 94° 56' 02.95"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35		▨	Hard gray FAT CLAY (CH) slickensided & w/ ferrous nodules												
		■	▨	Very stiff gray SANDY LEAN CLAY (CL)	(P)3.00			27	99			0.70	6			
-40	40		▨													
		☒	▨			7/6" 8/6" 12/6"		24								
-45	45		▨													
		☒	▨	-w/ sand lens @ 48.5'-50'		8/6" 11/6" 9/6"		25							66	
-50	50		▨													
		☒	▥	Dense gray SILTY SAND (SM)		6/6" 13/6" 17/6"		29								
-55	55		▥													
		☒	▥			8/6" 13/6" 22/6"										
-60	60		▥													
		☒	▥	Bottom @ 65'		13/6" 15/6" 24/6"		22								
-65	65															
-70	70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/5/2023
DATE BORING COMPLETED:	8/5/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-4

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 57.67"
W 94° 56' 28.78"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0	0	WATER												
-5	5													
		Very soft gray & light brown SANDY LEAN CLAY (CL) w/ silt pockets		WOR/ 18"		82								
				WOR/ 18"		92								
-10	10													
		-w/ sand pockets & shell fragments @ 10.5'-14'		WOR/ 18"		35								
				WOR/ 18"		35								
				WOR/ 18"		30								
-15	15													
				WOR/ 18"		45								
		-w/ sand pockets & shell fragments @ 18.5'-20'		WOR/ 18"				49	23				61	
-20	20													
				WOR/ 18"		60								
		-w/ shell fragments @ 22.5'-24'		WOR/ 18"		71								
		-w/ ferrous stains & sand pockets @ 24'-26'	(P)0.50			64	59							CU
-25	25													
		Very loose gray SANDY SILT (ML) -w/ clay pockets @ 28.5'-40'		1/6" WOH/ 6" WOH/ 6"		32								
-30	30													
				WOH/ 18"				31	7				59	
-35	35													

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 8/12/2023
DATE BORING COMPLETED: 8/12/2023
LOGGER: J. Sparks/Charlie
PROJECT NO.: 23.14.175

NOTES: 75 ft from original coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-4

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 57.67"
W 94° 56' 28.78"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35			Loose gray SILTY SAND (SM)												
				-becomes light gray @ 38.5'-55'		4/6" 1/6" 4/6"		23								
-40	40															
				-medium dense @ 43.5'-45'		4/6" 6/6" 12/6"		22								
-45	45															
				-dense @ 48.5'-50'		10/6" 16/6" 26/6"		21								
-50	50															
				-loose & w/ clay pockets @ 53.5'-55'		6/6" 3/6" 5/6"		35								
-55	55															
				Very stiff gray FAT CLAY (CH) w/ ferrous stains, calcareous nodules & shell fragments	(P)2.75			35 35	87 85			1.24	2 * *			CU
-60	60															
				Medium dense light gray SILTY SAND (SM) w/ clay pockets		8/6" 12/6" 15/6"										
-65	65			Bottom @ 65'												
-70	70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/12/2023
LOGGER:	J. Sparks/Charlie
PROJECT NO.:	23.14.175

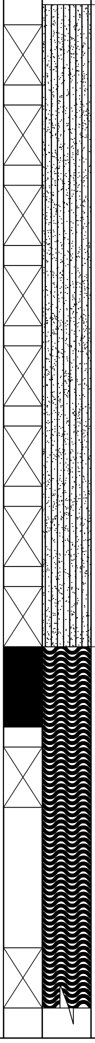
NOTES: 75 ft from original coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-5

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 23.63"
W 94° 54' 54.80"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'



ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0	0	WATER												
-5	5													
-10	10	Very loose gray SILT W/ SAND (ML)		WOR/ 18"		71								
		-w/ shell fragments @ 12.5'-22'		WOR/ 18"		53								
-15	15			WOR/ 18"		55								
				WOR/ 18"		45								
				WOR/ 18"		50								
-20	20			WOR/ 18"				0	NP				79	
				WOR/ 18"		57								
-25	25			WOR/ 18"		78								
		Firm gray ORGANIC CLAY (OH)	(P)0.75			55	69							CU
		-very soft @ 28.5'-35'		WOR/ 18"		96								
-30	30													
				WOH/ 18"				118	65				95	
-35	35													

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 8/2/2023
DATE BORING COMPLETED: 8/5/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-5

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 23.63"
W 94° 54' 54.80"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35			Very soft gray ORGANIC CLAY (OH)												
		☒		Loose gray SILTY SAND (SM) -w/ gravel @ 38.5'-50'		0/6" 3/6" 5/6"		53								
-40	40															
		☒		-very loose @ 43.5'-45'		1/6" 1/6" 0/6"		20								
-45	45															
		☒				1/6" 3/6" 2/6"		22								
-50	50															
		☒		-very loose @ 53.5'-55'		1/6" 1/6" 2/6"		16								
-55	55															
		☒		-medium dense @ 58.5'-60'		6/6" 7/6" 8/6"		22								
-60	60															
		☒		Bottom @ 65'		2/6" 2/6" 2/6"		18								
-65	65															
-70	70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/2/2023
DATE BORING COMPLETED:	8/5/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

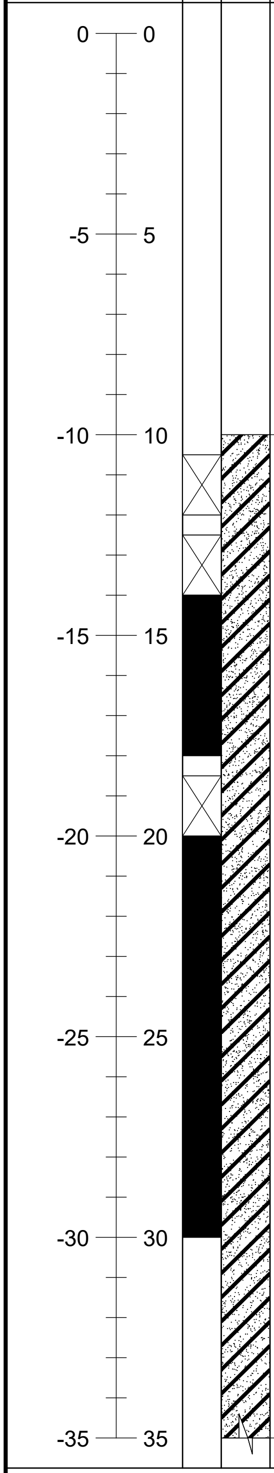
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-6

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 35' 40.00"
W 94° 54' 28.04"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
WATER												
Very soft gray FAT CLAY W/ SAND (CH)		WOR/ 18"		81								
		WOR/ 18"				53	33				78	
-very stiff & w/ shell fragments @ 14'-18' -becomes brown @ 14'-35'	(P)2.00			33	91				*			CU
	(P)3.50			29								
-firm @ 18.5'-20'		1/6" 3/6" 4/6"		29								
-very stiff @ 20'-24'	(P)3.25			26	97			2.25	4			
	(P)2.50			31								
-hard @ 24'-26'	(P)4.00											
-very stiff @ 26'-30'	(P)3.00			28	94			0.67	1 *			
	(P)2.75			37								
	(P)3.75			31								

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 8/1/2023
DATE BORING COMPLETED: 8/2/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

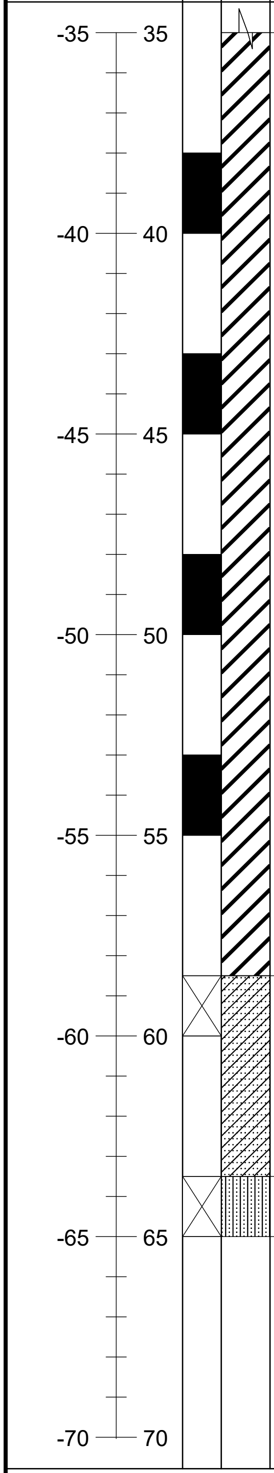
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-6

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 35' 40.00"
W 94° 54' 28.04"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff gray FAT CLAY (CH)												
-w/ shell fragments @ 38'-40'	(P)2.50			39	83			1.31	3			
	(P)2.50			39	82	86	47				100	
	(P)2.25			36								
	(P)3.00			33	91							CU
Stiff gray SANDY LEAN CLAY (CL)		3/6" 5/6" 4/6"		24								
Medium dense gray SILTY SAND (SM) Bottom @ 65'		7/6" 8/6" 8/6"		27								

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	8/1/2023
DATE BORING COMPLETED:	8/2/2023
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-7

PROJECT: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 33' 56.70"
W 94° 54' 13.00"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: 0' to 65'
Air Bored: to
Wash Bored: to

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0	0			WATER												
-5	5															
-10	10	☒	▨	Very soft gray FAT CLAY (CH)		WOR/ 6"		100								
		☒	▨	-w/ shell fragments @ 12.5'-16'		WOR/ 18"		62								
-15	15	☒	▨			WOR/ 18"		69								
		■	▨	-hard @ 16'-18' -brown @ 16'-26'	(P)4.50			33	90			0.83	5			
		■	▨	-very stiff @ 18'-22'	(P)2.50			27								
-20	20	■	▨		(P)3.50			18	105				*			CU
		■	▨	-hard @ 22'-24'	(P)4.50+			29	98	67	39				99	
		■	▨	-very stiff & w/ sand seams @ 24'-26'	(P)2.75			22								
-25	25															
		☒	▦	Loose brown SILTY SAND (SM)		2/6" 3/6" 4/6"		19								
		☒	▨	Stiff brown FAT CLAY (CH)		2/6" 5/6" 6/6"		27								
-30	30															
		☒	▨			3/6" 7/6" 7/6"		23								
-35	35															

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 7/31/2023
DATE BORING COMPLETED: 7/31/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-7

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 33' 56.70"
W 94° 54' 13.00"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: 0' to 65'
Wash Bored: to

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35 / 35			Stiff brown FAT CLAY (CH)												
			Stiff brown SILTY CLAY (CL-ML)		4/6" 5/6" 7/6"		34								
-40 / 40															
			Stiff brown FAT CLAY (CH)		5/6" 6/6" 6/6"		33								
-45 / 45															
					3/6" 5/6" 6/6"		36								
-50 / 50															
			-very stiff @ 53'-55' -gray @ 53'-65'	(P)2.25			37	81			1.86	4			
-55 / 55															
			-firm @ 58.5'-60' s		2/6" 3/6" 4/6"				56	32				98	
-60 / 60															
			-very stiff @ 63'-65'	(P)3.00											
-65 / 65			Bottom @ 65'												
-70 / 70															

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 7/31/2023
DATE BORING COMPLETED: 7/31/2023
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

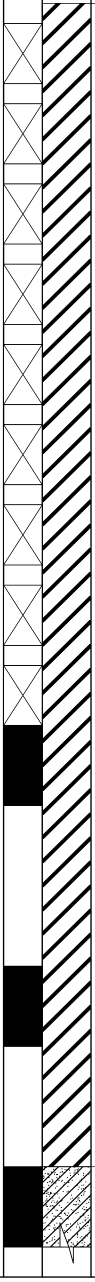
NOTES: SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-8

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 14.40"
W 94° 56' 01.40"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'



ELEVATION (FT) / DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0 / 0	Water												
-5 / 5	Very soft gray FAT CLAY (CH) w/ silt pockets -w/ shell fragments @ 4.5'-8'		WOR/ 18"										
			WOR/ 18"				62	36					
	-brown @ 8.5'-10'		WOR/ 18"										
-10 / 10	-w/ shell fragments @ 10.5'-14'		WOH/ 18"										
			WOH/ 18"										
-15 / 15			WOH/ 18"										
	-w/ shell fragments @ 16.5'-24'		WOH/ 18"				75	44				95	
			WOH/ 18"										
-20 / 20	-w/ sand layers @ 20.5'-22'		WOH/ 18"										
	-firm @ 22'-24'	(P)0.50 (T)0.50			64	64							
-25 / 25													
	-very stiff, w/ ferrous stains & sand pockets @ 28'-30'	(P)2.00											
-30 / 30													
	Stiff gray LEAN CLAY W/ SAND (CL) w/ ferrous stains, calcareous nodules & sand pockets	(P)1.25											
-35 / 35													

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/12/2023
DATE BORING COMPLETED: 8/16/2023
LOGGER: Charlie Hughes
PROJECT NO.: 23.14.175

NOTES: Barge 56' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-8

PROJECT: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 14.40"
W 94° 56' 01.40"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35	Very stiff gray LEAN CLAY W/ SAND (CL)												
			(P)2.00			25	102			0.81	5			
-40	40													
		Medium dense gray SILTY SAND (SM) w/ clay pockets		5/6" 7/6" 9/6"										
-45	45													
		Very stif gray FAT CLAY (CH) w/ ferrous stains & silt lens	(P)2.50											
-50	50													
		-stiff @ 53'-60'	(P)1.25			49	73				*			CU
-55	55													
			(P)1.00			49	73			1.26	2 *	20		
-60	60													
		Dense gray SILTY SAND (SM) -w/ coarse sand, clay pockets & gravel @ 63.5'-70'		15/6" 18/6" 21/6"									16	
-65	65													
		-medium dense @ 68.5'-70'		14/6" 10/6" 10/6"										
-70	70													

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/16/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: Barge 56' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-8

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 14.40"
W 94° 56' 01.40"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
		Dense gray SILTY SAND (SM)												
				13/6" 26/6" 25/6"										
-75	75													
		Hard bluish gray & reddish brown FAT CLAY (CH) -w/ silt lens @ 78'-95' -w/ sand pockets & calcareous nodules @ 78'-80	(P)4.25			23	104	55	33	3.36	10	25		
-80	80													
		-w/ sand layers @ 83'-90'	(P)4.50+											
-85	85													
		-very stiff @ 88'-100'	(P)3.50			27	97							
-90	90													
		-slickensided @ 93'-95' -w/ calcareous nodules @ 93'-100'	(P)4.25											
-95	95													
			(P)4.00			25	100			2.55	2			
-100	100													
		-w/ silt lens, sand seams & slickensided @ 103'-110'	(P)4.50+			24	106							
-105	105													

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/16/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: Barge 56' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-8

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 14.40"
W 94° 56' 01.40"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			▨	Hard bluish gray & reddish brown FAT CLAY (CH)												
		■	▨		(P)4.50+			24	102			3.95	2			
-110	110		▨													
		■	▨	-w/ sand pockets, silt pockets & shell fragments @ 113'-150' -very stiff @ 113'-120'	(P)3.25											
-115	115		▨													
		■	▨		(P)2.25											
-120	120		▨													
		■	▨	-w/ sand layers @ 123'-130' -stiff & light gray @ 123'-125'	(P)1.75			31	88			1.37	6			
-125	125		▨													
		■	▨	-very stiff @ 128'-140' -light brown @ 128'-130'	(P)2.50											
-130	130		▨													
		■	▨	-gray @ 133'-150'	(P)2.25											
-135	135		▨													
		■	▨		(P)2.50											
-140	140		▨													

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/16/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: Barge 56' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-8

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 14.40"
W 94° 56' 01.40"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			Stiff gray FAT CLAY (CH)												
				(P)1.75			26	103			0.66	5			
-145 / 145															
				(P)1.50											
-150 / 150			Bottom @ 150'												
-155 / 155															
-160 / 160															
-165 / 165															
-170 / 170															
-175 / 175															

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/16/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: Barge 56' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
CU: Consolidated Undrained Triaxial Test

LOG OF BORING B-9

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 21.43"
W 94° 55' 37.61"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT) / DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0 / 0	Water												
-5 / 5													
	Very soft gray FAT CLAY (CH) w/ silt pockets & shell fragments		WOR/ 18"										
	Loose light gray SILTY SAND (SM) w/ shell fragments		4/6" 5/6" 2/6"										
-10 / 10	-very loose @ 10.5'14' -gray @ 10.5'-16' -w/ clay pockets @ 10.5'-12'		1/6" 2/6" 0/6"										
			0/6" 0/6" 1/6"										
-15 / 15			2/6" 3/6" 2/6"										
	Very soft gray SANDY LEAN CLAY (CL) w/ shell fragments		2/6" 0/6" 0/6"									53	
-20 / 20	-no recovery @ 18.5'-20'		2/6" 0/6" 0/6"										
	Very soft gray FAT CLAY W/ SAND (CH) -w/ shell fragments @ 20.5'-22'		0/6" 0/6" 2/6"										
	-brown @ 22.5'-40'		0/6" 1/6" 1/6"									79	
-25 / 25	-very stiff @ 24'-26'	(P)2.25											
	-w/ sand pockets @ 28'-30'	(P)3.50											
-30 / 30													
		(P)2.25			32	91	75	39	1.49	4 *	10		
-35 / 35													

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/12/2023
DATE BORING COMPLETED: 8/14/2023
LOGGER: Charlie Hughes
PROJECT NO.: 23.14.175

NOTES: 45' from orginal coordinates.
SPT Hammer Type: Automatic Hammer

LOG OF BORING B-9

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 21.43"
W 94° 55' 37.61"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-35	35			Hard brown FAT CLAY W/ SAND (CH)												
		■			(P)4.00											
-40	40															
		■		-very stiff & gray @ 43'-55' -w/ ferrous nodules @ 43'-45'	(P)3.00											
-45	45															
		■			(P)2.75			32	91	76	44	2.25	5 *			
-50	50															
		■			(P)3.25											
-55	55															
		☒		Medium dense gray POORLY GRADED SAND W/ SILT (SP-SM)		6/6" 9/6" 11/6"									3	
-60	60															
		☒		-very dense @ 63.5'-65'		9/6" 25/6" 39/6"										
-65	65															
		☒		-dense @ 68.5'-75'		13/6" 14/6" 26/6"										
-70	70															

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/14/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: 45' from orginal coordinates.
SPT Hammer Type: Automatic Hammer

LOG OF BORING B-9

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 21.43"
W 94° 55' 37.61"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			▨	Dense gray POORLY GRADED SAND W/ SILT (SP-SM)												
		☒	▨	-brown @ 73.5'-75'		16/6" 20/6" 24/6"									7	
-75	75		▨													
		☒	▨	-very dense & gray @ 78.5'-80'		12/6" 21/6" 34/6"										
-80	80		▨													
		■	▧	Hard brown FAT CLAY (CH)	(P)4.25					77	42					
-85	85		▧													
		■	▧		(P)4.50+			32	93			1.37	1 *			
-90	90		▧													
		■	▧	-blue @ 93'-100'	(P)4.50+											
-95	95		▧													
		■	▧		(P)4.50											
-100	100		▧													
		■	▨	Hard light brown & gray LEAN CLAY W/ SAND (CL)	(P)4.50+			20	110	31	12	1.30	3			
-105	105															

COMPLETION DEPTH: 150 ft
DATE BORING STARTED: 8/12/2023
DATE BORING COMPLETED: 8/14/2023
LOGGER: Charlie Hughes
PROJECT NO.: 23.14.175

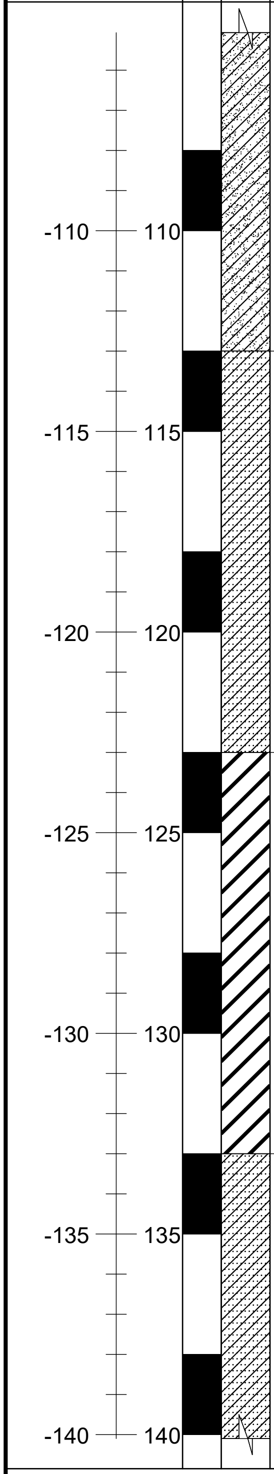
NOTES: 45' from orginal coordinates.
SPT Hammer Type: Automatic Hammer

LOG OF BORING B-9

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 39' 21.43"
W 94° 55' 37.61"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff brown & gray LEAN CLAY W/ SAND (CL)												
-w/ sand pockets & silt pockets @ 108'-109'	(P)3.75											
Very stiff bluish gray SANDY LEAN CLAY (CL) w/ sand layers, sand pockets & silt pockets	(P)3.75											
-stiff @ 118'-120'	(P)1.25			22	102			1.77	11	20		
Hard bluish gray FAT CLAY (CH) slickensided w/ silt lens & calcareous nodules	(P)4.50+											
	(P)4.25			22	106			6.48	2 *	108		
Very stiff light gray SANDY LEAN CLAY (CL) w/ sand layers & sand pockets	(P)3.00			24	100							
-stiff @ 138'-139'	(P)1.75			16	108							

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/14/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: 45' from orginal coordinates.
SPT Hammer Type: Automatic Hammer

LOG OF BORING B-9

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc Houston, TX

COORDINATES: N 29° 39' 21.43" W 94° 55' 37.61"
SURFACE ELEVATION: 0
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 150'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			▨	Very stiff gray SANDY LEAN CLAY (CL)												
		■	▨	-w/ sand pockets & shell fragments @ 143'-145'	(P)2.00											
-145	145		▨													
		■	▨	Very stiff light gray FAT CLAY (CH) w/ silt lens & sand pockets	(P)3.00			36	87			2.92	3			
-150	150			Bottom @ 150'												
-155	155															
-160	160															
-165	165															
-170	170															
-175	175															

COMPLETION DEPTH:	150 ft
DATE BORING STARTED:	8/12/2023
DATE BORING COMPLETED:	8/14/2023
LOGGER:	Charlie Hughes
PROJECT NO.:	23.14.175

NOTES: 45' from orginal coordinates.
SPT Hammer Type: Automatic Hammer

Preliminary Boring Logs & Key to Symbols and Terms

Borings B-10, B-11, B-12, and B-13

LOG OF BORING B-10

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 06.64"
W 94° 56' 47.63"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0															
5															
			Very soft gray FAT CLAY (CH)		WOH/ 18"										
					WOH/ 18"										
10															
					WOH/ 18"										
			-w/ shell fragments @ 12.5'-14'		WOH/ 18"										
15			Very loose gray SILTY SAND (SM) w/ shell fragments		2/6" 1/6" 2/6"										
			Very soft gray FAT CLAY (CH)		WOH/ 18"										
			-stiff @ 18.5'-20' -brown @ 18.5'-26'		6/6" 5/6" 6/6"										
20			-very stiff @ 20'-26'	(P)3.25											
				(P)3.00											
			-gray @ 24'-39'	(P)3.00											
25															
			-stiff @ 28'-30'	(P)2.00											
30															
			-very stiff @ 33'-35'	(P)3.75											
35															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	04/25/2024
DATE BORING COMPLETED:	04/26/2024
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

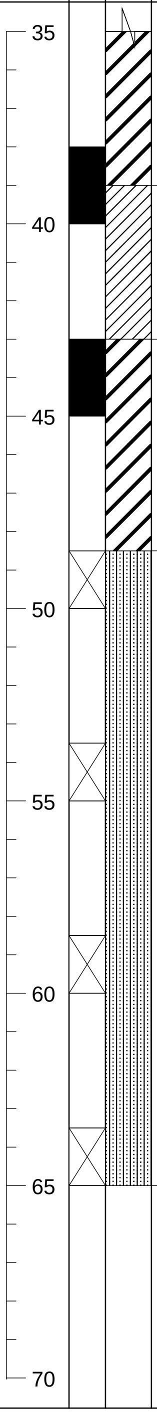
NOTES: 6' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
Water Depth - 6 ft @ 12:50 on 4/25/24.

LOG OF BORING B-10

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 40' 06.64"
W 94° 56' 47.63"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff gray FAT CLAY (CH)												
-stiff @ 38'-39'	(P)2.50											
Stiff gray LEAN CLAY (CL)												
Very stiff gray FAT CLAY (CH)	(P)3.00											
Medium dense gray SILTY SAND (SM)		5/6" 8/6" 6/6"										
		6/6" 9/6" 11/6"										
		9/6" 11/6" 11/6"										
-dense @ 63.5'-65'		12/6" 14/6" 17/6"										
Bottom @ 65'												

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 04/25/2024
DATE BORING COMPLETED: 04/26/2024
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: 6' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
Water Depth - 6 ft @ 12:50 on 4/25/24.

LOG OF BORING B-11

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 56.66"
W 94° 54' 56.80"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0															
5															
10			Very soft gray FAT CLAY (CH)		0/6" 0/6" 0/6"										
					0/6" 0/6" 0/6"										
			-w/ shell fragments @ 13.5'-15'		0/6" 0/6" 0/6"										
15			Very loose gray SILTY SAND (SM) w/ shell fragments		0/6" 0/6" 0/6"										
			-brown @ 17.5'-35'		1/6" 2/6" 1/6"										
20			-w/ shell fragments @ 19.5'-25'		5/6" 2/6" 1/6"										
					0/6" 1/6" 1/6"										
					1/6" 2/6" 1/6"										
25			-loose @ 25.5'-27'		4/6" 2/6" 4/6"										
			-medium dense @ 27.5'-35'		5/6" 7/6" 9/6"										
30															
			-w/ clay pockets @ 33.5'-35'		7/6" 7/6" 9/6"										
35															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	04/23/2024
DATE BORING COMPLETED:	04/23/2024
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: 9' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
Water Depth - 9 ft @ 0820 on 4/23/24.

LOG OF BORING B-11

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 56.66"
W 94° 54' 56.80"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
35			Medium dense brown SILTY SAND (SM)												
					12/6" 12/6" 15/6"										
40															
			Very stiff brown FAT CLAY (CH)	(P)3.00											
45															
				(P)4.00											
50															
			-stiff @ 53'-55'	(P)2.00											
55															
			-very stiff @ 58'-60' -gray @ 58'-65'	(P)3.25											
60															
			-very stiff to hard w/ calcareous deposits @ 63'-65'	(P)4.50											
65			Bottom @ 65'												
70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	04/23/2024
DATE BORING COMPLETED:	04/23/2024
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: 9' from orginal coordinates.
SPT Hammer Type: Automatic Hammer
Water Depth - 9 ft @ 0820 on 4/23/24.

LOG OF BORING B-12

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 25.39"
W 94° 55' 04.27"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0															
5															
10	☒		Very soft gray FAT CLAY (CH)		WOR/ 18"										
	☒				WOR/ 18"										
15	☒		-w/ shell fragments @ 14.5'-23'		WOR/ 18"										
	☒				WOR/ 18"										
	☒				WOH/ 18										
20	☒				WOH/ 18"										
	☒		Very soft gray SANDY LEAN CLAY (CL)		WOH/ 18"										
25	☒		Very loose gray SILTY SAND (SM)		WOH/ 18"										
	☒				WOH/ 18"										
30	☒				WOH/ 18"										
35	☒		-medium dense @ 33.5'-45' -tan @ 33.5'-65'		2/6" 4/6" 8/6"										

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 04/24/2024
DATE BORING COMPLETED: 04/25/2024
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
Water Depth - 10 ft @ 13:05 on 4/24/24.

LOG OF BORING B-12

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 38' 25.39"
W 94° 55' 04.27"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
35			Medium dense tan SILTY SAND (SM)												
40	☒				8/6" 5/6" 6/6"										
45	☒				6/6" 6/6" 7/6"										
50	☒		-dense @ 48.5'-50'		6/6" 21/6" 27/6"										
55	☒		-medium dense @ 53.5'-55'		17/6" 15/6" 13/6"										
60	☒		-very dense @ 58.5'-65'		12/6" 27/6" 36/6"										
65	☒		Bottom @ 65'		14/6" 26/6" 37/6"										
70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	04/24/2024
DATE BORING COMPLETED:	04/25/2024
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
Water Depth - 10 ft @ 13:05 on 4/24/24.

LOG OF BORING B-13

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 42.22"
W 94° 53' 52.10"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
0															
5															
10	☒	▨	Very soft gray FAT CLAY (CH)		WOR/ 18"										
	☒	▨			WOR/ 18"										
	☒	▨			WOR/ 18"										
15		▨													
	☒	▨			WOR/ 18"										
	☒	▨			WOR/ 18"										
20	☒	▨	-w/ shell fragments @ 19.5'-21'		WOR/ 18"										
	☒	▨			WOR/ 18"										
25	☒	░	Very loose gray SILTY SAND (SM)		1/6" 2/6" 2/6"										
	☒	░	-brown @ 25.5'-29'		WOR/ 6" 1/6" 2/6"										
	☒	░			1/6" 2/6" 2/6"										
30		░													
35	☒	▨	Stiff brown FAT CLAY (CH)		5/6" 5/6"										

COMPLETION DEPTH: 65 ft
DATE BORING STARTED: 04/23/24
DATE BORING COMPLETED: 04/24/2024
LOGGER: Josh Sparks
PROJECT NO.: 23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
Water Depth - 9 ft @ 7:45am on 4/24/24.

LOG OF BORING B-13

PROJECT: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

CLIENT: Trans-Global Solutions, Inc
Houston, TX

COORDINATES: N 29° 37' 42.22"
W 94° 53' 52.10"
SURFACE ELEVATION:
DRILLING METHOD:
Dry Augered: to
Air Bored: to
Wash Bored: 0' to 65'

ELEVATION (FT) / DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
35			Stiff brown FAT CLAY (CH)		5/6"										
				(P)2.50											
40															
			-very stiff @ 43'-45'	(P)3.50											
45															
			-stiff @ 48'-55' -gray @ 48'-65'	(P)2.75											
50															
				(P)2.00											
55															
			-very stiff @ 58'-60'	(P)3.00											
60															
			-stiff @ 63'-65'	(P)2.50											
65			Bottom @ 65'												
70															

COMPLETION DEPTH:	65 ft
DATE BORING STARTED:	04/23/24
DATE BORING COMPLETED:	04/24/2024
LOGGER:	Josh Sparks
PROJECT NO.:	23.14.175

NOTES: SPT Hammer Type: Automatic Hammer
Water Depth - 9 ft @ 7:45am on 4/24/24.

SYMBOLS AND TERMS USED ON BORING LOGS

Common Unified Soil Classification System Groups

- ▨ Well Graded Gravel (GW)
- ▨ Well Graded Gravel with Sand (GW)
- ▨ Poorly Graded Gravel (GP)
- ▨ Silty Gravel (GM)
- ▨ Clayey Gravel (GC)
- ▨ Well Graded Sand (SW)
- ▨ Well Graded Sand with Gravel (SW)
- ▨ Poorly Graded Sand (SP)
- ▨ Poorly Graded Sand with Silt (SP-SM)
- ▨ Silty Sand (SM)
- ▨ Clayey Sand (SC)
- ▨ Silty Clayey Sand (SC-SM)
- ▨ Lean Clay (CL)
- ▨ Lean Clay with Sand (CL)
- ▨ Sandy Lean Clay (CL)
- ▨ Silty Clay (CL-ML)
- ▨ Sandy Silty Clay (CL-ML)
- ▥ Silt (ML)
- ▥ Silt with Sand (ML)
- ▥ Sandy Silt (ML)
- ▨ Fat Clay (CH)
- ▨ Fat Clay with Sand (CH)
- ▨ Sandy Fat Clay (CH)
- ▥ Elastic Silt (MH)
- ▨ Peat (PT)

Miscellaneous Materials

- ■ Asphalt and/or Base
- ▨ Concrete
- ▨ Fill

Sampler Types

- ▯ Pavement / Rock Core
- ▮ Thin-Walled Tube
- ☒ SPT Split-Barrel
- ◩ Auger
- ▯ Sampling Attempt With No Recovery
- ⧗ TxDOT Cone Penetrometer Test
- ▥ California Split-Barrel Sampler

Field Test Data

P = 2.5	Pocket Penetrometer Measurement (tsf)
8/6"	Blow Count per 6-in. Interval of the Standard Penetration Test
T = 0.8	Torvane Measurement (tsf)
WOR	Weight of Rod
WOH	Weight of Hammer
▽	Observed Water Level During Drilling
▼	Observed Water Level After Drilling

Laboratory Test Data

*	Failed on slickensided plane.
**	Did not fail at 15% strain.

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	Typical SPT N_{60} Value Range*
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	Over 50

* N_{60} is the number of blows from a 140-lb weight having a free fall of 30-in. required to penetrate the final 12-in. of an 18-in. sample interval, corrected for field procedure to an average energy ratio of 60% (Terzaghi, Peck, and Mesri, 1996).

CONSISTENCY OF FINE-GRAINED SOILS

Consistency	Typical Compressive Strength (tsf)	Typical SPT "N_{60}" Value Range**
Very soft	$q_u < 0.25$	≤ 2
Soft	$0.25 \leq q_u < 0.50$	3-4
Firm	$0.50 \leq q_u < 1.00$	5-8
Stiff	$1.00 \leq q_u < 2.00$	9-15
Very Stiff	$2.00 \leq q_u < 4.00$	16-30
Hard	$q_u \geq 4.00$	≥ 31

** The correlation of consistency with a typical SPT "N_{60}" value range is approximate.

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
B-1																		
		0																
		5																
		5.5				CH	89.5											
		7.5																
		9.5				CH	51.1											
		11.5				CL	47.6											
		13.5				CL	29.8											
		15.5				CL	34.7											
		17.5			Gray SANDY LEAN CLAY; shell fragments	CL	42.6					63.5						
		19.5				CH	48.3											
		21.5																
		23.5				CH	42.6											
		28.5				CH	74.4		80	35	45							
		33	0.75		Dark gray FAT CLAY	CH	80.3	39.9							0.33	1.2	58.0	Multiple shear
		35																
		38	1.75		Dark grey FAT CLAY; ferrous nodules	CH	31.6	91.1							1.11	14.8		Bulge
		43	3.25		Tan LEAN CLAY with SAND; ferrous	CL	18.8	110.9	39	18	21				2.32	9.8		Multiple shear
		48	3.00		Gray tan FAT CLAY	CH	20.5	109.1				94.8			1.01	1.1	58.0	Slickensid
		53.5				SM	17.7											
		58.5				SM	23.7											
		63.5																
		63.5				SM	21.8											
		65																
B-2																		
		0																
		6																
		6.5				CH	34.5											
		8.5			Brown SILTY SAND	SM	24.7		NV	NP	NP	23.0						
		10.5				CL	23.5											
		12.5																
		14.5				CL	25.0											
		16.5				CH	45.4											
		18.5				CH	54.6											
		20.5				CH	59.9											
		22.5			Gray FAT CLAY	CH	61.1		70	29	41	95.6						
		24	1.00		Dark grey and dark brown FAT CLAY	CH	51.1	71.3							0.54	3.8		Slickensid
		28	0.75		Dark grey FAT CLAY	CH	57.9	66.0							0.64	2.5	25.0	Slickensid

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175 Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		33.5				CH	60.2											
		35																
		38.5																
		43.5				CH	45.7											
		48.5				CL	24.2											
		53.5				CH	38.7											
		58.5				SM	18.0											
		63.5				SM	17.5											
		68	4.50			CH	30.1		67	26	41							
		70																
		73	4.50		Brown SANDY LEAN CLAY	CL	17.8	115.9							4.52	7.8	25.0	Multiple shear
		78	4.50			CL	18.9	112.9										
		83	3.25			CL	19.6											
		88.5																
		93	4.50		Brown FAT CLAY	CH	22.9	103.6							3.07	2.6		Vertical shear
		98	4.50			CL	17.9	113.2										
		103	4.00			CL	16.8		42	19	23							
		105																
		108	4.50		Reddish-brown FAT CLAY	CH	24.6	101.7							1.64	1.6		Slickensid
		113	4.50			CH	21.2	108.8										
		118.5				SC-SM	22.5											
		123	4.50			CH	20.7	104.0										
		128	3.50		Brown and grey FAT CLAY	CH	27.3		59	29	30				2.09	2.9		Vertical shear
		133	3.50			CH	27.8	95.0										
		138	3.50															
		140																
		143	3.25			CH	43.4	77.4										
		148	3.50															
		150																
B-3																		
		0																
		8																
		8.5				CH	52.5											
		10.5				CH	47.6											
		12.5				CH	24.7											
		14.5																
		16.5				CL	22.9		33	18	15							

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
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Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		18.5				CL	22.0											
		20.5				CL	23.0											
		22.5				SC	21.1											
		24.5				CH	40.7		65	26	39							
		26.5				CL	32.0											
		28.5			Brown SILTY SAND; shell fragments	SM	21.0					12.1						
		33	4.50		Gray FAT CLAY	CH	35.8	86.4	63	23	40				0.73	0.9	45.0	Multiple shear
		35																
		38	3.00		Brown and tan FAT CLAY; ferrous nodules	CH	26.6	98.7							0.70	5.5		Vertical shear
		43.5				CL	24.3											
		48.5			Brown and gray SANDY LEAN CLAY	CL	24.9					65.7						
		53.5				CL	29.1											
		58.5																
		63.5				CL	21.7											
		65																
B-4																		
		0																
		6																
		6.5				CH	81.8											
		8.5				CH	92.1											
		10.5				CH	34.7											
		12.5				CH	34.8											
		14.5				CH	29.9											
		16.5				CH	45.0											
		18.5			Gray SANDY LEAN CLAY	CL			49	26	23	61.3						
		20.5				CH	60.3											
		22.5				CH	71.2											
		24	0.50		Gray FAT CLAY; organics	CH	64.3	58.8							0.46	4.0	25.0	60 degree
		28.5				SC-SM	32.3											
		33.5			Gray SANDY SILTY CLAY	CL-ML			31	24	7	58.6						
		35																
		38.5				SM	23.2											
		43.5				SM	21.5											
		48.5				SM	21.4											
		53.5				CH	35.4											
	Uc	58	2.75		Gray FAT CLAY	CH	35.2	87.0							1.24	1.9		Slickensid
	CU	58.1			Gray FAT CLAY with SAND; calcareous	CH	35.2	85.4							0.67	0.9	45.0	Slickensid

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175　　　Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		63.5																
		65																
B-5																		
		0																
		10																
		10.5				CH	70.6											
		12.5				CH	53.3											
		14.5				CH	55.2											
		16.5				CH	45.1											
		18.5				CH	50.2											
		20.5			Gray SILT with SAND	ML			NV	NP	NP	78.5						
		22.5				CH	56.6											
		24.5				CH	78.0											
		26	0.75		Gray FAT CLAY	CH	54.7	69.3							0.49	3.7	35.0	Bulge
		28.5				OH	96.2											
		33.5			Gray ORGANIC CLAY	OH			118	53	65	95.0						
		35																
		38.5				CH	53.1											
		43.5				SM	20.1											
		48.5				SM	22.2											
		53.5				SM	15.7											
		58.5				SM	21.9											
		63.5				SM	18.1											
		65																
B-6																		
		0																
		10																
		10.5				CH	80.5											
		12.5			Gray FAT CLAY with SAND; shell fragments	CH			53	20	33	77.7						
		14	2.00		Reddish-brown FAT CLAY	CH	32.7	91.0							0.68	2.2	45.0	Slickensid
		16	3.50			CH	28.7											
		18.5				CH	29.2											
		20	3.25		Reddish-brown FAT CLAY	CH	26.4	97.4							2.25	4.1		Vertical shear
		22	2.50			CH	31.2											
		24	4.00															
		26	3.00		Reddish-brown FAT CLAY	CH	28.4	93.9							0.67	0.7		Slickensid
		28	2.75			CH	37.1											
		33	3.75			CH	30.5											
		35																

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175 Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		38	2.50		Brown FAT CLAY	CH	39.1	82.7							1.31	3.1		Vertical shear
		43	2.50		Gray ORGANIC CLAY	OH	39.4	81.7	86	39	47	99.7						
		48	2.25			CH	35.5											
		53	3.00		Gray and brown FAT CLAY	CH	32.6	90.8							1.58	1.6	55.0	Bulge
		58.5				SM	24.1											
		63.5				SC-SM	26.6											
		65																
B-7																		
		0																
		10																
		10.5				CH	100.2											
		12.5				CH	61.7											
		14.5				CH	69.3											
		16	4.50		Brown FAT CLAY	CH	32.7	89.9							0.83	4.7		Vertical shear
		18	2.50			CH	27.4											
		20	3.50		Gray FAT CLAY	CH	17.6	105.0							0.78	1.0	58.0	Slickensid
		22	4.50		Gray FAT CLAY	CH	28.8	97.6	67	28	39	99.3						
		24	2.75			CH	21.7											
		26.5				CH	18.9											
		28.5				CH	27.2											
		33.5				CH	23.1											
		35																
		38.5				CH	33.8											
		43.5				CH	32.8											
		48.5				CH	35.7											
		53	2.25		Brown FAT CLAY	CH	37.4	81.0							1.86	4.3		Vertical shear
		58.5			Gray FAT CLAY	CH			56	24	32	97.9						
		63	3.00															
		65																
B-8																		
		0																
		4																
		4.5																
		6.5				CH			62	26	36							
		8.5																
		10.5																
		12.5																

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		14.5																
		16.5				CH			75	31	44	95.0						
		18.5																
		20.5																
		22	0.50	0.50		CH	64.4	63.7										
		28	2.00															
		33	1.25															
		35																
		38	2.00		Grey LEAN CLAY with SAND	CL	24.9	101.5							0.81	4.9		Vertical shear
		43.5																
		48	2.50															
		53	1.25		Gray and black FAT CLAY	CH	49.2	73.0							1.09	2.8	47.0	Slickensid
		58	1.00		Grey FAT CLAY	CH	48.8	72.6							1.26	2.4	20.0	Slickensid
		63.5				SM						15.5						
		68.5																
		70																
		73.5																
		78	4.25		Brown and grey FAT CLAY; calcareous and aggregate	CH	23.0	103.7	55	22	33				3.36	10.1	25.0	Vertical shear
		83	4.50															
		88	3.50			CH	26.9	97.4										
		93	4.25															
		98	4.00		Grey FAT CLAY	CH	24.6	99.8							2.55	1.8		Vertical shear
		103	4.50			CH	24.0	106.0										
		105																
		108	4.50		Brown and grey FAT CLAY	CH	23.7	101.6							3.95	2.3		Vertical shear
		113	3.25															
		118	2.25															
		123	1.75		Grey FAT CLAY	CH	31.2	88.0							1.37	5.5		Vertical shear
		128	2.50															
		133	2.25															
		138	2.50															
		140																
		143	1.75		Grey FAT CLAY	CH	25.8	102.6							0.66	4.9		Vertical shear
		148	1.50															

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175 Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		150																
B-9																		
		0																
		6																
		6.5																
		8.5																
		10.5																
		12.5																
		14.5																
		16.5				CL-ML						52.6						
		18.5																
		20.5																
		22.5				CH						78.7						
		24	2.25															
		28	3.50															
		33	2.25		Reddish-brown FAT CLAY	CH	31.8	91.2	75	36	39				1.49	3.8	10.0	Slickensid
		35																
		38	4.00															
		43	3.00															
		48	2.75		Grey FAT CLAY	CH	32.0	91.3	76	32	44				2.25	5.3		Slickensid
		53	3.25															
		58.5				SP						3.4						
		63.5																
		68.5																
		70																
		73.5				SP-SM						6.8						
		78.5																
		83	4.25			CH			77	35	42							
		88	4.50		Reddish-brown FAT CLAY	CH	31.5	93.3							1.37	0.9		Slickensid
		93	4.50															
		98	4.50															
		103	4.50		Grey LEAN CLAY with SAND	CL	20.3	109.9	31	19	12				1.30	3.4		Vertical shear
		105																
		108	3.75															
		113	3.75															
		118	1.25		Grey SANDY LEAN CLAY	CL	22.1	101.5							1.77	10.6	20.0	Vertical shear
		123	4.50															
		128	4.25		Dark grey FAT CLAY; calcareous nodules	CH	22.0	105.5							6.48	2.2	108.0	Slickensid

SUMMARY OF LABORATORY TESTS

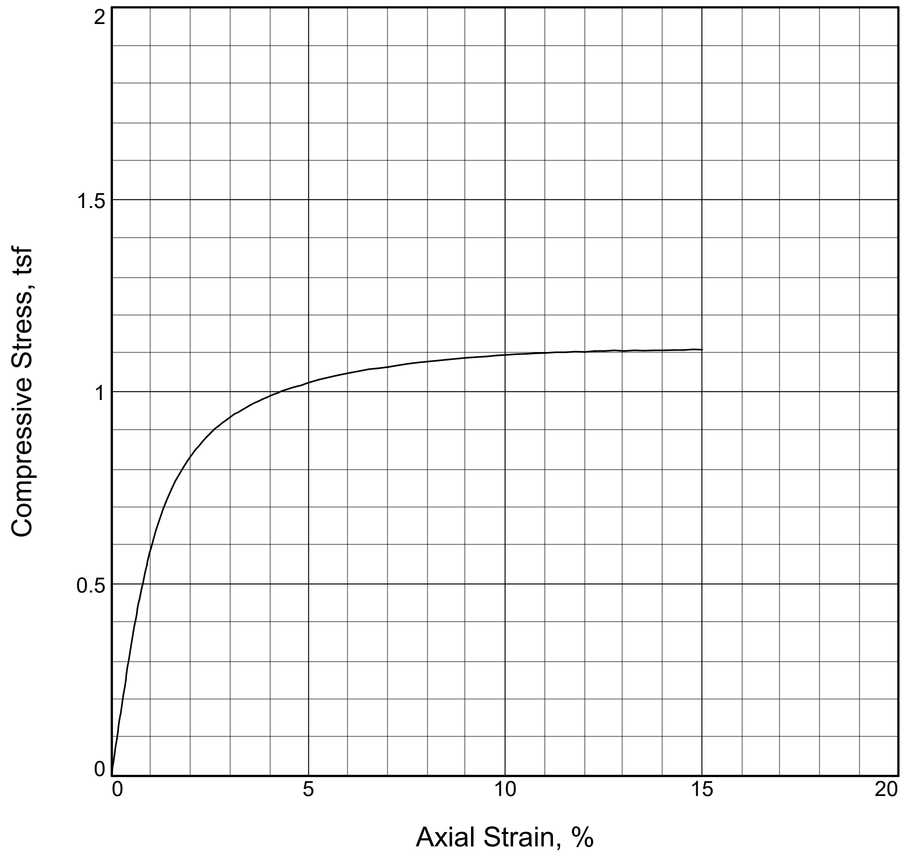
Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
		133	3.00		Grey FAT CLAY; sand seams	CH	24.0	99.5										
		138	1.75			CH	15.7	107.9										
		140																
		143	2.00															
		148	3.00		Grey FAT CLAY	CH	35.6	86.7							2.92	3.0		Vertical shear
		150																

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.110			
Undrained shear strength, tsf	0.555			
Failure strain, %	14.8			
Strain rate, %/min.	1.00			
Water content, %	31.6			
Wet density, pcf	119.9			
Dry density, pcf	91.1			
Saturation, %	98.3			
Void ratio	0.8843			
Specimen diameter, in.	2.86			
Specimen height, in.	5.98			
Height/diameter ratio	2.10			

Description: Dark grey FAT CLAY; ferrous nodules

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 8/24/23
Remarks:

Test method: ASTM D2166
Failure type: Bulge

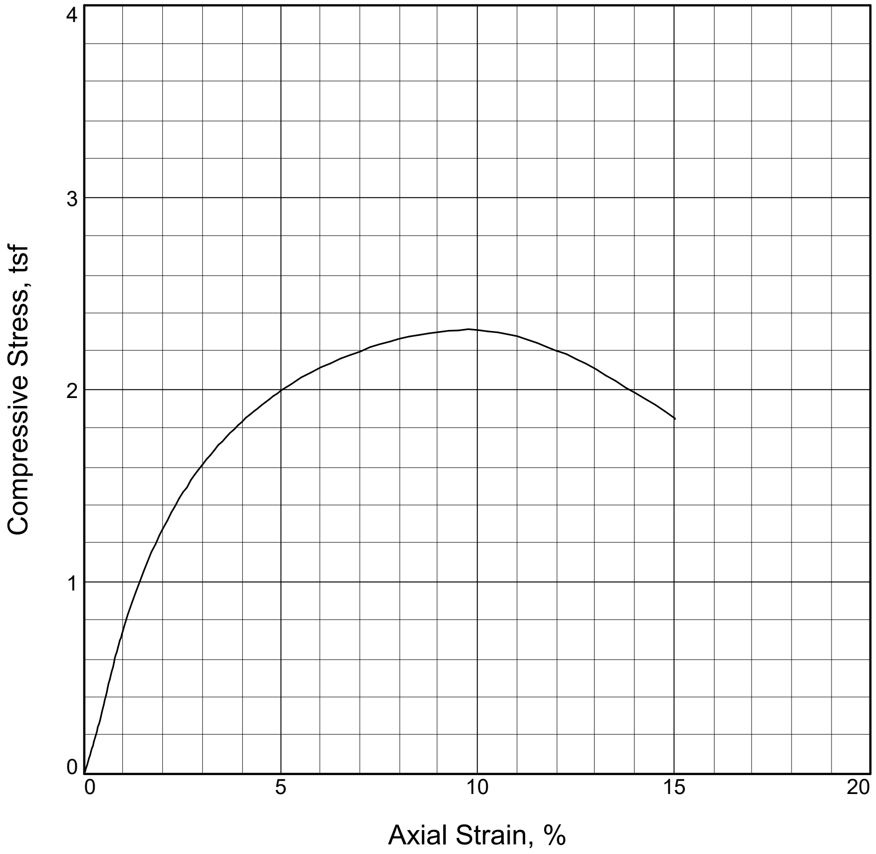
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-1 **Depth:** 38

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: BP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.315			
Undrained shear strength, tsf	1.157			
Failure strain, %	9.8			
Strain rate, %/min.	1.00			
Water content, %	18.8			
Wet density, pcf	131.7			
Dry density, pcf	110.9			
Saturation, %	97.5			
Void ratio	0.5195			
Specimen diameter, in.	2.86			
Specimen height, in.	5.99			
Height/diameter ratio	2.10			

Description: Tan LEAN CLAY with SAND; ferrous

LL = 39 **PL =** 18 **PI =** 21 **Assumed GS=** 2.70 **Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 8/24/23
Remarks:

Test method: ASTM D2166
Failure type: Multiple shear

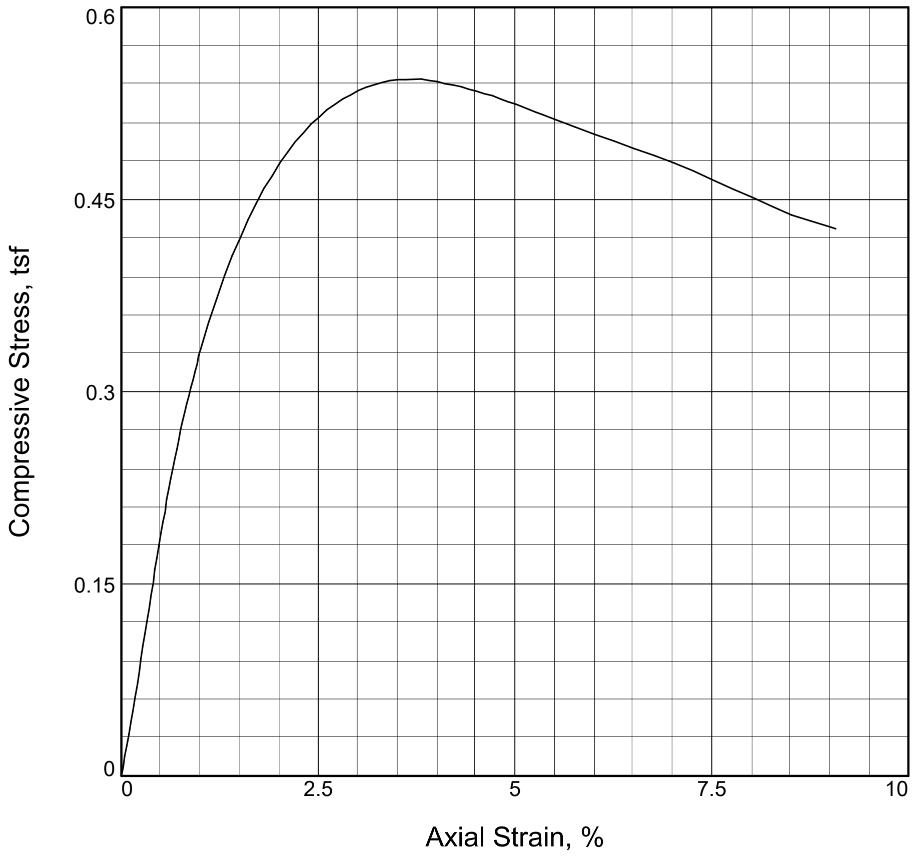
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-1 **Depth:** 43

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: BP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.544			
Undrained shear strength, tsf	0.272			
Failure strain, %	3.8			
Strain rate, %/min.	1.00			
Water content, %	51.1			
Wet density, pcf	107.8			
Dry density, pcf	71.3			
Saturation, %	99.9			
Void ratio	1.4063			
Specimen diameter, in.	2.86			
Specimen height, in.	5.96			
Height/diameter ratio	2.08			

Description: Dark grey and dark brown FAT CLAY

LL = | **PL =** | **PI =** | **Assumed GS=** 2.75 | **Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 8/24/23
Remarks:

Test method: ASTM D2166
Failure type: Slickensided

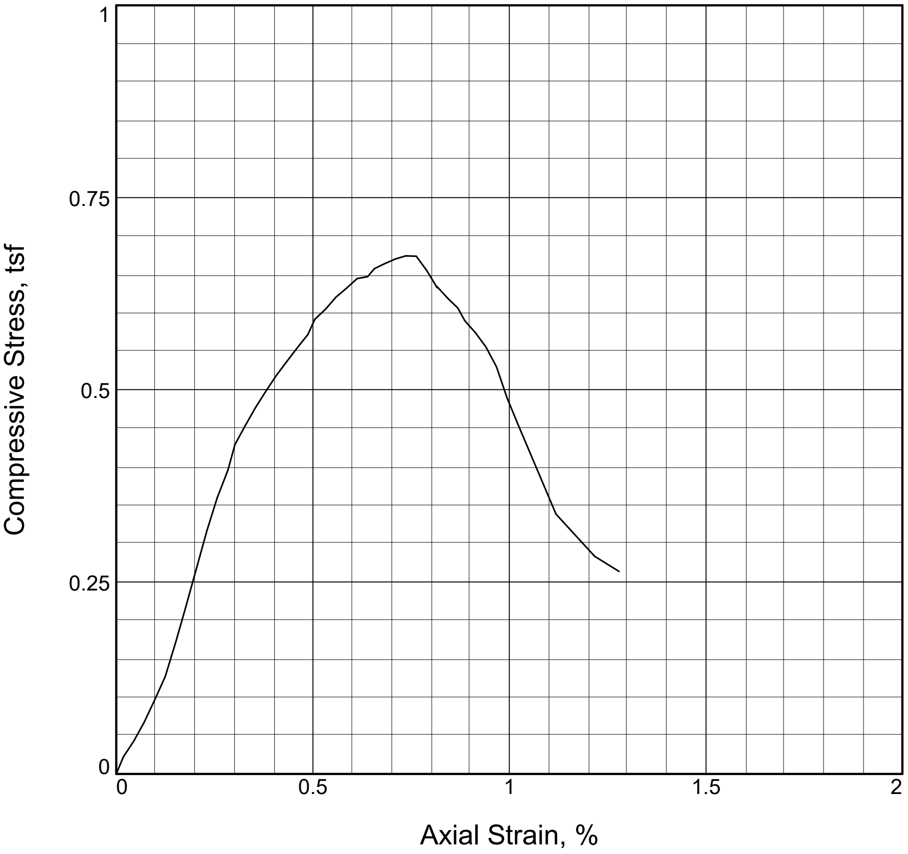
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-2 **Depth:** 24

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: BP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.674			
Undrained shear strength, tsf	0.337			
Failure strain, %	0.7			
Strain rate, %/min.	1.00			
Water content, %	28.4			
Wet density, pcf	120.5			
Dry density, pcf	93.9			
Saturation, %	96.3			
Void ratio	0.7958			
Specimen diameter, in.	2.88			
Specimen height, in.	5.91			
Height/diameter ratio	2.05			

Description: Reddish-brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/25/23

Remarks:

Test method: ASTM D2166

Failure type: Slickensided

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

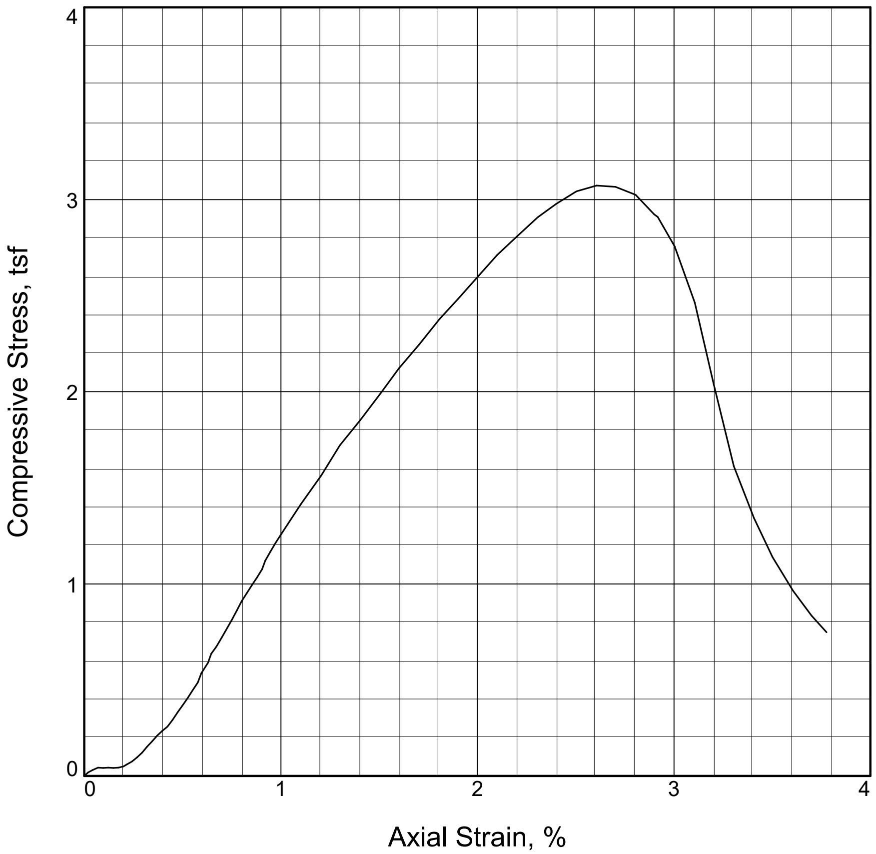
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-6 **Depth:** 26

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	3.073			
Undrained shear strength, tsf	1.537			
Failure strain, %	2.6			
Strain rate, %/min.	1.00			
Water content, %	22.9			
Wet density, pcf	127.3			
Dry density, pcf	103.6			
Saturation, %	98.5			
Void ratio	0.6275			
Specimen diameter, in.	2.86			
Specimen height, in.	5.91			
Height/diameter ratio	2.07			

Description: Brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 9/13/23
Remarks:

Test method: ASTM D2166
Failure type: Vertical shear

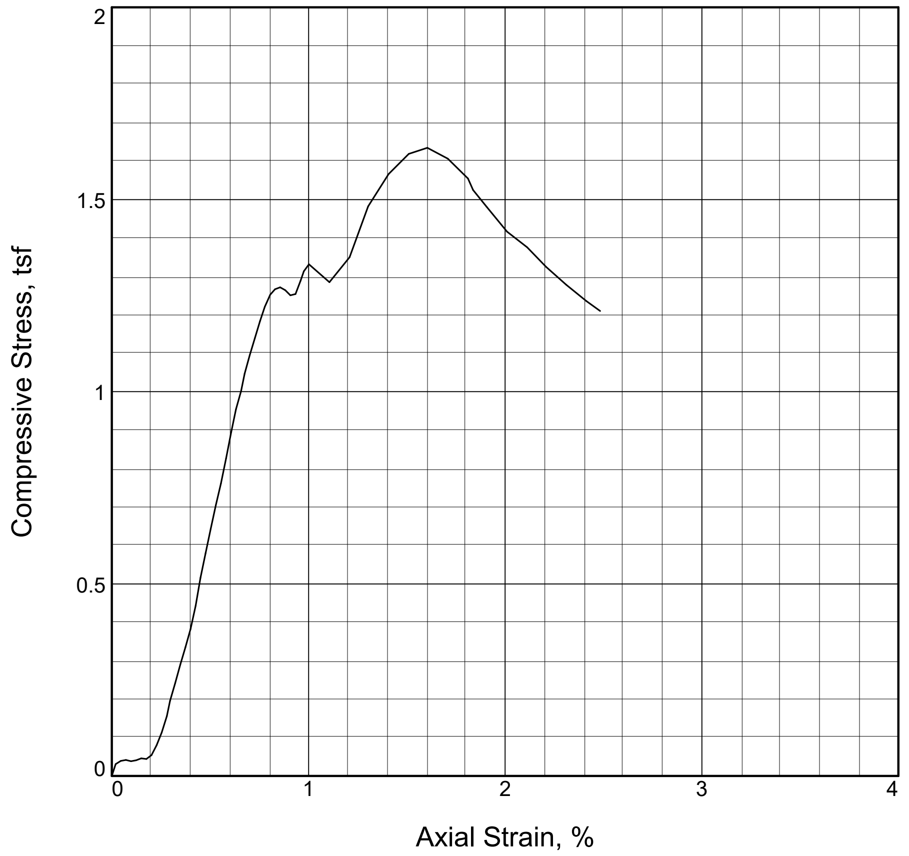
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-2 **Depth:** 93

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.635			
Undrained shear strength, tsf	0.817			
Failure strain, %	1.6			
Strain rate, %/min.	1.00			
Water content, %	24.6			
Wet density, pcf	126.7			
Dry density, pcf	101.7			
Saturation, %	98.3			
Void ratio	0.6877			
Specimen diameter, in.	2.88			
Specimen height, in.	5.91			
Height/diameter ratio	2.05			

Description: Reddish-brown FAT CLAY

LL = **PL =** **PI =** **Assumed GS=** 2.75 **Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/13/23

Remarks:

Test method: ASTM D2166

Failure type: Slickensided

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

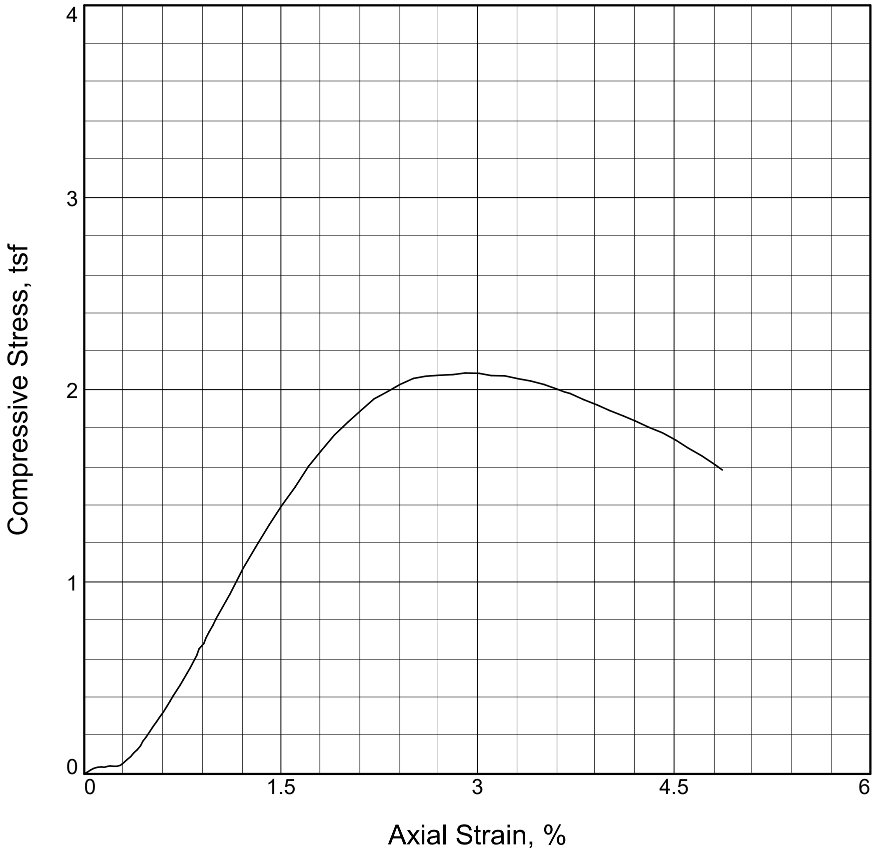
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-2 **Depth:** 108

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.087			
Undrained shear strength, tsf	1.043			
Failure strain, %	2.9			
Strain rate, %/min.	1.00			
Water content, %	27.3			
Wet density, pcf	119.6			
Dry density, pcf	94.0			
Saturation, %	92.7			
Void ratio	0.7941			
Specimen diameter, in.	2.88			
Specimen height, in.	5.90			
Height/diameter ratio	2.05			

Description: Brown and grey FAT CLAY

LL = 59	**PL =** 29	**PI =** 30	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/13/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

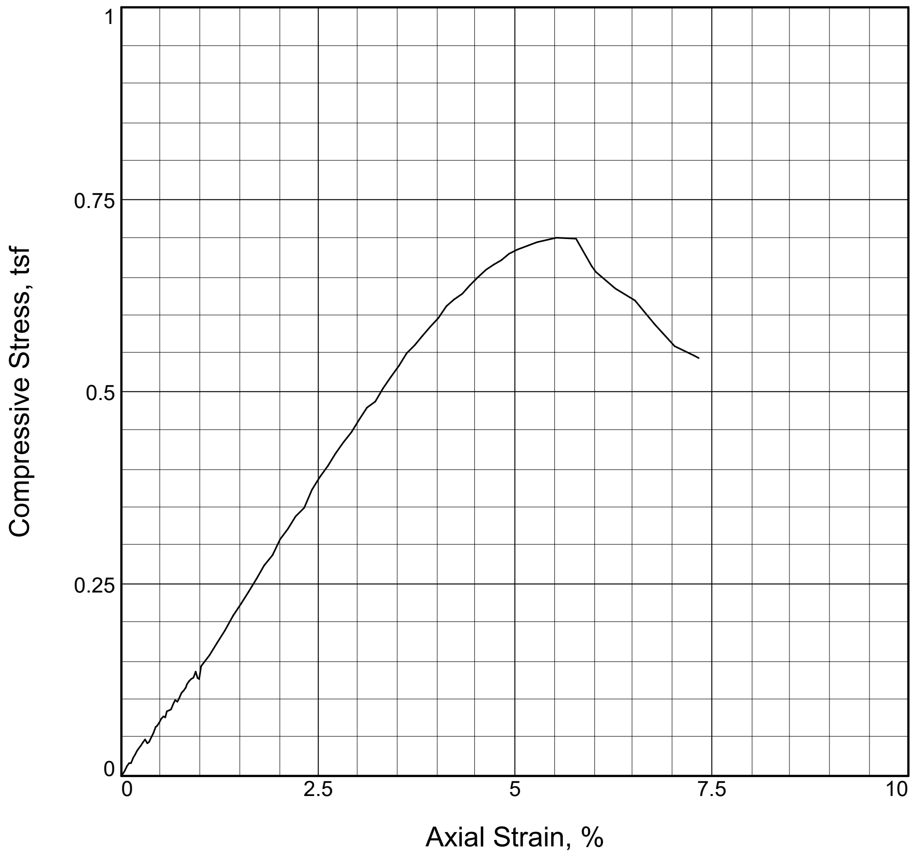
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-2 **Depth:** 128

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.701			
Undrained shear strength, tsf	0.350			
Failure strain, %	5.5			
Strain rate, %/min.	1.00			
Water content, %	26.6			
Wet density, pcf	125.0			
Dry density, pcf	98.7			
Saturation, %	99.1			
Void ratio	0.7396			
Specimen diameter, in.	2.90			
Specimen height, in.	5.77			
Height/diameter ratio	1.99			

Description: Brown and tan FAT CLAY; ferrous nodules

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 8/24/23
Remarks:

Test method: ASTM D2166
Failure type: Vertical shear

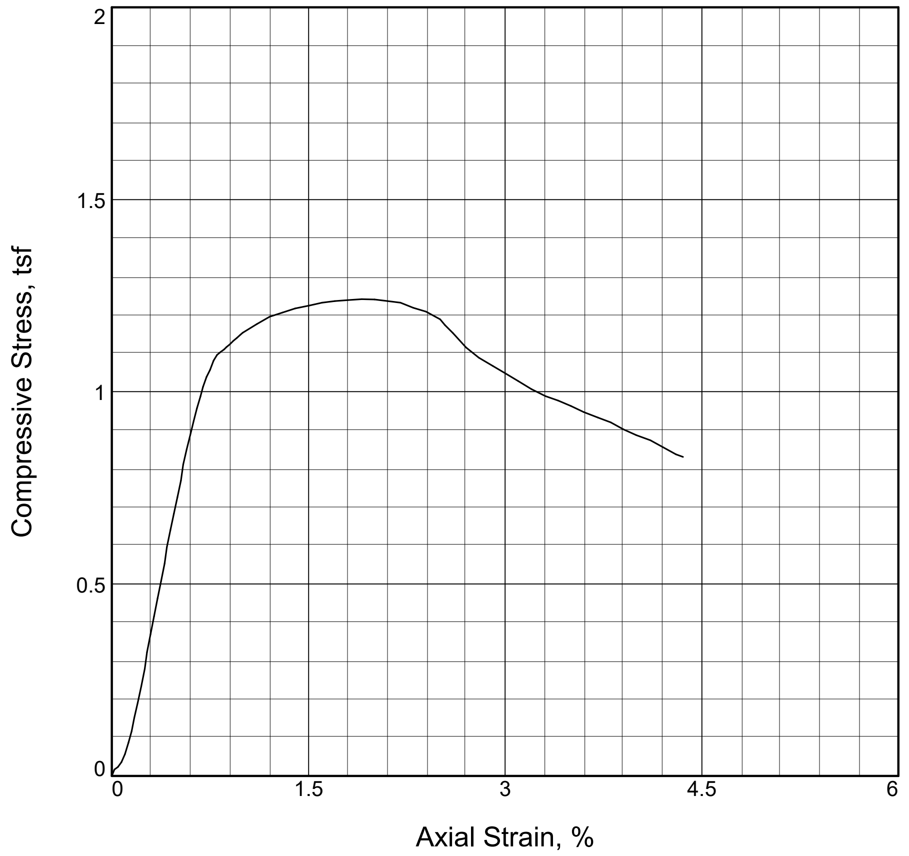
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-3 **Depth:** 38

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: BP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.241			
Undrained shear strength, tsf	0.620			
Failure strain, %	1.9			
Strain rate, %/min.	1.00			
Water content, %	35.2			
Wet density, pcf	117.7			
Dry density, pcf	87.0			
Saturation, %	99.6			
Void ratio	0.9724			
Specimen diameter, in.	2.86			
Specimen height, in.	5.75			
Height/diameter ratio	2.01			

Description: Gray FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/28

Remarks:
Test type: ASTM D2166
Failure type: Slickensided

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

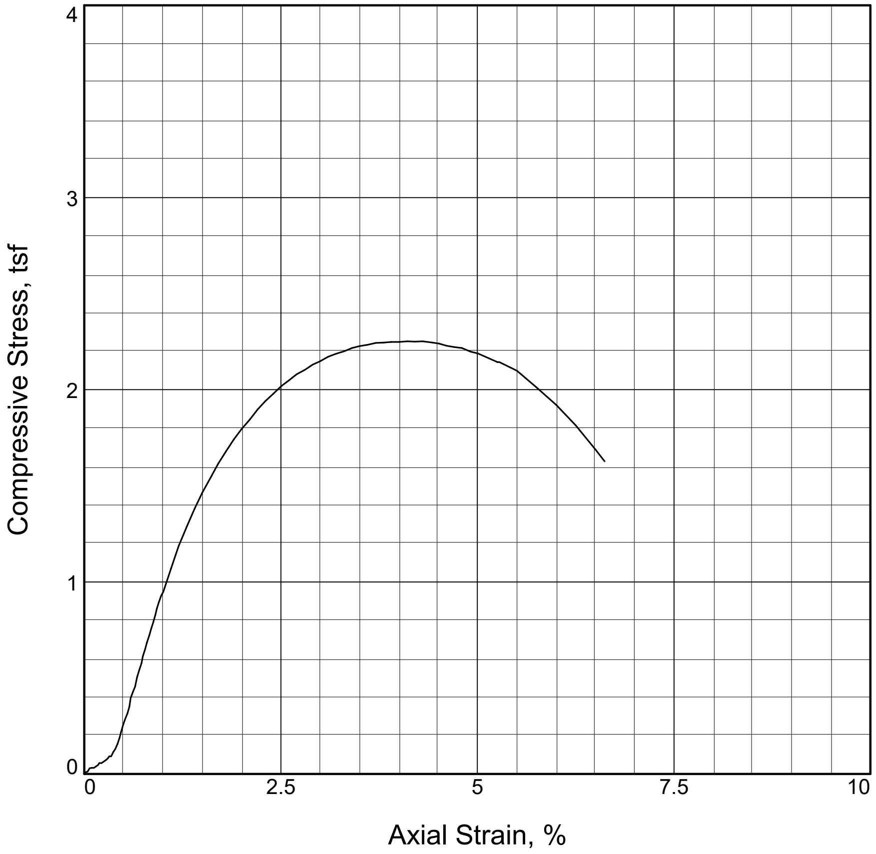
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-4 **Depth:** 58

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: DM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.252			
Undrained shear strength, tsf	1.126			
Failure strain, %	4.1			
Strain rate, %/min.	1.00			
Water content, %	26.4			
Wet density, pcf	123.1			
Dry density, pcf	97.4			
Saturation, %	97.6			
Void ratio	0.7310			
Specimen diameter, in.	2.88			
Specimen height, in.	5.91			
Height/diameter ratio	2.05			

Description: Reddish-brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/25/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

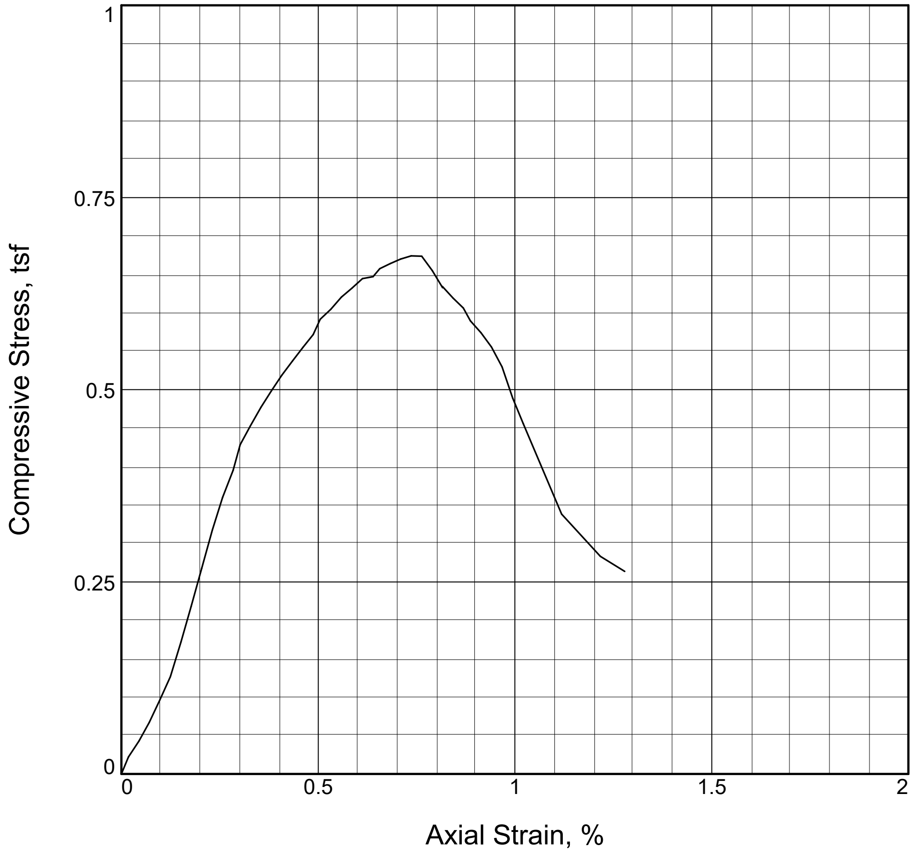
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-6 **Depth:** 20

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.674			
Undrained shear strength, tsf	0.337			
Failure strain, %	0.7			
Strain rate, %/min.	1.00			
Water content, %	28.4			
Wet density, pcf	120.5			
Dry density, pcf	93.9			
Saturation, %	96.3			
Void ratio	0.7958			
Specimen diameter, in.	2.88			
Specimen height, in.	5.91			
Height/diameter ratio	2.05			

Description: Reddish-brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 8/25/23
Remarks:

Test method: ASTM D2166
Failure type: Slickensided

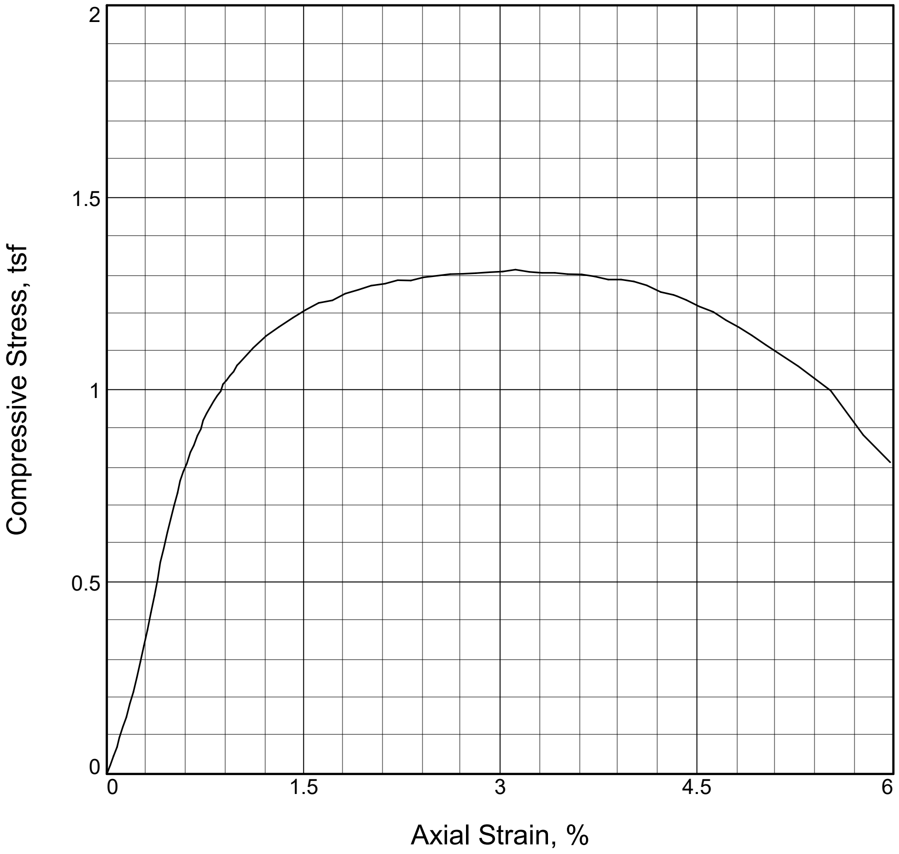
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-6 **Depth:** 26

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.312			
Undrained shear strength, tsf	0.656			
Failure strain, %	3.1			
Strain rate, %/min.	1.00			
Water content, %	39.1			
Wet density, pcf	115.1			
Dry density, pcf	82.7			
Saturation, %	98.4			
Void ratio	1.1130			
Specimen diameter, in.	2.80			
Specimen height, in.	5.91			
Height/diameter ratio	2.11			

Description: Brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.80	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/25/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

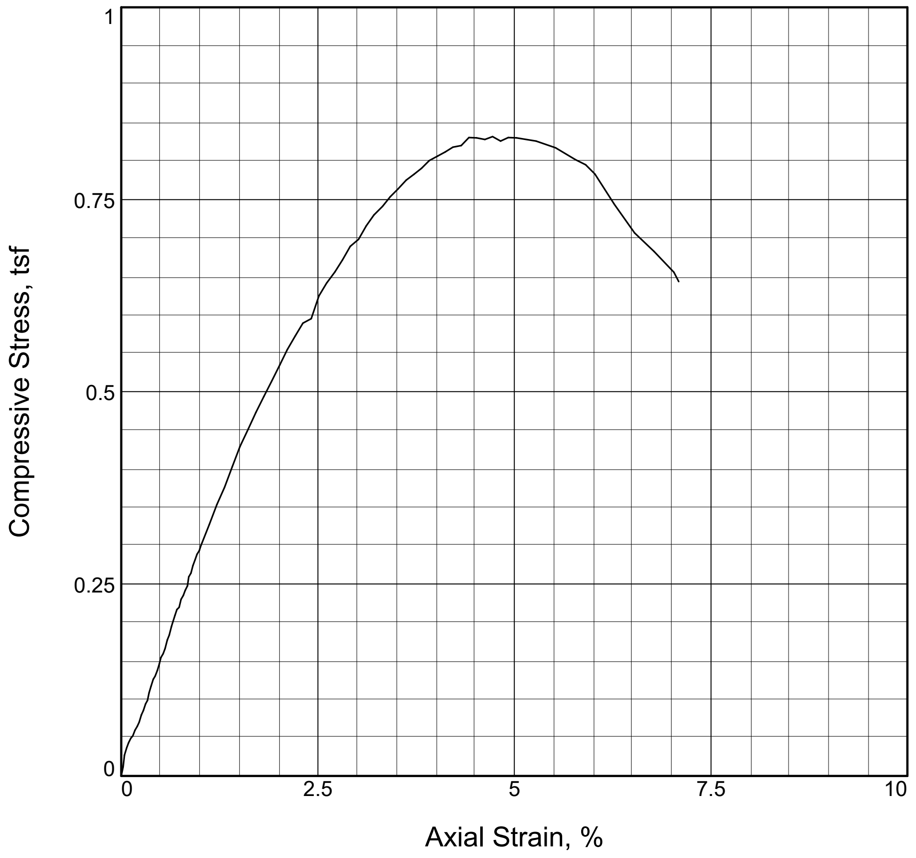
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-6 **Depth:** 38

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.832			
Undrained shear strength, tsf	0.416			
Failure strain, %	4.7			
Strain rate, %/min.	1.00			
Water content, %	32.7			
Wet density, pcf	119.4			
Dry density, pcf	90.0			
Saturation, %	99.0			
Void ratio	0.9086			
Specimen diameter, in.	2.87			
Specimen height, in.	5.89			
Height/diameter ratio	2.06			

Description: Brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/25/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

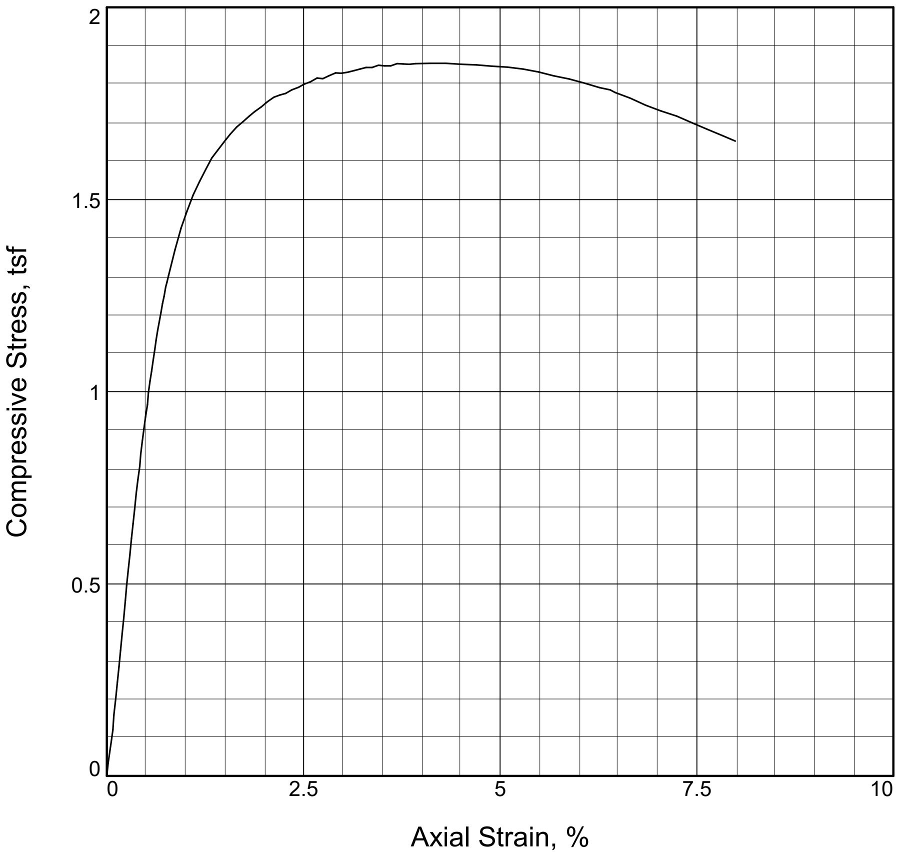
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-7 **Depth:** 16

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.855			
Undrained shear strength, tsf	0.927			
Failure strain, %	4.3			
Strain rate, %/min.	1.00			
Water content, %	37.4			
Wet density, pcf	111.3			
Dry density, pcf	81.0			
Saturation, %	93.4			
Void ratio	1.0816			
Specimen diameter, in.	2.87			
Specimen height, in.	5.46			
Height/diameter ratio	1.91			

Description: Brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 8/25/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

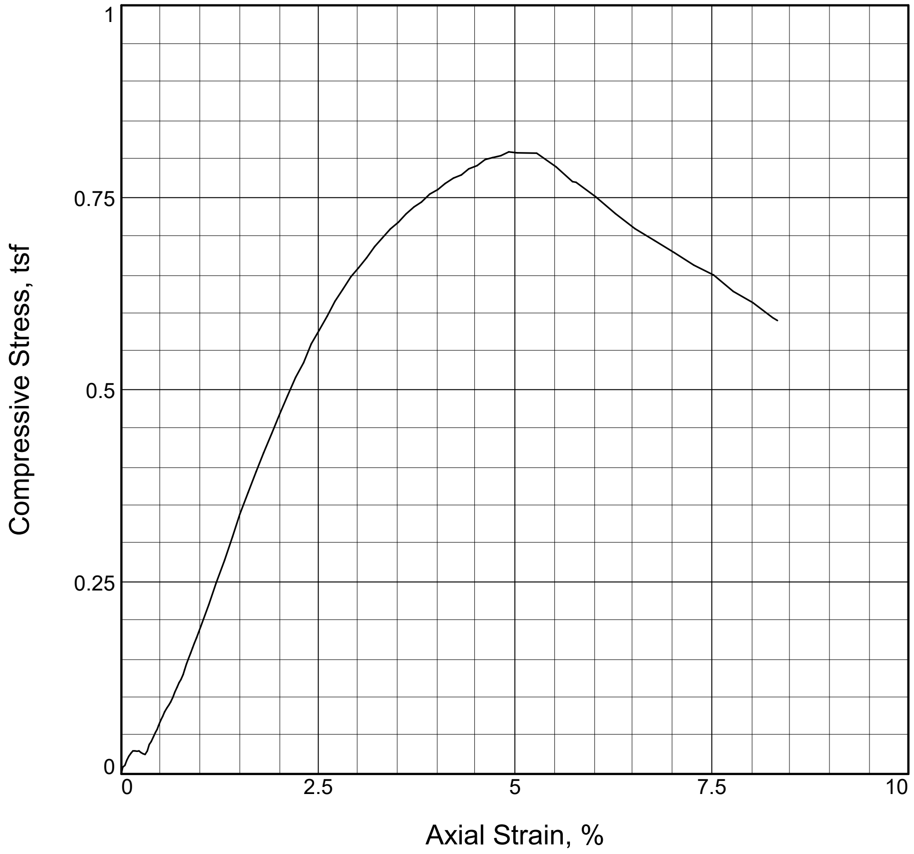
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-7 **Depth:** 53

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.810			
Undrained shear strength, tsf	0.405			
Failure strain, %	4.9			
Strain rate, %/min.	1.00			
Water content, %	24.9			
Wet density, pcf	126.7			
Dry density, pcf	101.5			
Saturation, %	99.0			
Void ratio	0.6919			
Specimen diameter, in.	2.86			
Specimen height, in.	5.86			
Height/diameter ratio	2.05			

Description: Grey LEAN CLAY with SAND

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/13/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

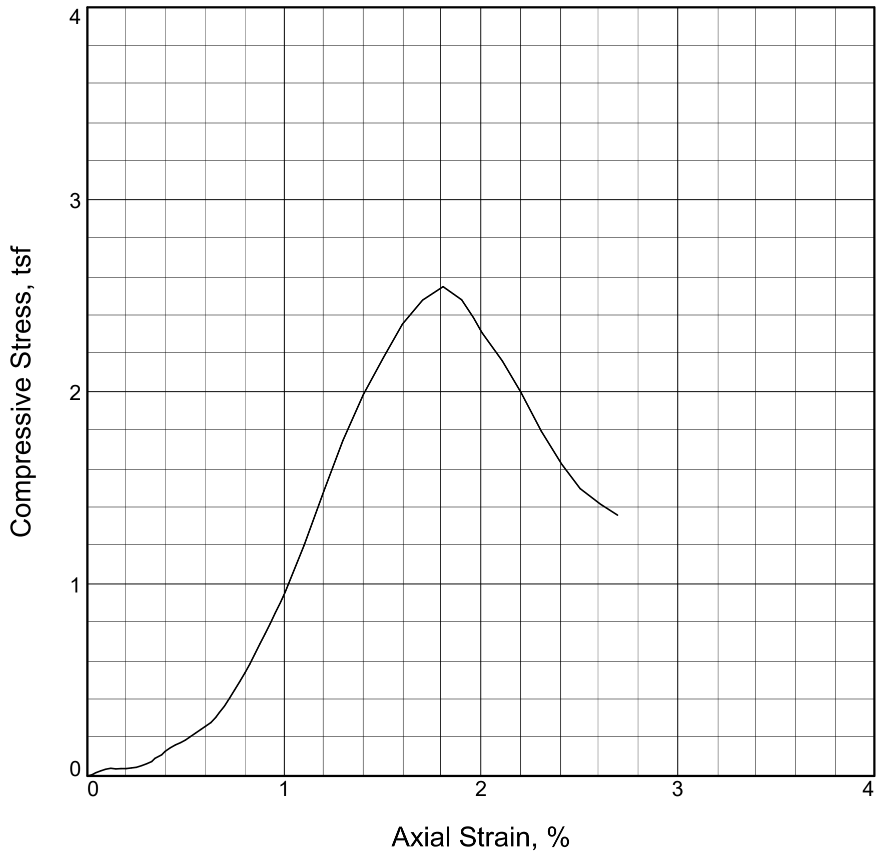
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-8 **Depth:** 38

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.547			
Undrained shear strength, tsf	1.274			
Failure strain, %	1.8			
Strain rate, %/min.	1.00			
Water content, %	24.6			
Wet density, pcf	124.4			
Dry density, pcf	99.8			
Saturation, %	96.6			
Void ratio	0.6886			
Specimen diameter, in.	2.89			
Specimen height, in.	5.91			
Height/diameter ratio	2.04			

Description: Grey FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 9/13/23
Remarks:

Test method: ASTM D2166
Failure type: Vertical shear

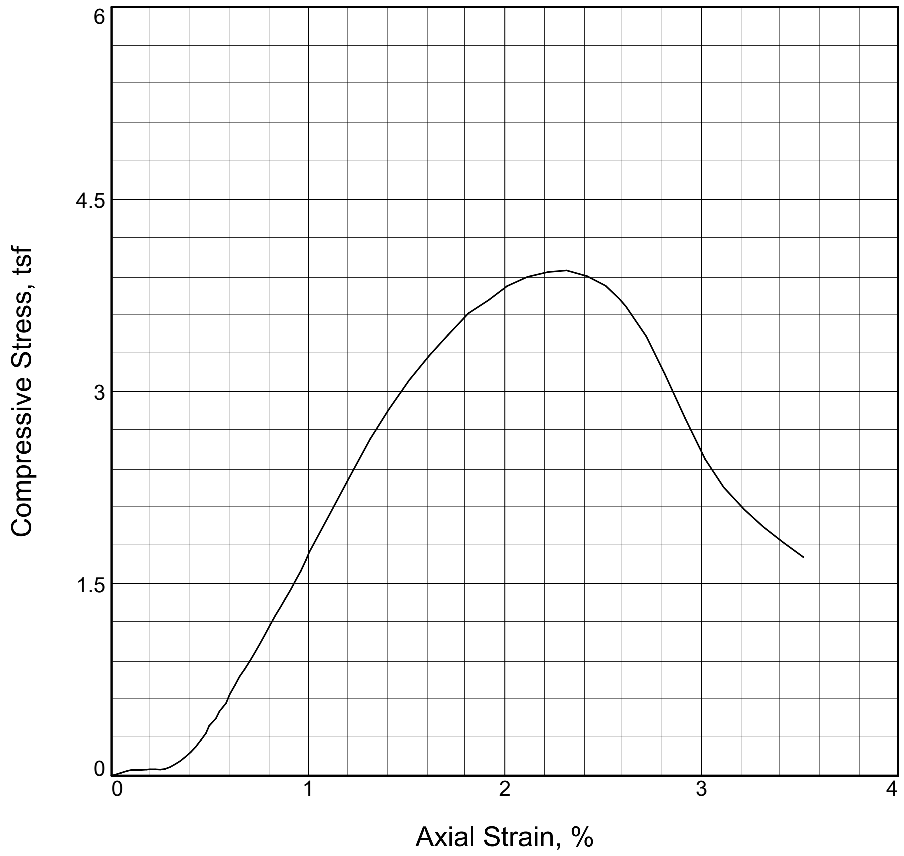
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-8 **Depth:** 98

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	3.946			
Undrained shear strength, tsf	1.973			
Failure strain, %	2.3			
Strain rate, %/min.	1.00			
Water content, %	23.7			
Wet density, pcf	125.7			
Dry density, pcf	101.7			
Saturation, %	97.1			
Void ratio	0.6577			
Specimen diameter, in.	2.90			
Specimen height, in.	5.90			
Height/diameter ratio	2.04			

Description: Brown and grey FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/13/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

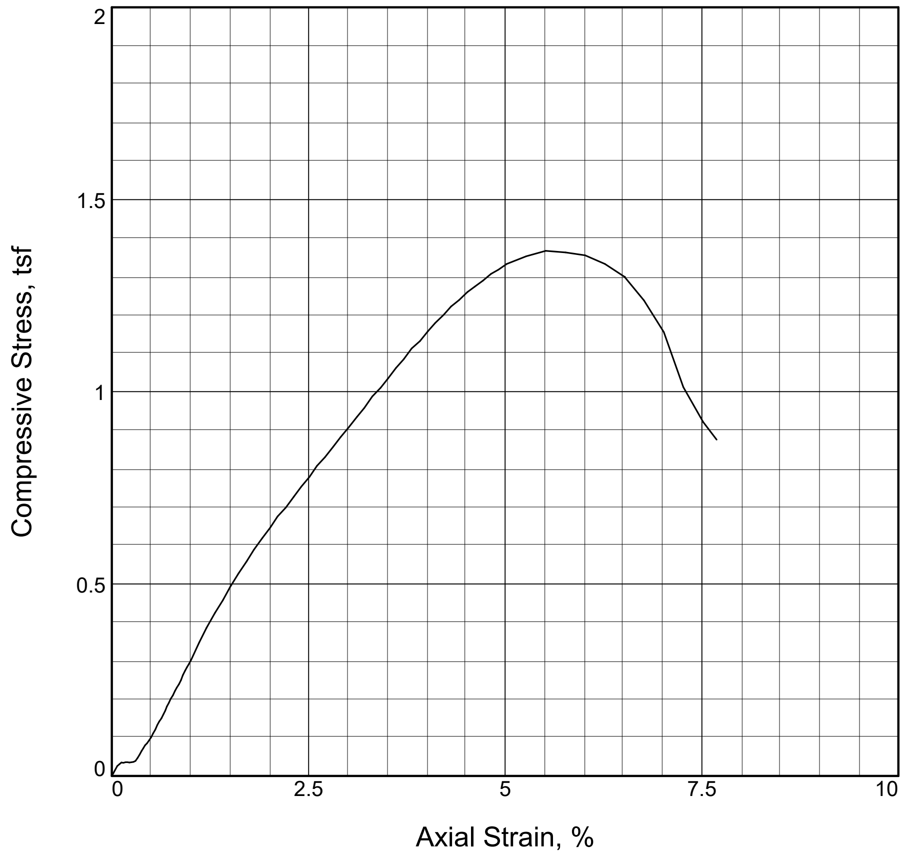
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-8 **Depth:** 108

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.366			
Undrained shear strength, tsf	0.683			
Failure strain, %	5.5			
Strain rate, %/min.	1.00			
Water content, %	31.2			
Wet density, pcf	115.5			
Dry density, pcf	88.0			
Saturation, %	92.0			
Void ratio	0.9149			
Specimen diameter, in.	2.93			
Specimen height, in.	5.85			
Height/diameter ratio	2.00			

Description: Grey FAT CLAY

LL = | **PL =** | **PI =** | **Assumed GS=** 2.70 | **Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/13/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

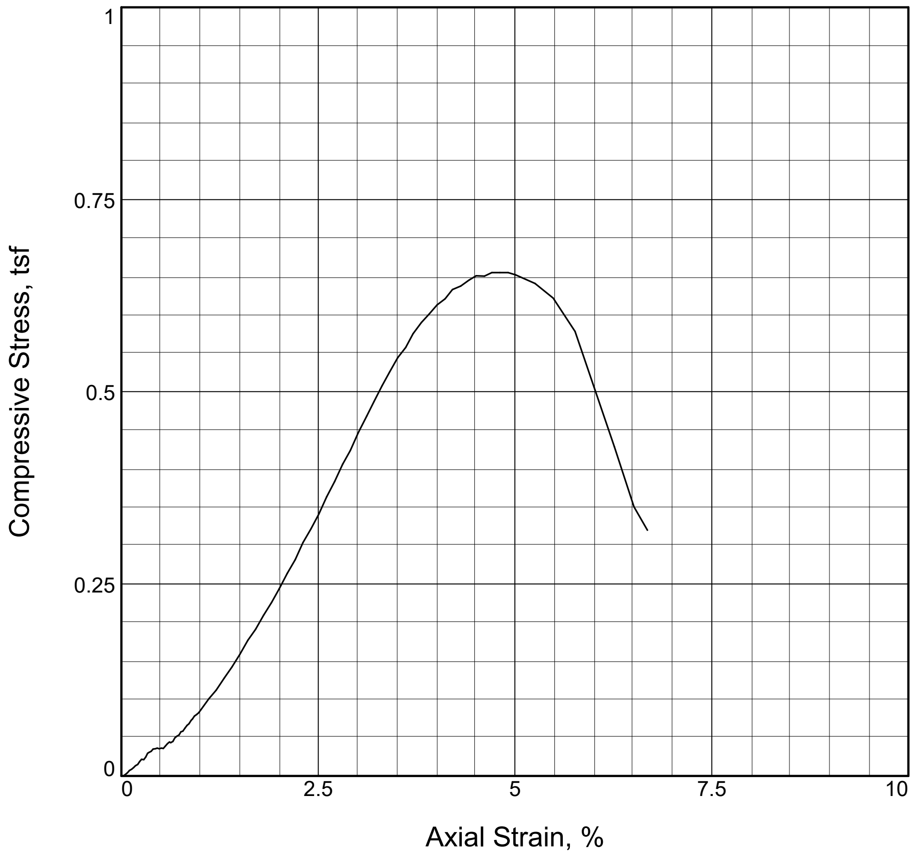
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-8 **Depth:** 123

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.655			
Undrained shear strength, tsf	0.328			
Failure strain, %	4.9			
Strain rate, %/min.	1.00			
Water content, %	25.8			
Wet density, pcf	129.0			
Dry density, pcf	102.6			
Saturation, %	100.0			
Void ratio	0.7341			
Specimen diameter, in.	2.82			
Specimen height, in.	5.77			
Height/diameter ratio	2.04			

Description: Grey FAT CLAY

LL = | **PL =** | **PI =** | **Assumed GS=** 2.85 | **Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 9/13/23
Remarks:

Test method: ASTM D2166
Failure type: Vertical shear

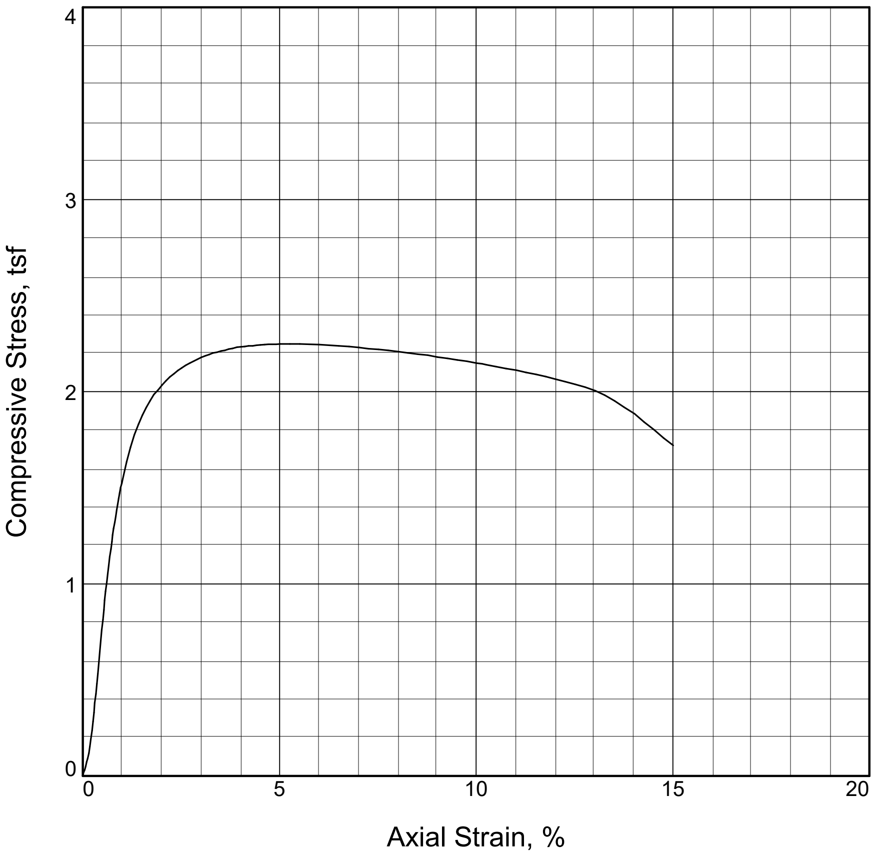
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-8 **Depth:** 143

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.249			
Undrained shear strength, tsf	1.125			
Failure strain, %	5.3			
Strain rate, %/min.	1.00			
Water content, %	32.0			
Wet density, pcf	120.5			
Dry density, pcf	91.3			
Saturation, %	100.0			
Void ratio	0.8803			
Specimen diameter, in.	2.84			
Specimen height, in.	5.90			
Height/diameter ratio	2.08			

Description: Grey FAT CLAY

LL = 76	**PL =** 32	**PI =** 44	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/14/23

Remarks:

Test method: ASTM D2166
Failure type: Slickensided

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

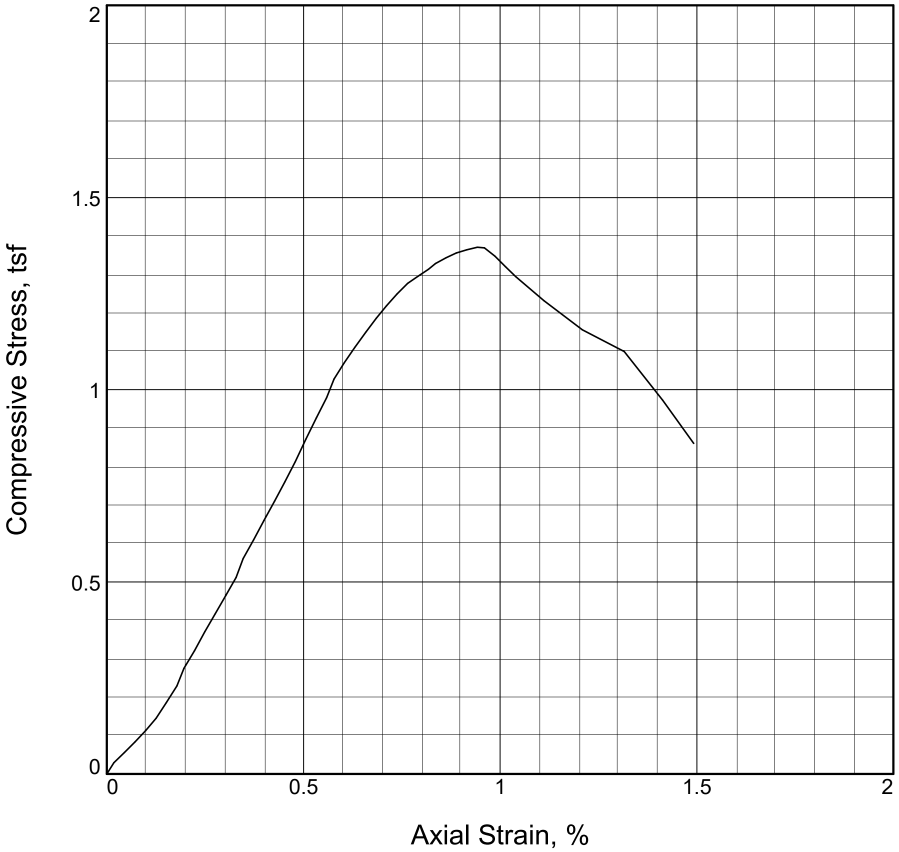
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-9 **Depth:** 48

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.371			
Undrained shear strength, tsf	0.685			
Failure strain, %	0.9			
Strain rate, %/min.	1.00			
Water content, %	31.5			
Wet density, pcf	122.7			
Dry density, pcf	93.4			
Saturation, %	99.0			
Void ratio	0.9056			
Specimen diameter, in.	2.86			
Specimen height, in.	5.91			
Height/diameter ratio	2.06			

Description: Reddish-brown FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.85	**Type:** Undisturbed

Project No.: 23.14.175
Date Sampled: 9/14/23
Remarks:

Test method: ASTM D2166
failure type: Slickensided

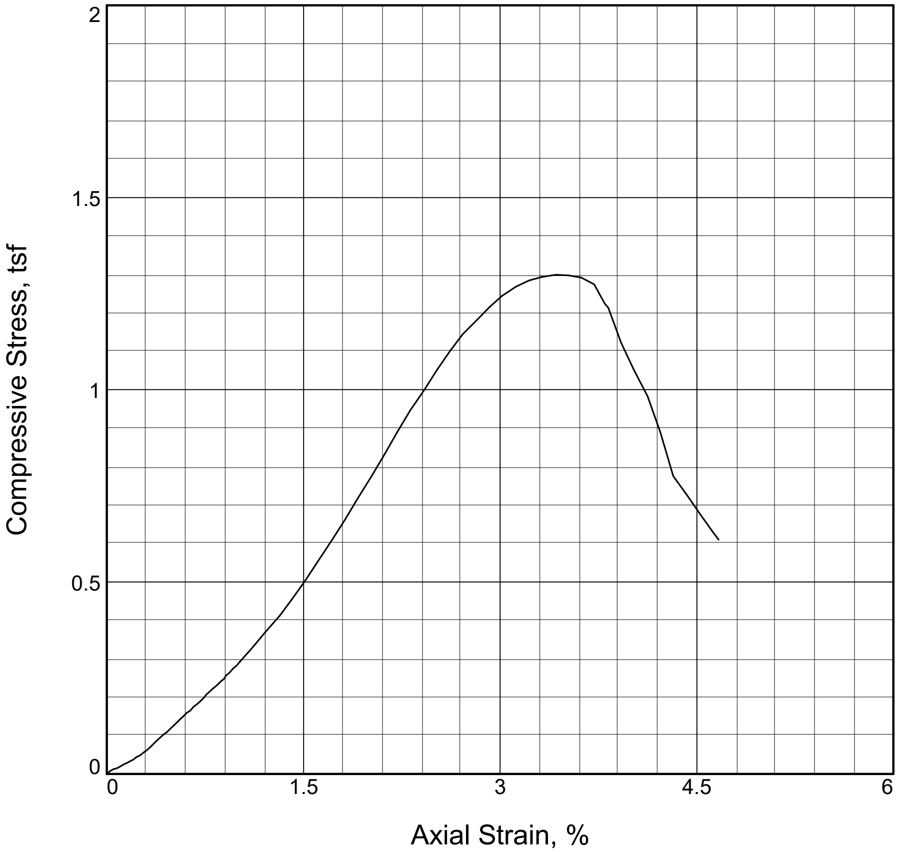
Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District
Source of Sample: B-9 **Depth:** 88

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.299			
Undrained shear strength, tsf	0.650			
Failure strain, %	3.4			
Strain rate, %/min.	1.00			
Water content, %	20.3			
Wet density, pcf	132.2			
Dry density, pcf	109.9			
Saturation, %	99.3			
Void ratio	0.5622			
Specimen diameter, in.	2.85			
Specimen height, in.	5.87			
Height/diameter ratio	2.06			

Description: Grey LEAN CLAY with SAND

LL = 31	**PL =** 19	**PI =** 12	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/14/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

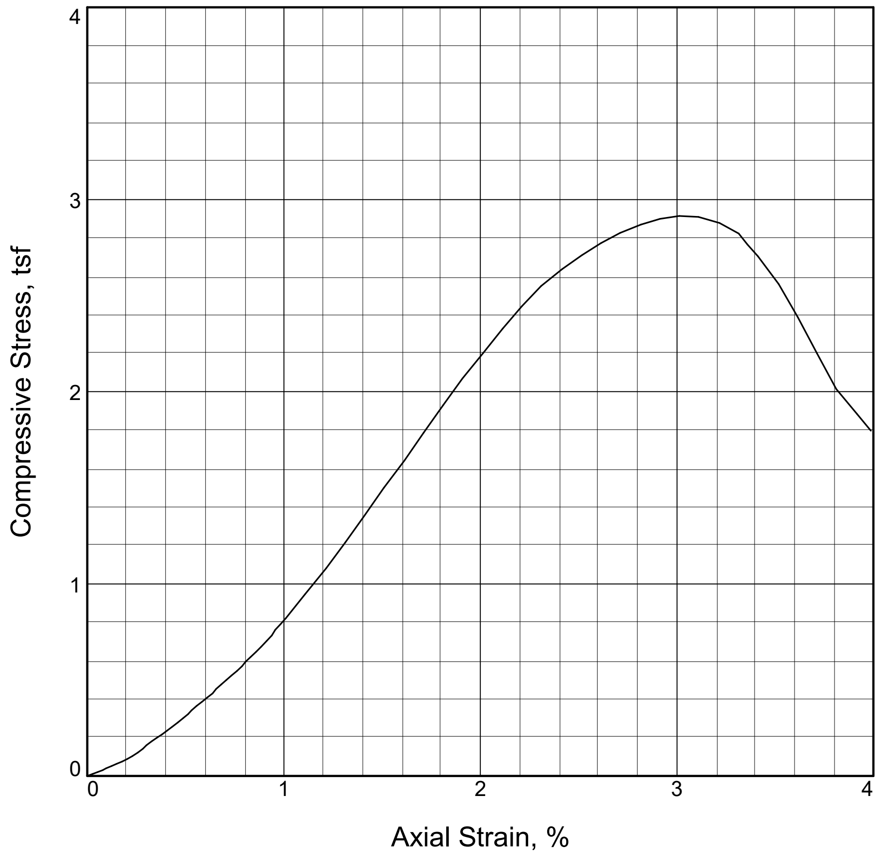
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-9 **Depth:** 103

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.915			
Undrained shear strength, tsf	1.457			
Failure strain, %	3.0			
Strain rate, %/min.	1.00			
Water content, %	35.6			
Wet density, pcf	117.6			
Dry density, pcf	86.8			
Saturation, %	99.9			
Void ratio	0.9785			
Specimen diameter, in.	2.87			
Specimen height, in.	5.89			
Height/diameter ratio	2.05			

Description: Grey FAT CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 9/15/23

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

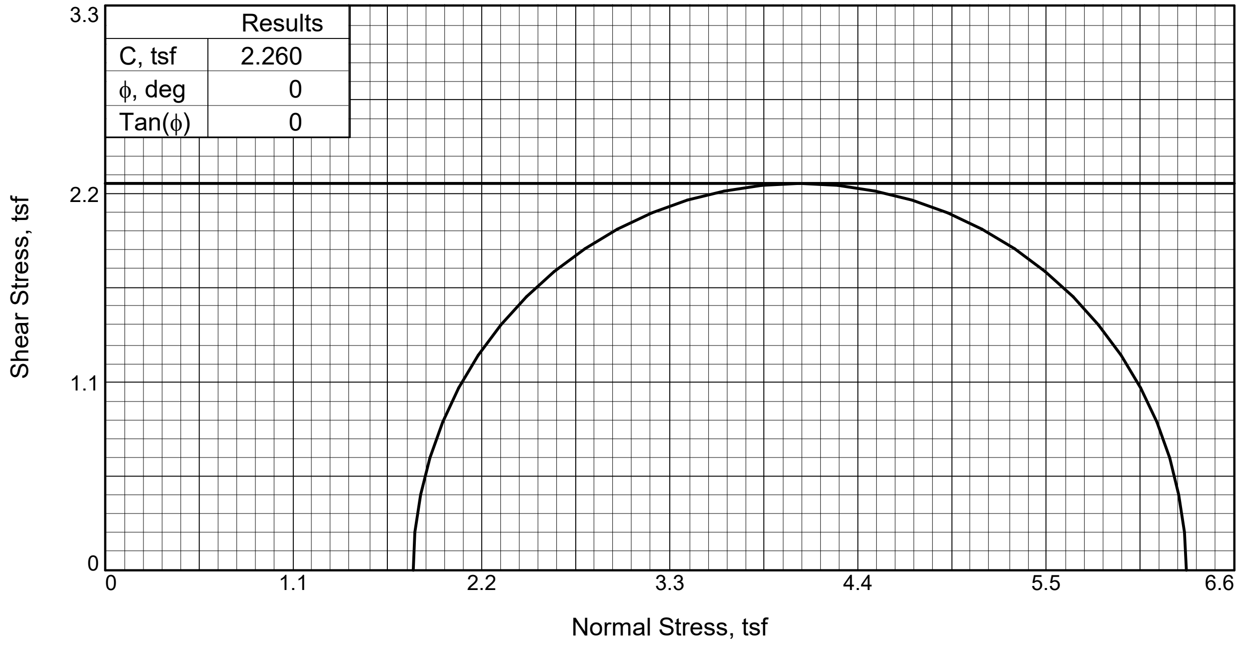
Client: Trans-Global Solutions, Inc
Houston, TX

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

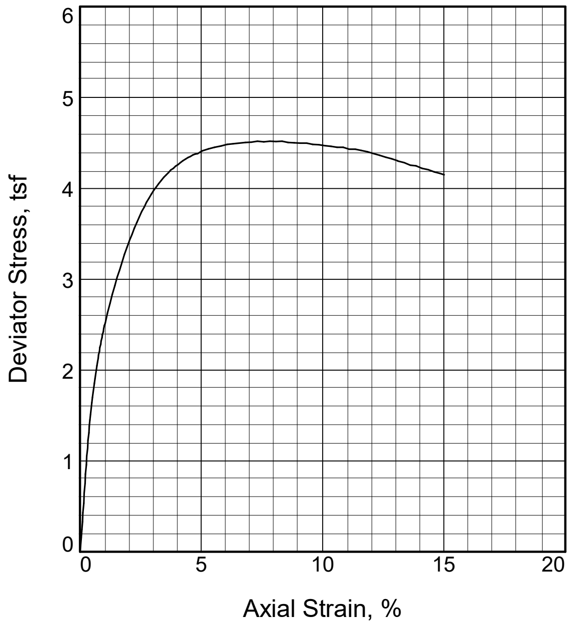
Source of Sample: B-9 **Depth:** 148

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



Results	
C, tsf	2.260
ϕ, deg	0
Tan(ϕ)	0



Sample No.		1
Initial	Water Content, %	17.8
	Dry Density, pcf	115.9
	Saturation, %	98.3
	Void Ratio	0.5085
	Diameter, in.	2.84
	Height, in.	5.90
At Test	Water Content, %	16.9
	Dry Density, pcf	115.9
	Saturation, %	93.2
	Void Ratio	0.5085
	Diameter, in.	2.84
	Height, in.	5.90
Strain rate, %/min.		1.00
Back Pressure, psi		0.00
Cell Pressure, psi		25.00
Fail. Stress, tsf		4.52
Strain, %		7.8
Ult. Stress, tsf		
Strain, %		
σ_1 Failure, tsf		6.32
σ_3 Failure, tsf		1.80

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Brown SANDY LEAN CLAY

Assumed Specific Gravity= 2.80

Remarks:
Test method: ASTM D2850
Failure type: Multiple shear

Figure ________

Client: Trans-Global Solutions, Inc
Houston, TX

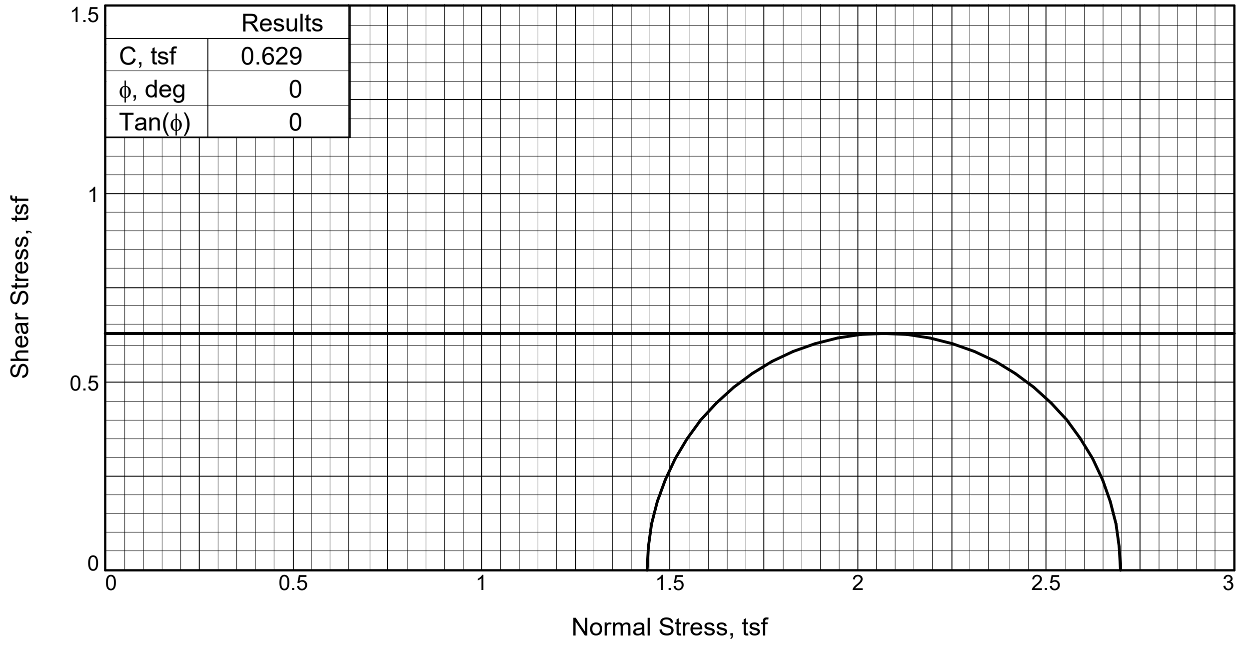
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-2 **Depth:** 73

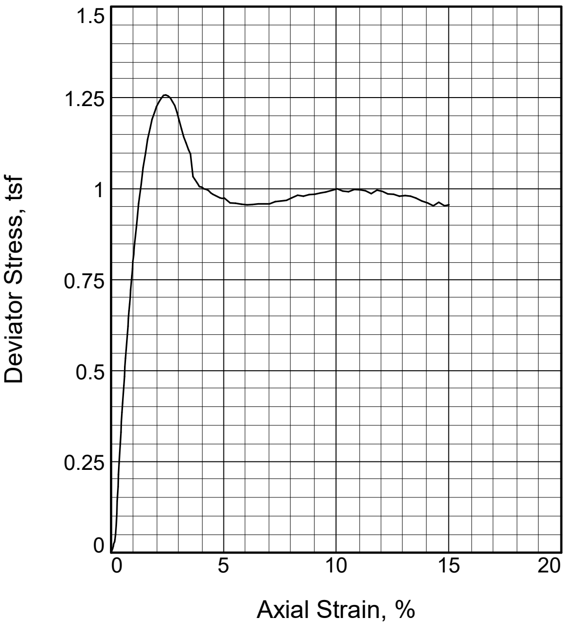
Proj. No.: 23.14.175 **Date Sampled:** 9/13/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



Results	
C, tsf	0.629
ϕ, deg	0
Tan(ϕ)	0



	Sample No.	1
Initial	Water Content, %	48.8
	Dry Density, pcf	72.6
	Saturation, %	99.7
	Void Ratio	1.3223
	Diameter, in.	2.86
	Height, in.	5.90
At Test	Water Content, %	48.5
	Dry Density, pcf	72.6
	Saturation, %	99.0
	Void Ratio	1.3223
	Diameter, in.	2.86
	Height, in.	5.90
	Strain rate, %/min.	1.00
	Back Pressure, psi	0.00
	Cell Pressure, psi	20.00
	Fail. Stress, tsf	1.26
	Strain, %	2.4
	Ult. Stress, tsf	
	Strain, %	
	σ_1 Failure, tsf	2.70
	σ_3 Failure, tsf	1.44

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Grey FAT CLAY

Assumed Specific Gravity= 2.70

Remarks:
Test method: ASTM D2850
Failure type: Slickensided

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

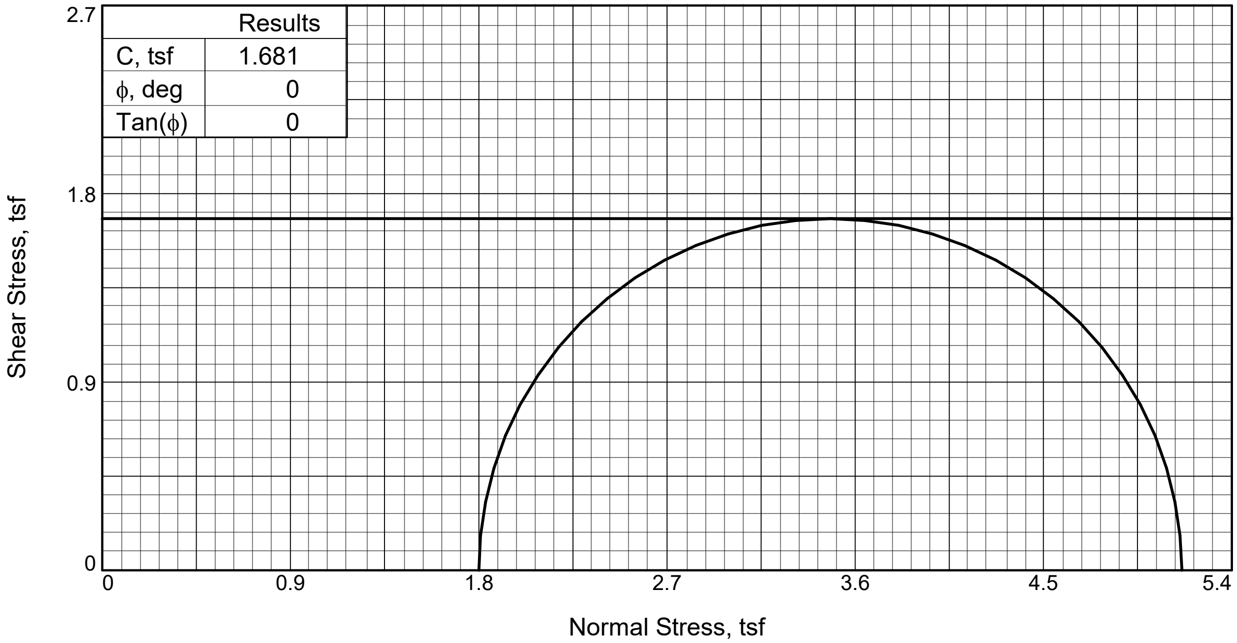
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-8 **Depth:** 58

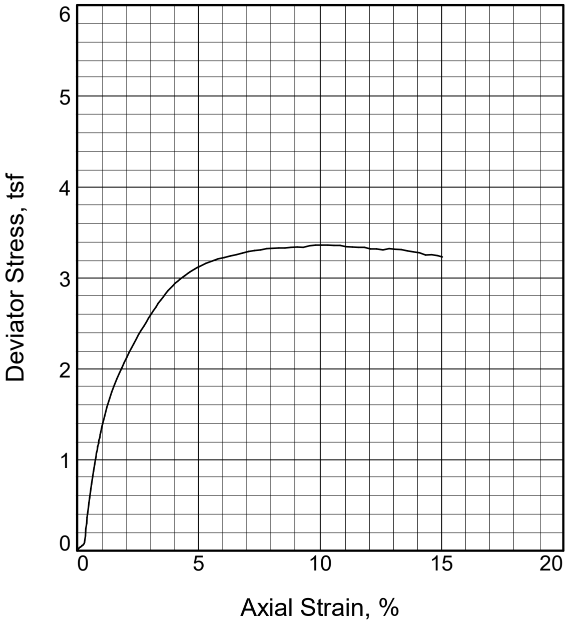
Proj. No.: 23.14.175 **Date Sampled:** 9/13/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



Results	
C, tsf	1.681
ϕ, deg	0
Tan(ϕ)	0



	Sample No.	1
Initial	Water Content, %	23.0
	Dry Density, pcf	103.7
	Saturation, %	99.3
	Void Ratio	0.6259
	Diameter, in.	2.89
	Height, in.	5.91
At Test	Water Content, %	16.6
	Dry Density, pcf	103.7
	Saturation, %	71.5
	Void Ratio	0.6259
	Diameter, in.	2.89
	Height, in.	5.91
	Strain rate, %/min.	1.00
	Back Pressure, psi	0.00
	Cell Pressure, psi	25.00
	Fail. Stress, tsf	3.36
	Strain, %	10.1
	Ult. Stress, tsf	
	Strain, %	
	σ_1 Failure, tsf	5.16
	σ_3 Failure, tsf	1.80

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Brown and grey FAT CLAY; calcareous and aggregate

LL= 55 **PL=** 22 **PI=** 33

Assumed Specific Gravity= 2.70

Remarks:

Test method: ASTM D2850

Failure type: Vertical shear

Figure ________

Client: Trans-Global Solutions, Inc
Houston, TX

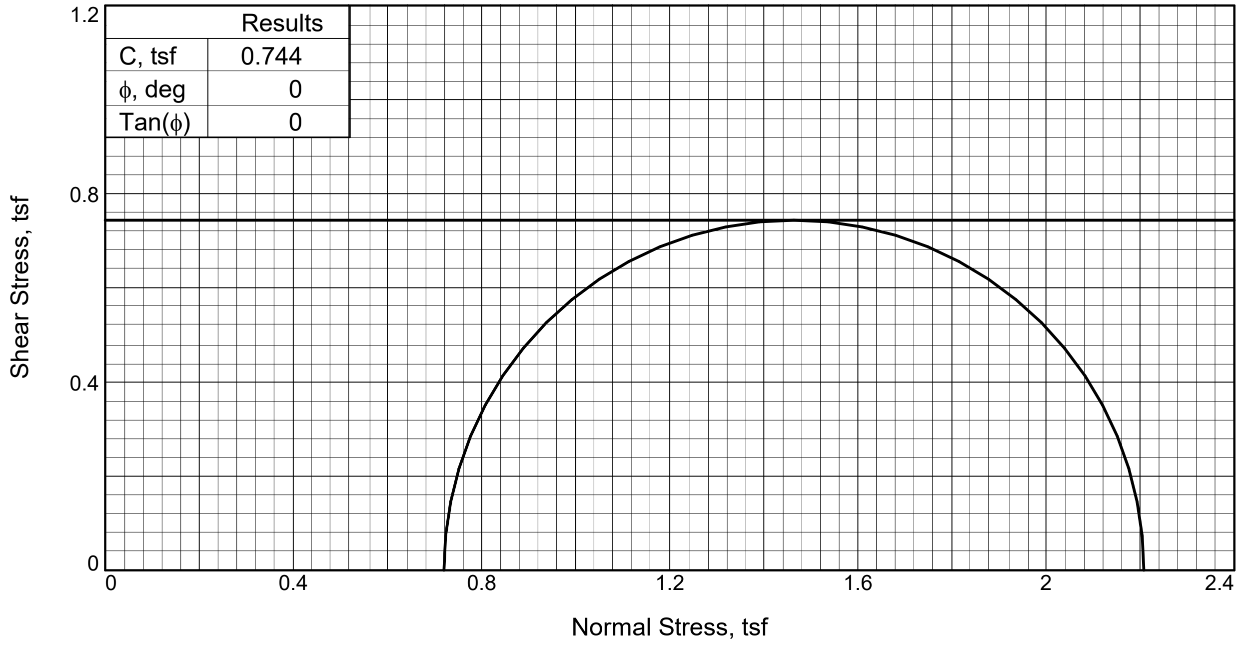
Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-8 **Depth:** 78

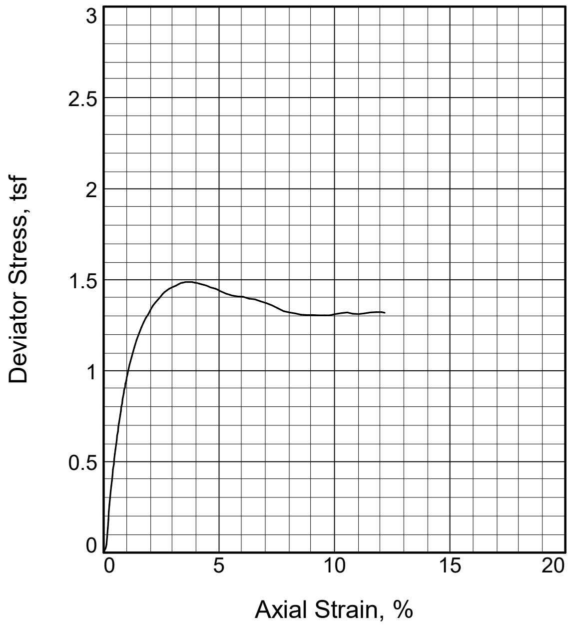
Proj. No.: 23.14.175 **Date Sampled:** 9/13/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



Results	
C, tsf	0.744
ϕ, deg	0
Tan(ϕ)	0



Sample No.		1
Initial	Water Content, %	31.8
	Dry Density, pcf	91.2
	Saturation, %	99.0
	Void Ratio	0.8832
	Diameter, in.	2.84
	Height, in.	5.89
At Test	Water Content, %	31.9
	Dry Density, pcf	91.2
	Saturation, %	99.2
	Void Ratio	0.8832
	Diameter, in.	2.84
	Height, in.	5.89
Strain rate, %/min.		1.00
Back Pressure, psi		0.00
Cell Pressure, psi		10.00
Fail. Stress, tsf		1.49
Strain, %		3.8
Ult. Stress, tsf		
Strain, %		
σ_1 Failure, tsf		2.21
σ_3 Failure, tsf		0.72

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Reddish-brown FAT CLAY

LL= 75 **PL=** 36 **PI=** 39

Assumed Specific Gravity= 2.75

Remarks:
Test method: ASTM D2166
Failure type: Slickensided

Figure ________

Client: Trans-Global Solutions, Inc
Houston, TX

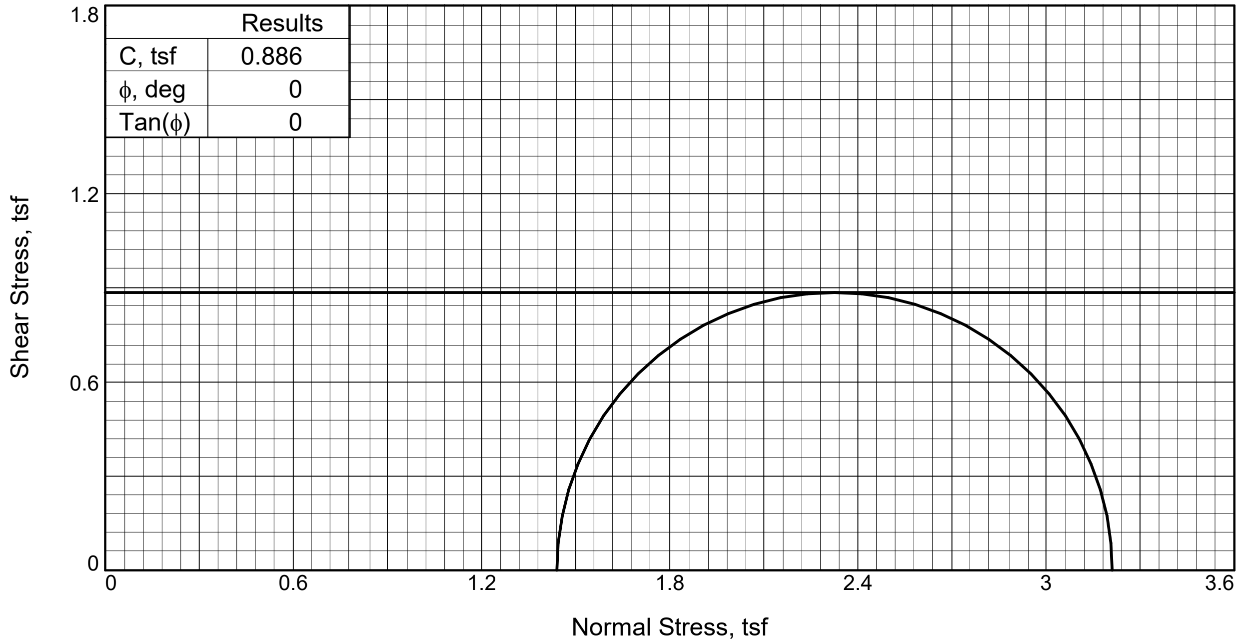
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-9 **Depth:** 33

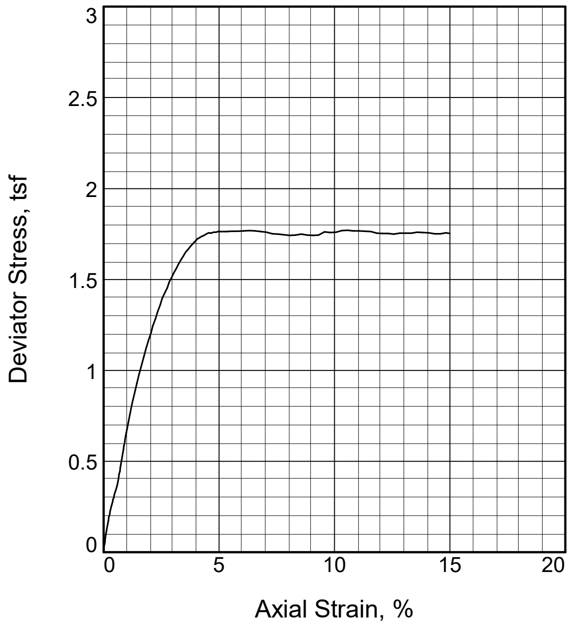
Proj. No.: 23.14.175 **Date Sampled:** 9/13/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



	Results
C, tsf	0.886
ϕ, deg	0
Tan(ϕ)	0



Sample No.		1
Initial	Water Content, %	22.2
	Dry Density, pcf	101.4
	Saturation, %	90.5
	Void Ratio	0.6616
	Diameter, in.	2.88
	Height, in.	5.75
At Test	Water Content, %	20.4
	Dry Density, pcf	101.4
	Saturation, %	83.2
	Void Ratio	0.6616
	Diameter, in.	2.88
	Height, in.	5.75
Strain rate, %/min.		1.00
Back Pressure, psi		0.00
Cell Pressure, psi		20.00
Fail. Stress, tsf		1.77
Strain, %		10.6
Ult. Stress, tsf		
Strain, %		
σ_1 Failure, tsf		3.21
σ_3 Failure, tsf		1.44

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Grey SANDY LEAN CLAY

Assumed Specific Gravity= 2.70

Remarks:
Test method: ASTM D2850
Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

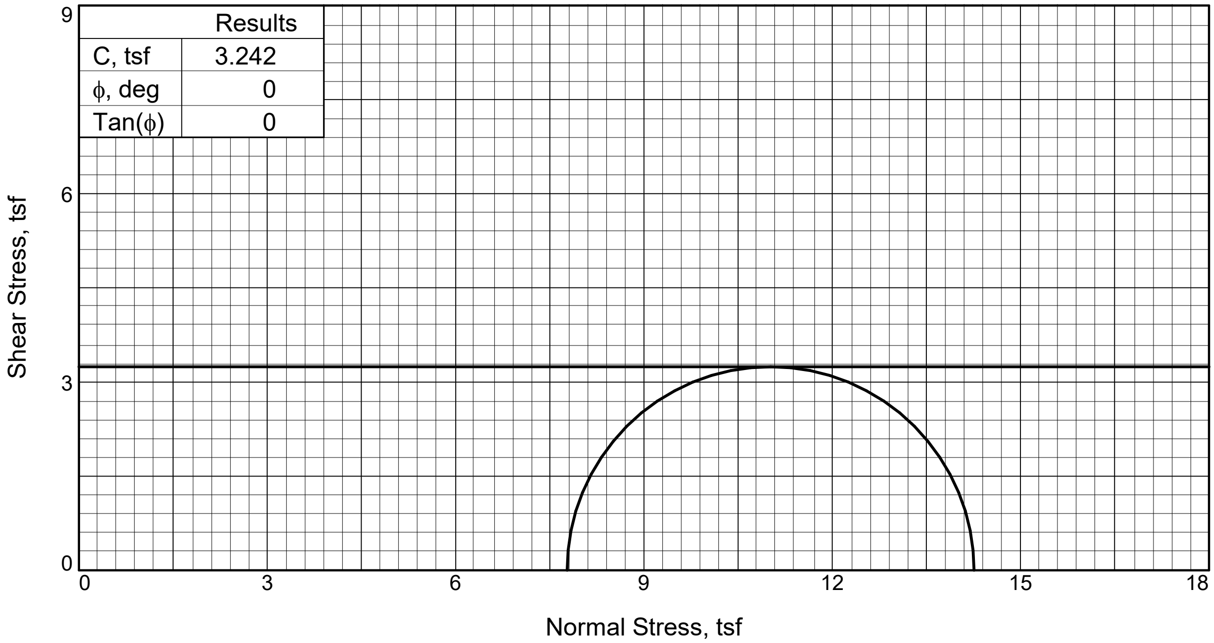
Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-9 **Depth:** 118

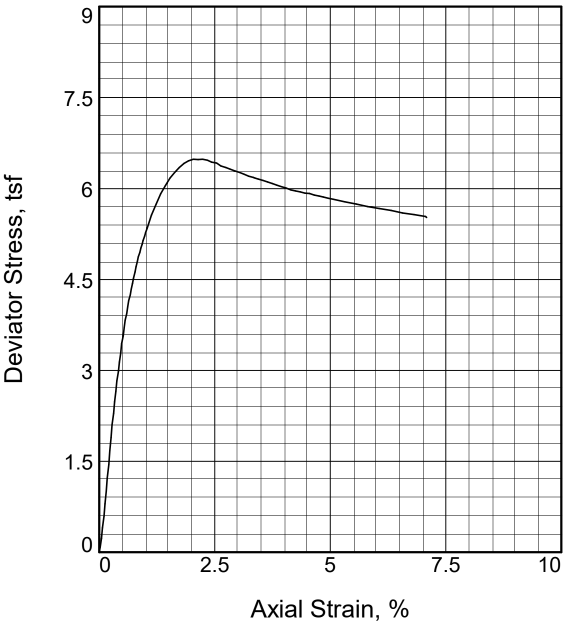
Proj. No.: 23.14.175 **Date Sampled:** 9/13/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: ALL



Results	
C, tsf	3.242
ϕ, deg	0
Tan(ϕ)	0



Sample No.		1
Initial	Water Content, %	22.2
	Dry Density, pcf	107.6
	Saturation, %	99.3
	Void Ratio	0.6248
	Diameter, in.	2.00
	Height, in.	4.00
At Test	Water Content, %	22.0
	Dry Density, pcf	107.6
	Saturation, %	98.8
	Void Ratio	0.6248
	Diameter, in.	2.00
	Height, in.	4.00
Strain rate, %/min.		1.00
Back Pressure, psi		0.00
Cell Pressure, psi		108.00
Fail. Stress, tsf		6.5
Strain, %		2.2
Ult. Stress, tsf		
Strain, %		
σ_1 Failure, tsf		14.3
σ_3 Failure, tsf		7.8

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Dark grey FAT CLAY; calcareous nodules

Assumed Specific Gravity= 2.80

Remarks:
Test type: ASTM D2850
Failure type: Slickensided

Figure ________

Client: Trans-Global Solutions, Inc
Houston, TX

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-9 **Depth:** 128

Proj. No.: 23.14.175 **Date Sampled:** 9/22/23

TRIAXIAL SHEAR TEST REPORT
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: DM

Laboratory Test Assignment Forms

Tolunay-Wong Engineers, Inc.

Project Name: Cedar port
Project Number: 23.14.175
Client Name:
Date Assigned:
Due Date:
Department:
Assigned By:
Project Manager:
Laboratory:

Sample ID			Soil Properties											Dispersion			Strength Tests					Volume Change Tests						Other
Boring Name	Depth (ft)	(C)ore, (J)ar, (B)ag	Water Content	Dry Unit Weight	Atterberg Limit	% Minus 200	Sieve Analysis	Sieve & Hydro	pH	Organic Content	Sulfates / Chlorides	Electrical Resistivity	Thermal Conductivity	Pinhole Dispersion	Crumb Dispersion	Hydraulic Conductivity	Torvane	Lab Vane Shear	UC Test S/S Curve (Y/N)	UU Triaxial Test S/S Curve (Y/N)	CU Triaxial Test w/ Pore Pressure	Incremental Consolidation	CRS Consolidation	Perform Consol QA	Overburden Stress for Consol. Test Q/A	Swell (Meth. A, B or C)	Free Swell (Holtz & Gibbs)	Remarks
B10	6-8	B																										
	8-10	B																										
	10-12	B																										
	12-14	B																										
	14-16	B																										
	16-18	B																										
	18-20	B																										
	20-22	C																										
	22-24	C																										
	24-26	C																										
	28-30	C																										
	33-35	C																										
	38-40	C																										
	43-45	C																										
	48-50	B																										
	53-55	B																										
	58-60	B																										
	63-65	B																										
TOTALS																												

Geotechnician: Josh S.
Date: 4-26-24
Date Assignments Received:
Received by:
Notes:

Tolunay-Wong Engineers, Inc.

Project Name: Cedar port
Project Number: 23.14.175
Client Name:

Date Assigned:
Due Date:
Department: HOU HEG

Assigned By:
Project Manager:
Laboratory:

Sample ID			Soil Properties											Dispersion			Strength Tests					Volume Change Tests						Other
Boring Name	Depth (ft)	(C)ore, (J)ar, (B)ag	Water Content	Dry Unit Weight	Atterberg Limit	% Minus 200	Sieve Analysis	Sieve & Hydro	pH	Organic Content	Sulfates / Chlorides	Electrical Resistivity	Thermal Conductivity	Pinhole Dispersion	Crumb Dispersion	Hydraulic Conductivity	Torvane	Lab Vane Shear	UC Test S/S Curve (Y/N)	UU Triaxial Test S/S Curve (Y/N)	CU Triaxial Test w/ Pore Pressure	Incremental Consolidation	CRS Consolidation	Perform Consol QA	Overburden Stress for Consol. Test Q/A	Swell (Meth. A, B or C)	Free Swell (Holtz & Gibbs)	Remarks
B11	9-11	B																										
	11-13	B																										
	13-15	B																										
	15-17	B																										
	17-19	B																										
	19-21	B																										
	21-23	B																										
	23-25	B																										
	25-27	B																										
	27-29	B																										
	33-35	B																										
	38-40	B																										
	43-45	C																										
	48-50	C																										
	53-55	C																										
	58-60	C																										
	63-65	C																										
TOTALS																												

Geotechnician: Josh S.
Date: 4-23-24
Date Assignments Received:
Received by:

Notes:

Tolunay-Wong Engineers, Inc.

Project Name: Cedar port
Project Number: 23.140175
Client Name:

Date Assigned:
Due Date:
Department: HOU HEG

Assigned By:
Project Manager:
Laboratory:

Sample ID			Soil Properties											Dispersion			Strength Tests					Volume Change Tests						Other
Boring Name	Depth (ft)	(C)ore, (J)ar, (B)ag	Water Content	Dry Unit Weight	Atterberg Limit	% Minus 200	Sieve Analysis	Sieve & Hydro	pH	Organic Content	Sulfates / Chlorides	Electrical Resistivity	Thermal Conductivity	Pinhole Dispersion	Crumb Dispersion	Hydraulic Conductivity	Torvane	Lab Vane Shear	UC Test S/S Curve (Y/N)	UU Triaxial Test S/S Curve (Y/N)	CU Triaxial Test w/ Pore Pressure	Incremental Consolidation	CRS Consolidation	Perform Consol QA	Overburden Stress for Consol. Test Q/A	Swell (Meth. A, B or C)	Free Swell (Holtz & Gibbs)	Remarks
B12	10-12	B																										
	12-14	B																										
	14-16	B																										
	16-18	B																										
	18-20	B																										
	20-22	B																										
	22-24	B																										
	24-26	B																										
	26-28	B																										
	28-30	B																										
	33-35	B																										
	38-40	B																										
	43-45	B																										
	48-50	B																										
	53-55	B																										
	58-60	B																										
	63-65	B																										
TOTALS																												

Geotechnician: Josio S.
Date: 4-24 / 4-25
Date Assignments Received:
Received by:

Notes:

Tolunay-Wong Engineers, Inc.

Project Name: Cedar Port
Date Assigned:
Assigned By:
Project Number: 23.14.175
Due Date:
Project Manager:
Client Name: Trans-Global Solutions
Department: HOU HEG
Laboratory:

Sample ID			Soil Properties											Dispersion			Strength Tests					Volume Change Tests						Other
Boring Name	Depth (ft)	(C)ore, (J)ar, (B)ag	Water Content	Dry Unit Weight	Atterberg Limit	% Minus 200	Sieve Analysis	Sieve & Hydro	pH	Organic Content	Sulfates / Chlorides	Electrical Resistivity	Thermal Conductivity	Pinhole Dispersion	Crumb Dispersion	Hydraulic Conductivity	Torvane	Lab Vane Shear	UC Test S/S Curve (Y/N)	UU Triaxial Test S/S Curve (Y/N)	CU Triaxial Test w/ Pore Pressure	Incremental Consolidation	CRS Consolidation	Perform Consol QA	Overburden Stress for Consol. Test Q/A	Swell (Meth. A, B or C)	Free Swell (Holtz & Gibbs)	Remarks
B-13	9-11	B																										
	11-13	B																										
	13-15	B																										
	15-17	B																										
	17-19	B																										
	19-21	B																										
	21-23	B																										
	23-25	B																										
	25-27	B																										
	27-29	B																										
	33-35	B																										
	38-40	C																										
	43-45	C																										
	48-50	C																										
	53-55	C																										
	58-60	C																										
	63-65	C																										
TOTALS																												

Geotechnician: Josh Sparks
Notes:
Date: 04/04/24
Date Assignments Received:
Received by:

Tolunay-Wong Engineers, Inc.

10710 S. Sam Houston Pkwy W., Suite 100 / Houston, TX 77031 / 713-722-7064 / Fax 713-777-0341

COVER SHEET

Email

To: Mr. Andrew Barrett
(abarrett@anchorqea.com)
Anchor QEA, LLC

Cc: Sara Flaherty
(Sflaherty@anchorqea.com)

Eric Haynes
(ehaynes@tweinc.com)

Ref: Laboratory Testing

From: Arthur J. Stephens, P.E.

Direct:	713-821-5842
Phone:	713-722-7064
Fax:	713-777-1424 / 713-722-0309
Cell:	832-741-2179
Email:	astephens@tweinc.com

Date: May 16, 2024
TWEI #: 23.14.175

Comments:

1) Attached are the results of the testing completed to date.
2) The following are still in progress.
    a. Consolidation test – 1
    b. Sieve and hydrometer tests – 2
3) These test results will be sent when completed.
4) We have only received laboratory assignments for boring B-10; please confirm.

Regards,

Tolunay-Wong Engineers, Inc.

TBPELS Firm Registration No.: F-000124

Arthur J. Stephens, P.E.
Executive Vice President

Art/dee/bxg

SUMMARY OF LABORATORY TESTS

Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
B-10																		
		0																
		6				CH	82.4											
		8.5				CH	56.2											
		10.5				CH	46.7											
		12.5				CH	44.9											
		14.5			Grey CLAYEY SAND; shells	SC	32.7					47.9						
		16.5				CH	44.3											
		18.5				CH	37.3											
		20	3.25		Tan FAT CLAY	CH	36.8	84.7	67	22	45				0.89	6.0		Vertical shear
		22	3.00			CH	38.4	83.9										
		24	3.00			CH	41.7											
		26				CH	46.3		52	19	33							
		28	2.00			CH	47.0											
		33	3.75			CH	35.5											
		35																
		38	2.50			CH	33.9											
		39																
		43	3.00			CH	23.0		113	29	84							
		48.5			Tan and grey SILTY SAND	SM	23.5					31.0						
		53.5																
		58.5																
		63.5																
		65																

ASTM D6913 Sieve Analysis

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.4	1.2	1.7	45.8	47.9	

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-10		14.5	Grey CLAYEY SAND; shells	SC

Tolunay-Wong
Engineers, Inc.
Houston, Texas

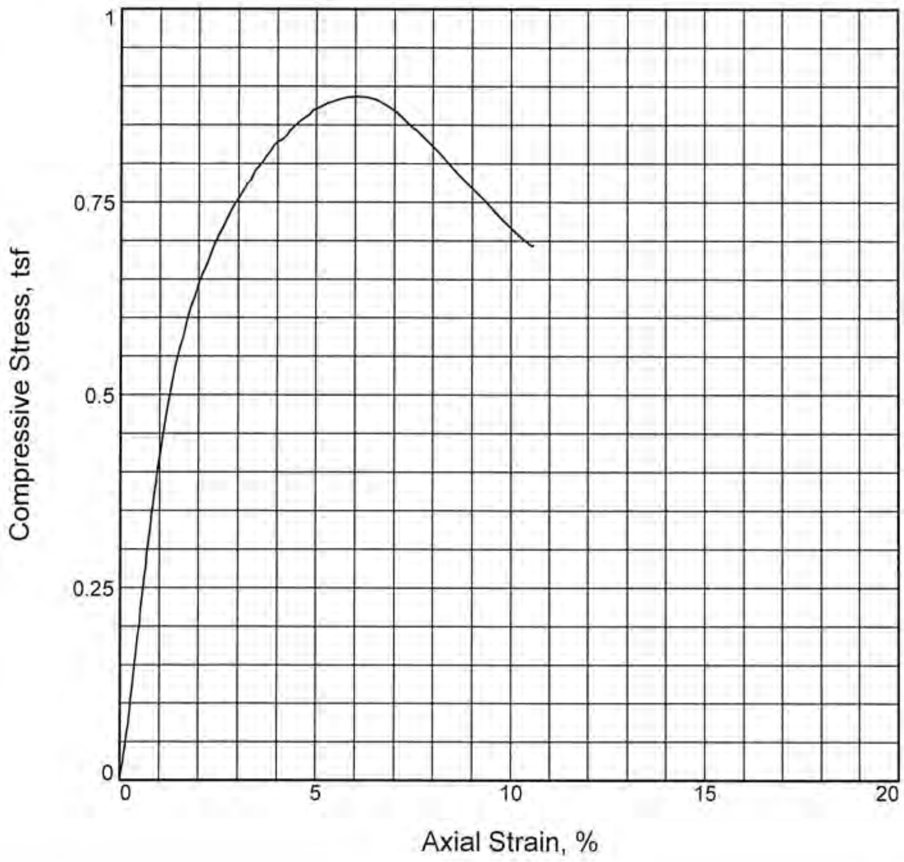
Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District and Dock Related Feasibility Study

Project No.: 23.14.173

Figure

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.886			
Undrained shear strength, tsf	0.443			
Failure strain, %	6.0			
Strain rate, %/min.	1.00			
Water content, %	36.8			
Wet density, pcf	115.9			
Dry density, pcf	84.7			
Saturation, %	98.6			
Void ratio	1.0265			
Specimen diameter, in.	2.87			
Specimen height, in.	5.88			
Height/diameter ratio	2.05			

Description: Tan FAT CLAY

LL = 67	**PL =** 22	**PI =** 45	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 23.14.175

Date Sampled: 5/13/24

Remarks:

Test method: ASTM D2166

Failure type: Vertical shear

Figure _______

Client: Trans-Global Solutions, Inc
Houston, TX

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-10 **Depth:** 20

UNCONFINED COMPRESSION TEST
Tolunay-Wong Engineers, Inc.
Houston, Texas

Tested By: JM

Tolunay-Wong Engineers, Inc.

10710 S. Sam Houston Pkwy. W, Suite 100 Houston, TX 77031

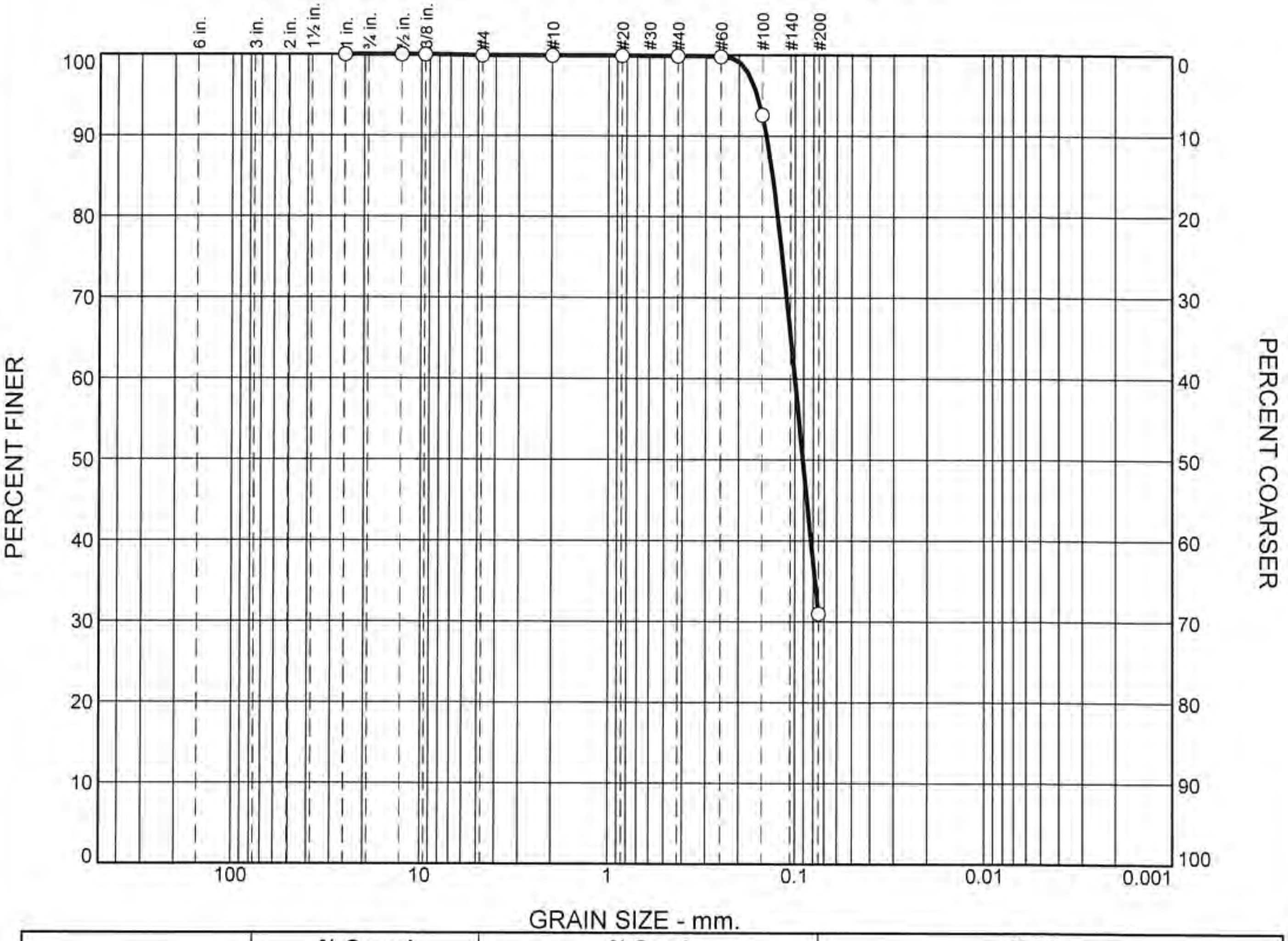
Specific Gravity of Soil - ASTM D854

Project Number	23.14.175	Date of Test	5/15
Report Number		Technician	MOE

Test Number	1	2	3	4
Test Method Used				
Sample Identification	B10 (24-26)			
Sample Description	Grey FAT CLAY			
Maximum Particle Size (sieve no.)				
Pycnometer No.	6			
Dry Mass of Soil, g	35.00			
Mass of Pycnometer + Water, g	343.25			
Mass of Pycnometer + Water + Soil, g	365.02			
Temperature of Contents of Pycnometer, C	24.5			
Specific Gravity at Test Temperature	2.65			
Temperature Correction Factor, K	0.9990			
Specific Gravity at 20C	2.64			

Calculated By	FNT	Reviewed By	EHH
Date	5/15/24	Date	5/15/24

ASTM D6913 Sieve Analysis



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	0.0	0.1	68.8	31.0	

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-10		48.5	Tan and grey SILTY SAND	SM

Tolunay-Wong Engineers, Inc. Houston, Texas

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District and Dock Related Feasibility Study

Project No.: 23.14.175

Figure

Updated Summary
Sieve & Hydrometer Tests

B-10 at 22 ft, B-10 at 33 ft

SUMMARY OF LABORATORY TESTS

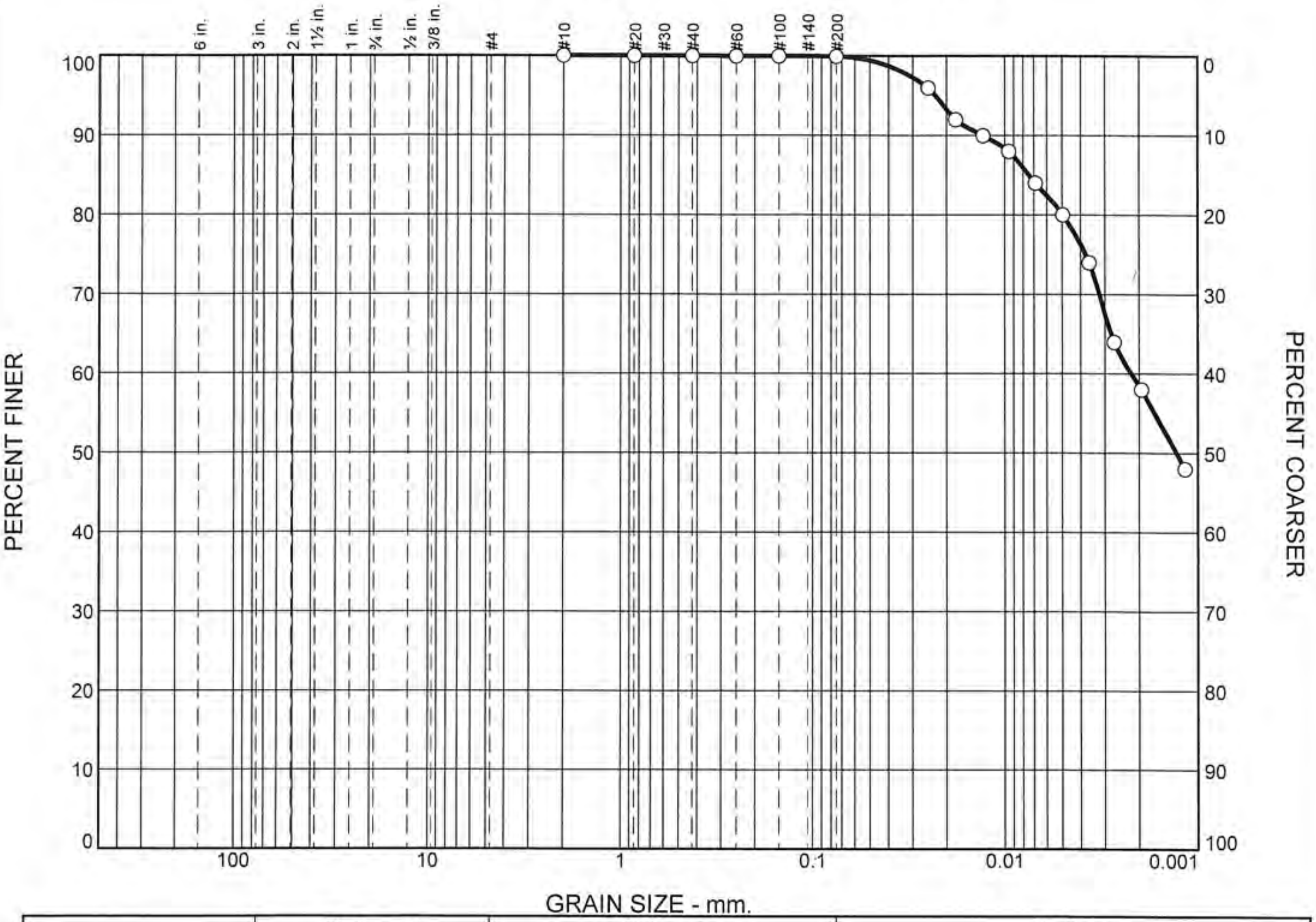
Project No. 23.14.175

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District
and Dock Related Feasibility Study

Boring No.	Sample No.	Depth (ft)	Pocket Pen. (tsf)	Torvane (tsf)	Soil Description	USCS	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plast. Index	Finer than #200 Sieve (%)	pH	Lab Vane Shear (tsf)	Uc/UU. Compr. (tsf)	Failure Strain (%)	Conf. Pres. (psi)	Failure Type
B-10																		
		0																
		6				CH	82.4											
		8.5				CH	56.2											
		10.5				CH	46.7											
		12.5				CH	44.9											
		14.5			Grey CLAYEY SAND; shells	SC	32.7					47.9						
		16.5				CH	44.3											
		18.5				CH	37.3											
		20	3.25		Tan FAT CLAY	CH	36.8	84.7	67	22	45				0.89	6.0		Vertical shear
		22	3.00		Tan and grey FAT CLAY	CH	38.4	83.9				99.9						
		24	3.00			CH	41.7											
		26				CH	46.3		52	19	33							
		28	2.00			CH	47.0											
		33	3.75		Grey FAT CLAY	CH	35.5					97.5						
		35																
		38	2.50			CH	33.9											
		39																
		43	3.00			CH	23.0		113	29	84							
		48.5			Tan and grey SILTY SAND	SM	23.5					31.0						
		53.5																
		58.5																
		63.5																
		65																

ASTM D422 Hydrometer Analysis



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	0.1	41.4	58.5

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-10		22	Tan and grey FAT CLAY	CH

Tolunay-Wong
Engineers, Inc.
Houston, Texas

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District and Dock Related Feasibility Study

Project No.: 23.14.173

Figure

Tested By: JM

ASTM D422 Hydrometer Analysis

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	2.4	47.7	49.8

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-10		33	Grey FAT CLAY	CH

Tolunay-Wong
Engineers, Inc.
Houston, Texas

Client: Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements; Proposed Cedar Port Improvement & Navigation District and Deck Related Feasibility Study

Project No.: 23.14.175

Figure

Tested By: JM

Tolunay-Wong Engineers, Inc.

10710 S. Sam Houston Pkwy W., Suite 100 / Houston, TX 77031 / 713-722-7064 / Fax 713-777-0341

COVER SHEET

Email

To:	Mr. Andrew Barrett (abarrett@anchorqea.com) Anchor QEA, LLC	**From:**	Arthur J. Stephens, P.E. **Direct:** 713-821-5842 **Phone:** 713-722-7064 **Fax:** 713-777-1424 / 713-722-0309 **Cell:** 832-741-2179 **Email:** astephens@tweinc.com
Cc:	Sara Flaherty (Sflaherty@anchorqea.com) Eric Haynes (ehaynes@tweinc.com)	**Date:** **TWEI #:**	June 5, 2024 23.14.175
Ref:	Laboratory Testing		

Comments:

Attached are the results of the consolidation tests. Please call if you have any questions.

Regards,

Tolunay-Wong Engineers, Inc.

TBPELS Firm Registration No.: F-000124

Arthur J. Stephens, P.E.
Executive Vice President

Art/dee

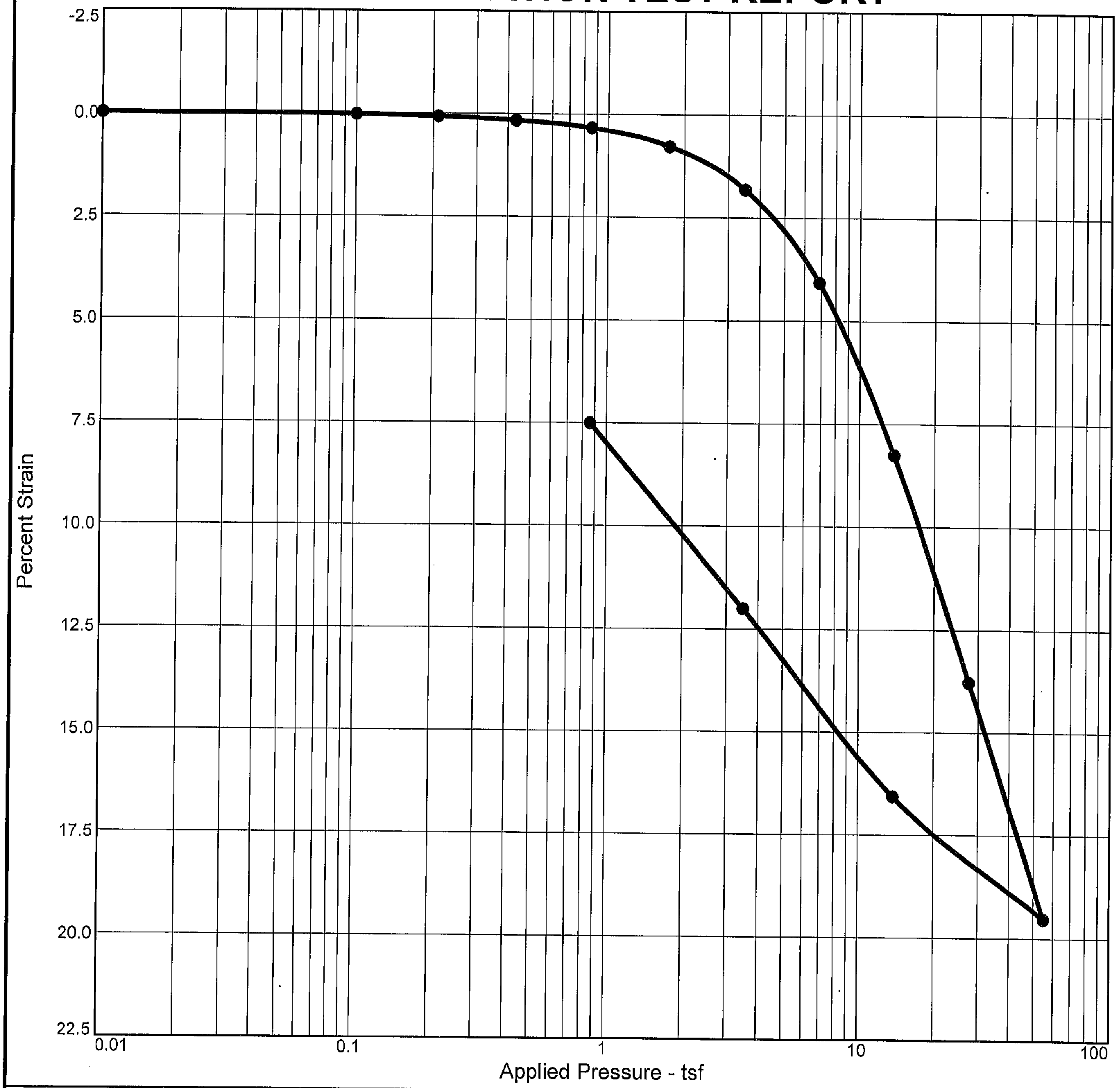
Attachments: Consolidation Test Reports:
Boring 11 @ 48 ft
Boring 13 @ 38 ft
Boring 13 @ 48 ft
Boring 13 @ 63 ft

Consolidation Test Reports

Boring 11 @ 48 ft
Boring 13 @ 38 ft
Boring 13 @ 48 ft
Boring 13 @ 63 ft

Boring 11 @ 48 ft

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.7 %	38.0 %	84.5			2.80	CH		1.068

MATERIAL DESCRIPTION

Brown FAT CLAY

Project No. 23.14.175 **Client:** Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-11 **Depth:** 48

Tolunay-Wong Engineers, Inc.

Houston, Texas

Remarks:

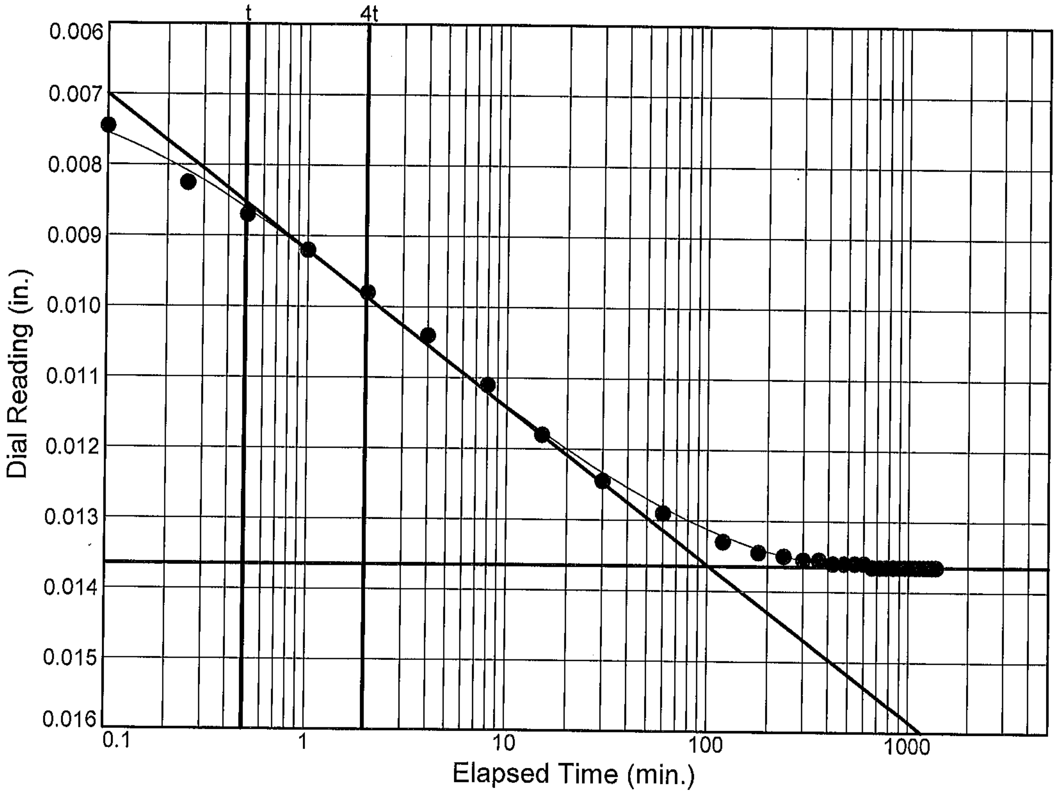
Test method: ASTM D2435
Specific gravity: Assumed

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

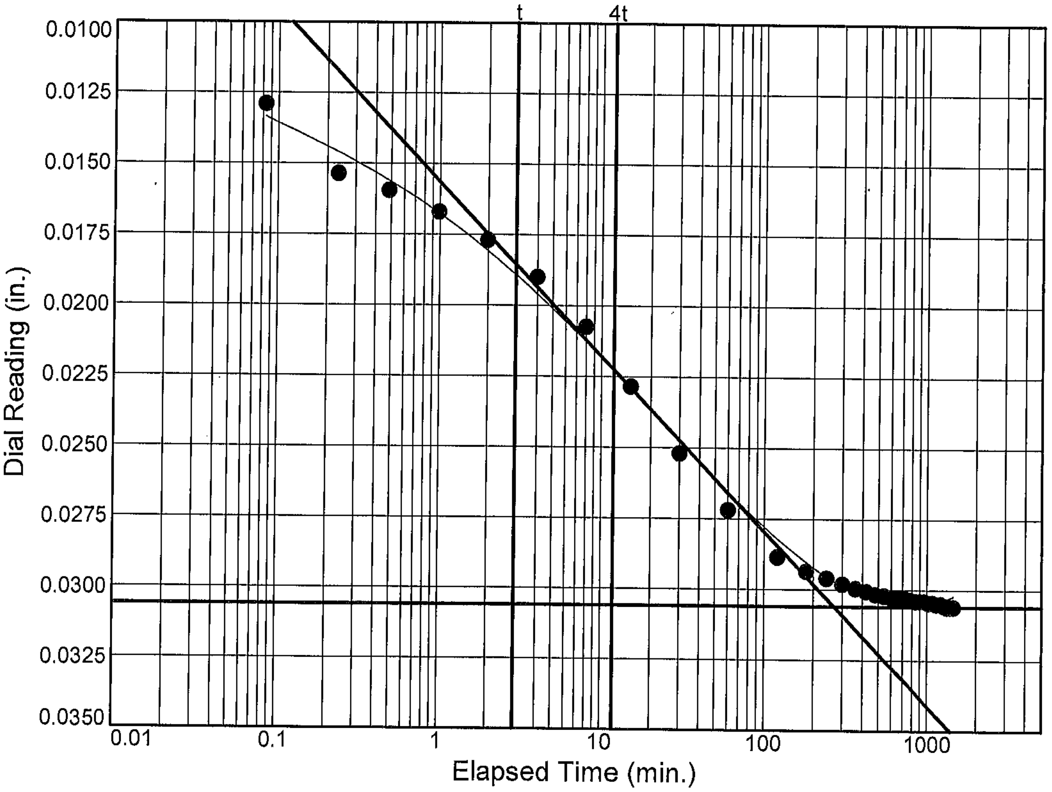
Source of Sample: B-11 Depth: 48



Load No.= 7
Load= 3.49 tsf
D_0 = 0.0073
D_{50} = 0.0105
D_{100} = 0.0137
T_{50} = 3.84 min.

C_v @ T_{50}
25.8 ft.^{2}/yr.

C_α = 0.000



Load No.= 8
Load= 6.87 tsf
D_0 = 0.0156
D_{50} = 0.0231
D_{100} = 0.0306
T_{50} = 16.02 min.

C_v @ T_{50}
6.0 ft.^{2}/yr.

C_α = 0.000

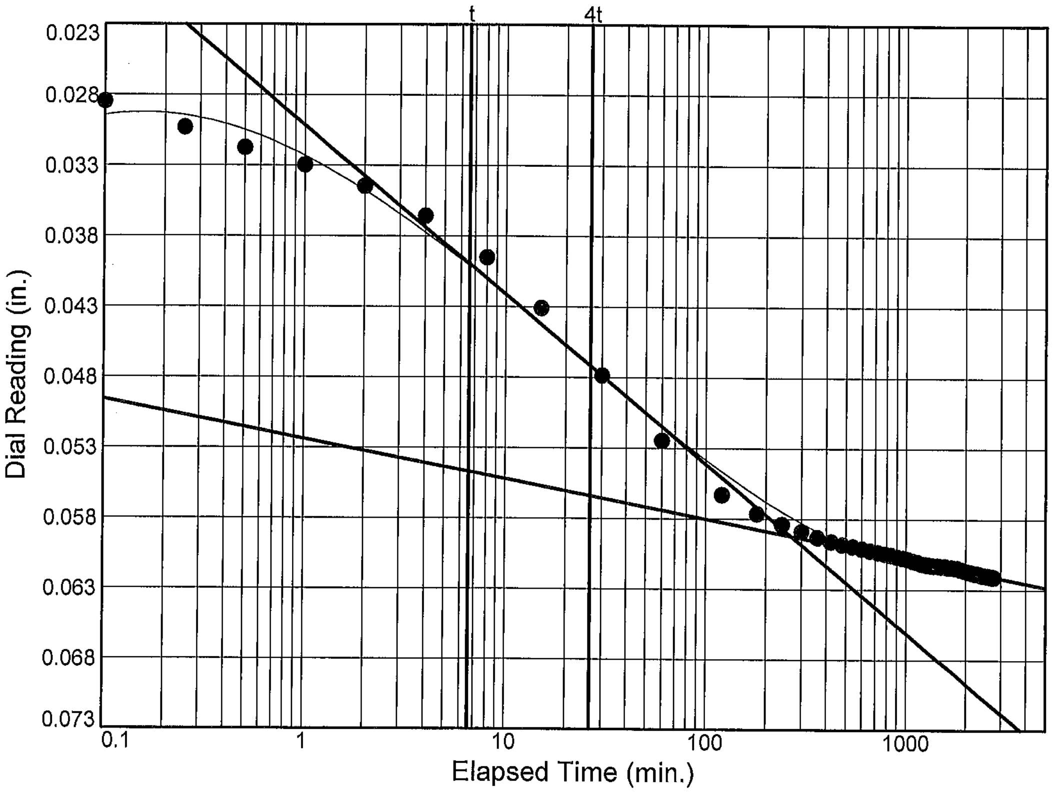
Figure

TOLUNAY-WONG ENGINEERS, INC.

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-11 Depth: 48



Load No.= 9

Load= 13.75 tsf

D_0 = 0.0330

D_{50} = 0.0461

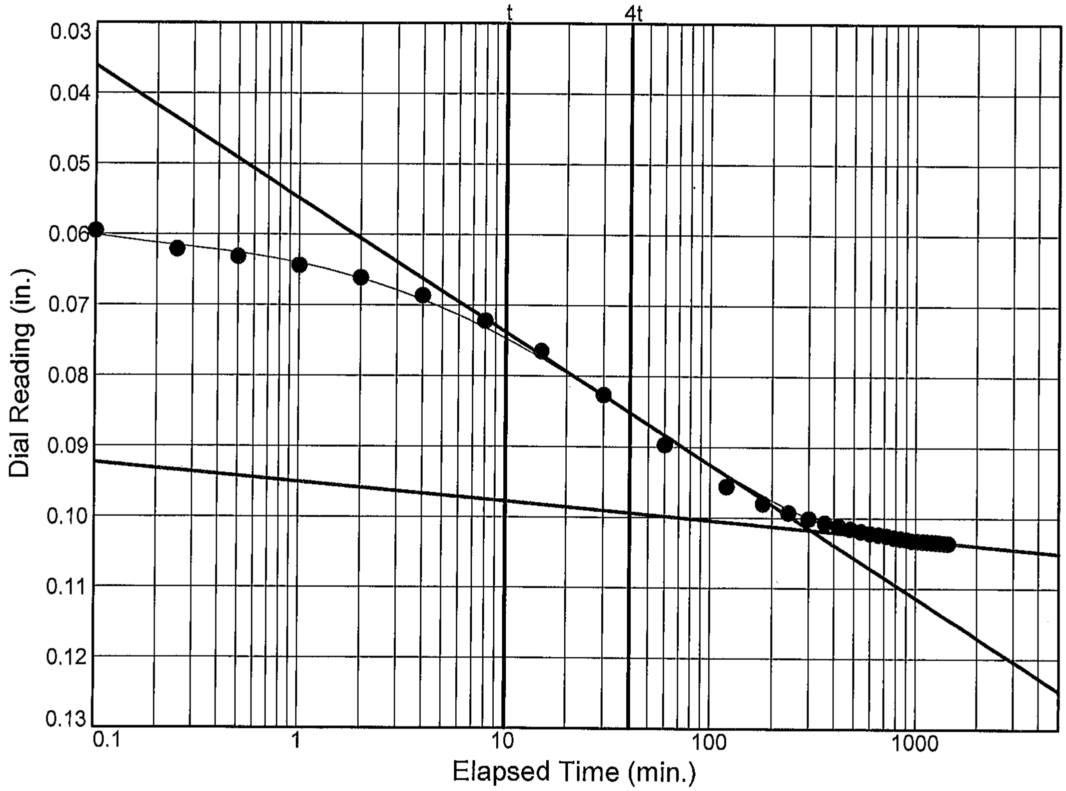
D_{100} = 0.0592

T_{50} = 21.38 min.

C_v @ T_{50}

4.2 ft.^{2}/yr.

C_α = 0.008



Load No.= 10

Load= 27.50 tsf

D_0 = 0.0642

D_{50} = 0.0830

D_{100} = 0.1018

T_{50} = 30.95 min.

C_v @ T_{50}

2.6 ft.^{2}/yr.

C_α = 0.007

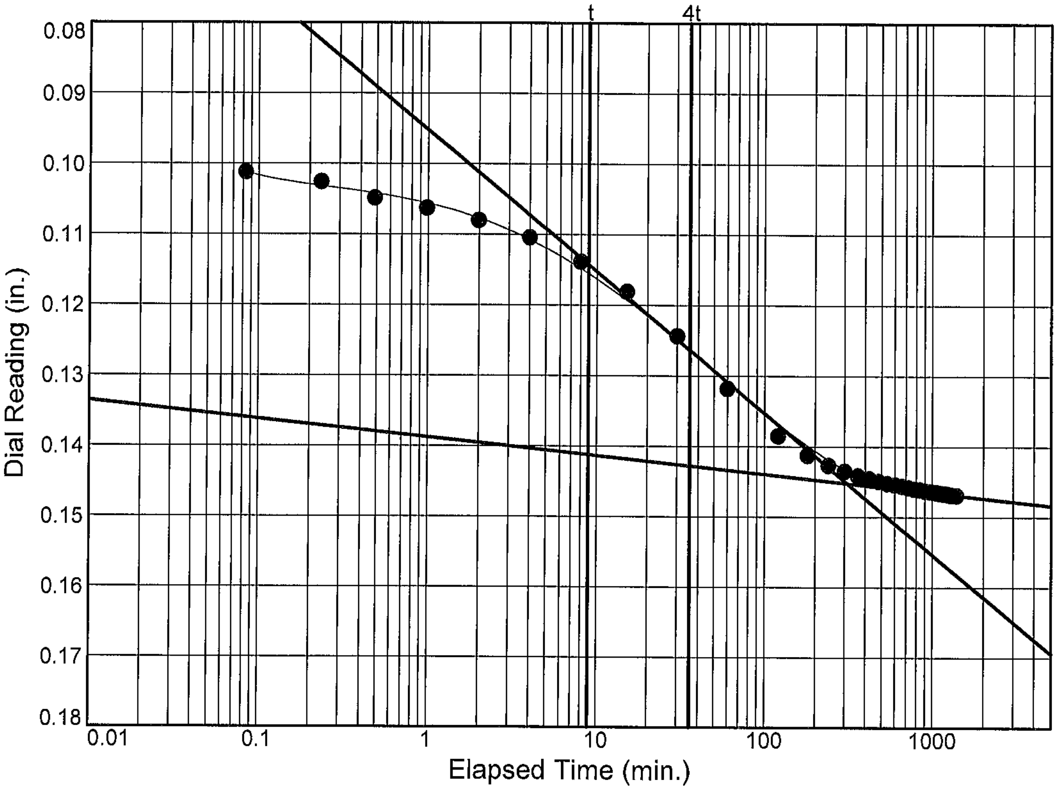
Figure

TOLUNAY-WONG ENGINEERS, INC.

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-11 Depth: 48



Load No.= 11

Load= 54.99 tsf

D_0 = 0.1047

D_{50} = 0.1249

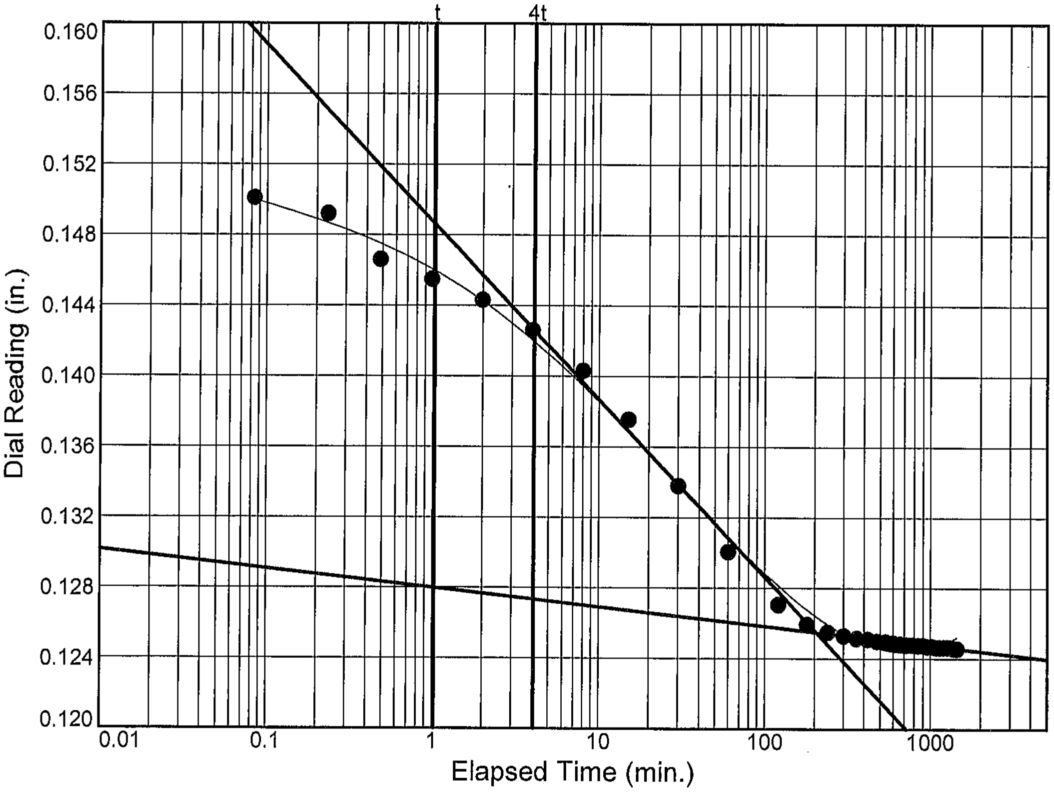
D_{100} = 0.1452

T_{50} = 30.19 min.

C_v @ T_{50}

2.3 ft.^{2}/yr.

C_α = 0.007



Load No.= 12

Load= 13.75 tsf

D_0 = 0.1500

D_{50} = 0.1378

D_{100} = 0.1255

T_{50} = 12.15 min.

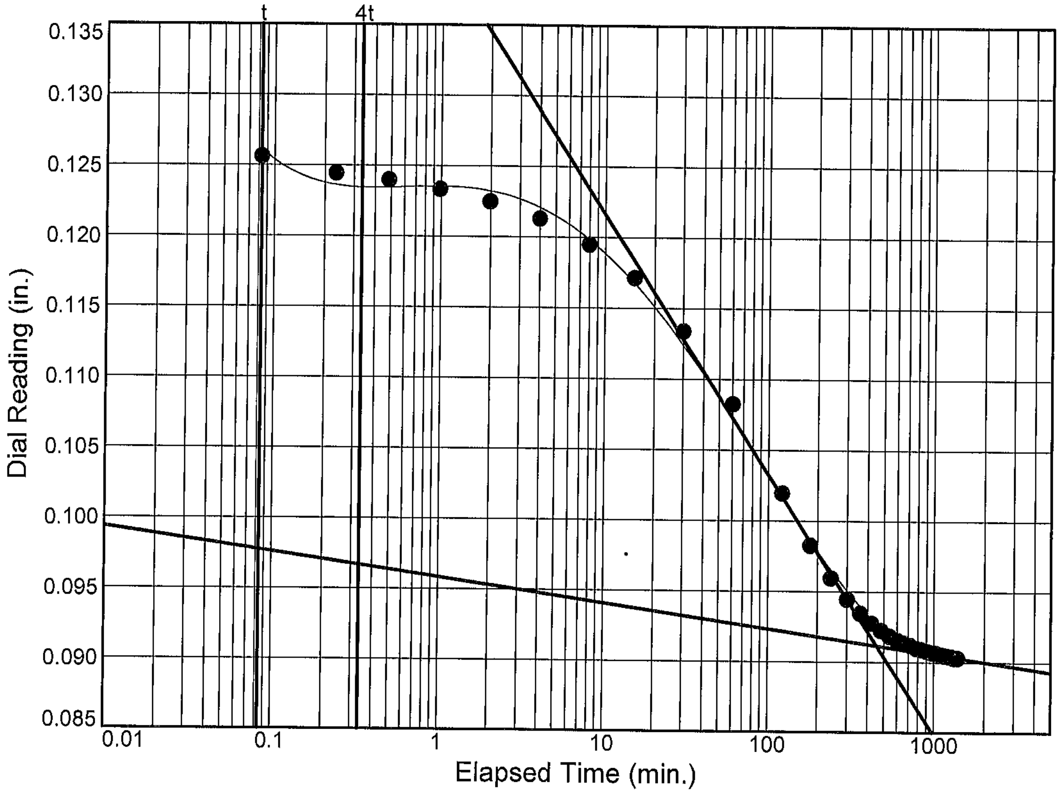
C_v @ T_{50}

5.6 ft.^{2}/yr.

Dial Reading vs. Time

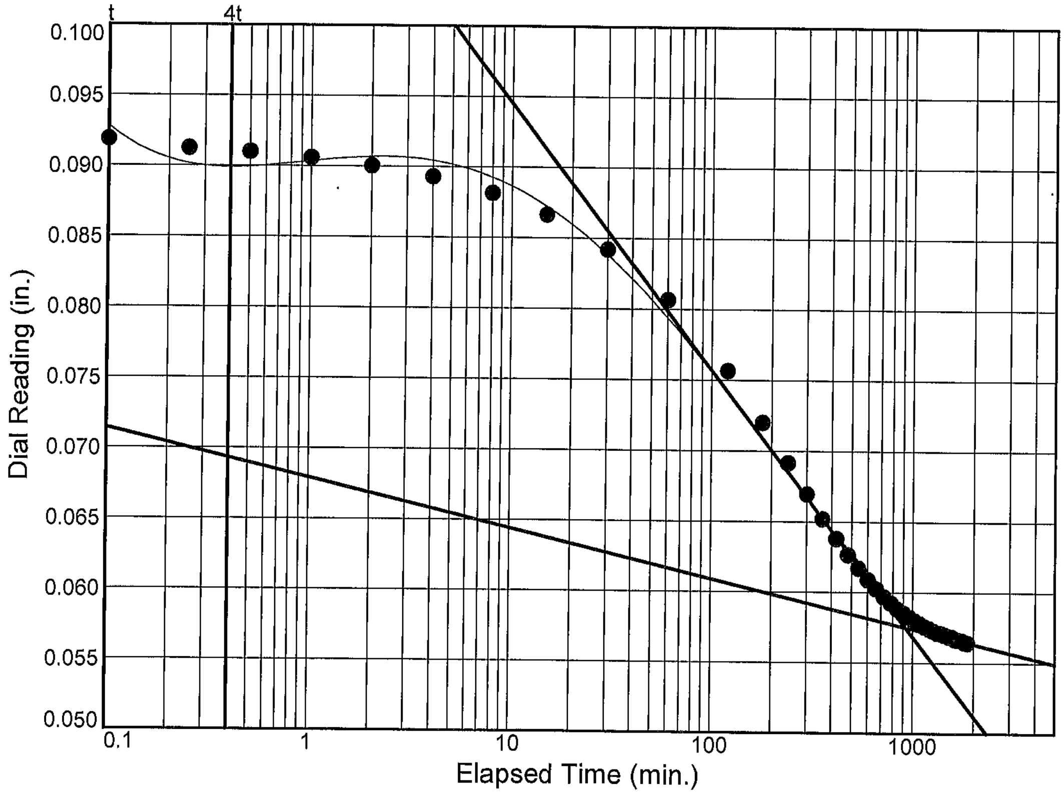
Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-11 Depth: 48



Load No.= 13
Load=3.49 tsf
D_0 = 0.1288
D_{50} = 0.1100
D_{100} = 0.0911
T_{50} = 42.04 min.

C_V @ T_{50}
1.8 ft.^{2}/yr.



Load No.= 14
Load=0.86 tsf
D_0 = 0.0957
D_{50} = 0.0766
D_{100} = 0.0575
T_{50} = 87.42 min.

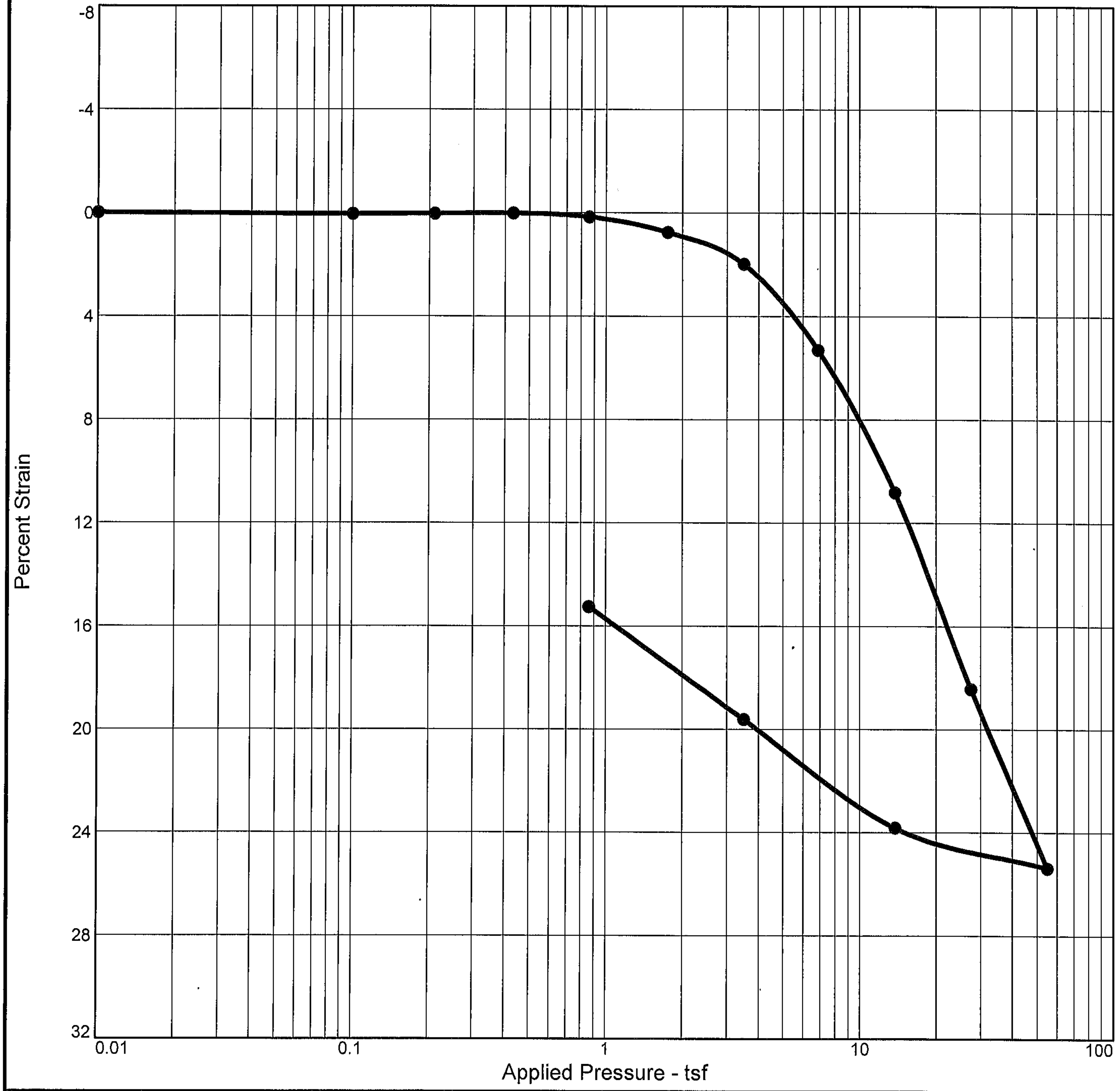
C_V @ T_{50}
0.9 ft.^{2}/yr.

Figure

TOLUNAY-WONG ENGINEERS, INC.

Boring 13 @ 38 ft

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.4 %	36.0 %	85.2			2.75	CH		1.016

MATERIAL DESCRIPTION

Brown FAT CLAY

Project No. 23.14.175 **Client:** Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-13 **Depth:** 38

Tolunay-Wong Engineers, Inc.

Houston, Texas

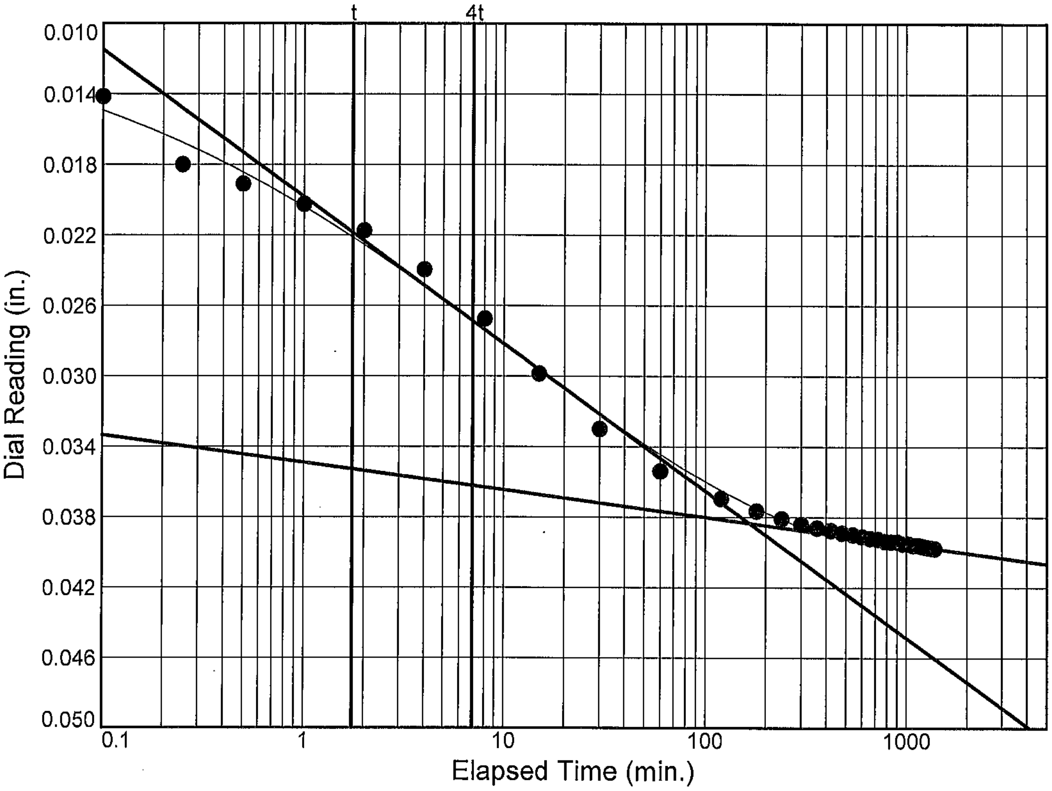
Remarks:
Test method: ASTM D2435
Specific gravity: Assumed

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-13 Depth: 38



Load No.= 8

Load= 6.87 tsf

D_0 = 0.0173

D_{50} = 0.0278

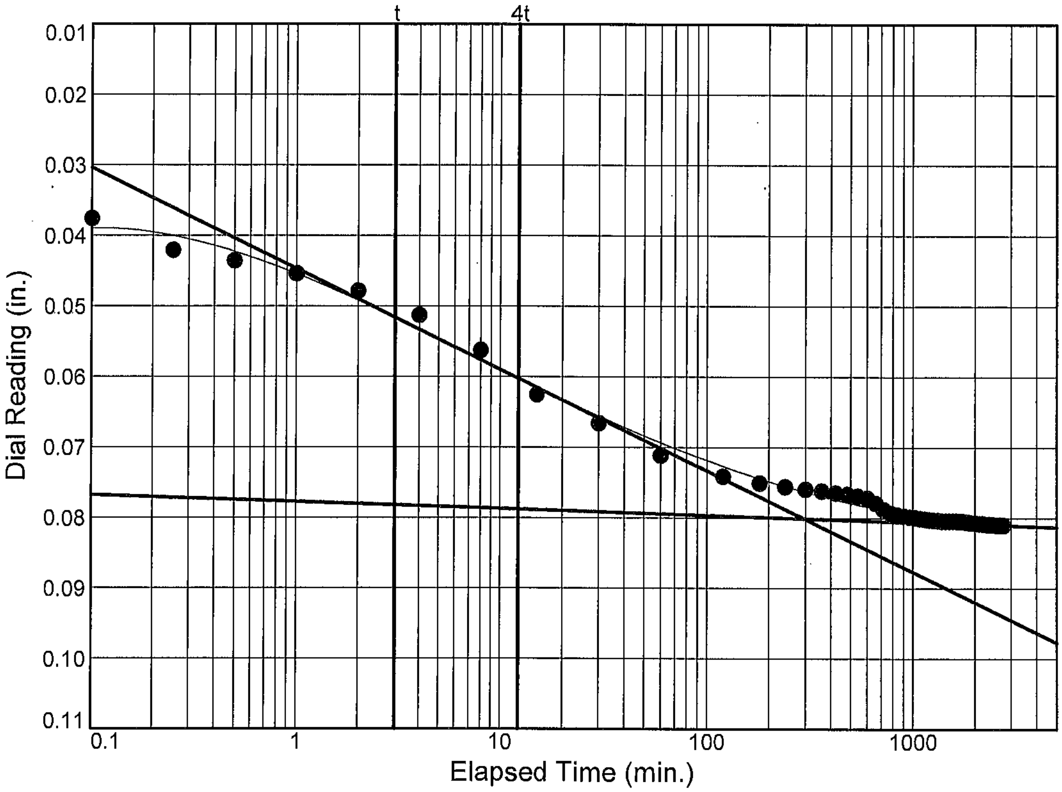
D_{100} = 0.0383

T_{50} = 9.12 min.

C_v @ T_{50}

10.3 ft.^{2}/yr.

C_α = 0.004



Load No.= 9

Load= 13.75 tsf

D_0 = 0.0431

D_{50} = 0.0616

D_{100} = 0.0801

T_{50} = 15.28 min.

C_v @ T_{50}

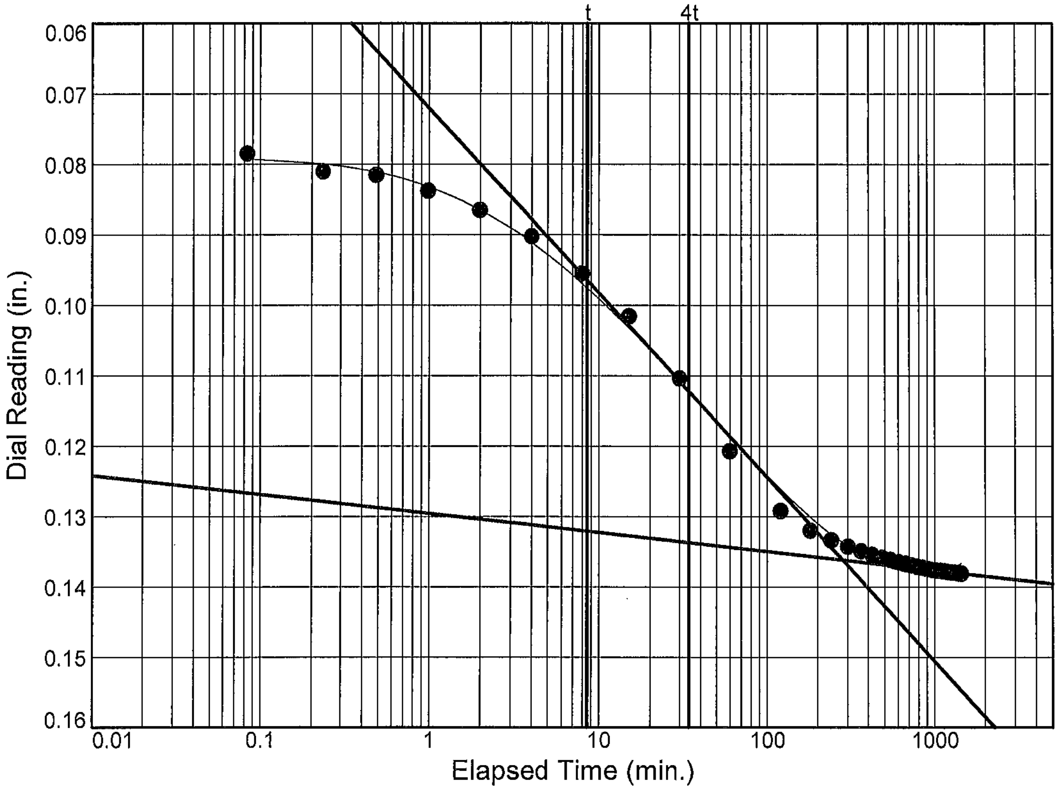
5.6 ft.^{2}/yr.

C_α = 0.003

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

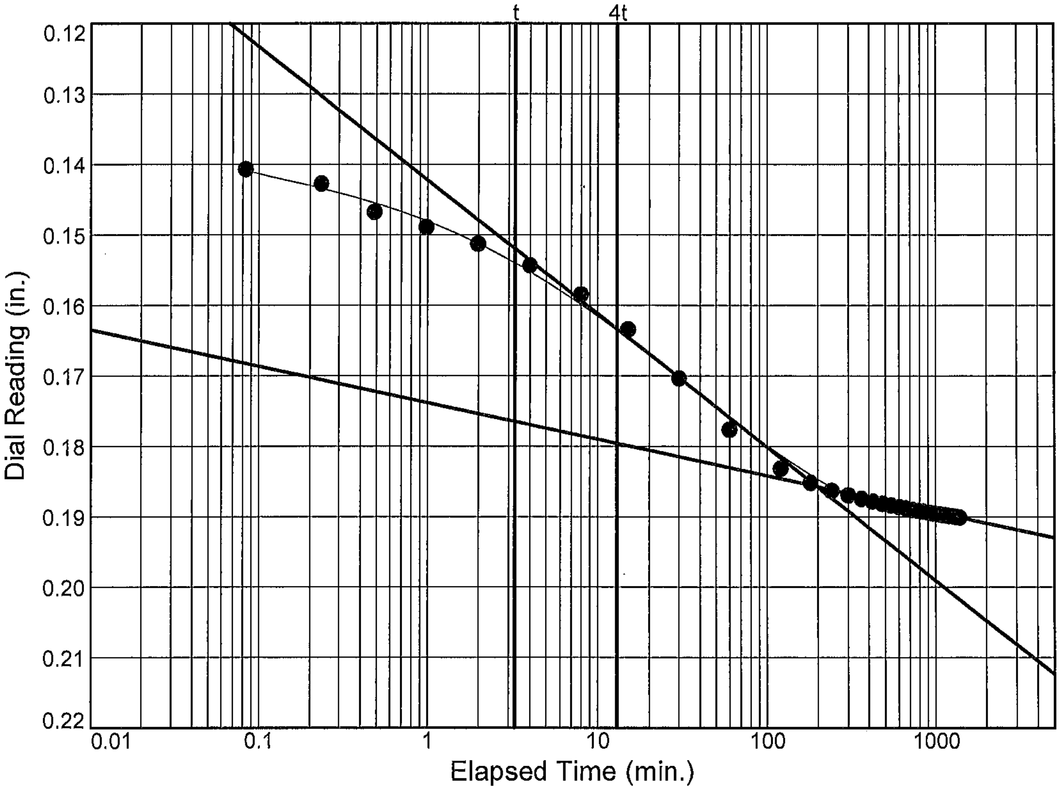
Source of Sample: B-13 Depth: 38



Load No.= 10
Load= 27.50 tsf
D_0 = 0.0829
D_{50} = 0.1095
D_{100} = 0.1362
T_{50} = 26.82 min.

C_v @ T_{50}
2.7 ft.^{2}/yr.

C_α = 0.007



Load No.= 11
Load= 54.99 tsf
D_0 = 0.1444
D_{50} = 0.1651
D_{100} = 0.1857
T_{50} = 15.77 min.

C_v @ T_{50}
3.9 ft.^{2}/yr.

C_α = 0.014

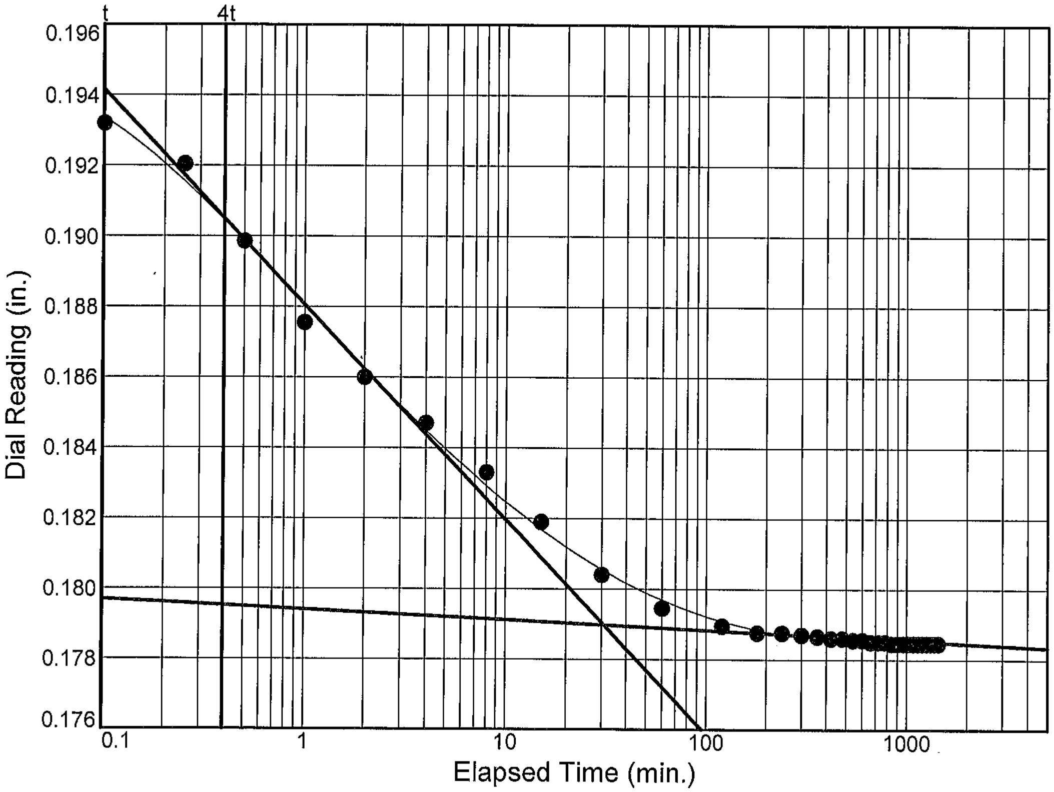
Figure

TOLUNAY-WONG ENGINEERS, INC.

Dial Reading vs. Time

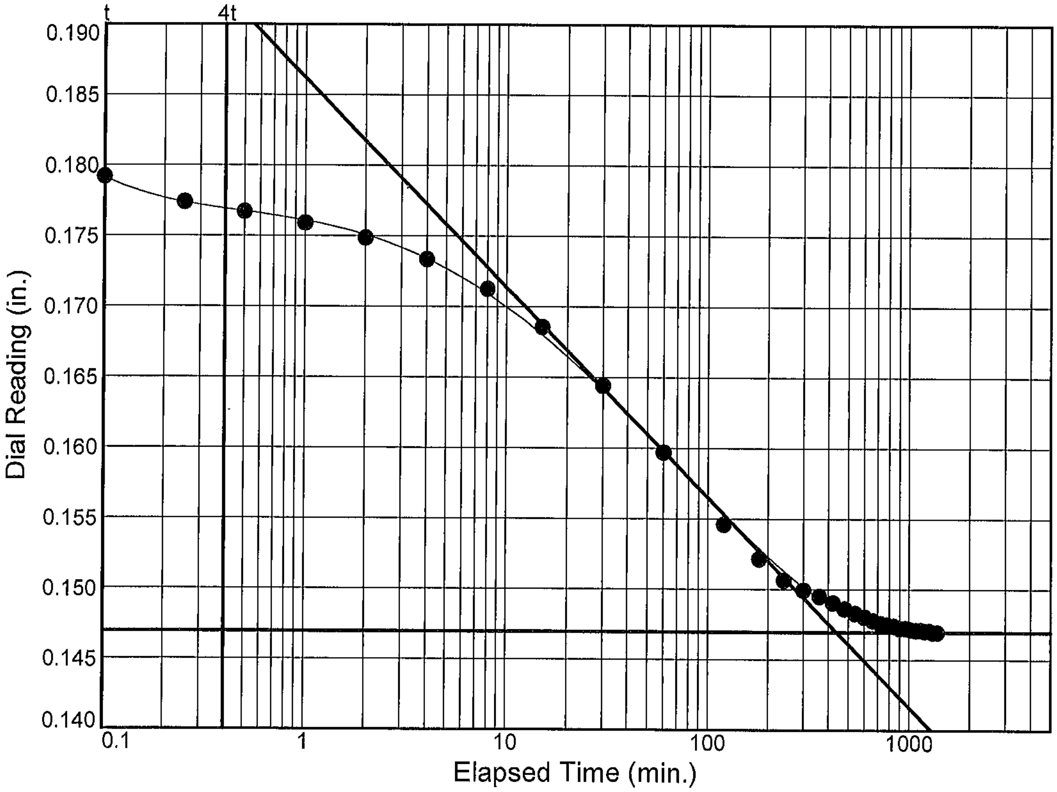
Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-13 Depth: 38



Load No.= 12
Load= 13.75 tsf
D_0 = 0.1963
D_{50} = 0.1876
D_{100} = 0.1790
T_{50} = 1.17 min.

C_v @ T_{50}
48.7 ft.^{2}/yr.



Load No.= 13
Load= 3.49 tsf
D_0 = 0.1814
D_{50} = 0.1642
D_{100} = 0.1469
T_{50} = 29.76 min.

C_v @ T_{50}
2.1 ft.^{2}/yr.

C_α = 0.000

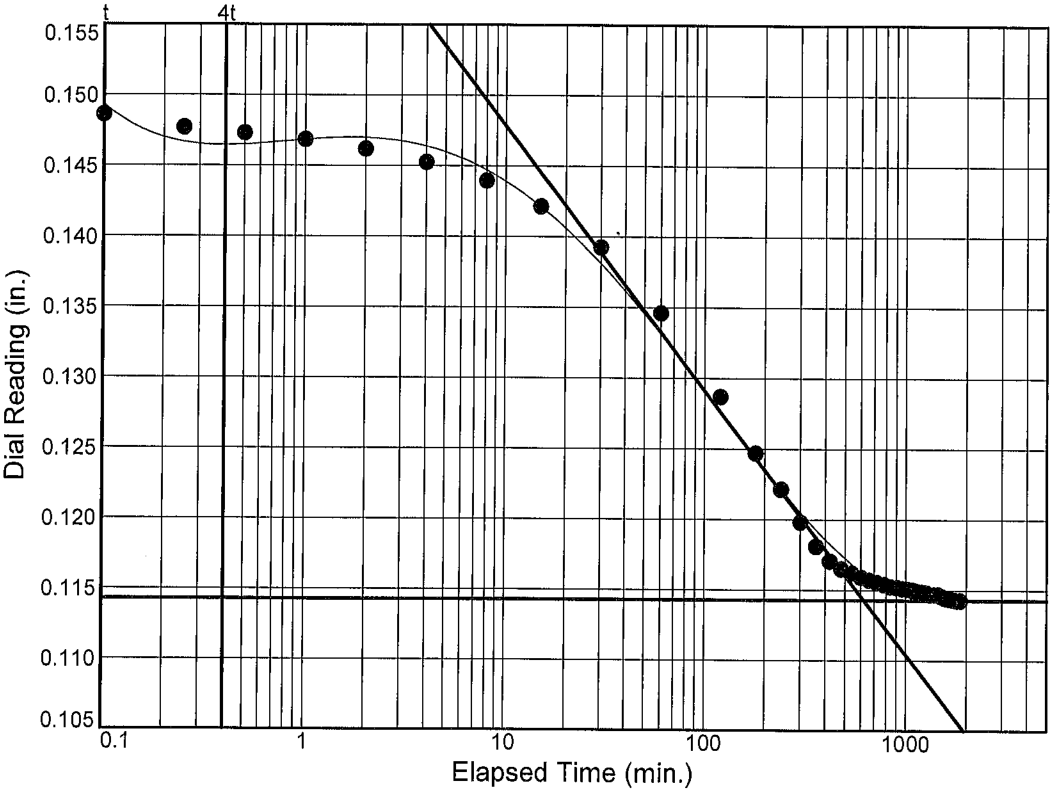
Figure

TOLUNAY-WONG ENGINEERS, INC.

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-13 Depth: 38



Load No.= 14
Load= 0.86 tsf
D_0 = 0.1522
D_{50} = 0.1332
D_{100} = 0.1143
T_{50} = 59.57 min.

C_v @ T_{50}
1.2 ft.^{2}/yr.

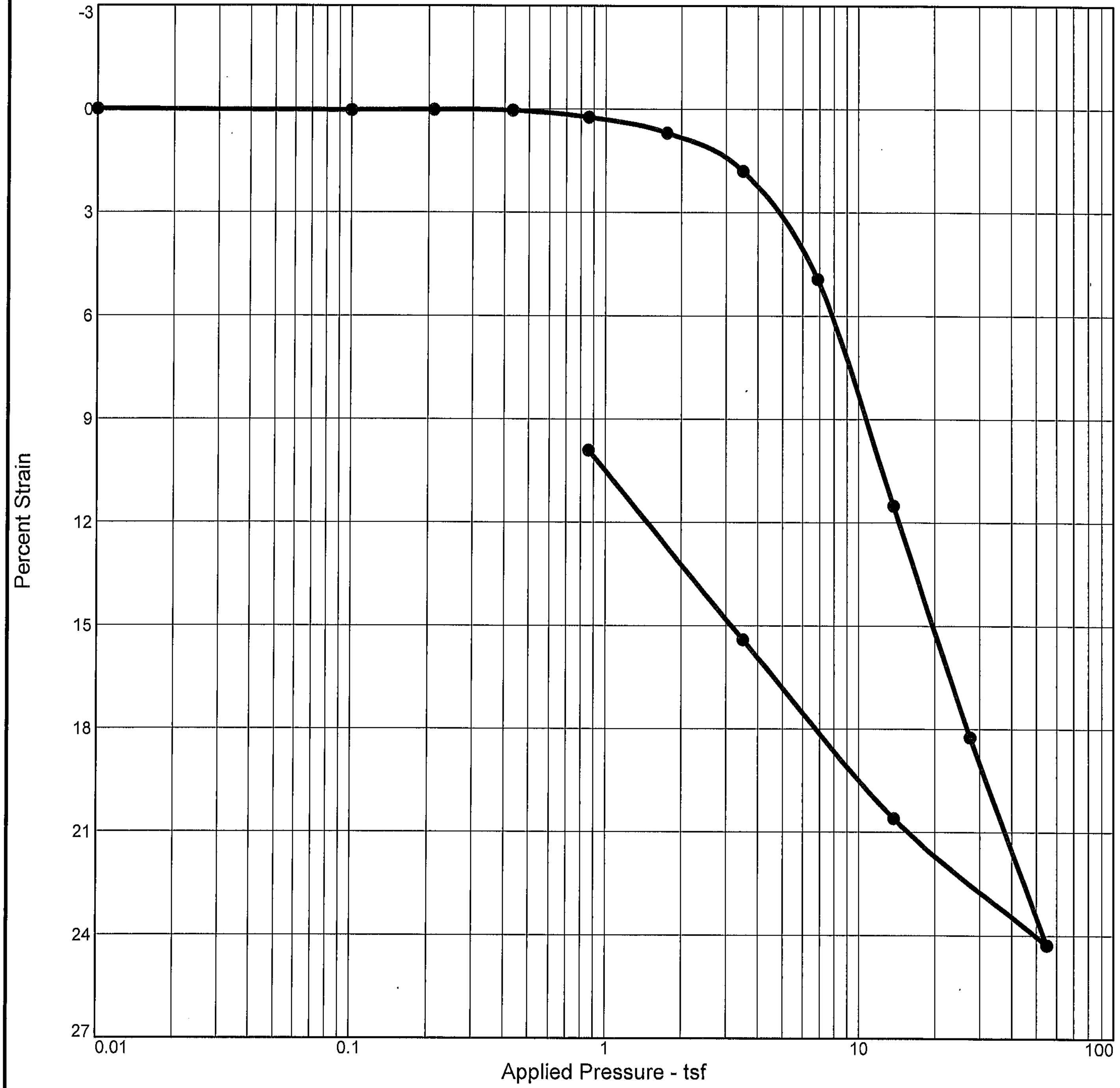
C_α = 0.000

TOLUNAY-WONG ENGINEERS, INC.

Figure

Boring 13 @ 48 ft

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.0 %	40.2 %	79.9			2.70	CH		1.108

MATERIAL DESCRIPTION

Grey FAT CLAY

Project No. 23.14.175 **Client:** Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-13 **Depth:** 48

Tolunay-Wong Engineers, Inc.

Houston, Texas

Remarks:

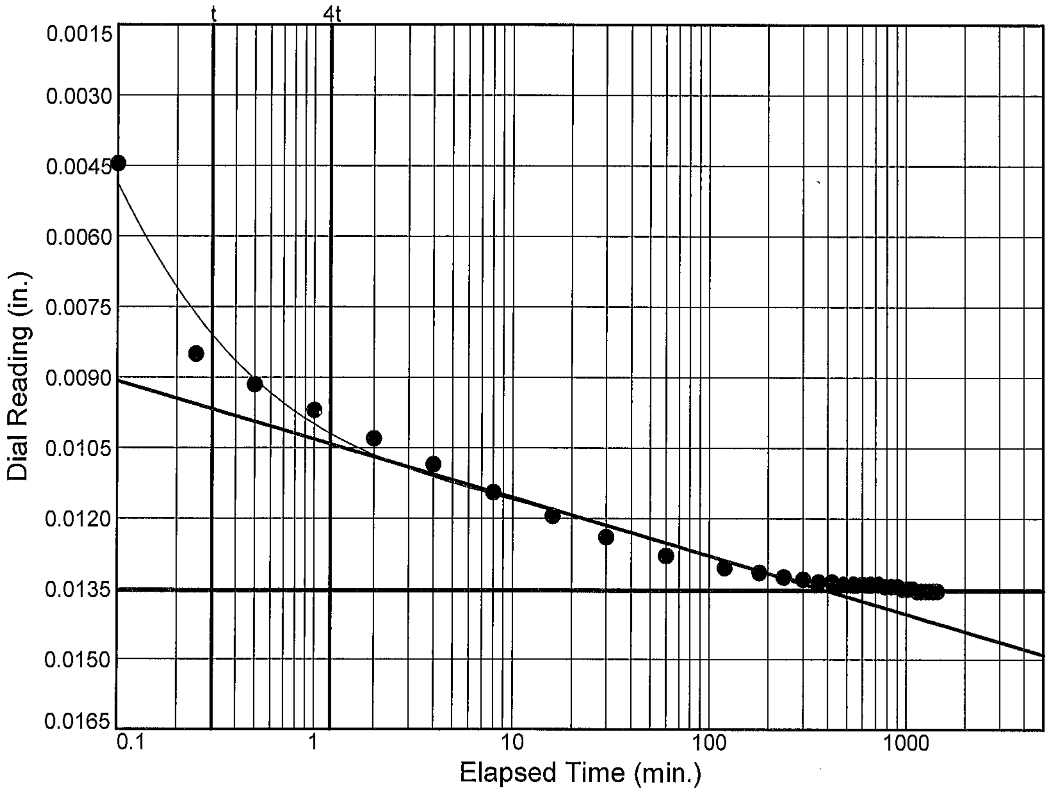
Test method: ASTM D2435
Specific gravity: Assumed

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

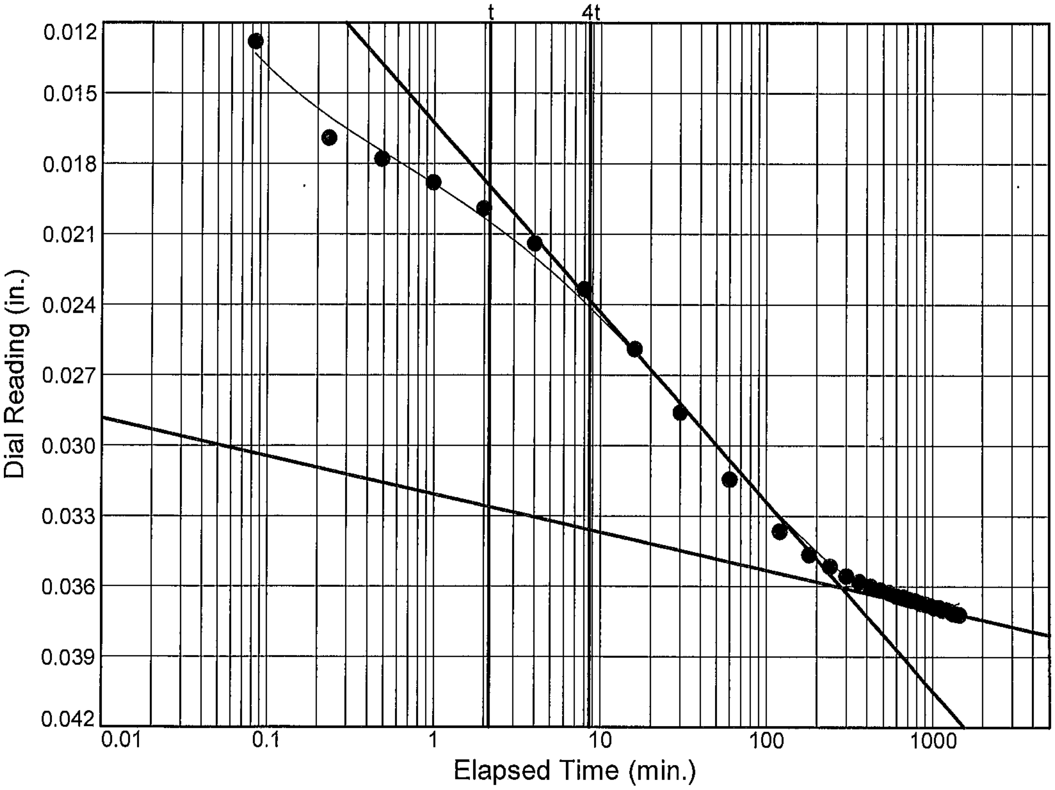
Source of Sample: B-13 Depth: 48



Load No.= 7
Load= 3.49 tsf
D_0 = 0.0060
D_{50} = 0.0098
D_{100} = 0.0136
T_{50} = 0.82 min.

C_v @ T_{50}
121.2 ft.^{2}/yr.

C_α = 0.000



Load No.= 8
Load= 6.87 tsf
D_0 = 0.0169
D_{50} = 0.0265
D_{100} = 0.0360
T_{50} = 17.93 min.

C_v @ T_{50}
5.3 ft.^{2}/yr.

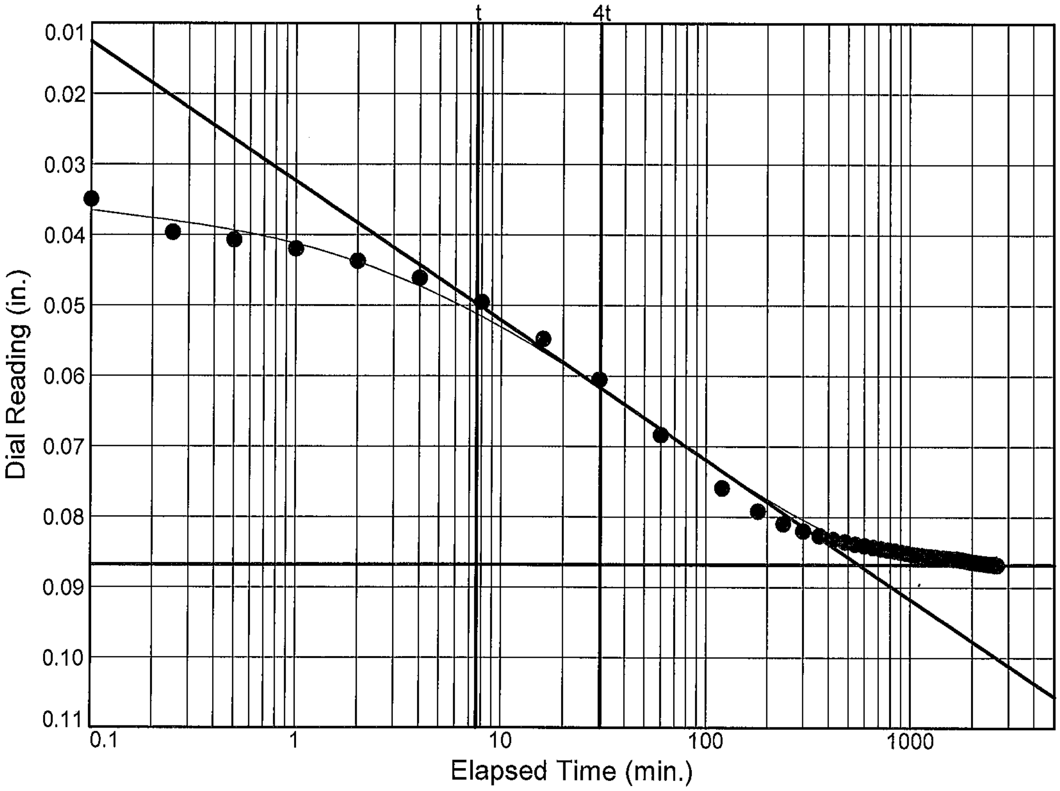
C_α = 0.005

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

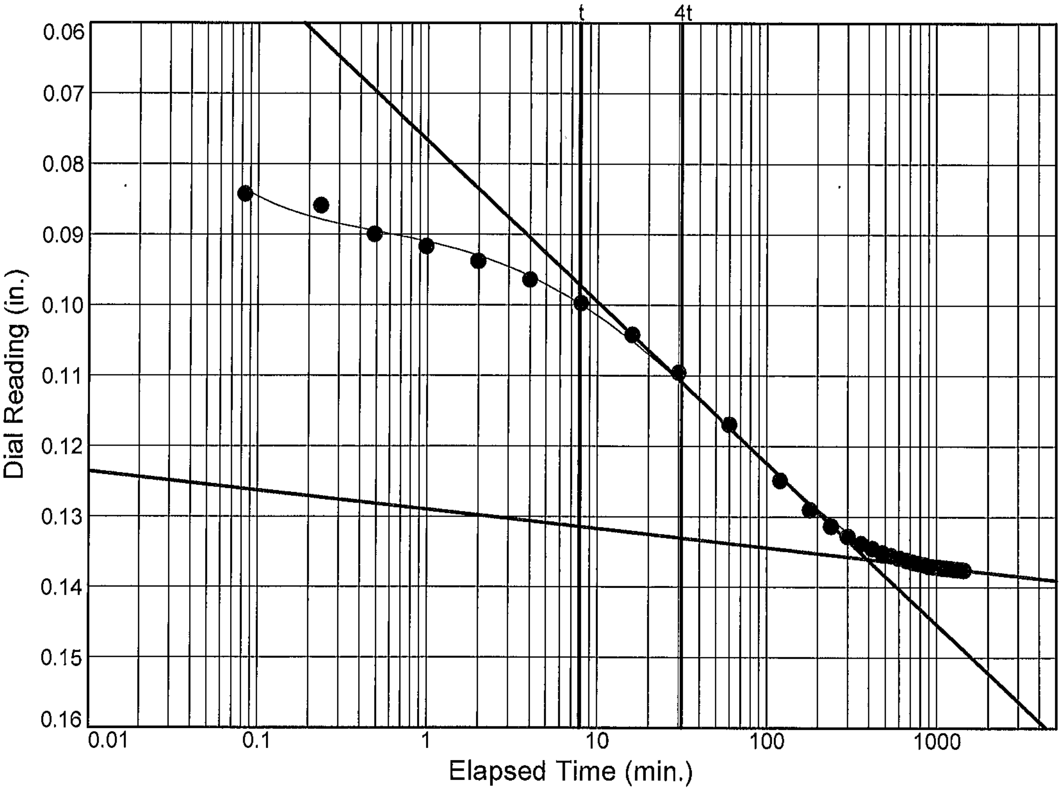
Source of Sample: B-13 **Depth:** 48



Load No.= 9
Load= 13.75 tsf
D_0 = 0.0407
D_{50} = 0.0637
D_{100} = 0.0868
T_{50} = 38.35 min.

C_V @ T_{50}
2.2 ft.^{2}/yr.

C_α = 0.000



Load No.= 10
Load= 27.50 tsf
D_0 = 0.0886
D_{50} = 0.1123
D_{100} = 0.1360
T_{50} = 35.65 min.

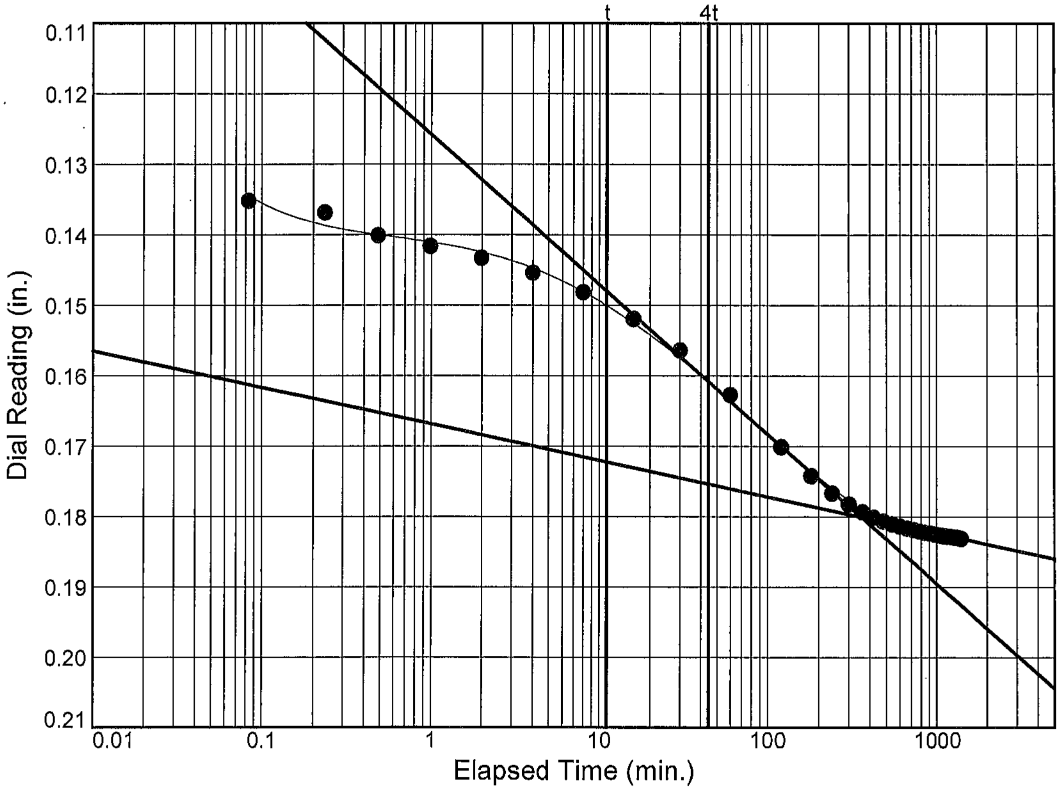
C_V @ T_{50}
2.1 ft.^{2}/yr.

C_α = 0.008

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

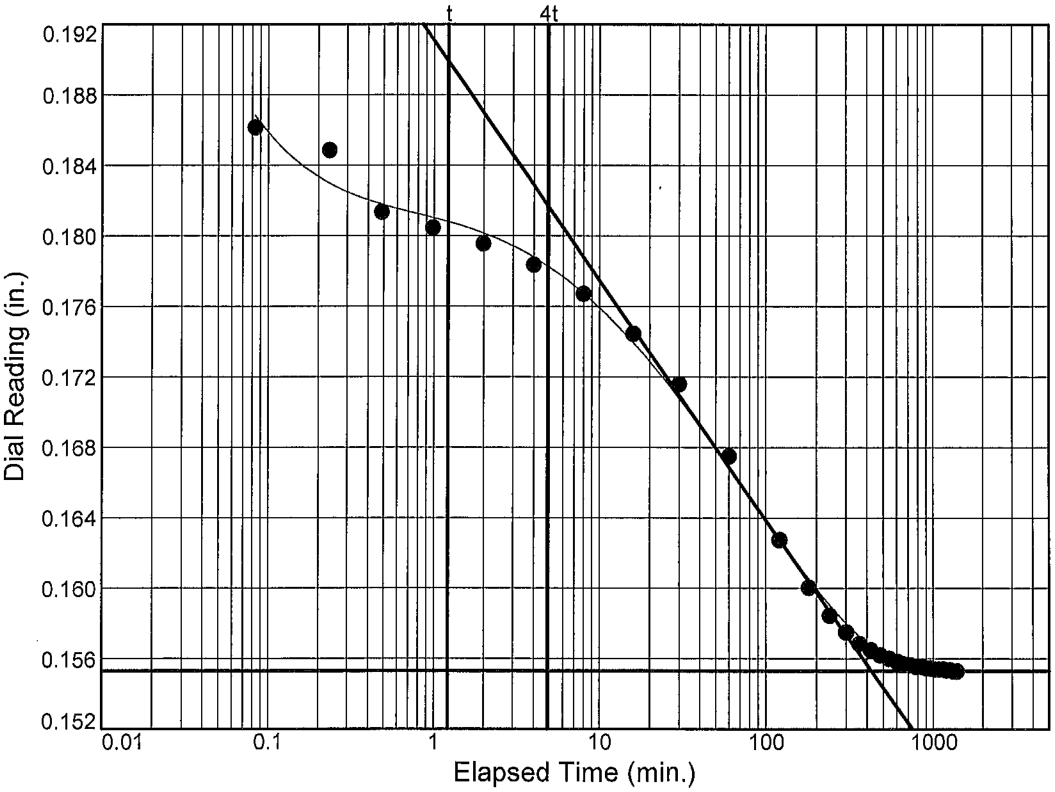
Source of Sample: B-13 Depth: 48



Load No.= 11
Load= 54.99 tsf
D_0 = 0.1392
D_{50} = 0.1596
D_{100} = 0.1800
T_{50} = 38.38 min.

C_v @ T_{50}
1.7 ft.^{2}/yr.

C_α = 0.014



Load No.= 12
Load= 13.75 tsf
D_0 = 0.1833
D_{50} = 0.1693
D_{100} = 0.1553
T_{50} = 39.19 min.

C_v @ T_{50}
1.6 ft.^{2}/yr.

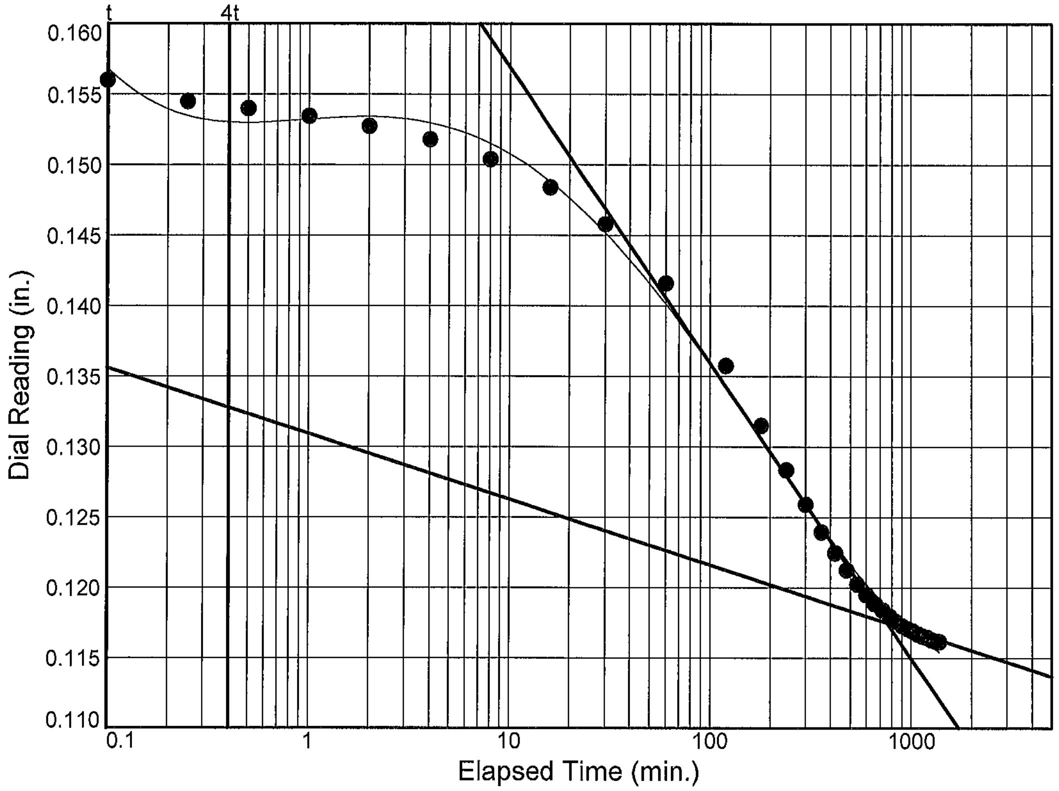
C_α = 0.000

Figure

Dial Reading vs. Time

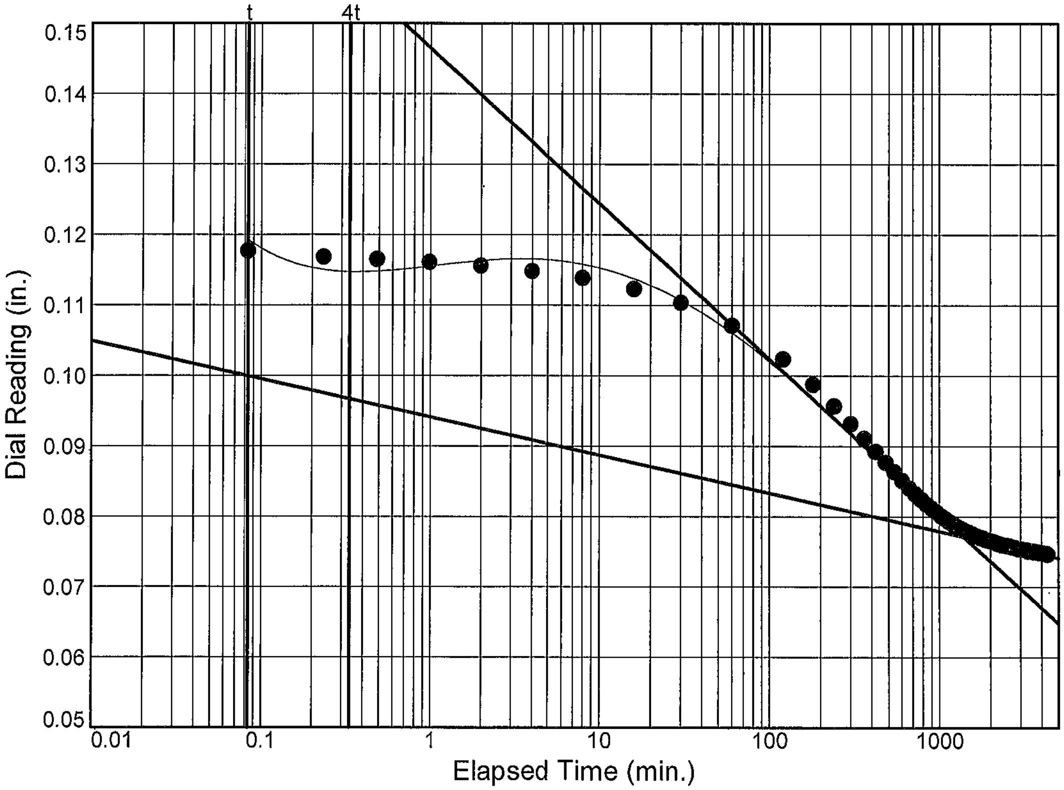
Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

Source of Sample: B-13 Depth: 48



Load No.= 13
Load=3.49 tsf
D_0 = 0.1606
D_{50} = 0.1390
D_{100} = 0.1175
T_{50} = 68.68 min.

C_v @ T_{50}
1.0 ft.^{2}/yr.



Load No.= 14
Load=0.86 tsf
D_0 = 0.1238
D_{50} = 0.1004
D_{100} = 0.0771
T_{50} = 119.07 min.

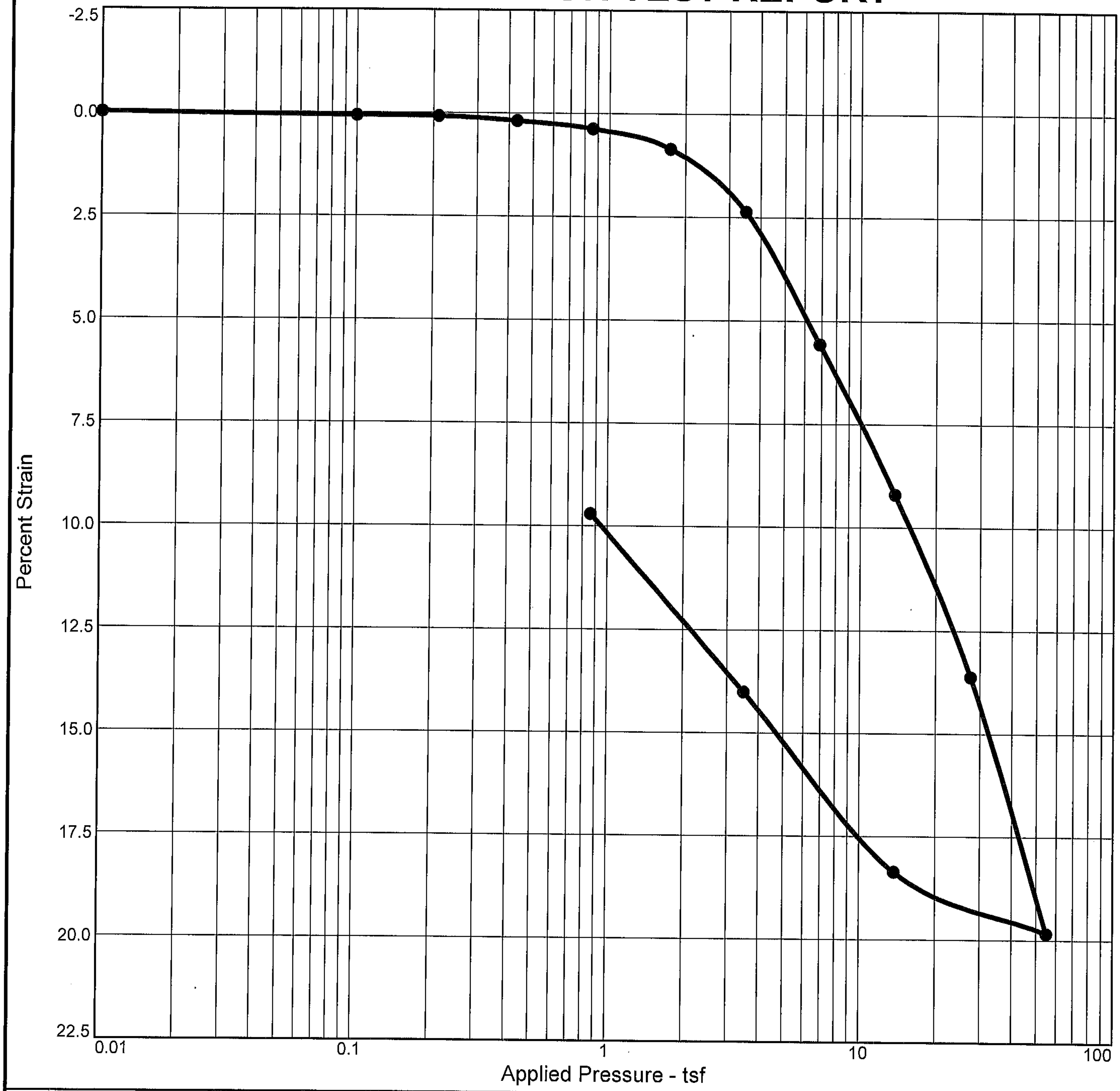
C_v @ T_{50}
0.7 ft.^{2}/yr.

Figure

TOLUNAY-WONG ENGINEERS, INC.

Boring 13 @ 63 ft

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.3 %	38.2 %	83.4			2.75	CH		1.058

MATERIAL DESCRIPTION

Grey FAT CLAY

Project No. 23.14.175 **Client:** Trans-Global Solutions, Inc

Project: Sampling & Laboratory Testing - Channel Improvements;
Proposed Cedar Port Improvement & Navigation District

Source of Sample: B-13 **Depth:** 63

Tolunay-Wong Engineers, Inc.

Houston, Texas

Remarks:

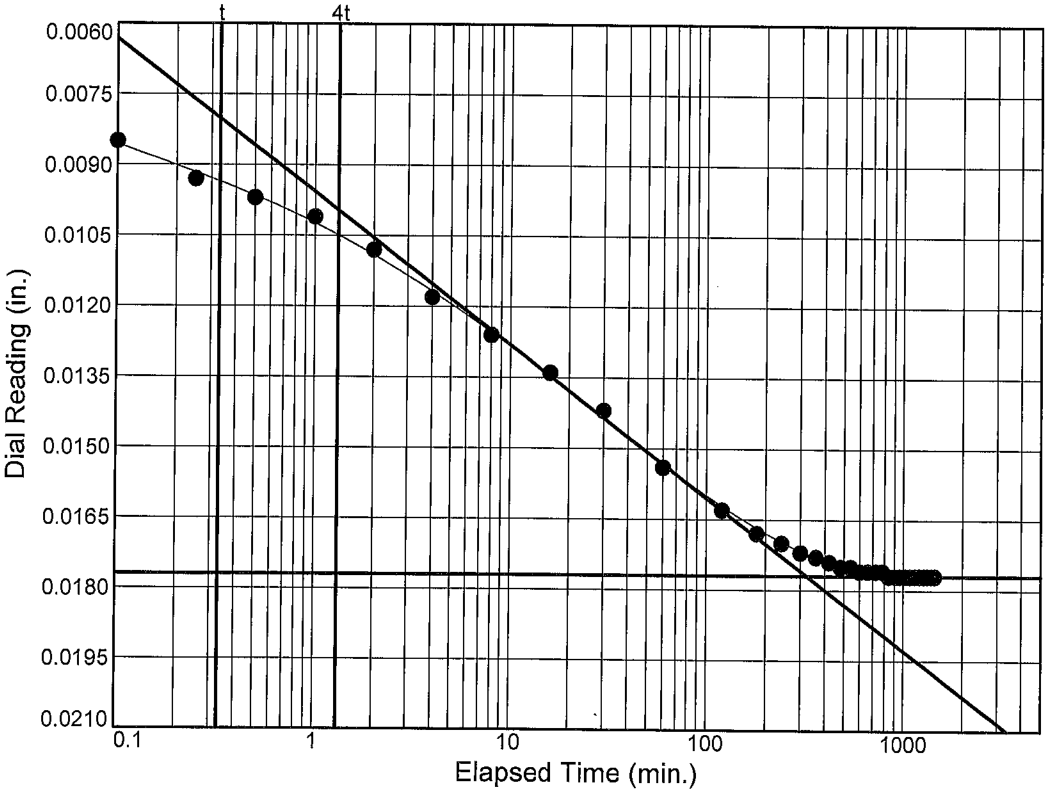
Test method: ASTM D2435
Specific gravity: Assumed

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

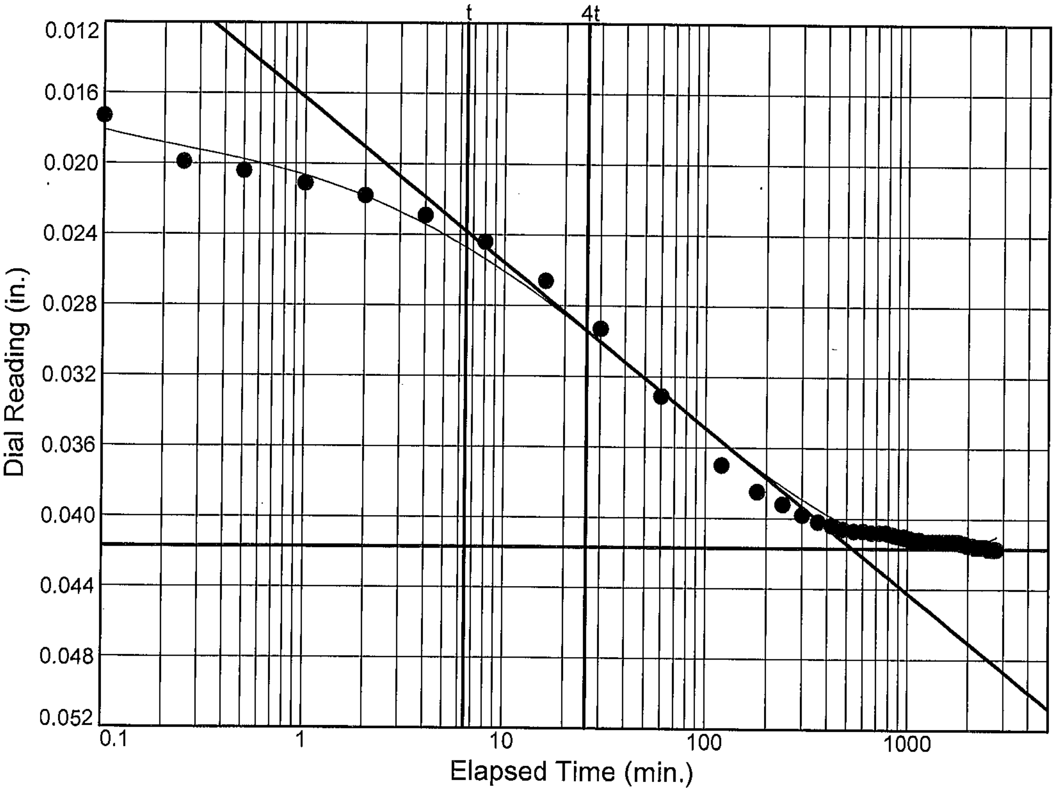
Source of Sample: B-13 Depth: 63



Load No.= 7
Load= 3.49 tsf
D_0 = 0.0082
D_{50} = 0.0130
D_{100} = 0.0177
T_{50} = 10.96 min.

C_v @ T_{50}
8.9 ft.^{2}/yr.

C_α = 0.000



Load No.= 8
Load= 6.87 tsf
D_0 = 0.0200
D_{50} = 0.0308
D_{100} = 0.0417
T_{50} = 36.34 min.

C_v @ T_{50}
2.6 ft.^{2}/yr.

C_α = 0.000

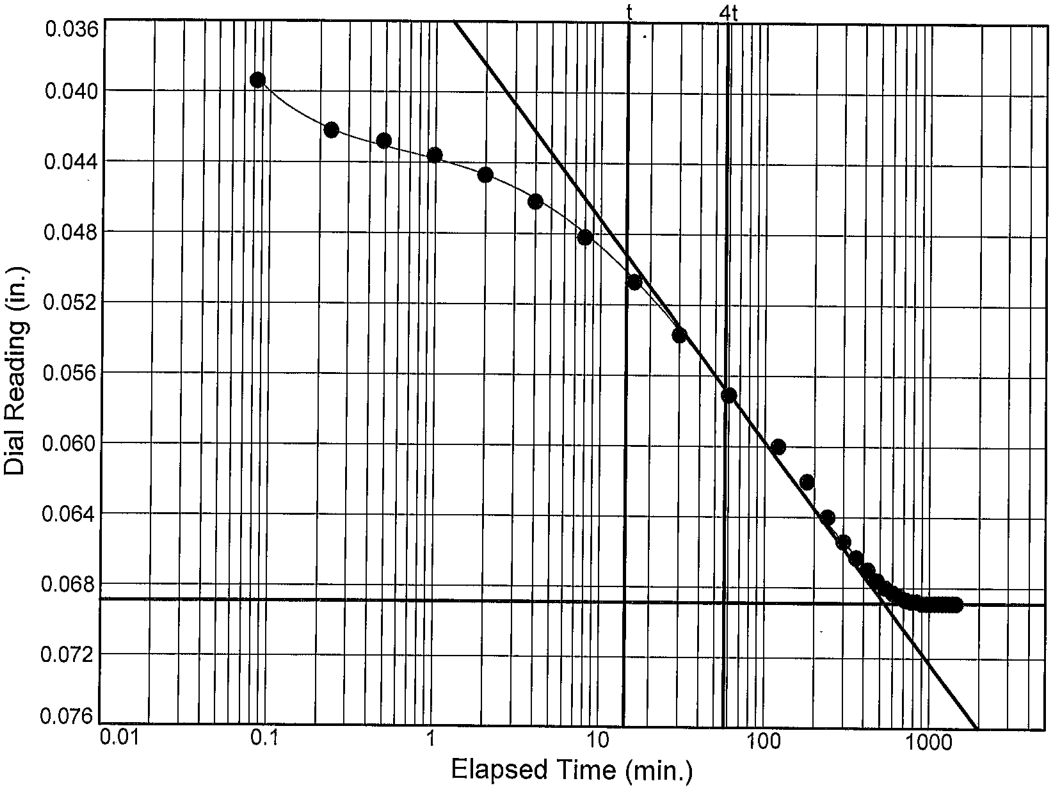
Figure

TOLUNAY-WONG ENGINEERS, INC.

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

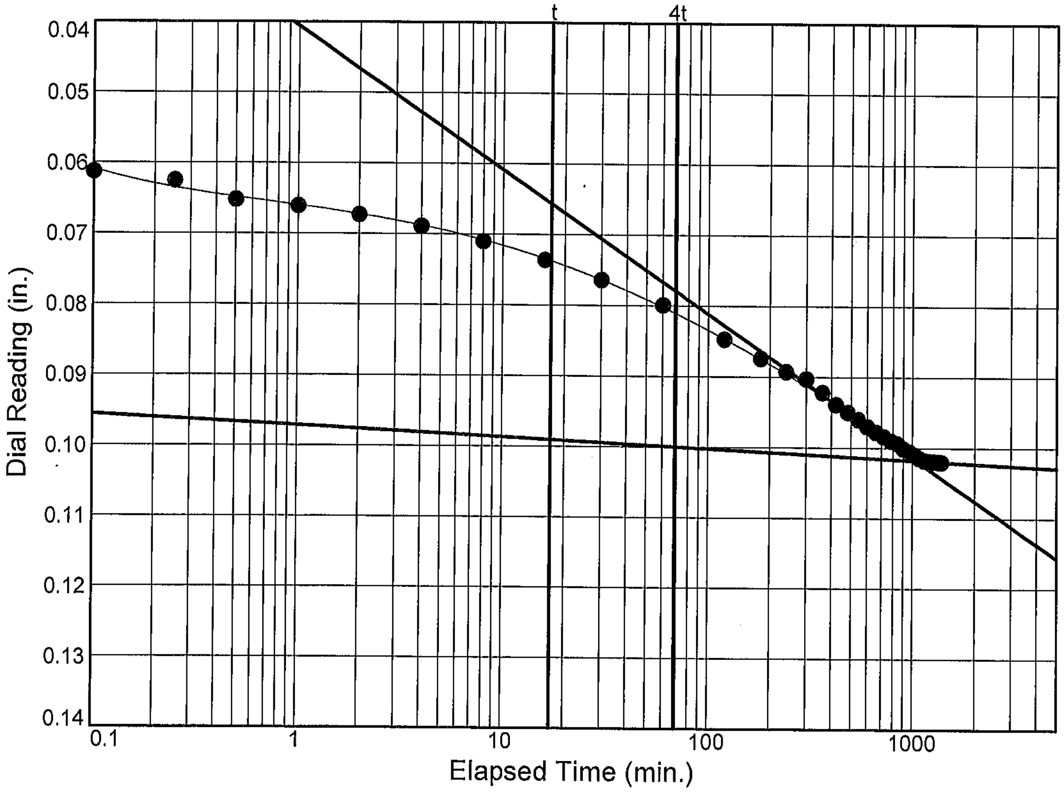
Source of Sample: B-13 Depth: 63



Load No.= 9
Load= 13.75 tsf
D_0 = 0.0434
D_{50} = 0.0562
D_{100} = 0.0689
T_{50} = 51.23 min.

C_v @ T_{50}
1.7 ft.^{2}/yr.

C_α = 0.000



Load No.= 10
Load= 27.50 tsf
D_0 = 0.0664
D_{50} = 0.0841
D_{100} = 0.1018
T_{50} = 110.87 min.

C_v @ T_{50}
0.7 ft.^{2}/yr.

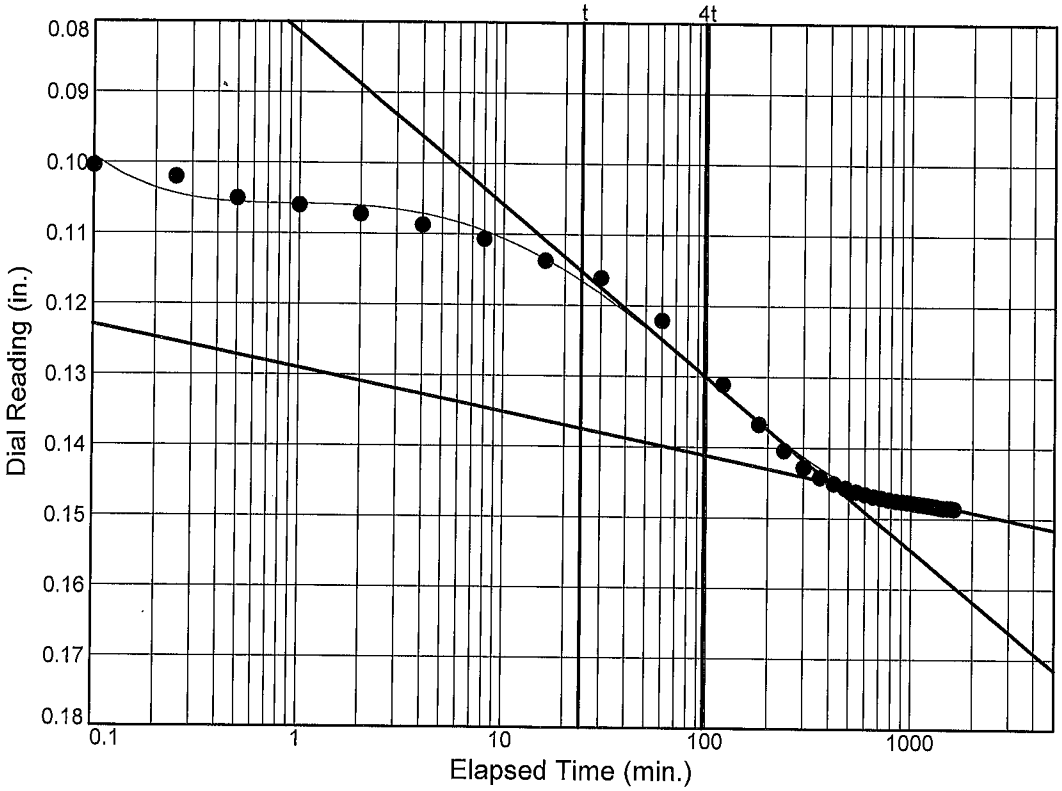
C_α = 0.004

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

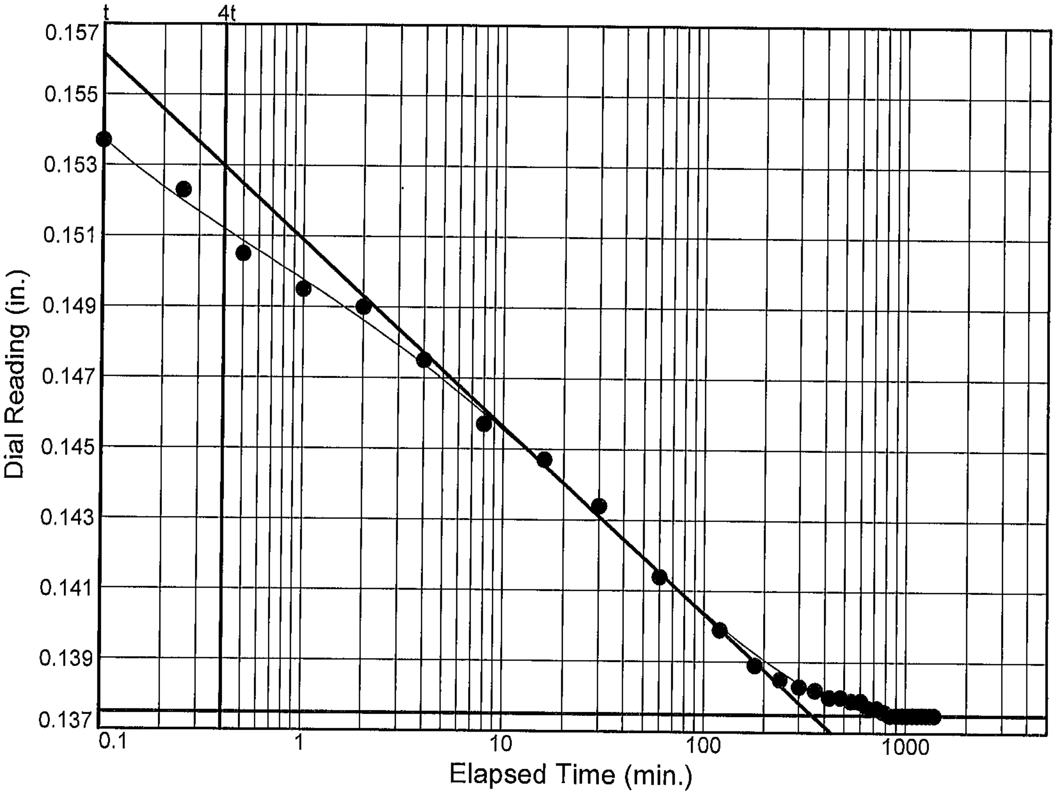
Source of Sample: B-13 Depth: 63



Load No.= 11
Load= 54.99 tsf
D_0 = 0.1032
D_{50} = 0.1241
D_{100} = 0.1449
T_{50} = 55.20 min.

C_v @ T_{50}
1.3 ft.^{2}/yr.

C_α = 0.017



Load No.= 12
Load= 13.75 tsf
D_0 = 0.1563
D_{50} = 0.1469
D_{100} = 0.1375
T_{50} = 5.18 min.

C_v @ T_{50}
12.7 ft.^{2}/yr.

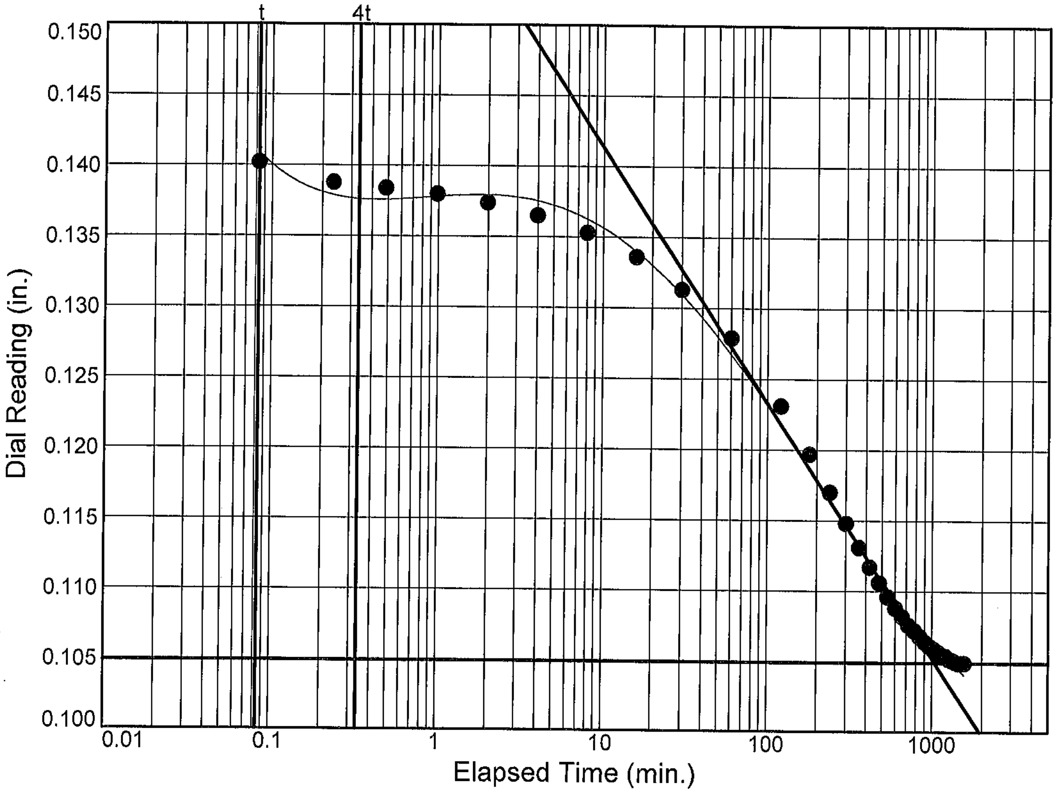
C_α = 0.000

Figure

Dial Reading vs. Time

Project No.: 23.14.175
Project: Sampling & Laboratory Testing - Channel Improvements;

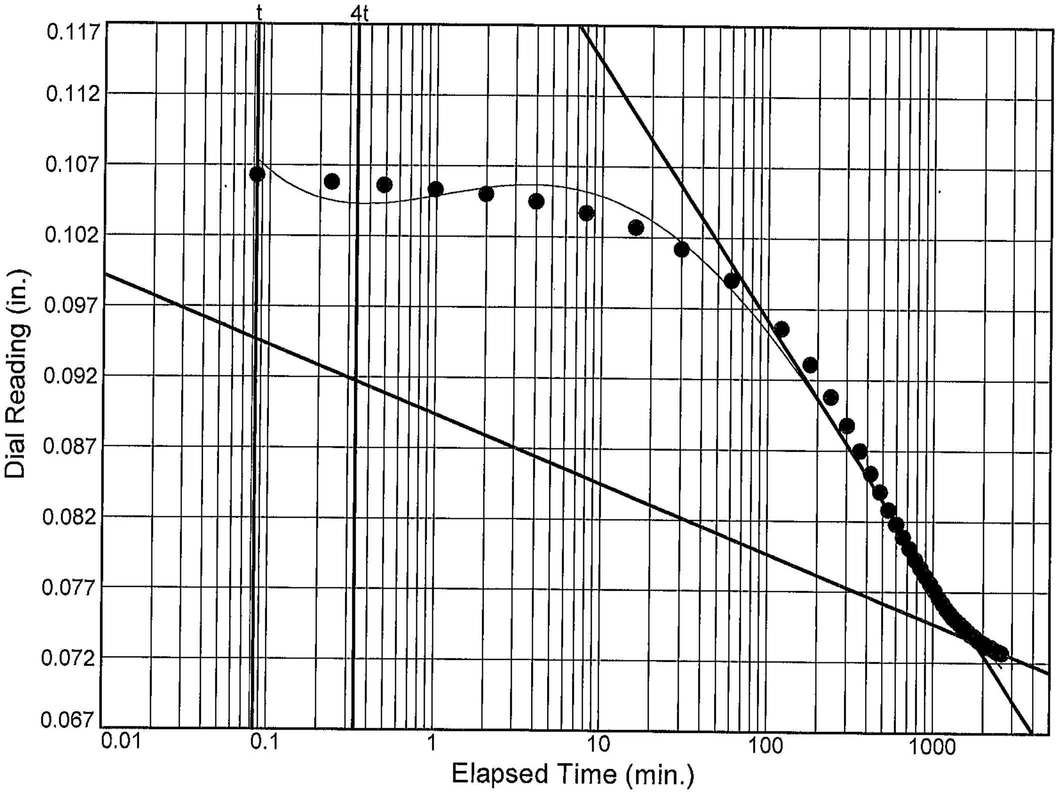
Source of Sample: B-13 **Depth:** 63



Load No.= 13
Load= 3.49 tsf
D_0 = 0.1442
D_{50} = 0.1245
D_{100} = 0.1049
T_{50} = 82.48 min.

C_v @ T_{50}
0.9 ft.^{2}/yr.

C_α = 0.000



Load No.= 14
Load= 0.86 tsf
D_0 = 0.1106
D_{50} = 0.0920
D_{100} = 0.0735
T_{50} = 161.73 min.

C_v @ T_{50}
0.5 ft.^{2}/yr.

Figure

TOLUNAY-WONG ENGINEERS, INC.

Attachment 3

Tolunay-Wong Engineers 2021 Report

TOLUNAY-WONG
ENGINEERS

PROPOSAL FOR GEOTECHNICAL SERVICES
CEDAR BAYOU DEEPENING/WIDENING
CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CHAMBERS COUNTY, TEXAS

Prepared for:

TGS Cedar Port Partners, LP
7500 FM 1405
Baytown, Texas 77523

Prepared by:

Tolunay-Wong Engineers, Inc.
2455 West Cardinal Drive, Suite A
Beaumont, Texas 77705

February 8, 2021

TWE Proposal No. P20-B352 (Revision 2)

Geotechnical Engineering
Construction Materials Testing
Geophysical Services
Deep Foundations Testing
Environmental Field Services

Tolunay-Wong Engineers, Inc.

2455 West Cardinal Drive, Suite A • Beaumont, Texas 77705 • Phone: (409) 840-4214 • Fax: (409) 840-4259

February 8, 2021

TGS Cedar Port Partners, LP
7500 FM 1405
Baytown, Texas 77523

Attn: Mr. James Scott
JScott@tgsgroup.com

Ref: Proposal for Geotechnical Services
Cedar Bayou Deepening/Widening
Chambers County Improvement District #1
Chambers County, Texas
TWE Proposal No. P20-B352 (Revision 2)

Dear Mr. Scott,

Tolunay-Wong Engineers, Inc. (TWE) is pleased to submit this revised proposal to provide geotechnical services for the referenced project. This proposal includes an introduction to TWE, a general description of the project, our proposed scope of services to be provided and the estimated cost for completion of our services associated with the project.

Introduction

TWE is familiar with the subsurface conditions within the vicinity of the project site based on geotechnical investigations performed in the past for various Clients and Owners. We have previously performed similar projects involving dredging for marine dock expansions and pre-dredge sampling projects for various Clients and Owners as listed below.

- Marine Dock Projects
    - TWE Project No. 19.23.052 – Energy Transfer Partners, LP – Ship Dock 1 – Nederland, Texas
    - TWE Project No. 19.23.143 – Kinder Morgan Operating, LP – Troika FEED Project – Port Arthur, Texas
    - TWE Project No. 20.23.035 – Lanier & Associates Consulting Engineers, Inc. – Grain Dock Wharf Replacement – Port of Beaumont – Beaumont, Texas
- Pre-Dredge Sampling Projects
    - TWE Project No. 18.23.073 – DiSorbo Consulting, LLC – Jefferson Energy Terminal – Beaumont, Texas
    - TWE Project No. 19.23.113 – GT Logistics – Omniport Dock – Port Arthur, Texas
    - TWE Project No. 20.23.030 – DiSorbo Consulting, LLC – Chevron Phillips Chemical Company – Orange, Texas

This project experience will be integrated into the specific evaluations of the current scope using our team of experienced geotechnical engineers and the resources of our office in Beaumont, Texas. Our Beaumont office organizational chart is provided in Appendix A for reference. Appendix B includes resumes for key personnel which will be involved with the project.

Quality & Safety Measures

This project will be executed in accordance with our Quality Manual and the requirements of the specific Scope of Work provided by the Client. All work performed by TWE under this scope of work will comply with Client and Engineer requirements. Table of contents of our QA/QC Manual, are provided in Appendix C for reference. Mr. Patrick J. Kenney, P.E., Senior Vice President, will review the technical aspects of the project and confirm that our QA/QC procedures are followed throughout the scope of services.

Project Overview

The project includes geotechnical explorations within Cedar Bayou to provide geotechnical information and recommendations required to facilitate dredging of the channel by the Chambers County Improvement District #1 (CCID1). Project exhibits, provided by the Client, are provided in Appendix E for reference. The channel alignment extends from the Houston Ship Channel at the western boundary and terminates at a proposed turning basin near proposed barge and ship docks at the eastern boundary. A 200-ac Dredge Material Placement Area (DMPA) is also being considered landside of the proposed dock area. The ship channel will be widened from 100-ft to 300-ft and deepened to El. (-)45-ft to (-)50-ft. Current water depths range from 2-ft to 12-ft along the alignment. Side slope gradients on the order of 1(V):2(H) to 1(V):3(H) are being considered.

Scope of Services

This revised proposal covers the scope of work activities that will be performed to conduct the geotechnical study for the referenced project. Please note this revised proposal does not include provisions for United States Army Corps of Engineers (USACE) permitting. The geotechnical activities and main categories of our scope of work for this project are provided below:

Pre-Commencement

Our pre-commencement activities include the critical elements for a safe, cost-effective and technically complete geotechnical exploration program. Our pre-commencement activities include the following critical tasks:

1) Notification of the explorations by TWE to the Texas 811 One Call system to request location services from all Participants which could have subsurface pipelines or utilities within the site.

2) Coordination of a Pre-Job Meeting to discuss site history, the potential presence or absence of subsurface utilities, obstructions or anomalies at the proposed exploration locations and daily work schedule and permit procedures.

3) Coordination with our Subcontractor, Peninsula Marine, Inc., to provide a lift boat or tug boat and spud barge to conduct the marine test borings using conventional TWE drilling and sampling equipment.

4) Coordination with our Subconsultant, DiSorbo Consulting, LLC., to provide environmental/analytical field, laboratory and reporting services per USACE guidelines to meet federal DMPA use or beneficial use requirements.

Field Program

The subsurface soil conditions within the channel alignment will be investigated by performing ten (10) test borings (TBs) to depths of 50-ft below the existing mudline, one (1) TB to a depth of 200-ft below the existing mudline and obtaining four (4) sediment samples (SS) of the existing channel bed. Environmental sampling will be performed at test boring locations MB-1, MB-4, MB-7 and MB-10. DiSorbo Consulting, LLC will accompany our field crew to assist and oversee the environmental sampling efforts and to ensure field procedures are in accordance with the appropriate USACE guidelines. The approximate TB and SS locations are shown on TWE Drawing No. P20-B352.1 (Revision 1) provided in Appendix F.

Test Borings (TBs)

The test borings will be performed and logged by experienced Geotechnicians under the direction of a Professional Engineer experienced in geotechnical engineering. Geotechnical drilling, sampling and grouting will be performed in accordance with ASTM International standards. Soil samples will be obtained on 3-ft depth intervals to a depth of 20-ft below the existing mudline and at 5-ft depth intervals thereafter until the 120-ft depth is reached. From 120-ft to 200-ft below the mudline, soil samples will be obtained at 10-ft depth intervals. All soil samples within the proposed dredging depths will be screened with a Photoionization Detector (PID) to determine if contaminants are present.

The marine test borings will be performed utilizing a conventional truck-mounted drilling rig placed on a self-elevating lift boat or on a spud barge maneuvered by a towboat provided by Peninsula Marine, Inc. We anticipate the water depth at the boring locations will be approximately 12-ft. Threaded steel casing, with a diameter of 6-in, will be installed into the mudline at the marine test boring locations to prevent borehole sloughing or collapse until competent materials are encountered. Wash or mud-rotary drilling methods will then be utilized from the existing mudline to the boring completion depth. Upon drilling and sampling completion, the threaded steel casing will be removed and the boreholes will be abandoned in-place.

Fine-grained, cohesive soils will be sampled using pushed, thin-walled tubes with an inside diameter of 2.87-in. Our Geotechnicians will conduct field strength measurements using a pocket penetrometer or hand torvane device on each cohesive soil sample recovered. The samples will be wrapped in foil, placed in moisture sealed containers and handled to minimize disturbance prior to transport to our laboratory.

Where coarse-grained, cohesionless or semi-cohesionless soils are encountered, sampling will be performed using standard penetration test (SPT) methods. Our Geotechnicians will monitor the driving resistance of the split barrel sampler and record blow counts while performing the SPTs. The disturbed samples from SPT sampling will be placed in moisture sealed containers and delivered to our laboratory.

Sediment Sampling (SS)

Channel bed sediment samples will be obtained using a clamshell sampler at four (4) boring locations (MB-3, MB-5, MB-7 and MB-9) along the project alignment. A clamshell sampler consists of two (2) quarter-cylindrical buckets which are lowered to the channel bed and manually closed. The loose sediments entrapped in the buckets will then be returned to the surface, containerized and labeled by both DiSorbo Consulting, LLC. and TWE and then transported to the respective laboratories for geotechnical and environmental/analytical laboratory testing assignments. Our budget estimate associated with this proposal assumes sediment samples will be obtained intermittently during drilling operations and an additional mobilization of marine equipment will not be required.

Laboratory Testing

Selected samples obtained from clam shell sampling and from the test borings will be used for geotechnical laboratory testing in accordance with ASTM International standards as well as environmental and analytical laboratory testing. The scope and extent of the geotechnical laboratory testing program will depend on the subsurface conditions encountered and assignments selected by the Geotechnical Engineer. Our proposed geotechnical laboratory testing program is summarized in Table 1 below.

Table 1 - Geotechnical Laboratory Testing Program

Test Description	Test Method
Standard Proctor Compaction	ASTM D698
Amount of Material in Soils Finer than No. 200 Sieve	ASTM D1140
Water (Moisture) Content	ASTM D2216
Unconsolidated-Undrained Triaxial Compression	ASTM D2850
Liquid Limit, Plastic Limit and Plasticity Index	ASTM D4318
Density (Unit Weight)	ASTM D7263
Particle Size Distribution of Fine-Grained Soils (Hydrometer)	ASTM D7928

Our scope of services described herein also includes the evaluation of compaction characteristics of the dredged materials. At this time, our proposal assumes moisture-density relations (Proctor compaction) testing will be performed on composite samples compiled from the test borings.

The environmental and analytical testing program, proposed DiSorbo Consulting, LLC, is provided in Appendix D of this revised proposal. The environmental and analytical laboratory testing will be performed on four (4) full-depth samples compiled from soil samples obtained from test borings MB-1, MB-4, MB-7 and MB-10 which capture the entire dredging envelope. Additional environmental/analytical scope details are provided in the electronic mail communication in Appendix D.

Log Compilation/Engineering Analysis/Report Preparation

Compilation of test boring logs will be performed as information becomes available from the field and laboratory. This data will be processed and developed into design subsurface profiles which will serve as the basis of our engineering analyses. Engineering analyses will be conducted utilizing this information to provide the geotechnical recommendations needed for the dredging of the channel and placement within the DMPA as well as foundations to support the proposed barge and ship dock structures. The results and findings of our geotechnical services will be provided in a final written report. Our final report will include following:

a) Discussion and conclusions of our findings including:
    i. Summary of field and laboratory tasks;
    ii. Existing project site conditions;
    iii. Test boring logs presenting tabulated field and laboratory geotechnical test results;
    iv. Test results of environmental and analytical laboratory testing and associated conclusions regarding use of the dredged material for placement within designated DMPA;
    v. Subsurface profiles showing soil stratification along the channel alignment; and,

b) Geotechnical conclusions and recommendations including:
    i. Characterization of subsurface soils to be dredged;
    ii. Suitability of dredged soils for use as fill material;
    iii. Suitable channel side slopes determined from global stability analyses;
    iv. Recommendations for site development using dredged materials within the proposed DMPA; and,
    v. Axial pile capacities and lateral pile analysis design parameters for proposed dock piles.

Schedule

Our proposed schedule to perform the scope of services described herein is shown in Table 2 below.

Table 2: Proposed Project Duration

Item	Duration
Pre-Commencement Activities	2 Weeks 1)
Field Program – TBs/SSs	2 Weeks
Geotechnical Laboratory Testing	2 to 3 Weeks
Environmental/Analytical Laboratory Testing	2 to 3 Weeks
Engineering Analysis/Report Preparation	2 to 3 Weeks
Total Estimated Project Duration	**6 to 8 Weeks**

1) Dependent on current field schedule, Subcontractor availability, site access, weather contingencies and clearance of subsurface utilities and/or pipelines within the project alignment.

We understand time is of the essence for preliminary development of the overall project scope. TWE and our Project Team will conduct the tasks provided in Table 3 simultaneously and interim information will be provided as requested to maintain the overall project schedule.

Estimated Cost

The estimated not-to-exceed budget for our geotechnical services associated with this project is **$156,755.00** as shown in the itemized budget estimate in Appendix G. Every reasonable effort will be made to stay within this proposed budget. Should unforeseen conditions or situations occur beyond the control of TWE, we will not exceed this lump sum amount without prior approval from the Client. However, due to unknowns associated with site conditions and various project scope items, we propose to conduct our services on a time and materials basis using the unit rates in Appendix G.

Acceptance of Proposal

To authorize TWE to proceed with this project, please provide a Contract Agreement, Purchase Order or similar document for our review and execution. If no such document is available, please sign the following page of this proposal and return a copy to our office and TWE will provide a Contract Agreement. Contractual documents should be sent to toconnor@tweinc.com with copy to thenneke@tweinc.com.

Closing

If you have any questions regarding this revised proposal, please contact us at **(409) 840-4214.** We appreciate your consideration for this project and we look forward to working with TGS Cedar Port Partners, LP.

Sincerely,

TOLUNAY-WONG ENGINEERS, INC.
TBPELS Firm Registration No. F-000124

Trey O'Connor, E.I.T.
Project Geotechnical Engineer

Tyler G. Henneke, P.E.
Vice President

TO/TGH/to

Appendices:
- A) TWE Beaumont Office Organizational Chart
- B) TWE Resumes of Key Personnel
- C) TWE QA/QC Table of Contents
- D) DSC Environmental/Analytical Testing Program
- E) L&A Project Exhibits
- F) TWE Field Program Location Plan
- G) TWE Itemized Budget Estimate

Agreed to and accepted by:

Signature: ________________________________

Name: ________________________________

Company: ________________________________

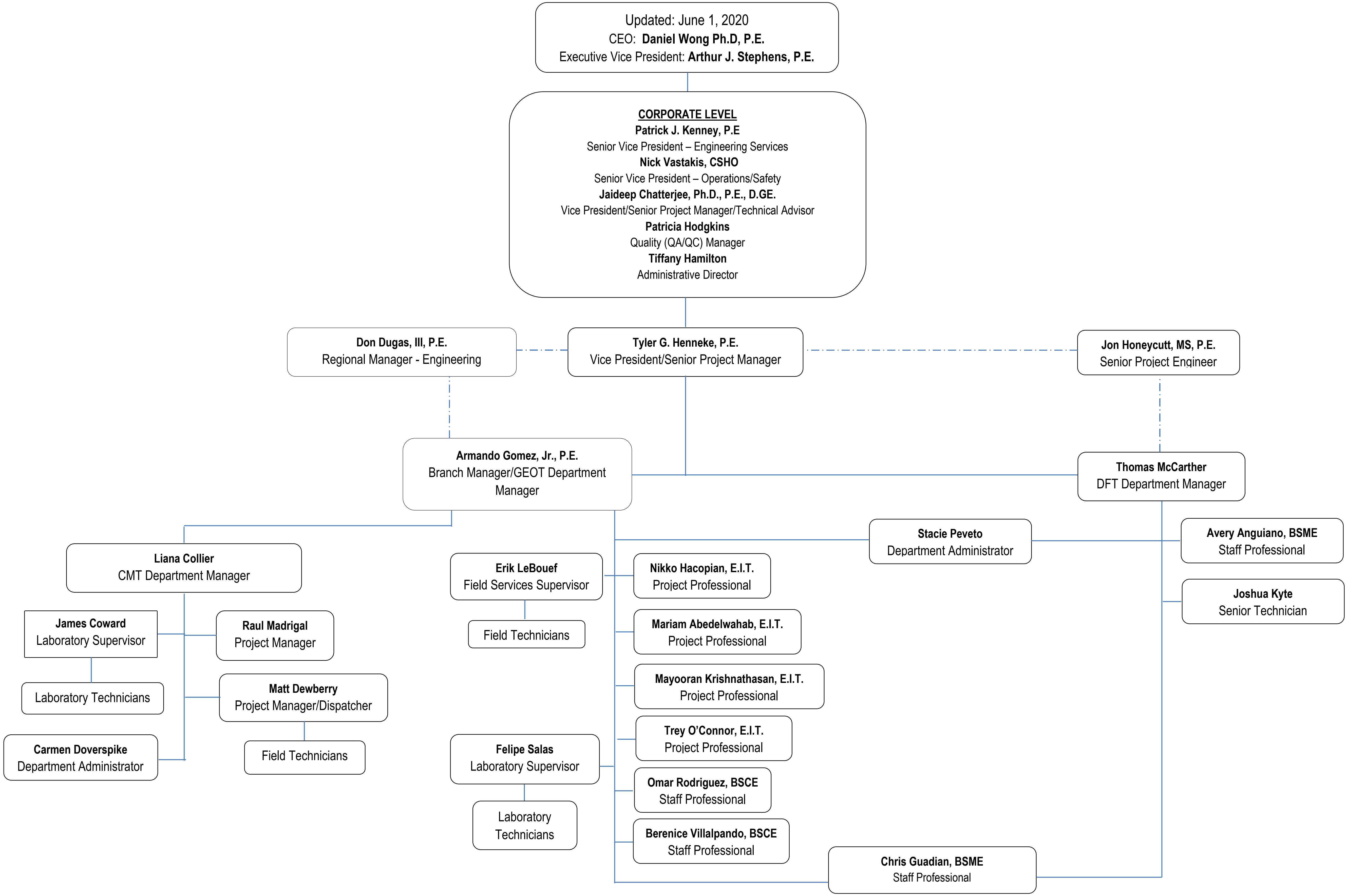
Date: ________________________________

APPENDIX A

TWE BEAUMONT OFFICE ORGANIZATIONAL CHART

Tolunay-Wong Engineers, Inc.

Beaumont, Texas - Branch Organizational Chart



Updated: June 1, 2020
CEO: **Daniel Wong Ph.D, P.E.**
Executive Vice President: **Arthur J. Stephens, P.E.**

CORPORATE LEVEL
Patrick J. Kenney, P.E
Senior Vice President – Engineering Services
Nick Vastakis, CSHO
Senior Vice President – Operations/Safety
Jaideep Chatterjee, Ph.D., P.E., D.GE.
Vice President/Senior Project Manager/Technical Advisor
Patricia Hodgkins
Quality (QA/QC) Manager
Tiffany Hamilton
Administrative Director

Don Dugas, III, P.E.
Regional Manager - Engineering

Tyler G. Henneke, P.E.
Vice President/Senior Project Manager

Jon Honeycutt, MS, P.E.
Senior Project Engineer

Armando Gomez, Jr., P.E.
Branch Manager/GEOT Department Manager

Thomas McCarther
DFT Department Manager

Stacie Peveto
Department Administrator

Avery Anguiano, BSME
Staff Professional

Joshua Kyte
Senior Technician

Liana Collier
CMT Department Manager

James Coward
Laboratory Supervisor

Laboratory Technicians

Carmen Doverspike
Department Administrator

Raul Madrigal
Project Manager

Matt Dewberry
Project Manager/Dispatcher

Field Technicians

Erik LeBouef
Field Services Supervisor

Field Technicians

Felipe Salas
Laboratory Supervisor

Laboratory Technicians

Nikko Hacopian, E.I.T.
Project Professional

Mariam Abedelwahab, E.I.T.
Project Professional

Mayooran Krishnathasan, E.I.T.
Project Professional

Trey O'Connor, E.I.T.
Project Professional

Omar Rodriguez, BSCE
Staff Professional

Berenice Villalpando, BSCE
Staff Professional

Chris Guadian, BSME
Staff Professional

APPENDIX B

TWE RESUMES OF KEY PERSONNEL

PATRICK J. KENNEY, P.E.

SENIOR VICE PRESIDENT – ENGINEERING SERVICES

SPECIALIZATION

Mr. Kenney has over 30 years experience in geotechnical and civil engineering project management, design and consulting. He has technical and managerial responsibility for onshore and marine projects for commercial, municipal, power and oil and gas/energy sectors. Mr. Kenney's expertise includes geotechnical analyses and design of shallow and deep foundation systems, earthen embankments, slope stability, lateral support of deep excavations, ground improvement systems, heavy haul roads, laydown yards and pavement systems, drainage and utilities for land and subdivision development projects. Experience also includes deep foundations testing and development of pile testing programs including WEAP analysis, static load testing, dynamic testing with PDA, pile integrity testing. He has experience in business management including business planning, budgeting, labor and expense management and control.

PROFESSIONAL HISTORY

Tolunay-Wong Engineers, Inc., Beaumont, Texas, 2009 - Present
ENGlobal Engineering, Inc., Beaumont, Texas, 2006 – 2009
Stork Southwestern Laboratories, Inc., Beaumont, Texas, 2000 – 2006
Harrison and Associates, Monroe, Louisiana, 1997 – 2000
Professional Service Industries, Inc., New Orleans, Louisiana/Beaumont Texas, 1988-1997

EDUCATION, REGISTRATIONS AND CERTIFICATIONS

BS in Civil Engineering, Louisiana Tech University, Ruston, Louisiana, 1988
Professional Engineer, State of Texas (No. 87994)
Professional Engineer, State of Louisiana (No. 25669)
Professional Engineer, State of Mississippi (No. 13263)
Professional Engineer, State of Arkansas (No. 15259)
Professional Engineer, State of New Mexico (No. 24751)

AFFILIATIONS

American Society of Civil Engineers (ASCE)
National Society of Professional Engineers (NSPE)
Texas Society of Professional Engineers (TSPE) – Past President – Sabine Chapter
Engineer of the Year Award 2009

PROFESSIONAL HISTORY

2009 - Present **Senior Vice President – Engineering Services**, Tolunay-Wong Engineers, Inc.

Project experience includes detailed geotechnical studies, laboratory testing, geotechnical consultation and project management for a variety of industrial, commercial, residential land development and government projects including feasibility studies, preliminary engineering design and final engineering design. Detailed geotechnical studies include paving, drainage and utilities, shallow and deep foundation design, detailed settlement analyses, ground improvement methods, cone penetrometer testing, seismocone testing, earthen embankments, sheet pile, retaining walls, slope stability analyses and temporary earth retaining systems. Experience also includes extensive background in geotechnical instrumentation installation, monitoring and consultation as well as deep

foundation testing including static load testing, dynamic testing with PDA, pile integrity testing (PIT) and cross-hole sonic integrity logging.
Representative Projects:

- Shell Gas to Liquids Project – Convent, LA
- Natural Gas to Gasoline Project – Natgasoline, LLC/OCI – Beaumont, TX
- Sabine Pass LNG – Soil Stabilization - Cameron, LA
- Cameron LNG – Soil Stabilization/CPT/Pile Testing – Hackberry, LA
- Sasol North America – Haul Roads and Laydown Yard – Lake Charles, LA
- Motiva Expansion – Aromatics and Cracker Units – Port Arthur, TX
- Valero St. Charles Refinery – Diamond Green Diesel Project – Norco, LA
- ExxonMobil Beaumont Refinery – Hurricane Flood Protection Project
- Interstate 10 Widening Project – Siegen Ln. to Highland Rd. – Baton Rouge, LA
- Interstate 12 Widening Project – O'Neal Lane Overpass – Livingston, LA
- Sienna Plantation Subdivision, Fort Bend County, TX (Multiple Phases)
- Westview Landing Subdivision, Harris County, TX (Multiple Phases)

2006 - 2009 **Senior Civil Engineer,** ENGlobal Engineering, Inc.

Civil/Structural Design experience includes structural steel and concrete foundation design for various structures for petrochemical facilities including pipe racks, electrical power line distribution structures, tanks and vessels. Experience also includes site development for both temporary construction and permanent facilities including laydown areas, buildings and heavy haul roads for a major refinery expansion project.

Representative Projects:

- Motiva Enterprises LLC – Port Arthur Refinery – Crude Expansion Project
- Hovensa St. Croix Refinery, USVI – Flue Gas Cooler Replacement Project

2000 - 2006 **Office Manager/ Manager of Engineering**, Stork Southwestern Laboratories, Inc.

Responsibilities have included coordination of all projects from start to finish, supervision of geotechnical laboratory testing, soils and foundation consulting and geotechnical report preparation. In addition managed quality control inspection and testing services for major construction projects and supervises construction inspection personnel. Served as office manager and geotechnical engineer for a wide variety of commercial, heavy industrial, medical and transportation projects covering the Southeast Texas area including Beaumont, Port Arthur, Orange, Kirbyville, Newton and Jasper.

Representative Projects:

- Fort Bend County Westpark Tollway (TxDOT) – Houston, Texas
- U.S. Highway 69 Widening Project (TxDOT) – Buna, TX to Kirbyville, TX
- Sabine Pass LNG Facility – Cameron Parish, Louisiana
- Motiva Enterprises LLC – Numerous Projects - Port Arthur, Texas
- LNVA North Reginal Treatment Plant – Reservoir and Evacuation Route

- St. Elizabeth Hospital Parking Garage & Ambulatory Care Facility
- Premcor Refinery - Refinery Expansion, Port Arthur, Texas
- Power Transmission Lines – Entergy - Various Locations, Gulf Coast Area
- Hartburg Substation Expansion – Entergy - Hartburg, Texas
- Water Treatment Plant Expansions - Winnie & Anahuac, Texas
- Sabine Shipyard – New Dock Facility - Sabine Pass, Texas

1997 - 2000

Civil Engineering Consulting and Surveying. Project Engineer, Harrison and Associates, Inc.

Responsible for engineering design and project management with municipal and public works projects including drainage improvement projects, street and highway design and reconstruction, flood control and subdivision development.

Representative Projects:

- Yester Oaks Drainage Improvements – Prepared drainage map and determined watershed boundaries and computed runoff volumes to size drainage structures. Developed plans and specifications, contract administration and construction inspection.
- Puckett Estates Road and Drainage Improvements – Prepared drainage map and determined watershed boundaries and computed runoff volumes to size drainage structures. Designed new roads for the subdivision and developed plans and specifications, contract administration and construction inspection.
- Managed Drainage and Flood Control Program for Ouachita Parish including overall drainage map for the Parish and planning for flood control projects including site selection right-of-way acquisition and computation of storage and discharge volumes and sizing of flood control structures.

1988 - 1997

Office Manager, Professional Service Industries, Inc.

Geotechnical Engineering and Construction Materials Services. Office Manager (Various Locations) –Served as office manager and geotechnical engineer for local geotechnical consultants covering the Southeast Texas area including Beaumont, Port Arthur, Orange, Kirbyville, Newton and Jasper. Provided geotechnical consulting in the Louisiana and Mississippi Gulf Coast area from Baton Rouge and New Orleans to Gulport/Biloxi, as well as Northeast Louisiana, North Central Mississippi and South Arkansas.

Representative Projects:

- Nine Mile Point Transmission Line – Mississippi River Crossing – New Orleans, LA
- Sunbeam/Oster Manufacturing/Distribution Facility – Hattiesburg, MS
- Poydras Plaza Office Tower / Parking Garage – New Orleans, LA
- New 6-Story Library – Northeast Louisiana University, Monroe, LA
- New 102.6 Megawatt Hydroelectric Power Station – Arkansas River – Dam No. 2 - Dumas, Arkansas

JAIDEEP CHATTERJEE, PhD, PE, DGE
VICE PRESIDENT

SUMMARY

Dr. Chatterjee has 14+ years of experience in geotechnical and civil engineering design and consulting practice. His professional experience encompasses a broad range of heavy industrial onshore and near shore projects and medium to large residential and commercial developments in the Gulf Coast Region of Texas and Louisiana as well as in the Permian Basin Region. Representative project experience includes large scale geotechnical studies for new LNG facilities, chemical manufacturing plants, crude oil refineries and large vessel ports and liquid, bulk and LNG/LPG terminals. His experience also includes geotechnical studies for directional drilling, flood control, slope stabilization and transportation projects. He had significantly contributed to geotechnical design of numerous New Orleans hurricane and flood protection projects undertaken by USACE post Hurricane Katrina. He has published numerous papers in reputed peer reviewed geotechnical engineering journals and conferences. He is a licensed professional engineer in multiple states, a core committee member of the Houston Chapter of the Geo-Institute of ASCE and a frequent speaker at various technical meetings and geotechnical engineering conferences. Dr. Chatterjee has Diplomate, Geotechnical Engineering (DGE) certification (highest distinction in geotechnical practice) from the Academy of Geo-Professionals (AGP) of the American Society of Civil Engineers (ASCE).

PROFESSIONAL HISTORY

Tolunay-Wong Engineers, Inc., Houston, TX, August 2013 – Present
Geosyntec Consultants, Houston, TX, December 2012 – August 2013
Burns Cooley Dennis, Inc., Ridgeland, MS, February. 2007 – December 2012
Jackson State University, Jackson, MS, January 2009 – December 2012
State University of New York at Buffalo, Buffalo, NY, 2002 – 2007
Development Consultants Ltd, India, 1997 – 2000

EDUCATION

PhD, Civil (Geotechnical) Engineering, State University of New York (SUNY) at Buffalo, 2007
MS, Civil (Geotechnical) Engineering, State University of New York (SUNY) at Buffalo, 2002
BS, Civil Engineering, Jadavpur University, Calcutta, India, 1997

PROFESSIONAL LICENSES AND CREDENTIALS

Professional Engineer – Texas (111154), Louisiana (36547), Oklahoma (30245), Mississippi (19982)
Diplomate, Geotechnical Engineering (DGE), Academy of Geo-Professionals (AGP), ASCE
Board Certified Geotechnical Engineer - American Society of Civil Engineers (ASCE)
Pre-Certified in All Geotechnical Services Categories - Texas Department of Transportation (TxDOT)
Transportation Worker Identification Credential (TWIC) Card – Transportation Security Administration
Eight (8) Hours Environmental Health and Safety Training Certificate

AFFILIATIONS AND COMMITTEES

American Society of Civil Engineers (ASCE) and Geo-Institute (G-I), Member
Geo-Institute, ASCE - Houston Branch, Committee Member
Deep Foundation Institute (DFI), Member
National Society of Professional Engineers (NSPE), Member
Texas Society of Professional Engineers (TSPE) – Greater Houston Chapter, Member
International Society for Soil Mechanics and Foundation Engineering (ISSMGE), Member
University at Buffalo Alumni Association, Life Member

PROFESSIONAL EXPERIENCE

Tolunay-Wong Engineers, Inc., Houston, TX
Vice President / Senior Geotechnical Manager
August 2013 – Present

At TWE, Dr. Chatterjee oversees geotechnical studies for medium to large projects, primarily across the Texas and Louisiana Gulf Coast Region covering Houston-Greater Houston, Beaumont-Port Arthur, Corpus Christi, Lake Charles, Baton Rouge and New Orleans areas. His responsibilities include mentoring junior staff, providing technical guidance and leadership, maintaining client relationship, assisting in marketing and business development, participating in local professional societies, peer review of engineering work products and providing technical and managerial oversight to various projects teams across various TWE offices covering Texas and Louisiana Gulf Coast Regions. He resolves abstract problems/difficult technical matters independently and serve as a technical resource throughout the company, being responsible for overall technical execution, quality and consistency.

Dr. Chatterjee's general project responsibilities include coordination of projects and communications with the Clients, supervision of engineering tasks, preparation of project proposals and reports, review of reports, design calculation packages, peer review, project monitoring, performing engineering analyses and providing overall technical guidance to various project teams from start to completion of the projects.

Representative Petrochemical, Industrial and Port and Marine Projects

- Phillips 66 – Beaumont Terminal Crude Oil and Refined Product Terminal Expansion Project and Master Storage Tanks Program - Nederland, Texas
- ExxonMobil Corporation – Beaumont Light Atmospheric Distillation Expansion (BLADE) Project - Beaumont, Texas
- Shell – Layberth Project – Shell Deer Park Facility - Deer Park, Texas
- Motiva Port Arthur Refinery – New Aromatics and Polyethylene Units - Port Arthur, Texas
- Valero Port Arthur Refinery - Crane Lift Evaluation, Design of Reactor Foundation and Evaluation of Heavy Haul Route for Reactor Transport - Port Arthur, Texas
- Energy Transfer Partners, LP – New Ship Dock 1 - Nederland, Texas
- Valero Corporation - Valero DCU 844 OSBL Project - Port Arthur, Texas
- ExxonMobil Corporation Beaumont Refinery – SCANfining (Selective Catalytic Naphtha Hydrofining Unit) Project - Beaumont, Texas
- Orascom E &C USA, Inc. - Natgasoline Methanol Plant - Beaumont, Texas
- Kinder Morgan – Troika Project - Port Arthur, Texas
- Enterprise Products Partners, LP – Refined Products and Crude Oil Terminals - Beaumont, Texas
- Chevron Phillips Chemical – U.S. Gulf Coast II Petrochemical Project - Orange, Texas
- Entergy Corporation – New Power Transmission Lines and Substations - Multiple Locations in US Gulf Coast Region covering Louisiana and Texas
- Oiltanking Beaumont, Inc. – Geotechnical Studies for New Crude Storage Tanks - Beaumont, Texas
- Port of Houston – Turning Basin Terminal – Wharf City Dock Rehabilitation - Houston, Texas
- Energy Transfer Partners, LP – Ship Dock 1 - Nederland, Texas
- Methanex, Louisiana – Geismar Unit Expansion Projects - Geismar, Louisiana
- Sasol Chemicals (USA), LLC - Lake Charles Chemical Complex - Lake Charles, Louisiana
- Shell Oil Company, US – Geotechnical Study for Proposed Gas to Diesel (GTL) Conversion Project - Geismar, Louisiana

Engineering tasks for petrochemical and industrial projects generally included subsurface investigation (soil borings and Cone Penetration Testing), laboratory testing assignments, development of design subsurface profiles and soil parameters, shallow foundations (spread footing, slab-on-grade, drilled footings, tank ring wall foundation) and deep foundations (driven piles, drilled shaft and augured cast-in-place piles) analyses and design, bearing capacity and settlement analyses, evaluation of dynamic soil properties using seismic cone or downhole seismic survey geophysical testing data, seismic site class evaluation and rigid and flexible pavement analyses and design recommendations using AASHTO for various project structures within petrochemical facilities including equipment, manifold structures, pipe racks, storage tanks and vessels and other ancillary project structures and components. Typical engineering tasks also included crane lift evaluation, site development for both temporary construction and permanent facilities including laydown areas, buildings and slab-on-grade, retaining structures and heavy haul roads for transporting heavy modular units, slope stability evaluation of containment levees and dikes, developing dynamic foundation stiffness and damping parameters using dynamic soil-structure computer programs.

For the substation and transmission line projects, engineering tasks included developing shallow and deep foundations recommendations for substation structures and electrical power line distribution structures. General site preparation and construction recommendations were also provided for the above projects.

For port and marine facilities and dock projects, engineering tasks generally included subsurface investigation (soil borings and Cone Penetration Testing), laboratory testing assignments, development of design subsurface profiles and soil parameters, developing deep foundations recommendations for various dock structures such as mooring and breasting dolphins, dock and access platform, developing shallow and deep foundations recommendations for landside dock structures and pipe racks, slope stability evaluation of bank slope, analysis and design of sheet pile bulkhead retention system, providing general site preparation and construction recommendations.

Representative Slope Stabilization, Hurricane Protection and Flood Control Projects:

- USACE Galveston District – Design of Sabine Pass to Galveston Bay, Port Arthur and Vicinity, Coastal Storm Risk Management Program – Geotechnical Investigation – Port Arthur, Texas
- USACE Galveston District and Jefferson County Drainage District 7 - Port Arthur Emergency Floodwall Repair Project Post Hurricane Harvey - Port Arthur, Texas
- McNeese State University – Contraband Bayou Erosion Project - Lake Charles, Louisiana
- LJA Engineering, Inc. – Port of Texas City Industrial Canal Slope Modification - Texas City, Texas
- Harris County Flood Control District - Greens Bayou Greenway 2020 Project - Harris County, Texas
- Harris County Flood Control District – Sims Bayou Hike and Bike Trail – Harris County, Texas
- Marathon Petroleum Corporation – Texas City Hurricane Protection Levee Evaluation, Marathon Galveston Bay Refinery - Texas City, Texas
- Lanier Associates – City of Beaumont Riverfront Park Restoration Project – Beaumont, Texas

Flood control, erosion protection, hurricane protection and slope stabilization project tasks included subsurface investigation, laboratory testing assignments, development of design subsurface profiles and soil parameters, slope stability evaluation of urban levee systems, remediation of over-steepened slopes, design of new sheetpile bulkhead, slope stability evaluation of trails and retaining walls under the jurisdiction of various federal, state and local agencies such as U.S. Army Corps of Engineers (USACE), Harris County Flood Control District, Harris and Fort Bend Counties, City of Houston and others. For the USACE projects, performed geotechnical studies following their Engineering Manuals and various USACE approved methods and computer programs. For the HCFCD projects, engineering tasks included performing slope stability evaluation using HCFCD guidelines, design of mechanically stabilized earth retaining wall systems and providing general slope construction and remediation guidelines.

Representative Directional Drilling Projects:

- Laney Directional Drilling – Sabine-Neches Waterway Direct Pipe Project - Port Arthur, Texas
- Praxair, Inc. – HDD Pipeline Relocation under Houston Ship Channel – Harris County, Texas
- Lower Neches Valley Authority (LNVA) – Evaluation of Existing Hurricane and Flood Protection Urban Levees and HDD Crossings - Port Arthur, Texas
- LJA Engineering, Inc. – Morgan’s Point Line Relocation at Cedar Bayou, HDD Crossing - Chambers County, Texas
- Enterprise Products Partners, LP - Interstate 10 HDD Crossing - Fort Stockton, Texas
- Kinder Morgan Pipeline Relocation Projects, various HDD Crossings – Southeast Texas, West Texas and New Mexico
- Enterprise Products Partners, LP - Tehucana Creek HDD Crossing, Freestone County, Texas

Geotechnical tasks for Horizontal Directional Drilling (HDD) and Direct Pipe (DP) projects included subsurface investigation, laboratory testing assignments, development of design subsurface profiles and soil parameters, evaluation of feasibility of directional drills based on explored subsurface conditions, developing soil formation limit pressures in accordance with Delft Method and hydraulic fracture evaluation.

Representative Transportation Projects:

- Texas Department of Transportation (TxDOT) – New Virginia Avenue Overpass over MLK Parkway - Jefferson County, Texas
- AIA Engineers – South End Overpass Project - Jefferson County, Texas
- Interstate 10 Widening Project – Highland Road to LA 73 Interchange - East Baton Rouge and Ascension Parishes, Louisiana
- Texas Department of Transportation (TxDOT) - Grand Parkway Segments Extension Project - H & I, US 59N to IH-10 – Northeast Houston, Texas

Engineering tasks for the overpass project included subsurface exploration using Texas Cone Penetrometer (TCP) Methods, developing soil boring logs using TxDOT Wincore Programs, developing deep foundation recommendations using TxDOT methods, developing geotechnical recommendations for mechanically stabilized earth retaining walls, performing settlement studies for access roadway embankments and providing pavement design recommendations for the bridge structure.

Representative Residential and Commercial Developments, Water Plant, Transportation Projects:

- Brown and Gay Engineers - Sueba Katy Boardwalk, 24-Acre Single Family Development - Fort Bend County, Texas
- Walter P. Moore – Julia Ideson Library Building - Houston, Texas
- Taylor Morrison – Grand Vista North Recreation Center - Fort Bend County, Texas
- Toll Brothers – Sienna Plantation, Section 21, Utilities and Paving - Fort Bend County, Texas
- Ventata Development – Trails of Katy, Section 3, Residential Foundations - Fort Bend County, Texas
- Brown and Gay Engineers – MCMUD No. 113 WWTP Expansion - Montgomery County, Texas
- Texas Department of Transportation (TxDOT) – New Virginia Avenue Overpass over MLK Parkway - Jefferson County, Texas
- AIA Engineers – South End Overpass Project - Jefferson County, Texas
- Interstate 10 Widening Project – Highland Road and Bayou Manchac Bridge Structures - East Baton Rouge and Ascension Parishes, Louisiana

For the land development, residential subdivision and commercial projects, engineering tasks typically included subsurface investigation (soil borings and Cone Penetration Testing), laboratory testing assignments, development of design subsurface profiles and soil parameters, developing shallow and deep foundation recommendations, developing Post Tension Institute (PTI) slab design parameters, evaluation of soil expansive potential and remediation and providing general site preparation and construction recommendations.

Geosyntec Consultants, Houston, TX
Project Engineer
December 2012 – August 2013

Worked on FEED studies of several large LNG projects and on a joint-industry partnership research project on the use of helical piles for offshore wind tower foundation. As Client's engineer, his primary responsibilities included peer review of deliverables pertaining to site investigation reports, geotechnical factual, interpretive and design reports, foundation design calculations, preparation of technical review reports and performing independent engineering analyses.

Engineering studies and analysis generally included but not limited to review of onshore and offshore site investigation reports containing boring and CPT data and laboratory test results, soil design profile and parameters development across the plant site, shallow and deep foundation analyses, slope stability evaluation and deep mixing ground improvement for retaining walls, bearing capacity, settlement analyses, soil liquefaction evaluation and seismic hazard analysis.

Representative Projects:

- Confidential Client – A Proposed Large LNG Facility - British Columbia, Canada
- AMEC Foster Wheeler - Offshore Gas Exploration Project - Offshore Romania
- ExxonMobil Corporation – Offshore Gas Exploration Projects - Turkey
- Repsol, UK – A Feasibility Study to Evaluate Use of Large Diameter Helical Piles as an Alternative to Driven Pile Foundations for Offshore Wind Turbines - Offshore Scotland, UK

FFEB, JV, LLC (Fugro, Stantec, Eustis, and Burns Cooley Dennis – A Joint Venture), Kenner, LA
Project Engineer / Senior Geotechnical Engineer
February 2007 – December 2012

Worked extensively on the detailed geotechnical engineering analyses and design for numerous large-scale projects as part of a large joint venture project team (FFEB JV, LLC, led by Fugro Consultants) pertaining to re-building of the New Orleans Hurricane and Flood Protection and Fronting Protection Systems. The work was performed for the US Army Corps of Engineers (USACE), New Orleans (MVN) District. The projects included design of various Mississippi riverbank and canal system Levees and Floodwalls, Flood Gates and Control Structures to provide 100-year flood protection.

Representative Hurricane Protection Levee Projects

- NOV-11 & 12, Port Sulphur to Venice Levee Enlargement - Plaquemines Parish, LA
- NOV-16, Empire to Buras Levee Enlargement - Plaquemines Parish, LA
- Carrollton Levee Enlargement and Floodwall - Orleans Parish, Louisiana
- Phoenix to Bohemia Levee Enlargement and Concrete Slope Repairs - Plaquemines Parish, Louisiana
- New Orleans International Airport Runway East-West Levee, Phase 2 - Jefferson Parish, Louisiana

For the above major hurricane protection levee projects, engineering tasks included development of Design Quality Control Plan (DQCP), preparation of project proposal and cost estimate, review, coordination, analysis, synthesis and compilation of subsurface and laboratory test data, development of soil profiles and parameters, identification of design soil reaches, development of design shear strength parameters using the undisturbed shear strength data and CPT data, settlement analysis for the estimation of levee overbuild and comprehensive slope stability and underseepage analyses and development of comprehensive geotechnical reports.

Engineering analyses and design were performed in struct accordance with various USACE Engineering Manual and guidance (Ems, ETLs and others) and the Hurricane and Storm Damage Risk Reduction System Design Guidelines (HSDRRSDG) developed by the USACE.

Performed extensive slope stability analyses of levees using computer programs “Stability with Uplift” (based on LMVD Method of Planes, MOP) and computer programs Slope/W (based on Spencer’s Method of analysis). For these levee projects, performed extensive underseepage analysis using USACE design guidelines (based on Blanket Theory) and Seep/W (based on Finite Element Method) and compared the results of different analyses to evaluate the reliability and accuracy of the results. Performed rigorous consolidation settlement analysis using a USACE computer program CSETT to estimate the required overbuild of the levee sections prior to performing the slope stability analyses. Performed remedial design analyses for the deficient levee reaches which did not meet either stability and/or seepage criteria.

The remedial designs for the stability included design of Stability Berm and Deep Soil Mixing Columns. The remedial measures for seepage included design of Relief Well and Seepage Berms. Significantly contributed to the preparation of plans and specification and engineering during construction.

Representative Hurricane Protection Floodwall Projects

- WBV-90-404C, Drainage Structure and Floodwall - Jefferson Parish, Louisiana.
- Bonnabel Floodgate, Phase 2 - Jefferson Parish, Louisiana
- West Return Canal Floodwall and its New South Wall Alignment - Jefferson Parish, Louisiana
- T-wall design for West Bank and Vicinity, Hurricane Protection Project, WBV14g.2, Old Estelle Pump Station to New Estelle Pump Station - Jefferson Parish, Louisiana

Performed geotechnical design and analyses of floodwalls (such as the design of T-wall and I-wall) which are major components of the recently developed hurricane protection system in the New Orleans area. Specific project duties in these floodwall projects included but not limited to analysis and synthesis of soil laboratory test data and cone penetration data, development of soil parameters for design and rigorous slope stability and seepage analyses. For the pile supported T-wall, performed extensive unbalanced load analyses using the computer programs Slope/W and MOP. Developed modulus of horizontal subgrade reaction and pile capacity curves for the pile supported T-walls based on USACE guidelines. Performed extensive lateral load analyses of piles using computer program L-PILE. For the projects involving I-wall and sheet pile system, performed extensive comparative slope stability analyses considering gap between the I-Wall and soil at the flood side of the sheet pile. In addition, performed global stability analysis of sheet pile supported I-wall. Performed local stability analysis of the I-wall using the computer program CWALSHT. Evaluated the safe water elevations for the I-wall system from the consideration of seepage and stability. Performed pile downdrag analysis and pile bending moment analysis due to consolidation of the supporting fill based on the USACE design guidelines. Significantly contributed to the preparation of the geotechnical design report and contributed to the preparation of plans and specification and engineering during construction.

Representative Fronting Protection and Strom Proofing of Pump Stations Projects:

- Fronting Protection at Elmwood Pumping Station - Jefferson Parish, Louisiana
- Storm proofing of Westwego No.1 Pump Station, JSP-15, Storm Proofing of Interior Pump Stations - Jefferson Parish, Louisiana

Engineering tasks included preparation of project scope and cost estimate, coordination with structural and hydraulics engineer for the loading data, review of subsurface data, development of design soil strength profiles, axial and lateral pile capacity analysis, design of braced excavation, sheet pile wall design, compilation and annotation of design calculations and preparation of geotechnical design report

Representative Outfall and Navigation Canals Projects

- Safe Water Level determination of three Outfall Canals (17-th St, Orleans Avenue and London Avenue Canals) in Orleans Parish, LA satisfying stability and seepage criteria for 100-year protection
- Engineering Alternate Report for 100-year hurricane protection for the Inner Harbor Navigation canal (IHNC) and Gulf Intercoastal Waterway (GIWW) Canals in East New Orleans

Performed extensive geotechnical analyses for the evaluation of the safe water level to determine the level of protection for future hurricanes for the levees and floodwalls along the west bank of Inner Harbor Navigation Canal (IHNC) and the Outfall Canals in the Lake Pontchartrain vicinity satisfying all of the criteria set forth in HSDRRSDG.

The various structures assessed for safe water elevation included levees, I-Walls and T-walls and Flood Gates along the IHNC and GIWW Canals. Performed internal and external stability analysis for remediation of deficient areas of New Orleans Outfall Canals (17-th street, London Avenue and Orleans Canal) using Deep Mixed Shear Walls. Significantly contributed to the preparation of the geotechnical design reports. Performed technical review of work performed by other firms involved in these projects.

Other Representative Project Experience

- Seepage Evaluation of Mississippi River Levees and Remediation

Worked on two major seepage evaluations and remediation projects for USCAE (New Orleans District) in Point Pleasant Parish and Point Coupee Parish in Louisiana. Performed extensive engineering analyses including development of seepage analysis parameters, development of levee sections and extents for analysis, underseepage analysis of Mississippi River levees, identification of seepage deficient reaches and design of two alternative measures, relief well and seepage berms for each deficient reach that did not meet the required factor of safety.

- Quality Control, Quality Assurance and Technical Review, Hurricane Protection Projects

Performed QA/QC work for various HPO projects. Reviewed geotechnical design work performed by other consulting engineering firms and provided recommendations to USACE as independent technical reviewer. Also assisted with the Independent Technical Review (ITR) of work performed by others.

Burns Cooley Dennis, Inc., Ridgeland, MS
Senior Geotechnical Engineer/ Project Engineer
February 2007 – December 2012

As a Project Engineer with BCD, worked on a variety of projects in Mississippi, Tennessee and Louisiana for various private Clients and State and Federal Agencies such as the Mississippi Department of Transportation (MDOT), NRCS and USACE. Routinely performed day-to-day operations of conventional geotechnical engineering projects involving subsurface investigation, supervision of laboratory testing, geotechnical analyses and report preparation.

Representative Projects

- Seepage Evaluation, Instrumentation, Monitoring and Remediation for Earth Dam - Ridgeland, MS

Performed seepage evaluation and designed remedial measures for the Ross Barnett Reservoir Dam in Rankin County, Mississippi for Pearl River Valley Water Supply District (PRVWSD). Piezometers were installed on the downstream side of the dams to record the fluctuation of pore pressure head with the upstream water level. The design analysis soil profile was generated by means of several soil borings. The simulated finite element analysis agreed well with the observed piezometer readings. Proposed remedial measures included seepage berms and drainage trench.

- Natural Resources Conservation Projects – MRL Dike Construction, Mississippi and Louisiana

Performed extensive settlement analysis for various US Natural Resource Conservation Services (NRCS) Projects, performed rock dike settlement analysis for various Mississippi River basins (such as Mouth of Bayou Penchant Basin and Mouth of Decade Penchant Basin in Terrebonne Parish, Louisiana) using computer program CSETT and developed time-settlement curves to simulate different stages of dike construction.

- Seismic Evaluation, New Madrid Fault – Memphis, Tennessee

Performed seismic assessment and developed site-specific response spectrum for various Canadian National Railroad projects in Tennessee near the New Madrid Fault.

- Wave Induced Liquefaction Analysis, Wastewater Treatment Plant - Pascagoula, MS

Performed liquefaction analysis and vibration induced settlement analysis for a Wastewater Treatment Plant in Pascagoula, Mississippi.

- Landslide Remediation and Slope Stabilization - Various Projects in MS and LA

Worked on several landslide and slope stabilization projects in Mississippi where the remediation was accomplished using Soil Nail and Anchor. Dr. Chatterjee performed mechanically stabilized earth (MSE) Wall analysis and design for various slope stabilization projects.

- Drilling, Sampling and Field Testing Operations, Various Projects in MS

Observed and assisted with drilling and sampling operations, monitoring field logging operations and SPT testing, drilled shaft construction and pile driving operations for various small and medium size residential, commercial and DOT projects in Mississippi.

Jackson State University, Civil and Environmental Engineering, Jackson, Mississippi
Adjunct Faculty in Civil (Geotechnical) Engineering
January 2009 – December 2012

As a part time adjunct faculty in the Department of Civil and Environmental Engineering, taught graduate geotechnical engineering courses on Advanced Soil Mechanics, Advanced Foundation Engineering, Earth Dams and Slope Stability, Finite Elements in Geotechnical Engineering, Soil Dynamics and Earthquake Engineering and Structural Dynamics. Most of the students in the class were practicing professionals working towards the MS Degree in Civil Engineering.

Performed research work in collaboration with the civil engineering department on the comparative slope stability analyses to assess the adequacy of the hurricane protection measures in New Orleans, Louisiana and vicinity. Worked on a research project which was focused on detailed engineering analysis of comparative slope stability using the Method of Planes, Limit Equilibrium Methods as well as the Finite Element Methods. Most of these research findings have been published in peer reviewed reputed geotechnical engineering journals.

State University of New York (SUNY) at Buffalo, Buffalo, NY
Research and Teaching Assistant
September 2000 – December 2007

Carried out research work on geotechnical engineering applications of Finite and Boundary Element Methods focusing on nonlinear soil behavior and deformation and collapse analyses of foundations., He investigated the bearing capacity factors of strip foundations, stability of slopes and earth retaining structures, soil consolidation and time dependent collapse of footings and embankments and analysis of fiber reinforced composites using numerical analysis techniques. Developed efficient algorithms and implemented constitutive models in high level computer programs developed in-house to perform practical geotechnical engineering analyses using these tools. A significant amount of the above research work resulted in a doctoral dissertation and has been published in reputed peer reviewed engineering journals. As a graduate student, also worked as a Teaching Assistant and helped faculties with preparation of course materials, classes and grading for undergraduate statics, dynamics, soil mechanics and foundation engineering courses.

SOFTWARES AND COMPUTER SYSTEMS PROFICIENCY

Proficient with the use of Geotechnical Engineering Analysis Programs SLOPE/W, SEEP/W, SIGMA/W, SLIDE, SETTLE-3D, UNISETTLE, UNIPILE, GROUP, RS-2, PLAXIS, FLAC, CSETT, CWALLSHT, SUPPORT-IT, MDOT PILE, A-PILE, L-PILE, SHAFT, PY-WALL, MSEW, DYNA 5, LMVD Method of Planes (USACE), GEOSYSTEMS, gINT, CLIQ, CPeT-IT, WinPAS, working knowledge of AUTOCAD.

AWARDS AND HONORS

Diplomate Geotechnical Engineering (DGE) – American Society of Civil Engineers
University at Buffalo – CSEE Graduate Fellowship ($15000), September 2002-July 2005, Graduate Teaching and Research Assistantships, 2000-2006

PUBLICATIONS

Peer reviewed journals

Wang, C.B., **Chatterjee, J**. and Banerjee, P. K. (2007) ‘An efficient implementation of BEM for two- and three-dimensional multi-region elastoplastic Analyses,’ Computer Methods in Applied Mechanics and Engineering, Elsevier Applied Science, Vol. 196, No. 4-6, pp. 829-842.

Chatterjee, J., Ma, F., Henry, D.P. and Banerjee, P. K. (2007) ‘Two- and three-dimensional transient heat conduction and thermoelastic analyses by BEM via efficient time convolution,’ Computer Methods in Applied Mechanics and Engineering, Elsevier Applied Science, Vol. 196, No. 29-30. pp. 2828-2838.

Ma, F., **Chatterjee, J**. and Banerjee, P. K. (2007) ‘New fast convolution algorithm in Boundary element methods for two and three-dimensional linear soil consolidation analysis,’ International Journal of Geomechanics, ASCE, Vol. 7, No. 3, pp. 236-249.

Henry, D.P., Ma, F., **Chatterjee, J**. and Banerjee, P. K. (2007) ‘Steady state thermoelastic analysis of 3D solids with fiber inclusions by boundary element method,’ Computer Methods in Applied Mechanics and Engineering, Elsevier Applied Science, Vol. 197, No. 1-4, pp. 294-307.

Ma, F., **Chatterjee, J**., Henry, D.P. and Banerjee, P. K. (2008) ‘Transient heat conduction analysis of composites by boundary element method,’ International Journal for Numerical Methods in Engineering, Wiley Inter Science, Vol. 73, No. 8, pp. 1113-1136.

Chatterjee, J., Henry, D.P., Ma, F. and Banerjee, P. K. (2008) ‘An efficient BEM formulation for three-dimensional steady state heat conduction analysis of composites,’ International Journal of Heat and Mass Transfer, Elsevier Applied Science, Vol. 51, No. 5-6, pp. 1439-1452.

Chatterjee, J., Ma, F., Henry, D.P. and Banerjee, P. K. (2008) ‘Advanced boundary element analysis of three-dimensional elastic solids with fiber reinforcements,’ Journal of Engineering Mechanics, ASCE, Vol. 134, No. 9, pp. 739-749.

Chatterjee, J., Amini, F. and Cooley, L.A. (2009) ‘A comparative slope stability analysis of New Orleans I-wall subjected to hurricane loading,’ International Journal of Geotechnical Engineering, J. Ross Publication, Vol. 3, No. 3, pp. 459-467.

Chatterjee, J. and Amini, F. (2011) ‘Slope stability modeling and analysis of T-wall subjected to hurricane loading,’ International Journal of Geotechnical Engineering, J. Ross Publication, Vol. 5, No. 1, pp. 103-112.

Xu, Y., **Chatterjee, J**. and Amini, F. (2011) ‘A comparative slope stability analysis of New Orleans levee subjected to hurricane loading’ Electronic Journal of Geotechnical Engineering, Vol. 18, Bund. C, pp. 325-336.

Chatterjee, J. and Amini, F. (2011) ‘A comparative assessment of slope stability of New Orleans I-wall with gap between the wall and layered cohesive backfill,’ Geomechanics and Geoengineering, An International Journal, Taylor and Francis, Vol. 6, No. 3, pp. 217-225.

Chatterjee, J. and Amini, F. (2012) ‘A comparative slope stability analysis of New Orleans hurricane protection I-wall with sheet pile penetrating into sand layer,’ Geomechanics and Geoengineering, An International Journal, Taylor and Francis, iFirst 2012, PP. 1-7.

Peer reviewed conference proceedings

Chatterjee, J. (2009) ‘Collapse Analysis in Geomechanics using the Boundary Element Method, Joint ASCE-ASME-SES Conference on Mechanics and Materials, Virginia Tech, Blacksburg, VA.

Chatterjee, J. and Amini, F. (2010) ‘A Comparative evaluation of unbalanced load in the stability analysis of New Orleans T-Wall subjected to hurricane loading,’ Geo-Florida 2010, Advances in Geotechnical Modeling and Design, Geotechnical Special Publication of ASCE, Reston, VA, No. 199, pp. 2173-2181.

Chatterjee, J., and Amini, F. (2010). Slope Stability Modeling of New Orleans Hurricane Protection Levees with Geotextile Reinforcement’, 6-th International Conference on Environmental. Geotechnics for Sustainable Development, Tata McGraw Hill, pp. 1699-1704.

Chatterjee, J. and Amini, F. (2011) ‘An investigation on the effect of seepage on the stability analysis of sheet pile supported I-wall in New Orleans, Louisiana’, Geo-Frontier 2011, Advances in Geotechnical Engineering, Geotechnical Special Publication of ASCE, Reston, VA, No. 211, pp. 3536-3545.

Chatterjee, J. and Amini, F. (2012) ‘An investigation of the design criteria for the analysis of I-wall in New Orleans, Louisiana for flood side gap condition ’, Geo-Congress 2012, State of the Art and Practice in Geotechnical Engineering, Geotechnical Special Publication of ASCE, Reston, VA, No. 225, pp. 507-515.

Byrne, B., Houlsby, G., Sancio, R.B. and **Chatterjee, J.** (2013) ‘A feasibility study evaluating the use of large screw pile for offshore wind tower foundations as an alternative to driven pile foundation,’ Marine Foundation Conference, Deep Foundation Institute (DFI), Seattle, WA, August 2013.

PRESENTATIONS AT TECHNICAL MEETINGS AND CONFERENCES

A comparative slope stability analysis of New Orleans levee and I-wall subjected to hurricane loading, Invited Presentation at the Annual Meeting of the Mississippi Chapter of ASCE, Jackson, MS, October 2008.

Nonlinear deformation and collapse Analysis using BEM, Presented at Joint ASCE-ASME Conference on Mechanics and Materials, Virginia Tech, Blacksburg, VA, June 2009.

A Comparative evaluation of unbalanced load in the stability analysis of New Orleans T-Wall subjected to hurricane loading, Presented at Geo Florida 2010, Annual Geo Congress of ASCE, West Palm Beach, FL, February 2010.

An overview of slope stability analysis of New Orleans hurricane protection systems, Presented at ASCE Student Chapter Meeting, Mississippi State University, Starkville, MS, April 2010.

An investigation on the effect of seepage on the stability analysis of sheet pile supported I-wall in New Orleans, Louisiana, Presented at Geo Frontier 2011, Annual Geo Congress of ASCE, Dallas, TX, March 2011.

An investigation of the design criteria for the analysis of I-wall in New Orleans, Louisiana for flood side gap condition, Presented at Geo Congress 2012, Annual Geo Congress of ASCE, Oakland, CA, March 2012.

A feasibility study to evaluate the use of screw pile as foundation for offshore wind towers, Presented at Annual Technology Exchange and Business Development Conference of Geosyntec Consultants, Somerville, MA, April 2013.

Use of large diameter helical piles for offshore wind turbines as an alternative to driven pile foundations, Presented at Louisiana Civil Engineering Conference and Show, ASCE and ACI, New Orleans Branch, Metairie, LA, September, 2016.

A Critical Review of New Orleans I-Wall Analysis Procedures for Flood Side Gap Condition, Presented at Louisiana Civil Engineering Conference and Show, ASCE and ACI, New Orleans Branch, Metairie, LA, September, 2017.

Geotechnical Design Considerations of Ground Storage Tanks in Southeast Texas and Louisiana, Presented at Infrastructure, Energy, Geotechnical, Flooding and Sustainability Conference, CIGMAT 2018, University of Houston, Houston, Texas, March, 2018.

Geotechnical Considerations of Ground Storage Tanks on Texas Gulf Coast Soils, Presented at ASCE Corpus Christi Branch Monthly Meeting, Corpus Christi, Texas, January, 2019.

TYLER G. HENNEKE, P.E.
VICE PRESIDENT

SUMMARY

Mr. Henneke's responsibilities include coordinating, supervising, managing and performing all phases of geotechnical engineering services, construction materials testing services and deep foundation testing services for TWE's Beaumont, Texas office. Mr. Henneke's responsibilities also include intercompany coordination of engineering, geophysical and deep foundation testing departments from the Houston, Texas office for all TWE offices across the Texas and Louisiana Gulf Coast region.

EDUCATION, REGISTRATIONS AND CERTIFICATIONS

B.S. Degree in Civil Engineering – Lamar University, Beaumont, TX, 2005-2010
Professional Engineer, State of Texas, 115724

ACCOMPLISHMENTS, AFFILIATIONS AND MEMBERSHIPS

Various Roles – TSPE Sabine Chapter – 2014 to Present
Board Member (Specialty Contractor) – Association of General Contractors of Southeast Texas – 2016-Present
Board Member – Junior Achievement of the Golden Triangle – 2016-Present
Recipient – Young Engineer of the Year Award – TSPE Sabine Chapter – 2015
Recipient – 40 Professionals Under 40 – Southeast Texas Young Professionals Organization – 2015
Recipient – Gerry E. Pate Scholarship in Civil Engineering – Lamar University
Member – Chi Epsilon – National Civil Engineering Honor Society
Member – National Society of Professional Engineers (NSPE)
Member – Texas Society of Professional Engineers (TSPE)
Member – American Society of Civil Engineers (ASCE)
Member – ASTM International (ASTM)
Member – Deep Foundations Institute (DFI)
Member – Pile Driving Contractors Association (PDCA)
Member – American Concrete Institute (ACI)

PROFESSIONAL HISTORY

Tolunay-Wong Engineers, Inc. – October 2008 to Present

Vice President – May 2020 to Present

Primarily responsible for the operations of the Beaumont, Texas office operations which includes geotechnical engineering, construction materials testing and deep foundations testing services. Also responsible for coordinating intercompany departments from Houston, Texas office which include engineering, geophysical and deep foundation testing assignments across the Texas and Louisiana Gulf Coast region. Personnel under Mr. Henneke's direction include licensed professional engineers, engineers-in-training, project managers, staff professionals, engineering assistants, laboratory technicians, field technicians, licensed drillers, driller helpers and administrative assistants.

Branch Manager – June 2016 to May 2020

Responsible for a network of over 55 personnel involved in the geotechnical engineering, construction materials testing and deep foundations testing fields. Personnel under Mr. Henneke's direction include licensed professional engineers, project managers, staff professionals, engineering assistants, laboratory technicians, field technicians, licensed drillers, driller helpers and administrative assistants. Main Client and Owner interface for TWE Beaumont office.

Engineering Manager – September 2013 to June 2016

Responsible for a network of over 30 personnel involved in the geotechnical engineering, deep foundations testing and construction materials testing fields for TWE's Beaumont, Texas and Sulphur, Louisiana offices. Personnel under direction include licensed professional engineers, staff professionals, engineering assistants, laboratory technicians, field technicians, licensed drillers, driller helpers and administrative assistants. Client and Owner interface for geotechnical engineering and deep foundation testing projects in Southeast Texas and Southwest Louisiana for TWE.

Department Manager – June 2011 to September 2013

Responsible for geotechnical engineering and deep foundations testing groups for TWE's Beaumont, Texas and Sulphur, Louisiana offices. Duties included direct communication with Clients and Owners, attending project meetings for business and project development, direct oversight of field, laboratory and office personnel from proposal development to performance of field and laboratory programs to engineering analysis and final reporting.

Staff Professional – May 2010 to June 2011

Managed projects under the direct supervision of licensed professional engineers in the geotechnical engineering consulting and deep foundations testing fields. Duties included attending project meetings with Clients and Owners, oversight of field and laboratory personnel, selection of laboratory test assignments, development of soil boring and CPT sounding logs, engineering analysis for shallow foundations, deep foundations, earth retaining structures, marine facilities, ground storage tanks, below grade structures/utilities, pavements and final reporting. Field tasks consisted of construction materials inspection, high-strain dynamic pile testing (PDA), low-strain pile integrity testing (PIT), low-strain sonic integrity logging, static axial compression, tension and lateral load testing, electrical resistivity (ER) surveys, ground penetrating radar (GPR) surveys, electromagnetic (EM) surveys and anchor bolt pull testing. Also responsible for the development of technical proposals and cost estimates for geotechnical engineering and deep foundations testing assignments.

Engineering Assistant – November 2008 to May 2010

Directly involved with supporting licensed professional engineers by providing field coordination, logging of soil borings, coordination of cone penetrometer testing (CPT), installation of geotechnical instrumentation, geotechnical laboratory test data entry, compilation of boring logs, drafting of boring location plans using AutoCAD and the development of technical proposals and cost estimates for geotechnical engineering and deep foundations testing assignments.

A representative list of projects or experience can be provided upon request.

TREY O'CONNOR, E.I.T.
PROJECT GEOTECHNICAL ENGINEER – BEAUMONT, TEXAS

SUMMARY

Mr. O'Connor's responsibilities include oversight of field and laboratory tasks, selection of laboratory test assignments, compilation of soil boring logs and CPT sounding logs, development of soil design parameters, engineering analysis for deep and shallow foundation systems, settlement estimates, below grade structures, pavements, railways and pipeline installations utilizing horizontal directional drilling (HDD) methods. Mr. O'Connor is also responsible for the development of technical proposals and cost estimates for geotechnical engineering project as well as technical reports presenting results from field and laboratory tasks and geotechnical recommendations.

EDUCATION, REGISTRATIONS AND CERTIFICATIONS

- B.S. Degree in Civil Engineering – Lamar University, Beaumont, TX, 2015-2019
- Registered Engineer-In-Training, State of Texas (E.I.T. No. 66937)
- Passed Professional Engineer's (PE) Exam – Texas Board of Professional Engineers (TBPE) (Anticipated Licensure Date – March 2022)

AFFILIATIONS

Member – Chi Epsilon – National Civil Engineering Honor Society
Board Member – American Society of Civil Engineers (ASCE) – Southeast Texas Branch

PROFESSIONAL HISTORY

Tolunay-Wong Engineers – February 2018 to Present

Project Geotechnical Engineer (March 2020 – Present)

Responsibilities include managing projects under the supervision of licensed Professional Engineers, communication with Clients and Owners, attending project meetings, oversight of field and laboratory activities, selection of laboratory testing assignments, compilation of soil boring and CPT sounding logs, development of soil design parameters for engineering analysis, geotechnical engineering analysis for deep and shallow foundation systems, below grade structures, earth retaining structures, ground storage tanks, pavements, railways and HDD pipeline installations as well as the development of technical proposals and reports.

Staff Professional (June 2019 – March 2020)

Mr. O'Connor's duties as Staff Professional included attending project meetings with Clients, Owners and Project Managers, oversight of field and laboratory activities, selection of laboratory testing assignments, compilation of soil boring and CPT sounding logs. Responsibilities also include development of technical proposals and geotechnical reports. Field tasks consisted of deep foundations testing (DFT) such as low-strain pile integrity testing (PIT), static axial and lateral load testing and pile instrumentation.

Laboratory Technician (February 2018 – June 2019)

Duties include performing standard geotechnical laboratory index and strength testing such as moisture content, unit weight, Atterberg limits, particle size distribution, unconfined compression (UC) and unconsolidated undrained (UU) triaxial compression. Responsibilities also include performing specialty laboratory testing such as one-dimensional consolidation testing, organic content, electrical resistivity as well as moisture density relation testing such as standard proctor compaction tests. Mr. O'Connor also assisted in bench scale programs for the treatment and stabilization of clay soils.

REPRESENTATIVE PROJECTS

Comprehensive or specific project lists can be provided upon request.

APPENDIX C

TWE QA/QC TABLE OF CONTENTS

Tolunay-Wong Engineers, Inc.
10710 S. Sam Houston Parkway W., Suite 100
Houston, Texas 77031
Corporate Office

Company Quality Manual

Chief Executive Officer/President: Daniel O. Wong; Ph.D., P.E.

Corporate Quality (QAQC) Manager: Patricia Hodgkins

Corporate Technical Manager Patrick Kenney, P.E.

Date of Issue: 10/02/2017

UNCONTROLLED COPY

Quality Manual

This Quality Manual meets the requirements of ISO 17025, ISO 9001, AASHTO R-18 and ASME NQA-1. This Quality Manual is confidential and assigned as outlined below.

Issued to:

☐ Controlled Copy - Issue No: ______________________
☒ Uncontrolled Copy

Table of Contents

APPENDIX D

DSC ENVIRONMENTAL/ANALYTICAL TESTING PROGRAM

Trey O'Connor

From: Bob Davis <bdavis@disorboconsult.com>
Sent: Friday, February 5, 2021 11:17 AM
To: Tyler Henneke; Chris Guy
Cc: Trey O'Connor; Joanne Scarf; David Cowart; Kathleen Alsup; Patrick Kenney
Subject: RE: Cedar Bayou Deepening & Widening - Chambers County, Texas

Here are some additional thoughts for the email string going here.

- Beneficial Use testing requirements vary depending on the landowner's prerogative, but as you know Dredging Permits often go out for interagency commentary, so sometimes the regulators (TPWD, EPA, others) insert themselves if there is the potential for return water or elutriate to affect public waters or offsite receptors. In cases where the Corps get involved in BU, I have seen them use the same criteria as their federal DMPA's.

- Sometimes the EPA gets involved if requested by the Corps, (that is, it would be specified as a condition in the Dept of Army permit), for example the Oil Tanking/Enterprise Pdts work a few years back, which was BU placement. For the recent CP Chem Orange work, spoils are primarily intended for privately owned BU, but federal PA is the backup plan. Both of those examples required (by either Corps, or landowner in the case of CP Chem) the conventional Corps list of testing PLUS dioxins/furans (D/F) and organotins. D/F will undoubtedly be asked for in the testing program at Cedar IF a federal placement area is requested as an option, due to the site of dredging and placement being in the Houston Area and downstream of the HSC and two particular superfund sites (San Jacinto River Waste Pits and Highlands Acid Pit, which are both in the SJ river floodplain).

- Chris, I would be hesitant to combine the geotechnical drilling and environmental core sampling in the same-barge collection event, IF we do dioxin/furan testing, since the toxicities and detection limits are so very low for D/F. The possibility of cross contamination could occur, and that outcome would not be good for anyone. I am not opposed to combining them in the same-barge collection event, however, if we leave out dioxin/furans this time around, since you say this is mainly preliminary core testing work. While we have not combined them before, I believe our crew can adopt practices that will allow them to pull aliquots from the geotech cores and eliminate cross-contamination for the conventional list of analytes.

- For the CP Chem work, we conducted comparisons of the sediment results to BOTH (1) USACE screening criteria, and (2) TCEQ Texas Risk Reduction Program (TRRP) health-based numbers, the latter being for the BU land disposal option. This is an "above-reproach" approach if trying to defend the beneficial use option. In this case (Cedar Port Industrial Park), we could do either or both for about the same cost (assuming we leave dioxin/furans and organotins off for now).

I will price my proposal without analytical for now, but I will also give you an estimated lab cost based on what I have seen. That way you can weigh the EAS pricing simultaneously.
Bob

Bob Davis
Senior Consultant

Trey O'Connor

From:	Bob Davis <bdavis@disorboconsult.com>
Sent:	Friday, February 5, 2021 2:08 PM
To:	Trey O'Connor
Cc:	Chris Guy; Tyler Henneke
Subject:	RE: Cedar Bayou Deepening & Widening - Chambers County, Texas
Attachments:	Cost Breakout for Cedar Ind Park Pre-Dredge 2021.pdf; TESTING LIST - NORMAL USACE + VOA.pdf

Trey and Tyler –

Here is my scope & estimated cost for this 'environmental field work, evaluation, and reporting' in a form that should be acceptable to the USACE, if used for preliminary or final assessment purposes.
A couple of mentions:

- The sample count may or may not be fully accepted by the Corps, depending on the quantity of material in the dredging work. They try to correlate sample counts to volume, for representation.
- The work assumes full-depth core samples at each of the 4 stations, made up by combining grabs from regular intervals when logging, then mixing these grabs on-deck for a homogeneous composite sample of entire core length of the dredging envelope at that station. I mention this, because sometimes the affected material (w/contaminants) is more concentrated near the top of the sediment column. Therefore, if there appear to be significant differences using a PID instrument in the field, it is prudent to collect two samples in a sediment column, so that if there is a hotspot in the upper more recent material it can possibly be separated out for disposal differently if justified, during the actual dredging work. This keeps a single or upper zone hotspot from disqualifying the entire core, hopefully that makes sense.
- We normally have two techs working together in the field, but I have given costs for one DiSorbo person working alongside your crew, as you requested. If we can add, and there is room for, another DiSorbo person, that would add $2,000., which would be my preference because they really help each other out when sampling and recording.
- I have given an estimate ($8k) of the contract laboratory cost for this sample count (9) and analytical list, and if we can bid that part out it might be even less. That cost is shown near the bottom of the spreadsheet, but not included in the total, per my understanding of our original conversation. To help you compare lab apples if you want to, I have also attached here a typical analyte list applicable for both federal DMPAs and BU areas.
- The bullets given in my last note to the larger group gives more context to this quote, thus I have not included dioxin/furan and organotins categories of lab testing here. Those may be required later.

We thank your team for reaching out to us, and we would be delighted to work with you on this important project.

Best regards,
Bob

Bob Davis
Senior Consultant

DiSorbo Consulting, LLC
9737 Great Hills Trail, Suite 340

Analyte/ Parameter	NOTES
VOCs	
1,1,1,2-Tetrachloroethane	
1,1,1-Trichloroethane	
1,1,2,2-Tetrachloroethane	
1,1,2-Trichloroethane	
1,1-Dichloroethane	
1,1-Dichloroethylene	
1,1-Dichloropropene	
1,2,3-trichlorobenzene	
1,2,3-Trichloropropane	
1,2,4-Trichlorobenzene	
1,2,4-Trimethylbenzene	
1,2-Dibromo-3-chloropropane	
1,2-Dibromoethane	
1,2-Dichlorobenzene	
1,2-Dichloroethane	
1,2-Dichloropropane	
1,3,5-Trimethylbenzene	
1,3-Dichlorobenzene	
1,3-Dichloropropane	
1,4-Dichlorobenzene	
2,2-Dichloropropane	
2-Chlorotoluene	
4-Chlorotoluene	
4-Isopropyltoluene	
Benzene	
Bromobenzene	
Bromochloromethane	
Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
cis-1,2-Dichloroethylene	
cis-1,3-Dichloropropene	
Dibromochloromethane	

Analyte/ Parameter	NOTES
Dibromomethane	
Dichlorodifluoromethane	
Ethylbenzene	
Isopropylbenzene	
m- & p-Xylenes	
MEK	
Methylene chloride	
Naphthalene	
n-Butylbenzene	
n-Propylbenzene	
o-Xylene	
sec-Butylbenzene	
Styrene	
t-butylbenzene	
Tetrachloroethylene	
Toluene	
trans-1,2-Dichloroethylene	
trans-1,3-Dichloropropene	
Trichloroethylene	
Trichlorofluoromethane	
Vinyl Chloride	
SVOCs	
1,2,4-Trichlorobenzene	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
2,4-Dichlorophenol	
2,4-Dimethylphenol	
2,4-Dinitrophenol	
Acenaphthene	
Acenaphthylene	
Anthracene	
Benzo(a)anthracene	
Benzo(a)pyrene	
Benzo(b&k)fluoranthene	
Benzo(g,h,i)perylene	
Chrysene	
Dibenzo(a,h)anthracene	
Diethyl phthalate	
Fluoranthene	
Fluorene	

Analyte/ Parameter	NOTES
Hexachlorobenzene	
Indeno(1,2,3-cd)pyrene	
Naphthalene	
Pentachlorophenol	
Phenanthrene	
Phenol	
Pyrene	
PESTICIDES AND PCBs	
4,4-DDD	
4,4-DDE	
4,4-DDT	
alpha-BHC	
Alpha-Chlordane	
Aldrin	
beta-BHC	
Chlordane	
delta-BHC	
Dieldrin	
Endosulfan I	
Endosulfan II	
Endosulfan sulfate	
Endrin	
Endrin aldehyde	
Endrin ketone	
gamma-BHC (Lindane)	
Heptachlor	
Heptachlor epoxide	
Toxaphene	
g-Chlordane	
PCBs, Total	
ORGANOTINS	
Dibutyltin dichloride	not necessary
Monobutyltin trichloride	unless there
Tetrabutyltin	had been vessel
Tributyltin hydride	repairs nearby
METALS	
Antimony	
Arsenic	

Analyte/ Parameter	NOTES
Cadmium	
Chromium, total	
Copper	
Lead	
Mercury	
Nickel	
Silver	
Zinc	
MISCELLANEOUS	
Ammonia	
% Clay	sediment only
% Sand and Gravel	sediment only
% Silt	sediment only
Solids Content (%)	sediment only
Total Organic Carbon	
TPH	
RCI - for initial waste characterization	
Reactivity - sulfides, cyanides	
Corrosivity or pH	
Ignitability or flashpoint	sediment only

APPENDIX E

L&A PROJECT EXHIBITS

PRELIMINARY
DECEMBER 10, 2020

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
& associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

REV	DATE	BY	DESCRIPTION	REV	DATE	BY	DESCRIPTION

THIS DOCUMENT IS RELEASED FOR PRELIMINARY REVIEW UNDER THE AUTHORITY OF CHRISTOPHER S. GUY ENGINEER, TX. P.E. 116477 ON 12/10/2020. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, OR PERMITTING PURPOSES

DATE DEC. '20
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

CEDAR BAYOU
DEEPENING PERMIT
PROPOSED NEW PLAN

9813-15
SHEET NO.
C1

PRELIMINARY
DECEMBER 10, 2020

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C2.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
& associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

REV	DATE	BY	DESCRIPTION	REV	DATE	BY	DESCRIPTION

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SCALE NOTED
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DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C2

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

CEDAR BAYOU
DEEPENING PERMIT
PROPOSED NEW PLAN

9813-15
SHEET NO.
C2

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612–C3.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
& associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

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DATE DEC. '20
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612–C3

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

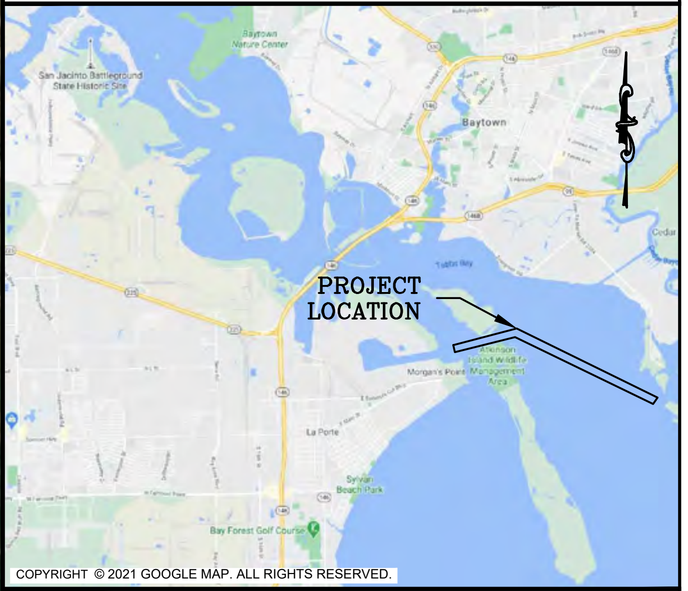
CEDAR BAYOU
DEEPENING PERMIT
POTENTIAL FUTURE SITE PLAN

9813–15
SHEET NO.
C3

APPENDIX F

TWE FIELD PROGRAM LOCATION PLAN

VICINITY MAP



FIELD PROGRAM COORDINATES

ITEM	DEPTH	LATITUDE	LONGITUDE
MB–1*	50'	29° 41' 03.48" N	94° 58' 49.18" W
MB–2	50'	29° 41' 09.92" N	94° 58' 34.73" W
SS/MB–3	50'	29° 41' 16.75" N	94° 58' 18.70" W
MB–4*	50'	29° 41' 20.05" N	94° 57' 59.73" W
SS/MB–5	50'	29° 41' 11.73" N	94° 57' 36.55" W
MB–6	50'	29° 41' 02.89" N	94° 57' 17.19" W
SS/MB–7*	50'	29° 40' 54.14" N	94° 56' 57.56" W
MB–8	50'	29° 40' 45.03" N	94° 56' 37.31" W
SS/MB–9	50'	29° 40' 36.21" N	94° 56' 21.21" W
MB–10*	50'	29° 40' 22.72" N	94° 56' 04.86" W
MB–11	200'	29° 40' 14.53" N	94° 55' 51.04" W

LEGEND

SYMBOL	DESCRIPTION
⊕	TEST BORING LOCATION
⊕	TEST BORING W/ SEDIMENT SAMPLING LOCATION
*	ENVIRONMENTAL/ANALYTICAL SAMPLING LOCATION

Tolunay-Wong Engineers, Inc.

PROPOSED FIELD PROGRAM LOCATION PLAN
CEDAR BAYOU DEEPENING/WIDENING
CHAMBERS COUNTY IMPROVEMENTS DISTRICT #1
CHAMBERS COUNTY, TEXAS

Drawn	*O.R.*	*02–08–2021*
Checked	*T.O.*	*02–08–2021*
Approved	*T.G.H.*	*02–08–2021*
Scale	*N.T.S.*	

TWE DRAWING NO. *P20–B352.1 REVISION 2*

APPENDIX G

TWE ITEMIZED BUDGET ESTIMATE

Proposed Budget Estimate

Description		Unit	Quantity	Rate	Extension
Pre-Commencement Activities					
1	Senior Project Manager	hour	8	$200.00	$1,600.00
2	Project Professional	hour	8	$130.00	$1,040.00
3	Field Services Supervisor	hour	8	$95.00	$760.00
4	DSC Pre-Commencement Preparations	lump sum	1	$3,520.00	$3,520.00
Field Program - Marine TBs/SSs					
5	Transports of Geotechnical Equipment/Personnel	each	2	$300.00	$600.00
6	6-in Diameter Threaded Steel Casing	foot	30	$25.00	$750.00
7	PMI Load/Unload Crane Barge	each	2	$225.00	$450.00
8	PMI Towboat/Barge/Fuel Consumption	day	10	$3,850.00	$38,500.00
9	DSC Field Execution/Personnel/Supplies	lump sum	1	$10,010.00	$10,010.00
10	3-Man Crew/Equipment	day	10	$2,600.00	$26,000.00
11	Senior Technician	day	10	$775.00	$7,750.00
12	Support Boat	day	10	$450.00	$4,500.00
13	Support Vehicles	day	10	$225.00	$2,250.00
14	Field Services Supervisor	hour	10	$95.00	$950.00
Laboratory Testing					
15	Standard Classification/Strength Laboratory Testing	foot	700	$10.00	$7,000.00
16	Particle Size Analysis with Hydrometer	each	15	$135.00	$2,025.00
17	Classification/Standard Proctor Series (ASTM D689)	each	11	$300.00	$3,300.00
18	DSC Environmental/Analytical Testing (Expedited)	lump sum	1	$13,200.00	$13,200.00
Log Compilation/Engineering Analysis/Report Preparation/Project Meetings					
19	Principal	hour	8	$225.00	$1,800.00
20	Senior Project Manager	hour	40	$200.00	$8,000.00
21	Project Professional	hour	80	$130.00	$10,400.00
22	Staff Professional	hour	28	$100.00	$2,800.00
23	DSC Evaluation/Reporting	lump sum	1	$9,550.00	$9,550.00
Total Budget Estimate					**$156,755.00**

TOLUNAY-WONG
ENGINEERS

DRAFT

DRAFT GEOTECHNICAL ENGINEERING REPORT
CEDAR BAYOU DEEPENING & WIDENING PROJECT
CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CHAMBERS COUNTY, TEXAS

Prepared for:

Trans-Global Solutions, Inc.
1735 West Cardinal Drive
Beaumont, Texas 77705

Prepared by:

Tolunay-Wong Engineers, Inc.
2455 West Cardinal Drive, Suite A
Beaumont, Texas 77705

August 17, 2021

TWE Project No. 21.23.029 / Report No. 120938

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DRAFT

August 17, 2021

Trans-Global Solutions, Inc.
1735 West Cardinal Drive
Beaumont, Texas 77705

Attn: Mr. James Scott
JScott@tgsgroup.com

Ref: Draft Geotechnical Engineering Report
Cedar Bayou Deepening & Widening Project
Chambers County Improvement District #1
Chambers County, Texas
TWE Project No. 21.23.029 / Report No. 120938

Dear Mr. Scott,

Tolunay-Wong Engineers, Inc. (TWE) is pleased to submit this draft report of our geotechnical study conducted for the Cedar Bayou Deepening & Widening Project for Chambers County Improvement District #1 in Chambers County, Texas. This report contains a detailed description of the field and laboratory work performed for this study, logs of test borings, laboratory test results and our geotechnical design and construction recommendations for the referenced project. If you have any questions regarding this report or if we can be of further assistance, please do not hesitate to contact us.

Sincerely,

TOLUNAY-WONG ENGINEERS, INC.
TBPELS Firm Registration No. F-124

Trey O'Connor, E.I.T.
Project Geotechnical Engineer

Tyler G. Henneke, P.E.
Vice President

TO/TGH/to

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APPENDICES

1 INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of our geotechnical engineering study performed for the referenced project. Our investigations were conducted in general accordance with TWE Proposal No. P20-B352 (Revision 2) dated February 8, 2021 and authorized by Trans-Global Solutions, Inc. (TGS) via Subcontract Agreement dated March 3, 2021.

The project includes dredging the existing Cedar Bayou channel between Cedar Port Industrial Park and the Houston Ship Channel. The ship channel will be widened from 100-ft to increase the channel bottom to a width ranging from 300-ft to 450-ft and deepened to an approximate elevation of El. (-)45-ft. A side slope gradient on the order of to 1V:2H is being considered at this time. Current water depths within the channel range from 2-ft to 12-ft along the project alignment.

The project also includes the design and construction of a dock and barge fleeting area which will consist of a new dock platform and approachway, mooring structures and a roll-on/roll-off (RORO) ramp. We understand a 256-ac Dredge Material Placement Area (DMPA) is also being considered landside of the proposed Dock Area. Lanier & Associates Consulting Engineers (L&A) will be the Engineer responsible for the design and construction of the proposed dock and barge fleeting area. Project exhibits, provided by the Engineer, are provided in Appendix A of this report.

2 PURPOSE AND SCOPE OF SERVICES

The purposes of our geotechnical engineering study were to investigate the subsurface soil and groundwater conditions along the project alignment and to assist the Client in the preliminary design phase of the project. Our scope of services for this study consisted of:

1. Conducting ten (10) marine test borings and three (3) landside test borings to evaluate subsurface stratigraphy and groundwater conditions along the project alignment;

2. Performing geotechnical laboratory tests on recovered soil samples from the test borings to evaluate the physical and engineering properties of the strata encountered;

3. Performing environmental and analytical laboratory tests to provide preliminary conclusions regarding the use of dredged material for placement within the designated DMPA;

4. Preparing a synopsis of our findings including existing project site conditions, subsurface soil and groundwater conditions and boring logs presenting tabulated field and laboratory test results;

5. Performing evaluations of global slope stability of the proposed dredged channel side slopes for comparison to the recommended USACE factors of safety;

6. Providing geotechnical design recommendations for deep foundation systems including axial compression and tension capacities, lateral pile response analysis, pile group considerations and settlement estimates;

7. Performing rotational (internal) and global (external) stability analyses of the proposed anchored bulkhead to determine required sheet pile embedment depth and required sheet pile section modulus; and,

8. Geotechnical recommendations for site development using dredged materials, ground improvements, fill and backfill placement, compaction requirements, foundation installation guidelines and overall quality control testing, monitoring and inspection guidelines.

Our scope of services did not include any environmental assessments for the presence or absence of wetlands at this site. Any statements in this report or on the boring logs regarding odors, colors, unusual items and conditions are strictly for the information of the Client. A geological fault study was also beyond the scope of our investigations.

3 FIELD PROGRAM

The field program performed for this project included ten (10) marine test borings within the channel and three (3) landside test borings in the location of the proposed barge fleeting area. The test boring locations and depths explored are presented on TWE Drawing Nos. 21.23.029-1 and 21.23.029-2 provided in Appendix B.

3.1 Test Borings

3.1.1 Drilling Methods

The marine test borings (MB-1 to MB-10) were performed from March 12 to March 18, 2021 using conventional truck-mounted drilling equipment positioned on a lift boat. The marine equipment, including the lift boat and a support boat, was provided by our Subcontractor, Peninsula Marine, Inc. Wash-rotary drilling techniques were utilized from the existing mudline to the boring completion depths. At test boring locations MB-1, MB-5, MB-7 and MB-9 our field crew was accompanied by representatives of DiSorbo Consulting, LLC to collect soil samples for the environmental and analytical scope of the project.

The landside test borings were performed from March 29 to April 1, 2021 using conventional highland buggy-mounted drilling equipment. The boreholes were advanced using dry-auger drilling methods until groundwater was encountered or until borehole conditions required the use of wash-rotary drilling techniques.

The soil borings were performed in general accordance with the Standard Practice for Soil Investigation and Sampling by Auger Borings (ASTM D1452). Soil samples were obtained continuously at 3-ft depth intervals to a depth of 20-ft and at 5-ft depth intervals thereafter until the boring completion depths were reached.

3.1.2 Soil Sampling

Fine-grained, cohesive soil samples were recovered from the soil boring by hydraulically pushing a 3-in diameter, thin-walled tube to about 24-in. The field sampling procedures were conducted in general accordance with the Standard Practice for Thin-Walled Tube Sampling of Soils (ASTM D1587). Our Geotechnicians visually classified the recovered soils and obtained field strength measurements of the recovered soils using a calibrated pocket penetrometer and/or hand torvane device. The tube samples were extruded in the field, wrapped in foil, placed in moisture-sealed plastic bags and protected from disturbance prior to transport to the laboratory. The recovered soil sample depths and field strength measurements are shown on the project boring logs presented Appendix C.

Cohesive soils thought to be coarse-grained, as well as cohesionless and semi-cohesionless coarse-grained soils, were collected with the Standard Penetration Test (SPT) sampler driven 18-in by blows from a 140-lb hammer falling 30-in in accordance with the Standard Test Method for Standard Penetration Test (SPT) and Spilt-Barrel Sampling of Soils (ASTM D1586). The number of blows required to advance the sampler three (3) consecutive 6-in depths are recorded for each corresponding sample on the boring log. The N-value, in blows per foot, is obtained from SPTs by adding the last two (2) blow count numbers. The consistency of cohesive soils and the relative density of cohesionless and semi-cohesionless soils can be inferred from the N-value. The samples obtained from the split-barrel sampler were visually classified, placed in moisture-sealed plastic bags and transported to our laboratory. SPT sampling intervals and blow counts are presented on the project boring logs in Appendix C.

At test boring locations MB-3, MB-5, MB-7 and MB-9 sediment samples were collected from the bottom of the channel. The sediment samples were obtained using a manual clamshell sampler. The sediment samples were obtained from the clamshell sampler were visually classified, placed in moisture-sealed plastic bags and transported to the laboratory.

3.1.3 Boring Logs

Our interpretations of general subsurface soil and groundwater conditions encountered in the project borings are included on the logs in Appendix C. The interpretations of the soil types throughout the boring depths and the locations of strata changes were based on visual classifications during field sampling and laboratory testing using the Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) [ASTM D2487] and the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) [ASTM D2488]. A key to symbols and terms used on the boring logs is also included presented in Appendix C.

3.1.4 Groundwater Measurements

Groundwater level measurements were attempted in the open landside boreholes during dry-auger drilling. Measurements were taken initially during dry-auger drilling when groundwater was first encountered and at 5-min intervals thereafter over a 15-min time period. The groundwater measurements observed within the soil borings are described in Section 5.4 of this report.

4 LABORATORY SERVICES

A geotechnical laboratory testing program was conducted on select soil samples from the test borings to assist in classification and evaluation of the physical and engineering properties of the soils encountered at the project site. Laboratory tests were performed in general accordance with ASTM International standards. The types and brief descriptions of the geotechnical and analytical laboratory tests performed are presented in Tables 4-1 below.

Table 4-1: Geotechnical Laboratory Testing Program

Test Description	Test Method
Amount of Material in Soils Finer than No. 200 Sieve	ASTM D1140
Water (Moisture) Content of Soil	ASTM D2216
One-Dimensional Consolidation Using Incremental Loading	ASTM D2435
Unconsolidated-Undrained Triaxial Compression on Cohesive Soils	ASTM D2850
Liquid Limit, Plastic Limit and Plasticity Index of Soils	ASTM D4318
Consolidated Undrained (CU) Triaxial Compression Test on Cohesive Soils	ASTM D4767
Density (Unit Weight) of Soil Specimens	ASTM D7263
Particle-Size Distribution Using Hydrometer Analysis	ASTM D7928

Standard geotechnical laboratory test results are presented on the project boring logs provided in Appendix C. Results of the geotechnical laboratory tests performed on sediment samples are provided in Appendix D. Results of the one-dimensional consolidation (landside samples only) and CU tests performed on select samples are presented graphically in Appendices E and F, respectively. The CU tests performed for the project were completed by our Subcontractor, TRI Environmental, Inc.

4.1 Consolidation Testing

Sample disturbance issues related to consolidation test results are discussed in detail in published literature for soft clays (Anderson and Kolstad, 1979, DeGroot et al., 2005) as well as for over-consolidated clays (Sabatini et al., FHWA Circular No. 5, 2002). According to the referenced FHWA publication, sample disturbance can occur during handling and transportation to laboratory despite best efforts to maintain structural integrity and moisture condition of the samples.

Anderson and Kolstad (1979) suggest the volumetric strain required to consolidate the sample back to its in-situ vertical effective stress is a relative indicator of sample quality. Table 4-2 on the following page shows the Sample Quality Designations (SQD) suggested by Anderson and Kolstad (1979) which were used for screening of the consolidation samples.

Table 4-2: Sample Quality Designation	
Volumetric Strain (%)	**Specimen Quality Designation (Description)**
< 1	A (Very Good to Excellent)
1 – 2	B (Good)
2 – 4	C (Fair)
4 – 8	D (Poor)
> 8	E (Very Poor)

Actual SQD determinations for the soil samples tested are provided in Table 4-3 below. Soil stress history and compressibility parameters derived from the consolidation tests are also presented in Table 4-3 below. Graphical results of the one-dimensional consolidation tests performed on selected samples are presented in Appendix E.

Table 4-3: Summary of One-Dimensional Consolidation Test Results

Test Boring	Depth (ft)	Soil Classification	e_o	p_c (tsf)	C_c	C_r	OCR	SQD
LB-1	6 – 8	Fat Clay (CH)	0.710	5.3	0.21	0.026	12.6	A
LB-1	28 – 30	Fat Clay (CH)	0.860	8.1	0.25	0.031	7.5	A
LB-1	48 – 50	Fat Clay (CH)	0.953	9.9	0.35	0.044	6.0	A
LB-2	93 – 95	Lean Clay with Sand (CL)	0.692	4.7	0.17	0.021	1.6	D*
LB-3	4 – 6	Fat Clay (CH)	0.785	1.9	0.24	0.030	6.3	A
LB-3	23 – 25	Fat Clay (CH)	0.705	5.8	0.20	0.025	6.8	A

*Samples with an SQD of D were not considered in our evaluations.

Symbol Key:

e_o = Initial Void Ratio
p_c = Pre-consolidation Pressure
C_c = Compression Index
C_r = Recompression Index
OCR = Overconsolidation Ratio
SQD = Sample Quality Designation

4.2 Environmental and Analytical Testing

Pre-dredge environmental and analytical sampling and testing was also performed as a part of our scope of services for this project. A separate report, submitted by our Subconsultant (DiSorbo Consulting, LLC) under separate cover in May 2021, provides details regarding the results of the preliminary testing performed for the proposed dredge envelope. A redacted findings report is provided in Appendix L for the purposes of this geotechnical report. The executive summary of the environmental findings report is discussed further in Section 5.5 herein.

5 PROJECT SITE CONDITIONS

Our interpretations of soil and groundwater conditions along the project alignment are based on geotechnical information obtained at the locations of the test borings performed for this study. This information has been used as the basis for our geotechnical design and construction recommendations included in this report. Subsurface conditions could vary at areas not explored by the test borings referenced herein. Significant variations in areas not explored by the test borings could require additional investigations.

5.1 Site Description and Surface Conditions

The project alignment is located between Cedar Port Industrial Park and the Houston Ship Channel in Chambers County, Texas. At the time of our field program, the water levels within the channel at the test boring locations were measured to range from 2-ft to 10.4-ft. The depth from the water surface to mudline at test boring MB-1 was not measured in the field. An approximate mudline elevation was selected at this location using the bathymetric information provided by the Engineer. Surface conditions at the landside test borings were undulating and consisted of grass cover accessible by highland buggy-mounted ATV rigs.

5.2 Subsurface Soil Stratigraphy

The generalized subsurface soil conditions within the project site were interpreted from the test boring logs presented in Appendix C. Two (2) sets of subsurface design groups were developed within the channel based on the subsurface strata encountered. The generalized subsurface profiles encountered within the channel alignment are summarized in Table 5-1 and Table 5-2 below. The generalized subsurface profile encountered landside near the barge fleeting area is summarized in Table 5-3 on the following page.

Table 5-1: Generalized Subsurface Soil Stratigraphy – MB-1 & MB-2

Approximate Elevation Range (ft)		Strata Description
(-)4	(-)10	Very Loose Sand
(-)10	(-)22	Very Soft to Soft Clay
(-)22	(-)33	Very Loose to Medium Dense Sand
(-)33	(-)38	Stiff Clay
(-)38	(-)60	Very Stiff Clay

Table 5-2: Generalized Subsurface Soil Stratigraphy – MB-3 to MB-10

Approximate Elevation Range (ft)		Strata Description
(-)4	(-)22	Very Soft to Firm Clay
(-)22	(-)48	Firm to Stiff Clay
(-)48	(-)60	Loose to Very Dense Sand

Table 5-3: Generalized Subsurface Soil Stratigraphy – LB-1 to LB-3		
Approximate Elevation Range (ft)		**Strata Description**
(+)10	(-)6	Stiff Clay
(-)6	(-)13	Firm Clay
(-)13	(-)59	Stiff to Very Stiff Clay
(-)59	(-)86	Dense to Very Dense Sand
(-)86	(-)106	Stiff to Very Stiff Clay
(-)106	(-)112	Loose to Medium Dense Sand
(-)112	(-)122	Stiff Clay
(-)122	(-)142	Medium Dense Sand
(-)142	(-)162	Very Stiff Clay
(-)162	(-)182	Very Dense Sand
(-)182	(-)194	Very Stiff Clay

Details of the soil conditions encountered in the project borings can be found on the corresponding test boring logs presented Appendix C. Cross-sectional subsurface profiles are also included in Appendix C.

5.3 Design Soil Parameters

Design soil parameters for engineering analyses were developed based on field and laboratory measurements, published literature and our experience with soils in the area. A ratio of undrained cohesion to effective overburden pressure (c/p) equaling 0.22 was used to determine minimum undrained shear strength values with depth according to the SHANSEP (Soil Stress History and Normalized Soil Engineering Properties) relation (Ladd and Foote, 1974). The design soil parameters developed for the project are presented in Appendix G.

Please note the generalized design soil stratification and soil types along with depth, assumed for engineering analyses purposes, can vary from the soil types and conditions encountered in the individual soil borings. In addition to the three (3) subsurface stratigraphy groups presented in Tables 5-1 through 5-3 above, a set of soil design parameters based solely on test boring MB-10 was developed for offshore dock structures. Details of the soil conditions encountered in the soil borings can be found on the corresponding soil boring logs presented in Appendix C.

5.4 Groundwater Observations

Groundwater measurements obtained from the landside soil borings when groundwater was first encountered during dry-auger drilling and after a 15-min hold period. The groundwater measurements obtained within the boreholes are provided in Table 5-4 on the following page.

Table 5-4: Groundwater Level Measurements

Test Boring	Boring Completion Depth (ft)	Free Water Depth during Dry-Auger Drilling (ft)	15-minute Static Water Level (ft)	15-min Total Hole Depth (ft)
LB-1	120	17.0	7.7	16.0
LB-2	200	11.0	7.3	8.0
LB-3	25	12.0	4.6	8.7

Groundwater levels at the project site could fluctuate with climatic and seasonal variations and should be verified before construction. Accurate determination of static groundwater levels is typically made with standpipe piezometers. Installation of standpipe piezometers to evaluate long-term groundwater conditions within the project site was not included in our scope of services for this project.

5.5 Environmental and Analytical Assessment

A separate report including details of the environmental and analytical program has been prepared by our Subconsultant, DiSorbo Consulting, LLC. The primary purpose of this study was to determine, in a preliminary capacity, if the soils cut from the dredge envelope are suitable for placement in Dredge Material Placement Areas (DMPAs). The results of the environmental and analytical testing indicate the materials dredged from the channel are suitable for placement in both private and federal placement areas. Please refer to the Executive Summary in the redacted Pre-Dredge Environmental Findings Report in Appendix L for further information.

6 DISCUSSION

The purpose of our geotechnical study was to provide geotechnical design and construction considerations for the preliminary design phase of the referenced project. As previously discussed, preliminary plans consist of dredging the channel to an elevation of El. (-)45-ft and widening the channel to widths ranging from 300-ft to 450-ft. The project will also include the design and construction of a proposed dock and barge fleeting area.

6.1 Global Stability Analysis

Dredging the bottom of slopes or in the lower part of slopes has the same effect as making the slope steeper or higher. When dredging or filling makes a slope steeper or higher, the active forces increase and the resisting (passive) forces are reduced, which leads to an increased risk of slope failures. Results of our slope stability analyses for short-term and long-term cases for the proposed channel side slope are provided in Section 7 of this report.

6.2 Site Grade Raise Fill Placement

We understand fill is planned to raise site grade within the shoreline area of the proposed dock and barge fleeting area to facilitate site drainage and construction activities of the proposed RORO ramp and storage lot. Based on drawings provided by the Engineer, we expect final site grade in this landside area to range from El. (+)5-ft to El. (+)12-ft. Existing site grade ranges from El. (+)2-ft to El. (+)14-ft. Estimated settlement due to area fill placement is discussed in Section 8 of this report.

6.3 Deep Foundation Systems

We anticipate deep foundations will be used for support of the proposed dock and barge fleeting structures. We considered driven piles such as steel open-ended pipe piles (OEPPs), square precast concrete piles (PCPs), cylindrical spun cast concrete piles (CSCCPs), Class B southern pine timber piles, and steel H-piles for this project. Recommendations for deep foundation systems are provided in Section 9 of this report. If additional pile types or sizes are considered, TWE should be contacted to include them in our final report.

6.4 Sheet Pile Bulkhead

We understand the construction of an anchored sheet pile bulkhead is being considered for the barge fleeting and RORO ramp area at this time. Based on information provided by the Engineer, we understand the anchored bulkhead will have a top of wall elevation of (+)12-ft and (+)5-ft at the dock area and RORO ramp area, respectively. We understand the loading behind the wall at the dock area and RORO ramp area is expected to be on the order of 1,250-psf and 250-psf, respectively. General recommendations for the sheet pile bulkheads are provided in Section 10 of this report.

6.5 Construction Considerations

General site and subgrade preparation, and other recommended construction guidelines such as fill and backfill types, are provided in Section 11 of this report.

7 CHANNEL SLOPE STABILITY

An evaluation of global slope stability of the dredged channel was performed considering the proposed channel cross section provided by the Engineer. Our analysis considered a channel bottom elevation of El. (-)49-ft to consider over-dredging and/or maintenance and side slopes on the order of 2H:1V.

7.1 Methodology

We performed global stability analyses of the proposed channel cross sections using the computer program Slide 2018 by Rocscience. Slide is a two-dimensional (2D) limit equilibrium slope stability program for evaluating the safety factor of failure surfaces in soil slopes. Slide analyzes the stability of slip surfaces using vertical slice limit equilibrium methods. Spencer's (1967) method was used which satisfies both force and moment equilibriums.

Stability of the channel side slopes was evaluated for short-term (undrained or total stress) and long-term (drained or effective stress) conditions. The short-term (end of construction) condition corresponds to the slope's state immediately after completion. In this condition, excess pore water pressures in the soils within the slope are assumed to have not been dissipated due to rapid application of the loading. Therefore, the soils are assumed to be in an undrained state. The long-term condition represents the case where the excess pore water pressures in the soils within the slope have dissipated over time and an effective stress or drained state has developed.

7.2 Results and Discussion

The results of our global stability evaluations are presented in Appendix H. According to the guidance provided in U.S. Army Corps of Engineers (USACE) Engineer Manual for Slope Stability (EM 1110-2-1902), the minimum required factor of safety considered appropriate for short-term stability cases is 1.3 and 1.5 for long-term global stability cases. Based on the results of our analyses, side slopes on the order of 2H:1V meet the USACE requirements.

It should be noted that several layers of loose to medium dense sand were encountered within the test borings performed within the channel alignment. Shallow surface slides and erosion of the slope caused by the flow of the channel can be expected. We recommend the constructed slopes be monitored long-term after construction and that proper maintenance of the channel is performed as needed.

8 SITE GRADE RAISE FILL PLACEMENT

Fill placed above existing site grade within the landside of the dock and barge fleeting area will affect design of foundations planned for the project due to settlement from increased overburden pressure of the fill. Impact of settlement as a result of fill placement primarily applies to structures supported at or near grade such as shallow foundations, paving, drainage alignments/tie-ins and interfaces between pile-supported and grade-supported structures. For deep foundations, effects of settlement from fill will be more significant if piles are tipped in clay soils and less significant if piles are tipped into competent sand strata.

Some settlement of the native site soils can be expected from the weight of the fill used to raise site grade. The magnitude of settlement will depend on the actual fill depths and the compressibility of the underlying soils. Based on the topographic information provided by the Engineer, existing site grade at the locations where fill is expected be placed ranges from approximately El. (+)2-ft to El. (+)10-ft. We evaluated area settlement due to placement of 3-ft, 6-ft, 9-ft and 12-ft of fill to raise site grade using a total unit weight of 120-pcf for the fill assuming dredged materials from the proposed Cedar Bayou channel will be used.

We performed an analysis of consolidation settlement due to fill placement using the computer program UniSettle (Version 4.0). Immediate settlement is expected to occur during or shortly after fill placement and therefore, was not considered in our analysis. Consolidation settlement will begin upon fill placement and continue at a decreasing rate over a period of 10-years or longer after construction is complete. The results of our analysis are summarized in Table 8-1 below.

Table 8-1: Summary of Fill Settlement Analyses

Fill Height	Consolidation Settlement
3-ft	2.0-in
6-ft	4.0-in
9-ft	7.7-in
12-ft	14.0-in

Please note the above settlement estimates could be +/-30% of the actual values realized during development of the site as areal settlement will depend on sequence of placement and actual fill thicknesses which should be monitored accordingly. We recommend settlement plates with extendable rods be installed prior to fill placement so that conventional surveying measurements can be made during construction to monitor actual settlements. Vibrating wire piezometers (VWPs) could also be installed to monitor pore water pressure during fill placement in critical areas of the site. If the above settlements are not tolerable, or if settlement needs to be accelerated, TWE should be contacted to discuss potential ground improvement options.

9 DEEP FOUNDATION SYSTEMS

This section applies to landside and marine structures which will be supported using deep foundation systems. Deep foundation systems considered herein consist of driven steel open-ended pipe piles (OEPPs), square precast concrete piles (PCPs), cylindrical spun cast concrete piles (CSCCPs), class B southern pine timber piles and H-piles. Geotechnical recommendations for these foundation types are provided in the following sections. If other pile types or sizes will be considered, TWE should be contacted to provide this information in our final report.

The pile capacities derived for offshore driven piles were based solely on subsurface information obtained from test boring MB-10 as preliminary information. Additional test borings in the location of the proposed dock are recommended to verify subsurface stratigraphy closer to the final structure locations.

9.1 Axial Pile Capacity

For driven piles, we computed ultimate compression and tension capacities of a single pile using the static method of analysis recommended by American Petroleum Institute (API RP 2A - WSD, 2002). The analyses were performed using the computer code APILE Plus, Version 2019 (Ensoft, Inc.). The ultimate axial pile capacity curves for the various pile types and sizes considered are provided in Appendix I. Ultimate axial pile capacity plots for offshore piles are provided in Figures 1 through 12 in Appendix I for varying mudline elevations. Ultimate axial pile capacity curves for piles driven landside are provided in Figures 13 through 16 in Appendix I. To calculate the capacity of battered piles, a generalized procedure for computing approximate axial and horizontal capacity is presented in Appendix J.

Ultimate axial pile capacities obtained from the curves in Appendix I should be reduced by an appropriate factor of safety to compute the allowable axial shaft capacity. A factor of safety of 2.5 is recommended to compute allowable compression capacity. A factor of safety of 3.0 is recommended to compute allowable tension capacity. If load testing will be conducted as part of the construction scope, reduced factors of safety as low as 2.0 could be considered. The buoyant weight of the piles can be added to the tension capacity. The computed weight of the piles should be reduced by a factor of 1.2 for design.

We discounted frictional resistance of the soils to 5-ft below existing grade or mudline to account for pile cut-off elevation and possible disturbances during construction. It should be noted the tension capacity is based solely on soil/pile interaction. Piles and pile cap connections should be structurally capable of resisting design uplift loads.

9.1.1 Individual Pile Settlement

A detailed analysis of axial load versus settlement for deep foundations was beyond the scope of this investigation. However, for single-isolated piles designed in accordance with the computed allowable values of side friction and end bearing, individual pile settlements should be less than about 0.5-in.

9.2 Lateral Pile Response

For deep foundations, lateral loads are resisted by the soil as well as the rigidity of the pile. Lateral capacity will vary with pile type and properties, degree of fixity and pile spacing. Typically, lateral loads are analyzed using the p-y method in which the soil is modeled as a series of non-linear springs.

This procedure with appropriate computer codes (i.e., LPILE by Ensoft, Inc.,) has the advantage that major factors influencing soil resistance are inherently included in the semi-empirical p-y design criteria. For the subsurface conditions observed within the project site, we recommend the LPILE soil design parameters presented in Appendix K for use with lateral and moment analysis of foundations associated with the project. Separate sets of lateral analysis soil design parameters were developed for piles driven offshore or landside.

9.3 Pile Groups

9.3.1 Axial Group Efficiency

The overall axial compression capacity of a pile group depends on several factors including soil type, pile type and spacing as well as the number of piles in the group. Therefore, groups of piles having a center-to-center spacing of less than three (3) diameters/widths should be analyzed for group efficiency considering both block and individual modes of failure. If pile groups are planned for this project, TWE should be contacted to analyze group capacities once the final pile size, depth and group configurations are selected.

9.3.2 Lateral Group Effects

The effects of close pile spacing results primarily in a reduction in the maximum soil resistance which can be mobilized as compared to the sum of the lateral resistances of individual piles within the group. This leads to the concept of a “p-multiplier” or the Pm factor. If pile groups are planned for this project, TWE should be contacted to analyze lateral group effects and appropriate Pm factors once the final pile size, depth and group configurations are selected.

9.3.3 Pile Group Settlement

Pile group design is typically governed by group settlement rather than axial group capacity or lateral group response. The settlement of a group of piles is significantly influenced by the size of the pile group and the compressibility of the soils below the pile tips. For typical spacing of about three (3) widths/diameters center-to-center, settlement estimates of pile groups (4 x 4 or larger) should be determined.

10 SHEET PILE BULKHEAD

We understand an anchored sheet pile bulkhead will be installed adjacent to the proposed 20-ac storage lot in the dock and barge fleeting area. We understand the anticipated loading behind the proposed sheet pile walls will be 1,250-psf behind the dock wall and 250-psf behind the RORO ramp wall. Details regarding the size of the sheet pile wall and anchor were not available at the time of this report. Based on information provided by the Engineer, we understand the mudline on the passive side of the wall will be sloped with a gradient of 3H:1V away from the wall starting at El. (-)15-ft to the final dredge elevation of El. (-)45-ft at the fenderline.

10.1 Lateral Earth Pressures

For lateral pressures on a permanent structure, the controlling factors include the nature of the retained material, the drainage of the material, and the relative rigidity of the walls. Two (2) soil conditions exist for analyzing lateral pressures on walls, permanent (long-term, drained soil condition) and temporary (short-term, undrained soil condition). Recommended design soil parameters for retention system design for both conditions are tabulated in Figure 7 of Appendix G.

The design of the permanent earth retention structures should consider long-term lateral earth and hydrostatic pressures and the hydrostatic uplift pressures at the base of the structures if the bottom of the structure is below the static groundwater level. For hydrostatic pressure considerations, the static groundwater level was assumed to be at El. 0-ft.

10.2 Stability Analysis

10.2.1 Rotational Stability Analysis

Rotational stability analyses of the sheet pile wall sections were performed using the soil design parameters provided in Figure 7 of Appendix G. The rotational stability analyses were performed considering both undrained (short-term) and drained (long-term) conditions using the computer program CWALSHT developed by U.S. Army Corps of Engineers (USACE) at the Engineering Research & Development Center in Vicksburg, Mississippi. CWALSHT (Dawkins, 1990) uses classical methods of sheet pile analysis based on limit equilibrium in accordance with USACE EM 1110-2-2504 (Design of Sheet Pile Walls).

The evaluation was performed using the Design Mode of the program which determines the embedment depth of the sheet pile section using factored soil shear strengths. The fixed earth support method was assumed. The design bending moment and anchor loads were determined using un-factored soil strengths to avoid compounding factors of safety. We assume the Engineer will use adequate factors of safety for the structural design of the sheet pile section and for anchor design.

In accordance with USACE EM 1110-2-2504, the factors of safety used on the soil strength for active and passive earth pressure computations are presented in Table 10-1 on the following page. Factors of safety are not typically used on soil strength for active pressure computation when the sheet pile deflections are not severely restricted.

Table 10-1: Factors of Safety Applied for Rotational Stability			
Sheet Pile	**Loading Condition**	**Factor of Safety on Soil Strength**	
		Active Pressure	**Passive Pressure**
Permanent Anchored Bulkhead	Short Term	1.0	2.0
	Long Term	1.0	1.5

The minimum sheet pile tip embedment depth was determined from the most critical case of stability analysis which was the rotational stability under long-term (drained) conditions for the dock wall and global stability under long-term (drained) conditions for the RORO ramp wall. Figures 1 and 2 below illustrate the sheet pile configuration and anticipated elevations of final site grade/mudline for the dock wall and RORO ramp wall, respectively.

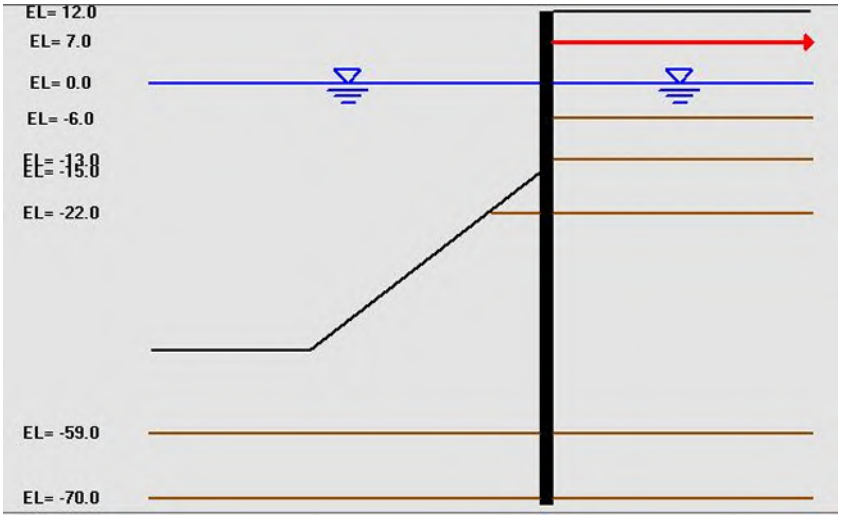


Figure 1: Dock Wall Configuration

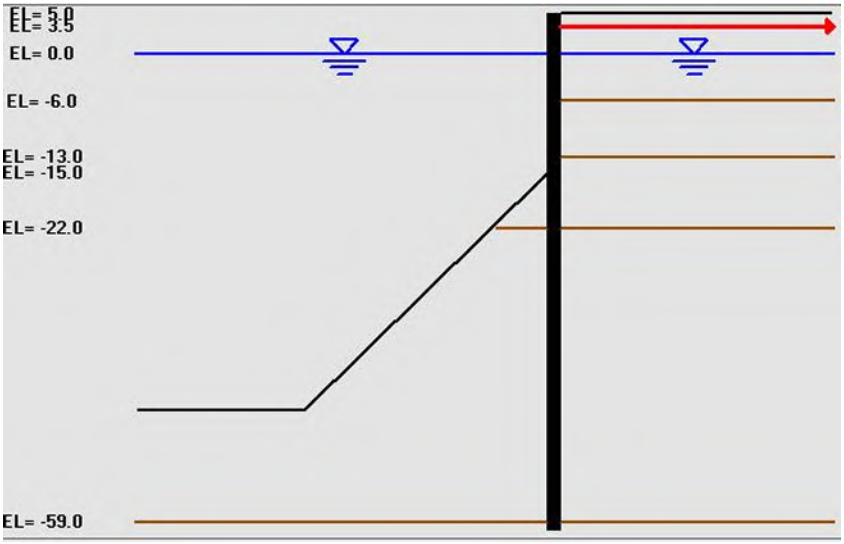


Figure 2: RORO Ramp Wall Configuration

Based on our rotational and global stability analyses, the results of anchored sheet pile bulkheads for the dock and RORO ramp areas are summarized in Table 10-2 and 10-3, respectively.

Table 10-2: Summary of Anchored Sheet Pile Analysis – Dock Wall

Design Parameters	Anchored Wall
Top of Sheet Pile Elevation	(+)12-ft
Anchor Location Elevation	(+)7-ft
Design Sheet Pile Tip Elevation	(-)66-ft
Design Embedment Depth	51-ft*
Design Sheet Pile Length	78-ft
Maximum Bending Moment	97.1-kip-ft/ft
Maximum Scaled Deflection	2.72×10^{10} lb-in^3
Horizontal Anchor Load	15.0 kips/ft

*Assumes mudline elevation of El. (-)15-ft at mudline/wall interface.

Table 10-3: Summary of Anchored Sheet Pile Analysis – RORO Ramp Wall

Design Parameters	Anchored Wall
Top of Sheet Pile Elevation	(+)5-ft
Anchor Location Elevation	(+)3.5-ft
Design Sheet Pile Tip Elevation	(-)36-ft
Design Embedment Depth	21-ft*
Design Sheet Pile Length	41-ft
Maximum Bending Moment	11.4-kip-ft/ft
Maximum Scaled Deflection	8.29×10^{8} lb-in^3
Horizontal Anchor Load	2.4 kips/ft

*Assumes mudline elevation of El. (-)15-ft at mudline/wall interface.

The required section modulus of sheet pile can be estimated by dividing the maximum bending moment by the allowable bending stress of the sheet pile material. The actual modulus of the selected sheet pile section should be greater than the required section modulus. The anticipated maximum deflection of the sheet pile can be determined by dividing the scaled deflection by elastic modulus (E) and moment of inertia (I) of the selected sheet pile section.

10.2.2 Global Stability Analysis

We performed global stability analyses of the critical sheet pile section using the computer program Slide 2018 by Rocscience. We selected the sheet pile embedment depth obtained from the critical case of rotational stability analysis [El. (-) 66-ft]. Global stability analysis was performed using Spencer's (1967) method for short-term and long-term conditions using undrained (total stress) and drained (effective stress) parameters, respectively. The computed factors of safety for global slope failure meet the USACE requirements for both short-term and long-term conditions. The results of our global stability analyses for the bulkhead are presented in Figures 5 through 8 of Appendix H.

11 CONSTRUCTION CONSIDERATIONS

This section provides our geotechnical recommendations pertaining to site preparation, fill material placement and compaction guidelines, foundation installation and overall construction monitoring and quality control.

11.1 Site Preparation

Areas designated for fill placement should be cleared and stripped of vegetation, organics, major root systems and other deleterious fill materials to the depth of competent subgrade capable of supporting proofrolling activities. After stripping, areas to receive fill should be graded to establish positive drainage across the site so that ponding of surface water does not collect and inhibit site access or construction activities. After site grading is completed to establish positive drainage, the exposed subgrade soils should be proofrolled as indicated below.

Prior to placement of fill, we recommend existing subgrade soils be proofrolled with a rubber tire pneumatic roller with a weight of at least 20-tons to detect significant weak areas. Such weak areas should either be removed and replaced with fill or stabilized in-place in general accordance with the recommendations provided herein. We do not recommend using off-road earth moving equipment (e.g. loaders or scrapers) or tracked vehicles for proofrolling.

Proofrolling should extend at least 5-ft beyond the construction limits. Proofrolling specifications should provide acceptance criteria such as rut depths less than 2-in and no visual evidence of pumping. TWE should be present to observe and document proofrolling and to delineate areas of weak or compressible soils, if encountered.

11.2 Fill and Backfill Soils

Fill soil types can be grouped according to their application. Fill soils that are used to support foundations and structures are typically identified as structural fill and are usually associated with engineering specifications. Fill soils that are used for general site grading and raising are typically identified as general fill. The recommended material and compaction requirements for various fill applications are described in the following report sections.

Fills should be placed in uniform layers or lifts. The maximum fill lift thickness should be controlled to maintain compaction throughout the entire fill lift and will depend on the type of compaction equipment used. Typically, a maximum 8-inch lift thickness (loose measure) is appropriate for most conventional compactors.

Prior to any filling operations, samples of the proposed fill materials should be obtained by TWE for laboratory classification and moisture-density relationship testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A representative of TWE should also be present to perform sufficient in-place density tests during the filling operations to verify proper levels of compaction are obtained.

11.2.1 General Fill

General Fill can be used for raising site grade including laydown areas, storage lots and roadways. General Fill can also be used in the lower regions (up to 3-ft below final grade) of deep fill areas where foundations are planned. General fill can also be used for backfill around pile caps.

General Fill should be free of organics, deleterious or otherwise unsuitable materials with a maximum particle size of 3-in or less. Based on borings MB-1 through MB-10, the soils to be dredged from the Cedar Bayou channel are mostly comprised of fat clay (CH) and lean clay (CL) soils which meet General Fill requirements. However, some lenses of cohesionless and semi-cohesionless sand soils were encountered throughout the marine borings at various elevations and boring MB-3 encountered organic clay (OH) in the depth range of 11-ft to 28.5-ft below mudline.

Based on our experience with marine dredging operations, we anticipate the soil solids will separate as natural dewatering occurs once the materials are pumped landside. We expect the clays, sands and silts will propagate and collect in isolated areas depending on the actual sequence of dredging. We do not recommend silts or silty soils classifying as ML, CL-ML, SM, SP-SM, SC-SM or SW-SM be used as General Fill material for this project.

General Fill should be placed in thin lifts, not exceeding 8-in loose measure, moisture-conditioned between -2% and +3% of optimum moisture content and compacted to a minimum 95% of the maximum dry density as determined by ASTM D698 (standard Proctor).

11.2.2 Structural Clay Fill

Structural Clay Fill should be considered for placement beneath soil-supported shallow foundations or other permanent structures sensitive to potential shrink/swell movements from the native or dredged soils. We anticipate Structural Clay Fill will need to be imported from an off-site borrow source and consist of a clean, low-plasticity sandy clay with a liquid limit of less than 40, a plasticity index between 10 and 20, and a maximum particle size of 3-in. In general, the soils encountered in the project borings did not meeting these Structural Clay Fill requirements.

Structural Clay Fill should be placed in thin lifts, not exceeding 8-in loose measure, moisture conditioned between -2% and +3% of optimum moisture content and compacted to a minimum 95% of the maximum dry density as determined by ASTM D698 (standard Proctor).

11.2.3 Structural Sand Fill

We recommend Structural Sand Fill be used as backfill behind the proposed sheet pile bulkheads. Structural Sand Fill material should consist of clean sand with less than 15% material finer than the No. 200 sieve. The sand should be placed in maximum 8-inch loose lifts and uniformly compacted to at least 70% relative density as determined by ASTM D4253 and ASTM D4254.

11.2.4 Structural Fill Alternatives

We understand the material dredged from the Cedar Bayou channel is being considered for beneficial use as much as applicable for the referenced project. As a structural fill alternative, for dredged materials that do not meet the General Fill, Structural Clay Fill or Structural Sand Fill designations, they could be stabilized with a chemical admixture such as lime, cement, fly ash, or a combination thereof, depending on their soil type and corresponding properties. Chemically-modified soils can be used in all applications where Structural Fill is required.

The type and quantity of chemical stabilization required should be determined by performing laboratory treatability studies on the actual soils planned for use. TWE would be pleased to further evaluate composition of available samples and potential stabilization options upon request.

11.3 Deep Foundation Installation

Performance of project structures supported on deep foundation systems will be directly related to the Contractor's adherence to the recommendations in this report and the project plans and specifications. Therefore, we recommend pile installation monitoring services be provided by TWE for this project. Pile installation monitoring services will provide verification the piles are installed in accordance with the intentions of this report and the project driving or installation criteria.

11.3.1 Driven Piles

Pile driving hammers should be selected according to pile type, length, size and weight of pile, as well as potential vibrations resulting from pile driving operations. Care should be taken to ensure the hammer selected is capable of achieving the desired penetration without causing damage to the piles or causing excessive vibrations which could cause damage to nearby structures.

We recommend the Contractor submit a pre-construction wave equation analysis (GRLWEAP or equivalent) prior to mobilization to appropriately size the hammer for the planned pile size and the site subsurface profile. It should be noted the piles could be driven through alternating clay and sand soil layers whereby compression and tension stresses could be of concern during driving. Each pile should be driven to the desired tip elevation and driving resistance without interruption in the driving operations. Pile driving records should be maintained by TWE on-site throughout the duration of pile driving.

It should be noted that a dense to very dense sand strata at elevations ranging from El. (-) 59-ft to El. (-) 88-ft were encountered at the project site. The sand strata encountered within this range could impact the installation of driven piles. It is recommended WEAPs and driveability studies are performed to estimate driving resistance and required hammer energy for driven piles installed for this project.

Some pile heaving could be experienced during installation of adjacent driven displacement type piles. It is therefore recommended that tip elevations of piles be recorded and if significant heave is noted after driving of subsequent piles, provisions should be made for reseating them.

11.4 Pile Load and Integrity Testing

TWE would be pleased to develop a detailed integrity and load testing program for the deep foundations being considered for this project. The purpose of the integrity and load tests would be to evaluate the as-built conditions of the piles, loading/unloading versus displacement response, evaluate ultimate axial compression, axial tension and lateral capacity of the piles, compare measured capacities and deflections with design criteria and develop installation guidelines for the remaining deep foundations to be installed for the project.

The load testing program could include a combination of static pile testing and high-strain dynamic testing to investigate a variety of pile types, sizes and depths. Refined WEAP analyses could also be performed for driven piles utilizing the data obtained from the static and dynamic tests. Using this information, pile driving criteria can be developed to establish a reliable relationship between hammer blow count and pile capacity and to establish pile driving and refusal criteria.

11.4.1 Dynamic Load Testing

We recommend all driven piles included in the test program be dynamically monitored during initial driving and during restrike events after the end of initial driving. Dynamic monitoring should utilize the most current state-of-the-art equipment and software including CAPWAP and WEAP Analysis programs. Additional pile sizes and lengths of interest which are not tested using static methods can be tested by dynamic testing methods at relatively low cost as compared to static testing.

For driven piles, we recommend full-drive monitoring of selected piles during initial driving to evaluate hammer performance, driving behavior, pile stresses and to establish pile driving or refusal criteria. We recommend dynamic monitoring also be performed on driven piles during specific restrike events after the end of initial driving to evaluate pile set up and long-term axial capacity.

11.4.2 Integrity Testing

If used for the project, we recommend the driven PCP piles be tested for quality and consistency using the Pile Integrity Tester (PIT) developed by Pile Dynamics, Inc. The PIT consists of low-strain dynamic testing to approximate relative cross-sectional changes along the length of the pile. Data is obtained with an accelerometer and instrumented weighted hammers in accordance with ASTM D5882.

12 LIMITATIONS

12.1 Limitations

This report has been prepared for the exclusive use of Trans-Global Solutions, Inc. and their project team for specific application to the Cedar Bayou Deepening & Widening Project in Chambers County, Texas. This report has been prepared in accordance with generally accepted geotechnical engineering practices common to the local area. No other warranty, expressed or implied, is made.

The geotechnical explorations performed within the site represent the in-situ condition at these specific locations. They have been used for the basis of the geotechnical design and construction recommendations provided in this report. The soil borings indicate subsurface conditions only at the specific locations and at the times they were performed and only to the depths penetrated. The soil borings do not necessarily reflect strata variations that could exist at other locations within the site.

The validity of the recommendations provided is based in part on assumptions about the stratigraphy made by the Geotechnical Engineer. Such assumptions can be confirmed only during construction and installation of the proposed foundations. Our recommendations presented in this report must be reevaluated if subsurface conditions during construction are different from those described in this report.

If any changes in the nature, design or location of the project are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed, and the conclusions modified or verified in writing by TWE. TWE is not responsible for any claims, damages or liability associated with interpretation or reuse of the subsurface data or engineering analyses without the expressed written authorization of TWE.

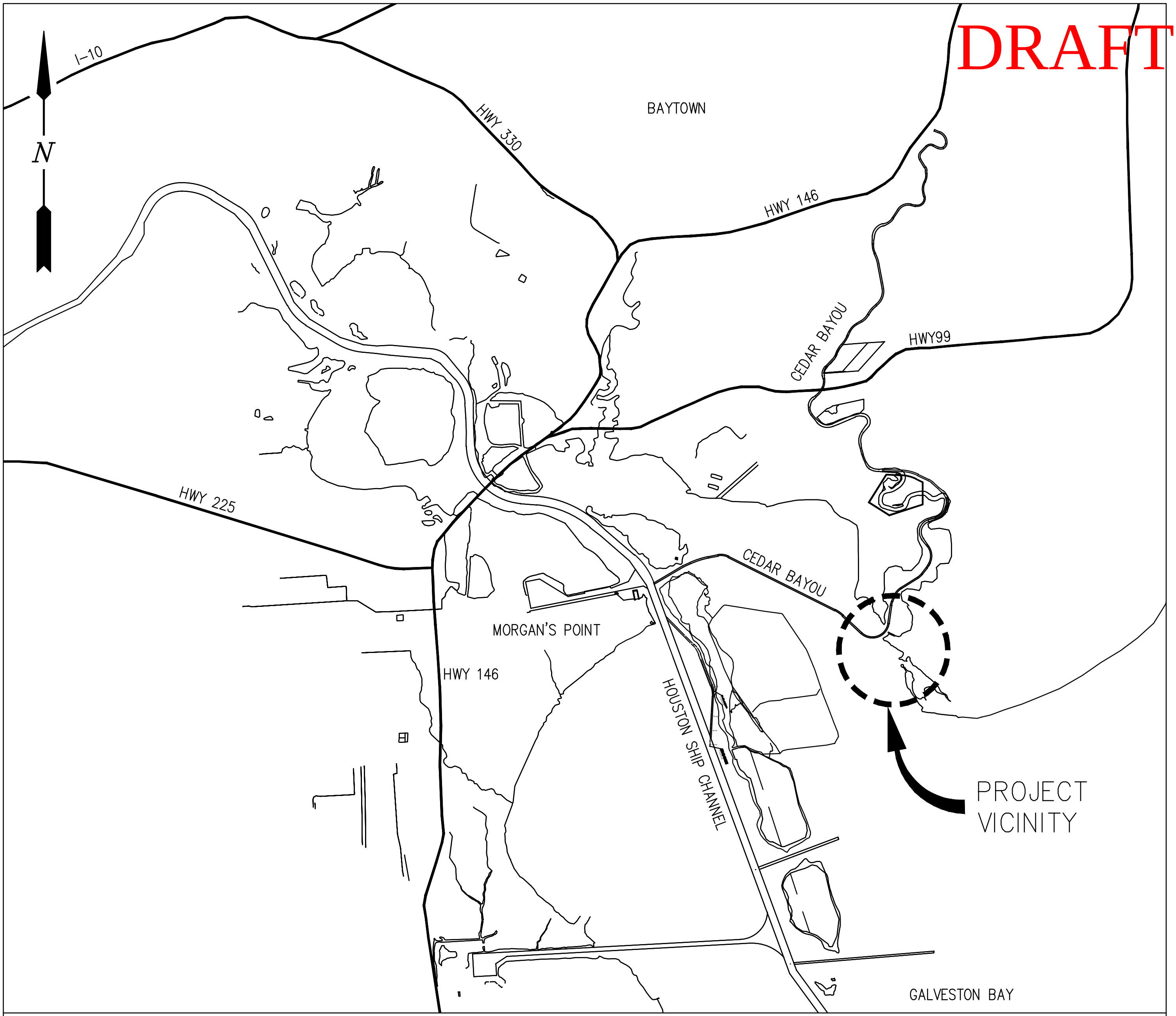
12.2 Design Review and Construction Monitoring

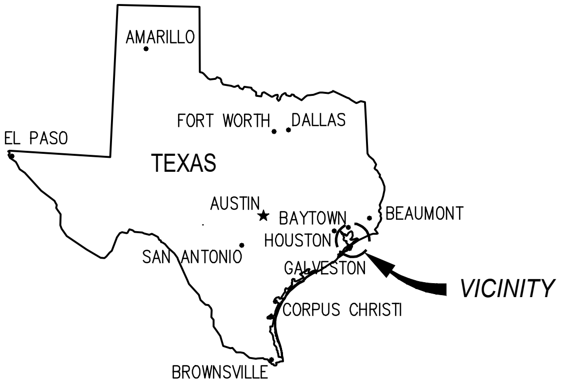
Review of the design and construction drawings should be performed by TWE before release. The review is aimed at determining if the geotechnical design and construction recommendations contained in this report have been properly interpreted. Design review is not within our authorized scope of services for this study at this time.

Construction surveillance by TWE is recommended and has been assumed in preparing our recommendations. These field services are required to check for changes in conditions which could result in modifications to our recommendations. The quality of the construction practices will affect foundation performance and should be monitored by TWE accordingly.

APPENDIX A

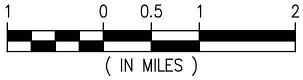
PROJECT EXHIBITS





AREA MAP

VICINITY MAP



CHAMBERS COUNTY
LAT. 29° 40' 00.00" N
LONG. 94° 55' 36.00" W

CHRISTOPHER S. GUY P.E.
TX PE #116477

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TGS CEDAR PORT PARTNERS, L.P.
CEDAR BAYOU TEXAS

CEDAR PORT BARGE DOCK
& BARGE FLEETING
VICINITY MAP

DATE AUG. '20
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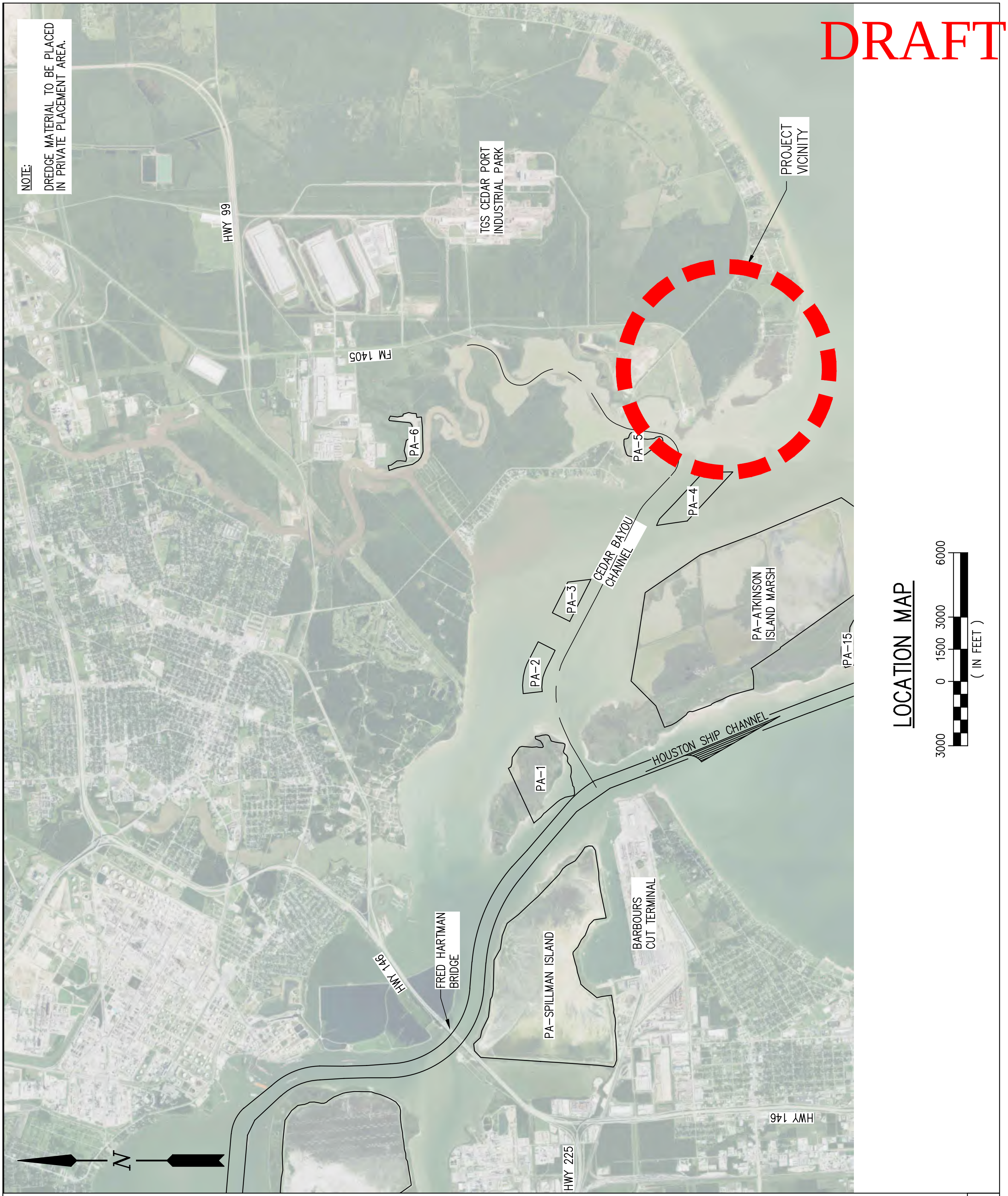

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
LOCATION MAP

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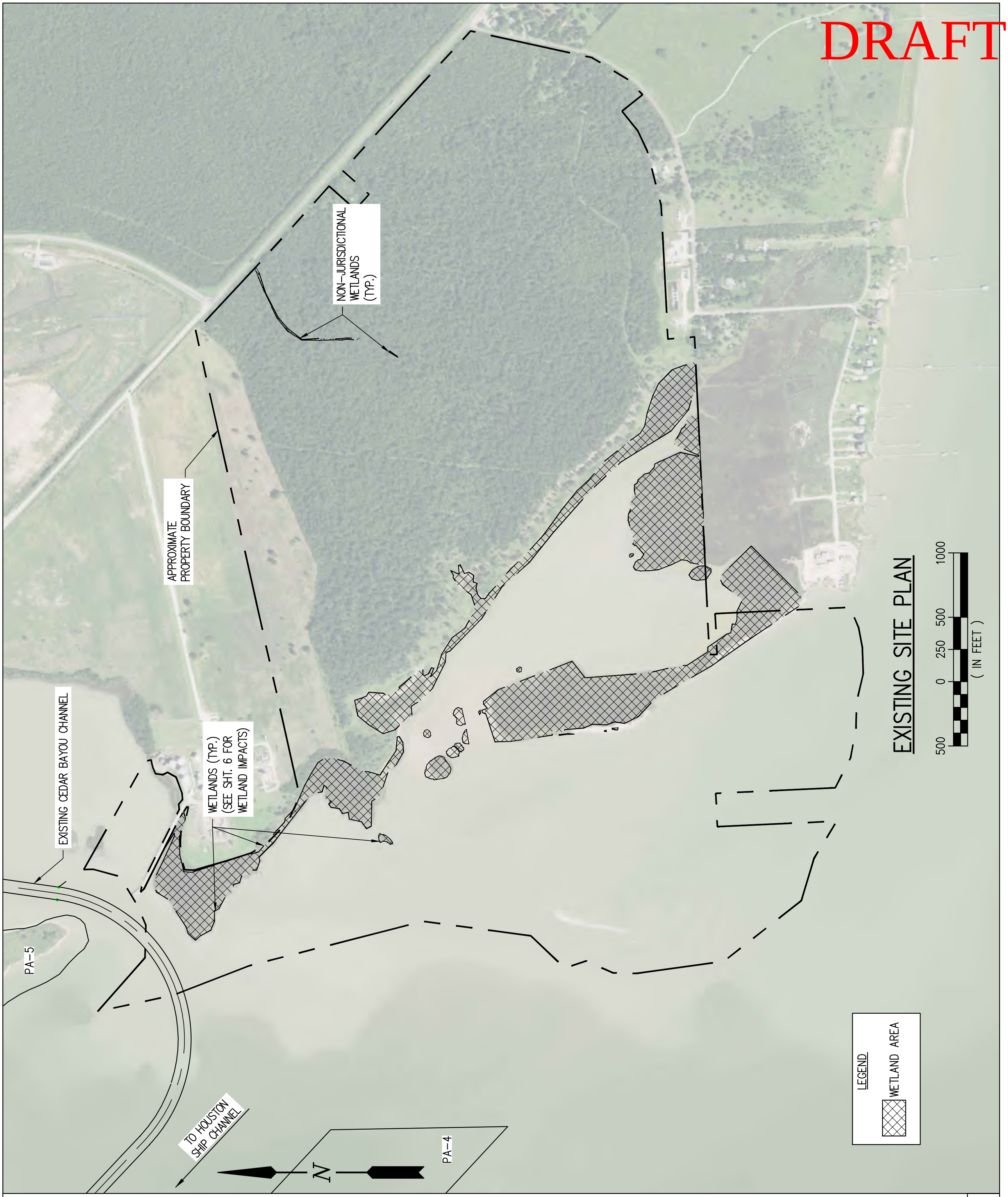

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
EXISTING SITE PLAN

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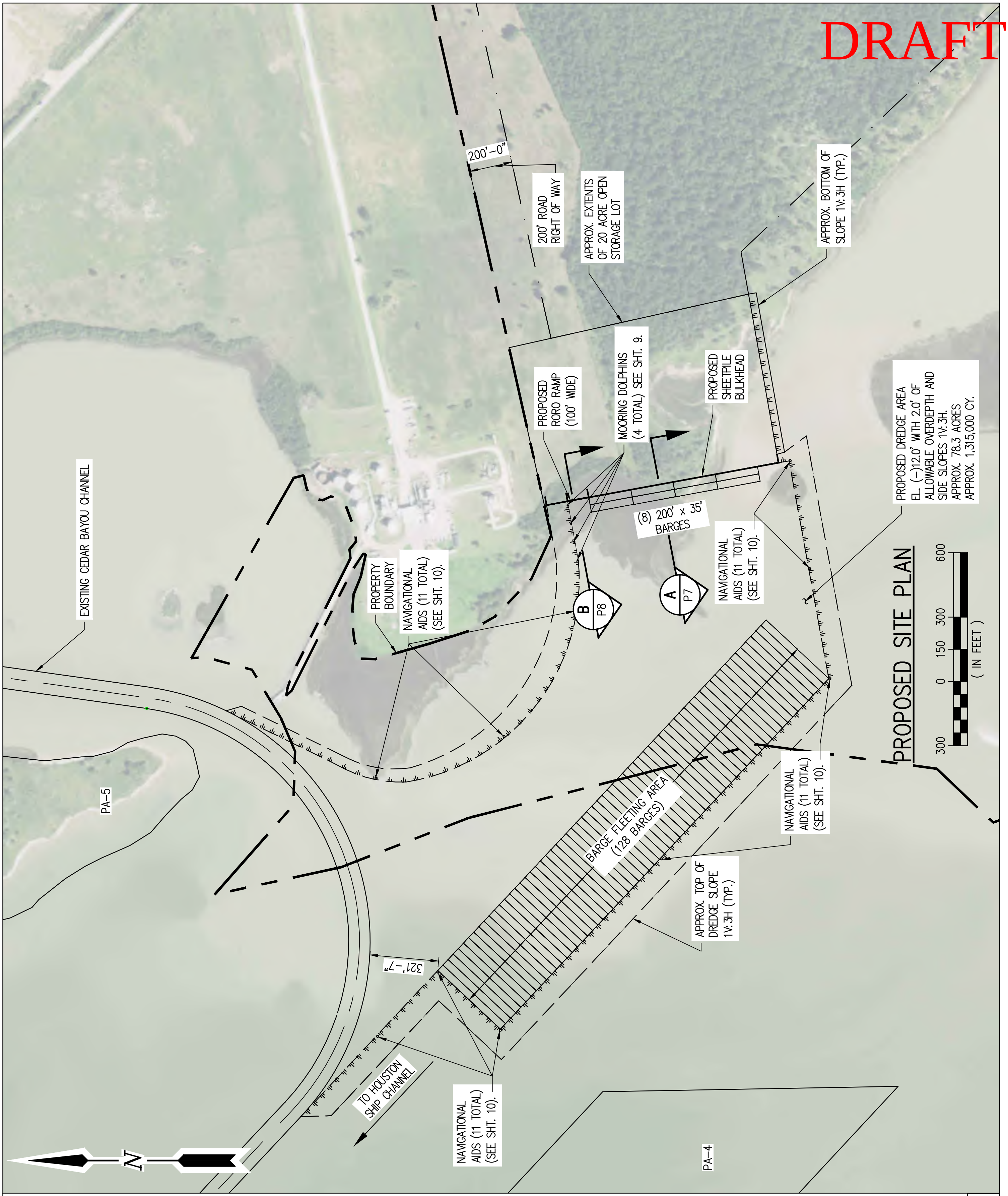

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
PROPOSED SITE PLAN

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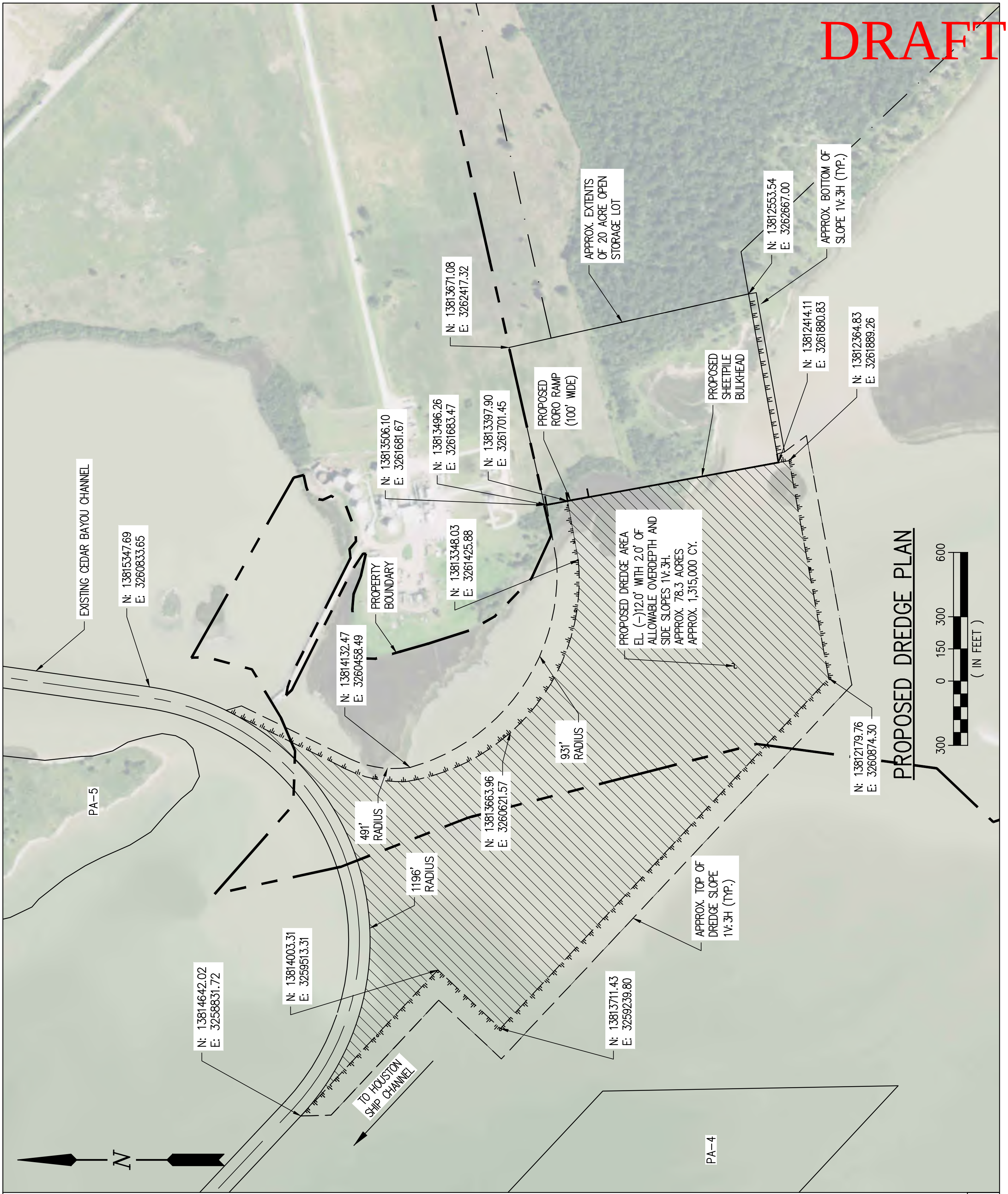

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
PROPOSED DREDGE PLAN

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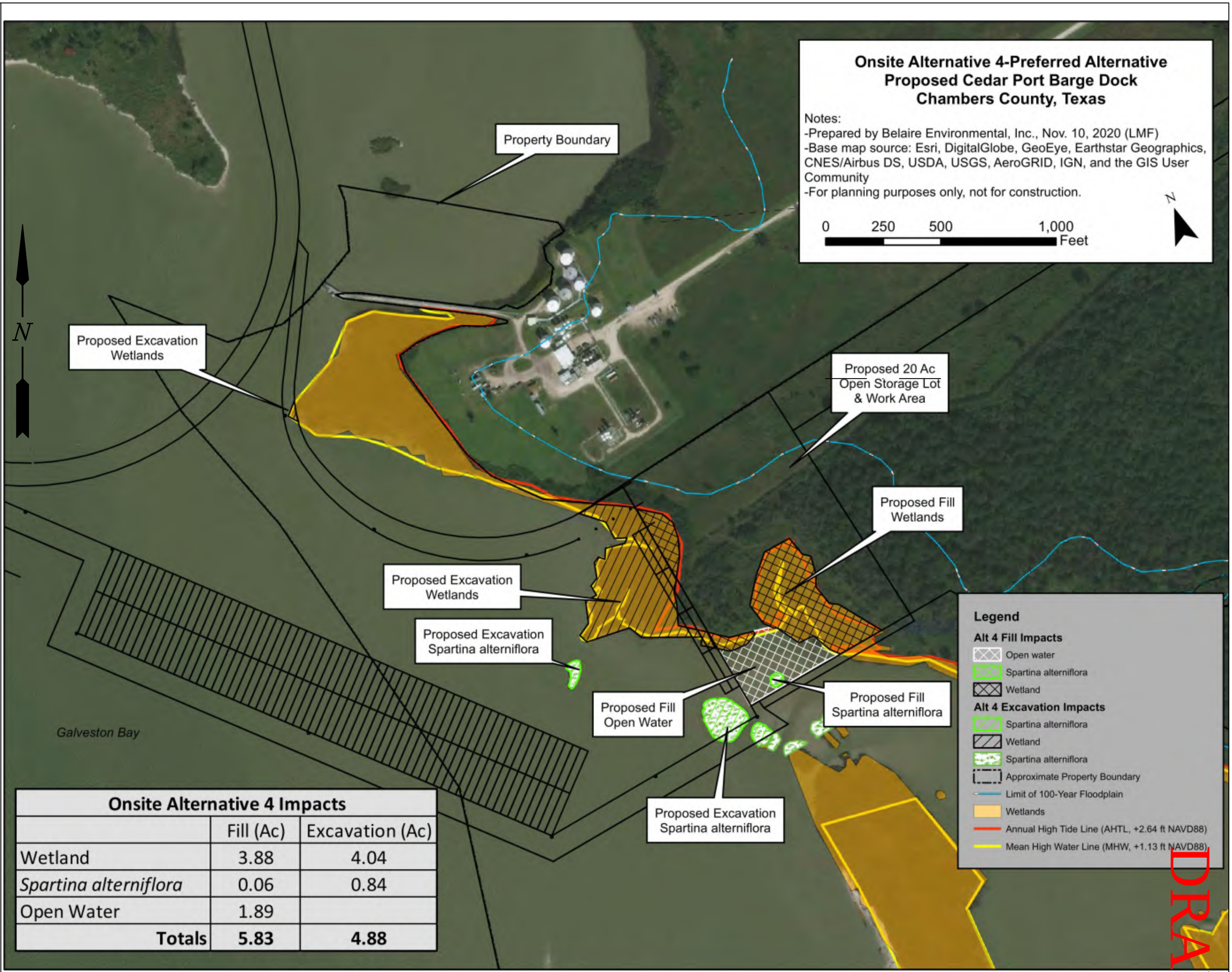

Onsite Alternative 4 Impacts

	Fill (Ac)	Excavation (Ac)
Wetland	3.88	4.04
Spartina alterniflora	0.06	0.84
Open Water	1.89	
Totals	**5.83**	**4.88**

WETLAND IMPACTS

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
WETLAND IMPACTS

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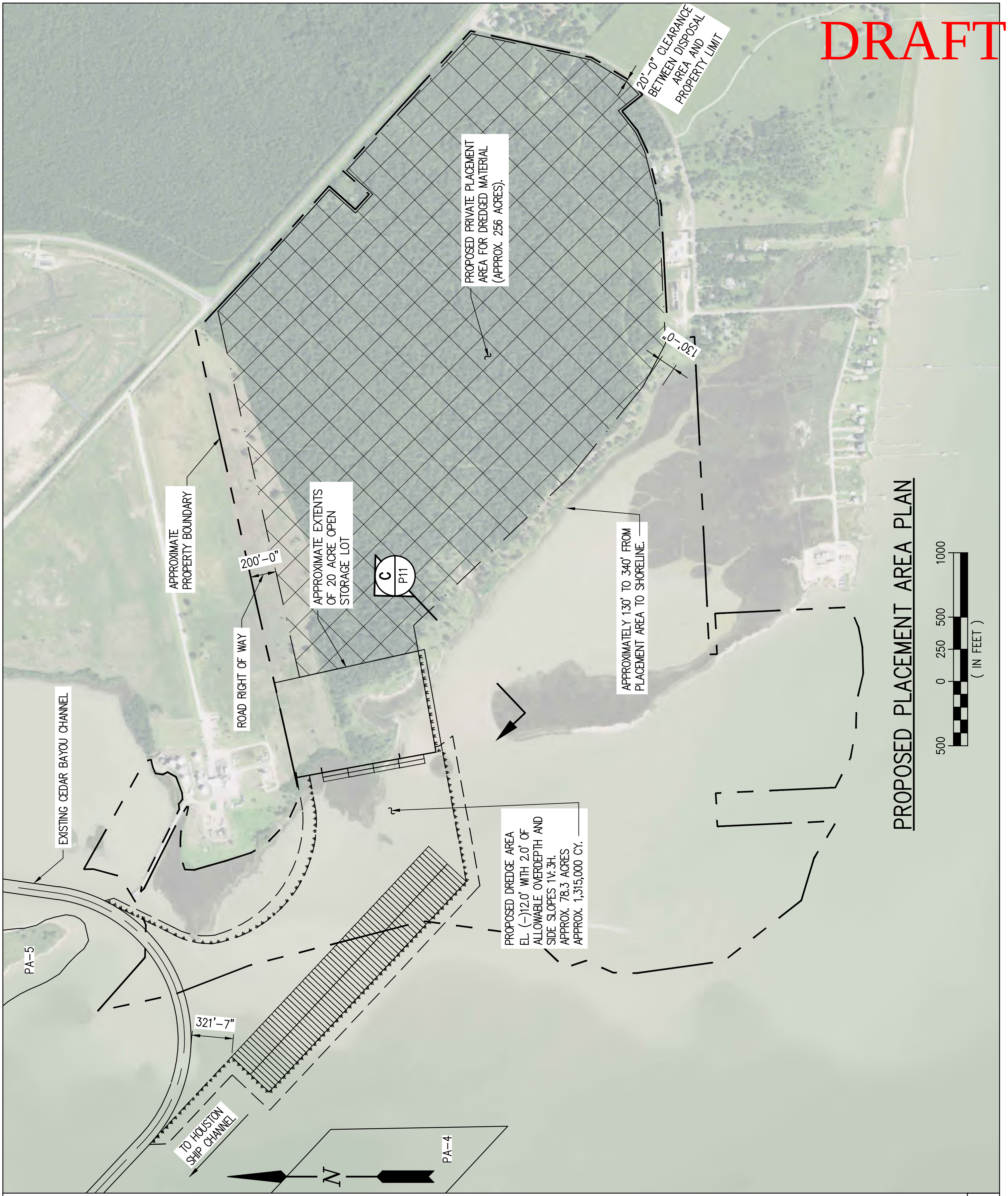

PROPOSED PLACEMENT AREA PLAN

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
PROPOSED PRIVATE PLACEMENT AREA

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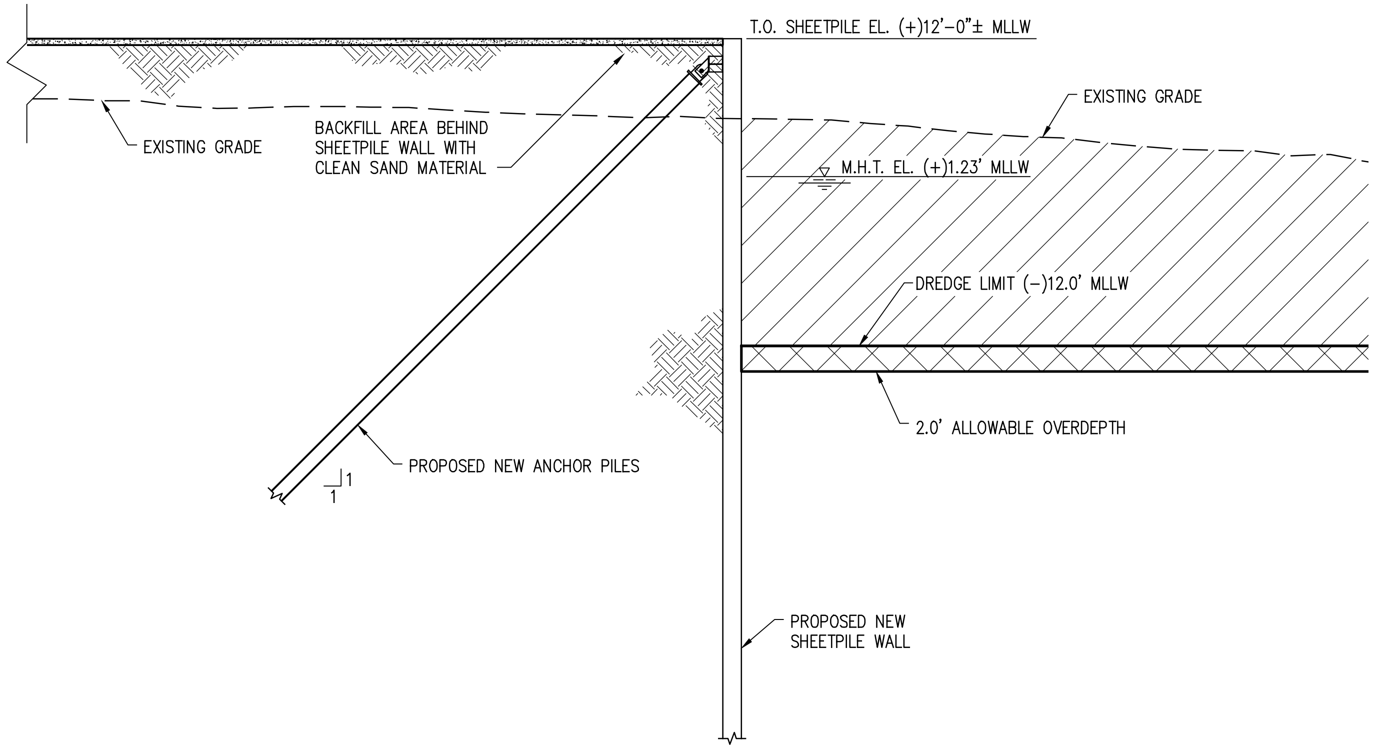

SECTION A
P4
1" = 15'

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CEDAR PORT BARGE DOCK
& BARGE FLEETING
TYPICAL CROSS SECTION

DATE AUG. '20
DESIGN CSG
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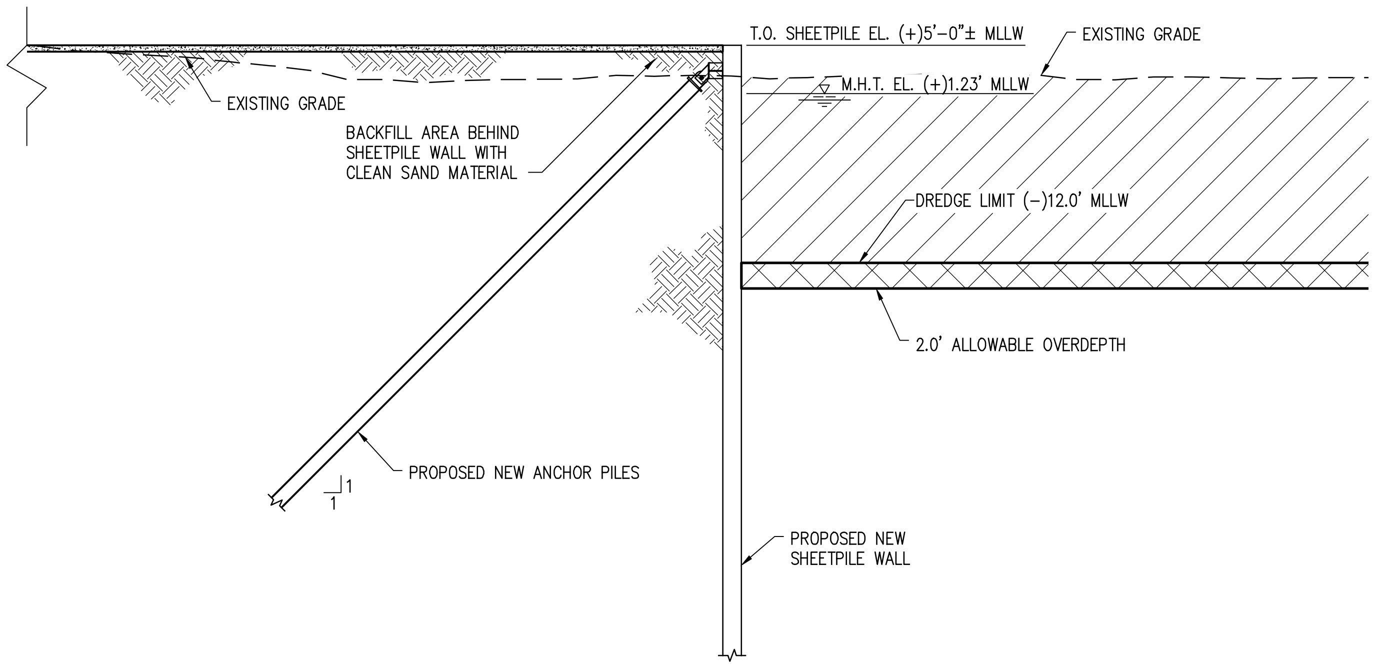

HEAVY CARGO DOCK
TYPICAL SECTION
1" = 15'

B
P4

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TX PE #116477

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CEDAR BAYOU TEXAS

CEDAR PORT BARGE DOCK
& BARGE FLEETING
HEAVY CARGO DOCK - SECTION

DATE AUG. '20
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JOB NO 11407
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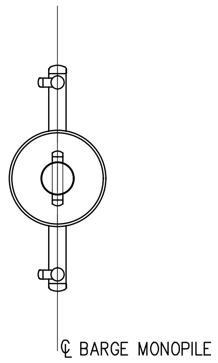
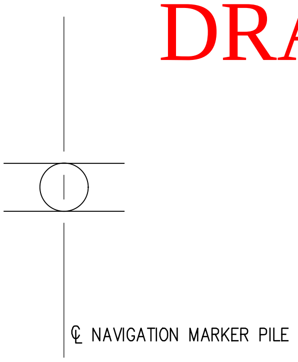


BARGE MONOPILE PLAN

N.T.S.



NAVIGATION MARKER PILE PLAN

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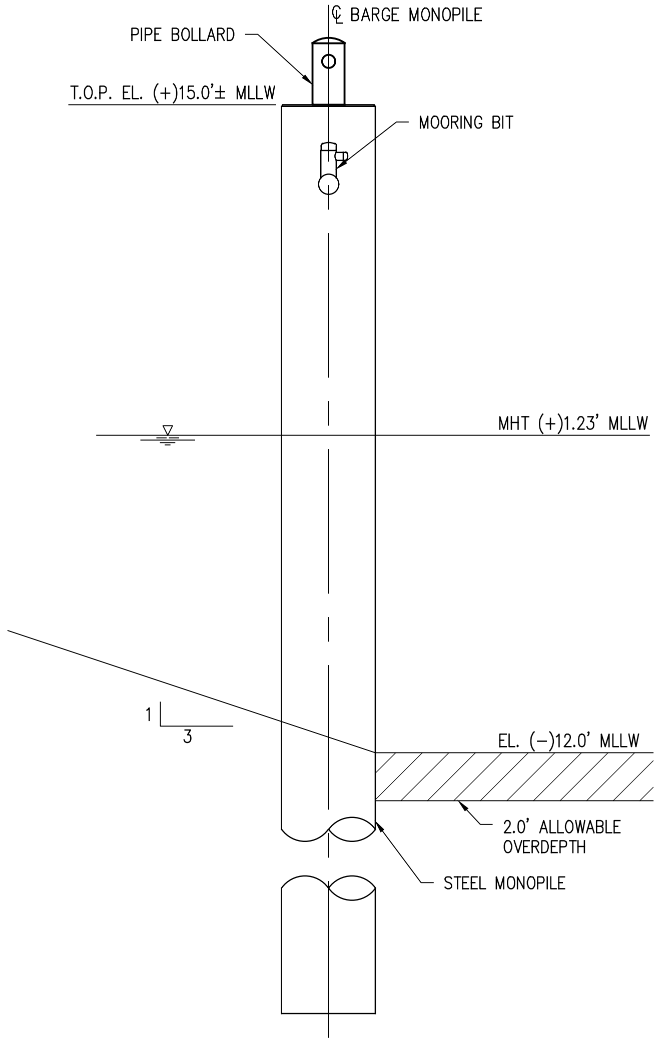

BARGE MONOPILE ELEVATION

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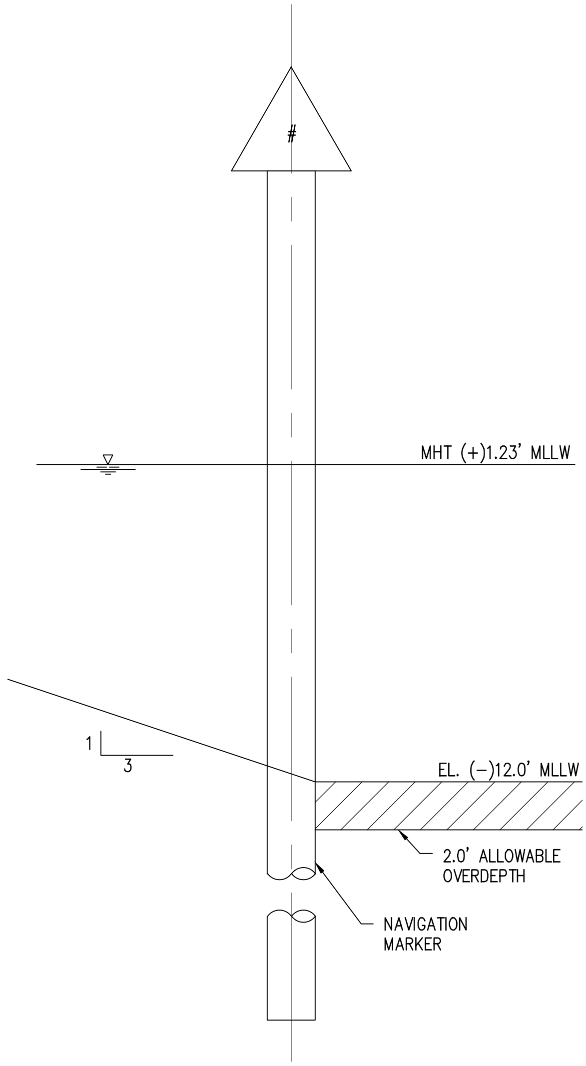
(4 REQUIRED)



NAVIGATION MARKER PILE ELEVATION

N.T.S.
(11 REQUIRED)

CHRISTOPHER S. GUY P.E.
TX PE #116477

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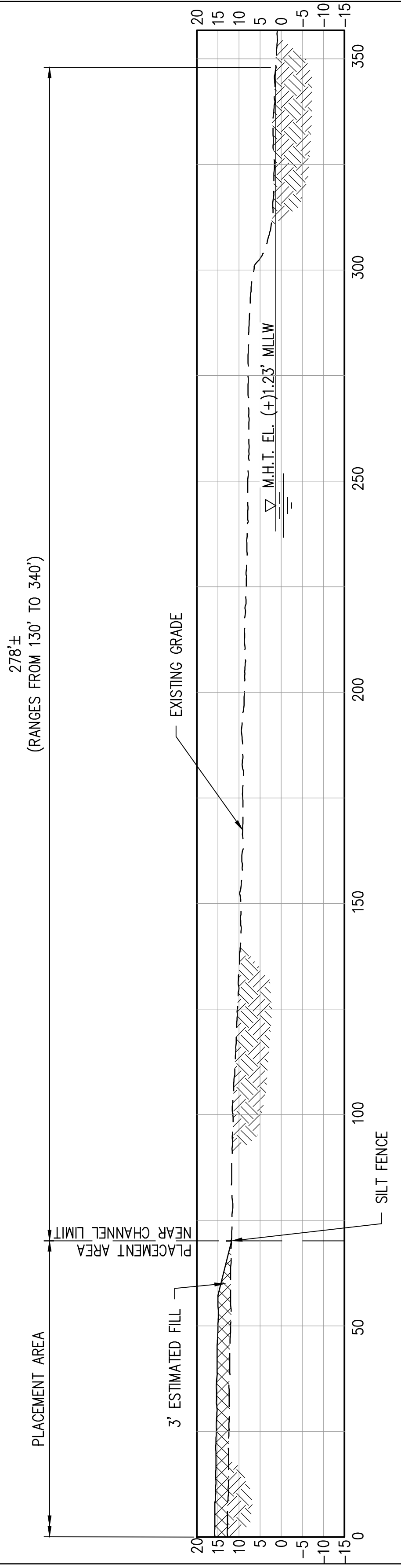
CEDAR PORT BARGE DOCK
& BARGE FLEETING
PROPOSED NEW STRUCTURES

DATE AUG. '20
DESIGN CSG
DRAWN PJC
CHECK DLC
JOB NO 11407
SHEET No. 10 OF 11

J:\11000S\11407 TGS CEDAR POINT BARGE DOCK\DRAWINGS\PERMIT − 8_5X11\11407−P10.DWG

DRAFT



PLACEMENT AREA TYPICAL SECTION

1" = 40'

C
P7

J:\11000S\11407 TGS CEDAR POINT BARGE DOCK\DRAWINGS\PERMIT – 8_5X11\11407–P11.DWG

CHRISTOPHER S. GUY P.E.
TX PE #116477

PRELIMINARY - FOR PERMIT PURPOSES ONLY

REV
1

LANIER & ASSOCIATES
CONSULTING ENGINEERS
INCORPORATED
LA: C–1120 TX: F–2981
NEW ORLEANS, LA • BEAUMONT, TX

TGS CEDAR PORT PARTNERS, L.P.
CEDAR BAYOU TEXAS

CEDAR PORT BARGE DOCK
& BARGE FLEETING
PLACEMENT AREA - SECTION

DATE AUG. '20
DESIGN CSG
DRAWN PJC
CHECK DLC
JOB NO 11407
SHEET No.
11 OF 11

DRAFT

PRELIMINARY
MARCH 05, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1 - CONTOURS.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER & associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

REV	DATE	BY	DESCRIPTION	REV	DATE	BY	DESCRIPTION

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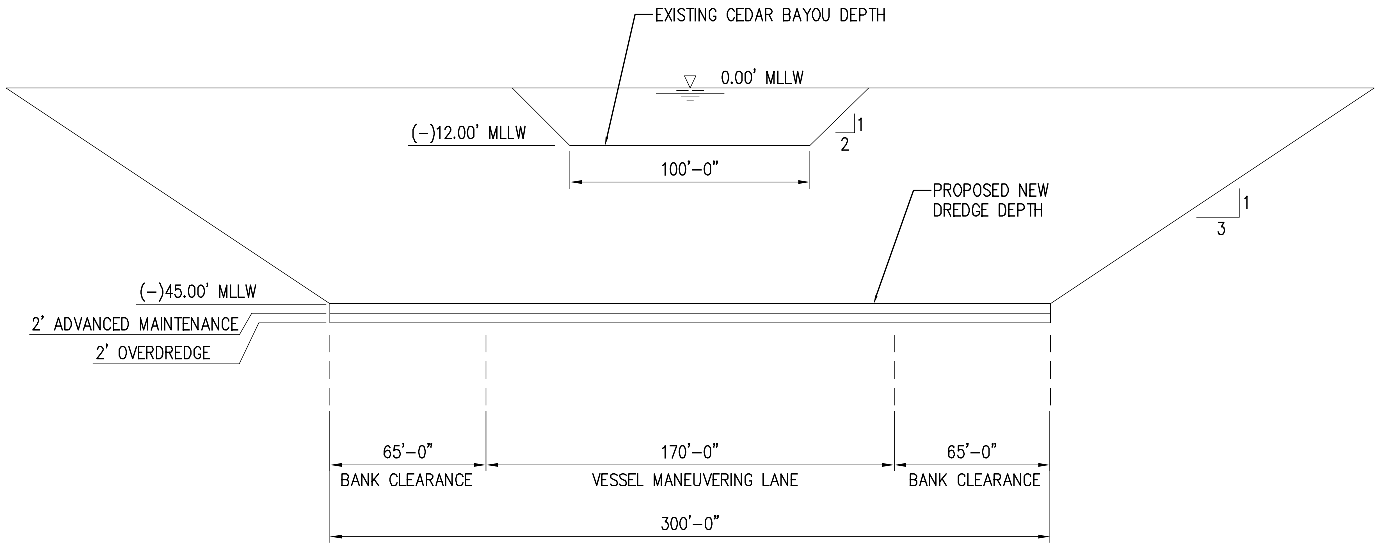
DATE MAR '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU TEXAS

CEDAR BAYOU
DEEPENING PERMIT
PROPOSED NEW PLAN

9813-15
SHEET NO.
C1

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\03 – PERMITS\11612–X1.DWG



TYPICAL CHANNEL CROSS–SECTION

SCALE: HORIZONTAL 1"=40'
VERTICAL 1"=20'

NOTES:

1. ALL ELEVATIONS IN MLLW U.N.O.
2. DESIGN VESSEL WIDTH B=106'
3. BANK CLEARANCE~0.6B
4. VESSEL MANEUVERING LANE~1.6B
5. TIDES PER NOAA GAGE AT MORGANS POINT:
   - MLLW = 0.00'
   - MEAN TIDE = (+)0.67'
   - MHW = (+)1.23'
   - MHHW = (+)1.31'

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0

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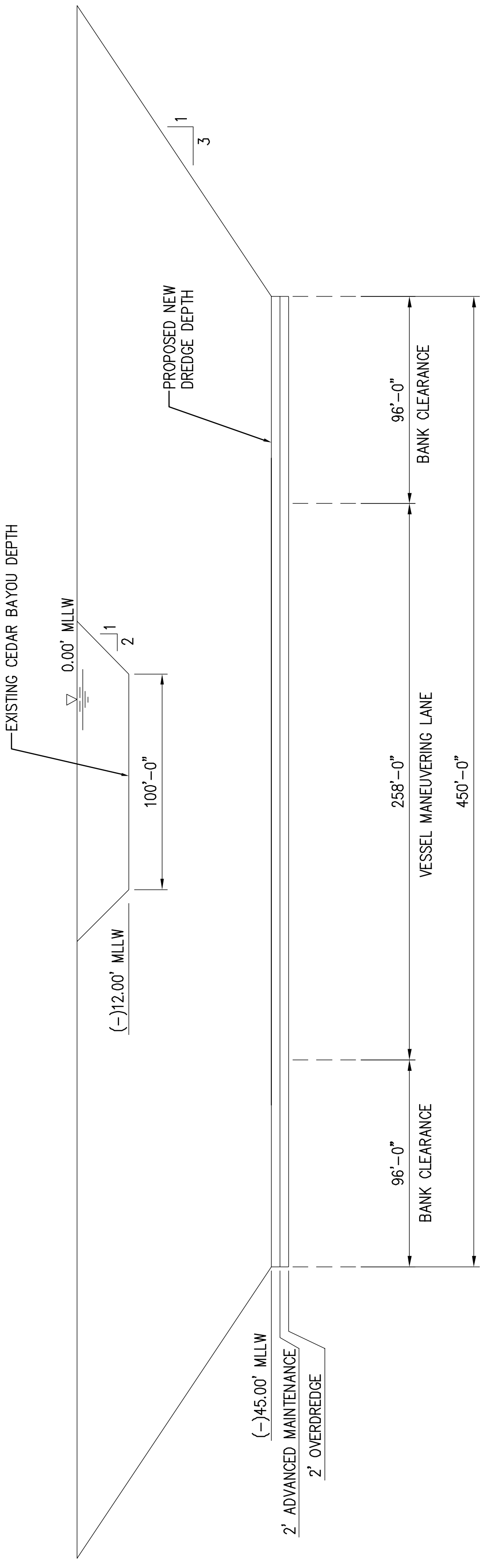
NEW ORLEANS, LA • BEAUMONT, TX

CEDAR BAYOU DEEPENING
CEDAR BAYOU TEXAS

CEDAR BAYOU DEEPENING
TYPICAL CHANNEL CROSS-SECTION
ONE-WAY TRAFFIC, BEAM = 106'

DATE NOV '19
DESIGN CSG
DRAWN ADG
CHECK DLC
JOB NO 11047
SHEET No.
1 OF 2



TYPICAL CHANNEL CROSS-SECTION

SCALE: HORIZONTAL 1"=40'
VERTICAL 1"=20'

NOTES:

1. ALL ELEVATIONS IN MLLW U.N.O.
2. DESIGN VESSEL WIDTH B=160'
3. BANK CLEARANCE~0.6B
4. VESSEL MANEUVERING LANE~1.6B
5. TIDES PER NOAA GAGE AT MORGANS POINT:
    - MLLW = 0.00'
    - MEAN TIDE = (+)0.67'
    - MHW = (+)1.23'
    - MHHW = (+)1.31'

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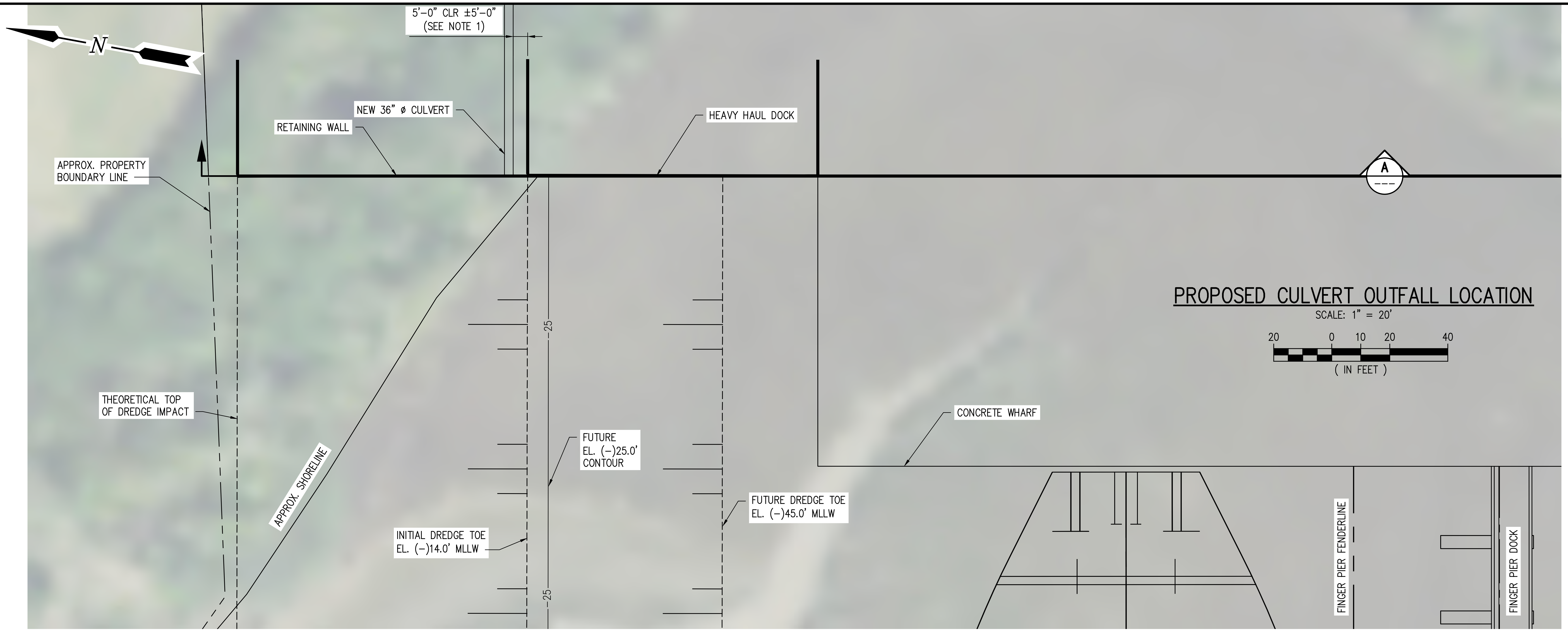
CEDAR BAYOU DEEPENING
CEDAR BAYOU TEXAS

CEDAR BAYOU DEEPENING
TYPICAL CHANNEL CROSS-SECTION
ONE-WAY TRAFFIC, BEAM = 160'

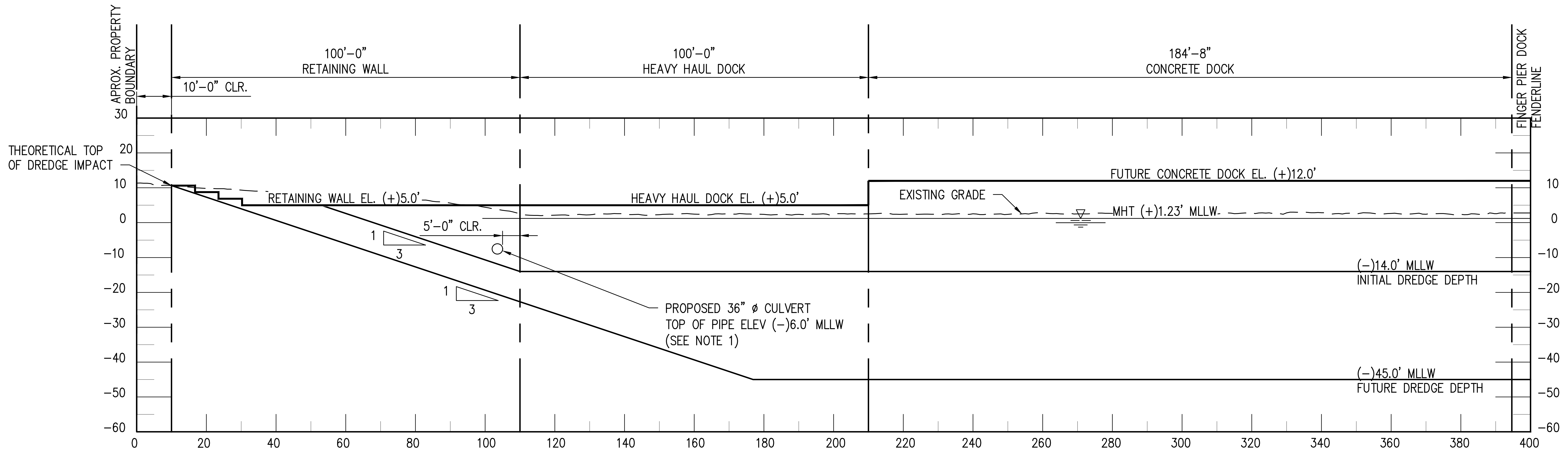
DATE NOV '19
DESIGN CSG
DRAWN ADG
CHECK DLC
JOB NO 11047
SHEET No.
2 OF 2

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\03 - PERMITS\11612-X2.DWG



PROPOSED CULVERT OUTFALL LOCATION

SCALE: 1" = 20'



PROPOSED OUTFALL CULVERT SECTION A ---

SCALE: 1" = 20'

NOTES:

1. CULVERT OUTFALL LOCATION DEPENDENT ON RETAINING WALL TIE BACK.

PRELIMINARY
MARCH 1, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C4.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
& associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

REV	DATE	BY	DESCRIPTION	REV	DATE	BY	DESCRIPTION

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C2

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU TEXAS

CEDAR BAYOU
DEEPENING PERMIT
PROPOSED CULVERT OUTFALL LOCATION

11612-20
SHEET NO.
C4

DRAFT

NOT APPROVED

OVERALL SITE PLAN AND DRAWING INDEX

SCALE: 1" = 1000'

PRELIMINARY FOR REVIEW ONLY
MARCH 11, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1A.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

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LA: C-1120

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1A

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

CEDAR BAYOU
DEEPENING PERMIT
OVERALL SITE PLAN AND DRAWING INDEX

11612-21
SHEET NO.

C1A

DRAFT

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MARCH 11, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1B.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER & associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1B

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

CEDAR BAYOU
DEEPENING PERMIT
EXISTING CONTOURS

11612-21
SHEET NO.
C1B

NOT APPROVED

PRELIMINARY
FOR REVIEW ONLY
MARCH 11, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612–C1C.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
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FIRM F-2981
LA: C-1120

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612–C1B

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU TEXAS

**CEDAR BAYOU
DEEPENING PERMIT
EXISTING CONTOURS**

11612–21
SHEET NO.
C1C

DRAFT

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PRELIMINARY FOR REVIEW ONLY
MARCH 11, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1D.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

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LA: C-1120

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1B

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

CEDAR BAYOU
DEEPENING PERMIT
EXISTING CONTOURS

11612-21
SHEET NO.
C1D

NOT APPROVED

PRELIMINARY
FOR REVIEW ONLY
MARCH 11, 2021

J:\11000S\11612 CEDAR BAYOU DEEPENING PERMIT\DRAWINGS\CIVIL\11612-C1E.DWG

CEDAR PORT
INDUSTRIAL PARK
TGS

LANIER
& associates
CONSULTING ENGINEERS, INC
FIRM F-2981
LA: C-1120

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DATE MAR. '21
SCALE NOTED
DESIGN *
DRAWN PJC
CHECK *
APPR'D CSG
CAD NO 11612-C1B

CHAMBERS COUNTY IMPROVEMENT DISTRICT #1
CEDAR BAYOU **TEXAS**

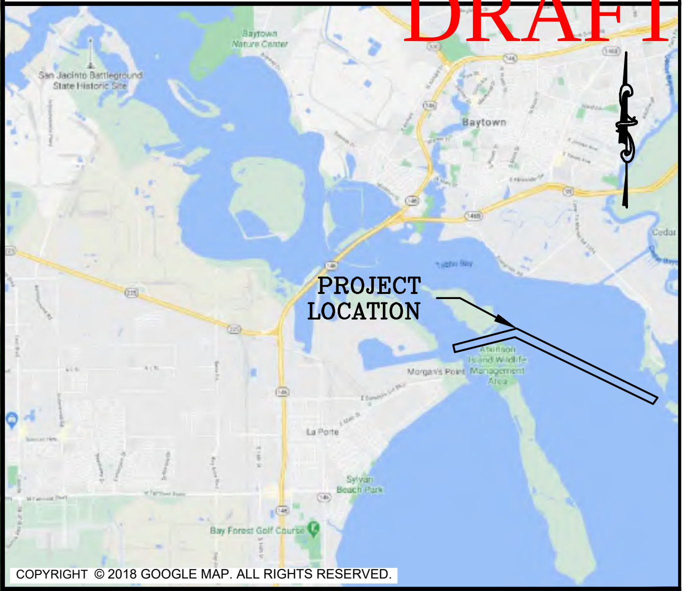
CEDAR BAYOU
DEEPENING PERMIT
EXISTING CONTOURS

11612-21
SHEET NO.
C1E

APPENDIX B

BORING LOCATION PLANS

VICINITY MAP



FIELD PROGRAM COORDINATES

ITEM	DEPTH	LATITUDE	LONGITUDE
MB–1*	50'	29° 41' 15.00" N	94° 58' 49.90" W
MB–2	50'	29° 41' 09.90" N	94° 58' 34.70" W
SS/MB–3	50'	29° 41' 15.50" N	94° 58' 18.10" W
MB–4	50'	29° 41' 18.90" N	94° 58' 00.00" W
SS/MB–5*	50'	29° 41' 10.90" N	94° 57' 39.30" W
MB–6	50'	29° 41' 01.20" N	94° 57' 18.30" W
SS/MB–7*	50'	29° 40' 50.93" N	94° 56' 56.29" W
MB–8	50'	29° 40' 40.90" N	94° 56' 34.60" W
SS/MB–9*	50'	29° 40' 28.10" N	94° 56' 16.70" W
MB–10	200'	29° 40' 19.60" N	94° 55' 56.40" W

LEGEND

SYMBOL	DESCRIPTION
🔴	TEST BORING LOCATION
🔵	TEST BORING W/ SEDIMENT SAMPLING LOCATION
*	ENVIRONMENTAL/ANALYTICAL SAMPLING LOCATION

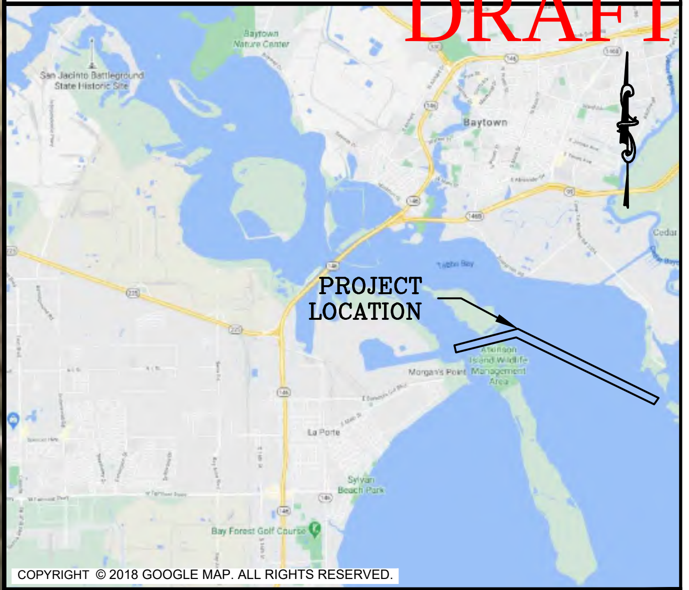
Tolunay-Wong Engineers, Inc.

FIELD PROGRAM LOCATION PLAN
CEDAR BAYOU DEEPENING/WIDENING
CHAMBERS COUNTY IMPROVEMENTS DISTRICT #1
CHAMBERS COUNTY, TEXAS

Drawn	*B.V.*	*03–16–2021*
Checked	*T.O.*	*06–04–2021*
Approved	*T.G.H.*	*06–04–2021*
Scale	*N.T.S.*	

TWE DRAWING NO. *21.23.029–1*

VICINITY MAP



FIELD PROGRAM COORDINATES

ITEM	DEPTH	LATITUDE	LONGITUDE
LB–1	120'	29° 40' 08.40" N	94° 55' 34.50" W
LB–2	200'	29° 40' 03.40" N	94° 55' 35.60" W
LB–3	25'	29° 40' 00.70" N	94° 55' 27.40" W

LEGEND

SYMBOL	DESCRIPTION
⊕	TEST BORING LOCATION

Tolunay-Wong Engineers, Inc.

FIELD PROGRAM LOCATION PLAN
CEDAR BAYOU DEEPENING/WIDENING
CHAMBERS COUNTY IMPROVEMENTS DISTRICT #1
CHAMBERS COUNTY, TEXAS

Drawn	*B.V.*	*03–09–2021*
Checked	*T.O.*	*06–04–2021*
Approved	*T.G.H.*	*06–04–2021*
Scale	*N.T.S.*	

TWE DRAWING NO. *21.23.029–2*

APPENDIX C

BORING LOGS AND CROSS-SECTIONAL SUBSURFACE PROFILES

LOG OF BORING MB-1

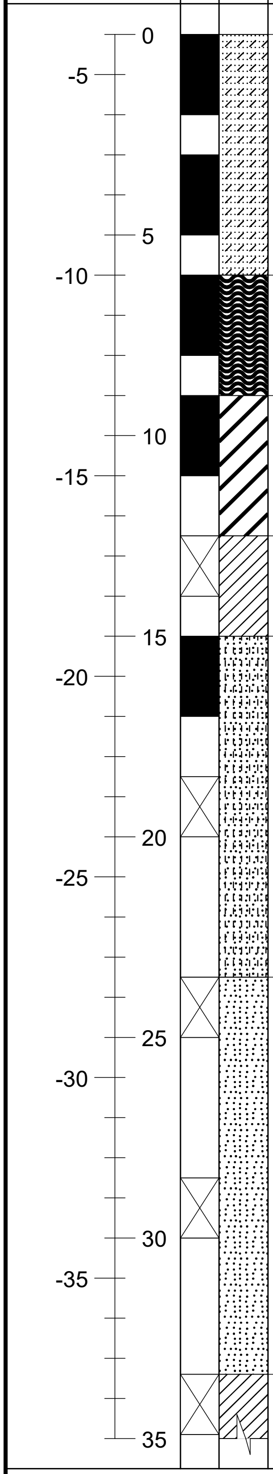
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 15.00"
W 94° 58' 49.90"

SURFACE ELEVATION: -4.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Gray CLAYEY SAND (SC)			31								36	
Very soft gray ORGANIC CLAY (OH), with sand seams	(T)0.10		126		52	31					90	
Soft gray FAT CLAY (CH), with shell fragments	(T)0.10		29	113				0.50	12	11		
Very soft gray LEAN CLAY (CL), with shell fragments		WOH	27		31	16						
Gray POORLY GRADED SAND with SILT (SP-SM)			24								7	
-becomes loose at 18.5'		1/6" 2/6" 3/6"										
Loose gray POORLY GRADED SAND (SP)		2/6" 2/6" 4/6"	20								1	
		1/6" 3/6" 2/6"	21								3	
Stiff, gray and tan LEAN CLAY (CL)		5/6" 6/6" 5/6"			47	29						

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/16/2021
DATE BORING COMPLETED:	03/16/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Depth to mudline measurement not obtained. WOH: Weight of Hammer.

LOG OF BORING MB-1

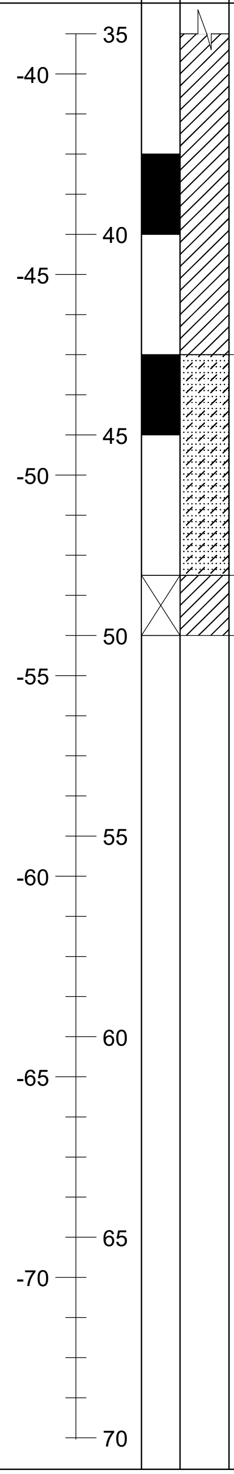
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 41' 15.00"
W 94° 58' 49.90"

SURFACE ELEVATION: -4.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff, gray and tan LEAN CLAY (CL)												
-becomes very stiff at 38'	(P)3.25											
Gray and tan CLAYEY SAND (SC), with calcareous nodules			19	125	28	9					35	
Brown and gray LEAN CLAY (CL), with calcareous nodules and sand pockets			17		45	25						

Bottom @ 50'

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/16/2021
DATE BORING COMPLETED:	03/16/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Depth to mudline measurement not obtained. WOH: Weight of Hammer.

LOG OF BORING MB-2

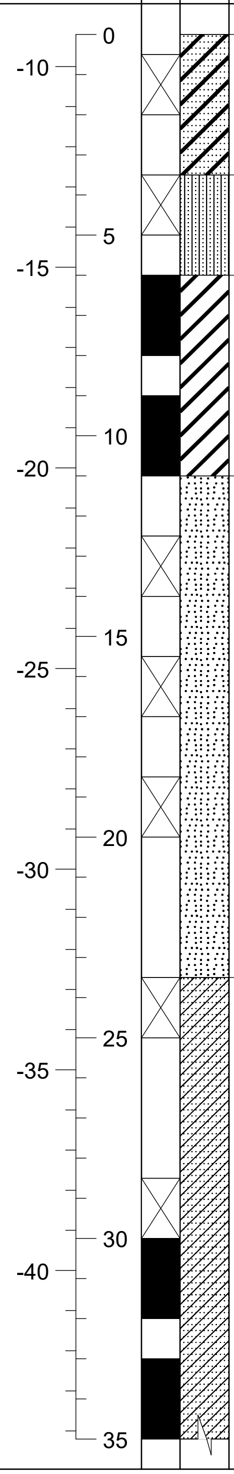
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 09.90"
W 94° 58' 34.70"

SURFACE ELEVATION: -9.2'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray SANDY FAT CLAY (CH)		WOH	59		67	40					70	
Very loose gray SILTY SAND (SM), with clay pockets		WOH	30								21	
Soft gray FAT CLAY (CH)	(T)0.15		62	72	70	38		0.27	7	9		
-becomes very soft at 9'	(T)0.08		70									
Very loose gray POORLY GRADED SAND (SP), with shell fragments												
		WOH	21								4	
		WOH										
		WOH	23								4	
Stiff, gray and tan SANDY LEAN CLAY (CL) -with ferrous nodules from 23.5' to 25'		WOH 4/6" 5/6"	26		47	26						
-becomes very stiff at 28.5' -with calcareous nodules from 28.5' to 40'		10/6" 11/6" 14/6"	15		39	26						
-hard from 30' to 32' -with ferrous nodules from 30' to 40'	(P)4.50		19								68	
	(P)4.50		13	119	33	19		3.12	15	28		

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/16/2021
DATE BORING COMPLETED:	03/16/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.2-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-2

DRAFT

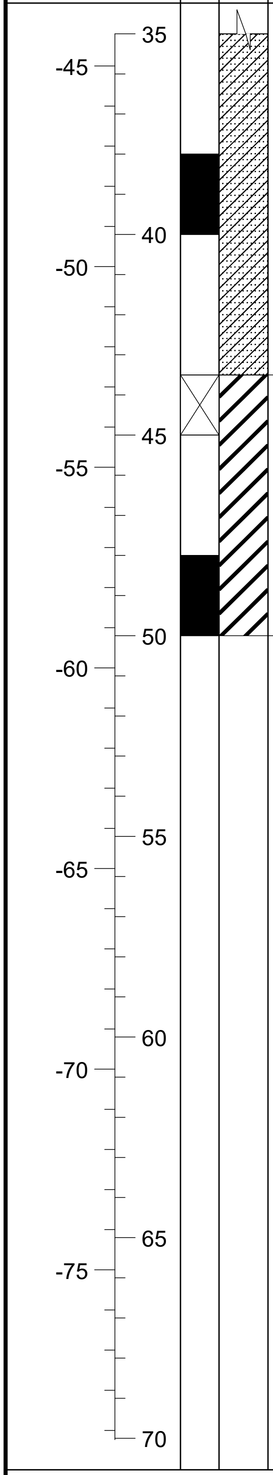
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 09.90"
W 94° 58' 34.70"

SURFACE ELEVATION: -9.2'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff, gray and tan SANDY LEAN CLAY (CL)												
-becomes hard, brown and gray at 38'	(P)4.50											
Very stiff, brown and gray FAT CLAY (CH), with calcareous and ferrous nodules		6/6" 8/6" 11/6"										
	(P)4.50		20	110	54	38		3.23	15	41		
Bottom @ 50'												

COMPLETION DEPTH: 50 ft
DATE BORING STARTED: 03/16/2021
DATE BORING COMPLETED: 03/16/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.2-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-3

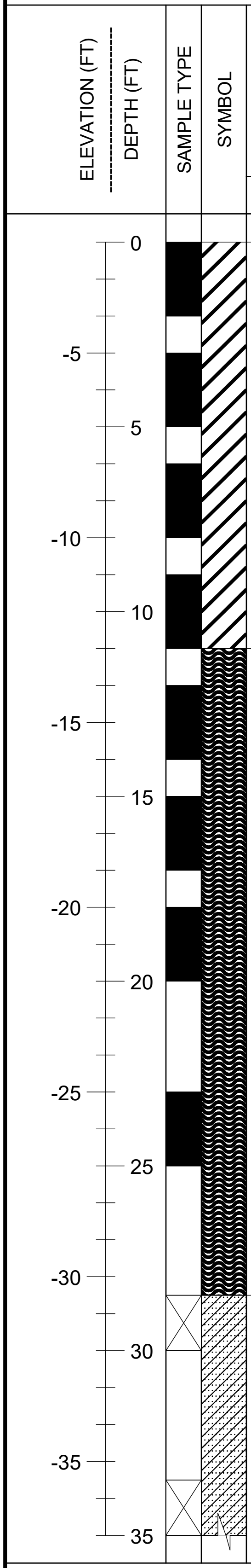
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 15.50"
W 94° 58' 18.10"

SURFACE ELEVATION: -2.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY (CH)	(T)0.03											
-with shell fragments from 3' to 5' -with sand seams from 3' to 11'	(T)0.06		71	56				0.08	8	4		
	(T)0.04		72		72	41					86	
	(T)0.09											
Very soft gray ORGANIC CLAY (OH)												
	(T)0.10		91		119	71					99	
	(T)0.08		97	47				0.13	15*	12		
	(T)0.12		98		124	79						
-with sand seams from 23' to 25'	(T)0.12		97		119	74					97	
Firm gray SANDY LEAN CLAY (CL)		3/6" 3/6" 5/6"	23								65	
-becomes stiff at 33.5'		3/6" 6/6" 7/6"	22		44	28						

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/18/2021
DATE BORING COMPLETED:	03/18/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

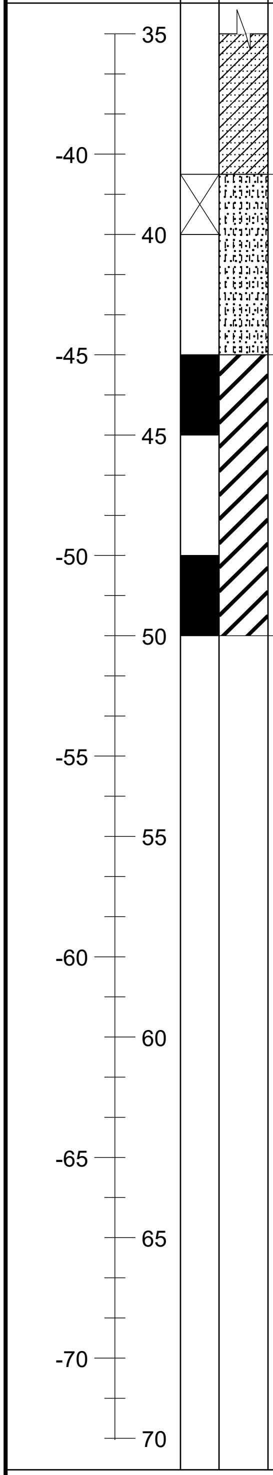
NOTES: The depth to mudline at the boring location was approximately 2.0-ft beneath the water surface at the time of drilling.

LOG OF BORING MB-3

PROJECT:	Cedar Bayou Deepening and Widening Chambers County, Texas	CLIENT:	Trans - Global Solutions, Inc Beaumont, Texas

COORDINATES: N 29° 41' 15.50"
W 94° 58' 18.10"
SURFACE ELEVATION: -2.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff gray SANDY LEAN CLAY (CL)												
Medium dense gray POORLY GRADED SAND with SILT (SP-SM)		4/6" 5/6" 6/6"	20								9	
Very stiff, brown and gray FAT CLAY (CH) -with sand partings from 43' to 45'	(P)4.50		24	96	82	52		2.92	5 *	33		
	(P)3.25		21									
Bottom @ 50'												

COMPLETION DEPTH: 50 ft
DATE BORING STARTED: 03/18/2021
DATE BORING COMPLETED: 03/18/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 2.0-ft beneath the water surface at the time of drilling.

LOG OF BORING MB-4

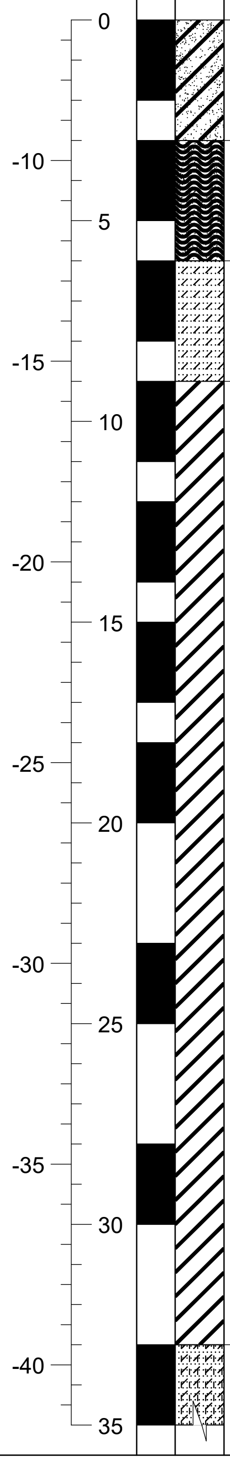
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 18.90"
W 94° 58' 00.00"

SURFACE ELEVATION: -6.5'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY with SAND (CH)	(T)0.05		70		65	42					84	
Very soft gray ORGANIC CLAY with SAND (OH)	(T)0.07		101									
Gray CLAYEY SAND (SC)			16		40	15					30	
Soft gray FAT CLAY (CH) -with sand pockets from 9' to 20' -with shell fragments from 9' to 25'	(T)0.11		85					0.34	12	10		
	(T)0.15		76								95	
	(T)0.16		78		78	58						
	(T)0.13											
	(T)0.15		76		77	32						
	(T)0.15											
Gray SILTY CLAYEY SAND (SC-SM)			22		23	7					46	

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/15/2021
DATE BORING COMPLETED:	03/15/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 6.5-ft beneath the water surface at the time of drilling.WOH: Weight of Hammer.

LOG OF BORING MB-4

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 41' 18.90"
W 94° 58' 00.00"

SURFACE ELEVATION: -6.5'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
	35	Gray SILTY CLAYEY SAND (SC-SM)												
-45	40													
-50		Soft gray LEAN CLAY with SAND (CL)	(T)0.15		24								71	
	45													
-55		Loose gray SILTY SAND (SM)		7/6" 5/6" 4/6"	21								32	
	50	Bottom @ 50'												
-60	55													
-65	60													
-70	65													
-75	70													

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/15/2021
DATE BORING COMPLETED:	03/15/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 6.5-ft beneath the water surface at the time of drilling.WOH: Weight of Hammer.

LOG OF BORING MB-5

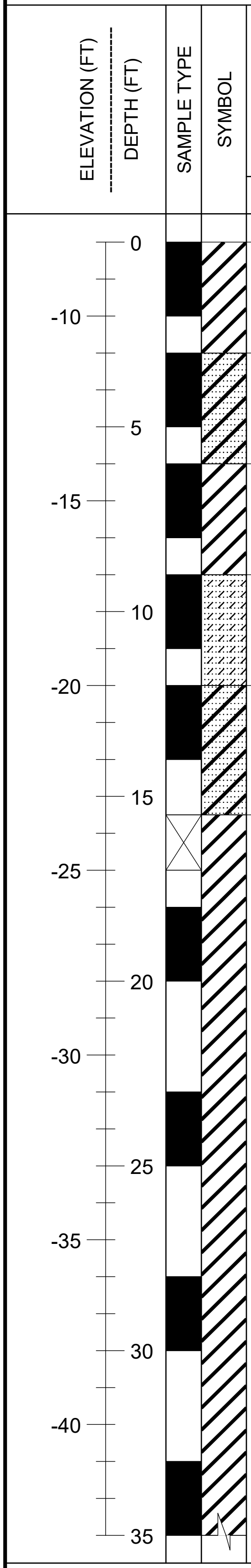
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 10.90"
W 94° 57' 39.30"

SURFACE ELEVATION: -8.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY (CH), with shell fragments	(T)0.05				63	41						
Very soft gray SANDY FAT CLAY (CH), with shell fragments	(T)0.05		38								56	
Very soft gray FAT CLAY (CH), with shell fragments	(T)0.09											
Gray CLAYEY SAND (SC)	(T)0.10		38		122	83					40	
Firm gray SANDY FAT CLAY (CH), with shell fragments	(P)0.50		25	101				0.56	12	13		
Very soft gray FAT CLAY (CH)		WOH	57		67	36						
-with shell fragments from 18' to 35'	(T)0.12											
-becomes soft at 23'	(T)0.20		53		74	37						
	(T)0.13											
	(T)0.15											

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/16/2021
DATE BORING COMPLETED:	03/16/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 8.0-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-5

DRAFT

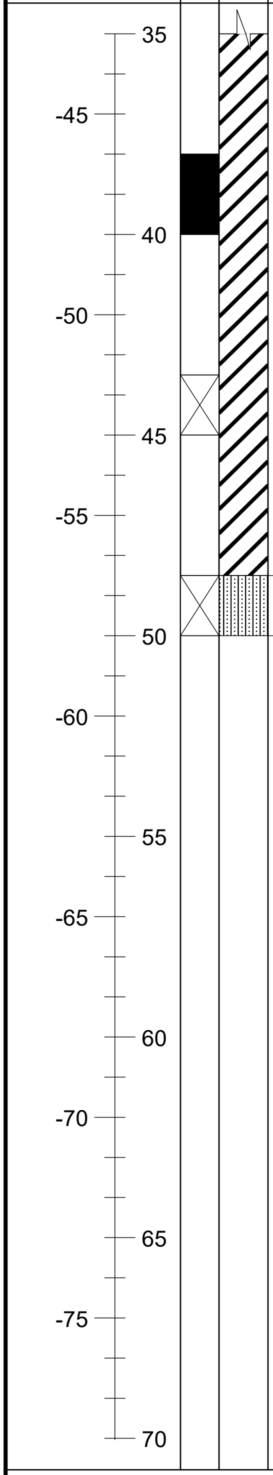
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 41' 10.90"
W 94° 57' 39.30"

SURFACE ELEVATION: -8.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Soft gray FAT CLAY (CH)												
	(T)0.15		48		81	39						
		1/6" 2/6" 2/6"										
Medium dense gray SILTY SAND (SM)		3/6" 6/6" 12/6"	28			NP					40	
Bottom @ 50'												

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/16/2021
DATE BORING COMPLETED:	03/16/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 8.0-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-6

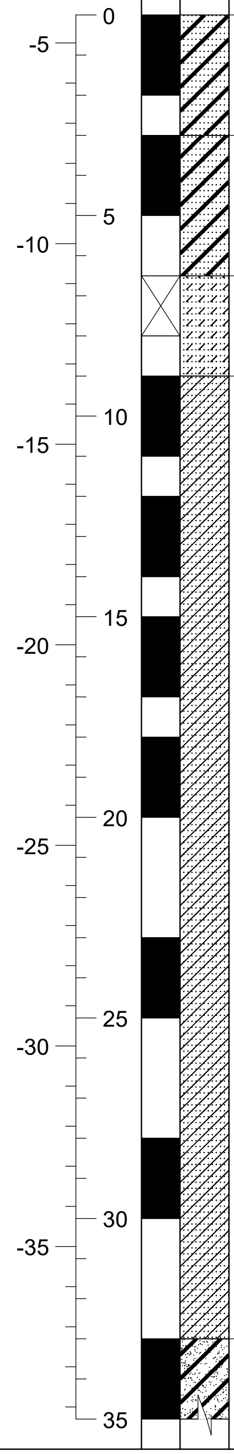
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 10.90"
W 94° 57' 39.30"

SURFACE ELEVATION: -4.3'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY (CH)	(T)0.05		71		67	37						
Very soft gray SANDY FAT CLAY (CH)	(T)0.07		49								65	
Very soft gray CLAYEY SAND (SC), with shell fragments		WOH	40								46	
Very soft gray SANDY LEAN CLAY (CL)	(T)0.10		32		36	21						
-with shell fragments from 12' to 25'	(T)0.06		31								52	
-becomes soft at 15'	(T)0.12		41		46	27						
	(T)0.13											
-with ferrous nodules from 23' to 33'	(T)0.17		32		38	21						
	(T)0.15		41	86				0.45	14	22		
Firm gray FAT CLAY with SAND (CH), with ferrous nodules	(P)1.00		40		50	28					76	

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/14/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 4.3-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-6

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 41' 10.90"
W 94° 57' 39.30"

SURFACE ELEVATION: -4.3'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-40	35			Firm gray FAT CLAY with SAND (CH), with ferrous nodules												
-45	40	☒		Loose gray SILTY SAND (SM)		1/6" 2/6" 3/6"	25								15	
-50	45	☒		-becomes medium dense at 43.5'		4/6" 6/6" 7/6"										
	50	☒		Medium dense gray POORLY GRADED SAND with SILT (SP-SM)		6/6" 7/6" 8/6"	20								7	
-55 -60 -65 -70	55 60 65 70			Bottom @ 50'												

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/14/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 4.3-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-7

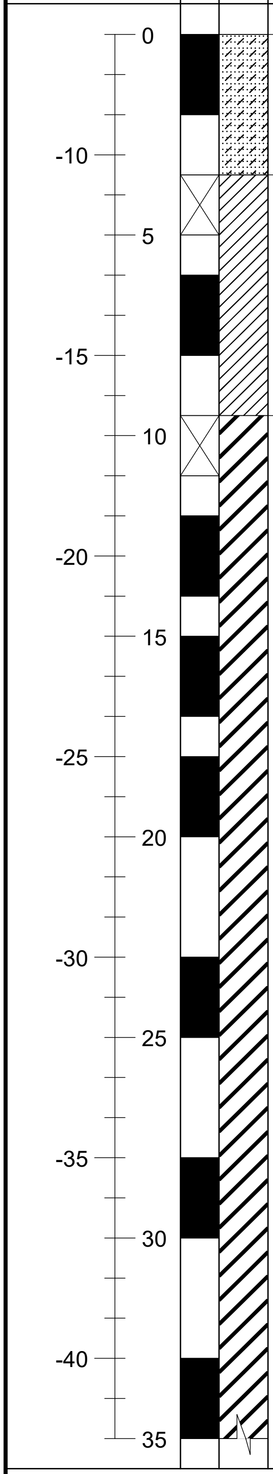
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 51.10"
W 94° 56' 56.80"

SURFACE ELEVATION: -7.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Gray CLAYEY SAND (SC)			41								40	
Very soft gray LEAN CLAY (CL)		WOH										
-with shell fragments from 6' to 8'	(T)0.08		41		46	25						
Firm, brown and gray FAT CLAY (CH)		1/6" 2/6" 3/6"										
-stiff from 12' to 14'	(P)1.75		35		66	38						
	(P)2.75		38	86				0.96	15*	13		
-becomes stiff at 18' -with calcareous nodules from 18' to 20'	(P)1.75		34		95	65						
-with shell fragments from 23' to 25'	(P)2.00		42	80				1.25	11	22		
-becomes gray at 28' -with calcareous nodules from 28' to 30'	(P)2.00											
-becomes very stiff at 33' -with sand pockets from 33' to 35'	(P)3.50		22		61	39					88	

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/17/2021
DATE BORING COMPLETED:	03/17/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 7.0-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-7

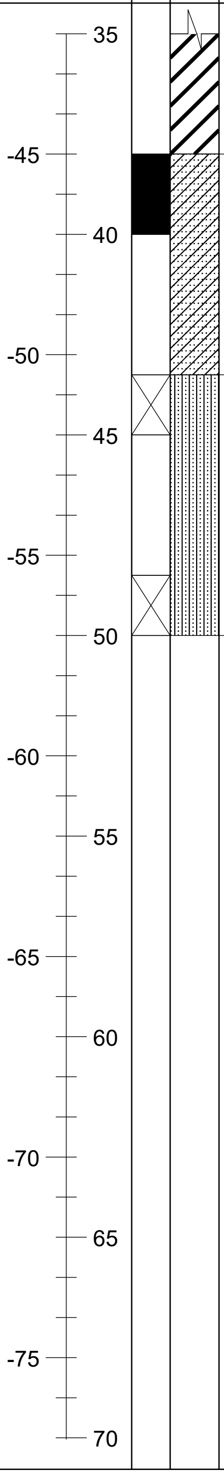
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 51.10"
W 94° 56' 56.80"

SURFACE ELEVATION: -7.0'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff gray FAT CLAY (CH), with sand pockets												
Firm gray SANDY LEAN CLAY (CL)	(P)1.50		26	102				0.67	11	34	54	
Medium dense gray SILTY SAND (SM)		5/6" 10/6" 15/6"										
		5/6" 7/6" 11/6"	23								41	

Bottom @ 50'

COMPLETION DEPTH: 50 ft
DATE BORING STARTED: 03/17/2021
DATE BORING COMPLETED: 03/17/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 7.0-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-8

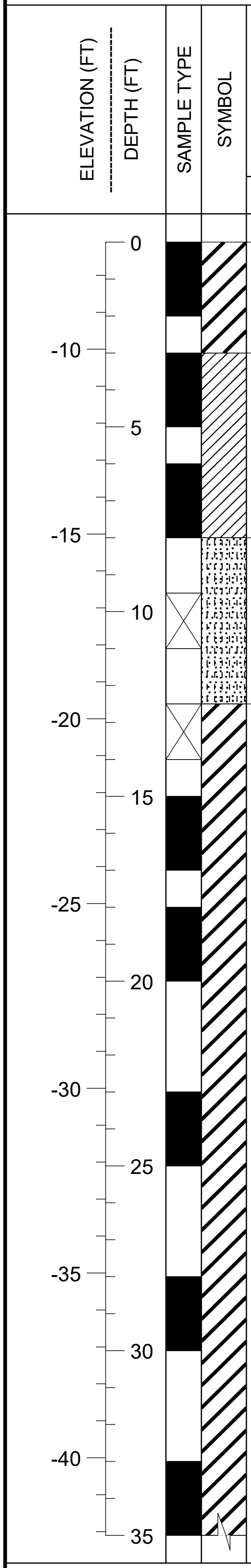
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 40.90"
W 94° 56' 34.60"

SURFACE ELEVATION: -7.1'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY (CH), with shell fragments	(T)0.05		91		99	56						
Very soft gray LEAN CLAY (CL), with shell fragments and sand pockets	(T)0.10		24		38	20						
-becomes firm, gray and tan at 6'	(T)0.08		19	118				0.61	11	8		
Very loose gray POORLY GRADED SAND with SILT (SP-SM)		WOH	28								11	
Firm, gray and brown FAT CLAY (CH) -slickensided with calcareous and ferrous nodules from 12.5' to 14'		2/6" 2/6" 6/6"	32		73	35						
-becomes very stiff at 15' -brown and red with silt pockets from 15' to 17'	(P)3.00											
-slickensided with ferrous nodules from 18' to 35'	(P)2.75		39	84	102	46		2.41	15**	16		
-stiff from 23' to 25'	(P)2.75											
-becomes gray and tan at 28'	(P)3.00											
-becomes stiff and gray at 33' -with wood fragments from 33' to 35'	(P)2.50		32		85	42						

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/14/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 7.1-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-8

DRAFT

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 40.90"
W 94° 56' 34.60"

SURFACE ELEVATION: -7.1'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
	35			Stiff gray FAT CLAY (CH)												
-45																
				Medium dense gray POORLY GRADED SAND with SILT (SP-SM)		6/6" 9/6" 13/6"										
	40															
-50																
				-becomes dense at 43.5'		10/6" 19/6" 28/6"	21								8	
	45															
-55																
				Dense gray POORLY GRADED SAND (SP)		15/6" 18/6" 24/6"	18								4	
	50			Bottom @ 50'												
-60																
	55															
-65																
	60															
-70																
	65															
-75																
	70															

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/14/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

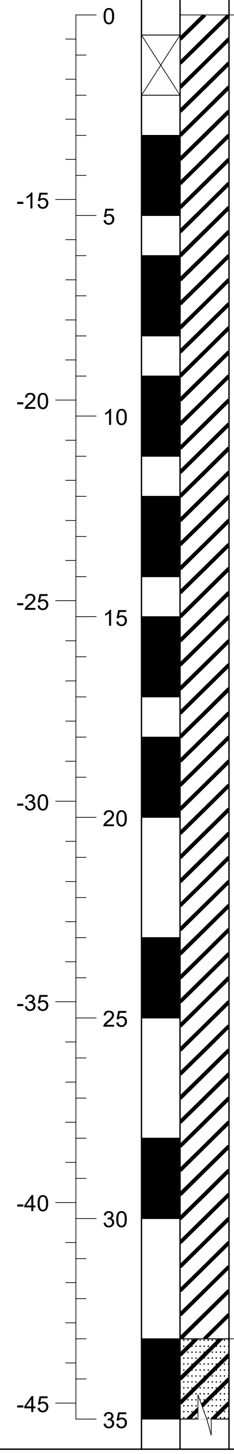
NOTES: The depth to mudline at the boring location was approximately 7.1-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer.

LOG OF BORING MB-9

DRAFT

PROJECT:	Cedar Bayou Deepening and Widening Chambers County, Texas	CLIENT:	Trans - Global Solutions, Inc Beaumont, Texas

COORDINATES: N 29° 40' 28.10"
W 94° 56' 16.70"
SURFACE ELEVATION: -10.4'
DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft gray FAT CLAY (CH)		WOP			66	39						
-with shell fragments from 3' to 8'	(T)0.06		79	53	59	34		0.16	14	7		
	(T)0.12											
	(T)0.10		80		106	67						
-very stiff from 12' to 14' -becomes brown and gray at 12'	(P)3.00											
-firm from 15' to 17'	(P)1.25		30	95	57	32		0.85	15**	16		
-very stiff from 18' to 20'	(P)3.25											
-becomes stiff at 23'	(P)1.75		43		102	70						
-slickensided from 28' to 30'	(P)2.25		36	87				1.73	5 *	27		
Firm gray SANDY FAT CLAY (CH)	(T)0.40		30								68	

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/17/2021
DATE BORING COMPLETED:	03/17/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 10.4-ft beneath the water surface at the time of drilling. WOP: Weight of Pipe.

LOG OF BORING MB-9

PROJECT:	Cedar Bayou Deepening and Widening Chambers County, Texas	CLIENT:	Trans - Global Solutions, Inc Beaumont, Texas

COORDINATES: N 29° 40' 28.10"
W 94° 56' 16.70"
SURFACE ELEVATION: -10.4'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 50'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
	35			Firm gray SANDY FAT CLAY (CH)												
		☒		Medium dense gray POORLY GRADED SAND with SILT (SP-SM)		6/6" 7/6" 7/6"	23								12	
-50	40															
		☒				7/6" 9/6" 14/6"										
-55	45															
		☒		Dense gray POORLY GRADED SAND (SP)		11/6" 13/6" 20/6"	21								4	
-60	50			Bottom @ 50'												
-65	55															
-70	60															
-75	65															
-80	70															

COMPLETION DEPTH:	50 ft
DATE BORING STARTED:	03/17/2021
DATE BORING COMPLETED:	03/17/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 10.4-ft beneath the water surface at the time of drilling. WOP: Weight of Pipe.

LOG OF BORING MB-10

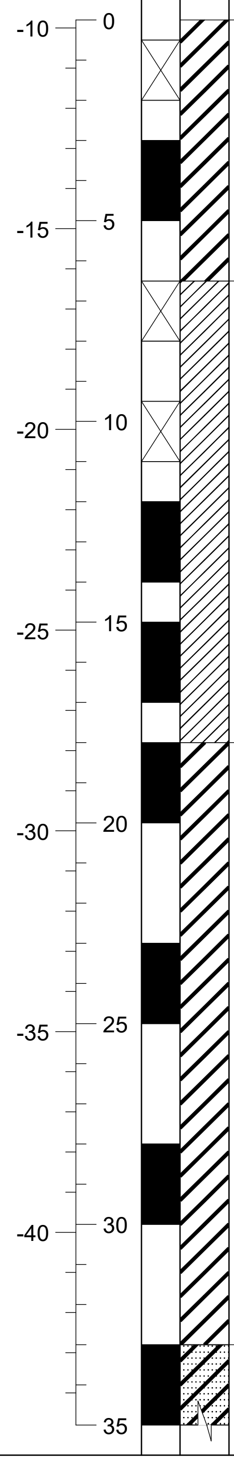
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"

SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very soft, gray and tan FAT CLAY (CH) -with ferrous nodules from 0' to 2'		WOH	63		60	32						
-becomes soft at 3' -with sand pockets from 3' to 5'	(T)0.13		60	71				0.40	12	7	99	
Very soft gray LEAN CLAY (CL) -with shell fragments from 6.5' to 8' -no recovery with shelby tube from 6' to 8'		WOP	43		46	19						
-no recovery with shelby tube from 9' to 11'		WOH										
-becomes soft at 12' -with shell fragments from 12' to 17'	(T)0.12		44	74	48	17		0.28	11	13		
	(T)0.17											
Firm gray FAT CLAY (CH), with sand pockets	(T)0.30		37		63	17					90	
-with ferrous nodules from 23' to 30'	(T)0.38		66	77				0.64	15	21		
	(T)0.35		61		85	39						
Firm gray SANDY FAT CLAY (CH), with ferrous nodules	(T)0.35		65								67	

COMPLETION DEPTH:	200 ft
DATE BORING STARTED:	03/12/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING MB-10

DRAFT

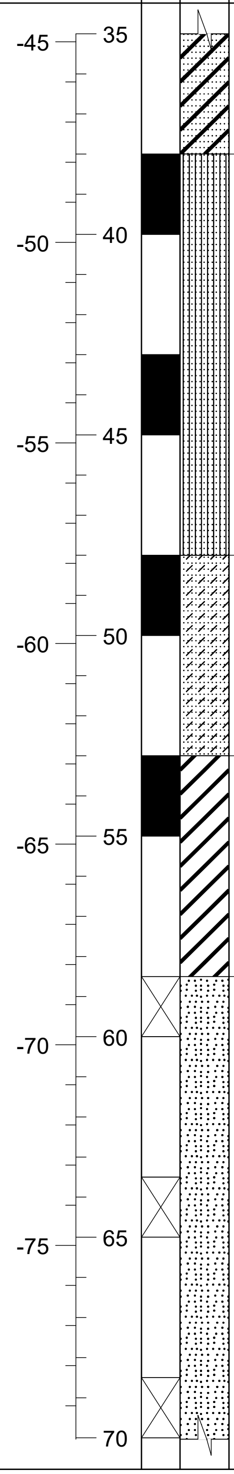
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"

SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Firm gray SANDY FAT CLAY (CH), with ferrous nodules												
Gray SANDY SILT (ML), with ferrous nodules	(P)1.25		42	80	42	11		0.77	15**	31	69	
	(P)4.25											
Gray CLAYEY SAND (SC), with ferrous nodules			18		30	16					48	
Stiff gray FAT CLAY (CH), with ferrous nodules	(P)2.00		55	71	99	60		1.39	11	44		
Dense gray POORLY GRADED SAND (SP)		6/6" 10/6" 25/6"	18								2	
-becomes very dense at 63.5'		29/6" 31/6" 34/6"										
-becomes medium dense at 68.5'		5/6" 10/6" 18/6"	17								3	

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/12/2021
DATE BORING COMPLETED: 03/14/2021
LOGGER: S. Cortinas
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING MB-10

DRAFT

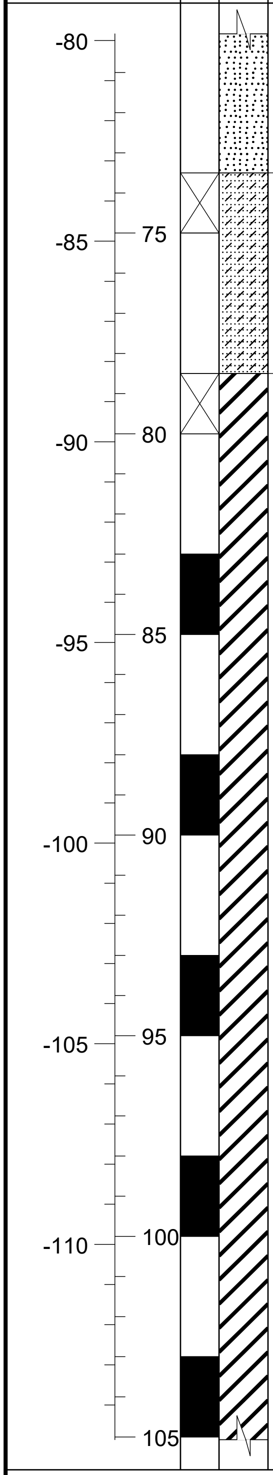
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"

SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Medium dense gray POORLY GRADED SAND (SP)												
Dense gray CLAYEY SAND (SC)		12/6" 15/6" 18/6"	22								20	
Very stiff, brown and gray FAT CLAY (CH), with ferrous nodules -with calcareous nodules from 78.5' to 85'		5/6" 10/6" 14/6"	25		63	44						
-slickensided from 83' to 85'	(P)4.25											
-becomes gray and tan at 88' -with sand pockets from 88' to 105'	(P)4.50		27	104	56	36		3.81	11	73		
-becomes hard and slickensided at 93' -with calcareous nodules from 93' to 95'	(P)4.50											
-becomes gray at 98'	(P)4.50		24		55	38						
-becomes brown and gray at 103'	(P)4.50		23								99	

COMPLETION DEPTH:	200 ft
DATE BORING STARTED:	03/12/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING MB-10

DRAFT

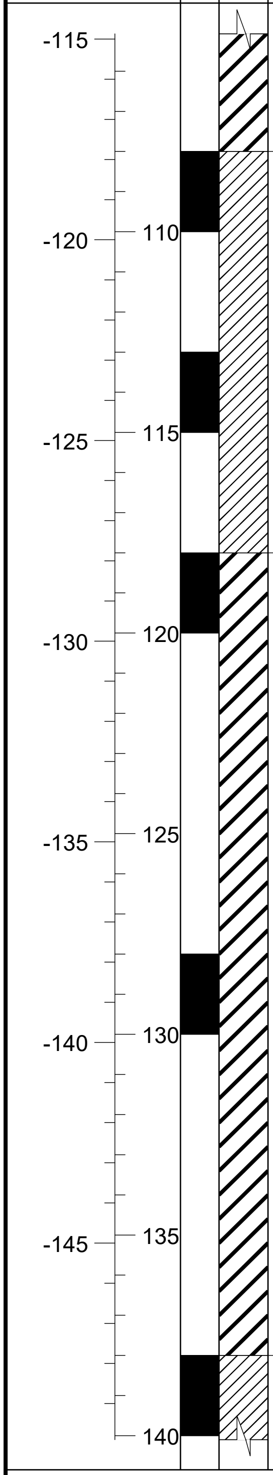
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"

SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Hard, brown and gray FAT CLAY (CH), slickensided												
Very stiff gray LEAN CLAY (CH), with ferrous nodules and sand seams	(P)4.50		18	105	36	22		3.86	15*	81		
	(P)3.25		22								95	
Very stiff gray FAT CLAY (CH), with ferrous nodules and shell fragments	(P)3.00		34	103				3.29	15*	98		
-with sand seams from 128' to 130'	(P)3.50		32		66	41						
Very stiff gray LEAN CLAY (CL), with calcareous nodules -with sand seams from 138' to 140'	(P)3.75		25		46	27						

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/12/2021
DATE BORING COMPLETED: 03/14/2021
LOGGER: S. Cortinas
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING MB-10

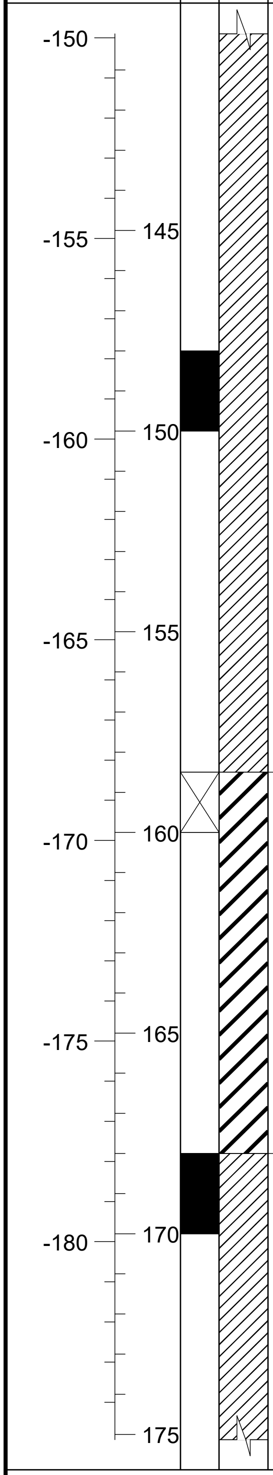
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"

SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff gray LEAN CLAY (CL), with calcareous nodules												
-becomes stiff at 148' -with ferrous nodules from 148' to 150'	(P)2.25		26	106				1.61	15**	110		
Very stiff gray FAT CLAY (CH), with organics, wood fragments and sand pockets		8/6" 10/6" 15/6"	46		61	22						
Very stiff, brown and gray LEAN CLAY (CL), with ferrous nodules and sand pockets	(P)4.25											

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/12/2021
DATE BORING COMPLETED: 03/14/2021
LOGGER: S. Cortinas
PROJECT NO.: 21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING MB-10

DRAFT

PROJECT:	Cedar Bayou Deepening and Widening Chambers County, Texas
CLIENT:	Trans - Global Solutions, Inc Beaumont, Texas

COORDINATES: N 29° 40' 19.60"
W 94° 55' 56.40"
SURFACE ELEVATION: -9.8'

DRILLING METHOD:
Dry Augered: - to -
Wash Bored: 0' to 200'

ELEVATION (FT)	DEPTH (FT)	SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
-185				Very stiff, brown and gray LEAN CLAY (CL), with ferrous nodules and sand pockets												
		☒		Brown and gray SILT (ML)		7/6" 11/6" 14/6"	32		35	9					95	
-190	180															
-195	185															
		☒		Very stiff gray FAT CLAY (CH), with ferrous nodules -no recovery with Shelby tube from 188' to 190'		8/6" 9/6" 10/6"										
-200	190															
-205	195															
		☒		Very dense gray CLAYEY SAND (SC)		30/6" 41/6" 50/5.5"	23								29	
-210	200			Bottom @ 200'												
-215	205															
	210															

COMPLETION DEPTH:	200 ft
DATE BORING STARTED:	03/12/2021
DATE BORING COMPLETED:	03/14/2021
LOGGER:	S. Cortinas
PROJECT NO.:	21.23.029

NOTES: The depth to mudline at the boring location was approximately 9.8-ft beneath the water surface at the time of drilling. WOH: Weight of Hammer. WOP: Weight of Pipe.

LOG OF BORING LB-1

DRAFT

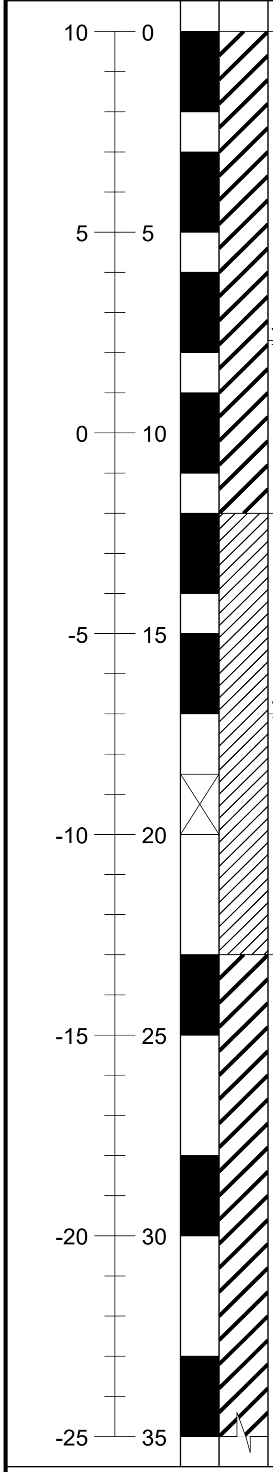
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 08.40"
W 94° 55' 34.50"

SURFACE ELEVATION: 10.0'

DRILLING METHOD:
Dry Augered: 0' to 17'
Wash Bored: 17' to 120'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff, brown and tan FAT CLAY (CH) -with ferrous nodules from 0' to 5'	(P)2.25		24		73	48						
-becomes tan and gray at 3' -with calcareous nodules from 3' to 11'	(P)2.25		24	103				1.56	15**	3		
-becomes very stiff at 6' -slickensided from 6' to 8'	(P)3.25		27		79	50						CON
	(P)3.00		25		72	46						
Stiff, tan and gray LEAN CLAY (CL) -with calcareous nodules from 12' to 14'	(P)2.25		22								95	
-becomes firm at 15' -with sand seams from 15' to 17'	(P)1.25		26	101	31	12		0.93	15**	13		
		2/6" 2/6" 3/6"	31								96	
Very stiff, tan and gray FAT CLAY (CH) -slickensided from 23' to 45'	(P)3.25		27		75	49						
-becomes brown and tan at 28' -with calcareous nodules from 28' to 30'	(P)3.50		34									CON
	(P)4.00		28		79	50						

COMPLETION DEPTH:	120 ft
DATE BORING STARTED:	03/29/2021
DATE BORING COMPLETED:	03/30/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 17.0-ft. 15-min Static Water Depth = 7.7-ft. 15-min Total Hole Depth = 16.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation.

LOG OF BORING LB-1

DRAFT

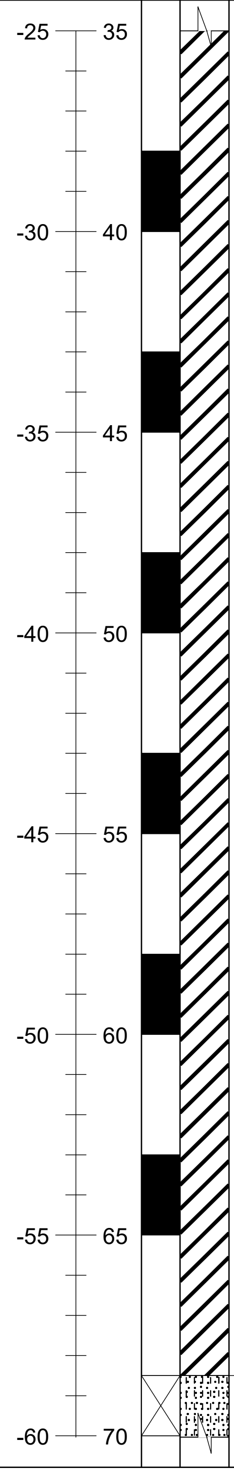
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 08.40"
W 94° 55' 34.50"

SURFACE ELEVATION: 10.0'

DRILLING METHOD:
Dry Augered: 0' to 17'
Wash Bored: 17' to 120'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff, brown and tan FAT CLAY (CH)												
-hard from 38' to 45'	(P)4.50											
	(P)4.25		26	95				4.29	7	37		
	(P)4.00		35		89	60						CON
-becomes gray and brown at 53'	(P)2.75											
	(P)2.50		30	94				2.35	10	49		
	(P)2.50		32		78	55						
Very dense, gray and tan POORLY GRADED SAND with SILT (SP-SM)		14/6" 21/6" 34/6"	20								5	

COMPLETION DEPTH: 120 ft
DATE BORING STARTED: 03/29/2021
DATE BORING COMPLETED: 03/30/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: Free Water Depth = 17.0-ft. 15-min Static Water Depth = 7.7-ft. 15-min Total Hole Depth = 16.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation.

LOG OF BORING LB-1

DRAFT

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 08.40"
W 94° 55' 34.50"

SURFACE ELEVATION: 10.0'

DRILLING METHOD:
Dry Augered: 0' to 17'
Wash Bored: 17' to 120'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
		Very dense, gray and tan POORLY GRADED SAND with SILT (SP-SM)												
		-gray from 73.5' to 80'		14/6" 22/6" 30/6"										
-65	75													
		-dense from 78.5' to 85'		11/6" 16/6" 24/6"	21								5	
-70	80													
				10/6" 19/6" 27/6"										
-75	85													
				15/6" 35/6" 48/6"	19								7	
-80	90													
		-becomes gray at 93.5' -with rock fragments from 93.5' to 95'		18/6" 37/6" 32/6"										
-85	95													
		Very stiff gray LEAN CLAY (CL), with sand pockets	(P)3.25		24		49	30					96	
-90	100													
		Very stiff gray FAT CLAY (CH), with sand pockets	(P)4.00		31	93				3.57	6	87		
-95	105													

COMPLETION DEPTH:	120 ft
DATE BORING STARTED:	03/29/2021
DATE BORING COMPLETED:	03/30/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 17.0-ft. 15-min Static Water Depth = 7.7-ft. 15-min Total Hole Depth = 16.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation.

LOG OF BORING LB-1

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 08.40"
W 94° 55' 34.50"

SURFACE ELEVATION: 10.0'

DRILLING METHOD:
Dry Augered: 0' to 17'
Wash Bored: 17' to 120'

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
		Very stiff gray FAT CLAY (CH), with sand pockets												
		-stiff from 108' to 110'	(P)2.50		28		55	34					94	
-100	110													
			(P)3.50		27	98				2.66	4 *	95		
-105	115													
		-becomes stiff at 118.5' -with organics from 118.5' to 120'		2/6" 3/6" 8/6"	45		92	71					90	
-110	120	Bottom @ 120'												
-115	125													
-120	130													
-125	135													
-130	140													

COMPLETION DEPTH:	120 ft
DATE BORING STARTED:	03/29/2021
DATE BORING COMPLETED:	03/30/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 17.0-ft. 15-min Static Water Depth = 7.7-ft. 15-min Total Hole Depth = 16.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation.

LOG OF BORING LB-2

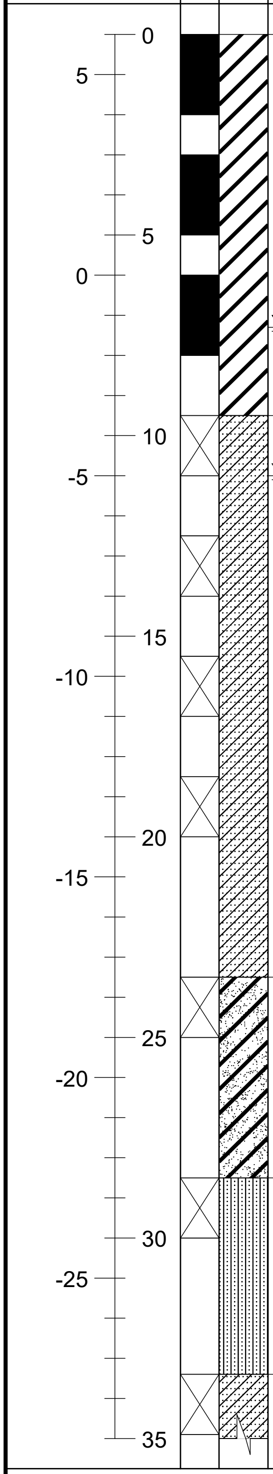
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff, brown and gray FAT CLAY (CH)	(P)2.25		21		53	38						
-becomes gray and tan at 3' -with ferrous nodules from 3' to 8'	(P)2.00		20		60	43						
-with calcareous nodules from 6' to 8'	(P)1.50		22	103				1.04	15**	6		
Very soft, gray and tan SANDY LEAN CLAY (CL)		WOH	26								55	
-becomes soft at 12.5' -with calcareous nodules from 12.5' to 17'		1/6" 1/6" 2/6"										
-firm from 15.5' to 17'		3/6" 4/6" 3/6"										
-becomes tan at 18.5'		1/6" 2/6" 2/6"	27								57	
Stiff, gray and tan FAT CLAY with SAND (CH)		3/6" 6/6" 7/6"	29		71	49					71	
Medium dense, gray and tan SILTY SAND (SM)		3/6" 7/6" 10/6"	26								36	
Very stiff, gray and tan SANDY LEAN CLAY (CL)		2/6" 4/6" 12/6"	31								70	

COMPLETION DEPTH:	200 ft
DATE BORING STARTED:	03/30/2021
DATE BORING COMPLETED:	04/01/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-2

DRAFT

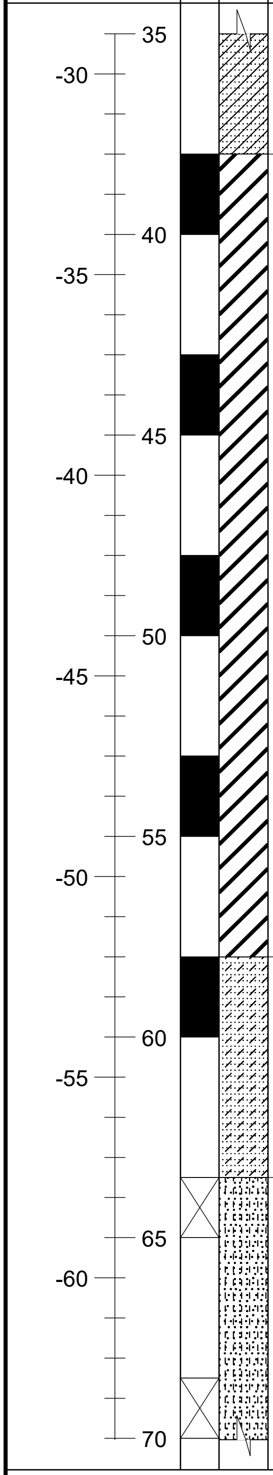
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Very stiff, gray and tan SANDY LEAN CLAY (CL)												
Very stiff, brown and gray FAT CLAY (CH) -slickensided from 38' to 40'	(P)4.50		27	96				3.00	3 *	33		
	(P)4.00		38		100	65						
-becomes gray and tan at 48'	(P)3.00		41		108	64						
-slickensided from 53' to 55'	(P)2.75		41	82				2.91	3 *	45		
Gray CLAYEY SAND (SC)	(P)2.75		20		35	19					32	
Dense gray POORLY GRADED SAND with SILT (SP-SM)		10/6" 20/6" 26/6"	21								6	
		8/6" 12/6" 21/6"										

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/30/2021
DATE BORING COMPLETED: 04/01/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-2

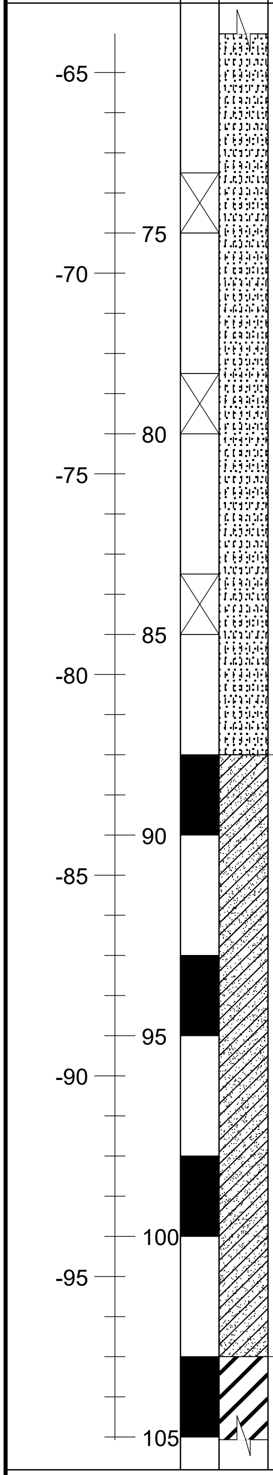
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Dense gray POORLY GRADED SAND with SILT (SP-SM)												
		12/6" 21/6" 27/6"	20								7	
		11/6" 18/6" 18/6"										
-becomes very dense at 83.5'		20/6" 29/6" 36/6"	20								7	
Very stiff gray LEAN CLAY with SAND (CL)	(P)4.50		21	105	40	20		3.00	14	74	83	
-stiff from 93' to 95'	(P)2.50		25		41	21						CON
	(P)2.75		24	101				2.51	14	83	85	
Stiff gray FAT CLAY (CH) -with calcareous nodules from 103' to 105'	(P)2.75		28		63	43						

COMPLETION DEPTH:	200 ft
DATE BORING STARTED:	03/30/2021
DATE BORING COMPLETED:	04/01/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-2

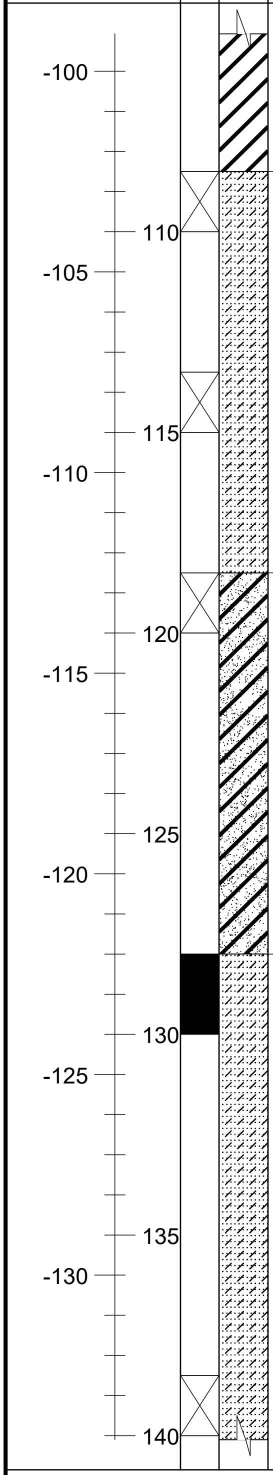
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff gray FAT CLAY (CH)												
Very loose gray CLAYEY SAND (SC)		1/6" 2/6" 2/6"	26		29	12					49	
-with organics from 113.5' to 115'		1/6" 2/6" 4/6"										
Firm gray FAT CLAY with SAND (CH)		1/6" 3/6" 5/6"	35								80	
Brown and gray CLAYEY SAND (SC) -with organics from 128' to 130'	(P)1.50		32		65	31					25	
-becomes loose and gray at 138.5'		1/6" 3/6" 7/6"	24								41	

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/30/2021
DATE BORING COMPLETED: 04/01/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-2

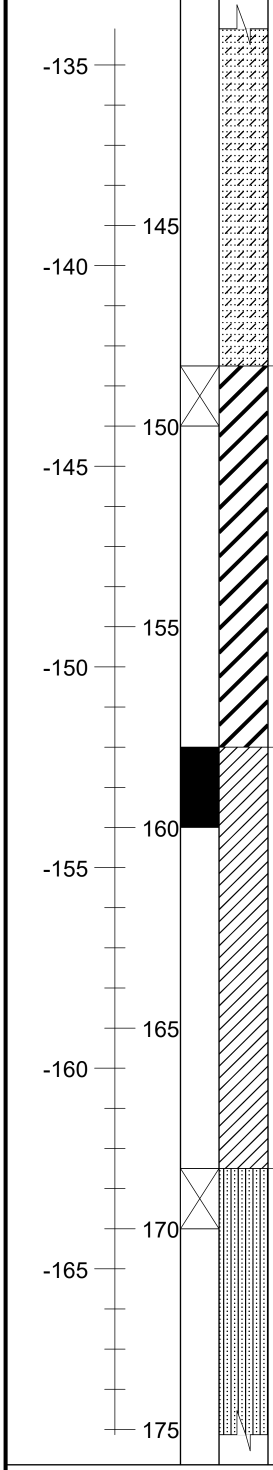
PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc.
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'



MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Loose gray CLAYEY SAND (SC)												
Stiff gray FAT CLAY (CH)		2/6" 4/6" 6/6"	36		74	51						
Very stiff gray LEAN CLAY (CL)	(P)2.25		27	98				2.11	10	93	99	
Very dense gray SILTY SAND (SM)		23/6" 40/6" 37/5"										

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/30/2021
DATE BORING COMPLETED: 04/01/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-2

DRAFT

PROJECT: Cedar Bayou Deepening and Widening
Chambers County, Texas

CLIENT: Trans - Global Solutions, Inc
Beaumont, Texas

COORDINATES: N 29° 40' 03.40"
W 94° 55' 35.60"

SURFACE ELEVATION: 6.0'

DRILLING METHOD:
Dry Augered: 0' to 11'
Wash Bored: 11' to 200'

ELEVATION (FT): -170, -175, -180, -185, -190, -195, -200

DEPTH (FT): 180, 185, 190, 195, 200, 205, 210

SAMPLE TYPE	SYMBOL	MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
		Very dense gray SILTY SAND (SM)												
☒				15/6" 29/6" 30/6"	21								40	
☒		Firm gray FAT CLAY (CH) -with organics and shell fragments from 188.5' to 190'		2/6" 3/6" 5/6"	39		71	49						
■		-becomes very stiff at 198'	(P)4.00		31	93				2.37	15	100		
		Bottom @ 200'												

COMPLETION DEPTH: 200 ft
DATE BORING STARTED: 03/30/2021
DATE BORING COMPLETED: 04/01/2021
LOGGER: C. Watts
PROJECT NO.: 21.23.029

NOTES: Free Water Depth = 11.0-ft. 15-min Static Water Depth = 7.3-ft. 15-min Total Hole Depth = 8.0-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation. WOH: Weight of Hammer.

LOG OF BORING LB-3

PROJECT:	Cedar Bayou Deepening and Widening Chambers County, Texas	CLIENT:	Trans - Global Solutions, Inc Beaumont, Texas

COORDINATES: N 29° 40' 00.70"
W 94° 55' 27.40"

SURFACE ELEVATION: 4.0'

DRILLING METHOD:
Dry Augered: 0' to 12'
Wash Bored: 12' to 25'

MATERIAL DESCRIPTION	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
Stiff brown LEAN CLAY (CL), with organics	(P)1.50		22		33	14						
Stiff, gray and tan FAT CLAY (CH), with ferrous nodules	(P)1.75		26	101				1.31	15	3		
-with calcareous nodules from 4' to 8'	(P)2.00		25		77	59						CON
	(P)2.25											
Firm , gray and tan SILTY CLAY with SAND (CL-ML)	(P)1.50		23	103	28	7		0.87	15	8	73	
Firm tan LEAN CLAY with SAND (CL)		1/6" 2/6" 4/6"	28								83	
-becomes gray and tan at 13.5'		1/6" 3/6" 4/6"	27		38	21						
Stiff, gray and tan LEAN CLAY (CL), with calcareous nodules and sand seams	(P)2.25		26		47	26					97	
Very stiff, brown and gray FAT CLAY (CH), with calcareous nodules	(P)3.75		29		73	49						CON
Bottom @ 25'												

ELEVATION (FT)	DEPTH (FT)
	0
0	5
-5	10
-10	15
-15	20
-20	25
-25	30
-30	35

COMPLETION DEPTH:	25 ft
DATE BORING STARTED:	04/01/2021
DATE BORING COMPLETED:	04/01/2021
LOGGER:	C. Watts
PROJECT NO.:	21.23.029

NOTES: Free Water Depth = 12.0-ft. 15-min Static Water Depth = 4.6-ft. 15-min Total Hole Depth = 8.7-ft. Borehole was backfilled with cement-bentonite grout. CON: One-Dimensional Consolidation.

DRAFT

KEY TO SYMBOLS AND TERMS USED ON BORING LOGS FOR SOIL

Most Common Unified Soil Classifications System Symbols

▨	Lean Clay (CL)
▨	Lean Clay w/ Sand (CL)
▨	Sandy Lean Clay (CL)
▨	Fat Clay (CH)
▨	Fat Clay w/ Sand (CH)
▨	Sandy Fat Clay (CH)
▨	Silty Clay (CL-ML)
▨	Sandy Silty Clay (CL-ML)
▨	Silty Clayey Sand (SC-SM)
▨	Clayey Sand (SC)
▥	Sandy Silt (ML)
▥	Silty Sand (SM)
▥	Silt w/ Sand (ML)
⬚	Well Graded Sand (SW)
⬚	Well Graded Sand w/ Gravel (SW-GM)
⬚	Poorly Graded Sand (SP)
⬚	Poorly Graded Sand w/ Silt (SP-SM)
▥	Silt (ML)
▥	Elastic Silt (MH)
▥	Elastic Silt w/ Sand (MH-SP)
⬚	Silty Gravel (GM)
⬚	Clayey Gravel (GC)
⬚	Well Graded Gravel (GW)
⬚	Well Graded Gravel w/ Sand (SP-GM)
⬚	Poorly Graded Gravel (GP)
▤	Peat

Miscellaneous Materials

⬚	Fill
⬚	Concrete
■	Asphalt and/or Base

Sampler Symbols	**Meaning**
▯	Pavement core
▮	Thin - walled tube sample
⊠	Standard Penetration Test (SPT)
◩	Auger sample
▱	Sampling attempt with no recovery
⧗	TxDOT Cone Penetrometer Test

Field Test Data

2.50	Pocket penetrometer reading in tons per square foot
(T)1.13	Torvane Measurement in tons per square foot
8/6"	Blow count per 6 - in. interval of the Standard Penetration Test
▽	Observed free water during drilling
▼	Observed static water level

Laboratory Test Data

Wc (%)	Moisture content in percent
Dens. (pcf)	Dry unit weight in pounds per cubic foot
Qu (tsf)	Unconfined compressive strength in tons per square foot
UU (tsf)	Compressive strength under confining pressure in tons per square foot
Str. (%)	Strain at failure in percent
LL	Liquid Limit in percent
PI	Plasticity Index
#200 (%)	Percent passing the No. 200 mesh sieve
( )	Confining pressure in pounds per square inch
*	Slickensided failure
**	Did not fail @ 15% strain

RELATIVE DENSITY OF COHESIONLESS & SEMI-COHESIONLESS SOILS

The following descriptive terms for relative density apply to cohesionless soils such as gravels, silty sands, and sands as well as semi-cohesive and semi-cohesionless soils such as sandy silts, and clayey sands.

Relative Density	**Typical N_{60} Value Range***
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	Over 50

* N_{60} is the number of blows from a 140-lb weight having a free fall of 30-in. required to penetrate the final 12-in. of an 18-in. sample interval, corrected for field procedure to an average energy ratio of 60% (Terzaghi, Peck, and Mesri, 1996).

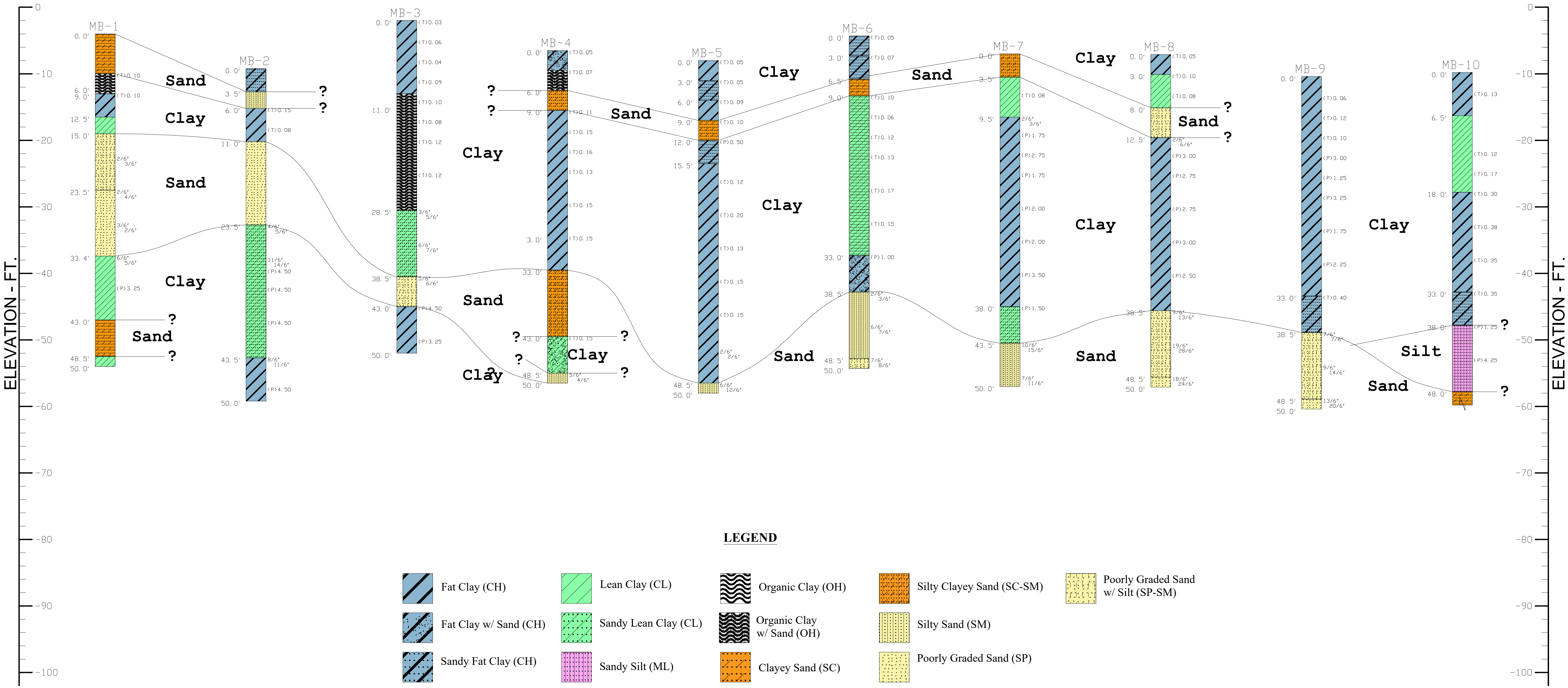
CONSISTENCY OF COHESIVE SOILS

The following descriptive terms for consistency apply to cohesive soils such as clays, sandy clays, and silty clays.

Typical Compressive Strength (tsf)	**Consistency**	**Typical SPT "N_{60}" Value Range****
$q_u < 0.25$	Very soft	≤ 2
$0.25 \leq q_u < 0.50$	Soft	3-4
$0.50 \leq q_u < 1.00$	Firm	5-8
$1.00 \leq q_u < 2.00$	Stiff	9-15
$2.00 \leq q_u < 4.00$	Very Stiff	16-30
$q_u \geq 4.00$	Hard	≥ 31

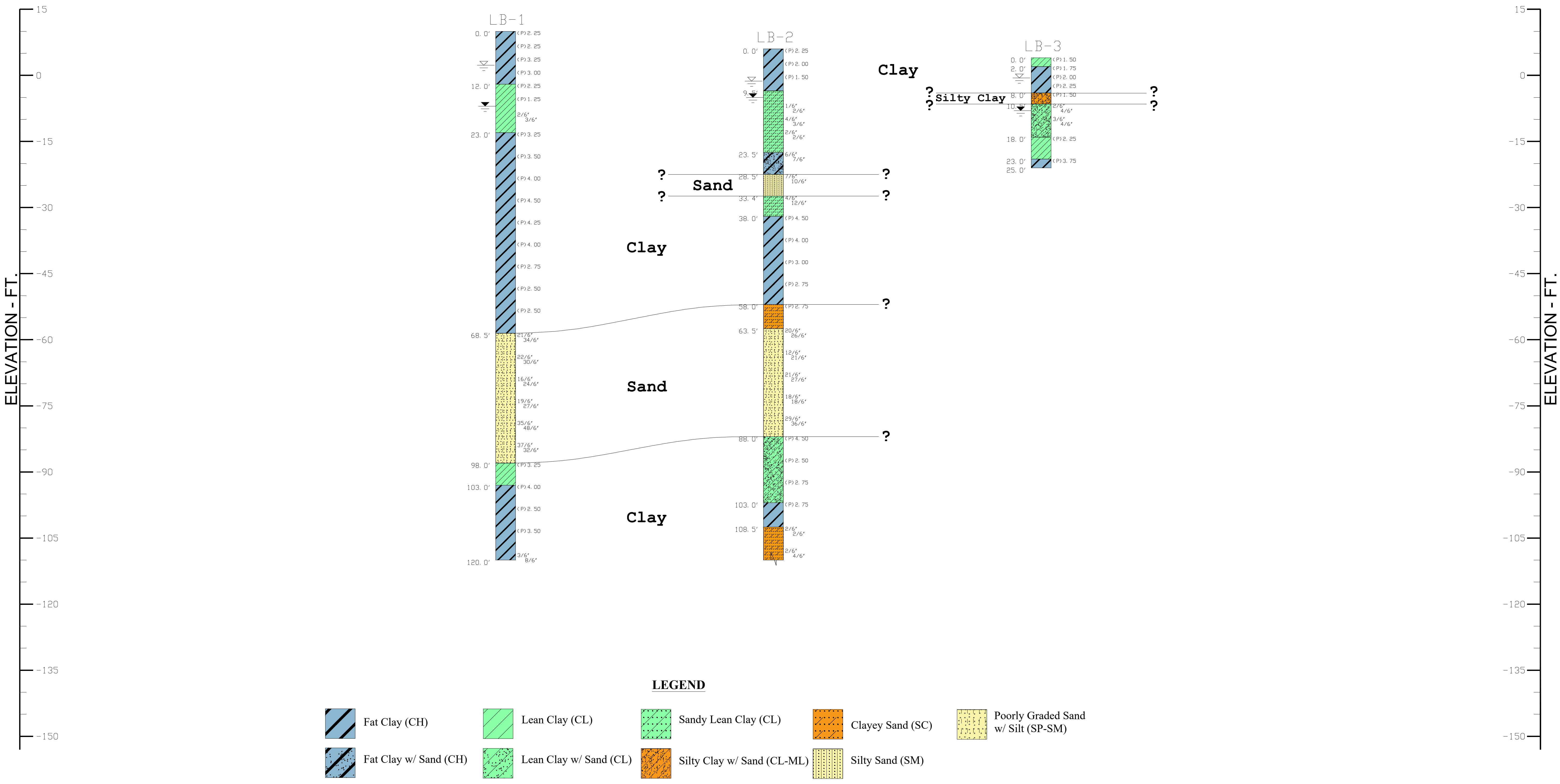
** An "N_{60}" value of 31 or greater corresponds to a hard consistency. The correlation of consistency with a typical SPT "N_{60}" value range is approximate.

SUBSURFACE PROFILE
CROSS SECTION A-A'



CEDAR BAYOU DEEPING & WIDENING PROJECT CHAMBERS COUNTY, TEXAS	Tolunay-Wong Engineers, Inc.	SUBSURFACE PROFILE CROSS SECTION A-A'
TRANS GLOBAL SOLUTIONS, INC. BEAUMONT, TEXAS		PROJECT NO.: 21.23.029
		FIGURE 1

SUBSURFACE PROFILES
CROSS SECTION B-B'



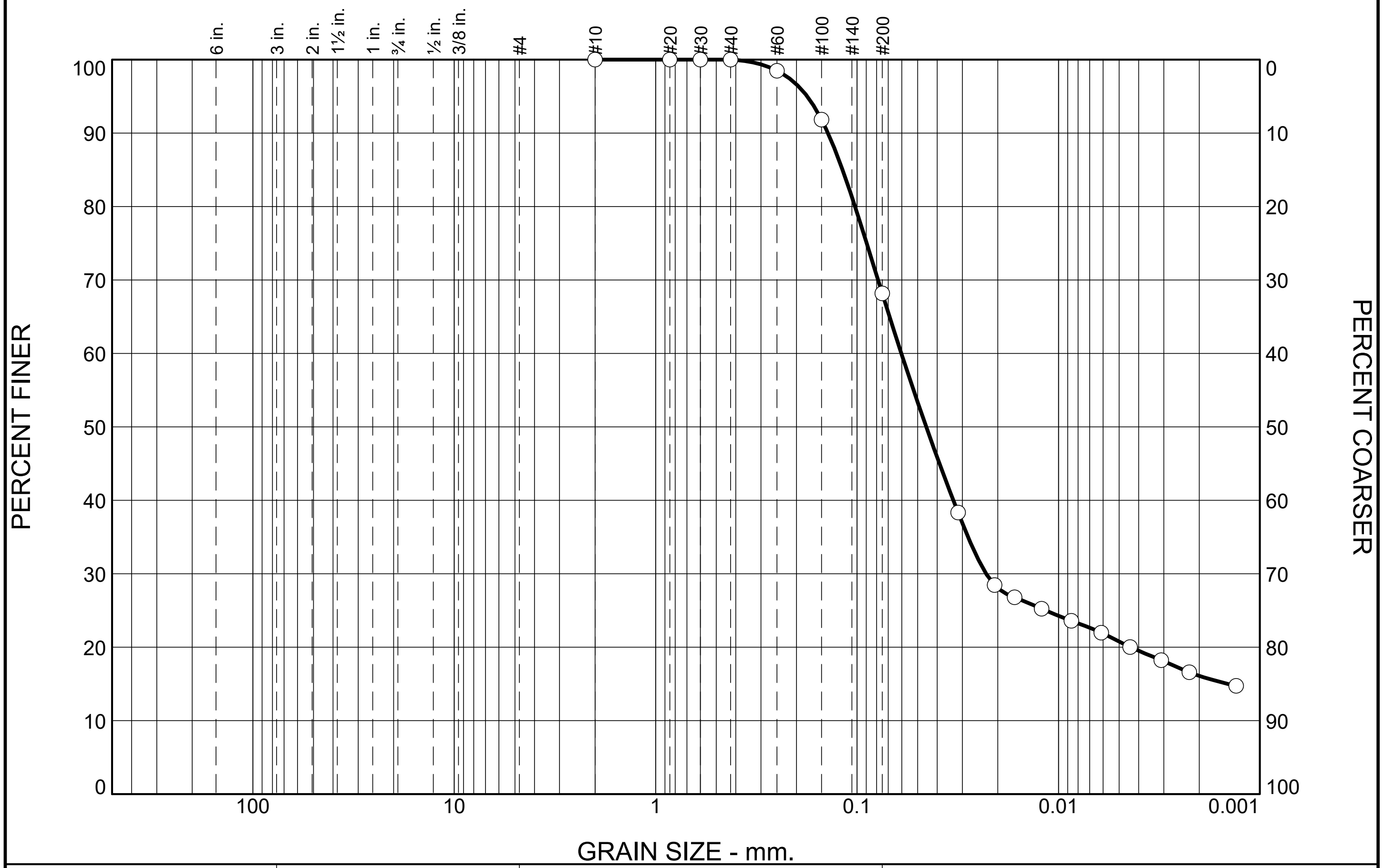
CEDAR BAYOU DEEPING & WIDENING PROJECT CHAMBERS COUNTY, TEXAS	SUBSURFACE PROFILE CROSS SECTION B-B'
TRANS GLOBAL SOLUTIONS, INC. BEAUMONT, TEXAS	PROJECT NO.: 21.23.029
	FIGURE 2

Tolunay-Wong Engineers, Inc.

APPENDIX D

LABORATORY RESULTS – SEDIMENT SAMPLES

ASTM D7928



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	31.8	52.1	16.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#30	100.0		
#40	100.0		
#60	98.5		
#100	91.8		
#200	68.2		

* (no specification provided)

Material Description

Gray SANDY LEAN CLAY (CL)

Atterberg Limits

PL= 19
LL= 38
PI= 19

Coefficients

D_{90}= 0.1394
D_{85}= 0.1180
D_{60}= 0.0603
D_{50}= 0.0453
D_{30}= 0.0229
D_{15}= 0.0014
D_{10}=
C_u=
C_c=

Classification

USCS= CL
AASHTO= A-6(11)

Remarks

Source of Sample: MB-3 Sediment Sample

Depth: --

Date:

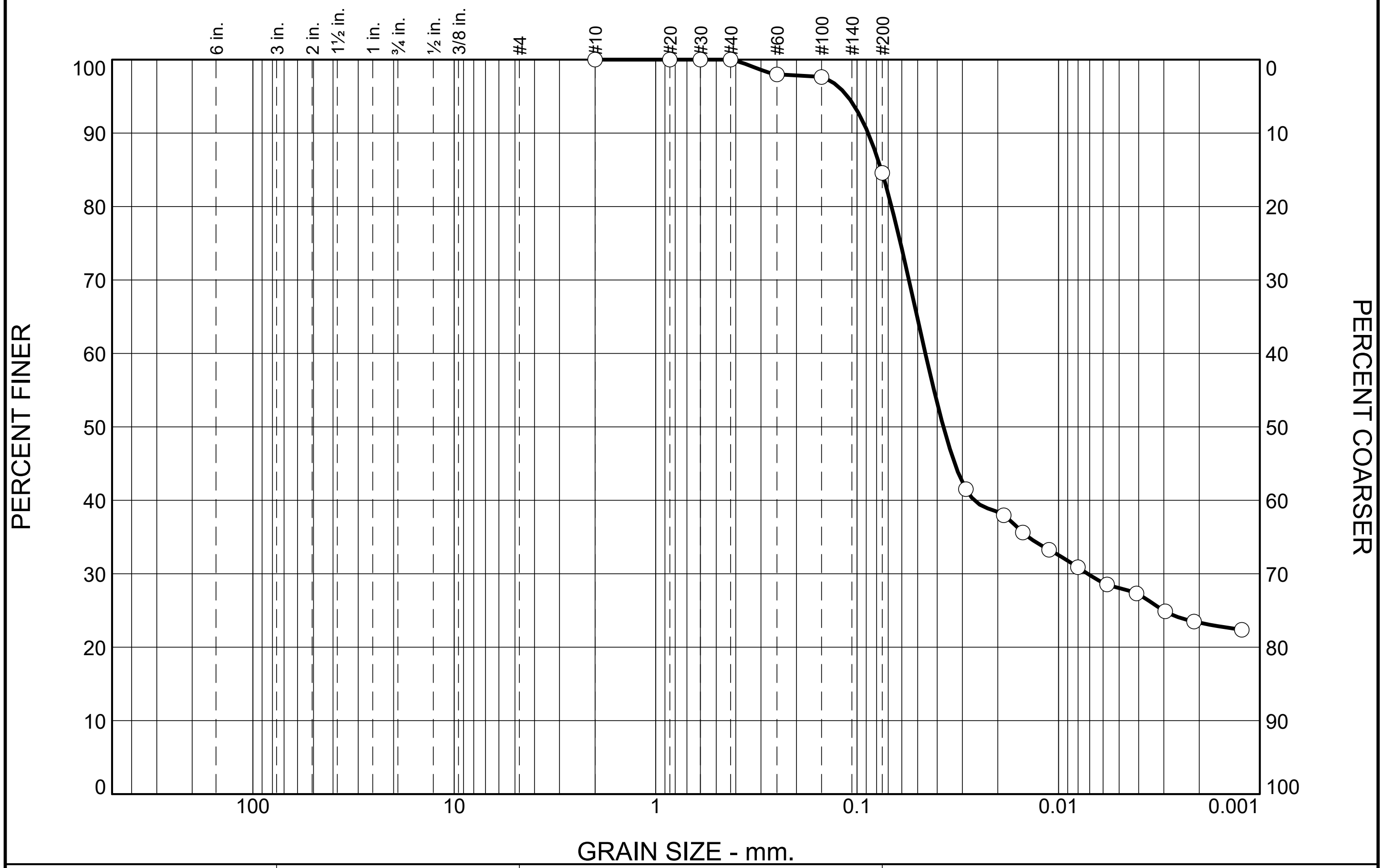
Tolunay-Wong Engineers, Inc.

Beaumont, TX

Client: Trans - Global Solutions, Inc.
Project: Cedar Bayou Deepening and Widening
Chambers County, Texas
Project No: 21.23.029

Figure

ASTM D7928



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	15.4	61.3	23.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#30	100.0		
#40	100.0		
#60	98.0		
#100	97.6		
#200	84.6		

* (no specification provided)

Material Description

Gray LEAN CLAY with SAND (CL)

Atterberg Limits

PL= 22
LL= 49
PI= 27

Coefficients

D_{90}= 0.0881
D_{85}= 0.0758
D_{60}= 0.0458
D_{50}= 0.0373
D_{30}= 0.0072
D_{15}=
D_{10}=
C_u=
C_c=

Classification

USCS= CL
AASHTO= A-7-6(24)

Remarks

Source of Sample: MB-5 Sediment Sample **Depth:** --

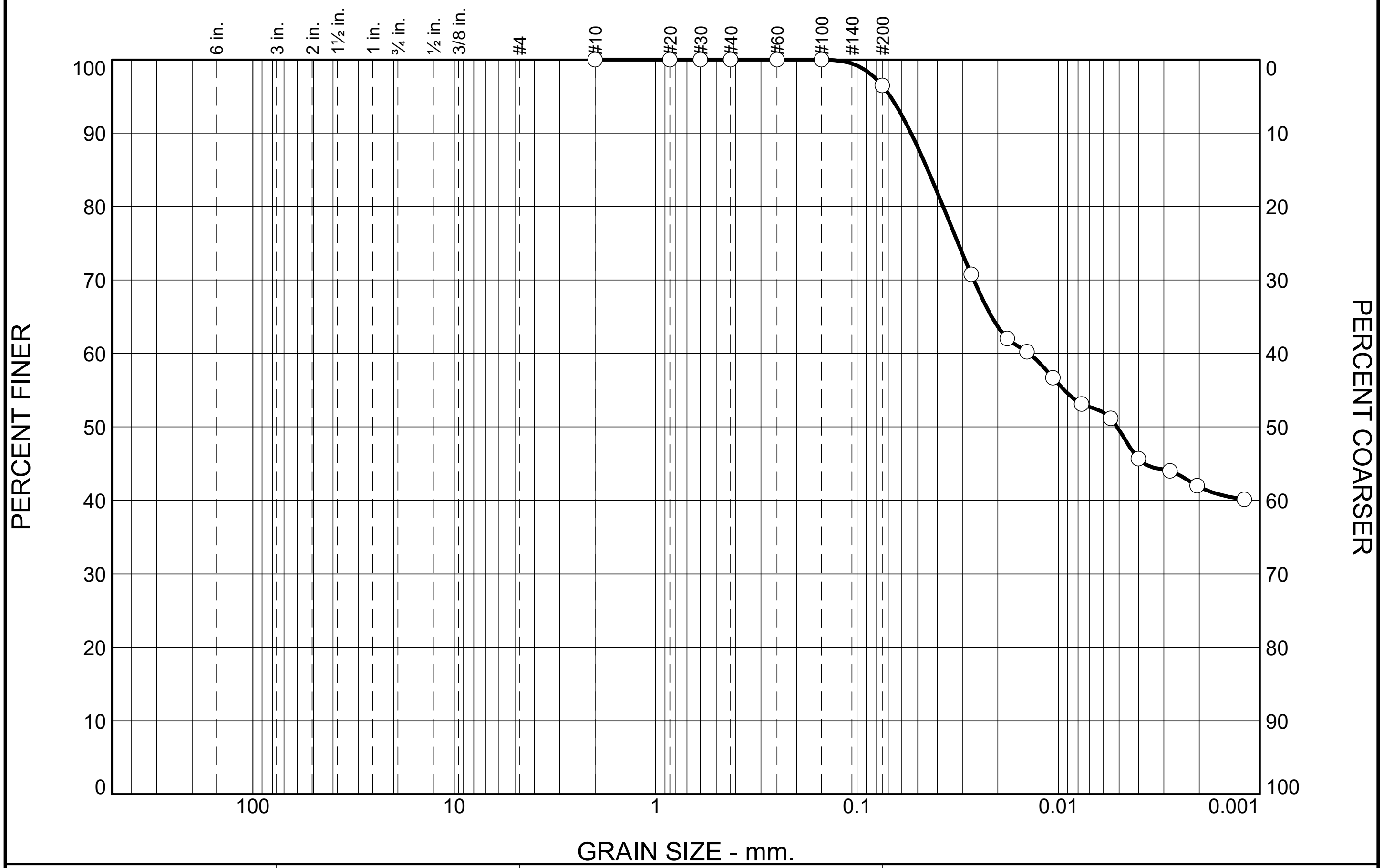
Date:

Tolunay-Wong Engineers, Inc.

Beaumont, TX

Client: Trans - Global Solutions, Inc.
Project: Cedar Bayou Deepening and Widening
Chambers County, Texas
Project No: 21.23.029 **Figure**

ASTM D7928



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	3.5	54.7	41.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#30	100.0		
#40	100.0		
#60	100.0		
#100	100.0		
#200	96.5		

* (no specification provided)

Material Description

Gray FAT CLAY (CH)

Atterberg Limits

PL= 34
LL= 91
PI= 57

Coefficients

D_{90}= 0.0540
D_{85}= 0.0446
D_{60}= 0.0139
D_{50}= 0.0051
D_{30}=
D_{15}=
D_{10}=
C_u=
C_c=

Classification

USCS= CH
AASHTO= A-7-5(66)

Remarks

Source of Sample: MB-7 Sediment Sample **Depth:** --

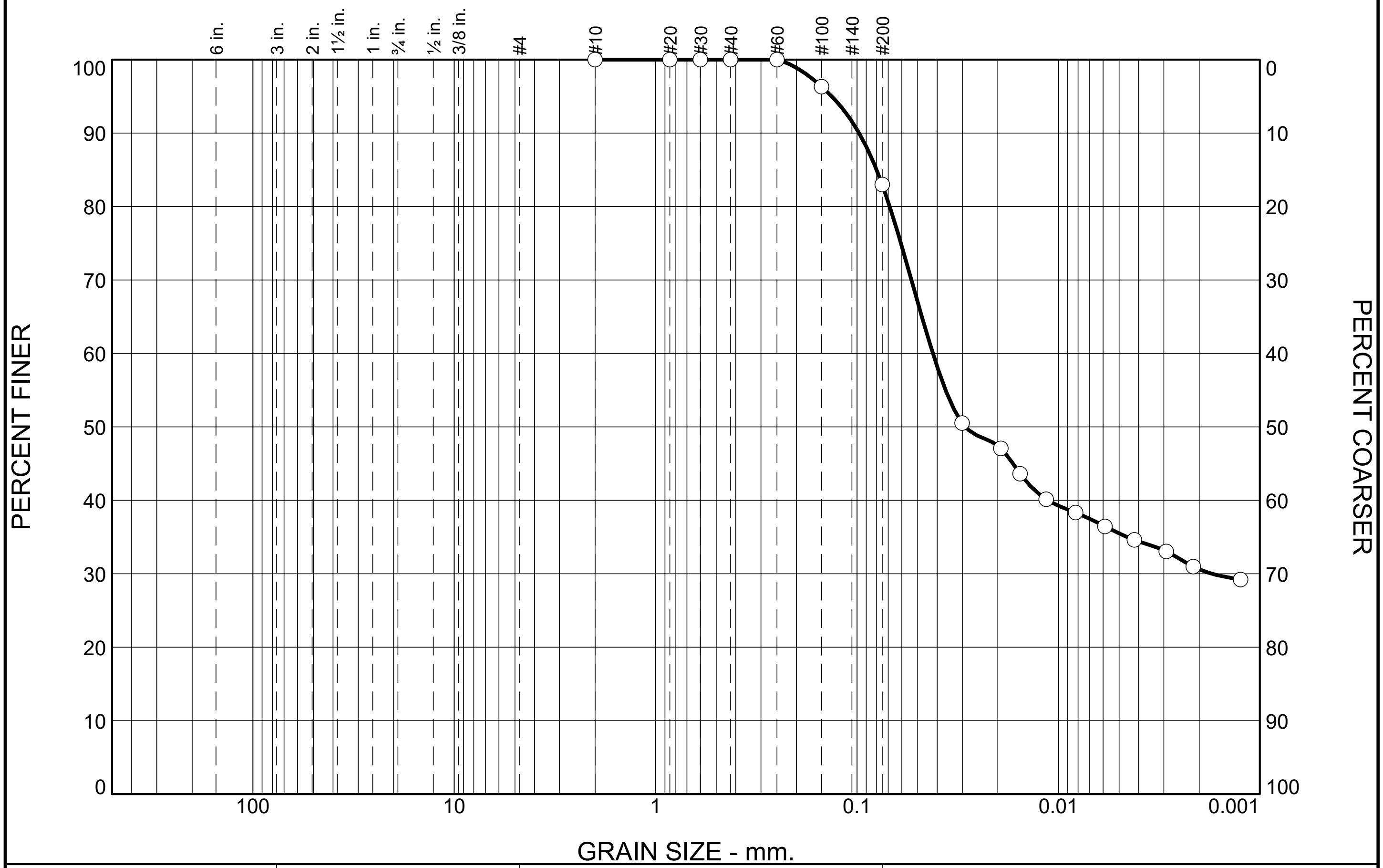
Date:

Tolunay-Wong Engineers, Inc.

Beaumont, TX

Client: Trans - Global Solutions, Inc.
Project: Cedar Bayou Deepening and Widening
Chambers County, Texas
Project No: 21.23.029 **Figure**

ASTM D7928



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	17.0	52.4	30.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#30	100.0		
#40	100.0		
#60	100.0		
#100	96.3		
#200	83.0		

* (no specification provided)

Material Description

Gray FAT CLAY with SAND (CH)

Atterberg Limits

PL= 27 LL= 66 PI= 39

Coefficients

D_{90}= 0.0977 D_{85}= 0.0800 D_{60}= 0.0420
D_{50}= 0.0290 D_{30}= 0.0017 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(36)

Remarks

Source of Sample: MB-9 Sediment Sample **Depth:** --

Date:

Tolunay-Wong Engineers, Inc.

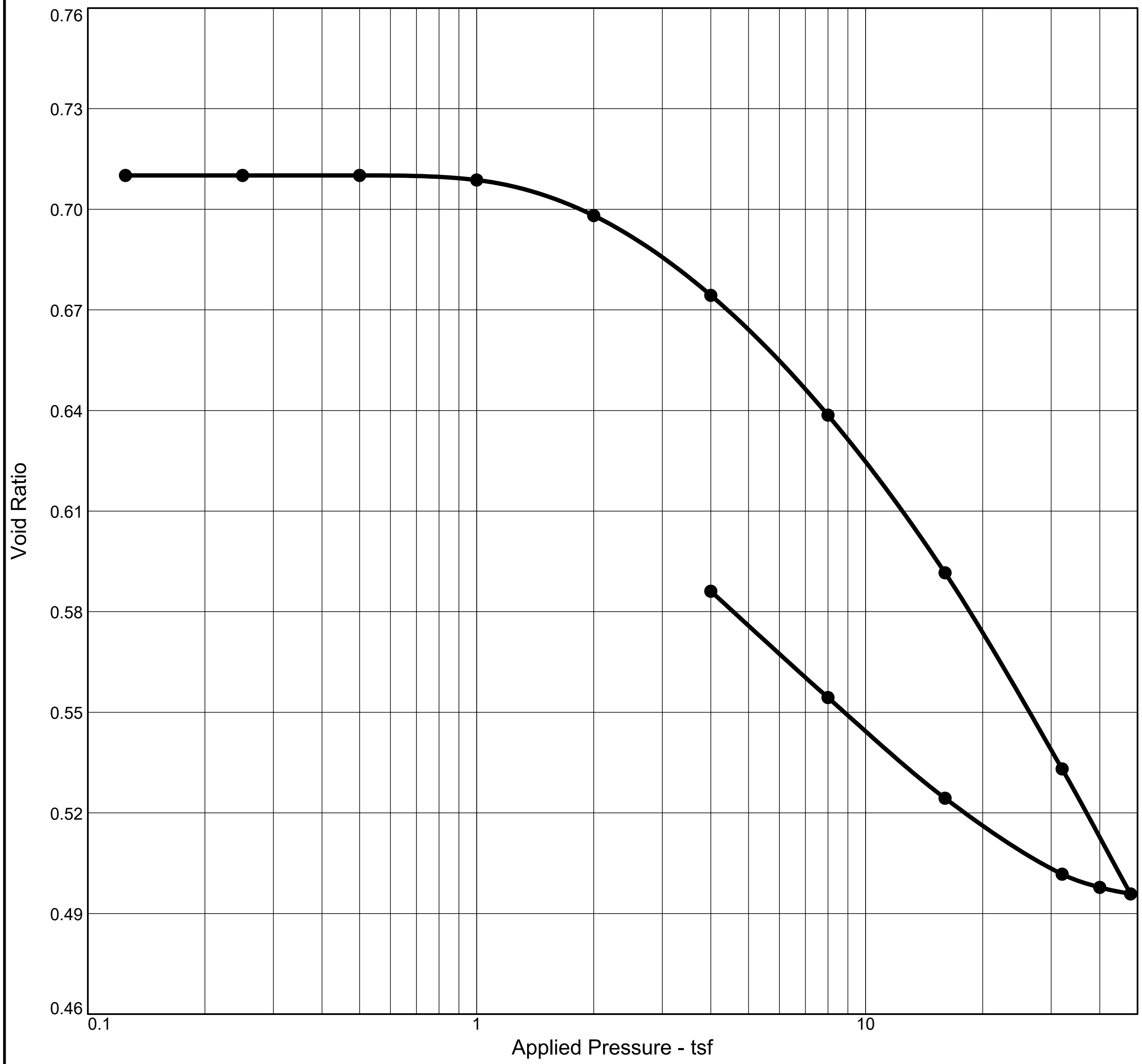
Beaumont, TX

Client: Trans - Global Solutions, Inc.
Project: Cedar Bayou Deepening and Widening
Chambers County, Texas
Project No: 21.23.029 **Figure**

APPENDIX E

ONE-DIMENSIONAL CONSOLIDATION TEST REPORTS

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.6 %	25.7 %	98.6	79	50	2.70	CH		0.710

MATERIAL DESCRIPTION

Very stiff, tan and gray FAT CLAY (CH), with calcareous nodules and slickensides

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-1 **Depth:** 6-8

Tolunay-Wong Engineers, Inc.

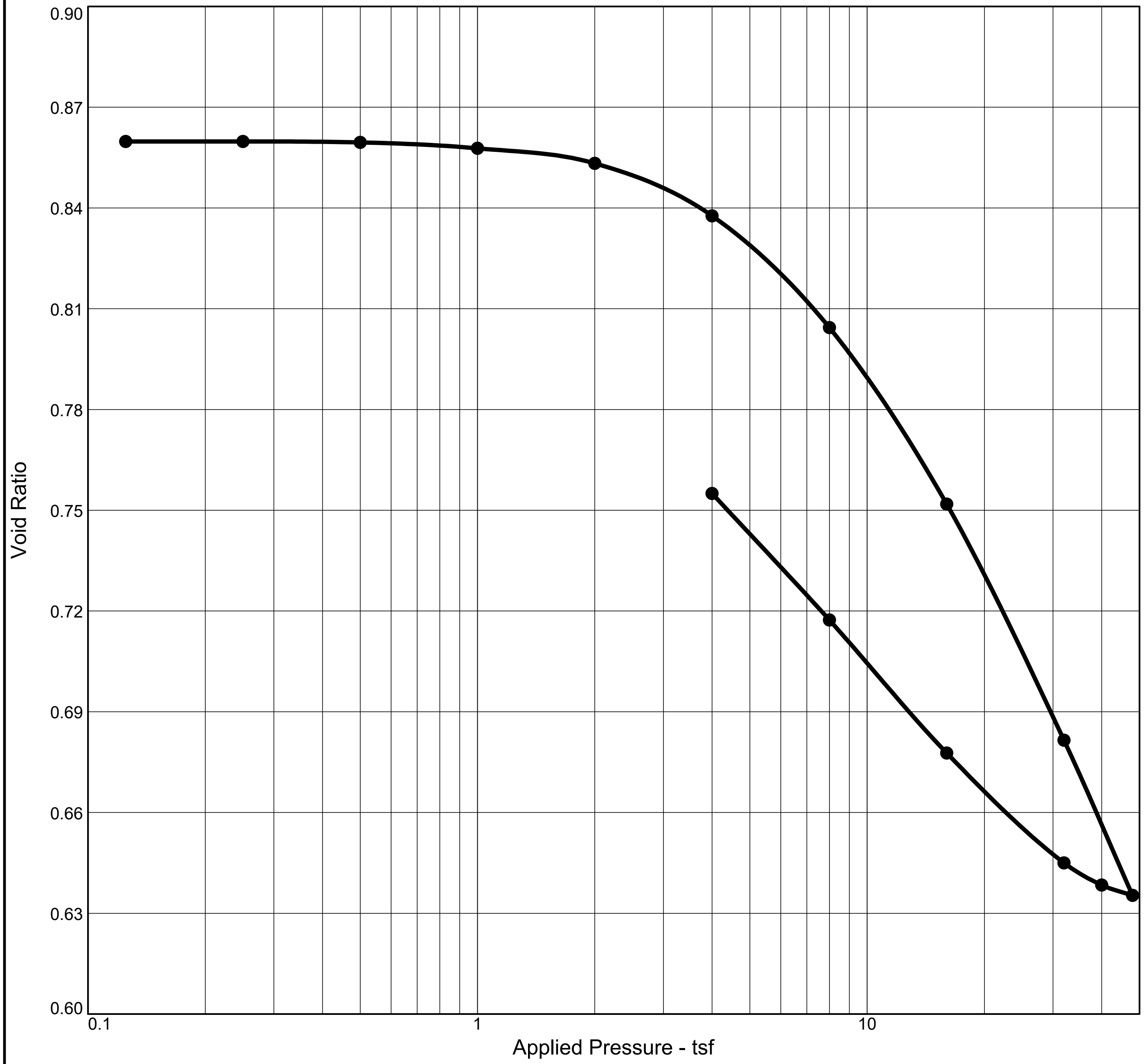
Beaumont, TX

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

Figure

Tested By: Benjamin Moore

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
102.9 %	32.8 %	90.6	-	-	2.70	CH		0.860

MATERIAL DESCRIPTION

Very stiff, brown and tan FAT CLAY (CH), with calcareous nodules

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-1 **Depth:** 28-30

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

Tolunay-Wong Engineers, Inc.

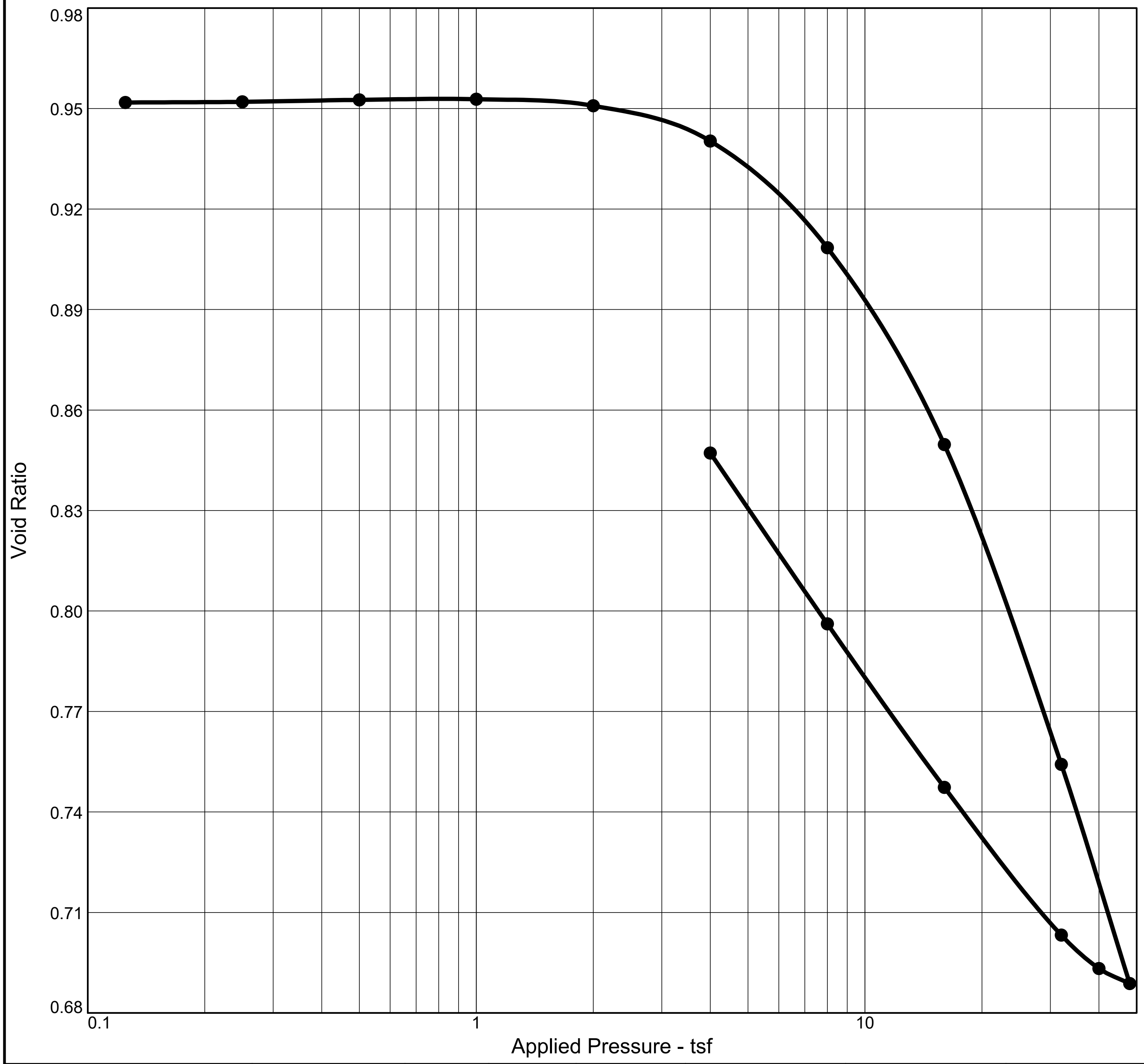
Beaumont, TX

Figure

Tested By: Benjamin Moore

DRAFT

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
102.9 %	36.3 %	86.3	89	60	2.70	CH		0.953

MATERIAL DESCRIPTION

Very stiff, brown and tan FAT CLAY (CH)

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-1 **Depth:** 48-50

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

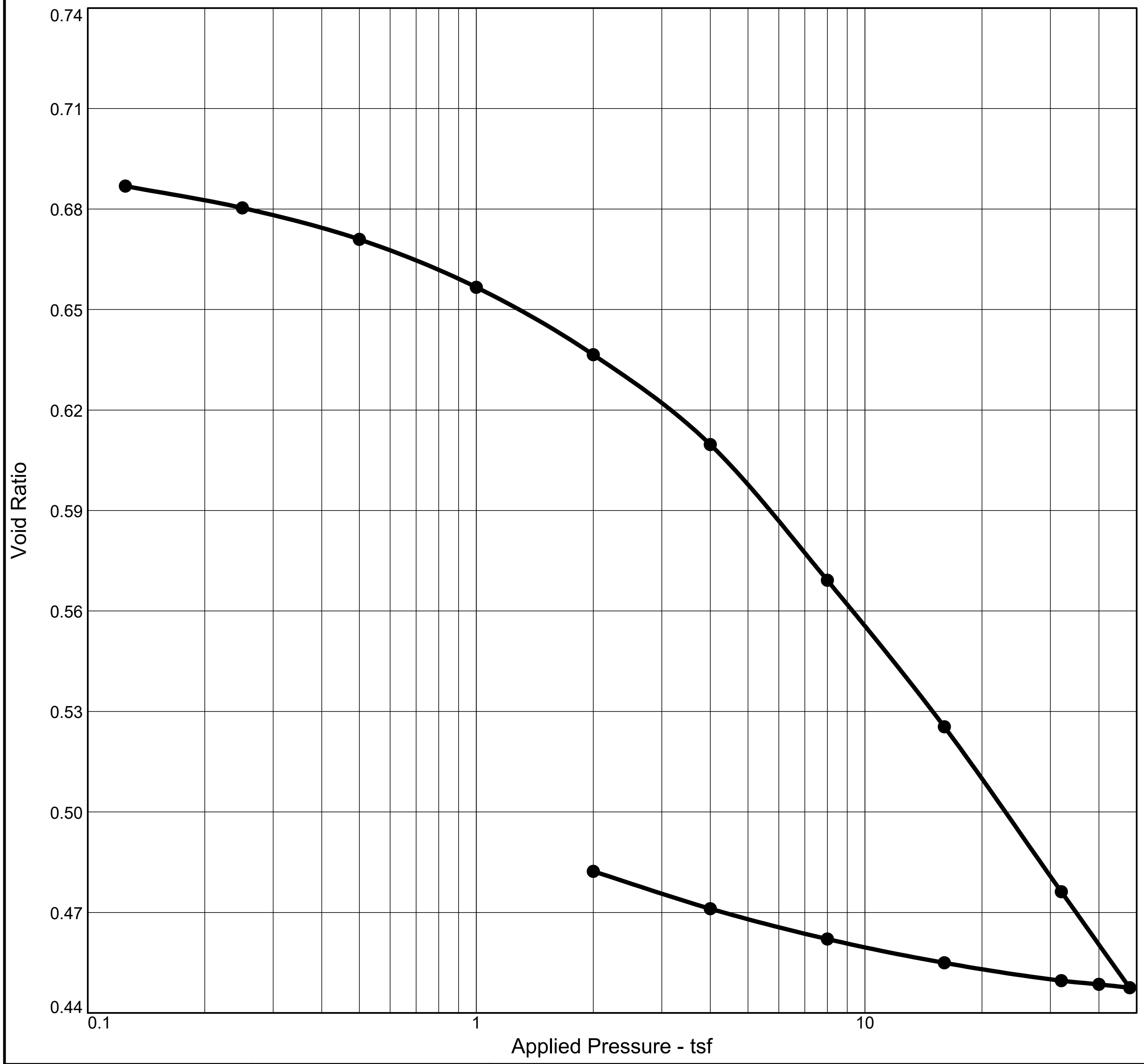
Tolunay-Wong Engineers, Inc.

Beaumont, TX

Figure

Tested By: Benjamin Moore

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.9 %	25.1 %	99.6	41	21	2.70	CL		0.692

MATERIAL DESCRIPTION

Stiff gray LEAN CLAY with SAND

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-2 **Depth:** 93-95

Tolunay-Wong Engineers, Inc.

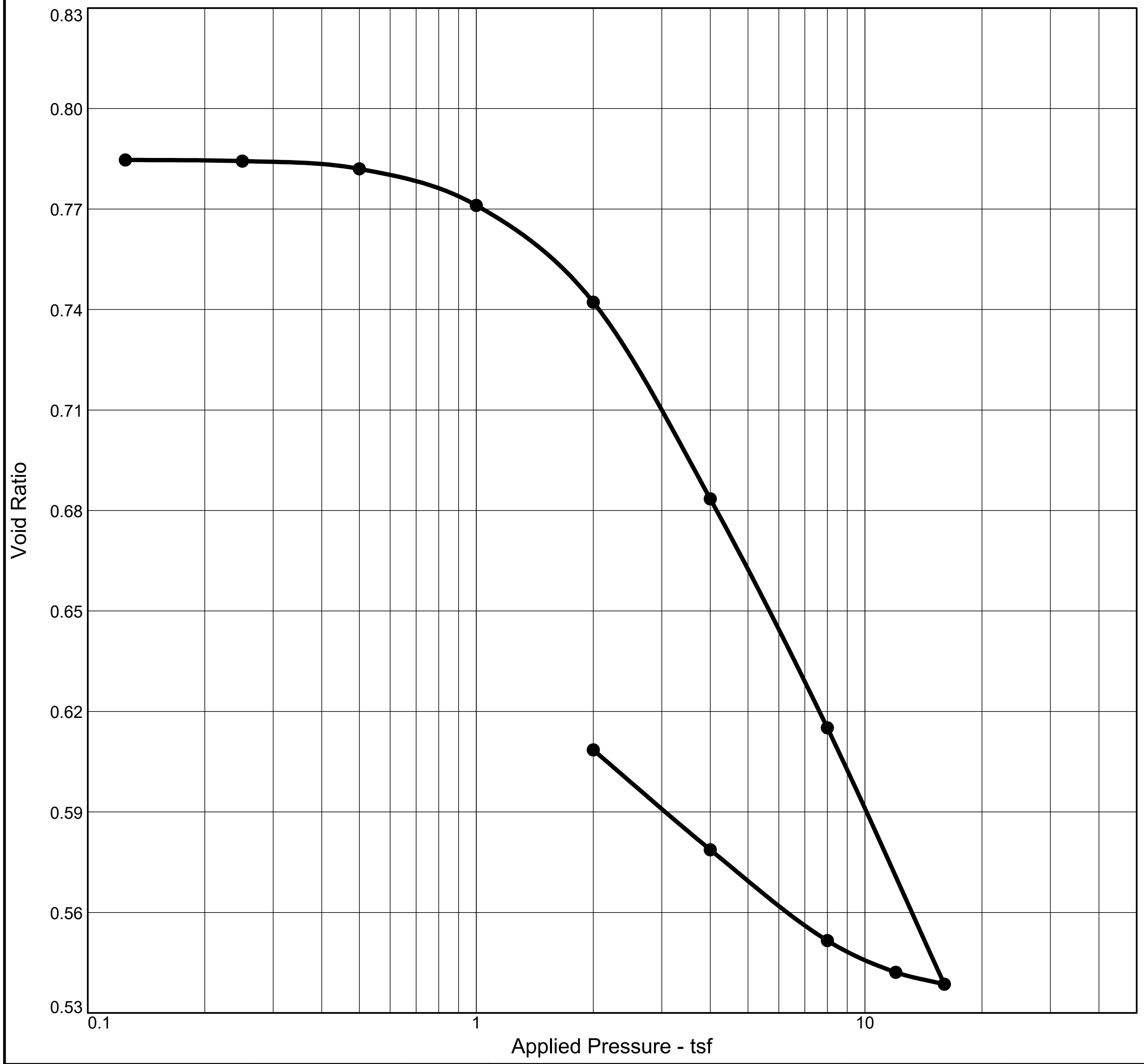
Beaumont, TX

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

Figure

Tested By: Benjamin Moore

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
97.5 %	28.3 %	94.4	77	59	2.70	CH		0.785

MATERIAL DESCRIPTION

Stiff, gray and tan FAT CLAY (CH), with ferrous and calcareous nodules

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-3 **Depth:** 4-6

Tolunay-Wong Engineers, Inc.

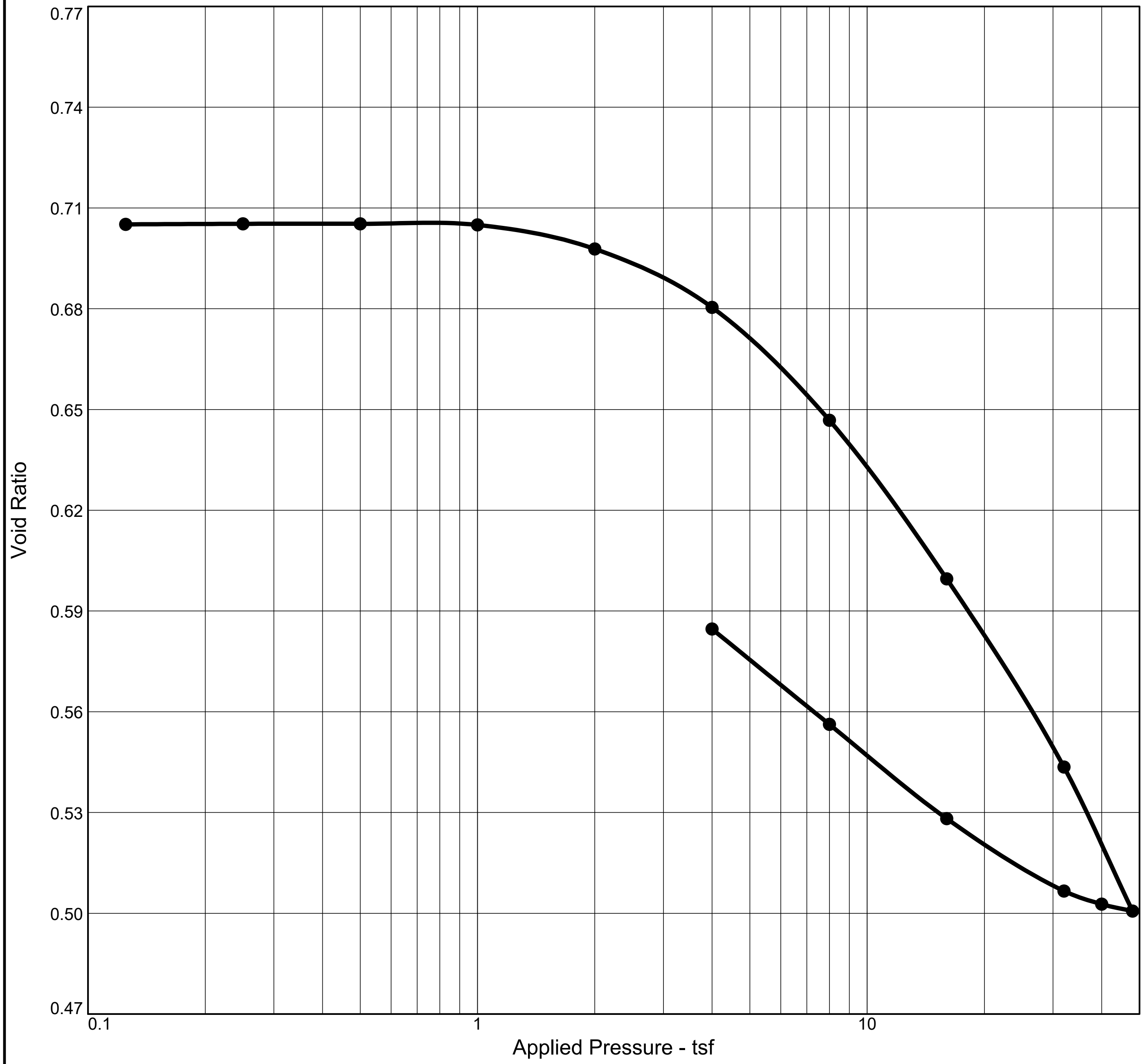
Beaumont, TX

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

Figure

Tested By: Benjamin Moore

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
103.6 %	27.1 %	98.8	73	49	2.70	CH		0.705

MATERIAL DESCRIPTION

Very stiff, brown and gray FAT CLAY (CH), with calcareous nodules

Project No. 21.23.029 **Client:** Trans - Global Solutions, Inc.

Project: Cedar Bayou Deepening and Widening
Chambers County, Texas

Source of Sample: LB-3 **Depth:** 23-25

Remarks:
ASTM D2435 - Method B
Specific Gravity: Assumed

Tolunay-Wong Engineers, Inc.

Beaumont, TX

Figure

Tested By: Benjamin Moore

APPENDIX F

CONSOLIDATED-UNDRAINED TRIAXIAL
COMPRESSION TEST REPORTS

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-1 / 38-40

TRI Log #: 63507.1
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	5.7	11.4	22.9	-
Initial Specimen Properties				
Avg. Diameter (in)	2.03	-	-	-
Avg. Height (in)	4.16	-	-	-
Avg. Water Content (%)	28.6	-	-	-
Bulk Density (pcf)	120.0	-	-	-
Dry Density (pcf)	93.4	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	93.8	-	-	-
Void Ratio, n	0.84	-	-	-
B-Value, End of Saturation	0.96	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.83	0.81	0.78	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	30.6	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	1.0	3.8	9.7	-
Minor Effective Stress (psi), $\sigma_3'_f$	-	-	-	-	3.5	8.1	16.8	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	7.6	13.3	22.1	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	2.1	3.3	6.1	-
Major Effective Stress (psi), $\sigma_1'_f$	-	-	-	-	11.2	21.4	38.9	-
Secant Friction Angle (degrees)	-	-	-	-	31.2	26.7	23.4	-
Effective Friction Angle (degrees)	-				20.5			
Effective Cohesion (psi)	-				1.4			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/4/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-1 / 38-40

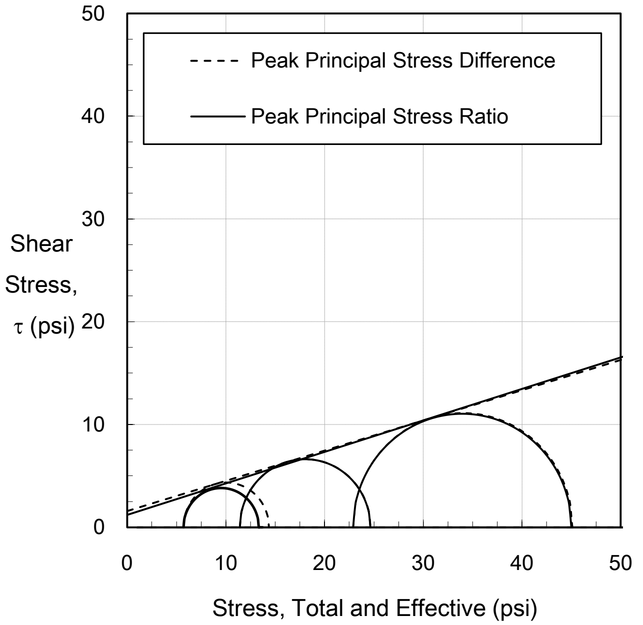
TRI Log #: 63507.1
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	16.4	17.0
Cohesion (psi)	c_R	1.6	1.2

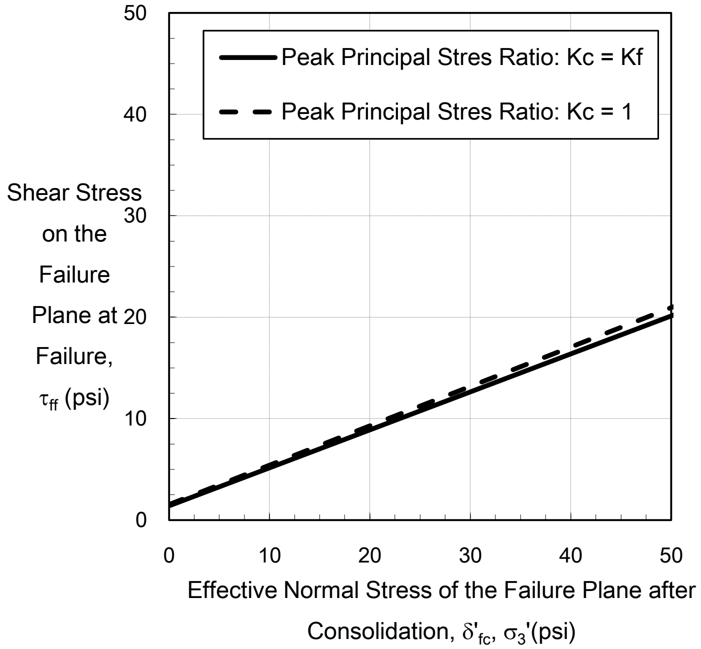
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	20.3	20.5
Effective Cohesion (psi)	c'	1.5	1.4

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	20.2	21.2
Cohesion (psi)	$\psi_{Kc=1}$	2.0	1.5

R / "Total Stress" Envelope



Three-Stage Rapid Drawdown Envelopes

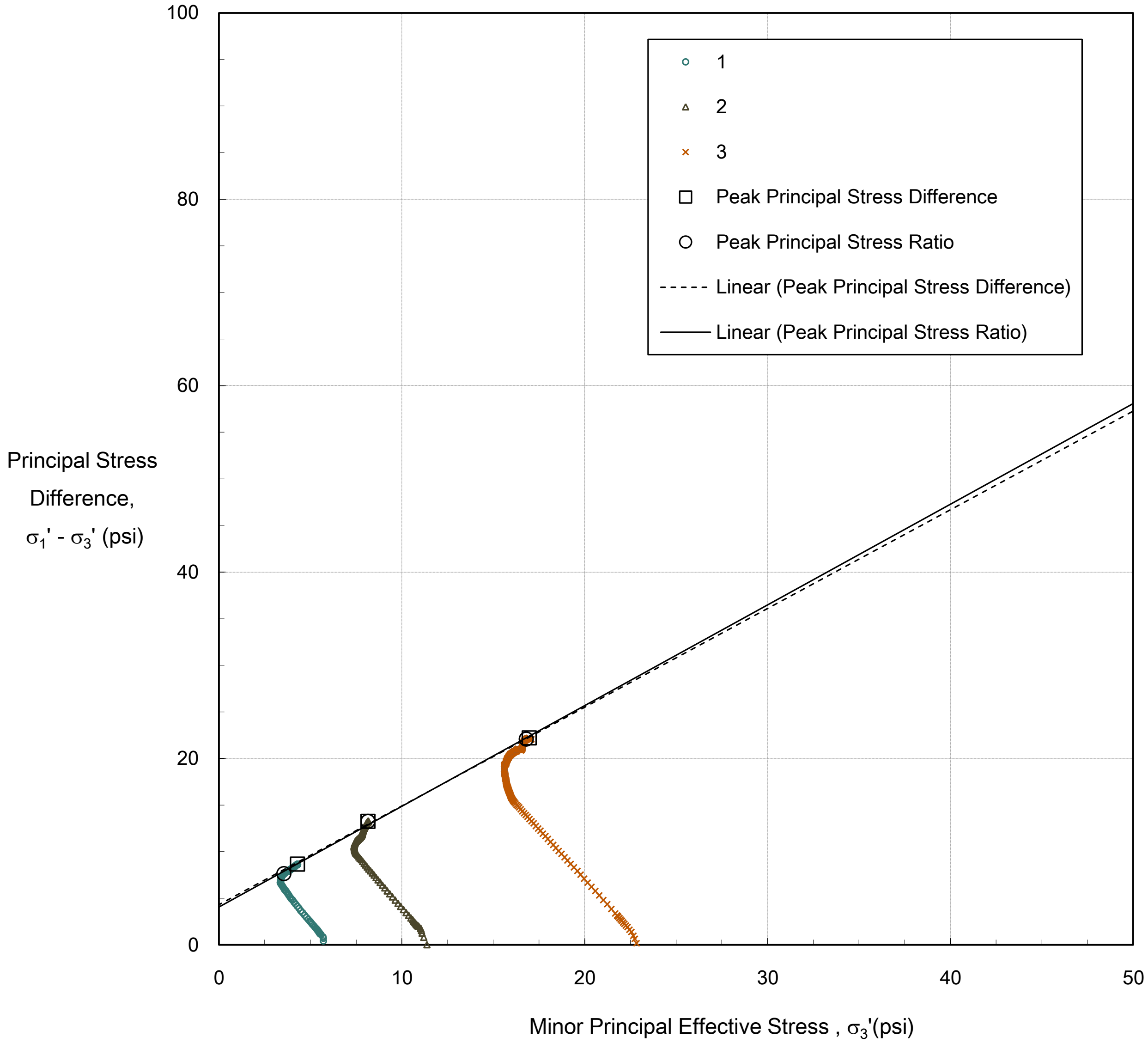


Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-1 / 38-40

TRI Log #: 63507.1
Test Method: ASTM D4767 Mod

Modified Mohr-Coulomb



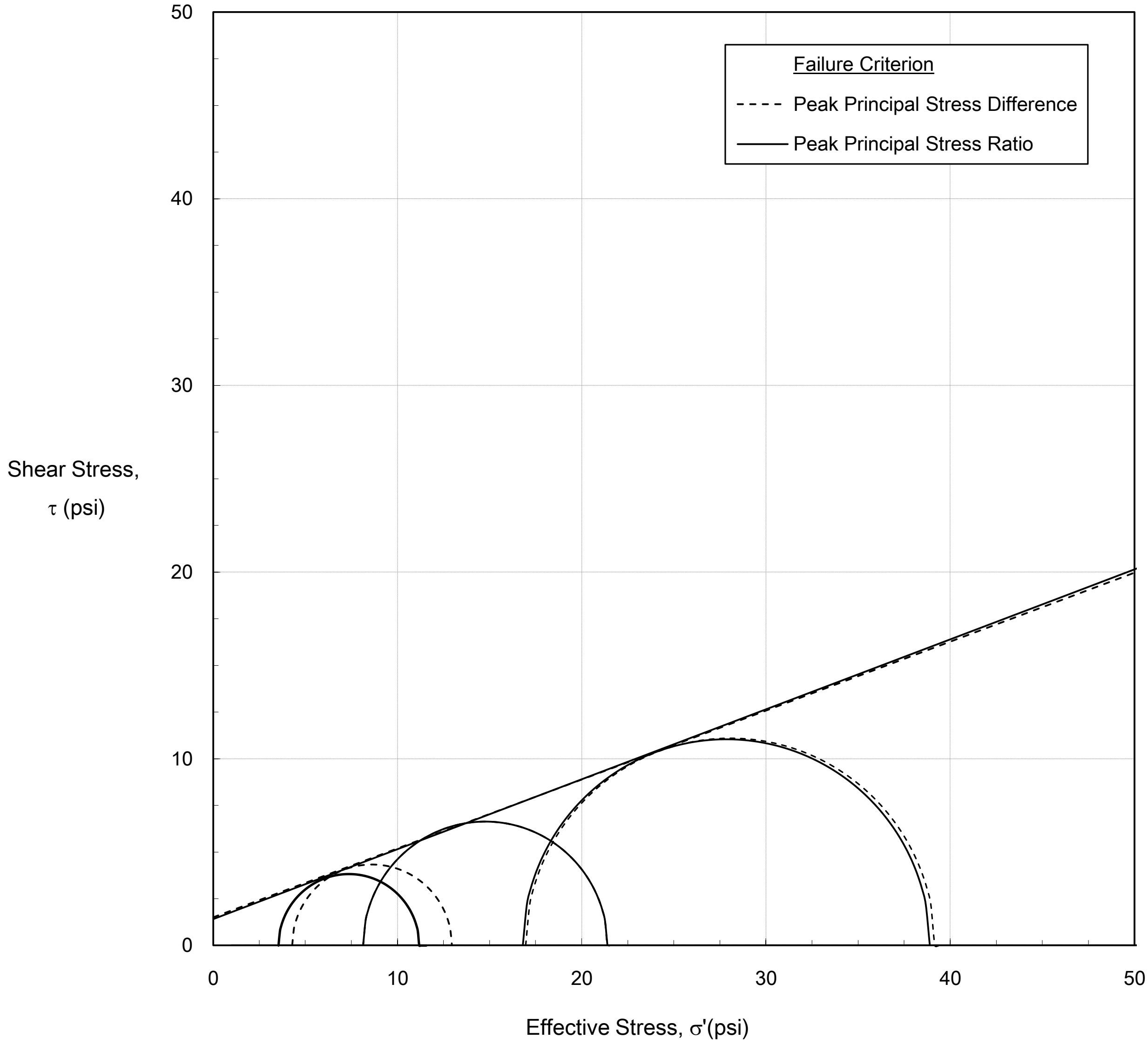
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	20.5
Effective Cohesion (psi)	-	1.4

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-1 / 38-40

TRI Log #: 63507.1
Test Method: ASTM D4767 Mod

Mohr-Coulomb

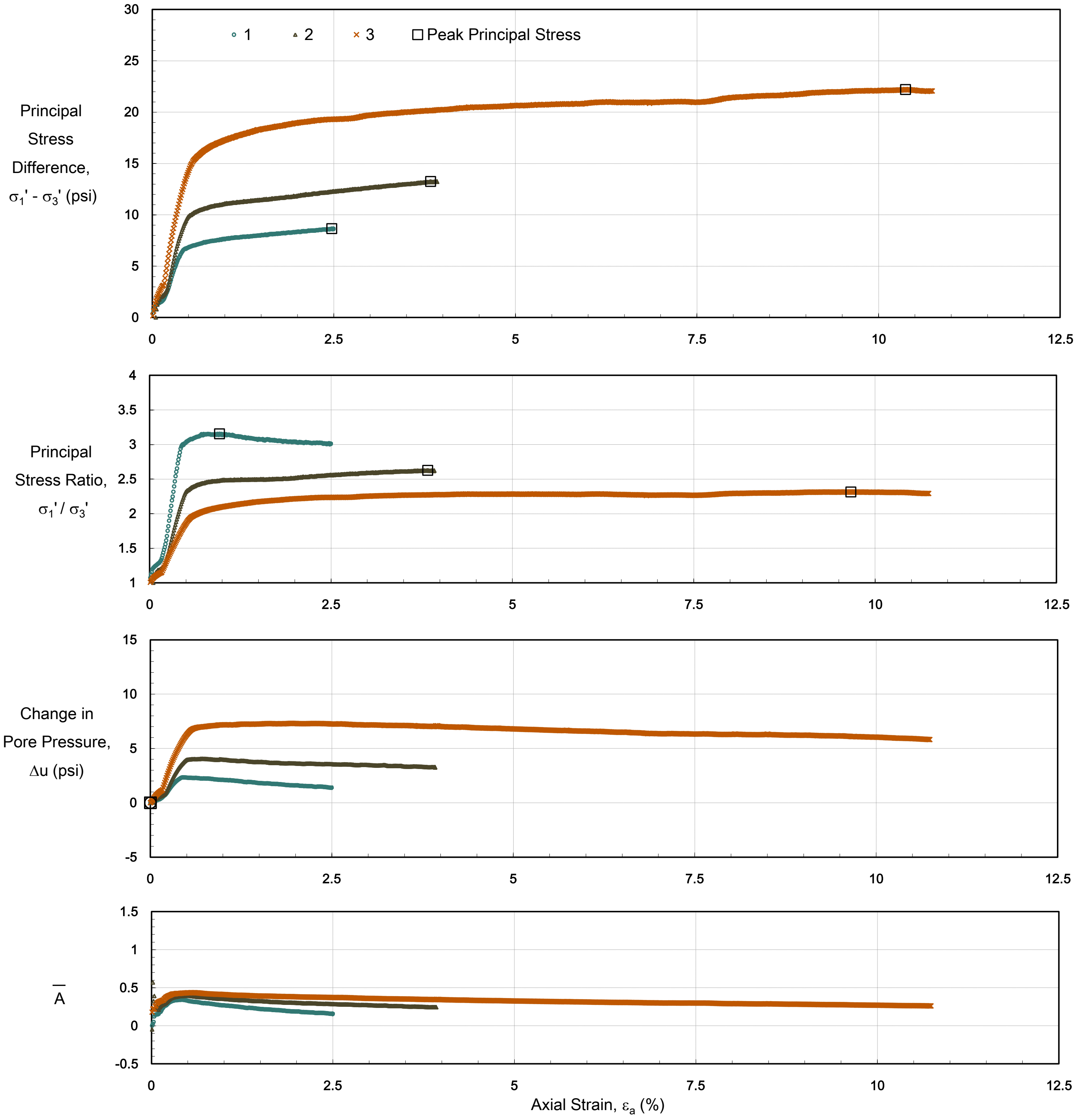


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	20.5
Effective Cohesion (psi)	-	1.4

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-1 / 38-40

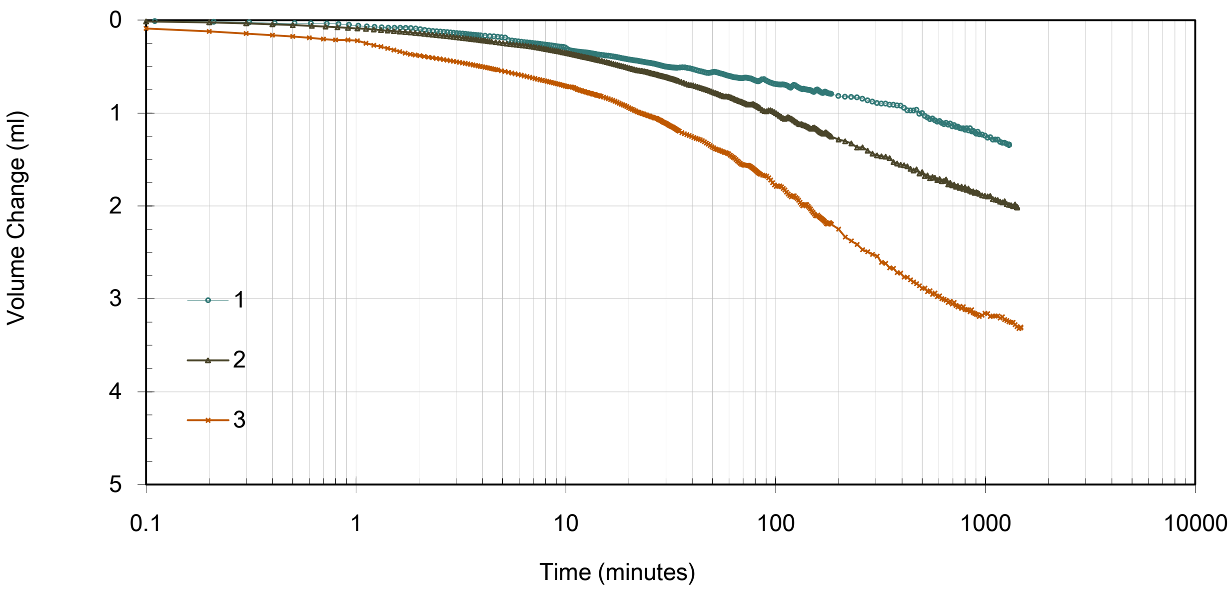
TRI Log #: 63507.1
Test Method: ASTM D4767 Mod

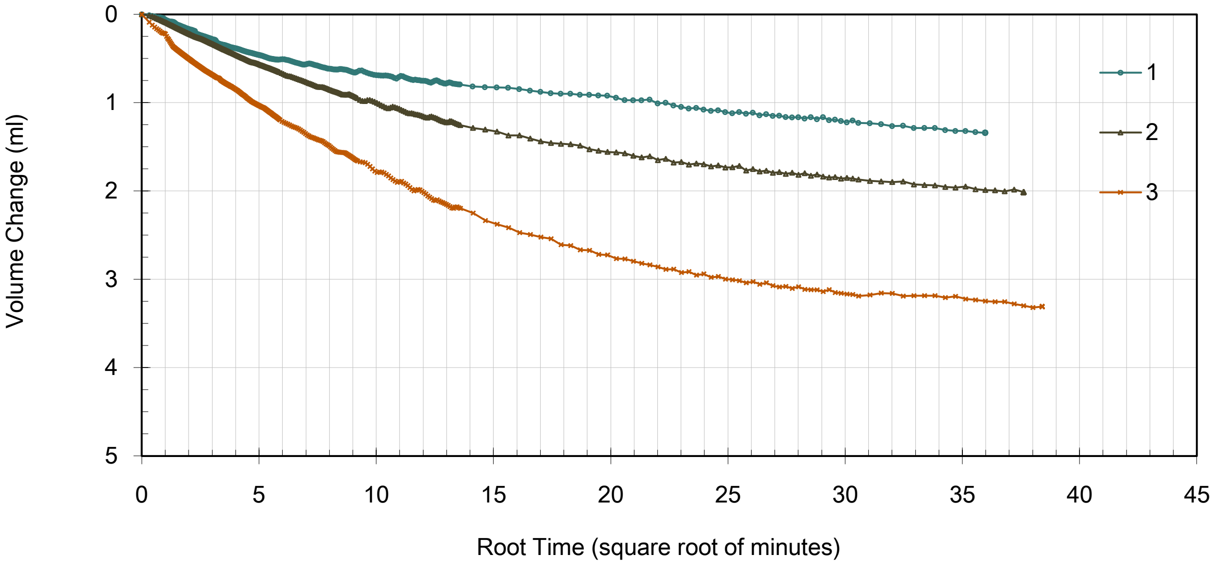


Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63507.1
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	MB-1 / 38-40		

Consolidation





Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-2 / 30-32

TRI Log #: 63507.2
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	4.8	9.6	19.2	-
Initial Specimen Properties				
Avg. Diameter (in)	2.01	2.03	2.05	-
Avg. Height (in)	4.22	4.10	3.99	-
Avg. Water Content (%)	19.0	-	-	-
Bulk Density (pcf)	124.4	-	-	-
Dry Density (pcf)	104.5	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	81.5	-	-	-
Void Ratio, n	0.64	0.63	0.60	-
B-Value, End of Saturation	0.95	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.63	0.60	0.57	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	19.3	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	2.8	2.9	3.0	-
Minor Effective Stress (psi), $\sigma_3'_f$	-	-	-	-	2.7	5.9	12.1	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	11.1	18.7	29.5	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	2.1	3.8	7.2	-
Major Effective Stress (psi), $\sigma_1'_f$	-	-	-	-	13.9	24.6	41.6	-
Secant Friction Angle (degrees)	-	-	-	-	42.1	37.8	33.4	-
Effective Friction Angle (degrees)	-				29.5			
Effective Cohesion (psi)	-				1.9			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/4/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-2 / 30-32

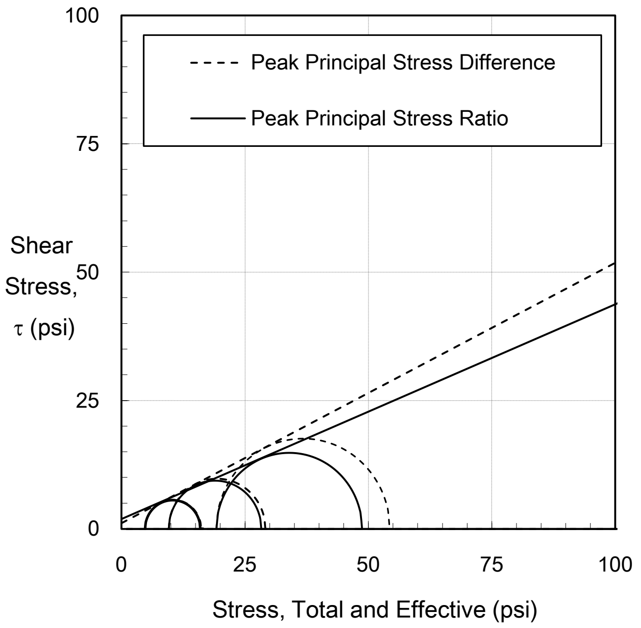
TRI Log #: 63507.2
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	26.9	22.7
Cohesion (psi)	c_R	1.1	1.9

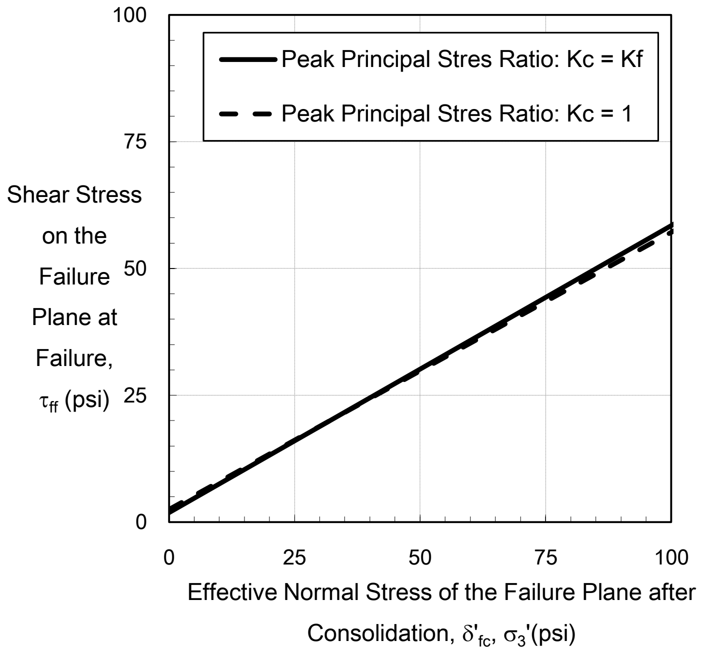
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	27.2	29.5
Effective Cohesion (psi)	c'	2.3	1.9

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	36.3	28.7
Cohesion (psi)	$\psi_{Kc=1}$	1.6	2.5

R / "Total Stress" Envelope



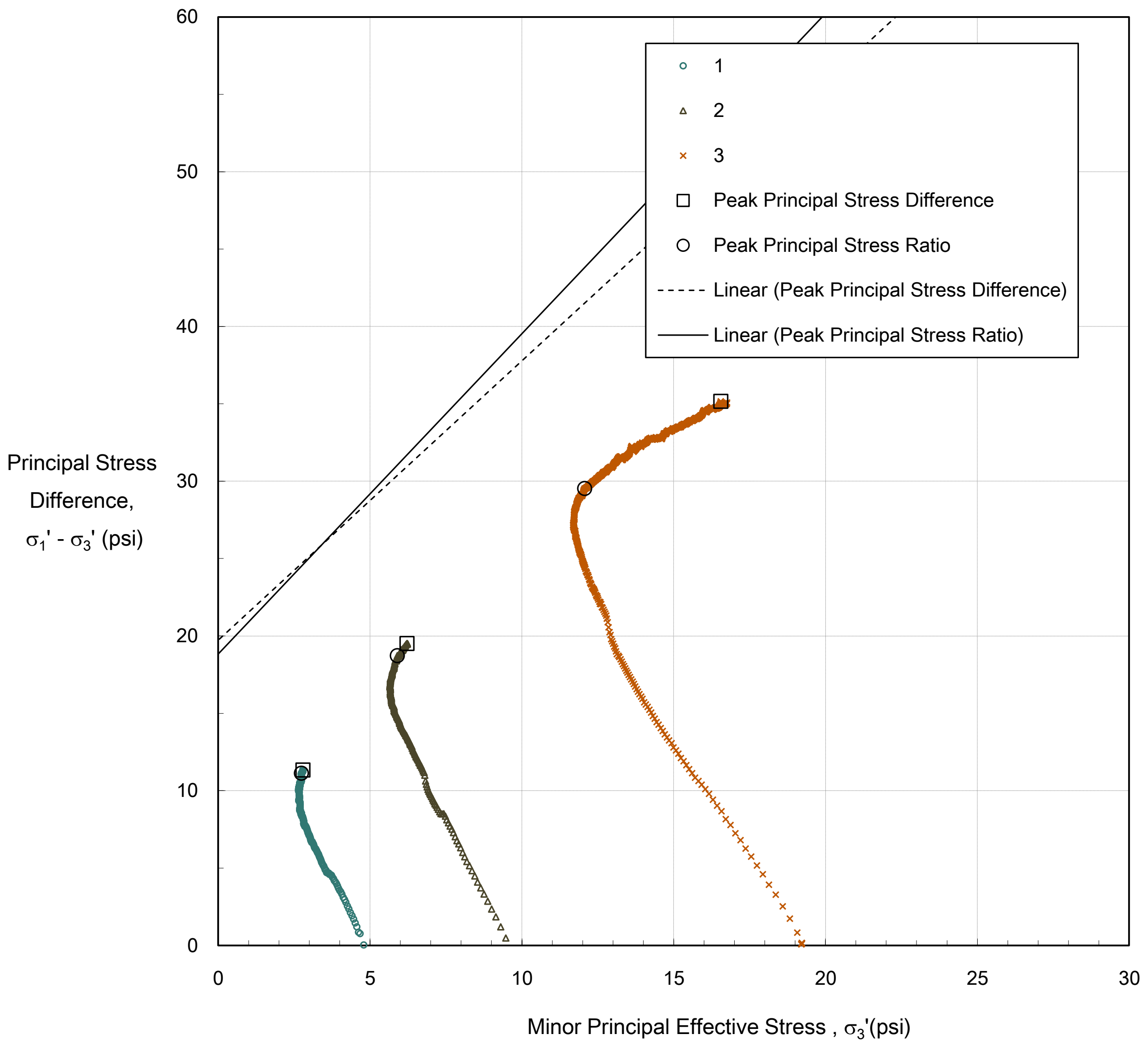
Three-Stage Rapid Drawdown Envelopes



Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63507.2
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	MB-2 / 30-32		

Modified Mohr-Coulomb



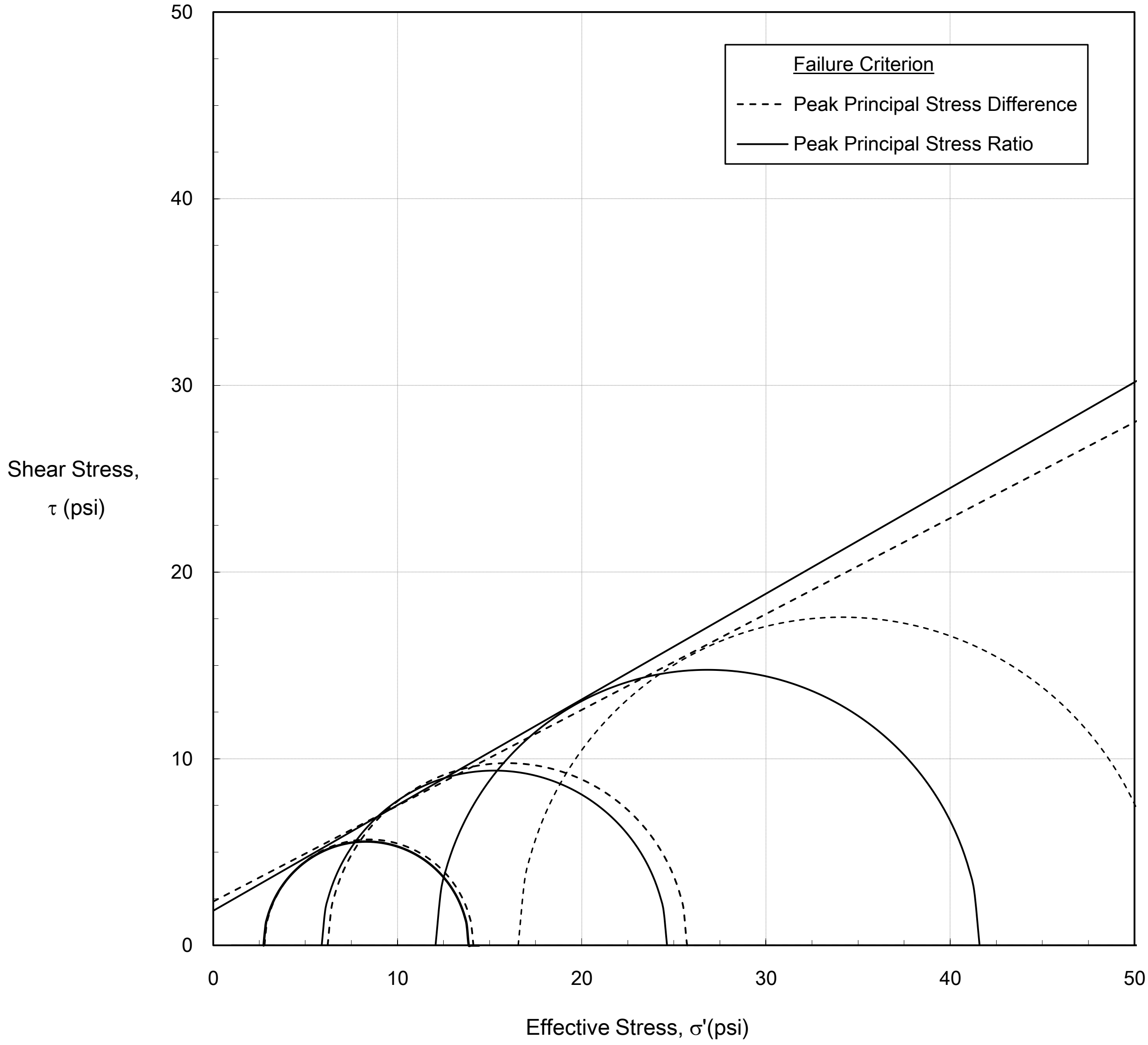
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	29.5
Effective Cohesion (psi)	-	1.9

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-2 / 30-32

TRI Log #: 63507.2
Test Method: ASTM D4767 Mod

Mohr-Coulomb

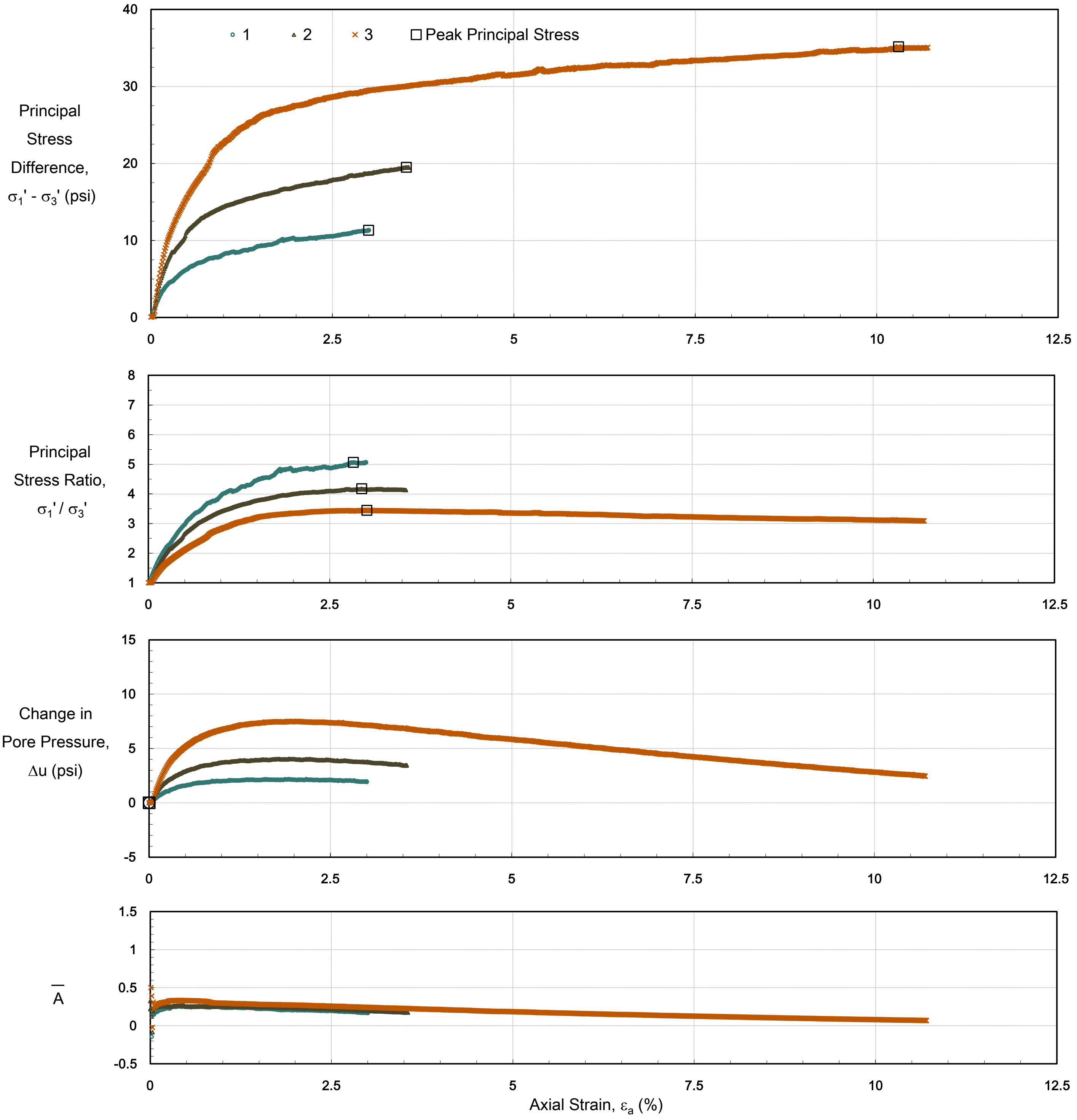


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	29.5
Effective Cohesion (psi)	-	1.9

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-2 / 30-32

TRI Log #: 63507.2
Test Method: ASTM D4767 Mod

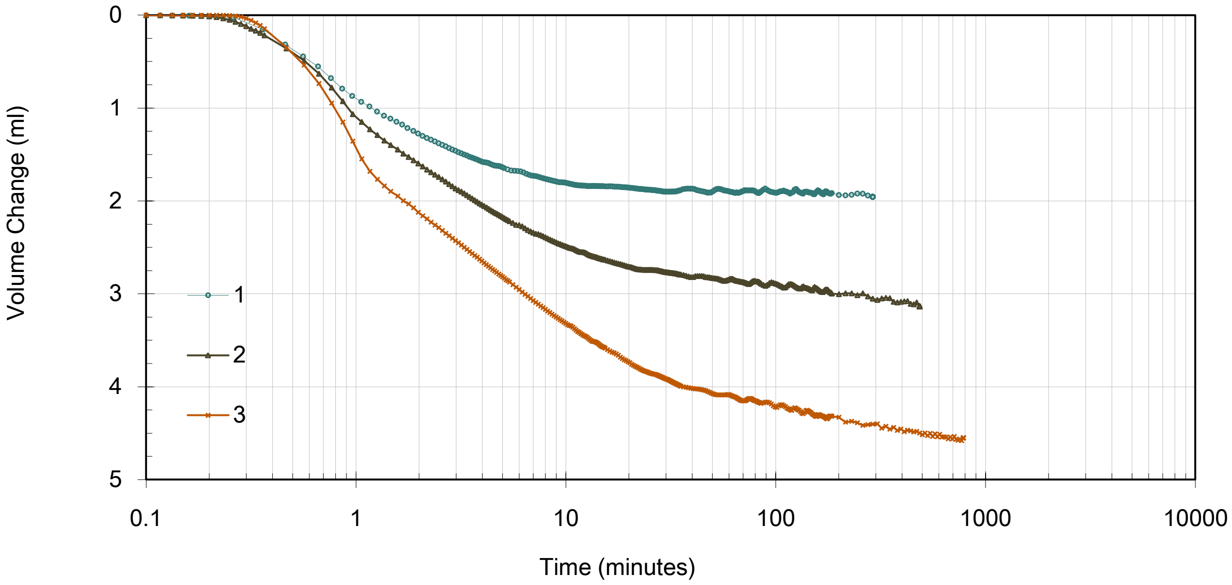


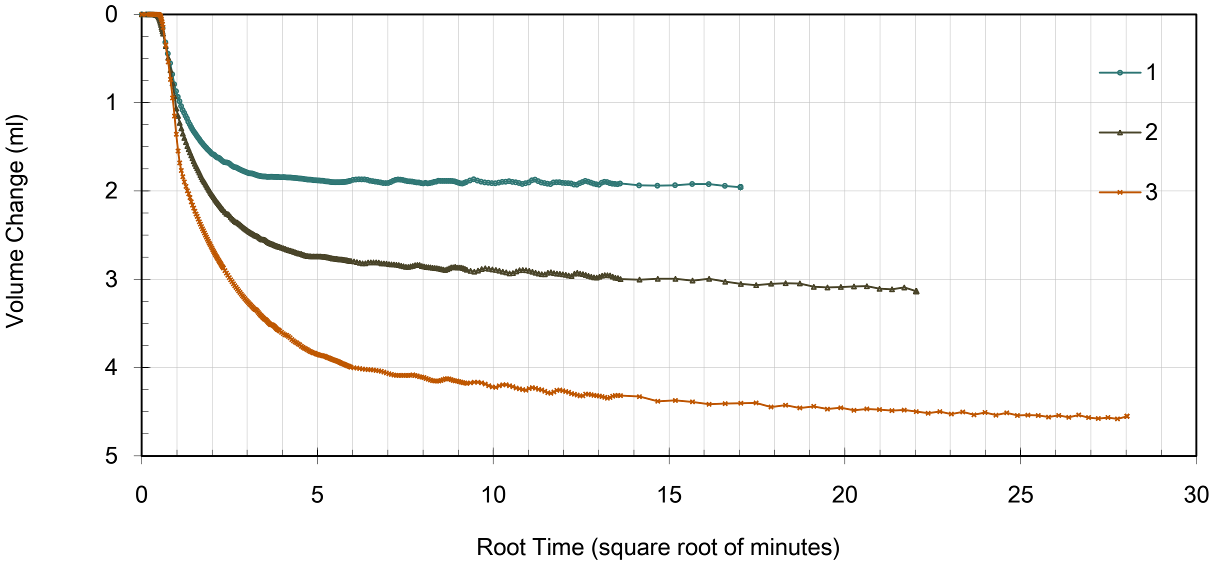
Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-2 / 30-32

TRI Log #: 63507.2
Test Method: ASTM D4767 Mod

Consolidation





TRI ENVIRONMENTAL

TESTING, RESEARCH, CONSULTING AND FIELD SERVICES
Austin, TX - USA | CA - USA | SC - USA | Gold Coast - Australia | Suzhou - China | Sao Paulo, Brazil | Johannesburg - Africa

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	6.1	12.2	24.4	-
Initial Specimen Properties				
Avg. Diameter (in)	2.03	2.05	2.05	-
Avg. Height (in)	4.80	4.70	4.61	-
Avg. Water Content (%)	20.8	-	-	-
Bulk Density (pcf)	126.9	-	-	-
Dry Density (pcf)	105.1	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	90.2	-	-	-
Void Ratio, n	0.63	0.62	0.60	-
B-Value, End of Saturation	0.98	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.62	0.60	0.57	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	23.4	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	2.4	2.2	2.8	-
Minor Effective Stress (psi), $\sigma_3'_f$	-	-	-	-	4.4	8.4	16.1	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	14.8	24.1	39.1	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	1.7	3.8	8.3	-
Major Effective Stress (psi), $\sigma_1'_f$	-	-	-	-	19.2	32.5	55.2	-
Secant Friction Angle (degrees)	-	-	-	-	38.8	36.2	33.2	-
Effective Friction Angle (degrees)	-				30.5			
Effective Cohesion (psi)	-				1.8			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/7/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

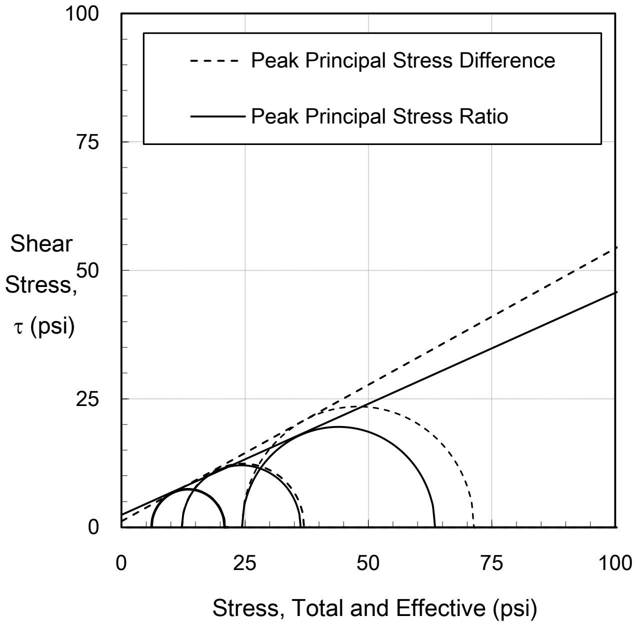
TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	28.0	23.4
Cohesion (psi)	c_R	1.1	2.4

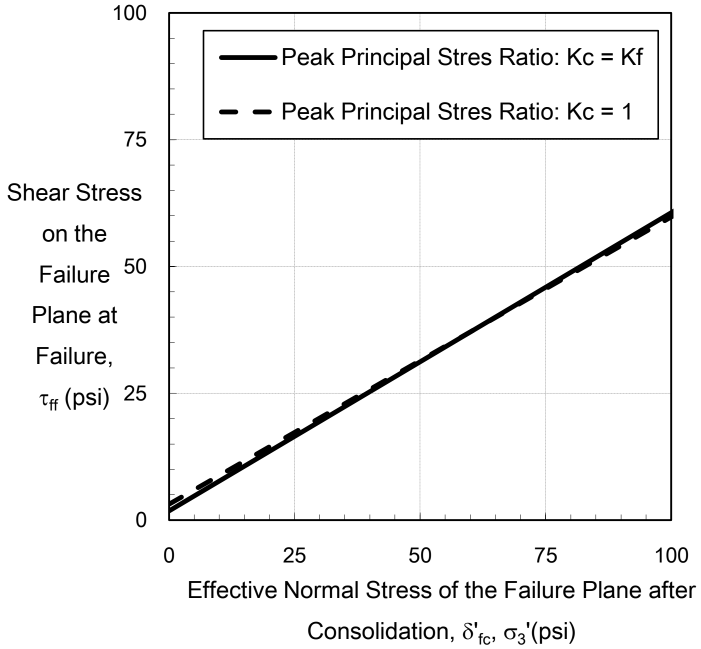
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	28.5	30.5
Effective Cohesion (psi)	c'	2.3	1.8

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	37.8	29.5
Cohesion (psi)	$\psi_{Kc=1}$	1.6	3.1

R / "Total Stress" Envelope



Three-Stage Rapid Drawdown Envelopes

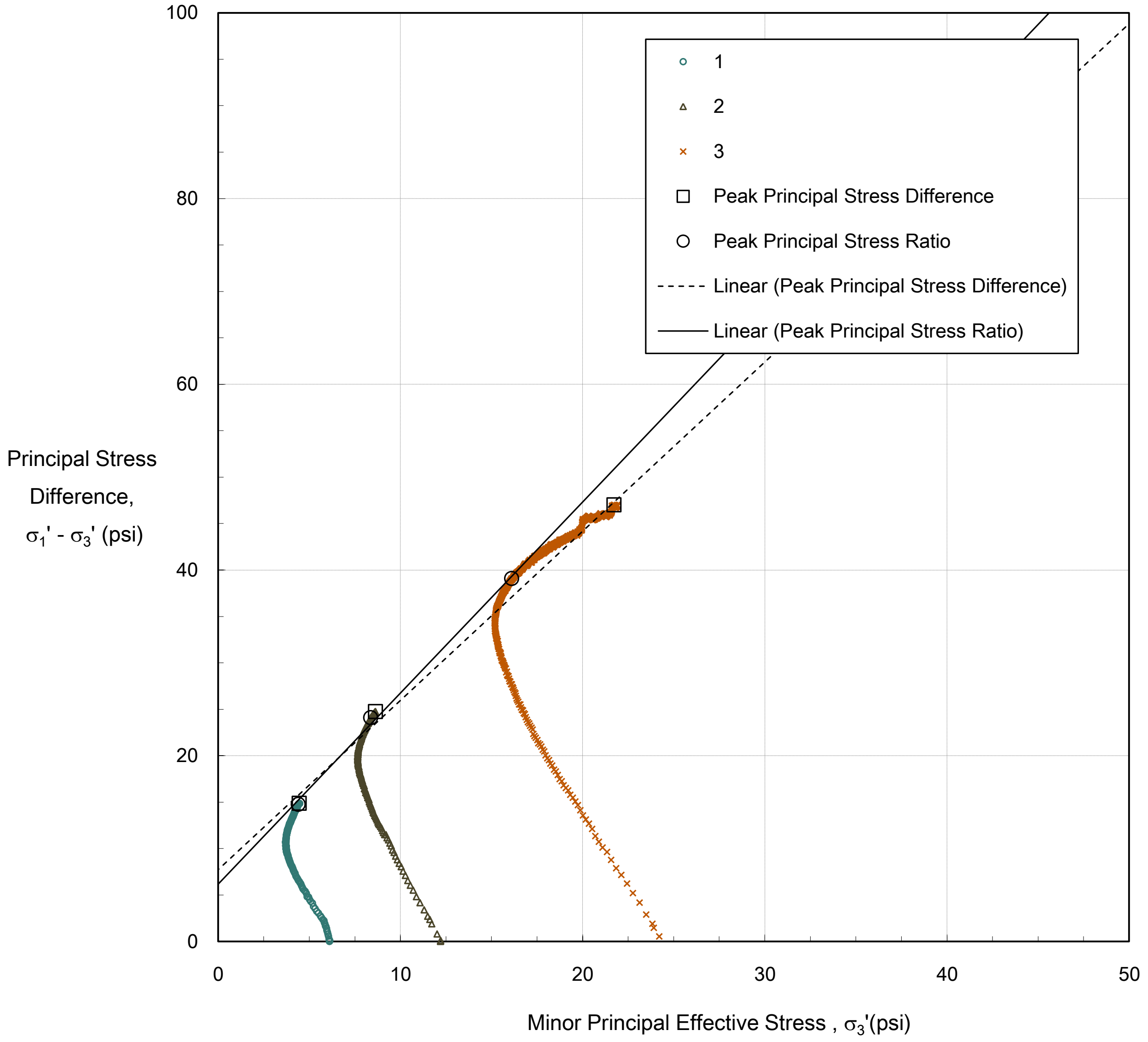


Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

Modified Mohr-Coulomb

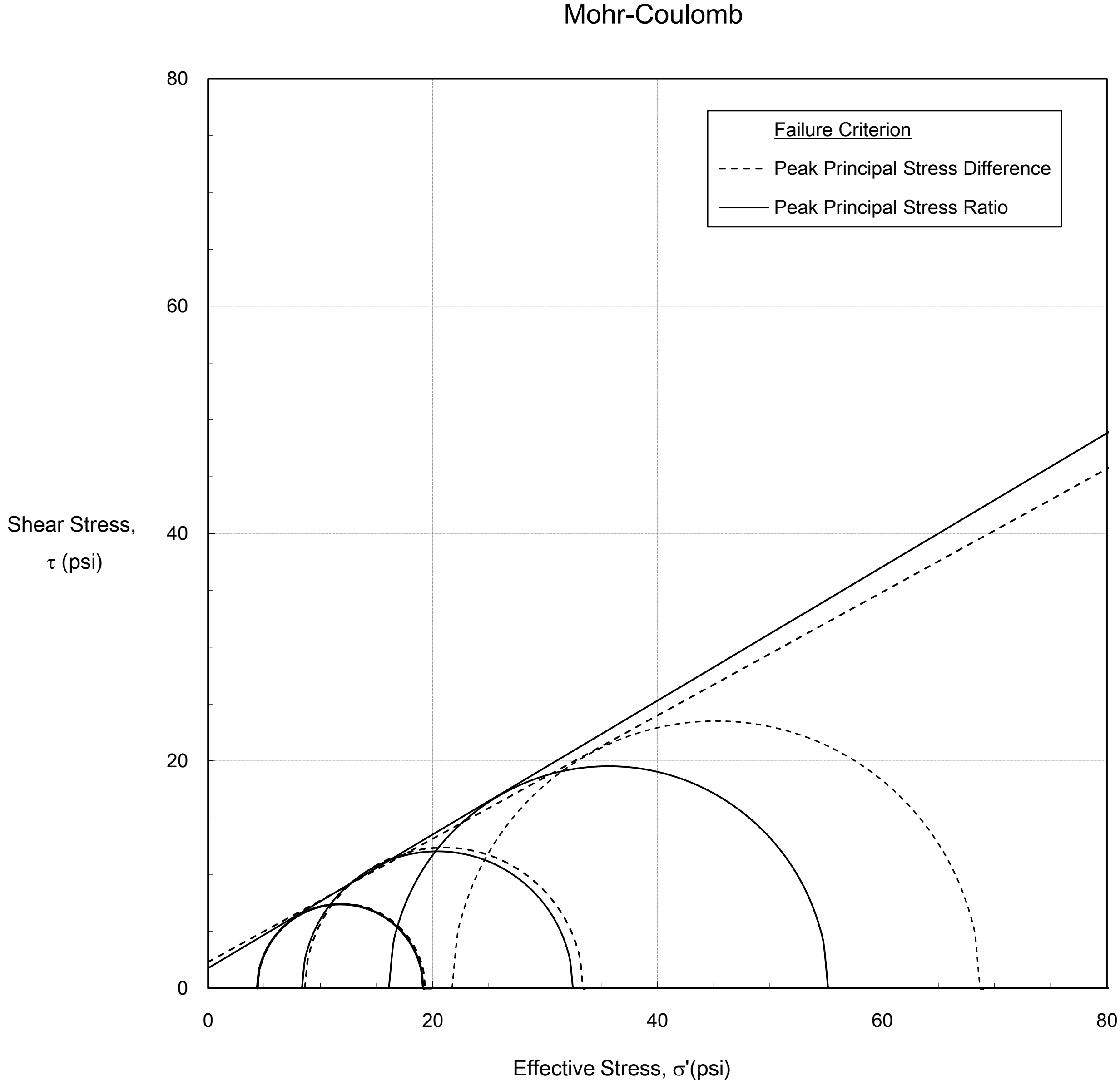


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	30.5
Effective Cohesion (psi)	-	1.8

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

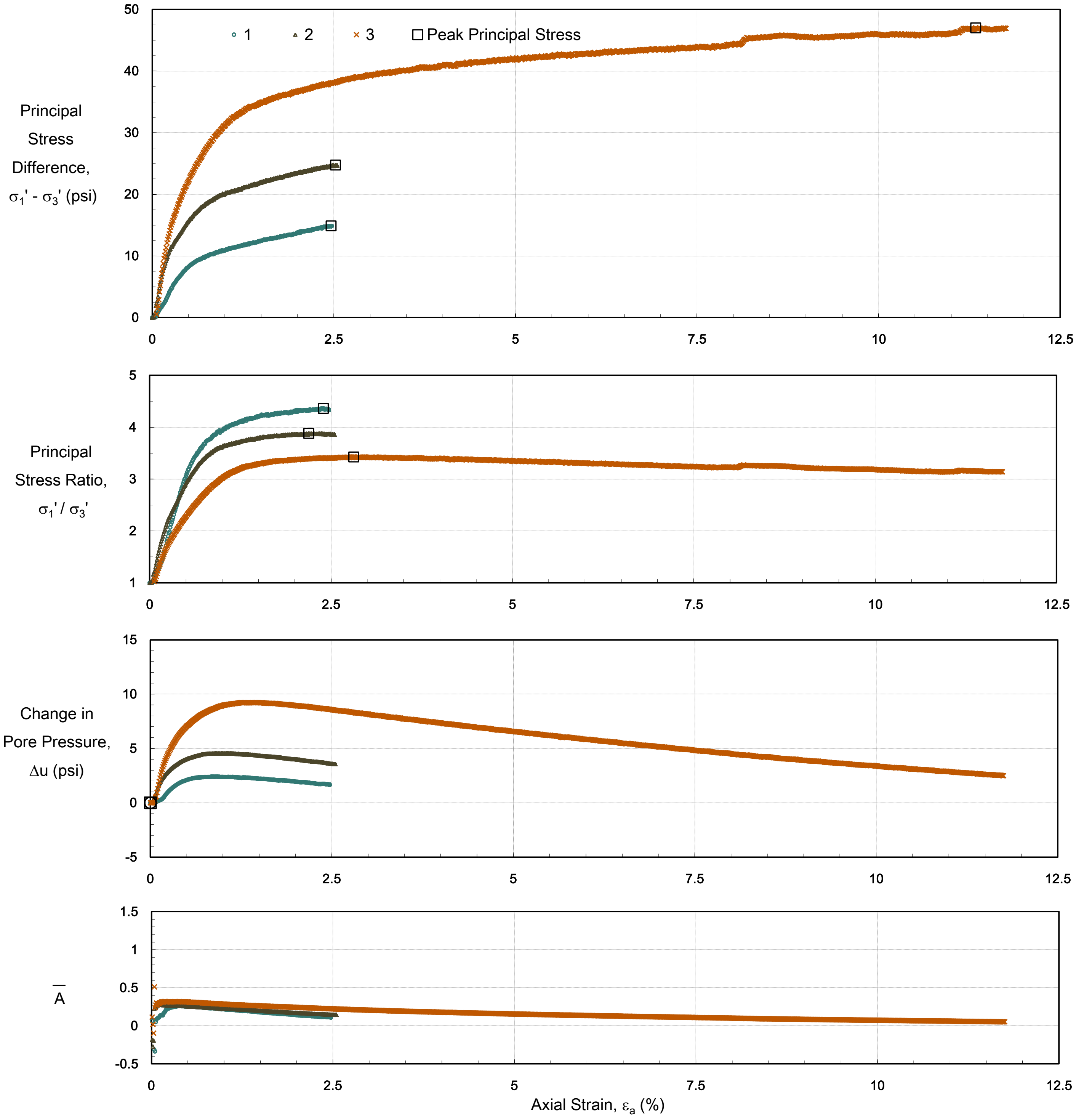


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	30.5
Effective Cohesion (psi)	-	1.8

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

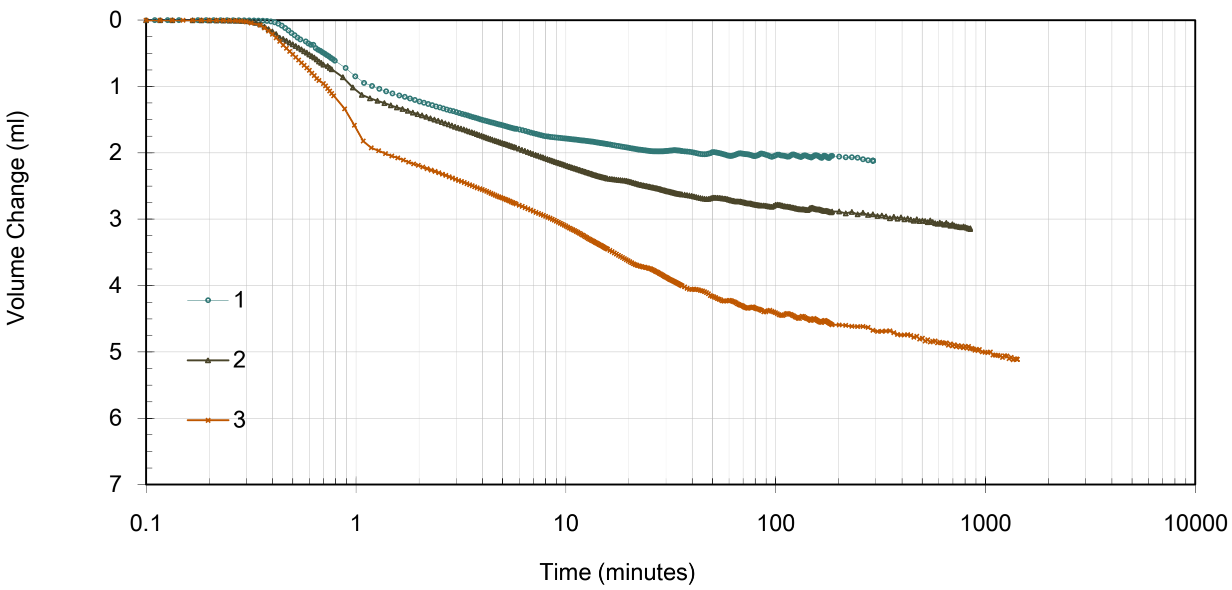


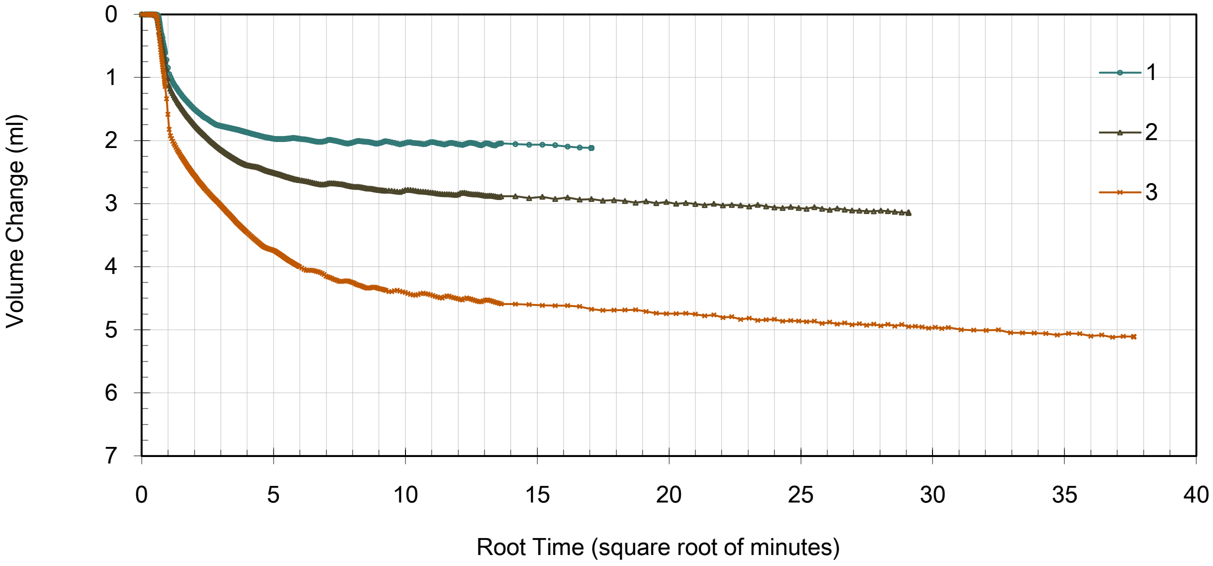
Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-7 / 33-35

TRI Log #: 63508.1
Test Method: ASTM D4767 Mod

Consolidation





Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-9 / 18-20

TRI Log #: 63508.2
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	3.0	5.9	11.9	-
Initial Specimen Properties				
Avg. Diameter (in)	2.02	2.04	2.05	-
Avg. Height (in)	4.05	3.98	3.92	-
Avg. Water Content (%)	32.2	-	-	-
Bulk Density (pcf)	117.8	-	-	-
Dry Density (pcf)	89.1	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	95.7	-	-	-
Void Ratio, n	0.93	0.92	0.91	-
B-Value, End of Saturation	0.95	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.92	0.91	0.90	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	29.8	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	2.3	1.5	1.5	-
Minor Effective Stress (psi), $\sigma_3'{}_f$	-	-	-	-	1.0	2.3	5.6	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	12.1	16.7	21.1	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	2.0	3.7	6.3	-
Major Effective Stress (psi), $\sigma_1'{}_f$	-	-	-	-	13.1	18.9	26.7	-
Secant Friction Angle (degrees)	-	-	-	-	58.9	51.7	40.6	-
Effective Friction Angle (degrees)	-				28.3			
Effective Cohesion (psi)	-				3.4			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/7/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-9 / 18-20

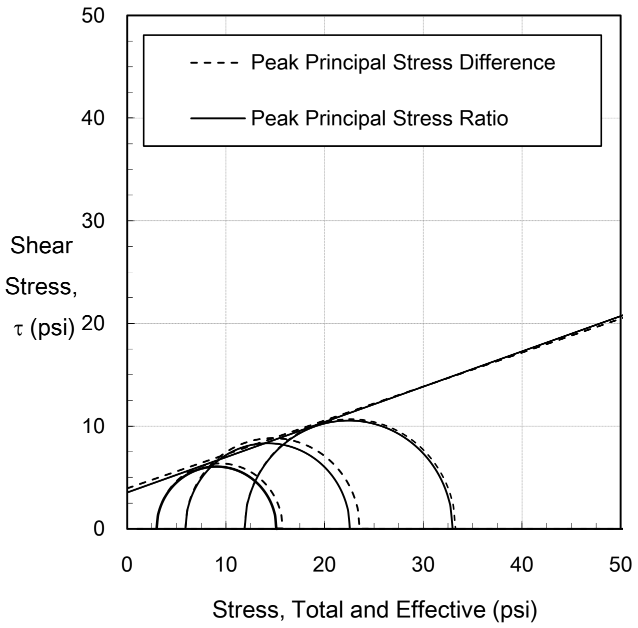
TRI Log #: 63508.2
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	18.3	19.0
Cohesion (psi)	c_R	3.9	3.5

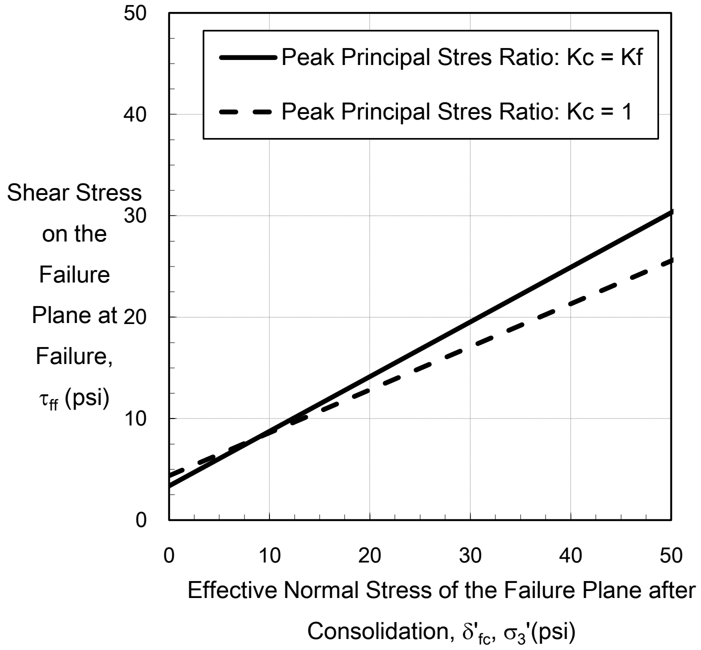
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	28.1	28.3
Effective Cohesion (psi)	c'	3.4	3.4

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	22.0	23.0
Cohesion (psi)	$\psi_{Kc=1}$	4.8	4.4

R / "Total Stress" Envelope

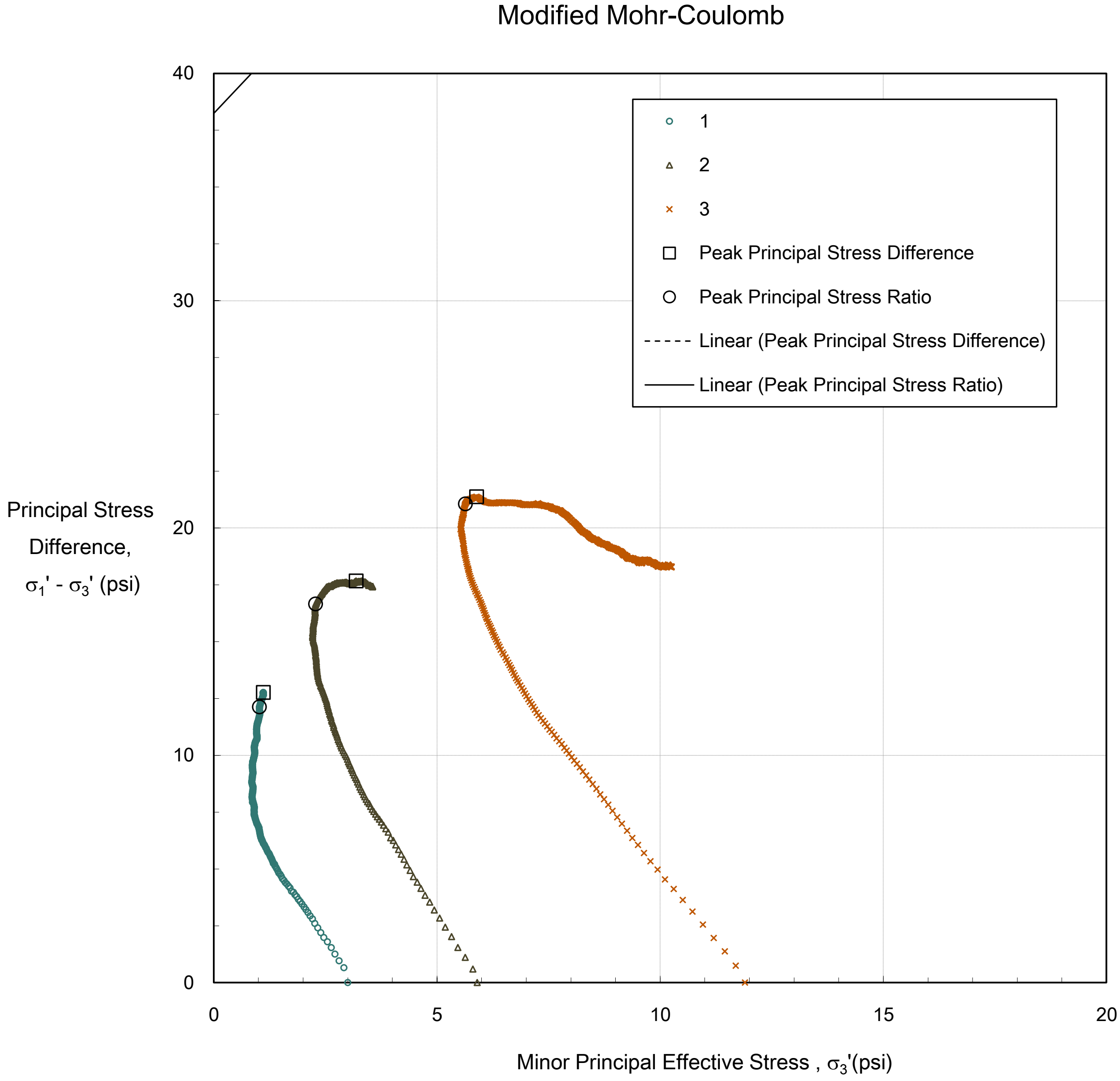


Three-Stage Rapid Drawdown Envelopes



Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63508.2
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	MB-9 / 18-20		



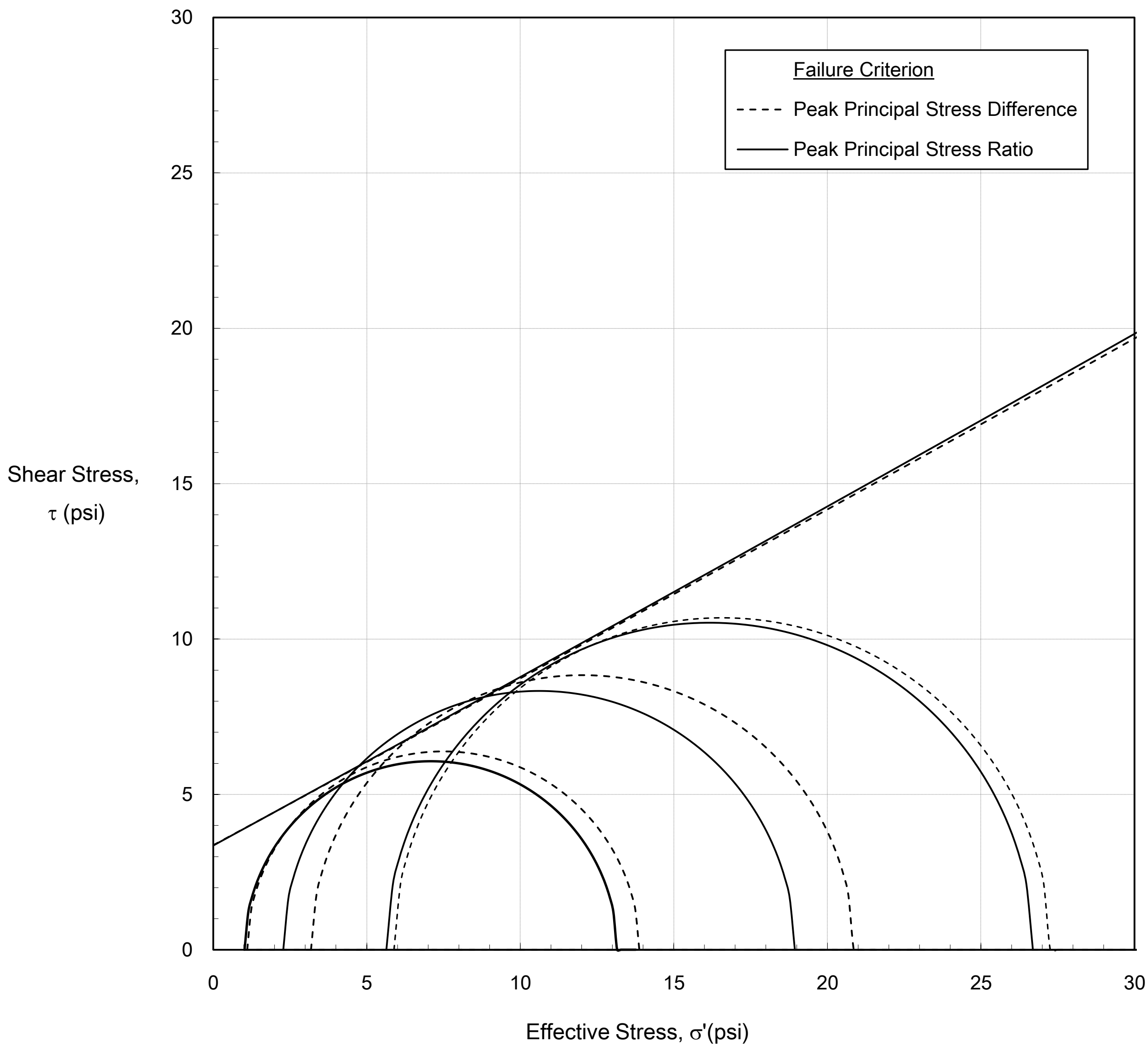
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	28.3
Effective Cohesion (psi)	-	3.4

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-9 / 18-20

TRI Log #: 63508.2
Test Method: ASTM D4767 Mod

Mohr-Coulomb

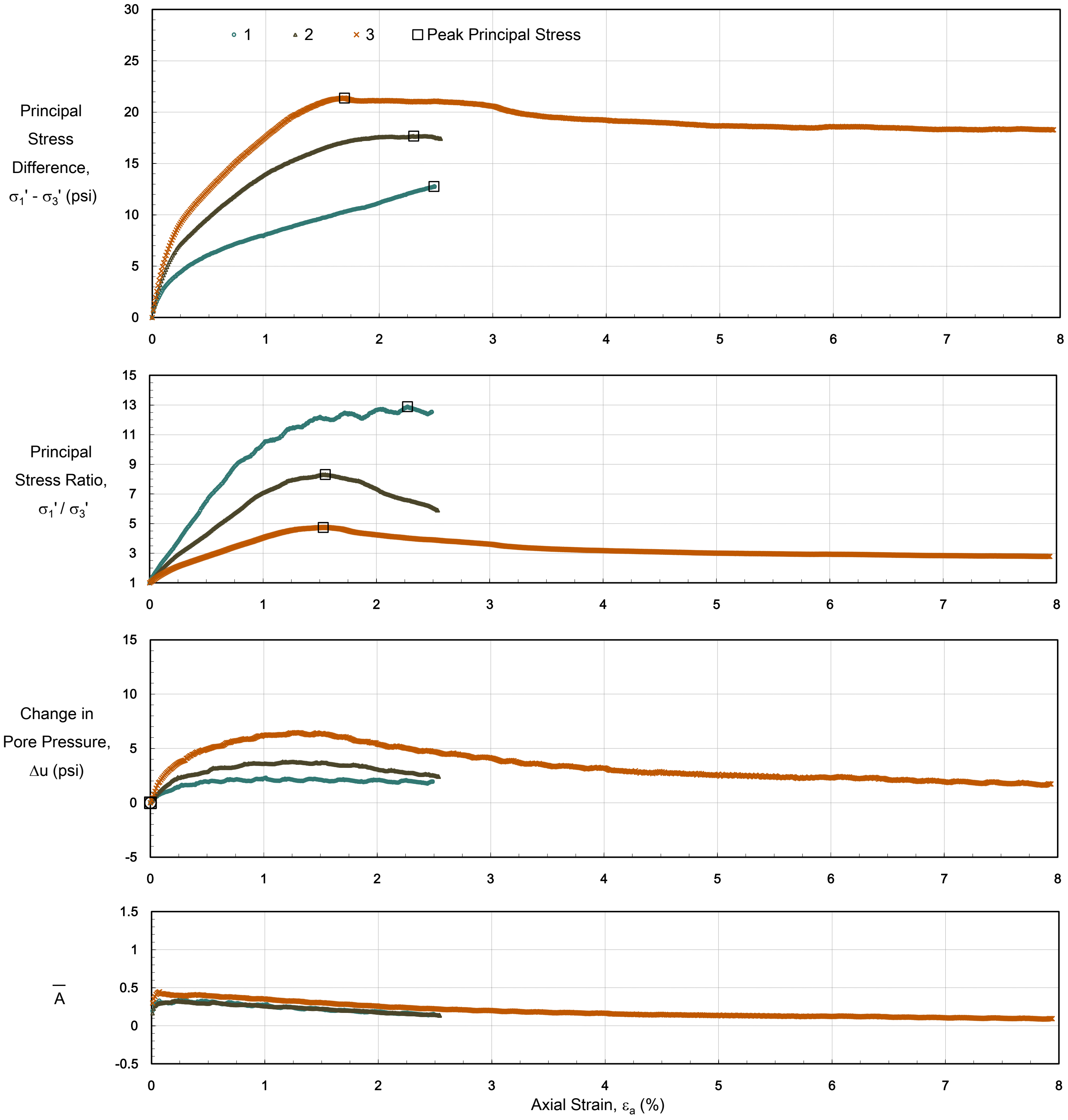


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	28.3
Effective Cohesion (psi)	-	3.4

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-9 / 18-20

TRI Log #: 63508.2
Test Method: ASTM D4767 Mod

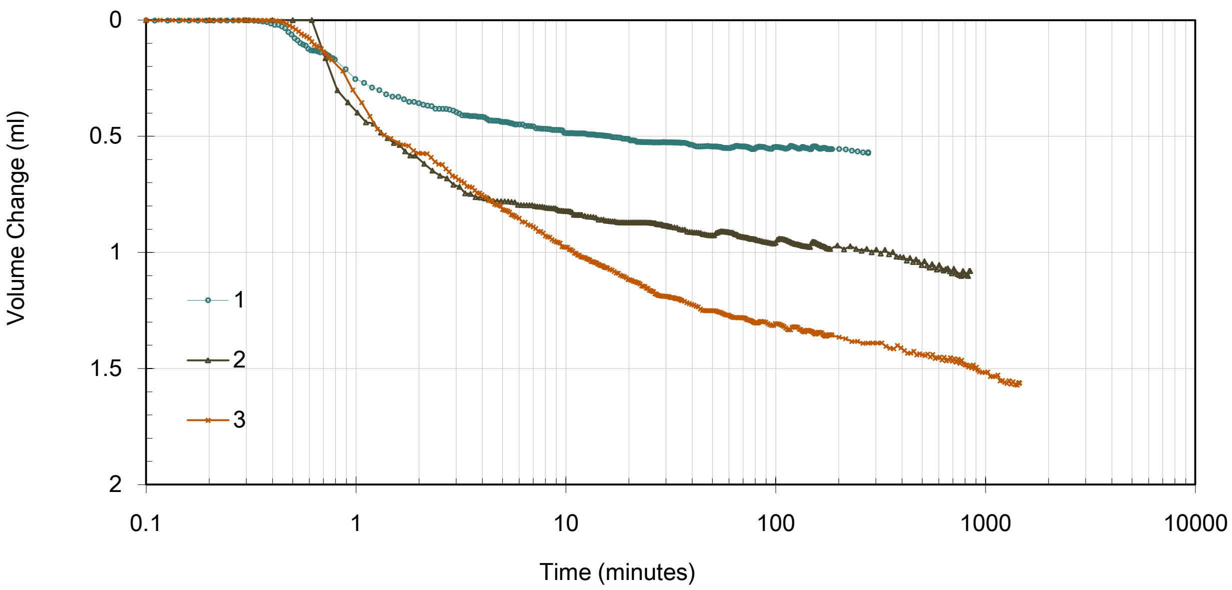


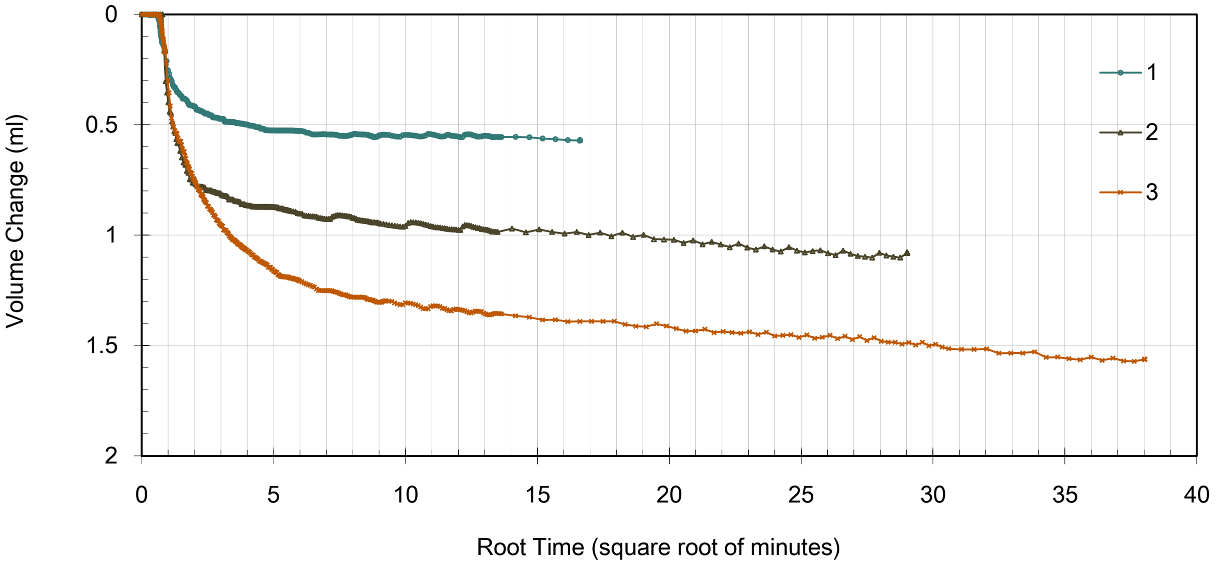
Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: MB-9 / 18-20

TRI Log #: 63508.2
Test Method: ASTM D4767 Mod

Consolidation





Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 9-11

TRI Log #: 63508.3
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	3.5	7.1	14.1	-
Initial Specimen Properties				
Avg. Diameter (in)	2.03	2.05	2.06	-
Avg. Height (in)	4.21	4.10	4.01	-
Avg. Water Content (%)	26.9	-	-	-
Bulk Density (pcf)	119.5	-	-	-
Dry Density (pcf)	94.2	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	90.0	-	-	-
Void Ratio, n	0.82	0.81	0.80	-
B-Value, End of Saturation	0.98	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.81	0.80	0.79	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	30.5	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	0.9	1.1	5.2	-
Minor Effective Stress (psi), $\sigma_3'_f$	-	-	-	-	2.2	4.6	9.3	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	7.6	11.8	17.3	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	1.3	2.4	4.7	-
Major Effective Stress (psi), $\sigma_1'_f$	-	-	-	-	9.8	16.4	26.7	-
Secant Friction Angle (degrees)	-	-	-	-	39.1	34.0	28.8	-
Effective Friction Angle (degrees)	-				23.7			
Effective Cohesion (psi)	-				1.6			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/7/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 9-11

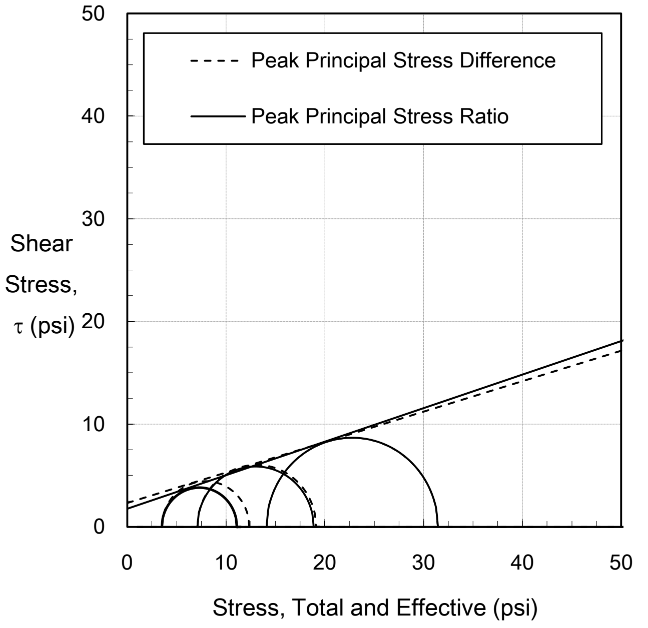
TRI Log #: 63508.3
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	16.5	18.1
Cohesion (psi)	c_R	2.3	1.7

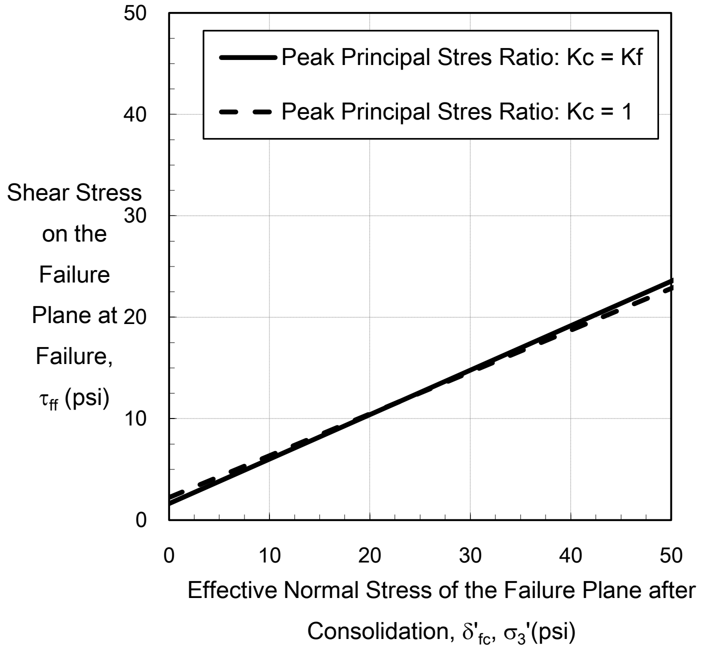
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	22.9	23.7
Effective Cohesion (psi)	c'	1.8	1.6

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	20.1	22.4
Cohesion (psi)	$\psi_{Kc=1}$	2.9	2.2

R / "Total Stress" Envelope



Three-Stage Rapid Drawdown Envelopes

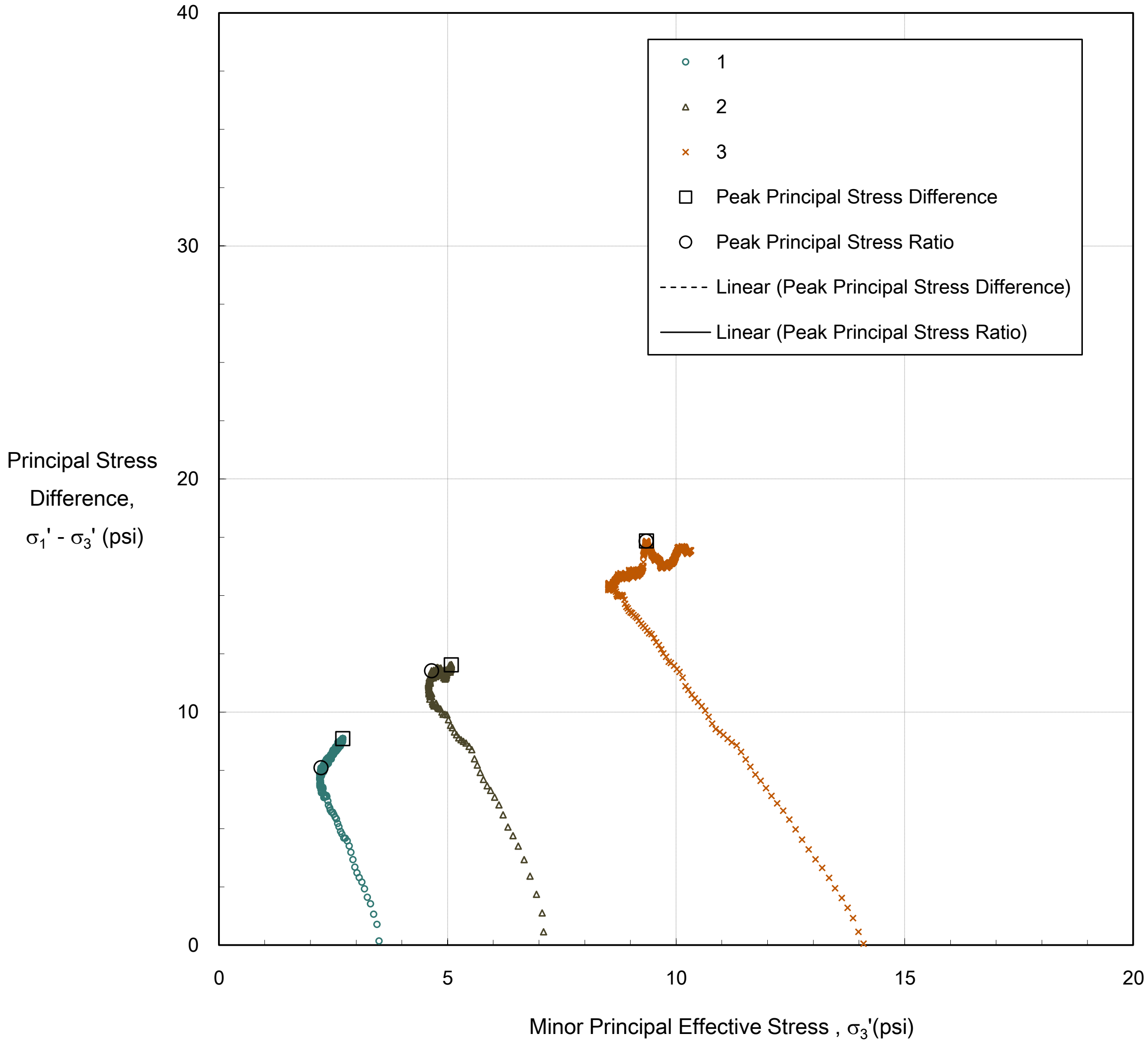


Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 9-11

TRI Log #: 63508.3
Test Method: ASTM D4767 Mod

Modified Mohr-Coulomb

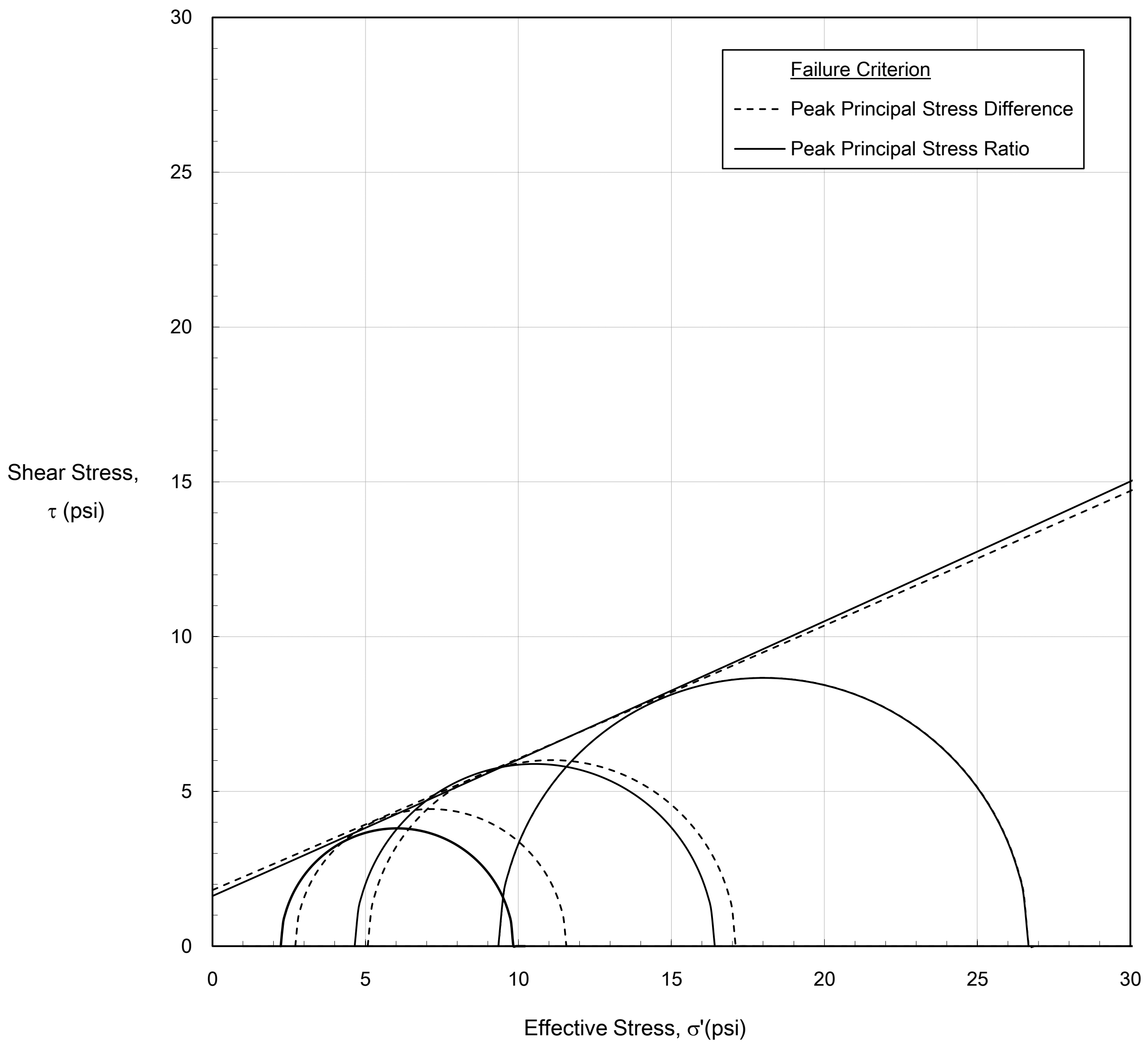


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	23.7
Effective Cohesion (psi)	-	1.6

Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63508.3
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	LB-1 / 9-11		

Mohr-Coulomb

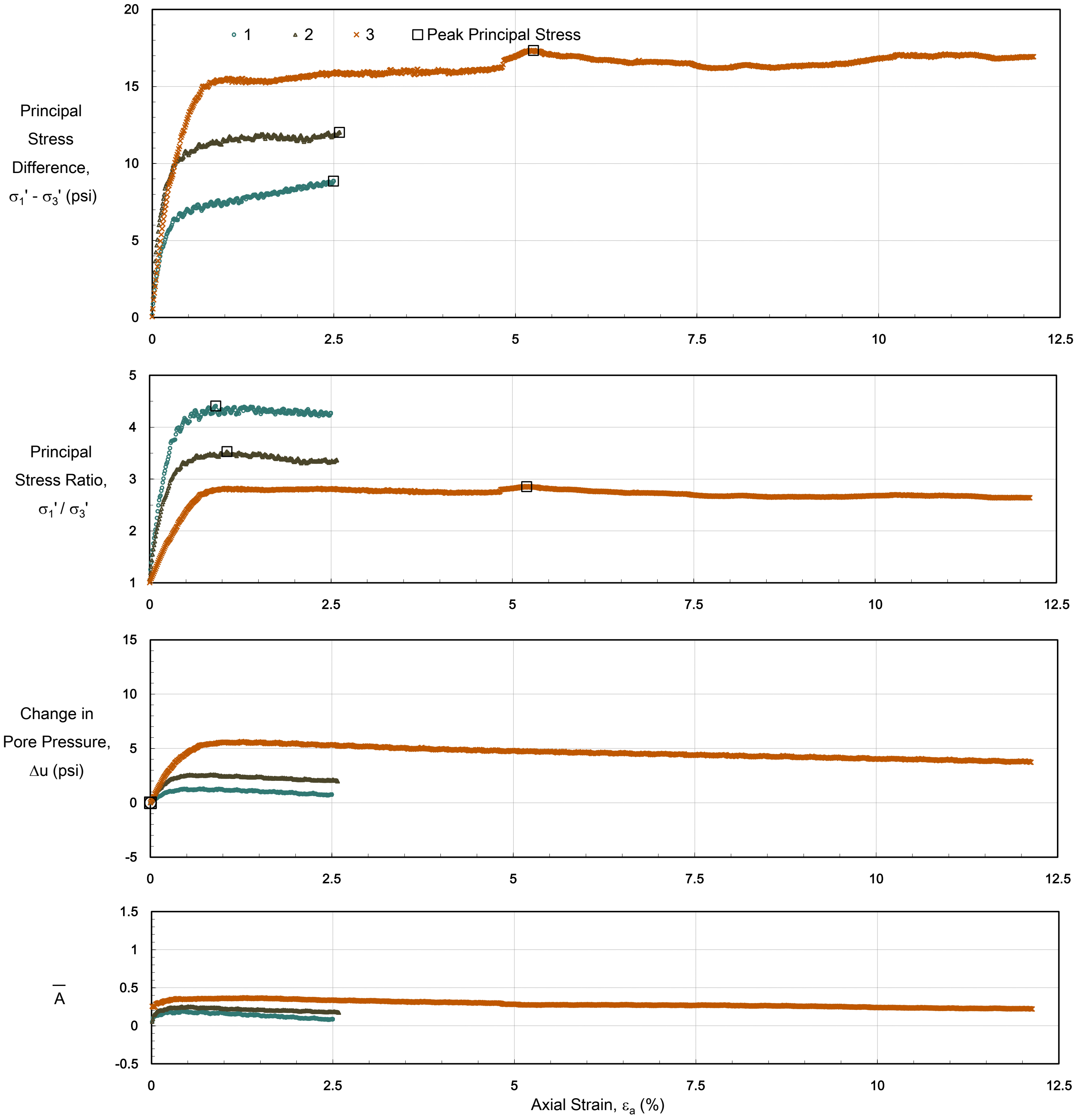


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	23.7
Effective Cohesion (psi)	-	1.6

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 9-11

TRI Log #: 63508.3
Test Method: ASTM D4767 Mod

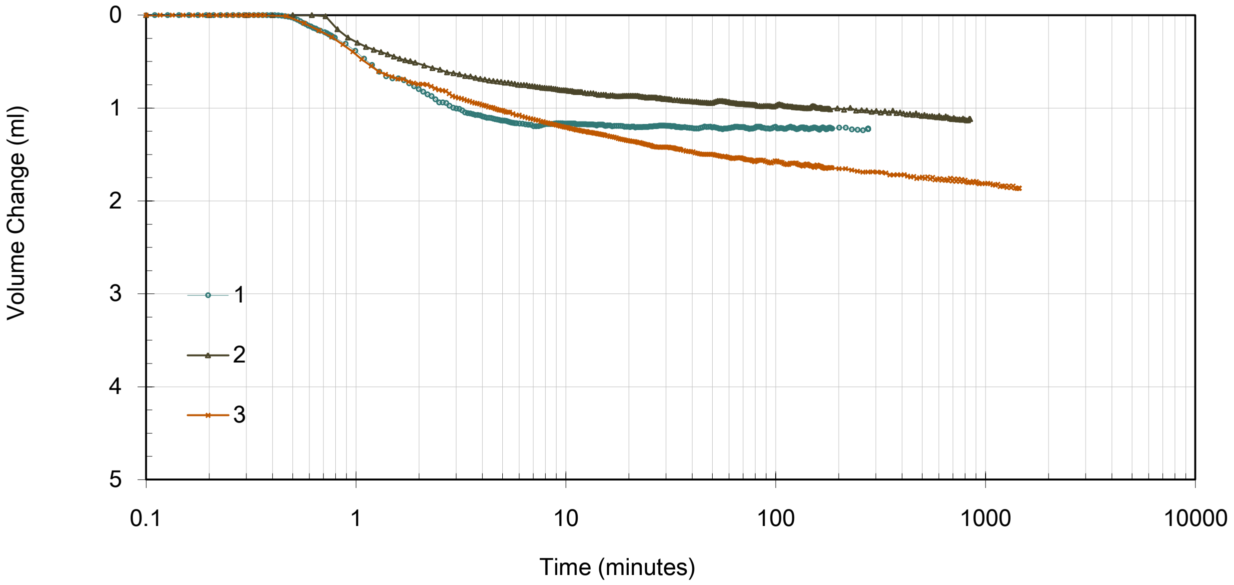


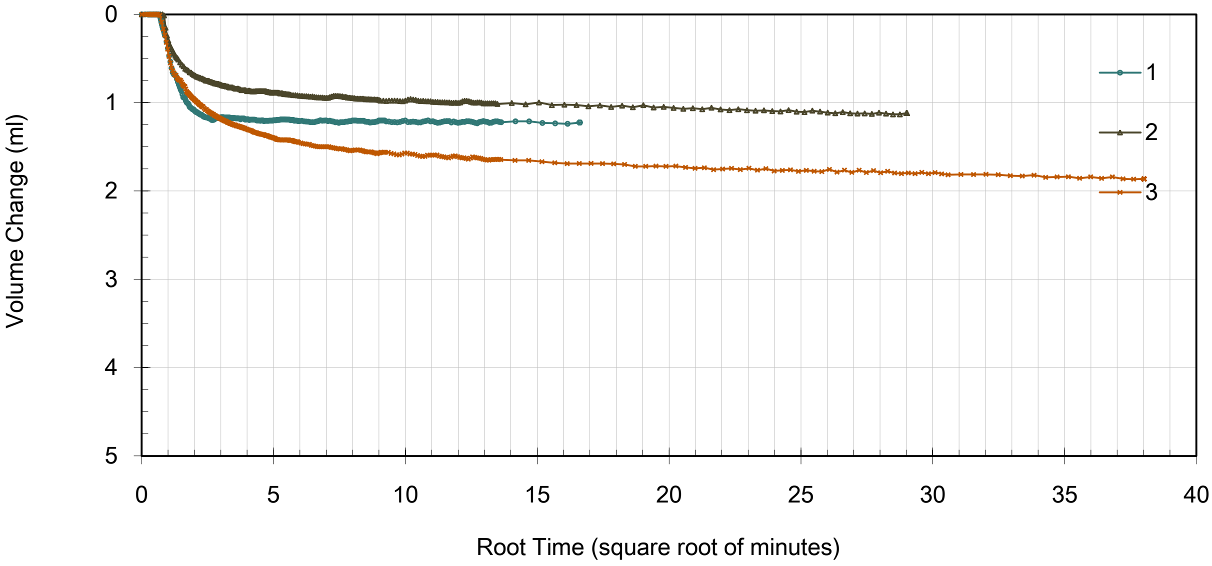
Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 9-11

TRI Log #: 63508.3
Test Method: ASTM D4767 Mod

Consolidation





Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 23-25

TRI Log #: 63508.4
Test Method: ASTM D4767 Mod

Specimens				
Identification	1	2	3	4
Depth/Elev. (ft)	-	-	-	-
Eff. Consol. Stress (psi)	6.5	13.1	26.1	-
Initial Specimen Properties				
Avg. Diameter (in)	2.04	2.06	2.08	-
Avg. Height (in)	4.18	4.08	3.98	-
Avg. Water Content (%)	27.2	-	-	-
Bulk Density (pcf)	117.7	-	-	-
Dry Density (pcf)	92.6	-	-	-
Specific Gravity (Assumed)	2.75			
Saturation (%)	87.5	-	-	-
Void Ratio, n	0.85	0.85	0.84	-
B-Value, End of Saturation	0.95	-	-	-

Test Setup	
Specimen Condition	Undisturbed / Intact
Specimen Preparation	Trimmed
Mounting Method	Wet
Consolidation	Isotropic

Post-Consolidation / Pre-Shear				
Void Ratio	0.85	0.84	0.83	-

Shear / Post-Shear				
Rate of Strain (%/hr)	1.00	1.00	1.00	-
Avg. Water Content (%)	-	-	29.3	-

At Failure								
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$				Ratio, $(\sigma_1'/\sigma_3')_{max}$			
Axial Strain at Failure (%), $\varepsilon_{a,f}$	-	-	-	-	1.3	2.1	2.2	-
Minor Effective Stress (psi), $\sigma_3'_f$	-	-	-	-	2.8	7.8	15.3	-
Principal Stress Difference (psi), $(\sigma_1-\sigma_3)_f$	-	-	-	-	9.6	17.9	26.4	-
Pore Water Pressure, Δu_f (psi)	-	-	-	-	3.7	5.6	10.8	-
Major Effective Stress (psi), $\sigma_1'_f$	-	-	-	-	12.4	25.7	41.6	-
Secant Friction Angle (degrees)	-	-	-	-	38.9	32.4	27.6	-
Effective Friction Angle (degrees)	-				23.6			
Effective Cohesion (psi)	-				2.1			

Note: Multi-stage testing was performed for this sample. The first two stages were terminated in accordance with stress path tangency and/or peak principal stress ratio. The presented M-C parameters are based on a linear regression in modified stress space, across all assigned effective consolidation stresses. This fit does not purported to capture typical curvature of envelopes that may, in particular, be observed across broader range in effective stresses. Please note that the stresses associated with peak principal stress ratio are presented in tabular form on the first page of the report. There are alternate interpretations to this failure criterion including but not limited to peak principal stress difference and strain compatibility.

Jeffrey A. Kuhn , Ph.D., P.E., 6/7/2021
Analysis & Quality Review/Date

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 23-25

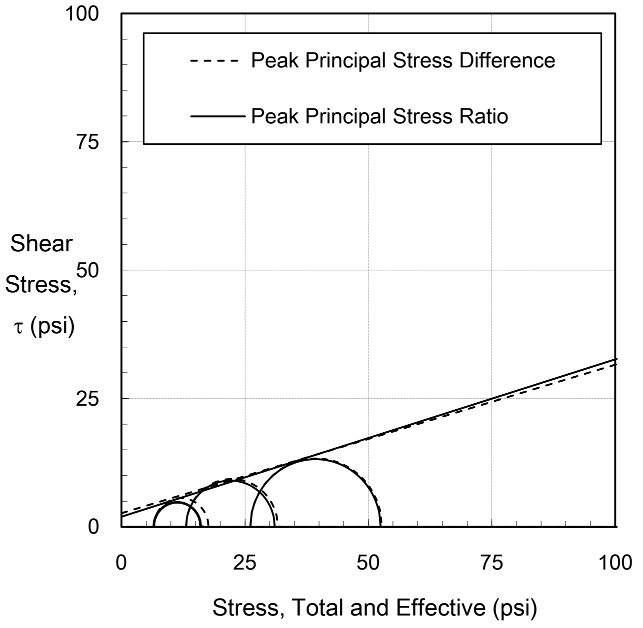
TRI Log #: 63508.4
Test Method: ASTM D4767 Mod

R / "Total Stress" Envelope			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	ϕ_R	16.1	17.0
Cohesion (psi)	c_R	2.7	2.0

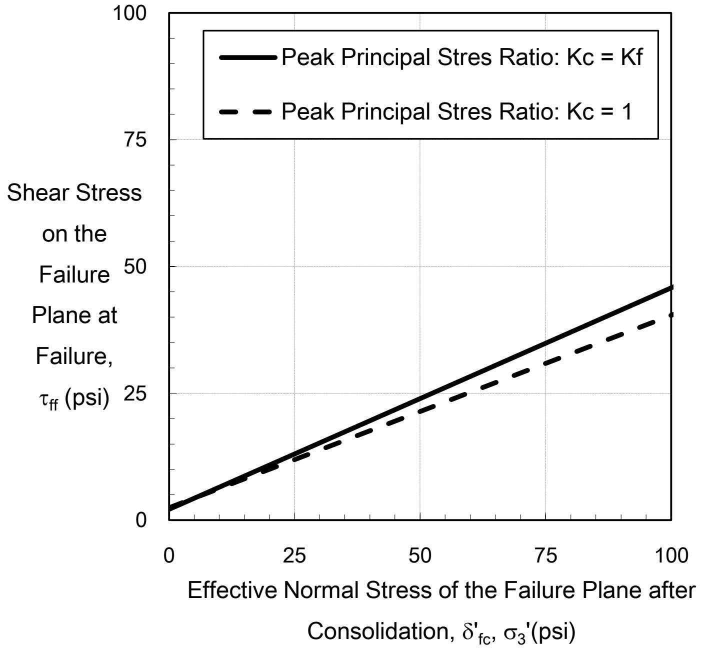
Kc = Kf Envelope, Effective Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	ϕ'	22.2	23.6
Effective Cohesion (psi)	c'	2.5	2.1

Kc = 1 (τ_{ff} vs σ'_{fc}) Envelope, Total Stress Envelope (Duncan et al. 1990)			
Failure Criterion: Peak Principal Stress		Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Friction Angle (deg)	$d_{Kc=1}$	19.6	20.8
Cohesion (psi)	$\psi_{Kc=1}$	3.3	2.4

R / "Total Stress" Envelope



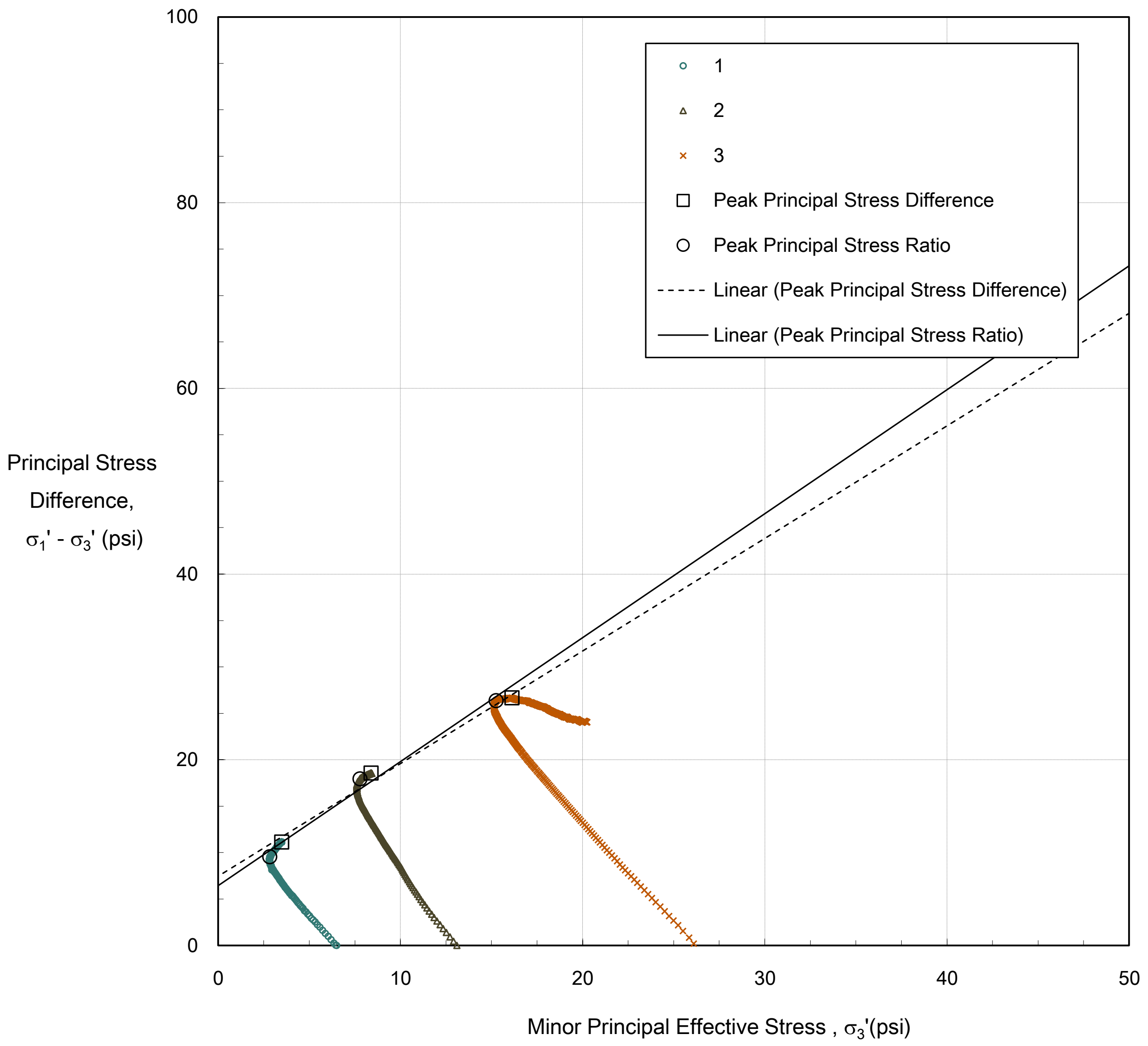
Three-Stage Rapid Drawdown Envelopes



Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63508.4
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	LB-1 / 23-25		

Modified Mohr-Coulomb



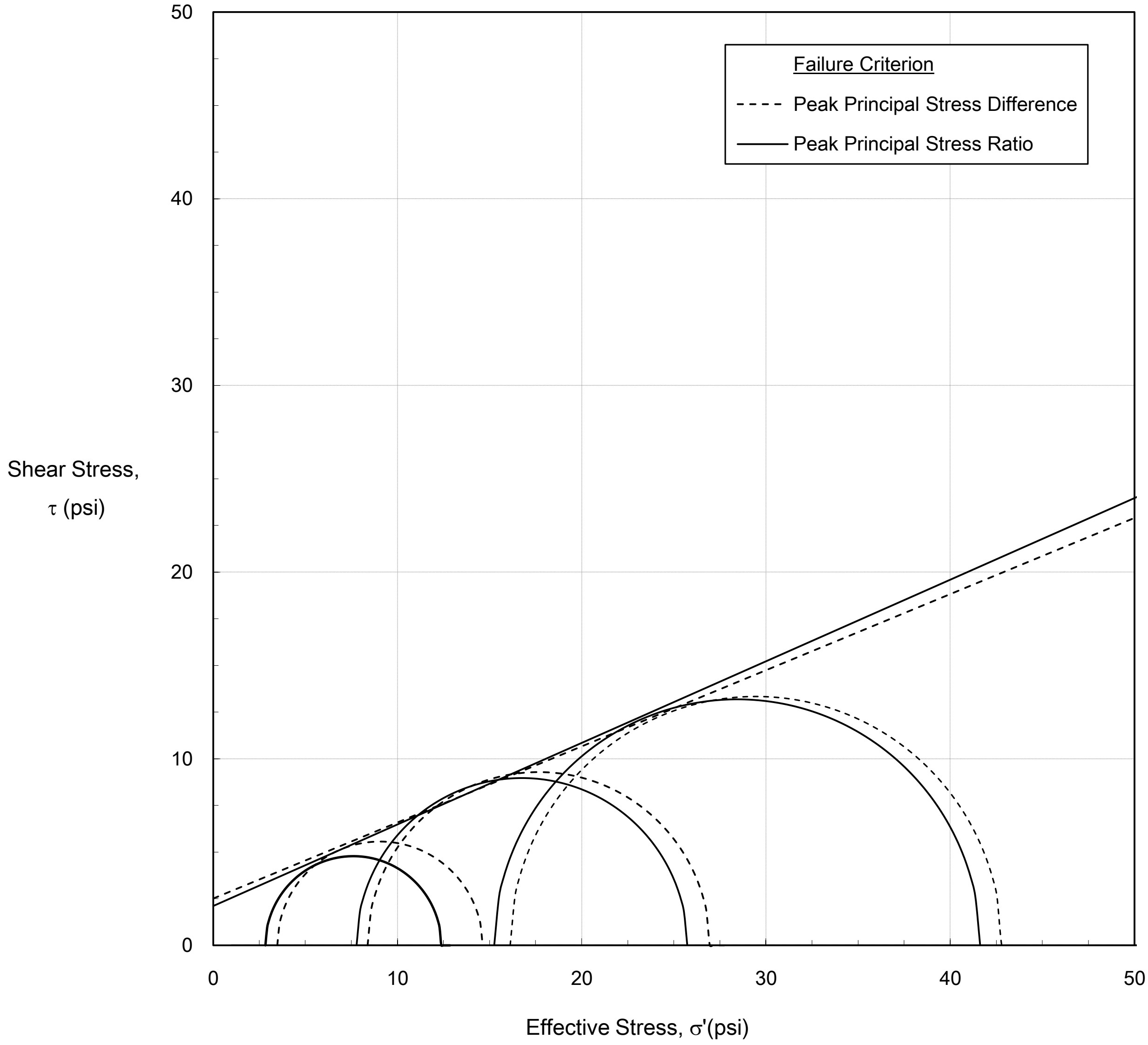
Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	23.6
Effective Cohesion (psi)	-	2.1

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 23-25

TRI Log #: 63508.4
Test Method: ASTM D4767 Mod

Mohr-Coulomb

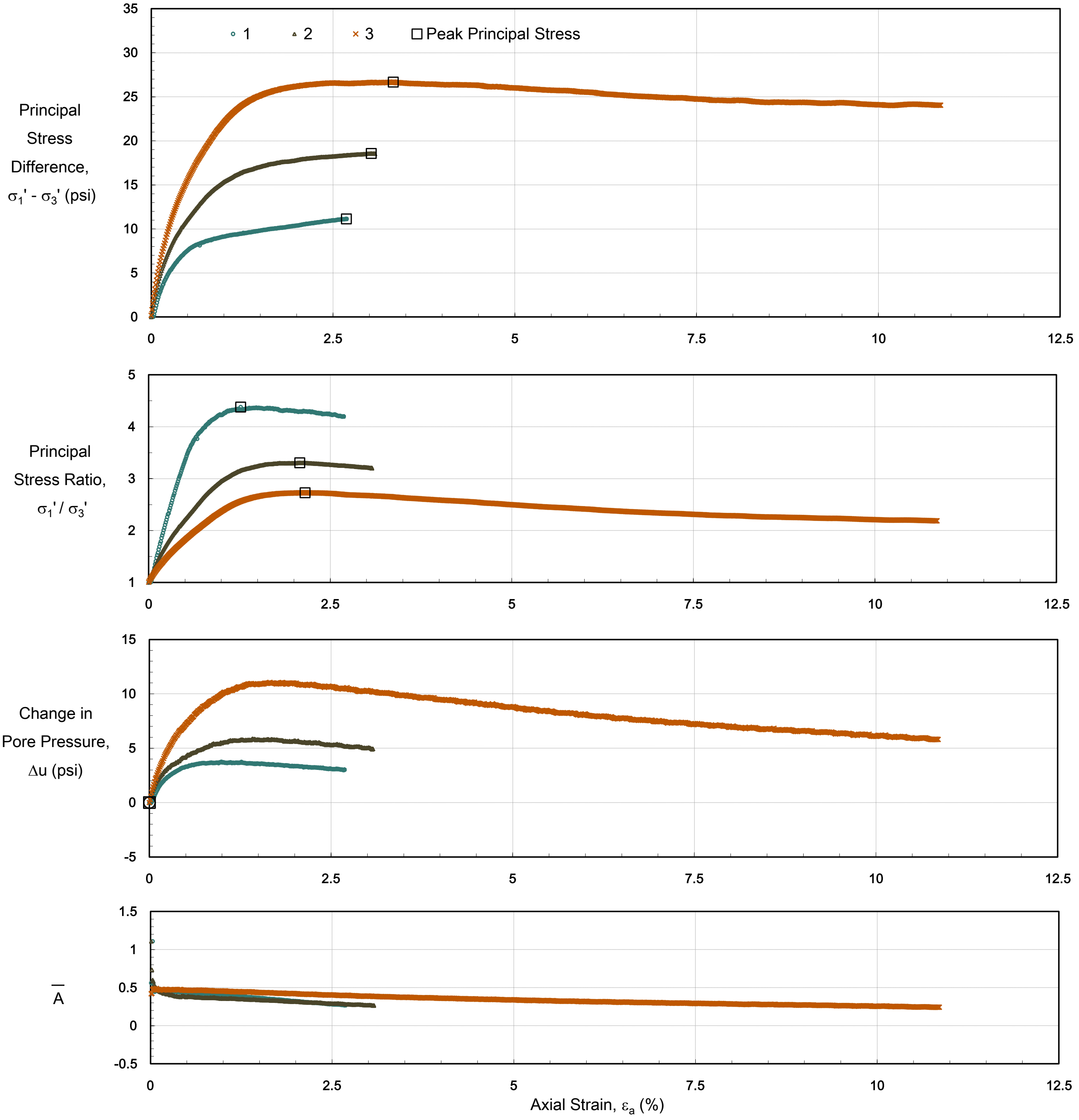


Failure Criterion: Peak Principal Stress	Difference, $(\sigma_1'-\sigma_3')_{max}$	Ratio, $(\sigma_1'/\sigma_3')_{max}$
Effective Friction Angle (deg)	-	23.6
Effective Cohesion (psi)	-	2.1

Multi-Stage Consolidated-Undrained Triaxial Compression

Client: Tolunay Wong Engineers, Inc
Project: 21.23.029 - Cedar Bayou Deepening & Widening Project
Sample: LB-1 / 23-25

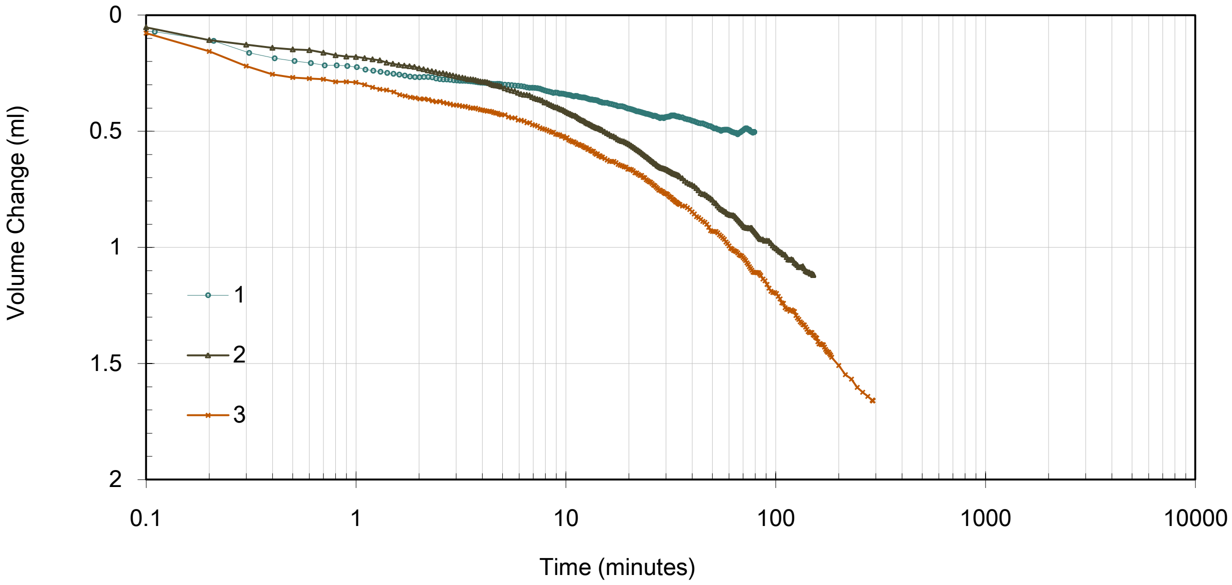
TRI Log #: 63508.4
Test Method: ASTM D4767 Mod

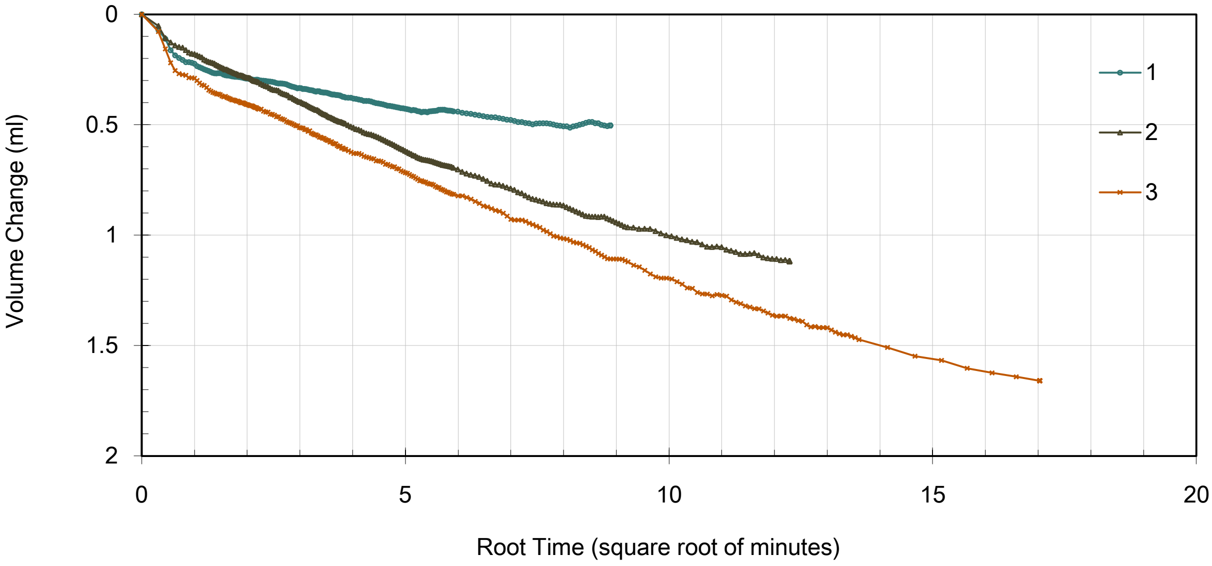


Multi-Stage Consolidated-Undrained Triaxial Compression

Client:	Tolunay Wong Engineers, Inc	TRI Log #:	63508.4
Project:	21.23.029 - Cedar Bayou Deepening & Widening Project	Test Method:	ASTM D4767 Mod
Sample:	LB-1 / 23-25		

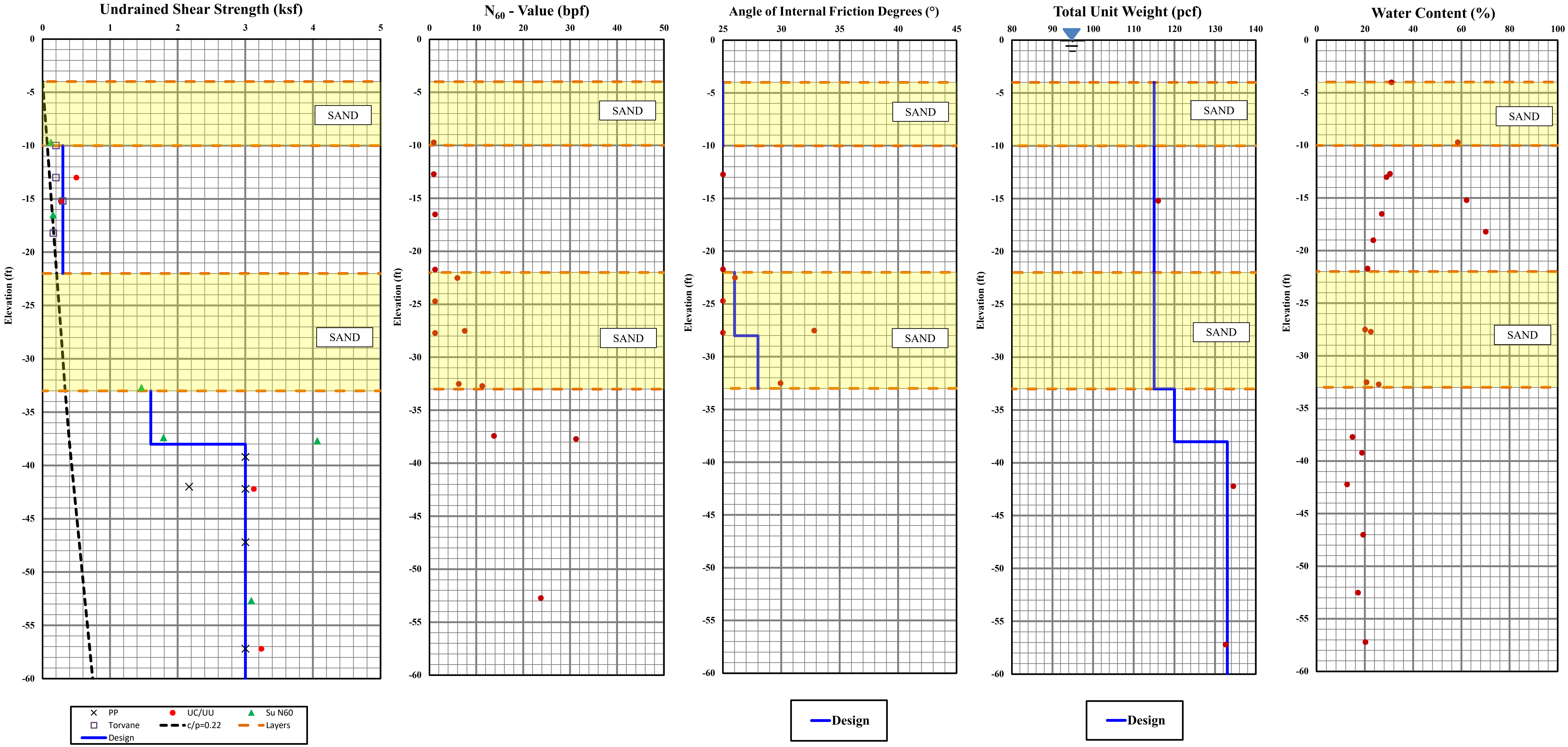
Consolidation





APPENDIX G

DESIGN SOIL PARAMETERS



Cedar Bayou Deepening & Widening Project

Chambers County, Texas

Tolunay-Wong Engineers, Inc.

Project Number: 21.23.029

Report Number: 120938

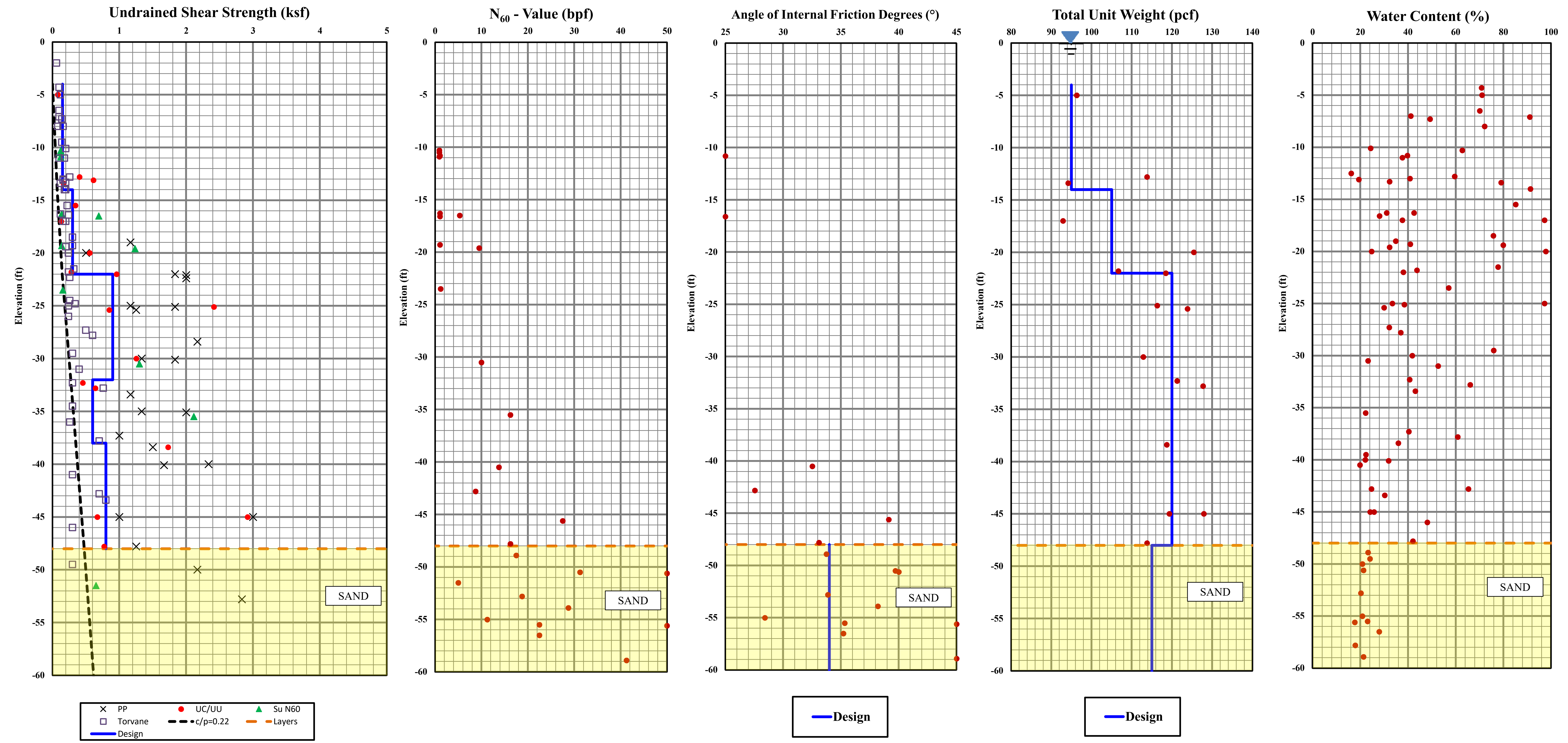
Trans-Global Solutions, Inc.

Beaumont, Texas

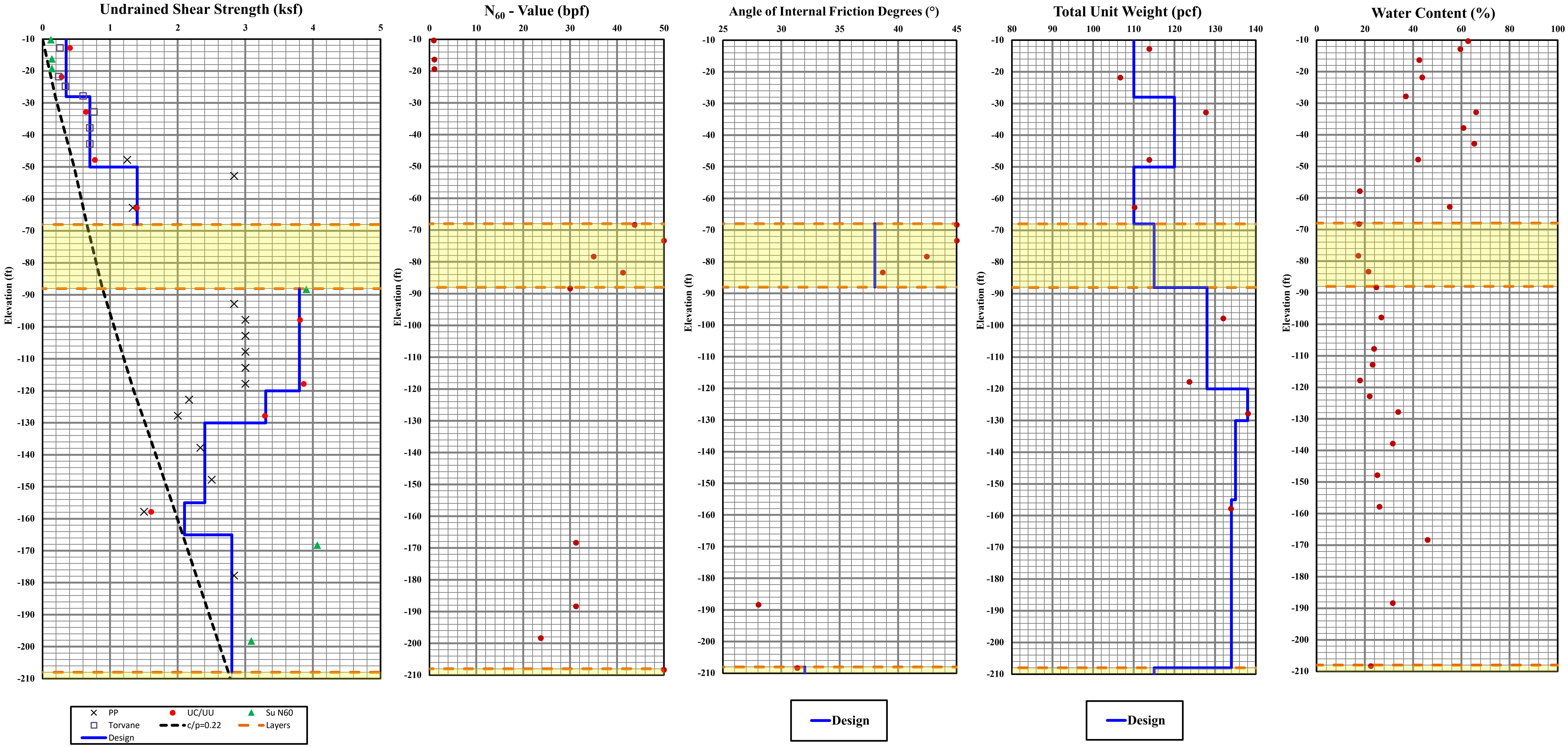
Design Soil Parameters
MB-1 and MB-2

Appendix G

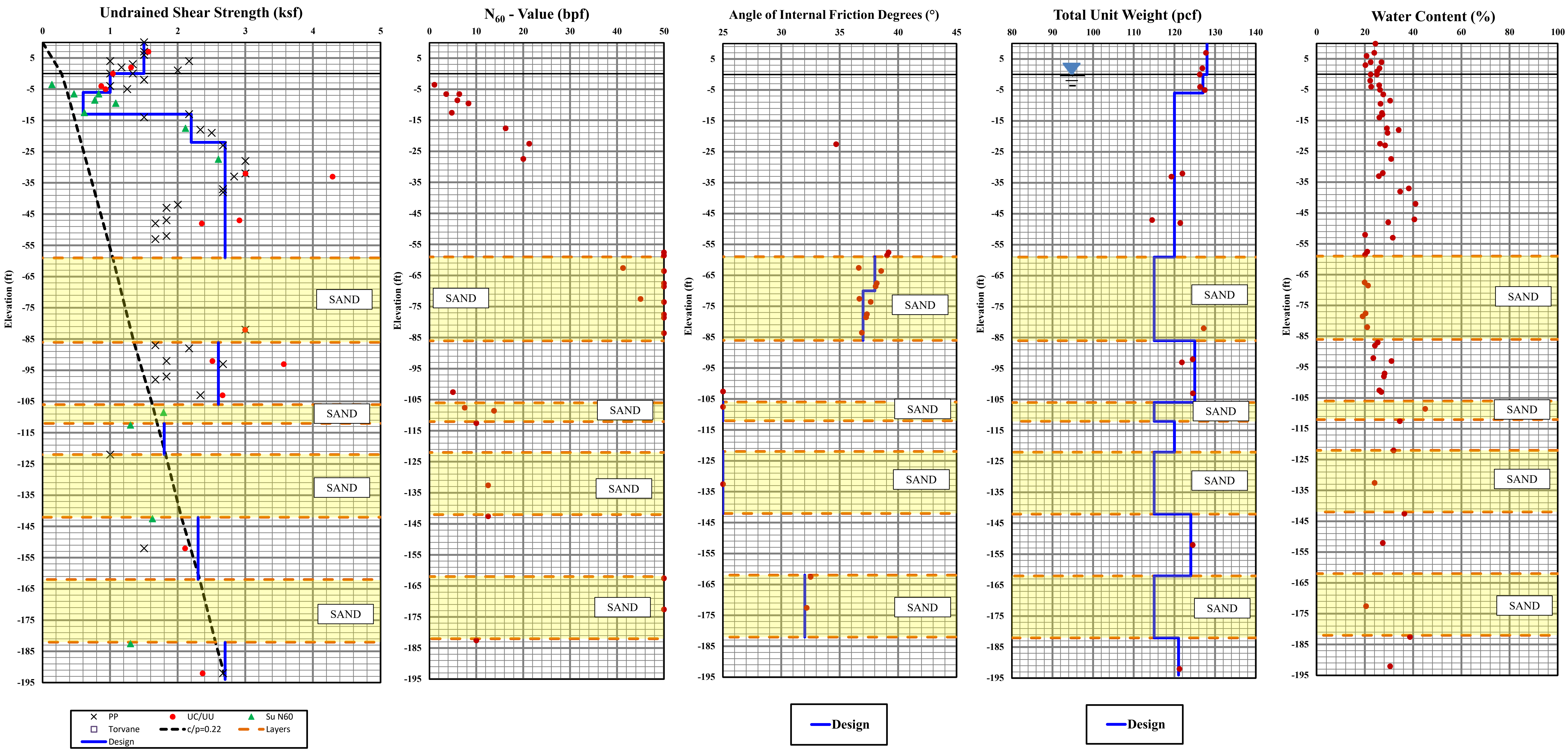
Figure 1



Cedar Bayou Deepening & Widening Project Chambers County, Texas	**Tolunay-Wong Engineers, Inc.**	Project Number: 21.23.029 Report Number: 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Design Soil Parameters MB-3 through MB-10**	Appendix G Figure 2



Cedar Bayou Deepening & Widening Project Chambers County, Texas	**Tolunay-Wong Engineers, Inc.**	Project Number: 21.23.029 Report Number: 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Design Soil Parameters - Dock Structures - Marine MB-10**	Appendix G Figure 3



Cedar Bayou Deepening & Widening Project Chambers County, Texas	**Tolunay-Wong Engineers, Inc.**	Project Number: 21.23.029 Report Number: 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Design Soil Parameters - Dock Structures - Landside** **LB-1 through LB-3**	Appendix G Figure 4

TABULATED DRAINED & UNDRAINED
SOIL PARAMETERS

Soil Design Parameters

Soil Layer	Soil Description	Elevation Range (ft)	γ (pcf)	γ' (pcf)	Undrained (Short-Term) Case		Drained (Long-Term) Case	
					c (psf)	φ (°)	c' (psf)	φ' (°)
1	Loose Sand	(-)4 to (-)10	115	53	0	25	0	25
2	Soft clay	(-)10 to (-)22	115	53	300	0	30	27
3	Loose Sand	(-)22 to (-)28	115	53	0	26	0	26
4	Loose Sand	(-)28 to (-)33	120	58	0	28	0	28
5	Stiff Clay	(-)33 to (-)38	120	58	1,600	0	160	28
6	Very Stiff Clay	(-)38 to (-)60	133	71	3,300	0	200	22

Legend:
γ = Total Unit Weight φ = Friction Angle
γ' = Submerged Unit Weight
c = Cohesion

Cedar Bayou Deepening & Widening Project Chambers County, Texas	**Tolunay-Wong Engineers, Inc.**	**Project No.** 21.23.029 **Report No.** 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Soil Design Parameters MB-1 & MB-2**	**Appendix** G **Figure 4**

DRAFT

Soil Design Parameters								
Soil Layer	Soil Description	Elevation Range (ft)	γ (pcf)	γ' (pcf)	Undrained (Short-Term) Case		Drained (Long-Term) Case	
					c (psf)	φ (°)	c' (psf)	φ' (°)
1	Very Soft Clay	(-)4 to (-)14	95	33	150	0	15	25
2	Soft Clay	(-)14 to (-)22	105	43	300	0	30	28
3	Firm Clay	(-)22 to (-)32	120	58	900	0	135	28
4	Firm Clay	(-)32 to (-)38	120	58	600	0	60	25
5	Firm Clay	(-)38 to (-)48	120	58	800	0	120	28
6	Loose to Very Dense Sand	(-)48 to (-)60	115	53	0	34	0	34

Legend:

γ = Total Unit Weight

γ' = Submerged Unit Weight

c = Cohesion

φ = Friction Angle

Cedar Bayou Deepening & Widening Project **Chambers County, Texas**	**Tolunay-Wong Engineers, Inc.**	**Project No.** 21.23.029 **Report No.** 120938
Trans-Global Solutions, Inc. **Beaumont, Texas**	**Soil Design Parameters** **MB-3 to MB-10**	**Appendix** G **Figure** 5

Soil Design Parameters - Sheet Pile Bulkhead

Soil Layer	Soil Description	Elevation Range (ft)	γ (pcf)	γ' (pcf)	Undrained (Short-Term) Case				Drained (Long-Term) Case			
					c (psf)	φ (°)	δ (°)	a (psf)	c' (psf)	φ' (°)	δ (°)	a (psf)
1	Stiff Clay (Fill)	(+)10 to (+)0	120	120	1,000	0	0	750	0	28	14	0
2	Stiff Clay	(+)0 to (-)6	127	65	1,000	0	0	750	100	24	12	0
3	Firm Clay	(-)6 to (-)13	120	58	600	0	0	550	60	28	14	0
4	Very Stiff Clay	(-)13 to (-)22	120	58	2,200	0	0	950	300	24	12	0
5	Very Stiff Clay	(-)22 to (-)59	120	58	2,700	0	0	950	200	19	9	0
6	Dense to Very Dense Sand	(-)59 to (-)70	115	53	0	38	19	0	0	38	19	0
7	Dense to Very Dense Sand	(-)70 to (-)86	115	53	0	37	19	0	0	37	19	0
8	Stiff to Very Stiff Clay	(-)86 to (-)106	125	63	2,600	0	0	950	200	27	13	0

Notes:

(1) Plasticity index (PI) was used to estimate drained friction angle for cohesive soils.
(2) Effective cohesion values were estimated using published correlations and our experience with similar soils.
(3) Effective cohesion values for clays at shallow depths were neglected to account for weathering and strain softening effects.
(4) Design groundwater level estimated at El. 0-ft.

Legend:

γ = Total Unit Weight
γ' = Submerged Unit Weight
c = Cohesion
φ = Friction Angle
δ = Angle of Wall Friction, δ = (0.5) φ for steel
a = Adhesion

Cedar Bayou Deepening & Widening Project
Chambers County, Texas

Tolunay-Wong Engineers, Inc.

Project No. 21.23.029
Report No. 120938

Trans-Global Solutions, Inc.
Beaumont, Texas

Soil Design Parameters - Sheet Pile Bulkhead
LB-1 to LB-3

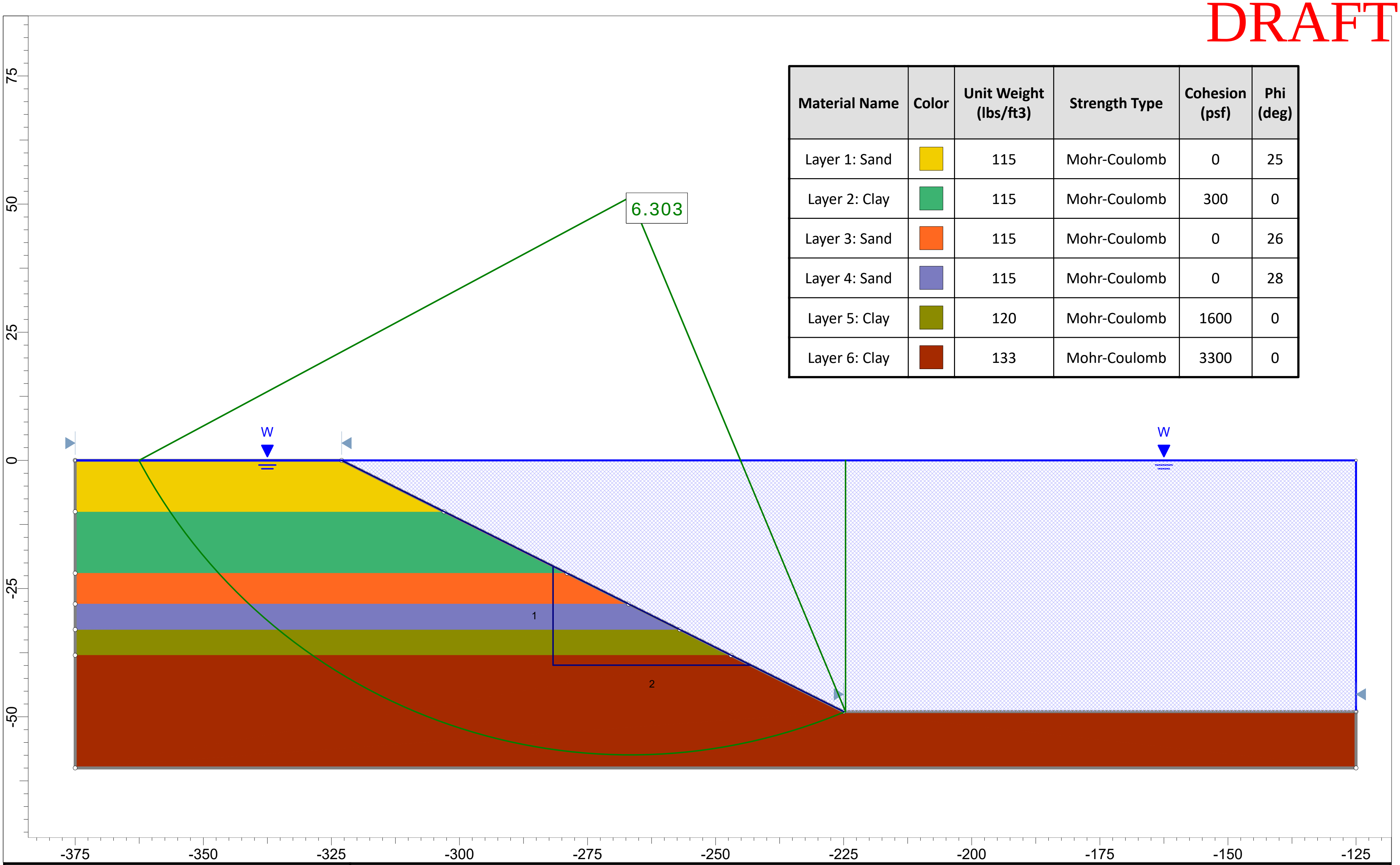
Appendix G
Figure 7

APPENDIX H

RESULTS OF GLOBAL
STABILITY ANALYSES

CHANNEL SIDE SLOPES GLOBAL STABILITY

DRAFT

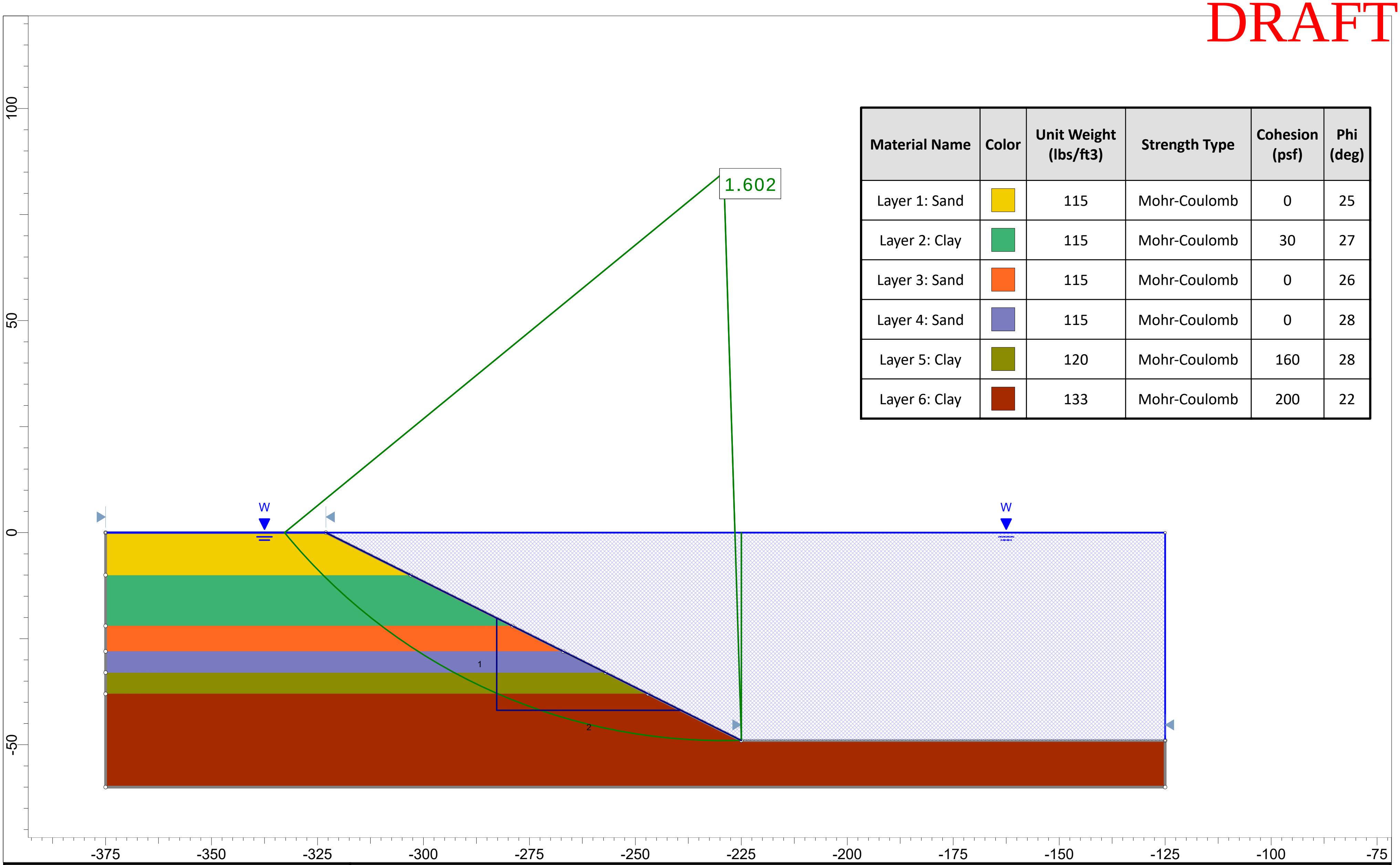


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1: Sand	🟨	115	Mohr-Coulomb	0	25
Layer 2: Clay	🟩	115	Mohr-Coulomb	300	0
Layer 3: Sand	🟧	115	Mohr-Coulomb	0	26
Layer 4: Sand	🟪	115	Mohr-Coulomb	0	28
Layer 5: Clay	🟫	120	Mohr-Coulomb	1600	0
Layer 6: Clay	🟥	133	Mohr-Coulomb	3300	0

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project	Cedar Bayou Deepening & Widening Project
Analysis Description	MB-1 & MB-2 - Short Term Conditions - Global Stability - 2H:1V
Drawn By	T. O'Connor
Scale	1:310
Client	Trans-Global Solutions, Inc.
Date	6/7/2021, 3:11:38 PM
	Figure 1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1: Sand	🟨	115	Mohr-Coulomb	0	25
Layer 2: Clay	🟩	115	Mohr-Coulomb	30	27
Layer 3: Sand	🟧	115	Mohr-Coulomb	0	26
Layer 4: Sand	🟪	115	Mohr-Coulomb	0	28
Layer 5: Clay	🟫	120	Mohr-Coulomb	160	28
Layer 6: Clay	🟥	133	Mohr-Coulomb	200	22

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project Cedar Bayou Deepening & Widening Project

Analysis Description MB-1 & MB-2 - Long Term Conditions - Global Stability - 2H:1V

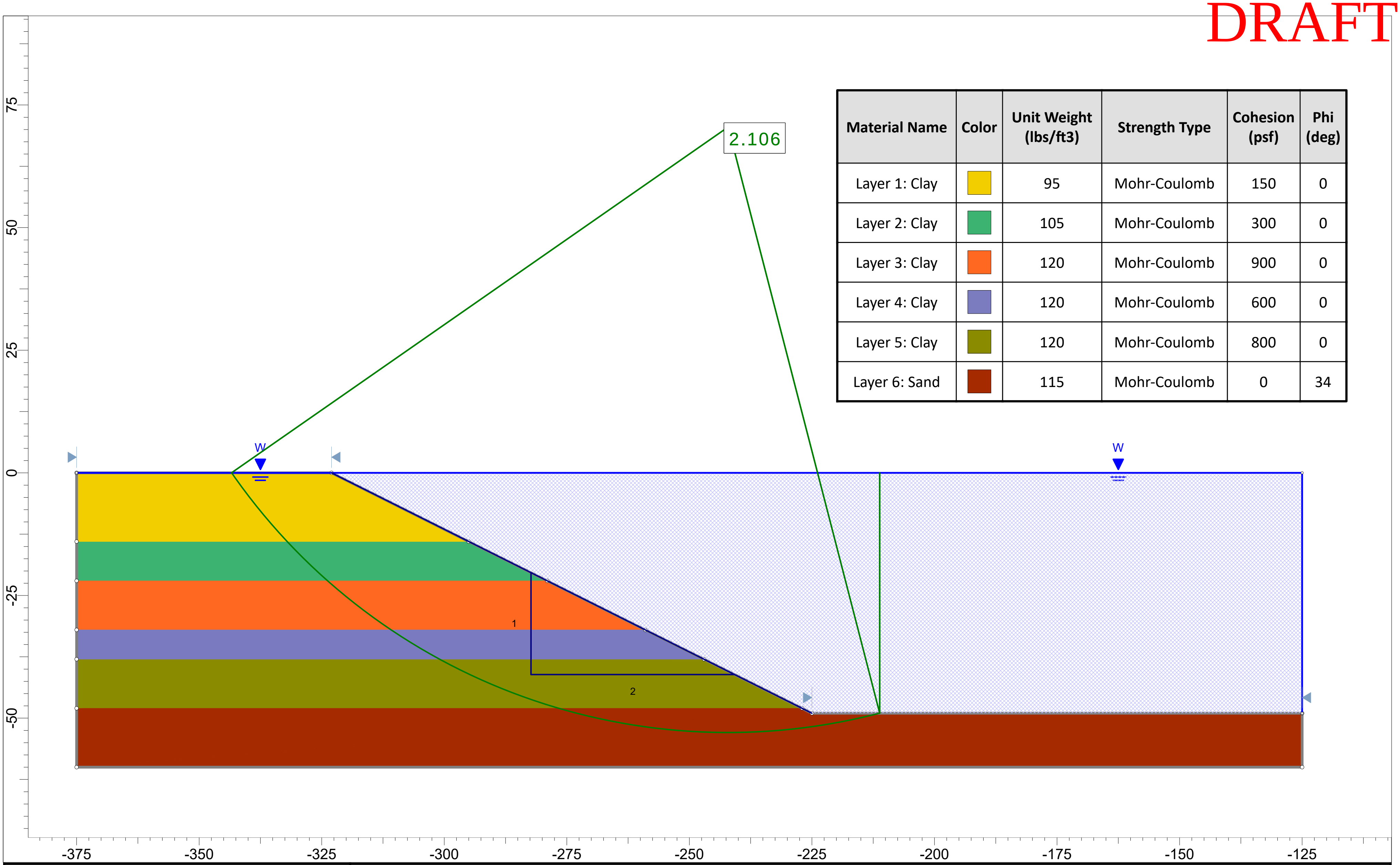
Drawn By T. O'Connor

Scale 1:374

Client Trans-Global Solutions, Inc.

Date 6/7/2021, 3:11:38 PM

Figure 2



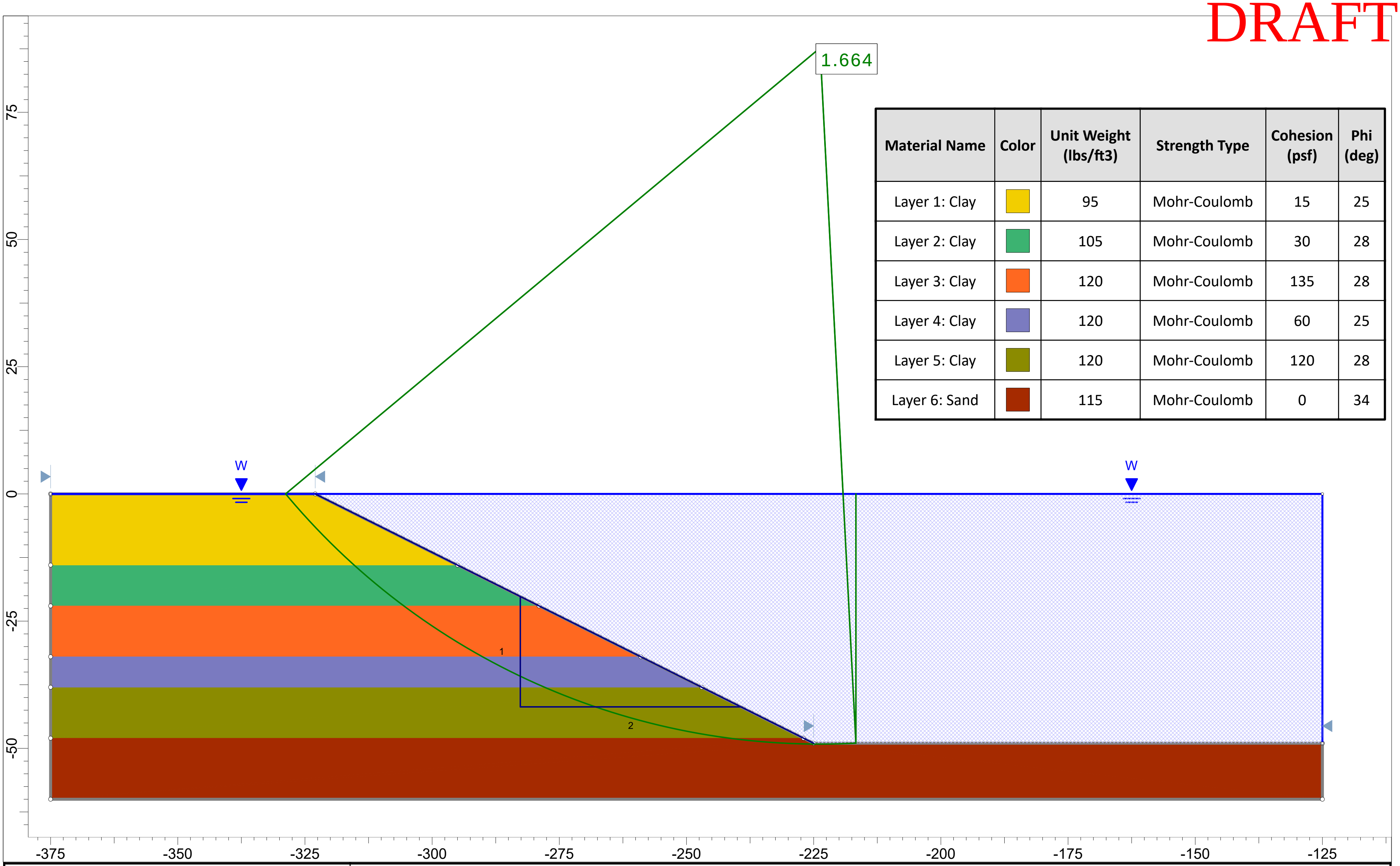
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1: Clay	🟨	95	Mohr-Coulomb	150	0
Layer 2: Clay	🟩	105	Mohr-Coulomb	300	0
Layer 3: Clay	🟧	120	Mohr-Coulomb	900	0
Layer 4: Clay	🟪	120	Mohr-Coulomb	600	0
Layer 5: Clay	🟩	120	Mohr-Coulomb	800	0
Layer 6: Sand	🟥	115	Mohr-Coulomb	0	34

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project	Cedar Bayou Deepening & Widening Project
Analysis Description	MB-3 to MB-10 - Short Term Conditions - Global Stability - 2H:1V
Drawn By	T. O'Connor
Scale	1:324
Client	Trans-Global Solutions, Inc.
Date	6/7/2021, 3:11:38 PM
	Figure 3

DRAFT



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1: Clay	🟨	95	Mohr-Coulomb	15	25
Layer 2: Clay	🟩	105	Mohr-Coulomb	30	28
Layer 3: Clay	🟧	120	Mohr-Coulomb	135	28
Layer 4: Clay	🟪	120	Mohr-Coulomb	60	25
Layer 5: Clay	🟫	120	Mohr-Coulomb	120	28
Layer 6: Sand	🟥	115	Mohr-Coulomb	0	34

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project Cedar Bayou Deepening & Widening Project

Analysis Description MB-3 to MB-10 - Long Term Conditions - Global Stability - 2H:1V

Drawn By T. O'Connor

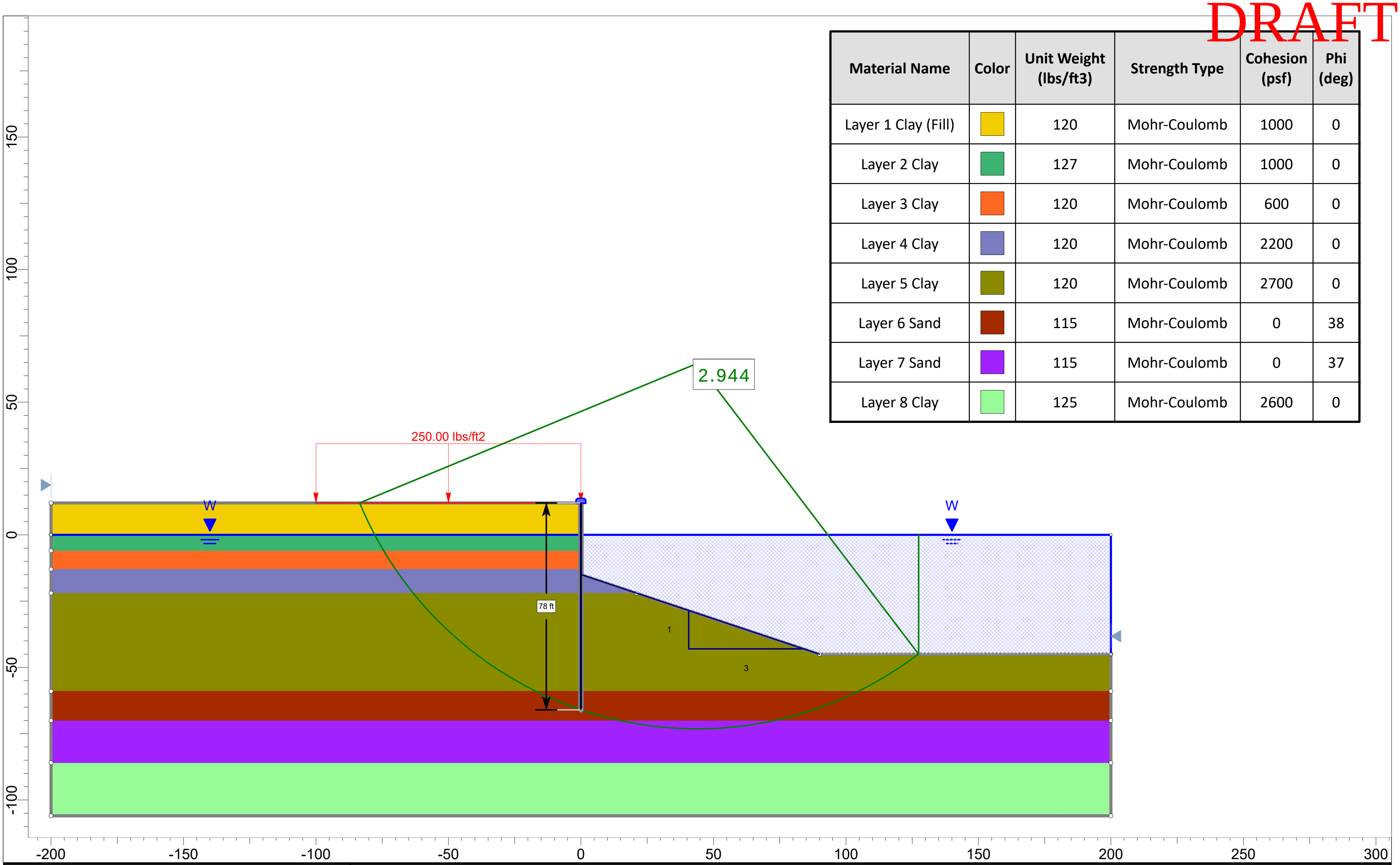
Scale 1:312

Client Trans-Global Solutions, Inc.

Date 6/7/2021, 3:11:38 PM

Figure 4

SHEET PILE BULKHEAD GLOBAL STABILITY

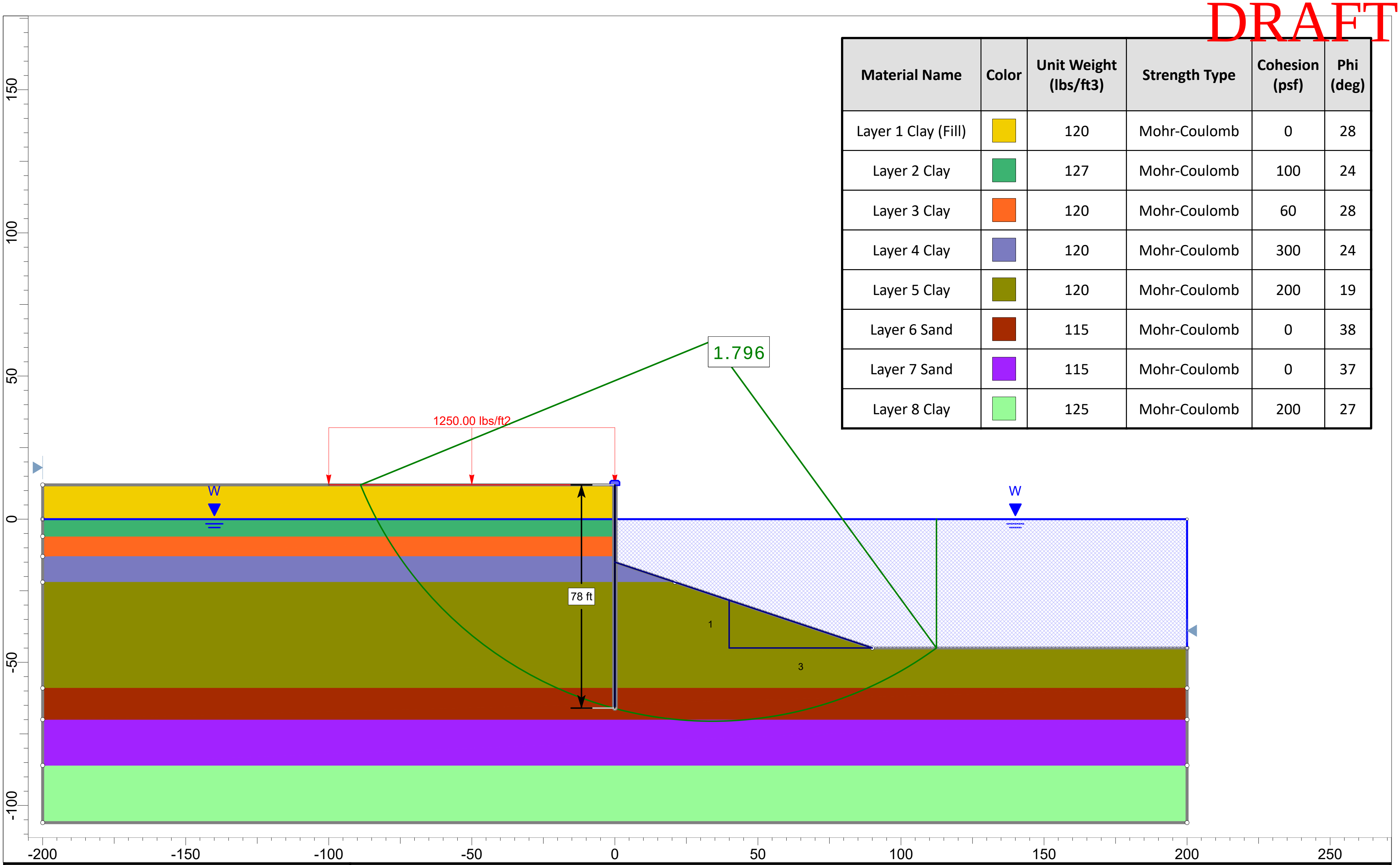


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1 Clay (Fill)	🟨	120	Mohr-Coulomb	1000	0
Layer 2 Clay	🟩	127	Mohr-Coulomb	1000	0
Layer 3 Clay	🟧	120	Mohr-Coulomb	600	0
Layer 4 Clay	🟦	120	Mohr-Coulomb	2200	0
Layer 5 Clay	🟫	120	Mohr-Coulomb	2700	0
Layer 6 Sand	🟥	115	Mohr-Coulomb	0	38
Layer 7 Sand	🟪	115	Mohr-Coulomb	0	37
Layer 8 Clay	🟩	125	Mohr-Coulomb	2600	0

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project	Cedar Bayou Deepening & Widening Project
Analysis Description	Sheet Pile Bulkhead - Short Term Conditions - Global Stability - Dock
Drawn By	T. O'Connor
Scale	1:599
Client	Trans-Global Solutions, Inc.
Date	
	Figure 5



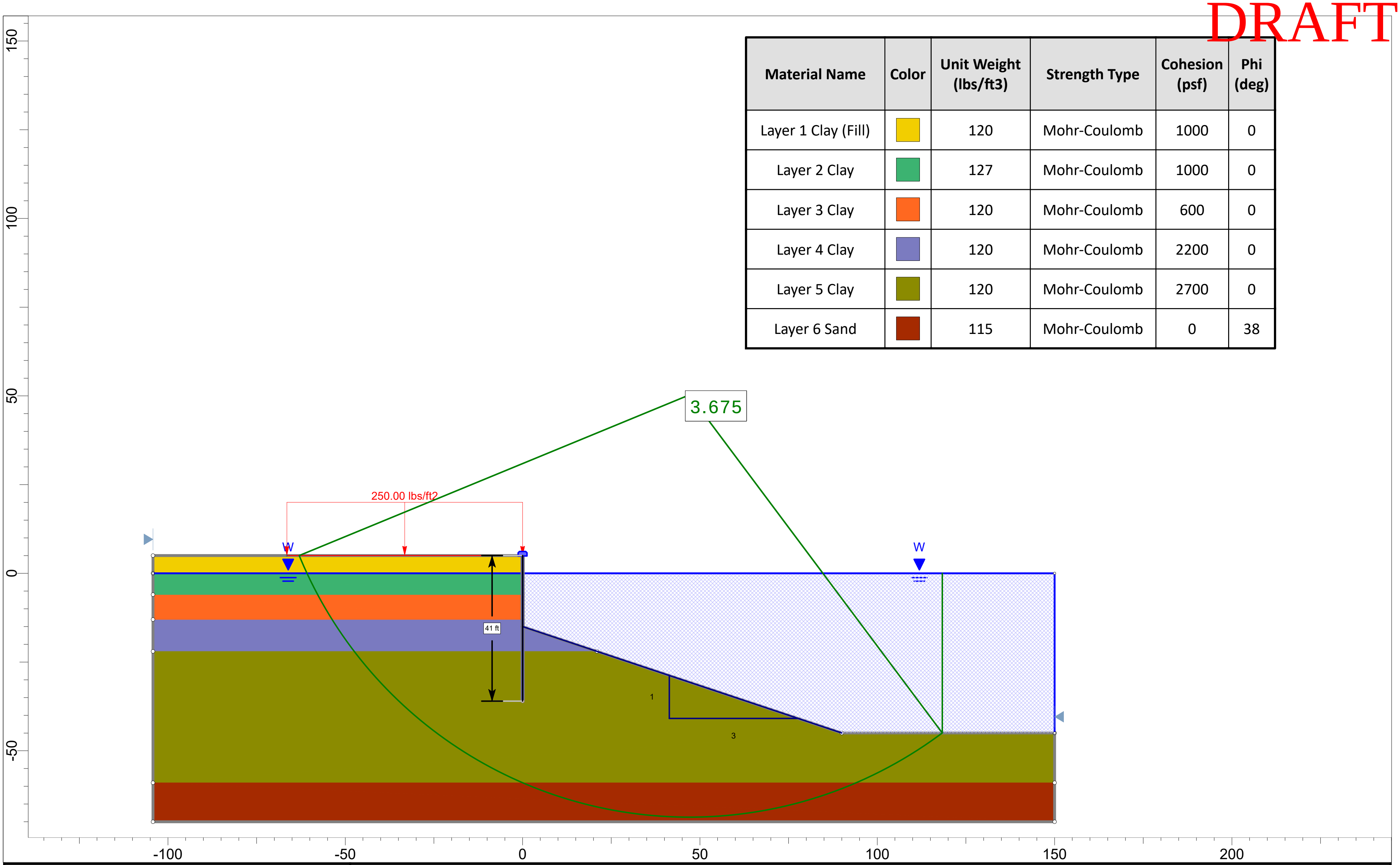
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1 Clay (Fill)	🟨	120	Mohr-Coulomb	0	28
Layer 2 Clay	🟩	127	Mohr-Coulomb	100	24
Layer 3 Clay	🟧	120	Mohr-Coulomb	60	28
Layer 4 Clay	🟦	120	Mohr-Coulomb	300	24
Layer 5 Clay	🟫	120	Mohr-Coulomb	200	19
Layer 6 Sand	🟥	115	Mohr-Coulomb	0	38
Layer 7 Sand	🟪	115	Mohr-Coulomb	0	37
Layer 8 Clay	🟩	125	Mohr-Coulomb	200	27

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project	Cedar Bayou Deepening & Widening Project		
Analysis Description	Sheet Pile Bulkhead - Long Term Conditions - Global Stability - Dock		
Drawn By T. O'Connor	*Scale* 1:555	*Client*	Trans-Global Solutions, Inc.
Date			Figure 6

DRAFT



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1 Clay (Fill)	🟨	120	Mohr-Coulomb	1000	0
Layer 2 Clay	🟩	127	Mohr-Coulomb	1000	0
Layer 3 Clay	🟧	120	Mohr-Coulomb	600	0
Layer 4 Clay	🟪	120	Mohr-Coulomb	2200	0
Layer 5 Clay	🟫	120	Mohr-Coulomb	2700	0
Layer 6 Sand	🟥	115	Mohr-Coulomb	0	38

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project Cedar Bayou Deepening & Widening Project

Analysis Description Sheet Pile Bulkhead - Short Term Conditions - Global Stability - RORO

Drawn By T. O'Connor

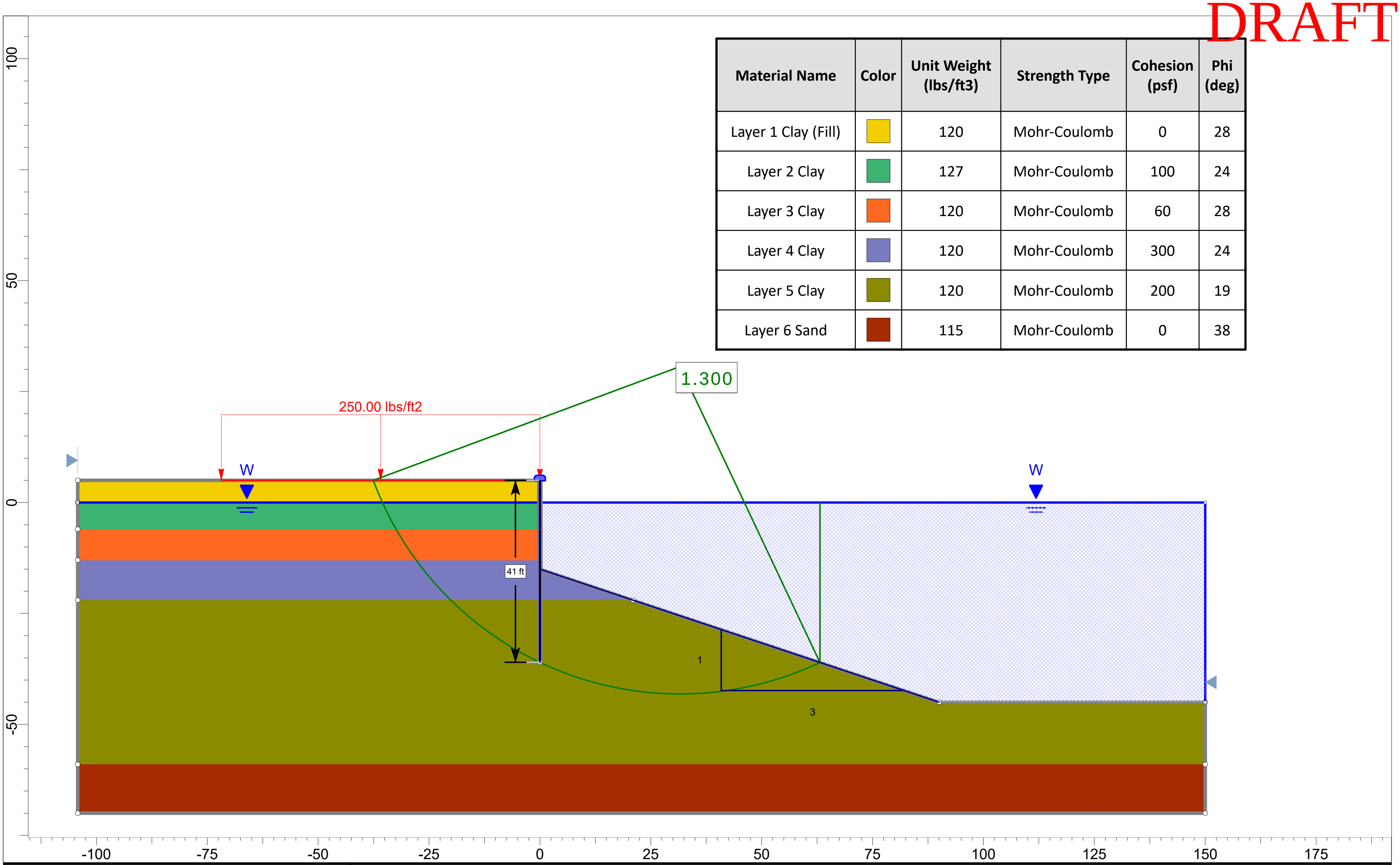
Scale 1:447

Client Trans-Global Solutions, Inc.

Date

Figure 7

DRAFT



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Layer 1 Clay (Fill)	🟨	120	Mohr-Coulomb	0	28
Layer 2 Clay	🟩	127	Mohr-Coulomb	100	24
Layer 3 Clay	🟧	120	Mohr-Coulomb	60	28
Layer 4 Clay	🟪	120	Mohr-Coulomb	300	24
Layer 5 Clay	🟫	120	Mohr-Coulomb	200	19
Layer 6 Sand	🟥	115	Mohr-Coulomb	0	38

Tolunay-Wong Engineers, Inc.

SLIDEINTERPRET 8.028

Project Cedar Bayou Deepening & Widening Project

Analysis Description Sheet Pile Bulkhead - Long Term Conditions - Global Stability - RORO

Drawn By T. O'Connor

Scale 1:358

Client Trans-Global Solutions, Inc.

Date

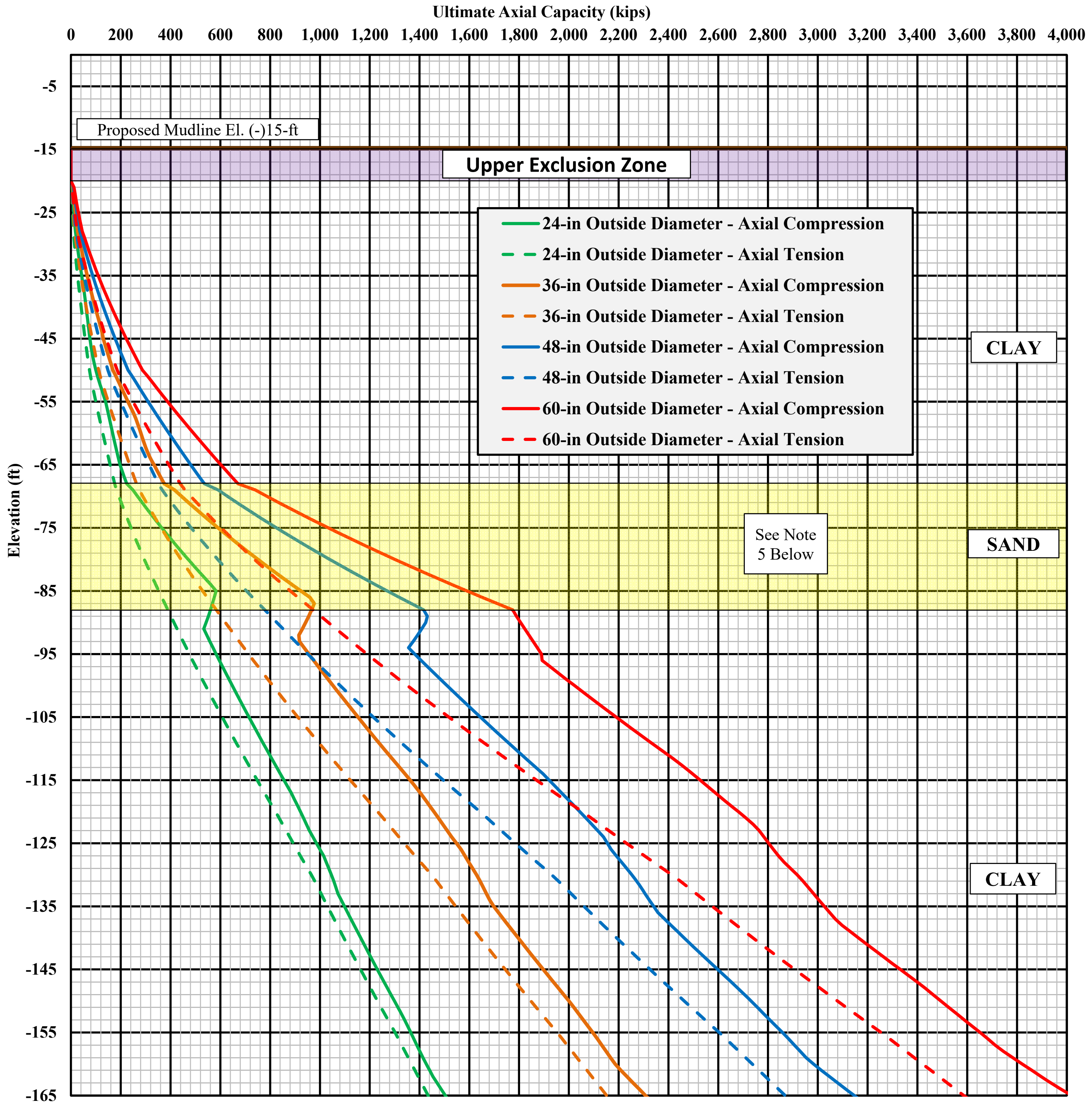
Figure 8

APPENDIX I

ULTIMATE AXIAL PILE CAPACITY CURVES

MUDLINE ELEVATION EL. (-) 15-FT

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)15-ft

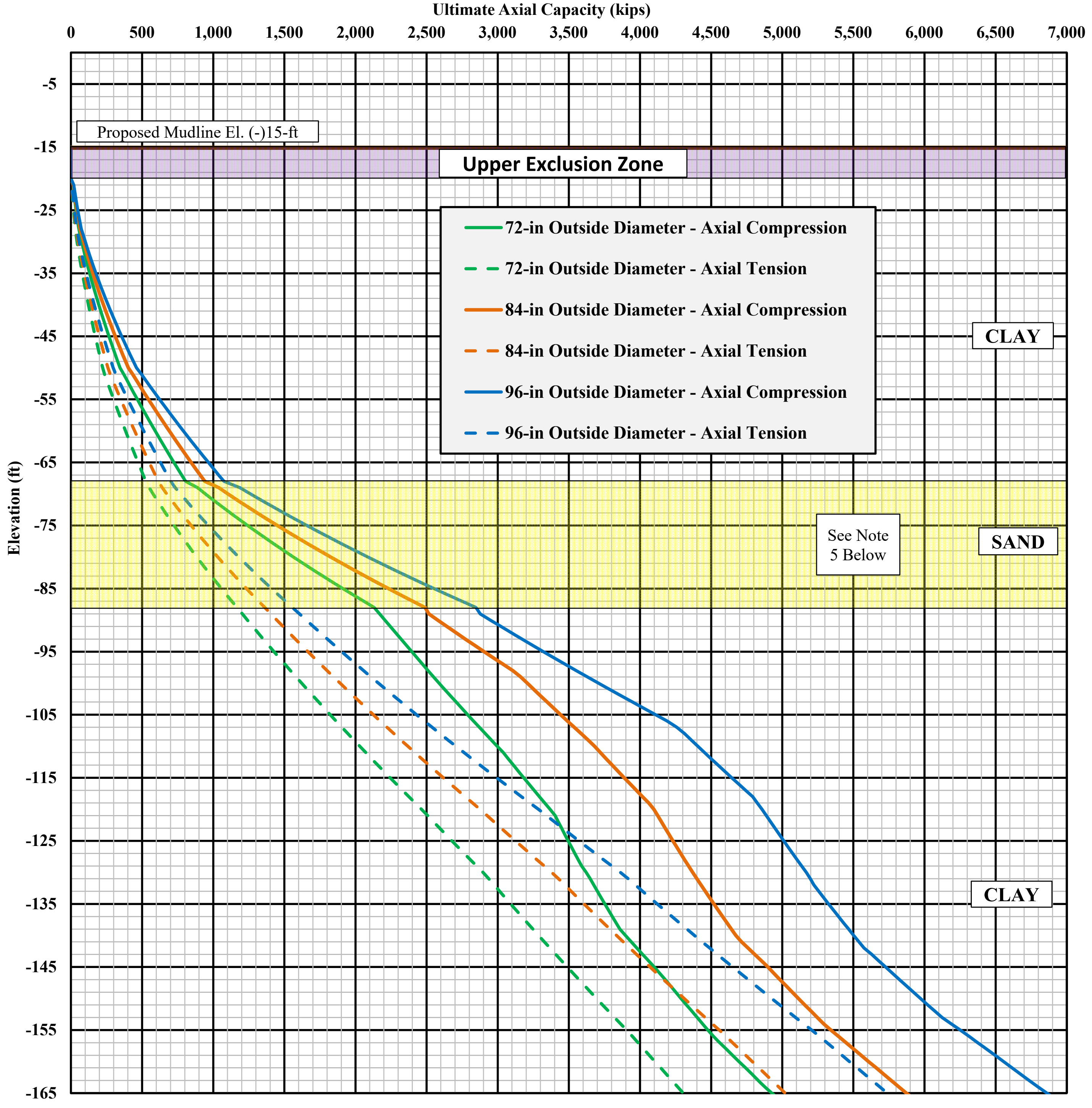


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 3/8-in for 24-in pipe piles and 1/2-in for all other pipe pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Steel Open-Ended Pipe Piles** **Marine - El. (-)15-ft**	**Appendix:** I **Figure:** 1

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)15-ft



NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 1/2-in for all pipe pile diameters shown.

Project

Cedar Bayou Deepening & Widening Project
Chambers County, Texas

Tolunay-Wong
Engineers, Inc.

Project Number: 21.23.029
Report Number: 120938

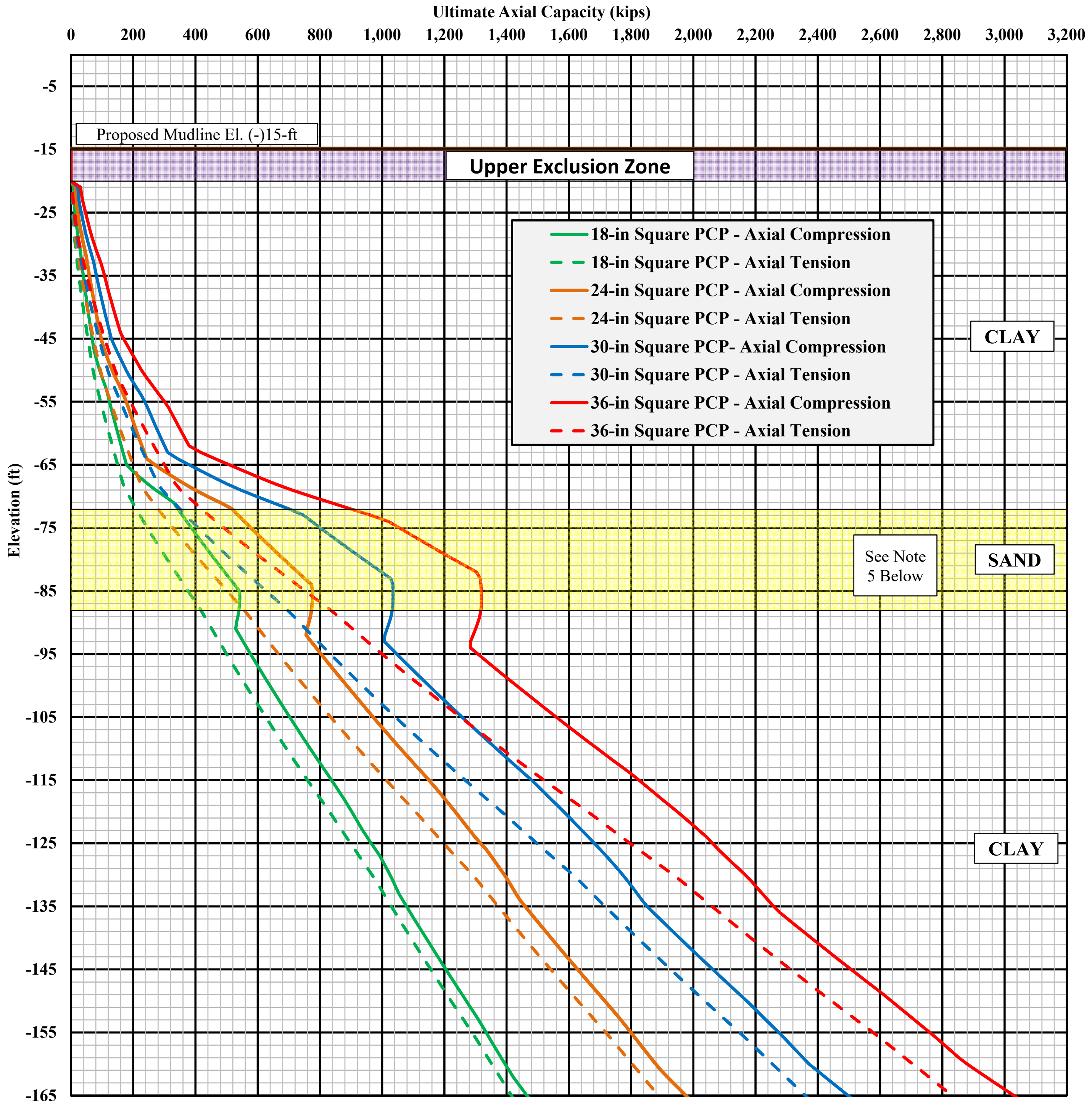
Client

Lanier & Associates Consulting Engineers, Inc.
Beaumont, Texas

Ultimate Axial Capacity vs. Elevation
Steel Open-Ended Pipe Piles
Marine - El. (-)15-ft

Appendix: I
Figure: 2

ULTIMATE AXIAL CAPACITY VERSUS DEPTH
SQUARE PRECAST CONCRETE PILES - MARINE - El. (-)15-ft



NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile width.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project
Cedar Bayou Deepening & Widening Project
Chambers County, Texas

Tolunay-Wong Engineers, Inc.

Project Number: 21.23.029
Report Number: 120938

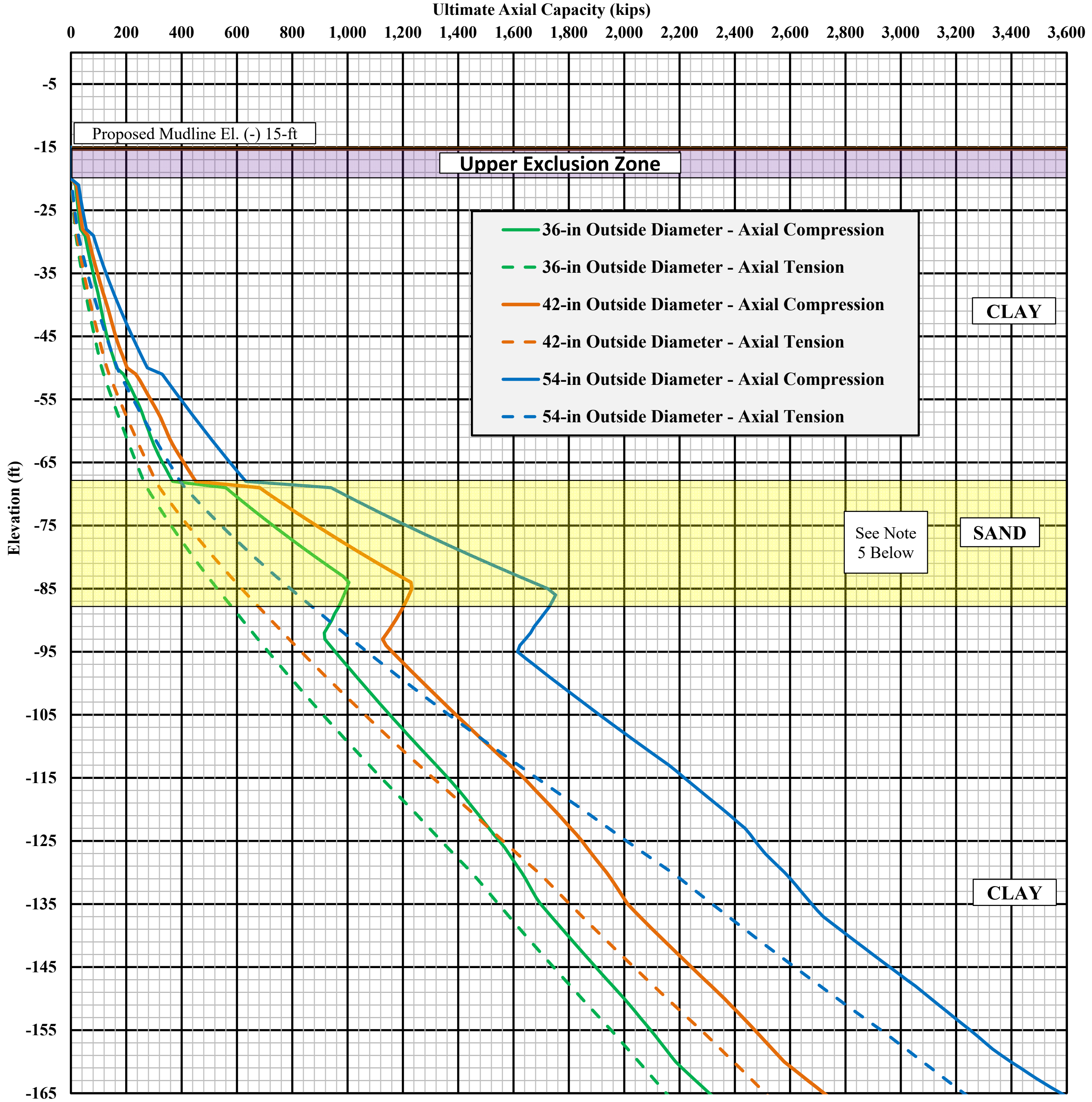
Client
Lanier & Associates Consulting Engineers, Inc.
Beaumont, Texas

Ultimate Axial Capacity vs. Elevation
Square Precast Concrete Piles
Marine - El. (-)15-ft

Appendix: I
Figure: 3

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
CYLINDRICAL SPUN CAST CONCRETE PILES - MARINE - El. (-) 15-ft

DRAFT



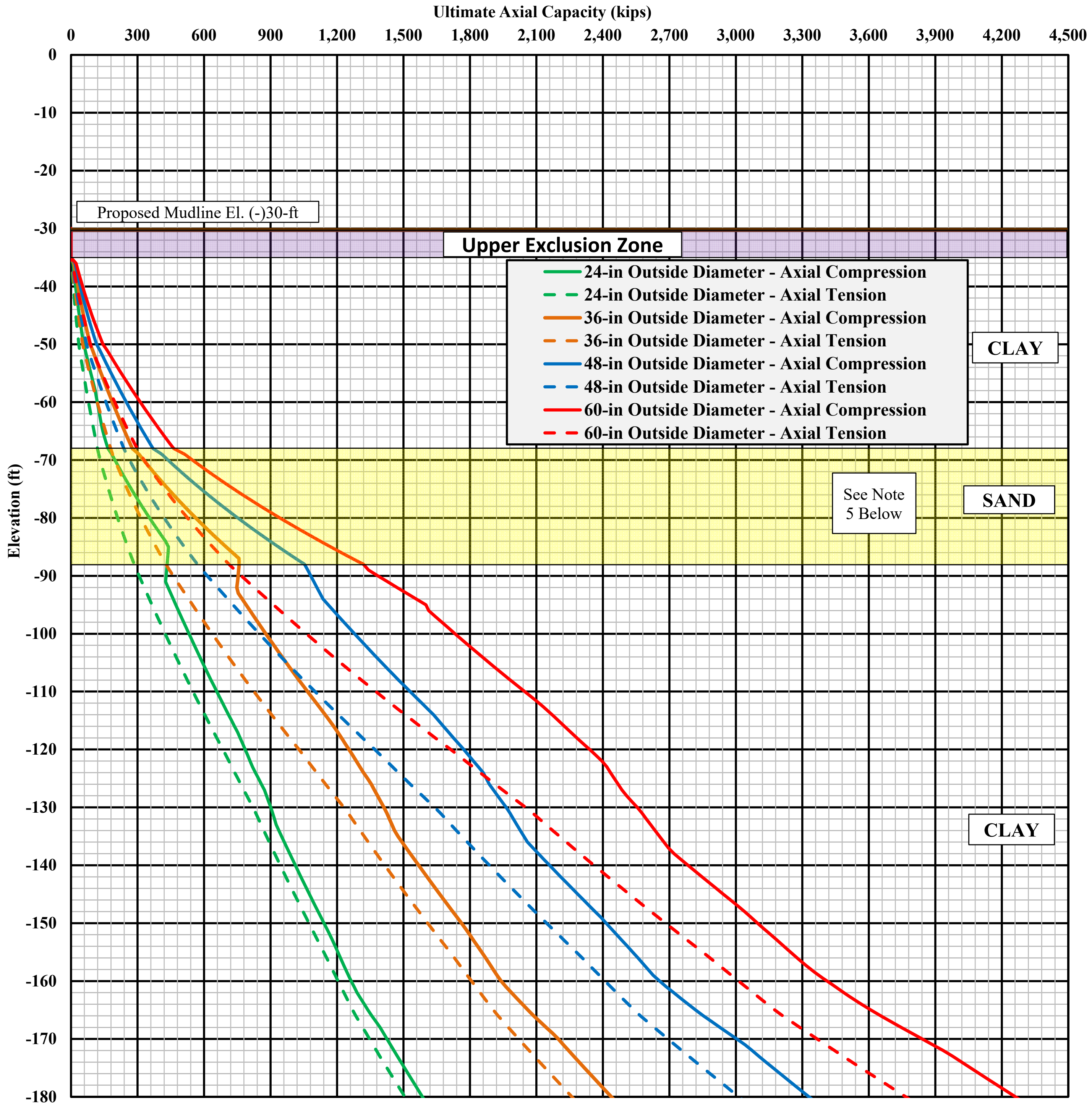
NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pile wall thickness of 6-in for all pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Cylindrical Spun Cast Concrete Piles** **Marine - El. (-)15-ft**	**Appendix:** I **Figure:** 4

MUDLINE ELEVATION EL. (-) 30-FT

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)30-ft

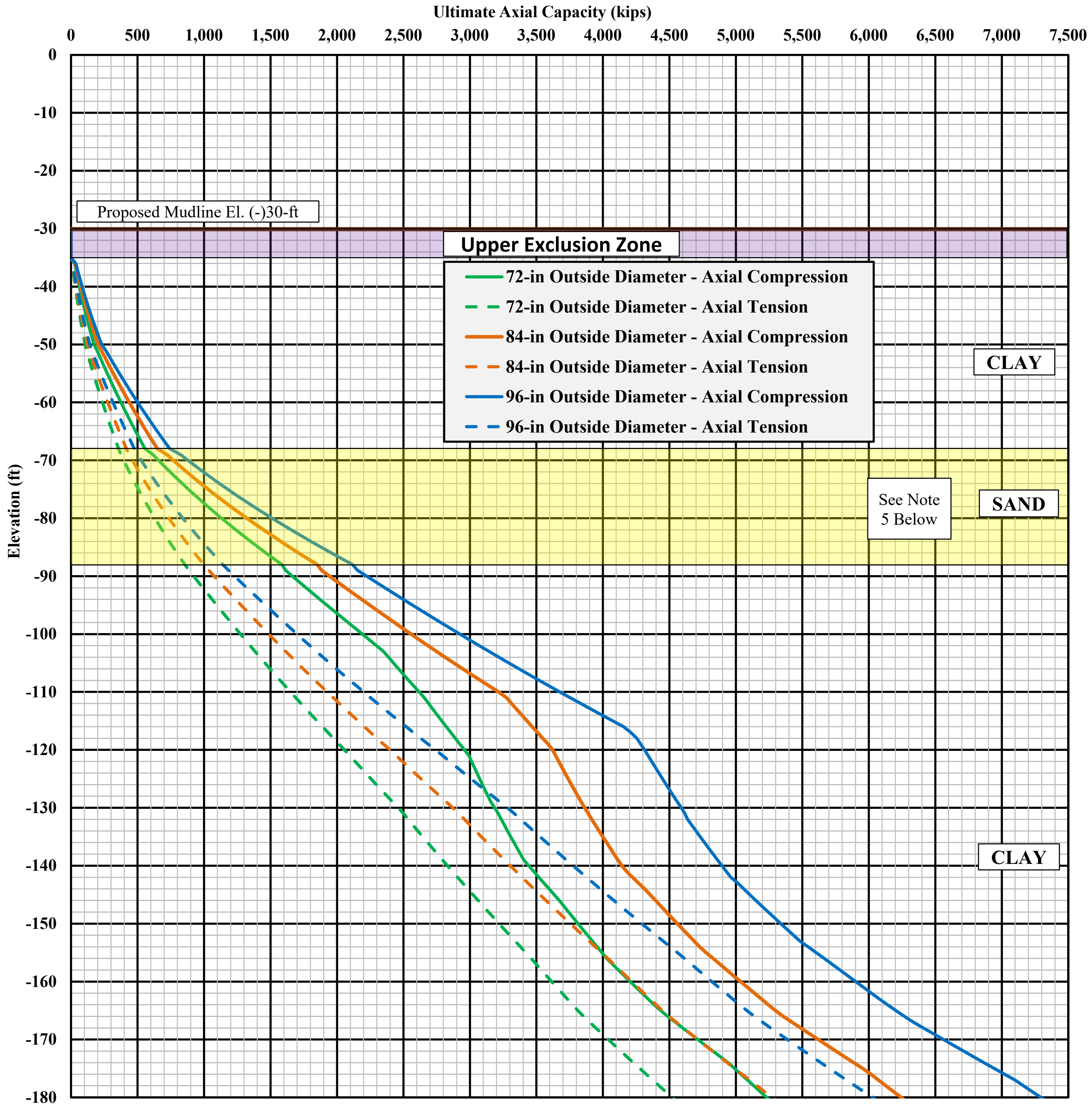


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 3/8-in for 24-in pipe piles and 1/2-in for all other pipe pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Steel Open-Ended Pipe Piles** **Marine - El. (-)30-ft**	**Appendix:** I **Figure:** 5

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)30-ft

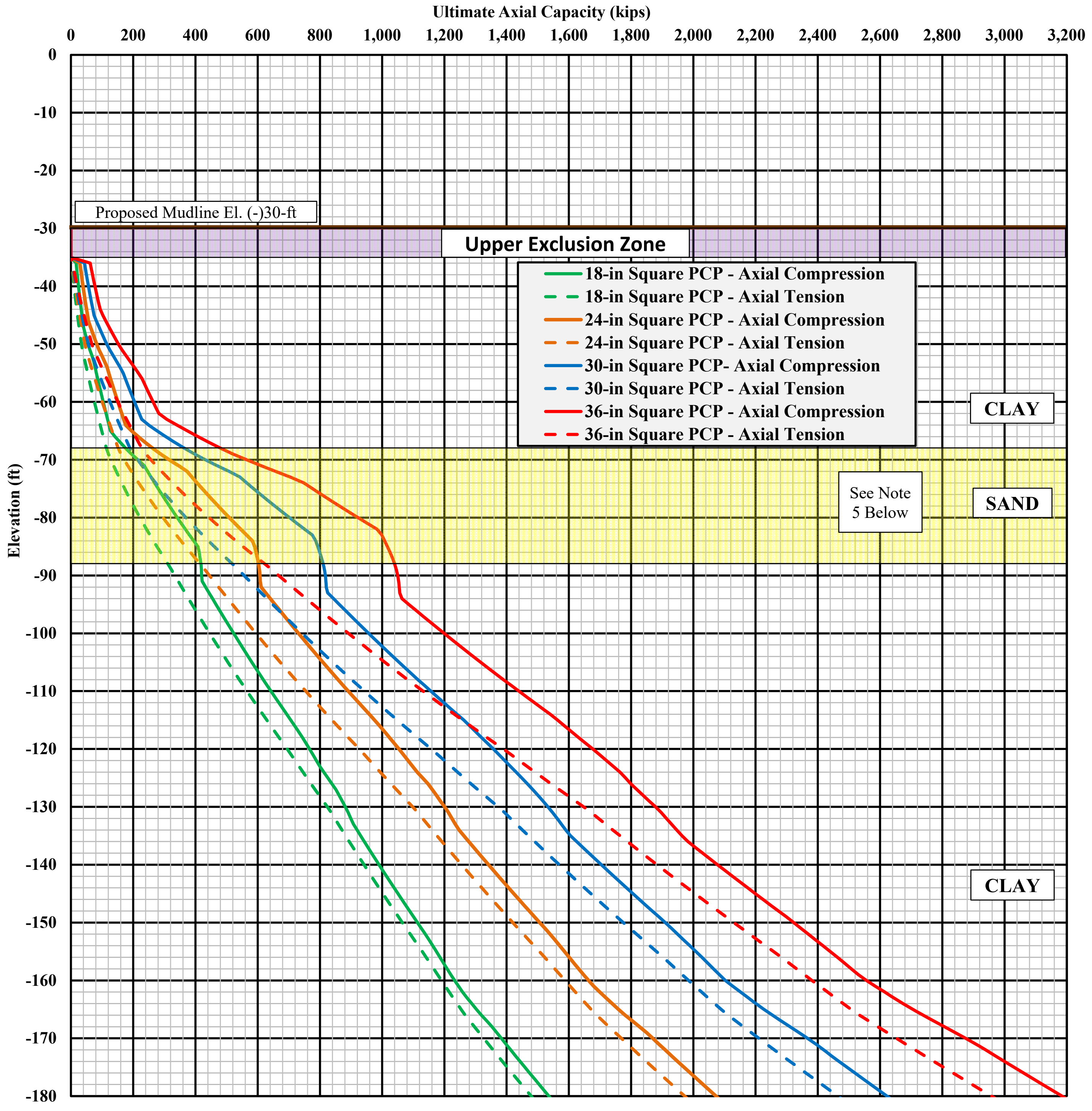


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 1/2-in for all pipe pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Steel Open-Ended Pipe Piles** **Marine - El. (-)30-ft**	**Appendix:** I **Figure:** 6

ULTIMATE AXIAL CAPACITY VERSUS DEPTH
SQUARE PRECAST CONCRETE PILES - MARINE - El. (-)30-ft

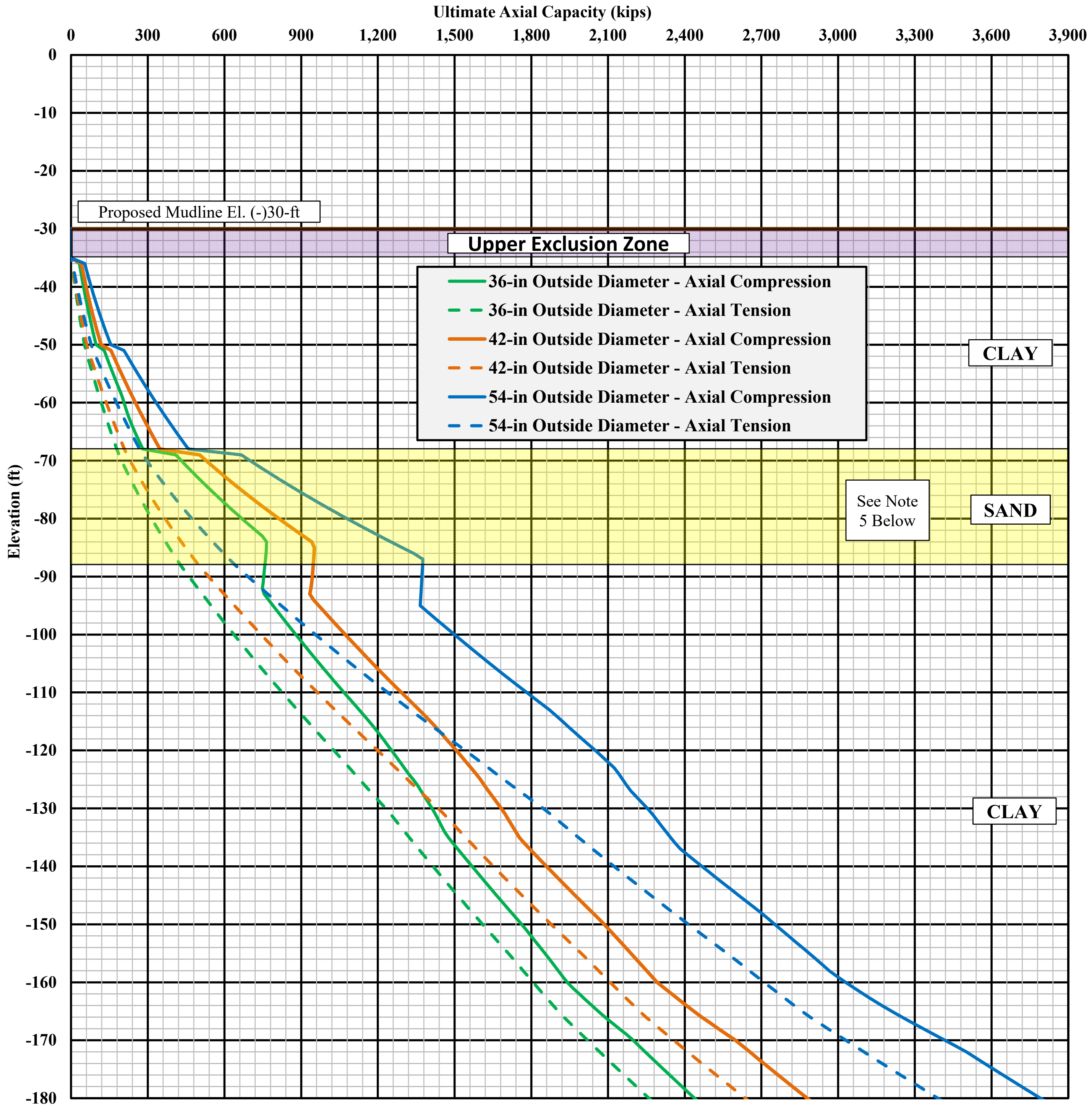


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile width.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Square Precast Concrete Piles** **Marine - El. (-)30-ft**	**Appendix:** I **Figure:** 7

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
CYLINDRICAL SPUN CAST CONCRETE PILES - MARINE - El. (-)30-ft



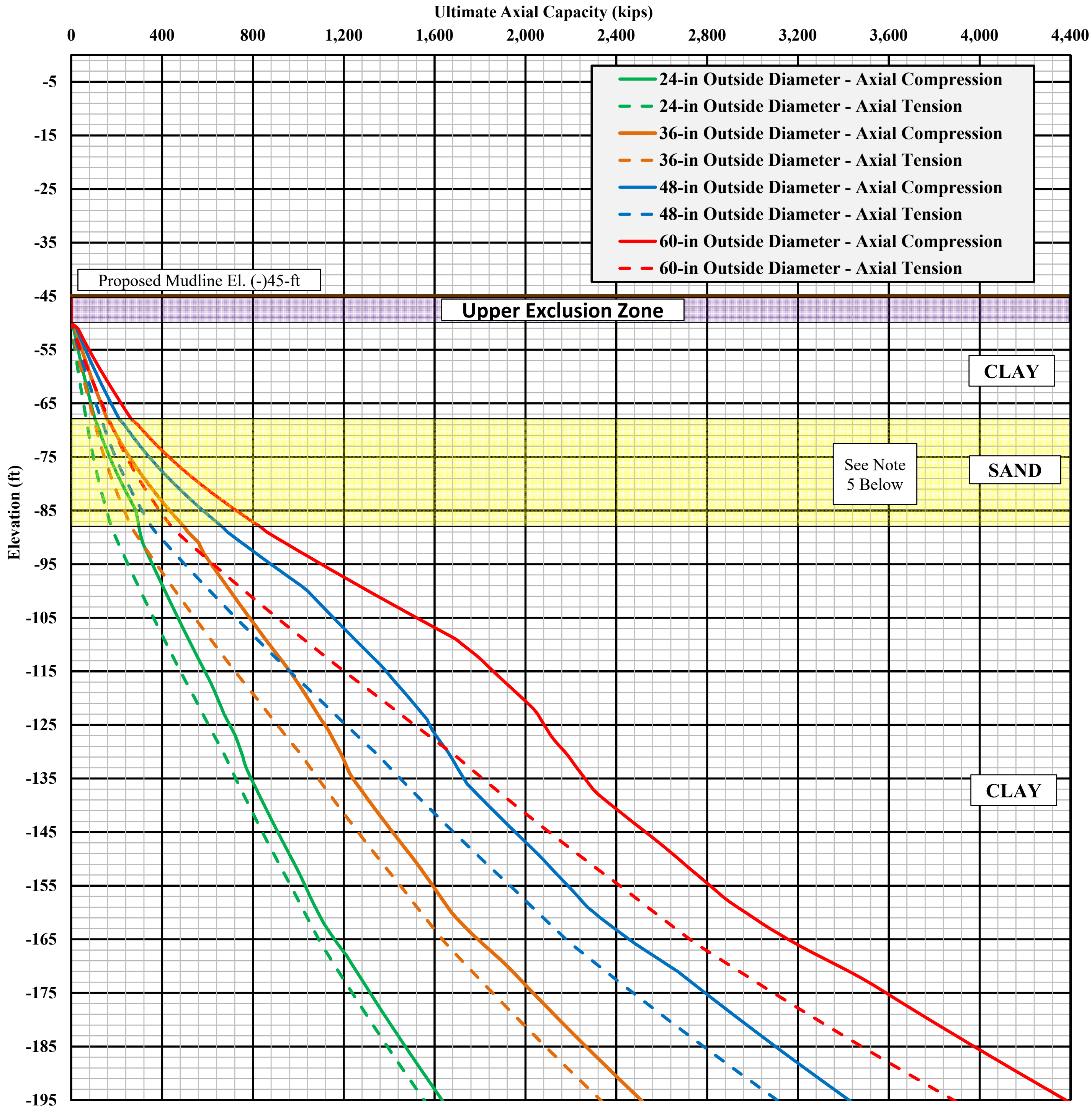
NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pile wall thickness of 6-in for all pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Cylindrical Spun Cast Concrete Piles** **Marine - El. (-)30-ft**	**Appendix:** I **Figure:** 8

MUDLINE ELEVATION EL. (-) 45-FT

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)45-ft



NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 3/8-in for 24-in pipe piles and 1/2-in for all other pipe pile diameters shown.

Project
Cedar Bayou Deepening & Widening Project
Chambers County, Texas

Tolunay-Wong
Engineers, Inc.

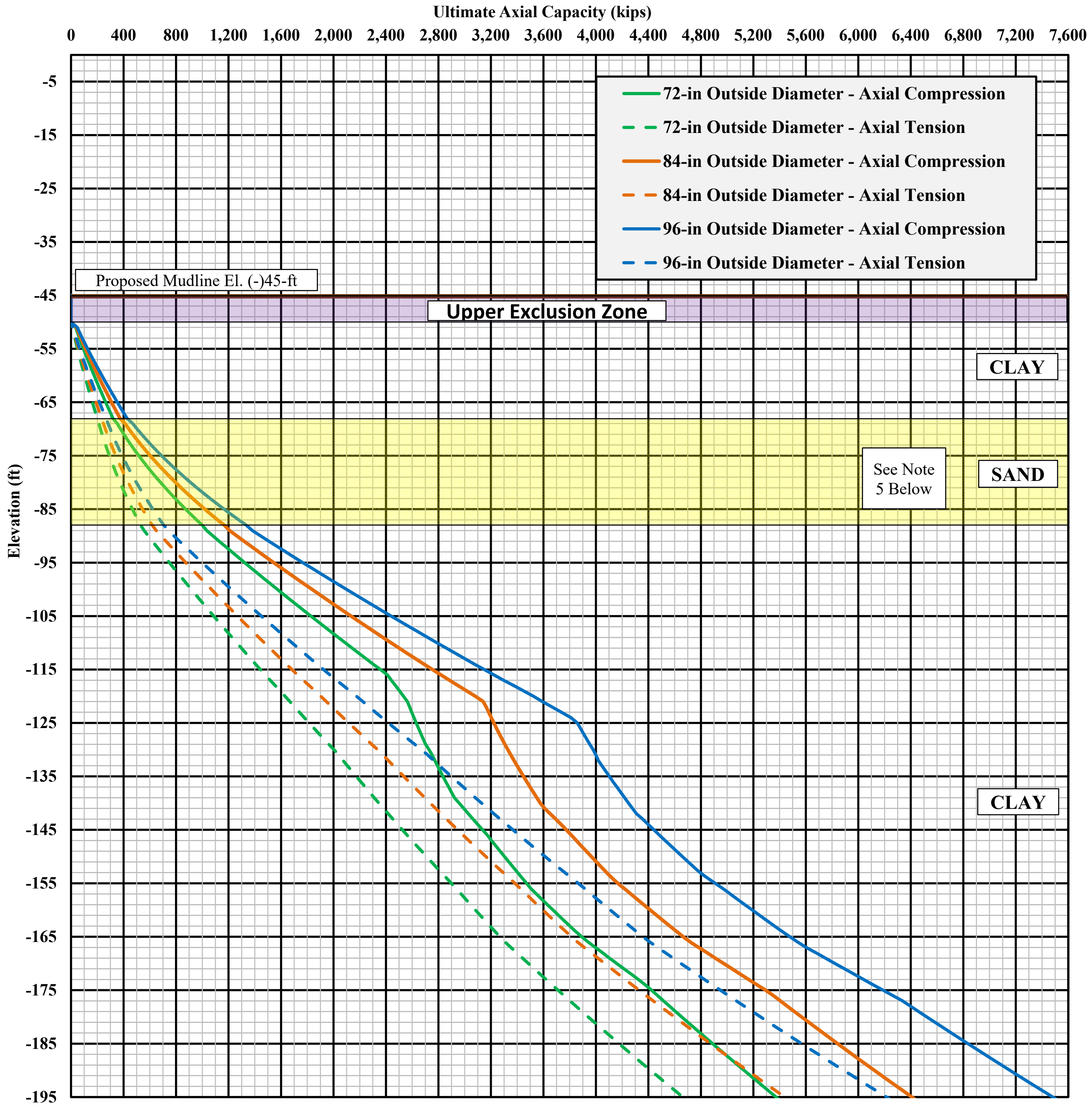
Project Number: 21.23.029
Report Number: 120938

Client
Lanier & Associates Consulting Engineers, Inc.
Beaumont, Texas

Ultimate Axial Capacity vs. Elevation
Steel Open-Ended Pipe Piles
Marine - El. (-)45-ft

Appendix: I
Figure: 9

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - MARINE - El. (-)45-ft



NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 1/2-in for all pipe pile diameters shown.

Project
Cedar Bayou Deepening & Widening Project
Chambers County, Texas

Tolunay-Wong Engineers, Inc.

Project Number: 21.23.029
Report Number: 120938

Client
Lanier & Associates Consulting Engineers, Inc.
Beaumont, Texas

Ultimate Axial Capacity vs. Elevation
Steel Open-Ended Pipe Piles
Marine - El. (-)45-ft

Appendix: I
Figure: 10

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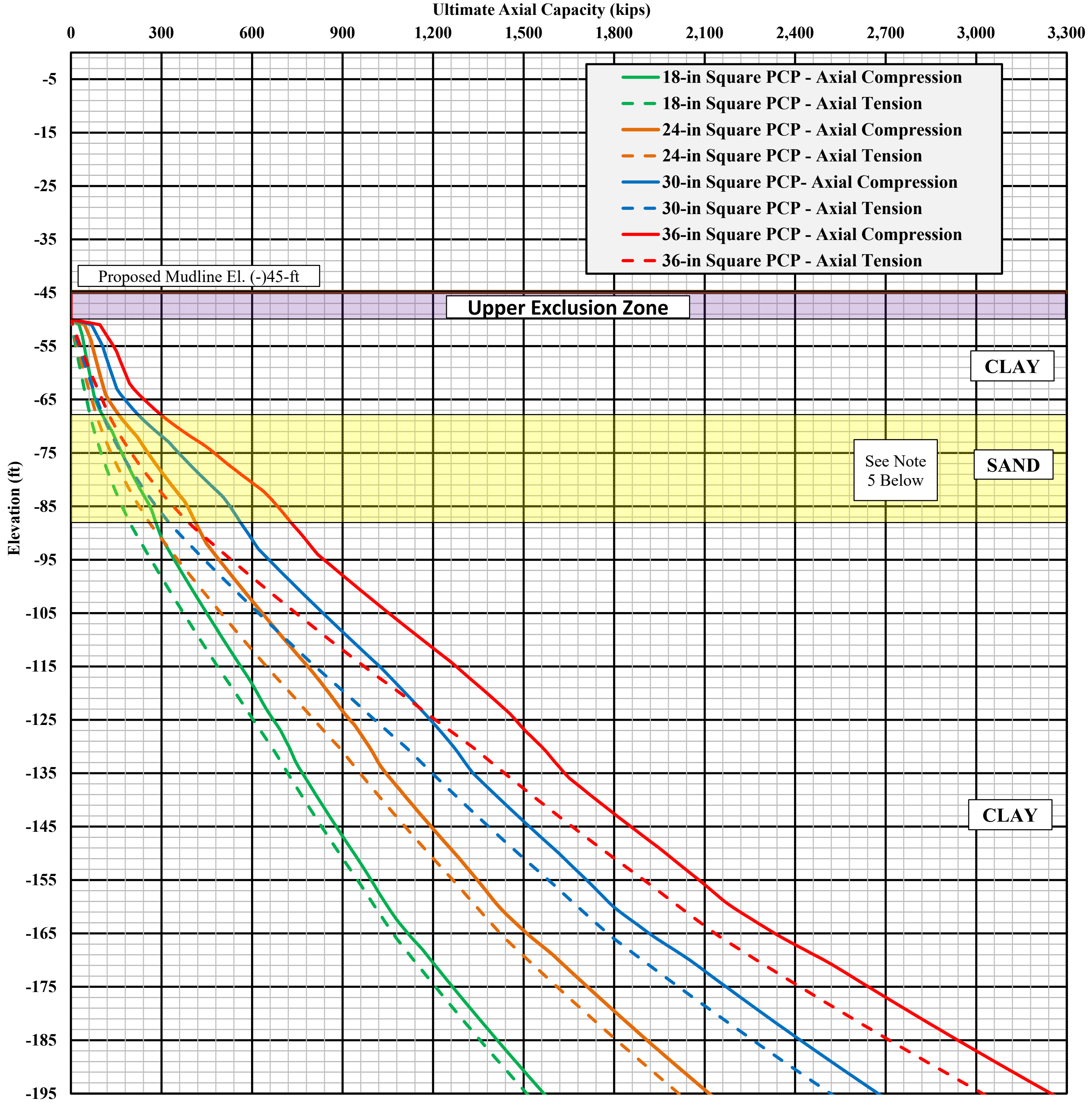
ULTIMATE AXIAL CAPACITY VERSUS DEPTH
SQUARE PRECAST CONCRETE PILES - MARINE - El. (-)45-ft



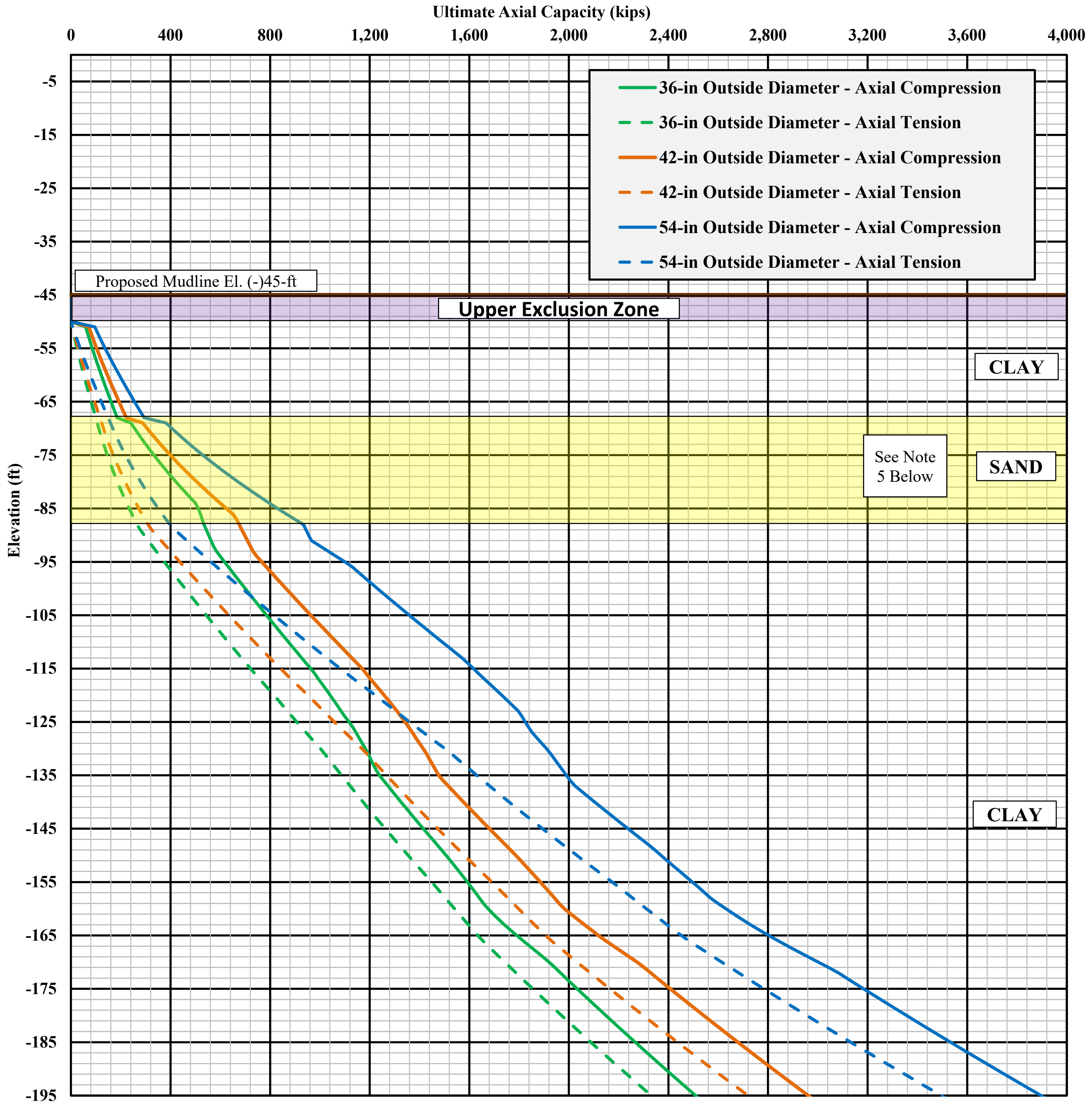
NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile width.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation Square Precast Concrete Piles Marine - El. (-)45-ft**	**Appendix:** I **Figure:** 11

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
CYLINDRICAL SPUN CAST CONCRETE PILES - MARINE - El. (-)45-ft

DRAFT



NOTES:

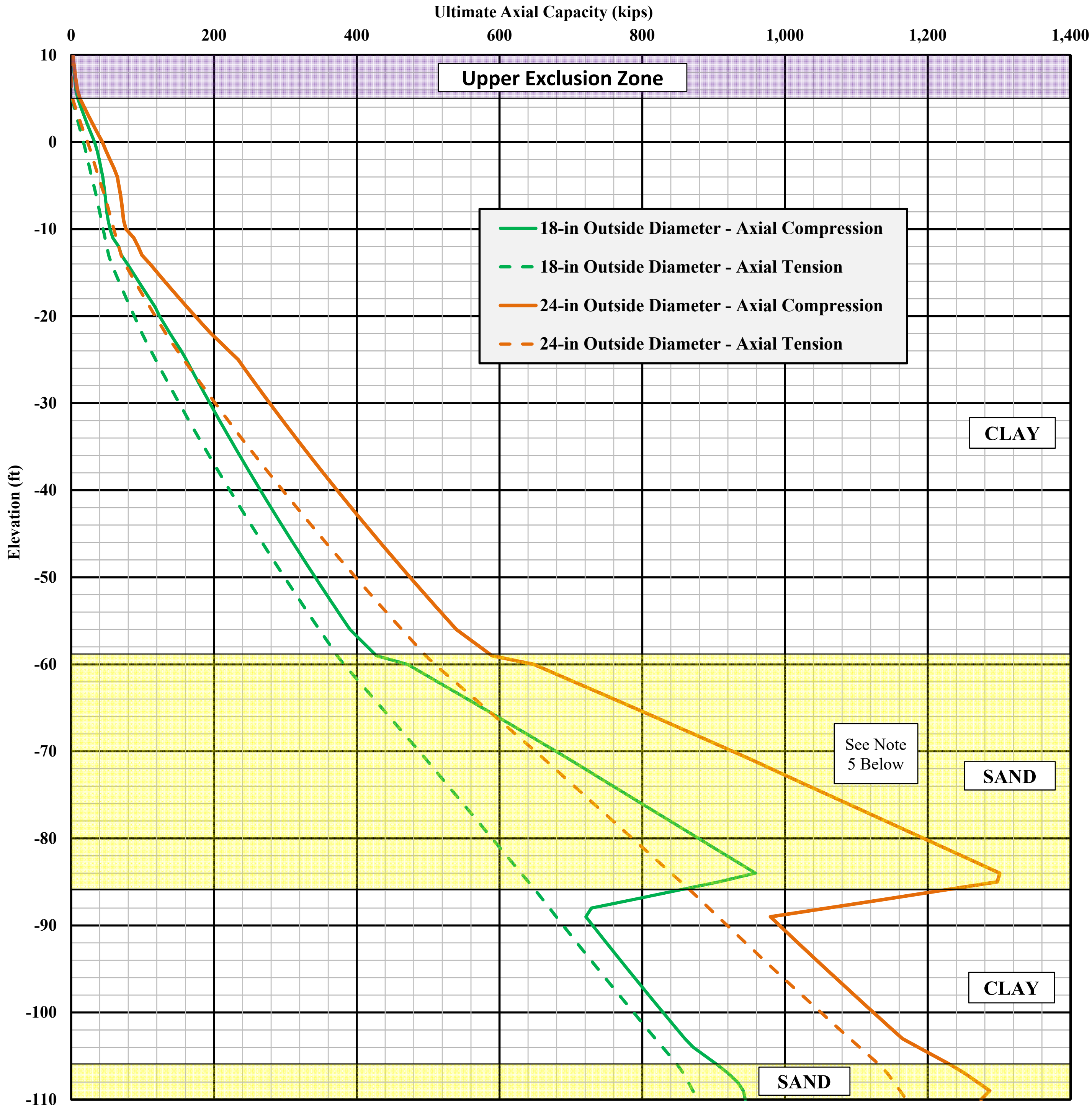
1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pile wall thickness of 6-in for all pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Cylindrical Spun Cast Concrete Piles** **Marine - El. (-)45-ft**	**Appendix:** I **Figure:** 12

LANDSIDE

DRAFT

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL OPEN-ENDED PIPE PILES - LANDSIDE - El. (+)10-FT

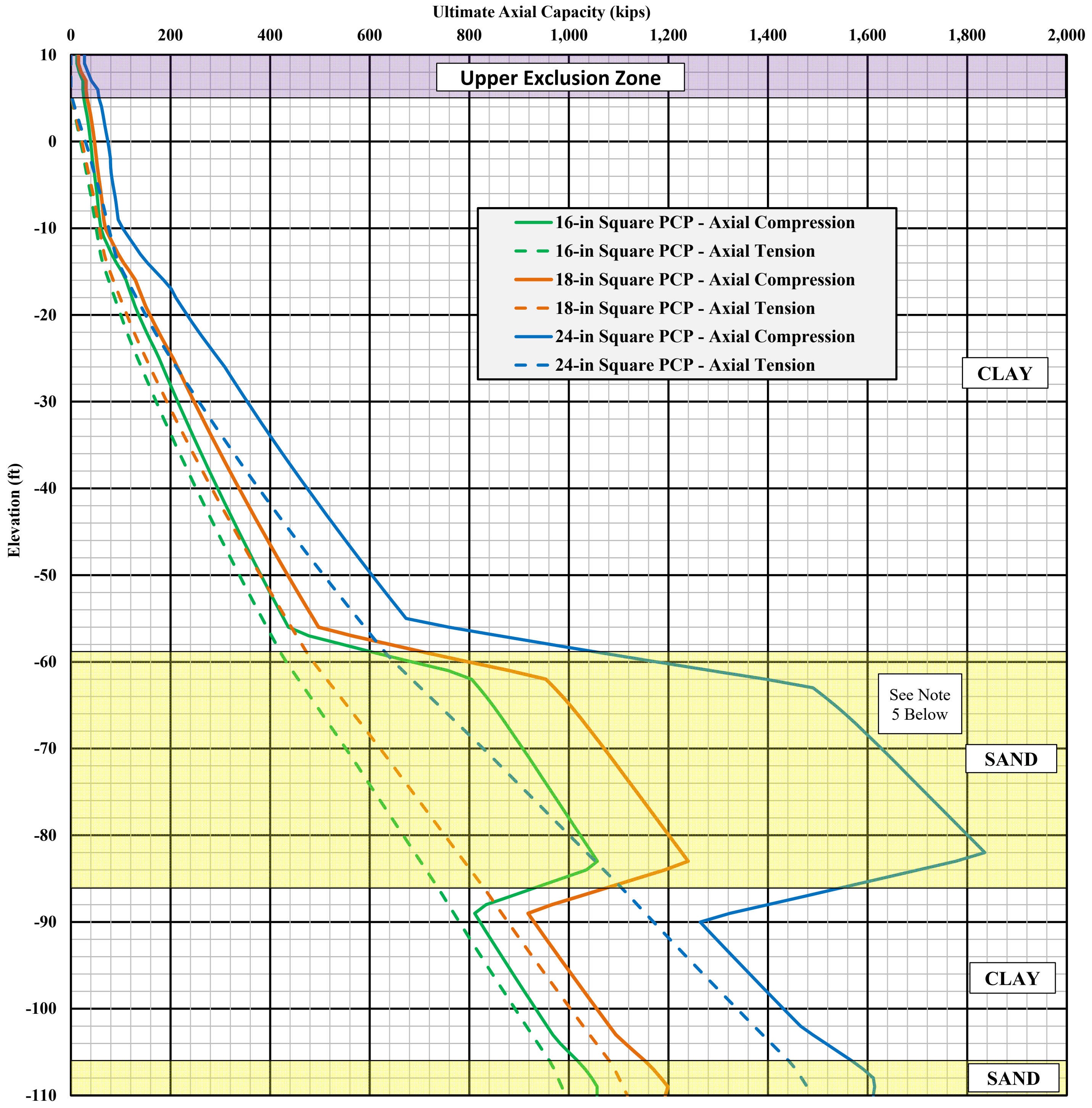


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.
6) Assumed pipe pile wall thickness of 3/8-in for all pipe pile diameters shown.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Steel Open-Ended Pipe Piles** **Landside - El. (+)10-ft**	**Appendix:** I **Figure:** 13

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
SQUARE PRECAST CONCRETE PILES - LANDSIDE - El. (+)10-FT



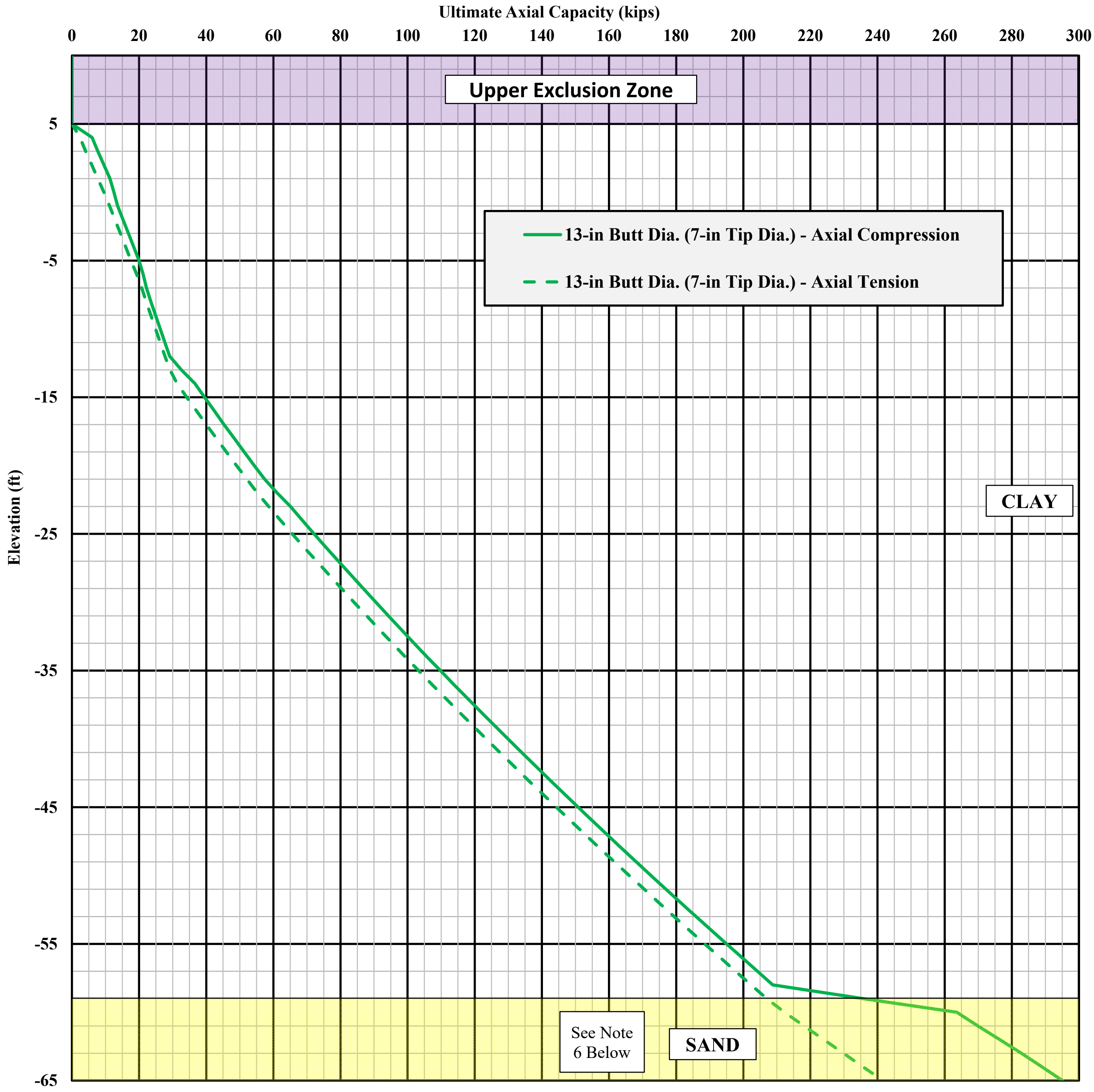
NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Square Precast Concrete Piles** **Landside - El. (+)10-ft**	**Appendix:** I **Figure:** 14

DRAFT

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
CLASS B TIMBER PILES - LANDSIDE - El. (+)10-FT

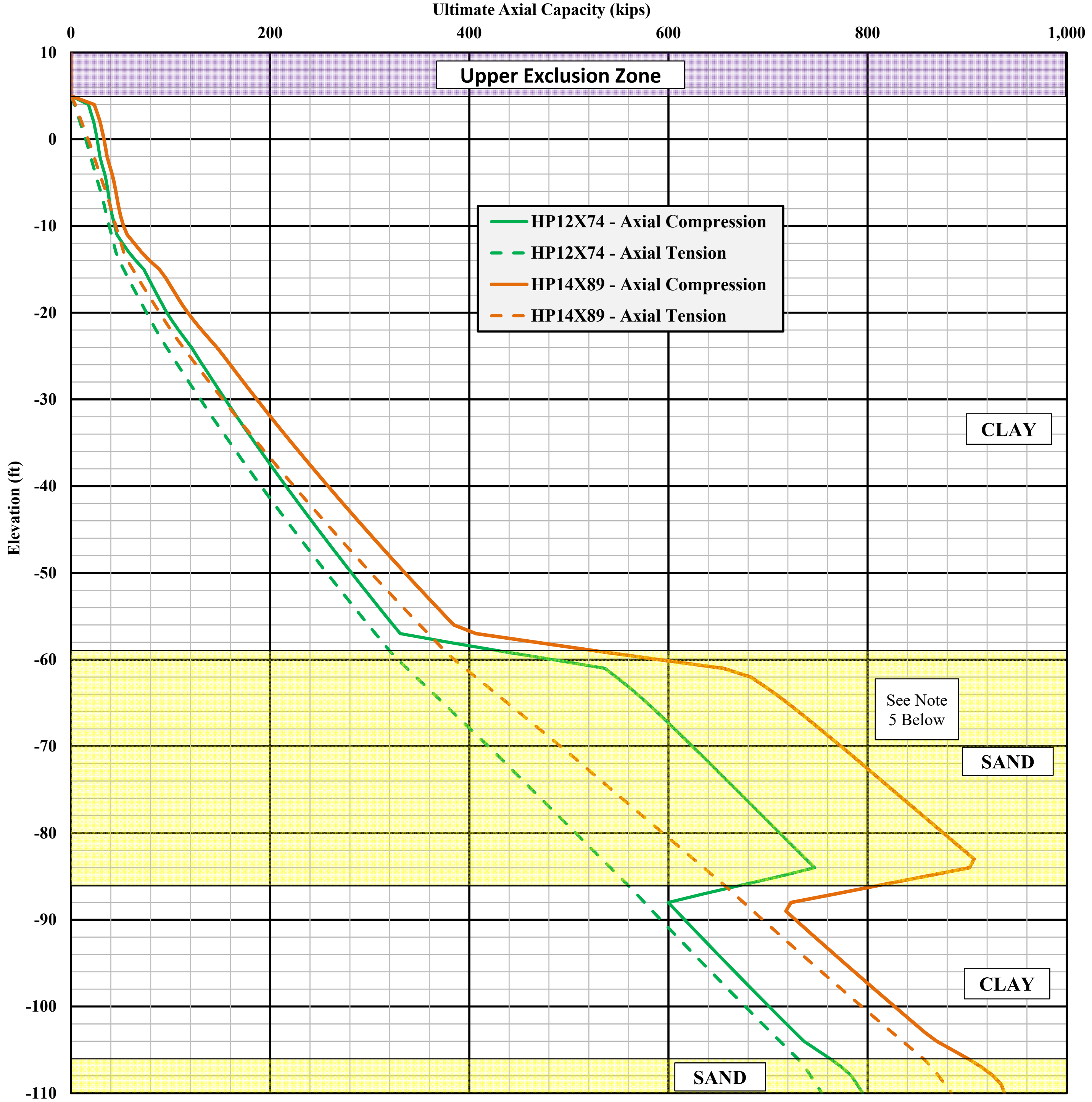


NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the butt diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Embedment depths for Class B timber pile sizes can be determined by commonly available Southern Pine Timber Pile lengths as presented in the Timber Piling Council (TPC) Timber Pile Design Manual (updated 2015).
6) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Class B Timber Piles** **Landside - El. (+)10-ft**	**Appendix:** I **Figure:** 15

ULTIMATE AXIAL CAPACITY VERSUS ELEVATION
STEEL H-PILES - LANDSIDE - El. (+)10-FT



NOTES:

1) Center-to-center spacing of the pile should be at least three (3) times the pile diameter.
2) A factor of safety of 2.5 is recommended for allowable compression loads.
3) A factor of safety of 3.0 is recommended for allowable tension loads (does not include the weight of pile).
4) Reduced factors of safety can be considered if a pile load testing program (static, dynamic or combination) is performed.
5) Increased driving resistance and/or refusal could be encountered in the sand strata shown. See Section 11.3.

Project Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	**Project Number:** 21.23.029 **Report Number:** 120938
Client Lanier & Associates Consulting Engineers, Inc. Beaumont, Texas	**Ultimate Axial Capacity vs. Elevation** **Steel H-Piles** **Landside - El. (+)10-ft**	**Appendix:** I **Figure:** 16

APPENDIX J

PROCEDURE FOR COMPUTING CAPACITY OF BATTERED PILES

PROCEDURE FOR COMPUTING APPROXIMATE AXIAL AND HORIZONTAL CAPACITY OF BATTERED PILES

NOMENCLATURE:

P_c = Compression Capacity of Vertical Pile

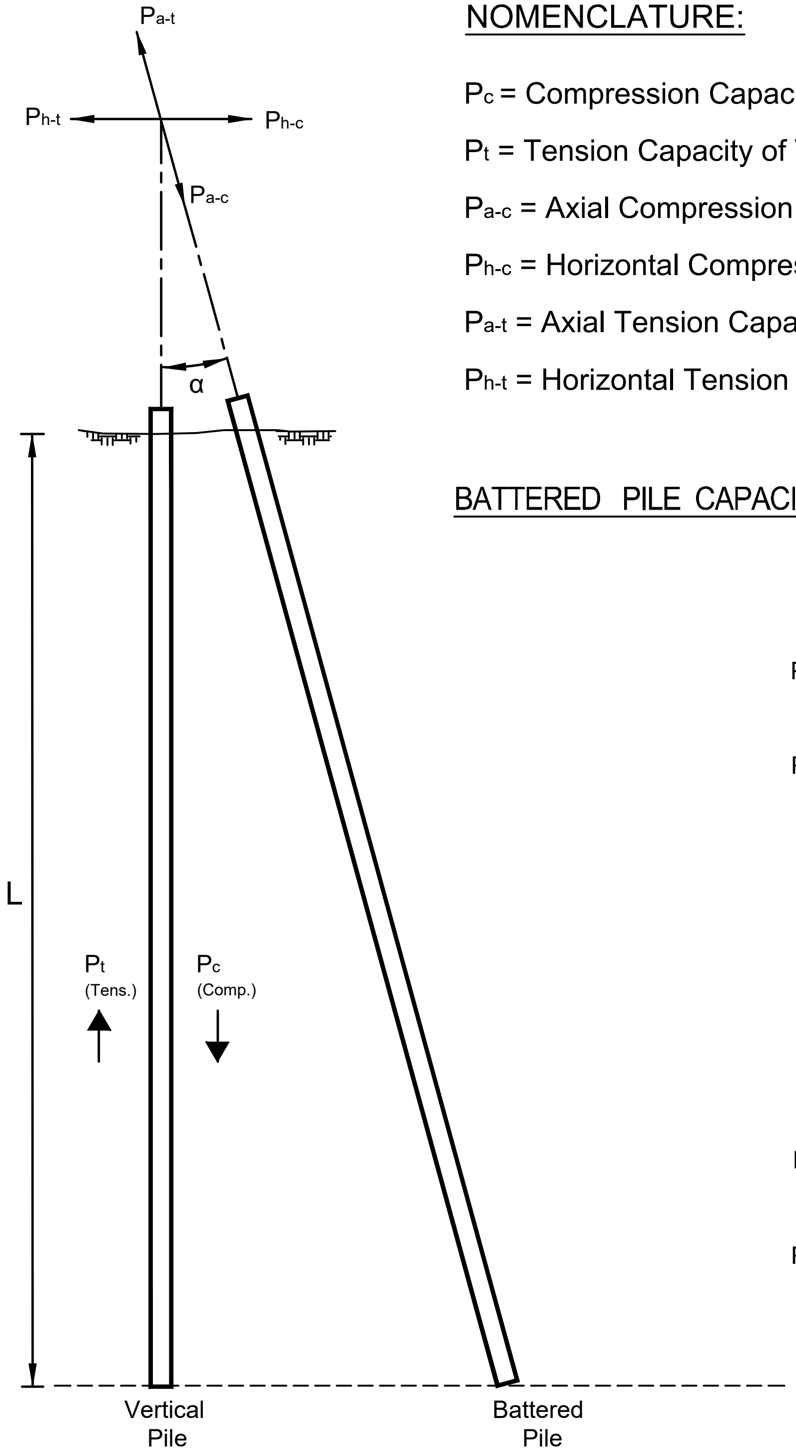
P_t = Tension Capacity of Vertical Pile

P_{a-c} = Axial Compression Capacity of Battered Pile

P_{h-c} = Horizontal Compression Capacity of Battered Pile

P_{a-t} = Axial Tension Capacity of Battered Pile

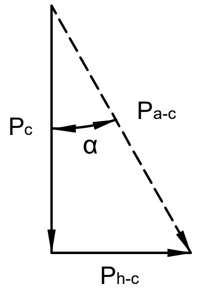
P_{h-t} = Horizontal Tension Capacity of Battered Pile



BATTERED PILE CAPACITY CALCULATIONS:

$$P_{a-c} = \frac{P_c}{\cos(\alpha)}$$

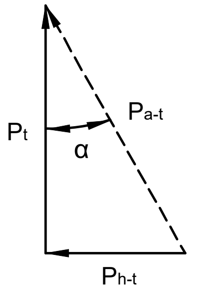
$$P_{h-c} = P_c\ [\ \tan(\alpha)\ ]$$



Vertical Diagram
For Compression

$$P_{a-t} = \frac{P_t}{\cos(\alpha)}$$

$$P_{h-t} = P_t\ [\ \tan(\alpha)\ ]$$



Vertical Diagram
For Tension

Notes:

(1) If Ultimate compression and tension capacity of vertical piles (Pc and Pt) are used to compute battered pile capacities, appropriate factors of safety should be applied.

(2) Vertical and angled piles must be penetrated to equal elevations for this method to be applicable.

(3) Bending stiffness of piles and soil bearing capacity against battered piles is not included in this method.

APPENDIX K

SOIL DESIGN PARAMETERS FOR
LATERAL PILE RESPONSE ANALYSIS

Table: Lateral Analysis Soil Design Parameters - Marine Dock Structures							
LPILE Soil Type	Elevation (ft)		Effective Unit Weight, γ' (pcf)	Cohesion, c (psf)	Friction Angle (°)	Static Lateral Modulus, *k* (pci)	Strain Factor, ε_{50}
	Top	Bottom					
Soft Clay (Matlock)	-10	-28	48	350	--	30	0.020
Soft Clay (Matlock)	-28	-50	58	700	--	100	0.010
Stiff Clay without Free Water	-50	-68	48	1,400	--	500	0.007
Sand (Reese)	-68	-88	53	--	38	125	--
Stiff Clay without Free Water	-88	-120	66	3,800	--	1,000	0.005
Stiff Clay without Free Water	-120	-130	76	3,300	--	1,000	0.005
Stiff Clay without Free Water	-130	-155	73	2,400	--	1,000	0.005
Stiff Clay without Free Water	-155	-165	72	2,100	--	1,000	0.005
Stiff Clay without Free Water	-165	-208	72	2,800	--	1,000	0.005

Cedar Bayou Deepening & Widening Project Chambers County, Texas	**Tolunay-Wong Engineers, Inc.**	Project Number: 21.23.029 Report Number: 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Lateral Analysis Soil Design Parameters Marine Dock Structures**	Appendix K Figure 1

Table: Lateral Analysis Soil Design Parameters - Landside Dock Structures

LPILE Soil Type	Elevation (ft)		Effective Unit Weight, γ' (pcf)	Cohesion, c (psf)	Friction Angle (°)	Static Lateral Modulus, *k* (pci)	Strain Factor, ε_{50}
	Top	Bottom					
Stiff Clay without Free Water	10	0	128	1,500	--	500	0.007
Stiff Clay without Free Water	0	-6	65	1,000	--	100	0.010
Soft Clay (Matlock)	-6	-13	58	600	--	100	0.010
Stiff Clay without Free Water	-13	-22	58	2,200	--	1,000	0.005
Stiff Clay without Free Water	-22	-59	58	2,700	--	1,000	0.005
Sand (Reese)	-59	-70	53	--	38	125	--
Sand (Reese)	-70	-86	53	--	37	125	--
Stiff Clay without Free Water	-86	-106	63	2,600	--	1,000	0.005
Sand (Reese)	-106	-112	53	--	25	125	--

Cedar Bayou Deepening & Widening Project Chambers County, Texas	Tolunay-Wong Engineers, Inc.	Project Number: 21.23.029 Report Number: 120938
Trans-Global Solutions, Inc. Beaumont, Texas	**Lateral Analysis Soil Design Parameters Landside Dock Structures**	Appendix K Figure 2

APPENDIX L

DISORBO CONSULTING, LLC PRE-DREDGE
ENVIRONMENTALFINDINGS REPORT (REDACTED)

DRAFT

Findings Report
Pre-Dredge Environmental Testing
Cedar Bayou Channel Deepening/Widening
Cedar Port Industrial Park

TGS

Trans-Global Solutions Inc.
Chambers County, Texas

Tolunay-Wong
Engineers, Inc.

LANIER & ASSOCIATES
CONSULTING ENGINEERS, INC.

May 2021

DiSorbo
Environmental Consulting Firm

DiSorbo Consulting, LLC
9737 Great Hills Trail, Suite 340
Austin, TX 78759
713.955.1230 (p) | 713.955.1201 (f)
disorboconsult.com

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Executive Summary

This report presents the findings of pre-dredge environmental testing in support of the Trans-Global Solutions Inc. (TGS) deepening/widening of the Cedar Bayou connecting channel between the Cedar Port Industrial Park and the Houston Ship Channel (see Figure 1 Site Location Map). The Cedar Port Industrial Park is located east of Houston, Texas in Chambers County. Dredge spoils will likely be relocated to a private placement area (PA).

Consistent with new cut dredging protocols, full-depth core sediment samples (4) were collected by a barge-mounted drilling rig within the new cut dredge footprint to represent the material to be removed. In addition, three (3) of these stations were selected for the collection of elutriate make-up materials for laboratory preparation and testing. Two (2) stations were selected for the collection of channel water column testing. Including the quality control blanks, there were a total of eleven (11) media samples tested for environmental parameters. Geotechnical testing was performed by others.

Lab analyses were completed by A&B Labs located in east Houston, Texas, which is a NELAP certified lab. The field collection activities were completed in March 2021 by DiSorbo Consulting, LLC in accordance with the sampling and analysis plan prepared specifically for this work.

In addition to physical characteristics (grain size distribution, water and solids content), sediment samples were comprehensively analyzed for volatile & semi-volatile organics, metals, ammonia, pH, total organic carbon, TPH, polychlorinated biphenyls (PCBs), and pesticides. Representative water and elutriate samples were analyzed for a similar comprehensive list. In addition, the sediment samples were subjected to waste characterization and classification testing as a contingency.

The results were compared to normal criteria utilized by the USACE Environmental Section and Real Estate Division for federal Placement Area and Beneficial Use Area disposition of dredged material.

Overall, based on this limited testing, the dredged sediment placement on land with subsequent dewatering by settling and the resulting discharge of return water will not have a negative or degrading impact on current environmental conditions at the placement area selected or Cedar Bayou (location of return water discharge) based on the normal criteria. The following paragraphs recount these findings in greater detail by the specific environmental media tested.

Sediment in the Dredge Footprint

Per USACE guidance, the primary reference criteria for sediment included (1) NOAA-Effects Range Low (ER-L) for Marine, (2) USEPA Region 6 published values, and (3) Texas Risk Reduction Program (TRRP) values for human health and ecological exposure. In addition, the sediment samples collected were subjected to volatiles analysis and RCI testing (reactivity, corrosivity, and ignitability), parameters which are over and above the normal USACE testing regime. Dioxins were not tested.

For the source area or dredging footprint (four full-depth core samples), all of the volatile organic analytes (VOAs), semi-volatile organic compounds (SVOCs), PCB, TPH, TOC, ammonia, pH, and pesticides results were either non-detect or within the primary screening and acceptable levels.

For metals, there were detections for virtually all of the analytes except silver which was non-detect. Among the detections, all were quantified at concentrations within the screening benchmark (NOAA ER-L), with the exception of the metal arsenic in the sediment sample from Station MB-9. However, this singular exceedance was lower than the secondary screening benchmark (NOAA ER-L) utilized by the USACE for evaluating sediment quality, and the elutriate sample taken from this same station had concentrations of all constituents, including arsenic, that were acceptable from a water quality perspective. Thus, the trace metals observed in the sediment do not disqualify the material from being transferred to and disposed of in a private land PA, beneficial use area, or in a federal PA on approval. In addition, the sediment material all met non-hazardous criteria under RCRA.

Site Water and Elutriate Findings

Benchmark criteria for the water matrix and elutriate included the (1) Texas Surface Water Quality Standards [TSWQS, 30 TAC §307, marine acute assuming water effect ratio of 1], (2) USEPA National Water Quality Criteria (WQC, marine acute), (3) NOAA Screening Quick Reference Tables (SQRT, marine acute water), and (4) USEPA Region 6 Watershed Standards (marine acute).

For the site water and elutriate samples, all of the metals, VOAs, SVOCs, TPH, pesticide, ammonia, and PCB concentrations were either non-detect or at levels well within applicable criteria.

Summary

Overall, the results of the source area testing indicate that the dredged material placement and subsequent settling with resulting discharge of return water will not have a negative or degrading impact on current environmental conditions at either the placement area selected or the receiving water (location of return water discharge) based on USACE and USEPA recognized or Texas adopted criteria. Placement could conceivably include private PA, beneficial use zone, or federal PAs.

Section 1
Project Information

1.1 Project Description and Background

The Cedar Port Industrial Park intends to perform new cut (hydraulic and/or mechanical) dredging of the Cedar Bayou waterway located between the Industrial Park and the Houston Ship Channel (see Figure 1 Site Location Map). The purpose of the current sampling effort was to test sediment and other media from within the dredge footprint to ensure suitability of the material for disposal. The placement area will discharge return water after settling into the same or a nearby waterway.

This report of findings documents the field sampling protocols (e.g., sample collection and field-testing methods and quality assurance/quality control measures) and laboratory methods of physical and chemical analyses for sediment, water, and elutriate media to determine dredge disposal site suitability. This report also presents an evaluation of the laboratory findings.

1.2 Sampling Objectives

The objectives of the bulk sediment and water sampling event included:

- Collection of sediment data from the footprint of the area to be dredged to determine if the source material contains concentrations of chemicals of concern that would indicate significant historical contamination; for this objective, the findings are primarily compared to recognized environmental benchmarks furnished by the USACE;
- Collection of site water to determine pre-existing concentrations of constituents in the water column and for comparison to applicable water quality standards; and
- Collection of elutriate phase testing data from the area to be dredged to evaluate return water compliance with water quality standards applicable to the receiving water.

1.3 Overview and Approach

The environmental sampling team from DiSorbo mobilized to the area in March 2021, alongside a separate crew (Tolunay-Wong Engineers, TWE) that concurrently collected geotechnical core samples from the same platform and rig. Decontamination protocols between these separately purposed core collections were strictly followed. In accordance with the environmental sampling plan specific to this project, four sampling stations were preselected in the marine environment, as shown on Figure 2 and in Table 2-1. The locations were selected in order to be representative of the footprint for new cut dredging to deepen and widen the existing barge channel (which is off the main federal Houston Ship Channel [HSC]) in order to accommodate ship traffic in the future (-45' MLLW is the reported nominal depth of the deepening and widening plan). The existing stretch of barge channel connects the mouth of Cedar Bayou with the HSC. The HSC is part of the San Jacinto River system that meets various bays before entering the Gulf of Mexico near Galveston, Texas.

Water, elutriate makeup, and sediment samples were collected from the dredge footprint areas for the purpose of laboratory testing to characterize the material to be dredged. An equipment blank and a trip blank were included in the testing program for quality control purposes. The laboratory utilized for the testing was A&B Labs of Houston, which is recognized by the National Environmental Laboratory Accreditation Program (NELAP). Their specialty subcontracted labs are also accredited.

In addition to physical characteristics (grain size distribution, water and solids content), sediment samples were comprehensively analyzed for volatile and semi-volatile organics, metals, ammonia, pH, total organic carbon, PCBs, TPH, and pesticides. Water samples were analyzed for a similar comprehensive list. Elutriate samples generated in the laboratory from field collected media were also analyzed. Dioxins were not included. Additionally, the sediments were subjected to waste characterization testing under Resource Conservation and Recovery Act (RCRA) and Texas waste classification testing protocols, as a contingency in the event that a suitable land-based placement area is determined to not available for use for this dredging project.

Results were then compared with media appropriate screening criteria recommended by the regulatory agencies. In some cases, in which screening benchmarks were not furnished in the USACE/USEPA guidance and yet analyte detections were made, DiSorbo sought and referenced other available media specific criteria from the literature or regulations for comparison.

1.4 Report Organization

This report is organized into five primary sections after the Executive Summary, including: Introduction, Methods, Results/Discussion, Conclusions, and References. Details of the plans and results are supplied in accompanying tables and figures. Supporting and additional information, such as the plan for sampling, comparison criteria, logs, and lab reports are given in appendices.

Section 2
Methods of Collection and Analysis

2.1 Overview of Sampling Program

The primary purpose of the pre-dredge sampling project was to evaluate sediment from within the deepening and widening footprint proposed for the existing barge channel that connects the mouth of Cedar Bayou with the HSC south of the Interstate 10 crossing of the San Jacinto River. The existing barge channel to be deepened and widened is located within an industrialized portion of Chambers County, Texas, immediately east of Harris County.

Water, elutriate, and sediment samples were collected from the proposed dredge area for the purpose of laboratory testing to characterize the material to be dredged. The sampled material was laboratory analyzed to determine whether unacceptable adverse environmental impacts could result from dredging and the subsequent dredge material placement operations, including the discharge of return water to the channel.

All sample collection activities and chemical analyses were conducted in accordance with guidance generally provided by USACE-SWG for new cut and maintenance dredging and per existing standard procedures outlined in the following reference documents.

- USEPA and USACE (1991). Evaluation of Dredged Material Proposed for Ocean Disposal (the “Green Book”). Testing Manual, Section 8, Collection and Preservation of Samples. EPA 503/8-01/001.
- USEPA and USACE (1995). QA/QC Guidance for Sampling and Analysis for Sediment, Water and Tissues for Dredged Material Evaluations (Chemical Evaluations). EPA-823- B-95-001.
- USEPA and USACE (1998). Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. Inland Testing Manual (the “ITM”). Section 8, EPA-823-B-98-004.

Copies of the Sampling & Analysis Plan (SAP), Health & Safety Plan (HASP), Job Safety Analysis (JSA), and relevant screening criteria for this work are included in Appendix A of this report.

Prior to the sampling activity, the new empty containers for sediment, site water, and elutriate sample collection were segregated into station specific sampling sets. The containers were placed into ice chests with packing material and labeled with sample type (Site Water, Sediment, Elutriate Makeup, Trip and Equipment Blanks). All other required information, such as the date and time, was added at the time of actual sample collection.

2.2 Sample Sites, Equipment and Team

A total of eleven (11) media samples were collected and analyzed by the contract laboratory, including four (4) full-depth core sediment samples (Stations MB-1, MB-5, MB-7, and MB-9).

The count included two water quality (channel water) samples plus one equipment blank; and sufficient additional sediment and site water were collected so that the laboratory could prepare three (3) elutriate samples from Stations MB-1, MB-5, and MB-9 for aqueous phase testing, based upon the Standard Elutriate Test (SET). A trip blank (water container unopened in the field) was analyzed as well for a limited subset of tests (metals only, per usual protocol). The purpose of the elutriate phase testing is to imitate, first, the settling and clarification of the dredge spoil and, secondly, the return water discharge quality for comparison with TSWQS or other health-based standards and screening levels, with or without mixing zone calculations, as appropriate.

Table 2-1 in combination with Figure 2 provides sample station information including the sample names, precise locations, and sample counts. The sampling location plan (Figure 2) illustrates the approximate footprint of the area to be dredged adjacent to the federal channel. The sample stations were spatially located to be representative of the entire footprint. Zones of minimal or incidental deposition or pre-existing deeper draft spots were avoided as usual. However, because the project involves extending the navigational channel depth from barge draft (-11’ MLLW nominal) to ship draft (-45’ to -50’ MLLW nominal), this factor was of practically no concern, that is, there was plenty of “new cut” column at all of the stations considered.

The coordination of efforts to complete the pre-dredge planning, mobilization, field sampling, laboratory analyses, tabulation of results, evaluation and interpretation of results, quality control review, reporting, technical review, and ultimate regulatory approval, if necessary, included/includes the following persons and organizations:

Title	Point of Contact (POC)	Contact Information
Project Manager	Bob Davis	DiSorbo Consulting – Austin Office 9737 Great Hills Trail, Suite 340 Austin, Texas 78759 O. 512-693-4184 | C. 512-970-9639 bdavis@disorboconsult.com
Task Manager / Safety (and Field Crew for Environ Sampling)	Allen Rienstra - lead James Reis - assist	DiSorbo Consulting – Austin Office 9737 Great Hills Trail, Suite 340 Austin, Texas 78759 C. 512-693-4185 | C. 409-504-6933 arienstra@disorboconsult.com jreis@disorboconsult.com
Additional Field Assist	Trey O'Connor, E.I.T. TWE Drilling Rig & Crew Spud-barge tug and support boat by Peninsula Marine	Tolunay-Wong Engineers 2455 W Cardinal Dr, Beaumont, TX 77705 409-840-4214
Subcontractor for Drilling	DiSorbo was a subcontractor to TWE for this project	Tolunay Wong Engineers 2455 W. Cardinal Drive Beaumont, TX 77705 O. 409-840-4214
Laboratory Contact	Clint Larison and Shantall Carpenter	A&B Environmental Services, Inc. 10100 East Freeway, Suite 100 Houston, Texas 77029 O. 713-453-6060 ext. 136 clarison@ablabs.com scarpenter@ablabs.com
Engineering Partner of Host Facility	Chris Guy, P.E. Lanier & Associates Consulting Engineers, Inc.	Lanier & Associates Beaumont Office 595 Orleans St, Suite 600 Beaumont, TX 77701 Ofc: (409) 212-1051 cguy@lanier-engineers.com
Host Facility and Project Owner	James Scott Cedar Port Industrial Park	James Scott Trans-Global Solutions, Inc. Office: 409-727-4801 Cell: 409-658-7959 jscott@tgsgroup.com

2.3 Sediment Sample Collection

Before the sampling event began, the new and clean sediment/soil, site water, and elutriate sample containers were segregated into station specific sampling sets. The sampling containers were labeled with the station identification number and all other required information except date and time, which was added just prior to collecting the sample. The containers were placed in ice chests designated with the station identification number and with packing material but no ice. Separate ice chests with ice to be used for sample preservation were transported to the collection station along with the station sample container ice chests. Sets of ice chests (containing the sampling containers and the ice) were placed on the water craft and transported to the designated sampling stations.

Sediment samples were collected from the four stations within the dredge footprint in order to spatially represent the entire area. Station locations were informed by an earlier depth survey conducted by Lanier & Associates. The actual locations of sampling were GPS-recorded for precision, and ended up being very close to the planned locations. Sediment samples were collected using a conventional rotary drilling rig positioned by truck on a spud barge for the marine stations. The maximum depth required is about -47' MLLW. The maximum length of cores was determined and continuously logged in several foot intervals, with an aliquot of material taken from each interval and the full core blended and composite sampled using a lined bucket for mixing.

Nitrile disposable gloves were worn before composite mixing and loading aliquots into the labeled and marked sample containers. New disposable gloves were used at each location. As the sample containers were filled, they were placed in Ziploc (or equivalent) bags, then placed into the assigned ice chest. The archive-intended sediment samples, if retained, were initially placed on ice and then transferred to a freezer once they reached their final destination. A small amount of headspace was allowed for the archived samples to prevent container breakage during freezing.

2.4 Water Sample Collection for Bulk Chemistry and Elutriate Testing

Two stations for water quality chemical analysis were identified (see Figure 2). Three standard elutriate test (SET) stations were identified as well. One equipment blank (deionized water pumped through clean tubing and/or over the sampling equipment) was also containerized for analysis. The trip blank was not opened during sampling operations.

Once the vessel was positioned and stabilized at each sampling station, a 12-volt submersible pump attached three feet from the bottom of a five feet long length of 3/8" rebar (vertical orientation) was lowered into the water. The rebar was fitted with a flat bottom to prevent it from penetrating into sediment, thus maintaining the pump intake within about three feet of the bottom. The weight of the assembly facilitated submersion and stabilization of the pump. The pump was attached to the rebar with tie wraps, and the rebar was suspended from its eyelet. The electrical and poly lines were attached to the cable from the pump to the surface. The sample tubing was flushed with at least ten times the tubing volume before samples were collected. The site water was field tested for pH, temperature, and conductivity. Immediately before each sample jar was filled, a collection time was assigned to the containers for that station and sample set. As the sample containers were filled, they were placed in their protective sleeves and then into the assigned ice chest. Once an ice chest received its containers, ice was added to maintain approximate 4°C until lab receipt and handling.

The pump was retrieved and then decontaminated by submersing it and the tubing in an Alconox soap rinse and then pumping a minimum of ten tubing volumes of the soap solution through the pump and tubing, followed by a tap water pumped rinse, then two deionized water pumped rinses. All decontamination rinsate was collected in containers and disposed of properly. After the decontamination procedures were completed, the pump, tubing, and rebar devices were placed into a clean plastic bag to prevent contamination from other activities on the vessel. Once the water sampling was completed, all sample ice chests were delivered to a staging area for loading to vehicle and transportation to the laboratory. A field log was kept during the sampling to record the time sequence, field conditions, weather conditions, and to make other observations or to note deviations from the plan and reasons for those deviations. A copy of the field log notes is in Appendix C.

2.5 Sample Preservation, Shipping, and Custody

As the sample containers were filled and marked, they were placed into their protective sleeves and then placed into the assigned ice chest. All samples were handled under chain of custody (COC) protocols beginning at the time of collection. The samples were transported to A&B Labs in Houston.

Samples were considered to be “in custody” if they were (1) in the custodian’s possession or view, (2) in a secured place (locked) with restricted access, or (3) in route via courier. Standard COC procedures were used for all samples collected, transferred, and analyzed as part of this project. COC forms were used to identify the samples, custodians, and dates of transfer. Each person who had custody of the samples signed the COC forms and ensured the samples were stored properly and not left unattended unless properly secured. The information on COC forms included:

- Sample Identification Number;
- Sample Collection Date and Time;
- Sample Matrix (e.g., marine sediment or water);
- Parameters to be Analyzed;
- Container Types;
- Sampler Identification;
- Dates of Transfer; and
- Names and Signatures of Persons with Successive Custody.

Copies of the original COC's are made at the laboratory upon delivery of the samples. In addition, COC records are included in the final report prepared by the analytical laboratory, and are also included here in Appendix D.

2.6 Physical and Chemical Analyses

Physical and chemical parameters were based on the USACE guidance regarding potential chemicals of concern in Texas waterways as well as area specific knowledge of chemicals detected in nearby projects. All of the analytical methods followed USEPA, Standard Methods (SMs) or ASTM protocols, and the test methods are listed in Table 2-2. The analytical laboratory contracted to perform the analyses maintains current NELAP accreditation for the prescribed methods, and the certificates are included in Appendix B. Samples were collected, prepared, and shipped to maintain compliance with appropriate holding times and temperatures for the prospective analytical methods as presented in the SAP and Table 2-2. Physical and chemical analyses for sediment samples included:

- Grain size analysis (gravel, sand, silt, clay);
- Water Content/Percent Solids;
- Total Organic Carbon (TOC) and pH;
- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- Pesticides and Total PCB Aroclors;
- Total Metals (antimony, arsenic, cadmium, total chromium, copper, lead, mercury, nickel, silver, and zinc);
- Total Petroleum Hydrocarbons (TPH);
- Total Ammonia; and
- RCRA Characteristics of RCI (reactivity, corrosivity, ignitability).

Site water and elutriate analyses were conducted for the following constituents:

- Total Organic Carbon;
- pH and salinity;
- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- Pesticides and Total PCB Aroclors,
- Dissolved Metals (antimony, arsenic, cadmium, total chromium, copper, lead, total mercury, nickel, silver, and zinc);
- Total Petroleum Hydrocarbons (TPH); and
- Total Ammonia.

Standard elutriate testing was conducted for three of the stations. Chemical analyses commenced as soon as practicable after laboratories took receipt of the samples. Analyses were conducted within method holding times (except pH) and accomplished with appropriate quality control measures. The current Texas laboratory certification is provided in Appendix B.

Standard elutriate test (SET) samples were prepared according to USACE procedures included in the USACE ITM. Sediment and site water were mixed at the default method conditions and ratios prior to agitation and aeration. This test is designed to conservatively mimic conditions indicative of water quality discharged from a confined disposal facility during active dredge disposal operations.

The laboratory standard operating procedure (SOP) for the SET is included here in Appendix B. In accordance with procedures outlined in the ITM and the UTM, elutriate phase analysis results were compared to Texas Surface Water Quality Criteria (30 Texas Administrative Code Chapter 307) to evaluate whether, after appropriate mixing zone boundaries have been applied if necessary, surface water quality criteria will be met in the return water that is discharged to the receiving water.

2.7 Variances from SAP

This section identifies modifications that were made in the field or laboratory and additionally reports discrepancies observed by the sampling team or laboratory on behalf of the applicant. While every effort was made to follow the details and intent of the SAP, the reality of field sampling and data collection is that sometimes variances are required or inadvertently occur. It is important to both describe and weigh the significance of such variances in the report of findings.

Holding Times

Holding times were not met for pH for the sediment samples in the laboratory. This was an expected occurrence due to the elapsed time from collection to analysis. There was reasonable agreement between the pH measurements of channel water obtained in the field versus the laboratory reported values of pH, and all were in the 5-9 standard units range.

Missing Lab Parameters

The lab inadvertently omitted the analysis of pH for the two water quality samples and the three elutriate samples. The sediment sample from Station MB-5 was supposed to receive RCRA RCI testing in addition to the usual USACE parameters, and these supplemental tests (RCI) were absent from the results. Th remaining three sediment samples did receive RCI testing, however, with the outcome determination of “non-hazardous” if disposed as a waste. The omissions of pH and RCI were determined to not be significant or critical omissions.

Over-extended Core Lengths

The field crew mistakenly added 50’ to the measured depth of water to arrive at the target depth for full-depth core samples. For example, if the water depth was determined to be 8’, the termination depth of core collected was 58’ below water surface at that station. In actuality, the dredging envelope depth is based on the datum of mean lower low water (MLLW). If the projected allowable dredge depth is -47’ MLLW and the water depth is 8’ (that is, the mudline occurs 8’ below the water surface), then the appropriate length for the full-depth core sample would be 39’ rather than 50’. On average, this discrepancy added about 25% of extra length to the cores. Because the sampling lab results were virtually all non-detect, this additional core length does not appreciably change the outcome of the evaluation. The crew has been instructed about this calculation for future collection activities.

Section 3
Results and Discussion

3.1 Sediment

The laboratory reported the chemical analyses of the sediment samples on a dry weight basis, as is the normal industry standard when direct comparisons with benchmark concentrations are to be made. The full set of results of sediment testing is tabulated in Table 3-1. Bold values represent detected concentrations. Yellow highlighted cells in this table represent findings that exceeded one or more but not all available benchmark criteria. A comparison of project-specific quantitation limits furnished by the laboratory with the target detection limits presented in the SAP was also made, and the laboratory-achieved reporting limits were acceptable in almost every instance.

Per USACE guidance, referenced numerical criteria for sediment included (1) NOAA-Effects Range Low (ER-L) for Marine; (2) USEPA Region 6 published values, and (3) Texas Risk Reduction Program (TRRP) Tier 1 Residential values for human health exposure. Other numerical criteria for sediment were also included as reference points in the tables, being available for some of the analytes which did not have numerical criteria published in the aforementioned sources.

For metals, there were detections for virtually all of the analytes except silver which was non-detect. Among the detections, all were quantified at concentrations within the screening benchmark (NOAA ER-L), with the exception of the metal arsenic in the sediment sample from Station MB-9. However, this singular exceedance was lower than the secondary screening benchmark (NOAA ER-L) utilized by the USACE for evaluating sediment quality, and the elutriate sample taken from this same station had concentrations of all constituents, including arsenic, that were acceptable from a water quality perspective. All other parameter results (VOCs, SVOCs, pesticides, PCBs, ammonia, TPH, TOC, pH, and RCI values) were either non-detect or acceptably low. Thus, none of the findings disqualify the material from being transferred to and disposed of in a private land PA, beneficial use area, or in a federal PA on approval. In addition, the reported sediment material results all met non-hazardous criteria under RCRA.

These findings indicate that the dredge material associated with this new cut event are acceptable for loading to a private or federal placement area (if requested), or to a qualified beneficial use area.

3.2 Water

Table 3-2 presents a summary of laboratory analytical results for the water quality samples collected (Stations MB-1 and MB-7) and the equipment blank. The complete analytical reports including QA/QC data can be found in Appendix E.

As mentioned earlier, benchmark criteria for the water matrix are primarily the Texas Surface Water Quality Standards (TSWQS, 30 TAC §307, marine acute assuming water effect ratio of 1), followed by the USEPA National Water Quality Criteria (WQC, marine acute), the NOAA Screening Quick Reference Tables (SQRT, marine acute water), and the USEPA Region 6 Watershed Standards (marine acute).

For the tested constituents (metals, VOCs, SVOCs, pesticides, TOC, pH, ammonia, TPH, and PCBs) in the water phase, sample results were either non-detect or at levels well below the identified criteria.

In all, the water column (Cedar Bayou barge channel) testing was as expected, with no significant environmental concerns.

3.3 Elutriate

The summary results of elutriate testing at the dredge footprint are presented in Table 3-3. Benchmark criteria for elutriate include the same ones as listed above for the water column samples.

Similar to the water column results, the elutriate phase testing for metals, VOCs, SVOCs, pesticides, TOC, pH, ammonia, TPH, and PCBs yielded results that were either non-detect or at levels below the identified criteria.

In summary, for elutriate produced by material from the dredging footprint as represented by these findings, the results appear to meet current standards of surface water quality, especially after mixing with ambient water.

3.4 Field Observations

As presented in Table 3-4, the physical characterizations of the sediments were consistent with the observation of low organic content (average of 0.4% OC), presumably naturally sourced and with about equal fractions of sand, silt, and clay, in the reported particle size distributions. Laboratory measured pH of sediment fell within the expected neutral to upper values for a clay rich bottom sediment associated with typical inland navigable waterways in the Texas Gulf Coast.

Section 4
Conclusions

This report documents the methodology and results of pre-dredge multimedia sample collection and analysis related to the Cedar Port Industrial Park access channel deepening/widening project.

Sediment in the Dredge Footprint

For the source area or dredging footprint (four full-depth core samples), all of the volatile organic analytes (VOAs), semi-volatile organic compounds (SVOCs), PCB, TPH, TOC, ammonia, pH, and pesticides results were either non-detect or within the primary screening and acceptable levels.

For metals, there were detections for virtually all of the analytes except silver which was non-detect. Among the detections, all were quantified at concentrations within the screening benchmark (NOAA ER-L), with the exception of the metal arsenic in the sediment sample from Station MB-9. However, this singular exceedance was lower than the secondary screening benchmark (NOAA ER-L) utilized by the USACE for evaluating sediment quality, and the elutriate sample taken from this same station had concentrations of all constituents, including arsenic, that were acceptable from a water quality perspective.

Thus, the trace metals or other constituents observed in the sediment do not disqualify the material from being transferred to and disposed of in a private land PA, beneficial use area, or in a federal PA on USACE approval. In addition, the sediment material all met non-hazardous criteria under RCRA.

Site Water and Elutriate Findings

For the site water (two samples) and elutriate phase (three samples), all of the metals, VOAs, SVOCs, TPH, TOC, pesticide, ammonia, and PCB concentrations were either non-detect or at levels well within applicable criteria.

Summary

Overall, the results of the source area testing indicate that the dredged material placement and subsequent settling with resulting discharge of return water will not have a negative or degrading impact on current environmental conditions at either the placement area selected or the receiving water (location of return water discharge) based on USACE and USEPA recognized or Texas adopted criteria. Placement could conceivably include private PA, beneficial use zone, or federal PAs.

Section 5
References

1. USEPA and USACE (Feb 1991). Evaluation of Dredged Material Proposed for Ocean Disposal (the "Green Book"). Testing Manual, Section 8, Collection and Preservation of Samples. EPA 503/8-01/001.

2. USEPA (April 1995). QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations (Chemical Evaluations). EPA-823-B-95-001.

3. USEPA and USACE (1998). Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. Inland Testing Manual (the "ITM"). Section 8. EPA-823-B-98-004.

4. USEPA and USACE (May 1981). Procedures for Handling and Chemical Analysis of Sediment and Water Samples, "Technical Report EPA / CE-81-1, prepared by R.H. Plumb, Jr. and colleagues Great Lakes Laboratory, State University College at Buffalo, NY for the USEPA / USCOE Technical Committee of Criteria for Dredged and Fill Material.

5. USEPA (Oct 2001). Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. EPA-823-B-01-002.

6. USEPA (1986). Test Methods for Evaluating Solid Waste (SW846): Physical/chemical Methods.

7. Buchman, M.F.(2008). NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle, WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages. http://response.restoration.noaa.gov/sites/default/files/SQuiRTs.pdf

8. EPA Region 6 Sediment Benchmark: based on Guidance for Conduction Ecological Risk Assessments at Remediation Sites in Texas, Toxicology and Risk Assessment Section, Texas Natural Resource Conservation Commission, Austin, TX (2001 RG-263, Revised)

9. TCEQ (2010) Texas Surface Water Quality Standards (TSWQS) Title 30 Texas Administrative Code (TAC) Section 307.6(c)(i) Table 1, Saltwater Acute Criteria.

10. Vicinie, A., Palermo, M., Matko, L. (2011) Proceedings of the Western Dredging Association (WEDA XXXI) Technical Conference and Texas A&M University (TAMU 41) Dredging Seminar, Nashville, Tennessee, June 5-8, 2011: A review of the various elutriate tests and refinements of the methodologies.

Tables

Table 2-1
Overview of Pre-Dredge Stations within Footprint
TWE Cedar Port – 2021 Pre-Dredge Testing in Support of Channel Dredging

Station	Collection Date	Location Coordinates Latitude / Longitude		Meas. Depth of Water (feet)	pH of Water		Other Metrics		Sediment Sample Collected	Site Water Collected	Elutriate Media Collected
					Field	Lab (Note 1)	Water Temp Field	Total Drilled Depth			
MW-1	03/16/2021	29.6874	-93.9807	6	--	NM	--	56’	●	●	●
MW-5	03/16/2021	29.6863	-93.9806	8	--	--	--	58’	●		●
MW-7	03/17/2021	29.6809	-93.9491	7	5.20	NM	21.09 C	57’	●	●	
MW-9	03/17/2021	29.6744	-93.9379	10	6.55	--	20.87 C	60’	●		●

NOTES:

1. Laboratory inadvertently omitted the measurement of pH of the water samples (NM = Not Measured).
2. See Figure 2 for the mapped locations of the sampling stations.

Table 2-2
Analytical Testing Program
TWE Cedar Port – 2021 Pre-Dredge Testing in Support of Channel Dredging

Parameter	*EPA or Other Recognized Method*	*Sediment Note 1 (4 samples)*	*Water Note 2 (2 samples + EqB & Trip Blk)*	*Elutriate Note 3 (3 samples)*
		Physical Testing		
Grain Size Distribution	ASTM 422-63	●		
Water Content/Solids	SM 2540G	●		
		Chemical Testing		
pH	SW-846 9040/9045	●	●	
TPH	TCEQ 1005	●	●	●
Ammonia	EPA 350.2	●	●	●
TOC	SW-846 9060A	●	●	●
9 Metals Plus Mercury	EPA 200.8/SW-846 7471B	●	●	●
Volatiles & Semi-volatiles	EPA 8260/8270D	●	●	●
Total PCBs	EPA 8082A	●	●	●
Salinity	SM 2520B		●	
Pesticides (OC)	EPA 8081B	●	●	●

Notes:

1. Sediment samples were taken at Stations MB-1, MB-5, MB-7, and MB-9. A duplicate was not taken.
2. Water Quality samples were taken at Stations MW-1, MW-7, and MW-9, plus Equipment Blank & Trip Blank.
3. Elutriate materials were taken at Stations MW-1, MW-5, and MW-9; the lab generated elutriate samples.
4. The laboratory inadvertently omitted the water sample pH measurements.
5. In addition to these analyses, the lab analyzed Sediment Samples MB-1, 7, and 9 for RCRA characteristics.

Table 3-1: Sediment Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

Analyte	Method	Units	Samp Count	Screening Benchmarks								TDL	Lab RL	MB-1-SED 21031513.11 3/16/2021		MB-5-SED 21031513.13 3/16/2021		MB-7-SED 21031513.08 3/17/2021		MB-9-SED 21031513.09 3/17/2021		Average	Sediment: Data Evaluation	
				NOAA ER-L (b)	NOAA ER-M (b)	EPA Reg 6 (c)	TCEQ TRRP Residential (d)	Ecological Reference (e) or (f)		Other	Ref			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Compare MAX/AVG to Preferred Bmark	Additional Comment
SVOCs																								
1,2,4-Trichlorobenzene	SW-846 8260C	mg/Kg	4				69,500	20,000	(e)	--		10	0.0044	< 0.00138		< 0.00138		< 0.00138		< 0.00138		< 0.00	Pass	--
1,2-Dichlorobenzene	SW-846 8260C	mg/Kg	4				389,000			--		20	0.0044	< 0.001		< 0.001		< 0.001		< 0.001		< 0.00	Pass	--
1,3-Dichlorobenzene	SW-846 8260C	mg/Kg	4				61,600			--		20	0.0044	< 0.00141		< 0.00141		< 0.00141		< 0.00141		< 0.00	Pass	--
1,4-Dichlorobenzene	SW-846 8260C	mg/Kg	4				253,000	20,000	(e)	--		20	0.0044	< 0.00144		< 0.00144		< 0.00144		< 0.00144		< 0.00	Pass	--
2,4-Dichlorophenol	SW-846 8270D	ug/Kg	4				200,000			--		120	0.04175	< 21.67		< 21.67		< 21.67		< 21.67		< 21.67	Pass	--
2,4-Dimethylphenol	SW-846 8270D	ug/Kg	4				1,330,000			--		20	0.04175	< 23.74		< 23.74		< 23.74		< 23.74		< 23.74	Pass	--
2,4-Dinitrophenol	SW-846 8270D	ug/Kg	4				133,000	20,000	(e)	--		500	0.04175	< 55.67		< 55.67		< 55.67		< 55.67		< 55.67	Pass	--
Acenaphthene	SW-846 8270D	ug/Kg	4	16	500	16	2,970,000	20,000	(e)	--		20	0.04175	< 15.32		< 15.32		< 15.32		< 15.32		< 15.32	Pass	--
Acenaphthylene	SW-846 8270D	ug/Kg	4	44	640	44	3,800,000			--		20	0.04175	< 23.74		< 23.74		< 23.74		< 23.74		< 23.74	Pass	--
Anthracene	SW-846 8270D	ug/Kg	4	85.3	1100	85.3	17,700,000			--		20	0.04175	< 18.12		< 18.12		< 18.12		< 18.12		< 18.12	Pass	--
Benzo(a)anthracene	SW-846 8270D	ug/Kg	4	261	1600	261	41,000			--		20	0.04175	< 28.26		< 28.26		< 28.26		< 28.26		< 28.26	Pass	
Benzo(a)pyrene	SW-846 8270D	ug/Kg	4	430	1600	430	4,100			--		20	0.04175	< 43.33		< 43.33		< 43.33		< 43.33		< 43.33	Pass	--
Benzo(b&k)fluoranthene	SW-846 8270D	ug/Kg	4				41,000			1800	AET	20	0.04175	< 46.97		< 46.97		< 46.97		< 46.97		< 46.97	Pass	--
Benzo(g,h,i)perylene	SW-846 8270D	ug/Kg	4				1,780,000			670	AET	20	0.04175	< 29.86		< 29.86		< 29.86		< 29.86		< 29.86	Pass	--
Chrysene	SW-846 8270D	ug/Kg	4	384	2800	384	4,100,000			--		20	0.04175	< 23.74		< 23.74		< 23.74		< 23.74		< 23.74	Pass	--
Dibenzo(a,h)anthracene	SW-846 8270D	ug/Kg	4	63.4	260	63.4	4,000			--		20	0.04175	< 49.42		< 49.42		< 49.42		< 49.42		< 49.42	Pass	--
Diethyl phthalate	SW-846 8270D	ug/Kg	4				53,300,000	100,000	(e)	530	D	50	0.04175	< 29.86		< 29.86		< 29.86		< 29.86		< 29.86	Pass	--
Fluoranthene	SW-846 8270D	ug/Kg	4	600	5100	600	2,320,000			--		20	0.04175	< 25.62		< 25.62		< 25.62		< 25.62		< 25.62	Pass	--
Fluorene	SW-846 8270D	ug/Kg	4	19	540	19	2,260,000	30,000	(e)	--		20	0.04175	< 11.87		< 11.87		< 11.87		< 11.87		< 11.87	Pass	--
Hexachlorobenzene	SW-846 8270D	ug/Kg	4				1,020			--		10	0.04175	< 39.94		< 39.94		< 39.94		< 39.94		< 39.94	Pass	--
Indeno(1,2,3-cd)pyrene	SW-846 8270D	ug/Kg	4				42,000			600	AET	20	0.04175	< 35.61		< 35.61		< 35.61		< 35.61		< 35.61	Pass	--
Naphthalene	SW-846 8260C	mg/Kg	4	160	2100	160	124,000			--		20	0.0044	< 0.00188		< 0.00188		< 0.00188		< 0.00188		< 0.00	Pass	--
Pentachlorophenol	SW-846 8270D	ug/Kg	4				730	500	(e)	--		100	0.04175	< 35.61		< 35.61		< 35.61		< 35.61		< 35.61	Pass	--
Phenanthrene	SW-846 8270D	ug/Kg	4	240	1500	240	1,710,000			--		20	0.04175	< 21.67		< 21.67		< 21.67		< 21.67		< 21.67	Pass	--
Phenol	SW-846 8270D	ug/Kg	4				950,000	30,000	(e)	--		100	0.04175	< 18.12		< 18.12		< 18.12		< 18.12		< 18.12	Pass	--
Pyrene	SW-846 8270D	ug/Kg	4	665	2600	665	1,700,000			--		20	0.04175	< 38.15		< 38.15		< 38.15		< 38.15		< 38.15	Pass	--

Table 3-1: Sediment Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

				Screening Benchmarks																			Sediment: Data Evaluation	
Analyte	Method	Units	Samp Count	NOAA ER-L (b)	NOAA ER-M (b)	EPA Reg 6 (c)	TCEQ TRRP Resi-dential (d)	Ecological Reference (e) or (f)		Other	Ref	TDL	Lab RL	MB-1-SED 21031513.11 3/16/2021 Result	Qual	MB-5-SED 21031513.13 3/16/2021 Result	Qual	MB-7-SED 21031513.08 3/17/2021 Result	Qual	MB-9-SED 21031513.09 3/17/2021 Result	Qual	Average Result	Compare MAX/AVG to Preferred Bmark	Additional Comment
PESTICIDES AND PCBs																								
4,4-DDD	SW-846 8081B	ug/Kg	4	2	20	1.22	14,200	21	(f)	--		5	4.175	< 0.26		< 0.26		< 0.26		< 0.26		< 0.26	Pass	--
4,4-DDE	SW-846 8081B	ug/Kg	4	2.2	27	2.07	10,200	21	(f)	--		5	4.175	< 0.36		< 0.36		< 0.36		< 0.36		< 0.36	Pass	--
4,4-DDT	SW-846 8081B	ug/Kg	4	1	7	1.19	5,390	21	(f)	--		5	4.175	< 0.48		< 0.48		< 0.48		< 0.48		< 0.48	Pass	--
alpha-BHC	SW-846 8081B	ug/Kg	4				250			--		3	4.175	< 0.1		< 0.1		< 0.1		< 0.1		< 0.10	Pass	--
Alpha-Chlordane	SW-846 8081B	ug/Kg	4				13,000			--		3	4.175	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	Pass	--
Aldrin	SW-846 8081B	ug/Kg	4				50			--		3	4.175	< 0.2		< 0.2		< 0.2		< 0.2		< 0.20	Pass	--
beta-BHC	SW-846 8081B	ug/Kg	4				920			--		3	4.175	< 0.33		< 0.33		< 0.33		< 0.33		< 0.33	Pass	--
Chlordane	SW-846 8081B	ug/Kg	4		6		7,330			--		3	41.75	< 1.67		< 1.67		< 1.67		< 1.67		< 1.67	Pass	--
delta-BHC	SW-846 8081B	ug/Kg	4				2,850			--		3	4.175	< 0.34		< 0.34		< 0.34		< 0.34		< 0.34	Pass	--
Dieldrin	SW-846 8081B	ug/Kg	4	0.02	8	0.715	150	4.9	(f)	--		5	4.175	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	Pass	**RL > BM**
Endosulfan I	SW-846 8081B	ug/Kg	4				90,800			--		5	4.175	< 0.34		< 0.34		< 0.34		< 0.34		< 0.34	Pass	--
Endosulfan II	SW-846 8081B	ug/Kg	4				270,000			--		5	4.175	< 0.28		< 0.28		< 0.28		< 0.28		< 0.28	Pass	--
Endosulfan sulfate	SW-846 8081B	ug/Kg	4				380,000			--		5	4.175	< 0.25		< 0.25		< 0.25		< 0.25		< 0.25	Pass	--
Endrin	SW-846 8081B	ug/Kg	4				9,010			--		5	4.175	< 0.39		< 0.39		< 0.39		< 0.39		< 0.39	Pass	--
Endrin aldehyde	SW-846 8081B	ug/Kg	4				19,000			--		5	4.175	< 0.41		< 0.41		< 0.41		< 0.41		< 0.41	Pass	--
Endrin ketone	SW-846 8081B	ug/Kg	4				19,000			--		5	4.175	< 0.33		< 0.33		< 0.33		< 0.33		< 0.33	Pass	--
gamma-BHC (Lindane)	SW-846 8081B	ug/Kg	4				1,110			--		3	4.175	< 0.15		< 0.15		< 0.15		< 0.15		< 0.15	Pass	--
Heptachlor	SW-846 8081B	ug/Kg	4				130			--		3	4.175	< 0.33		< 0.33		< 0.33		< 0.33		< 0.33	Pass	--
Heptachlor epoxide	SW-846 8081B	ug/Kg	4				240			--		3	4.175	< 0.26		< 0.26		< 0.26		< 0.26		< 0.26	Pass	--
Toxaphene	SW-846 8081B	ug/Kg	4				1,240			--		50	41.75	< 1.67		< 1.67		< 1.67		< 1.67		< 1.67	Pass	--
g-Chlordane	SW-846 8081B	ug/Kg	4				7330			--		3	4.175	< 0.18		< 0.18		< 0.18		< 0.18		< 0.18	Pass	--
PCBs, Total	SW-846 8082A	ug/Kg	4	22.7		22.7	1,140	40,000	(e)	--		10	0.4175	< 1.52		< 1.52		< 1.52		< 1.52		< 1.52	Pass	--
METALS																								
Antimony	SW-846 6020B	mg/Kg	4		-		15	0.27	(f)	1	TX	2.5	0.5	0.11335	J	0.17724	J	0.14734	J	0.12636	J	< 0.14	Pass	--
Arsenic	SW-846 6020B	mg/Kg	4	8.2	70	8.2	24.2	18	(e)	5.9	TX	1.0	0.5	**1.83**		**3.11**		**3.73**		**16.37**		6.26	Pass	**See Text**
Cadmium	SW-846 6020B	mg/Kg	4	1.2	9.6	1.2	51.0	0.36	(f)	--		1.0	0.5	< 0.070		**0.079**	J	**0.079**	J	**0.08071**	J	0.08	Pass	--
Chromium, total	SW-846 6020B	mg/Kg	4	81	370	81	26,600	0.4	(e)	30	TX	1	0.5	**3.8**		**5.47**		**8.72**		**14.26**		8.06	Pass	--
Copper	SW-846 6020B	mg/Kg	4	34	270	34	1,300	28	(f)	15	TX	10	0.5	**3.15**		**5**		**6.73**		**11.99**		6.72	Pass	--
Lead	SW-846 6020B	mg/Kg	4	46.7	218	46.7	-	11	(f)	15	TX	10	0.5	**4.42**		**7.65**		**8.82**		**11.34**		8.06	Pass	--
Mercury	SW-846 7470A	mg/Kg	4	0.15	0.71	0.15	5.50	0.1	(e)	0.04	TX	0.1	0.01	**0.004**	J	**0.028**		**0.009**	J	**0.027**		0.02	Pass	--
Nickel	SW-846 6020B	mg/Kg	4	20.9	51.6	20.9	842	38	(e)	10	TX	10	0.5	**3.86**		**5.78**		**9.99**		**18.97**		9.65	Pass	**See Text**
Silver	SW-846 6020B	mg/Kg	4	1	3.7	1	96.7	4.2	(f)	--		1.0	0.5	< 0.13		< 0.13		< 0.13		< 0.13		0.13	Pass	--
Zinc	SW-846 6020B	mg/Kg	4	150	410	150	9,920	46	(f)	30	TX	10	1	**11.6**		**17.54**		**24.42**		**39.6**		23.29	Pass	--

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Table 3-1: Sediment Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

				Screening Benchmarks																			Sediment: Data Evaluation	
												TDL	Lab RL	MB-1-SED 21031513.11 3/16/2021		MB-5-SED 21031513.13 3/16/2021		MB-7-SED 21031513.08 3/17/2021		MB-9-SED 21031513.09 3/17/2021		Average	Compare MAX/AVG to Preferred Bmark	Additional Comment
Analyte	Method	Units	Samp Count	NOAA ER-L (b)	NOAA ER-M (b)	EPA Reg 6 (c)	TCEQ TRRP Resi-dential (d)	Ecological Reference (e) or (f)		Other	Ref			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result		
MISCELLANEOUS																								
Ammonia	SM4500NH3-Dm	mg/Kg	4				2500			--		0	1	6.07		20.8		3.53		11.27		10.42	Pass	--
Clay	D422	%	4							--		1	0.01	26.1		20.3		25.4		44.0		29.0	Pass	--
Sand	D423	%	4							--		1	0.01	46.2		32.6		24.8		16.8		30.1	Pass	--
Silt	D424	%	4							--		1	0.01	27.7		47.1		49.8		39.2		41.0	Pass	--
Solid Content (%)	SM 2540G	%	4							--		1		77.60		63.2		71.60		75.30		71.93	Pass	--
pH	SW-846 9045D	SU	4							--		-		8.8		- -	-	9.1		8.9		8.93	Pass	--
Total Organic Carbon	Walkley-Black	mg/Kg	4							--		-	267	3680		8760		3090		2280		4452.50	Pass	--
TPH	TX 1005	mg/Kg	4				1,070			--		5		< 6.88		< 6.88		< 6.88		< 6.88		< 6.88	Pass	--

NOTES:

0.29	Detected Results in **BOLD**
U	Non-detected compound.
Exceeds	Maximum or average value exceeds the benchmark
PASS	Maximum or average value is below the benchmark
🟦	Preferred criteria, per USACE SWG guidance
🟨	Results exceed some screening criteria but not others
🟧	Results exceed ER-M criteria (Effects Range-Medium)
🟥	Results exceed all applicable screening criteria
BM-NA	Detected but benchmark is not available
RL > BM	Reporting limit exceeds one or more benchmarks
U	Undetected at SDL (Sample Detection Limit).
J	Estimation. Below calibration range but above MDL.
H3	Sample was received and analyzed past holding time
D1	Sample required dilution due to matrix effects.

(a) Sabine-Neches Nagivation District Placement Former Placement Criteria (NO LONGER IN EFFECT)

(b) NOAA - Effects Range - Low OR Median, Marine, from "Screening Quick Reference Tables for Organics-Sediments", NOAA 2008 OR & R Report

(c) USEPA Region 6 - http://rais.ornl.gov/tools/eco_search.php

(d) TCEQ Texas Risk Reduction Standards (TRRP) Protective Concentration Levels, Human Health, Residential, 30 TAC 350 (August 2018)

(e) TCEQ Ecological Guidance (2014)

(f) USEPA Eco-SSL: http://www.epa.gov/ecotox/ecossl/

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Special Notes:

1. The sediment samples were additionally analyzed for Volatile Organic Compounds (Method 8260C) and none of the target compounds were found at detectable levels.
2. The sediment samples were additionally analyzed for RCRA Hazardous Waste Characteristics (RCI = Reactivity, Corrosivity, Ignitability); all were determined non-hazardous.

Table 3-2: Water Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

				Screening Benchmarks					Sample IDs and Concentrations									Water: Data Evaluation		
				TSWQS (30TAC 307) Marine Acute Ref 1	Second-ary Ref Screen Criteria				MB-1-WAT 21031513.01 3/17/2021		MB-7-WAT 21031513.03 3/17/2021		MB-EQB-WAT 21031513.05 3/17/2021		MB-Trip-WAT 21031513.06 3/17/2021		Average	Compare MAX to Preferred Bmark	Compare MEAN to Preferred Benchmark	
Analyte	Method	Units	Samp Count			Ref 2, 3, or 4	TDL	Lab RL	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result			Additional Comment
SVOCs																				
Benzo[b&k]fluoranthene	EPA 625.1	ug/L	4		300	3	0.6	0.00125	< 0.57		< 0.57		< 0.57				< 0.570	Pass	Pass	--
1,2,4-Trichlorobenzene	EPA 625.1	ug/L	4		160	3	0.9	0.00125	< 0.53		< 0.53		< 0.53				< 0.530	Pass	Pass	--
1,2-Dichlorobenzene	EPA 624.1	mg/L	4		1970	3	0.8	0.005	< 0.001		< 0.001		< 0.001				< 0.001	Pass	Pass	--
1,3-Dichlorobenzene	EPA 624.1	mg/L	4		1970	3	0.9	0.005	< 0.001		< 0.001		< 0.001				< 0.001	Pass	Pass	--
1,4-Dichlorobenzene	EPA 624.1	mg/L	4		1970	3	1	0.01	< 0.001		< 0.001		< 0.001				< 0.001	Pass	Pass	--
2,4-Dichlorophenol	EPA 625.1	ug/L	4				0.8	0.00125	< 0.69		< 0.69		< 0.69				< 0.690	Pass	Pass	--
2,4-Dimethylphenol	EPA 625.1	ug/L	4				10	0.00125	< 0.53		< 0.53		< 0.53				< 0.530	Pass	Pass	--
2,4-Dinitrophenol	EPA 625.1	ug/L	4		4850	3	5	0.00125	< 1.41000		< 1.41000		< 1.41000				< 1.410	Pass	Pass	--
Acenaphthene	EPA 625.1	ug/L	4		970	3	0.75	0.00125	< 0.28		< 0.28		< 0.28				< 0.280	Pass	Pass	--
Acenaphthylene	EPA 625.1	ug/L	4		300	3	1	0.00125	< 0.47		< 0.47		< 0.47				< 0.470	Pass	Pass	--
Anthracene	EPA 625.1	ug/L	4		300	3	0.6	0.00125	< 0.35		< 0.35		< 0.35				< 0.350	Pass	Pass	--
Benzo[a]anthracene	EPA 625.1	ug/L	4		300	3	0.4	0.00125	< 0.38		< 0.38		< 0.38				< 0.380	Pass	Pass	--
Benzo[a]pyrene	EPA 625.1	ug/L	4		300	3	0.3	0.00125	< 0.85		< 0.85		< 0.85				< 0.850	Pass	Pass	--
Benzo[g,h,i]perylene	EPA 625.1	ug/L	4		300	3	1.2	0.00125	< 0.63		< 0.63		< 0.63				< 0.630	Pass	Pass	--
Chrysene	EPA 625.1	ug/L	4		300	3	0.3	0.00125	< 0.57		< 0.57		< 0.57				< 0.570	Pass	Pass	--
Dibenz(a,h)anthracene	EPA 625.1	ug/L	4		300	3	1.3	0.00125	< 0.69		< 0.69		< 0.69				< 0.690	Pass	Pass	--
Diethyl phthalate	EPA 625.1	ug/L	4		2944	3	1	0.00125	< 0.63		< 0.63		< 0.63				< 0.630	Pass	Pass	--
Fluoranthene	EPA 625.1	ug/L	4		40	3	0.9	0.00125	< 0.44		< 0.44		< 0.44				< 0.440	Pass	Pass	--
Fluorene	EPA 625.1	ug/L	4		300	3	0.6	0.00125	< 0.47		< 0.47		< 0.47				< 0.470	Pass	Pass	--
Hexachlorobenzene	EPA 625.1	ug/L	4		160	3	0.4	0.00125	< 0.69		< 0.69		< 0.69				< 0.690	Pass	Pass	--
Indeno[1,2,3-cd]pyrene	EPA 625.1	ug/L	4		300	3	1.2	0.00125	< 0.22		< 0.22		< 0.22				< 0.220	Pass	Pass	--
Naphthalene	EPA 625.1	ug/L	4		250	4	0.8	0.00125	< 0.31		< 0.31		< 0.31				< 0.310	Pass	Pass	--
Pentachlorophenol	EPA 625.1	ug/L	4	15.1	13	3	50	0.00125	< 0.5		< 0.5		< 0.5				< 0.500	Pass	Pass	--
Phenanthrene	EPA 625.1	ug/L	4	7.7	7.7	3	0.5	0.00125	< 0.44		< 0.44		< 0.44				< 0.440	Pass	Pass	--
Phenol	EPA 625.1	ug/L	4		5800	3	10	0.00125	< 0.44		< 0.44		< 0.44				< 0.440	Pass	Pass	--
Pyrene	EPA 625.1	ug/L	4		300	3	1.5	0.00125	< 0.57		< 0.57		< 0.57				< 0.570	Pass	Pass	--

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Table 3-2: Water Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

Analyte	Method	Units	Samp Count	Screening Benchmarks			TDL	Lab RL	Sample IDs and Concentrations									Water: Data Evaluation		
				TSWQS (30TAC 307) Marine Acute Ref 1	Second-ary Ref Screen Criteria	Ref 2, 3, or 4			MB-1-WAT 21031513.01 3/17/2021		MB-7-WAT 21031513.03 3/17/2021		MB-EQB-WAT 21031513.05 3/17/2021		MB-Trip-WAT 21031513.06 3/17/2021		Average	Compare MAX to Preferred Bmark	Compare MEAN to Preferred Benchmark	Additional Comment
									Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result			
PESTICIDES/PCBs																				
alpha-Chlordane	EPA 608.3	ug/L	4	0.09			0.03	0.125	< 0.002		< 0.002		< 0.002				< 0.002	Pass	Pass	--
g-Chlordane	EPA 608.3	ug/L	4	0.09			0.03	0.125	< 0.005		< 0.005		< 0.005				< 0.005	Pass	Pass	--
4,4'-DDD	EPA 608.3	ug/L	4	0.13	3.6	3	0.1	0.125	< 0.006		< 0.006		< 0.006				< 0.006	Pass	Pass	--
4,4'-DDE	EPA 608.3	ug/L	4		14	3	0.1	0.125	< 0.002		< 0.002		< 0.002				< 0.002	Pass	Pass	--
4,4'-DDT	EPA 608.3	ug/L	4		0.13	2	0.1	0.125	< 0.004		< 0.004		< 0.004				< 0.004	Pass	Pass	--
Aldrin	EPA 608.3	ug/L	4	1.3	1.3		0.03	0.125	< 0.003		< 0.003		< 0.003				< 0.003	Pass	Pass	--
alpha-BHC	EPA 608.3	ug/L	4				0.03	0.125	< 0.008		< 0.008		< 0.008				< 0.008	Pass	Pass	--
beta-BHC	EPA 608.3	ug/L	4				0.03	0.125	< 0.01		< 0.01		< 0.01				< 0.010	Pass	Pass	--
Chlordane (technical)	EPA 608.3	ug/L	4	0.09	0.09		0.03	1.25	< 0.025		< 0.025		< 0.025				< 0.025	Pass	Pass	--
delta-BHC (d-BHC)	EPA 608.3	ug/L	4				0.03	0.125	< 0.004		< 0.004		< 0.004				< 0.004	Pass	Pass	--
Dieldrin	EPA 608.3	ug/L	4	0.71	0.71	2	0.02	0.125	< 0.003		< 0.003		< 0.003				< 0.003	Pass	Pass	--
Endosulfan I	EPA 608.3	ug/L	4	0.034	0.034	2	0.1	0.125	< 0.003		< 0.003		< 0.003				< 0.003	Pass	Pass	--
Endosulfan II	EPA 608.3	ug/L	4	0.034			0.1	0.125	< 0.004		< 0.004		< 0.004				< 0.004	Pass	Pass	--
Endosulfan sulfate	EPA 608.3	ug/L	4	0.034			0.1	0.125	< 0.003		< 0.003		< 0.003				< 0.003	Pass	Pass	--
Endrin	EPA 608.3	ug/L	4	0.037	0.037	2	0.1	0.125	< 0.004		< 0.004		< 0.004				< 0.004	Pass	Pass	--
Endrin Aldehyde	EPA 608.3	ug/L	4	0.037	0.037	2	0.1	0.125	< 0.008		< 0.008		< 0.008				< 0.008	Pass	Pass	--
Endrin Ketone	EPA 608.3	ug/L	4	0.037	0.037	2	0.1	0.125	< 0.005		< 0.005		< 0.005				< 0.005	Pass	Pass	--
gamma-BHC (Lindane)	EPA 608.3	ug/L	4		0.16	2	0.1	0.125	< 0.005		< 0.005		< 0.005				< 0.005	Pass	Pass	--
Heptachlor	EPA 608.3	ug/L	4	0.053	0.053	2	0.1	0.125	< 0.005		< 0.005		< 0.005				< 0.005	Pass	Pass	--
Heptachlor epoxide	EPA 608.3	ug/L	4	0.053	0.053	2	0.1	0.125	< 0.002		< 0.002		< 0.002				< 0.002	Pass	Pass	--
Toxaphene	EPA 608.3	ug/L	4	0.21	90	2	0.5	1.25	< 0.10		< 0.10		< 0.10				< 0.100	Pass	Pass	--
PCBs, Total	#N/A	ug/L	4	10			0.01	0.05	< 0.01		< 0.01		< 0.01				< 0.013	Pass	Pass	--

Table 3-2: Water Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

				Screening Benchmarks					Sample IDs and Concentrations									Water: Data Evaluation		
									MB-1-WAT 21031513.01 3/17/2021		MB-7-WAT 21031513.03 3/17/2021		MB-EQB-WAT 21031513.05 3/17/2021		MB-Trip-WAT 21031513.06 3/17/2021		Average			
Analyte	Method	Units	Samp Count	TSWQS (30TAC 307) Marine Acute Ref 1	Second-ary Ref Screen Criteria	Ref 2, 3, or 4	TDL	Lab RL	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Compare MAX to Preferred Bmark	Compare MEAN to Preferred Benchmark	Additional Comment
METALS																				
Antimony	EPA 200.8	ug/L	4		1500	3	3	0.00125	**2.09**		**1.48**		< 0.2000		< 0.2000		1.785	Pass	Pass	--
Arsenic	EPA 200.8	ug/L	4	149	69	2	1	0.00125	**2.62**		**2.38**		0.443		0.381		2.500	Pass	Pass	--
Cadmium	EPA 200.8	ug/L	4	40	40	2	1	0.00125	< 0.3	D1	< 0.3	D1	< 0.1		< 0.1		< 0.300	Pass	Pass	--
Chromium (total)	EPA 200.8	ug/L	4		103	4	1	0.00125	**0.61**	D1	< **0.3**	D1	< 0.1		< 0.1		0.457	Pass	Pass	--
Copper	EPA 200.8	ug/L	4	13.5	4.8	2	1	0.00125	**1.57**		**1.19**	D1	< 0.4		< 0.4		1.380	Pass	Pass	--
Lead	EPA 200.8	ug/L	4	133	210	2	1	0.00125	< 0.3	D1	< 0.3	D1	< 0.1		< 0.1		< 0.300	Pass	Pass	--
Nickel	EPA 200.8	ug/L	4	118	74	2	1	0.00125	**1.8**		**1.75**		< 0.1		< 0.1		1.775	Pass	Pass	--
Silver	EPA 200.8	ug/L	4	2	1.9	2	1	0.00125	< 0.5	D1	< 0.5	D1	< 0.2		< 0.2		< 0.500	Pass	Pass	--
Zinc	EPA 200.8	ug/L	4	92.7	90		1	0.005	**4.47**	D1	**4.23**	D1	**5.16**		< 1.1		< 4.4	Pass	Pass	--
Mercury	EPA 245.1	ug/L	4	2.1			0.2	0.0002	**0.09**		< 0.06		< 0.06		< 0.06		< 0.075	Pass	Pass	--
MISCELLANEOUS																				
Ammonia	SM 4500NH3D	mg/L	4				-	0.03	0.05		0.07		< 0.01				< 0.043	--	--	--
Salinity	SM 2520B	s.u.	4				-	2	11.3		8.6						9.950	--	--	--
Total Organic Carbon	SM 5310B	mg/L	4				-	1	4.4		4.7		< 0.35				3.150	--	--	--
TPH	TX 1005	mg/L	4				-	6.45	< 0.18		< 0.18		< 0.18				< 0.180	--	--	--

0.29	Detected Results in **BOLD**
U	Non-detected compound.
EXCEEDS	Maximum or average value exceeds the benchmark
PASS	Maximum or average value is below the benchmark
🟦	Preferred or primary criteria, per USACE SWG guidance
44	Results exceed some screening criteria but not others
66	Results exceed all applicable screening criteria for that constituent
BM-NA	Detected but benchmark is not available
RL > BM	Reporting limit exceeds one or more benchmarks
ND or BDL	Analyte not detected
U	Undetected at SDL (Sample Detection Limit).
J	Estimation. Below calibration range but above MDL.
H3	Sample was received and analyzed past holding time
D1	Sample required dilution due to matrix effects.

Special Note: The water samples and equipment blank were additionally analyzed for VOCs by Method 8260, and no target compounds were detected.

Table 3-3: Elutriate Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

Analyte	Method	Units	Sample Count	Screening Benchmarks			Target DL	Method DL	Sample IDs and Concentrations							Elutriate: Data Evaluation		
				TSWQS (30 TAC 307) Marine Acute Ref 1	Secon-dary Ref Screen Criteria	Ref 2, 3, or 4			MB-1-ELUT 21031513.15 3/17/2021		MB-5-ELUT 21031513.16 3/17/2021		MB-9-ELUT 21031513.17 3/17/2021		Average	Compare MAX to Preferred Bmark	With Mixing Zone Calcs	Additional Comment
									Result	Qual	Result	Qual	Result	Qual	Result			
SVOCs																		
Benzo[b&k]fluoranthene	SW846 8270D	ug/L	1		300	3	0.6	0.00125	< 0.57		< 0.57		< 0.57		< 0.5700	Pass	Pass	-
1,2,4-Trichlorobenzene	EPA 625.1	ug/L	1		160	3	0.9	0.00125	< 0.53		< 0.53		< 0.53		< 0.5300	Pass	Pass	-
1,2-Dichlorobenzene	EPA 625.1	ug/L	1		1970	3	0.8	0.00125	< 0.41		< 0.41		< 0.41		< 0.4100	Pass	Pass	-
1,3-Dichlorobenzene	EPA 625.1	ug/L	1		1970	3	0.9	0.00125	< 0.53		< 0.53		< 0.53		< 0.5300	Pass	Pass	-
1,4-Dichlorobenzene	EPA 625.1	ug/L	1		1970	3	1	0.00125	< 0.25		< 0.25		< 0.25		< 0.2500	Pass	Pass	-
2,4-Dichlorophenol	EPA 625.1	ug/L	1				0.8	0.00125	< 0.69		< 0.69		< 0.69		< 0.6900	Pass	Pass	-
2,4-Dimethylphenol	EPA 625.1	ug/L	1				10	0.00125	< 0.53		< 0.53		< 0.53		< 0.5300	Pass	Pass	-
2,4-Dinitrophenol	EPA 625.1	ug/L	1		4850	3	5	0.00125	< 1.41		< 1.41		< 1.41		< 1.4100	Pass	Pass	-
Acenaphthene	EPA 625.1	ug/L	1		970	3	0.75	0.00125	< 0.28		< 0.28		< 0.28		< 0.2800	Pass	Pass	-
Acenaphthylene	EPA 625.1	ug/L	1		300	3	1	0.00125	< 0.47		< 0.47		< 0.47		< 0.4700	Pass	Pass	-
Anthracene	EPA 625.1	ug/L	1		300	3	0.6	0.00125	< 0.35		< 0.35		< 0.35		< 0.3500	Pass	Pass	-
Benzo[a]anthracene	EPA 625.1	ug/L	1		300	3	0.4	0.00125	< 0.38		< 0.38		< 0.38		< 0.3800	Pass	Pass	-
Benzo[a]pyrene	EPA 625.1	ug/L	1		300	3	0.3	0.00125	< 0.85		< 0.85		< 0.85		< 0.8500	Pass	Pass	-
Benzo[g,h,i]perylene	EPA 625.1	ug/L	1		300	3	1.2	0.00125	< 0.63		< 0.63		< 0.63		< 0.6300	Pass	Pass	-
Chrysene	EPA 625.1	ug/L	1		300	3	0.3	0.00125	< 0.57		< 0.57		< 0.57		< 0.5700	Pass	Pass	-
Dibenz(a,h)anthracene	EPA 625.1	ug/L	1		300	3	1.3	0.00125	< 0.69		< 0.69		< 0.69		< 0.6900	Pass	Pass	-
Diethyl phthalate	EPA 625.1	ug/L	1		2944	3	1	0.00125	< 0.63		< 0.63		< 0.63		< 0.6300	Pass	Pass	-
Fluoranthene	EPA 625.1	ug/L	1		40	3	0.9	0.00125	< 0.44		< 0.44		< 0.44		< 0.4400	Pass	Pass	-
Fluorene	EPA 625.1	ug/L	1		300	3	0.6	0.00125	< 0.47		< 0.47		< 0.47		< 0.4700	Pass	Pass	-
Hexachlorobenzene	EPA 625.1	ug/L	1		160	3	0.4	0.00125	< 0.69		< 0.69		< 0.69		< 0.6900	Pass	Pass	-
Indeno[1,2,3-c,d]pyrene	EPA 625.1	ug/L	1		300	3	1.2	0.00125	< 0.22		< 0.22		< 0.22		< 0.2200	Pass	Pass	-
Naphthalene	EPA 625.1	ug/L	1		250	4	0.8	0.00125	< 0.31		< 0.31		< 0.31		< 0.3100	Pass	Pass	-
Pentachlorophenol	EPA 625.1	ug/L	1	15.1	13	3	50	0.00125	< 0.5		< 0.5		< 0.5		< 0.5000	Pass	Pass	-
Phenanthrene	EPA 625.1	ug/L	1	7.7	7.7	3	0.5	0.00125	< 0.44		< 0.44		< 0.44		< 0.4400	Pass	Pass	-
Phenol	EPA 625.1	ug/L	1		5800	3	10	0.00125	< 0.44		< 0.44		< 0.44		< 0.4400	Pass	Pass	-
Pyrene	EPA 625.1	ug/L	1		300	3	1.5	0.00125	< 0.57		< 0.57		< 0.57		< 0.570	Pass	Pass	-

Table 3-3: Elutriate Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

				Screening Benchmarks					Sample IDs and Concentrations							Elutriate: Data Evaluation		
				TSWQS (30 TAC 307) Marine Acute	Secon-dary Ref Screen Criteria	Ref 2, 3, or 4			MB-1-ELUT 21031513.15 3/17/2021		MB-5-ELUT 21031513.16 3/17/2021		MB-9-ELUT 21031513.17 3/17/2021		Average	Compare MAX to Preferred Bmark	With Mixing Zone Calcs	Additional Comment
Analyte	Method	Units	Sample Count	Ref 1			Target DL	Method DL	Result	Qual	Result	Qual	Result	Qual	Result			
PESTICIDES / PCBs																		
alpha-Chlordane	EPA 608.3	ug/L	1	0.09			0.03	0.125	< 0.002		< 0.002		< 0.002		< 0.002	Pass	Pass	-
y-Chlordane	EPA 608.3	ug/L	1	0.09				0.125	< 0.005		< 0.005		< 0.005		< 0.005	Pass	Pass	
4,4'-DDD	EPA 608.3	ug/L	1	0.13	3.6	3	0.003	0.125	< 0.006		< 0.006		< 0.006		< 0.006	Pass	Pass	
4,4'-DDE	EPA 608.3	ug/L	1		14	3	0.1	0.125	< 0.002		< 0.002		< 0.002		< 0.002	Pass	Pass	-
4,4'-DDT	EPA 608.3	ug/L	1		0.13	2	0.1	0.125	< 0.004		< 0.004		< 0.004		< 0.004	Pass	Pass	-
Aldrin	EPA 608.3	ug/L	1	1.3	1.3		0.03	0.125	< 0.003		< 0.003		< 0.003		< 0.003	Pass	Pass	-
alpha-BHC	EPA 608.3	ug/L	1			2	0.03	0.125	< 0.008		< 0.008		< 0.008		< 0.008	Pass	Pass	-
beta-BHC	EPA 608.3	ug/L	1				0.03	0.125	< 0.01		< 0.01		< 0.01		< 0.010	Pass	Pass	-
Chlordane (technical)	EPA 608.3	ug/L	1	0.09	0.09	2	0.1	1.25	< 0.025		< 0.025		< 0.025		< 0.025	Pass	Pass	-
delta-BHC (d-BHC)	EPA 608.3	ug/L	1					0.125	< 0.004		< 0.004		< 0.004		< 0.004	Pass	Pass	
Dieldrin	EPA 608.3	ug/L	1	0.71	0.71	2	0.03	0.125	< 0.003		< 0.003		< 0.003		< 0.003	Pass	Pass	-
Endosulfan I	EPA 608.3	ug/L	1	0.034	0.034		0.03	0.125	< 0.003		< 0.003		< 0.003		< 0.003	Pass	Pass	-
Endosulfan II	EPA 608.3	ug/L	1	0.034			0.03	0.125	< 0.004		< 0.004		< 0.004		< 0.004	Pass	Pass	-
Endosulfan sulfate	EPA 608.3	ug/L	1	0.034		2	0.02	0.125	< 0.003		< 0.003		< 0.003		< 0.003	Pass	Pass	-
Endrin	EPA 608.3	ug/L	1	0.037	0.037			0.125	< 0.004		< 0.004		< 0.004		< 0.004	Pass	Pass	
Endrin Aldehyde	EPA 608.3	ug/L	1	0.037	0.037	2	0.1	0.125	< 0.008		< 0.008		< 0.008		< 0.008	Pass	Pass	-
Endrin Ketone	EPA 608.3	ug/L	1	0.037	0.037		0.1	0.125	< 0.005		< 0.005		< 0.005		< 0.005	Pass	Pass	-
gamma-BHC (Lindane)	EPA 608.3	ug/L	1		0.16		0.1	0.125	< 0.005		< 0.005		< 0.005		< 0.005	Pass	Pass	-
Heptachlor	EPA 608.3	ug/L	1	0.053	0.053	2	0.1	0.125	< 0.005		< 0.005		< 0.005		< 0.005	Pass	Pass	-
Heptachlor epoxide	EPA 608.3	ug/L	1	0.053	0.053	2	0.1	0.125	< 0.002		< 0.002		< 0.002		< 0.002	Pass	Pass	-
Toxaphene	EPA 608.3	ug/L	1	0.21	90	2	0.1	1.25	< 0.100		< 0.100		< 0.100		< 0.100	Pass	Pass	--
PCBs, Total	EPA 608.3	ug/L	1	10			0.01	0.05	< 0.0129		< 0.0129		< 0.0129		< 0.013	Pass	Pass	-

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Table 3-3: Elutriate Analysis Results and Screening - TWE Cedar Port Pre-Dredge Testing 2021

Analyte	Method	Units	Sample Count	Screening Benchmarks			Target DL	Method DL	Sample IDs and Concentrations							Elutriate: Data Evaluation		
				TSWQS (30 TAC 307) Marine Acute Ref 1	Secon-dary Ref Screen Criteria	Ref 2, 3, or 4			MB-1-ELUT 21031513.15 3/17/2021		MB-5-ELUT 21031513.16 3/17/2021		MB-9-ELUT 21031513.17 3/17/2021		Average	Compare MAX to Preferred Bmark	With Mixing Zone Calcs	Additional Comment
									Result	Qual	Result	Qual	Result	Qual	Result			
METALS																		
Mercury	EPA 245.1	ug/L	1	2.1			0.2	0.0002	< 0.06		< 0.06		< 0.06		< 0.06	Pass	Pass	-
Antimony	EPA 200.8	ug/L	1		1500	3	3	0.00125	**1.82**		**0.984**	D1	**0.784**	D1	1.82	Pass	Pass	-
Arsenic	EPA 200.8	ug/L	1	149	69	2	1	0.00125	**5.07**		**3.35**		**2.56**		5.07	Pass	Pass	-
Cadmium	EPA 200.8	ug/L	1	40	40	2	1	0.00125	< 0.3	D1	< 0.3	D1	< 0.3	D1	< 0.30	Pass	Pass	-
Chromium (total)	EPA 200.8	ug/L	1		103	4	1	0.00125	**0.713**	D1	**0.344**	D1	< 0.3	D1	0.71	Pass	Pass	-
Copper	EPA 200.8	ug/L	1	13.5	4.8	2	1	0.00125	**1.5**		**1.21**	D1	**1.14**	D1	1.50	Pass	Pass	-
Lead	EPA 200.8	ug/L	1	133	210	2	1	0.00125	< 0.3	D1	< 0.3	D1	< 0.3	D1	< 0.30	Pass	Pass	-
Nickel	EPA 200.8	ug/L	1	118	74	2	1	0.00125	**1.93**		**2.17**		**1.9**		1.93	Pass	Pass	-
Silver	EPA 200.8	ug/L	1	2	1.9	2	1	0.00125	< 0.5	D1	< 0.5	D1	< 0.5	D1	< 0.50	Pass	Pass	-
Zinc	EPA 200.8	ug/L	1	92.7	90	2	1	0.005	**6.29**		**5.26**		**9.71**		6.29	Pass	Pass	-
MISCELLANEOUS																		
Ammonia	SM 4500NH3D	mg/L	1					0.03	0.85		0.71		1.37		0.850	--	--	-
Total Organic Carbon	SM 5310B	mg/L	1					1	4.7		4.8		4.6		4.700	--	--	-
TPH	TX 1005	mg/L	1					6.45	0.415	J	< 0.18		< 0.18		< 0.415	--	--	-

0.29	Detected Results in **BOLD**
U	Non-detected compound.
EXCEEDS	Maximum or average value exceeds the benchmark
PASS	Maximum or average value is below the benchmark
🟦	Preferred criteria, per USACE SWG guidance
🟨	Results exceed some screening criteria but not others
🟥	Results exceed all applicable screening criteria for that constituent
RL > BM	Reporting limit exceeds one or more benchmarks
ND or BDL or <value	Analyte not detected at the indicated reporting limit
U	Undetected at SDL (Sample Detection Limit).
J	Estimation. Below calibration range but above MDL.
H3	Sample was received and analyzed past holding time
D1	Sample required dilution due to matrix effects.

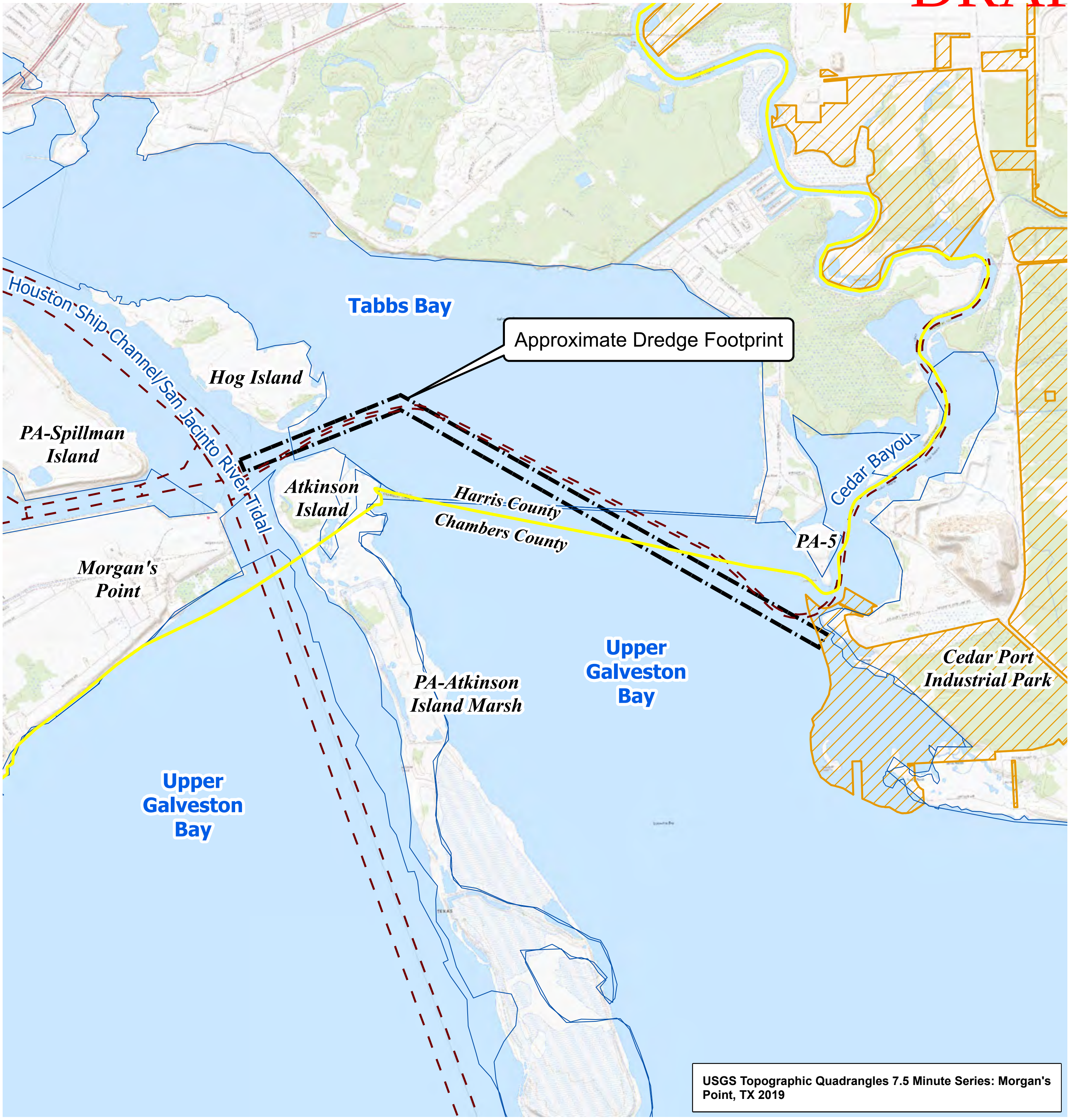
1 Texas Surface Water Quality Criteria (30TAC307) saltwater marine acute criteria, water effect ratio is equal to 1.
2 USEPA National Water Quality Criteria (WQC, Marine Acute)
3 NOAA Screening Quick Reference Tables (SQRT, Marine Acute Water)
4 USEPA Region 6 Watershed Standards (Marine Acute)

<u>Special Note:</u> All three elutriate samples were also analyzed for VOCs by Method 8269; no target compounds were detected. See last appendix.

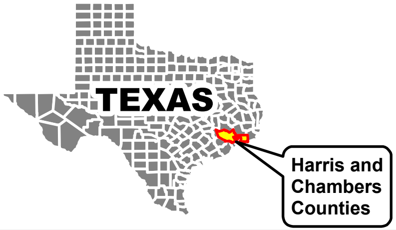
Table 3-4
Sediment Physical Characterization
TWE Cedar Port – 2021 Channel Dredging

Fraction	Units	MW-1 03/16/2021	MW-5 03/16/2021	MW-7 03/17/2021	MW-9 03/17/2021
Clay	%	26.1	20.3	25.4	44.0
Silt	%	27.7	47.1	49.8	39.2
Sand	%	46.2	32.6	24.8	16.8
Gravel	%	0.0	0.0	0.0	0.0
Total	%	100.0	100.0	100.0	100.0

Figures

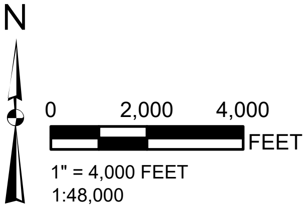


USGS Topographic Quadrangles 7.5 Minute Series: Morgan's Point, TX 2019



Legend

- ▭ Approximate Dredge Footprint
- ▨ TGS Cedar Port Partners LP Property Boundary
- ▭ USACE Federal Channel Framework
- — County Line



1" = 4,000 FEET
1:48,000

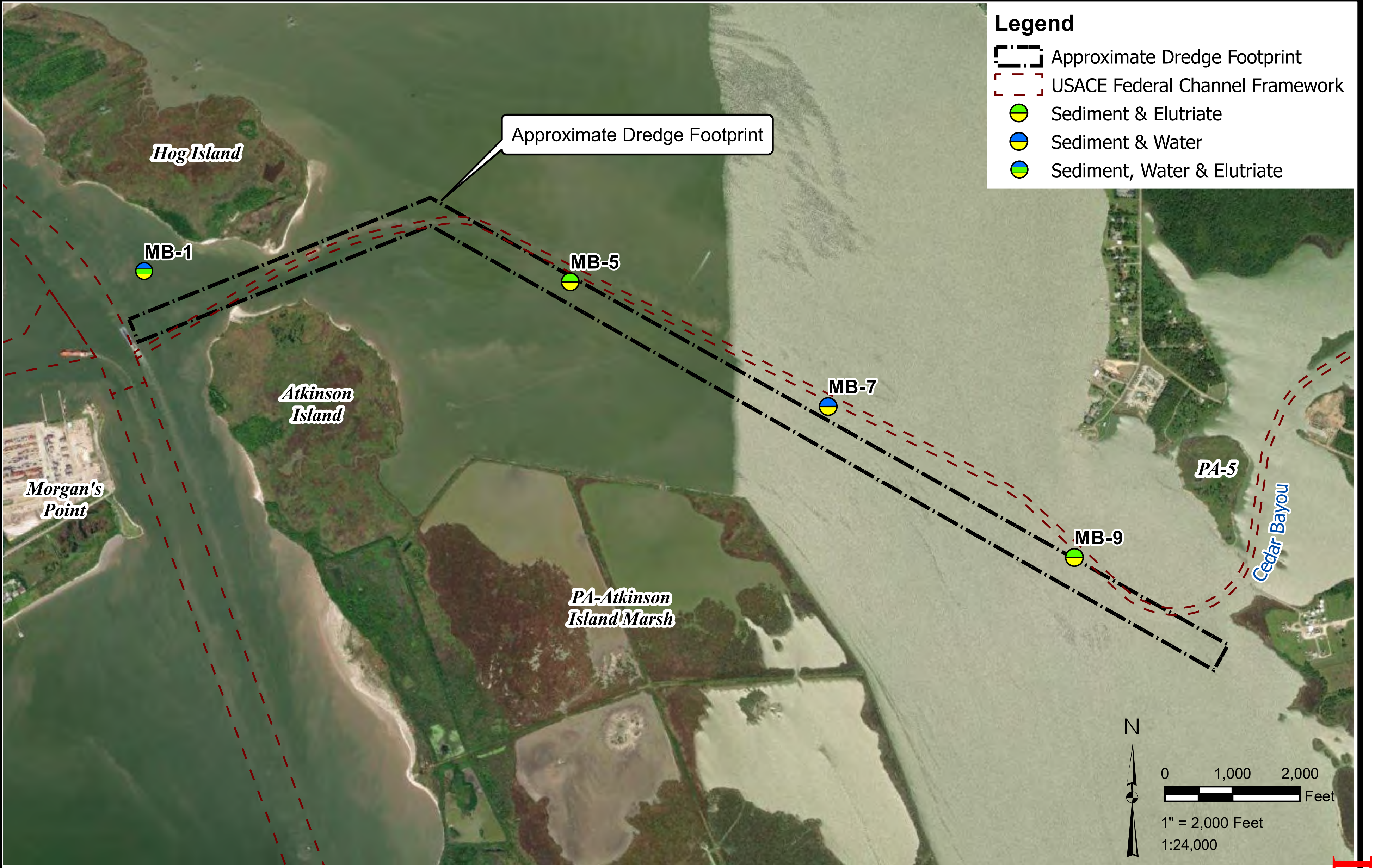
DiSorbo Environmental Consulting Firm
LANIER & ASSOCIATES CONSULTING ENGINEERS, INC.
Tolunay-Wong Engineers, Inc.
TGS Trans-Global Solutions, Inc.

CEDAR PORT IND PARK CHANNEL PRE-DREDGE

FIGURE 1
SITE LOCATION MAP

DRAWN BY:	L WILSON
APPROVED BY:	B DAVIS
PROJECT NO:	SITE LOCATION
FILE NO.	Dredge Project 2021.mxd
DATE:	MARCH 2021

J:\Prj\TGS Cedar Port\Dredge Project 2021\Dredge Project 2021.aprx
Printed By: laurie on 3/1/2021



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TGS Trans-Global Solutions, Inc.

CEDAR PORT INDUSTRIAL PARK CHANNEL PRE-DREDGE

FIGURE 2 SITE PLAN AND SAMPLE LOCATIONS

DRAWN BY:	L WILSON
APPROVED BY:	B DAVIS
PROJECT NO:	SAMPLE LOCATIONS
FILE NO.	Dredge Project 2021.mxd
DATE:	APRIL 2021

J:\Prj\TGS Cedar Port\Dredge Project 2021\Dredge Project 2021.aprx
Printed By: laurie on 4/13/2021

USACE Tabulated Criteria

Table 3: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Analysis of Common COCs and Parameters for Marine Water and Elutriate, Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks				Suggested Methods [f]
			Region 6 [a]	TSWQS (Marie Acute) (1) [b]	EPA WQC (Marine Acute) (2) [c]	NOAA (Marine Acute) (3) [d]	Region 6 (Marine Acute) (4) [e]	
Semivolatiles								
1,2,4-Trichlorobenzene	120-82-1	ug/L	0.9^h	-	-	160	22	8270C, GC-MS SIM Mode; 1625C, 3510A, 3520A/8100, 8240A, 8250, 8260, 8270A, 8310
1,2-Dichlorobenzene	95-50-1	ug/L	0.8^h	-	-	1,970	591	
1,3-Dichlorobenzene	541-73-1	ug/L	0.9^h	-	-	1,970	142	
1,4-Dichlorobenzene	541-73-1	ug/L	1^h	-	-	1,970	99	
2,4-Dichlorophenol	120-83-2	ug/L	0.8^h	-	-	-	-	
2,4-Dimethylphenol	105-67-9	ug/L	10	-	-	-	-	
2,4-Dinitrophenol	51-28-5	ug/L	5^h	-	-	4,850	1330	
Acenaphthene	83-32-9	ug/L	0.75^h	-	-	970	40.4	
Acenaphthylene	208-96-8	ug/L	1.0^h	-	-	300	-	
Anthracene	120-12-7	ug/L	0.6^h	-	-	300	0. 18	
Benzo(a)anthracene	56-55-3	ug/L	0.4^h	-	-	300	-	
Benzo(a)pyrene	50-32-8	ug/L	0.3^h	-	-	300	-	
Benzo(b)fluoranthene	205-99-2	ug/L	0.6^h	-	-	300	-	
Benzo(g,h,i)perylene	191-24-2	ug/L	1.2^h	-	-	300	-	
Benzo(k)fluoranthene	207-08-9	ug/L	0.6^h	-	-	300	-	
Chrysene	218-01-9	ug/L	0.3^h	-	-	300	-	
Dibenzo(a,h)anthracene	53-70-3	ug/L	1.3^h	-	-	300	-	
Diethyl Phthalate	84-66-2	ug/L	1^h	-	-	2,944	884	
Fluoranthene	206-44-0	ug/L	0.9^h	-	-	40	2.96	
Fluorene	86-73-7	ug/L	0.6^h	-	-	300	50	
Hexachlorobenzene	118-74-1	ug/L	0.4^h	-	-	160	-	
Indeno[1,2,3-c,d]pyrene	193-39-5	ug/L	1.2^h	-		300	-	
Naphthalene	91-20-3	ug/L	0.8^h	-	-	-	250	
Pentachlorophenol	87-86-5	ug/L	50	15.1	13	13	9.6	
Phenanthrene	85-01-8	ug/L	0.5^h	7.7	-	7.7	4.6	
Phenol	108-95-2	ug/L	10	-	-	5,800	5,500	
Pyrene	129-00-0	ug/L	1.5^h	-	-	300	0. 24	
Pesticides								
4,4'-DDD	72-54-8	ug/L	0.1	0.13	-	3.6	0. 025	608, 3510A, 3520A/8080, 8081A
4,4'-DDE	72-55-9	ug/L	0.1	-	-	14	0. 14	
4,4'-DDT	50-29-3	ug/L	0.1	-	0.13 (G, ii)	0.065	0. 001	
Aldrin	309-00-2	ug/L	0.03^h	1.3	1.3 (G)	0.65	0. 13	

Table 3: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Analysis of Common COCs and Parameters for Marine Water and Elutriate, Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks				Suggested Methods [f]
			Region 6 [a]	TSWQS (Marie Acute) [b]	EPA WQC (Marine Acute) [c]	NOAA (Marine Acute) [d]	Region 6 (Marine Acute) [e]	
Alpha-BHC	319-84-6	ug/L	0.03	-	-	-	-	608, 3510A, 3520A/8080, 8081A
Beta-BHC	319-85-7	ug/L	0.03	-	-	-	-	
Chlordane and Derivatives	57-74-9	ug/L	0.03[h]	0.09	0.09 (G)	-	-	
Delta-BHC	319-86-8	ug/L	0.03	-	-	-	-	
Dieldrin	60-57-1	ug/L	0.03	0.71	0.71 (G)	0.355	0. 002	
Endosulfan and Derivatives	115-29-7	ug/L	0.1	0.034	0.034 (G, Y)	0.017	-	
Endrin and Derivatives	72-20-8	ug/L	0.1	0.037	0.037 (G)	0.0185	0. 002	
Gamma-BHC (lindane)	58-89-9	ug/L	0.1	-	0.16 (G)	0.08	-	
Heptachlor and Derivatives	76-44-8	ug/L	0.1	0.053	0.053 (G)	0.0265	0. 004	
Toxaphene	8001-35-2	ug/L	0.5	0.21	90 (D)	0.21	0. 0002	
Polychlorinated Biphenyls								
Total PCB	1336-36-3	ug/L	0.01	10	-	0.033	-	8082
Metals [g]								
Antimony	7440-36-0	ug/L	3 (0.03)[i]	-	-	1,500	500	200.8, 6010 or 6020
Arsenic	7440-38-2	ug/L	1 (0.011)[i]	149w	69 (A, D)	69	78	
Cadmium	7440-43-9	ug/L	1 (0.01)[i]	40w	40 (D)	40	-	
Chromium (total)	7440-47-3	ug/L	1	-	-	-	103	
Copper	7440-50-8	ug/L	1 (0.1)[i]	13.5w	4.8 (D, cc)	4.8	3.6	
Lead	7439-92-1	ug/L	1 (0.03)[i]	133w	210 (D)	210	5.3	
Mercury	7439-97-6	ug/L	0.2 (0.0003)[i]	2.1	-	1.8	1.1	7471, 7420, 245.1
Nickel	7440-02-0	ug/L	1 (0.1)[i]	118w	74 (D)	74	13.1	200.8, 6010 or 6020
Silver	7440-22-4	ug/L	1 (0.1)[i]	2w	1.9 (D)	0.95	-	
Zinc	7440-66-6	ug/L	1 (0.5)[i]	92.7w	90 (D)	90	84.2	
Miscellaneous Parameters								
Ammonia	NH3	mg/l	0.03	-	-	-	-	350.1, 350.2, 350.3
Total Organic Carbon	Q129	%	0.10%	-	-	-	-	9060, 415.1, APHA 5310D
Total Petroleum Hydrocarbons	8012-95-1	mg/l	0.1	-	-	-	NA	418.1, 8021, TNRCC 1005 & 1006

🟩 Selected Criteria

FOOTNOTES:

Table 3: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Analysis of Common COCs and Parameters for Marine Water and Elutriate, Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks				Suggested Methods [f]
			Region 6 [a]	TSWQS (Marie Acute) [b]	EPA WQC (Marine Acute) [c]	NOAA (Marine Acute) [d]	Region 6 (Marine Acute) [e]	

a) This list may include analyses and analytes not required for your site, or may not include site-specific requirements for your site. Consult with the Galveston District. The primary source of these TDLs was EPA 823-B-95-001, QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations. (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf)

b) TSWQS- https://www.tceq.texas.gov/waterquality/standards/2010standards.html

c) EPA WQC- http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

d) NOAA- http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

e) Region 6- http://www.epa.gov/region6/water/ecopro/watershd/standard/index.htm

f) Suggested methods from USEPA, 1995, "QA/QC Guidance for Sediment and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations" (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf), the SERIM (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100FTIH.TXT), and the USEPA Region 6 RIA (http://www.epa.gov/region6/water/ecopro/em/ocean/text/ria.pdf). Any method that can achieve these TDLs is acceptable, provided the appropriate documentation of the method performance is generated for the project and the method is adequately identified and described in the SAP.

g) Metals shall be expressed as Dissolved values in water samples, except for mercury, which shall be reported as Total Recoverable Concentrations

h) These values are based on recommendations from the EPA Region 6 laboratory in Houston; these values were based on data or other technical basis.

i) The values in parentheses are based on EPA "clean techniques", (EPA 1600 series methods) which are applicable in instances where other TDLs are inadequate to assess EPA water quality criteria.

TSWQS footnotes (footnote letters from TCEQ, only footnotes for constituents of concern are retained in this table):

w) Indicates that a criterion is multiplied by a water-effect ratio (WER) in order to incorporate the effects of local water chemistry on toxicity. The WER is equal to 1 except where sufficient data is available to establish a site-specific WER.

EPA WQC footnotes (footnote letters from NRWRC, only footnotes for constituents of concern are retained in this table)

A) This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive. Please consult the criteria document for details.

D) Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic life Metals Criteria (PDF)," (49 pp, 3MB) October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available on NSCEP's web site and 40CFR§131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble- Conversion Factors for Dissolved Metals.

G) This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (PDF) (153 pp, 7.3MB) (EPA 440/5-80-019), Chlordane (PDF) (68 pp, 3.1MB) (EPA 440/5-80-027), DDT (PDF) (175 pp, 8.3MB) (EPA 440/5-80-038), Endosulfan (PDF) (155 pp, 7.3MB) (EPA 440/5-80-046), Endrin (PDF) (103 pp, 4.6MB) (EPA 440/5-80-047), Heptachlor (PDF) (114 pp, 5.4MB) (EPA 440/5-80-052), Hexachlorocyclohexane (PDF) (109 pp, 4.8MB) (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines (PDF) (104 pp, 3.3MB). If evaluation is to be done using an averaging period, the acute criteria values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

Y) This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

cc) When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

ii)This criterion applies to DDT and its metabolites (i.e., the total conc. DDT plus metabolites should not exceed this value).

Table 4: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Bulk Analysis of Common COCs and Parameters for Marine Sediment (dry weight), Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks			Suggested Methods [d]
			Region 6 [a]	NOAA (Marine) [b]		Region 6	
				ERL	ERM	(Marine) [c]	
Semivolatiles							
1,2,4-Trichlorobenzene	120-82-1	ug/kg	10	-	-	-	8270C; GC-MS in SIM mode; 1625C, 3540A, 3550A/8100, 8240A, 8250, 8260, 8270A
1,2-Dichlorobenzene	95-50-1	ug/kg	20	-	-	-	
1,3-Dichlorobenzene	541-73-1	ug/kg	20	-	-	-	
1,4-Dichlorobenzene	541-73-1	ug/kg	20	-	-	-	
2,4-Dichlorophenol	120-83-2	ug/kg	120[f]	-	-	-	
2,4-Dimethylphenol	105-67-9	ug/kg	20	-	-	-	
2,4-Dinitrophenol	51-28-5	ug/kg	500[f]	-	-	-	
Acenaphthene	83-32-9	ug/kg	20	16	500	16	
Acenaphthylene	208-96-8	ug/kg	20	44	640	44	
Anthracene	120-12-7	ug/kg	20	85.3	1,100	85.3	
Benzo(a)anthracene	56-55-3	ug/kg	20	261	1,600	261	
Benzo(a)pyrene	50-32-8	ug/kg	20	430	1,600	430	
Benzo(b)fluoranthene	205-99-2	ug/kg	20	-	-	-	
Benzo(g,h,i)perylene	191-24-2	ug/kg	20	-	-	-	
Benzo(k)fluoranthene	207-08-9	ug/kg	20	-	-	-	
Chrysene	218-01-9	ug/kg	20	384	2,800	384	
Dibenzo(a,h)anthracene	53-70-3	ug/kg	20	63.4	260	63.4	
Diethyl Phthalate	84-66-2	ug/kg	50	-	-	-	
Fluoranthene	206-44-0	ug/kg	20	600	5,100	600	
Fluorene	86-73-7	ug/kg	20	19	540	19	
Hexachlorobenzene	118-74-1	ug/kg	10	-	-	-	
Indeno[1,2,3-c,d]pyrene	193-39-5	ug/kg	20	-	-	-	
Naphthalene	91-20-3	ug/kg	20	160	2,100	160	
Pentachlorophenol	87-86-5	ug/kg	100	-	-	-	
Phenanthrene	85-01-8	ug/kg	20	240	1,500	240	
Phenol	108-95-2	ug/kg	100	-	-	-	
Pyrene	129-00-0	ug/kg	20	665	2,600	665	
Pesticides							
4,4'-DDD	72-54-8	ug/kg	5[f]	2	20	1.22	3540A, 3550A/8080, 8081A
4,4'-DDE	72-55-9	ug/kg	5[f]	2.2	27	2.07	
4,4'-DDT	50-29-3	ug/kg	5[f]	1	7	1.19	
Aldrin	309-00-2	ug/kg	3[f]	-	-	-	
Alpha-BHC	319-84-6	ug/kg	3[f]	-	-	-	
Beta-BHC	319-85-7	ug/kg	3[f]	-	-	-	
Chlordane and Derivatives	57-74-9	ug/kg	3[f]	-	-	-	
Delta-BHC	319-86-8	ug/kg	3[f]	-	-	-	
Dieldrin	60-57-1	ug/kg	5[f]	0.02	8	0.715	
Endosulfan and Derivatives	115-29-7	ug/kg	5[f]	-	-	-	
Endrin and Derivatives	72-20-8	ug/kg	5[f]	-	-	-	
Gamma-BHC (Lindane)	58-89-9	ug/kg	3[f]	-	-	-	
Heptachlor and Derivatives	76-44-8	ug/kg	3[f]	-	-	-	
Toxaphene	8001-35-2	ug/kg	50	-	-	-	
Polychlorinated Biphenyls							
Total PCB	1336-36-3	ug/kg	1	22.7 (g)	180	22.7 (g)	8082
Metals [e]							
Antimony	7440-36-0	mg/kg	2.5	-	-	-	6010/6020 , 3050A/7421, 7420, 3010A
Arsenic	7440-38-2	mg/kg	1	8.2	70	8.2	
Cadmium	7440-43-9	mg/kg	1	1.2	96	1.2	
Chromium (total)	7440-47-3	mg/kg	1	81	370	81	
Copper	7440-50-8	mg/kg	10	34	270	34	

Table 4: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Bulk Analysis of Common COCs and Parameters for Marine Sediment (dry weight), Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks			Suggested Methods [d]
			Region 6 [a]	NOAA (Marine) [b]		Region 6 (Marine) [c]	
				ERL	ERM		
Lead	7439-92-1	mg/kg	10	46.7	218	46.7	6010/6020 , 3050A/7421, 7420, 3010A
Mercury	7439-97-6	mg/kg	0.1	0.15	0.71	0.15	7471
Nickel	7440-02-0	mg/kg	10	20.9	51.6	20.9	6010/6020, 3050A/7421, 7420, 3010A
Silver	7440-22-4	mg/kg	1	1	3.7	1	
Zinc	7440-66-6	mg/kg	10	150	410	150	
Miscellaneous Parameters							
Ammonia	NH3	mg/kg	0.1	-	-	-	350.1, 350.1
Grain Size (sand, silt, clay)	-	%	1%	-	-	-	Sieve & Hydrometer
Total Organic Carbon	Q129	%	0.10%	-	-	-	9060
Total Petroleum Hydrocarbons	8012-95-1	mg/kg	5	-	-	-	8021, 9070, 418.1, TRNCC 1005 & 1006
Total Solids/Dry Weight	-	%	0.10%	-	-	-	160.3

🟩 Selected Criteria

FOOTNOTES:

a) This list may include analyses and analytes not required for your site, or may not include site-specific requirements for your site. Consult with the Galveston District. The primary source of these TDLs was EPA 823-B-95-001, QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations. (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf)

b) NOAA- http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

c) Region 6- http://rais.ornl.gov/tools/eco_search.php

d) Suggested methods reported in USEPA, 1995, "QA/QC Guidance for Sediment and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations" (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf). Any method that can achieve these TDLs is acceptable, provided the appropriate documentation of the method performance is generated for the project and the method is adequately identified and described in the SAP.

e) Metals shall be expressed as Dissolved values in water samples, except for mercury and selenium, which shall be reported as Total Recoverable

f) These values are based on recommendations from the EPA Region 6 Laboratory in Houston; these values were based on data or other technical basis.

g) Total PCBs for Region 6 from "Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas" RG-263 (revised) January 2006; Total PCBs for NOAA from Squirt Table for Organics in Sediment

Table 5: Tier I Soil PCLs for Human Health Screening [Total Combined, Redidential and Commercial/Industrial] for Common COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Screening Benchmarks[a]	
			Residential[b]	Commercial/Industrial[c]
Semivolatiles				
1,2,4-Trichlorobenzene	120-82-1	mg/kg	7.0E+01	1.1E+02
1,2-Dichlorobenzene	95-50-1	mg/kg	3.9E+02	5.7E+02
1,3-Dichlorobenzene	541-73-1	mg/kg	6.2E+01	8.8E+01
1,4-Dichlorobenzene	541-73-1	mg/kg	2.5E+02	1.2E+03
2,4-Dichlorophenol	120-83-2	mg/kg	2.0E+02	2.0E+03
2,4-Dimethylphenol	105-67-9	mg/kg	1.3E+03	1.4E+04
2,4-Dinitrophenol	51-28-5	mg/kg	1.3E+02	1.4E+03
Acenaphthene	83-32-9	mg/kg	3.0E+03	3.7E+04
Acenaphthylene	208-96-8	mg/kg	3.8E+03	3.7E+04
Anthracene	120-12-7	mg/kg	1.8E+04	1.9E+05
Benzo(a)anthracene	56-55-3	mg/kg	4.1E+01	1.7E+02
Benzo(a)pyrene	50-32-8	mg/kg	4.1E+00	1.7E+01
Benzo(b)flouranthene	205-99-2	mg/kg	4.1E+01	1.7E+02
Benzo(g,h,i)perylene	191-24-2	mg/kg	1.8E+03	1.9E+04
Benzo(k)fluoranthene	207-08-9	mg/kg	4.2E+02	1.7E+03
Chrysene	218-01-9	mg/kg	4.1E+03	1.7E+04
Dibenzo(a,,h)anthracene	53-70-3	mg/kg	4.0E+00	1.7E+01
Diethyl Phthalate	84-66-2	mg/kg	5.3E+04	5.5E+05
Fluoranthene	206-44-0	mg/kg	2.3E+03	2.5E+04
Fluorene	86-73-7	mg/kg	2.3E+03	2.5E+04
Hexachlorobenzene	118-74-1	mg/kg	1.0E+00	6.9E+00
Indeno[1,2,3-c,d]pyrene	193-39-5	mg/kg	4.2E+01	1.7E+02
Naphthalene	91-20-3	mg/kg	1.2E+02	1.9E+02
Pentachlorophenol	87-86-5	mg/kg	7.3E-01	3.2E+01
Phenanthrene	85-01-8	mg/kg	1.7E+03	1.9E+04
Phenol	108-95-2	mg/kg	9.5E+02	1.4E+03
Pyrene	129-00-0	mg/kg	1.7E+03	1.9E+04
Pesticides				
4,4'-DDD	72-54-8	mg/kg	1.4E+01	1.0E+02
4,4'-DDE	72-55-9	mg/kg	1.0E+01	7.3E+01
4,4'-DDT	50-29-3	mg/kg	5.4E+00	6.8E+01
Aldrin	309-00-2	mg/kg	5.0E-02	9.7E-01
Alpha-BHC	319-84-6	mg/kg	2.5E-01	2.9E+00
Alpha chlordane	5103-71-9	mg/kg	1.3E+01	5.4E+01
Beta-BHC	319-85-7	mg/kg	9.2E-01	1.1E+01
Beta chlordane	5103-74-2	mg/kg	-	-
Delta-BHC	319-86-8	mg/kg	2.9E+00	1.2E+01
Dieldrin	60-57-1	mg/kg	1.5E-01	1.1E+00
Endosulfan	115-29-7	mg/kg	4.0E+02	4.1E+03
Endosulfan I	959-98-8	mg/kg	9.1E+01	1.4E+03

Table 5: Tier I Soil PCLs for Human Health Screening [Total Combined, Redidential and Commercial/Industrial] for Common COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Screening Benchmarks[a]	
			Residential[b]	Commercial/Industrial[c]
Endosulfan II	33213-65-9	mg/kg	2.7E+02	4.1E+03
Endosulfan sulfate	1031-07-8	mg/kg	3.8E+02	4.1E+03
Endrin	72-20-8	mg/kg	9.0E+00	2.0E+02
Endrin aldehyde	7421-93-4	mg/kg	1.9E+01	2.0E+02
Endrin ketone	53494-70-5	mg/kg	1.9E+01	2.0E+02
Gamma-BHC (Lindane)	58-89-9	mg/kg	1.1E+00	1.8E+01
Gamma chlordane	5566-34-7	mg/kg	7.3E+00	5.1E+01
Heptachlor	76-44-8	mg/kg	1.3E-01	2.8E+00
Heptachlor epoxide	1024-57-3	mg/kg	2.4E-01	1.9E+00
Toxaphene	8001-35-2	mg/kg	1.2E+00	1.7E+01
Polychlorinated Biphenyls				
Total PCB	1336-36-3	mg/kg	1.1E+00	7.1E+00
Metals				
Antimony	7440-36-0	mg/kg	1.5E+01	3.1E+02
Arsenic	7440-38-2	mg/kg	2.4E+01	2.0E+02
Cadmium	7440-43-9	mg/kg	5.1E+01	7.7E+02
Chromium (total)	7440-47-3	mg/kg	2.7E+04	7.5E+04
Copper	7440-50-8	mg/kg	1.3E+03	9.4E+04
Lead	7439-92-1	mg/kg	-	-
Mercury (pH = 4.9)	7439-97-6	mg/kg	2.1E+00	3.3E+00
Mercury (pH = 6.8)	7439-97-6	mg/kg	5.5E+00	1.1E+01
Nickel	7440-02-0	mg/kg	8.4E+02	8.6E+03
Silver	7440-22-4	mg/kg	9.7E+01	2.3E+03
Zinc	7440-66-6	mg/kg	9.9E+03	2.5E+05
Metals				
Ammonia	NH3	mg/kg	2.5E+03	3.5E+03
Grain Size (sand, silt, clay)	-	%	-	-
Total Organic Carbon	Q129	%	-	-
Total Petroleum Hydrocarbons[d]	8012-95-1	mg/kg	1.1E+03	2.1E+03
Total Solids/Dry Weight	-	%	-	-

FOOTNOTES:

a) TCEQ Texas Risk Reduction Program (TRRP-http://tceq.texas.gov/remediation/trrp/guidance.html);lowest values are reported from 0.5 acre and 30 acre carinogenic and noncarcinogenic values.

b) Residential total soil combined include inhalation, ingestion, dermal, and vegetable consumption pathways.

c) Region 6- http://rais.ornl.gov/tools/eco_search.php

d) Suggested methods reported in USEPA, 1995, "QA/QC Guidance for Sediment and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations" (http://water.epa/gov/polwaste/sediments/cs/upload/evaluationguide.pdf). Any method that can achieve these TDLs is acceptable, provided the appropriate documentation of the method performance is generated for the project and the method is adequately

Table 6: Ecological Benchmarks for Soil for Common COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Median Background	Screening Benchmarks			
				TCEQ [a]		EcoSSL [b]	
				Earthworms	Plants	Avian	Mammal
Semivolatiles							
1,2,4-Trichlorobenzene	120-82-1	ug/kg	-	2.0E+04	-	-	-
1,2-Dichlorobenzene	95-50-1	ug/kg	-	-	-	-	-
1,3-Dichlorobenzene	541-73-1	ug/kg	-	-	-	-	-
1,4-Dichlorobenzene	541-73-1	ug/kg	-	2.0E+04	-	-	-
2,4-Dichlorophenol	120-83-2	ug/kg	-	-	-	-	-
2,4-Dimethylphenol	105-67-9	ug/kg	-	-	-	-	-
2,4-Dinitrophenol	51-28-5	ug/kg	-	-	2.0E+04	-	-
Acenaphthene	83-32-9	ug/kg	-	-	2.0E+04	-	-
Acenaphthylene	208-96-8	ug/kg	-	-	-	-	-
Anthracene	120-12-7	ug/kg	-	-	-	-	-
Benzo(a)anthracene	56-55-3	ug/kg	-	-	-	-	-
Benzo(a)pyrene	50-32-8	ug/kg	-	-	-	-	-
Benzo(b)fluoranthene	205-99-2	ug/kg	-	-	-	-	-
Benzo(g,h,i)perylene	191-24-2	ug/kg	-	-	-	-	-
Benzo(k)fluoranthene	207-08-9	ug/kg	-	-	-	-	-
Chrysene	218-01-9	ug/kg	-	-	-	-	-
Dibenzo(a,h)anthracene	53-70-3	ug/kg	-	-	-	-	-
Diethyl Phthalate	84-66-2	ug/kg	-	-	1.0E+05	-	-
Fluoranthene	206-44-0	ug/kg	-	-	-	-	-
Fluorene	86-73-7	ug/kg	-	3.0E+04	-	-	-
Hexachlorobenzene	118-74-1	ug/kg	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene	193-39-5	ug/kg	-	-	-	-	-
Naphthalene	91-20-3	ug/kg	-	-	-	-	-
Pentachlorophenol	87-86-5	ug/kg	-	3.1E+04	5.0E+02	2.1E+03	2.8E+03
Phenanthrene	85-01-8	ug/kg	-	-	-	-	-
Phenol	108-95-2	ug/kg	-	3.0E+04	7.0E+04	-	-
Pyrene	129-00-0	ug/kg	-	-	-	-	-
Pesticides							
4,4′-DDD	72-54-8	ug/kg	-	-	-	9.3E+01	2.1E+01
4,4′-DDE	72-55-9	ug/kg	-	-	-	9.3E+01	2.1E+01
4,4′-DDT	50-29-3	ug/kg	-	-	-	9.3E+01	2.1E+01
Aldrin	309-00-2	ug/kg	-	-	-	-	-
Alpha-BHC	319-84-6	ug/kg	-	-	-	-	-
Alpha chlordane	5103-71-9	ug/kg	-	-	-	-	-
Beta-BHC	319-85-7	ug/kg	-	-	-	-	-
Beta chlordane	5103-74-2	ug/kg	-	-	-	-	-
Delta-BHC	319-86-8	ug/kg	-	-	-	-	-
Dieldrin	60-57-1	ug/kg	-	-	-	2.2E+01	4.9E+00
Endosulfan	115-29-7	ug/kg	-	-	-	-	-
Endosulfan I	959-98-8	ug/kg	-	-	-	-	-
Endosulfan II	33213-65-9	ug/kg	-	-	-	-	-
Endosulfan sulfate	1031-07-8	ug/kg	-	-	-	-	-
Endrin	72-20-8	ug/kg	-	-	-	-	-
Endrin aldehyde	7421-93-4	ug/kg	-	-	-	-	-
Endrin ketone	53494-70-5	ug/kg	-	-	-	-	-
Gamma-BHC (Lindane)	58-89-9	ug/kg	-	-	-	-	-
Gamma chlordane	5566-34-7	ug/kg	-	-	-	-	-
Heptachlor	76-44-8	ug/kg	-	-	-	-	-

Table 6: Ecological Benchmarks for Soil for Common COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Median Background	Screening Benchmarks			
				TCEQ [a]		EcoSSL [b]	
				Earthworms	Plants	Avian	Mammal
Heptachlor epoxide	1024-57-3	ug/kg	-	-	-	-	-
Toxaphene	8001-35-2	ug/kg	-	-	-	-	-
Polychlorinated Biphenyls							
Total PCB	1336-36-3	ug/kg	-	-	4.0E+04	-	-
Metals							
Antimony	7440-36-0	mg/kg	1.0E+00	7.8E+01	5.0E+00	-	2.7E-01
Arsenic	7440-38-2	mg/kg	5.9E+00	6.0E+01	1.8E+01	4.3E+01	4.6E+01
Cadmium	7440-43-9	mg/kg	-	1.4E+02	3.2E+01	7.7E-01	3.6E-01
Chromium (total)	7440-47-3	mg/kg	3.0E+01	4.0E-01	1.0E+00	-	-
Copper	7440-50-8	mg/kg	1.5E+01	8.0E+01	7.0E+01	2.8E+01	4.9E+01
Lead	7439-92-1	mg/kg	1.5E+01	1.7E+03	1.2E+02	1.1E+01	5.6E+01
Mercury	7439-97-6	mg/kg	4.0E-02	1.0E-01	3.0E-01	-	-
Nickel	7440-02-0	mg/kg	1.0E+01	2.8E+02	3.8E+01	2.1E+02	1.3E+02
Silver	7440-22-4	mg/kg	-	-	5.6E+02	4.2E+00	1.4E+01
Zinc	7440-66-6	mg/kg	3.0E+01	1.2E+02	1.6E+02	4.6E+01	7.9E+01
Miscellaneous Parameters							
Ammonia	NH3	mg/kg	-	-	-	-	-
Grain Size (sand, silt, clay)	-	%	-	-	-	-	-
Total Organic Carbon	Q129	%	-	-	-	-	-
Total Petroleum Hydrocarbons	8012-95-1	mg/kg	-	-	-	-	-
Total Solids/Dry Weight	-	%	-	-	-	-	-

Footnotes:

a) TCEQ: Conducting Ecological Risk Assessments at Remediation Sites in Texas (2014) (http://www.tceq.texas.gov/remediation/eco/eco.html)

b) USEPA Eco-SSL: http://www.epa.gov/ecotox/ecossl/

Table 7: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Analysis of Special Land Use/History COCs and Parameters for Marine Water and Elutriate, Private Dredging Application

Chemical	CAS #	Units	TDL- Marine	Screening Benchmarks				Suggested Methods [f]
			Region 6 [a]	TSWQS (Marie Acute) [b]	EPA WQC (Marine Acute) [c]	NOAA (Marine Acute) [d]	Region 6 (Marine Acute) [e]	
Metals								
Chromium (3+)	7440-47-3 (III)	ug/L	1	-	-	103,000	-	6020
Chromium (6+)	7440-47-3 (Cr6+)	ug/L	1	1,090w	1,100 (D)	1,100	49.6	7196A, 7197, 218.5
Selenium [g]	7782-49-2	ug/L	2	564	290 (D, dd)	290	0.136	7740, 7741, 7742, 270.2, 270.2
Organotin								
Tributyltin	688-73-3	ug/L	0.01 [h]	-	-	-	-	Krone et al., 1989 (GC/FPD)
Miscellaneous Parameters								
Cyanides	57-12-5	mg/l	0.1 [i]	0.0056	1 (Q)	0.001	0.0056	335.2, 9010B/9012A

Footnotes:

a) This list may include analyses and analytes not required for your site, or may not include site-specific requirements for your site. Consult with the Galveston District. The primary source of these TDLs was EPA 823-B-95-001, QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations. (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf)

b) TSWQS- https://www.tceq.texas.gov/waterquality/standards/2010standards.html

c) EPA WQC- http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

d) NOAA- http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

e) Region 6- http://www.epa.gov/region6/water/ecopro/watershd/standard/index.htm

f) Suggested methods from USEPA, 1995, "QA/QC Guidance for Sediment and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations" (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf), the SERIM (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100FTIH.TXT), and the USEPA Region 6 RIA (http://www.epa.gov/region6/water/ecopro/em/ocean/text/ria.pdf). Any method that can achieve these TDLs is acceptable, provided the appropriate documentation of the method performance is generated for the project and the method is adequately identified and described in the SAP.

g) Selenium shall be reported as Total Recoverable Concentrations

h) TDL value taken from Southeast Regional Implementation Manual (2008) (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100FTIH.TXT)

i) This value recommended by Houston lab using colorimetric method. This value is based upon FREE cyanide, not complexed as the method is designed to analyze for. If free cyanide is expected, consult the laboratory as to the best method for quantifying free cyanide.

EPA WQC footnotes (footnote letters from NRWRC, only footnotes for constituents of concern are retained in this table)

D) Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic life Metals Criteria (PDF)," (49 pp, 3MB) October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available on NSCEP's web site and 40CFR§131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble-Conversion Factors for Dissolved Metals.

dd) Selenium criteria document (EPA 440/5-87-006, September 1987)states that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the conc.of selenium exceeds 5.0 µg/l in salt water because the saltwater CCC does not take into account uptake via the food chain.

Q) This recommended water quality criterion is expressed as ug free cyanide (as CN)/l.

Table 8: Target Detection Levels (TDLs), Screening Benchmarks and Analytical Methodology for Analysis of Special Land Use/History COCs and Parameters for Marine Sediment (dry weight), Private Dredging Application

Chemical	CAS #	Units	TDL-Marine	Screening Benchmarks			Suggested Methods [d]
			Region 6 [a]	NOAA (Marine) [b]		Region 6 (Marine) [c]	
				ERL	ERM		
Polychlorinated Biphenyls [e]							
Polychlorinated Biphenyls-209 congeners	-	ug/kg	1	-	-	-	1668
Metals							
Chromium (3+)	7440-47-3 (III)	mg/kg	1	-	-	-	6010/6020
Chromium (6+)	7440-47-3	mg/kg	1	-	-	-	7196
Selenium [f]	7782-49-2	mg/kg	0.5	-	-	-	7741, 7740, 6010/6020
Organotin [g]							
Dibutyltin	1002-53-5	ug/kg	10	-	-	-	Krone et al., 1989 (GC/FPD)
Monobutyltin	78763-54-9	ug/kg	10	-	-	-	
Tributyltin	688-73-3	ug/kg	10	-	-	-	
Miscellaneous Parameters							
Cyanides	57-12-5	mg/kg	2	-	-	-	9010B/9012A
Volatile Organics							
Trichloroethene	79-01-6	ug/kg	5	-	-	-	P&T
Tetrachloroethene	127-18-4	ug/kg	0.1	-	-	-	
Ethylbenzene	100-41-4	ug/kg	1.5	-	-	-	
Total Xylene (sum of o-, m-, p-)	95-47-6 108-38-3 106-42-3	ug/kg	5	-	-	-	
Dioxins/Furans [h]							
2,3,7,8 - TCDD	1746-01-6	pg/g	0.1	-	-	-	1613B
1,2,3,7,8 - PeCDD	40321-76-4	pg/g	0.1	-	-	-	
1,2,3,4,7,8 - HxCDD	39227-28-6	pg/g	0.1	-	-	-	
1,2,3,6,7,8 - HxCDD	57653-85-7	pg/g	0.1	-	-	-	
1,2,3,7,8,9 - HxCDD	19408-74-3	pg/g	0.1	-	-	-	
1,2,3,4,6,7,8 - HpCDD	35822-46-9	pg/g	0.1	-	-	-	
OCDD	3268-87-9	pg/g	0.1	-	-	-	
2,3,7,8 - TCDF	51207-31-9	pg/g	0.1	-	-	-	
1,2,3,7,8 - PeCDF	57117-41-6	pg/g	0.1	-	-	-	
2,3,4,7,8 - PeCDF	57117-31-4	pg/g	0.1	-	-	-	
1,2,3,4,7,8 - HxCDF	70648-26-9	pg/g	0.1	-	-	-	
1,2,3,6,7,8 - HxCDF	57117-44-9	pg/g	0.1	-	-	-	
2,3,4,6,7,8 - HxCDF	60851-34-5	pg/g	0.1	-	-	-	
1,2,3,7,8,9 - HxCDF	72918-21-9	pg/g	0.1	-	-	-	
1,2,3,4,6,7,8 - HpCDF	67562-39-4	pg/g	0.1	-	-	-	
1,2,3,4,7,8,9 - HpCDF	55673-89-7	pg/g	0.1	-	-	-	
OCDF	39001-02-0	pg/g	0.1	-	-	-	
Total Dioxin TEQ	-	pg/g	20	-	-	-	-

FOOTNOTES:

a) This list may include analyses and analytes not required for your site, or may not include site-specific requirements for your site. Consult with the Galveston District. The primary source of these TDLs was EPA 823-B-95-001, QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations. (http://water.epa.gov/polwaste/sediments/cs/upload/evaluationguide.pdf

b) NOAA- http://response/restoration.noaa.gov/cpr/sediment/squirt/squirt.html

c) Region 6- http://rais.ornl.gov/tools/eco_search.php

d) Suggested methods reported in USEPA, 1995, "QA/QC Guidance for Sediment and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations" (http://water.epa/gov/polwaste/sediments/cs/upload/evaluationguide.pdf). Any method that can achieve these TDLs is acceptable, provided the appropriate documentation of the method performance is generated for the project and the method is adequately identified and described in the SAP.

e) PCB congener TDLs are reported from the Southeast Regional Implementation Manual (2008) (http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100FTIH.TXT). Analysis of 209 congeners for fingerprinting.

f) Selenium shall be reported as Total Recoverable Concentrations

g) Organotin TDLs are reported from the Souteast Regional Implementation Manual (2008). For example, sites with historic sandblasting, shipbreaking, maintenance, and repair would warrant analysis of organotins.

h) Dioxins/Furans TDLs are reported from Galveston Harbor and Channel and HSC Table A-2

Table 9: Tier I Soil PCLs for Human Health Screening [Total Combined, Residential and Commerical/Industrial] for Speical Land Use/History COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Screening Benchmarks [a]	
			Residential [b]	Commercial/Industrial [c]
Polychlorinated Biphenyls [d]				
Polychlorinated Biphenyls- 209 congeners	-	ug/kg	1.14E+03	7.13E+03
Metals				
Chromium (3+)	7440-47-3 (III)	mg/kg	2.69E+04	7.46E+04
Chromium (6+)	7440-47-3 (Cr6+)	mg/kg	1.22E+02	1.01E+03
Selenium [e]	7782-49-2	mg/kg	3.09E+02	2.27E+03
Organotin				
Dibutyltin	1002-53-5	ug/kg	-	-
Monobutyltin	78763-54-9	ug/kg	-	-
Tributyltin	688-73-3	ug/kg	-	-
Miscellaneous Parameters				
Cyanides	57-12-5	mg/kg	4.80E+01	5.83E+02
Dioxins/Furans				
2,3,7,8 -TCDD	1746-01-6	pg/g	-	-
1,2,3,7,8 - PeCDD	40321-76-4	pg/g	-	-
1,2,3,4,7,8 - HxCDD	39227-28-6	pg/g	-	-
1,2,3,6,7,8 - HxCDD	57653-85-7	pg/g	-	-
1,2,3,7,8,9 - HxCDD	19408-74-3	pg/g	-	-
1,2,3,4,6,7,8 - HpCDD	35822-46-9	pg/g	-	-
OCDD	3268-87-9	pg/g	-	-
2,3,7,8 - TCDF	51207-31-9	pg/g	-	-
1,2,3,7,8 - PeCDF	57117-41-6	pg/g	-	-
2,3,4,7,8 - PeCDF	57117-31-4	pg/g	-	-
1,2,3,4,7,8 - HxCDF	70648-26-9	pg/g	-	-
1,2,3,6,7,8 - HxCDF	57117-44-9	pg/g	-	-
2,3,4,6,7,8 - HxCDF	60851-34-5	pg/g	-	-
1,2,3,7,8,9 - HxCDF	72918-21-9	pg/g	-	-
1,2,3,4,6,7,8 - HpCDF	67562-39-4	pg/g	-	-
1,2,3,4,7,8,9 - HpCDF	55673-89-7	pg/g	-	-
OCDF	39001-02-0	pg/g	-	-
Total Dioxin TEQ (2,3,7,8,-TCDD TEQ)	-	pg/g	1	5

Footnotes:

a) TCEQ Texas Risk Reduction Program (TRRP-http://www.tceq.texas.gov/remediation/trrp/guidance.html); lowest values are reported from 0.5 acre and 30 acre carcinogenic and noncarcinogenic values.

b) TRRP Table 4- Residential total soil combined include inhalation, ingestion, dermal, and vegetable consumption pathways.

c) TRRP Table 5- Commercial/Industrial total soil combined include inhalation, ingestion, and dermal pathways.

d) Analysis of 209 congeners for fingerprinting.

e) Selenium shall be reported as Total Recoverable Concentrations

Table 10: Ecological Benchmarks for Soil for Special Land Use/History COCs and Parameters, Private Dredging Application

Chemical	CAS #	Units	Median Background	Screening Benchmarks			
				TCEQ [a]		EcoSSL [b]	
				Earthworms	Plants	Avian	Mammal
Polychlorinated Biphenyls [c]							
Polychlorinated Biphenyls- 209 congeners	-	ug/kg	-	-	4.00E+01	-	-
Metals							
Chromium (3+)	7440-47-3 (III)	mg/kg	-	-	-	26	34
Chromium (6+)	7440-47-3 (Cr6+)	mg/kg	-	-	-	-	130
Selenium [d]	7782-49-2	mg/kg	3.00E-01	4.10E+00	5.20E-01	1.20E+00	6.30E-01
Organotin							
Dibutyltin	1002-53-5	ug/kg	-	-	-	-	-
Monobutyltin	78763-54-9	ug/kg	-	-	-	-	-
Tributyltin	688-73-3	ug/kg	-	-	-	-	-
Miscellaneous Parameters							
Cyanides	57-12-5	mg/kg	-	-	-	-	-
Dioxins/Furans							
2,3,7,8 -TCDD	1746-01-6	pg/g	-	-	-	-	-
1,2,3,7,8 - PeCDD	40321-76-4	pg/g	-	-	-	-	-
1,2,3,4,7,8 - HxCDD	39227-28-6	pg/g	-	-	-	-	-
1,2,3,6,7,8 - HxCDD	57653-85-7	pg/g	-	-	-	-	-
1,2,3,7,8,9 - HxCDD	19408-74-3	pg/g	-	-	-	-	-
1,2,3,4,6,7,8 - HpCDD	35822-46-9	pg/g	-	-	-	-	-
OCDD	3268-87-9	pg/g	-	-	-	-	-
2,3,7,8 - TCDF	51207-31-9	pg/g	-	-	-	-	-
1,2,3,7,8 - PeCDF	57117-41-6	pg/g	-	-	-	-	-
2,3,4,7,8 - PeCDF	57117-31-4	pg/g	-	-	-	-	-
1,2,3,4,7,8 - HxCDF	70648-26-9	pg/g	-	-	-	-	-
1,2,3,6,7,8 - HxCDF	57117-44-9	pg/g	-	-	-	-	-
2,3,4,6,7,8 - HxCDF	60851-34-5	pg/g	-	-	-	-	-
1,2,3,7,8,9 - HxCDF	72918-21-9	pg/g	-	-	-	-	-
1,2,3,4,6,7,8 - HpCDF	67562-39-4	pg/g	-	-	-	-	-
1,2,3,4,7,8,9 - HpCDF	55673-89-7	pg/g	-	-	-	-	-
OCDF	39001-02-0	pg/g	-	-	-	-	-
Total Dioxin TEQ (2,3,7,8,-TCDD TEQ)	-	pg/g	-	-	-	-	-

Footnotes:

a) TCEQ: Conducting Ecological Risk Assessments at Remediation Sites in Texas (2014) (http://www.tceq.texas.gov/remediation/eco/eco.html)

b) USEPA Eco-SSL: http://www.epa.gov/ecotox/ecossl/

c) Analysis of 209 congeners for fingerprinting.

d) Selenium shall be reported as Total Recoverable Concentrations

Texas-Specific Criteria

Texas-Specific Soil Background Concentrations
milligrams per kilogram (mg/kg)[1]

Metal	Median Background Concentration (mg/kg)
Aluminum	30,000
Antimony	1
Arsenic	5.9
Barium	300
Beryllium	1.5
Boron	30
Total Chromium	30
Cobalt	7
Copper	15
Fluoride	190
Iron	15,000
Lead	15
Manganese	300
Mercury	0.04
Nickel	10
Selenium	0.3
Strontium	100
Tin	0.9
Titanium	2,000
Thorium	9.3
Vanadium	50
Zinc	30

[1] Source: "Background Geochemistry of Some Rocks, Soils, Plants, and Vegetables in the Conterminous United States", by Jon J. Connor, Hansford T. Shacklette, et al., Geological Survey Professional Paper 574-F, US Geological Survey.

TABLE 1

Criteria in Water for Specific Toxic Materials - AQUATIC LIFE PROTECTION

(All values are listed or calculated in micrograms per liter)
(Hardness concentrations are input as milligrams per liter)

Parameter	CASRN	Freshwater	Freshwater	Saltwater	Saltwater
		Acute Criteria	Chronic Criteria	Acute Criteria	Chronic Criteria
Aldrin	309-00-2	3.0	---	1.3	---
Aluminum (d)	7429-90-5	991w	---	---	---
Arsenic (d)	7440-38-2	340 w	150 w	149w	78w
Cadmium (d)	7440-43-9	$1.136672-(\ln(hardness)(0.041838))\ (we^{(1.0166(\ln(hardness))-2.4743)})$	$1.101672-(\ln(hardness)(0.041838))\ (we^{(0.7409(\ln(hardness))-4.719)})$	40.0 w	8.75 w
Carbaryl	63-25-2	2.0	---	613	---
Chlordane	57-74-9 and 12789-03-6	2.4	0.004	0.09	0.004
Chlorpyrifos	2921-88-2	0.083	0.041	0.011	0.006
Chromium (Tri) (d)	16065-83-1	$0.316we^{(0.8190(\ln(hardness))+3.7256)}$	$0.860we^{(0.8190(\ln(hardness))+0.6848)}$	---	---
Chromium (Hex) (d)	18540-29-9	15.7w	10.6w	1,090w	49.6w
Copper (d)*	7440-50-8	$0.960m\ e^{(0.9422(\ln(hardness))-1.6448)}$	$0.960m\ e^{(0.8545(\ln(hardness))-1.6463)}$	13.5w	3.6w
Cyanide † (free)	57-12-5	45.8	10.7	5.6	5.6
4,4'- DDT	50-29-3	1.1	0.001	0.13	0.001
Demeton	8065-48-3	---	0.1	---	0.1

Diazinon	333-41-5	0.17	0.17	0.819	0.819
Dicofol	115-32-2	59.3	19.8	---	---
Dieldrin	60-57-1	0.24	0.002	0.71	0.002
Diuron	330-54-1	210	70	---	---
Endosulfan I (*alpha*)	959-98-8	0.22	0.056	0.034	0.009
Endosulfan II (*beta*)	33213-65-9	0.22	0.056	0.034	0.009
Endosulfan sulfate	1031-07-8	0.22	0.056	0.034	0.009
Endrin	72-20-8	0.086	0.002	0.037	0.002
Guthion	86-50-0	---	0.01	---	0.01
Heptachlor	76-44-8	0.52	0.004	0.053	0.004
Hexachloro-cyclohexane (*gamma*)(Lindane)	58-89-9	1.126	0.08	0.16	---
Lead (d)	7439-92-1	1.46203-(ln(hardness)(0.145712)) $(we^{(1.273(\ln(\text{hardness}))-1.460)})$	1.46203-(ln(hardness)(0.145712)) $(we^{(1.273(\ln(\text{hardness}))-4.705)})$	133w	5.3w
Malathion	121-75-5	---	0.01	---	0.01
Mercury	7439-97-6	2.4	1.3	2.1	1.1
Methoxychlor	72-43-5	---	0.03	---	0.03
Mirex	2385-85-5	---	0.001	---	0.001
Nickel (d)	7440-02-0	$0.998we^{(0.8460(\ln(\text{hardness}))+2.255)}$	$0.997we^{(0.8460(\ln(\text{hardness}))+0.0584)}$	118w	13.1w
Nonylphenol	84852-15-3	28	6.6	7	1.7
	and 25154-				

	52-3				
Parathion (ethyl)	56-38-2	0.065	0.013	---	---
Pentachlorophenol	87-86-5	$e^{(1.005(pH)-4.869)}$	$e^{(1.005(pH)-5.134)}$	15.1	9.6
Phenanthrene	85-01-8	30	30	7.7	4.6
Polychlorinated	1336-36-3	2.0	0.014	10	0.03
Biphenyls (PCBs) ‡					
Selenium	7782-49-2	20	5	564	136
Silver, as free ion	7440-22-4	0.8w	---	2w	---
Toxaphene	8001-35-2	0.78	0.0002	0.21	0.0002
Tributyltin (TBT)	688-73-3	0.13	0.024	0.24	0.0074
2,4,5 Trichlorophenol	95-95-4	136	64	259	12
Zinc (d)	7440-66-6	$0.978we^{(0.8473(\ln(hardness))+0.884)}$	$0.986we^{(0.8473(\ln(hardness))+0.884)}$	92.7w	84.2w

* In designated oyster waters, an acute saltwater copper criterion of 3.6 micrograms per liter applies outside of the mixing zone of permitted discharges, and specified mixing zones for copper do not encompass oyster reefs containing live oysters.

† Compliance will be determined using the analytical method for available cyanide.

(d) Indicates that the criteria for a specific parameter are for the dissolved portion in water. All other criteria are for total recoverable concentrations, except where noted.

‡ These criteria apply to the sum of all congener or all isomer or homolog or Arochlor analysis.

w Indicates that a criterion is multiplied by a water-effect ratio (WER) in order to incorporate the effects of local water chemistry on toxicity. The WER is equal to 1 except where sufficient data is available to establish a site-specific WER.

WERs for individual water bodies are listed in Appendix E when standards are revised. The number preceding the w in the freshwater criterion equation is an EPA conversion factor.

m Indicates that a criterion may be multiplied by a WER or a biotic ligand model result in order to incorporate the effects of local water chemistry on toxicity. The multiplier is equal to 1 except where sufficient data is available to establish a site-specific multiplier. Multipliers for individual water bodies are listed in Appendix E when standards are revised. The number preceding the m in the freshwater equation is an EPA conversion factor.

e The mathematical constant that is the basis of the natural logarithm. When rounded to four decimal points, *e* is equal to 2.7183.

Appendix C

Field Notes & Boring Logs

3/16/21 TWEI 21001

Marine Sampling & Analysis

San Jacinto River / North Bay

0730 Arrived @ Dock / Met w/ ME

WX: 70°F, wind East @ 1mph

Fog, Overcast

0800 - Departed Dock w/ work boat. Arrived @ Jack-up rig & set up equipment.

0830 - Moved rig to Station MB-1. Water Depth 6'

Morgan's Point Tide

0.50' ↑

0905 Started Drilling MB-1

1200 Stopped Drilling MB-1

PHOTOS: 359-364

1210 Sampled MB-1-SED

MB-1-ELUT-SED

3/16/21 TWEI 21001

1230 Arrived @ Station MB-5

Water Depth: 8'

Morgan's Point Tide

1.00' ↓

1245 - Started Drilling MB-5

Photos:

1515 - Stopped Drilling MB-5

1530 - Sampled MB-5-ELT-SED

MB-5-SED

1600 - Set up @ MB-7

Alisha @ A & B LABS

1630 Arrived @ Dock

1713 - Dropped off samples @ A & B LABS

3/17/2021 @ TWE
~~Hawaiian Energy~~ -
Cedar Dredge project

0600 - Left BNB. Stopped for fuel & ICE.

0730 - Arrived @ Boat launch. Loaded equipment. Departed for Barrington to fuel track boat.

0845 - Arrived @ Jack-up rig. Safety meeting.

WX: Humid wind NE @ 11 mph
71°F, 80% precip.

GPS of MB-7 / 036

Water Depth:

0900 Sampled MB-7 - WAT

0935 - Calibrated Horiba WQ meter

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WQ for Station MB-7
21.09°C
5.20 pH
201 ORP
13.7 ms/cm
71.3 NTU
8.24 ms/L DO

Morgan's Pt. Tide 0.80 ↑
@ 10:45

11:45 Stopped Drilling MB-7

1150 - Sampled MB-7 - SED
1155 - Trip Blank WAT
1200 - Departed for MB-9
Arrived

12:22 Started Drilling MB-9

1226 - Rain delay, Fronts line moving through.

1310 - Started Drilling MB-9

3/17/21 TWE
Cooper Dredge

MB-9 WQ
20.87°C
6.55 ph
134 ORP
14.2 mS/cm
92.9 NTU
5.61 mg/L DO

1300 Sampled MB-9-ELUT-WTR

1500 Stopped drilling MB-9

1520 Sampled MB-9-SED
MB-9-SED-ELUT

WX: Clear, 70°F Winds N @ 10 mph. Received ~0.25" evening front.

1530 Departed for station MB-3 (will not sample)

1645 - MB-5-ELUT-WAT

1710 - MB-1-ELUT WAT
MB-1-WAT

1730 - Equipment Blank sample

1745: Arrived @ Dock. Unloaded equipment

Equipment Report Card

Ajax
Environmental

Horiba U-52

Sonde- C1102

This equipment has been inspected prior to its shipment and the following items and general, observable condition have been described.

Please review this instrument upon its arrival to confirm the contents of this report. Should you recognize a deviation, please call 713-789-4149 to report your findings.

All items on this report will be reviewed upon the unit's return to AJAX Env. Any damage, lost items or unreasonable and unusual maintenance required to restore the unit to its reported condition will require additional charges to the customer.

1. Display: .... __x__
2. Sonde: .... __x__
3. Sonde Moisture Container: .... _____
4. Manual: .... __x__
5. Flow Thru Sampler (FTC): .... __x__
6. Calibration Cup: .... __x__
7. Small calibration solution: .... __x___

Auto Calibration Solution:
Lot 9082801
Exp. 09/30/21

---

1. calibrated pH reading:	4.01
2. Calibrated Conductivity reading:	4.50 mS/cm
3. Calibrated DO reading:	8.50 mg/l
4. Calibrated Turbidity reading:	0.0 NTU
5. Temperature reading for calibration:	24.15 C

Inspector: SNT Date: 03-15-21

Ajax Environmental
10801 Hammerly Blvd., Suite 148
Houston, TX 77043

Certification of Calibration

Zero Reading

MFG: GasCo Lot #: 305-401959890-1 Expiration: 11/10/24

Instrument S/N: A1101 **Model: MiniRae Lite**

Span Reading

Span Concentration 100 ppm Isobutylene

Zero Reading 0.0 ppm Span Reading 100.1 ppm

Calibrated by: Nick Taylor

Signature:

Date completed: March 15, 2021

Photographs During Collection of Media for Environmental Testing
TGS Cedar Port Industrial Park – Deepening/Widening Cedar Bayou Channel
Pre-Dredge Sampling Fieldwork – March 2021

1. Truck-mounted drill rig in braked position on work deck of Spud Barge.

2. Water Conditions Quiet for Portions of Full-Depth Core Collection Work.

3. Drilling Crew Performed Double Duty (Geotech and Envir Cores) during week.

4. Example of Brown and Gray Clays Encountered in Full-Depth Cores.

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Photographs During Collection of Media for Environmental Testing
TGS Cedar Port Industrial Park – Deepening/Widening Cedar Bayou Channel
Pre-Dredge Sampling Fieldwork – March 2021

5. Marine Core MB-7 at the
15-17 Foot Interval Sliced & Splayed

6. Typical Full-Depth Core Broken into
Lined Container for Forming Composite

7. Typical High-Clay Portion of a Full-Depth
Core Interval for Observation/Description

8. Closer-in View of Same Interval Splayed.

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Environmental Consulting Firm

Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : S. Hernandez
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 6'
Total Depth : 56'
Start Date/Time : 3/16/2021 09:00
Finish Date/Time : 3/16/2021 12:00

MB-1

(Sheet 1 of 3)

Latitude : 29.68740
Longitude : -94.98066
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0	0.0			SP	55	☒	SAND - Sulfide odor, brownish gray, shell fragments, low plasticity.
5	0.2			SP	90	☒	SAND - Similar to above (STA).
	16.0			SL	90	☒	CLAYEY SAND - Sulfide odor, gray, low plasticity.
10	6.0			SL	90	☒	CLAYEY SAND - STA.
	0.0			SL	90	☒	CLAYEY SAND - STA.
15	0.0			SP	100	☒	SAND - No odor, light to dark gray, fine to coarse grain.
	0.0			SP		☒	SAND - No odor, gray with some tan, fine grain.

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Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : S. Hernandez
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 6'
Total Depth : 56'
Start Date/Time : 3/16/2021 09:00
Finish Date/Time : 3/16/2021 12:00

MB-1

(Sheet 2 of 3)

Latitude : 29.68740
Longitude : -94.98066
Comments : Sediment samples were composites of full core.

Saturation

▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
19	0.0			SP	100	☒	
24	0.0			SP	50	☒	SAND - No odor, coarse.
29	0.0			SP	100	☒	SAND - STA, with clay inclusions
34	0.0			CH	100	☒	CLAY - Gley, moderate plasticity, firm, no odor, 2.5 tons/cubic foot.

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Cedar Port Industrial Park, Cedar Bayou
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Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 6'
Total Depth : 56'
Start Date/Time : 3/16/2021 09:00
Finish Date/Time : 3/16/2021 12:00

MB-1

(Sheet 3 of 3)

Latitude : 29.68740
Longitude : -94.98066
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
38	0.0		▨	CH	100	☒	CLAY - Gray with some tan, no odor, very firm, moderate plasticity, 3.5 tons/cubic foot
43	0.0		▨	CL	70	☒	CLAY - Very gralley, gray to brown, firm, low plasticity, no odor, some shells, 3.5 tons/cubic foot.
48	0.0		▨	CL	100	☒	CLAY - STA.
53							

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Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : S. Hernandez
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 8'
Total Depth : 58'
Start Date/Time : 3/16/2021 12:35
Finish Date/Time : 3/16/2021 15:40

MB-5

(Sheet 1 of 3)

Latitude : 29.68635
Longitude : -94.98086
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0	0.0		▨	CL	100	☒	SANDY CLAY - No odor, gray, soft, moderate plasticity.
5	0.0		▨	CL	100	☒	SANDY CLAY - Soft, gray, no odor, moderate plasticity, transitions to fat clay at 4.0'.
	0.0		▨	CL	100	☒	SANDY CLAY - Similar to above (STA), sulfide odor.
10	0.0		▨	CH	100	☒	CLAY - Sand lenses throughout, gray, no odor, fat.
	0.0		▨	CL	100	☒	CLAY - STA.
15	0.0		▨	CL	100	☒	CLAY - STA.
	0.0		▨	CL		☒	CLAY - STA, 2-3" of shell fill material at top then into the fat clays.

DiSorbo Consulting, LLC

1001 Louisiana Street, Suite 3250
Houston, Texas 77002
713-955-1230

9737 Great Hills Trail, Suite 340
Austin, Texas 78759
512-693-4190

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Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist	: James Reis
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Driller	: S. Hernandez
Drilling Rig	: SIMCO 2500
Drilling Method	: 4" Wash Bin
Sampling Method	: 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth	: 8'
Total Depth	: 58'
Start Date/Time	: 3/16/2021 12:35
Finish Date/Time	: 3/16/2021 15:40

MB-5

(Sheet 2 of 3)

Latitude	: 29.68635
Longitude	: -94.98086
Comments	: Sediment samples were composites of full core.

Saturation

▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
19	0.0		▨	CL	100	☒	
24	0.0		▨	CL	100	☒	CLAY - STA.
29	0.0		▨	CL	100	☒	CLAY - STA.
34	0.0		▨	CL	100	☒	CLAY - STA.

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Total Depth : 58'
Start Date/Time : 3/16/2021 12:35
Finish Date/Time : 3/16/2021 15:40

MB-5

(Sheet 3 of 3)

Latitude : 29.68635
Longitude : -94.98086
Comments : Sediment samples were composites of full core.

Saturation

▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
38	0.0		▨	CL	100 100	☒	CLAY - Sand and shell inclusions.
43	0.0		▨	CL	100	☒	SANDY SILTY CLAY - No odor, low plasticity, soft.
48	0.0		▨	CL	100	☒	CLAY - Transitions to clayey sand at 49'.
53							

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Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : H. Willoughby
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 7'
Total Depth : 57'
Start Date/Time : 3/17/2021 09:05
Finish Date/Time : 3/17/2021 11:40

MB-7

(Sheet 1 of 3)

Latitude : 29.68092
Longitude : -94.94906
Comments : Sediment samples were composites of full core.

Saturation

▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0	1.9			CL	100	☒	CLAY - Moderate plasticity, sand inclusions, gray, sulfide odor.
				SC			CLAYEY SAND - Low plasticity, gray, soft, shell inclusions, sulfide odor.
5	0.0			SC	100	☒	CLAYEY SAND - Similar to above (STA).
	0.0			CL	60	☒	SILTY CLAY - Moderate plasticity, soft, shell inclusions, no odor.
10	0.0			CL	50	☒	CLAY - Light brown, firm, moderate plasticity.
	0.0			CL	100	☒	CLAY - Light brown, very firm, moderate plasticity, gray/reddish brown redox inclusions, 2.75 tons/cubic foot.
15	0.0			CH	70	☒	CLAY - Dark reddish brown (redox), very firm, high plasticity, no odor, transitions to grayish yellow at bottom, 2.75 tons/cubic foot.
	0.0			CL		☒	CLAY - Gray, very firm, moderate plasticity, small black inclusions, 2.0 tons/cubic foot

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Environmental Consulting Firm

Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
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Driller : H. Willoughby
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 7'
Total Depth : 57'
Start Date/Time : 3/17/2021 09:05
Finish Date/Time : 3/17/2021 11:40

MB-7

(Sheet 2 of 3)

Latitude : 29.68092
Longitude : -94.94906
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION	Completion Results
19	0.0		▨	CL	100	☒		
24	0.0		▨	CL	80	☒	CLAY - STA, crumbly, 2.5 tons/cubic foot.	
29	0.0		▨	CL	70	☒	CLAY - Dark greenish gray, damp, low plasticity, crumbly, no odor	
34	0.0		▨	CL	60	☒	CLAY - Light to dark gray, low plasticity, no odor, crumbly.	

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Start Date/Time : 3/17/2021 09:05
Finish Date/Time : 3/17/2021 11:40

MB-7

(Sheet 3 of 3)

Latitude : 29.68092
Longitude : -94.94906
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
38	0.0			SS	95	☒	SAND - Gray, saturated, no odor, clayey sand until 39' into sand.
43	0.0			SS	40	☒	SAND - With some clay, gray, firm, no odor
48	0.0			SS	40	☒	SAND - STA.
53							

03-29-2021 C:\Box Sync\Projects\TWE\Cedar Port Pre-Dredge TWEI21001\Field Work\BORING LOGS\MB-7.bor

DiSorbo
Environmental Consulting Firm

Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : H. Willoughby
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 10.3'
Total Depth : 60.3'
Start Date/Time : 3/17/2021 13:00
Finish Date/Time : 3/17/2021 15:00

MB-9

(Sheet 1 of 3)

Latitude : 29.67444
Longitude : -94.93785
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
0	0.0		▨	CH	30	☒	CLAY - Unconsolidated, dark gray, no odor.
5	0.0		▨	CH	100	☒	CLAY - Gray, soft, no odor.
	0.0		▨	CH	65	☒	CLAY - Similar to above (STA), more firm than above.
10	0.0		▨	CH	50	☒	CLAY - STA.
	0.0		▨	CH	50	☒	CLAY - Reddish brown with gray, shells, crumbly, stiff, no odor.
15	0.0		▨	CH	100	☒	CLAY - STA.
	0.0		▨	CH		☒	CLAY - STA.

03-29-2021 C:\Box Sync\Projects\TWE\Cedar Port Pre-Dredge TWEI21001\Field Work\BORING LOGS\MB-9.bor

DiSorbo
Environmental Consulting Firm

Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist	: James Reis
Drilling Company	: TWE
Driller	: H. Willoughby
Drilling Rig	: SIMCO 2500
Drilling Method	: 4" Wash Bin
Sampling Method	: 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth	: 10.3'
Total Depth	: 60.3'
Start Date/Time	: 3/17/2021 13:00
Finish Date/Time	: 3/17/2021 15:00

MB-9

(Sheet 2 of 3)

Latitude	: 29.67444
Longitude	: -94.93785
Comments	: Sediment samples were composites of full core.

Saturation

▼ Saturation

Completion Results

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
19	0.0		▨	CH	70	☒	
24	0.0		▨	CH	75	☒	CLAY - STA, more gray/gley than above.
29	0.0		▨	CH	100	☒	CLAY - STA.
34	0.0		▨	CH	100	☒	CLAY - Gley, some gravel, no odor, stiff, crumbly, 2.0 tons/cubic foot.

DiSorbo
Environmental Consulting Firm

Cedar Port Industrial Park, Cedar Bayou
Tolunay-Wong Engineers
TWEI21001

Geologist : James Reis
Drilling Company : TWE
Driller : H. Willoughby
Drilling Rig : SIMCO 2500
Drilling Method : 4" Wash Bin
Sampling Method : 3"Shlby.Tb. & 2" Splt. Spn.
Water Depth : 10.3'
Total Depth : 60.3'
Start Date/Time : 3/17/2021 13:00
Finish Date/Time : 3/17/2021 15:00

MB-9

(Sheet 3 of 3)

Latitude : 29.67444
Longitude : -94.93785
Comments : Sediment samples were composites of full core.

Saturation
▼ Saturation

Depth (ft.)	PID (ppm)	Saturation	Lithology	USCS	Recovery (%)	Sample	DESCRIPTION
38	0.0		▥	SM	30	☒	SAND - Gray, no odor.
43	0.0		▥	SM	60	☒	SAND - STA.
48	0.0		░	SP	50	☒	SAND - Coarse.
53							

Completion Results

03-29-2021 C:\Box Sync\Projects\TWE\Cedar Port Pre-Dredge TWEI21001\Field Work\BORING LOGS\MB-9.bor

DRAFT

DiSorbo Consulting, LLC 1001 Louisiana Street, Suite 3250 | Houston, Texas 77002 713.955.1230 www.disorboconsult.com

Client: Tolunay-Wong Engineers, Trans-Global Solutior
Project No. TWEI21001
Boring No. \ Well No. MB-1
Project Name: Cedar Port Pre-Dredge 2021
Sheet 1 of 2
Water Depth: 6'
Target/Total Depth: 56' (H2O+TD)
GPS Coordinates: 29.68740, -94.98066
Logged By: James Reis
Drilling Methods \ Auger Size \ Bit Size: 4" Wash Bin
Drilling Rig: SIMCO 2500
Driller: S. Hernandez
Drilling Company: TWE
Sampling Method \ Size of Sampler: 3" Shelby Tube, 2" Split Spoon
Drilling Start Date / Time: 3.16.21 0900
Comments:
Drilling Finish Date / Time: 3.16.21 1200

Field Screening						
Depth (feet bgl)	PID (ppm)	Air Temp. (°F)	Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
	0.0	68	0-2	SP	55	SAND - sulfide odor, brownish grey, shell fragments,
						low plasticity
	0.2	69	3-5	SP	90	SAND - STA
	16.0	70	6-8	SL	90	CLAYEY SAND - sulfide odor, grey, low plasticity
	6.0	70	9-11	SL	90	CLAYEY SAND - STA
	0.0	70	12-14	SL	90	CLAYEY SAND - STA
	0.0	70	15-17	SP	100	SAND - no odor, light to dark grey, fine to coarse
						grain
	0.0	70	18-20	SP	100	SAND - no odor, gray w/ some tan, fine grain
	0.0	71	23-25	SP	50	SAND - no odor, coarse
	0.0	71	28-30	SP	100	SAND - STA w/ clay inclusions
	0.0	72	33-35	CH	100	CLAY - gley, mod. plasticity, firm, no odor
						2.5 tons/ft^3
	0.0	72	38-40	CH	100	CLAY - grey w/ some tan, no odor, very firm,
						mod. plasticity
						3.5 tons/ft^3

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See Pg 1

Client: Tolunay-Wong Engineers, Trans-Global Solutior

Project No. TWEI21001

Boring No. \ Well No. MB-1

Project Name: Cedar Port Pre-Dredge 2021

Sheet 2 of 2

Water Depth

Target/Total Depth

GPS Coordinates

Logged By

Drilling Methods \ Auger Size \ Bit Size

Drilling Rig

Driller

Drilling Company

Sampling Method \ Size of Sampler

Drilling Start Date / Time

Comments

Drilling Finish Date / Time

Field Screening			Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
Depth (feet bgl)	PID (ppm)	Air Temp. (°F)				
	0.0	72	43-45	CL	70	CLAY - very gravelly, grey to brown, firm,
						low plasticity, no odor, some shells
						3.5 tons/ft³
	0.0	72	48-50	CL	100	CLAY - STA
						✭ Sample times!
						1210 MB-1-SED
						1210 MB-1-ELUT-SED
						3.17.21 17:10 MB-1-WAT
						3.17.21 17:10 MB-1-ELUT-WAT

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Client: Tolunay-Wong Engineers, Trans-Global Solutior			Project No. TWEI21001		Boring No. \ Well No. MB-5
Project Name: Cedar Port Pre-Dredge 2021					Sheet 1 of 1
Water Depth 8'	Target/Total Depth -58' (H20→TD)	GPS Coordinates 29.68635, -94.96086			Logged By James Ress
Drilling Methods \ Auger Size \ Bit Size 4" Wash Bit		Drilling Rig SIMCO 2500	Driller S. Hernandez		Drilling Company TWE
Sampling Method \ Size of Sampler 3" Shelby Tube / 2" Split Spoon					Drilling Start Date / Time 3.16.21 1235
Comments					Drilling Finish Date / Time 3.16.21 1540

Depth (feet bgl)	Field Screening PID (ppm)	 Air Temp. (°F)	Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
	0.0	72	0-2	CL	100	SANDY CLAY - Soft, gray, no odor, mod. plasticity
	0.0	72	3-5	CL	100	SANDY CLAY - gray, soft, no odor, mod. plasticity,
						transitions to fat clay @ 4.0'
	0.0	72	6-8	CL	100	SANDY CLAY - STA, sulfide odor
	0.0	73	9-11	CH	100	CLAY - w/ sand lenses, gray, no odor, fat
	0.0	73	12-14	CL	100	CLAY - STA
	0.0	73	15-17	CL	100	CLAY - STA
	0.0	73	18-20	CL	100	CLAY - STA, 2-3" of shell fill material @
						top then into the fat clays
			23-25 * JR			
	0.0	73	~~21-23~~	CL	100	CLAY - STA
			~~25~~			
	0.0	74	28-30	CL	100	CLAY - STA
	0.0	74	33-35	CL	100	CLAY - STA
	0.0	74	38-40	CL	100	CLAY - Sand & shell inclusions, fines present
	0.0	74	43-45	CL	100	SANDY SILTY CLAY - no odor, low plasticity, soft
	0.0	75	48-50	CL	100	CLAY - transitions to clayey sand @ 49'

*Sample times: 1530 MB-5-SED
1530 MB-5-ELUT-SED

3.17.21 16:45
MB-5-ELUT-WAT

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Client Tolunay-Wong Engineers, Trans-Global Solutior

Project No. TWEI21001

Boring No. \ Well No. MB-7

Project Name Cedar Port Pre-Dredge 2021

Sheet 1 of 2

Water Depth 7'

Target/Total Depth 57' (H2O→TD)

GPS Coordinates 29.68092, -94.94906

Logged By James Reis

Drilling Methods \ Auger Size \ Bit Size ~~Shelby~~ 4" Wash Bin

Drilling Rig SIMCO 2500

Driller H. Willoughby

Drilling Company TWE

Sampling Method \ Size of Sampler 3" Shelby Tube / 2" Split Spoon

Drilling Start Date / Time 3.17.21 0905

Comments

Drilling Finish Date / Time 3.17.21 1140

Field Screening			Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
Depth (feet bgl)	PID (ppm)	Air Temp. (°F)				
	0.0	72	0-6"	CL	100	CLAY - mod. plasticity, sand inclusions, grey, sulfide odor
	1.9	72	6"-2'	SC	100	CLAYEY SAND - low plasticity, grey, soft, shell inclusions, sulfide odor
	0.0	72	3-5	SC	100	CLAY SAND - STA
	0.0	73	6-8	Ch	60	SILTY CLAY - mod. plasticity, soft, shell inclusions, no odor
	0.0	73	9-11	CL	50	CLAY - light brown, firm, mod. plasticity
	0.0	73	12-14	CL	100	CLAY - light brown, very firm, mod. plasticity, gray/reddish brown inclusions (redox) 2.75 tons/ft³
	0.0	73	15-17	CH	70	CLAY - Dark reddish brown (redox), very firm, high plasticity, no odor, transitions to grayish yellow @ bottom. 2.75 tons/ft³
	0.0	73	18-20	CL	100	CLAY - gray, very firm, high to mod. plasticity, small black inclusions. 2.0 tons/ft³
	0.0	73	23-25 ~~21-23~~	~~CL~~	80	CLAY - STA, crumbly 2.5 tons/ft³
	0.0	73	28-30	CL	70	CLAY - dark greenish gray, damp, low plasticity crumbly, no odor

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See Page 1

Client: Tolunay-Wong Engineers, Trans-Global Solutior		Project No. TWEI21001	Boring No. \ Well No. MB-7
Project Name: Cedar Port Pre-Dredge 2021			Sheet 2 of 2
Water Depth:	Target/Total Depth:	GPS Coordinates:	Logged By:
Drilling Methods \ Auger Size \ Bit Size:	Drilling Rig:	Driller:	Drilling Company:
Sampling Method \ Size of Sampler:			Drilling Start Date / Time:
Comments:			Drilling Finish Date / Time:

	Field Screening					
Depth (feet bgl)	PID (ppm)	Air Temp. (°F)	Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
	0.0	73	33-35	CL	60	CLAY - light to dark gray, low plasticity, no odor,
						crumbly
	0.0	73	38-40	SS	95	SAND - gray, saturated, no odor, clayey
						sand until 39' into sand
	0.0	73	43-45	SS	40	SAND - w/ some clay, gray, firm, no odor
	0.0	73	48-50	SS	40	SAND - STA
						* Sample times!
						1150 MB-7-SED
						0900 MB-7-WAT

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Client Tolunay-Wong Engineers, Trans-Global Solutior		Project No. TWEI21001	Boring No. \ Well No. MB-9
Project Name Cedar Port Pre-Dredge 2021			Sheet 1 of 1
Water Depth 10'4"	Target/Total Depth 60'4" (H20->TD)	GPS Coordinates 29.67444, -94.93785	Logged By James Reis
Drilling Methods \ Auger Size \ Bit Size 4" Wash Bm	Drilling Rig SIMCO 2500	Driller H. Willoughby	Drilling Company TWE
Sampling Method \ Size of Sampler 3" Shelby Tube / 2" Split Spoon			Drilling Start Date / Time 3.17.21 1300
Comments			Drilling Finish Date / Time 3.17.21 1500

Field Screening						
Depth (feet bgl)	PID (ppm)	Air Temp. (°F)	Lithologic Interval (feet bgl)	Symbol	% Recovery	Description of Lithology
	0.0	61	0-2	CH	30	CLAY - unconsolidated, dark gray, no odor
	0.0	61	3-5	CH	100	CLAY - gray, soft, no odor
	0.0	62	6-8	CH	65	CLAY - STA, more firm
	0.0	63	9-11	CH	50	CLAY - STA
	0.0	63	12-14	CH	50	CLAY - reddish brown w/ gray inclusions, shells, crumbly, stiff, no odor.
	0.0	63	15-17	CH	100	CLAY - STA
	0.0	63	18-20	CH	70	CLAY - STA
	0.0	70	23-25	CH	75	CLAY - STA, w/ more gray/gley
	0.0	70	28-30	CH	100	CLAY - STA
	0.0	71	33-35	CH	100	CLAY - Gley, some gravel, no odor, stiff, crumbly 2.0 tons/ft^3
	0.0	73	38-40	SM	30	SAND - gray, no odor, moist
	0.0	73	43-45	SM	60	SAND - STA
	0.0	73	48-50	SP	50	SAND - coarse, ~~#~~ .
						* Sample time:
						15:20 MB-9-SED

13:20 MB-9-ELUT-SED

13:00 MB-9-ELUT-WAT

Appendix D

Chain of Custody Forms

DRAFT

The Chain of Custody is a Legal Document

Page 1 of 2

10100 East Freeway (I-10)
Houston, TX 77029

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

A&B

1. REPORT TO:
Company: DiSorbo Consulting
Address: 8501 N. MoPac, Ste. 300
Austin, TX 78759
Contact: Bob Davis
Phone: 512-970-9639
Email: bdavis@disorboconsult.com
CC:
CC:

2. INVOICE TO:
Company: DiSorbo Consulting
Address: 1010 Travis St., Ste 916
Houston, TX 77702
Contact: Accounts Payable
Phone: 713-955-1227
Email:
CC:
CC:

3. PO# / Qt210301205

4. Turnaround Time- Business Days
☐ 1 Day * ☑ 5 Days
☐ 2 Days * ☐ 7 Days
☐ 3 Days * ☐ Other ____
* Surcharge Applies

Day Zero is the day sample is received. Report due at 5pm on due day.

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Package ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company
James Reis, DiSorbo

Sampler's Signature & Date
3·17·21

												1	1	1	1	3	5	3	3	3	No. Containers
												P	P	P	P	VOA	A/G	A/G	A/G	VOA	14. Containers*
																					15. Preservatives**
																					Water List
9. Sample ID & Description	Lab Use Only	10. Sampling Date	Time	11. comp	grab	12. Matrix GW	Water	Soil	Sludge	Oil	13. TOTAL No. of Containers	NH3 (<0.03 RL), TOC	Salinity	Metals Dissolved ICPMS (ug/L)	Hg (ug/L)	TPH 1005	SVOC, SVOC SIM (ug/L)	PCBs	Pesticides	VOC	18. Comments
MB - 1 - WAT		3·17·21	1710		X		X				21	X	X	X	X	X	X	X	X	X	
MB - 1 - ELUT - WATER PART			1716				X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - 7 - WAT			0900				X				21	X	X	X	X	X	X	X	X	X	
MB - 9 - ELUT - WATER PART			1300				X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - EQB - WAT			1750				X				20	X		X	X	X	X	X	X	X	
MB - TRIP - WAT			1155				X				2			X	X						
MB-5 - ELUT - WATERPA		↓	1645		↓																

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
James Reis, DiSorbo	3·17·21	19:00		3·17·21	1900	
						1.6°C

* Containers: VOA- 40 ml vial
4 oz/8 oz- glass wide mouth
A/G- Amber/Glass 1 Liter
P/O- Plastic/other ____

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other *ZnAcetate*

Temperature: ____
Intact? ☒ Y ☐ N
Initials ____

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

DRAFT

The Chain of Custody is a Legal Document

Page 2 of 2

10100 East Freeway (I-10)
Houston, TX 77029

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

1. REPORT TO:
Company: DiSorbo Consulting
Address: 8501 N. MoPac, Ste. 300
Austin, TX 78759
Contact: Bob Davis
Phone: 512-970-9639
Email:bdavis@disorboconsult.com
CC:
CC:

2. INVOICE TO:
Company: DiSorbo Consulting
Address: 1010 Travis St., Ste 916
Houston, TX 77702
Contact: Accounts Payable
Phone: 713-955-1227
Email:
CC:
CC:

3.PO# / Qt210301205

4. Turnaround Time- Business Days
☐ 1 Day * ☑ 5 Days
☐ 2 Days * ☐ 7 Days
☐ 3 Days * ☐ Other ____
* Surcharge Applies

Day Zero is the day sample is received. Report due at 5pm on due day.

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company
James Reis, DiSorbo

Sampler's Signature & Date
3.17.21

													1	1	4					No. Containers
													G	G	G					14. Containers*
													C	C	C					15. Preservatives**
9. Sample ID & Description	Lab Use Only	**10. Sampling** Date	Time	**11.** comp	grab	**12. Matrix** GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub	%Moisture, Particle Size_Sub	%Moisture, NH3 (<0.1 RL), Hg, Metals ICPMS, Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg)	VOCs	RCI			Soil List 18. Comments
~~MB - 1 - SED~~ JR								X				6	X	X	X	X	X			
MB - 7 - SED		3-17-21	11:50	X				X				6	X	X	X	X	X			
MB - 9 - SED		3-17-21	15:20	X				X				6	X	X	X	X	X			
~~MB - 1 - ELUT - SED PART~~ JR								X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
MB - 9 - ELUT - SED PART		3-17-21	15:20	X				X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
James Reis, DiSorbo	3.17.21	19:00		3-17-21	1900	
						1.6 °C 10OM23

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ________

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other *ZnAcetate*

Temperature: ____
Intact? ☐ Y ☐ N
Initials ________

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

Appendix E

Laboratory Reports

Laboratory Analysis Report

Total Number of Pages: 99

Job ID : 21031513

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

---

Client Project Name :
Cedar Port Pre-Dredge Sampling

Report To :

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Client Address: 8501 N. MoPac Expressway, Ste. 300
City, State, Zip: Austin, Texas, 78759

P.O.#.:
Sample Collected By: James Reis
Date Collected: 03/16/21 - 03/17/21

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	A&B Sample ID
MB-1-WAT	Water	21031513.01
MB-7-WAT	Water	21031513.03
MB-EQB-WAT	Water	21031513.05
MB-Trip-WAT	Water	21031513.06
MB-7-SED	Soil	21031513.08
MB-9-SED	Soil	21031513.09
MB-1-SED	Soil	21031513.11
MB-5-SED	Soil	21031513.13
MB-1-ELUT-WAT & SED Composite	Water	21031513.15
MB-5-ELUT-WAT & SED Composite	Water	21031513.16
MB-9-ELUT-WAT & SED Composite	Water	21031513.17

Shantall Carpenter

Released By: Shantall Carpenter
Title: Senior Project Manager
Date: 3/30/2021

This Laboratory is NELAP (T104704213) accredited. Effective: 04/01/2020; Expires: 3/31/2021
Scope: Non-Potable Water, Drinking Water, Air, Solid, Biological Tissue, Hazardous Waste

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Date Received : 03/16/2021 17:15

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 21031513

Date: 3/30/2021

General Term Definition

Back-Wt	Back Weight	Post-Wt	Post Weight
BRL	Below Reporting Limit	ppm	parts per million
cfu	colony-forming units	Pre-Wt	Previous Weight
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
Front-Wt	Front Weight	RPD	Relative Percent Difference
LCS	Laboratory Check Standard	RptLimit	Reporting Limit
LCSD	Laboratory Check Standard Duplicate	SDL	Sample Detection Limit
MS	Matrix Spike	surr	Surrogate
MSD	Matrix Spike Duplicate	T	Time
MW	Molecular Weight	TNTC	Too numerous to count
J	Estimation. Below calibration range but above MDL		

Qualifier Definition

D1	Sample required dilution due to matrix effects.
L1	Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.
L2	Associated LCS and/or LCSD recovery is below acceptance limits for flagged analyte. Bias may be low.
LO	Low level quantitation check does not meet recovery acceptance criteria.
M1	Matrix Spike and/or Matrix Spike Duplicate recovery is above laboratory control limits due to matrix interference.
M2	Matrix Spike and/or Matrix Spike Duplicate recovery is below laboratory control limits due to matrix interference."The sample randomly selected as QC for this batch was not part of your project. Therefore, this sample matrix is not applicable to your project samples."
S2	Surrogate recovery is below control limit. Results may be biased low.
V1	CCV recovery is above acceptance limits. This target analyte was not detected in the sample.
V11	CCV recovery is below acceptance limits.

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-WAT	Job Sample ID:	21031513.01
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 2520B	Salinity (Electrical Conductivity Method)								
	Salinity[2]	11.3	s.u.	1	0.52	2		03/23/21 16:00	LEB
SM 4500NH3D									
	Ammonia as N	0.05	mg/L	1		0.01		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	4.4	mg/L	1	0.35	1		03/22/21 13:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	2.09	ug/L	2.5	0.500	0.625		03/22/21 21:15	GG
	Arsenic	2.62	ug/L	2.5	0.250	0.625		03/22/21 21:15	GG
	Cadmium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 21:15	GG
	Chromium	0.613	ug/L	2.5	0.300	0.625	J	03/22/21 21:15	GG
	Copper	1.57	ug/L	2.5	1.00	0.625		03/22/21 21:15	GG
	Lead	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 21:15	GG
	Nickel	1.80	ug/L	2.5	0.300	0.625		03/22/21 21:15	GG
	Silver	< 0.5	ug/L	2.5	0.500	0.625	D1	03/22/21 21:15	GG
	Zinc	4.47	ug/L	2.5	2.80	0.625	D1	03/22/21 21:15	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	0.09	ug/L	1	0.0600	0.2	J	03/19/21 12:55	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<0.35	mg/L	1.00	0.35	2.15		03/19/21 17:13	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/19/21 17:13	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/19/21 17:13	AK
	Total C6-C35	<0.18	mg/L	1.00	0.18			03/19/21 17:13	AK
	Chlorooctadecane(surr)	99.8	%	1.00		70-125		03/19/21 17:13	AK
	1-Chlorooctane(surr)	77.9	%	1.00		70-125		03/19/21 17:13	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 22:12	PS
	Decachlorobiphenyl(surr)	51	%	0.25		35-129		03/23/21 22:12	PS
	Tetrachloro-m-xylene(surr)	52	%	0.25		27-127		03/23/21 22:12	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:00	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:00	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 19:00	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:00	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:00	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:00	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:00	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-WAT	Job Sample ID:	21031513.01
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 19:00	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 19:00	PS
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:00	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:00	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:00	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:00	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:00	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:00	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:00	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:00	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:00	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:00	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:00	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 19:00	PS
	Tetrachloro-m-xylene(surr)	38.9	%	0.25		24-127		03/23/21 19:00	PS
	Decachlorobiphenyl(surr)	25.6	%	0.25		34-120	S2	03/23/21 19:00	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/18/21 16:34	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/18/21 16:34	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-WAT	Job Sample ID:	21031513.01
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 16:34	RT
	Dibromofluoromethane(surr)	123	%	1.00		70-130		03/18/21 16:34	RT
	1,2-Dichloroethane-d4(surr)	128	%	1.00		70-130		03/18/21 16:34	RT
	Toluene-d8(surr)	98	%	1.00		70-130		03/18/21 16:34	RT
	p-Bromofluorobenzene(surr)	102	%	1.00		70-130		03/18/21 16:34	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 18:20	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 18:20	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 18:20	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 18:20	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 18:20	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 18:20	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 18:20	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 18:20	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 18:20	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 18:20	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 18:20	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 18:20	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 18:20	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 18:20	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 18:20	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 18:20	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 18:20	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 18:20	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 18:20	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 18:20	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 18:20	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 18:20	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-1-WAT	Job Sample ID:	21031513.01
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 18:20	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 18:20	MS
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 18:20	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 18:20	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 18:20	MS
	2-Fluorophenol(surr)	28.5	%	0.25		15-115		03/22/21 18:20	MS
	Phenol-d6(surr)	21	%	0.25		10-130		03/22/21 18:20	MS
	Nitrobenzene-d5(surr)	61.1	%	0.25		23-120		03/22/21 18:20	MS
	2-Fluorobiphenyl(surr)	56.3	%	0.25		30-115		03/22/21 18:20	MS
	2,4,6-Tribromophenol(surr)	42.3	%	0.25		19-122		03/22/21 18:20	MS
	p-Terphenyl-d14(surr)	55	%	0.25		18-137		03/22/21 18:20	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 19:31	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 19:31	MS
	2,4,6-Tribromophenol(surr)	41.4	%	0.25		19-122		03/22/21 19:31	MS
	2-Fluorobiphenyl(surr)	41.9	%	0.25		30-115		03/22/21 19:31	MS
	2-Fluorophenol(surr)	26.8	%	0.25		15-115		03/22/21 19:31	MS
	Nitrobenzene-d5(surr)	54.2	%	0.25		23-120		03/22/21 19:31	MS
	Phenol-d6(surr)	19.4	%	0.25		10-130		03/22/21 19:31	MS
	p-Terphenyl-d14(surr)	50.7	%	0.25		18-137		03/22/21 19:31	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-WAT
Date Collected: 03/17/21
Time Collected: 09:00
Other Information:

Job Sample ID: 21031513.03
Sample Matrix Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 2520B	Salinity (Electrical Conductivity Method)								
	Salinity[2]	8.6	s.u.	1	0.52	2		03/23/21 16:00	LEB
SM 4500NH3D									
	Ammonia as N	0.07	mg/L	1		0.01		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	4.7	mg/L	1	0.35	1		03/22/21 13:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	1.48	ug/L	2.5	0.500	0.625		03/22/21 21:35	GG
	Arsenic	2.38	ug/L	2.5	0.250	0.625		03/22/21 21:35	GG
	Cadmium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 21:35	GG
	Chromium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 21:35	GG
	Copper	1.19	ug/L	2.5	1.00	0.625	D1	03/22/21 21:35	GG
	Lead	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 21:35	GG
	Nickel	1.75	ug/L	2.5	0.300	0.625		03/22/21 21:35	GG
	Silver	< 0.5	ug/L	2.5	0.500	0.625	D1	03/22/21 21:35	GG
	Zinc	4.23	ug/L	2.5	2.80	0.625	D1	03/22/21 21:35	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/19/21 12:58	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<0.35	mg/L	1.00	0.35	2.15		03/19/21 18:40	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/19/21 18:40	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/19/21 18:40	AK
	Total C6-C35	<0.18	mg/L	1.00	0.18			03/19/21 18:40	AK
	Chlorooctadecane(surr)	94.4	%	1.00		70-125		03/19/21 18:40	AK
	1-Chlorooctane(surr)	82	%	1.00		70-125		03/19/21 18:40	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 22:26	PS
	Decachlorobiphenyl(surr)	45	%	0.25		35-129		03/23/21 22:26	PS
	Tetrachloro-m-xylene(surr)	58	%	0.25		27-127		03/23/21 22:26	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:14	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:14	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 19:14	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:14	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:14	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:14	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:14	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-WAT
Date Collected: 03/17/21
Time Collected: 09:00
Other Information:

Job Sample ID: 21031513.03
Sample Matrix Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 19:14	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 19:14	PS
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:14	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:14	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:14	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:14	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:14	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:14	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:14	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:14	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:14	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:14	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:14	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 19:14	PS
	Tetrachloro-m-xylene(surr)	46.3	%	0.25		24-127		03/23/21 19:14	PS
	Decachlorobiphenyl(surr)	25	%	0.25		34-120	S2	03/23/21 19:14	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/18/21 17:37	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/18/21 17:37	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-WAT
Date Collected: 03/17/21
Time Collected: 09:00
Other Information:

Job Sample ID: 21031513.03
Sample Matrix Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 17:37	RT
	Dibromofluoromethane(surr)	119	%	1.00		70-130		03/18/21 17:37	RT
	1,2-Dichloroethane-d4(surr)	129	%	1.00		70-130		03/18/21 17:37	RT
	Toluene-d8(surr)	98.1	%	1.00		70-130		03/18/21 17:37	RT
	p-Bromofluorobenzene(surr)	102	%	1.00		70-130		03/18/21 17:37	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:21	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 19:21	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:21	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 19:21	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:21	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:21	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 19:21	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 19:21	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 19:21	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 19:21	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 19:21	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 19:21	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:21	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 19:21	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:21	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:21	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:21	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 19:21	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 19:21	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 19:21	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:21	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 19:21	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-7-WAT	Job Sample ID:	21031513.03
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	09:00	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 19:21	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 19:21	MS
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 19:21	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 19:21	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:21	MS
	2-Fluorophenol(surr)	30.2	%	0.25		15-115		03/22/21 19:21	MS
	Phenol-d6(surr)	21.6	%	0.25		10-130		03/22/21 19:21	MS
	Nitrobenzene-d5(surr)	63.8	%	0.25		23-120		03/22/21 19:21	MS
	2-Fluorobiphenyl(surr)	58.4	%	0.25		30-115		03/22/21 19:21	MS
	2,4,6-Tribromophenol(surr)	40.5	%	0.25		19-122		03/22/21 19:21	MS
	p-Terphenyl-d14(surr)	52.8	%	0.25		18-137		03/22/21 19:21	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 20:01	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 20:01	MS
	2,4,6-Tribromophenol(surr)	41	%	0.25		19-122		03/22/21 20:01	MS
	2-Fluorobiphenyl(surr)	44.9	%	0.25		30-115		03/22/21 20:01	MS
	2-Fluorophenol(surr)	28.1	%	0.25		15-115		03/22/21 20:01	MS
	Nitrobenzene-d5(surr)	56.7	%	0.25		23-120		03/22/21 20:01	MS
	Phenol-d6(surr)	20	%	0.25		10-130		03/22/21 20:01	MS
	p-Terphenyl-d14(surr)	48.3	%	0.25		18-137		03/22/21 20:01	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-EQB-WAT	Job Sample ID:	21031513.05
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:50	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 4500NH3D									
	Ammonia as N	<0.01	mg/L	1		0.01		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	<0.35	mg/L	1	0.35	1		03/22/21 13:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	< 0.2	ug/L	1	0.200	0.25		03/22/21 20:39	GG
	Arsenic	0.443	ug/L	1	0.100	0.25		03/22/21 20:39	GG
	Cadmium	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:39	GG
	Chromium	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:39	GG
	Copper	< 0.4	ug/L	1	0.400	0.25		03/22/21 20:39	GG
	Lead	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:39	GG
	Nickel	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:39	GG
	Silver	< 0.2	ug/L	1	0.200	0.25		03/22/21 20:39	GG
	Zinc	5.16	ug/L	1	1.10	0.25		03/22/21 20:39	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/19/21 13:02	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<0.35	mg/L	1.00	0.35	2.15		03/19/21 19:38	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/19/21 19:38	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/19/21 19:38	AK
	Total C6-C35	<0.18	mg/L	1.00	0.18			03/19/21 19:38	AK
	Chlorooctadecane(surr)	98.3	%	1.00		70-125		03/19/21 19:38	AK
	1-Chlorooctane(surr)	90	%	1.00		70-125		03/19/21 19:38	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 22:54	PS
	Decachlorobiphenyl(surr)	51	%	0.25		35-129		03/23/21 22:54	PS
	Tetrachloro-m-xylene(surr)	66	%	0.25		27-127		03/23/21 22:54	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:27	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:27	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 19:27	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:27	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:27	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:27	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:27	PS
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 19:27	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 19:27	PS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-EQB-WAT

Date Collected: 03/17/21

Time Collected: 17:50

Other Information:

Job Sample ID: 21031513.05

Sample Matrix Water

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:27	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:27	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:27	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:27	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:27	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:27	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:27	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:27	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:27	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:27	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:27	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 19:27	PS
	Tetrachloro-m-xylene(surr)	49.8	%	0.25		24-127		03/23/21 19:27	PS
	Decachlorobiphenyl(surr)	34.9	%	0.25		34-120		03/23/21 19:27	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/18/21 18:39	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/18/21 18:39	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis	
Project Name:	Cedar Port Pre-Dredge Sampling		

Client Sample ID:	MB-EQB-WAT	Job Sample ID:	21031513.05
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:50	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/18/21 18:39	RT
	Dibromofluoromethane(surr)	125	%	1.00		70-130		03/18/21 18:39	RT
	1,2-Dichloroethane-d4(surr)	129	%	1.00		70-130		03/18/21 18:39	RT
	Toluene-d8(surr)	98.4	%	1.00		70-130		03/18/21 18:39	RT
	p-Bromofluorobenzene(surr)	102	%	1.00		70-130		03/18/21 18:39	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:53	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 19:53	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:53	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 19:53	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:53	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 19:53	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 19:53	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 19:53	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 19:53	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 19:53	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 19:53	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 19:53	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:53	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 19:53	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:53	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:53	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:53	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 19:53	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 19:53	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 19:53	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 19:53	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 19:53	MS
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 19:53	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 19:53	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-EQB-WAT	Job Sample ID:	21031513.05
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:50	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 19:53	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 19:53	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 19:53	MS
	2-Fluorophenol(surr)	37.6	%	0.25		15-115		03/22/21 19:53	MS
	Phenol-d6(surr)	22.1	%	0.25		10-130		03/22/21 19:53	MS
	Nitrobenzene-d5(surr)	60.5	%	0.25		23-120		03/22/21 19:53	MS
	2-Fluorobiphenyl(surr)	58.9	%	0.25		30-115		03/22/21 19:53	MS
	2,4,6-Tribromophenol(surr)	57.1	%	0.25		19-122		03/22/21 19:53	MS
	p-Terphenyl-d14(surr)	59.8	%	0.25		18-137		03/22/21 19:53	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 20:31	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 20:31	MS
	2,4,6-Tribromophenol(surr)	63.2	%	0.25		19-122		03/22/21 20:31	MS
	2-Fluorobiphenyl(surr)	43.1	%	0.25		30-115		03/22/21 20:31	MS
	2-Fluorophenol(surr)	35.4	%	0.25		15-115		03/22/21 20:31	MS
	Nitrobenzene-d5(surr)	54.4	%	0.25		23-120		03/22/21 20:31	MS
	Phenol-d6(surr)	20.7	%	0.25		10-130		03/22/21 20:31	MS
	p-Terphenyl-d14(surr)	52.2	%	0.25		18-137		03/22/21 20:31	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-Trip-WAT	Job Sample ID:	21031513.06
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	11:55	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 200.8	Dissolved Metals								
	Antimony	< 0.2	ug/L	1	0.200	0.25		03/22/21 20:51	GG
	Arsenic	0.381	ug/L	1	0.100	0.25		03/22/21 20:51	GG
	Cadmium	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:51	GG
	Chromium	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:51	GG
	Copper	< 0.4	ug/L	1	0.400	0.25		03/22/21 20:51	GG
	Lead	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:51	GG
	Nickel	< 0.1	ug/L	1	0.100	0.25		03/22/21 20:51	GG
	Silver	< 0.2	ug/L	1	0.200	0.25		03/22/21 20:51	GG
	Zinc	< 1.1	ug/L	1	1.10	0.25		03/22/21 20:51	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/19/21 13:05	BDC

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-SED
Date Collected: 03/17/21
Time Collected: 11:50
Other Information:

Job Sample ID: 21031513.08
Sample Matrix Soil
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 1010A	Ignitability (Flash Point) up to 150 degrees F								
	Ignitability	>150	°F	1				03/23/21 10:39	YSK
SM 2540G	% Moisture								
	% Moisture	28.4	%	1		0.1		03/19/21 08:15	SL
SM4500NH3-Dm									
	Ammonia as N[1]	3.53	mg/Kg	10	0.200	1		03/22/21 08:46	SG
SW-846 7.3	Reactive Cyanide								
	Reactive Cyanide[2]	<4.9	mg/Kg	1	4.9			03/23/21 11:51	YSK
SW-846 7.3	Reactive Sulfide								
	Reactive Sulfide[2]	<25	mg/Kg	1	25			03/23/21 12:05	YSK
SW-846 9045D	Corrosivity, pH								
	pH	9.1	s.u.					03/19/21 11:48	SL
	Temperature when read, °C[2]	22.1	s.u.					03/19/21 11:48	SL
SW-846 6020B	Metals by ICP/MS								
	Antimony	0.14734	mg/Kg	1	0.10	0.125		03/22/21 15:02	GG
	Arsenic	3.73	mg/Kg	1	0.08	0.125		03/22/21 15:02	GG
	Cadmium	0.07917	mg/Kg	1	0.07	0.125	J	03/22/21 15:02	GG
	Chromium	8.72	mg/Kg	1	0.11	0.125		03/22/21 15:02	GG
	Copper	6.73	mg/Kg	1	0.02	0.125		03/22/21 15:02	GG
	Lead	8.82	mg/Kg	1	0.11	0.125		03/22/21 15:02	GG
	Nickel	9.99	mg/Kg	1	0.02	0.125		03/22/21 15:02	GG
	Silver	<0.13	mg/Kg	1	0.13	0.125		03/25/21 16:11	GG
	Zinc	24.42	mg/Kg	1	0.57	0.5		03/22/21 15:02	GG
SW-846 7470A	Total Metals - Mercury								
	Mercury	0.00942	mg/Kg	2	0.00176	0.008	D1	03/19/21 14:29	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<9.49	mg/Kg	1.00	9.49	25		03/19/21 01:49	AK
	>C12-C28	<13	mg/Kg	1.00	13.0	25		03/19/21 01:49	AK
	>C28-C35	<6.88	mg/Kg	1.00	6.88	25		03/19/21 01:49	AK
	Total C6-C35	<6.88	mg/Kg	1.00	6.88			03/19/21 01:49	AK
	Chlorooctadecane(surr)	103	%	1.00		60-150		03/19/21 01:49	AK
	1-Chlorooctane(surr)	96.4	%	1.00		60-143		03/19/21 01:49	AK
SW-846 8081B	Organochlorine Pesticides								
	Alpha-chlordane	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 21:40	PS
	Gamma-chlordane	< 0.18	ug/Kg	0.25	0.18	0.08325		03/23/21 21:40	PS
	4,4-DDD	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 21:40	PS
	4,4-DDE	<0.36	ug/Kg	0.25	0.36	0.4175		03/23/21 21:40	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis	
Project Name:	Cedar Port Pre-Dredge Sampling		

Client Sample ID:	MB-7-SED	Job Sample ID:	21031513.08
Date Collected:	03/17/21	Sample Matrix	Soil
Time Collected:	11:50	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8081B	Organochlorine Pesticides								
	4,4-DDT	< 0.48	ug/Kg	0.25	0.48	0.4175	L1	03/23/21 21:40	PS
	a-BHC	< 0.10	ug/Kg	0.25	0.10	0.08325		03/23/21 21:40	PS
	Aldrin	< 0.20	ug/Kg	0.25	0.20	0.08325		03/23/21 21:40	PS
	b-BHC	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 21:40	PS
	Chlordane	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 21:40	PS
	d-BHC	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 21:40	PS
	Dieldrin	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 21:40	PS
	Endosulfan I	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 21:40	PS
	Endosulfan II	< 0.28	ug/Kg	0.25	0.28	0.08325		03/23/21 21:40	PS
	Endosulfan sulfate	<0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 21:40	PS
	Endrin	< 0.39	ug/Kg	0.25	0.39	0.4175		03/23/21 21:40	PS
	Endrin aldehyde	< 0.41	ug/Kg	0.25	0.41	0.4175		03/23/21 21:40	PS
	Endrin ketone	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 21:40	PS
	g-BHC	< 0.15	ug/Kg	0.25	0.15	0.08325		03/23/21 21:40	PS
	Heptachlor	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 21:40	PS
	Heptachlor epoxide	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 21:40	PS
	Toxaphene	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 21:40	PS
	Tetrachloro-m-xylene(surr)	34.9	%	0.25		20-131		03/23/21 21:40	PS
	Decachlorobiphenyl(surr)	18.9	%	0.25		30-134	S2	03/23/21 21:40	PS
SW-846 8082A	Polychlorinated Biphenyls								
	Total PCBs	< 1.52	ug/Kg	0.25	1.52	0.4175		03/24/21 03:03	PS
	Tetrachloro-m-xylene(surr)	60	%	0.25		42-128		03/24/21 03:03	PS
	Decachlorobiphenyl(surr)	44.9	%	0.25		42-130		03/24/21 03:03	PS
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,1,1,2-Tetrachloroethane	<0.00085	mg/Kg	0.94	0.00085	0.0047		03/18/21 18:36	RT
	1,1,1-Trichloroethane	<0.00148	mg/Kg	0.94	0.00148	0.0047		03/18/21 18:36	RT
	1,1,2,2-Tetrachloroethane	<0.00132	mg/Kg	0.94	0.00132	0.0047		03/18/21 18:36	RT
	1,1,2-Trichloroethane	<0.00176	mg/Kg	0.94	0.00176	0.0047		03/18/21 18:36	RT
	1,1-Dichloroethane	<0.00157	mg/Kg	0.94	0.00157	0.0047		03/18/21 18:36	RT
	1,1-Dichloroethylene	<0.00173	mg/Kg	0.94	0.00173	0.0047		03/18/21 18:36	RT
	1,1-Dichloropropene	<0.00144	mg/Kg	0.94	0.00144	0.0047		03/18/21 18:36	RT
	1,2,3-trichlorobenzene	<0.00166	mg/Kg	0.94	0.00166	0.0047		03/18/21 18:36	RT
	1,2,3-Trichloropropane	<0.00151	mg/Kg	0.94	0.00151	0.0047		03/18/21 18:36	RT
	1,2,4-Trichlorobenzene	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	1,2,4-Trimethylbenzene	<0.00122	mg/Kg	0.94	0.00122	0.0047		03/18/21 18:36	RT
	1,2-Dibromo-3-chloropropane	<0.00311	mg/Kg	0.94	0.00311	0.0047		03/18/21 18:36	RT
	1,2-Dibromoethane	<0.00113	mg/Kg	0.94	0.00113	0.0047		03/18/21 18:36	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-SED

Date Collected: 03/17/21

Time Collected: 11:50

Other Information:

Job Sample ID: 21031513.08

Sample Matrix Soil

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,2-Dichlorobenzene	<0.001	mg/Kg	0.94	0.00100	0.0047		03/18/21 18:36	RT
	1,2-Dichloroethane	<0.00132	mg/Kg	0.94	0.00132	0.0047		03/18/21 18:36	RT
	1,2-Dichloropropane	<0.00113	mg/Kg	0.94	0.00113	0.0047		03/18/21 18:36	RT
	1,3,5-Trimethylbenzene	<0.00151	mg/Kg	0.94	0.00151	0.0047		03/18/21 18:36	RT
	1,3-Dichlorobenzene	<0.00141	mg/Kg	0.94	0.00141	0.0047		03/18/21 18:36	RT
	1,3-Dichloropropane	<0.00141	mg/Kg	0.94	0.00141	0.0047		03/18/21 18:36	RT
	1,4-Dichlorobenzene	<0.00144	mg/Kg	0.94	0.00144	0.0047		03/18/21 18:36	RT
	2,2-Dichloropropane	<0.0022	mg/Kg	0.94	0.00220	0.0047		03/18/21 18:36	RT
	2-Chlorotoluene	<0.00144	mg/Kg	0.94	0.00144	0.0047		03/18/21 18:36	RT
	4-Chlorotoluene	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	4-Isopropyltoluene	<0.00141	mg/Kg	0.94	0.00141	0.0047		03/18/21 18:36	RT
	Benzene	<0.00107	mg/Kg	0.94	0.00107	0.0047		03/18/21 18:36	RT
	Bromobenzene	<0.00113	mg/Kg	0.94	0.00113	0.0047		03/18/21 18:36	RT
	Bromochloromethane	<0.00126	mg/Kg	0.94	0.00126	0.0047	L1	03/18/21 18:36	RT
	Bromodichloromethane	<0.00088	mg/Kg	0.94	0.00088	0.0047		03/18/21 18:36	RT
	Bromoform	<0.00072	mg/Kg	0.94	0.00072	0.0047		03/18/21 18:36	RT
	Bromomethane	<0.0017	mg/Kg	0.94	0.00170	0.0047		03/18/21 18:36	RT
	Carbon tetrachloride	<0.00151	mg/Kg	0.94	0.00151	0.0047		03/18/21 18:36	RT
	Chlorobenzene	<0.00148	mg/Kg	0.94	0.00148	0.0047		03/18/21 18:36	RT
	Chloroethane	<0.00242	mg/Kg	0.94	0.00242	0.0047		03/18/21 18:36	RT
	Chloroform	<0.00119	mg/Kg	0.94	0.00119	0.0047	L1	03/18/21 18:36	RT
	Chloromethane	<0.00226	mg/Kg	0.94	0.00226	0.0047		03/18/21 18:36	RT
	cis-1,2-Dichloroethylene	<0.00119	mg/Kg	0.94	0.00119	0.0047	L1	03/18/21 18:36	RT
	cis-1,3-Dichloropropene	<0.00113	mg/Kg	0.94	0.00113	0.0047		03/18/21 18:36	RT
	Dibromochloromethane	<0.0011	mg/Kg	0.94	0.00110	0.0047		03/18/21 18:36	RT
	Dibromomethane	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	Dichlorodifluoromethane	<0.00135	mg/Kg	0.94	0.00135	0.0047		03/18/21 18:36	RT
	Ethylbenzene	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	Isopropylbenzene	<0.00126	mg/Kg	0.94	0.00126	0.0047		03/18/21 18:36	RT
	m- & p-Xylenes	<0.00273	mg/Kg	0.94	0.00273	0.0094		03/18/21 18:36	RT
	MEK	<0.00267	mg/Kg	0.94	0.00267	0.0047		03/18/21 18:36	RT
	Methylene chloride	<0.00154	mg/Kg	0.94	0.00154	0.0047		03/18/21 18:36	RT
	Naphthalene	<0.00188	mg/Kg	0.94	0.00188	0.0047		03/18/21 18:36	RT
	n-Butylbenzene	<0.00179	mg/Kg	0.94	0.00179	0.0047		03/18/21 18:36	RT
	n-Propylbenzene	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	o-Xylene	<0.00126	mg/Kg	0.94	0.00126	0.0047		03/18/21 18:36	RT
	sec-Butylbenzene	<0.0016	mg/Kg	0.94	0.00160	0.0047		03/18/21 18:36	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-7-SED

Date Collected: 03/17/21

Time Collected: 11:50

Other Information:

Job Sample ID: 21031513.08

Sample Matrix Soil

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	Styrene	<0.00126	mg/Kg	0.94	0.00126	0.0047		03/18/21 18:36	RT
	t-butylbenzene	<0.00141	mg/Kg	0.94	0.00141	0.0047		03/18/21 18:36	RT
	Tetrachloroethylene	<0.00138	mg/Kg	0.94	0.00138	0.0047		03/18/21 18:36	RT
	Toluene	<0.00119	mg/Kg	0.94	0.00119	0.0047		03/18/21 18:36	RT
	trans-1,2-Dichloroethylene	<0.00144	mg/Kg	0.94	0.00144	0.0047	L1	03/18/21 18:36	RT
	trans-1,3-Dichloropropene	<0.00094	mg/Kg	0.94	0.00094	0.0047		03/18/21 18:36	RT
	Trichloroethylene	<0.00104	mg/Kg	0.94	0.00104	0.0047		03/18/21 18:36	RT
	Trichlorofluoromethane	<0.00198	mg/Kg	0.94	0.00198	0.0047	V1	03/18/21 18:36	RT
	Vinyl Chloride	<0.00185	mg/Kg	0.94	0.00185	0.0047		03/18/21 18:36	RT
	Dibromofluoromethane(surr)	111	%	0.94		70-130		03/18/21 18:36	RT
	1,2-Dichloroethane-d4(surr)	108	%	0.94		70-130		03/18/21 18:36	RT
	Toluene-d8(surr)	98.9	%	0.94		70-130		03/18/21 18:36	RT
	p-Bromofluorobenzene(surr)	113	%	0.94		70-130		03/18/21 18:36	RT
SW-846 8270D	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:02	MS
	1,2-Dichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:02	MS
	1,3-Dichlorobenzene	< 30.65	ug/Kg	0.25	30.7	41.8		03/22/21 19:02	MS
	1,4-Dichlorobenzene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:02	MS
	2,4-Dichlorophenol	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:02	MS
	2,4-Dimethylphenol	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:02	MS
	2,4-Dinitrophenol	< 55.67	ug/Kg	0.25	55.7	41.8		03/22/21 19:02	MS
	Acenaphthene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 19:02	MS
	Acenaphthylene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:02	MS
	Anthracene	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 19:02	MS
	Benzo(a)anthracene	< 28.26	ug/Kg	0.25	28.3	41.8		03/22/21 19:02	MS
	Benzo(a)pyrene	< 43.33	ug/Kg	0.25	43.3	41.8		03/22/21 19:02	MS
	Benzo(b)fluoranthene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:02	MS
	Benzo(g,h,i)perylene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:02	MS
	Benzo(k)fluoranthene	< 46.97	ug/Kg	0.25	47.0	41.8		03/22/21 19:02	MS
	Chrysene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:02	MS
	Dibenzo(a,h)anthracene	< 49.42	ug/Kg	0.25	49.4	41.8		03/22/21 19:02	MS
	Diethyl phthalate	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:02	MS
	Fluoranthene	< 25.62	ug/Kg	0.25	25.6	41.8		03/22/21 19:02	MS
	Fluorene	< 11.87	ug/Kg	0.25	11.9	41.8		03/22/21 19:02	MS
	Hexachlorobenzene	< 39.94	ug/Kg	0.25	39.9	41.8		03/22/21 19:02	MS
	Indeno(1,2,3-cd)pyrene	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 19:02	MS
	Naphthalene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 19:02	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-7-SED	Job Sample ID:	21031513.08
Date Collected:	03/17/21	Sample Matrix	Soil
Time Collected:	11:50	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8270D	Semivolatile Organic Compounds								
	Pentachlorophenol	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 19:02	MS
	Phenanthrene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:02	MS
	Phenol	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 19:02	MS
	Pyrene	< 38.15	ug/Kg	0.25	38.2	41.8		03/22/21 19:02	MS
	2-Fluorophenol(surr)	57.9	%	0.25		20-115		03/22/21 19:02	MS
	Phenol-d6(surr)	58	%	0.25		15-120		03/22/21 19:02	MS
	Nitrobenzene-d5(surr)	50.3	%	0.25		20-120		03/22/21 19:02	MS
	2-Fluorobiphenyl(surr)	56.8	%	0.25		30-115		03/22/21 19:02	MS
	2,4,6-Tribromophenol(surr)	81.1	%	0.25		10-120		03/22/21 19:02	MS
	p-Terphenyl-d14(surr)	71.7	%	0.25		30-140		03/22/21 19:02	MS
SW-846 8270D SIM	Selected Ion Monitoring								
	1,2,4-Trichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	1,3-Dichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Benzo(b)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Benzo(g,h,i)perylene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Benzo(k)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Dibenzo(a,h)anthracene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Hexachlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Pyrene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:03	MS
	Nitrobenzene-d5(surr)	51.1	%	0.25		20-120		03/22/21 23:03	MS
	2-Fluorobiphenyl(surr)	44.4	%	0.25		30-115		03/22/21 23:03	MS
	2,4,6-Tribromophenol(surr)	64.9	%	0.25		10-120		03/22/21 23:03	MS
	p-Terphenyl-d14(surr)	57.3	%	0.25		30-140		03/22/21 23:03	MS
	2-Fluorophenol(surr)	50.6	%	0.25		20-115		03/22/21 23:03	MS
	Phenol-d6(surr)	49.3	%	0.25		15-120		03/22/21 23:03	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC   Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-9-SED
Date Collected: 03/17/21
Time Collected: 15:20
Other Information:

Job Sample ID: 21031513.09
Sample Matrix Soil
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 1010A	Ignitability (Flash Point) up to 150 degrees F								
	Ignitability	>150	°F	1				03/23/21 10:39	YSK
SM 2540G	% Moisture								
	% Moisture	24.7	%	1		0.1		03/19/21 08:15	SL
SM4500NH3-Dm									
	Ammonia as N[1]	11.27	mg/Kg	10	0.200	1		03/22/21 08:46	SG
SW-846 7.3	Reactive Cyanide								
	Reactive Cyanide[2]	<4.9	mg/Kg	1	4.9			03/23/21 11:51	YSK
SW-846 7.3	Reactive Sulfide								
	Reactive Sulfide[2]	<25	mg/Kg	1	25			03/23/21 12:05	YSK
SW-846 9045D	Corrosivity, pH								
	pH	8.9	s.u.					03/19/21 11:48	SL
	Temperature when read, °C[2]	22	s.u.					03/19/21 11:48	SL
SW-846 6020B	Metals by ICP/MS								
	Antimony	0.12636	mg/Kg	1	0.10	0.125		03/22/21 15:10	GG
	Arsenic	16.37	mg/Kg	1	0.08	0.125		03/22/21 15:10	GG
	Cadmium	0.08071	mg/Kg	1	0.07	0.125	J	03/22/21 15:10	GG
	Chromium	14.26	mg/Kg	1	0.11	0.125		03/22/21 15:10	GG
	Copper	11.99	mg/Kg	1	0.02	0.125		03/22/21 15:10	GG
	Lead	11.34	mg/Kg	1	0.11	0.125		03/22/21 15:10	GG
	Nickel	18.97	mg/Kg	1	0.02	0.125		03/22/21 15:10	GG
	Silver	<0.13	mg/Kg	1	0.13	0.125		03/25/21 16:15	GG
	Zinc	39.60	mg/Kg	1	0.57	0.5		03/22/21 15:10	GG
SW-846 7470A	Total Metals - Mercury								
	Mercury	0.02716	mg/Kg	2	0.00176	0.008		03/19/21 13:59	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<9.49	mg/Kg	1.00	9.49	25		03/19/21 02:18	AK
	>C12-C28	<13	mg/Kg	1.00	13.0	25		03/19/21 02:18	AK
	>C28-C35	<6.88	mg/Kg	1.00	6.88	25		03/19/21 02:18	AK
	Total C6-C35	<6.88	mg/Kg	1.00	6.88			03/19/21 02:18	AK
	Chlorooctadecane(surr)	99	%	1.00		60-150		03/19/21 02:18	AK
	1-Chlorooctane(surr)	94.1	%	1.00		60-143		03/19/21 02:18	AK
SW-846 8081B	Organochlorine Pesticides								
	Alpha-chlordane	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:07	PS
	Gamma-chlordane	< 0.18	ug/Kg	0.25	0.18	0.08325		03/23/21 22:07	PS
	4,4-DDD	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:07	PS
	4,4-DDE	<0.36	ug/Kg	0.25	0.36	0.4175		03/23/21 22:07	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-9-SED	Job Sample ID:	21031513.09
Date Collected:	03/17/21	Sample Matrix	Soil
Time Collected:	15:20	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8081B	Organochlorine Pesticides								
	4,4-DDT	< 0.48	ug/Kg	0.25	0.48	0.4175	L1	03/23/21 22:07	PS
	a-BHC	< 0.10	ug/Kg	0.25	0.10	0.08325		03/23/21 22:07	PS
	Aldrin	< 0.20	ug/Kg	0.25	0.20	0.08325		03/23/21 22:07	PS
	b-BHC	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:07	PS
	Chlordane	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:07	PS
	d-BHC	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:07	PS
	Dieldrin	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:07	PS
	Endosulfan I	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:07	PS
	Endosulfan II	< 0.28	ug/Kg	0.25	0.28	0.08325		03/23/21 22:07	PS
	Endosulfan sulfate	<0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:07	PS
	Endrin	< 0.39	ug/Kg	0.25	0.39	0.4175		03/23/21 22:07	PS
	Endrin aldehyde	< 0.41	ug/Kg	0.25	0.41	0.4175		03/23/21 22:07	PS
	Endrin ketone	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:07	PS
	g-BHC	< 0.15	ug/Kg	0.25	0.15	0.08325		03/23/21 22:07	PS
	Heptachlor	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:07	PS
	Heptachlor epoxide	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:07	PS
	Toxaphene	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:07	PS
	Tetrachloro-m-xylene(surr)	32.4	%	0.25		20-131		03/23/21 22:07	PS
	Decachlorobiphenyl(surr)	22	%	0.25		30-134	S2	03/23/21 22:07	PS
SW-846 8082A	Polychlorinated Biphenyls								
	Total PCBs	< 1.52	ug/Kg	0.25	1.52	0.4175		03/24/21 03:30	PS
	Tetrachloro-m-xylene(surr)	56.3	%	0.25		42-128		03/24/21 03:30	PS
	Decachlorobiphenyl(surr)	46.7	%	0.25		42-130		03/24/21 03:30	PS
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,1,1,2-Tetrachloroethane	<0.00085	mg/Kg	0.92	0.00085	0.0046		03/18/21 19:06	RT
	1,1,1-Trichloroethane	<0.00148	mg/Kg	0.92	0.00148	0.0046		03/18/21 19:06	RT
	1,1,2,2-Tetrachloroethane	<0.00132	mg/Kg	0.92	0.00132	0.0046		03/18/21 19:06	RT
	1,1,2-Trichloroethane	<0.00176	mg/Kg	0.92	0.00176	0.0046		03/18/21 19:06	RT
	1,1-Dichloroethane	<0.00157	mg/Kg	0.92	0.00157	0.0046		03/18/21 19:06	RT
	1,1-Dichloroethylene	<0.00173	mg/Kg	0.92	0.00173	0.0046		03/18/21 19:06	RT
	1,1-Dichloropropene	<0.00144	mg/Kg	0.92	0.00144	0.0046		03/18/21 19:06	RT
	1,2,3-trichlorobenzene	<0.00166	mg/Kg	0.92	0.00166	0.0046		03/18/21 19:06	RT
	1,2,3-Trichloropropane	<0.00151	mg/Kg	0.92	0.00151	0.0046		03/18/21 19:06	RT
	1,2,4-Trichlorobenzene	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	1,2,4-Trimethylbenzene	<0.00122	mg/Kg	0.92	0.00122	0.0046		03/18/21 19:06	RT
	1,2-Dibromo-3-chloropropane	<0.00311	mg/Kg	0.92	0.00311	0.0046		03/18/21 19:06	RT
	1,2-Dibromoethane	<0.00113	mg/Kg	0.92	0.00113	0.0046		03/18/21 19:06	RT

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-9-SED	Job Sample ID:	21031513.09
Date Collected:	03/17/21	Sample Matrix	Soil
Time Collected:	15:20	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,2-Dichlorobenzene	<0.001	mg/Kg	0.92	0.00100	0.0046		03/18/21 19:06	RT
	1,2-Dichloroethane	<0.00132	mg/Kg	0.92	0.00132	0.0046		03/18/21 19:06	RT
	1,2-Dichloropropane	<0.00113	mg/Kg	0.92	0.00113	0.0046		03/18/21 19:06	RT
	1,3,5-Trimethylbenzene	<0.00151	mg/Kg	0.92	0.00151	0.0046		03/18/21 19:06	RT
	1,3-Dichlorobenzene	<0.00141	mg/Kg	0.92	0.00141	0.0046		03/18/21 19:06	RT
	1,3-Dichloropropane	<0.00141	mg/Kg	0.92	0.00141	0.0046		03/18/21 19:06	RT
	1,4-Dichlorobenzene	<0.00144	mg/Kg	0.92	0.00144	0.0046		03/18/21 19:06	RT
	2,2-Dichloropropane	<0.0022	mg/Kg	0.92	0.00220	0.0046		03/18/21 19:06	RT
	2-Chlorotoluene	<0.00144	mg/Kg	0.92	0.00144	0.0046		03/18/21 19:06	RT
	4-Chlorotoluene	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	4-Isopropyltoluene	<0.00141	mg/Kg	0.92	0.00141	0.0046		03/18/21 19:06	RT
	Benzene	<0.00107	mg/Kg	0.92	0.00107	0.0046		03/18/21 19:06	RT
	Bromobenzene	<0.00113	mg/Kg	0.92	0.00113	0.0046		03/18/21 19:06	RT
	Bromochloromethane	<0.00126	mg/Kg	0.92	0.00126	0.0046	L1	03/18/21 19:06	RT
	Bromodichloromethane	<0.00088	mg/Kg	0.92	0.00088	0.0046		03/18/21 19:06	RT
	Bromoform	<0.00072	mg/Kg	0.92	0.00072	0.0046		03/18/21 19:06	RT
	Bromomethane	<0.0017	mg/Kg	0.92	0.00170	0.0046		03/18/21 19:06	RT
	Carbon tetrachloride	<0.00151	mg/Kg	0.92	0.00151	0.0046		03/18/21 19:06	RT
	Chlorobenzene	<0.00148	mg/Kg	0.92	0.00148	0.0046		03/18/21 19:06	RT
	Chloroethane	<0.00242	mg/Kg	0.92	0.00242	0.0046		03/18/21 19:06	RT
	Chloroform	<0.00119	mg/Kg	0.92	0.00119	0.0046	L1	03/18/21 19:06	RT
	Chloromethane	<0.00226	mg/Kg	0.92	0.00226	0.0046		03/18/21 19:06	RT
	cis-1,2-Dichloroethylene	<0.00119	mg/Kg	0.92	0.00119	0.0046	L1	03/18/21 19:06	RT
	cis-1,3-Dichloropropene	<0.00113	mg/Kg	0.92	0.00113	0.0046		03/18/21 19:06	RT
	Dibromochloromethane	<0.0011	mg/Kg	0.92	0.00110	0.0046		03/18/21 19:06	RT
	Dibromomethane	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	Dichlorodifluoromethane	<0.00135	mg/Kg	0.92	0.00135	0.0046		03/18/21 19:06	RT
	Ethylbenzene	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	Isopropylbenzene	<0.00126	mg/Kg	0.92	0.00126	0.0046		03/18/21 19:06	RT
	m- & p-Xylenes	<0.00273	mg/Kg	0.92	0.00273	0.0092		03/18/21 19:06	RT
	MEK	<0.00267	mg/Kg	0.92	0.00267	0.0046		03/18/21 19:06	RT
	Methylene chloride	<0.00154	mg/Kg	0.92	0.00154	0.0046		03/18/21 19:06	RT
	Naphthalene	<0.00188	mg/Kg	0.92	0.00188	0.0046		03/18/21 19:06	RT
	n-Butylbenzene	<0.00179	mg/Kg	0.92	0.00179	0.0046		03/18/21 19:06	RT
	n-Propylbenzene	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	o-Xylene	<0.00126	mg/Kg	0.92	0.00126	0.0046		03/18/21 19:06	RT
	sec-Butylbenzene	<0.0016	mg/Kg	0.92	0.00160	0.0046		03/18/21 19:06	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-9-SED	Job Sample ID:	21031513.09
Date Collected:	03/17/21	Sample Matrix	Soil
Time Collected:	15:20	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	Styrene	<0.00126	mg/Kg	0.92	0.00126	0.0046		03/18/21 19:06	RT
	t-butylbenzene	<0.00141	mg/Kg	0.92	0.00141	0.0046		03/18/21 19:06	RT
	Tetrachloroethylene	<0.00138	mg/Kg	0.92	0.00138	0.0046		03/18/21 19:06	RT
	Toluene	<0.00119	mg/Kg	0.92	0.00119	0.0046		03/18/21 19:06	RT
	trans-1,2-Dichloroethylene	<0.00144	mg/Kg	0.92	0.00144	0.0046	L1	03/18/21 19:06	RT
	trans-1,3-Dichloropropene	<0.00094	mg/Kg	0.92	0.00094	0.0046		03/18/21 19:06	RT
	Trichloroethylene	<0.00104	mg/Kg	0.92	0.00104	0.0046		03/18/21 19:06	RT
	Trichlorofluoromethane	<0.00198	mg/Kg	0.92	0.00198	0.0046	V1	03/18/21 19:06	RT
	Vinyl Chloride	<0.00185	mg/Kg	0.92	0.00185	0.0046		03/18/21 19:06	RT
	Dibromofluoromethane(surr)	117	%	0.92		70-130		03/18/21 19:06	RT
	1,2-Dichloroethane-d4(surr)	112	%	0.92		70-130		03/18/21 19:06	RT
	Toluene-d8(surr)	101	%	0.92		70-130		03/18/21 19:06	RT
	p-Bromofluorobenzene(surr)	108	%	0.92		70-130		03/18/21 19:06	RT
SW-846 8270D	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:34	MS
	1,2-Dichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:34	MS
	1,3-Dichlorobenzene	< 30.65	ug/Kg	0.25	30.7	41.8		03/22/21 19:34	MS
	1,4-Dichlorobenzene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:34	MS
	2,4-Dichlorophenol	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:34	MS
	2,4-Dimethylphenol	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:34	MS
	2,4-Dinitrophenol	< 55.67	ug/Kg	0.25	55.7	41.8		03/22/21 19:34	MS
	Acenaphthene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 19:34	MS
	Acenaphthylene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:34	MS
	Anthracene	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 19:34	MS
	Benzo(a)anthracene	< 28.26	ug/Kg	0.25	28.3	41.8		03/22/21 19:34	MS
	Benzo(a)pyrene	< 43.33	ug/Kg	0.25	43.3	41.8		03/22/21 19:34	MS
	Benzo(b)fluoranthene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:34	MS
	Benzo(g,h,i)perylene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:34	MS
	Benzo(k)fluoranthene	< 46.97	ug/Kg	0.25	47.0	41.8		03/22/21 19:34	MS
	Chrysene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 19:34	MS
	Dibenzo(a,h)anthracene	< 49.42	ug/Kg	0.25	49.4	41.8		03/22/21 19:34	MS
	Diethyl phthalate	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 19:34	MS
	Fluoranthene	< 25.62	ug/Kg	0.25	25.6	41.8		03/22/21 19:34	MS
	Fluorene	< 11.87	ug/Kg	0.25	11.9	41.8		03/22/21 19:34	MS
	Hexachlorobenzene	< 39.94	ug/Kg	0.25	39.9	41.8		03/22/21 19:34	MS
	Indeno(1,2,3-cd)pyrene	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 19:34	MS
	Naphthalene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 19:34	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-9-SED

Date Collected: 03/17/21

Time Collected: 15:20

Other Information:

Job Sample ID: 21031513.09

Sample Matrix Soil

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8270D	Semivolatile Organic Compounds								
	Pentachlorophenol	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 19:34	MS
	Phenanthrene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 19:34	MS
	Phenol	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 19:34	MS
	Pyrene	< 38.15	ug/Kg	0.25	38.2	41.8		03/22/21 19:34	MS
	2-Fluorophenol(surr)	60.1	%	0.25		20-115		03/22/21 19:34	MS
	Phenol-d6(surr)	60.1	%	0.25		15-120		03/22/21 19:34	MS
	Nitrobenzene-d5(surr)	52.2	%	0.25		20-120		03/22/21 19:34	MS
	2-Fluorobiphenyl(surr)	58.3	%	0.25		30-115		03/22/21 19:34	MS
	2,4,6-Tribromophenol(surr)	86.3	%	0.25		10-120		03/22/21 19:34	MS
	p-Terphenyl-d14(surr)	76.7	%	0.25		30-140		03/22/21 19:34	MS
SW-846 8270D SIM	Selected Ion Monitoring								
	1,2,4-Trichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	1,3-Dichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Benzo(b)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Benzo(g,h,i)perylene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Benzo(k)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Dibenzo(a,h)anthracene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Hexachlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	Pyrene	< 0.825	ug/Kg	0.25	3.30	0.825		03/22/21 23:33	MS
	2,4,6-Tribromophenol(surr)	66.7	%	0.25		10-120		03/22/21 23:33	MS
	p-Terphenyl-d14(surr)	57.9	%	0.25		30-140		03/22/21 23:33	MS
	2-Fluorophenol(surr)	52.5	%	0.25		20-115		03/22/21 23:33	MS
	Phenol-d6(surr)	52	%	0.25		15-120		03/22/21 23:33	MS
	Nitrobenzene-d5(surr)	54	%	0.25		20-120		03/22/21 23:33	MS
	2-Fluorobiphenyl(surr)	44.8	%	0.25		30-115		03/22/21 23:33	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-1-SED
Date Collected: 03/16/21
Time Collected: 12:10
Other Information:

Job Sample ID: 21031513.11
Sample Matrix Soil
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 1010A	Ignitability (Flash Point) up to 150 degrees F								
	Ignitability	>150	°F	1				03/23/21 10:39	YSK
SM 2540G	% Moisture								
	% Moisture	22.4	%	1		0.1		03/20/21 14:45	SL
SM4500NH3-Dm									
	Ammonia as N[1]	6.07	mg/Kg	10	0.200	1		03/22/21 08:46	SG
SW-846 7.3	Reactive Cyanide								
	Reactive Cyanide[2]	<4.9	mg/Kg	1	4.9			03/23/21 11:51	YSK
SW-846 7.3	Reactive Sulfide								
	Reactive Sulfide[2]	<25	mg/Kg	1	25			03/23/21 12:05	YSK
SW-846 9045D	Corrosivity, pH								
	pH	8.8	s.u.					03/22/21 10:50	SL
	Temperature when read, °C[2]	21.8	s.u.					03/22/21 10:50	SL
SW-846 6020B	Metals by ICP/MS								
	Antimony	0.11335	mg/Kg	1	0.10	0.125	J	03/22/21 15:26	GG
	Arsenic	1.83	mg/Kg	1	0.08	0.125		03/22/21 15:26	GG
	Cadmium	<0.07	mg/Kg	1	0.07	0.125		03/22/21 15:26	GG
	Chromium	3.80	mg/Kg	1	0.11	0.125		03/22/21 15:26	GG
	Copper	3.15	mg/Kg	1	0.02	0.125		03/22/21 15:26	GG
	Lead	4.42	mg/Kg	1	0.11	0.125		03/22/21 15:26	GG
	Nickel	3.86	mg/Kg	1	0.02	0.125		03/22/21 15:26	GG
	Silver	<0.13	mg/Kg	1	0.13	0.125		03/25/21 16:19	GG
	Zinc	11.60	mg/Kg	1	0.57	0.5		03/22/21 15:26	GG
SW-846 7470A	Total Metals - Mercury								
	Mercury	0.00363	mg/Kg	1	0.00088	0.004	J	03/22/21 14:43	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<9.49	mg/Kg	1.00	9.49	25		03/22/21 11:29	AK
	>C12-C28	<13	mg/Kg	1.00	13.0	25		03/22/21 11:29	AK
	>C28-C35	<6.88	mg/Kg	1.00	6.88	25		03/22/21 11:29	AK
	Total C6-C35	<6.88	mg/Kg	1.00	6.88			03/22/21 11:29	AK
	Chlorooctadecane(surr)	106	%	1.00		60-150		03/22/21 11:29	AK
	1-Chlorooctane(surr)	95.5	%	1.00		60-143		03/22/21 11:29	AK
SW-846 8081B	Organochlorine Pesticides								
	Alpha-chlordane	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:20	PS
	Gamma-chlordane	< 0.18	ug/Kg	0.25	0.18	0.08325		03/23/21 22:20	PS
	4,4-DDD	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:20	PS
	4,4-DDE	<0.36	ug/Kg	0.25	0.36	0.4175		03/23/21 22:20	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-1-SED	Job Sample ID:	21031513.11
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	12:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8081B	Organochlorine Pesticides								
	4,4-DDT	< 0.48	ug/Kg	0.25	0.48	0.4175	L1	03/23/21 22:20	PS
	a-BHC	< 0.10	ug/Kg	0.25	0.10	0.08325		03/23/21 22:20	PS
	Aldrin	< 0.20	ug/Kg	0.25	0.20	0.08325		03/23/21 22:20	PS
	b-BHC	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:20	PS
	Chlordane	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:20	PS
	d-BHC	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:20	PS
	Dieldrin	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:20	PS
	Endosulfan I	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:20	PS
	Endosulfan II	< 0.28	ug/Kg	0.25	0.28	0.08325		03/23/21 22:20	PS
	Endosulfan sulfate	<0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:20	PS
	Endrin	< 0.39	ug/Kg	0.25	0.39	0.4175		03/23/21 22:20	PS
	Endrin aldehyde	< 0.41	ug/Kg	0.25	0.41	0.4175		03/23/21 22:20	PS
	Endrin ketone	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:20	PS
	g-BHC	< 0.15	ug/Kg	0.25	0.15	0.08325		03/23/21 22:20	PS
	Heptachlor	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:20	PS
	Heptachlor epoxide	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:20	PS
	Toxaphene	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:20	PS
	Tetrachloro-m-xylene(surr)	22.9	%	0.25		20-131		03/23/21 22:20	PS
	Decachlorobiphenyl(surr)	13.6	%	0.25		30-134	S2	03/23/21 22:20	PS
SW-846 8082A	Polychlorinated Biphenyls								
	Total PCBs	< 1.52	ug/Kg	0.25	1.52	0.4175		03/24/21 03:44	PS
	Tetrachloro-m-xylene(surr)	41.8	%	0.25		42-128	S2	03/24/21 03:44	PS
	Decachlorobiphenyl(surr)	30.8	%	0.25		42-130	S2	03/24/21 03:44	PS
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,1,1,2-Tetrachloroethane	<0.00085	mg/Kg	0.88	0.00085	0.0044		03/17/21 12:01	RT
	1,1,1-Trichloroethane	<0.00148	mg/Kg	0.88	0.00148	0.0044		03/17/21 12:01	RT
	1,1,2,2-Tetrachloroethane	<0.00132	mg/Kg	0.88	0.00132	0.0044		03/17/21 12:01	RT
	1,1,2-Trichloroethane	<0.00176	mg/Kg	0.88	0.00176	0.0044		03/17/21 12:01	RT
	1,1-Dichloroethane	<0.00157	mg/Kg	0.88	0.00157	0.0044		03/17/21 12:01	RT
	1,1-Dichloroethylene	<0.00173	mg/Kg	0.88	0.00173	0.0044		03/17/21 12:01	RT
	1,1-Dichloropropene	<0.00144	mg/Kg	0.88	0.00144	0.0044		03/17/21 12:01	RT
	1,2,3-trichlorobenzene	<0.00166	mg/Kg	0.88	0.00166	0.0044		03/17/21 12:01	RT
	1,2,3-Trichloropropane	<0.00151	mg/Kg	0.88	0.00151	0.0044		03/17/21 12:01	RT
	1,2,4-Trichlorobenzene	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	1,2,4-Trimethylbenzene	<0.00122	mg/Kg	0.88	0.00122	0.0044		03/17/21 12:01	RT
	1,2-Dibromo-3-chloropropane	<0.00311	mg/Kg	0.88	0.00311	0.0044		03/17/21 12:01	RT
	1,2-Dibromoethane	<0.00113	mg/Kg	0.88	0.00113	0.0044		03/17/21 12:01	RT

DRAFT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-1-SED	Job Sample ID:	21031513.11
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	12:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,2-Dichlorobenzene	<0.001	mg/Kg	0.88	0.00100	0.0044		03/17/21 12:01	RT
	1,2-Dichloroethane	<0.00132	mg/Kg	0.88	0.00132	0.0044		03/17/21 12:01	RT
	1,2-Dichloropropane	<0.00113	mg/Kg	0.88	0.00113	0.0044		03/17/21 12:01	RT
	1,3,5-Trimethylbenzene	<0.00151	mg/Kg	0.88	0.00151	0.0044		03/17/21 12:01	RT
	1,3-Dichlorobenzene	<0.00141	mg/Kg	0.88	0.00141	0.0044		03/17/21 12:01	RT
	1,3-Dichloropropane	<0.00141	mg/Kg	0.88	0.00141	0.0044		03/17/21 12:01	RT
	1,4-Dichlorobenzene	<0.00144	mg/Kg	0.88	0.00144	0.0044		03/17/21 12:01	RT
	2,2-Dichloropropane	<0.0022	mg/Kg	0.88	0.00220	0.0044		03/17/21 12:01	RT
	2-Chlorotoluene	<0.00144	mg/Kg	0.88	0.00144	0.0044		03/17/21 12:01	RT
	4-Chlorotoluene	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	4-Isopropyltoluene	<0.00141	mg/Kg	0.88	0.00141	0.0044		03/17/21 12:01	RT
	Benzene	<0.00107	mg/Kg	0.88	0.00107	0.0044		03/17/21 12:01	RT
	Bromobenzene	<0.00113	mg/Kg	0.88	0.00113	0.0044		03/17/21 12:01	RT
	Bromochloromethane	<0.00126	mg/Kg	0.88	0.00126	0.0044	L1	03/17/21 12:01	RT
	Bromodichloromethane	<0.00088	mg/Kg	0.88	0.00088	0.0044		03/17/21 12:01	RT
	Bromoform	<0.00072	mg/Kg	0.88	0.00072	0.0044		03/17/21 12:01	RT
	Bromomethane	<0.0017	mg/Kg	0.88	0.00170	0.0044		03/17/21 12:01	RT
	Carbon tetrachloride	<0.00151	mg/Kg	0.88	0.00151	0.0044		03/17/21 12:01	RT
	Chlorobenzene	<0.00148	mg/Kg	0.88	0.00148	0.0044		03/17/21 12:01	RT
	Chloroethane	<0.00242	mg/Kg	0.88	0.00242	0.0044		03/17/21 12:01	RT
	Chloroform	<0.00119	mg/Kg	0.88	0.00119	0.0044	L1	03/17/21 12:01	RT
	Chloromethane	<0.00226	mg/Kg	0.88	0.00226	0.0044		03/17/21 12:01	RT
	cis-1,2-Dichloroethylene	<0.00119	mg/Kg	0.88	0.00119	0.0044	L1	03/17/21 12:01	RT
	cis-1,3-Dichloropropene	<0.00113	mg/Kg	0.88	0.00113	0.0044		03/17/21 12:01	RT
	Dibromochloromethane	<0.0011	mg/Kg	0.88	0.00110	0.0044		03/17/21 12:01	RT
	Dibromomethane	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	Dichlorodifluoromethane	<0.00135	mg/Kg	0.88	0.00135	0.0044		03/17/21 12:01	RT
	Ethylbenzene	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	Isopropylbenzene	<0.00126	mg/Kg	0.88	0.00126	0.0044		03/17/21 12:01	RT
	m- & p-Xylenes	<0.00273	mg/Kg	0.88	0.00273	0.0088		03/17/21 12:01	RT
	MEK	<0.00267	mg/Kg	0.88	0.00267	0.0044		03/17/21 12:01	RT
	Methylene chloride	<0.00154	mg/Kg	0.88	0.00154	0.0044		03/17/21 12:01	RT
	Naphthalene	<0.00188	mg/Kg	0.88	0.00188	0.0044		03/17/21 12:01	RT
	n-Butylbenzene	<0.00179	mg/Kg	0.88	0.00179	0.0044		03/17/21 12:01	RT
	n-Propylbenzene	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	o-Xylene	<0.00126	mg/Kg	0.88	0.00126	0.0044		03/17/21 12:01	RT
	sec-Butylbenzene	<0.0016	mg/Kg	0.88	0.00160	0.0044		03/17/21 12:01	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-1-SED	Job Sample ID:	21031513.11
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	12:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	Styrene	<0.00126	mg/Kg	0.88	0.00126	0.0044		03/17/21 12:01	RT
	t-butylbenzene	<0.00141	mg/Kg	0.88	0.00141	0.0044		03/17/21 12:01	RT
	Tetrachloroethylene	<0.00138	mg/Kg	0.88	0.00138	0.0044		03/17/21 12:01	RT
	Toluene	<0.00119	mg/Kg	0.88	0.00119	0.0044		03/17/21 12:01	RT
	trans-1,2-Dichloroethylene	<0.00144	mg/Kg	0.88	0.00144	0.0044	L1	03/17/21 12:01	RT
	trans-1,3-Dichloropropene	<0.00094	mg/Kg	0.88	0.00094	0.0044		03/17/21 12:01	RT
	Trichloroethylene	<0.00104	mg/Kg	0.88	0.00104	0.0044		03/17/21 12:01	RT
	Trichlorofluoromethane	<0.00198	mg/Kg	0.88	0.00198	0.0044	V1	03/17/21 12:01	RT
	Vinyl Chloride	<0.00185	mg/Kg	0.88	0.00185	0.0044		03/17/21 12:01	RT
	Dibromofluoromethane(surr)	110	%	0.88		70-130		03/17/21 12:01	RT
	1,2-Dichloroethane-d4(surr)	111	%	0.88		70-130		03/17/21 12:01	RT
	Toluene-d8(surr)	102	%	0.88		70-130		03/17/21 12:01	RT
	p-Bromofluorobenzene(surr)	111	%	0.88		70-130		03/17/21 12:01	RT
SW-846 8270D	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:05	MS
	1,2-Dichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:05	MS
	1,3-Dichlorobenzene	< 30.65	ug/Kg	0.25	30.7	41.8		03/22/21 20:05	MS
	1,4-Dichlorobenzene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:05	MS
	2,4-Dichlorophenol	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:05	MS
	2,4-Dimethylphenol	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:05	MS
	2,4-Dinitrophenol	< 55.67	ug/Kg	0.25	55.7	41.8		03/22/21 20:05	MS
	Acenaphthene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 20:05	MS
	Acenaphthylene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:05	MS
	Anthracene	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 20:05	MS
	Benzo(a)anthracene	< 28.26	ug/Kg	0.25	28.3	41.8		03/22/21 20:05	MS
	Benzo(a)pyrene	< 43.33	ug/Kg	0.25	43.3	41.8		03/22/21 20:05	MS
	Benzo(b)fluoranthene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:05	MS
	Benzo(g,h,i)perylene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:05	MS
	Benzo(k)fluoranthene	< 46.97	ug/Kg	0.25	47.0	41.8		03/22/21 20:05	MS
	Chrysene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:05	MS
	Dibenzo(a,h)anthracene	< 49.42	ug/Kg	0.25	49.4	41.8		03/22/21 20:05	MS
	Diethyl phthalate	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:05	MS
	Fluoranthene	< 25.62	ug/Kg	0.25	25.6	41.8		03/22/21 20:05	MS
	Fluorene	< 11.87	ug/Kg	0.25	11.9	41.8		03/22/21 20:05	MS
	Hexachlorobenzene	< 39.94	ug/Kg	0.25	39.9	41.8		03/22/21 20:05	MS
	Indeno(1,2,3-cd)pyrene	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 20:05	MS
	Naphthalene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 20:05	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-1-SED

Date Collected: 03/16/21

Time Collected: 12:10

Other Information:

Job Sample ID: 21031513.11

Sample Matrix Soil

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8270D	Semivolatile Organic Compounds								
	Pentachlorophenol	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 20:05	MS
	Phenanthrene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:05	MS
	Phenol	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 20:05	MS
	Pyrene	< 38.15	ug/Kg	0.25	38.2	41.8		03/22/21 20:05	MS
	2-Fluorophenol(surr)	55.6	%	0.25		20-115		03/22/21 20:05	MS
	Phenol-d6(surr)	56	%	0.25		15-120		03/22/21 20:05	MS
	Nitrobenzene-d5(surr)	50.7	%	0.25		20-120		03/22/21 20:05	MS
	2-Fluorobiphenyl(surr)	56.8	%	0.25		30-115		03/22/21 20:05	MS
	2,4,6-Tribromophenol(surr)	76.4	%	0.25		10-120		03/22/21 20:05	MS
	p-Terphenyl-d14(surr)	67.9	%	0.25		30-140		03/22/21 20:05	MS
SW-846 8270D SIM	Selected Ion Monitoring								
	1,2,4-Trichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	1,3-Dichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Benzo(b)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Benzo(g,h,i)perylene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Benzo(k)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Dibenzo(a,h)anthracene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Hexachlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	Pyrene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:04	MS
	2-Fluorophenol(surr)	49.9	%	0.25		20-115		03/23/21 00:04	MS
	Phenol-d6(surr)	49.6	%	0.25		15-120		03/23/21 00:04	MS
	Nitrobenzene-d5(surr)	50.2	%	0.25		20-120		03/23/21 00:04	MS
	2-Fluorobiphenyl(surr)	42.5	%	0.25		30-115		03/23/21 00:04	MS
	2,4,6-Tribromophenol(surr)	61.8	%	0.25		10-120		03/23/21 00:04	MS
	p-Terphenyl-d14(surr)	52.5	%	0.25		30-140		03/23/21 00:04	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-5-SED
Date Collected: 03/16/21
Time Collected: 15:30
Other Information:

Job Sample ID: 21031513.13
Sample Matrix Soil
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 2540G	% Moisture								
	% Moisture	36.8	%	1		0.1		03/20/21 14:45	SL
SM4500NH3-Dm									
	Ammonia as N[1]	20.8	mg/Kg	10	0.200	1		03/22/21 08:46	SG
SW-846 6020B	Metals by ICP/MS								
	Antimony	0.17724	mg/Kg	1	0.10	0.125		03/22/21 15:34	GG
	Arsenic	3.11	mg/Kg	1	0.08	0.125		03/22/21 15:34	GG
	Cadmium	0.07911	mg/Kg	1	0.07	0.125	J	03/22/21 15:34	GG
	Chromium	5.47	mg/Kg	1	0.11	0.125		03/22/21 15:34	GG
	Copper	5.00	mg/Kg	1	0.02	0.125		03/22/21 15:34	GG
	Lead	7.65	mg/Kg	1	0.11	0.125		03/22/21 15:34	GG
	Nickel	5.78	mg/Kg	1	0.02	0.125		03/22/21 15:34	GG
	Silver	<0.13	mg/Kg	1	0.13	0.125		03/25/21 16:23	GG
	Zinc	17.54	mg/Kg	1	0.57	0.5		03/22/21 15:34	GG
SW-846 7470A	Total Metals - Mercury								
	Mercury	0.02762	mg/Kg	1	0.00088	0.004		03/22/21 15:10	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<9.49	mg/Kg	1.00	9.49	25		03/22/21 16:40	AK
	>C12-C28	<13	mg/Kg	1.00	13.0	25		03/22/21 16:40	AK
	>C28-C35	<6.88	mg/Kg	1.00	6.88	25		03/22/21 16:40	AK
	Total C6-C35	<6.88	mg/Kg	1.00	6.88			03/22/21 16:40	AK
	Chlorooctadecane(surr)	88.9	%	1.00		60-150		03/22/21 16:40	AK
	1-Chlorooctane(surr)	97.5	%	1.00		60-143		03/22/21 16:40	AK
SW-846 8081B	Organochlorine Pesticides								
	Alpha-chlordane	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:34	PS
	Gamma-chlordane	< 0.18	ug/Kg	0.25	0.18	0.08325		03/23/21 22:34	PS
	4,4-DDD	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:34	PS
	4,4-DDE	<0.36	ug/Kg	0.25	0.36	0.4175		03/23/21 22:34	PS
	4,4-DDT	< 0.48	ug/Kg	0.25	0.48	0.4175	L1	03/23/21 22:34	PS
	a-BHC	< 0.10	ug/Kg	0.25	0.10	0.08325		03/23/21 22:34	PS
	Aldrin	< 0.20	ug/Kg	0.25	0.20	0.08325		03/23/21 22:34	PS
	b-BHC	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:34	PS
	Chlordane	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:34	PS
	d-BHC	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:34	PS
	Dieldrin	< 0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:34	PS
	Endosulfan I	< 0.34	ug/Kg	0.25	0.34	0.4175		03/23/21 22:34	PS
	Endosulfan II	< 0.28	ug/Kg	0.25	0.28	0.08325		03/23/21 22:34	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-5-SED	Job Sample ID:	21031513.13
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	15:30	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8081B	Organochlorine Pesticides								
	Endosulfan sulfate	<0.25	ug/Kg	0.25	0.25	0.08325		03/23/21 22:34	PS
	Endrin	< 0.39	ug/Kg	0.25	0.39	0.4175		03/23/21 22:34	PS
	Endrin aldehyde	< 0.41	ug/Kg	0.25	0.41	0.4175		03/23/21 22:34	PS
	Endrin ketone	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:34	PS
	g-BHC	< 0.15	ug/Kg	0.25	0.15	0.08325		03/23/21 22:34	PS
	Heptachlor	< 0.33	ug/Kg	0.25	0.33	0.08325		03/23/21 22:34	PS
	Heptachlor epoxide	< 0.26	ug/Kg	0.25	0.26	0.08325		03/23/21 22:34	PS
	Toxaphene	<1.67	ug/Kg	0.25	1.67	0.8325		03/23/21 22:34	PS
	Tetrachloro-m-xylene(surr)	18.4	%	0.25		20-131	S2	03/23/21 22:34	PS
	Decachlorobiphenyl(surr)	14.9	%	0.25		30-134	S2	03/23/21 22:34	PS
SW-846 8082A	Polychlorinated Biphenyls								
	Total PCBs	< 1.52	ug/Kg	0.25	1.52	0.4175		03/24/21 03:58	PS
	Tetrachloro-m-xylene(surr)	40.7	%	0.25		42-128	S2	03/24/21 03:58	PS
	Decachlorobiphenyl(surr)	34.2	%	0.25		42-130	S2	03/24/21 03:58	PS
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	1,1,1,2-Tetrachloroethane	<0.00085	mg/Kg	0.87	0.00085	0.00435		03/17/21 13:02	RT
	1,1,1-Trichloroethane	<0.00148	mg/Kg	0.87	0.00148	0.00435		03/17/21 13:02	RT
	1,1,2,2-Tetrachloroethane	<0.00132	mg/Kg	0.87	0.00132	0.00435		03/17/21 13:02	RT
	1,1,2-Trichloroethane	<0.00176	mg/Kg	0.87	0.00176	0.00435		03/17/21 13:02	RT
	1,1-Dichloroethane	<0.00157	mg/Kg	0.87	0.00157	0.00435		03/17/21 13:02	RT
	1,1-Dichloroethylene	<0.00173	mg/Kg	0.87	0.00173	0.00435		03/17/21 13:02	RT
	1,1-Dichloropropene	<0.00144	mg/Kg	0.87	0.00144	0.00435		03/17/21 13:02	RT
	1,2,3-trichlorobenzene	<0.00166	mg/Kg	0.87	0.00166	0.00435		03/17/21 13:02	RT
	1,2,3-Trichloropropane	<0.00151	mg/Kg	0.87	0.00151	0.00435		03/17/21 13:02	RT
	1,2,4-Trichlorobenzene	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	1,2,4-Trimethylbenzene	<0.00122	mg/Kg	0.87	0.00122	0.00435		03/17/21 13:02	RT
	1,2-Dibromo-3-chloropropane	<0.00311	mg/Kg	0.87	0.00311	0.00435		03/17/21 13:02	RT
	1,2-Dibromoethane	<0.00113	mg/Kg	0.87	0.00113	0.00435		03/17/21 13:02	RT
	1,2-Dichlorobenzene	<0.001	mg/Kg	0.87	0.00100	0.00435		03/17/21 13:02	RT
	1,2-Dichloroethane	<0.00132	mg/Kg	0.87	0.00132	0.00435		03/17/21 13:02	RT
	1,2-Dichloropropane	<0.00113	mg/Kg	0.87	0.00113	0.00435		03/17/21 13:02	RT
	1,3,5-Trimethylbenzene	<0.00151	mg/Kg	0.87	0.00151	0.00435		03/17/21 13:02	RT
	1,3-Dichlorobenzene	<0.00141	mg/Kg	0.87	0.00141	0.00435		03/17/21 13:02	RT
	1,3-Dichloropropane	<0.00141	mg/Kg	0.87	0.00141	0.00435		03/17/21 13:02	RT
	1,4-Dichlorobenzene	<0.00144	mg/Kg	0.87	0.00144	0.00435		03/17/21 13:02	RT
	2,2-Dichloropropane	<0.0022	mg/Kg	0.87	0.00220	0.00435		03/17/21 13:02	RT
	2-Chlorotoluene	<0.00144	mg/Kg	0.87	0.00144	0.00435		03/17/21 13:02	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-5-SED

Date Collected: 03/16/21

Time Collected: 15:30

Other Information:

Job Sample ID: 21031513.13

Sample Matrix Soil

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	4-Chlorotoluene	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	4-Isopropyltoluene	<0.00141	mg/Kg	0.87	0.00141	0.00435		03/17/21 13:02	RT
	Benzene	<0.00107	mg/Kg	0.87	0.00107	0.00435		03/17/21 13:02	RT
	Bromobenzene	<0.00113	mg/Kg	0.87	0.00113	0.00435		03/17/21 13:02	RT
	Bromochloromethane	<0.00126	mg/Kg	0.87	0.00126	0.00435	L1	03/17/21 13:02	RT
	Bromodichloromethane	<0.00088	mg/Kg	0.87	0.00088	0.00435		03/17/21 13:02	RT
	Bromoform	<0.00072	mg/Kg	0.87	0.00072	0.00435		03/17/21 13:02	RT
	Bromomethane	<0.0017	mg/Kg	0.87	0.00170	0.00435		03/17/21 13:02	RT
	Carbon tetrachloride	<0.00151	mg/Kg	0.87	0.00151	0.00435		03/17/21 13:02	RT
	Chlorobenzene	<0.00148	mg/Kg	0.87	0.00148	0.00435		03/17/21 13:02	RT
	Chloroethane	<0.00242	mg/Kg	0.87	0.00242	0.00435		03/17/21 13:02	RT
	Chloroform	<0.00119	mg/Kg	0.87	0.00119	0.00435	L1	03/17/21 13:02	RT
	Chloromethane	<0.00226	mg/Kg	0.87	0.00226	0.00435		03/17/21 13:02	RT
	cis-1,2-Dichloroethylene	<0.00119	mg/Kg	0.87	0.00119	0.00435	L1	03/17/21 13:02	RT
	cis-1,3-Dichloropropene	<0.00113	mg/Kg	0.87	0.00113	0.00435		03/17/21 13:02	RT
	Dibromochloromethane	<0.0011	mg/Kg	0.87	0.00110	0.00435		03/17/21 13:02	RT
	Dibromomethane	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	Dichlorodifluoromethane	<0.00135	mg/Kg	0.87	0.00135	0.00435		03/17/21 13:02	RT
	Ethylbenzene	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	Isopropylbenzene	<0.00126	mg/Kg	0.87	0.00126	0.00435		03/17/21 13:02	RT
	m- & p-Xylenes	<0.00273	mg/Kg	0.87	0.00273	0.0087		03/17/21 13:02	RT
	MEK	<0.00267	mg/Kg	0.87	0.00267	0.00435		03/17/21 13:02	RT
	Methylene chloride	<0.00154	mg/Kg	0.87	0.00154	0.00435		03/17/21 13:02	RT
	Naphthalene	<0.00188	mg/Kg	0.87	0.00188	0.00435		03/17/21 13:02	RT
	n-Butylbenzene	<0.00179	mg/Kg	0.87	0.00179	0.00435		03/17/21 13:02	RT
	n-Propylbenzene	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	o-Xylene	<0.00126	mg/Kg	0.87	0.00126	0.00435		03/17/21 13:02	RT
	sec-Butylbenzene	<0.0016	mg/Kg	0.87	0.00160	0.00435		03/17/21 13:02	RT
	Styrene	<0.00126	mg/Kg	0.87	0.00126	0.00435		03/17/21 13:02	RT
	t-butylbenzene	<0.00141	mg/Kg	0.87	0.00141	0.00435		03/17/21 13:02	RT
	Tetrachloroethylene	<0.00138	mg/Kg	0.87	0.00138	0.00435		03/17/21 13:02	RT
	Toluene	<0.00119	mg/Kg	0.87	0.00119	0.00435		03/17/21 13:02	RT
	trans-1,2-Dichloroethylene	<0.00144	mg/Kg	0.87	0.00144	0.00435	L1	03/17/21 13:02	RT
	trans-1,3-Dichloropropene	<0.00094	mg/Kg	0.87	0.00094	0.00435		03/17/21 13:02	RT
	Trichloroethylene	<0.00104	mg/Kg	0.87	0.00104	0.00435		03/17/21 13:02	RT
	Trichlorofluoromethane	<0.00198	mg/Kg	0.87	0.00198	0.00435	V1	03/17/21 13:02	RT
	Vinyl Chloride	<0.00185	mg/Kg	0.87	0.00185	0.00435		03/17/21 13:02	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-5-SED	Job Sample ID:	21031513.13
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	15:30	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8260C	Volatile Organic Compounds by GC/MS								
	Dibromofluoromethane(surr)	119	%	0.87		70-130		03/17/21 13:02	RT
	1,2-Dichloroethane-d4(surr)	118	%	0.87		70-130		03/17/21 13:02	RT
	Toluene-d8(surr)	102	%	0.87		70-130		03/17/21 13:02	RT
	p-Bromofluorobenzene(surr)	109	%	0.87		70-130		03/17/21 13:02	RT
SW-846 8270D	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:37	MS
	1,2-Dichlorobenzene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:37	MS
	1,3-Dichlorobenzene	< 30.65	ug/Kg	0.25	30.7	41.8		03/22/21 20:37	MS
	1,4-Dichlorobenzene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:37	MS
	2,4-Dichlorophenol	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:37	MS
	2,4-Dimethylphenol	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:37	MS
	2,4-Dinitrophenol	< 55.67	ug/Kg	0.25	55.7	41.8		03/22/21 20:37	MS
	Acenaphthene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 20:37	MS
	Acenaphthylene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:37	MS
	Anthracene	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 20:37	MS
	Benzo(a)anthracene	< 28.26	ug/Kg	0.25	28.3	41.8		03/22/21 20:37	MS
	Benzo(a)pyrene	< 43.33	ug/Kg	0.25	43.3	41.8		03/22/21 20:37	MS
	Benzo(b)fluoranthene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:37	MS
	Benzo(g,h,i)perylene	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:37	MS
	Benzo(k)fluoranthene	< 46.97	ug/Kg	0.25	47.0	41.8		03/22/21 20:37	MS
	Chrysene	< 23.74	ug/Kg	0.25	23.7	41.8		03/22/21 20:37	MS
	Dibenzo(a,h)anthracene	< 49.42	ug/Kg	0.25	49.4	41.8		03/22/21 20:37	MS
	Diethyl phthalate	< 29.86	ug/Kg	0.25	29.9	41.8		03/22/21 20:37	MS
	Fluoranthene	< 25.62	ug/Kg	0.25	25.6	41.8		03/22/21 20:37	MS
	Fluorene	< 11.87	ug/Kg	0.25	11.9	41.8		03/22/21 20:37	MS
	Hexachlorobenzene	< 39.94	ug/Kg	0.25	39.9	41.8		03/22/21 20:37	MS
	Indeno(1,2,3-cd)pyrene	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 20:37	MS
	Naphthalene	< 15.32	ug/Kg	0.25	15.3	41.8		03/22/21 20:37	MS
	Pentachlorophenol	< 35.61	ug/Kg	0.25	35.6	41.8		03/22/21 20:37	MS
	Phenanthrene	< 21.67	ug/Kg	0.25	21.7	41.8		03/22/21 20:37	MS
	Phenol	< 18.12	ug/Kg	0.25	18.1	41.8		03/22/21 20:37	MS
	Pyrene	< 38.15	ug/Kg	0.25	38.2	41.8		03/22/21 20:37	MS
	2-Fluorophenol(surr)	55.6	%	0.25		20-115		03/22/21 20:37	MS
	Phenol-d6(surr)	54.4	%	0.25		15-120		03/22/21 20:37	MS
	Nitrobenzene-d5(surr)	49.1	%	0.25		20-120		03/22/21 20:37	MS
	2-Fluorobiphenyl(surr)	54.6	%	0.25		30-115		03/22/21 20:37	MS
	2,4,6-Tribromophenol(surr)	77.1	%	0.25		10-120		03/22/21 20:37	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-5-SED	Job Sample ID:	21031513.13
Date Collected:	03/16/21	Sample Matrix	Soil
Time Collected:	15:30	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SW-846 8270D	Semivolatile Organic Compounds								
	p-Terphenyl-d14(surr)	69	%	0.25		30-140		03/22/21 20:37	MS
SW-846 8270D SIM	Selected Ion Monitoring								
	1,2,4-Trichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	1,3-Dichlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Benzo(b)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Benzo(g,h,i)perylene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Benzo(k)fluoranthene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Dibenzo(a,h)anthracene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Hexachlorobenzene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Pyrene	< 0.825	ug/Kg	0.25	3.30	0.825		03/23/21 00:35	MS
	Nitrobenzene-d5(surr)	49.8	%	0.25		20-120		03/23/21 00:35	MS
	2-Fluorobiphenyl(surr)	41.4	%	0.25		30-115		03/23/21 00:35	MS
	2,4,6-Tribromophenol(surr)	59.5	%	0.25		10-120		03/23/21 00:35	MS
	p-Terphenyl-d14(surr)	54.7	%	0.25		30-140		03/23/21 00:35	MS
	2-Fluorophenol(surr)	49.1	%	0.25		20-115		03/23/21 00:35	MS
	Phenol-d6(surr)	47.9	%	0.25		15-120		03/23/21 00:35	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-ELUT-WAT & SED Composite	Job Sample ID:	21031513.15
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 4500NH3D									
	Ammonia as N	0.85	mg/L	1		0.01		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	4.7	mg/L	1	0.35	1		03/22/21 17:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	1.82	ug/L	2.5	0.500	0.625		03/22/21 22:04	GG
	Arsenic	5.07	ug/L	2.5	0.250	0.625		03/22/21 22:04	GG
	Cadmium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:04	GG
	Chromium	0.713	ug/L	2.5	0.300	0.625	D1	03/22/21 22:04	GG
	Copper	1.50	ug/L	2.5	1.00	0.625		03/22/21 22:04	GG
	Lead	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:04	GG
	Nickel	1.93	ug/L	2.5	0.300	0.625		03/22/21 22:04	GG
	Silver	< 0.5	ug/L	2.5	0.500	0.625	D1	03/22/21 22:04	GG
	Zinc	6.29	ug/L	2.5	2.80	0.625		03/22/21 22:04	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/23/21 13:01	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	0.415	mg/L	1.00	0.35	2.15	J	03/22/21 23:51	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/22/21 23:51	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/22/21 23:51	AK
	Total C6-C35	0.415	mg/L	1.00	0.18			03/22/21 23:51	AK
	Chlorooctadecane(surr)	105	%	1.00		70-125		03/22/21 23:51	AK
	1-Chlorooctane(surr)	90.6	%	1.00		70-125		03/22/21 23:51	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 23:08	PS
	Decachlorobiphenyl(surr)	58	%	0.25		35-129		03/23/21 23:08	PS
	Tetrachloro-m-xylene(surr)	60	%	0.25		27-127		03/23/21 23:08	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:53	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:53	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 19:53	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:53	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:53	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:53	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:53	PS
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 19:53	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 19:53	PS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-ELUT-WAT & SED Composite	Job Sample ID:	21031513.15
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:53	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:53	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:53	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:53	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 19:53	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 19:53	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 19:53	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:53	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:53	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 19:53	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 19:53	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 19:53	PS
	Tetrachloro-m-xylene(surr)	43.9	%	0.25		24-127		03/23/21 19:53	PS
	Decachlorobiphenyl(surr)	32.5	%	0.25		34-120	S2	03/23/21 19:53	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/23/21 13:52	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/23/21 13:52	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-1-ELUT-WAT & SED Composite
Date Collected: 03/17/21
Time Collected: 17:10
Other Information:

Job Sample ID: 21031513.15
Sample Matrix: Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 13:52	RT
	Dibromofluoromethane(surr)	120	%	1.00		70-130		03/23/21 13:52	RT
	1,2-Dichloroethane-d4(surr)	126	%	1.00		70-130		03/23/21 13:52	RT
	Toluene-d8(surr)	96.3	%	1.00		70-130		03/23/21 13:52	RT
	p-Bromofluorobenzene(surr)	101	%	1.00		70-130		03/23/21 13:52	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:24	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 20:24	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:24	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 20:24	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:24	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:24	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 20:24	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 20:24	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 20:24	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 20:24	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 20:24	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 20:24	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:24	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 20:24	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:24	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:24	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:24	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 20:24	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 20:24	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 20:24	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:24	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 20:24	MS
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 20:24	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 20:24	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-1-ELUT-WAT & SED Composite	Job Sample ID:	21031513.15
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:	17:10	% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 20:24	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 20:24	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:24	MS
	2-Fluorophenol(surr)	31.8	%	0.25		15-115		03/22/21 20:24	MS
	Phenol-d6(surr)	23.1	%	0.25		10-130		03/22/21 20:24	MS
	Nitrobenzene-d5(surr)	64.8	%	0.25		23-120		03/22/21 20:24	MS
	2-Fluorobiphenyl(surr)	61.1	%	0.25		30-115		03/22/21 20:24	MS
	2,4,6-Tribromophenol(surr)	46.2	%	0.25		19-122		03/22/21 20:24	MS
	p-Terphenyl-d14(surr)	57.2	%	0.25		18-137		03/22/21 20:24	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 21:03	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 21:03	MS
	2,4,6-Tribromophenol(surr)	47.2	%	0.25		19-122		03/22/21 21:03	MS
	2-Fluorobiphenyl(surr)	44.5	%	0.25		30-115		03/22/21 21:03	MS
	2-Fluorophenol(surr)	30.1	%	0.25		15-115		03/22/21 21:03	MS
	Nitrobenzene-d5(surr)	56.6	%	0.25		23-120		03/22/21 21:03	MS
	Phenol-d6(surr)	21.7	%	0.25		10-130		03/22/21 21:03	MS
	p-Terphenyl-d14(surr)	51.9	%	0.25		18-137		03/22/21 21:03	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-5-ELUT-WAT & SED Composite
Date Collected: 03/17/21
Time Collected:
Other Information:

Job Sample ID: 21031513.16
Sample Matrix Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 4500NH3D									
	Ammonia as N	0.71	mg/L	1		0.01		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	4.8	mg/L	1	0.35	1		03/22/21 17:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	0.984	ug/L	2.5	0.500	0.625	D1	03/22/21 22:24	GG
	Arsenic	3.35	ug/L	2.5	0.250	0.625		03/22/21 22:24	GG
	Cadmium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:24	GG
	Chromium	0.344	ug/L	2.5	0.300	0.625	J	03/22/21 22:24	GG
	Copper	1.21	ug/L	2.5	1.00	0.625	D1	03/22/21 22:24	GG
	Lead	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:24	GG
	Nickel	2.17	ug/L	2.5	0.300	0.625		03/22/21 22:24	GG
	Silver	< 0.5	ug/L	2.5	0.500	0.625	D1	03/22/21 22:24	GG
	Zinc	5.26	ug/L	2.5	2.80	0.625		03/22/21 22:24	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/23/21 13:04	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<0.35	mg/L	1.00	0.35	2.15		03/23/21 00:21	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/23/21 00:21	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/23/21 00:21	AK
	Total C6-C35	<0.18	mg/L	1.00	0.18			03/23/21 00:21	AK
	Chlorooctadecane(surr)	91.5	%	1.00		70-125		03/23/21 00:21	AK
	1-Chlorooctane(surr)	80.5	%	1.00		70-125		03/23/21 00:21	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 23:21	PS
	Decachlorobiphenyl(surr)	55	%	0.25		35-129		03/23/21 23:21	PS
	Tetrachloro-m-xylene(surr)	60	%	0.25		27-127		03/23/21 23:21	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:07	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:07	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 20:07	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:07	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:07	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 20:07	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:07	PS
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 20:07	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 20:07	PS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-5-ELUT-WAT & SED Composite	Job Sample ID:	21031513.16
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:		% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:07	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:07	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:07	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:07	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:07	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:07	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 20:07	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:07	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:07	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:07	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:07	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 20:07	PS
	Tetrachloro-m-xylene(surr)	44.6	%	0.25		24-127		03/23/21 20:07	PS
	Decachlorobiphenyl(surr)	32.5	%	0.25		34-120	S2	03/23/21 20:07	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/23/21 14:23	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/23/21 14:23	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-5-ELUT-WAT & SED Composite	Job Sample ID:	21031513.16
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:		% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:23	RT
	Dibromofluoromethane(surr)	116	%	1.00		70-130		03/23/21 14:23	RT
	1,2-Dichloroethane-d4(surr)	122	%	1.00		70-130		03/23/21 14:23	RT
	Toluene-d8(surr)	96.8	%	1.00		70-130		03/23/21 14:23	RT
	p-Bromofluorobenzene(surr)	102	%	1.00		70-130		03/23/21 14:23	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:55	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 20:55	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:55	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 20:55	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:55	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 20:55	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 20:55	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 20:55	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 20:55	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 20:55	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 20:55	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 20:55	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:55	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 20:55	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:55	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:55	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:55	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 20:55	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 20:55	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 20:55	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 20:55	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 20:55	MS
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 20:55	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 20:55	MS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-5-ELUT-WAT & SED Composite

Date Collected: 03/17/21

Time Collected:

Other Information:

Job Sample ID: 21031513.16

Sample Matrix Water

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 20:55	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 20:55	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 20:55	MS
	2-Fluorophenol(surr)	27.5	%	0.25		15-115		03/22/21 20:55	MS
	Phenol-d6(surr)	18.8	%	0.25		10-130		03/22/21 20:55	MS
	Nitrobenzene-d5(surr)	54.2	%	0.25		23-120		03/22/21 20:55	MS
	2-Fluorobiphenyl(surr)	52	%	0.25		30-115		03/22/21 20:55	MS
	2,4,6-Tribromophenol(surr)	46.7	%	0.25		19-122		03/22/21 20:55	MS
	p-Terphenyl-d14(surr)	59.8	%	0.25		18-137		03/22/21 20:55	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 21:33	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 21:33	MS
	Phenol-d6(surr)	16.8	%	0.25		10-130		03/22/21 21:33	MS
	p-Terphenyl-d14(surr)	54.3	%	0.25		18-137		03/22/21 21:33	MS
	2,4,6-Tribromophenol(surr)	48.9	%	0.25		19-122		03/22/21 21:33	MS
	2-Fluorobiphenyl(surr)	37.2	%	0.25		30-115		03/22/21 21:33	MS
	2-Fluorophenol(surr)	25	%	0.25		15-115		03/22/21 21:33	MS
	Nitrobenzene-d5(surr)	47.2	%	0.25		23-120		03/22/21 21:33	MS

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name:	DiSorbo Consulting LLC	Attn: Bob Davis
Project Name:	Cedar Port Pre-Dredge Sampling	

Client Sample ID:	MB-9-ELUT-WAT & SED Composite	Job Sample ID:	21031513.17
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:		% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
SM 4500NH3D									
	Ammonia as N	1.37	mg/L	5		0.05		03/22/21 13:37	SG
SM 5310B	Total Organic Carbon								
	TOC	4.6	mg/L	1	0.35	1		03/22/21 17:00	AJ
EPA 200.8	Dissolved Metals								
	Antimony	0.784	ug/L	2.5	0.500	0.625	D1	03/22/21 22:52	GG
	Arsenic	2.56	ug/L	2.5	0.250	0.625		03/22/21 22:52	GG
	Cadmium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:52	GG
	Chromium	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:52	GG
	Copper	1.14	ug/L	2.5	1.00	0.625	D1	03/22/21 22:52	GG
	Lead	< 0.3	ug/L	2.5	0.300	0.625	D1	03/22/21 22:52	GG
	Nickel	1.9	ug/L	2.5	0.300	0.625		03/22/21 22:52	GG
	Silver	< 0.5	ug/L	2.5	0.500	0.625	D1	03/22/21 22:52	GG
	Zinc	9.71	ug/L	2.5	2.80	0.625		03/22/21 22:52	GG
EPA 245.1	Total Metals - Mercury								
	Mercury	< 0.06	ug/L	1	0.0600	0.2		03/23/21 13:07	BDC
TX 1005	Total Petroleum Hydrocarbons								
	C6-C12	<0.35	mg/L	1.00	0.35	2.15		03/23/21 00:50	AK
	>C12-C28	<0.37	mg/L	1.00	0.37	2.15		03/23/21 00:50	AK
	>C28-C35	<0.18	mg/L	1.00	0.18	2.15		03/23/21 00:50	AK
	Total C6-C35	<0.18	mg/L	1.00	0.18			03/23/21 00:50	AK
	Chlorooctadecane(surr)	98.2	%	1.00		70-125		03/23/21 00:50	AK
	1-Chlorooctane(surr)	86.5	%	1.00		70-125		03/23/21 00:50	AK
EPA 608.3	Polychlorinated Biphenyls								
	Total PCBs	<0.0129	ug/L	1	0.0129	0.05		03/23/21 23:25	PS
	Decachlorobiphenyl(surr)	58	%	0.25		35-129		03/23/21 23:35	PS
	Tetrachloro-m-xylene(surr)	60	%	0.25		27-127		03/23/21 23:35	PS
EPA 608.3	Organochlorine Pesticides								
	Alpha-chlordane	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:47	PS
	Gamma-chlordane	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:47	PS
	4,4-DDD	< 0.006	ug/L	0.25	0.006	0.0025		03/23/21 20:47	PS
	4,4-DDE	<0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:47	PS
	4,4-DDT	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:47	PS
	a-BHC	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 20:47	PS
	Aldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:47	PS
	b-BHC	< 0.010	ug/L	0.25	0.010	0.0025		03/23/21 20:47	PS
	Chlordane	<0.025	ug/L	0.25		0.025		03/23/21 20:47	PS

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LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID:	MB-9-ELUT-WAT & SED Composite	Job Sample ID:	21031513.17
Date Collected:	03/17/21	Sample Matrix	Water
Time Collected:		% Moisture	
Other Information:			

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 608.3	Organochlorine Pesticides								
	d-BHC	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:47	PS
	Dieldrin	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:47	PS
	Endosulfan I	< 0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:47	PS
	Endosulfan II	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:47	PS
	Endosulfan sulfate	<0.003	ug/L	0.25	0.003	0.0025		03/23/21 20:47	PS
	Endrin	< 0.004	ug/L	0.25	0.004	0.0025		03/23/21 20:47	PS
	Endrin aldehyde	< 0.008	ug/L	0.25	0.008	0.0025		03/23/21 20:47	PS
	Endrin ketone	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:47	PS
	g-BHC	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:47	PS
	Heptachlor	< 0.005	ug/L	0.25	0.005	0.0025		03/23/21 20:47	PS
	Heptachlor epoxide	< 0.002	ug/L	0.25	0.002	0.0025		03/23/21 20:47	PS
	Toxaphene	<0.1	ug/L	0.25	0.1	0.025		03/23/21 20:47	PS
	Tetrachloro-m-xylene(surr)	46.3	%	0.25		24-127		03/23/21 20:47	PS
	Decachlorobiphenyl(surr)	33.1	%	0.25		34-120	S2	03/23/21 20:47	PS
EPA 624.1	Volatile Organic Compounds								
	1,1,1-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,1,2,2-Tetrachloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,1,2-Trichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,1-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,1-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,2-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,2-Dichloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,3-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	1,4-Dichlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	2-Butanone	<0.005	mg/L	1.00	0.005	0.005		03/23/21 14:54	RT
	Benzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Bromodichloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Bromoform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Bromomethane	<0.002	mg/L	1.00	0.002	0.005		03/23/21 14:54	RT
	Carbon tetrachloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Chlorobenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Chloroethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Chloroform	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Chloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	cis-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Dibromochloromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Ethylbenzene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC Attn: Bob Davis
Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-9-ELUT-WAT & SED Composite
Date Collected: 03/17/21
Time Collected:
Other Information:

Job Sample ID: 21031513.17
Sample Matrix Water
% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 624.1	Volatile Organic Compounds								
	Methylene chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Tetrachloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Toluene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	trans-1,2-Dichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	trans-1,3-Dichloropropene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Trichloroethylene	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Trichlorofluoromethane	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Vinyl Chloride	<0.001	mg/L	1.00	0.001	0.005		03/23/21 14:54	RT
	Dibromofluoromethane(surr)	119	%	1.00		70-130		03/23/21 14:54	RT
	1,2-Dichloroethane-d4(surr)	125	%	1.00		70-130		03/23/21 14:54	RT
	Toluene-d8(surr)	96.9	%	1.00		70-130		03/23/21 14:54	RT
	p-Bromofluorobenzene(surr)	102	%	1.00		70-130		03/23/21 14:54	RT
EPA 625.1	Semivolatile Organic Compounds								
	1,2,4-Trichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 21:25	MS
	1,2-Dichlorobenzene	< 0.41	ug/L	0.25	0.410	1.25		03/22/21 21:25	MS
	1,3-Dichlorobenzene	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 21:25	MS
	1,4-Dichlorobenzene	< 0.25	ug/L	0.25	0.250	1.25		03/22/21 21:25	MS
	2,4-Dichlorophenol	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 21:25	MS
	2,4-Dimethylphenol	< 0.53	ug/L	0.25	0.530	1.25		03/22/21 21:25	MS
	2,4-Dinitrophenol	< 1.41	ug/L	0.25	1.41	1.25		03/22/21 21:25	MS
	Acenaphthene	< 0.28	ug/L	0.25	0.280	1.25		03/22/21 21:25	MS
	Acenaphthylene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 21:25	MS
	Anthracene	< 0.35	ug/L	0.25	0.350	1.25		03/22/21 21:25	MS
	Benzo(a)anthracene	< 0.38	ug/L	0.25	0.380	1.25		03/22/21 21:25	MS
	Benzo(a)pyrene	< 0.85	ug/L	0.25	0.850	1.25		03/22/21 21:25	MS
	Benzo(b)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 21:25	MS
	Benzo(g,h,i)perylene	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 21:25	MS
	Benzo(k)fluoranthene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 21:25	MS
	Chrysene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 21:25	MS
	Dibenzo(a,h)anthracene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 21:25	MS
	Diethyl phthalate	< 0.63	ug/L	0.25	0.630	1.25		03/22/21 21:25	MS
	Fluoranthene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 21:25	MS
	Fluorene	< 0.47	ug/L	0.25	0.470	1.25		03/22/21 21:25	MS
	Hexachlorobenzene	< 0.69	ug/L	0.25	0.690	1.25		03/22/21 21:25	MS
	Indeno(1,2,3-cd)pyrene	< 0.22	ug/L	0.25	0.220	1.25		03/22/21 21:25	MS
	Naphthalene	< 0.31	ug/L	0.25	0.310	1.25		03/22/21 21:25	MS
	Pentachlorophenol	< 0.5	ug/L	0.25	0.500	1.25		03/22/21 21:25	MS

DRAFT

LABORATORY TEST RESULTS

Job ID : 21031513

Date 3/30/2021

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Project Name: Cedar Port Pre-Dredge Sampling

Client Sample ID: MB-9-ELUT-WAT & SED Composite

Date Collected: 03/17/21

Time Collected:

Other Information:

Job Sample ID: 21031513.17

Sample Matrix Water

% Moisture

Test Method	Parameter/Test Description	Result	Units	DF	SDL	MQL	Q	Date Time	Analyst
EPA 625.1	Semivolatile Organic Compounds								
	Phenanthrene	< 0.44	ug/L	0.25	0.440	1.25		03/22/21 21:25	MS
	Phenol	< 0.44	ug/L	0.25	0.440	1.25	L2	03/22/21 21:25	MS
	Pyrene	< 0.57	ug/L	0.25	0.570	1.25		03/22/21 21:25	MS
	2-Fluorophenol(surr)	29.5	%	0.25		15-115		03/22/21 21:25	MS
	Phenol-d6(surr)	19	%	0.25		10-130		03/22/21 21:25	MS
	Nitrobenzene-d5(surr)	55.4	%	0.25		23-120		03/22/21 21:25	MS
	2-Fluorobiphenyl(surr)	51	%	0.25		30-115		03/22/21 21:25	MS
	2,4,6-Tribromophenol(surr)	39.8	%	0.25		19-122		03/22/21 21:25	MS
	p-Terphenyl-d14(surr)	50.2	%	0.25		18-137		03/22/21 21:25	MS
EPA 625.1	Selected Ion Monitoring								
	Benzo(a)pyrene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 22:03	MS
	Chrysene	< 0.025	ug/L	0.25	0.1	0.025		03/22/21 22:03	MS
	2,4,6-Tribromophenol(surr)	40.5	%	0.25		19-122		03/22/21 22:03	MS
	2-Fluorobiphenyl(surr)	37.9	%	0.25		30-115		03/22/21 22:03	MS
	2-Fluorophenol(surr)	27.3	%	0.25		15-115		03/22/21 22:03	MS
	Nitrobenzene-d5(surr)	49.6	%	0.25		23-120		03/22/21 22:03	MS
	Phenol-d6(surr)	17.6	%	0.25		10-130		03/22/21 22:03	MS
	p-Terphenyl-d14(surr)	45.5	%	0.25		18-137		03/22/21 22:03	MS

¹-Parameter not covered by accreditation

²-Parameter not available for accreditation

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : Total Petroleum Hydrocarbons **Method : TX 1005** **Reporting Units : mg/Kg**

QC Batch ID : Qb210318139 **Created Date :** 03/18/21 **Created By :** AKumar

Samples in This QC Batch : 21031513.08,09

Sample Preparation : PB21031858 **Prep Method :** TX 1005 **Prep Date :** 03/18/21 11:30 **Prep By :** AKumar

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
C6-C12	TPH-1005-1	< MDL	mg/Kg	1.00	25	9.49		
>C12-C28	TPH-1005-2	< MDL	mg/Kg	1.00	25	13.0		
>C28-C35	TPH-1005-4	< MDL	mg/Kg	1.00	25	6.88		
Total C6-C35		< MDL	mg/Kg	1.00	----	6.88		
Chlorooctadecane(surr)	3386-33-2	100	%	1.00				
1-Chlorooctane(surr)	111-85-3	94.7	%	1.00				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	500	507	101	500	455	91.1	10.8	20	75-125	
>C12-C28	500	503	101	500	457	91.3	9.6	20	75-125	
>C28-C35	500	481	96.2	500	490	97.9	1.8	20	75-125	

QC Type: MS and MSD

QC Sample ID: 21031483.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
C6-C12	1.26	500	511	102	500	547	109	6.7	20	75-125	
>C12-C28	2.27	500	535	107	500	562	112	4.9	20	75-125	
>C28-C35	0.00	500	599	120	500	529	106	12.4	20	75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **EPA 624.1** **Reporting Units : mg/L**

QC Batch ID : Qb21031931 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.01,03,05

Sample Preparation : PB21031941 **Prep Method :** EPA 624.1 **Prep Date :** 03/18/21 10:00 **Prep By :** Rajeev

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,1,1-Trichloroethane	71-55-6	< MDL	mg/L	1.00	0.005	0.001		
1,1,2,2-Tetrachloroethane	79-34-5	< MDL	mg/L	1.00	0.005	0.001		
1,1,2-Trichloroethane	79-00-5	< MDL	mg/L	1.00	0.005	0.001		
1,1-Dichloroethane	75-34-3	< MDL	mg/L	1.00	0.005	0.001		
1,1-Dichloroethylene	75-35-4	< MDL	mg/L	1.00	0.005	0.001		
1,2-Dichlorobenzene	95-50-1	< MDL	mg/L	1.00	0.005	0.001		
1,2-Dichloroethane	107-06-2	< MDL	mg/L	1.00	0.005	0.001		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/L	1.00	0.005	0.001		
1,4-Dichlorobenzene	106-46-7	< MDL	mg/L	1.00	0.005	0.001		
2-Butanone	78-93-3	< MDL	mg/L	1.00	0.005	0.005		
Benzene	71-43-2	< MDL	mg/L	1.00	0.005	0.001		
Bromodichloromethane	75-27-4	< MDL	mg/L	1.00	0.005	0.001		
Bromoform	75-25-2	< MDL	mg/L	1.00	0.005	0.001		
Bromomethane	74-83-9	< MDL	mg/L	1.00	0.005	0.002		
Carbon tetrachloride	56-23-5	< MDL	mg/L	1.00	0.005	0.001		
Chlorobenzene	108-90-7	< MDL	mg/L	1.00	0.005	0.001		
Chloroethane	75-00-3	< MDL	mg/L	1.00	0.005	0.001		
Chloroform	67-66-3	< MDL	mg/L	1.00	0.005	0.001		
Chloromethane	74-87-3	< MDL	mg/L	1.00	0.005	0.001		
cis-1,3-Dichloropropene	10061-01-5	< MDL	mg/L	1.00	0.005	0.001		
Dibromochloromethane	124-48-1	< MDL	mg/L	1.00	0.005	0.001		
Ethylbenzene	100-41-4	< MDL	mg/L	1.00	0.005	0.001		
Methylene chloride	75-09-2	< MDL	mg/L	1.00	0.005	0.001		
Tetrachloroethylene	127-18-4	< MDL	mg/L	1.00	0.005	0.001		
Toluene	108-88-3	< MDL	mg/L	1.00	0.005	0.001		
trans-1,2-Dichloroethylene	156-60-5	< MDL	mg/L	1.00	0.005	0.001		
trans-1,3-Dichloropropene	10061-02-6	< MDL	mg/L	1.00	0.005	0.001		
Trichloroethylene	79-01-6	< MDL	mg/L	1.00	0.005	0.001		
Trichlorofluoromethane	75-69-4	< MDL	mg/L	1.00	0.005	0.001		
Vinyl Chloride	75-01-4	< MDL	mg/L	1.00	0.005	0.001		
Dibromofluoromethane(surr	1868-53-7	114	%	1.00				
1,2-Dichloroethane-d4(surr	17060-07-0	111	%	1.00				
Toluene-d8(surr)	2037-26-5	98.9	%	1.00				
p-Bromofluorobenzene(surr	460-00-4	103	%	1.00				

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **EPA 624.1** **Reporting Units :** **mg/L**

QC Batch ID : Qb21031931 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.01,03,05

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,1-Dichloroethylene	0.02	0.0235	118	0.02	0.0231	115	1.9	30	75.5-124	
Benzene	0.02	0.0215	107	0.02	0.0215	108	0.1	30	80-120	
Chlorobenzene	0.02	0.0210	105	0.02	0.0209	104	0.5	30	80-120	
Toluene	0.02	0.0214	107	0.02	0.0211	106	1.5	30	77.1-121	
Trichloroethylene	0.02	0.0211	106	0.02	0.0208	104	1.5	30	80-120	
1,1,1-Trichloroethane	0.02	0.0224	112	0.02	0.0221	111	1.4	30	80-120	
1,1,2,2-Tetrachloroethane	0.02	0.0185	92.3	0.02	0.0198	99.2	7	30	80-120	
1,1,2-Trichloroethane	0.02	0.0207	104	0.02	0.0215	107	3.7	30	80-120	
1,1-Dichloroethane	0.02	0.0227	114	0.02	0.0227	114	0.1	30	77.6-124	
1,2-Dichlorobenzene	0.02	0.0208	104	0.02	0.0204	102	1.7	30	83.2-121	
1,2-Dichloroethane	0.02	0.0219	110	0.02	0.0224	112	2.2	30	74.5-129	
1,3-Dichlorobenzene	0.02	0.0208	104	0.02	0.0206	103	1.1	30	80-120	
1,4-Dichlorobenzene	0.02	0.0210	105	0.02	0.0206	103	1.8	30	80-120	
Bromodichloromethane	0.02	0.0217	108	0.02	0.0217	108	0.1	30	80-119	
Bromoform	0.02	0.0194	96.9	0.02	0.0201	101	3.6	30	78.8-127	
Bromomethane	0.02	0.0208	104	0.02	0.0211	105	1.4	30	53-138	
Carbon tetrachloride	0.02	0.0218	109	0.02	0.0212	106	2.7	30	70-136	
Chloroethane	0.02	0.0208	104	0.02	0.0201	101	3.5	30	75.6-128	
Chloroform	0.02	0.0224	112	0.02	0.0226	113	0.9	30	79-123	
Chloromethane	0.02	0.0221	111	0.02	0.0222	111	0.4	30	69.6-125	
cis-1,3-Dichloropropene	0.02	0.0218	109	0.02	0.0218	109	0.2	30	80-120	
Dibromochloromethane	0.02	0.0206	103	0.02	0.0209	104	1.5	30	82.8-117	
Ethylbenzene	0.02	0.0214	107	0.02	0.0210	105	1.8	30	80-120	
Methylene chloride	0.02	0.0217	109	0.02	0.0217	109	0.1	30	69.4-131	
Tetrachloroethylene	0.02	0.0216	108	0.02	0.0208	104	3.8	30	40-168	
trans-1,2-Dichloroethylene	0.02	0.0229	115	0.02	0.0228	114	0.6	30	77.5-122	
trans-1,3-Dichloropropene	0.02	0.0213	107	0.02	0.0216	108	1.2	30	81.5-113	
Trichlorofluoromethane	0.02	0.0208	104	0.02	0.0213	106	2.4	30	80-132	
Vinyl Chloride	0.02	0.0214	107	0.02	0.0213	107	0.6	30	71.1-127	
2-Butanone	0.02	0.0219	109	0.02	0.0213	107	2.7	30	75-125	

QC Type: MS and MSD

QC Sample ID: 21031513.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1-Dichloroethylene	BRL	0.02	0.0256	128						81-130	
Benzene	BRL	0.02	0.0225	113						84-132	
Chlorobenzene	BRL	0.02	0.0207	104						72-132	
Toluene	BRL	0.02	0.0218	109						72-136	
Trichloroethylene	BRL	0.02	0.0218	109						75-136	
1,1,1-Trichloroethane	BRL	0.02	0.0241	121						78-131	

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Volatile Organic Compounds **Method : EPA 624.1** **Reporting Units : mg/L**

QC Batch ID : Qb21031931 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.01,03,05

QC Type: MS and MSD
QC Sample ID: 21031513.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1,2,2-Tetrachloroethane	BRL	0.02	0.0256	128						66-145	
1,1,2-Trichloroethane	BRL	0.02	0.0241	120						69-138	
1,1-Dichloroethane	BRL	0.02	0.0248	124						84-128	
1,2-Dichlorobenzene	BRL	0.02	0.0205	103						73-138	
1,2-Dichloroethane	BRL	0.02	0.0264	132						65-154	
1,3-Dichlorobenzene	BRL	0.02	0.0201	100						74-136	
1,4-Dichlorobenzene	BRL	0.02	0.0201	101						71-136	
Bromodichloromethane	BRL	0.02	0.0238	119						83-134	
Bromoform	BRL	0.02	0.0232	116						68-135	
Bromomethane	BRL	0.02	0.0213	107						65-144	
Carbon tetrachloride	BRL	0.02	0.0262	131						70-136	
Chloroethane	BRL	0.02	0.0221	110						76-147	
Chloroform	BRL	0.02	0.0243	121						68-130	
Chloromethane	BRL	0.02	0.0227	113						73-127	
cis-1,3-Dichloropropene	BRL	0.02	0.0233	116						81-126	
Dibromochloromethane	BRL	0.02	0.0229	114						68-139	
Ethylbenzene	BRL	0.02	0.0212	106						75-133	
Methylene chloride	BRL	0.02	0.0238	119						74-126	
Tetrachloroethylene	BRL	0.02	0.0201	100						65-138	
trans-1,2-Dichloroethylene	BRL	0.02	0.0246	123						73-130	
trans-1,3-Dichloropropene	BRL	0.02	0.0232	116						73-129	
Trichlorofluoromethane	BRL	0.02	0.0236	118						78-143	
Vinyl Chloride	BRL	0.02	0.0225	113						58-135	
2-Butanone	BRL	0.02	0.0247	124						75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Metals - Mercury **Method : EPA 245.1** **Reporting Units : mg/L**

QC Batch ID : Qb21031936 **Created Date :** 03/19/21 **Created By :** BChristofer

Samples in This QC Batch : 21031513.01,03,05,06

Digestion : PB21031937 **Prep Method :** EPA 245.1 **Prep Date :** 03/19/21 08:40 **Prep By :** JYou

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Mercury	7439-97-6T	< MDL	mg/L	1	0.0002	0.00006		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.005	0.00543	109	0.005	0.00551	110	1.5	20	85-115	

QC Type: MS and MSD

QC Sample ID: 21031531.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	BRL	0.005	0.00464	92.8						82-115	

Refer to the Definition page for terms.

DRAFT

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **SW-846 8260C** **Reporting Units :** **mg/Kg**

QC Batch ID : Qb21031938 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.08,09,11,13

Sample Preparation :		**Prep Method :**	**Prep Date :**	**Prep By :**
	PB21031938	SW-846 5035A	03/17/21 11:00	Rajeev
	PB21031938	SW-846 5035A	03/18/21 15:10	Rajeev

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,1,1,2-Tetrachloroethane	630-20-6	< MDL	mg/Kg	1.00	0.005	0.00085		
1,1,1-Trichloroethane	71-55-6	< MDL	mg/Kg	1.00	0.005	0.00148		
1,1,2,2-Tetrachloroethane	79-34-5	< MDL	mg/Kg	1.00	0.005	0.00132		
1,1,2-Trichloroethane	79-00-5	< MDL	mg/Kg	1.00	0.005	0.00176		
1,1-Dichloroethane	75-34-3	< MDL	mg/Kg	1.00	0.005	0.00157		
1,1-Dichloroethylene	75-35-4	< MDL	mg/Kg	1.00	0.005	0.00173		
1,1-Dichloropropene	563-58-6	< MDL	mg/Kg	1.00	0.005	0.00144		
1,2,3-trichlorobenzene	87-61-6	< MDL	mg/Kg	1.00	0.005	0.00166		
1,2,3-Trichloropropane	96-18-4	< MDL	mg/Kg	1.00	0.005	0.00151		
1,2,4-Trichlorobenzene	120-82-1	< MDL	mg/Kg	1.00	0.005	0.00138		
1,2,4-Trimethylbenzene	95-63-6	< MDL	mg/Kg	1.00	0.005	0.00122		
1,2-Dibromo-3-chloropropa	96-12-8	< MDL	mg/Kg	1.00	0.005	0.00311		
1,2-Dibromoethane	106-93-4	< MDL	mg/Kg	1.00	0.005	0.00113		
1,2-Dichlorobenzene	95-50-1	< MDL	mg/Kg	1.00	0.005	0.00100		
1,2-Dichloroethane	107-06-2	< MDL	mg/Kg	1.00	0.005	0.00132		
1,2-Dichloropropane	78-87-5	< MDL	mg/Kg	1.00	0.005	0.00113		
1,3,5-Trimethylbenzene	108-67-8	< MDL	mg/Kg	1.00	0.005	0.00151		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/Kg	1.00	0.005	0.00141		
1,3-Dichloropropane	142-28-9	< MDL	mg/Kg	1.00	0.005	0.00141		
1,4-Dichlorobenzene	106-46-7	< MDL	mg/Kg	1.00	0.005	0.00144		
2,2-Dichloropropane	594-20-7	< MDL	mg/Kg	1.00	0.005	0.00220		
2-Chlorotoluene	95-49-8	< MDL	mg/Kg	1.00	0.005	0.00144		
4-Chlorotoluene	106-43-4	< MDL	mg/Kg	1.00	0.005	0.00138		
4-Isopropyltoluene	99-87-6	< MDL	mg/Kg	1.00	0.005	0.00141		
Benzene	71-43-2	< MDL	mg/Kg	1.00	0.005	0.00107		
Bromobenzene	108-86-1	< MDL	mg/Kg	1.00	0.005	0.00113		
Bromochloromethane	74-97-5	< MDL	mg/Kg	1.00	0.005	0.00126		
Bromodichloromethane	75-27-4	< MDL	mg/Kg	1.00	0.005	0.00088		
Bromoform	75-25-2	< MDL	mg/Kg	1.00	0.005	0.00072		
Bromomethane	74-83-9	< MDL	mg/Kg	1.00	0.005	0.00170		
Carbon tetrachloride	56-23-5	< MDL	mg/Kg	1.00	0.005	0.00151		
Chlorobenzene	108-90-7	< MDL	mg/Kg	1.00	0.005	0.00148		
Chloroethane	75-00-3	< MDL	mg/Kg	1.00	0.005	0.00242		
Chloroform	67-66-3	< MDL	mg/Kg	1.00	0.005	0.00119		
Chloromethane	74-87-3	< MDL	mg/Kg	1.00	0.005	0.00226		
cis-1,2-Dichloroethylene	156-59-2	< MDL	mg/Kg	1.00	0.005	0.00119		
cis-1,3-Dichloropropene	10061-01-5	< MDL	mg/Kg	1.00	0.005	0.00113		

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **SW-846 8260C** **Reporting Units :** **mg/Kg**

QC Batch ID : Qb21031938 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL	Qual
Dibromochloromethane	124-48-1	< MDL	mg/Kg	1.00	0.005	0.00110	
Dibromomethane	74-95-3	< MDL	mg/Kg	1.00	0.005	0.00138	
Dichlorodifluoromethane	75-71-8	< MDL	mg/Kg	1.00	0.005	0.00135	
Ethylbenzene	100-41-4	< MDL	mg/Kg	1.00	0.005	0.00138	
Isopropylbenzene	98-82-8	< MDL	mg/Kg	1.00	0.005	0.00126	
m- & p-Xylenes	179601-23-1	< MDL	mg/Kg	1.00	0.01	0.00273	
MEK	78-93-3	< MDL	mg/Kg	1.00	0.005	0.00267	
Methylene chloride	75-09-2	< MDL	mg/Kg	1.00	0.005	0.00154	
Naphthalene	91-20-3	< MDL	mg/Kg	1.00	0.005	0.00188	
n-Butylbenzene	104-51-8	< MDL	mg/Kg	1.00	0.005	0.00179	
n-Propylbenzene	103-65-1	< MDL	mg/Kg	1.00	0.005	0.00138	
o-Xylene	95-47-6	< MDL	mg/Kg	1.00	0.005	0.00126	
sec-Butylbenzene	135-98-8	< MDL	mg/Kg	1.00	0.005	0.00160	
Styrene	100-42-5	< MDL	mg/Kg	1.00	0.005	0.00126	
t-butylbenzene	98-06-6	< MDL	mg/Kg	1.00	0.005	0.00141	
Tetrachloroethylene	127-18-4	< MDL	mg/Kg	1.00	0.005	0.00138	
Toluene	108-88-3	< MDL	mg/Kg	1.00	0.005	0.00119	
trans-1,2-Dichloroethylene	156-60-5	< MDL	mg/Kg	1.00	0.005	0.00144	
trans-1,3-Dichloropropene	10061-02-6	< MDL	mg/Kg	1.00	0.005	0.00094	
Trichloroethylene	79-01-6	< MDL	mg/Kg	1.00	0.005	0.00104	
Trichlorofluoromethane	75-69-4	< MDL	mg/Kg	1.00	0.005	0.00198	
Vinyl Chloride	75-01-4	< MDL	mg/Kg	1.00	0.005	0.00185	
Dibromofluoromethane(surr	1868-53-7	120	%	1.00			
1,2-Dichloroethane-d4(surr	17060-07-0	109	%	1.00			
Toluene-d8(surr)	2037-26-5	98.9	%	1.00			
p-Bromofluorobenzene(surr	460-00-4	111	%	1.00			

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,1,1,2-Tetrachloroethane	0.02	0.0222	111	0.02	0.0225	113	1.4	30	78-125	
1,1,1-Trichloroethane	0.02	0.0253	126	0.02	0.0257	128	1.6	30	70-130	
1,1,2,2-Tetrachloroethane	0.02	0.0215	107	0.02	0.0214	107	0.4	30	70-124	
1,1,2-Trichloroethane	0.02	0.0214	107	0.02	0.0213	106	0.3	30	78-121	
1,1-Dichloroethane	0.02	0.0237	118	0.02	0.0248	124	4.6	30	76-125	
1,1-Dichloroethylene	0.02	0.0240	120	0.02	0.0252	126	5	30	70-131	
1,1-Dichloropropene	0.02	0.0222	111	0.02	0.0227	113	2.2	30	76-125	
1,2,3-trichlorobenzene	0.02	0.0180	90.3	0.02	0.0202	101	11.2	30	66-130	
1,2,3-Trichloropropane	0.02	0.0217	109	0.02	0.0219	110	0.7	30	73-125	

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **SW-846 8260C** **Reporting Units : mg/Kg**

QC Batch ID : Qb21031938 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,2,4-Trichlorobenzene	0.02	0.0185	92.6	0.02	0.0209	105	12.1	30	66-129	
1,2,4-Trimethylbenzene	0.02	0.0216	108	0.02	0.0227	113	4.8	30	75-123	
1,2-Dibromo-3-chloropropa	0.02	0.0194	96.9	0.02	0.0202	101	4.1	30	61-132	
1,2-Dibromoethane	0.02	0.0211	106	0.02	0.0211	106	0.2	30	78-122	
1,2-Dichlorobenzene	0.02	0.0214	107	0.02	0.0217	108	1.5	30	78-121	
1,2-Dichloroethane	0.02	0.0238	119	0.02	0.0238	119	0.2	30	71-128	
1,2-Dichloropropane	0.02	0.0217	109	0.02	0.0213	107	2	30	76-123	
1,3,5-Trimethylbenzene	0.02	0.0220	110	0.02	0.0224	112	1.8	30	73-124	
1,3-Dichlorobenzene	0.02	0.0212	106	0.02	0.0221	110	4	30	77-121	
1,3-Dichloropropane	0.02	0.0225	113	0.02	0.0229	114	1.7	30	77-121	
1,4-Dichlorobenzene	0.02	0.0216	108	0.02	0.0221	110	2.5	30	75-120	
2,2-Dichloropropane	0.02	0.0246	123	0.02	0.0256	128	4	30	67-133	
2-Chlorotoluene	0.02	0.0227	113	0.02	0.0230	115	1.4	30	75-122	
4-Chlorotoluene	0.02	0.0224	112	0.02	0.0228	114	1.6	30	72-124	
4-Isopropyltoluene	0.02	0.0216	108	0.02	0.0222	111	2.6	30	73-127	
Benzene	0.02	0.0219	110	0.02	0.0220	110	0.4	30	77-121	
Bromobenzene	0.02	0.0209	105	0.02	0.0205	103	2	30	78-121	
Bromochloromethane	0.02	0.0256	128	0.02	0.0251	126	2.1	30	75-125	L1
Bromodichloromethane	0.02	0.0236	118	0.02	0.0233	116	1.3	30	71-127	
Bromoform	0.02	0.0220	110	0.02	0.0218	109	1.1	30	67-132	
Bromomethane	0.02	0.0247	123	0.02	0.0239	119	3.2	30	55-140	
Carbon tetrachloride	0.02	0.0238	119	0.02	0.0235	117	1.1	30	69-135	
Chlorobenzene	0.02	0.0221	111	0.02	0.0218	109	1.4	30	79-120	
Chloroethane	0.02	0.0243	121	0.02	0.0241	121	0.7	30	59-139	
Chloroform	0.02	0.0243	122	0.02	0.0253	127	3.9	30	78-123	L1
Chloromethane	0.02	0.0229	115	0.02	0.0255	128	10.5	30	50-136	
cis-1,2-Dichloroethylene	0.02	0.0245	123	0.02	0.0251	126	2.3	30	77-123	L1
cis-1,3-Dichloropropene	0.02	0.0223	111	0.02	0.0218	109	2.2	30	74-126	
Dibromochloromethane	0.02	0.0226	113	0.02	0.0221	110	2.1	30	74-126	
Dibromomethane	0.02	0.0235	118	0.02	0.0226	113	4	30	78-125	
Dichlorodifluoromethane	0.02	0.0201	101	0.02	0.0223	112	10.2	30	29-149	
Ethylbenzene	0.02	0.0224	112	0.02	0.0220	110	2	30	76-122	
Isopropylbenzene	0.02	0.0222	111	0.02	0.0221	110	0.6	30	68-134	
m- & p-Xylenes	0.04	0.0453	113	0.04	0.0450	113	0.6	30	77-124	
MEK	0.02	0.0247	123	0.02	0.0213	107	14.7	30	51-148	
Methylene chloride	0.02	0.0195	97.7	0.02	0.0183	91.5	6.5	30	70-128	
Naphthalene	0.02	0.0164	82.1	0.02	0.0198	98.9	18.7	30	62-129	
n-Butylbenzene	0.02	0.0218	109	0.02	0.0227	114	4.1	30	70-128	
n-Propylbenzene	0.02	0.0221	111	0.02	0.0225	112	1.7	30	73-125	
o-Xylene	0.02	0.0222	111	0.02	0.0219	109	1.6	30	77-123	
sec-Butylbenzene	0.02	0.0219	109	0.02	0.0226	113	3.3	30	73-126	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Volatile Organic Compounds** **Method :** **SW-846 8260C** **Reporting Units : mg/Kg**

QC Batch ID : Qb21031938 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Styrene	0.02	0.0223	112	0.02	0.0212	106	5.1	30	76-124	
t-butylbenzene	0.02	0.0202	101	0.02	0.0206	103	1.8	30	73-125	
Tetrachloroethylene	0.02	0.0224	112	0.02	0.0217	109	3.1	30	73-128	
Toluene	0.02	0.0228	114	0.02	0.0227	114	0.3	30	77-121	
trans-1,2-Dichloroethylene	0.02	0.0242	121	0.02	0.0254	127	5	30	74-125	L1
trans-1,3-Dichloropropene	0.02	0.0216	108	0.02	0.0223	112	3.4	30	71-130	
Trichloroethylene	0.02	0.0213	106	0.02	0.0216	108	1.5	30	77-123	
Trichlorofluoromethane	0.02	0.0263	131	0.02	0.0278	139	5.7	30	62-140	
Vinyl Chloride	0.02	0.0222	111	0.02	0.0239	120	7.3	30	56-135	

QC Type: MS and MSD

QC Sample ID: 21031513.09

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1,1,2-Tetrachloroethane	BRL	0.019	0.0205	108						71.4-131	
1,1,1-Trichloroethane	BRL	0.019	0.0226	119						69.6-140	
1,1,2,2-Tetrachloroethane	BRL	0.019	0.0204	107						66.6-128	
1,1,2-Trichloroethane	BRL	0.019	0.0208	110						72.8-125	
1,1-Dichloroethane	BRL	0.019	0.0223	117						72.7-129	
1,1-Dichloroethylene	BRL	0.019	0.0226	119						71.4-131	
1,1-Dichloropropene	BRL	0.019	0.0205	108						75.9-132	
1,2,3-trichlorobenzene	BRL	0.019	0.0154	81						56.7-153	
1,2,3-Trichloropropane	BRL	0.019	0.0214	113						61.6-138	
1,2,4-Trichlorobenzene	BRL	0.019	0.0156	81.9						55.9-150	
1,2,4-Trimethylbenzene	BRL	0.019	0.0202	106						71.1-131	
1,2-Dibromo-3-chloropropa	BRL	0.019	0.0197	104						52.4-150	
1,2-Dibromoethane	BRL	0.019	0.0202	106						72.9-125	
1,2-Dichlorobenzene	BRL	0.019	0.0192	101						76.1-126	
1,2-Dichloroethane	BRL	0.019	0.0225	118						66.4-134	
1,2-Dichloropropane	BRL	0.019	0.0208	109						70.2-128	
1,3,5-Trimethylbenzene	BRL	0.019	0.0202	106						75.1-127	
1,3-Dichlorobenzene	BRL	0.019	0.0196	103						73.9-126	
1,3-Dichloropropane	BRL	0.019	0.0223	117						68.3-124	
1,4-Dichlorobenzene	BRL	0.019	0.0197	104						72.3-127	
2,2-Dichloropropane	BRL	0.019	0.0182	95.8						68.5-138	
2-Chlorotoluene	BRL	0.019	0.0206	109						71.7-128	
4-Chlorotoluene	BRL	0.019	0.0203	107						72.2-126	
4-Isopropyltoluene	BRL	0.019	0.0198	104						77.5-125	
Benzene	BRL	0.019	0.0207	109						74-126	
Bromobenzene	BRL	0.019	0.0192	101						73.3-129	

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Volatile Organic Compounds **Method : SW-846 8260C** **Reporting Units : mg/Kg**

QC Batch ID : Qb21031938 **Created Date :** 03/18/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: MS and MSD

QC Sample ID: 21031513.09

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Bromochloromethane	BRL	0.019	0.0229	121						68.8-131	
Bromodichloromethane	BRL	0.019	0.0224	118						69-135	
Bromoform	BRL	0.019	0.0206	108						62-146	
Bromomethane	BRL	0.019	0.0222	117						58.7-139	
Carbon tetrachloride	BRL	0.019	0.0214	112						68.7-135	
Chlorobenzene	BRL	0.019	0.0198	104						73.3-129	
Chloroethane	BRL	0.019	0.0229	121						66.2-129	
Chloroform	BRL	0.019	0.0228	120						73.7-134	
Chloromethane	BRL	0.019	0.0209	110						51.4-135	
cis-1,2-Dichloroethylene	BRL	0.019	0.0219	115						72.4-132	
cis-1,3-Dichloropropene	BRL	0.019	0.0205	108						67.7-134	
Dibromochloromethane	BRL	0.019	0.0209	110						73.2-126	
Dibromomethane	BRL	0.019	0.0219	115						69.9-134	
Dichlorodifluoromethane	BRL	0.019	0.0159	83.7						36.8-144	
Ethylbenzene	BRL	0.019	0.0201	106						72.2-128	
Isopropylbenzene	BRL	0.019	0.0199	105						71.2-131	
m- & p-Xylenes	BRL	0.038	0.0405	107						70.7-131	
MEK	BRL	0.019	0.0169	88.8						52.5-152	
Methylene chloride	BRL	0.019	0.0177	93.1						70.6-129	
Naphthalene	BRL	0.019	0.0147	77.4						60.7-145	
n-Butylbenzene	BRL	0.019	0.0194	102						66.5-136	
n-Propylbenzene	BRL	0.019	0.0205	108						73.3-126	
o-Xylene	BRL	0.019	0.0203	107						71.6-130	
sec-Butylbenzene	BRL	0.019	0.0203	107						77.9-124	
Styrene	BRL	0.019	0.0193	101						71.1-131	
t-butylbenzene	BRL	0.019	0.0181	95.3						74.4-130	
Tetrachloroethylene	BRL	0.019	0.0208	109						62.6-157	
Toluene	BRL	0.019	0.0204	107						73.3-127	
trans-1,2-Dichloroethylene	BRL	0.019	0.0225	118						70-130	
trans-1,3-Dichloropropene	BRL	0.019	0.0196	103						71.5-124	
Trichloroethylene	BRL	0.019	0.0201	106						69.2-133	
Trichlorofluoromethane	BRL	0.019	0.0242	127						63.9-140	
Vinyl Chloride	BRL	0.019	0.0205	108						40.9-159	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513

Date : 3/30/2021

Analysis : **Corrosivity, pH**

Method : **SW-846 9045D**

Reporting Units : **s.u.**

QC Batch ID : Qb21031941

Created Date : 03/19/21

Created By : Surayah

Samples in This QC Batch : 21031513.08,09

QC Type: **Duplicate**

QC Sample ID: **21031463.01**

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
pH	5.6	5.6	s.u.	0	5		

QC Type: **LCS and LCSD**

Parameter	LCS Assigned	LCS Result		LCSD Assigned	LCSD Result		RPD	RPD CtrlLimit	Tolerance	Qual
pH	4.0	4.05							98.75-101.25	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : % Moisture **Method : SM 2540G** **Reporting Units : %**

QC Batch ID : Qb21031943 **Created Date :** 03/19/21 **Created By :** Surayah

Samples in This QC Batch : 21031513.08,09

Sample Preparation : PB21031942 **Prep Method :** SM 2540G **Prep Date :** 03/19/21 08:10 **Prep By :** Surayah

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
% Moisture		< MDL	%	1	0.1			

QC Type: Duplicate

QC Sample ID: 21031600.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
% Moisture	2.63	3.06	%	15.1	20		

ab-q213-0321

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Metals - Mercury **Method : SW-846 7470A** **Reporting Units : mg/Kg**

QC Batch ID : Qb21031950 **Created Date :** 03/19/21 **Created By :** BChristofer

Samples in This QC Batch : 21031513.08,09

Digestion : PB21031948 **Prep Method :** SW-846 7470A **Prep Date :** 03/19/21 08:30 **Prep By :** JYou

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Mercury	7439-97-6T	< MDL	mg/Kg	1	0.004	0.00088		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.1	0.101	101	0.1	0.100	100	0.8	20	80-120	

QC Type: MS and MSD

QC Sample ID: 21031513.09

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	0.0272	0.2	0.213	92.9						80-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Petroleum Hydrocarbons **Method : TX 1005** **Reporting Units : mg/L**

QC Batch ID : Qb21031988 **Created Date :** 03/19/21 **Created By :** AKumar

Samples in This QC Batch : 21031513.15,16,17

Sample Preparation : PB21031959 **Prep Method :** TX 1005 **Prep Date :** 03/19/21 15:00 **Prep By :** AKumar

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
C6-C12	TPH-1005-1	< MDL	mg/L	1.00	2.15	0.35		
>C12-C28	TPH-1005-2	< MDL	mg/L	1.00	2.15	0.37		
>C28-C35	TPH-1005-4	< MDL	mg/L	1.00	2.15	0.18		
Total C6-C35		< MDL	mg/L	1.00	----	0.18		
Chlorooctadecane(surr)	3386-33-2	94.2	%	1.00				
1-Chlorooctane(surr)	111-85-3	94.3	%	1.00				

QC Type: Duplicate

QC Sample ID: 21031658.10

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
>C12-C28	BRL	0.188	mg/L	0	+20		
>C28-C35	BRL	0.083	mg/L	0	+20		
C6-C12	BRL	0.425	mg/L	0	+20		
Total C6-C35	BRL	0.696	mg/L	0	+20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	43	42.1	97.9	43	43.1	100	2.3	20	75-125	
>C12-C28	43	45.0	105	43	46.8	109	4	20	75-125	
>C28-C35	43	43.2	101	43	46.5	108	7.3	20	75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Total Petroleum Hydrocarbons** **Method :** **TX 1005** **Reporting Units :** **mg/L**

QC Batch ID : Qb21031989 **Created Date :** 03/19/21 **Created By :** AKumar

Samples in This QC Batch : 21031513.01,03,05

Sample Preparation : PB21031958 **Prep Method :** TX 1005 **Prep Date :** 03/19/21 14:00 **Prep By :** AKumar

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
C6-C12	TPH-1005-1	< MDL	mg/L	1.00	2.15	0.35		
>C12-C28	TPH-1005-2	< MDL	mg/L	1.00	2.15	0.37		
>C28-C35	TPH-1005-4	< MDL	mg/L	1.00	2.15	0.18		
Total C6-C35		< MDL	mg/L	1.00	----	0.18		
Chlorooctadecane(surr)	3386-33-2	96.2	%	1.00				
1-Chlorooctane(surr)	111-85-3	93.9	%	1.00				

QC Type: Duplicate

QC Sample ID: 21031513.03

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
>C12-C28	BRL	0.170	mg/L	0	+20		
>C28-C35	BRL	0.023	mg/L	0	+20		
C6-C12	BRL	0.241	mg/L	0	+20		
Total C6-C35	BRL	0.434	mg/L	0	+20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	43	45.0	105	43	45.0	105	0	20	75-125	
>C12-C28	43	49.7	116	43	48.4	113	2.6	20	75-125	
>C28-C35	43	46.2	108	43	44.4	103	4	20	75-125	

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Metals by ICP/MS** **Method :** **SW-846 6020B** **Reporting Units : mg/Kg**

QC Batch ID : Qb210322104 **Created Date :** 03/22/21 **Created By :** Ggorane

Samples in This QC Batch : 21031513.08,09,11,13

Digestion : PB21032244 **Prep Method :** SW-846 3050B **Prep Date :** 03/19/21 12:30 **Prep By :** JYou

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Antimony	7440-36-0	< MDL	mg/Kg	1	0.125	0.10		
Arsenic	7440-38-2T	< MDL	mg/Kg	1	0.125	0.08		
Cadmium	7440-43-9	< MDL	mg/Kg	1	0.125	0.07		
Chromium	7440-47-3T	< MDL	mg/Kg	1	0.125	0.11		
Copper	7440-50-8	< MDL	mg/Kg	1	0.125	0.02		
Lead	7439-92-1T	< MDL	mg/Kg	1	0.125	0.11		
Nickel	7440-02-0	< MDL	mg/Kg	1	0.125	0.02		
Silver	7440-22-4	< MDL	mg/Kg	1	0.125	0.13		
Zinc	7440-66-6T	< MDL	mg/Kg	1	0.5	0.57		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Antimony	25	24.7	98.8	25	25.3	101	2.4	20	80-120	
Arsenic	25	28.1	112	25	27.9	111	0.8	20	80-120	
Cadmium	25	24.5	97.9	25	24.5	98.1	0.1	20	80-120	
Chromium	25	23.4	93.6	25	23.5	93.8	0.4	20	80-120	
Copper	25	23.6	94.5	25	23.6	94.6	0.1	20	80-120	
Lead	25	24.6	98.2	25	25.0	100	1.8	20	80-120	
Nickel	25	24.4	97.5	25	24.4	97.5	0.1	20	80-120	
Silver	25	22.6	90.3	25	22.3	89.2	1.2	20	80-120	
Zinc	25	25.0	100	25	25.3	101	1.1	20	80-120	

QC Type: MS and MSD

QC Sample ID: 21031410.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Antimony	BRL	25	9.39	37.6						75-125	M2
Arsenic	2.10	25	31.6	118						75-125	
Cadmium	BRL	25	26.6	106						75-125	
Chromium	5.60	25	33.4	111						75-125	
Copper	3.81	25	29.8	104						75-125	
Lead	5.21	25	29.6	97.6						75-125	
Nickel	4.86	25	31.6	107						75-125	
Silver	BRL	25	25.9	104						75-125	
Zinc	13.4	25	41.7	113						75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Metals - Mercury **Method : SW-846 7470A** **Reporting Units : mg/Kg**

QC Batch ID : Qb210322108 **Created Date :** 03/22/21 **Created By :** BChristofer

Samples in This QC Batch : 21031513.11,13

Digestion : PB21032260 **Prep Method :** SW-846 7470A **Prep Date :** 03/22/21 08:45 **Prep By :** JYou

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Mercury	7439-97-6T	< MDL	mg/Kg	1	0.004	0.00088		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.1	0.101	101	0.1	0.0961	96.1	4.9	20	80-120	

QC Type: MS and MSD

QC Sample ID: 21031513.13

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	0.0276	0.1	0.118	90.5						80-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : % Moisture **Method : SM 2540G** **Reporting Units : %**

QC Batch ID : Qb21032212 **Created Date :** 03/22/21 **Created By :** Surayah

Samples in This QC Batch : 21031513.11,13

Sample Preparation : PB21032205 **Prep Method :** SM 2540G **Prep Date :** 03/20/21 14:30 **Prep By :** Surayah

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
% Moisture		< MDL	%	1	0.1			

QC Type: Duplicate

QC Sample ID: 21031562.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
% Moisture	17.9	17.5	%	2.3	20		

ab-q213-0321

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Corrosivity, pH **Method : SW-846 9045D** **Reporting Units : s.u.**

QC Batch ID : Qb21032237 **Created Date :** 03/22/21 **Created By :** Surayah

Samples in This QC Batch : 21031513.11

QC Type: Duplicate

QC Sample ID: 21031513.11

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
pH	8.8	8.8	s.u.	0	5		

QC Type: LCS and LCSD

Parameter	LCS Assigned	LCS Result		LCSD Assigned	LCSD Result		RPD	RPD CtrlLimit	Tolerance	Qual
pH	4.0	3.98							98.75-101.25	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Total Petroleum Hydrocarbons** **Method :** **TX 1005** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032269 **Created Date :** 03/22/21 **Created By :** AKumar

Samples in This QC Batch : 21031513.11

Sample Preparation : PB21032229 **Prep Method :** TX 1005 **Prep Date :** 03/22/21 11:00 **Prep By :** AKumar

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
C6-C12	TPH-1005-1	< MDL	mg/Kg	1.00	25	9.49		
>C12-C28	TPH-1005-2	< MDL	mg/Kg	1.00	25	13.0		
>C28-C35	TPH-1005-4	< MDL	mg/Kg	1.00	25	6.88		
Total C6-C35		< MDL	mg/Kg	1.00	----	6.88		
Chlorooctadecane(surr)	3386-33-2	114	%	1.00				
1-Chlorooctane(surr)	111-85-3	109	%	1.00				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	500	533	107	500	526	105	1.4	20	75-125	
>C12-C28	500	581	116	500	581	116	0.1	20	75-125	
>C28-C35	500	504	101	500	520	104	3.2	20	75-125	

QC Type: MS and MSD

QC Sample ID: 21031513.11

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
C6-C12	5.37	500	506	100	500	507	100	0.1	20	75-125	
>C12-C28	5.22	500	548	109	500	529	105	3.6	20	75-125	
>C28-C35	0.35	500	549	110	500	532	106	3	20	75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Method :** **SM4500NH3-Dm** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032279 **Created Date :** 03/22/21 **Created By :** Sgarcia

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Ammonia as N	NH3-N	< MDL	mg/Kg	1	0.1	0.02		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Ammonia as N	50	50.0	100	50	49.4	98.8	1.2		80-120	

QC Type: MS and MSD

QC Sample ID: 21031513.08

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Ammonia as N	3.53	50	55.7	104	50	53.6	100	3.8		80-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : **Method :** **SM 4500NH3D** **Reporting Units : mg/L**

QC Batch ID : Qb21032282 **Created Date :** 03/22/21 **Created By :** Sgarcia

Samples in This QC Batch : 21031513.01,03,05,15,16,17

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Ammonia as N	NH3-N	< MDL	mg/L	1	0.01			

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Ammonia as N	0.5	0.48	96	0.5	0.49	98	2.1		87.1-115	

QC Type: MS and MSD

QC Sample ID: 21031513.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Ammonia as N	0.05	0.5	0.52	94	0.5	0.52	94	0	20	85.2-121	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Organic Carbon **Method : SM 5310B** **Reporting Units : mg/L**

QC Batch ID : Qb21032284 **Created Date :** 03/22/21 **Created By :** Ajohn

Samples in This QC Batch : 21031513.01,03,05

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
TOC		< MDL	mg/L	1	1	0.35		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
TOC	10	9.1	91						89.4-113	

QC Type: MS and MSD

QC Sample ID: 21031507.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
TOC	8.7	5	13.7	100	5	13.6	98	0.7	10	80-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Organic Carbon **Method : SM 5310B** **Reporting Units : mg/L**

QC Batch ID : Qb21032286 **Created Date :** 03/22/21 **Created By :** Ajohn

Samples in This QC Batch : 21031513.15,16,17

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
TOC		< MDL	mg/L	1	1	0.35		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
TOC	10	9.5	95						89.4-113	

QC Type: MS and MSD
QC Sample ID: 21031742.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
TOC	25.0	5	30.3	106	5	30.7	114	1.3	10	80-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Petroleum Hydrocarbons **Method : TX 1005** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032297 **Created Date :** 03/22/21 **Created By :** AKumar

Samples in This QC Batch : 21031513.13

Sample Preparation : PB21032249 **Prep Method :** TX 1005 **Prep Date :** 03/22/21 15:00 **Prep By :** AKumar

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
C6-C12	TPH-1005-1	< MDL	mg/Kg	1.00	25	9.49		
>C12-C28	TPH-1005-2	< MDL	mg/Kg	1.00	25	13.0		
>C28-C35	TPH-1005-4	< MDL	mg/Kg	1.00	25	6.88		
Total C6-C35		< MDL	mg/Kg	1.00	----	6.88		
Chlorooctadecane(surr)	3386-33-2	125	%	1.00				
1-Chlorooctane(surr)	111-85-3	120	%	1.00				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
C6-C12	500	532	106	500	539	108	1.2	20	75-125	
>C12-C28	500	570	114	500	589	118	3.2	20	75-125	
>C28-C35	500	554	111	500	566	113	2.2	20	75-125	

QC Type: MS and MSD
QC Sample ID: 21031513.13

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
C6-C12	1.06	500	569	114	500	567	113	0.5	20	75-125	
>C12-C28	1.14	500	602	120	500	577	115	4.3	20	75-125	
>C28-C35	0.05	500	503	101	500	513	103	2	20	75-125	

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Salinity (Electrical Conductivity Method) **Method : SM 2520B** **Reporting Units : s.u.**

QC Batch ID : Qb210323105 **Created Date :** 03/23/21 **Created By :** LEBell

Samples in This QC Batch : 21031513.01,03

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Salinity		< MDL	s.u.	1	2	0.52		

QC Type: Duplicate

QC Sample ID: 21031513.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Salinity	11.3	11.3		0	20		

ab-q213-0321

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Semivolatile Organic Compounds **Method : SW-846 8270D** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032315 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.08,09,11,13

Extraction : PB21032241 **Prep Method :** SW-846 3546 **Prep Date :** 03/22/21 12:30 **Prep By :** MMuteen

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,2,4-Trichlorobenzene	120-82-1	< MDL	mg/Kg	0.25	0.04175	0.02167		
1,2-Dichlorobenzene	95-50-1	< MDL	mg/Kg	0.25	0.04175	0.02167		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/Kg	0.25	0.04175	0.03065		
1,4-Dichlorobenzene	106-46-7	< MDL	mg/Kg	0.25	0.04175	0.02374		
2,4-Dichlorophenol	120-83-2	< MDL	mg/Kg	0.25	0.04175	0.02167		
2,4-Dimethylphenol	105-67-9	< MDL	mg/Kg	0.25	0.04175	0.02374		
2,4-Dinitrophenol	51-28-5	< MDL	mg/Kg	0.25	0.04175	0.05567		
Acenaphthene	83-32-9	< MDL	mg/Kg	0.25	0.04175	0.01532		
Acenaphthylene	208-96-8	< MDL	mg/Kg	0.25	0.04175	0.02374		
Anthracene	120-12-7	< MDL	mg/Kg	0.25	0.04175	0.01812		
Benzo(a)anthracene	56-55-3	< MDL	mg/Kg	0.25	0.04175	0.02826		
Benzo(a)pyrene	50-32-8	< MDL	mg/Kg	0.25	0.04175	0.04333		
Benzo(b)fluoranthene	205-99-2	< MDL	mg/Kg	0.25	0.04175	0.02986		
Benzo(g,h,i)perylene	191-24-2	< MDL	mg/Kg	0.25	0.04175	0.02986		
Benzo(k)fluoranthene	207-08-9	< MDL	mg/Kg	0.25	0.04175	0.04697		
Chrysene	218-01-9	< MDL	mg/Kg	0.25	0.04175	0.02374		
Dibenzo(a,h)anthracene	53-70-3	< MDL	mg/Kg	0.25	0.04175	0.04942		
Diethyl phthalate	84-66-2	< MDL	mg/Kg	0.25	0.04175	0.02986		
Fluoranthene	206-44-0	< MDL	mg/Kg	0.25	0.04175	0.02562		
Fluorene	86-73-7	< MDL	mg/Kg	0.25	0.04175	0.01187		
Hexachlorobenzene	118-74-1	< MDL	mg/Kg	0.25	0.04175	0.03994		
Indeno(1,2,3-cd)pyrene	193-39-5	< MDL	mg/Kg	0.25	0.04175	0.03561		
Naphthalene	91-20-3	< MDL	mg/Kg	0.25	0.04175	0.01532		
Pentachlorophenol	87-86-5	< MDL	mg/Kg	0.25	0.04175	0.03561		
Phenanthrene	85-01-8	< MDL	mg/Kg	0.25	0.04175	0.02167		
Phenol	108-95-2	< MDL	mg/Kg	0.25	0.04175	0.01812		
Pyrene	129-00-0	< MDL	mg/Kg	0.25	0.04175	0.03815		
2-Fluorophenol(surr)	367-12-4	58	%	0.25				
Phenol-d6(surr)	13127-88-3	55	%	0.25				
Nitrobenzene-d5(surr)	4165-60-0	50.5	%	0.25				
2-Fluorobiphenyl(surr)	132-60-8	56.8	%	0.25				
2,4,6-Tribromophenol(surr)	118-79-6	78.5	%	0.25				
p-Terphenyl-d14(surr)	1718-51-0	68.2	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Semivolatile Organic Compounds** **Method :** **SW-846 8270D** **Reporting Units :** **mg/Kg**

QC Batch ID : Qb21032315 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,2,4-Trichlorobenzene	0.834	0.424	50.9	0.834	0.454	54.4	6.8	35	34-112	
1,2-Dichlorobenzene	0.834	0.442	53	0.834	0.453	54.3	2.5	35	33-113	
1,3-Dichlorobenzene	0.834	0.441	52.9	0.834	0.459	55	4	35	30-110	
1,4-Dichlorobenzene	0.834	0.446	53.5	0.834	0.462	55.4	3.5	35	31-111	
2,4-Dichlorophenol	0.834	0.516	61.9	0.834	0.556	66.7	7.5	35	40-118	
2,4-Dimethylphenol	1.67	0.882	52.8	1.67	0.942	56.4	6.6	35	30-115	
2,4-Dinitrophenol	0.834	0.571	68.5	0.834	0.606	72.7	6	35	6-101	
Acenaphthene	0.834	0.449	53.9	0.834	0.477	57.2	6	35	40-109	
Acenaphthylene	0.834	0.461	55.3	0.834	0.489	58.6	5.9	35	32-117	
Anthracene	0.834	0.534	64.1	0.834	0.572	68.5	6.9	35	47-117	
Benzo(a)anthracene	0.834	0.531	63.7	0.834	0.567	67.9	6.6	35	49-117	
Benzo(a)pyrene	0.834	0.575	69	0.834	0.614	73.7	6.6	35	45-117	
Benzo(b)fluoranthene	0.834	0.550	65.9	0.834	0.573	68.7	4.1	35	45-124	
Benzo(g,h,i)perylene	0.834	0.515	61.7	0.834	0.542	65	5.1	35	43-119	
Benzo(k)fluoranthene	0.834	0.551	66.1	0.834	0.619	74.2	11.6	35	47-121	
Chrysene	0.834	0.523	62.7	0.834	0.553	66.3	5.6	35	50-116	
Dibenzo(a,h)anthracene	0.834	0.534	64.1	0.834	0.567	67.9	6	35	45-122	
Diethyl phthalate	0.834	0.514	61.7	0.834	0.558	66.9	8.2	35	50-121	
Fluoranthene	0.834	0.544	65.2	0.834	0.590	70.7	8.1	35	50-124	
Fluorene	0.834	0.513	61.5	0.834	0.554	66.4	7.7	35	43-120	
Hexachlorobenzene	0.834	0.576	69	0.834	0.608	72.9	5.4	35	45-115	
Indeno(1,2,3-cd)pyrene	0.834	0.514	61.7	0.834	0.543	65.1	5.5	35	45-119	
Naphthalene	0.834	0.778	93.2	0.834	0.831	99.6	6.6	35	35-112	
Pentachlorophenol	0.834	0.700	83.9	0.834	0.725	87	3.5	35	25-125	
Phenanthrene	0.834	0.522	62.6	0.834	0.557	66.8	6.5	35	50-113	
Phenol	0.834	0.471	56.4	0.834	0.485	58.2	2.9	35	34-118	
Pyrene	0.834	0.528	63.4	0.834	0.564	67.6	6.6	35	47-115	

QC Type: MS and MSD

QC Sample ID: 21031513.13

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,2,4-Trichlorobenzene	BRL	0.834	0.417	50						32-126	
1,2-Dichlorobenzene	BRL	0.834	0.432	51.9						34-118	
1,3-Dichlorobenzene	BRL	0.834	0.425	51						34-118	
1,4-Dichlorobenzene	BRL	0.834	0.432	51.7						35-115	
2,4-Dichlorophenol	BRL	0.834	0.524	62.8						31-124	
2,4-Dimethylphenol	BRL	1.67	0.916	54.8						29-129	
2,4-Dinitrophenol	BRL	0.834	0.544	65.3						D-94	
2,4-Dinitrotoluene	BRL	0.834	0.576	69.1						42-134	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Semivolatile Organic Compounds **Method : SW-846 8270D** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032315 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: MS and MSD

QC Sample ID: 21031513.13

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
2-Chlorophenol	BRL	0.834	0.461	55.3						26-119	
4-Chloro-3-methylphenol	BRL	0.834	0.545	65.3						40-127	
4-Nitrophenol	BRL	0.834	0.472	56.6						14-138	
Acenaphthene	BRL	0.834	0.457	54.8						45-125	
Acenaphthylene	BRL	0.834	0.461	55.3						43-118	
Anthracene	BRL	0.834	0.541	64.8						53-119	
Benzo(a)anthracene	BRL	0.834	0.538	64.5						43-131	
Benzo(a)pyrene	BRL	0.834	0.581	69.7						43-126	
Benzo(b)fluoranthene	BRL	0.834	0.542	65						36-126	
Benzo(g,h,i)perylene	BRL	0.834	0.515	61.7						27-126	
Benzo(k)fluoranthene	BRL	0.834	0.582	69.8						36-134	
Chrysene	BRL	0.834	0.525	63						42-131	
Dibenzo(a,h)anthracene	BRL	0.834	0.540	64.7						33-122	
Diethyl phthalate	BRL	0.834	0.543	65.1						48-126	
Fluoranthene	BRL	0.834	0.558	66.9						51-125	
Fluorene	BRL	0.834	0.525	62.9						48-123	
Hexachlorobenzene	BRL	0.834	0.576	69						35-130	
Indeno(1,2,3-cd)pyrene	BRL	0.834	0.518	62.2						31-135	
Naphthalene	BRL	0.834	0.812	97.3						32-124	
N-nitroso-di-n-propylamine	BRL	0.834	0.459	55.1						30-128	
Pentachlorophenol	BRL	0.834	0.709	85.1						36-117	
Phenanthrene	BRL	0.834	0.528	63.3						45-125	
Phenol	BRL	0.834	0.479	57.5						22-118	
Pyrene	BRL	0.834	0.546	65.5						32-138	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Ignitability (Flash Point) up to 150 degrees F **Method : SW-846 1010A** **Reporting Units : °F**

QC Batch ID : Qb21032322 **Created Date :** 03/23/21 **Created By :** SKYanduru

Samples in This QC Batch : 21031513.08,09,11

QC Type: Duplicate

QC Sample ID: 21031775.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Ignitability	>150	>150	°F		12		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Ignitability	85	86	101	85	86	101	0	12	96-104	

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Dissolved Metals **Method : EPA 200.8** **Reporting Units : mg/L**

QC Batch ID : Qb21032324 **Created Date :** 03/22/21 **Created By :** Ggorane

Samples in This QC Batch : 21031513.01,03,05,06,15,16,17

Digestion : PB21032316 **Prep Method :** SW-846 3005A **Prep Date :** 03/22/21 12:30 **Prep By :** Ggorane

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Antimony	7440-36-0	< MDL	mg/L	1	0.00025	0.0002		
Arsenic	7440-38-2T	< MDL	mg/L	1	0.00025	0.0001		
Cadmium	7440-43-9	< MDL	mg/L	1	0.00025	0.0001		
Chromium	7440-47-3T	< MDL	mg/L	1	0.00025	0.0001		
Copper	7440-50-8	< MDL	mg/L	1	0.00025	0.0004		
Lead	7439-92-1T	< MDL	mg/L	1	0.00025	0.0001		
Nickel	7440-02-0	< MDL	mg/L	1	0.00025	0.0001		
Silver	7440-22-4	< MDL	mg/L	1	0.00025	0.0002		
Zinc	7440-66-6T	< MDL	mg/L	1	0.00025	0.0011		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Antimony	0.05	0.0500	100	0.05	0.0503	101	0.6	20	85-115	
Arsenic	0.05	0.0527	105	0.05	0.0529	106	0.3	20	85-115	
Cadmium	0.05	0.0497	99.3	0.05	0.0499	99.9	0.5	20	85-115	
Chromium	0.05	0.0495	99.1	0.05	0.0488	97.7	1.5	20	85-115	
Copper	0.05	0.0496	99.3	0.05	0.0491	98.1	1.1	20	85-115	
Lead	0.05	0.0477	95.3	0.05	0.0486	97.1	2	20	85-115	
Nickel	0.05	0.0492	98.4	0.05	0.0492	98.3	0	20	85-115	
Silver	0.05	0.0473	94.6	0.05	0.0473	94.5	0	20	85-115	
Zinc	0.05	0.0494	98.7	0.05	0.0489	97.9	1	20	85-115	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Semivolatile Organic Compounds **Method : EPA 625.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032339 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.01,03,05,15,16,17

Extraction : PB21032243 **Prep Method :** EPA 625.1 **Prep Date :** 03/22/21 12:30 **Prep By :** MMuteen

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,2,4-Trichlorobenzene	120-82-1	< MDL	mg/L	0.25	0.00125	0.00053		
1,2-Dichlorobenzene	95-50-1	< MDL	mg/L	0.25	0.00125	0.00041		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/L	0.25	0.00125	0.00053		
1,4-Dichlorobenzene	106-46-7	< MDL	mg/L	0.25	0.00125	0.00025		
2,4-Dichlorophenol	120-83-2	< MDL	mg/L	0.25	0.00125	0.00069		
2,4-Dimethylphenol	105-67-9	< MDL	mg/L	0.25	0.00125	0.00053		
2,4-Dinitrophenol	51-28-5	< MDL	mg/L	0.25	0.00125	0.00141		
Acenaphthene	83-32-9	< MDL	mg/L	0.25	0.00125	0.00028		
Acenaphthylene	208-96-8	< MDL	mg/L	0.25	0.00125	0.00047		
Anthracene	120-12-7	< MDL	mg/L	0.25	0.00125	0.00035		
Benzo(a)anthracene	56-55-3	< MDL	mg/L	0.25	0.00125	0.00038		
Benzo(a)pyrene	50-32-8	< MDL	mg/L	0.25	0.00125	0.00085		
Benzo(b)fluoranthene	205-99-2	< MDL	mg/L	0.25	0.00125	0.00057		
Benzo(g,h,i)perylene	191-24-2	< MDL	mg/L	0.25	0.00125	0.00063		
Benzo(k)fluoranthene	207-08-9	< MDL	mg/L	0.25	0.00125	0.00057		
Chrysene	218-01-9	< MDL	mg/L	0.25	0.00125	0.00057		
Dibenzo(a,h)anthracene	53-70-3	< MDL	mg/L	0.25	0.00125	0.00069		
Diethyl phthalate	84-66-2	< MDL	mg/L	0.25	0.00125	0.00063		
Fluoranthene	206-44-0	< MDL	mg/L	0.25	0.00125	0.00044		
Fluorene	86-73-7	< MDL	mg/L	0.25	0.00125	0.00047		
Hexachlorobenzene	118-74-1	< MDL	mg/L	0.25	0.00125	0.00069		
Indeno(1,2,3-cd)pyrene	193-39-5	< MDL	mg/L	0.25	0.00125	0.00022		
Naphthalene	91-20-3	< MDL	mg/L	0.25	0.00125	0.00031		
Pentachlorophenol	87-86-5	< MDL	mg/L	0.25	0.00125	0.00050		
Phenanthrene	85-01-8	< MDL	mg/L	0.25	0.00125	0.00044		
Phenol	108-95-2	< MDL	mg/L	0.25	0.00125	0.00044		
Pyrene	129-00-0	< MDL	mg/L	0.25	0.00125	0.00057		
2-Fluorophenol(surr)	367-12-4	38.9	%	0.25				
Phenol-d6(surr)	13127-88-3	22	%	0.25				
Nitrobenzene-d5(surr)	4165-60-0	61.5	%	0.25				
2-Fluorobiphenyl(surr)	132-60-8	60.1	%	0.25				
2,4,6-Tribromophenol(surr)	118-79-6	57.6	%	0.25				
p-Terphenyl-d14(surr)	1718-51-0	66.6	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : **Semivolatile Organic Compounds** **Method :** **EPA 625.1** **Reporting Units :** **mg/L**

QC Batch ID : Qb21032339 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.01,03,05,15,16,17

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,2,4-Trichlorobenzene	0.025	0.0118	47.3	0.025	0.0120	47.9	1.4	35	40-140	
1,2-Dichlorobenzene	0.025	0.0120	47.9	0.025	0.0119	47.5	0.6	35	40-140	
1,3-Dichlorobenzene	0.025	0.0120	48.1	0.025	0.0120	48.1	0.1	35	40-140	
1,4-Dichlorobenzene	0.025	0.0119	47.8	0.025	0.0119	47.6	0.4	35	40-140	
2,4-Dichlorophenol	0.025	0.0162	64.7	0.025	0.0163	65.3	0.8	35	40-140	
2,4-Dimethylphenol	0.05	0.0305	61	0.025	0.0298	119	2.3	35	40-140	
2,4-Dinitrophenol	0.025	0.0160	64	0.025	0.0169	67.5	5.5	35	40-140	
Acenaphthene	0.025	0.0141	56.3	0.025	0.0141	56.2	0.2	35	40-140	
Acenaphthylene	0.025	0.0145	58.2	0.025	0.0145	58.1	0.3	35	40-140	
Anthracene	0.025	0.0167	66.7	0.025	0.0168	67.1	0.8	35	40-140	
Benzo(a)anthracene	0.025	0.0170	67.9	0.025	0.0175	69.9	3.1	35	40-140	
Benzo(a)pyrene	0.025	0.0183	73.1	0.025	0.0183	73.2	0.2	35	40-140	
Benzo(b)fluoranthene	0.025	0.0166	66.4	0.025	0.0165	66	0.6	35	40-140	
Benzo(g,h,i)perylene	0.025	0.0163	65.2	0.025	0.0164	65.5	0.7	35	40-140	
Benzo(k)fluoranthene	0.025	0.0168	67.3	0.025	0.0165	66.1	2	35	40-140	
Chrysene	0.025	0.0166	66.4	0.025	0.0164	65.5	1.3	35	40-140	
Dibenzo(a,h)anthracene	0.025	0.0163	65.1	0.025	0.0164	65.6	0.8	35	40-140	
Diethyl phthalate	0.025	0.0157	62.7	0.025	0.0157	62.6	0.2	35	40-140	
Fluoranthene	0.025	0.0176	70.4	0.025	0.0175	70.1	0.6	35	40-140	
Fluorene	0.025	0.0158	63	0.025	0.0158	63	0.3	35	40-140	
Hexachlorobenzene	0.025	0.0164	65.6	0.025	0.0165	66.1	0.6	35	40-140	
Indeno(1,2,3-cd)pyrene	0.025	0.0167	66.8	0.025	0.0168	67	0.6	35	40-140	
Naphthalene	0.025	0.0221	88.5	0.025	0.0221	88.6	0.1	35	40-140	
Pentachlorophenol	0.025	0.0165	65.9	0.025	0.0167	67	1.4	35	40-140	
Phenanthrene	0.025	0.0160	64.1	0.025	0.0161	64.5	0.5	35	40-140	
Phenol	0.025	0.00662	26.5	0.025	0.00652	26.1	1.5	35	40-140	L2
Pyrene	0.025	0.0169	67.6	0.025	0.0170	68	0.6	35	40-140	

QC Type: MS and MSD
QC Sample ID: 21031513.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,2,4-Trichlorobenzene	0.00000	0.025	0.00970	38.8						15-120	
1,2-Dichlorobenzene	0.00000	0.025	0.00935	37.4						15-120	
1,3-Dichlorobenzene	0.00000	0.025	0.00920	36.8						15-120	
1,4-Dichlorobenzene	0.00000	0.025	0.00932	37.3						15-120	
2,4-Dichlorophenol	0.00000	0.025	0.0133	53.2						15-120	
2,4-Dimethylphenol	0.00000	0.05	0.0276	55.2						15-120	
2,4-Dinitrophenol	0.00000	0.025	0.00721	28.9						15-120	
Acenaphthene	0.00000	0.025	0.0130	51.9						15-120	

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : **Semivolatile Organic Compounds** **Method :** **EPA 625.1** **Reporting Units :** **mg/L**

QC Batch ID : Qb21032339 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.01,03,05,15,16,17

QC Type: MS and MSD

QC Sample ID: 21031513.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Acenaphthylene	0.00000	0.025	0.0134	53.8						15-120	
Anthracene	0.00000	0.025	0.0159	63.6						15-120	
Benzo(a)anthracene	0.00000	0.025	0.0166	66.2						15-120	
Benzo(a)pyrene	0.00000	0.025	0.0175	70.1						15-120	
Benzo(b)fluoranthene	0.00000	0.025	0.0160	64						15-120	
Benzo(g,h,i)perylene	0.00000	0.025	0.0158	63.2						15-120	
Benzo(k)fluoranthene	0.00000	0.025	0.0155	61.9						15-120	
Chrysene	0.00000	0.025	0.0160	64						15-120	
Dibenzo(a,h)anthracene	0.00000	0.025	0.0158	63.4						15-120	
Diethyl phthalate	0.00000	0.025	0.0154	61.5						15-120	
Fluoranthene	0.00000	0.025	0.0168	67.3						15-120	
Fluorene	0.00000	0.025	0.0148	59.3						15-120	
Hexachlorobenzene	0.00000	0.025	0.0156	62.5						15-120	
Indeno(1,2,3-cd)pyrene	0.00000	0.025	0.0162	65						15-120	
Naphthalene	0.00000	0.025	0.0192	76.9						15-120	
Pentachlorophenol	0.00000	0.025	0.00674	27						15-120	
Phenanthrene	0.00000	0.025	0.0154	61.7						15-120	
Phenol	0.00000	0.025	0.00554	22.2						15-120	
Pyrene	0.00000	0.025	0.0164	65.5						15-120	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Reactive Cyanide **Method : SW-846 7.3** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032349 **Created Date :** 03/23/21 **Created By :** SKYanduru

Samples in This QC Batch : 21031513.08,09,11

Sample Preparation : PB21032321 **Prep Method :** SW-846 7.3 **Prep Date :** 03/23/21 10:00 **Prep By :** SKYanduru

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Reactive Cyanide		< MDL	mg/Kg	1	----	4.9		

QC Type: Duplicate

QC Sample ID: 21031309.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Reactive Cyanide	BRL	BRL	mg/Kg	0	20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Reactive Cyanide	5	2.04	40.7	5	2.04	40.7	0.2	20	40-120	

ab-q213-0321

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513

Date : 3/30/2021

Analysis : **Selected Ion Monitoring** **Method :** **EPA 625.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032354 **Created Date :** 03/23/21 **Created By :** MShah

Samples in This QC Batch : 21031513.01,03,05,15,16,17

Extraction : PB21032246 **Prep Method :** EPA 625.1 **Prep Date :** 03/22/21 12:30 **Prep By :** MMuteen

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Benzo(a)pyrene	50-32-8	< MDL	mg/L	0.25	2.5E-05	0.0001		
Chrysene	218-01-9	< MDL	mg/L	0.25	2.5E-05	0.0001		
2,4,6-Tribromophenol(surr)	118-79-6	58.5	%	0.25				
2-Fluorobiphenyl(surr)	132-60-8	49.5	%	0.25				
2-Fluorophenol(surr)	367-12-4	39	%	0.25				
Nitrobenzene-d5(surr)	4165-60-0	49.5	%	0.25				
Phenol-d6(surr)	13127-88-3	21.5	%	0.25				
p-Terphenyl-d14(surr)	1718-51-0	60.5	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Benzo(a)pyrene	0.0005	0.0002975	59.5	0.0005	0.0002775	55.5	7			
Chrysene	0.0005	0.0003025	60.5	0.0005	0.0002825	56.5	6.8			

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Selected Ion Monitoring **Method : SW-846 8270D SI** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032355 **Created Date :** 03/22/21 **Created By :** MShah

Samples in This QC Batch : 21031513.08,09,11,13

Extraction : PB21032248 **Prep Method :** SW-846 3546 **Prep Date :** 03/22/21 12:30 **Prep By :** MMuteen

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,2,4-Trichlorobenzene	120-82-1	< MDL	mg/Kg	0.25	0.000825	0.0033		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/Kg	0.25	0.000825	0.0033		
Benzo(b)fluoranthene	205-99-2	< MDL	mg/Kg	0.25	0.000825	0.0033		
Benzo(g,h,i)perylene	191-24-2	< MDL	mg/Kg	0.25	0.000825	0.0033		
Benzo(k)fluoranthene	207-08-9	< MDL	mg/Kg	0.25	0.000825	0.0033		
Dibenzo(a,h)anthracene	53-70-3	< MDL	mg/Kg	0.25	0.000825	0.0033		
Hexachlorobenzene	118-74-1	< MDL	mg/Kg	0.25	0.000825	0.0033		
Pyrene	129-00-0	< MDL	mg/Kg	0.25	0.000825	0.0033		
2,4,6-Tribromophenol(surr)	118-79-6	55	%	0.25				
2-Fluorobiphenyl(surr)	132-60-8	63	%	0.25				
2-Fluorophenol(surr)	367-12-4	59	%	0.25				
Nitrobenzene-d5(surr)	4165-60-0	58.5	%	0.25				
Phenol-d6(surr)	13127-88-3	55	%	0.25				
p-Terphenyl-d14(surr)	1718-51-0	78	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,2,4-Trichlorobenzene	0.0166	0.00808	48.7	0.0166	0.00892	53.7	9.8	30	32-126	
1,3-Dichlorobenzene	0.0166	0.00800	48.2	0.0166	0.00850	51.2	6.1	30	34-118	
Benzo(b)fluoranthene	0.0166	0.00883	53.2	0.0166	0.0103	62.2	15.3	30	36-126	
Benzo(g,h,i)perylene	0.0166	0.00833	50.2	0.0166	0.00967	58.2	14.8	30	27-126	
Benzo(k)fluoranthene	0.0166	0.00908	54.7	0.0166	0.00983	59.2	7.9	30	36-134	
Dibenzo(a,h)anthracene	0.0166	0.00842	50.7	0.0166	0.00967	58.2	13.9	30	33-122	
Hexachlorobenzene	0.0166	0.00958	57.7	0.0166	0.0103	62.2	7.2	30	35-130	
Pyrene	0.0166	0.00933	56.2	0.0166	0.0102	61.7	8.9	30	32-138	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Reactive Sulfide **Method : SW-846 7.3** **Reporting Units : mg/Kg**

QC Batch ID : Qb21032359 **Created Date :** 03/23/21 **Created By :** SKYanduru

Samples in This QC Batch : 21031513.08,09,11

Sample Preparation : PB21032322 **Prep Method :** SW-846 7.3 **Prep Date :** 03/23/21 10:00 **Prep By :** SKYanduru

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Reactive Sulfide		< MDL	mg/Kg	1	----	25		

QC Type: Duplicate

QC Sample ID: 21031309.01

Parameter	QCSample Result	Sample Result	Units	RPD	RPD CtrlLimit		Qual
Reactive Sulfide	BRL	BRL	mg/Kg	0	20		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Reactive Sulfide	1000	1000	100	1000	1000	100	0	20	91.9-108	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Total Metals - Mercury **Method : EPA 245.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032378 **Created Date :** 03/23/21 **Created By :** BChristofer

Samples in This QC Batch : 21031513.15,16,17

Digestion : PB21032328 **Prep Method :** EPA 245.1 **Prep Date :** 03/23/21 08:40 **Prep By :** JYou

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Mercury	7439-97-6T	< MDL	mg/L	1	0.0002	0.00006		

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.005	0.00479	95.8	0.005	0.00476	95.2	0.6	20	85-115	

QC Type: MS and MSD

QC Sample ID: 21031832.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	BRL	0.005	0.00461	92.2						82-115	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Volatile Organic Compounds **Method : EPA 624.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032397 **Created Date :** 03/23/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.15,16,17

Sample Preparation : PB21032355 **Prep Method :** EPA 624.1 **Prep Date :** 03/23/21 10:00 **Prep By :** Rajeev

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
1,1,1-Trichloroethane	71-55-6	< MDL	mg/L	1.00	0.005	0.001		
1,1,2,2-Tetrachloroethane	79-34-5	< MDL	mg/L	1.00	0.005	0.001		
1,1,2-Trichloroethane	79-00-5	< MDL	mg/L	1.00	0.005	0.001		
1,1-Dichloroethane	75-34-3	< MDL	mg/L	1.00	0.005	0.001		
1,1-Dichloroethylene	75-35-4	< MDL	mg/L	1.00	0.005	0.001		
1,2-Dichlorobenzene	95-50-1	< MDL	mg/L	1.00	0.005	0.001		
1,2-Dichloroethane	107-06-2	< MDL	mg/L	1.00	0.005	0.001		
1,3-Dichlorobenzene	541-73-1	< MDL	mg/L	1.00	0.005	0.001		
1,4-Dichlorobenzene	106-46-7	< MDL	mg/L	1.00	0.005	0.001		
2-Butanone	78-93-3	< MDL	mg/L	1.00	0.005	0.005		
Benzene	71-43-2	< MDL	mg/L	1.00	0.005	0.001		
Bromodichloromethane	75-27-4	< MDL	mg/L	1.00	0.005	0.001		
Bromoform	75-25-2	< MDL	mg/L	1.00	0.005	0.001		
Bromomethane	74-83-9	< MDL	mg/L	1.00	0.005	0.002		
Carbon tetrachloride	56-23-5	< MDL	mg/L	1.00	0.005	0.001		
Chlorobenzene	108-90-7	< MDL	mg/L	1.00	0.005	0.001		
Chloroethane	75-00-3	< MDL	mg/L	1.00	0.005	0.001		
Chloroform	67-66-3	< MDL	mg/L	1.00	0.005	0.001		
Chloromethane	74-87-3	< MDL	mg/L	1.00	0.005	0.001		
cis-1,3-Dichloropropene	10061-01-5	< MDL	mg/L	1.00	0.005	0.001		
Dibromochloromethane	124-48-1	< MDL	mg/L	1.00	0.005	0.001		
Ethylbenzene	100-41-4	< MDL	mg/L	1.00	0.005	0.001		
Methylene chloride	75-09-2	< MDL	mg/L	1.00	0.005	0.001		
Tetrachloroethylene	127-18-4	< MDL	mg/L	1.00	0.005	0.001		
Toluene	108-88-3	< MDL	mg/L	1.00	0.005	0.001		
trans-1,2-Dichloroethylene	156-60-5	< MDL	mg/L	1.00	0.005	0.001		
trans-1,3-Dichloropropene	10061-02-6	< MDL	mg/L	1.00	0.005	0.001		
Trichloroethylene	79-01-6	< MDL	mg/L	1.00	0.005	0.001		
Trichlorofluoromethane	75-69-4	< MDL	mg/L	1.00	0.005	0.001		
Vinyl Chloride	75-01-4	< MDL	mg/L	1.00	0.005	0.001		
Dibromofluoromethane(surr	1868-53-7	117	%	1.00				
1,2-Dichloroethane-d4(surr	17060-07-0	112	%	1.00				
Toluene-d8(surr)	2037-26-5	97.5	%	1.00				
p-Bromofluorobenzene(surr	460-00-4	100	%	1.00				

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Volatile Organic Compounds **Method : EPA 624.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032397 **Created Date :** 03/23/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.15,16,17

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
1,1-Dichloroethylene	0.02	0.0228	114	0.02	0.0222	111	2.6	30	75.5-124	
Benzene	0.02	0.0214	107	0.02	0.0213	106	0.3	30	80-120	
Chlorobenzene	0.02	0.0201	101	0.02	0.0202	101	0.4	30	80-120	
Toluene	0.02	0.0211	105	0.02	0.0207	103	1.8	30	77.1-121	
Trichloroethylene	0.02	0.0209	105	0.02	0.0206	103	1.6	30	80-120	
1,1,1-Trichloroethane	0.02	0.0227	114	0.02	0.0222	111	2.3	30	80-120	
1,1,2,2-Tetrachloroethane	0.02	0.0210	105	0.02	0.0204	102	2.7	30	80-120	
1,1,2-Trichloroethane	0.02	0.0210	105	0.02	0.0208	104	1.1	30	80-120	
1,1-Dichloroethane	0.02	0.0228	114	0.02	0.0224	112	2	30	77.6-124	
1,2-Dichlorobenzene	0.02	0.0205	102	0.02	0.0204	102	0.4	30	83.2-121	
1,2-Dichloroethane	0.02	0.0222	111	0.02	0.0219	110	1.3	30	74.5-129	
1,3-Dichlorobenzene	0.02	0.0203	102	0.02	0.0204	102	0.4	30	80-120	
1,4-Dichlorobenzene	0.02	0.0202	101	0.02	0.0202	101	0.2	30	80-120	
Bromodichloromethane	0.02	0.0212	106	0.02	0.0215	107	1.4	30	80-119	
Bromoform	0.02	0.0203	101	0.02	0.0199	99.7	1.9	30	78.8-127	
Bromomethane	0.02	0.0210	105	0.02	0.0211	105	0.3	30	53-138	
Carbon tetrachloride	0.02	0.0214	107	0.02	0.0212	106	0.9	30	70-136	
Chloroethane	0.02	0.0228	114	0.02	0.0224	112	2	30	75.6-128	
Chloroform	0.02	0.0223	112	0.02	0.0219	110	2	30	79-123	
Chloromethane	0.02	0.0201	101	0.02	0.0202	101	0.3	30	69.6-125	
cis-1,3-Dichloropropene	0.02	0.0217	108	0.02	0.0214	107	1.2	30	80-120	
Dibromochloromethane	0.02	0.0206	103	0.02	0.0203	102	1.5	30	82.8-117	
Ethylbenzene	0.02	0.0208	104	0.02	0.0205	103	1.5	30	80-120	
Methylene chloride	0.02	0.0249	124	0.02	0.0244	122	1.9	30	69.4-131	
Tetrachloroethylene	0.02	0.0204	102	0.02	0.0201	101	1.4	30	40-168	
trans-1,2-Dichloroethylene	0.02	0.0226	113	0.02	0.0223	111	1.5	30	77.5-122	
trans-1,3-Dichloropropene	0.02	0.0213	106	0.02	0.0207	103	2.7	30	81.5-113	
Trichlorofluoromethane	0.02	0.0227	114	0.02	0.0224	112	1.4	30	80-132	
Vinyl Chloride	0.02	0.0197	98.4	0.02	0.0196	98.2	0.4	30	71.1-127	
2-Butanone	0.02	0.0193	96.7	0.02	0.0213	106	9.7	30	75-125	

QC Type: MS and MSD

QC Sample ID: 21031755.02

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1-Dichloroethylene	BRL	0.02	0.0227	114						81-130	
Benzene	BRL	0.02	0.0212	106						84-132	
Chlorobenzene	BRL	0.02	0.0202	101						72-132	
Toluene	BRL	0.02	0.0208	104						72-136	
Trichloroethylene	BRL	0.02	0.0221	111						75-136	
1,1,1-Trichloroethane	BRL	0.02	0.0223	111						78-131	

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Volatile Organic Compounds **Method : EPA 624.1** **Reporting Units : mg/L**

QC Batch ID : Qb21032397 **Created Date :** 03/23/21 **Created By :** Rajeev

Samples in This QC Batch : 21031513.15,16,17

QC Type: MS and MSD
QC Sample ID: 21031755.02

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
1,1,2,2-Tetrachloroethane	BRL	0.02	0.0271	135						66-145	
1,1,2-Trichloroethane	BRL	0.02	0.0237	119						69-138	
1,1-Dichloroethane	BRL	0.02	0.0224	112						84-128	
1,2-Dichlorobenzene	BRL	0.02	0.0206	103						73-138	
1,2-Dichloroethane	0.0477	0.02	0.0646	84.4						65-154	
1,3-Dichlorobenzene	BRL	0.02	0.0203	102						74-136	
1,4-Dichlorobenzene	BRL	0.02	0.0202	101						71-136	
Bromodichloromethane	0.0206	0.02	0.0413	104						83-134	
Bromoform	BRL	0.02	0.0243	121						68-135	
Bromomethane	BRL	0.02	0.0214	107						65-144	
Carbon tetrachloride	BRL	0.02	0.0215	108						70-136	
Chloroethane	BRL	0.02	0.0226	113						76-147	
Chloroform	0.0378	0.02	0.0552	86.9						68-130	
Chloromethane	BRL	0.02	0.0246	123						73-127	
cis-1,3-Dichloropropene	BRL	0.02	0.0225	112						81-126	
Dibromochloromethane	BRL	0.02	0.0268	134						68-139	
Ethylbenzene	BRL	0.02	0.0207	103						75-133	
Methylene chloride	BRL	0.02	0.0204	102						74-126	
Tetrachloroethylene	BRL	0.02	0.0198	99						65-138	
trans-1,2-Dichloroethylene	BRL	0.02	0.0225	113						73-130	
trans-1,3-Dichloropropene	BRL	0.02	0.0227	114						73-129	
Trichlorofluoromethane	BRL	0.02	0.0243	121						78-143	
Vinyl Chloride	BRL	0.02	0.0202	101						58-135	
2-Butanone	BRL	0.02	0.0233	116						75-125	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Polychlorinated Biphenyls **Method : EPA 608.3** **Reporting Units : ug/L**

QC Batch ID : Qb21032568 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.01,03,05,15,16,17

Extraction : PB21032369 **Prep Method :** EPA 608.3 **Prep Date :** 03/23/21 10:00 **Prep By :** Msoria

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Total PCBs		< MDL	ug/L	1	0.05	0.0129		
Decachlorobiphenyl(surr)	2051-24-3	97	%	0.25				
Tetrachloro-m-xylene(surr)	877-09-8	80	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Total PCBs	4	1.884	47.1	4	1.994	49.9	5.7	18	41-130	

QC Type: MS and MSD

QC Sample ID: 21031513.03

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Total PCBs		4	1.698	42.5						40-140	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

DRAFT

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Polychlorinated Biphenyls **Method : SW-846 8082A** **Reporting Units : ug/Kg**

QC Batch ID : Qb21032570 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.08,09,11,13

Extraction : PB21032371 **Prep Method :** SW-846 3546 **Prep Date :** 03/23/21 14:30 **Prep By :** Msoria

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Total PCBs		< MDL	ug/Kg	0.25	0.4175	1.52		
Tetrachloro-m-xylene(surr)	877-09-8	98.3	%	0.25				
Decachlorobiphenyl(surr)	2051-24-3	128	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Total PCBs	66.5	69.802	105	66.5	70.424	106	0.9	9	16.2-170	

QC Type: MS and MSD

QC Sample ID: 21031513.08

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Total PCBs	0	66.5	42.997	64.7						40-140	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Organochlorine Pesticides **Method : EPA 608.3** **Reporting Units : ug/L**

QC Batch ID : Qb21032592 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.01,03,05,15,16,17

Extraction : PB21032370 **Prep Method :** EPA 608.3 **Prep Date :** 03/23/21 12:00 **Prep By :** Msoria

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Alpha-chlordane	5103-71-9	< MDL	ug/L	0.25	0.0025	0.002		
Gamma-chlordane	5103-74-2	< MDL	ug/L	0.25	0.0025	0.005		
4,4-DDD	72-54-8	< MDL	ug/L	0.25	0.0025	0.006		
4,4-DDE	72-55-9	< MDL	ug/L	0.25	0.0025	0.002		
4,4-DDT	50-29-3	< MDL	ug/L	0.25	0.0025	0.004		
a-BHC	319-84-6	< MDL	ug/L	0.25	0.0025	0.008		
Aldrin	309-00-2	< MDL	ug/L	0.25	0.0025	0.003		
b-BHC	319-85-7	< MDL	ug/L	0.25	0.0025	0.010		
Chlordane	57-74-9	< MDL	ug/L	0.25	0.025			
d-BHC	319-86-8	< MDL	ug/L	0.25	0.0025	0.004		
Dieldrin	60-57-1	< MDL	ug/L	0.25	0.0025	0.003		
Endosulfan I	959-98-8	< MDL	ug/L	0.25	0.0025	0.003		
Endosulfan II	33213-65-9	< MDL	ug/L	0.25	0.0025	0.004		
Endosulfan sulfate	1031-07-8	< MDL	ug/L	0.25	0.0025	0.003		
Endrin	72-20-8	< MDL	ug/L	0.25	0.0025	0.004		
Endrin aldehyde	7421-93-4	< MDL	ug/L	0.25	0.0025	0.008		
Endrin ketone	53494-70-5	< MDL	ug/L	0.25	0.0025	0.005		
g-BHC	58-89-9	< MDL	ug/L	0.25	0.0025	0.005		
Heptachlor	76-44-8	< MDL	ug/L	0.25	0.0025	0.005		
Heptachlor epoxide	1024-57-3	< MDL	ug/L	0.25	0.0025	0.002		
Toxaphene	8001-35-2	< MDL	ug/L	0.25	0.025	0.1		
Tetrachloro-m-xylene(surr)	877-09-8	33.9	%	0.25				
Decachlorobiphenyl(surr)	2051-24-3	37.4	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Alpha-chlordane	0.1	0.0664	66.4	0.1	0.0631	63.1	5.1	23	29-135	
Gamma-chlordane	0.1	0.0639	63.9	0.1	0.0629	62.9	1.5	21	27-136	
4,4-DDD	0.1	0.0714	71.4	0.1	0.0719	71.9	0.7	24	27-147	
4,4-DDE	0.1	0.032	32	0.1	0.03218	32.2	0.6	21	30-136	
4,4-DDT	0.1	0.113	113	0.1	0.111	111	1.5	30	23-152	
a-BHC	0.1	0.049	48.8	0.1	0.050	49.6	2.5	25	23-125	
Aldrin	0.1	0.0575	57.5	0.1	0.0549	54.9	4.6	23	27-127	
b-BHC	0.1	0.0642	64.3	0.1	0.0626	62.6	2.6	24	29-132	
d-BHC	0.1	0.0734	73.4	0.1	0.0711	71.1	3.1	20	30-139	
Dieldrin	0.1	0.0571	57.1	0.1	0.0561	56.1	1.8	21	29-135	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Organochlorine Pesticides **Method : EPA 608.3** **Reporting Units : ug/L**

QC Batch ID : Qb21032592 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.01,03,05,15,16,17

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Endosulfan I	0.1	0.031	31	0.1	0.031	30.6	0	24	15-125	
Endosulfan II	0.1	0.040	39.6	0.1	0.039	38.9	1.6	21	20-133	
Endosulfan sulfate	0.1	0.037	37	0.1	0.0358	35.8	3.3	20	21-151	
Endrin	0.1	0.0608	60.8	0.1	0.0604	60.4	0.6	24	22-147	
Endrin aldehyde	0.1	0.0602	60.3	0.1	0.0588	58.8	2.4	33	14-136	
Endrin ketone	0.1	0.0808	80.8	0.1	0.0796	79.6	1.4	20	15-154	
g-BHC	0.1	0.0556	55.6	0.1	0.0564	56.4	1.4	25	23-132	
Heptachlor	0.1	0.0564	56.4	0.1	0.0569	56.9	0.9	20	27-134	
Heptachlor epoxide	0.1	0.0619	61.9	0.1	0.0612	61.3	1.1	24	32-132	

QC Type: MS and MSD

QC Sample ID: 21031513.05

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Alpha-chlordane	0.000	0.1	0.0620	62						40-140	
Gamma-chlordane	0.000	0.1	0.0618	61.8						40-140	
4,4-DDD	0.000	0.1	0.122	122						40-140	
4,4-DDE	BRL	0.1	0.03481	34.8						40-140	M2
4,4-DDT	0.000	0.1	0.142	143						40-140	M1
a-BHC	0.000	0.1	0.047	47.4						40-140	
Aldrin	0.000	0.1	0.041	41.1						40-140	
b-BHC	0.000	0.1	0.0678	67.8						40-140	
d-BHC	0.000	0.1	0.0811	81.1						40-140	
Dieldrin	0.000	0.1	0.0582	58.3						40-140	
Endosulfan I	0.000	0.1	0.035	35.3						40-140	M2
Endosulfan II	0.000	0.1	0.0531	53.1						40-140	
Endosulfan sulfate	BRL	0.1	0.03956	39.6						40-140	M2
Endrin	0.000	0.1	0.0700	70						40-140	
Endrin aldehyde	0.000	0.1	0.0766	76.6						40-140	
Endrin ketone	0.000	0.1	0.0881	88.1						40-140	
g-BHC	0.000	0.1	0.0556	55.6						40-140	
Heptachlor	0.000	0.1	0.049	49.3						40-140	
Heptachlor epoxide	0.000	0.1	0.0666	66.6						40-140	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE

Job ID : 21031513 **Date :** 3/30/2021

Analysis : Organochlorine Pesticides **Method : SW-846 8081B** **Reporting Units : ug/Kg**

QC Batch ID : Qb21032593 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.08,09,11,13

Extraction : PB21032373 **Prep Method :** SW-846 3546 **Prep Date :** 03/23/21 13:30 **Prep By :** Msoria

---

QC Type: Method Blank

Parameter	CAS #	Result	Units	D.F.	MQL	MDL		Qual
Alpha-chlordane	5103-71-9	< MDL	ug/Kg	0.25	0.08325	0.25		
Gamma-chlordane	5103-74-2	< MDL	ug/Kg	0.25	0.08325	0.18		
4,4-DDD	72-54-8	< MDL	ug/Kg	0.25	0.08325	0.26		
4,4-DDE	72-55-9	< MDL	ug/Kg	0.25	0.4175	0.36		
4,4-DDT	50-29-3	< MDL	ug/Kg	0.25	0.4175	0.48		
a-BHC	319-84-6	< MDL	ug/Kg	0.25	0.08325	0.10		
Aldrin	309-00-2	< MDL	ug/Kg	0.25	0.08325	0.20		
b-BHC	319-85-7	< MDL	ug/Kg	0.25	0.08325	0.33		
Chlordane	57-74-9	< MDL	ug/Kg	0.25	0.8325	1.67		
d-BHC	319-86-8	< MDL	ug/Kg	0.25	0.4175	0.34		
Dieldrin	60-57-1	< MDL	ug/Kg	0.25	0.08325	0.25		
Endosulfan I	959-98-8	< MDL	ug/Kg	0.25	0.4175	0.34		
Endosulfan II	33213-65-9	< MDL	ug/Kg	0.25	0.08325	0.28		
Endosulfan sulfate	1031-07-8	< MDL	ug/Kg	0.25	0.08325	0.25		
Endrin	72-20-8	< MDL	ug/Kg	0.25	0.4175	0.39		
Endrin aldehyde	7421-93-4	< MDL	ug/Kg	0.25	0.4175	0.41		
Endrin ketone	53494-70-5	< MDL	ug/Kg	0.25	0.08325	0.33		
g-BHC	58-89-9	< MDL	ug/Kg	0.25	0.08325	0.15		
Heptachlor	76-44-8	< MDL	ug/Kg	0.25	0.08325	0.33		
Heptachlor epoxide	1024-57-3	< MDL	ug/Kg	0.25	0.08325	0.26		
Toxaphene	8001-35-2	< MDL	ug/Kg	0.25	0.8325	1.67		
Tetrachloro-m-xylene(surr)	877-09-8	55	%	0.25				
Decachlorobiphenyl(surr)	2051-24-3	70.6	%	0.25				

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Alpha-chlordane	3.34	3.01	90.1	3.34	2.57	76.9	15.8	25	52-135	
Gamma-chlordane	3.34	3.12	93.4	3.34	2.60	77.8	18.2	25	47-143	
4,4-DDD	3.34	3.20	95.8	3.34	3.01	90.1	6.1	24	56-152	
4,4-DDE	3.34	2.15	64.4	3.34	2.14	64.1	0.5	22	31-152	
4,4-DDT	3.34	4.85	145	3.34	4.72	141	2.7	27	38-144	L1
a-BHC	3.34	2.20	65.9	3.34	2.01	60.2	9	24	43-131	
Aldrin	3.34	2.33	69.8	3.34	2.22	66.5	4.8	24	45-133	
b-BHC	3.34	2.75	82.3	3.34	2.60	77.8	5.6	24	48-134	
d-BHC	3.34	3.02	90.4	3.34	2.72	81.4	10.5	24	38-156	
Dieldrin	3.34	2.33	69.8	3.34	2.30	68.9	1.3	21	58-136	

QUALITY CONTROL CERTIFICATE

Job ID : 21031513

Date : 3/30/2021

Analysis : Organochlorine Pesticides **Method : SW-846 8081B** **Reporting Units : ug/Kg**

QC Batch ID : Qb21032593 **Created Date :** 03/23/21 **Created By :** PSunkara

Samples in This QC Batch : 21031513.08,09,11,13

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Endosulfan I	3.34	1.12	33.5	3.34	1.19	35.6	6.1	22	19-132	
Endosulfan II	3.34	1.79	53.6	3.34	1.68	50.3	6.3	21	36-95	
Endosulfan sulfate	3.34	2.47	74	3.34	2.38	71.3	3.7	23	63-143	
Endrin	3.34	2.67	79.9	3.34	2.33	69.8	13.6	21	51-141	
Endrin aldehyde	3.34	2.66	79.6	3.34	2.55	76.3	4.2	23	42-150	
Endrin ketone	3.34	3.67	110	3.34	3.42	102	7	18	61-149	
g-BHC	3.34	2.56	76.6	3.34	2.28	68.3	11.6	22	49-135	
Heptachlor	3.34	2.52	75.4	3.34	2.24	67.1	11.8	24	52-124	
Heptachlor epoxide	3.34	2.60	77.8	3.34	2.50	74.9	3.9	23	57-129	

QC Type: MS and MSD

QC Sample ID: 21031513.08

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
4,4-DDD	0.0000	3.34	2.98	89.2						56-152	
4,4-DDE	BRL	3.34	2.420	72.5						31-152	
4,4-DDT	0.0000	3.34	4.58	137						38-144	
a-BHC	0.0000	3.34	1.88	56.3						43-131	
Aldrin	0.0000	3.34	2.01	60.2						45-133	
b-BHC	0.0000	3.34	2.42	72.5						48-134	
d-BHC	0.0000	3.34	2.72	81.4						38-156	
Dieldrin	0.0000	3.34	2.09	62.6						58-136	
Endosulfan I	0.0000	3.34	0.862	25.8						19-132	
Endosulfan II	0.0000	3.34	1.46	43.7						36-95	
Endosulfan sulfate	BRL	3.34	2.828	84.7						63-143	
Endrin	0.0000	3.34	2.37	71						51-141	
Endrin aldehyde	0.0000	3.34	2.27	68						42-150	
Endrin ketone	0.0000	3.34	3.34	100						61-149	
g-BHC	0.0000	3.34	2.20	65.9						49-135	
Heptachlor	0.0000	3.34	2.07	62						52-124	
Heptachlor epoxide	0.0000	3.34	2.48	74.3						57-129	

Refer to the Definition page for terms.

DRAFT

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Page 1 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

10100 East Freeway (I-10)
Houston, TX 77029

A&B -

1. REPORT TO:	**2. INVOICE TO:**	**3.PO#** / Q1210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	**4. Turnaround Time- Business Days**
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days
Contact: Bob Davis	Contact: Accounts Payable	☐ 3 Days * ☐ Other ___
Phone: 512-970-9639	Phone: 713-955-1227	* Surcharge Applies
Email: bdavis@disorboconsult.com	Email:	*Day Zero is the day sample is received. Report due at 5pm on due day.*
CC:	CC:	
CC:	CC:	

5. Project #

6. Project Name / Location

Cedar Port Pre-Dredge Sampling

7. Reporting Requirement

☐ TRRP Limits ☐ TRRP Rpt. Package ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company James Reis, DiSorbo

Sampler's Signature & Date 3-17-21

9. Sample ID & Description	Lab Use Only	**10. Sampling** Date	Time	**11.** comp	grab	**12. Matrix** GW	Water	Soil	Sludge	Oil	**13. TOTAL No. of Containers**	NH3 (<0.03 RL), TOC	Salinity	Metals Dissolved ICPMS (ug/L)	Hg (ug/L)	TPH 1005	SVOC, SVOC SIM (ug/L)	PCBs	Pesticides	VOC	**18. Comments**
No. Containers												1	1	1	1	3	5	3	3	3	
14. Containers*												P	P	P	P	VOA	A/G	A/G	A/G	VOA	
15. Preservatives**																					Water List
MB - 1 - WAT	01AU	3-17-21	1710		X		X				21	X	X	X	X	X	X	X	X	X	
MB - 1 - ELUT - WATER PART	02AT	↓	1716		↓		X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - 7 - WAT	03AU		0900				X				21	X	X	X	X	X	X	X	X	X	
MB - 9 - ELUT - WATER PART	04AT		1300				X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - EQB - WAT	05AT		1750				X				20	X		X	X	X	X	X	X	X	
MB - TRIP - WAT	06AB		1155				X				2			X	X						
MB-5-ELUT-WATERPA	07AT		1645																		

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS
James Reis, DiSorbo	3-17-21	19:00		3-17-21	1900	
						1.6 C

* Containers: VOA- 40 ml vial
4 oz/8 oz- glass wide mouth

A/G- Amber/Glass 1 Liter
P/O- Plastic/other ___

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature: ___
Intact? ☐ Y ☐ N
Initials ___

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

DRAFT

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Page 2 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

A

10100 East Freeway (I-10)
Houston, TX 77029

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	4. Turnaround Time- Business Days
Address: 8501 N MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days
Contact: Bob Davis	Contact: Accounts Payable	☐ 3 Days * ☐ Other ____
Phone: 512-970-9639	Phone: 713-955-1227	* Surcharge Applies
Email: bdavis@disorboconsult.com	Email:	
CC:	CC:	*Day Zero is the day sample is received.* *Report due at 5pm on due day.*
CC:	CC:	

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company: James Reis, DiSorbo

Sampler's Signature & Date: 3.17.21

9. Sample ID & Description	Lab Use Only	10. Sampling Date	Time	11. comp	grab	12. Matrix GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub	%Moisture, Particle Size_Sub	%Moisture, NH3 (<0.1 RL), Hg, Metals ICPMS, Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg)	VOCs	RCI			18. Comments
No. Containers													1	1	4					
14. Containers*													G	G	G					
15. Preservatives**													C	C	C					Soil List
~~MB - 1 - SED~~ JR								X				6	X	X	X	X	X			
MB - 7 - SED	08AF	3-17-21	11:50	X				X				6	X	X	X	X	X			
MB - 9 - SED	09AF	3-17-21	15:20	X				X				6	X	X	X	X	X			
~~MB - 1 - ELUT - SED PART~~ JR								X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
MB - 9 - ELUT - SED PART	10AF	3-17-21	15:20	X				X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
James Reis, DiSorbo	3.17.21	19:00		3.17.21	1900	
						1.6 °C IR001/3

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ______

Preservatives: C- Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other *ZnAcetate*

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

Temperature: ____
Intact? ☑ Y ☐ N
Initials ______

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

DRAFT

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Page 2 of 2

10100 East Freeway (I-10)
Houston, TX 77029

Job ID:~~21031410~~ TA 3/19/21
21031513

A

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q1210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	4. Turnaround Time- Business Days
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days ☐ 3 Days * ☐ Other ___
Contact: Bob Davis	Contact: Accounts Payable	* Surcharge Applies
Phone: 512-970-9639	Phone: 713-955-1227	
Email: bdavis@disorboconsult.com	Email:	*Day Zero is the day sample is received.* *Report due at 5pm on due day.*
CC:	CC:	
CC:	CC:	

5. Project #

6. Project Name / Location: Cedar Port Pre-Dredge Sampling

7. Reporting Requirement: ☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company

Sampler's Signature & Date

9. Sample ID & Description	Lab Use Only	10. Sampling Date	10. Sampling Time	11. comp	11. grab	12. Matrix GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub	%Moisture, Particle Size_Sub	%Moisture, NH3 (0.1 RL), Hg, Metals ICPMS Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg)	VOCs	RCI			18. Comments
No. Containers													1	1	4					
14. Containers*													G	G	G					
15. Preservatives**													C	C	C					Soil List
MB - 1 - SED	~~01AF~~ 11A F	03/16/21	1210					X				6	X	X	X	X	X			
MB - 1 - ELUT - SED PART	~~02AF~~ 12A F		1210					X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
MB - 5 - SED	~~03AF~~ 13A F		1530					X				6	X	X	X	X				
MB - 5 - ELUT - SED PART	~~04AF~~ 14A F		1530					X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS.
	03/16	1715		3-16-21	1715	4.1°C IR20230

* Containers: VOA- 40 ml vial; A/G- Amber/Glass 1 Liter; 4 oz/8 oz- glass wide mouth; P/O- Plastic/other ______

Preservatives C- Cool H- HCl N- HNO3 S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature: ____ K101

Intact? ☑ Y ☐ N

Initials ______

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

Sample Condition Checklist

DRAFT

A&B JobID : **21031513**	Date Received : **03/16/2021**	Time Received : **5:15PM**
Client Name : **DiSorbo Consulting LLC**		
Temperature : **1.6°C**	Sample pH : **<2 nh3, hg**	
Thermometer ID : **102002320**	pH Paper ID : **81548**	
Perservative :		

	Check Points	**Yes**	**No**	**N/A**
1.	**Cooler seal present and signed.**		X	
2.	**Sample(s) in a cooler.**	X		
3.	**If yes, ice in cooler.**	X		
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If no comment).**	X		
8.	**Matrix :** **Water** ☐ **Soil** ☐ **Liquid** ☐ **Sludge** ☐ **Solid** ☐ **Cassette** ☐ **Tube** ☐ **Bulk** ☐ **Badge** ☐ **Food** ☐ **Other** ☐			
9.	**Sample(s) were received in appropriate container(s).**	X		
10.	**Sample(s) were received with proper preservative**	X		
11.	**All samples were logged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's**		X	
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received within the hold time.**	X		
16.	**VOA vials completely filled.**	X		
17.	**Sample accepted.**	X		
18	**Has client been contacted about sub-out**	X		

Comments : Include actions taken to resolve discrepancies/problem:

07= 'MB-4-ELUT-WATERPORT as sx ID. -VH 03-19-21

Received by : JMontemayor

Check in by/date : VHernandez / 03/18/2021

ab-s005-0321

Laboratory Analysis Report

Total Number of Pages: 17

Job ID : 21031513

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

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Client Project Name :
Cedar Port Pre-Dredge Sampling

Report To :

Client Name: DiSorbo Consulting LLC

Attn: Bob Davis

Client Address: 8501 N. MoPac Expressway, Ste. 30

City, State, Zip: Austin, Texas, 78759

P.O.#.:

Sample Collected By: James Reis

Date Collected: 03/16/21 - 03/17/21

Client Sample ID	Matrix	A&B Sample ID
MB-7-SED	Soil	21031513.08
MB-9-SED	Soil	21031513.09
MB-1-SED	Soil	21031513.11
MB-5-SED	Soil	21031513.13

This analysis was subcontracted to :
Ana Lab, 2600 Dudley
Kilgore, Texas, 75662

Shantall Carpenter

Released By: Shantall Carpenter
Title: Senior Project Manager

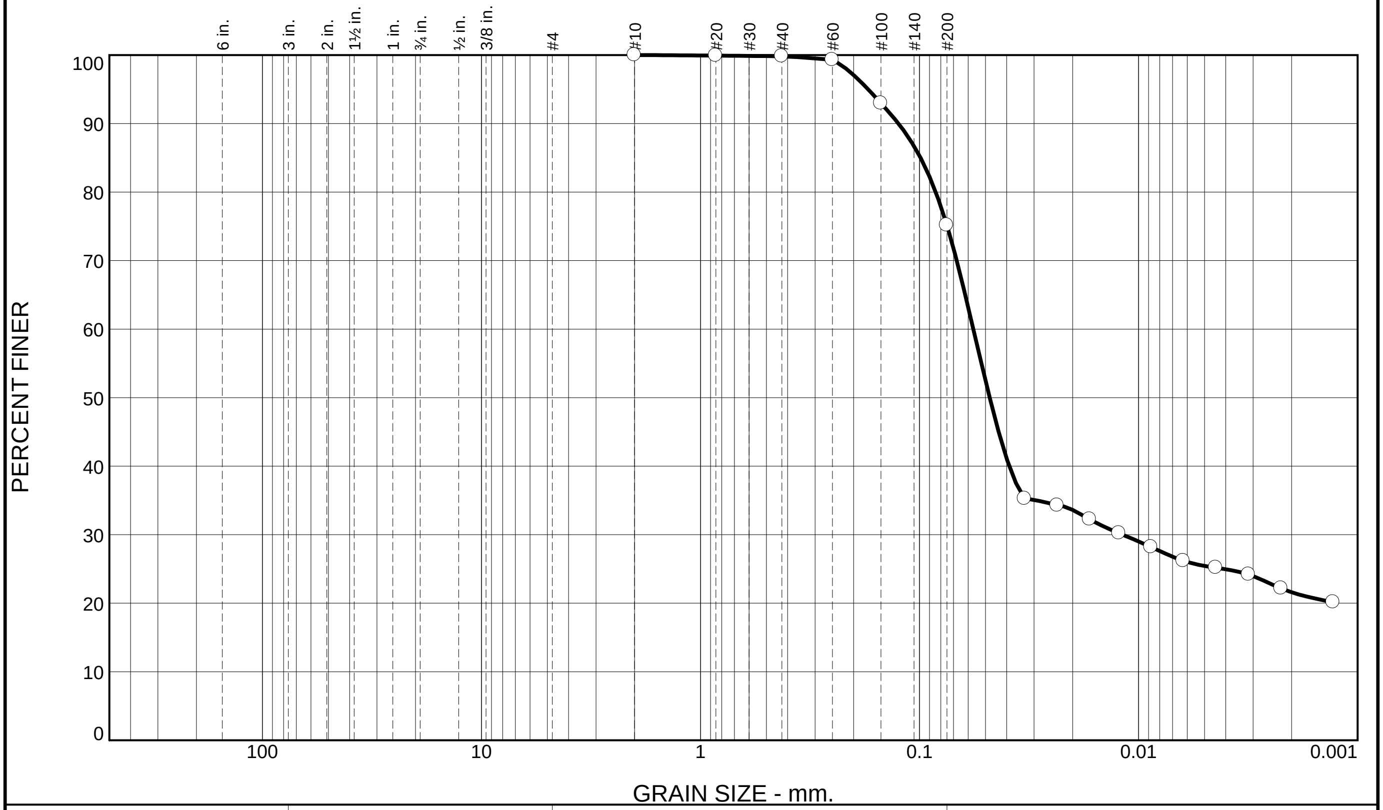
Date: 04/19/2021

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

Date Received : 03/16/2021 17:15

DRAFT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	24.6	49.8	25.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.3		
#100	93.0		
#200	75.2		

* (no specification provided)

Material Description

MB-7-SED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1248 D_{85}= 0.0989 D_{60}= 0.0568
D_{50}= 0.0478 D_{30}= 0.0118 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: MB-7-SED

Date: 04/01/2021

TOLUNAY-WONG ENGINEERS

Client: A & B Labs
Project:

Tested By: R Kowis **Checked By:** R Kowis

DRAFT

GRAIN SIZE DISTRIBUTION TEST DATA

4/8/2021

Client: A & B Labs
Project:
Project Number:
Sample Number: MB-7-SED
Material Description: MB-7-SED
Date: 04/01/2021
Tested by: R Kowis **Checked by:** R Kowis

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 244.24
Tare Wt. = 231.82
Minus #200 from wash = 75.2%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
281.82	231.82	231.82	#10	231.82	100.0
			#20	231.86	99.9
			#40	231.91	99.8
			#60	232.18	99.3
			#100	235.34	93.0
			#200	244.24	75.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 44.00
Dry weight and tare = 43.77
Tare weight = 31.37
Hygroscopic moisture = 1.9%
Table of composite correction values:

Temp., deg. C:	20.8	21.3
Comp. corr.:	-5.0	-5.0

Meniscus correction only = 0.5
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.3	22.5	17.5	0.0132	23.0	12.5	0.0331	35.3
4.00	21.3	22.0	17.0	0.0132	22.5	12.6	0.0235	34.2
8.00	21.3	21.0	16.0	0.0132	21.5	12.8	0.0167	32.2
15.00	21.3	20.0	15.0	0.0132	20.5	12.9	0.0123	30.2
30.00	21.1	19.0	14.0	0.0133	19.5	13.1	0.0088	28.2
60.00	21.0	18.0	13.0	0.0133	18.5	13.3	0.0062	26.2
120.00	20.8	17.5	12.5	0.0133	18.0	13.3	0.0044	25.2
240.00	21.0	17.0	12.0	0.0133	17.5	13.4	0.0031	24.2
480.00	21.0	16.0	11.0	0.0133	16.5	13.6	0.0022	22.2
1440.00	21.3	15.0	10.0	0.0132	15.5	13.8	0.0013	20.1

Tolunay-Wong Engineers, Inc. in Texas City, TX

Fractional Components

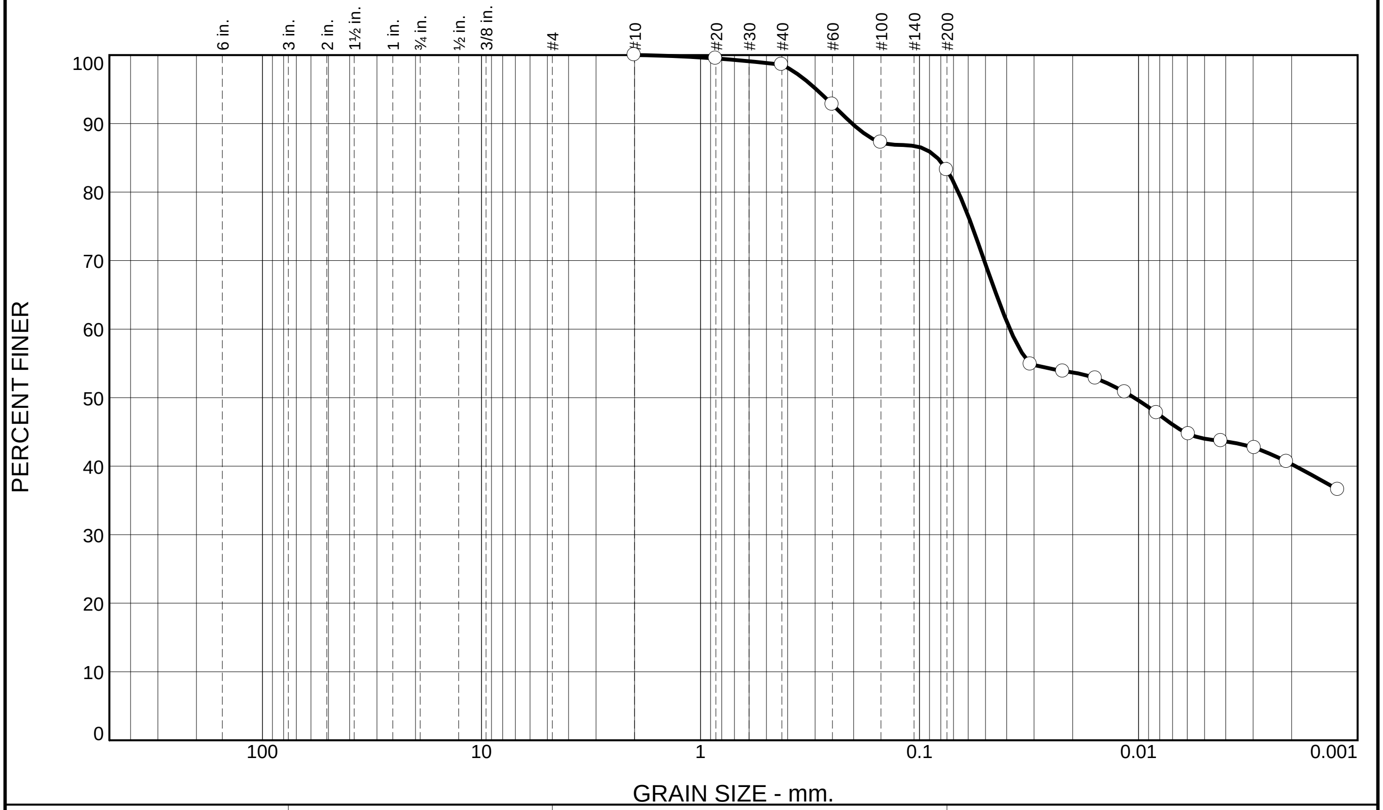
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	24.6	24.8	49.8	25.4	75.2

D_{5}	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0118	0.0389	0.0478	0.0568	0.0843	0.0989	0.1248	0.1717

Fineness Modulus
0.08

DRAFT

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.4	15.4	39.2	44.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.5		
#40	98.6		
#60	92.8		
#100	87.2		
#200	83.2		

* (no specification provided)

Material Description

MB-9-SED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2030 D_{85}= 0.0829 D_{60}= 0.0387
D_{50}= 0.0105 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: MB-9-SED

Date: 04/01/2021

TOLUNAY-WONG ENGINEERS

Client: A & B Labs
Project:

Tested By: R Kowis **Checked By:** R Kowis

DRAFT

GRAIN SIZE DISTRIBUTION TEST DATA

4/8/2021

Client: A & B Labs
Project:
Project Number:
Sample Number: MB-9-SED
Material Description: MB-9-SED
Date: 04/01/2021
Tested by: R Kowis **Checked by:** R Kowis

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 59.75
Tare Wt. = 51.36
Minus #200 from wash = 83.2%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
101.36	51.36	51.36	#10	51.36	100.0
			#20	51.61	99.5
			#40	52.07	98.6
			#60	54.97	92.8
			#100	57.74	87.2
			#200	59.75	83.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 45.33
Dry weight and tare = 44.97
Tare weight = 31.76
Hygroscopic moisture = 2.7%
Table of composite correction values:

Temp., deg. C:	20.7	21.3
Comp. corr.:	-5.0	-5.0

Meniscus correction only = 0.5
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	20.9	32.0	27.0	0.0133	32.5	11.0	0.0311	54.9
4.00	20.9	31.5	26.5	0.0133	32.0	11.0	0.0221	53.8
8.00	20.8	31.0	26.0	0.0133	31.5	11.1	0.0157	52.8
15.00	20.8	30.0	25.0	0.0133	30.5	11.3	0.0115	50.8
30.00	20.8	28.5	23.5	0.0133	29.0	11.5	0.0083	47.7
60.00	20.7	27.0	22.0	0.0133	27.5	11.8	0.0059	44.7
120.00	20.7	26.5	21.5	0.0133	27.0	11.9	0.0042	43.7
240.00	21.2	26.0	21.0	0.0132	26.5	11.9	0.0030	42.7
480.00	21.2	25.0	20.0	0.0132	25.5	12.1	0.0021	40.6
1440.00	21.3	23.0	18.0	0.0132	23.5	12.4	0.0012	36.6

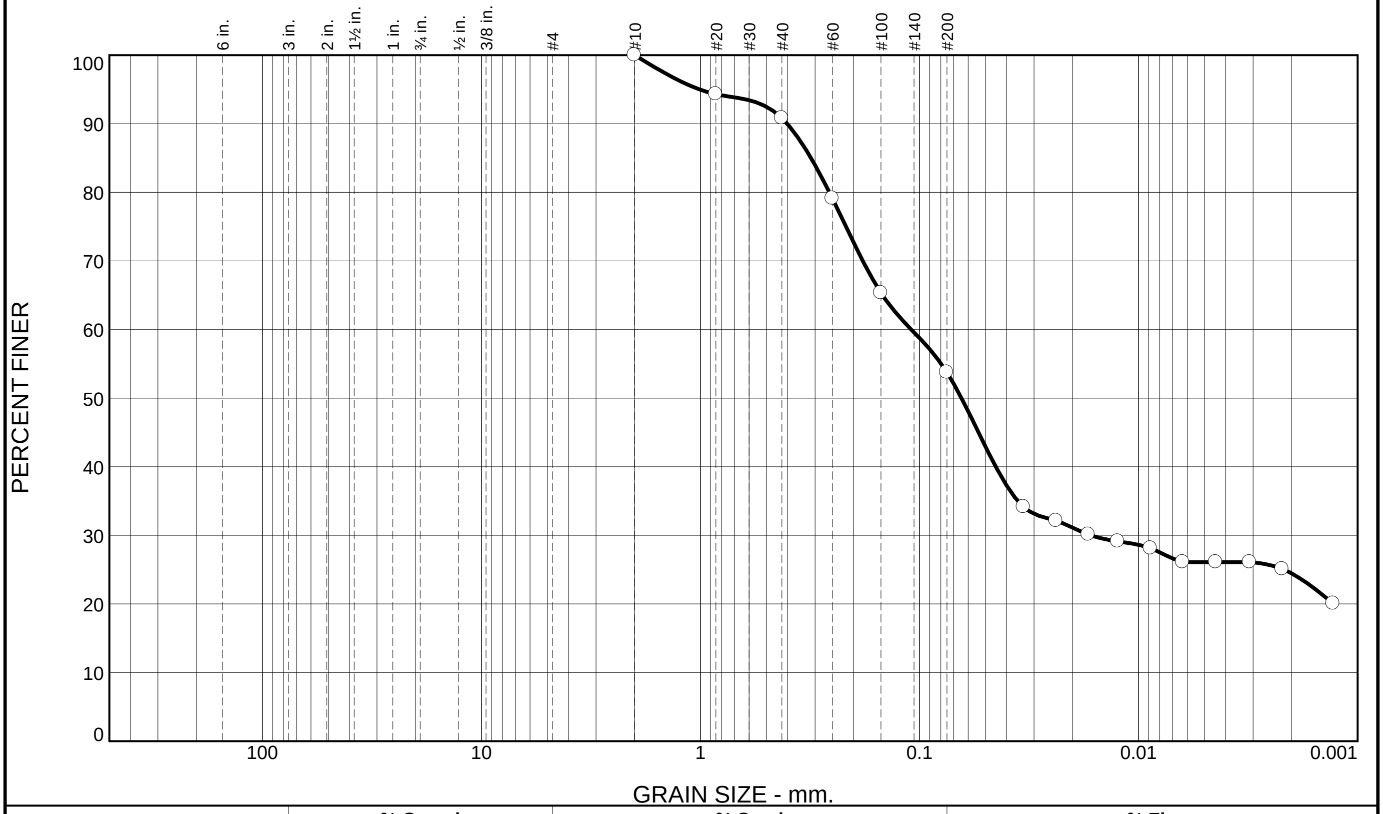
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.4	15.4	16.8	39.2	44.0	83.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0019	0.0105	0.0387	0.0665	0.0829	0.2030	0.2959

Fineness Modulus
0.19

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	9.2	37.0	27.7	26.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	94.3		
#40	90.8		
#60	79.1		
#100	65.3		
#200	53.8		

* (no specification provided)

Material Description

MB-1-SED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4022 D_{85}= 0.3130 D_{60}= 0.1091
D_{50}= 0.0643 D_{30}= 0.0165 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: MB-1-SED

Date: 04/01/2021

TOLUNAY-WONG ENGINEERS

Client: A & B Labs
Project:

Tested By: R Kowis **Checked By:** R Kowis

DRAFT

GRAIN SIZE DISTRIBUTION TEST DATA

4/8/2021

Client: A & B Labs
Project:
Project Number:
Sample Number: MB-1-SED
Material Description: MB-1-SED
Date: 04/01/2021
Tested by: R Kowis **Checked by:** R Kowis

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 75.72
Tare Wt. = 52.60
Minus #200 from wash = 53.8%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
102.60	52.60	52.60	#10	52.60	100.0
			#20	55.45	94.3
			#40	57.20	90.8
			#60	63.04	79.1
			#100	69.93	65.3
			#200	75.72	53.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 42.45
Dry weight and tare = 42.24
Tare weight = 28.43
Hygroscopic moisture = 1.5%
Table of composite correction values:

Temp., deg. C:	20.6	21.3
Comp. corr.:	-5.0	-5.0

Meniscus correction only = 0.5
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	20.7	22.0	17.0	0.0133	22.5	12.6	0.0335	34.1
4.00	20.7	21.0	16.0	0.0133	21.5	12.8	0.0238	32.1
8.00	20.7	20.0	15.0	0.0133	20.5	12.9	0.0169	30.1
15.00	20.6	19.5	14.5	0.0133	20.0	13.0	0.0124	29.1
30.00	20.6	19.0	14.0	0.0133	19.5	13.1	0.0088	28.1
60.00	20.6	18.0	13.0	0.0133	18.5	13.3	0.0063	26.1
120.00	20.6	18.0	13.0	0.0133	18.5	13.3	0.0044	26.1
240.00	21.3	18.0	13.0	0.0132	18.5	13.3	0.0031	26.1
480.00	21.3	17.5	12.5	0.0132	18.0	13.3	0.0022	25.1
1440.00	21.3	15.0	10.0	0.0132	15.5	13.8	0.0013	20.1

DRAFT

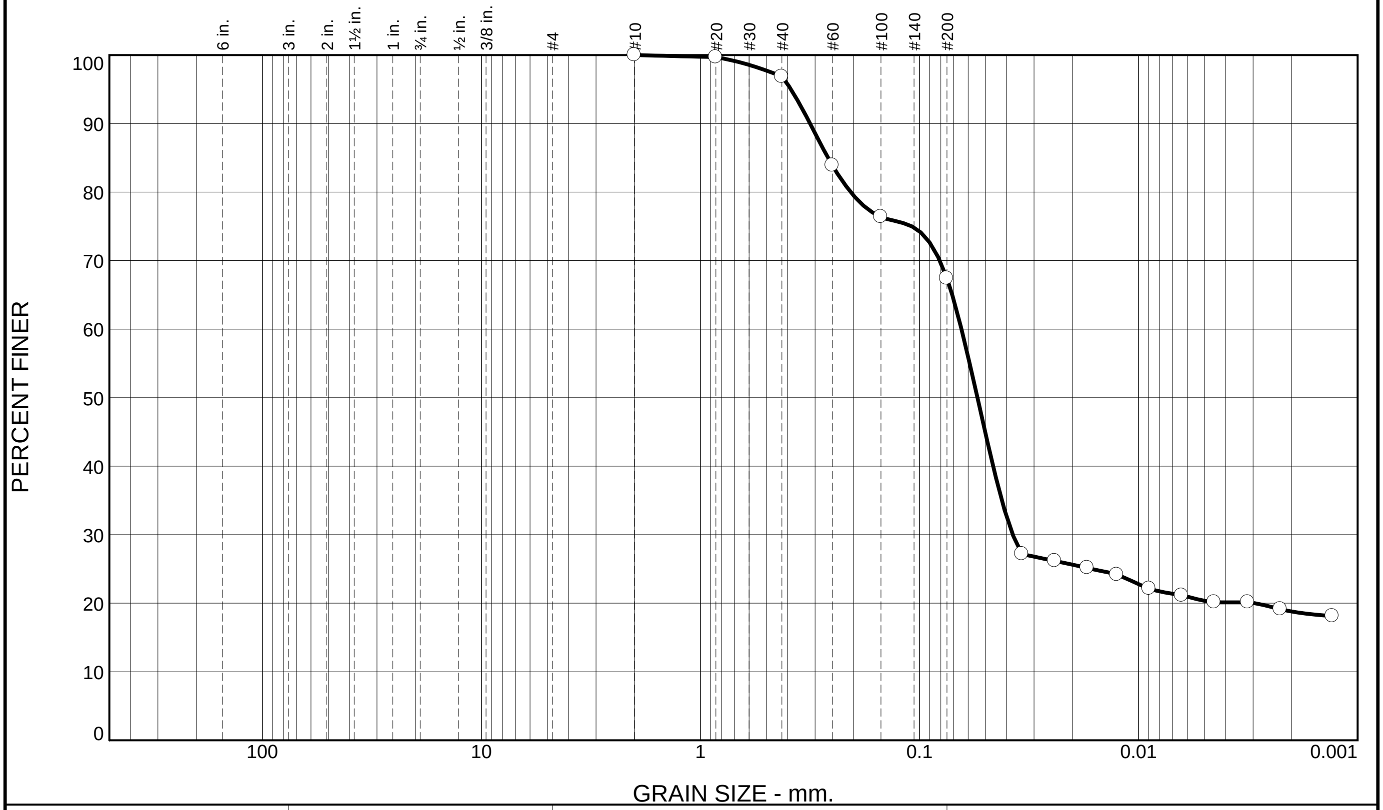
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	**Fine**	**Total**	**Coarse**	**Medium**	**Fine**	**Total**	**Silt**	**Clay**	**Total**
0.0	0.0	0.0	0.0	0.0	9.2	37.0	46.2	27.7	26.1	53.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0165	0.0449	0.0643	0.1091	0.2580	0.3130	0.4022	1.0090

Fineness Modulus
0.61

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.1	29.5	47.1	20.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.7		
#40	96.9		
#60	83.9		
#100	76.4		
#200	67.4		

* (no specification provided)

Material Description

MB-5-SED

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3161 D_{85}= 0.2616 D_{60}= 0.0643
D_{50}= 0.0544 D_{30}= 0.0375 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: MB-5-SED

Date: 04/01/2021

TOLUNAY-WONG ENGINEERS

Client: A & B Labs
Project:

Tested By: R Kowis **Checked By:** R Kowis

DRAFT

GRAIN SIZE DISTRIBUTION TEST DATA

4/8/2021

Client: A & B Labs
Project:
Project Number:
Sample Number: MB-5-SED
Material Description: MB-5-SED
Date: 04/01/2021
Tested by: R Kowis **Checked by:** R Kowis

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 245.51
Tare Wt. = 229.21
Minus #200 from wash = 67.4%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
279.21	229.21	229.21	#10	229.21	100.0
			#20	229.36	99.7
			#40	230.78	96.9
			#60	237.26	83.9
			#100	241.02	76.4
			#200	245.51	67.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 40.42
Dry weight and tare = 40.21
Tare weight = 28.28
Hygroscopic moisture = 1.8%
Table of composite correction values:

Temp., deg. C:	20.8	21.2
Comp. corr.:	-5.0	-5.0

Meniscus correction only = 0.5
Specific gravity of solids = 2.7
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.1	18.5	13.5	0.0133	19.0	13.2	0.0340	27.2
4.00	21.1	18.0	13.0	0.0133	18.5	13.3	0.0241	26.2
8.00	21.0	17.5	12.5	0.0133	18.0	13.3	0.0171	25.2
15.00	21.0	17.0	12.0	0.0133	17.5	13.4	0.0126	24.2
30.00	21.0	16.0	11.0	0.0133	16.5	13.6	0.0089	22.1
60.00	20.9	15.5	10.5	0.0133	16.0	13.7	0.0063	21.1
120.00	20.8	15.0	10.0	0.0133	15.5	13.8	0.0045	20.1
240.00	21.2	15.0	10.0	0.0132	15.5	13.8	0.0032	20.1
480.00	21.2	14.5	9.5	0.0132	15.0	13.8	0.0022	19.1
1440.00	21.2	14.0	9.0	0.0132	14.5	13.9	0.0013	18.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	3.1	29.5	32.6	47.1	20.3	67.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0030	0.0375	0.0461	0.0544	0.0643	0.2062	0.2616	0.3161	0.3865

Fineness Modulus
0.37

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Page 1 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

A&B

10100 East Freeway (I-10)
Houston, TX 77029

1. REPORT TO:	**2. INVOICE TO:**
Company: DiSorbo Consulting	Company: DiSorbo Consulting
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702
Contact: Bob Davis	Contact: Accounts Payable
Phone: 512-970-9639	Phone: 713-955-1227
Email: bdavis@disorboconsult.com	Email:
CC:	CC:
CC:	CC:

3. PO# / Q1210301205

4. Turnaround Time- Business Days

☐ 1 Day * ☑ 5 Days
☐ 2 Days * ☐ 7 Days
☐ 3 Days * ☐ Other ____

* Surcharge Applies

Day Zero is the day sample is received. Report due at 5pm on due day.

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Package ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company James Reis, DiSorbo

Sampler's Signature & Date 3-17-21

9. Sample ID & Description	**Lab Use Only**	**10. Sampling** Date	Time	**11.** comp	grab	**12. Matrix** GW	Water	Soil	Sludge	Oil	**13. TOTAL No. of Containers**	**NH3 (<0.03 RL), TOC**	**Salinity**	**Metals Dissolved ICPMS (ug/L)**	**Hg (ug/L)**	**TPH 1005**	**SVOC, SVOC SIM (ug/L)**	**PCBs**	**Pesticides**	**VOC**	**18. Comments**
No. Containers												1	1	1	1	3	5	3	3	3	
14. Containers*												P	P	P	P	VOA	A/G	A/G	A/G	VOA	
15. Preservatives**																					**Water List**
MB - 1 - WAT	01AU	3-17-21	1710		X		X				21	X	X	X	X	X	X	X	X	X	
MB - 1 - ELUT - WATER PART	02AT	↓	1716		↓		X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - 7 - WAT	03AU	↓	0900		↓		X				21	X	X	X	X	X	X	X	X	X	
MB - 9 - ELUT - WATER PART	04AT	↓	1300		↓		X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - EQB - WAT	05AT	↓	1750		↓		X				20	X		X	X	X	X	X	X	X	
MB - TRIP - WAT	06AB	↓	1155		↓		X				2			X	X						
MB-5-ELUT-WAtER PA-	07AT	↓	1645		↓																

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS
James Reis, DiSorbo	3-17-21	19:00		3.17.21	1900	1.6 C

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ______

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other *ZnAcetate*

Temperature: ______
Intact? ☑ Y ☐ N
Initials ______

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

DRAFT

The Chain of Custody is a Legal Document

Page 2 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

10100 East Freeway (I-10)
Houston, TX 77029

1. REPORT TO:
Company: DiSorbo Consulting
Address: 8501 N. MoPac, Ste. 300
Austin, TX 78759
Contact: Bob Davis
Phone: 512-970-9639
Email: bdavis@disorboconsult.com
CC:
CC:

2. INVOICE TO:
Company: DiSorbo Consulting
Address: 1010 Travis St., Ste 916
Houston, TX 77702
Contact: Accounts Payable
Phone: 713-955-1227
Email:
CC:
CC:

3. PO# / Q210301205

4. Turnaround Time- Business Days
☐ 1 Day * ☑ 5 Days
☐ 2 Days * ☐ 7 Days
☐ 3 Days * ☐ Other ____
* Surcharge Applies

Day Zero is the day sample is received. Report due at 5pm on due day.

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company James Reis, DiSorbo

Sampler's Signature & Date 3.17.21

													1	1	4					No. Containers
													G	G	G					14. Containers*
													C	C	C					15. Preservatives**
9. Sample ID & Description	Lab Use Only	10. Sampling Date	Time	11. comp	grab	12. Matrix GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub	%Moisture, Particle Size_Sub	%Moisture, NH3 (<0.1 RL), Hg, Metals ICPMS, Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg)	VOCs	RCI			Soil List 18. Comments
~~MB - 1 - SED~~ QR								X				6	X	X	X	X	X			
MB - 7 - SED	06AF	3-17-21	11:50	X				X				6	X	X	X	X	X			
MB - 9 - SED	09AF	3-17-21	15:20	X				X				6	X	X	X	X	X			
~~MB - 1 - ELUT - SED PART~~ QR								X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
MB - 9 - ELUT - SED PART	10AF	3-17-21	15:20	X				X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
James Reis, DiSorbo	3.17.21	19:00		3.17.21	1900	1.6 °C 10CM/3

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ________

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature: ____
Intact? ☑ Y ☐ N
Initials ________

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

The Chain of Custody is a Legal Document

Page 2 of 2

10100 East Freeway (I-10)
Houston, TX 77029

Job ID:~~21031410~~ TA 3/19/21
21031513

A

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	4. Turnaround Time- Business Days
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days ☐ 3 Days * ☐ Other ___
Contact: Bob Davis	Contact: Accounts Payable	* Surcharge Applies
Phone: 512-970-9639	Phone: 713-955-1227	
Email: bdavis@disorboconsult.com	Email:	***Day Zero is the day sample is received. Report due at 5pm on due day.***
CC:	CC:	
CC:	CC:	

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company **Sampler's Signature & Date**

													No. Containers	1	1	4			
													14. Containers*	G	G	G			
													15. Preservatives**	C	C	C			
9. Sample ID & Description AA 3/19/21	Lab Use Only	**10. Sampling** Date	Time	**11.** comp	grab	**12. Matrix** GW	Water	Soil	Sludge	Oil	other	**13. TOTAL No. of Containers**	TOC_Sub A	%Moisture, Particle Size_Sub P	%Moisture, NH3 (0.1 RL), Hg, Metals ICPMS Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg) CHEF	VOCs	RCI	Soil List	**18. Comments**
11AF MB - 1 - SED	01AF	03/16/21	1210					X				6	X	X	X	X	X		
12AF MB - 1 - ELUT - SED PART	02AF		1210					X				6	X	X	X	X			Lab to composite ELUT WTR and ELUT SED
13AF MB - 5 - SED	03AF		1530					X				6	X	X	X	X			
14AF MB - 5 - ELUT - SED PART	04AF	↓	1530					X				6	X	X	X	X			Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS.
	03/16	1715		3-16-21	1715	
						4/C IR00130

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ______

Preservatives C- Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature: ___ K191
Intact? ☑ Y ☐ N
Initials ______

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

DRAFT

Sample Condition Checklist

A&B JobID : **21031513**	Date Received : **03/17/2021**	Time Received : **7:00PM**
Client Name : **DiSorbo Consulting LLC**		
Temperature : **1.6**	Sample pH : **<2 nh3, hg**	
Thermometer ID : **102002320**	pH Paper ID : **81548**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler seal present and signed.**		X	
2.	**Sample(s) in a cooler.**	X		
3.	**If yes, ice in cooler.**	X		
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If no comment).**	X		
8.	**Matrix :** **Water** ☐ **Soil** ☐ **Liquid** ☐ **Sludge** ☐ **Solid** ☐ **Cassette** ☐ **Tube** ☐ **Bulk** ☐ **Badge** ☐ **Food** ☐ **Other** ☐			
9.	**Sample(s) were received in appropriate container(s).**	X		
10.	**Sample(s) were received with proper preservative**	X		
11.	**All samples were logged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's**		X	
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received within the hold time.**	X		
16.	**VOA vials completely filled.**	X		
17.	**Sample accepted.**	X		
18	**Has client been contacted about sub-out**	X		

Comments : Include actions taken to resolve discrepancies/problem:

07= 'MB-4-ELUT-WATERPORT as sx ID. -VH 03-19-21

Received by : JMontemayor

Check in by/date : VHernandez / 03/18/2021

Laboratory Analysis Report

Total Number of Pages: 29

Job ID : 21031513

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

---

Client Project Name :
Cedar Port Pre-Dredge Sampling

Report To :

Client Name: DiSorbo Consulting LLC
Attn: Bob Davis
Client Address: 8501 N. MoPac Expressway, Ste. 30
City, State, Zip: Austin, Texas, 78759

P.O.#.:
Sample Collected By: James Reis
Date Collected: 03/16/21 - 03/17/21

Client Sample ID	**Matrix**	**A&B Sample ID**
MB-7-SED	Soil	21031513.08
MB-9-SED	Soil	21031513.09
MB-1-SED	Soil	21031513.11
MB-5-SED	Soil	21031513.13

This analysis was subcontracted to :
Ana Lab, 2600 Dudley
Kilgore, Texas, 75662

Shantall Carpenter

Released By: Shantall Carpenter
Title: Senior Project Manager

Date: 04/19/2021

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

ab-q210-0321

Date Received : 03/16/2021 17:15

2600 Dudley Rd. Kilgore, Texas 75662
R: 3306 State Highway 135 N, Kilgore, TX 75662
*Office: 903-984-0551 * Fax: 903-984-5914*

ANA-LAB
Testing the Limits of Science and Service

Project
959316

Printed 04/06/2021 14:23

ABL2-G

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

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Email: projectmanger@ana-lab.com

ABL2-G

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Project
959316

Printed: 04/06/2021

RESULTS

Sample Results

1973820 **MB-7-SED**

Received: 03/30/2021

Solid & Chemical Materials *Collected by:* Client A & B Labs *PO:* 45151/21031513
Taken: 03/17/2021 11:50:00

SM2540 G-1997 /MOD *Prepared:* *945096* *03/31/2021* *07:45:00* *Analyzed* *945096* *03/31/2021* *07:45:00* *TH2*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**75.1**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared:* *945077* *04/01/2021* *07:30:00* *Analyzed* *945077* *04/01/2021* *07:30:00* *ESG*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**3090 ***	**mg/kg**	266			01

* Dry Weight Basis

1973821 **MB-9-SED**

Received: 03/30/2021

Solid & Chemical Materials *Collected by:* Client A & B Labs *PO:* 45151/21031513
Taken: 03/17/2021 15:20:00

SM2540 G-1997 /MOD *Prepared:* *945096* *03/31/2021* *07:45:00* *Analyzed* *945096* *03/31/2021* *07:45:00* *TH2*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**70.1**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared:* *945340* *04/02/2021* *08:15:00* *Analyzed* *945340* *04/02/2021* *08:15:00* *ESG*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**2280 ***	**mg/kg**	285			01

* Dry Weight Basis

ABL2-G

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Project
959316

Printed: 04/06/2021

1973822 MB-1-SED

Received: 03/30/2021

Solid & Chemical Materials
Collected by: Client A & B Labs
PO: 45151/21031513
Taken: 03/16/2021 12:10:00

SM2540 G-1997 /MOD *Prepared: 945413 04/01/2021 15:40:00 Analyzed 945413 04/01/2021 15:40:00 TH2*

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Total Solids for Dry Wt**	**74.8**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared: 945340 04/02/2021 08:15:00 Analyzed 945340 04/02/2021 08:15:00 ESG*

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Organic Carbon**	**3680 ***	**mg/kg**	267			01

* Dry Weight Basis

1973823 MB-5-SED

Received: 03/30/2021

Solid & Chemical Materials
Collected by: Client A & B Labs
PO: 45151/21031513
Taken: 03/16/2021 15:30:00

SM2540 G-1997 /MOD *Prepared: 945752 04/05/2021 15:25:00 Analyzed 945752 04/05/2021 15:25:00 TH2*

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Total Solids for Dry Wt**	**66.1**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared: 945340 04/02/2021 08:15:00 Analyzed 945340 04/02/2021 08:15:00 ESG*

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Organic Carbon**	**8760 ***	**mg/kg**	303			01

* Dry Weight Basis

Sample Preparation

1973820 MB-7-SED

Received: 03/30/2021

45151/21031513

03/17/2021

ABL2-G

A & B Labs
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Suite 100
Houston, TX 77029

Project
959316

Printed: 04/06/2021

1973820 **MB-7-SED**

Received: 03/30/2021
45151/21031513

03/17/2021

		Prepared:		*03/31/2021*	*13:01:24*	*Calculated*		*03/31/2021*	*13:01:24*	*CAL*
z	**Environmental Fee (per Project)**	**Verified**								
	Calculation	*Prepared:*		*04/01/2021*	*13:59:13*	*Calculated*		*04/01/2021*	*13:59:13*	*CAL*
	As Received to Dry Weight Basis	**Calculated**								
	SM 2540 G-1997	*Prepared:*	*944622*	*03/31/2021*	*07:45:00*	*Analyzed*	*944622*	*03/31/2021*	*07:45:00*	*TH2*
NELAC	**Total Solids Start Code**	**Started**								

1973821 **MB-9-SED**

Received: 03/30/2021
45151/21031513

03/17/2021

	Calculation	*Prepared:*		*04/02/2021*	*11:46:17*	*Calculated*		*04/02/2021*	*11:46:17*	*CAL*
	As Received to Dry Weight Basis	**Calculated**								
	SM 2540 G-1997	*Prepared:*	*944622*	*03/31/2021*	*07:45:00*	*Analyzed*	*944622*	*03/31/2021*	*07:45:00*	*TH2*
NELAC	**Total Solids Start Code**	**Started**								

1973822 **MB-1-SED**

Received: 03/30/2021
45151/21031513

03/16/2021

1

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Project
959316

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Printed: 04/06/2021

1973822 **MB-1-SED** *Received:* 03/30/2021

45151/21031513

03/16/2021

Calculation *Prepared:* *04/02/2021* *15:46:34* *Calculated* *04/02/2021* *15:46:34* *CAL*

As Received to Dry Weight Basis **Calculated**

SM 2540 G-1997 *Prepared:* *945168* *04/01/2021* *15:40:00* *Analyzed* *945168* *04/01/2021* *15:40:00* *TH2*

NELAC **Total Solids Start Code** **Started**

1973823 **MB-5-SED** *Received:* 03/30/2021

45151/21031513

03/16/2021

Calculation *Prepared:* *04/06/2021* *14:22:18* *Calculated* *04/06/2021* *14:22:18* *CAL*

As Received to Dry Weight Basis **Calculated**

SM 2540 G-1997 *Prepared:* *945666* *04/05/2021* *15:25:00* *Analyzed* *945666* *04/05/2021* *15:25:00* *TH2*

NELAC **Total Solids Start Code** **Started**

1

ABL2-G

Project
959316

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Printed: 04/06/2021

Qualifiers:

We report results on an As Received or wet basis unless marked Dry Weight. Unless otherwise noted, testing was performed at Ana-labs corporate laboratory that holds the following Federal and State certificates: EPA Lab Number TX00063, US Department of Agriculture Soil Import Permit P330-18-00178, Texas Commission on Environmental Quality Commercial Drinking Water Lab Approval (Lab ID: TX219), Texas Commission on Environmental Quality NELAP T104704201-21-18, Louisiana Department of Environmental Quality Laboratory Certification (NELAP, LELAP) #02008, Louisiana Department of Health Drinking Water Certificate No LA026, Oklahoma Department of Environmental Quality TNI Laboratory Accreditation Program Certificate No. 2020-097, Arkansas Department of Environmental Quality Certification #18-068-0. The Accredited column designates accreditation by N -- NELAC, or z -- not covered under NELAC scope of accreditation.

These analytical results relate to the sample tested. This report may NOT be reproduced EXCEPT in FULL without written approval of Ana-Lab Corp. Unless otherwise specified, these test results meet the requirements of NELAC.
RL is the Reporting Limit (sample specific quantitation limit) and is at or above the Method Detection Limit (MDL). CAS is Chemical Abstract Service number. RL is our Reporting Limit, or Minimum Quantitation Level. The RL takes into account the Instrument Detection Limit (IDL), Method Detection Limit (MDL), and Practical Quantitation Limit (PQL), and any dilutions and/or concentrations performed during sample preparation (EQL). Our analytical result must be above this RL before we report a value in the 'Results' column of our report (without a 'J' flag). Otherwise, we report ND (Not Detected above RL), because the result is "<" (less than) the number in the RL column. MAL is Minimum Analytical Level and is typically from regulatory agencies. Unless we report a result in the result column, or interferences prevent it, we work to have our RL at or below the MAL.

Bill Peery

Bill Peery, MS, VP Technical Services

1
2

ABL2-G

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Project
959316

Printed: 04/06/2021

RESULTS

Sample Results

1973820 **MB-7-SED** *Received:* 03/30/2021

Solid & Chemical Materials *Collected by:* Client A & B Labs *PO:* 45151/21031513
Taken: 03/17/2021 11:50:00

SM2540 G-1997 /MOD *Prepared:* *945096* *03/31/2021* *07:45:00* *Analyzed* *945096* *03/31/2021* *07:45:00* *TH2*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**75.1**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared:* *945077* *04/01/2021* *07:30:00* *Analyzed* *945077* *04/01/2021* *07:30:00* *ESG*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**3090 ***	**mg/kg**	266			01

* Dry Weight Basis

Sample Preparation for Sample 1973820

1973820 **MB-7-SED** *Received:* 03/30/2021

45151/21031513

03/17/2021

Prepared: *03/31/2021* *13:01:24* *Calculated* *03/31/2021* *13:01:24* *CAL*

z	**Environmental Fee (per Project)**	**Verified**

Calculation *Prepared:* *04/01/2021* *13:59:13* *Calculated* *04/01/2021* *13:59:13* *CAL*

As Received to Dry Weight Basis	**Calculated**

SM 2540 G-1997 *Prepared:* *944622* *03/31/2021* *07:45:00* *Analyzed* *944622* *03/31/2021* *07:45:00* *TH2*

Report Page 7 of 24

NELAP-accredited #T104704201-21-18

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ABL2-G

Page 2 of 2

Project
959316

A & B Labs
Shantall Carpenter
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Suite 100
Houston, TX 77029

Printed: 04/06/2021

1973820 **MB-7-SED**

Received: 03/30/2021

45151/21031513

03/17/2021

SM 2540 G-1997 *Prepared:* *944622* *03/31/2021* *07:45:00* *Analyzed* *944622* *03/31/2021* *07:45:00* *TH2*

NELAC	**Total Solids Start Code**	**Started**

Qualifiers:

We report results on an As Received or wet basis unless marked Dry Weight. Unless otherwise noted, testing was performed at Ana-labs corporate laboratory that holds the following Federal and State certificates: EPA Lab Number TX00063, US Department of Agriculture Soil Import Permit P330-18-00178, Texas Commission on Environmental Quality Commercial Drinking Water Lab Approval (Lab ID: TX219), Texas Commission on Environmental Quality NELAP T104704201-21-18, Louisiana Department of Environmental Quality Laboratory Certification (NELAP, LELAP) #02008, Louisiana Department of Health Drinking Water Certificate No LA026, Oklahoma Department of Environmental Quality TNI Laboratory Accreditation Program Certificate No. 2020-097, Arkansas Department of Environmental Quality Certification #18-068-0. The Accredited column designates accreditation by N -- NELAC, or z -- not covered under NELAC scope of accreditation.

These analytical results relate to the sample tested. This report may NOT be reproduced EXCEPT in FULL without written approval of Ana-Lab Corp. Unless otherwise specified, these test results meet the requirements of NELAC.
RL is the Reporting Limit (sample specific quantitation limit) and is at or above the Method Detection Limit (MDL). CAS is Chemical Abstract Service number. RL is our Reporting Limit, or Minimum Quantitation Level. The RL takes into account the Instrument Detection Limit (IDL), Method Detection Limit (MDL), and Practical Quantitation Limit (PQL), and any dilutions and/or concentrations performed during sample preparation (EQL). Our analytical result must be above this RL before we report a value in the 'Results' column of our report (without a 'J' flag). Otherwise, we report ND (Not Detected above RL), because the result is "<" (less than) the number in the RL column. MAL is Minimum Analytical Level and is typically from regulatory agencies. Unless we report a result in the result column, or interferences prevent it, we work to have our RL at or below the MAL.

Bill Peery

Bill Peery, MS, VP Technical Services

2600 Dudley Rd. Kilgore, Texas 75662
R: 3306 State Highway 135 N, Kilgore, TX 75662
*Office: 903-984-0551 * Fax: 903-984-5914*

ANALAB
Testing the Limits of Science and Service

1
2
3

ABL2-G

A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Project
959316

Printed: 04/06/2021

RESULTS

Sample Results

1973821 **MB-9-SED** *Received:* 03/30/2021

Solid & Chemical Materials *Collected by:* Client A & B Labs *PO:* 45151/21031513

Taken: 03/17/2021 15:20:00

SM2540 G-1997 /MOD *Prepared:* *945096* *03/31/2021* *07:45:00* *Analyzed* *945096* *03/31/2021* *07:45:00* *TH2*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**70.1**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared:* *945340* *04/02/2021* *08:15:00* *Analyzed* *945340* *04/02/2021* *08:15:00* *ESG*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**2280 ***	**mg/kg**	285			01

* Dry Weight Basis

Sample Preparation for Sample 1973821

1973821 **MB-9-SED** *Received:* 03/30/2021

45151/21031513

03/17/2021

Calculation *Prepared:* *04/02/2021* *11:46:17* *Calculated* *04/02/2021* *11:46:17* *CAL*

	As Received to Dry Weight Basis	**Calculated**

SM 2540 G-1997 *Prepared:* *944622* *03/31/2021* *07:45:00* *Analyzed* *944622* *03/31/2021* *07:45:00* *TH2*

NELAC	**Total Solids Start Code**	**Started**

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Bill Peery

Bill Peery, MS, VP Technical Services

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RESULTS

Sample Results

1973822 **MB-1-SED** *Received:* 03/30/2021

Solid & Chemical Materials *Collected by:* Client A & B Labs *PO:* 45151/21031513

Taken: 03/16/2021 12:10:00

SM2540 G-1997 /MOD *Prepared:* *945413* *04/01/2021* *15:40:00* *Analyzed* *945413* *04/01/2021* *15:40:00* *TH2*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**74.8**	**%**	0.010			01

*Walkley-Black *MOD* *Prepared:* *945340* *04/02/2021* *08:15:00* *Analyzed* *945340* *04/02/2021* *08:15:00* *ESG*

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**3680 ***	**mg/kg**	267			01

* Dry Weight Basis

Sample Preparation for Sample 1973822

1973822 **MB-1-SED** *Received:* 03/30/2021

45151/21031513

03/16/2021

Calculation *Prepared:* *04/02/2021* *15:46:34* *Calculated* *04/02/2021* *15:46:34* *CAL*

	As Received to Dry Weight Basis	**Calculated**

SM 2540 G-1997 *Prepared:* *945168* *04/01/2021* *15:40:00* *Analyzed* *945168* *04/01/2021* *15:40:00* *TH2*

NELAC	**Total Solids Start Code**	**Started**

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Bill Peery

Bill Peery, MS, VP Technical Services

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RESULTS

Sample Results

1973823 **MB-5-SED**

Solid & Chemical Materials	*Collected by:* Client	A & B Labs	*PO:* 45151/21031513	*Received:*	03/30/2021
	Taken: 03/16/2021	15:30:00			

SM2540 G-1997 /MOD — *Prepared:* 945752 04/05/2021 15:25:00 — *Analyzed* 945752 04/05/2021 15:25:00 TH2

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Total Solids for Dry Wt**	**66.1**	**%**	0.010			01

*Walkley-Black *MOD* — *Prepared:* 945340 04/02/2021 08:15:00 — *Analyzed* 945340 04/02/2021 08:15:00 ESG

	Parameter	*Results*	*Units*	*RL*	*Flags*	*CAS*	*Bottle*
NELAC	**Organic Carbon**	**8760 ***	**mg/kg**	303			01

* Dry Weight Basis

Sample Preparation for Sample 1973823

1973823 **MB-5-SED** — *Received:* 03/30/2021

45151/21031513

03/16/2021

Calculation — *Prepared:* 04/06/2021 14:22:18 — *Calculated* 04/06/2021 14:22:18 CAL

As Received to Dry Weight Basis	**Calculated**

SM 2540 G-1997 — *Prepared:* 945666 04/05/2021 15:25:00 — *Analyzed* 945666 04/05/2021 15:25:00 TH2

NELAC	**Total Solids Start Code**	**Started**

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Bill Peery

Bill Peery, MS, VP Technical Services

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R: 3306 State Highway 135 N, Kilgore, TX 75662
*Office: 903-984-0551 * Fax: 903-984-5914*

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CAS	Parameter	Results	MDL	SDL	MQL	MQLAdj	Flag	Units	Target	Bottle	Dilute
Solid & Chemical Materials	Gravimetrics								SM2540 G-1997 /MOD		
1973820	MB-7-SED										
		Collection:	03/17/2021		11:50:00	Client			*Received:*	03/30/2021	
Prepared:	*945096*										
				Analyzed:		*945096*	3/31/21		07:45:00		
	Total Solids for Dry Wt	**75.1**	0.010	0.010	0.010	0.010		**%**		01	1.00
1973821	MB-9-SED										
		Collection:	03/17/2021		15:20:00	Client			*Received:*	03/30/2021	
Prepared:	*945096*										
				Analyzed:		*945096*	3/31/21		07:45:00		
	Total Solids for Dry Wt	**70.1**	0.010	0.010	0.010	0.010		**%**		01	1.00
1973822	MB-1-SED										
		Collection:	03/16/2021		12:10:00	Client			*Received:*	03/30/2021	
Prepared:	*945413*										
				Analyzed:		*945413*	4/1/21		15:40:00		
	Total Solids for Dry Wt	**74.8**	0.010	0.010	0.010	0.010		**%**		01	1.00
1973823	MB-5-SED										

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Solid & Chemical Materials Gravimetrics SM2540 G-1997 /MOD

Collection: 03/16/2021 15:30:00 Client *Received:* 03/30/2021

Prepared: *945752*

Analyzed: *945752* 4/5/21 15:25:00

CAS	Parameter	Results	MDL	SDL	MQL	MQLAdj	Flag	Units	Target	Bottle	Dilute
	Total Solids for Dry Wt	**66.1** **Dup: 65.2** **Mean: 65.65**	0.010	0.010	0.010	0.010		**%**		01	1.00

MDL is Method Detection Limit (40 CFR 136 Appendix B)

SDL is Sample Detection Limit and is the adjusted MDL (sample specific dilutions, dry weight)

MQL is the Method Quantitation Limit and corresponds to a low standard

MQLADJ is the Adjusted Method Quantitation Limit (dilutions, dry weight)

Qualifiers:

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Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Bill Peery

Bill Peery, MS, VP Technical Services

Email: projectmanger@ana-lab.com

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CAS	*Parameter*	*Results*	*MDL*	*SDL*	*MQL*	*MQLAdj*	*Flag*	*Units*	*Target*	*Bottle*	*Dilute*
Solid & Chemical Materials	Wet Bench								Walkley-Black *MOD		
1973820	MB-7-SED										
		Collection:	03/17/2021		11:50:00	Client			*Received:*	03/30/2021	
Prepared:	*945077*										
				Analyzed:		*945077*	4/1/21		07:30:00		
	Organic Carbon	**3090 ***	200	266	200	266		**mg/kg**		01	1.00
** Dry Weight Basis*											
1973821	MB-9-SED										
		Collection:	03/17/2021		15:20:00	Client			*Received:*	03/30/2021	
Prepared:	*945340*										
				Analyzed:		*945340*	4/2/21		08:15:00		
	Organic Carbon	**2280 ***	200	285	200	285		**mg/kg**		01	1.00
** Dry Weight Basis*											
1973822	MB-1-SED										
		Collection:	03/16/2021		12:10:00	Client			*Received:*	03/30/2021	
Prepared:	*945340*										
				Analyzed:		*945340*	4/2/21		08:15:00		
	Organic Carbon	**3680 ***	200	267	200	267		**mg/kg**		01	1.00
** Dry Weight Basis*											

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CAS	Parameter	Results	MDL	SDL	MQL	MQLAdj	Flag	Units	Target	Bottle	Dilute
Solid & Chemical Materials	Wet Bench								Walkley-Black *MOD		
1973823	MB-5-SED										
		Collection:	03/16/2021		15:30:00	Client			*Received:*	03/30/2021	
Prepared:	*945340*										
				Analyzed:	*945340*		4/2/21		08:15:00		
	Organic Carbon	**8760 ***	200	303	200	303		**mg/kg**		01	1.00
** Dry Weight Basis*											

MDL is Method Detection Limit (40 CFR 136 Appendix B)

SDL is Sample Detection Limit and is the adjusted MDL (sample specific dilutions, dry weight)

MQL is the Method Quantitation Limit and corresponds to a low standard

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A & B Labs
Shantall Carpenter
10100 East Freeway
Suite 100
Houston, TX 77029

Bill Peery

Bill Peery, MS, VP Technical Services

Email: projectmanger@ana-lab.com

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Analytical Set 945096 SM2540 G-1997 /MOD

ControlBlk

Parameter	*PrepSet*	*Reading*	*MDL*	*MQL*	*Units*	*File*
Total Solids for Dry Wt	945096	0.0003			grams	122163592

Duplicate

Parameter	*Sample*	*Result*	*Unknown*	*Unit*	*RPD*	*Limit%*
Total Solids for Dry Wt	1973463	81.7	84.6	%	3.49	20.0
Total Solids for Dry Wt	1973686	3.60	3.57	%	0.837	20.0
Total Solids for Dry Wt	1973768	0.795	0.808	%	1.62	20.0

Analytical Set 945413 SM2540 G-1997 /MOD

ControlBlk

Parameter	*PrepSet*	*Reading*	*MDL*	*MQL*	*Units*	*File*
Total Solids for Dry Wt	945413	0			grams	122169079

Duplicate

Parameter	*Sample*	*Result*	*Unknown*	*Unit*	*RPD*	*Limit%*
Total Solids for Dry Wt	1974169	99.9	99.9	%	0	20.0
Total Solids for Dry Wt	1974188	0.570	0.566	%	0.704	20.0

Analytical Set 945752 SM2540 G-1997 /MOD

ControlBlk

Parameter	*PrepSet*	*Reading*	*MDL*	*MQL*	*Units*	*File*
Total Solids for Dry Wt	945752	0.0003			grams	122175696

Duplicate

Parameter	*Sample*	*Result*	*Unknown*	*Unit*	*RPD*	*Limit%*
Total Solids for Dry Wt	1973823	65.2	66.1	%	1.37	20.0
Total Solids for Dry Wt	1974768	72.0	70.8	%	1.68	20.0

Analytical Set 945077 Walkley-Black *MOD

Blank

Parameter	*PrepSet*	*Reading*	*MDL*	*MQL*	*Units*	*File*
Organic Carbon	945077	ND	200	200	mg/kg	122163330

LCS Dup

Parameter	*PrepSet*	*LCS*	*LCSD*	*Known*	*Limits%*	*LCS%*	*LCSD%*	*Units*	*RPD*	*Limit%*
Organic Carbon	945077	323	314	300	85.0 - 115	108	105	mg/kg	2.83	20.0

MSD

Parameter	*Sample*	*MS*	*MSD*	*UNK*	*Known*	*Limits*	*MS%*	*MSD%*	*Units*	*RPD*	*Limit%*
Organic Carbon	1973694	13100	14300	1850	10500	70.0 - 130	110	122	mg/kg	10.1	20.0

Analytical Set 945340 Walkley-Black *MOD

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Blank

Parameter	*PrepSet*	*Reading*	*MDL*	*MQL*	*Units*	*File*
Organic Carbon	945340	ND	200	200	mg/kg	122167844

LCS Dup

Parameter	*PrepSet*	*LCS*	*LCSD*	*Known*	*Limits%*	*LCS%*	*LCSD%*	*Units*	*RPD*	*Limit%*
Organic Carbon	945340	310	314	300	85.0 - 115	103	105	mg/kg	1.28	20.0

MSD

Parameter	*Sample*	*MS*	*MSD*	*UNK*	*Known*	*Limits*	*MS%*	*MSD%*	*Units*	*RPD*	*Limit%*
Organic Carbon	1973821	12000	12100	1600	9520	70.0 - 130	113	114	mg/kg	0.957	20.0

* Out RPD is Relative Percent Difference: abs(r1-r2) / mean(r1,r2) * 100%

Recover% is Recovery Percent: result / known * 100%

Blank - Method Blank

Subcontract Laboratory Chain-of-Custody

A & B Labs
10100 East Freeway
Suite 100
Houston, TX 77029
713-453-6060
713-453-6091 fax
info@ablabs.com

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Company: Ana-Labs
Address: 2600 Dudley Road
City: Kilgore, TX 75663
Contact: Skeeter Ludwig
Phone: 903-984-0551
Email: skeeter@ana-lab.com

Report To:
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Address: 10100 East Frwy Suite 100
Houston, TX 77029
Contact: Shantall Carpenter/Alisha Hughes
Phone: 713-453-6060 xt 127
Email: alishar@ablabs.com
CC: scarpenter@ablabs.com

Turnaround Time:
STD: X

PO# 45151 / 21031513

PLEASE EMAIL INVOICE TO: ACCOUNTSPAYABLE@ABLABS.COM

Special Instructions or Comments:
Please report wet weight.

			Collection												Preservatives
Lab #	Item	Sample ID / Name	Date	Time	Comp	Grab	Matrix	# of Containers	Container Types	TOC					Remarks:
21031513.08	1	MB-7-SED	3/17/2021	11:50		X	Sed	1		X					1973Y20
21031513.09	2	MB-9-SED	3/17/2021	15:20		X	Sed	1		X					1973Y21
21031513.11	3	MB-1-SED	3/16/2021	1210		X	Sed	1		X					1973Y22
21031513.13	4	MB-5-SED	3/16/2021	15:30		X	Sed	1		X					1973Y23
	5														
	6														
	7														
	8														
	9														
	10														
	11														
	12														

Matrix: WW-Wastewater W-Water DW-Drinking Water S-Soil SD-Solid L-Liquid SL-Sludge O-Oil A-Air Bag Can-Air Canister B-OVM Badge T-Tube
Preservatives: C-Cool Ice H-HCl N-Nitric Acid S-Sulfuric Acid OH-NaOH T-Sodium Thiosulfate O- Other (specify)______
Containers: VOA-40 ml vial A-amber 1 liter G-glass 1 liter 4oz or 8oz - 4 8 ounce glass P-Plastic

Relinquished By:	Date:	Time	Received By:	Date	Time
Fed Ex	3/30/21	1225	Fed Ex [illegible] Tarver Ana-Lab	3/30/21	1225

ab-s004-0309

See Attached for
Tracking # and Temp

ORIGIN ID:HBYA (713) 453-6060
ASHLEY ARNETT
A&B ENVIRONMENTAL SERVICES
10100 EAST FWY STE 100

HOUSTON, TX 77029
UNITED STATES US

SHIP DATE: 29MAR21
ACTWGT: 10.00 LB
CAD: 251130614/INET4340

BILL SENDER

TO SAMPLE RECEIVINGSKEETER
ANA-LABS
2600 DUDLEY RD.

KILGORE TX 75663
(903) 984-0551 REF: 15000978
INV:
PO: DEPT:

56DJ2/5E-2F1E4A

FedEx Express

E

J2111210119011e

TUE - 30 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7732 9775 6303

AH GGGA

75663
TX-US SHV

Date 3/30 Time 1235 Tech IG
Temp: 3.5/3.4 C
Therm#: 6443 Corr Fact: -0.1 C

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

The Chain of Custody is a Legal Document

Page 1 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

10100 East Freeway (I-10)
Houston, TX 77029

A&B .

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q1210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	4. Turnaround Time- Business Days
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days
Contact: Bob Davis	Contact: Accounts Payable	☐ 3 Days * ☐ Other ___
Phone: 512-970-9639	Phone: 713-955-1227	* Surcharge Applies
Email: bdavis@disorboconsult.com	Email:	*Day Zero is the day sample is received. Report due at 5pm on due day.*
CC:	CC:	
CC:	CC:	

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Package ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company
James Reis, DiSorbo

Sampler's Signature & Date
3-17-21

9. Sample ID & Description	Lab Use Only	10. Sampling Date	Time	11. comp	grab	12. Matrix GW	Water	Soil	Sludge	Oil	13. TOTAL No. of Containers	NH3 (<0.03 RL), TOC	Salinity	Metals Dissolved ICPMS (ug/L)	Hg (ug/L)	TPH 1005	SVOC, SVOC SIM (ug/L)	PCBs	Pesticides	VOC	18. Comments
No. Containers												1	1	1	1	3	5	3	3	3	
14. Containers*												P	P	P	P	VOA	A/G	A/G	A/G	VOA	
15. Preservatives**																					Water List
MB - 1 - WAT	01AU	3-17-21	1710		X		X				21	X	X	X	X	X	X	X	X	X	
MB - 1 - ELUT - WATER PART	02AT	↓	1716		↓		X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - 7 - WAT	03AU		0900				X				21	X	X	X	X	X	X	X	X	X	
MB - 9 - ELUT - WATER PART	04AT		1300				X				20	X		X	X	X	X	X	X	X	Comp w/SED PART
MB - EQB - WAT	05AT		1750				X				20	X		X	X	X	X	X	X	X	
MB - TRIP - WAT	06AB		1155				X				2			X	X						
MB-5 - ELUT-WATERPA	07AT		1615																		

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS
James Reis, DiSorbo	3-17-21	19:00		3-17-21	1900	16°C [illegible]

* Containers: VOA- 40 ml vial
4 oz/8 oz- glass wide mouth
A/G- Amber/Glass 1 Liter
P/O- Plastic/other ______

Preservatives: C-Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other *ZnAcetate*

Temperature: ______
Intact? ☑ Y ☐ N
Initials ______

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

The Chain of Custody is a Legal Document

Page 2 of 2

Job ID: 21031513

TAT: 5 Days PM: Scarpenter

10100 East Freeway (I-10)
Houston, TX 77029

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	**4. Turnaround Time- Business Days**
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days ☐ 3 Days * ☐ Other ____
Contact: Bob Davis	Contact: Accounts Payable	* Surcharge Applies
Phone: 512-970-9639	Phone: 713-955-1227	*Day Zero is the day sample is received.* *Report due at 5pm on due day.*
Email: bdavis@disorboconsult.com	Email:	
CC:	CC:	
CC:	CC:	

A

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company James Reis, DiSorbo

Sampler's Signature & Date 3.17.21

9. Sample ID & Description	Lab Use Only	10. Sampling Date	10. Sampling Time	11. comp	11. grab	12. Matrix GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub	%Moisture, Particle Size_Sub	%Moisture, NH3 (<0.1 RL), Hg, Metals ICPMS, Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg)	VOCs	RCI			18. Comments
No. Containers													1	1	4					
14. Containers*													G	G	G					
15. Preservatives**													C	C	C					Soil List
~~MB - 1 - SED~~ JR								X				6	X	X	X	X	X			
MB - 7 - SED	08AF	3-17-21	11:50	X				X				6	X	X	X	X	X			
MB - 9 - SED	09AF	3-17-21	15:20	X				X				6	X	X	X	X	X			
~~MB - 1 - ELUT - SED PART~~ JR								X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
MB - 9 - ELUT - SED PART	10AF	3-17-21	15:20	X				X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS:
James Reis, DiSorbo	3-17-21	19:00		3/17/21	1900	
						1.6 °C 10C0/3

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ________

Preservatives: C- Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature: ____
Intact? ☑ Y ☐ N
Initials ________

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

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DRAFT

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Page 2 of 2

Job ID:21031410 ~~21031410~~ TA 3/19/21

21031513

10100 East Freeway (I-10)
Houston, TX 77029

A

1. REPORT TO:	2. INVOICE TO:	3.PO# / Q1210301205
Company: DiSorbo Consulting	Company: DiSorbo Consulting	4. Turnaround Time- Business Days
Address: 8501 N. MoPac, Ste. 300 Austin, TX 78759	Address: 1010 Travis St., Ste 916 Houston, TX 77702	☐ 1 Day * ☑ 5 Days ☐ 2 Days * ☐ 7 Days ☐ 3 Days * ☐ Other ___
Contact: Bob Davis	Contact: Accounts Payable	* Surcharge Applies
Phone: 512-970-9639	Phone: 713-955-1227	
Email: bdavis@disorboconsult.com	Email:	*Day Zero is the day sample is received.*
CC:	CC:	*Report due at 5pm on due day.*
CC:	CC:	

5. Project #

6. Project Name / Location
Cedar Port Pre-Dredge Sampling

7. Reporting Requirement
☐ TRRP Limits ☐ TRRP Rpt. Packag ☐ Std Level II ☑ MDL Report ☐ EDD

8. Sampler's Name & Company

Sampler's Signature & Date

																				No. Containers
													1	1	4					14. Containers*
													G	G	G					15. Preservatives**
													C	C	C					
9. Sample ID & Description AA 3/19/21	Lab Use Only	10. Sampling Date	Time	11. comp	grab	12. Matrix GW	Water	Soil	Sludge	Oil	other	13. TOTAL No. of Containers	TOC_Sub A	%Moisture, Particle Size_Sub P	%Moisture, NH3 (0.1 RL), Hg, Metals ICPMS Pest, PCB (<1 RL), TPH SVOC, SVOC SIM (ug/Kg) ChEF	VOCs	RCI			Soil List 18. Comments
11AF MB - 1 - SED	01AF	03/16/21	1210					X				6	X	X	X	X	X			
12AF MB - 1 - ELUT - SED PART	02AF	↓	1210					X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED
13AF MB - 5 - SED	03AF		1530					X				6	X	X	X	X				
14AF MB - 5 - ELUT - SED PART	04AF		1530					X				6	X	X	X	X				Lab to composite ELUT WTR and ELUT SED

19. RELINQUISHED BY	DATE	TIME	20. RECEIVED BY	DATE	TIME	KNOWN HAZARDS / COMMENTS
Kevin Stills	03/16	1715		3-16-21	1715	
						4°C IR20230

* Containers: VOA- 40 ml vial A/G- Amber/Glass 1 Liter
4 oz/8 oz- glass wide mouth P/O- Plastic/other ______

Preservatives C- Cool H- HCl N- HNO3
S-H2SO4 OH- NaOH T-Na2S2O3 X- Other ZnAcetate

Temperature ______ K101
Intact? ☐ Y ☐ N
Initials ______

BILL OF LADING/TRACKING #

METHOD OF SHIPMENT

A&B CANNOT ACCEPT VERBAL CHANGES. PLEASE FAX WRITTEN CHANGES TO 713-453-6091 OR EMAIL THE NEW COC TO YOUR PROJECT MANAGER.

Samples will be disposed of after 30 days. A&B reserves the right to return samples.

Sample Condition Checklist

A&B JobID : **21031513**
Date Received : **03/17/2021**
Time Received : **7:00PM**
Client Name : **DiSorbo Consulting LLC**
Temperature : **1.6**
Sample pH : **<2 nh3, hg**
Thermometer ID : **102002320**
pH Paper ID : **81548**
Perservative :

	Check Points	Yes	No	N/A
1.	Cooler seal present and signed.		X	
2.	Sample(s) in a cooler.	X		
3.	If yes, ice in cooler.	X		
4.	Sample(s) received with chain-of-custody.	X		
5.	C-O-C signed and dated.	X		
6.	Sample(s) received with signed sample custody seal.		X	
7.	Sample containers arrived intact. (If no comment).	X		
8.	Matrix : Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☐ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	Sample(s) were received in appropriate container(s).	X		
10.	Sample(s) were received with proper preservative	X		
11.	All samples were logged or labeled.	X		
12.	Sample ID labels match C-O-C ID's		X	
13.	Bottle count on C-O-C matches bottles found.	X		
14.	Sample volume is sufficient for analyses requested.	X		
15.	Samples were received within the hold time.	X		
16.	VOA vials completely filled.	X		
17.	Sample accepted.	X		
18	Has client been contacted about sub-out	X		

Comments : Include actions taken to resolve discrepancies/problem:

07= 'MB-4-ELUT-WATERPORT as sx ID. -VH 03-19-21

Received by : JMontemayor

Check in by/date : VHernandez / 03/18/2021