LAKE PETIT DAM
REVIEW OF PROPOSED IMPROVEMENTS

Meeting with GaEPD Safe Dams Program

Big Canoe, Georgia
31 July 2009

Geosyntec consultants

Geosyntec Team

- Engineer of Record, Mr. Scott Fletcher, P.E.
- R. Neil Davies, P.E., Principal Engineer
- Dr. Robert Bachus, P.E., Principal Engineer
- Mehmet Iscimen, P.E., Project Engineer

Agenda

- Background
- Summary of FY09 Annual Inspection
- Proposed Actions (based on FY08 Annual Inspection)
- Additional Actions proposed by Big Canoe POA
- Review/Status of 1998 proposals

Background

- 115-ft high zoned earth embankment constructed in 1972
- Category I dam with 2.5:1 downstream slopes and 3.5:1 upstream slopes
- 10-ft wide benches constructed at approximately 20-ft vertical intervals
- Regularly maintained and inspected

Summary of FY09 Annual Inspection

Annual inspection by Safe Dam's Program officials indicated:

- Well maintained and mowed
- Some small pine trees and overhanging branches on right side abutment
- Several holes in floor of concrete chute spillway
- Water flowing under at least one drain located near downstream toe of dam

Actions based on FY08 Annual Inspection

- Routine vegetation and filling was performed during the course of routine maintenance
- A plan was developed to address erosion and minor "beaching" observed along the waterline
- Plans are under development to replace deteriorated concrete-lined ditches, together with other recommendations from the 1998 Geosyntec report
- Area around the toe drain outlets (tailwater creek) was cleaned out
- Pipes that discharge to the tailwater creek have been investigated and surveyed. Plans under development for repairs and/or replacement as needed
- Localized repairs proposed to concrete chute spillway

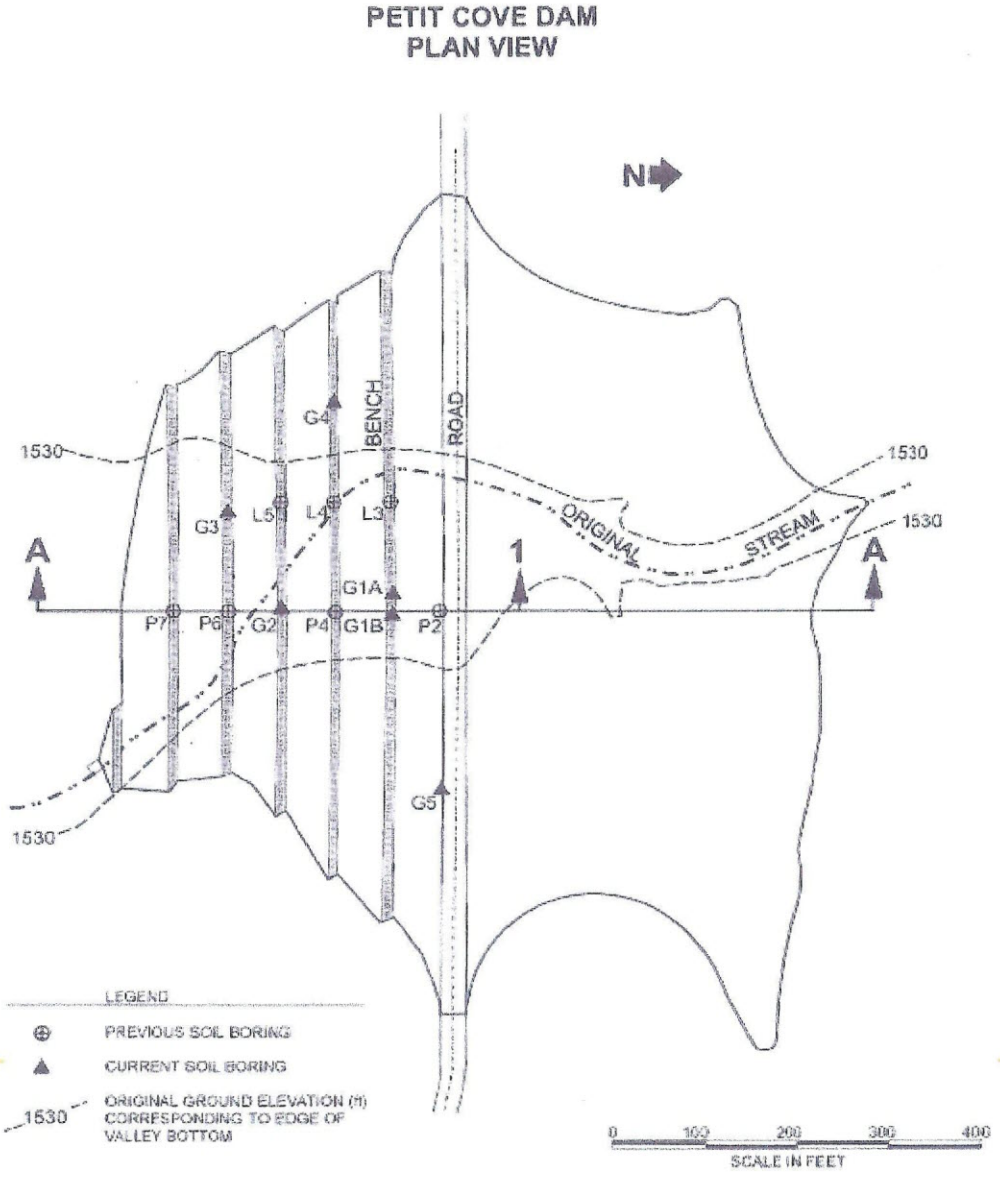
Review of 1998 Proposals

Lake Petit Dam

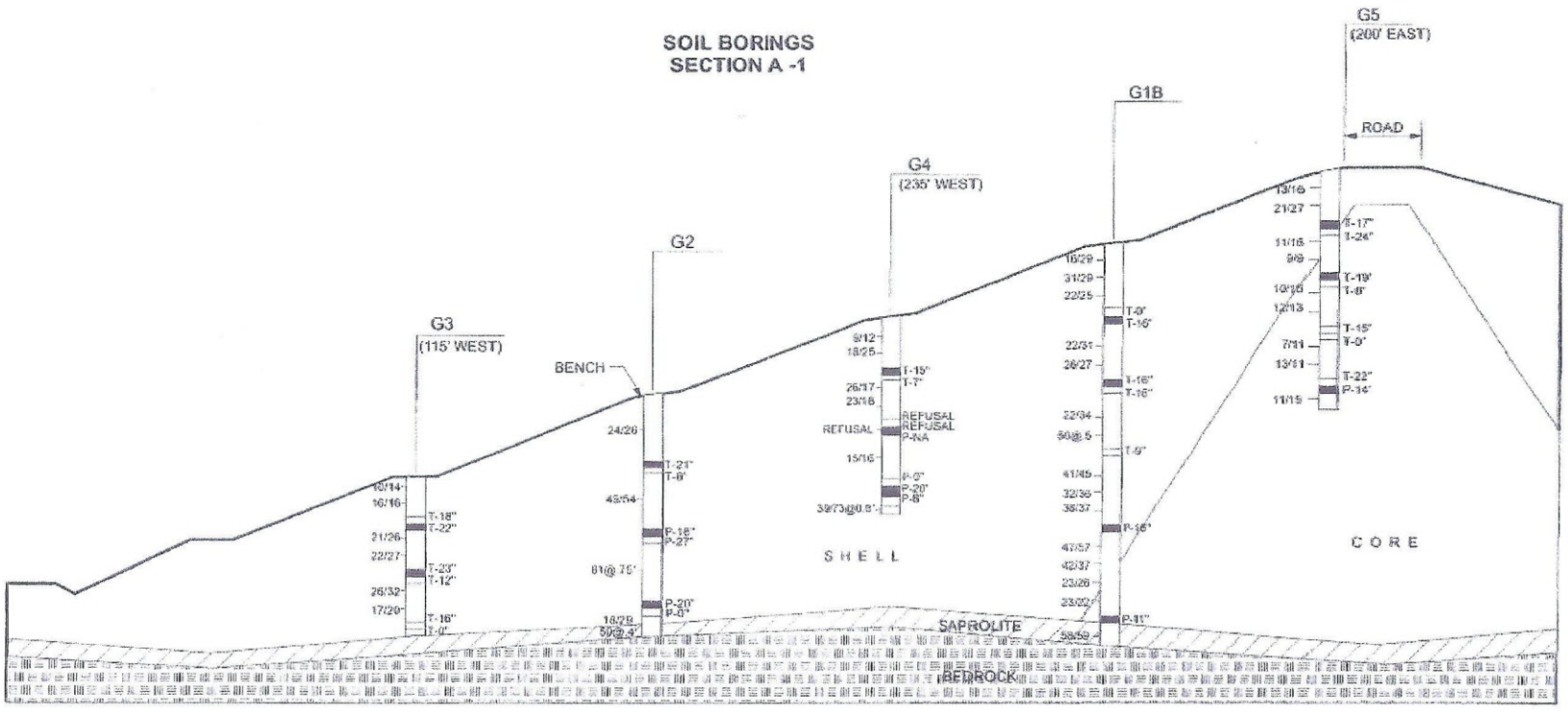
1998 Proposals - Background

- Evaluations performed in 1998 by Geosyntec include the following:
  - Field investigation – 6 geotechnical borings and field testing
  - Laboratory testing – including 16 triaxial tests
  - Field instrumentation – water levels monitored
  - Site Physical Conditions Model – used for static and seismic slope stability evaluation
  - Seepage analyses
  - Slope stability analyses

Plan View


PETIT COVE DAM
PLAN VIEW
N
BENCH
ROAD
ORIGINAL
STREAM
1530
1530
1530
1530
A
A
1
G4
G3
L5
L4
L3
G1A
P7
P6
G2
P4
G1B
P2
G5
LEGEND
PREVIOUS SOIL BORING
CURRENT SOIL BORING
ORIGINAL GROUND ELEVATION (ft) CORRESPONDING TO EDGE OF VALLEY BOTTOM
0
100
200
300
400
SCALE IN FEET

Geotechnical Borings



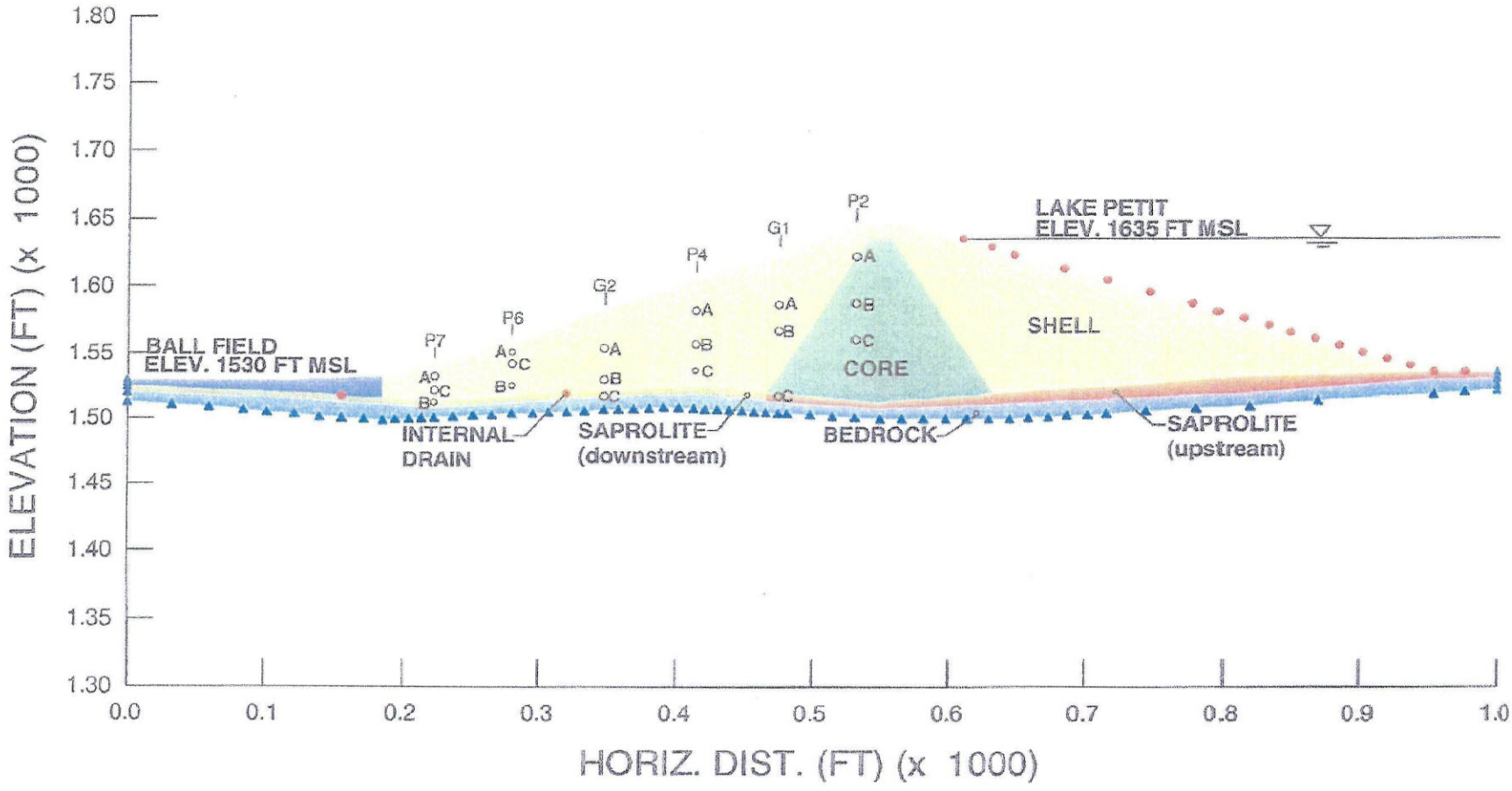
LEGEND

10/14	10 = SUM OF 2ND AND 3RD SPT* BLOWCOUNTS 14 = SUM OF 3RD AND 4TH SPT* BLOWCOUNTS
T-18" P-18"	T = SHELBY TUBE SAMPLE P = PITCHER BARREL SAMPLE 18" = SAMPLE RECOVERY
NA	NOT AVAILABLE
	SAMPLE USED FOR LABORATORY TRIAXIAL SHEAR TESTING

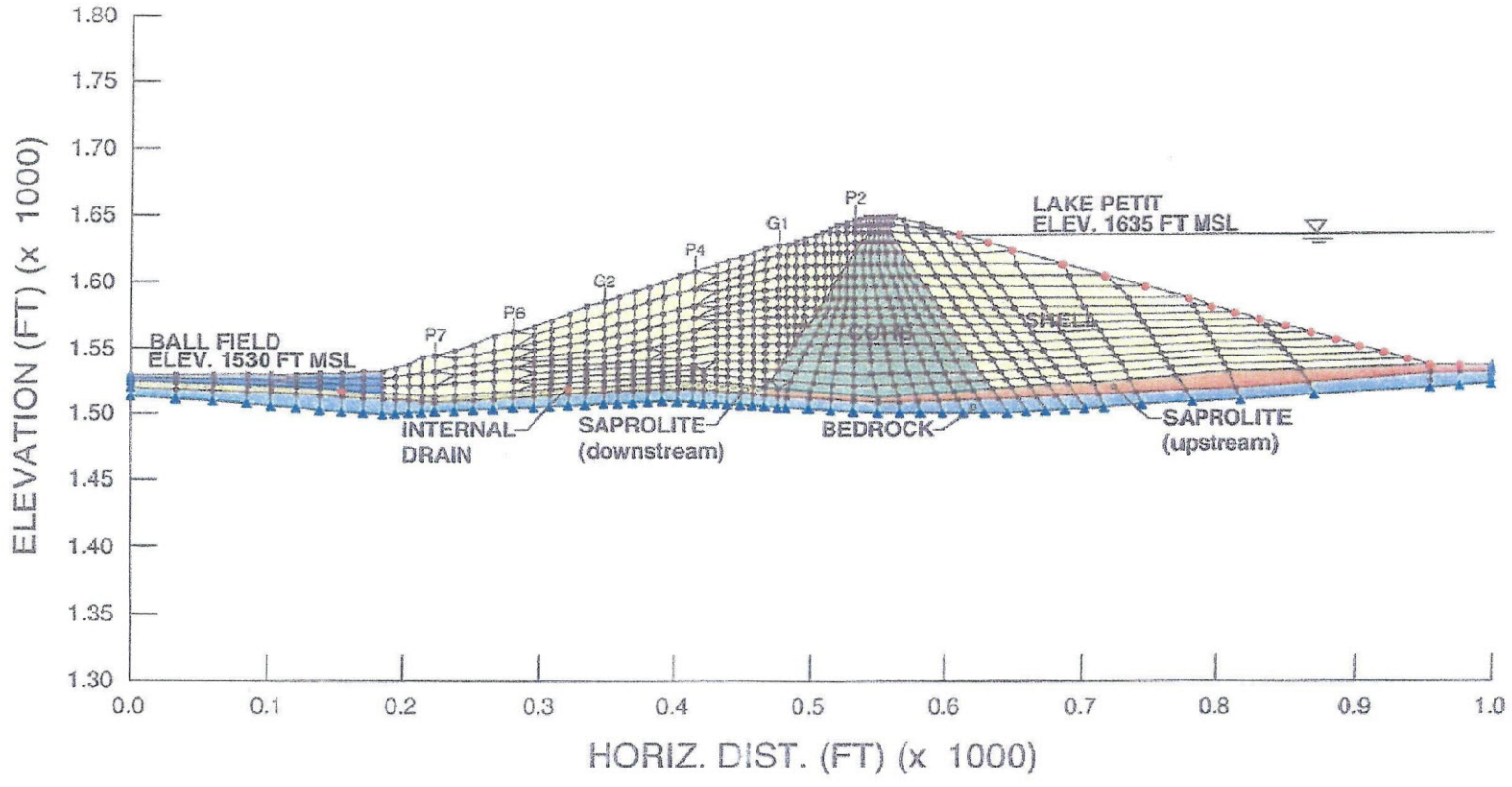
* STANDARD PENETRATION TEST

NOTE
BORINGS SHOWN FROM GEOSYNTEC
FIELD INVESTIGATION PROGRAM, OCTOBER1996

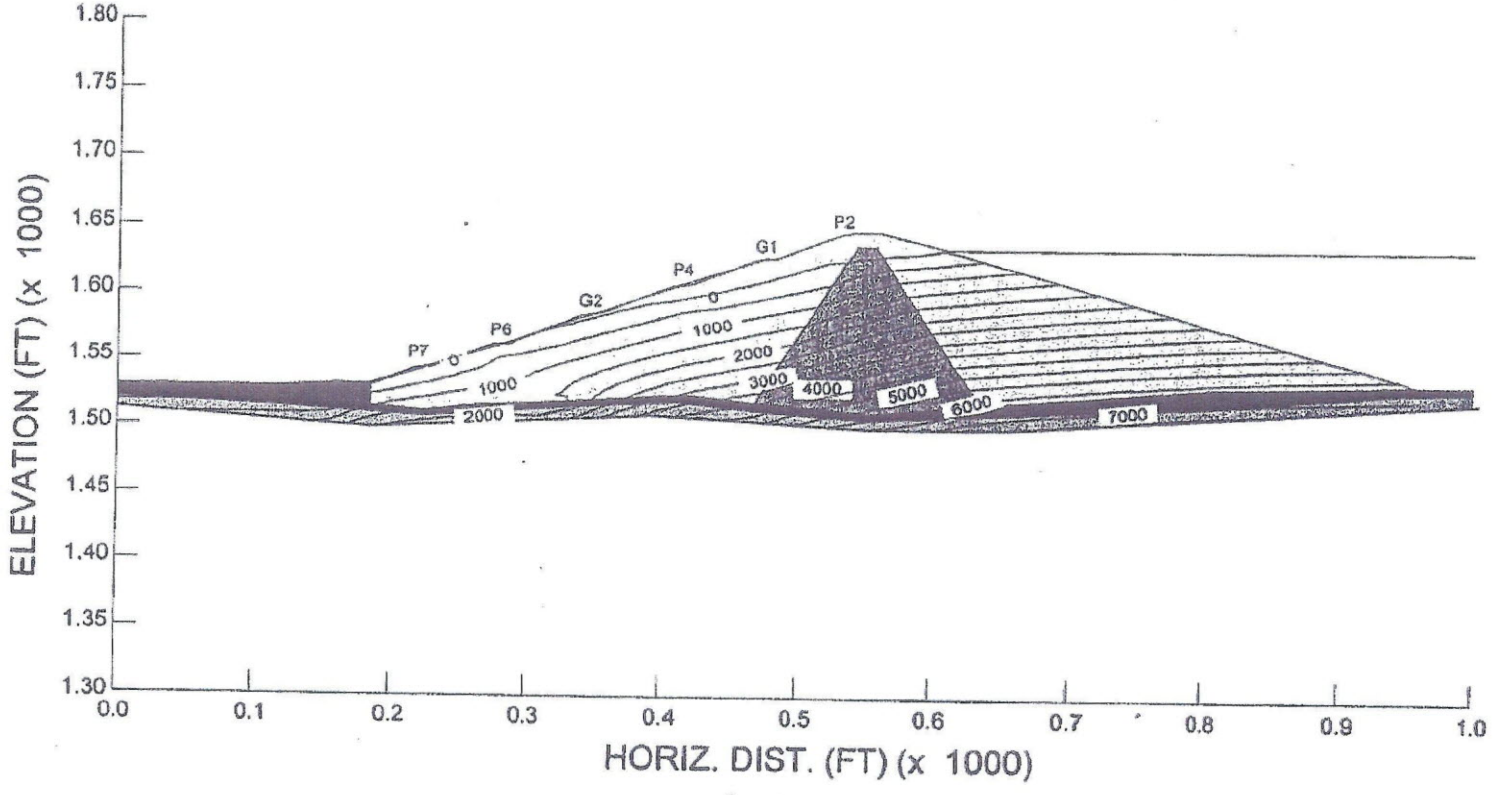
Piezometer Locations and Boundary Conditions



Finite Element Mesh – SEEP/W

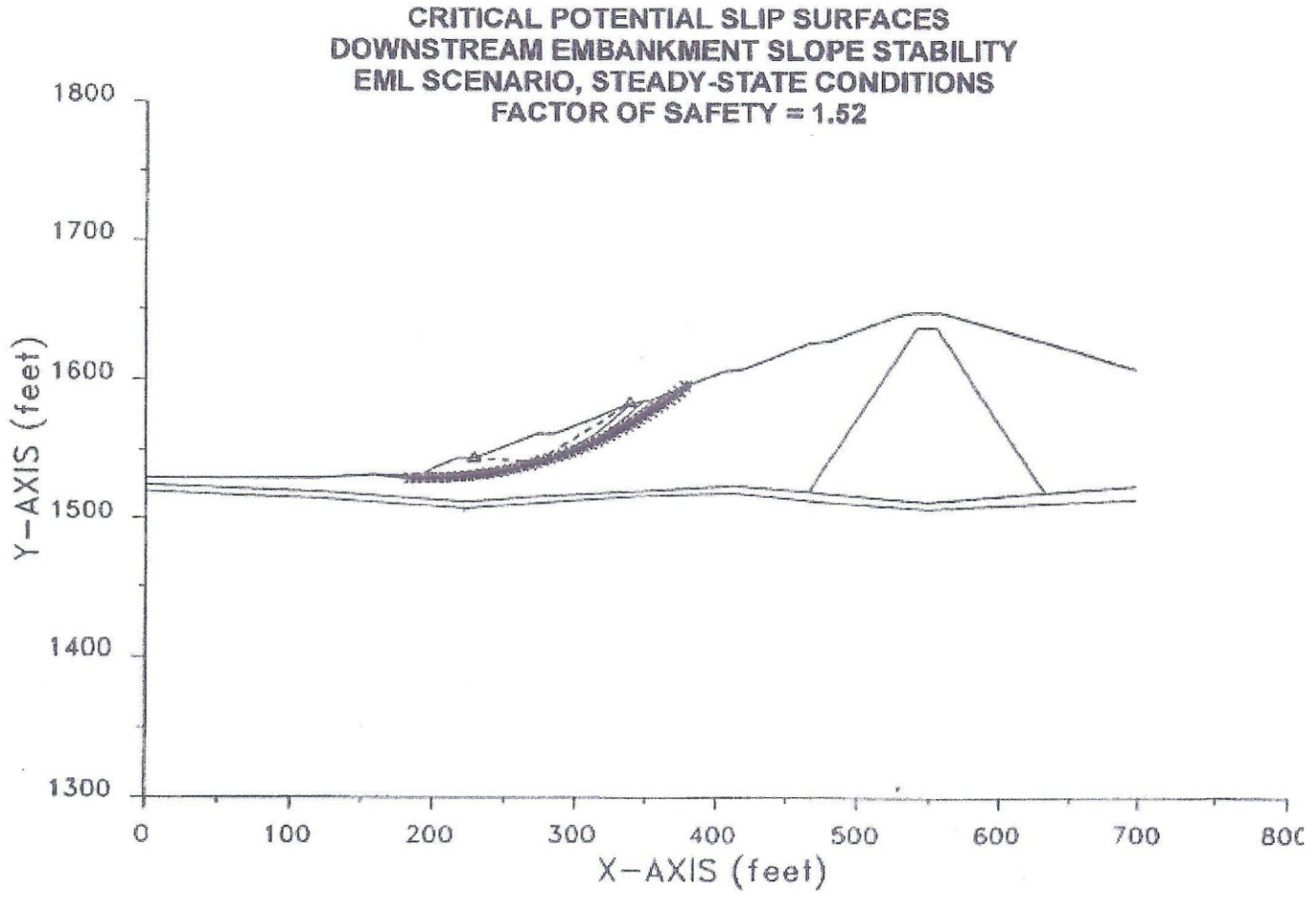


Pore Pressures under EML Scenario

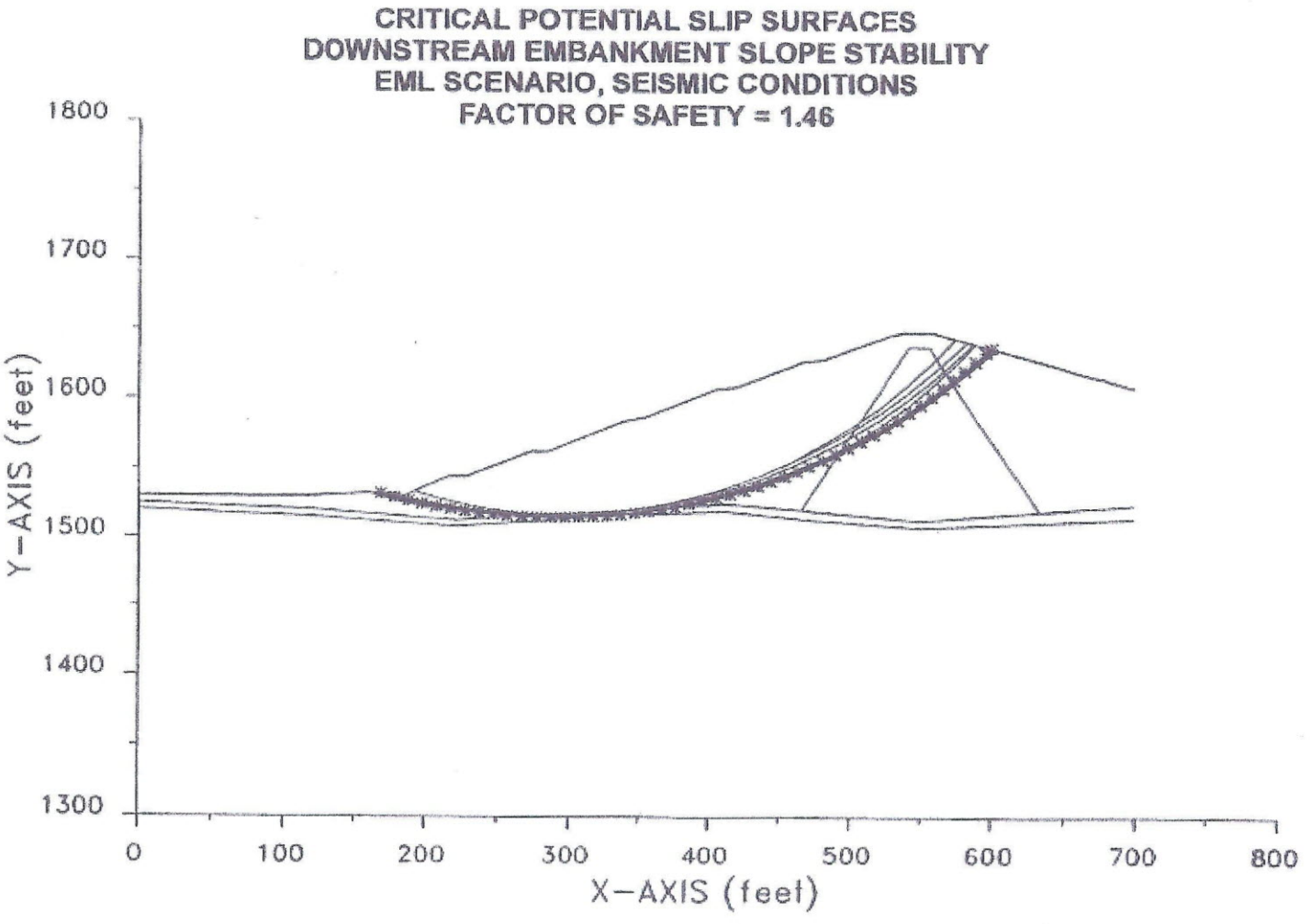


EML – estimated maximum water level

Critical Slip Surfaces – EML, steady state



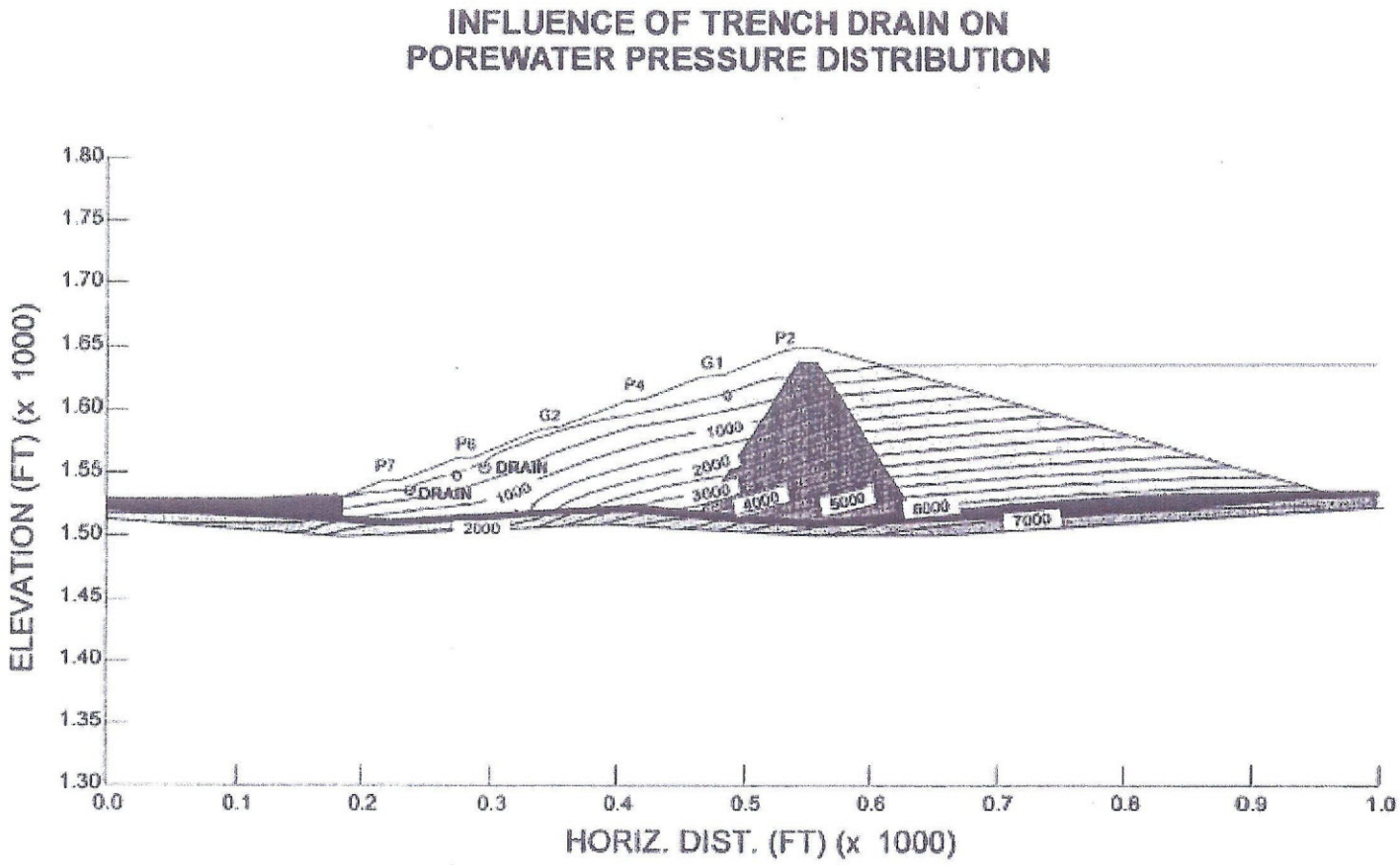
Critical Slip Surfaces, EML Seismic



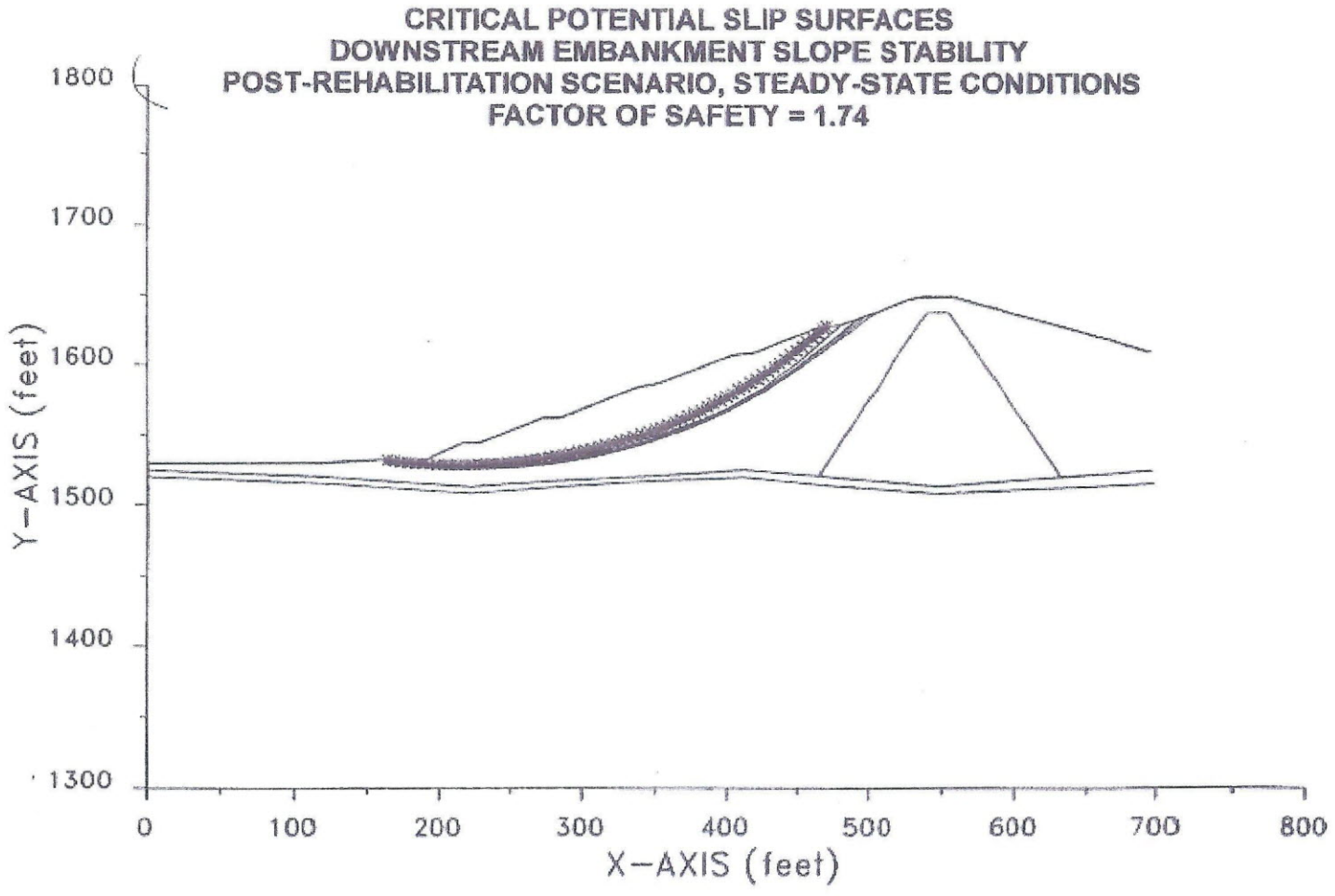
Surficial Slip surfaces

- Analyses identified surficial slip surfaces near toe of the dam with FS less than 1.5
- Surficial surfaces driven by close proximity of phreatic surface under EML conditions
- Surficial stability issues are typically addressed during routine maintenance; however rehabilitation measures were considered and evaluated

Effects of Adding Trench Drains



Critical Slip surfaces, Post-rehabilitation

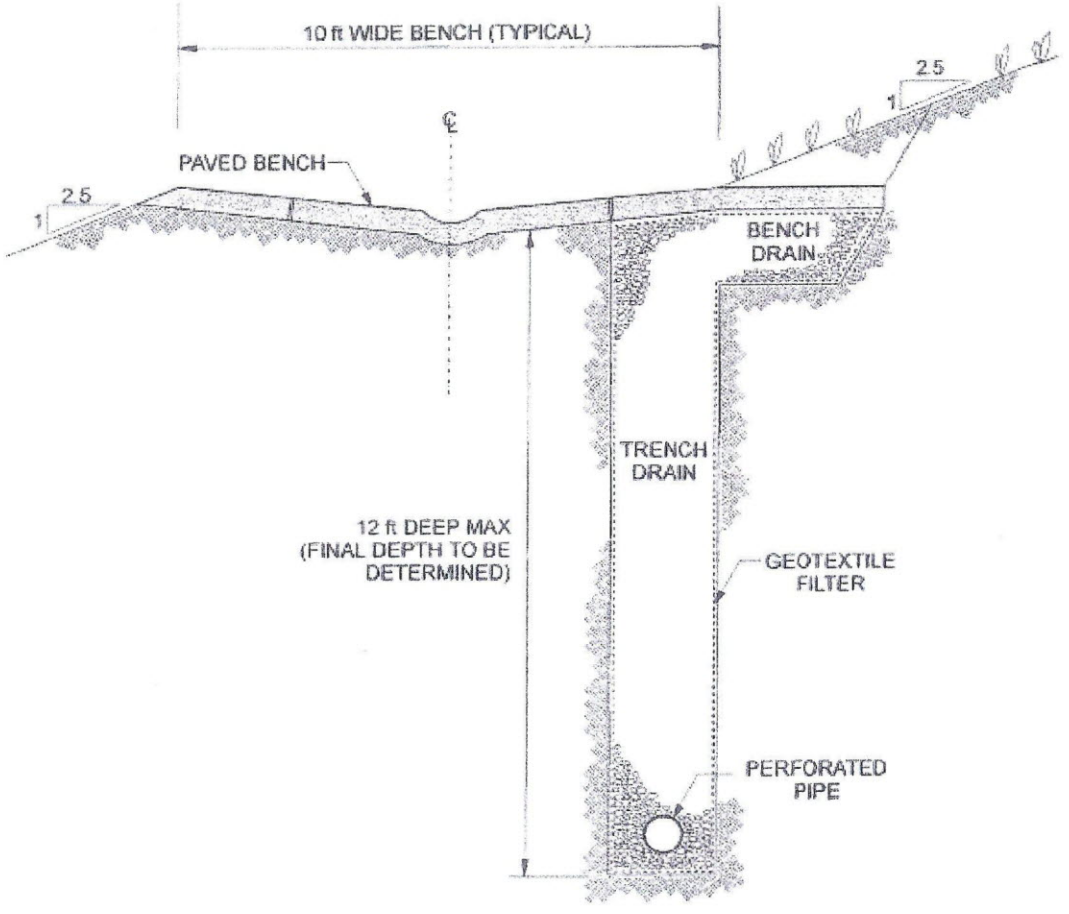


Summary of Critical Analyses

Analysis	GaEPD Target (1)	Existing Conditions@ EML	Post-rehab Conditions
Static Condition	1.50	1.52	1.74
Seismic Condition	1.10	1.46	>1.46

(1) Minimum calculated FS from GaEPD Safe Dam Rules

Proposed Trench/bench Drain (Typ)



Recommendations

- Reduce infiltration of precipitation into downstream face and lower phreatic surface in lower portion of dam
- Propose to install two lines of combined trench/bench drains
- Propose to replace paving on ditches where needed and extend width of paving