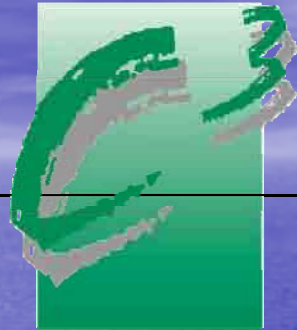


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**Robbie Laird, P.Eng
Manager of Marketing and
Business Development**





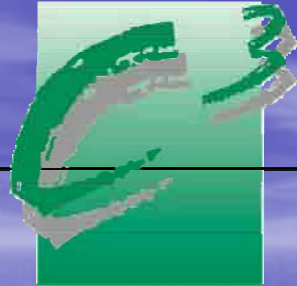
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The Waterloo Barrier[®]

What is it?





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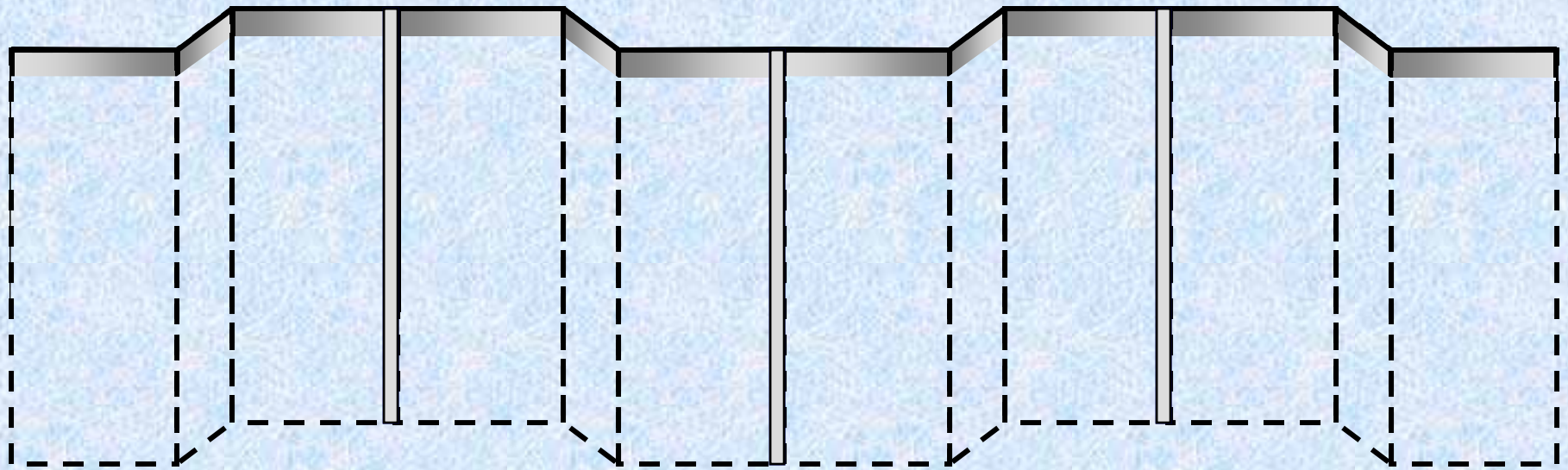
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It is a low permeability steel
sheet piling barrier system,
sealed in place after being
driven

The one that doesn't leak



An Overview



Joint Sealing

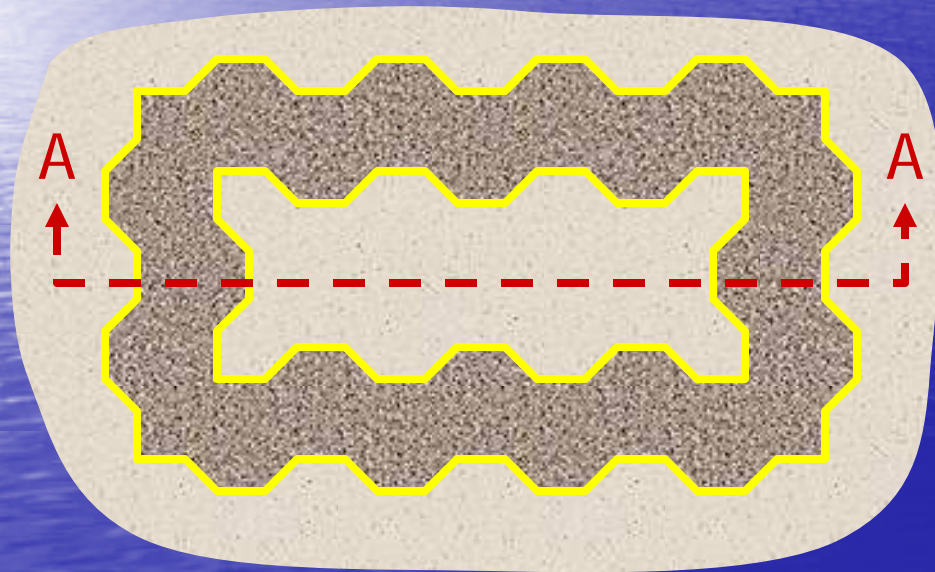
Research and Development

- Controlled release experiments

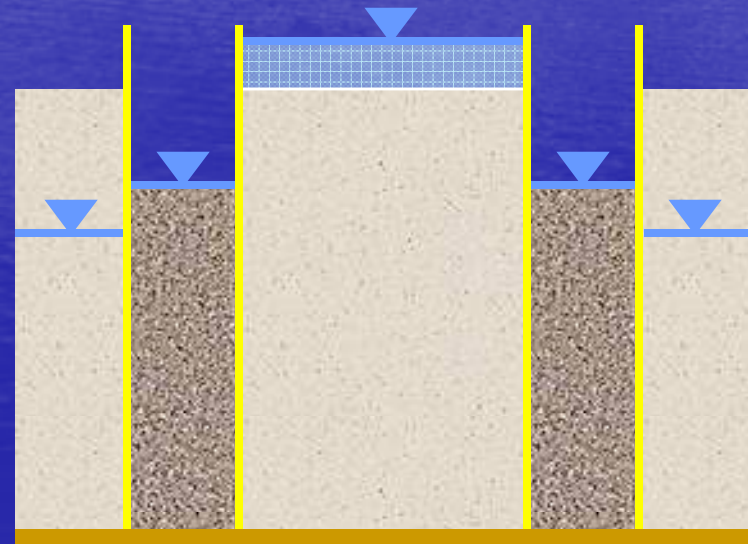


Closed Cell Performance Testing

Test Facility – Internal Sealable Cavity

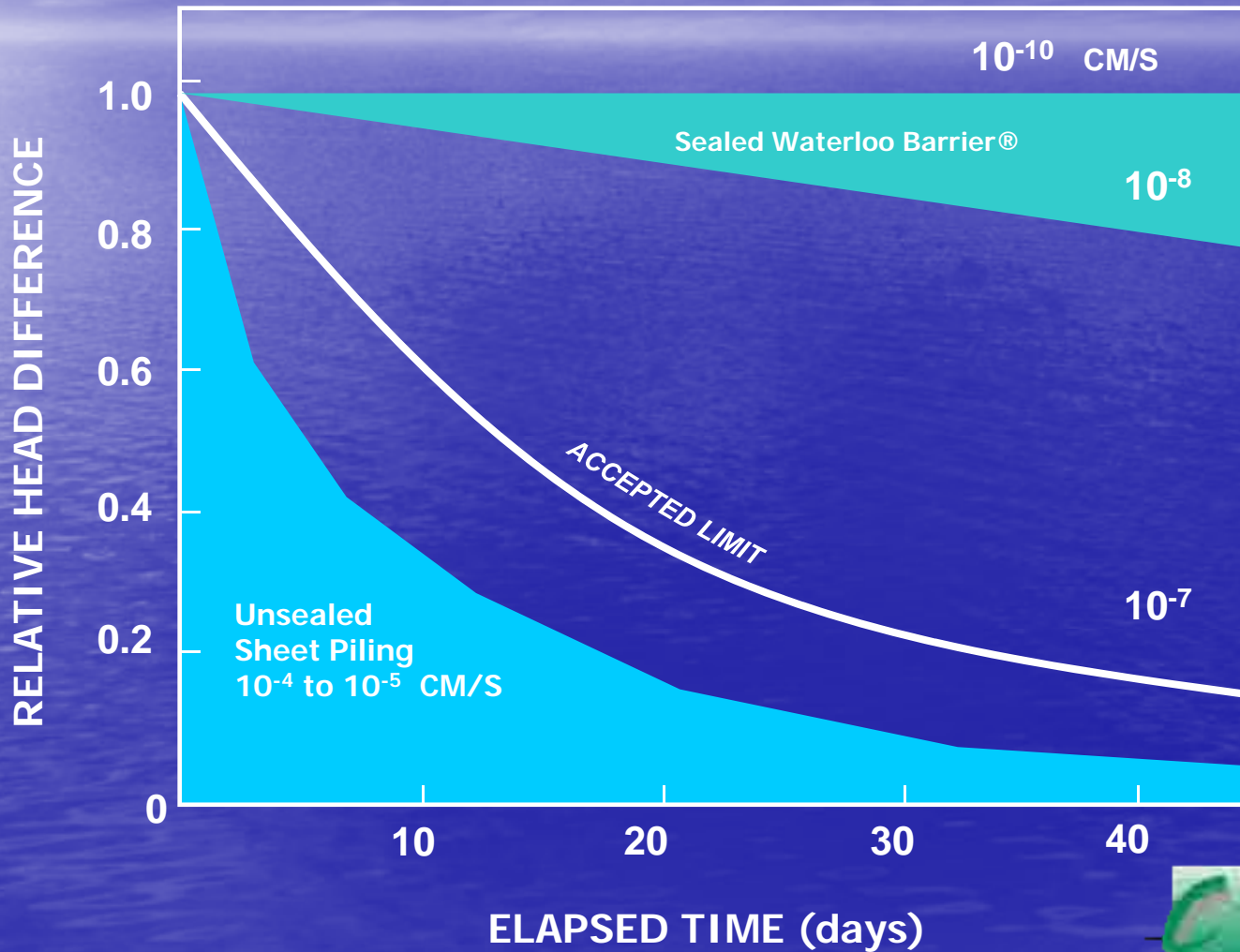


Section A-A





Hydraulic Test Results



The finished product

- **Cold Rolled Lock**
 - QA/QC of fabrication is assured
 - Continuous confined interlock minimizes separation during pile driving
 - Welded angle not constrained during driving, pull apart and cannot be sealed



What Can We Do For You? – Financial Decision Budgets

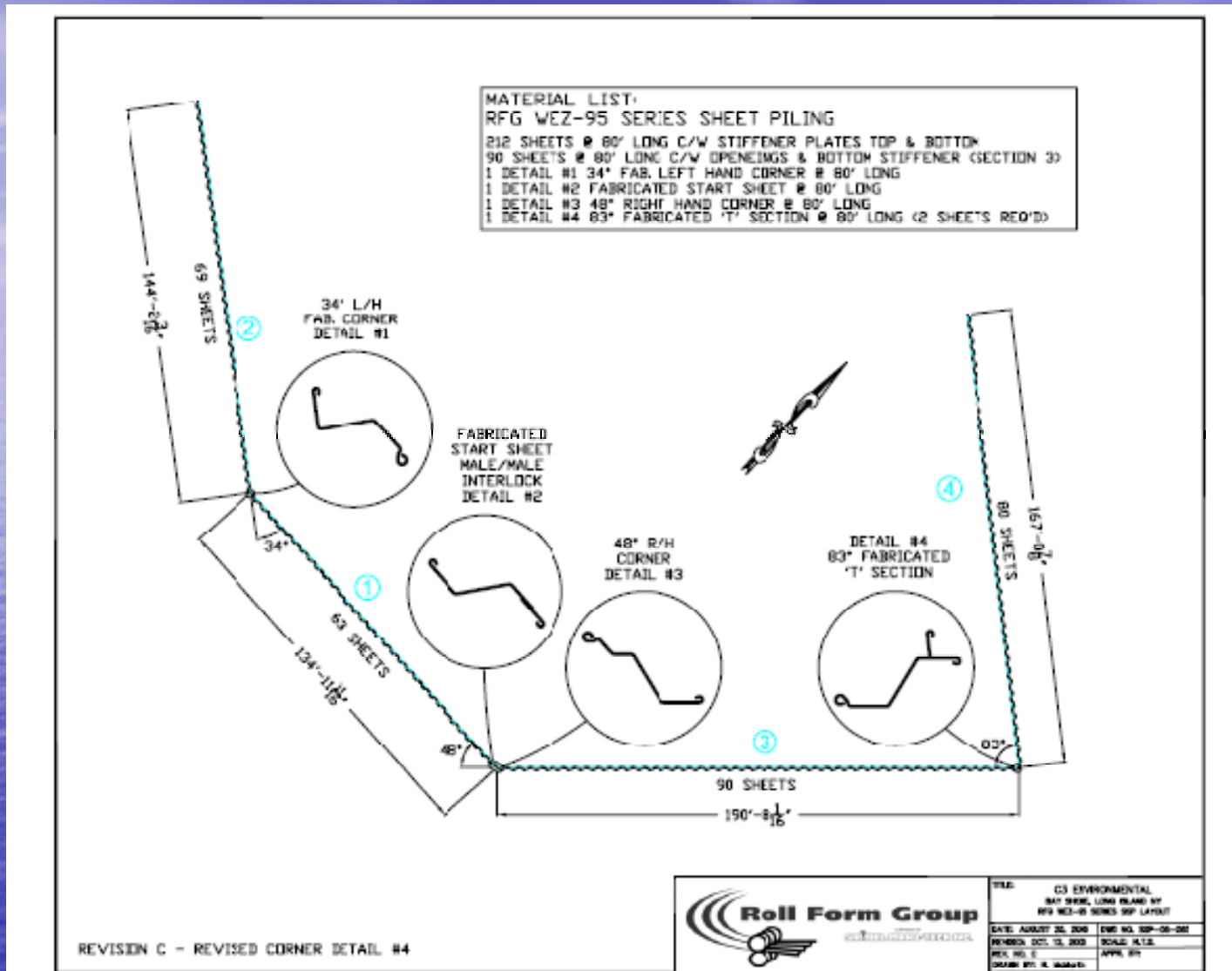
- Consider us a resource, use our experience.
- What is the general location?
- What is the time frame, months, years?
- Concept Site Plan
- Length and Depth of Wall, Corners, Utilities?
- Geological data as it may impact driving?

What Can We Do For You? – Feasibility Study

- Concept Proposal
 - Test drive
- Concept Design
 - Strength calculations, retaining walls, cantilever walls, sea walls
 - Pile cut list
 - CAD layout from the Roll Form Group
- Construction considerations
 - Site Access
 - Wires
 - Utilities and Penetrations
 - Staging Areas



Fully Engineered Detailed Design – CAD Layout



Fully Engineered Detailed Design – Cut List

SHEET PILE INSTALLATION LIST - Bay Shore, Long Island NY

Based on RFG REV E												
SECTION	STATION		LENGTH ft	# OF PILES	PILE #			RIGHT	LEFT	RUNNING DISTANCE	LENGTH ft	AREA sq. ft.
	From	To										
Section 2 West wall	0	4.17	4.17	2	1	TO	2	1	1	4.17	83.00	346
	4.17	14.58	10.42	5	3	TO	7	3	2	14.58	82.00	854
	14.58	25.00	10.42	5	8	TO	12	2	3	25.00	80.00	833
	25.00	37.50	12.50	6	13	TO	18	3	3	37.50	78.00	975
	37.50	47.92	10.42	5	19	TO	23	3	2	47.92	76.00	792
	47.92	58.33	10.42	5	24	TO	28	2	3	47.92	74.00	771
	58.33	68.75	10.42	5	29	TO	33	3	2	58.33	72.00	750
	68.75	81.25	12.50	6	34	TO	39	3	3	70.83	70.00	875
	81.25	108.33	27.08	13	40	TO	52	6	7	97.92	72.00	1950
	108.33	122.92	14.58	7	53	TO	59	4	3	112.50	74.00	1079
corner, 31 deg	122.92	125.00	2.08	1	60	TO	60	0	1	114.58	74.00	154
Section 1, Clinton	125.00	272.92	147.92	71	61	TO	131	32	31	262.50	78.00	11538
Starter section	272.92	275.00	2.08	1	132	TO	132	0	0	264.58	76.00	158
corner, 52 deg	275.00	277.08	2.08	1	133	TO	133	1	0	266.67	74.00	154
Section 3 Windows	277.08	464.58	187.50	80	134	TO	223	45	45	454.17	74.00	13875
corner, 90 deg	464.58	466.67	2.08	1	224	TO	224	0	1	456.25	75.00	156
East	466.67	633.33	166.67	80	225	TO	304	40	40	622.92	75.00	12500
			Sub total	304			Sub total	148	147		Sub Total	47760
Spares, plain				10				5	5		80.00	1667
Spares, holes				10				5	5		80.00	1667
Extra for starter sheet				1				1			80.00	167
Extra for T detail				1					1		80.00	167
											Sub Total	51427
Stiffeners				548							10.00	11417
TOTALS				326				159	158		Incl stiffeners	62844

Pile Section is WEZ95

Lineal Feet per pile at 25" centre to centre 2,083

NOTE: Starter sheet 133, 54 deg corner go both ways.

This list is updated based on PS&S file moving alignment across clifton

Final list will be approved as part of the 95%/100% design process.

SHEET PILE ORDER LIST - NO SPARES

LENGTH FT	# OF PILES	Area SF	Colours
80.00	12	2000.00	RED
78.00	77	12512.50	WHITE
76.00	6	950.00	GREEN
75.00	81	12656.25	YELLOW
74.00	104	16033.33	PURPLE
72.00	18	2700.00	ORANGE
70.00	6	875.00	PINK
Total	304	47,727.08	

Some pile will need extra welded on.



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The Waterloo Barrier®
The QA/QC Process in the Field

Pile Installation QA/QC

- **Footplates**
 - Factory installed or field Installed
 - Determine driving sequence
 - Keeps joints clean during pile driving



Pile Installation QA/QC

- Recording Driving Logs
 - Access database
 - Time, rate, depth
 - Colour coding



Pile Installation QA/QC

- Flushing
 - Grout tube
 - Close to driving
 - Full depth



Pile Installation QA/QC

- Video
 - Optional extra
 - Electronic record



Joint Sealing QA/QC

- Grout Mixing
 - Pre-mixed bags
 - Pre-measured water
 - Fixed mixing time
 - Transfer to holding tank



Joint Sealing QA/QC

- Tremie
 - Fill from the bottom
 - Displaces water and fines
 - Only joint system sealed in place after driving



Joint Sealing QA/QC

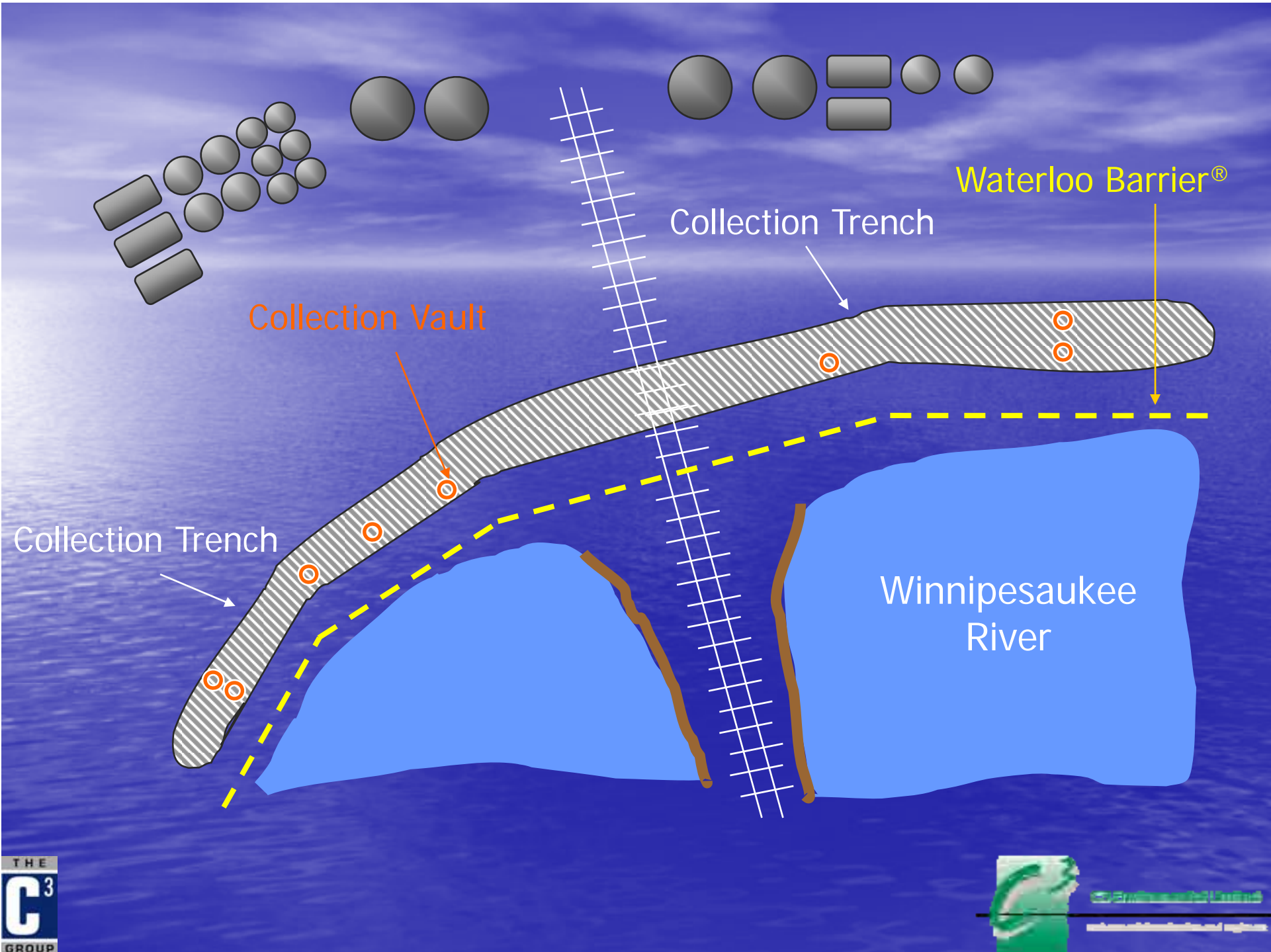
- Joint Grouting



Case Histories

- **Retaining and Cut-off Wall**
 - Former Manufactured Gas Plant in Laconia, NH
 - Served as a structural sea-wall for shoreline improvement
 - Served as cut-off wall to enhance a creosote collection system







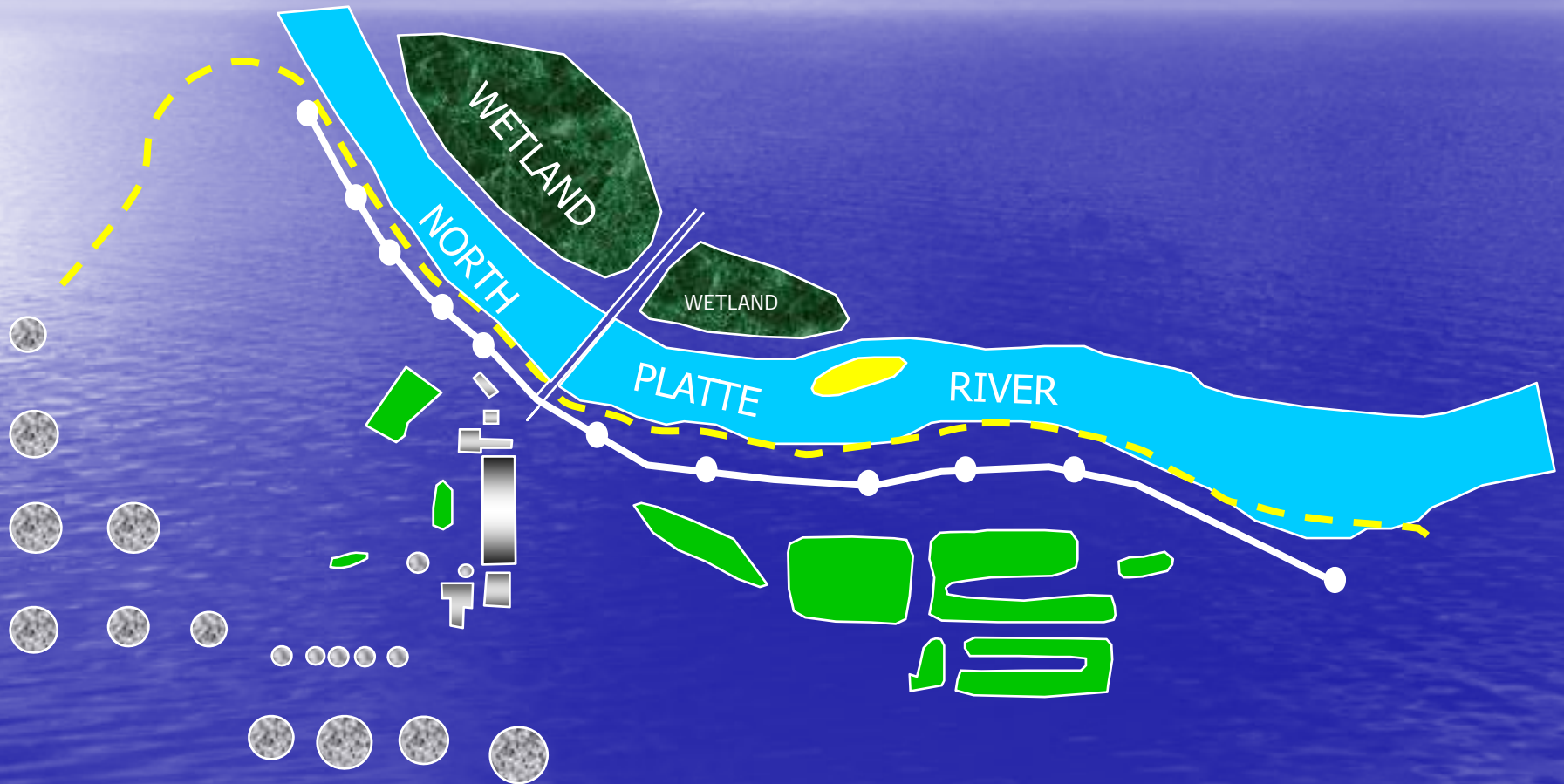


Case Histories

- **Pump and Treat Enhancement**
 - Former refinery in Casper, WY
 - Served as structural retaining wall for shoreline improvement
 - Served as hydraulic barrier to prevent migration of hydrocarbon contaminants
 - Enhanced the pump and treat system and minimize water treatment
 - Cross a bridge and utility lines



FORMER REFINERY PLANT CASPER, WYOMING





Advantages

- Clean rapid installation
- No excavation of contaminated materials
- Clean interface between land and waterways
- Detailed QA/QC program
- Structural strength of wall
- Chemical compatibility of sealants
- Only cut-off barrier on the market with a hydraulic performance warranty, 1×10^{-7} cm/s

