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Soil-Bentonite Cutoff Wall Through Dense Alluvium with Boulders into Bedrock, McCook Reservoir

Tri-Services Infra-Structure Conference

2-4 August 2005

(St. Louis, MO)

William A. Rochford, P.E.

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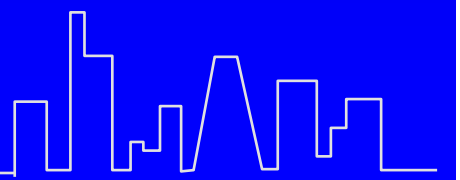
Outline

- Reason for Cutoff Wall
- Test Section
- Demonstration Section
- Verification
- Lessons Learned



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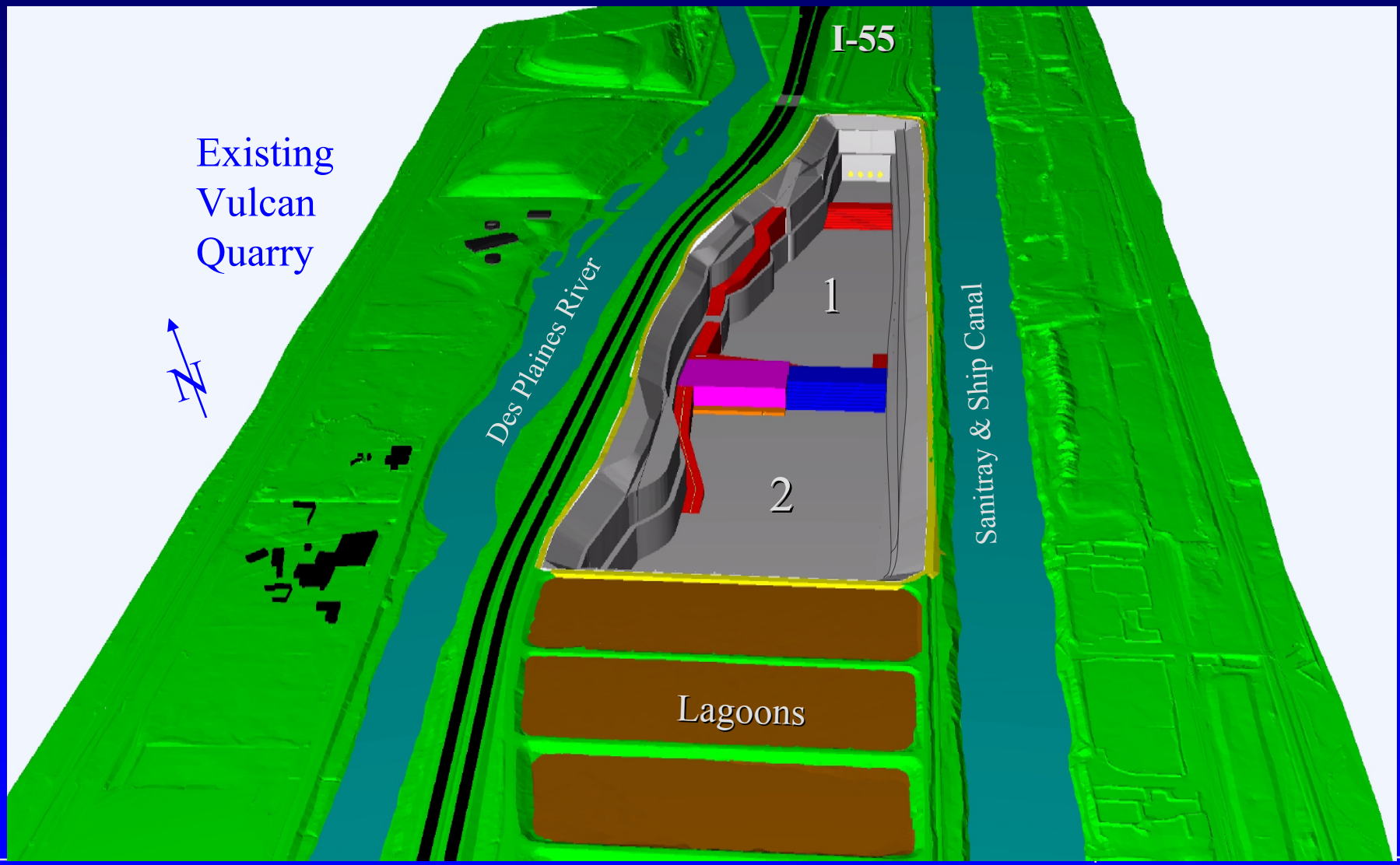
Reservoir Plan Schematic



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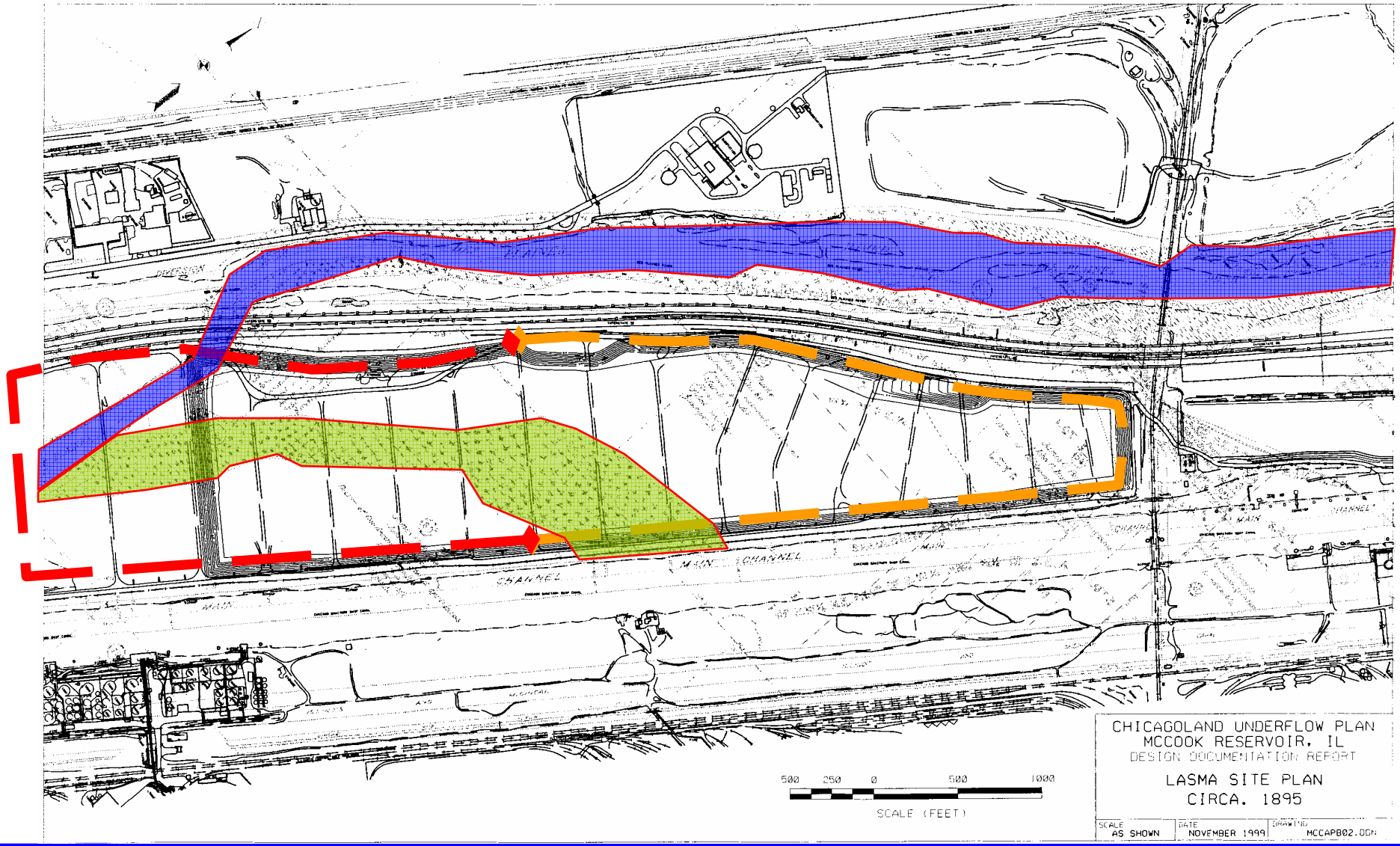
Historic River Channel



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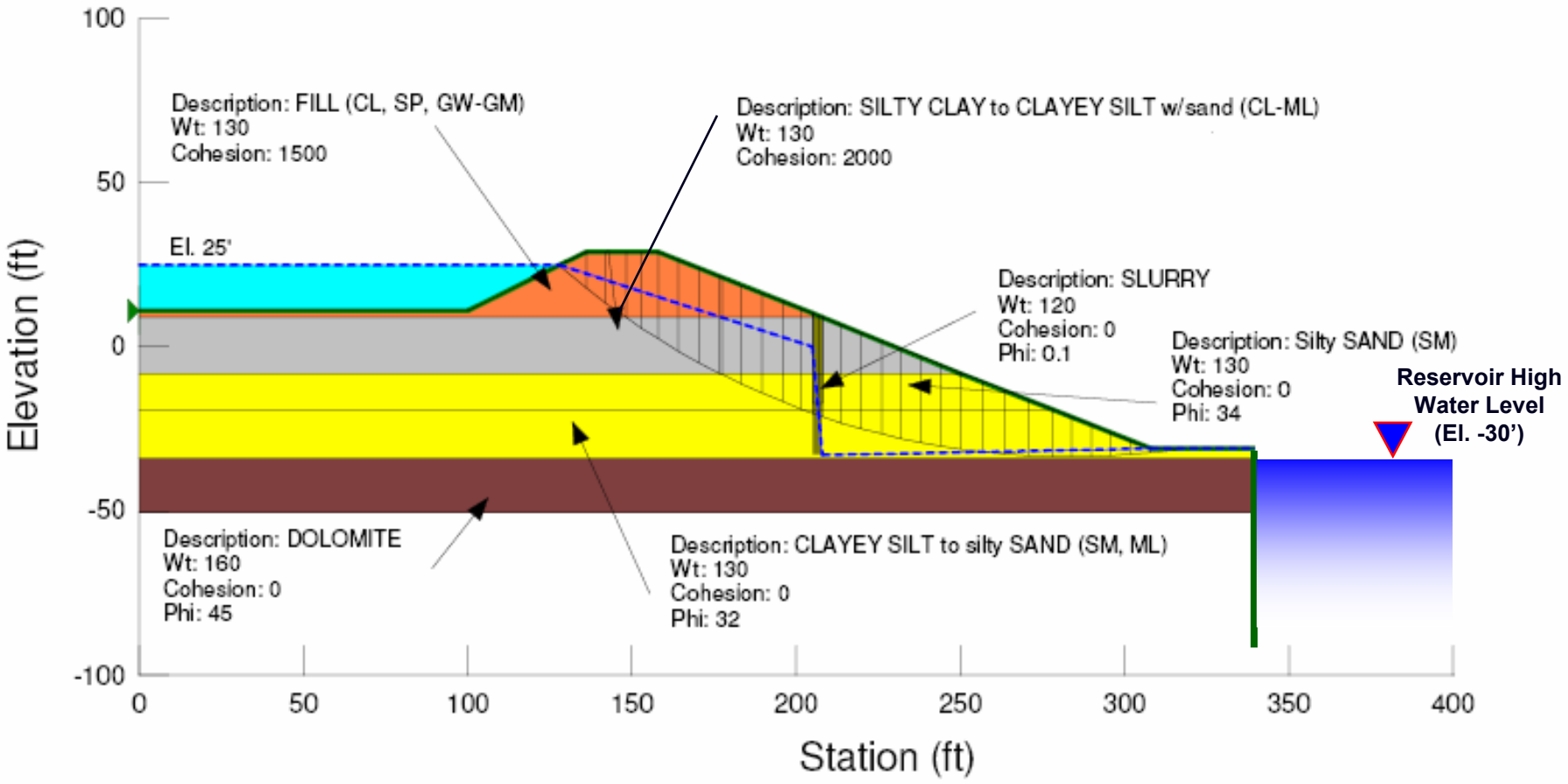
Riverside & Lagoon Cross-Section



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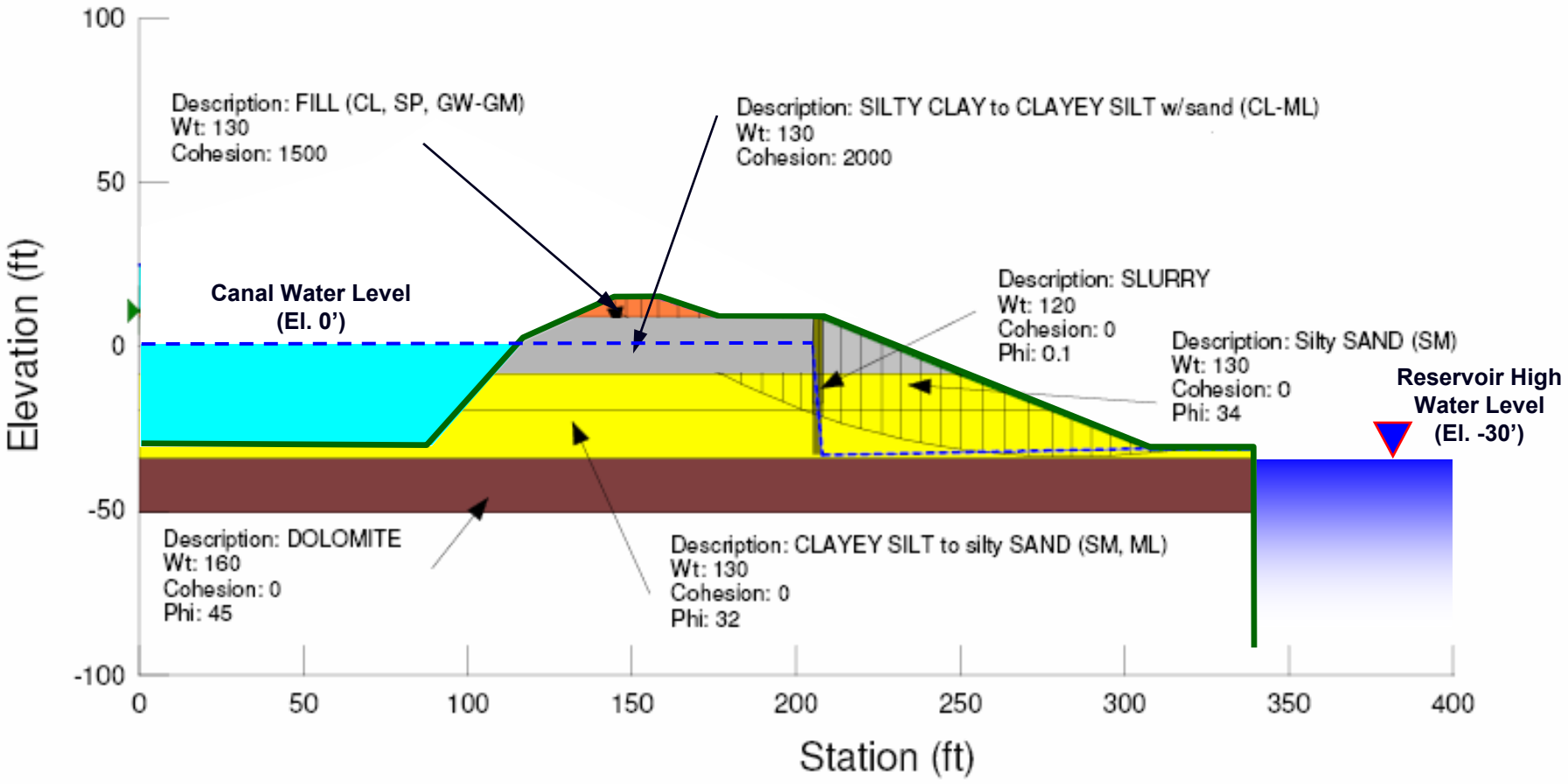
Canalside Cross-Section



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Slope Erosion

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Test Section

- Construction – July-Aug 2000
- 4-sided Box (50’ x 50’)
- Pump Test

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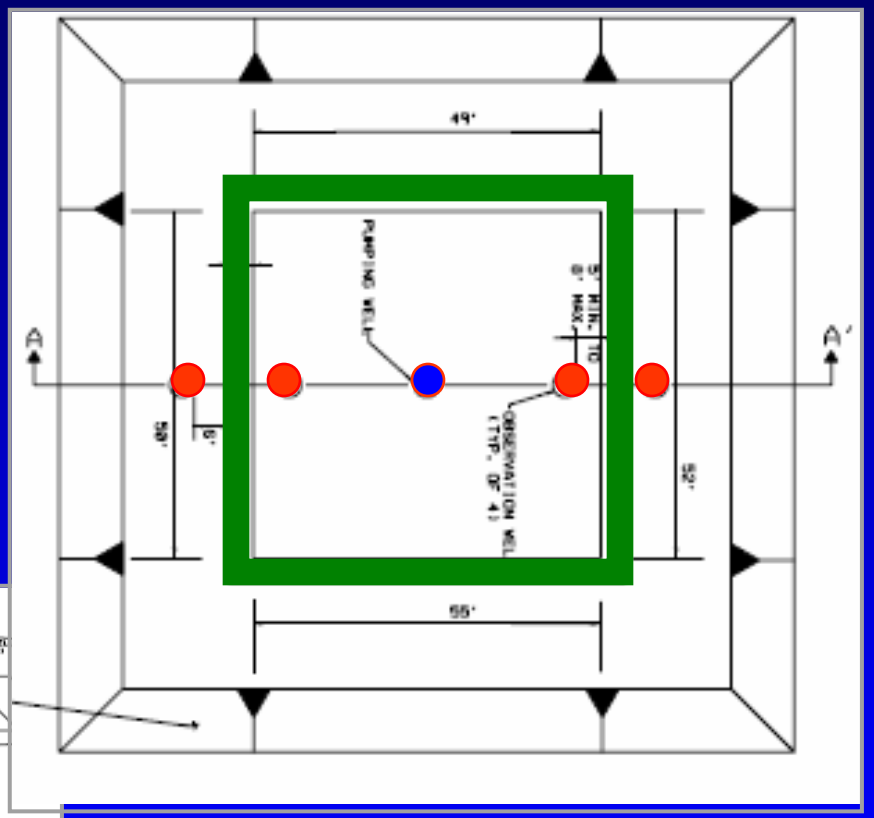
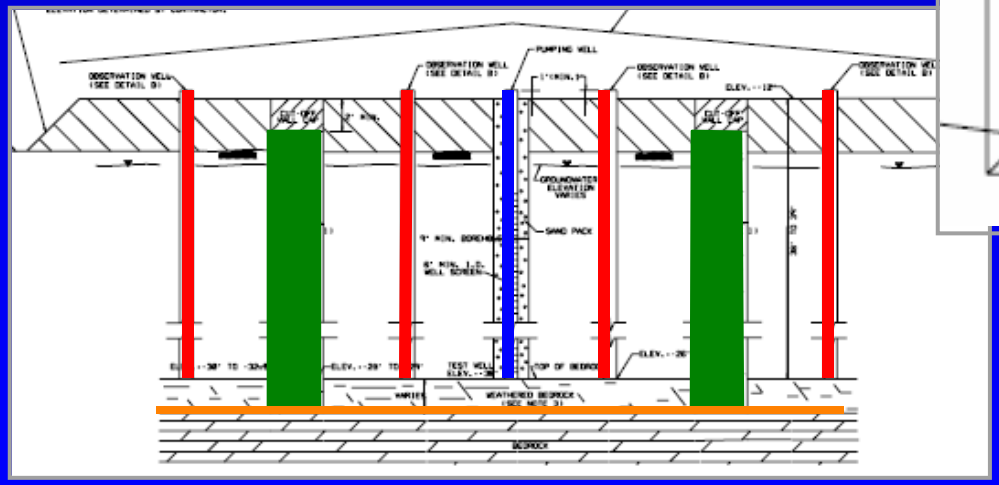
Test Section





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Excavator

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Boulders

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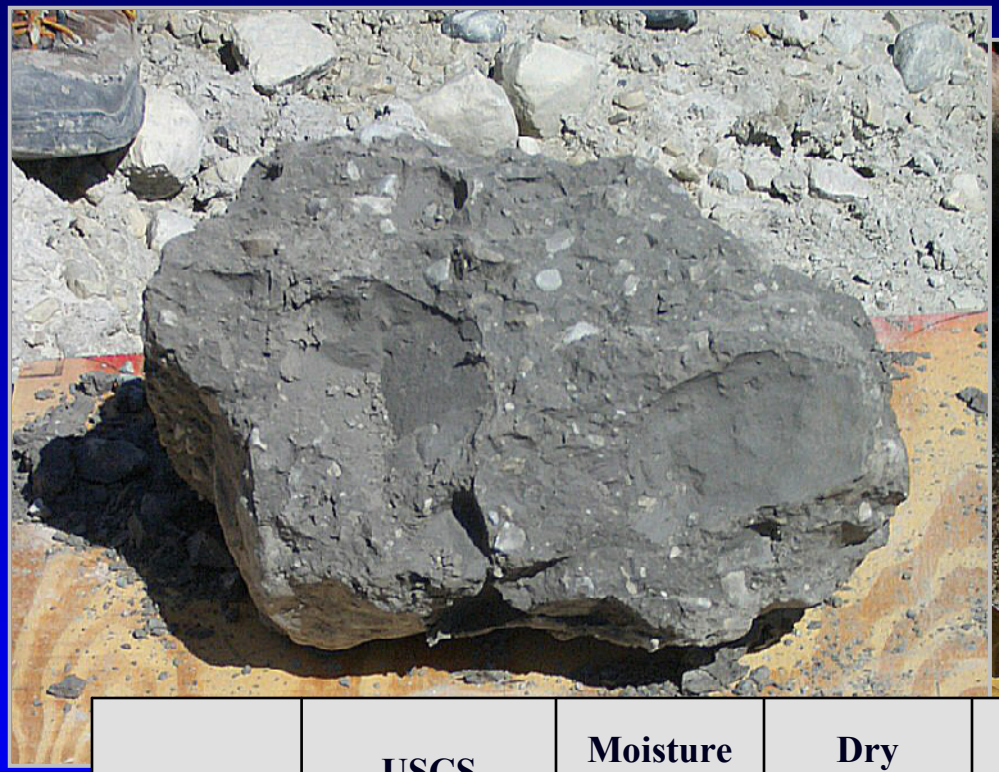
Hardpan



Soil Type	USCS Classification	Moisture Content w_c%	Dry Density γ_d	Specific Gravity G_s
Clayey Silt	ML	9.8	133.3	2.75

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Demonstration Section & Initial Wall Construction

- Modified Contract to Demonstrate Alternate Method to Penetrate Hardpan and Bedrock
- Conducted Investigation of Completed Section
- Developed More Stringent & Intensive QA Inspection Program

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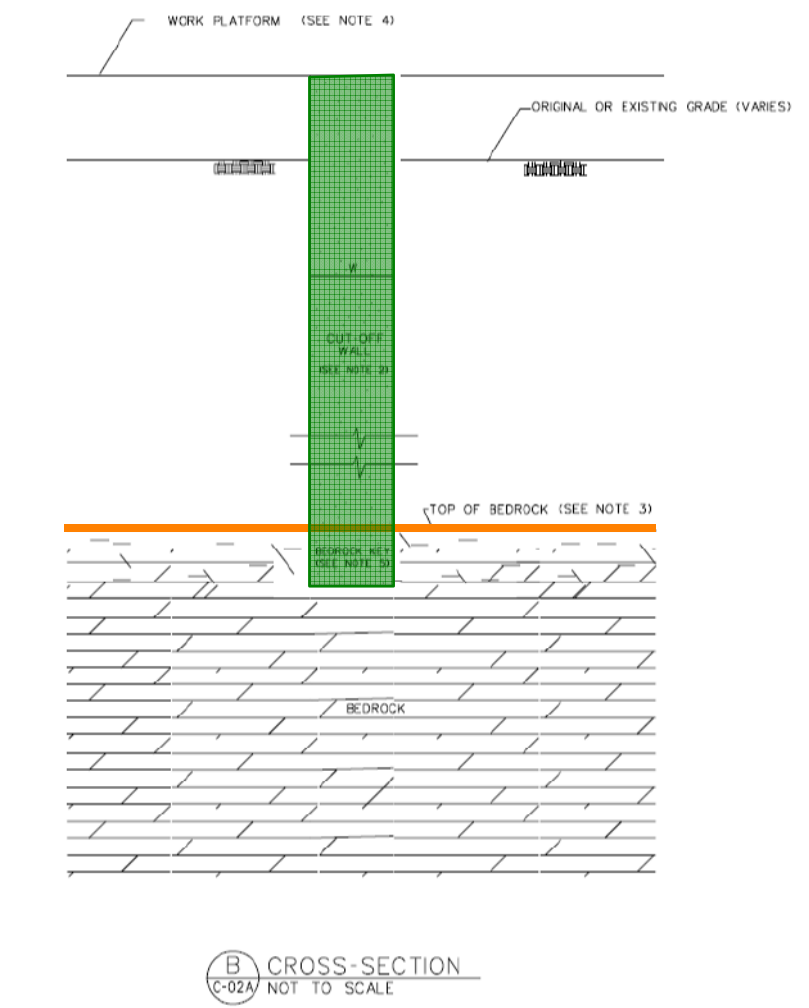
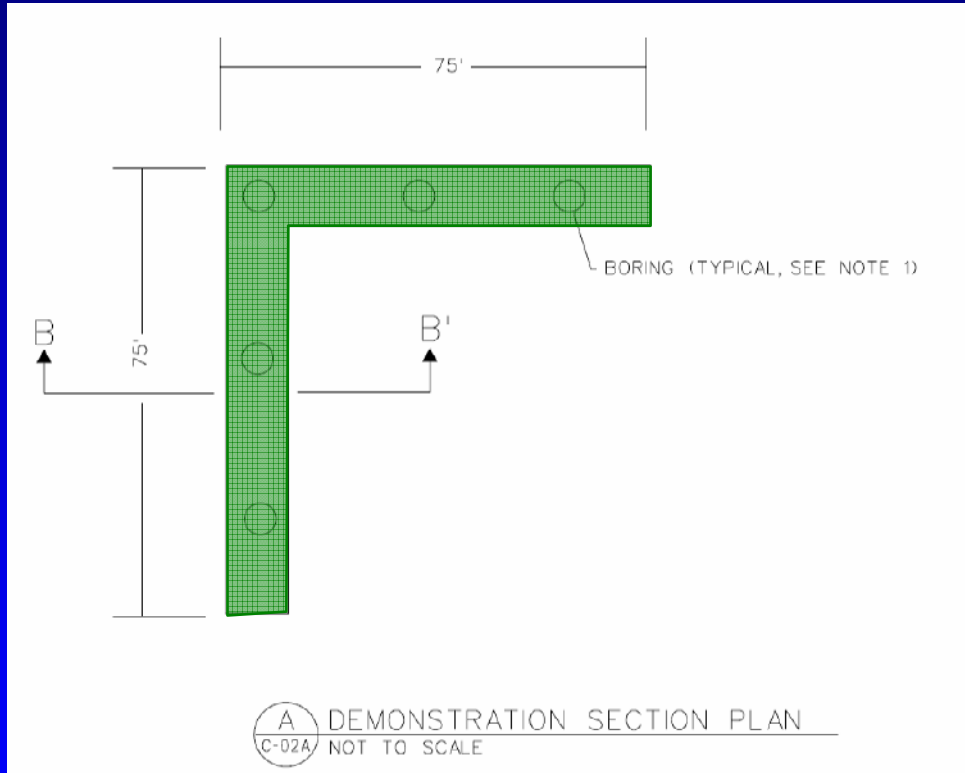
Demonstration Section Modification



B C-02A CROSS-SECTION
NOT TO SCALE



A C-02A DEMONSTRATION SECTION PLAN
NOT TO SCALE

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Chisel

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Initial Wall Construction

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Initial Wall Construction

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Investigation

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Probing for Cutoff Wall

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Backfill Sampling

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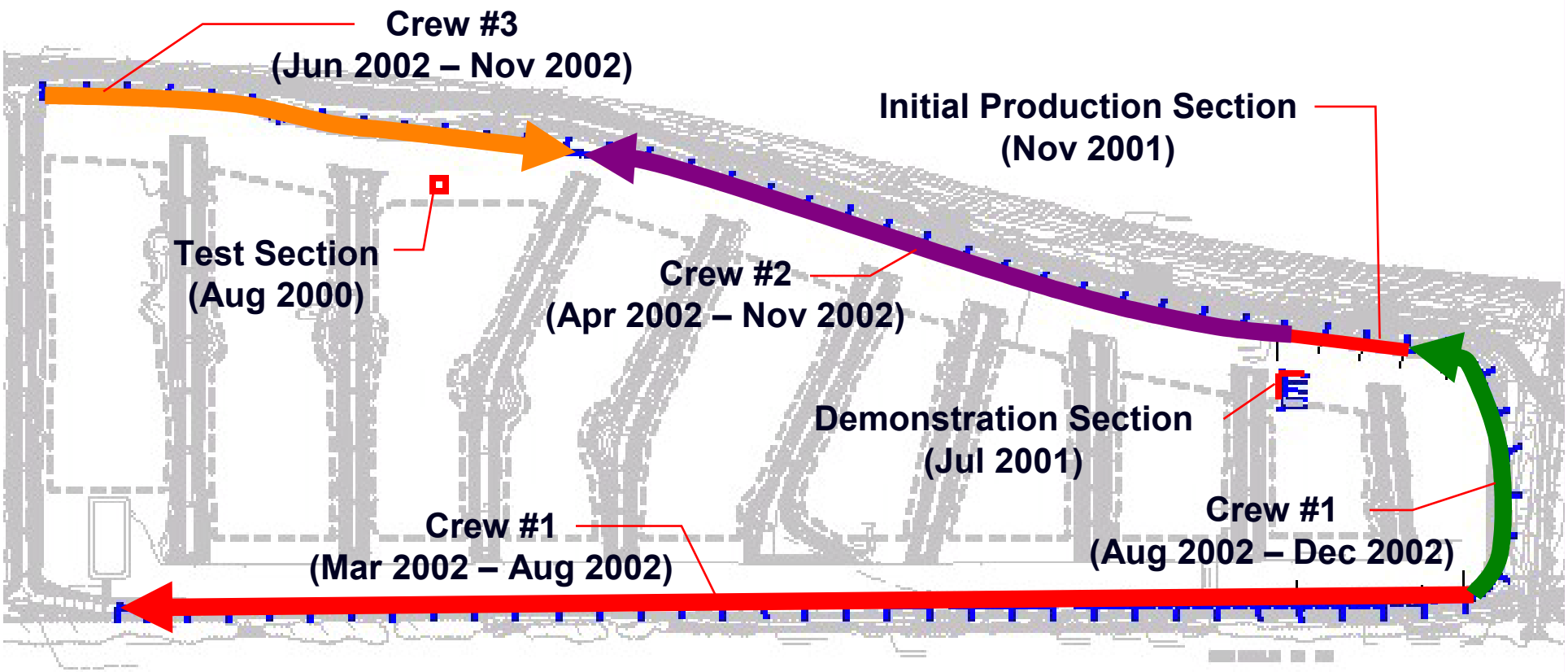
Cutoff Wall Construction



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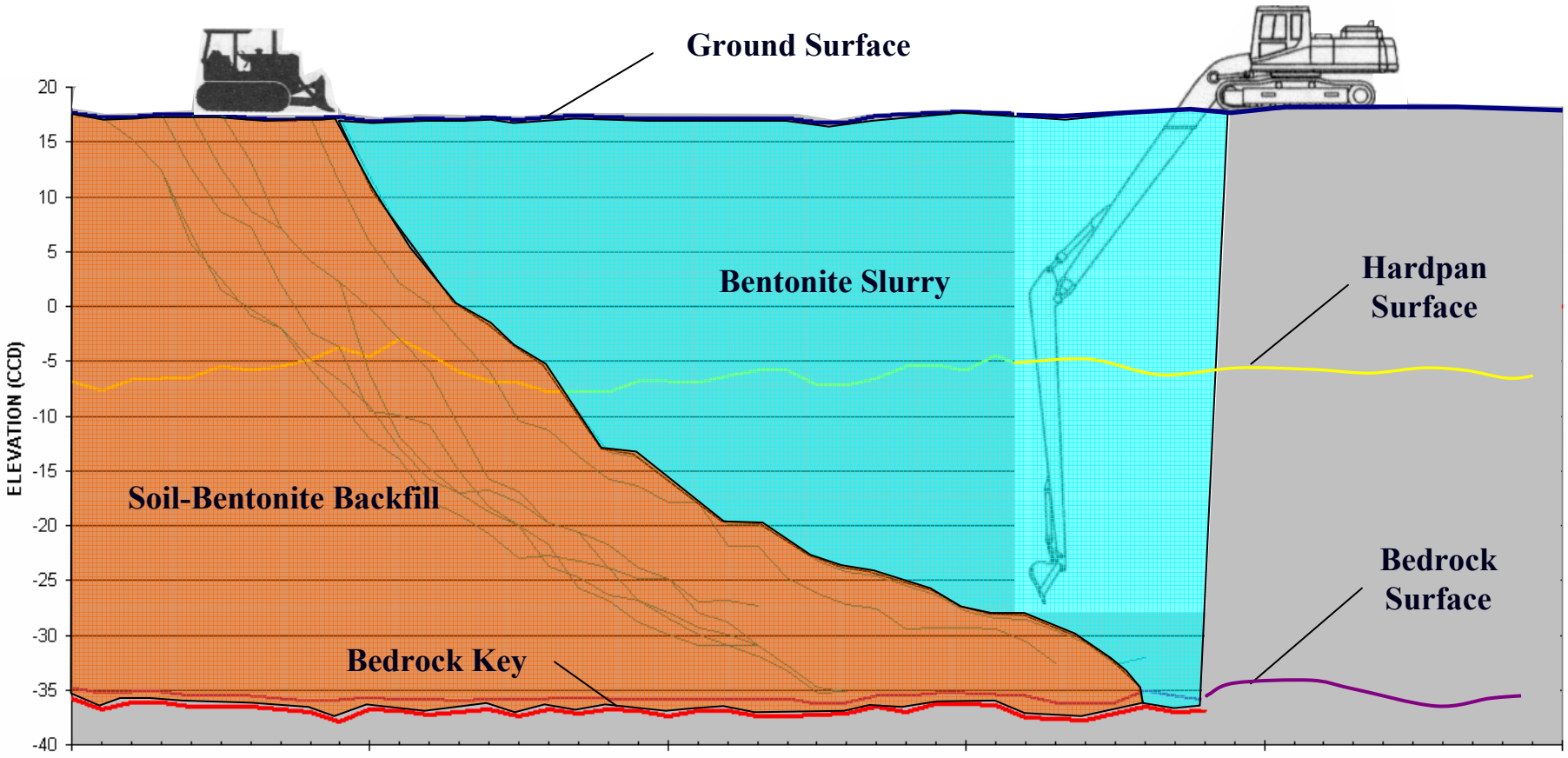
Cutoff Wall Construction



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Cutoff Wall Construction

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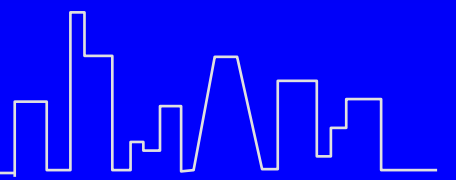
QA/QC Verification

- Depth Measurements During Excavation
- Bedrock Key Verification
- Post-Construction Depth Measurements



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Depth Measurements

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Bedrock Key Verification

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Depth Verification

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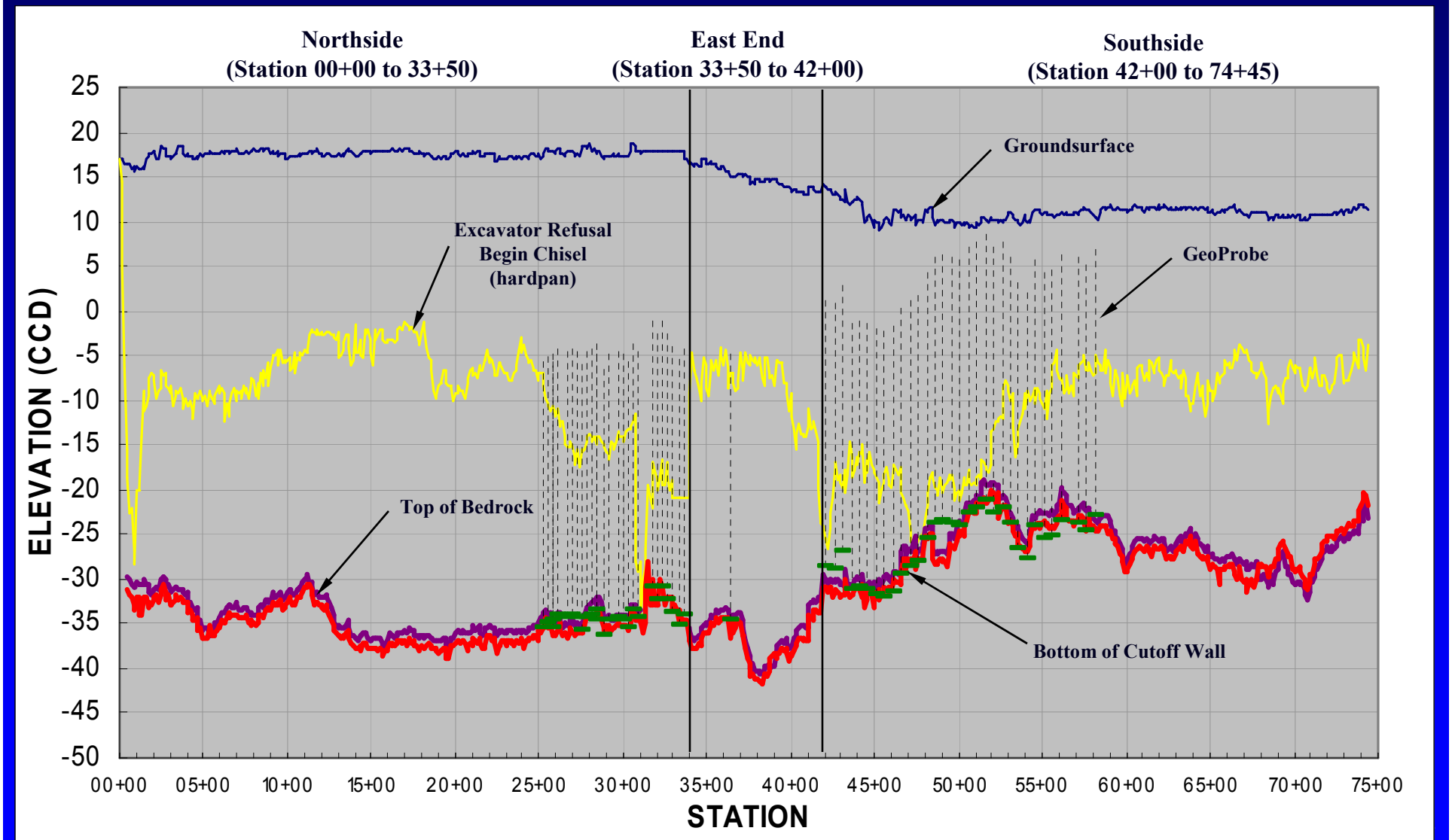
Wall Profile



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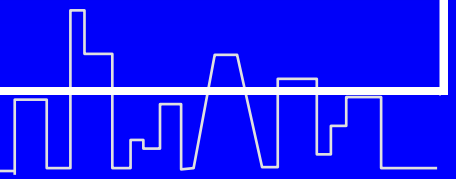
Construction Summary

	Estimated (Square Feet)	Actual (Square Feet)	
Trench @ $6.25/sf	263,000	182,706	w/Excavator
Trench @ $48.42/sf	14,880	145,375	w/Chisel
Bedrock Key @ $48.42/sf	7,440	7,271	w/Chisel
Total	285,320	335,352	



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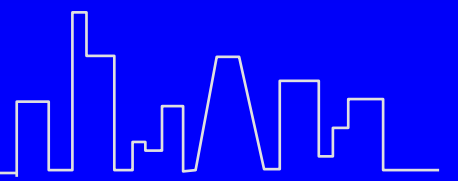
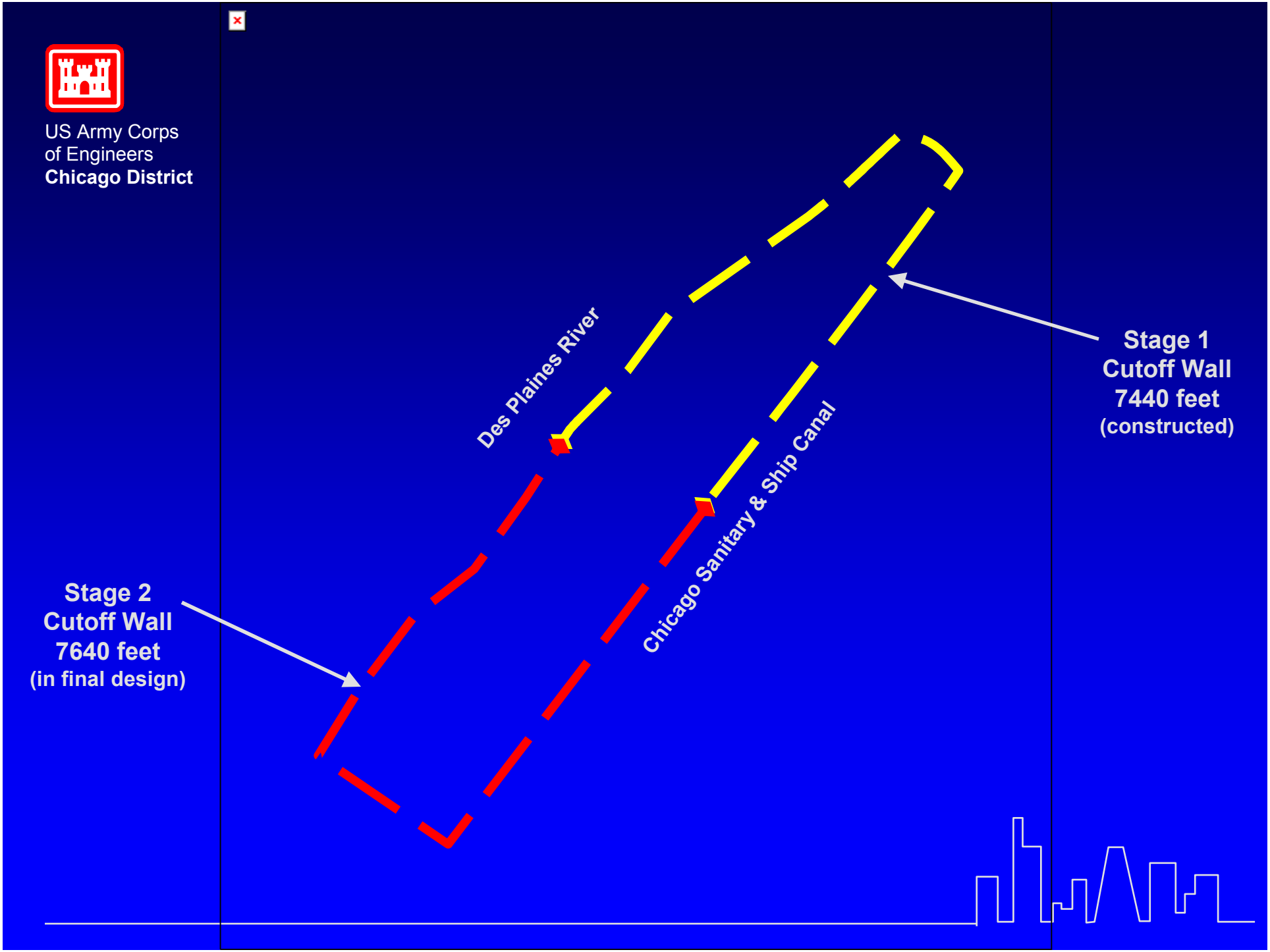
Lessons Learned

- Ensure Thorough Site Investigations
- Cutoff Walls MUST be keyed into Underlying Layer for Seepage Control, VERIFY
- Subsurface Construction Requires a High Level of QA/QC, especially at Start-Up
- Keep Close Coordination between Design and Construction
- Perform a Test Section

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Des Plaines River
Chicago Sanitary & Ship Canal
Stage 1
Cutoff Wall
7440 feet
(constructed)
Stage 2
Cutoff Wall
7640 feet
(in final design)

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