PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 17 ELEV. (MSL.) 1194' DATE COMPLETED 12-20-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0 2 4				SM+ML	**LANDSLIDE DEBRIS (Qls)** Loose, dry, jumbled mass of SILT and SAND, roots, rock fragments, recent shallow slide debris -Back rotated block of Bedrock Siltstone with abundant voids and fractures, thin roots, no defined slide plane -Bedding: N34W, 26NE			
6					**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Hard, damp, dark olive gray, fine-grained Sandy SILTSTONE; thinly bedded			
					TRENCH TERMINATED AT 7.5 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-84,
Log of Test Pit TP 17, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 18 ELEV. (MSL.) 1166' DATE COMPLETED 12-20-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Stiff to hard, moist, brown, fine-grained Sandy SILTSTONE, thinly bedded and laminated, moderately weathered in upper 2 feet of unit with thin roots and carbonate -Bedding: N70W, 12SW			
2								
4					-Bedding: N79W, 18SW, 4 inch thick bed of light gray, ashy Sandstone, continuous throughout trench, offset 6 inches along subvertical fracture -Siltstone dark olive gray, massive and jointed, hard			
6				SM	Dense, moist, light gray, moderately cemented Silty SANDSTONE; difficult excavation			
					TRENCH TERMINATED AT 6 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-85,
Log of Test Pit TP 18, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◨ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 19 ELEV. (MSL.) 1142' DATE COMPLETED 12-20-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Very stiff to hard, moist, olive gray to grayish brown, fine-grained Sandy SILTSTONE, thinly bedded, moderately weathered in upper 18 inches, gypsum and carbonate mineralization along bedding and joints -Bedding: N52W, 19SW			
2								
4					-Bedding: N39W, 22SW, 6 inch Silty Sandstone bed, light olive gray, fine-grained and continuous throughout trench, gypsum stringers throughout with local black carbon nodules			
6	T19-1				-Dark olive gray, fine-grained, thinly bedded, slightly weathered with carbonate and gypsum stringers throughout, moderatel fractured			
8					TRENCH TERMINATED AT 8 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-86,
Log of Test Pit TP 19, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▥ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 20

ELEV. (MSL.) **1110'** DATE COMPLETED **12-20-2006**

EQUIPMENT **JD450C TRACK MOUNTED BACKHOE** BY: **N.A.A.**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 – 2				SM+ML	**ENGINEERED ARTIFICIAL FILL (afe)** Loose, slightly moist, olive brown, Silty SAND and Sandy SILT, rock fragments to 6 inches in diameter			
3 – 6				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Hard, damp, dark gray to black, SILTSTONE, shaley, hard, slightly moist, fissile cleavage			
6					TRENCH TERMINATED AT 6 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-87,
Log of Test Pit TP 20, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 21

ELEV. (MSL.) **1172'** DATE COMPLETED **12-20-2006**

EQUIPMENT **JD450C TRACK MOUNTED BACKHOE** BY: **N.A.A.**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 – 2				SC	**TOPSOIL** Loose, slightly moist, dark brown, Clayey SAND, fine- to medium-grained, porous, thin roots, scattered carbonate pods			
4				SM	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Dense, damp, yellowish to light olive brown and brown, fine- to medium-grained Silty SANDSTONE, thinly bedded to laminated, weakly to moderately cemented, minor interbeds of Siltstone -Bedding N74W, 30SW			
					TRENCH TERMINATED AT 5 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-88,
Log of Test Pit TP 21, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 22 ELEV. (MSL.) 1190' DATE COMPLETED 12-20-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0 - 2				SC	**TOPSOIL** Medium dense, slightly moist, dark brown, Clayey SAND, fine- to medium-grained, porous, thin roots			
2 - 6				SM	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Dense, damp, yellow to light gray, fine-grained Silty SANDSTONE; iron oxide staining -Interbedded Sandy Siltstone and Silty Sandstone, olive gray to light grayish brown, fine-grained, hard, moderately cemented			
6					TRENCH TERMINATED AT 6 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-89,
Log of Test Pit TP 22, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 23 ELEV. (MSL.) 1028' DATE COMPLETED 12-21-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM+ML	**ENGINEERED ARTIFICIAL FILL (afe)** Medium dense, moist, olive brown to olive gray, Sandy SILT and Silty SAND, rock fragments of Siltstone and Sandstone to 6 inches in diameter (~30% of material)			
2								
4								
6					-Becomes dry to slightly moist and somewhat powdery			
8								
10								
12					TRENCH TERMINATED AT 12 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-90,
Log of Test Pit TP 23, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 24

ELEV. (MSL.) 1002' DATE COMPLETED 12-21-2006

EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**TOPSOIL** Soft, slightly moist, dark brown, Sandy SILT; thin roots, animal burrows			
4				ML	**BEDROCK CREEP** Very stiff, slightly moist, light olive to yellowish brown, Sandy SILTSTONE, intensely weathered and fractured, abundant carbonate pods and stringers, disturbed by slope creep			
8				CL+ML	Moderately hard, moist, dark gray to dark olive gray, Silty CLAYSTONE with Clayey Siltstone interbeds, bedding appears moderately disturbed with polished surfaces along bedding planes and joints, creep affected			
12					-Some subrounded Sandstone fragments with iron oxide rinds			
14				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Hard, cemented bed of calcareous SILTSTONE, difficult excavation, scattered shell fossils, intact bedrock			

TRENCH TERMINATED AT 14 FEET
No groundwater encountered
Backfilled and tamped with soil cuttings

Figure A-91,
Log of Test Pit TP 24, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 25 ELEV. (MSL.) 982' DATE COMPLETED 12-21-2006 EQUIPMENT JD450C TRACK MOUNTED BACKHOE BY: N.A.A.	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0 – 3				CL+ML	**TOPSOIL** Stiff, moist, dark brown, Clayey SILT to Silty CLAY, porous, thin roots, blocky pedogenic development			
3 – 10.5				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Moderately hard, moist, olive brown to olive gray, fine-grained Sandy SILTSTONE, highly fractured, intensely weathered to 6 feet -Bedding: N66W, 14SW; hard calcereous Siltstone bed, moderately bedded, moderately to slightly weathered, well indurated, interbedded with Clayey Siltstone -Layer of subrounded Siltstone concretions, difficult excavation			
					TRENCH TERMINATED AT 10.5 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-92,
Log of Test Pit TP 25, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◩ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 26

ELEV. (MSL.) **960'** DATE COMPLETED **12-21-2006**

EQUIPMENT **JD450C TRACK MOUNTED BACKHOE** BY: **N.A.A.**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 – 2 – 4				SM+SC	**LANDSLIDE DEBRIS (Qls)** Loose, slightly moist, grayish brown, Silty to Clayey SAND, porous, common fragments of Siltstone and Sandstone, carbonate minerlization and thin roots, surficial slide debris			
6 – 8				ML	**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** Loose, dry, olive gray, Clayey SILTSTONE, intensely weathered and fractured, carbonate minerlization -4 inch thick bed of yellow to reddish brown fine-grained Sandstone, continuous -Bedding N24W, 19SW becomes very stiff, slightly moist, dark olive gray, jointed with carbonate minerlization, relatively massive, moderately weathered			
					TRENCH TERMINATED AT 9.5 FEET No groundwater encountered Backfilled and tamped with soil cuttings			

Figure A-93,
Log of Test Pit TP 26, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 27

ELEV. (MSL.) **1080'** DATE COMPLETED **05-03-2010**

EQUIPMENT **TRACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**ENGINEERED ARTIFICIAL FILL (afe)** Medium dense, moist, light gray, dark gray to light brown, fine, Sandy/Clayey SILT with trace gravel			
2								
4					-Clean contact; dipping south west			
				SM	**PUENTE FORMATION - SOQUEL MEMBER (Tps)** Very dense, damp, light brown with orange oxidation, Silty, fine to medium SANDSTONE			
6					-Bedding contact at 7.5 feet dipping approx. 18°SW			
8								
					TRENCH TERMINATED AT 8.5 FEET			

Figure A-94,
Log of Test Pit TP 27, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◨ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

PROJECT NO. G1218-52-01

TEST PIT TP 28

ELEV. (MSL.) **1058'** DATE COMPLETED **05-03-2010**

EQUIPMENT **TRACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**TOPSOIL** Loose to medium dense, damp to moist, dark brown, Clayey, fine to medium SAND			
2					-Gradational contact			
				SM	**PUENTE FORMATION - SOQUEL MEMBER (Tps)** Dense, damp, light brown, Silty, fine to coarse SANDSTONE; massive; no discernable bedding			
4								
6								
					TRENCH TERMINATED AT 7.5 FEET			

Figure A-95,
Log of Test Pit TP 28, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 29

ELEV. (MSL.) **1098'** DATE COMPLETED **05-03-2010**

EQUIPMENT **TRACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TOPSOIL** Stiff, moist, dark brown, Silty CLAY			
2				ML&CL	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, dark gray to grayish brown, interbedded, fine, Sandy/Clayey SILTSTONE and Silty CLAYSTONE; thinly bedded			
4								
6					-Bedding (N20W, 21S)			
					TRENCH TERMINATED AT 7 FEET			

Figure A-96,
Log of Test Pit TP 29, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 30 ELEV. (MSL.) 1068' DATE COMPLETED 05-03-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**TOPSOIL** Stiff, moist, dark brown, Silty CLAY			
2								
				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp to moist, grayish brown, interbedded, fine, Sandy SILTSTONE/Clayey SILTSTONE; thinly bedded			
4								
6					-Sharp contact (N20W, 21S)			
				SM	Very dense, damp, light brown, Silty, fine to medium SANDSTONE; cemented			
					TRENCH TERMINATED AT 7.5 FEET			

Figure A-97,
Log of Test Pit TP 30, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 31 ELEV. (MSL.) 1101' DATE COMPLETED 05-03-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**LANDSLIDE DEBRIS (Qls)** Soft to stiff, moist, dark brown, Silty CLAY			
2					-Sand clasts blobs present with siltstone breccia clasts above basal slip surface			
4				ML&CL	-**BASAL SLIP SURFACE** at 3.5 feet; and contact (N20W, 24S); no apparent clay gouge; sharp contact **PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, pale green and light brown, fine, Sandy SILTSTONE and Silty CLAYSTONE; thinly bedded			
6					TRENCH TERMINATED AT 6 FEET			

Figure A-98,
Log of Test Pit TP 31, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 32 ELEV. (MSL.) 1126' DATE COMPLETED 05-03-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**TOPSOIL** Stiff, moist to damp, dark brown, Silty CLAY			
2				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Very hard, damp, light brown, fine, Sandy SILT			
4					-Bedding (N10W, 24S)			
6					-Grades into clayey siltstone below 5 feet			
					TRENCH TERMINATED AT 7 FEET			

Figure A-99,
Log of Test Pit TP 32, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 33 ELEV. (MSL.) 1098' DATE COMPLETED 05-03-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**LANDSLIDE DEBRIS (Qls)** Soft to stiff, moist, dark brown, Silty CLAY			
2					-1/2-3" siltstone breccia fragments present at 2.5 feet; no clay gouge **-BASAL SLIP SURFACE** at 3 feet			
4				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Very hard, damp, light brown, fine, Sandy/Clayey SILTSTONE; moderate bedding			
					TRENCH TERMINATED AT 5 FEET			

Figure A-100,
Log of Test Pit TP 33, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◩ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 34 ELEV. (MSL.) 1048' DATE COMPLETED 05-03-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/ML	**ENGINEERED ARTIFICIAL FILL (afe)** Medium dense/very stiff, moist, lightbrown, Silty, fine SANDSTONE/fine, Sandy SILT with some clay			
2								
4					-Clean contact			
6				SM	**PUENTE FORMATION - SOQUEL MEMBER (Tps)** Dense, damp, brown, Silty, fine to medium SANDSTONE			
					TRENCH TERMINATED AT 7 FEET			

Figure A-101,
Log of Test Pit TP 34, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 35

ELEV. (MSL.) **1143'** DATE COMPLETED **05-05-2010**

EQUIPMENT **TRACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**LANDSLIDE DEBRIS (Qls)** Soft, damp, gray, fine, Sandy SILT with siltstone breccia clasts up to 10"			
2								
4					-No defined basal slip surface			
6				ML&CL	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, gray and light brown, interbedded, fine, Sandy SILTSTONE and Silty CLAYSTONE; thinly bedded			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-102,
Log of Test Pit TP 35, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

TEST PIT TP 36

ELEV. (MSL.) 1152' DATE COMPLETED 05-05-2010

EQUIPMENT TRACKHOE BY: T. REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**TOPSOIL** Soft, damp, gray, Clayey, fine, Sandy SILT			
2				ML&CL	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, gray and brown, Clayey SILTSTONE and Silty CLAYSTONE; thinly bedded			
4					-Bedding (East-West 32S)			
6								
					TRENCH TERMINATED AT 6.5 FEET			

Figure A-103,
Log of Test Pit TP 36, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G1218-52-01

TEST PIT TP 37

ELEV. (MSL.) 1137' DATE COMPLETED 05-05-2010

EQUIPMENT TRACKHOE BY: T. REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 - 4.5				ML	**ALLUVIUM (Qal)** Soft, moist, brown and gray, Clayey SILT			
4.5 - 6.5				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, dark gray and brown, Clayey SILTSTONE; thinly bedded			
					TRENCH TERMINATED AT 6.5 FEET			

Figure A-104,
Log of Test Pit TP 37, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 38

ELEV. (MSL.) 1120'   DATE COMPLETED 05-05-2010

EQUIPMENT TRACKHOE   BY: T. REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**LANDSLIDE DEBRIS/COLLUVIUM (Qls/Qc)** Soft, damp, gray brown, Clayey/fine, Sandy SILT			
2								
					-Siltstone clasts up to 6"			
4								
6				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, gray brown, Clayey, SILTSTONE; thinly bedded			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-105,
Log of Test Pit TP 38, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TEST PIT TP 39 ELEV. (MSL.) 1065' DATE COMPLETED 05-05-2010 EQUIPMENT TRACKHOE BY: T. REIST	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				ML/CL	**LANDSLIDE DEBRIS (Qls)** Soft, moist, dark brown, Clayey SILT/Silty CLAY -Becomes orange brown, brown and gray with chaotic appearance below			
2								
4								
6					**-BASAL SLIP SURFACE** at 6.5 feet; estimated based on excavated material; zone of plastic clay with 1/4-1/2" breccia clasts			
8				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard, damp, white, fine, Sandy SILTSTONE			
					TRENCH TERMINATED AT 9 FEET Unable to log due to unsafe condition			

Figure A-106,
Log of Test Pit TP 39, Page 1 of 1

G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01

TEST PIT TP 40

ELEV. (MSL.) **1068'** DATE COMPLETED **05-05-2010**

EQUIPMENT **TRACKHOE** BY: **T. REIST**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**LANDSLIDE DEBRIS (Qls)** Soft, moist, brown, Silty CLAY			
2					-Becomes grayish brown and clayier below 2 feet			
4					-Distinct change in fabric and color below 5 feet			
6				CL	**ALLUVIUM (Qal)** Stiff, moist, dark brown, Silty CLAY			
8								
				ML	**PUENTE FORMATION - SOQUEL MEMBER (Tps-slt)** Hard to very stiff, moist, yellowish brown, fine, Sandy SILTSTONE			
10					TRENCH TERMINATED AT 10 FEET			

Figure A-107,
Log of Test Pit TP 40, Page 1 of 1

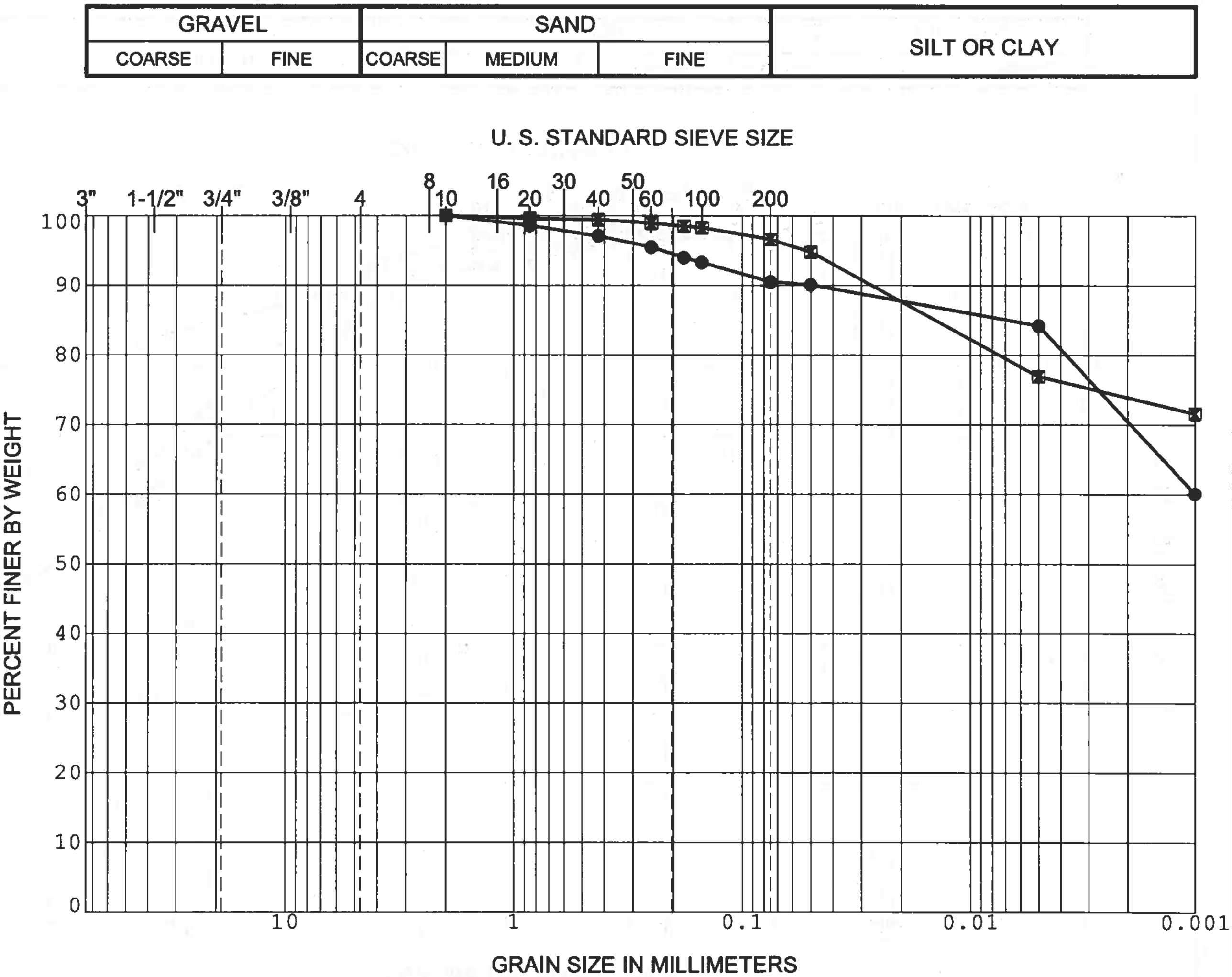
G1218-52-01 (UPD-04-17-2012).GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1218-52-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B33-6	41.0	MH		110	44	66
⊠	B34-6	35.5	CH		103	39	64
▲							

GRADATION CURVE

PORTOLA CENTER

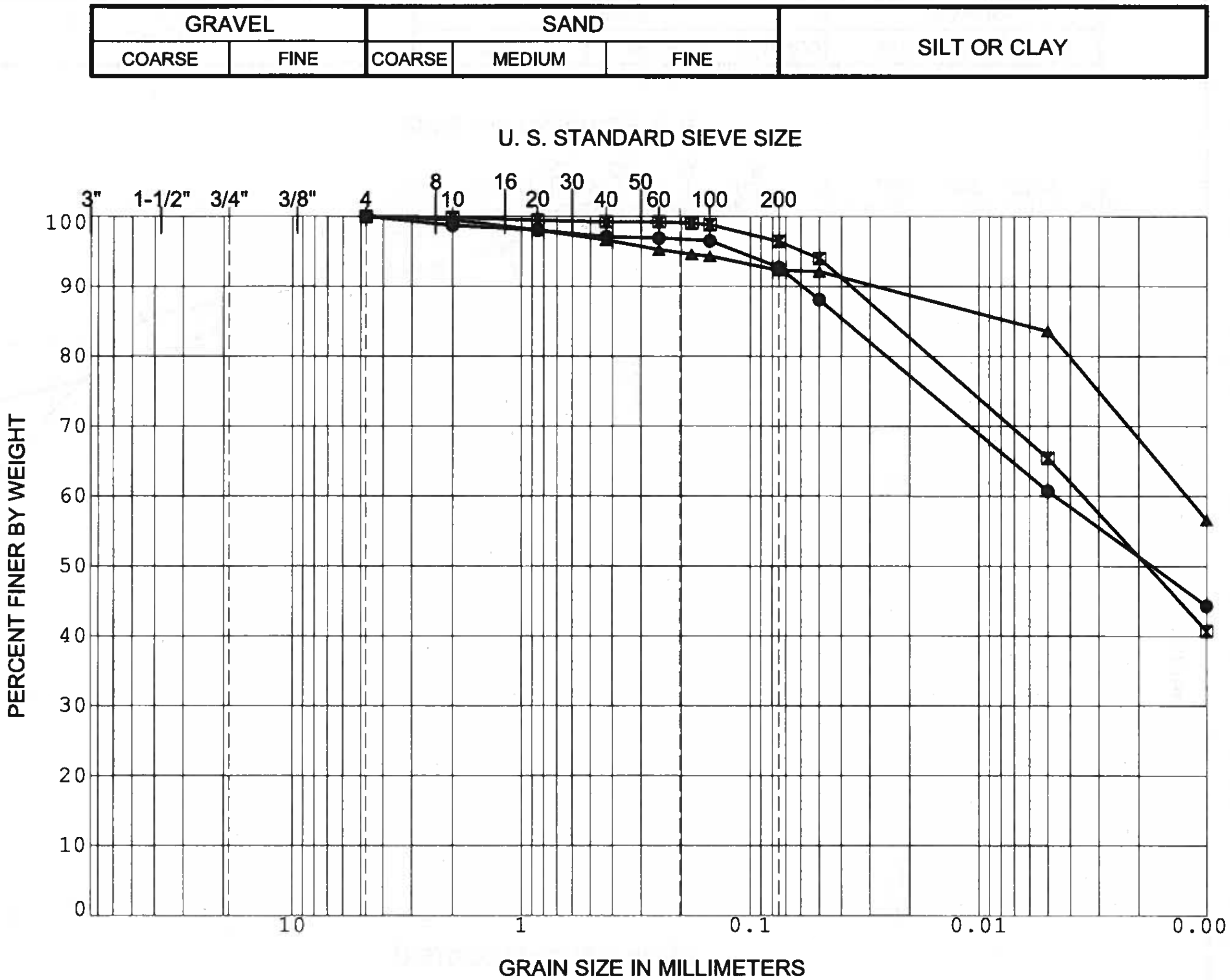
LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-6

GEOCON

PROJECT NO. G1218-52-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B30-4	23.0	CH		80	33	47
⊠	B31-4	30.5	ML		82	37	45
▲	B33-3	13.5	CH		101	40	61

GRADATION CURVE

PORTOLA CENTER

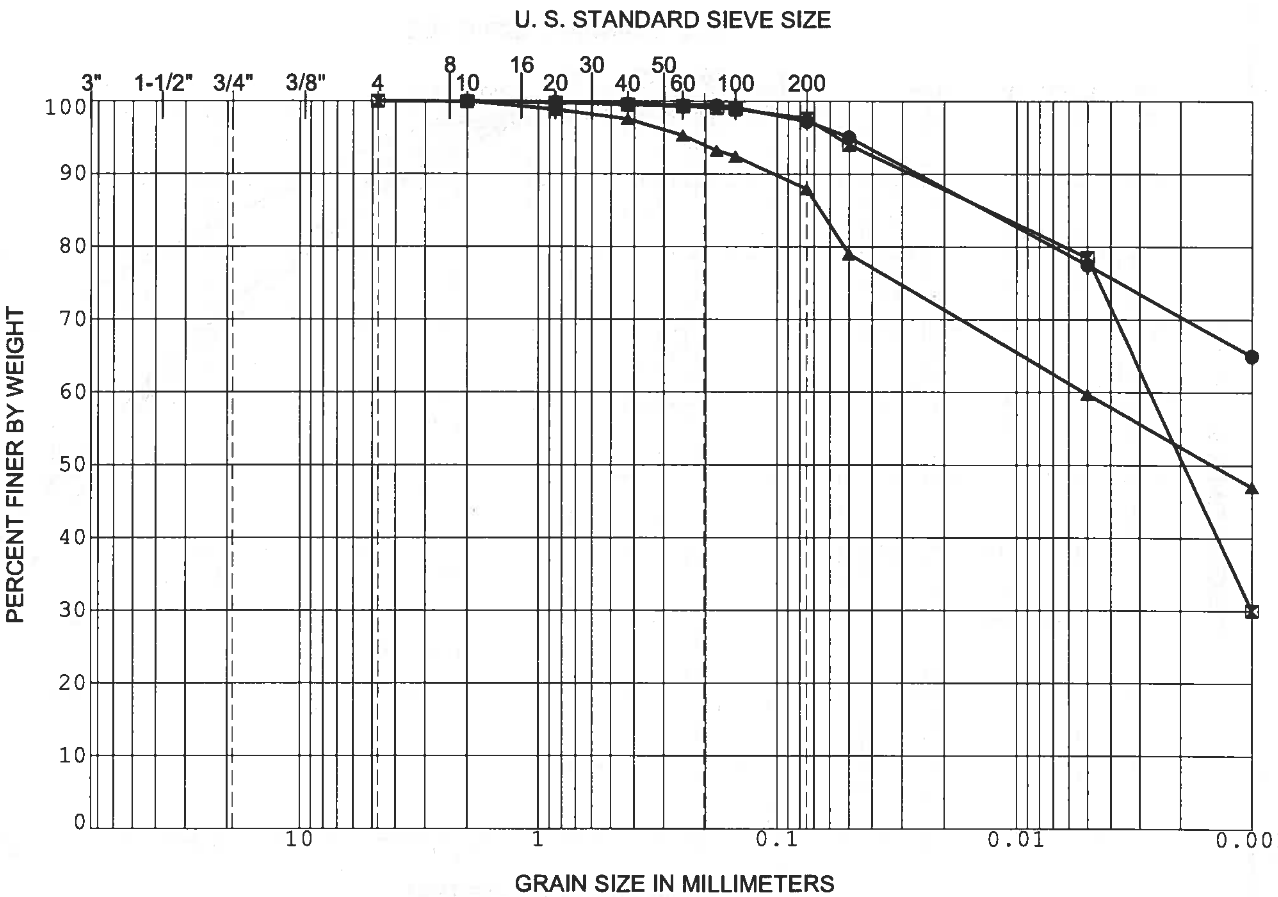
LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

GEOCON

PROJECT NO. G1218-52-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B24-26	39.0	CH		91	34	57
⊠	B25-17	33.0	CH		99	33	66
▲	B26-1	67.0	CH		82	32	50

GRADATION CURVE

PORTOLA CENTER

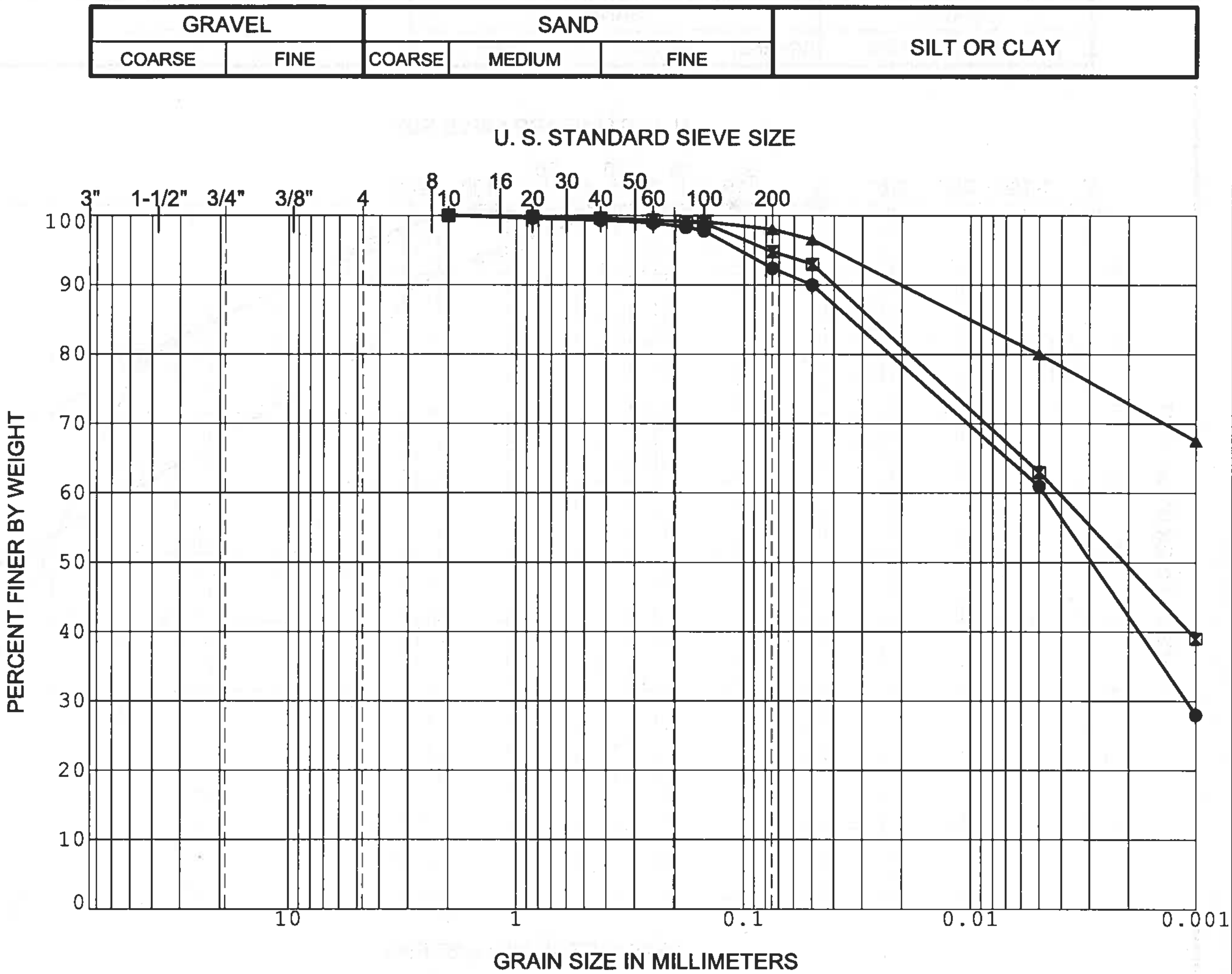
LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-4

GEOCON

PROJECT NO. G1218-52-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B23-6	25.6	MH		83	38	45
⊠	B23-13	37.0	MH		76	34	42
▲	B24-23	26.5	CH		104	35	69

GRADATION CURVE

PORTOLA CENTER

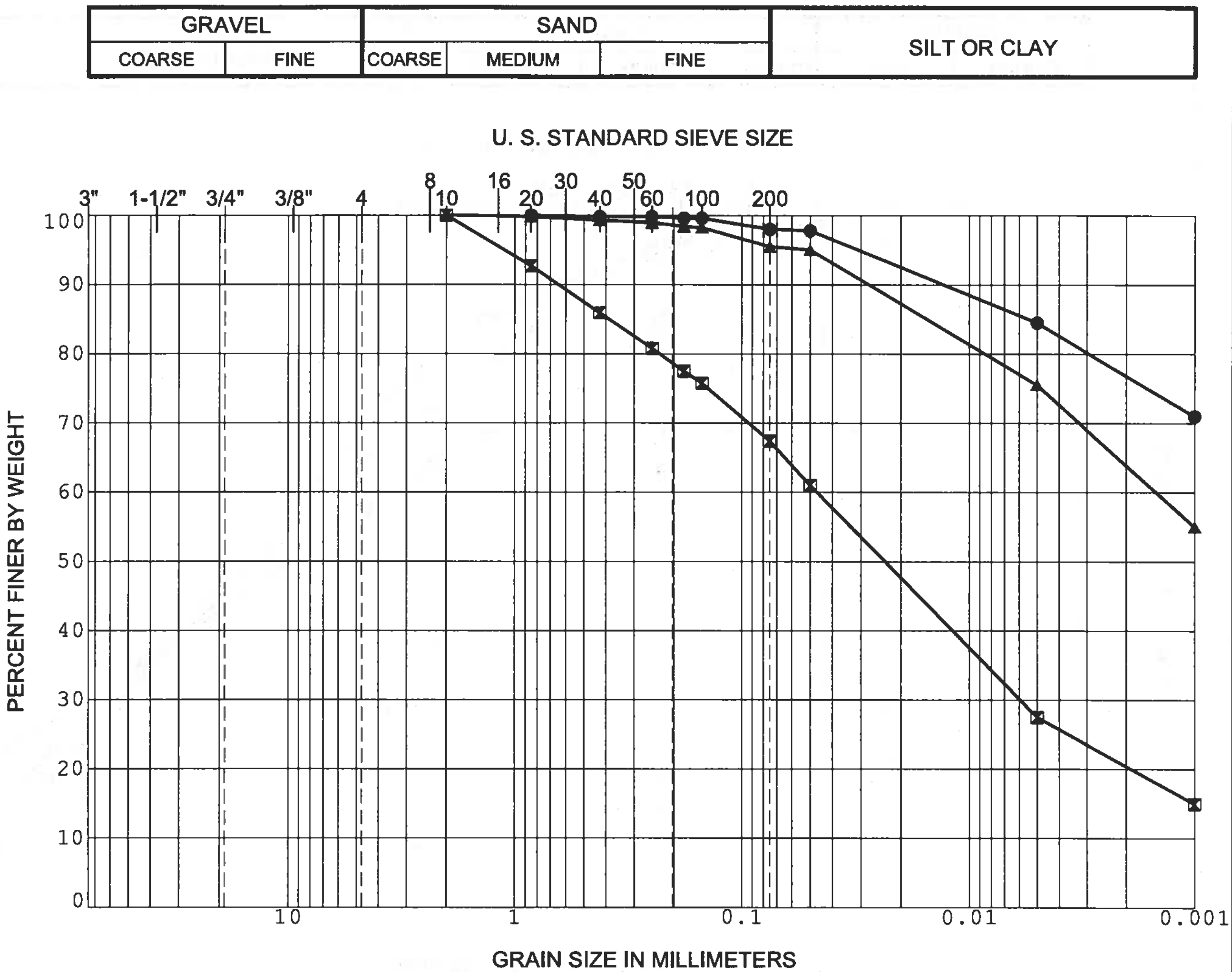
LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-3

GEOCON

PROJECT NO. G1218-52-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B14-11	28.0	CH		116	43	73
⊠	B14-6	30.0	MH		74	43	31
▲	B21-17	66.0	CH		87	33	54

GRADATION CURVE

PORTOLA CENTER

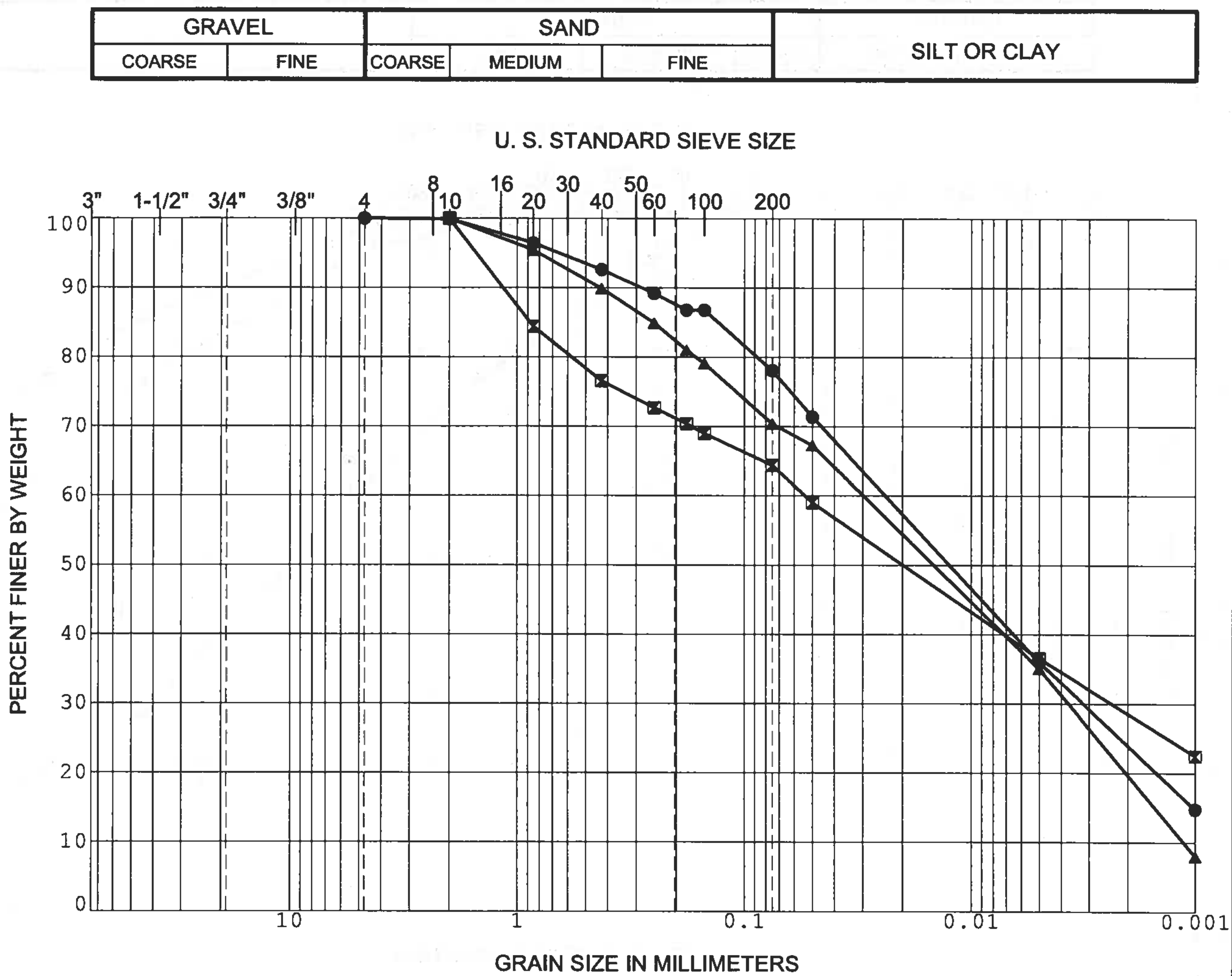
LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-2

GEOCON

PROJECT NO. G1218-52-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B12-4	25.0	MH		96	58	38
⊠	B14-1	5.0	MH		108	70	38
▲	B14-5	25.0	MH		99	56	43

GRADATION CURVE

PORTOLA CENTER

LAKE FOREST, CALIFORNIA

G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-1

GEOCON

TABLE B-VII
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (PH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST METHOD 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
T19-1	6.9	615

TABLE B-IV
SUMMARY OF LABORATORY ATTERBERG LIMITS TEST RESULTS
ASTM D 4318

Sample No.	Liquid Limit	Plastic Limit	Plasticity Index
B12-4	96	58	38
B14-1	108	70	38
B14-5	99	56	43
B14-11	116	43	73
B14-6	74	43	31
B21-17	87	33	54
B23-6	83	38	45
B23-13	76	34	42
B24-23	104	35	69
B24-26	91	34	57
B25-17	99	33	66
B26-1	82	32	50
B30-4	80	33	47
B31-4	82	37	45
B33-3	101	40	61
B33-6	110	44	66
B34-6	103	39	64

TABLE B-V
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Sulfate Exposure
T19-1	0.645	Severe (S2)
B12-4	0.647	Severe (S2)
B14-1	0.111	Moderate (S1)

TABLE B-VI
SUMMARY OF LABORATORY WATER-SOLUBLE CHLORIDE ION CONTENT TEST RESULTS
AASHTO TEST NO. T 291

Sample No.	Chloride Ion Content ppm (%)
T19-1	820 (0.082)

TABLE B-II (Concluded)
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Geologic Unit	Depth of Sample (Feet)	Dry Density (pcf)	Moisture Content (%)		Peak (Ultimate) Cohesion (psf)	Peak (Ultimate) Angle of Shear Resistance (degrees)
				Initial	Final		
B24-5	Tps-slt	15	91.0	29.5	35.7	200 (0)	39 (39)
B24-8	Tps-slt	25	102.1	20.9	25.4	1210 (570)	30 (30)
B35-3	Tps	20	83.3	35.8	39.5	855 (490)	34 (37)
B35-6	Tps-slt	50	105.1	16.9	21.2	955 (870)	38 (38)
B37-2	Tps-slt	20	69.9	46.9	51.8	1110 (1180)	39 (37)
B38-1	Tps	10	110.0	13.2	18.8	590 (545)	48 (48)
B43-3	afe	10	76.0	36.2	43.4	0 (0)	51 (50)
B44-4	afe	20	75.0	41.6	46.7	205 (125)	45 (41)
B45-3	afe	10	80.8	37.3	39.8	900 (700)	41 (39)
B49-4	afe	15	98.9	23.3	28.0	670 (670)	35 (30)
B50-3	afe	15	99.9	23.2	25.0	600 (500)	38 (38)
B51-4	afe	15	100.0	22.3	27.3	1050 (965)	24 (24)
B57-3	Tplv	20	90.8	30.9	41.9	500 (400)	27 (24)
B57-5	Tplv	40	103.0	19.3	26.7	900 (600)	27 (27)

*Sample remolded to approximately 90 percent of maximum dry density at near optimum moisture content.
**Residual Shear Test Results.

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	Soil Expansion Classification	2010 CBC Expansion Classification
	Before Test	After Test				
B5-1	23.2	36.8	82.9	102	High	Expansive
B5-2	27.3	37.3	84.6	54	Medium	Expansive
B6-1	10.0	18.2	109.6	0	Very low	Non-Expansive
B7-5	7.4	27.1	103.6	127	High	Expansive
B7-6	7.2	24.7	106.4	105	High	Expansive
B11-5	13.4	36.5	85.4	113	High	Expansive
B12-10	21.5	50.4	71.1	73	Medium	Expansive
B14-11	24.9	43.0	77.0	81	Medium	Expansive
B15-2	27.2	50.9	73.9	110	High	Expansive
T10-1	7.6	18.5	114.0	53	Medium	Expansive

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Geologic Unit	Depth of Sample (Feet)	Dry Density (pcf)	Moisture Content (%)		Peak (Ultimate) Cohesion (psf)	Peak (Ultimate) Angle of Shear Resistance (degrees)
				Initial	Final		
B3-1	Tps-slt	6	97.7	23.9	22.9	425	40
B3-2	Tps-slt	11	94.1	26.3	32.3	780	20
B4-4	Tplv	21	82.7	36.1	33.6	1670	24
B4-7**	Tplv	36	82.8	39.0	36.7	550	7
B5-1*	Tplv	1-5	72.1	35.5	44.8	480	23
B5-4**	Tplv	16	68.4	64.4	56.9	630	25
B6-1*	Tps	1-5	108.6	9.0	16.7	630	30
B6-3	Tps	11	111.1	7.3	20.8	270	39
B7-4	afe	20	101.2	23.6	19.9	720	21
B7-5*	afe	21-25	102.1	13.6	22.8	770	9
B7-6	afe	30	101.6	22.6	24.8	700	31
B10-1	afe	5	102.5	21.6	23.5	420	27
B12-8	Tplv	45	69.9	35.0	44.7	1200 (850)	27 (26)
B12-9	Tplv	51	67.0	38.0	48.0	155 (490)	53 (41)
B12-10*	Tplv	31-35	64.0	43.9	62.6	430	31
B14-5**	Tplv	25	69.7	49.7	56.5	200 (240)	24 (20)
B14-6	Tplv	30	79.5	40.4	42.7	730 (630)	33 (33)
B14-10	Tplv	50	54.9	63.0	71.0	500 (90)	40 (39)
B14-11*	Tplv	28-29	70.0	39.4	54.1	310	35
B15-7	Tplv	40	78.5	39.9	44.5	260 (50)	39 (26)
B15-8	Tplv	45	68.7	46.6	51.8	550 (490)	32 (23)
B16-2	afe	10	78.0	32.9	55.6	380	43
B16-5	afe	25	74.0	43.1	48.3	1060	24
B16-8	afe	40	67.0	50.7	53.4	1140	33
B16-11	afe	55	107.1	6.9	15.6	580	34
B16-13*	afe	0-5	71.2	33.4	55.6	370	32
B18-8*	afe	0-5	64.6	27.8	52.2	360	36
B19-8*	afe	0-5	113.6	8.6	17.5	440	27
B21-3	Tps-slt	15	99.9	23.2	30.7	450 (450)	32 (30)
B21-10	Tps-slt	45	78.1	38.8	43.4	225 (220)	43 (36)
B23-3	Tps	10	109.9	5.5	14.9	400 (210)	43 (39)
B23-10	Tps-slt	29	93.6	27.1	31.1	675 (525)	25 (21)

TABLE B-I (Concluded)
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B14-11	Yellowish brown, fine, Sandy SILT (Tplv)	83.0	31.0
B16-13	Brown, fine, Sandy SILT (afe)	83.5	27.0
B18-8	Light olive brown, Clayey SAND (afe)	83.5	30.5
B19-8	Olive brown, Fine, Silty SAND (afe)	127.0	8.0
B40-4	Brown, fine to medium Sandy SILT (afe)	109.0	16.7
B40-12	Dark brown, Sandy CLAY (afe)	109.6	16.1
B42-5	Olive brown, Silty SAND; trace gravel (afe)	128.9	10.2
B43-1	Dark olive brown, Clayey SAND (afe)	83.6	33.0
B44-5	Olive brown, Sandy SILT; trace gravel (afe)	109.5	17.6
B45-2	Olive brown, Sandy SILT; trace gravel (afe)	87.3	29.1
B49-3	Olive brown, Sandy SILT; trace gravel (afe)	113.4	15.6
B50-4	Olive brown, Clayey SILT; trace gravel (afe)	113.5	16.8
B51-6	Olive gray, Sandy SILT (afe)	106.5	18.5
B54-6	Very dark grayish brown, Sandy SILT (Tplv)	77.9	33.8
B58-2	Dark olive brown, Silty SAND (afe)	119.8	12.6
B58-5	Very dark gray, Sandy CLAY (afe)	118.3	13.2
B60-5	Olive brown, Sandy SILT (afe)	112.7	15.4
B61-2	Dark grayish brown, Silty SAND; trace gravel (afe)	116.1	14.6
B61-8	Dark olive brown, Sandy SILT (afe)	110.5	17.7
B62-3	Olive brown, Sandy CLAY; trace gravel (afe)	105.6	18.6

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with current generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were analyzed for *in situ* dry density and moisture content, maximum dry density and optimum moisture content, shear strength, expansion potential, Atterberg limits, water-soluble sulfate, water-soluble chloride, pH and resistivity, gradation, and consolidation characteristics. The results of the laboratory tests are presented on Tables B-I through B-VII and graphically on Figures B-1 through B-77. The in-place dry density and moisture content of the samples tested are presented in the boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-6	Yellowish brown, Sandy SILT (afe)	118.5	13.0
B1-18	Olive, Sandy SILT (afe)	108.5	16.0
B1-19	Dark gray, Sandy SILT (afe)	113.0	14.5
B2-4	Brown, Silty to Clayey SAND (afe)	130.5	9.5
B2-8	Light Brown, Sandy SILT (afe)	101.0	21.0
B2-12	Yellowish brown, Sandy SILT (afe)	87.0	30.0
B3-14	Olive gray, Silty SAND (Tps)	106.0	17.5
B5-1	Light brown, Sandy SILT (Tplv)	79.0	38.0
B6-1	Yellowish brown, Silty, fine to medium SAND (Tps)	121.5	8.5
B7-5	Dark gray, Sandy SILT (afe)	109.0	18.5
B7-10	Dark gray, Sandy CLAY (afe)	124.0	12.5
B8-6	Gray, Sandy CLAY (afe)	115.0	15.0
B8-20	Dark brown, Sandy SILT (afe)	124.0	12.0
B10-16	Gray, Silty SAND (afe)	97.0	23.5
B11-5	Dark gray, Sandy SILT (afe)	82.5	33.0
B11-10	Olive, Sandy SILT (afe)	111.0	16.0
B12-10	Grayish brown, fine to medium, Sandy SILT (Tplv)	75.0	37.5

APPENDIX B

Sincerely,

Dan Yokoyama

Dan Yokoyama, REHS
Environmental Health Specialist II
Water Quality Program
Environmental Health

Attachments

cc: Mike Fennessy, Supervisor, Water Quality Program
Juan Anzora, Water Quality Inspector

COUNTY OF ORANGE
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BOB WILSON
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RICHARD SANCHEZ, REHS, MPH
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1241 E. DYER RD., #120
SANTA ANA, CA 92705-5611

TELEPHONE: (714) 433-6288
FAX: (714) 433-6481
E-MAIL: ehealth@ochca.com

October 14, 2011

Paul D. Theriault
GEOCON West, Inc.
41571 Corning Place, Suite 101
Murrieta, CA 92562-7065

Re: Proper destruction of large diameter soil borings for Well Construction Permit # 11-10-16 (Saddleback Ranch Rd. and Glen Ranch Rd. in Lake Forest, CA).

Dear Paul Theriault:

All soil borings that are permitted by this Agency must be destroyed according to the California Well Standards Bulletins 74-81 and 74-90. All exploratory borings located in areas where there is a possibility of surface contamination (from known or potential sources of pollution and contamination) must be adequately abandoned. The top 20 feet (minimum) must be sealed with an approved, impervious sealant. If contaminated soil or groundwater is encountered in any of the exploratory borings, in-situ soil must not be used as part of the sealing material. Exploratory borings must be completely filled with appropriate sealing material from bottom to top. All drilling must be undertaken in such a manner as to not impair the quality of the groundwater.

If no groundwater is encountered in the eight – 30-inch diameter soil borings (total estimated boring depth of 50-130 feet below ground surface) the following variance will be given for the destruction of the borings. Begin with backfilling the bottom of the hole with two feet of bentonite grout. A half-foot of bentonite grout must be placed after every five feet of clean native material. In circumstances where the soil formation is well known, one foot of bentonite grout after every ten feet of clean native material is also acceptable. The top section between five feet and ten feet below grade must also be filled with bentonite grout. The registered professional as the 'generator' of the waste (soil cuttings) must determine by observation and if necessary appropriate analytical tests that the native soil is clean before it is used for backfilling.

Sincerely,

Dan Yokoyama

Dan Yokoyama, REHS
Environmental Health Specialist II
Water Quality Program
Environmental Health

Attachments

cc: Mike Fennessy, Supervisor, Water Quality Program
Juan Anzora, Water Quality Inspector

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E-MAIL: ehealth@ochca.com

October 14, 2011

Paul D. Theriault
GEOCON West, Inc.
41571 Corning Place, Suite 101
Murrieta, CA 92562-7065

Re: Proper destruction of large diameter soil borings for Well Construction Permit # 11-10-15 (Saddleback Ranch Rd. and Glen Ranch Rd. in Lake Forest, CA).

Dear Paul Theriault:

All soil borings that are permitted by this Agency must be destroyed according to the California Well Standards Bulletins 74-81 and 74-90. All exploratory borings located in areas where there is a possibility of surface contamination (from known or potential sources of pollution and contamination) must be adequately abandoned. The top 20 feet (minimum) must be sealed with an approved, impervious sealant. If contaminated soil or groundwater is encountered in any of the exploratory borings, in-situ soil must not be used as part of the sealing material. Exploratory borings must be completely filled with appropriate sealing material from bottom to top. All drilling must be undertaken in such a manner as to not impair the quality of the groundwater.

If no groundwater is encountered in the ten – 30-inch diameter soil borings (total estimated boring depth of 60-95 feet below ground surface) the following variance will be given for the destruction of the borings. Begin with backfilling the bottom of the hole with two feet of bentonite grout. A half-foot of bentonite grout must be placed after every five feet of clean native material. In circumstances where the soil formation is well known, one foot of bentonite grout after every ten feet of clean native material is also acceptable. The top section between five feet and ten feet below grade must also be filled with bentonite grout. The registered professional as the 'generator' of the waste (soil cuttings) must determine by observation and if necessary appropriate analytical tests that the native soil is clean before it is used for backfilling.

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E-MAIL: ehealth@ochca.com

November 6, 2007

Damien Gonsman
Geocon Incorporated
6960 Flanders Drive
San Diego, CA 92121

Re: Proper destruction of soil borings for Well Construction Permit # 07-11-09.

Dear Damien Gonsman:

All soil borings that are permitted by this Agency must be destroyed according to the California Well Standards Bulletins 74-81 and 74-90. All exploratory borings located in areas where there is a possibility of surface contamination (from known or potential sources of pollution and contamination) shall be adequately abandoned. The top 20 feet (minimum) shall be sealed with an approved, impervious sealant. If contaminated soil or groundwater is encountered in any of the exploratory borings, in-situ soil shall not be used as part of the sealing material. Exploratory borings shall be completely filled with appropriate sealing material from bottom to top. All drilling shall be undertaken in such a manner as to not impair the quality of the groundwater.

If no groundwater is encountered in the five – 30-inch diameter soil borings (total estimated boring depth of 100 feet below ground surface) the following variance will be given for the destruction of the borings. Begin with backfilling the bottom of the hole with two feet of bentonite grout. A half-foot of bentonite grout must be placed after every five feet of clean native material. In circumstances where the soil formation is well known, one foot of bentonite grout after every ten feet of clean native material is also acceptable. The top section between five feet and ten feet below grade shall also be filled with bentonite grout. The registered professional as the 'generator' of the waste (soil cuttings) must determine by observation and if necessary appropriate analytical tests that the native soil is clean before it is used for backfilling.

Sincerely,

Dan Yokoyama

Dan Yokoyama, REHS
Environmental Health Specialist II
Water Quality Section
Environmental Health

Attachments

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MIKE SPURGEON
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STEVEN K. WONG, REHS, MPH
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FAX: (714) 433-6481
E-MAIL: ehealth@ochca.com

December 14, 2006

Gerald Kasman
Geocon Inland Empire, Inc.
3303 N. San Fernando Blvd., Ste. 100
Burbank, CA 91504

Re: Proper Destruction of Soil Borings for Well Construction Permit # 06-12-09.

Dear Gerald Kasman:

All soil borings that are permitted by this Agency must be destroyed according to the California Well Standards Bulletins 74-81 and 74-90. All exploratory borings located in areas where there is a possibility of surface contamination (from known or potential sources of pollution and contamination) shall be adequately abandoned. The top 20 feet (minimum) shall be sealed with an approved, impervious sealant. If contaminated soil or groundwater is encountered in any of the exploratory borings, in-situ soil shall not be used as part of the sealing material. Exploratory borings shall be completely filled with appropriate sealing material from bottom to top. All drilling shall be undertaken in such a manner as to not impair the quality of the groundwater.

If no groundwater is encountered in the six – 24-inch diameter soil borings (total estimated boring depth of 80 feet below ground surface) the following variance will be given for the destruction of the borings. Begin with backfilling the bottom of the hole with two feet of bentonite grout. A half-foot of bentonite grout must be place after every five feet of clean native material. In circumstances where the soil formation is well known, one foot of bentonite grout after every ten feet of clean native material is also acceptable. The top section between five feet and ten feet below grade shall also be filled with bentonite grout. The registered professional as the 'generator' of the waste (soil cuttings) must determine by observation and if necessary appropriate analytical tests that the native soil is clean before it is used for backfilling.

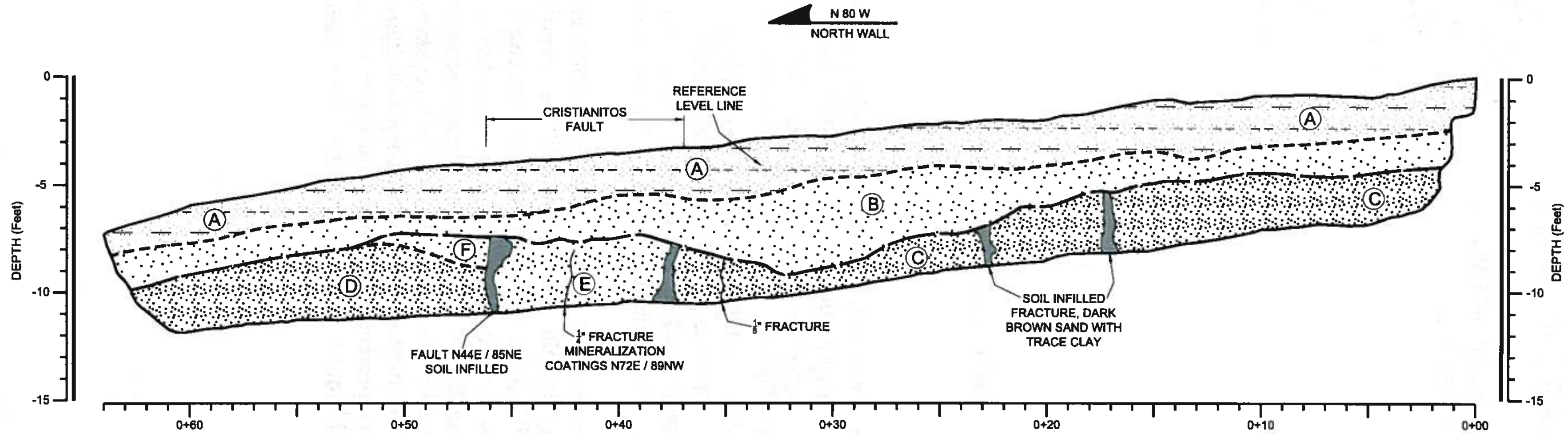
Sincerely,

Dan Yokoyama

Dan Yokoyama, REHS
Environmental Health Specialist II
Water Quality Section
Environmental Health Division

Attachments

PORTOLA CENTER NORTH
TM #17300
LAKE FOREST, CALIFORNIA



FAULT TRENCH FT-1
SCALE: 1" = 5' (Horiz. = Vert.)

Ⓐ **TOPSOIL:** Sandy SILT to Silty SAND, fine- to medium-grained, firm to stiff, dark brown, porous, thin roots; few animal burrows; scattered coarse grains; "A" soil horizon; no evidence of offset or displacement

Ⓑ **TOPSOIL:** Silty SAND with CLAY; fine- to medium-grained, medium dense to dense, olive gray to olive brown, weakly developed pedogenic profile, translocated clay; "AB" to "BTj" soil

Ⓒ **PUENTE FORMATION - SOQUEL MEMBER:** SANDSTONE, fine- to medium-grained with some coarse grains, medium dense to dense, moderately to highly weathered, poorly cemented, scattered clasts of sandy siltstone, massive, light yellowish brown to olive brown

Ⓓ **CAPISTRANO FORMATION:** SANDSTONE, fine- to medium-grained with few coarse grains, dense, moderately weathered, poorly cemented and friable, slightly micaceous, light olive gray to light yellowish gray, massive

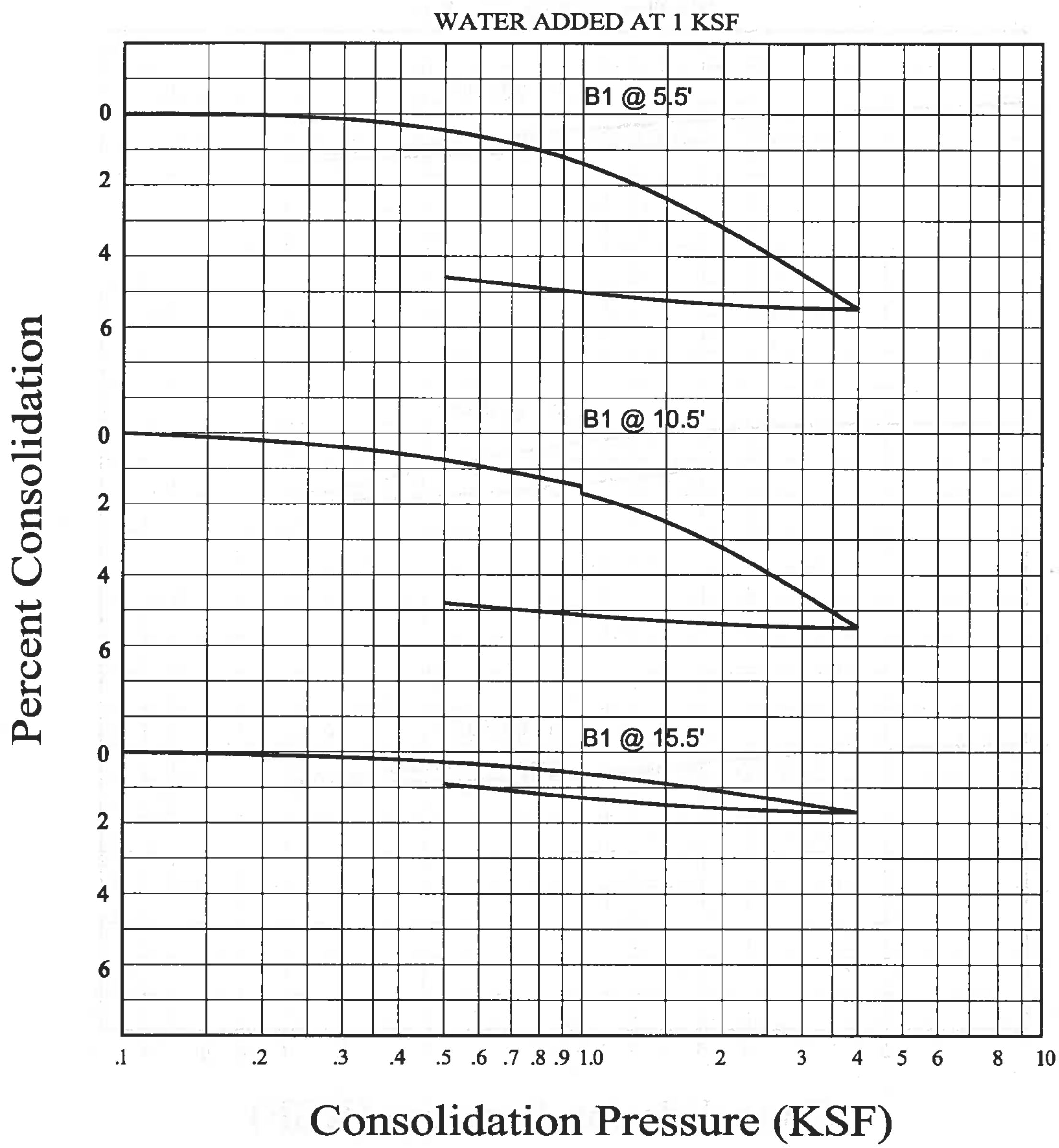
Ⓔ **CRISTIANITOS FAULT:** Zone of highly fractured, crushed SANDSTONE bounded on the west by a soil-filled fault ~ 12" wide at station 0+46 and on the east at station 0+38 by a soil-filled fracture; minor clay gouge and crushed matrix within fractures; some mineralization within fractures; juxtaposing Capistrano Formation (west) and Puente Formation (east); no vertical displacement measurable; trending roughly NE with near-vertical dip

Ⓕ Wedge of crushed Capistrano Formation infilled with clay and sand and highly fractured; soil infilling with clayey basal contact forming upper surface of Capistrano Formation toward the west end of the trench

GEOCON INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

LOG OF TRENCH FT-1

PROJECT NO. G1218 - 52 - 01
FIGURE A-108
DATE 04 - 16 - 2013



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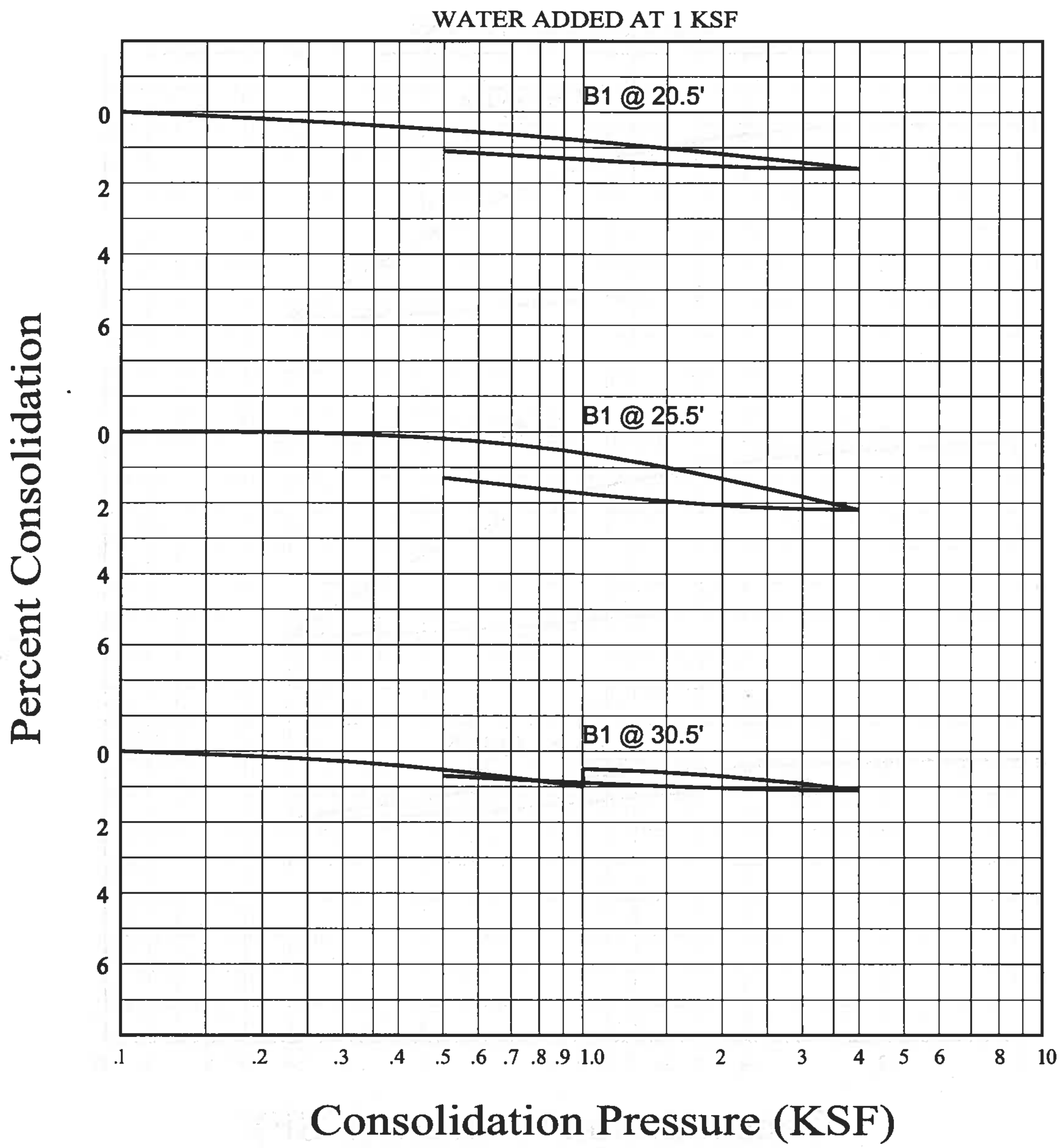
CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

BRG	DSK/GTYPD		PROJECT NO. G1218-52-01	FIG. B-7



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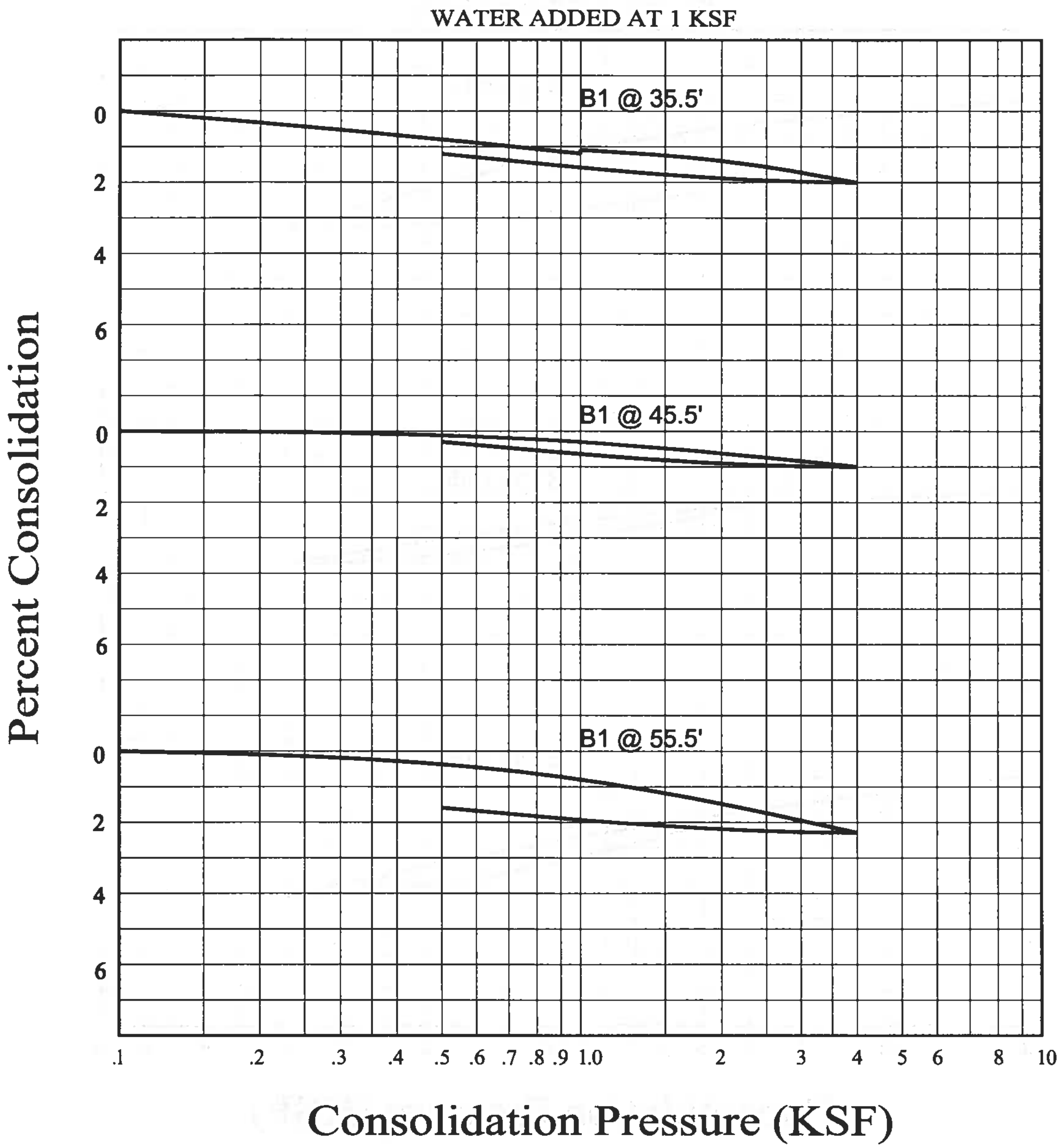
CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

BRG	DSK/GTYPD	PROJECT NO. G1218-52-01	FIG. B-8



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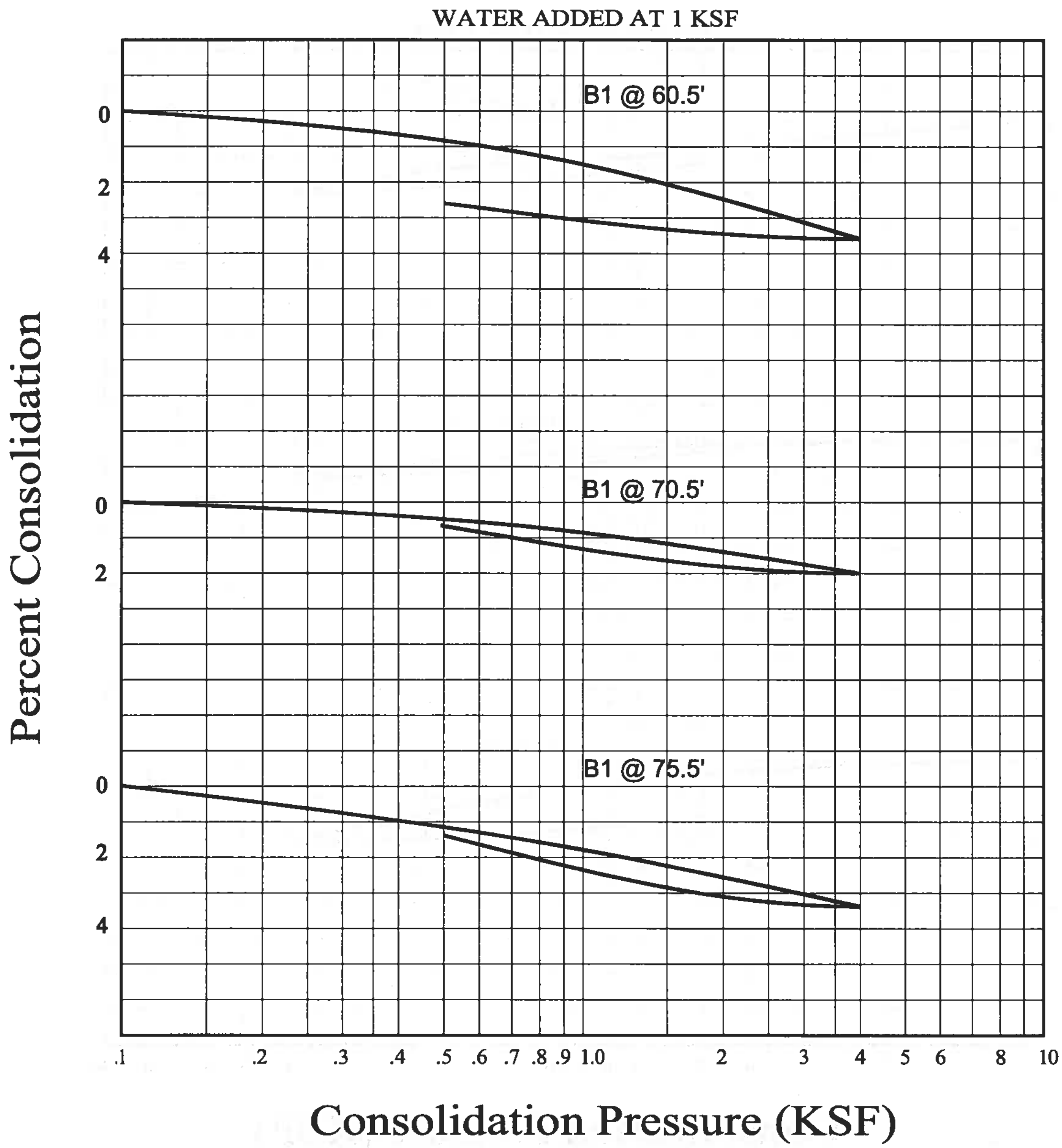
CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

BRG	DSK/GTYPD		PROJECT NO. G1218-52-01	FIG. B-9



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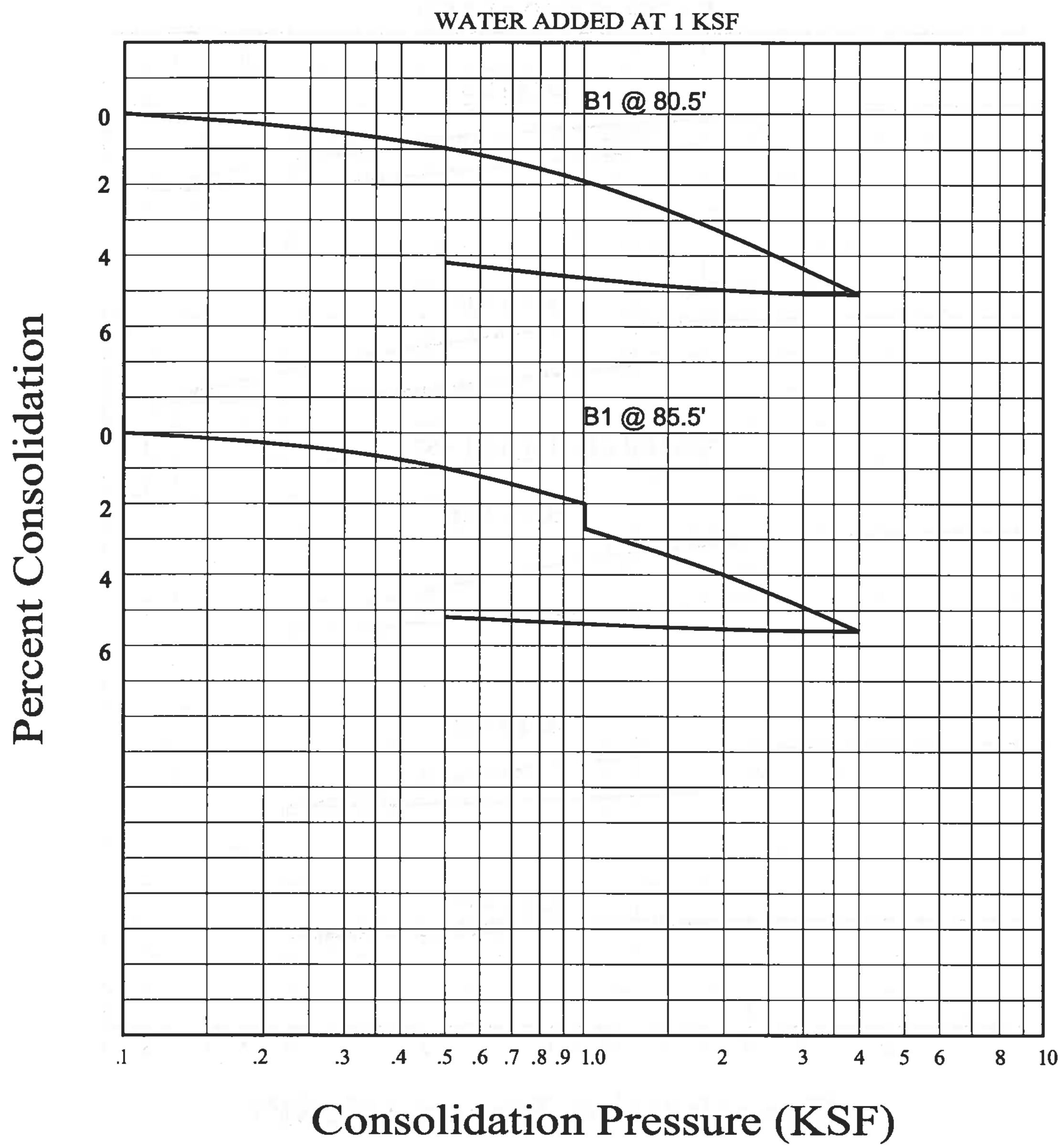
CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

BRG		DSK/GTYPD	PROJECT NO. G1218-52-01	FIG. B-10



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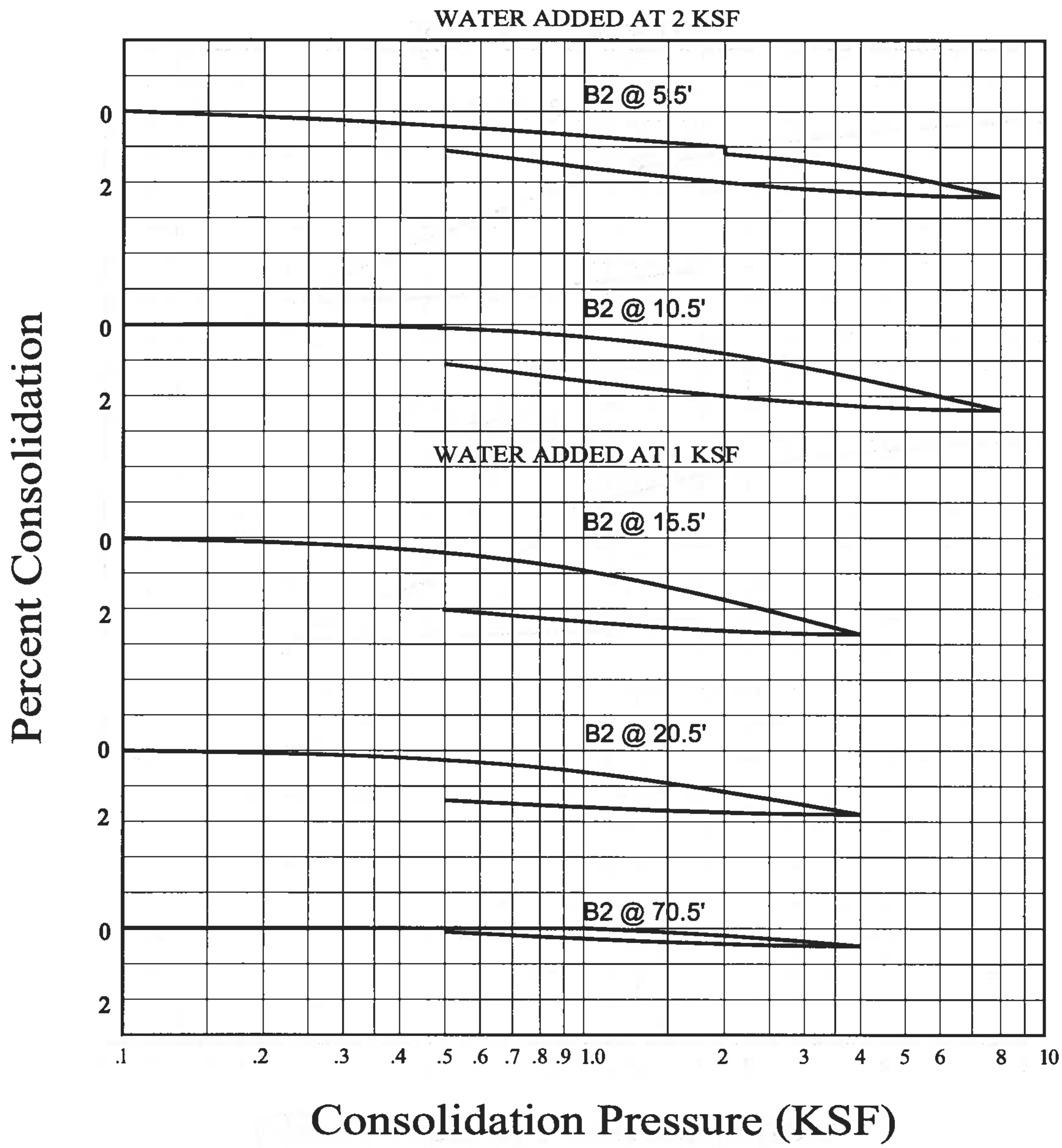
BRG | DSK/GTYPD

CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01

FIG. B-11



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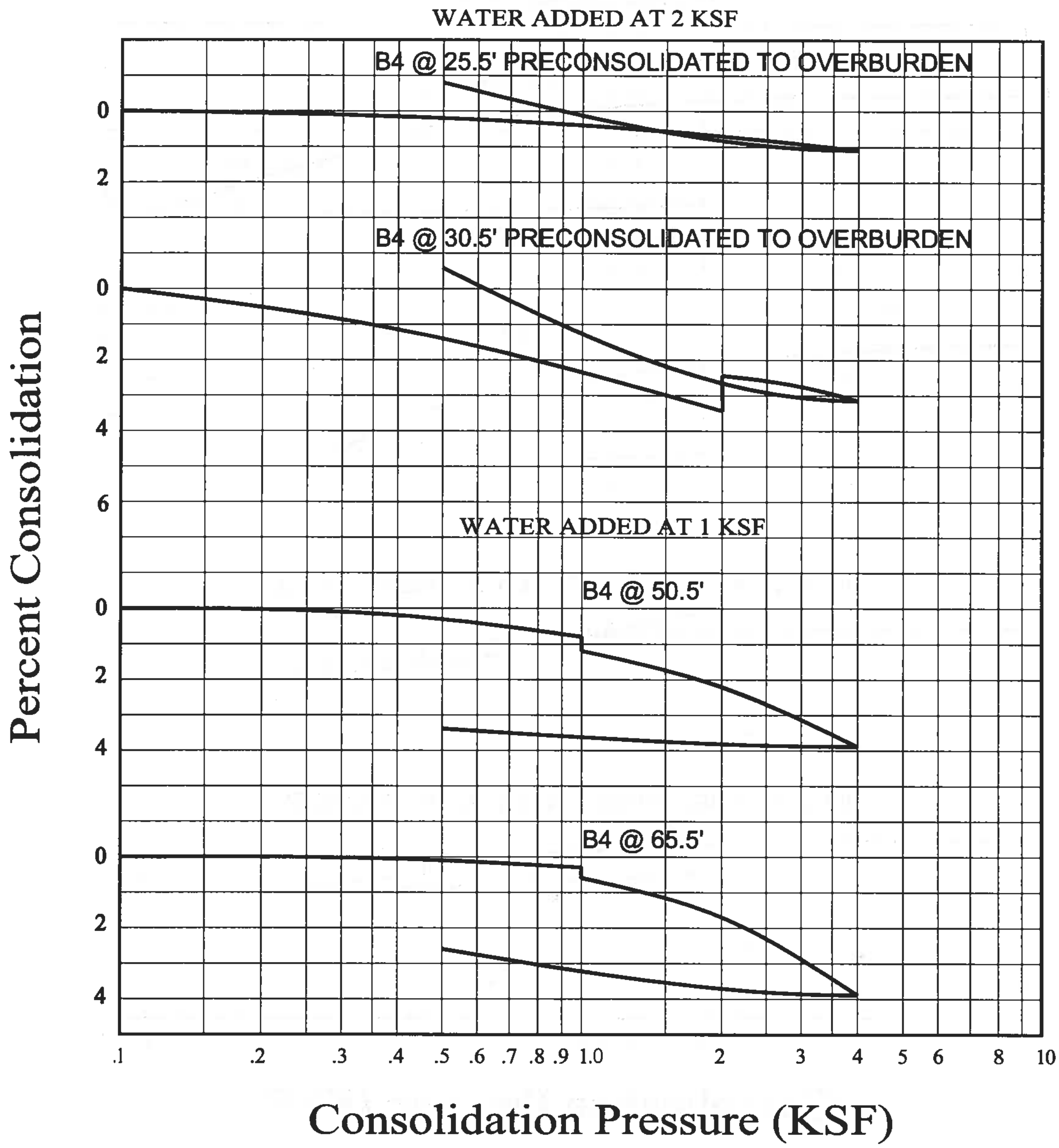
BRG		DSK/GTYPD

CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

	PROJECT NO. G1218-52-01	FIG. B-12



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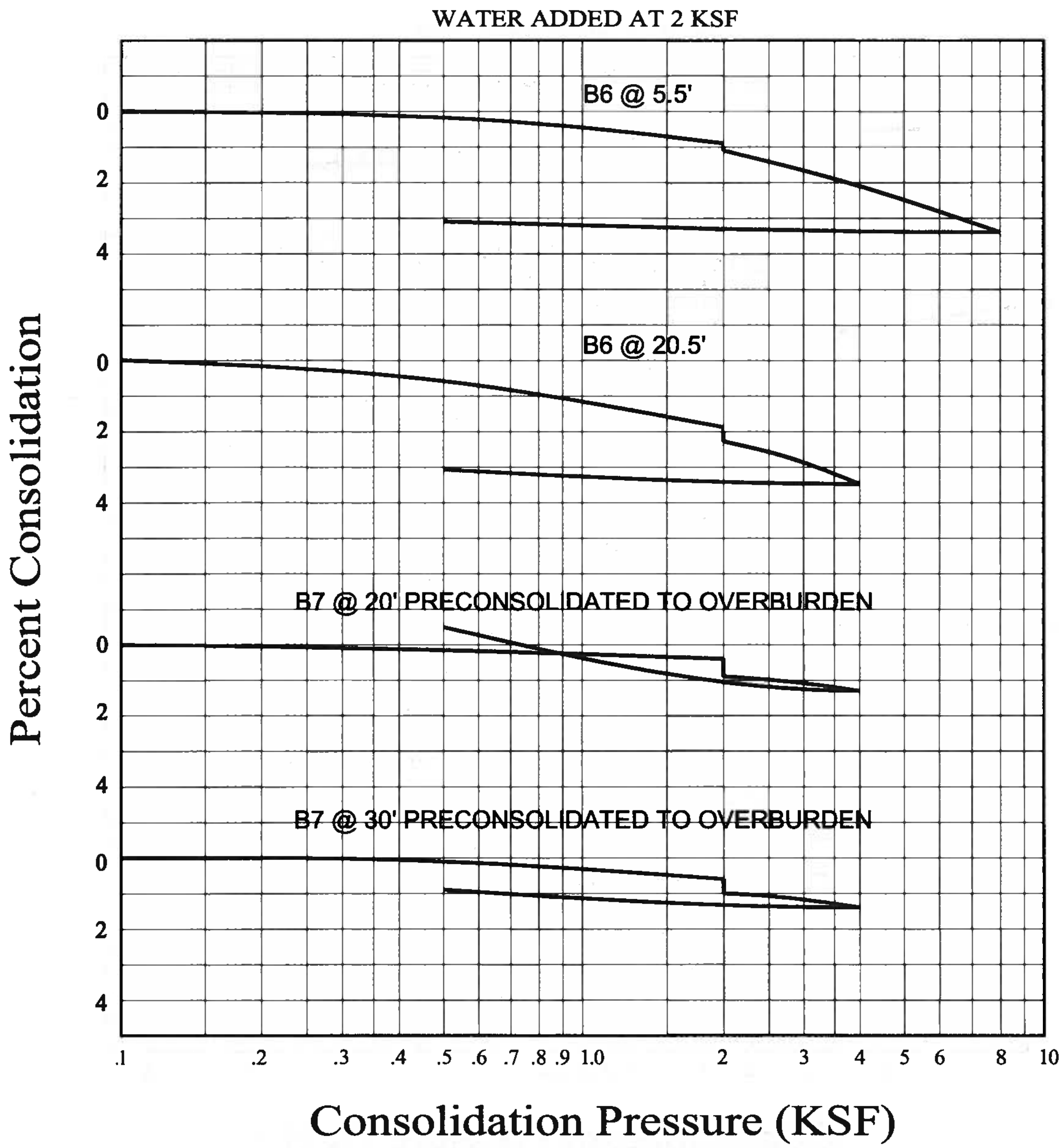
CONSOLIDATION TEST RESULTS

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

BRG		DSK/GTYPD		PROJECT NO. G1218-52-01	FIG. B-13



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CONSOLIDATION TEST RESULTS

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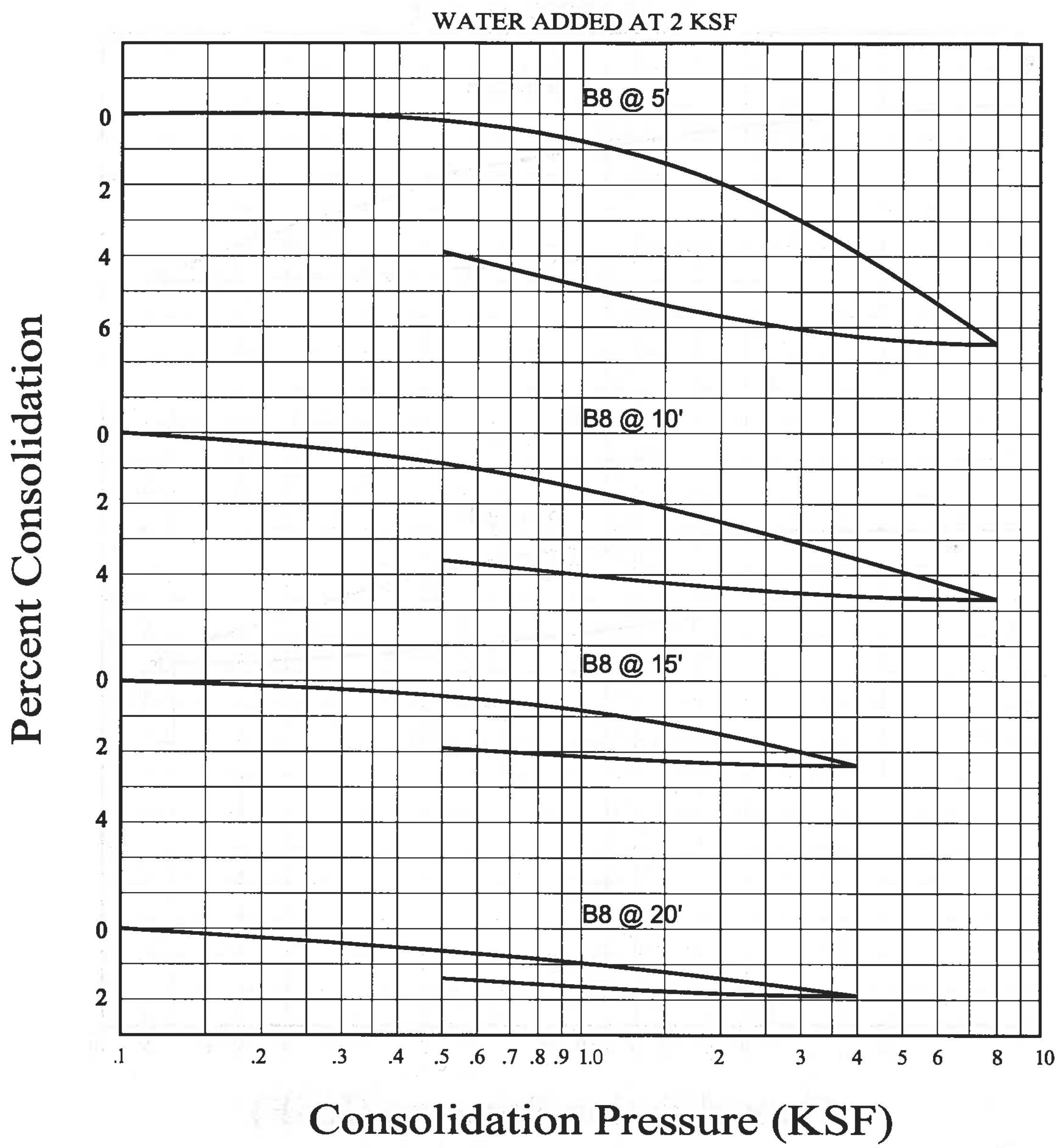
BRG		DSK/GTYPD		PROJECT NO. G1218-52-01	FIG. B-14



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BRG		DSK/GTYPD

CONSOLIDATION TEST RESULTS

PORTOLA CENTER
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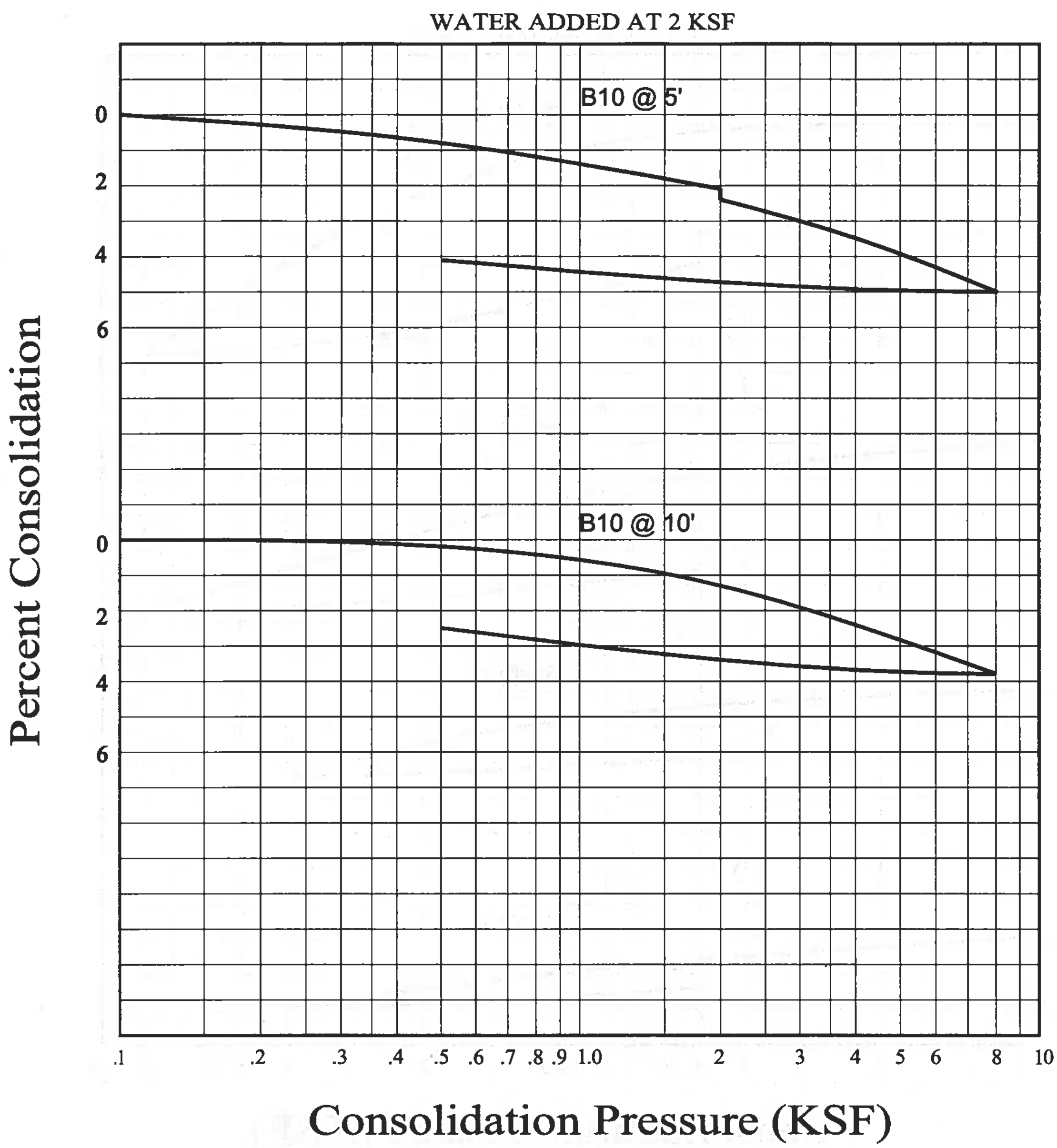
	PROJECT NO. G1218-52-01	FIG. B-15



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CONSOLIDATION TEST RESULTS

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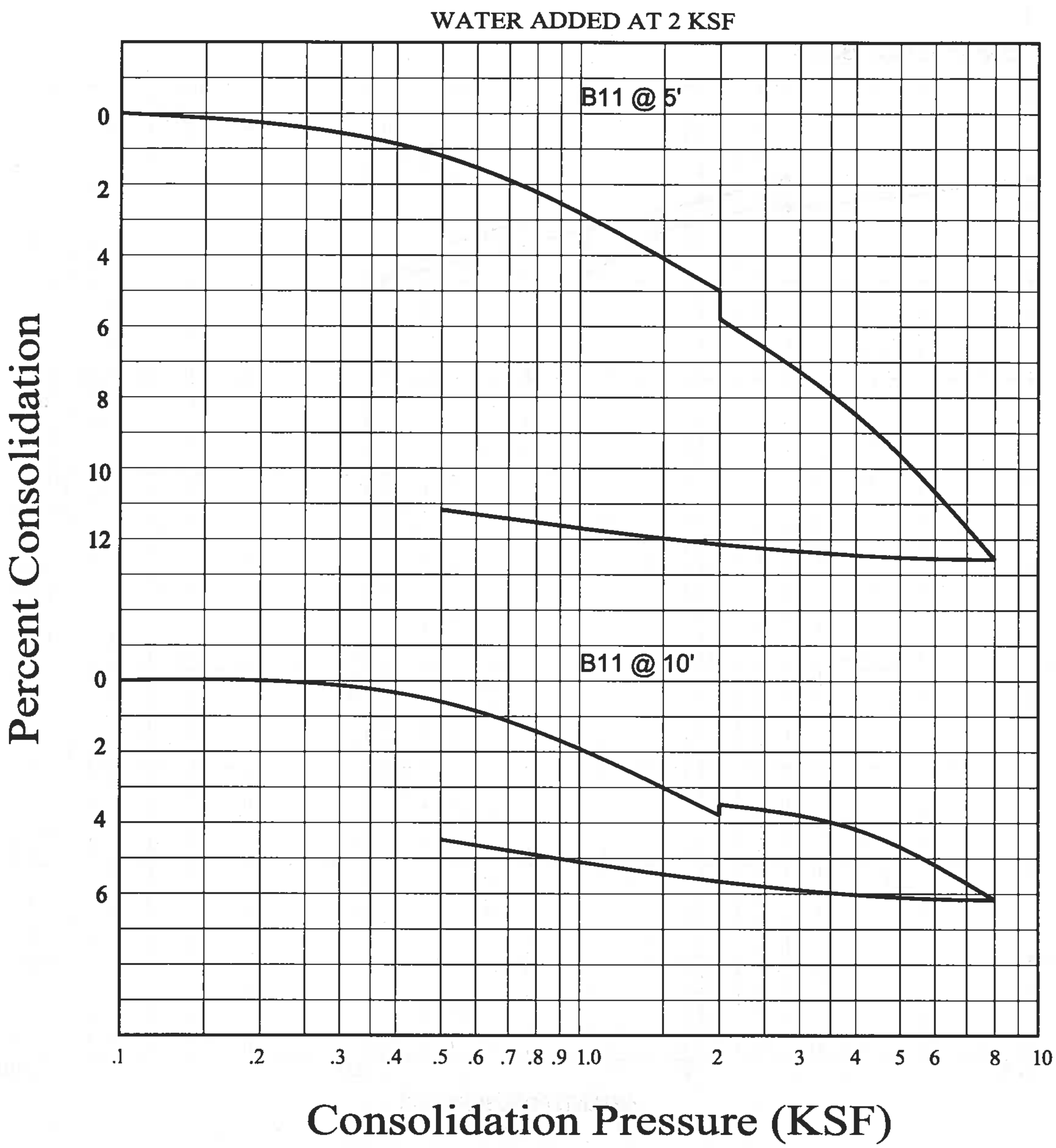
BRG		DSK/GTYPD	PROJECT NO. G1218-52-01	FIG. B-16



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CONSOLIDATION TEST RESULTS

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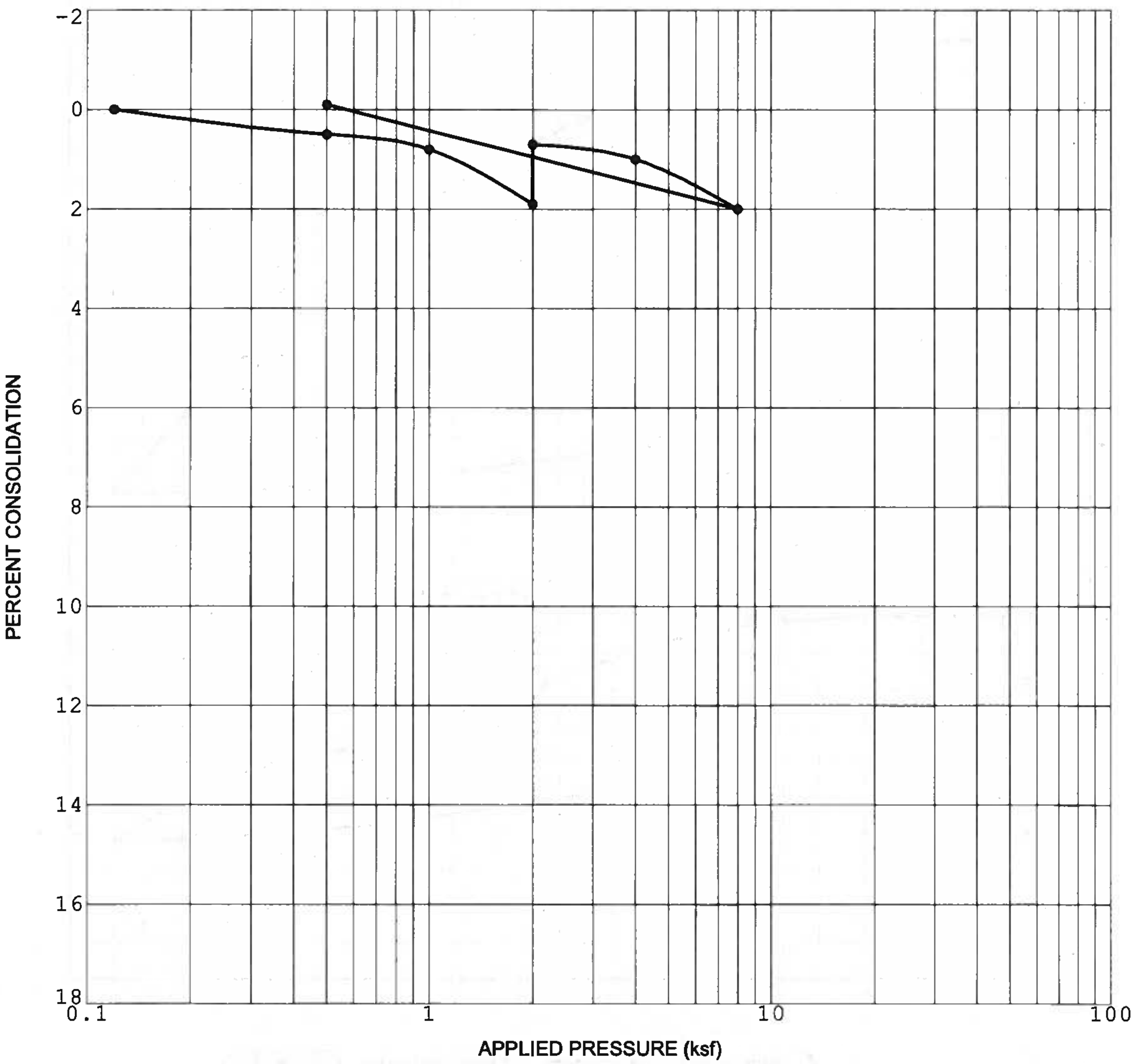
PROJECT NO. G1218-52-01

FIG. B-17

PROJECT NO. G1218-52-01

SAMPLE NO. B25-3



Initial Dry Density (pcf)	92.1
Initial Water Content (%)	30.0

Initial Saturation (%)	99.6
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

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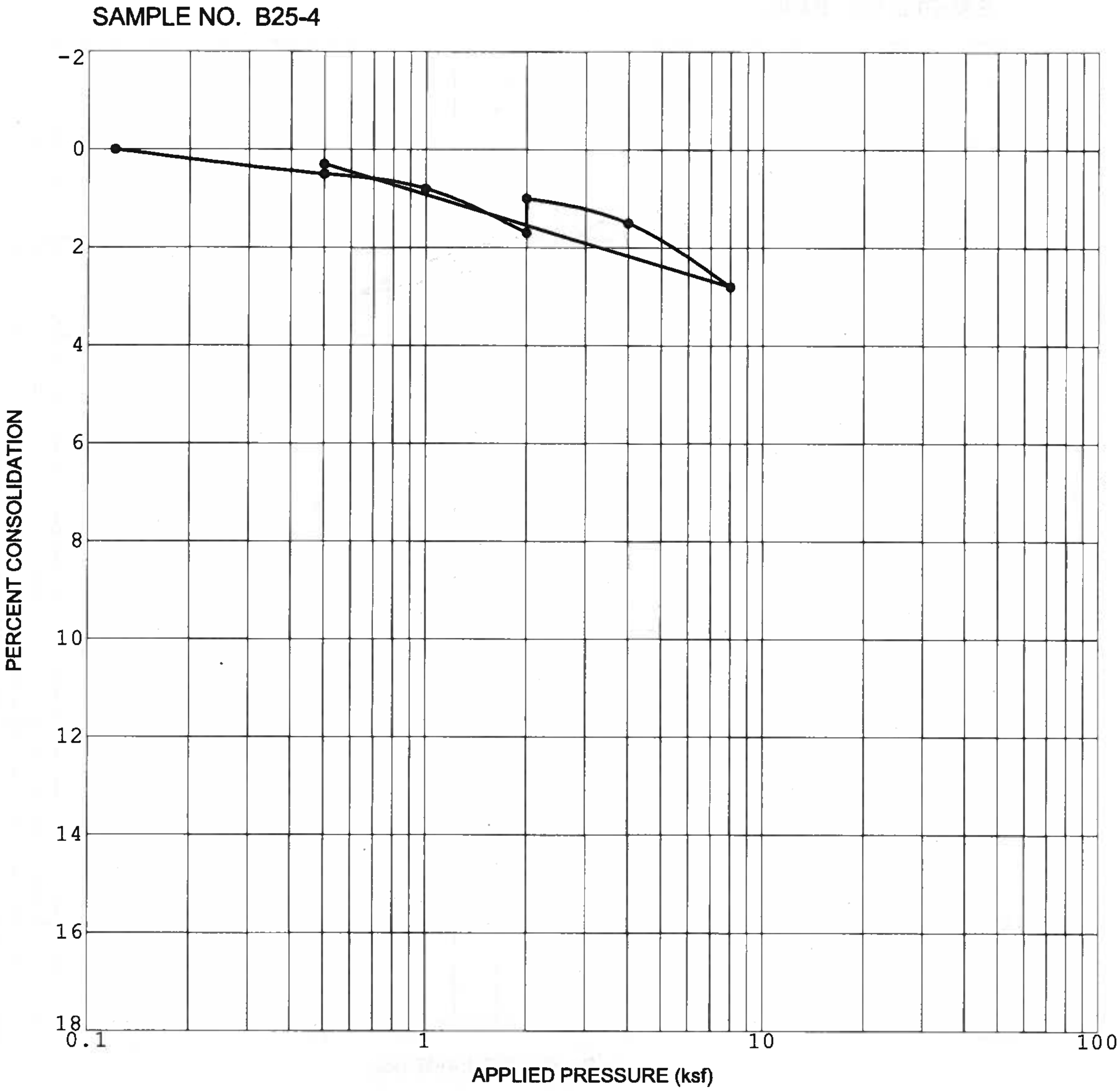
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-18

GEOCON

PROJECT NO. G1218-52-01



Initial Dry Density (pcf)	83.9
Initial Water Content (%)	33.4

Initial Saturation (%)	90.7
Sample Saturated at (ksf)	2.0

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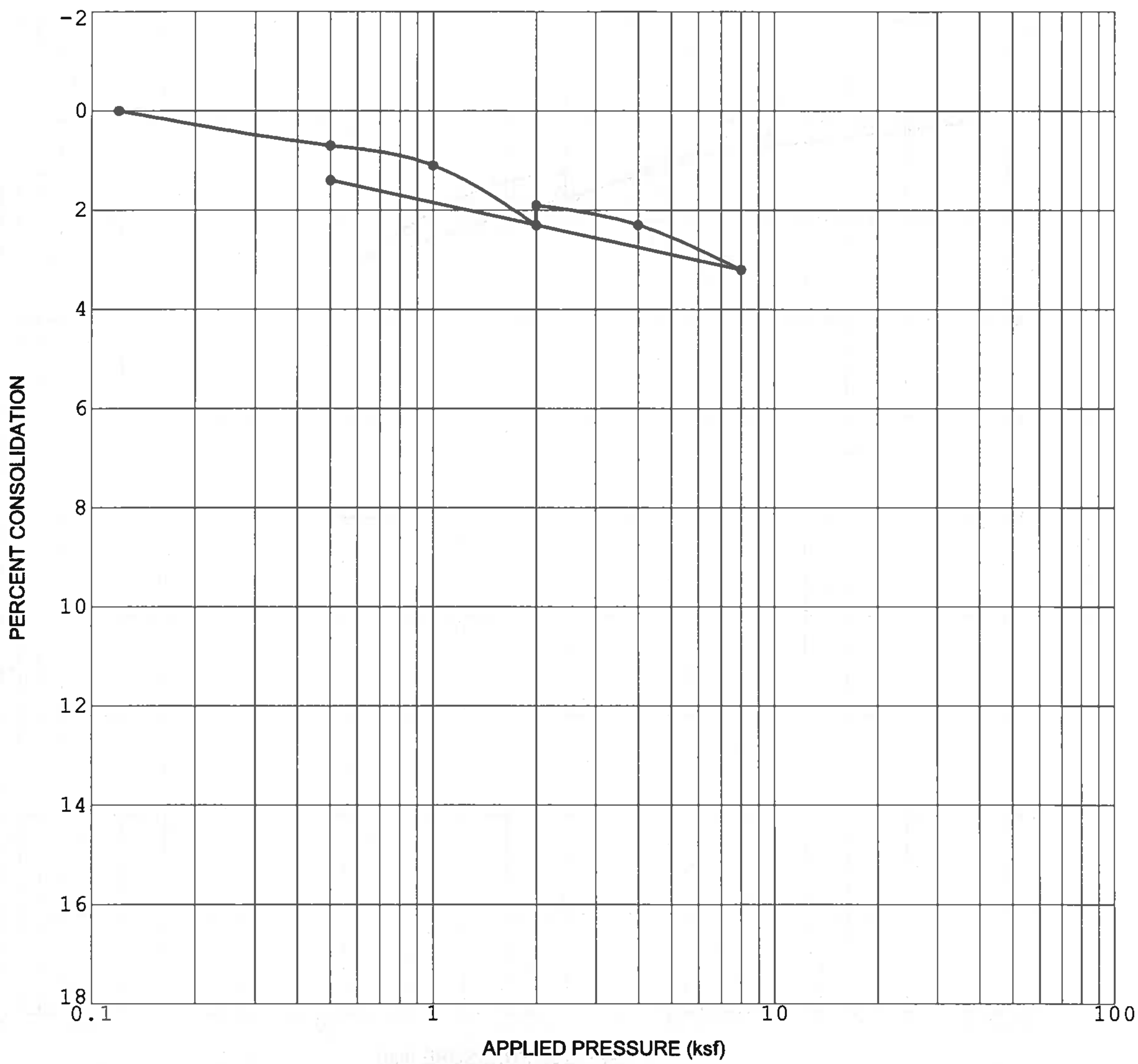
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-19

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B40-5



Initial Dry Density (pcf)	93.2		**Initial Saturation (%)**	96.3
Initial Water Content (%)	28.3		**Sample Saturated at (ksf)**	2.0

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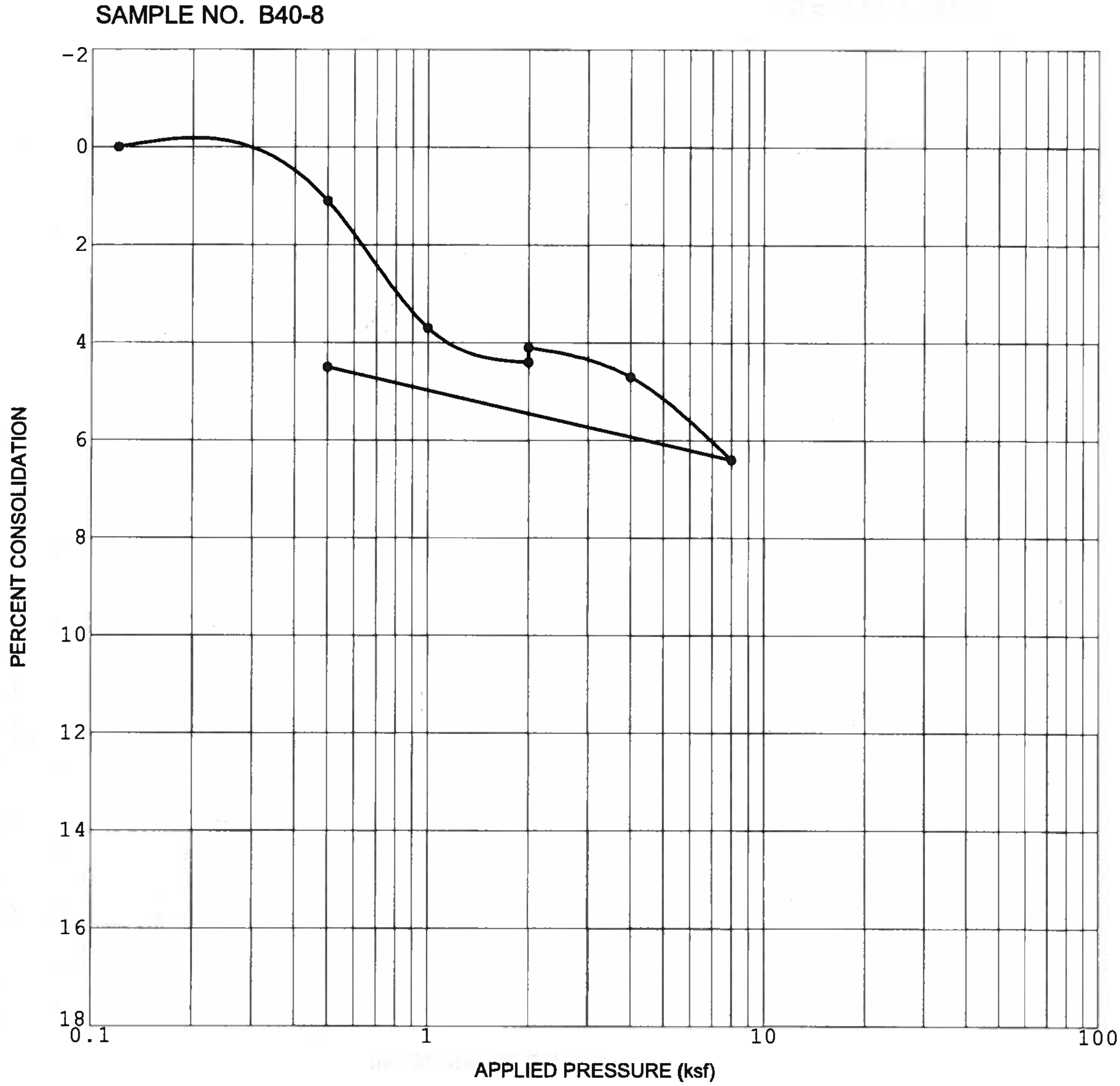
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-20

GEOCON

PROJECT NO. G1218-52-01



Initial Dry Density (pcf)	74.2
Initial Water Content (%)	43.0

Initial Saturation (%)	92.3
Sample Saturated at (ksf)	2.0

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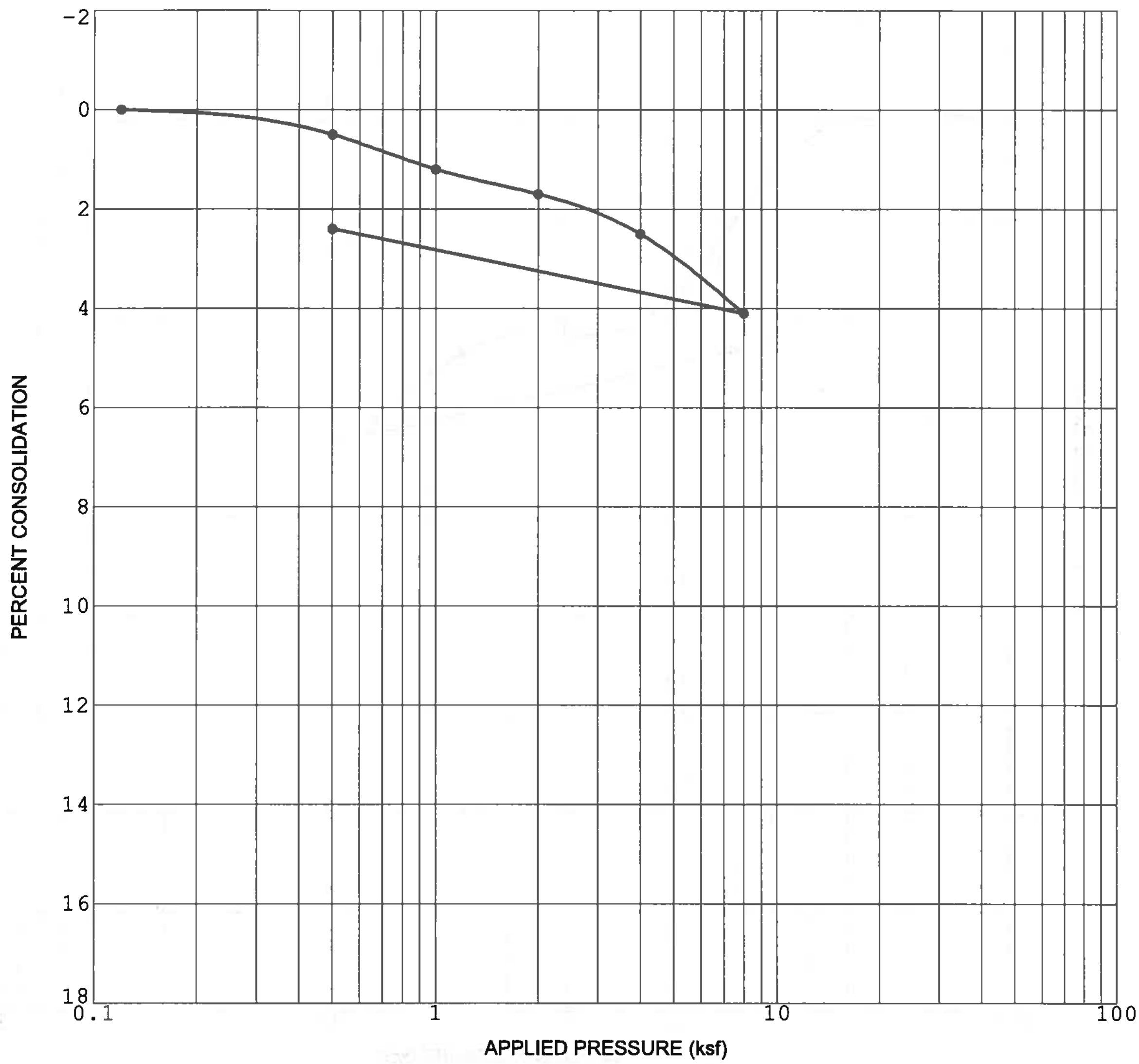
PROJECT NO. G1218-52-01

SAMPLE NO. B42-7



Initial Dry Density (pcf)	89.2	**Initial Saturation (%)**	91.3
Initial Water Content (%)	29.6	**Sample Saturated at (ksf)**	2.0

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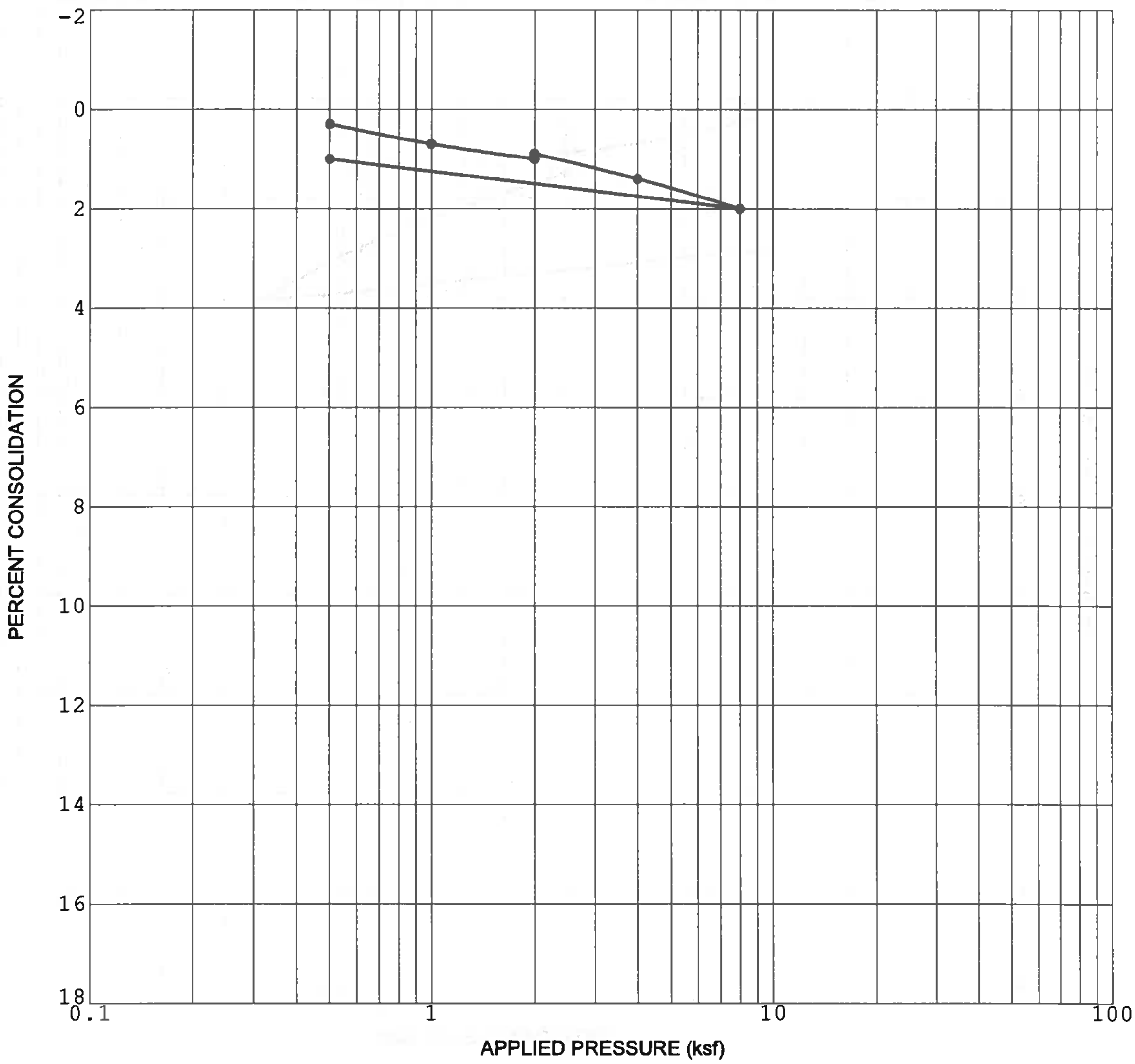
Figure B-22

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B58-6



Initial Dry Density (pcf)	69.0		**Initial Saturation (%)**	90.0
Initial Water Content (%)	42.2		**Sample Saturated at (ksf)**	2.0

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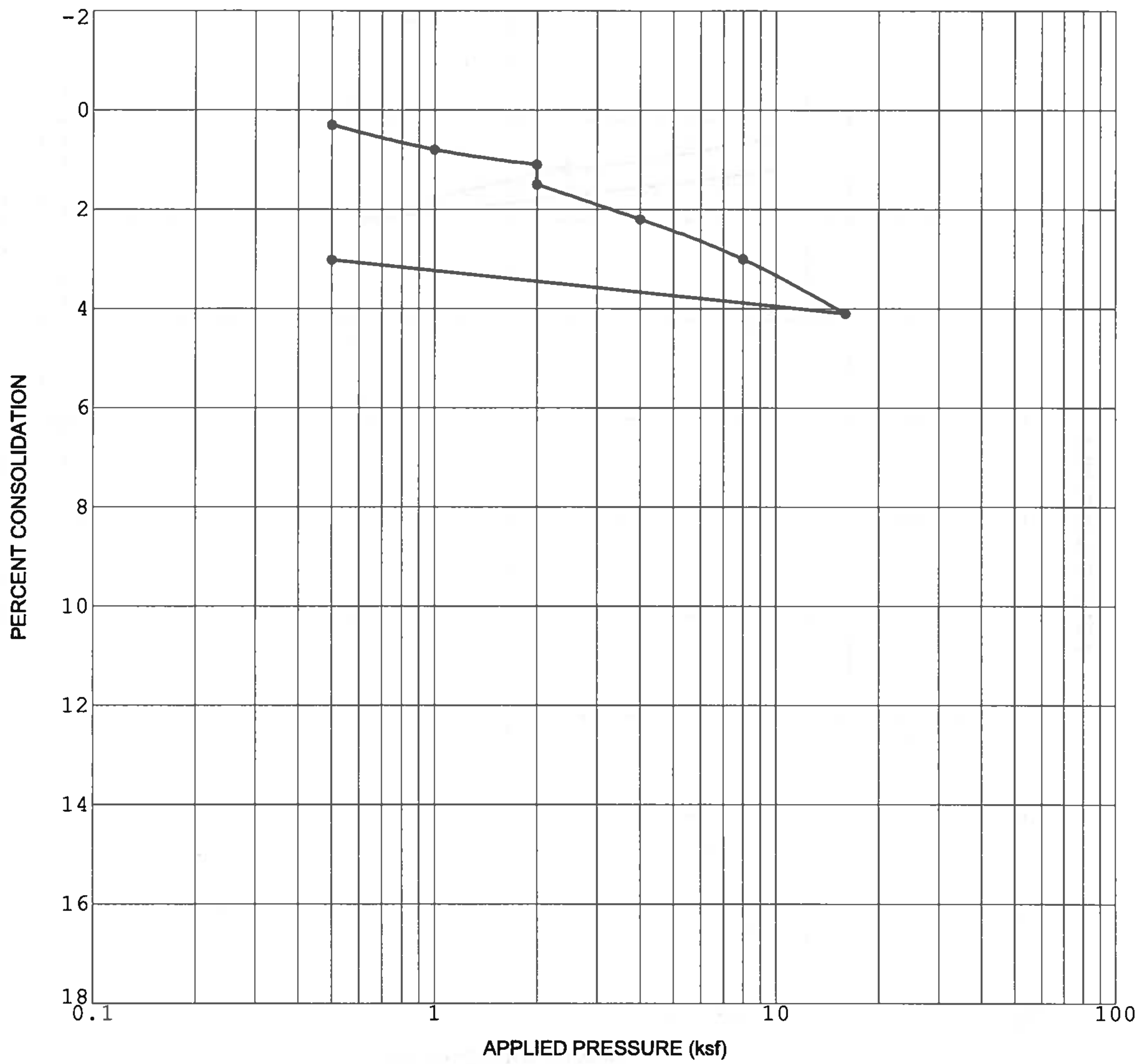
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-23

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B59-7



Initial Dry Density (pcf)	119.0		**Initial Saturation (%)**	42.0
Initial Water Content (%)	5.5		**Sample Saturated at (ksf)**	2.0

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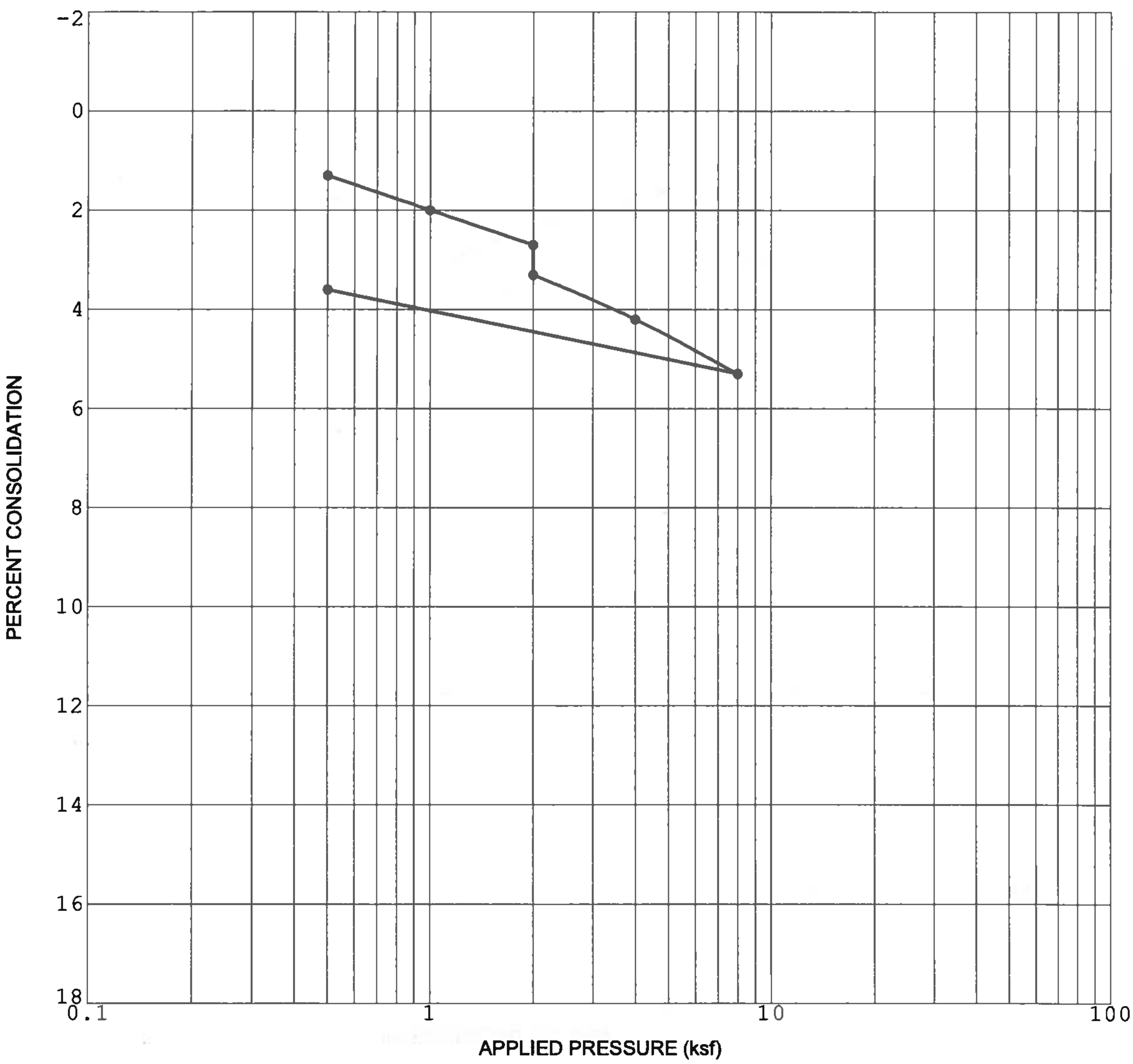
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-24

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B60-2



Initial Dry Density (pcf)	127.1
Initial Water Content (%)	10.2

Initial Saturation (%)	90.3
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

PORTOLA CENTER

LAKE FOREST, CALIFORNIA

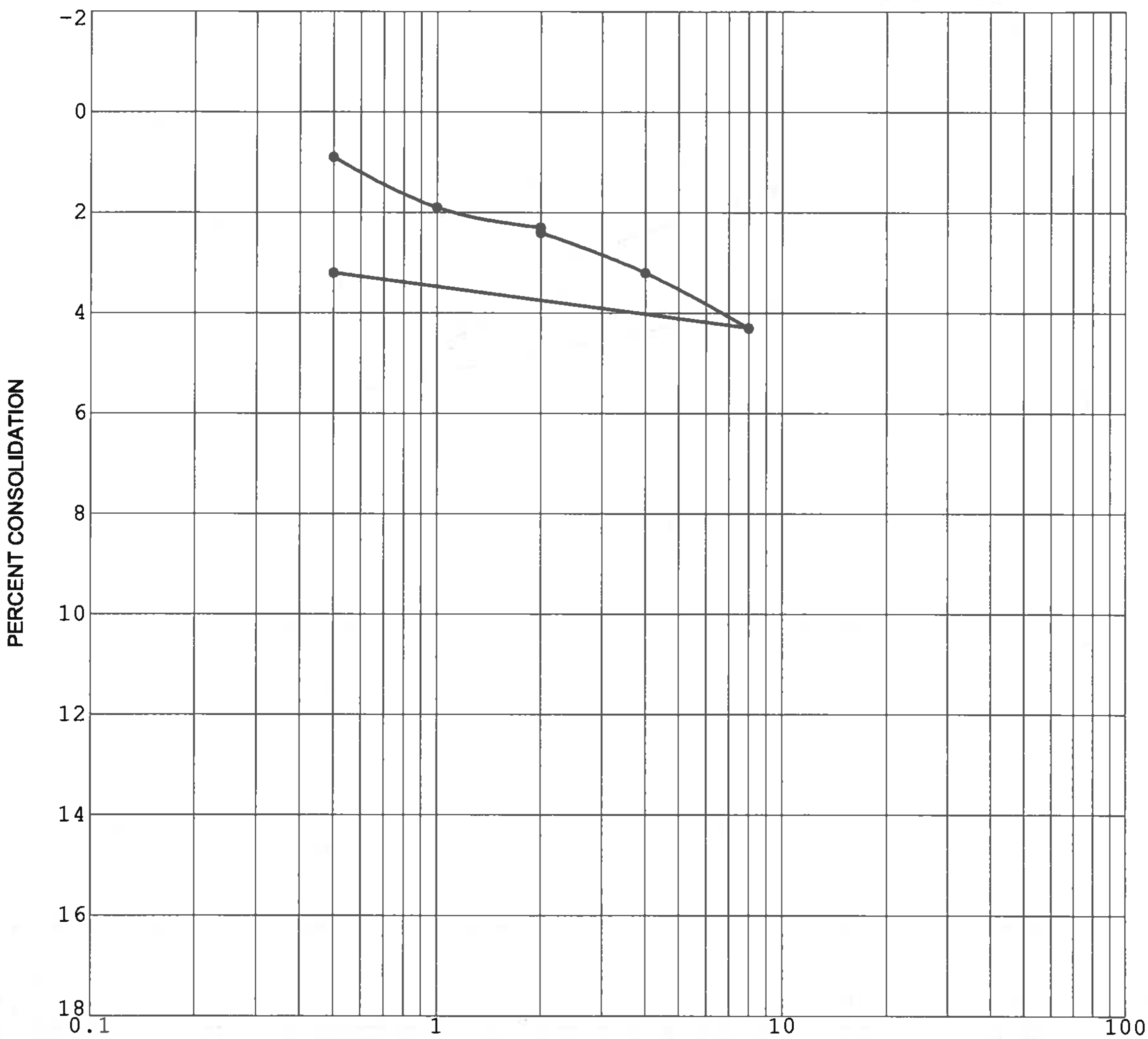
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-25

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B61-4



Initial Dry Density (pcf)	115.5		**Initial Saturation (%)**	96.4
Initial Water Content (%)	15.8		**Sample Saturated at (ksf)**	2.0

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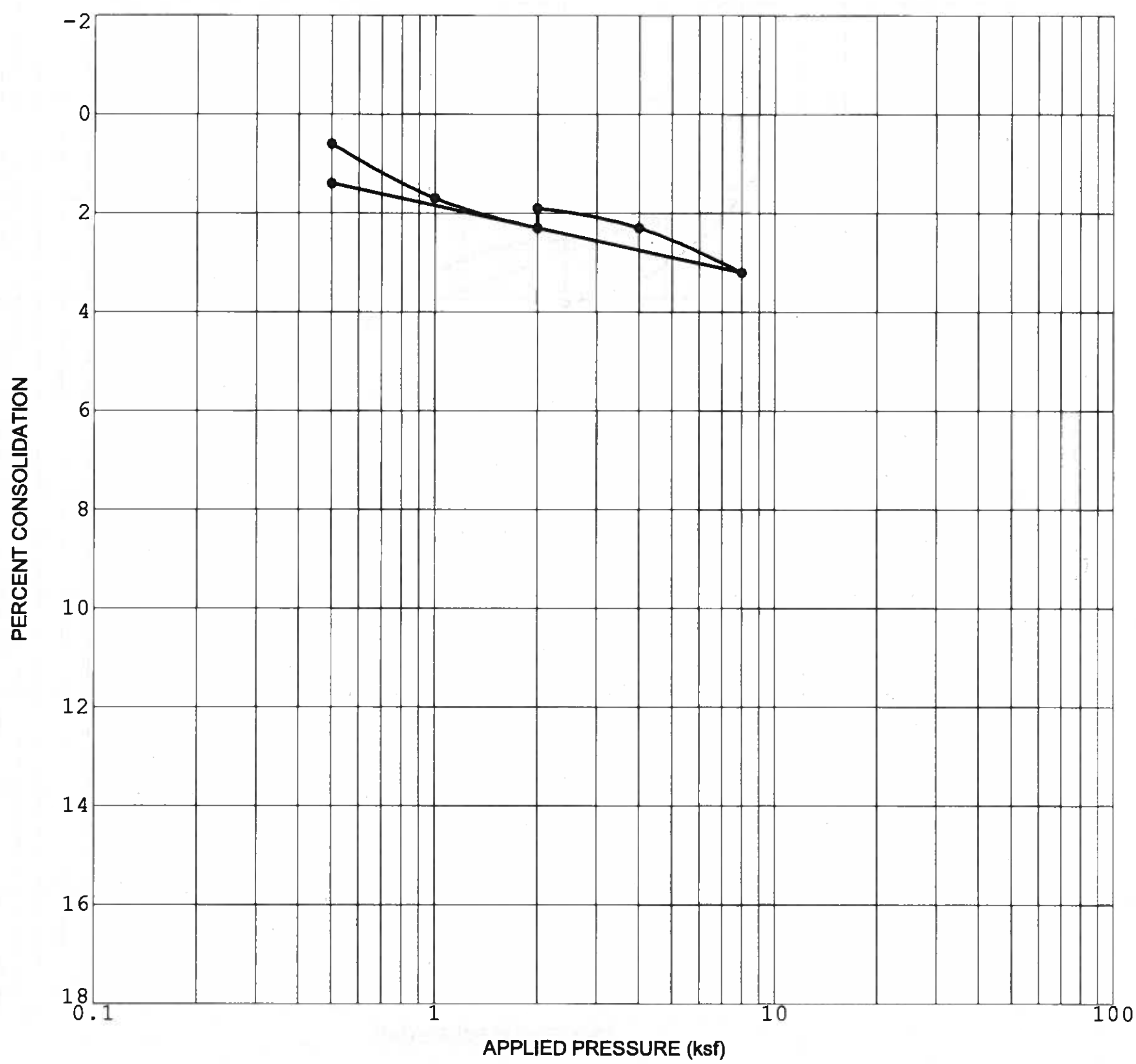
PROJECT NO. G1218-52-01

SAMPLE NO. B61-10



Initial Dry Density (pcf)	134.9
Initial Water Content (%)	28.8

Initial Saturation (%)	94.4
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

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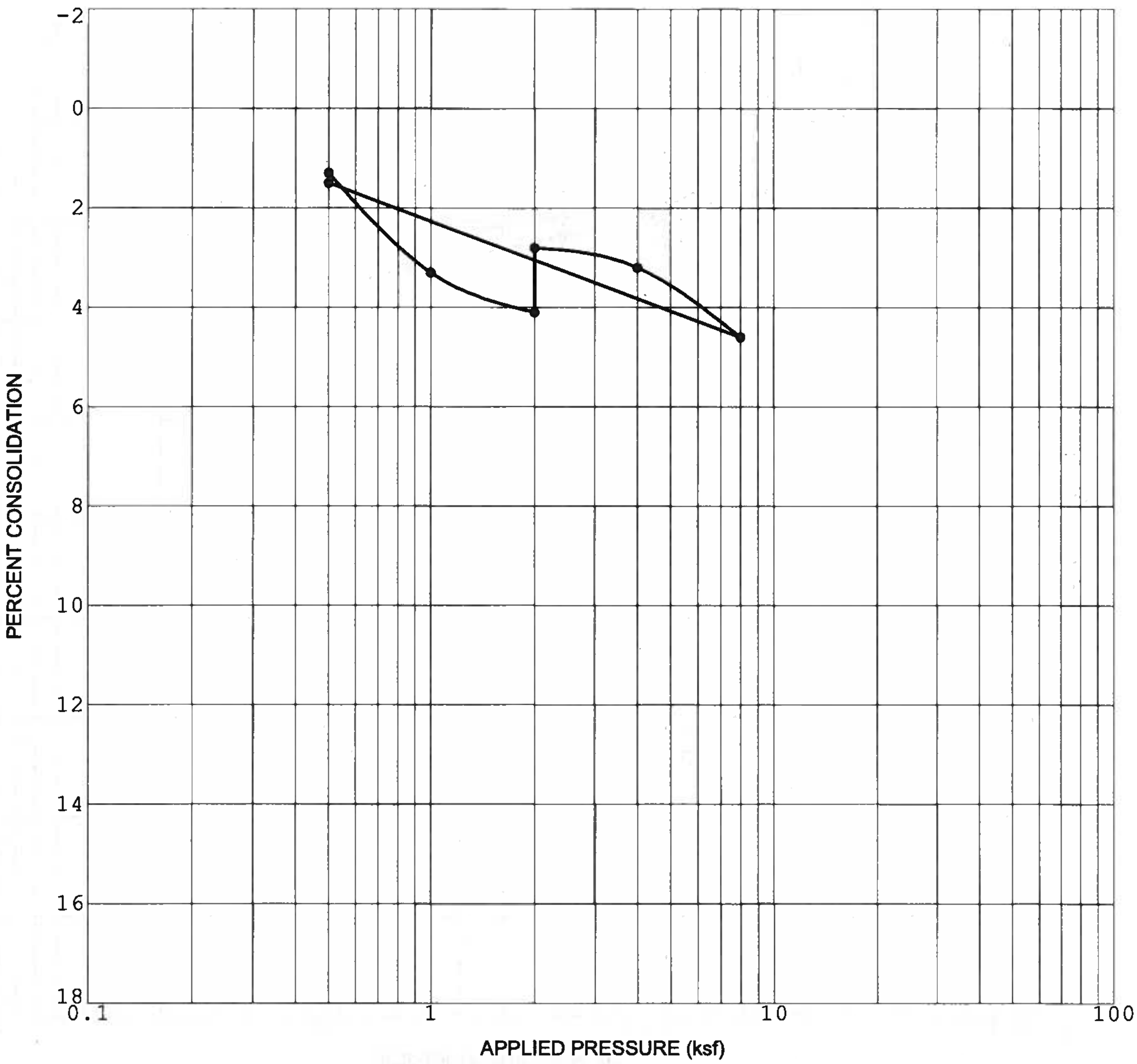
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-27

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B62-2



Initial Dry Density (pcf)	83.6		**Initial Saturation (%)**	100±
Initial Water Content (%)	37.9		**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

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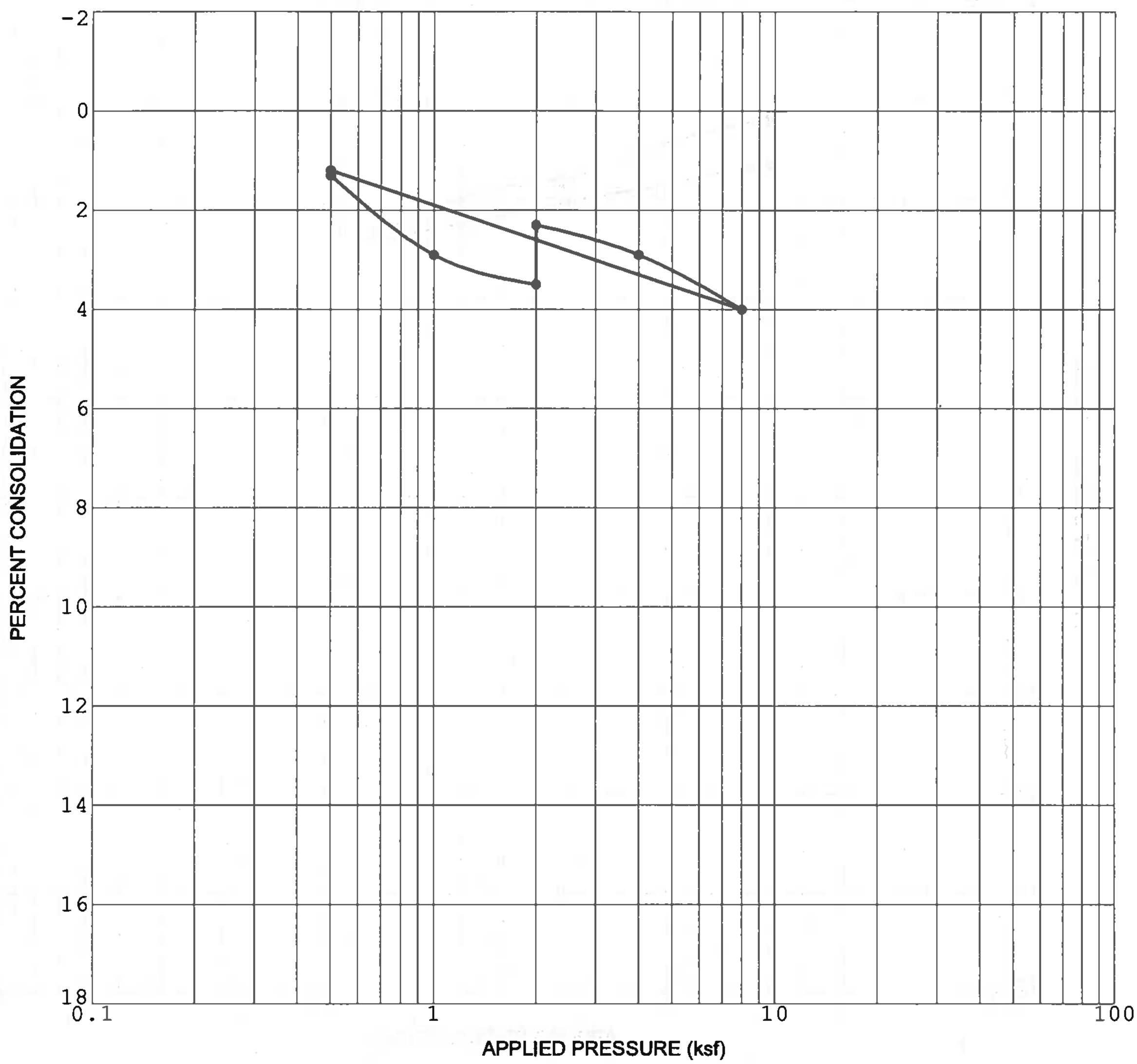
PROJECT NO. G1218-52-01

SAMPLE NO. B62-5



Initial Dry Density (pcf)	92.7	**Initial Saturation (%)**	99.7
Initial Water Content (%)	29.7	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

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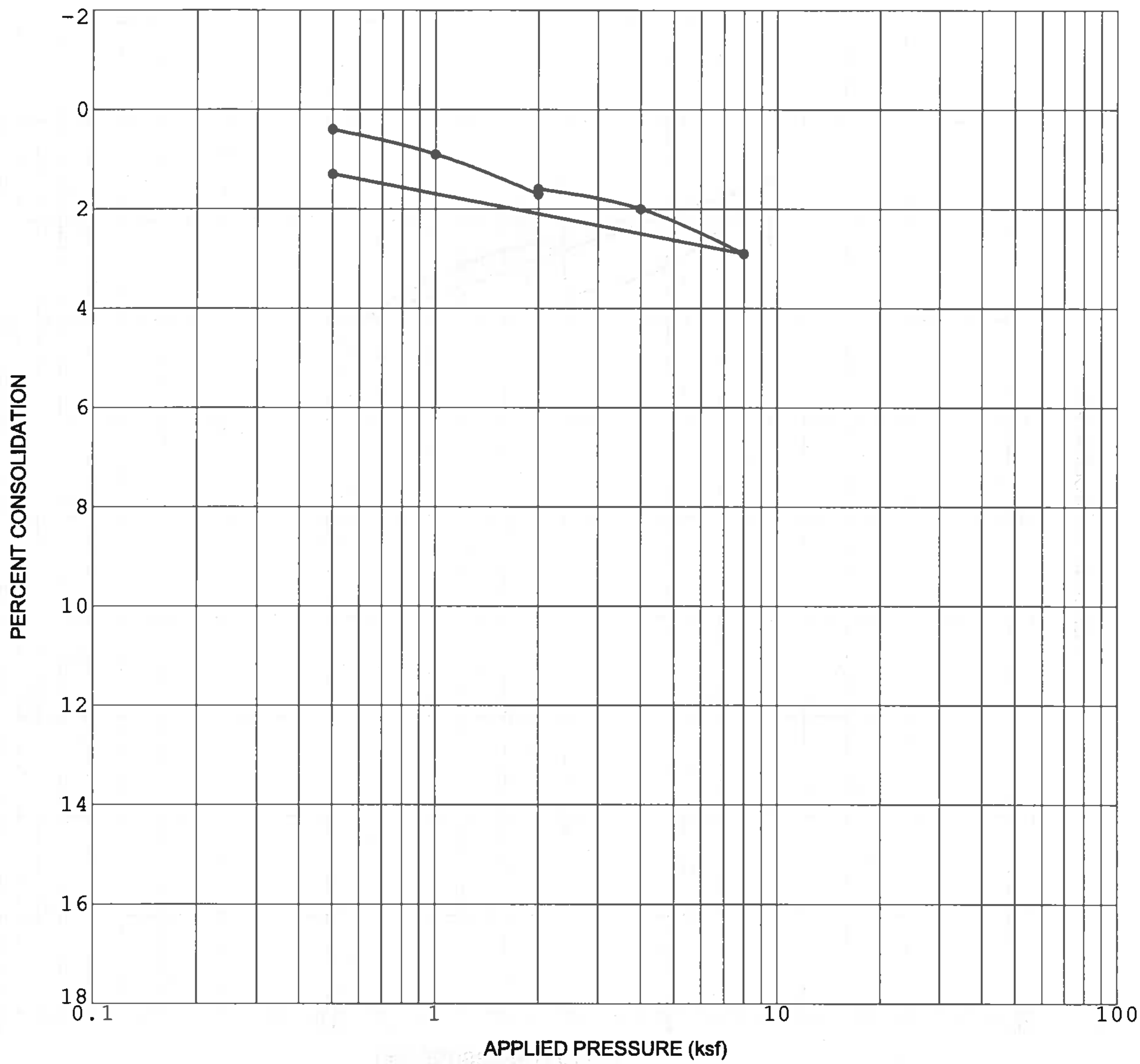
G1218-52-01 (UPD-04-17-2012).GPJ

Figure B-29

GEOCON

PROJECT NO. G1218-52-01

SAMPLE NO. B64-2



Initial Dry Density (pcf)	102.1
Initial Water Content (%)	21.1

Initial Saturation (%)	83.1
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

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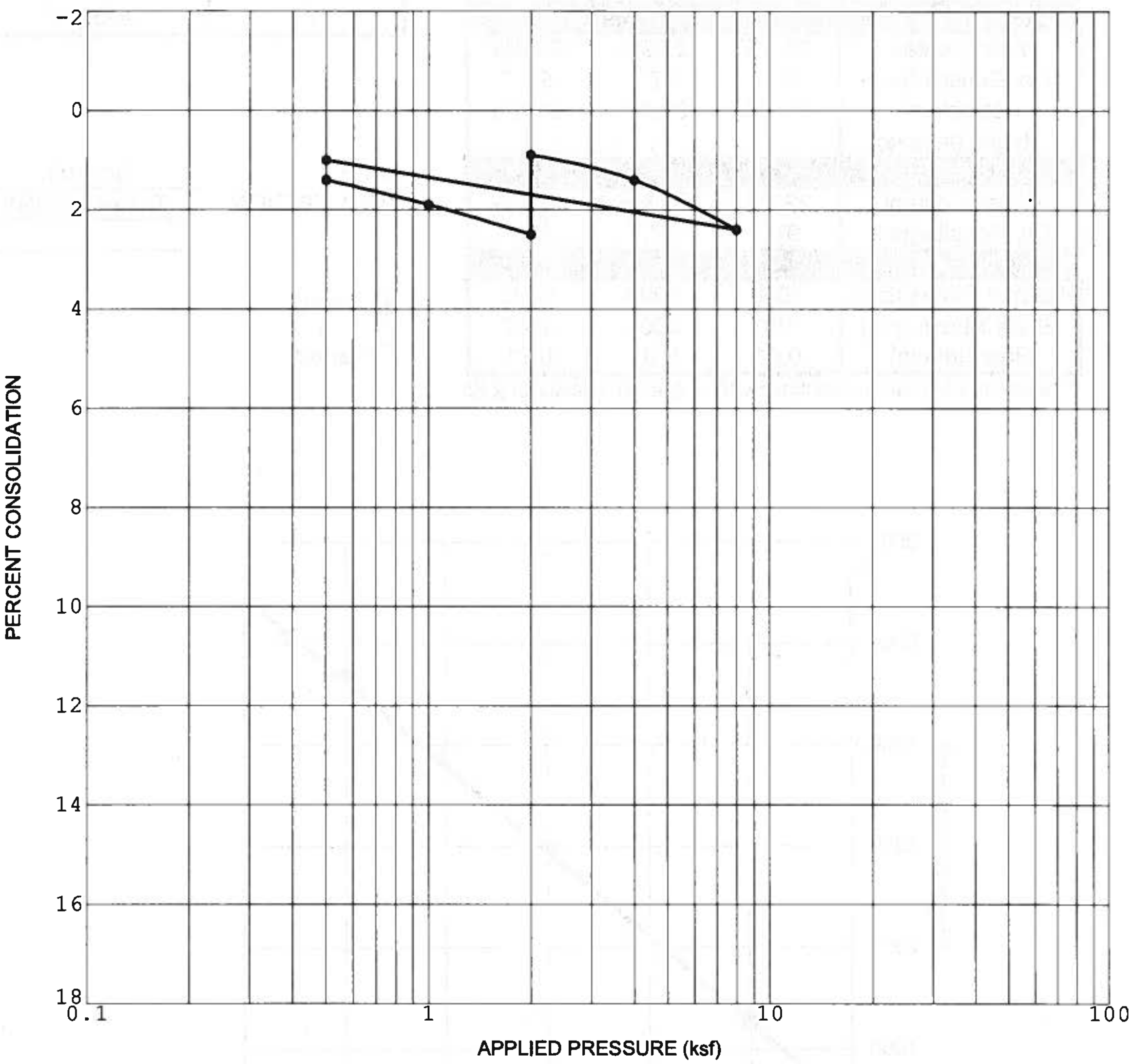
PROJECT NO. G1218-52-01



Initial Dry Density (pcf)	98.9		Initial Saturation (%)	99.0
Initial Water Content (%)	25.3		Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

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SAMPLE NO.: B3-1

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	23.9%	23.9%	23.9%
Dry Density (pcf)	97.7	97.7	97.7
Saturation*	91.4%	91.4%	91.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	22.9%	22.9%	22.9%
Dry Density (pcf)	97.7	97.7	97.7
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1283	3000	4667
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

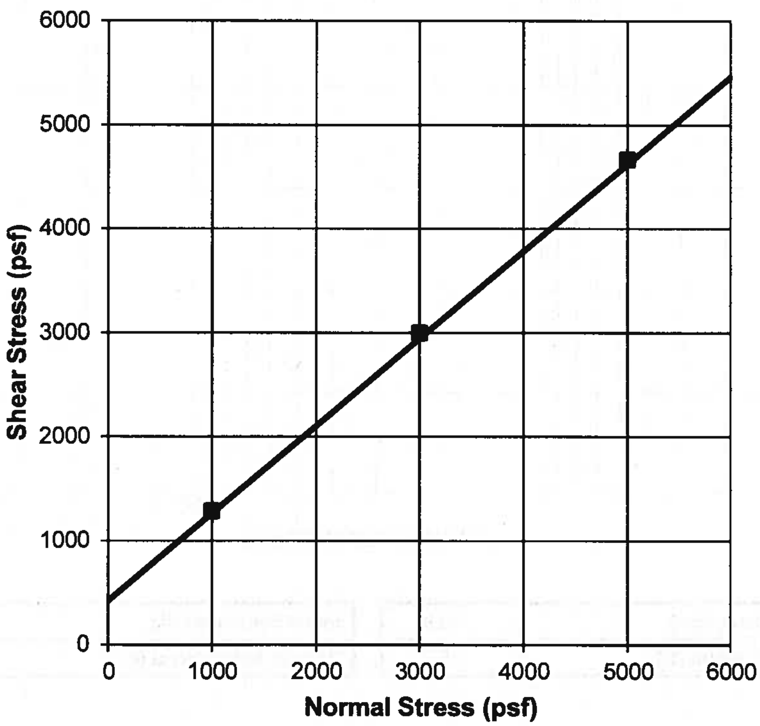
Results	
ϕ	40 degrees
c	425 psf

DATE: 5/6/2007

DESCRIPTION: Tps-slt - SM/ML

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-32

SAMPLE NO.: B3-2

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	26.3%	26.3%	26.3%
Dry Density (pcf)	94.1	94.1	94.1
Saturation*	92.0%	92.0%	92.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	32.3%	32.3%	32.3%
Dry Density (pcf)	94.1	94.1	94.1
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1133	1867	2583
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	20 degrees
c	780 psf

DATE: 5/6/2007
DESCRIPTION: Tps-slt - SM

☑ Natural
☐ Remold

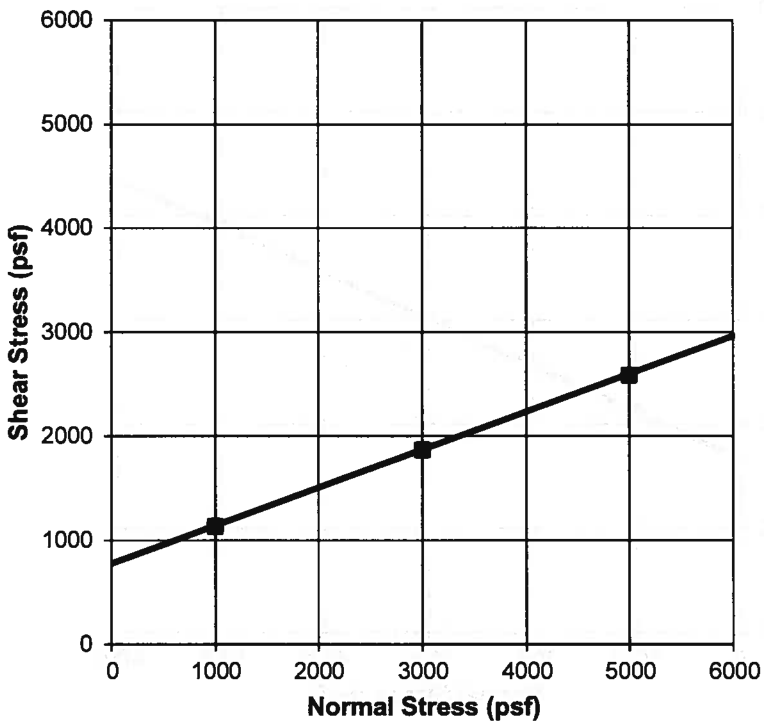

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FIG. B-33

SAMPLE NO.: B4-4

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	36.1%	36.1%	36.1%
Dry Density (pcf)	82.7	82.7	82.7
Saturation*	95.6%	95.6%	95.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	33.6%	33.6%	33.6%
Dry Density (pcf)	82.7	82.7	82.7
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	2117	3000	3900
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	24 degrees
c	1670 psf

DATE: 5/6/2007
DESCRIPTION: Tplv - SM

☑ Natural

☐ Remold

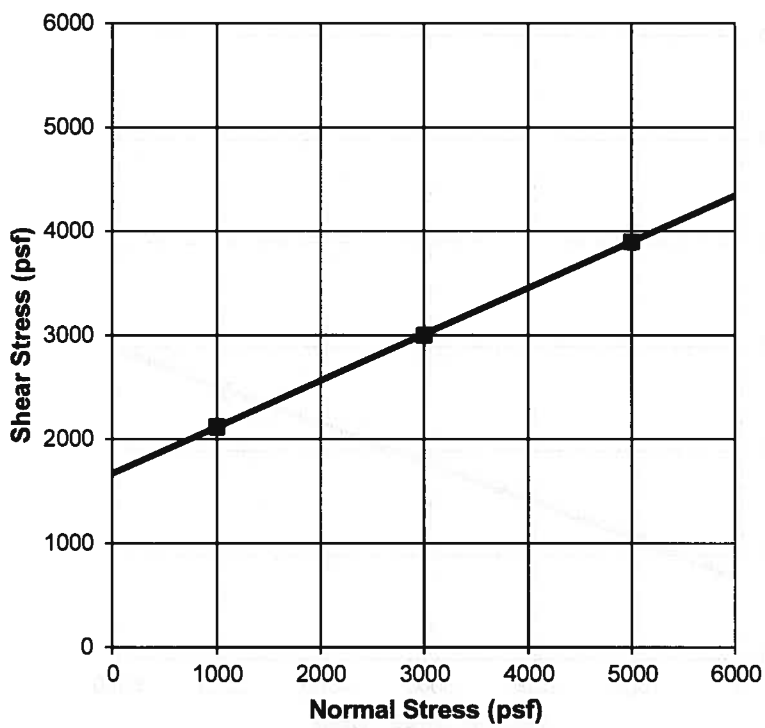

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FIG. B-34

SAMPLE NO.: B4-7

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	39.0%	39.0%	39.0%
Dry Density (pcf)	82.8	82.8	82.8
Saturation*	103.6%	103.6%	103.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	36.7%	36.7%	36.7%
Dry Density (pcf)	82.8	82.8	82.8
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	667	917	1150
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	7 degrees
c	550 psf

DATE: 5/6/2007

DESCRIPTION: Tplv - SM

*Residual Shear

☑ Natural

☐ Remold

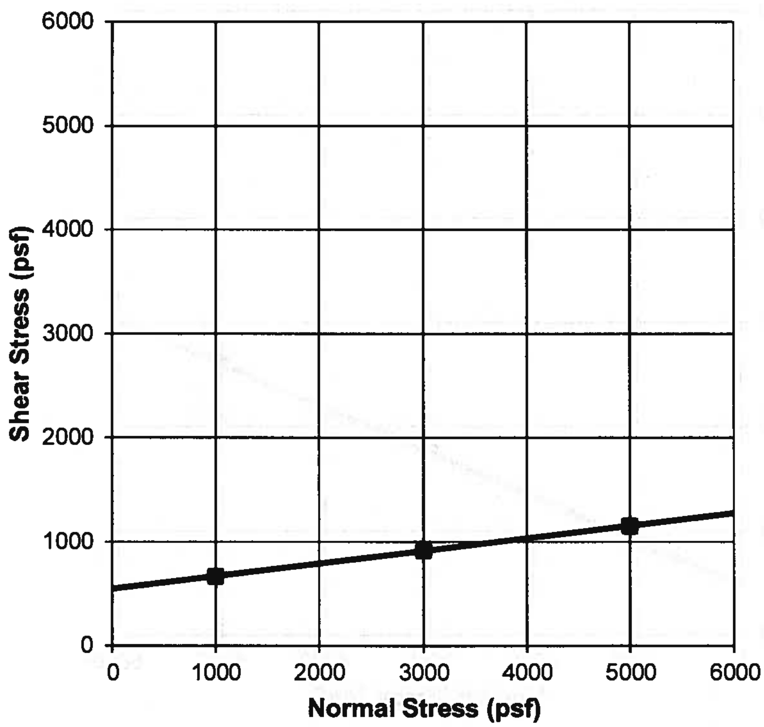

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FIG. B-35

SAMPLE NO.: B5-1

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	35.5%	35.5%	35.5%
Dry Density (pcf)	72.1	72.1	72.1
Saturation*	72.7%	72.7%	72.7%
Height (inches)	1	1	1
AFTER TEST			
Water Content	44.8%	44.8%	44.8%
Dry Density (pcf)	72.1	72.1	72.1
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	900	1767	2600
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	23 degrees
c	480 psf

DATE: 3/6/2007
DESCRIPTION: Tplv - ML

☐ Natural

☑ Remold

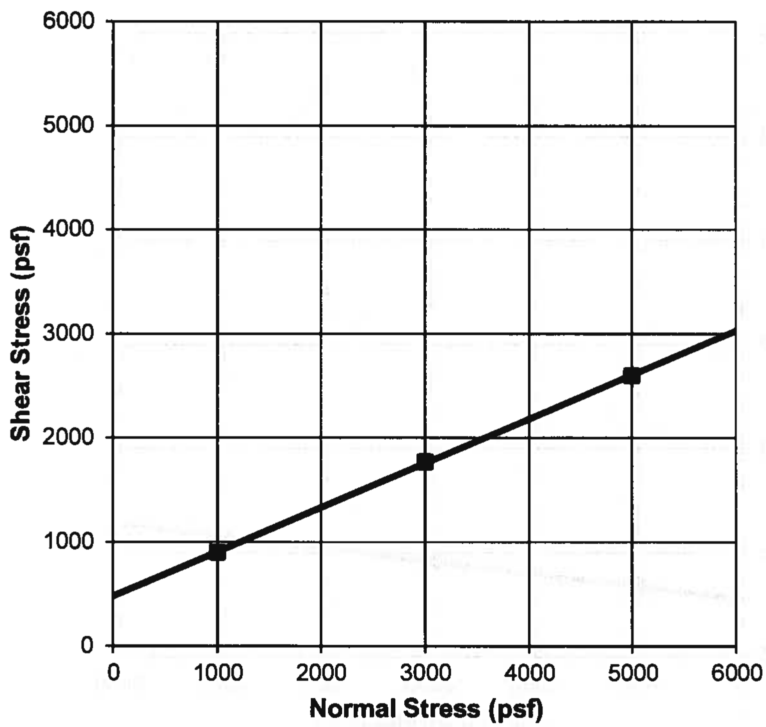

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FIG. B-36

SAMPLE NO.: B5-4

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	64.4%	64.4%	64.4%
Dry Density (pcf)	68.4	68.4	68.4
Saturation*	120.3%	120.3%	120.3%
Height (inches)	1	1	1
AFTER TEST			
Water Content	56.9%	56.9%	56.9%
Dry Density (pcf)	68.4	68.4	68.4
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1117	1950	2950
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	25 degrees
c	630 psf

DATE: 5/6/2007

DESCRIPTION: Tplv - SM

*Residual Shear

☑ Natural

☐ Remold

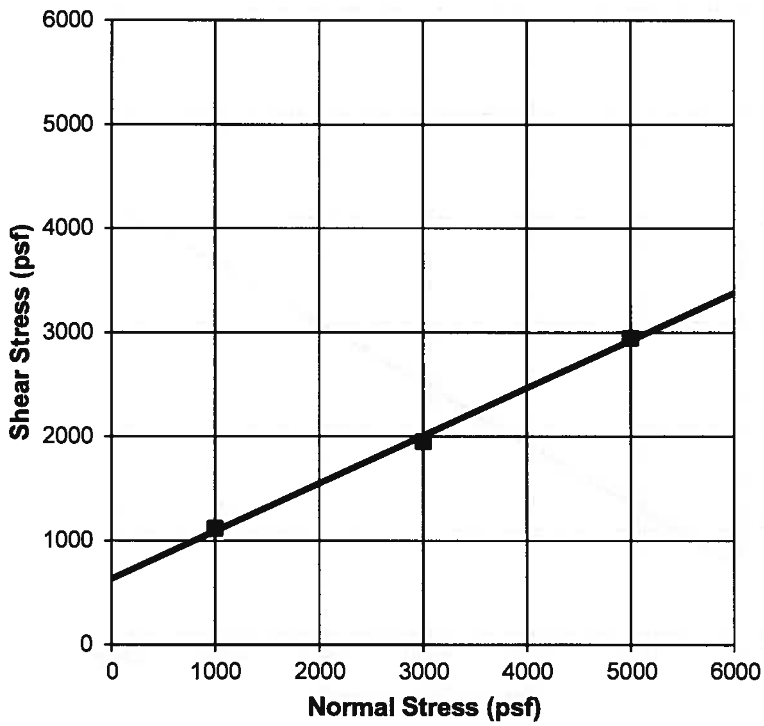

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FIG. B-37

SAMPLE NO.: B6-1

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	9.0%	9.0%	9.0%
Dry Density (pcf)	108.6	108.6	108.6
Saturation*	45.6%	45.6%	45.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	16.7%	16.7%	16.7%
Dry Density (pcf)	108.6	108.6	108.6
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1217	2367	3533
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	30 degrees
c	630 psf

DATE: 3/6/2007

DESCRIPTION: Tps - SM

☐ Natural

☑ Remold

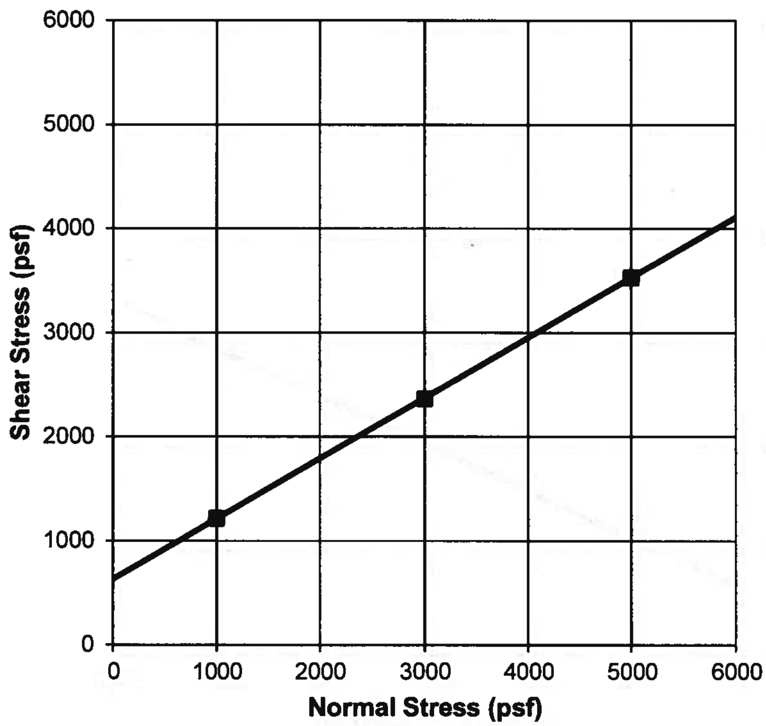

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FIG. B-38

SAMPLE NO.: B6-3

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	36.1%	36.1%	36.1%
Dry Density (pcf)	82.7	82.7	82.7
Saturation*	95.6%	95.6%	95.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	33.6%	33.6%	33.6%
Dry Density (pcf)	82.7	82.7	82.7
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1083	2733	4350
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	39 degrees
c	270 psf

DATE: 5/6/2007

DESCRIPTION: Tps - SM

☑ Natural

☐ Remold

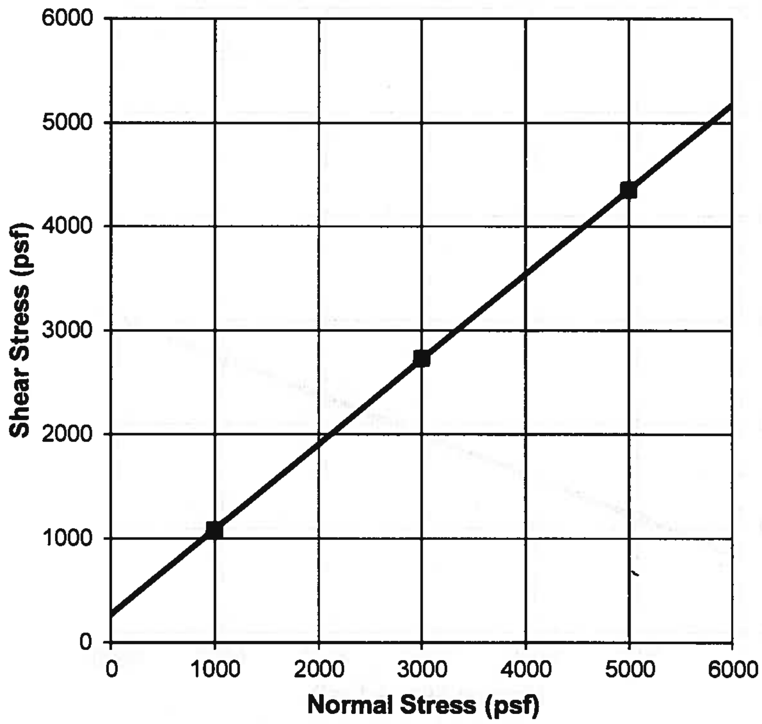

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FIG. B-39

SAMPLE NO.: B7-4

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	23.6%	23.6%	23.6%
Dry Density (pcf)	101.2	101.2	101.2
Saturation*	98.6%	98.6%	98.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	19.9%	19.9%	19.9%
Dry Density (pcf)	101.2	101.2	101.2
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1100	1883	2633
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	21 degrees
c	720 psf

DATE: 3/6/2007

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

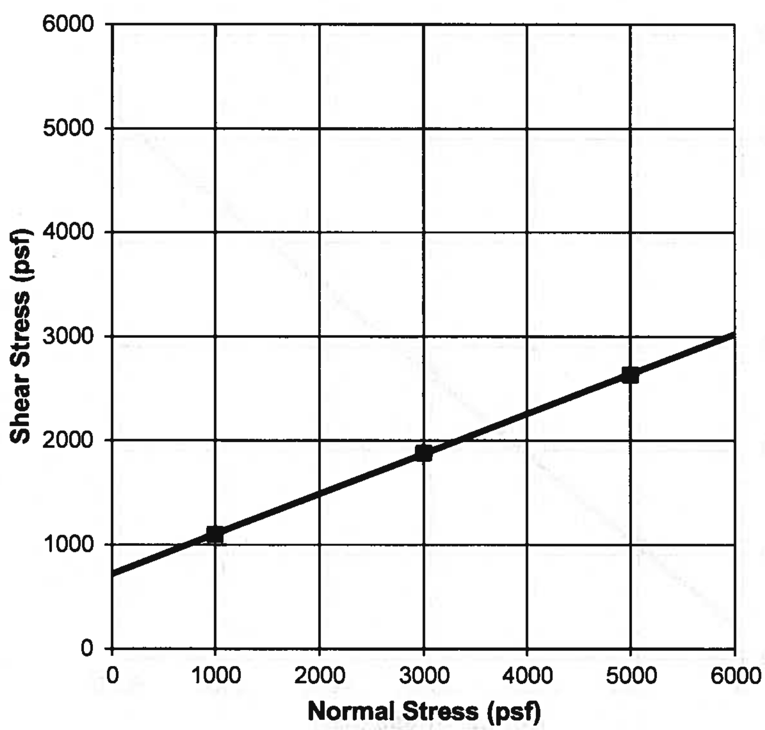

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FIG. B-40

SAMPLE NO.: B7-5

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	13.6%	13.6%	13.6%
Dry Density (pcf)	102.1	102.1	102.1
Saturation*	58.1%	58.1%	58.1%
Height (inches)	1	1	1
AFTER TEST			
Water Content	22.8%	22.8%	22.8%
Dry Density (pcf)	102.1	102.1	102.1
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	900	1283	1517
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	9 degrees
c	770 psf

DATE: 3/6/2007

DESCRIPTION: ML

☐ Natural

☑ Remold

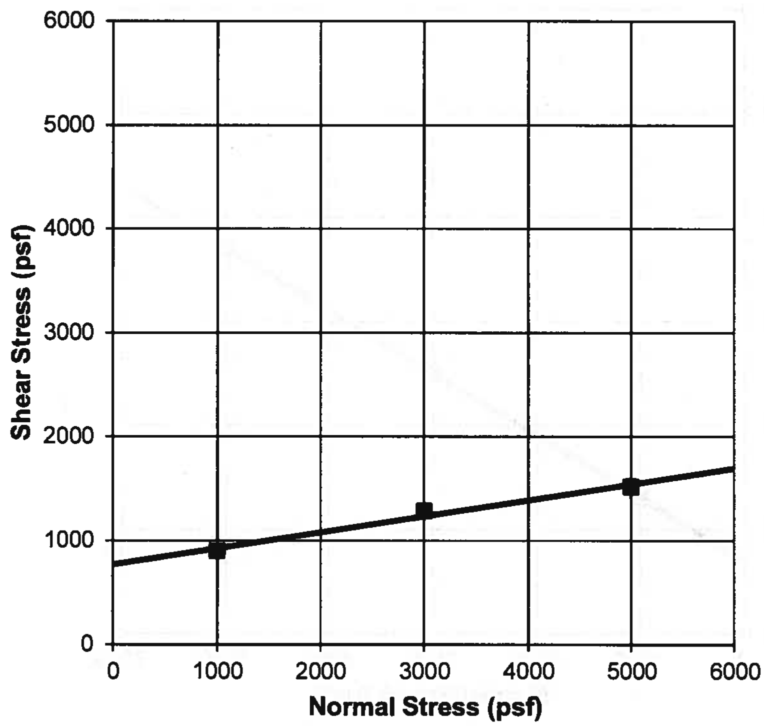

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FIG. B-41

SAMPLE NO.: B7-6

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	22.6%	22.6%	22.6%
Dry Density (pcf)	101.6	101.6	101.6
Saturation*	95.4%	95.4%	95.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	24.8%	24.8%	24.8%
Dry Density (pcf)	101.6	101.6	101.6
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1300	2500	3700
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	31 degrees
c	700 psf

DATE: 3/6/2007

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

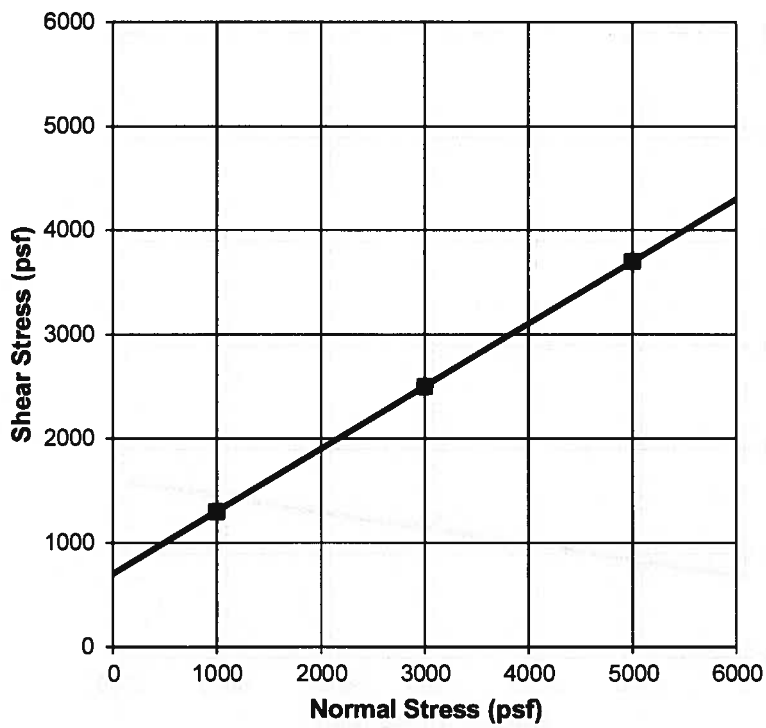

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FIG. B-42

SAMPLE NO.: B10-1

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	21.6%	21.6%	21.6%
Dry Density (pcf)	102.5	102.5	102.5
Saturation*	93.3%	93.3%	93.3%
Height (inches)	1	1	1
AFTER TEST			
Water Content	23.5%	23.5%	23.5%
Dry Density (pcf)	102.5	102.5	102.5
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	933	1983	3005
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	27 degrees
c	420 psf

DATE: 3/6/2007

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

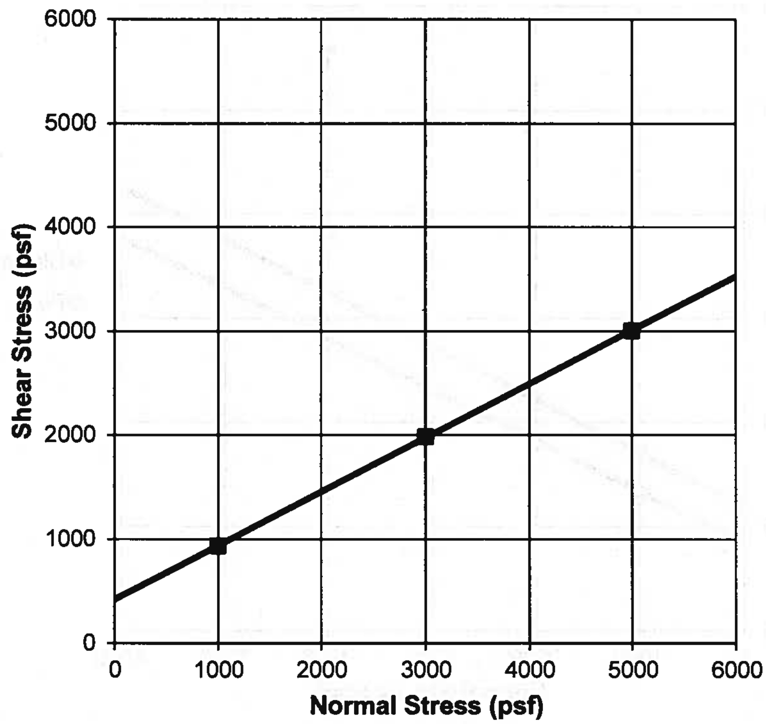

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FIG. B-43

SAMPLE NO.: B12-8

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	35.2%	35.7%	34.1%
Dry Density (pcf)	71.5	67.2	70.9
Saturation*	71.1%	64.8%	67.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	42.4%	47.8%	43.9%
Dry Density (pcf)	68.8	66.2	68.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1331	1810	3828
Peak Stress (psf)	1731	2247	5601
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	27 degrees
c (Ultimate)	850 psf
c (Peak)	1200 psf

DATE: 10/11/2007

DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold

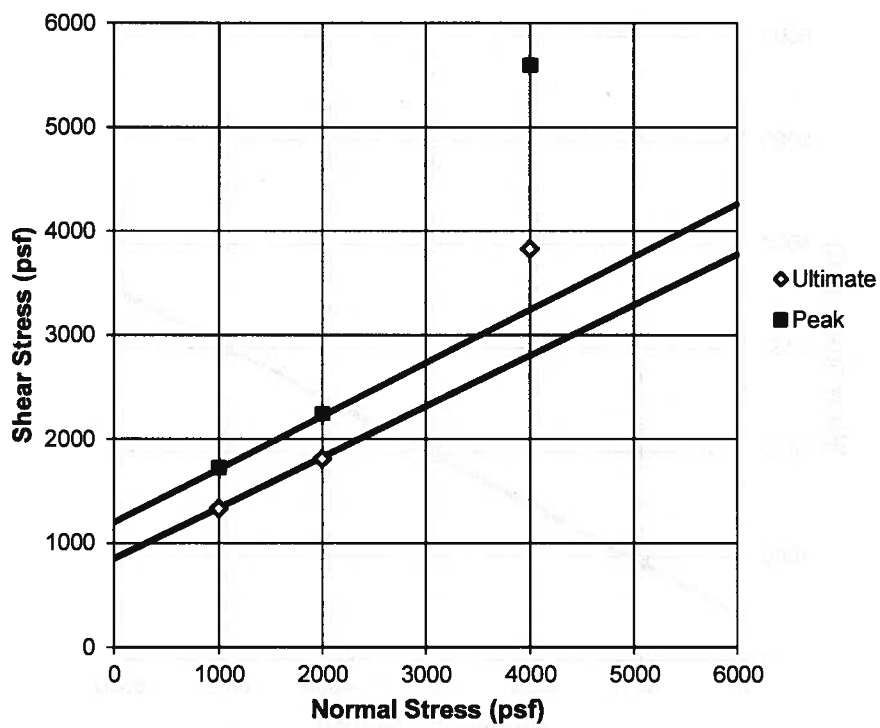

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FIG. B-44

SAMPLE NO.: B12-9

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	37.8%	40.3%	36.0%
Dry Density (pcf)	70.1	64.2	66.6
Saturation*	73.6%	67.7%	64.1%
Height (inches)	1	1	1
AFTER TEST			
Water Content	45.6%	51.3%	47.1%
Dry Density (pcf)	64.5	62.9	64.3
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1488	2082	4079
Peak Stress (psf)	1574	2726	5564
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	41 degrees
ϕ (Peak)	53 degrees
c (Ultimate)	490 psf
c (Peak)	155 psf

DATE: 10/15/2007
DESCRIPTION: Tplv - ML

☑ Natural

☐ Remold

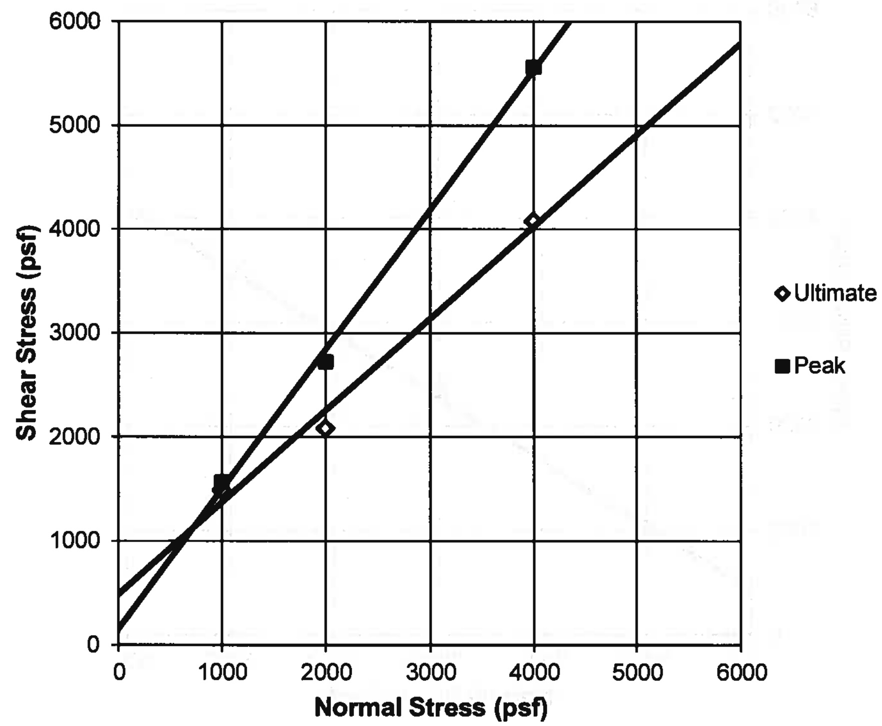

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FIG. B-45

SAMPLE NO.: B12-10

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	43.9%	43.9%	43.9%
Dry Density (pcf)	64.0	64.0	64.0
Saturation*	73.4%	73.4%	73.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	62.6%	62.6%	62.6%
Dry Density (pcf)	64.0	64.0	64.0
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1025	2322	3488
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	31 degrees
c	430 psf

DATE: 10/4/2007

DESCRIPTION: Tplv - SM

☐ Natural

☑ Remold

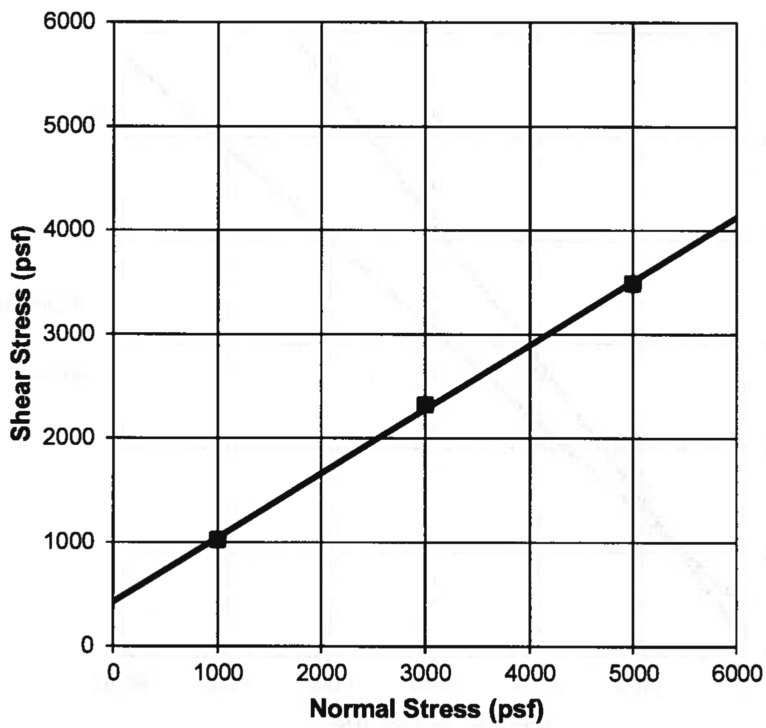

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FIG. B-46

SAMPLE NO.: B14-5

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	49.7%	49.7%	49.7%
Dry Density (pcf)	69.7	69.7	69.7
Saturation*	96.0%	96.0%	96.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	56.5%	56.5%	56.5%
Dry Density (pcf)	69.5	69.8	69.9
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	558	1009	1646
Peak Stress (psf)	622	1109	1939
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	20 degrees
ϕ (Peak)	24 degrees
c (Ultimate)	240 psf
c (Peak)	200 psf

DATE: 10/3/2007

DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold

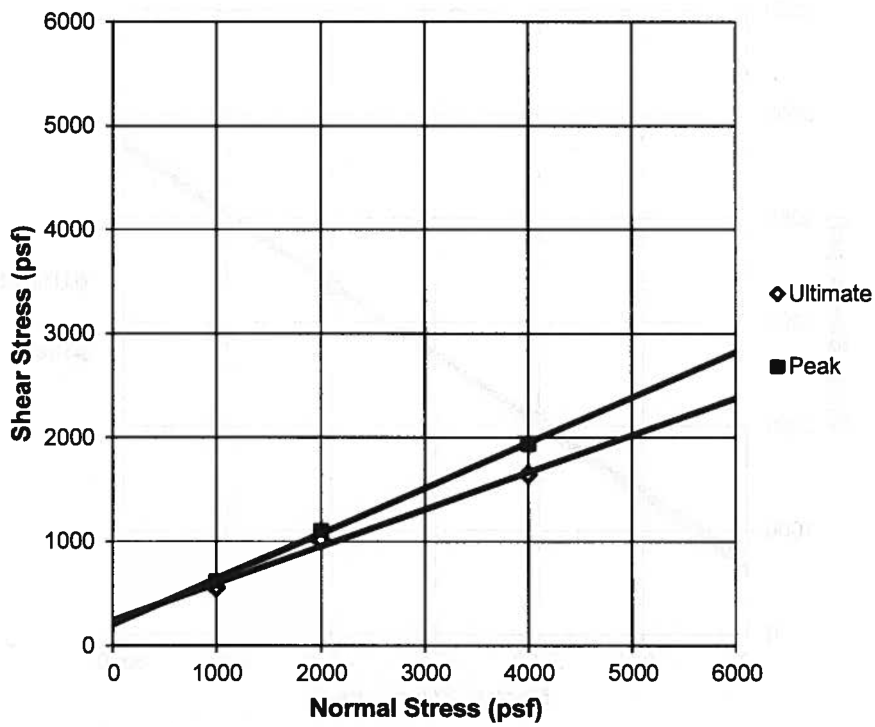

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FIG. B-47

SAMPLE NO.: B14-6

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	40.4%	40.4%	40.4%
Dry Density (pcf)	79.5	79.5	79.5
Saturation*	99.2%	99.2%	99.2%
Height (inches)	1	1	1
AFTER TEST			
Water Content	42.7%	42.7%	42.7%
Dry Density (pcf)	80.3	80.3	80.7
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1266	2075	3341
Peak Stress (psf)	1352	2089	3341
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	33 degrees
ϕ (Peak)	33 degrees
c (Ultimate)	630 psf
c (Peak)	730 psf

DATE: 10/5/2007
DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold

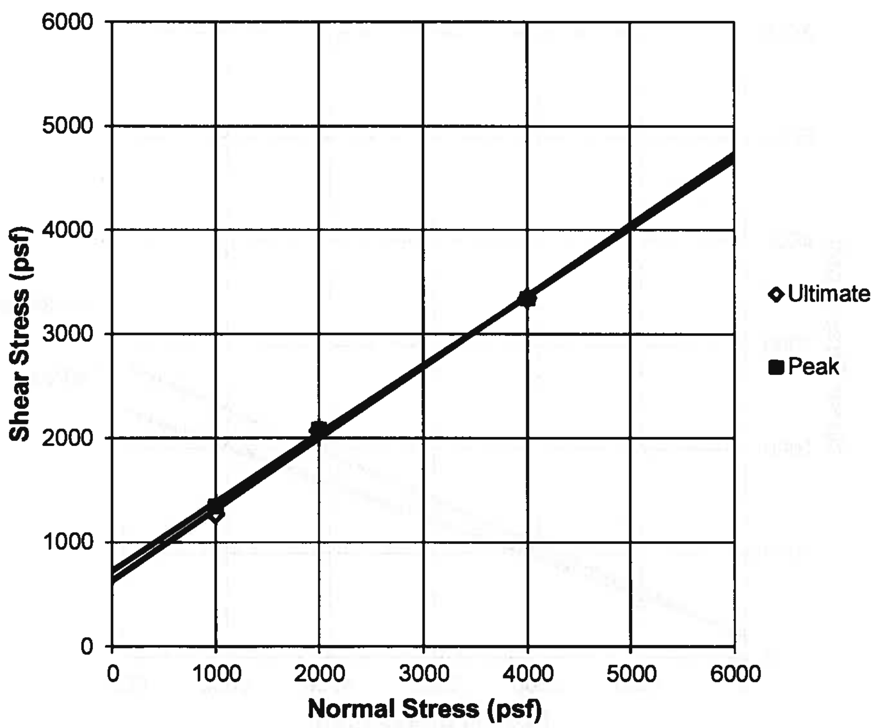

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FIG. B-48

SAMPLE NO.: B14-10

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	65.8%	62.9%	60.2%
Dry Density (pcf)	54.5	53.7	56.4
Saturation*	85.7%	80.2%	82.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	72.6%	72.0%	68.3%
Dry Density (pcf)	53.8	54.0	55.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1030	1531	3413
Peak Stress (psf)	1553	1875	3950
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

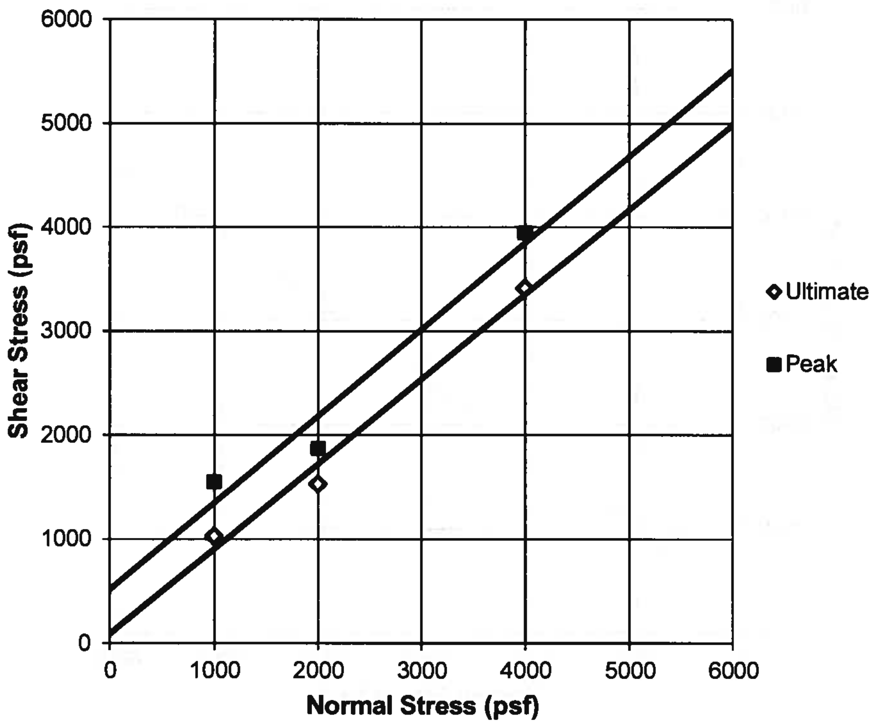
Results	
ϕ (Ultimate)	39 degrees
ϕ (Peak)	40 degrees
c (Ultimate)	90 psf
c (Peak)	500 psf

DATE: 10/17/2007

DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-49

SAMPLE NO.: B14-11

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	39.4%	39.4%	39.4%
Dry Density (pcf)	70.0	70.0	70.0
Saturation*	76.6%	76.6%	76.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	43.9%	43.9%	43.8%
Dry Density (pcf)	70.0	70.0	70.0
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1046	2343	3851
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

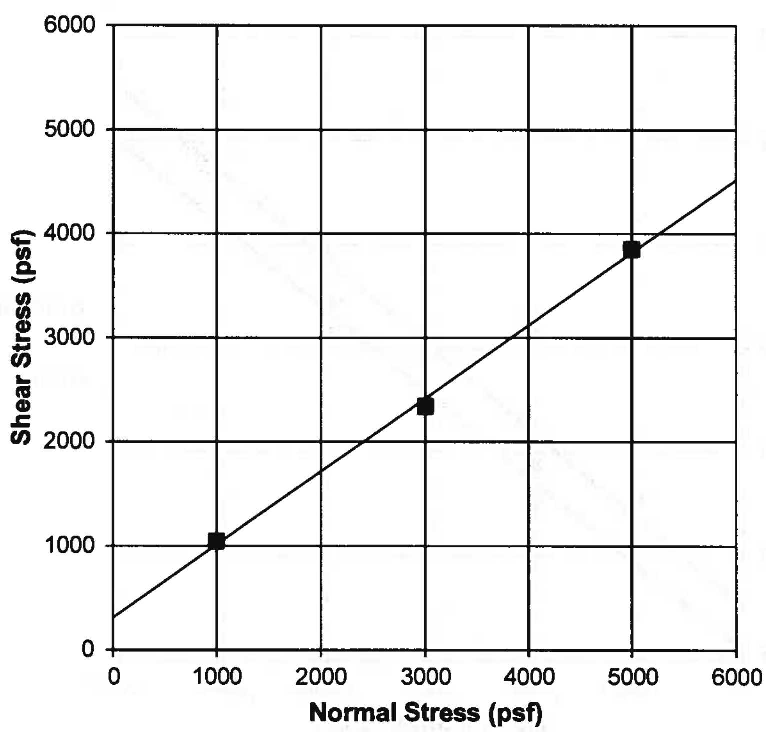
Results	
ϕ	35 degrees
c	310 psf

DATE: 5/6/2007

DESCRIPTION: Tplv - ML

☐ Natural

☑ Remold



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PROJECT NO. G1218-52-01

FIG. B-50

SAMPLE NO.: B15-7

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	38.7%	43.6%	37.5%
Dry Density (pcf)	81.2	74.8	79.6
Saturation*	98.7%	95.3%	92.2%
Height (inches)	1	1	1
AFTER TEST			
Water Content	42.1%	47.9%	43.5%
Dry Density (pcf)	81.1	74.5	79.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	408	1195	1910
Peak Stress (psf)	959	2068	3470
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	39 degrees
c (Ultimate)	50 psf
c (Peak)	260 psf

DATE: 10/23/2007

DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold

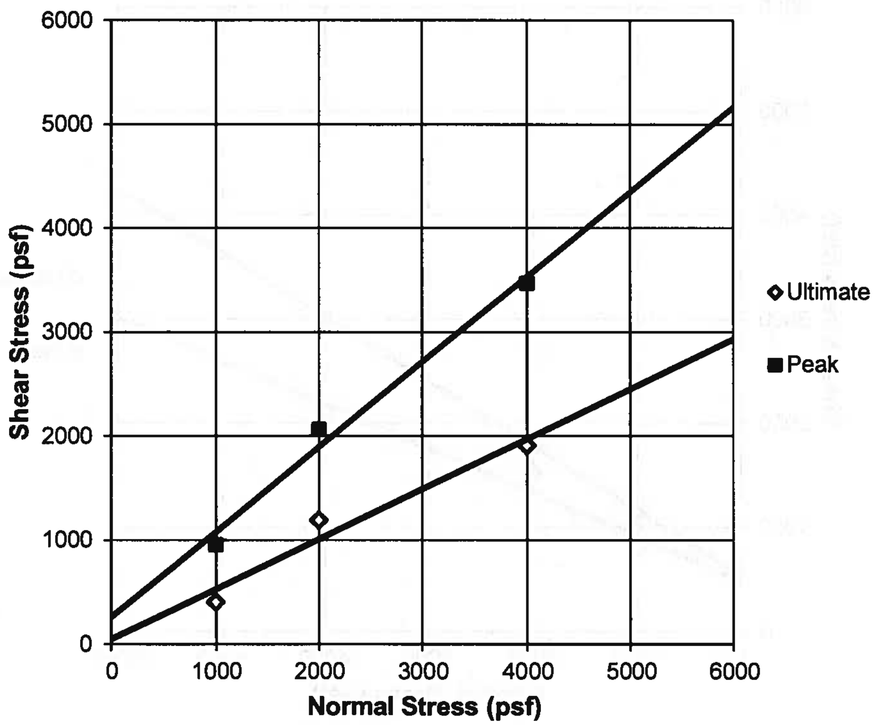

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FIG. B-51

SAMPLE NO.: B15-8

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	46.4%	44.4%	49.0%
Dry Density (pcf)	70.4	67.8	67.8
Saturation*	91.1%	81.7%	90.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	50.4%	51.0%	54.0%
Dry Density (pcf)	69.0	68.1	68.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	794	1517	2118
Peak Stress (psf)	1159	1796	3019
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	23 degrees
ϕ (Peak)	32 degrees
c (Ultimate)	490 psf
c (Peak)	550 psf

DATE: 10/9/2007
DESCRIPTION: Tplv - CL

☑ Natural

☐ Remold

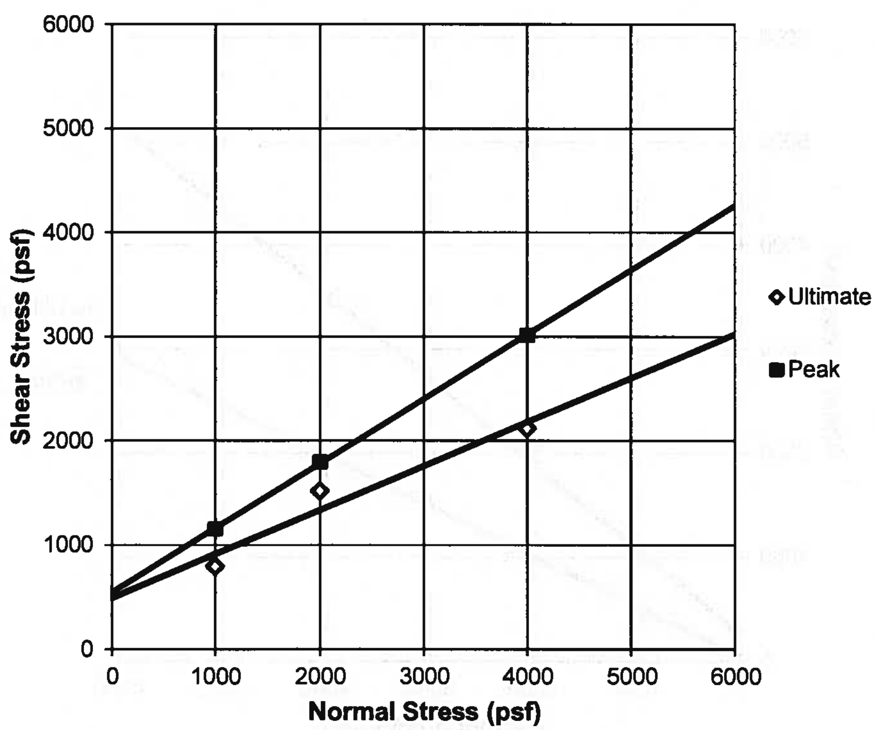

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FIG. B-52

SAMPLE NO.: B16-2

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	32.9%	32.9%	32.9%
Dry Density (pcf)	78.0	78.0	78.0
Saturation*	77.8%	77.8%	77.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	40.9%	40.9%	40.9%
Dry Density (pcf)	78.0	78.0	78.0
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1287	3267	5056
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	43 degrees
c	380 psf

DATE: 10/2/2007

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

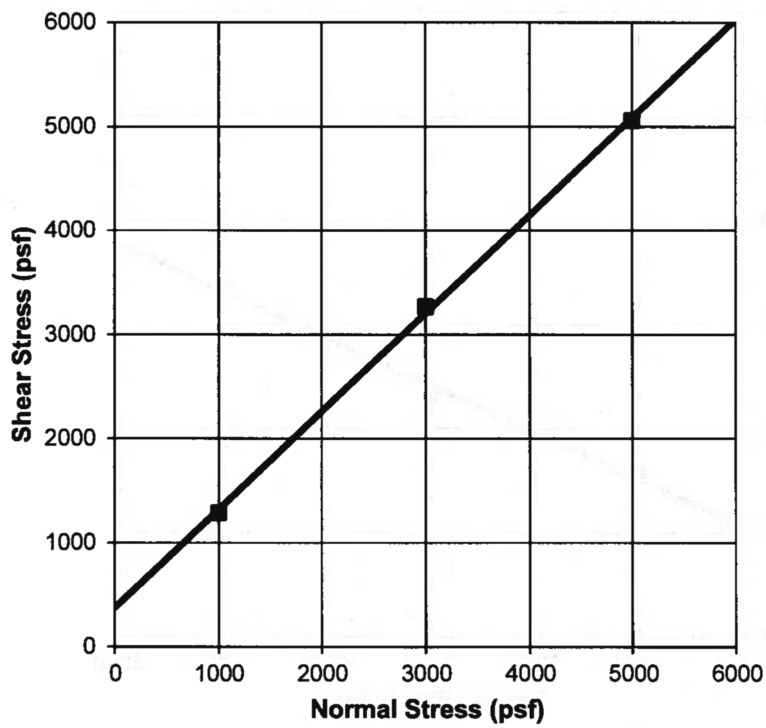

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FIG. B-53

SAMPLE NO.: B16-5

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	43.1%	43.1%	43.1%
Dry Density (pcf)	74.0	74.0	74.0
Saturation*	92.5%	92.5%	92.5%
Height (inches)	1	1	1
AFTER TEST			
Water Content	48.3%	48.3%	48.3%
Dry Density (pcf)	74.0	74.0	74.0
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1569	2302	3368
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	24 degrees
c	1060 psf

DATE: 5/6/2007

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

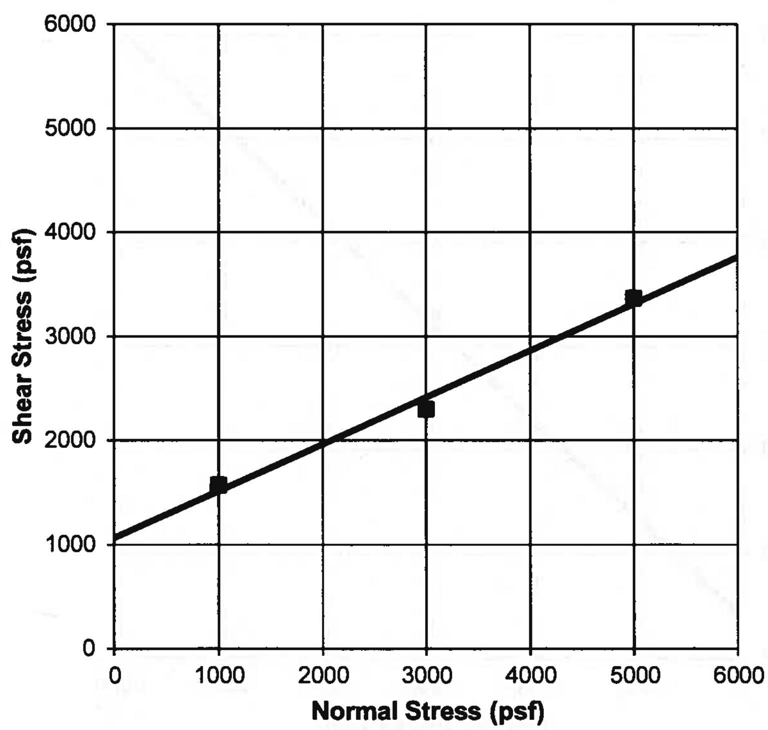

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FIG. B-54

SAMPLE NO.: B16-8

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	50.7%	50.7%	50.7%
Dry Density (pcf)	67.0	67.0	67.0
Saturation*	91.5%	91.5%	91.5%
Height (inches)	1	1	1
AFTER TEST			
Water Content	53.4%	53.4%	53.4%
Dry Density (pcf)	67.0	67.0	67.0
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1800	3050	4388
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	33 degrees
c	1140 psf

DATE: 10/4/2007

DESCRIPTION: afe - SM

☑ Natural

☐ Remold

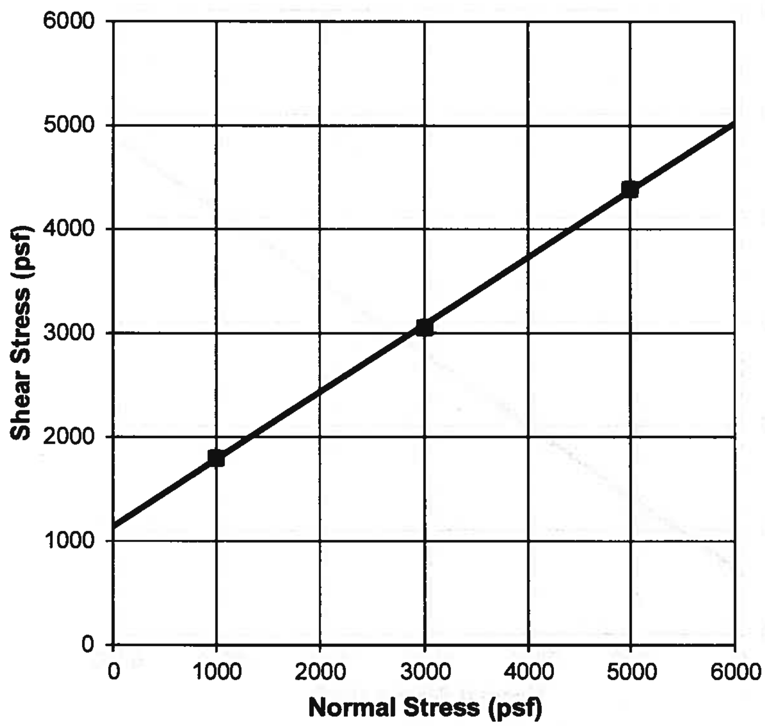

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FIG. B-55

SAMPLE NO.: B16-11

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	6.9%	6.9%	6.9%
Dry Density (pcf)	107.1	107.1	107.1
Saturation*	33.6%	33.6%	33.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	15.6%	15.6%	15.6%
Dry Density (pcf)	107.1	107.1	107.1
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1146	2916	3920
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	34 degrees
c	580 psf

DATE: 5/6/2007

DESCRIPTION: afe - SM

☑ Natural

☐ Remold

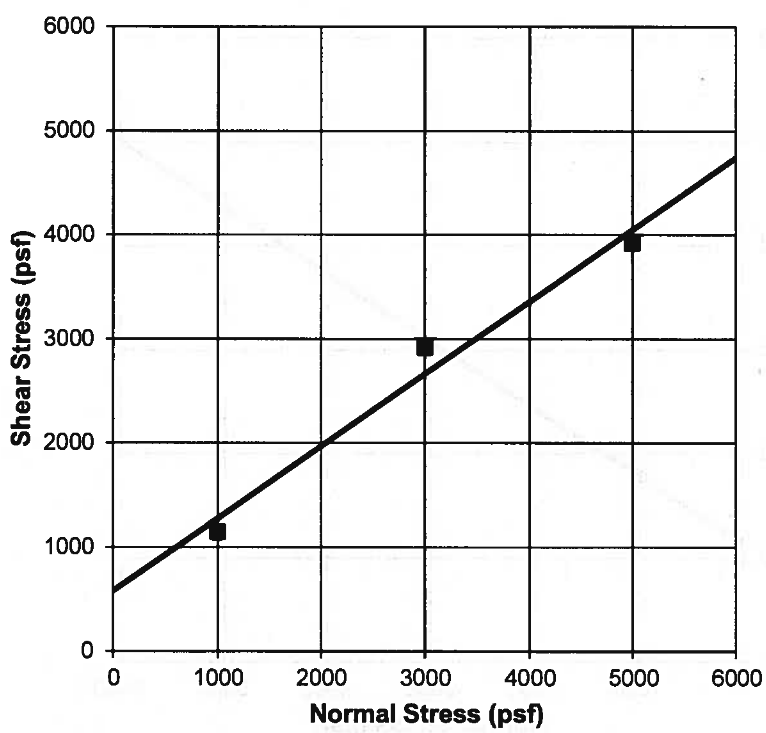

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FIG. B-56

SAMPLE NO.: B16-13

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	33.4%	33.4%	33.4%
Dry Density (pcf)	71.2	71.2	71.2
Saturation*	66.9%	66.9%	66.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	55.6%	55.6%	55.6%
Dry Density (pcf)	71.2	71.2	71.2
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	965	2322	3479
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	32 degrees
c	370 psf

DATE: 10/4/2007

DESCRIPTION: afe - ML

☐ Natural

☑ Remold

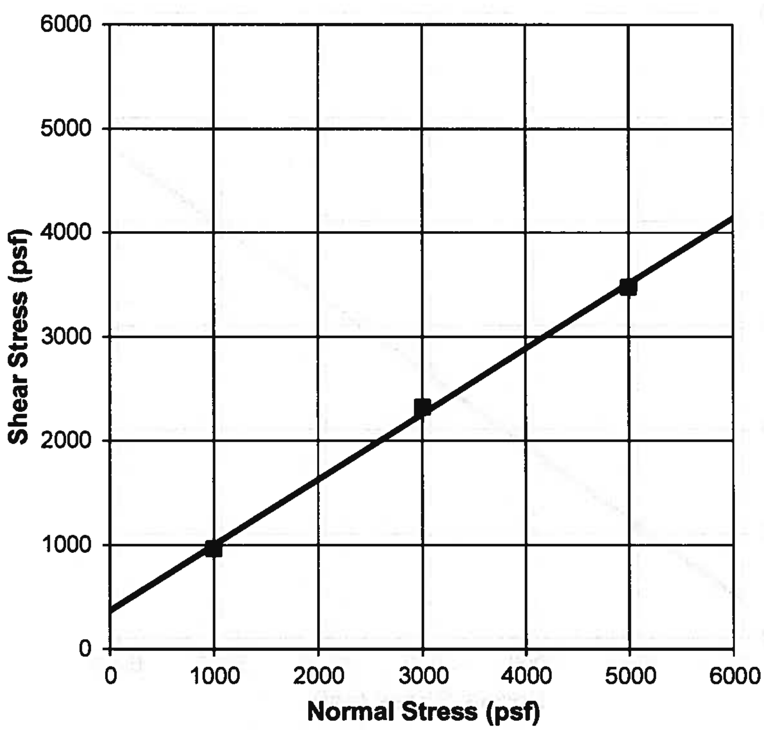

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FIG. B-57

SAMPLE NO.: B18-8

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	27.8%	27.8%	27.8%
Dry Density (pcf)	74.6	74.6	74.6
Saturation*	60.5%	60.5%	60.5%
Height (inches)	1	1	1
AFTER TEST			
Water Content	52.2%	52.2%	52.2%
Dry Density (pcf)	71.2	71.2	71.2
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	1055	2563	3931
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	36 degrees
c	360 psf

DATE: 10/3/2007
DESCRIPTION: afe - ML

☐ Natural

☑ Remold

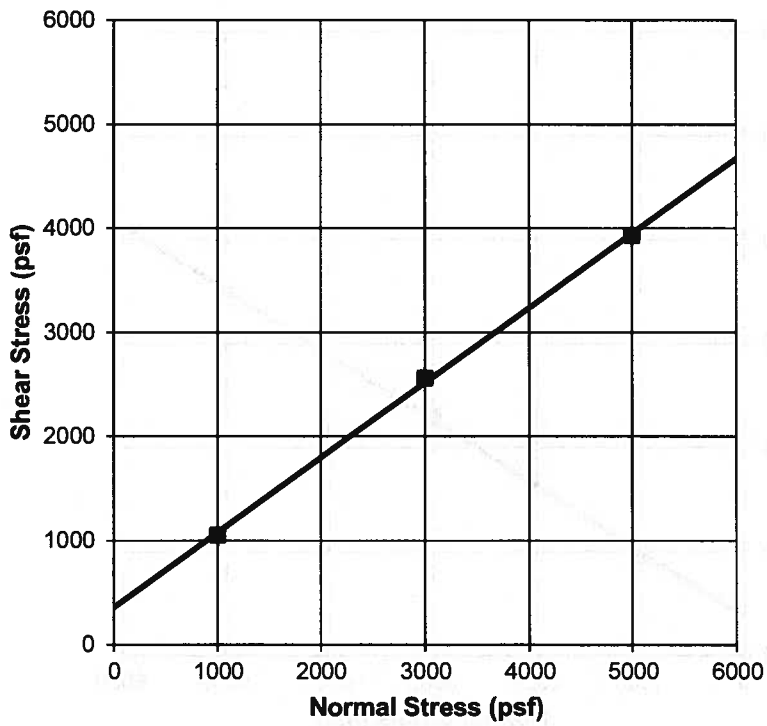

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FIG. B-58

SAMPLE NO.: B19-8

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	8.6%	8.6%	8.6%
Dry Density (pcf)	113.6	113.6	113.6
Saturation*	50.0%	50.0%	50.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.5%	17.5%	17.5%
Dry Density (pcf)	113.6	113.6	113.6
FAILURE			
Normal Stress (psf)	1000	3000	5000
Shear Stress (psf)	975	1890	2986
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ	27 degrees
c	440 psf

DATE: 10/3/2007

DESCRIPTION: afe - SM

☐ Natural

☑ Remold

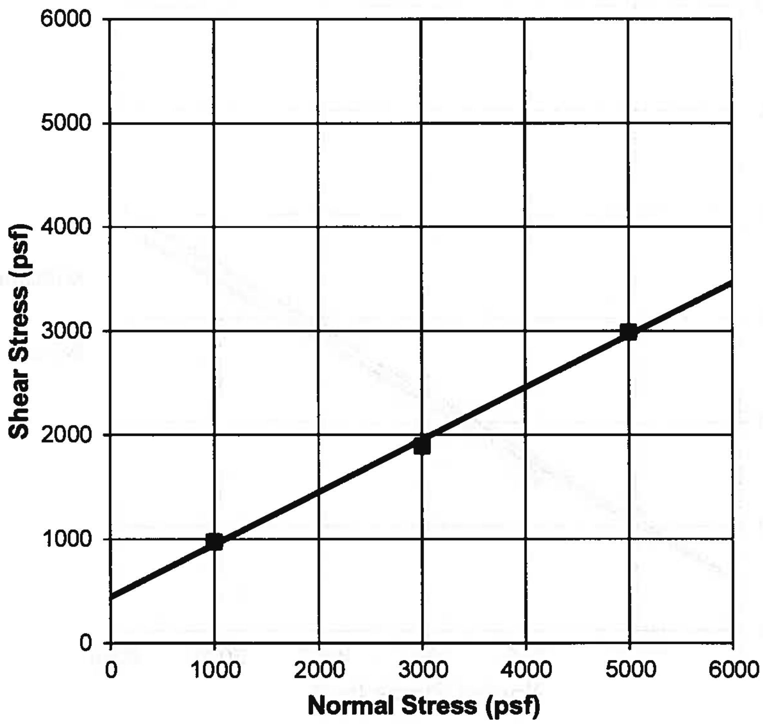

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FIG. B-59

SAMPLE NO.: B21-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	23.7%	24.2%	21.7%
Dry Density (pcf)	99.7	98.3	101.6
Saturation*	95.3%	94.0%	91.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	30.5%	32.4%	29.2%
Dry Density (pcf)	89.0	132.3	123.3
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1128	1442	2807
Peak Stress (psf)	1128	1574	2925
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	30 degrees
ϕ (Peak)	32 degrees
c (Ultimate)	450 psf
c (Peak)	450 psf

DATE: 12/11/2007

DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold

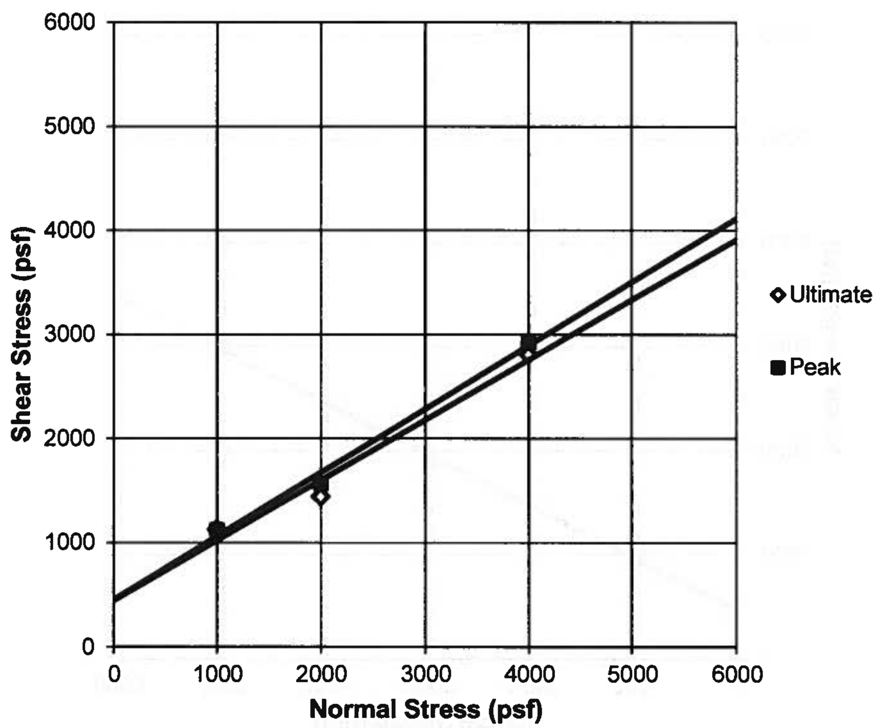

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FIG. B-60

SAMPLE NO.: B21-10

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	41.3%	32.4%	42.7%
Dry Density (pcf)	76.0	85.3	73.1
Saturation*	93.0%	91.3%	89.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	44.0%	36.9%	49.3%
Dry Density (pcf)	62.6	93.6	131.5
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1016	1534	3129
Peak Stress (psf)	1128	2148	3931
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

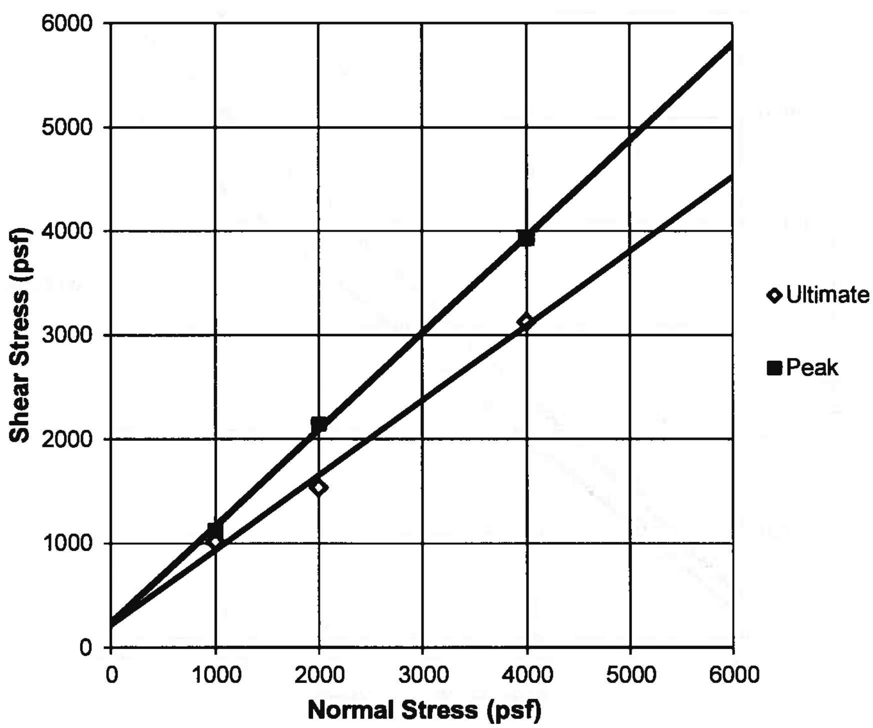
Results	
ϕ (Ultimate)	36 degrees
ϕ (Peak)	43 degrees
c (Ultimate)	220 psf
c (Peak)	225 psf

DATE: 12/11/2007

DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-61

SAMPLE NO.: B23-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	4.5%	5.9%	6.1%
Dry Density (pcf)	108.6	113.3	107.8
Saturation*	22.9%	34.1%	30.5%
Height (inches)	1	1	1
AFTER TEST			
Water Content	14.9%	13.4%	16.4%
Dry Density (pcf)	84.3	117.0	116.1
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1067	1828	3535
Peak Stress (psf)	1361	2235	4165
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	39 degrees
ϕ (Peak)	43 degrees
c (Ultimate)	210 psf
c (Peak)	400 psf

DATE: 12/11/2007

DESCRIPTION: Tps - ML

☑ Natural

☐ Remold

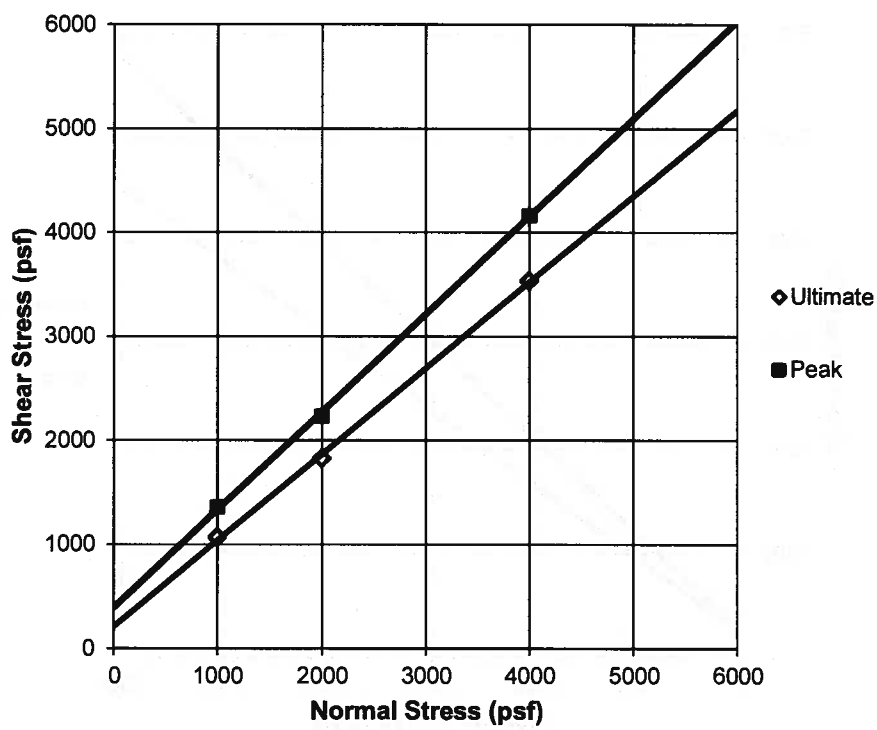

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FIG. B-62

SAMPLE NO.: B23-10

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	24.7%	28.9%	27.8%
Dry Density (pcf)	97.2	90.6	93.1
Saturation*	93.1%	92.5%	94.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	27.3%	34.1%	31.9%
Dry Density (pcf)	89.6	130.7	131.9
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	863	1371	2011
Peak Stress (psf)	1219	1483	2550
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	21 degrees
ϕ (Peak)	25 degrees
c (Ultimate)	525 psf
c (Peak)	675 psf

DATE: 12/13/2007

DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold

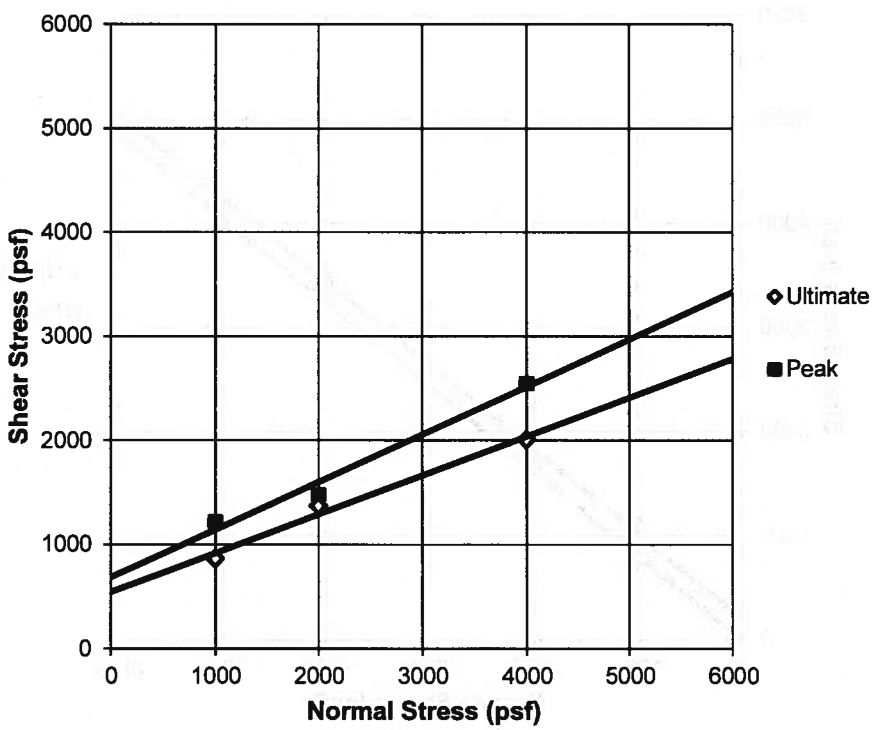

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FIG. B-63

SAMPLE NO.: B24-5

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	32.1%	27.2%	29.2%
Dry Density (pcf)	88.4	91.2	93.5
Saturation*	97.6%	88.8%	100.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	37.5%	35.0%	34.5%
Dry Density (pcf)	90.1	162.9	321.2
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	792	1676	3322
Peak Stress (psf)	1117	1676	3494
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	39 degrees
ϕ (Peak)	39 degrees
c (Ultimate)	0 psf
c (Peak)	200 psf

DATE: 12/11/2007
DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold

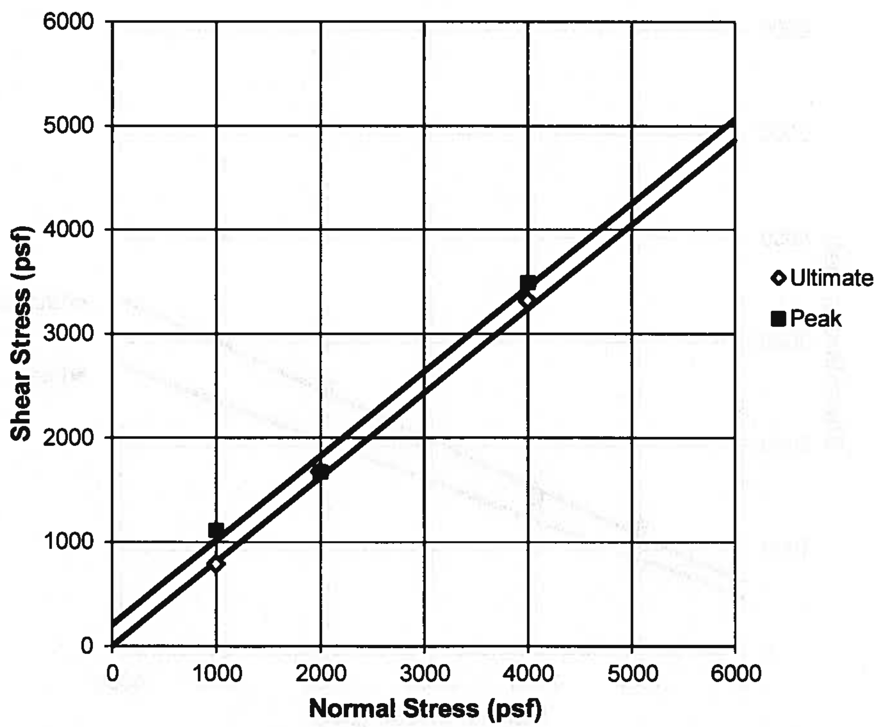

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FIG. B-64

SAMPLE NO.: B24-8

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	16.9%	22.3%	23.6%
Dry Density (pcf)	107.7	98.8	99.9
Saturation*	83.2%	87.6%	95.3%
Height (inches)	1	1	1
AFTER TEST			
Water Content	21.2%	26.6%	28.3%
Dry Density (pcf)	90.4	124.1	200.6
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1148	1757	2905
Peak Stress (psf)	1656	2570	3454
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

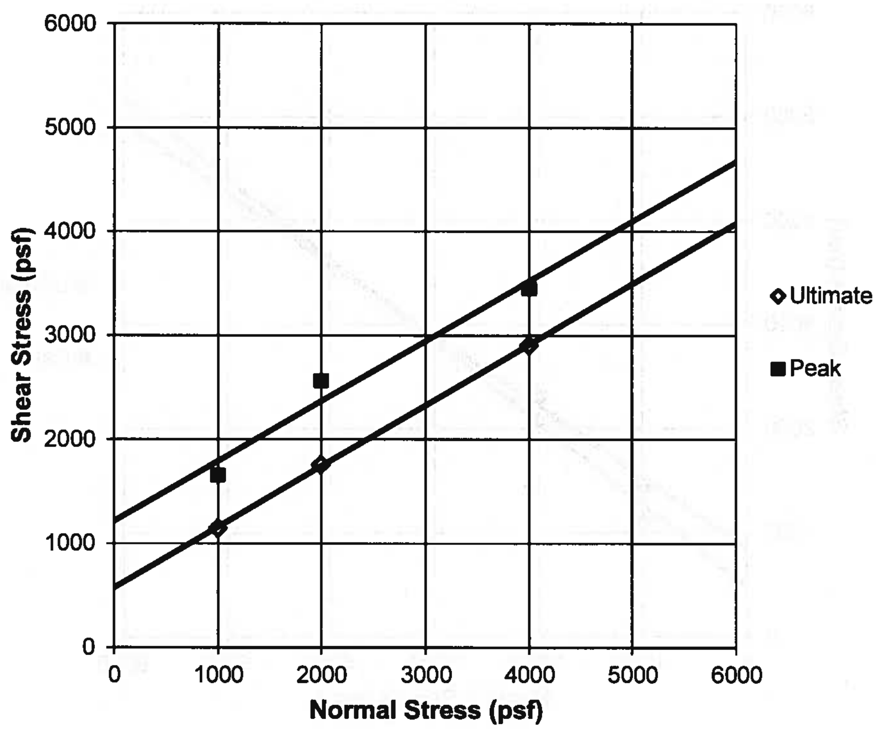
Results	
ϕ (Ultimate)	30 degrees
ϕ (Peak)	30 degrees
c (Ultimate)	570 psf
c (Peak)	1210 psf

DATE: 12/11/2007

DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-65

SAMPLE NO.: B35-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	35.6%	35.7%	36.0%
Dry Density (pcf)	84.4	83.2	82.4
Saturation*	98.1%	95.9%	94.7%
Height (inches)	1	1	1
AFTER TEST			
Water Content	39.6%	38.6%	40.4%
Dry Density (pcf)	83.0	81.9	83.3
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1100	2322	3534
Peak Stress (psf)	1456	2342	3544
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

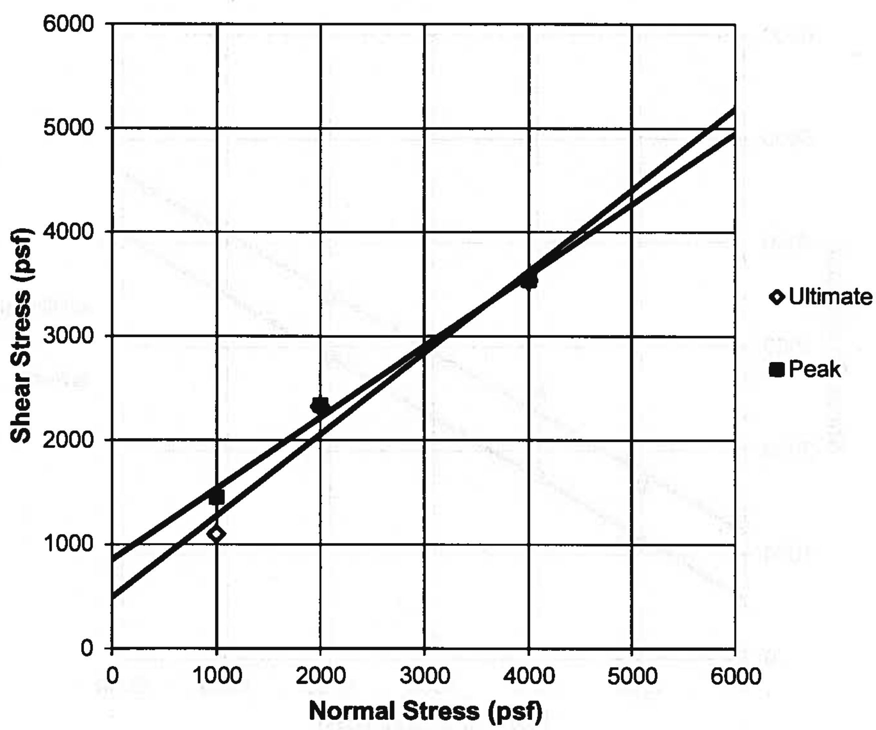
Results	
ϕ (Ultimate)	37 degrees
ϕ (Peak)	34 degrees
c (Ultimate)	490 psf
c (Peak)	855 psf

DATE: 1/5/2012

DESCRIPTION: Tps - SM

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-66

SAMPLE NO.: B35-6

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	12.2%	21.6%	16.9%
Dry Density (pcf)	112.8	97.0	105.6
Saturation*	69.3%	81.2%	79.2%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.3%	25.0%	21.4%
Dry Density (pcf)	110.4	95.1	108.2
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1517	2729	4022
Peak Stress (psf)	1609	2729	4033
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	38 degrees
ϕ (Peak)	38 degrees
c (Ultimate)	870 psf
c (Peak)	955 psf

DATE: 12/29/2011

DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold

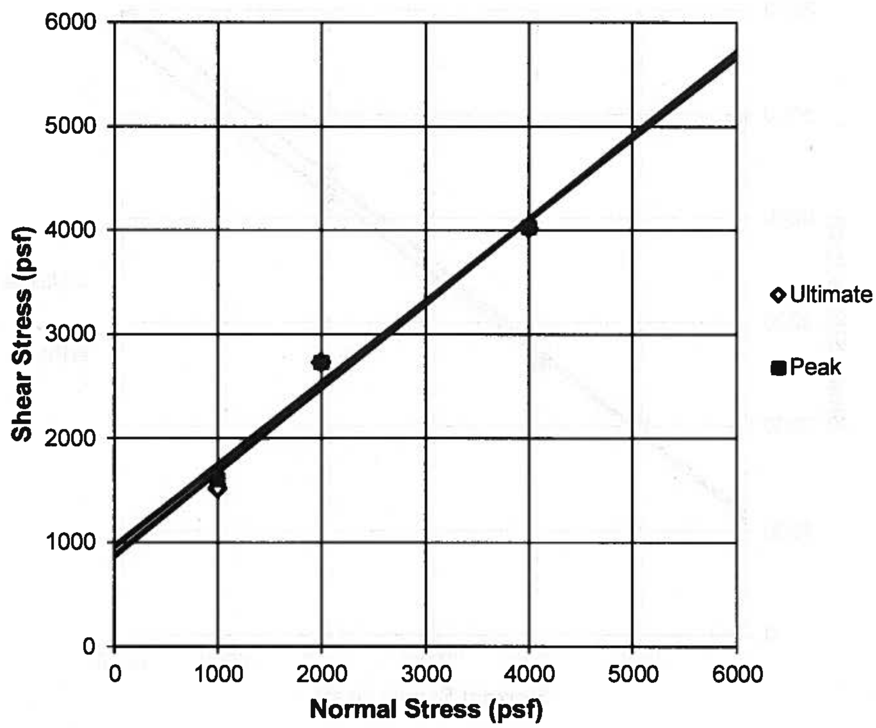

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FIG. B-67

SAMPLE NO.: B37-2

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	46.6%	47.8%	46.2%
Dry Density (pcf)	70.3	69.3	70.0
Saturation*	91.3%	91.3%	89.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	51.3%	53.1%	51.0%
Dry Density (pcf)	66.8	68.3	69.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	2006	2597	4246
Peak Stress (psf)	2026	2607	4440
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	37 degrees
ϕ (Peak)	39 degrees
c (Ultimate)	1180 psf
c (Peak)	1110 psf

DATE: 12/29/2011
DESCRIPTION: Tps-slt - ML

☑ Natural

☐ Remold

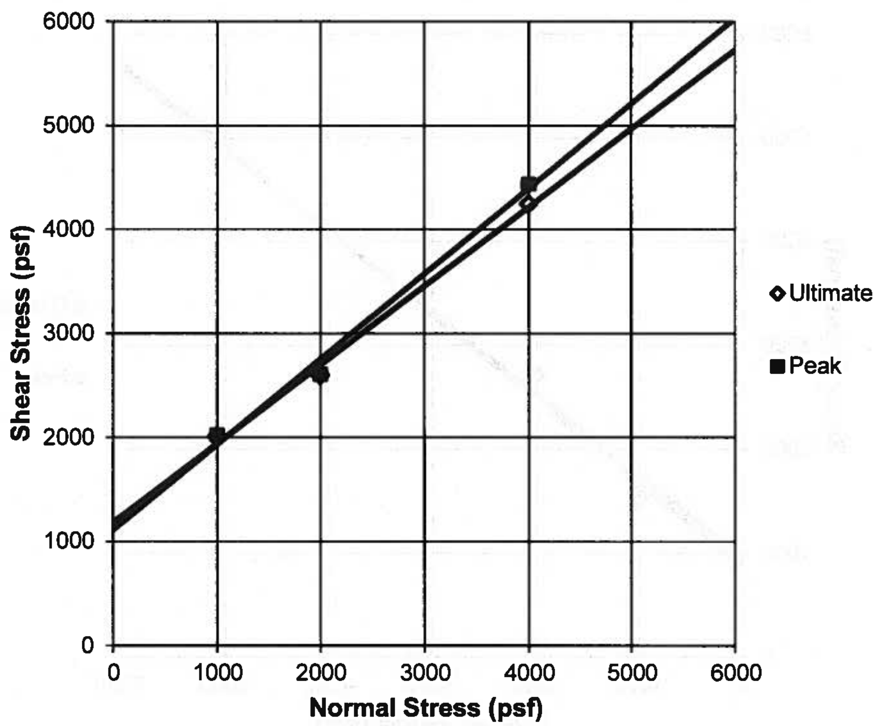

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FIG. B-68

SAMPLE NO.: B38-1

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	13.4%	13.3%	12.9%
Dry Density (pcf)	113.9	103.0	113.0
Saturation*	78.8%	58.1%	73.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.4%	21.3%	17.6%
Dry Density (pcf)	109.1	104.1	113.4
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	2037	2128	5104
Peak Stress (psf)	2067	2149	5104
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	48 degrees
ϕ (Peak)	48 degrees
c (Ultimate)	545 psf
c (Peak)	590 psf

DATE: 12/29/2011
DESCRIPTION: Tps - SM

☑ Natural

☐ Remold

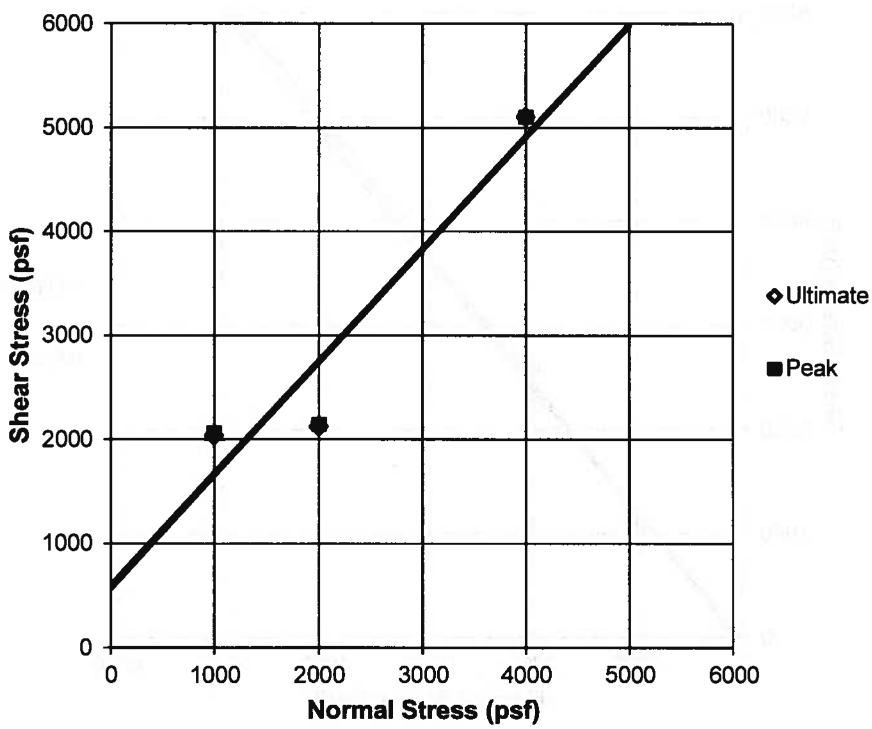

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FIG. B-69

SAMPLE NO.: B43-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	36.3%	30.0%	42.4%
Dry Density (pcf)	74.6	81.9	71.4
Saturation*	79.1%	78.0%	85.3%
Height (inches)	1	1	1
AFTER TEST			
Water Content	44.2%	37.5%	48.6%
Dry Density (pcf)	75.7	84.3	72.6
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1065	2587	4749
Peak Stress (psf)	1085	2587	4885
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	50 degrees
ϕ (Peak)	51 degrees
c (Ultimate)	0 psf
c (Peak)	0 psf

DATE: 12/29/2011

DESCRIPTION: afe - SM

☑ Natural

☐ Remold

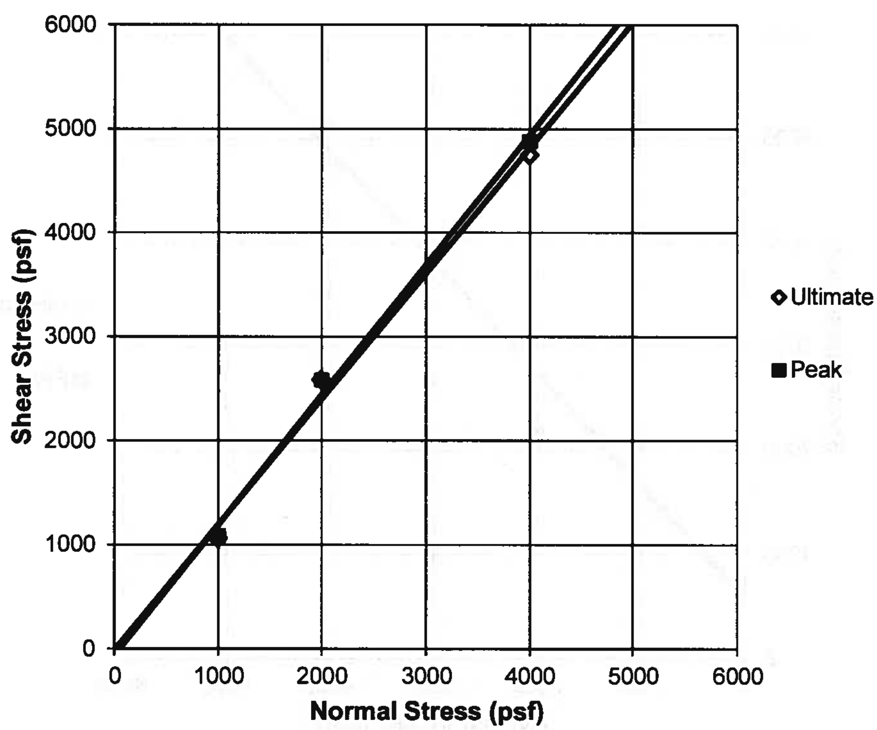

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FIG. B-70

SAMPLE NO.: B44-4

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	39.9%	44.4%	40.4%
Dry Density (pcf)	76.4	72.7	76.0
Saturation*	90.6%	92.1%	91.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	45.6%	50.4%	44.2%
Dry Density (pcf)	73.9	72.4	74.4
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1036	1836	3654
Peak Stress (psf)	1308	1972	4177
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	41 degrees
ϕ (Peak)	45 degrees
c (Ultimate)	125 psf
c (Peak)	205 psf

DATE: 12/29/2011

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

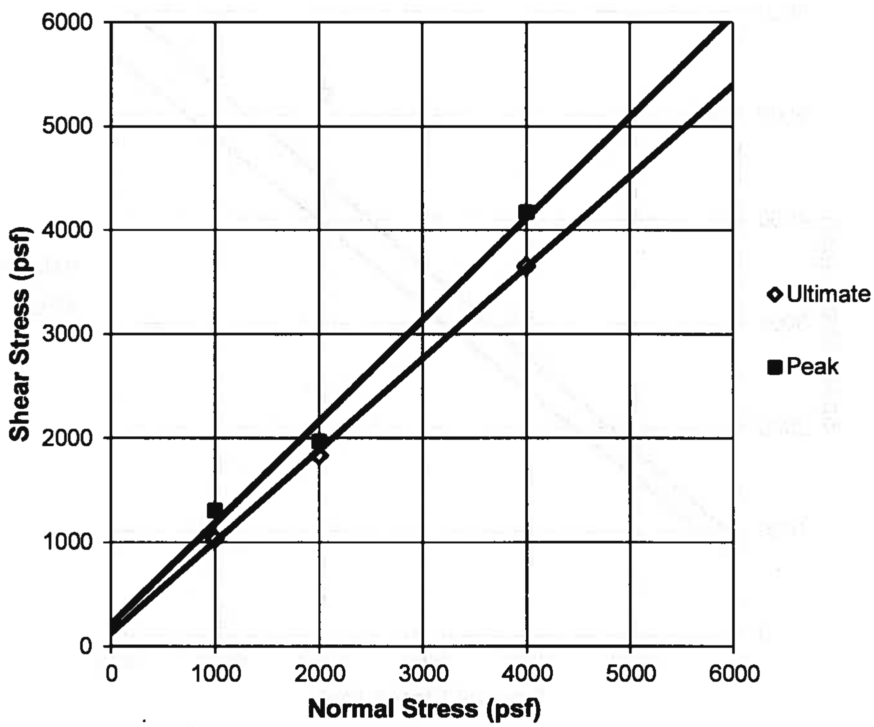

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FIG. B-71

SAMPLE NO.: B45-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	39.2%	33.7%	39.0%
Dry Density (pcf)	79.2	84.4	78.7
Saturation*	95.4%	93.1%	93.8%
Height (inches)	1	1	1
AFTER TEST			
Water Content	41.5%	36.8%	41.0%
Dry Density (pcf)	77.4	85.2	78.3
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1487	1935	5203
Peak Stress (psf)	1864	1965	5203
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	39 degrees
ϕ (Peak)	41 degrees
c (Ultimate)	700 psf
c (Peak)	900 psf

DATE: 12/29/2011

DESCRIPTION: afe - ML

☑ Natural

☐ Remold

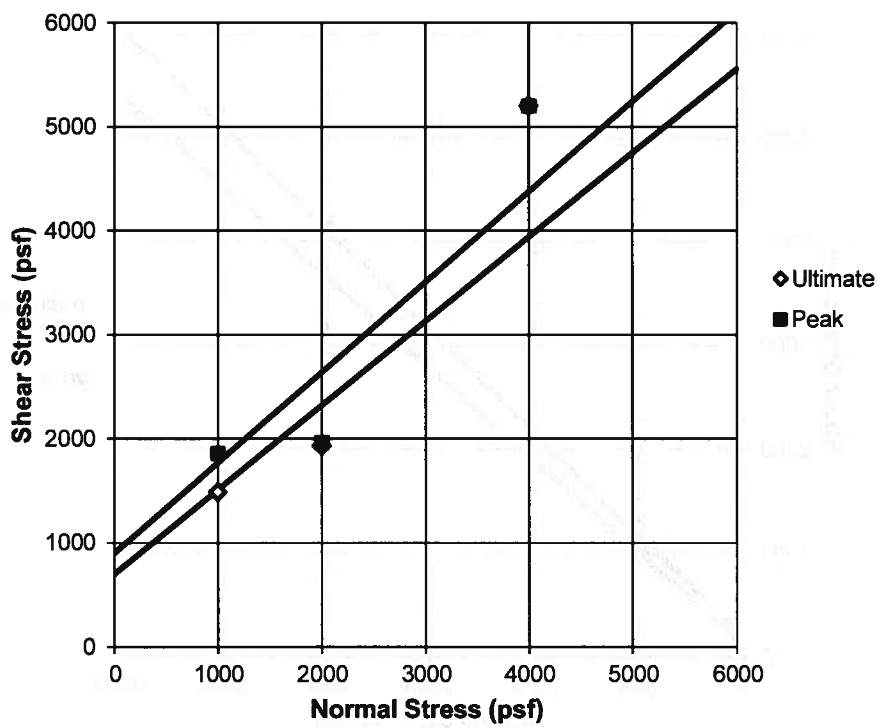

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FIG. B-72

SAMPLE NO.: B49-4

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	22.6%	22.6%	25.4%
Dry Density (pcf)	102.2	98.2	96.0
Saturation*	96.5%	87.4%	93.2%
Height (inches)	1	1	1
AFTER TEST			
Water Content	26.3%	27.0%	30.8%
Dry Density (pcf)	100.5	98.5	97.6
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1221	1923	2979
Peak Stress (psf)	1408	1930	3429
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	30 degrees
ϕ (Peak)	35 degrees
c (Ultimate)	670 psf
c (Peak)	670 psf

DATE: 12/12/2011
DESCRIPTION: afe - SM

☑ Natural

☐ Remold

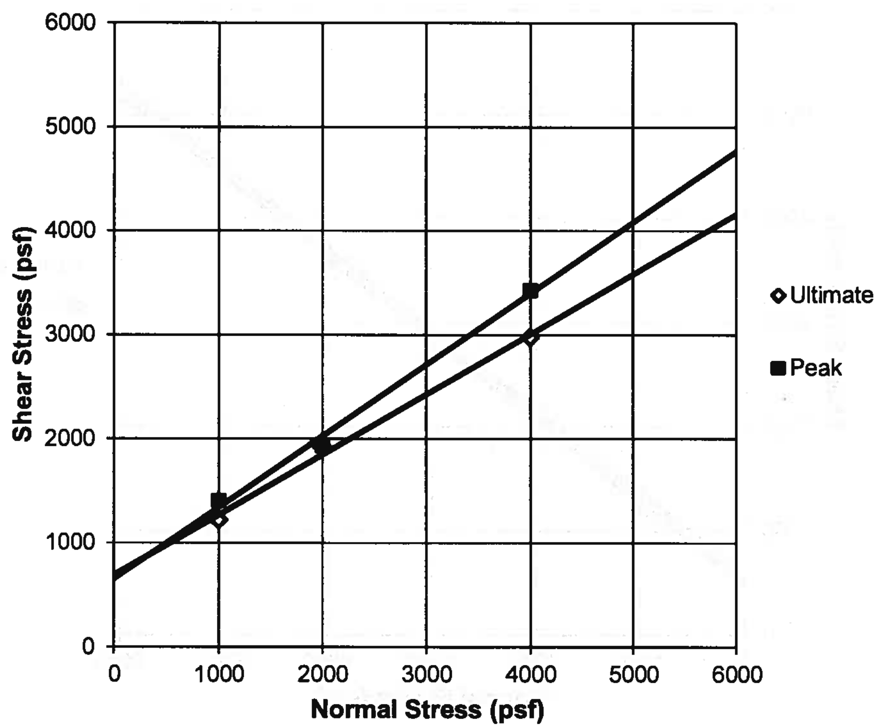

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FIG. B-73

SAMPLE NO.: B50-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	22.6%	24.7%	22.4%
Dry Density (pcf)	101.2	99.1	99.4
Saturation*	94.4%	97.9%	89.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	24.1%	26.2%	24.8%
Dry Density (pcf)	98.6	100.0	102.2
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1110	2179	3595
Peak Stress (psf)	1375	2189	3605
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	38 degrees
ϕ (Peak)	38 degrees
c (Ultimate)	500 psf
c (Peak)	600 psf

DATE: 12/9/2011

DESCRIPTION: afe - SM

☑ Natural

☐ Remold

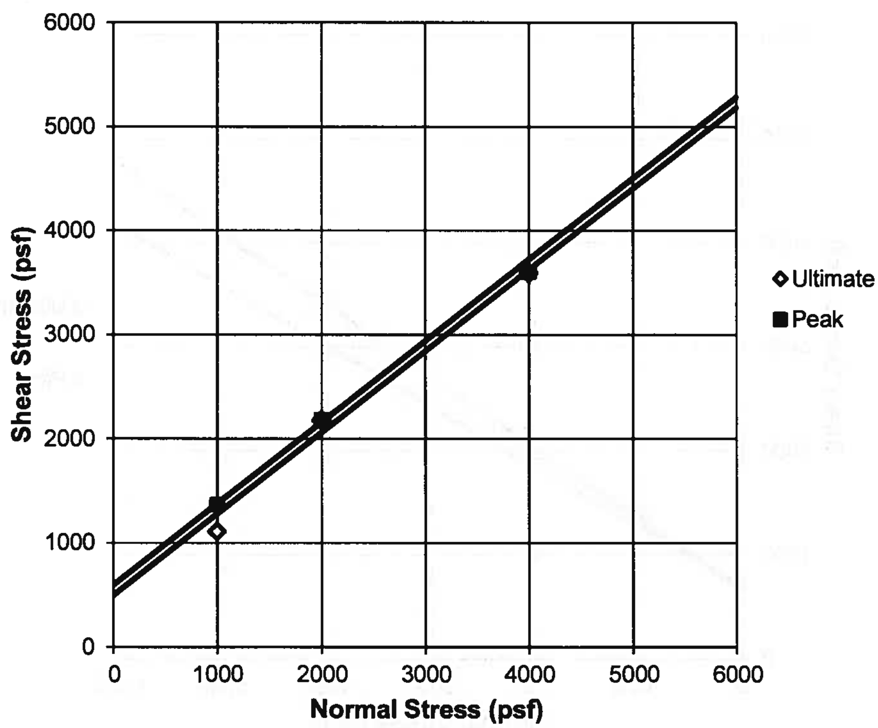

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FIG. B-74

SAMPLE NO.: B51-4

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	22.5%	21.0%	23.4%
Dry Density (pcf)	98.7	101.3	100.1
Saturation*	88.1%	87.8%	94.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	27.7%	26.7%	27.4%
Dry Density (pcf)	96.1	100.3	101.8
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1301	2078	2752
Peak Stress (psf)	1301	2337	2843
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

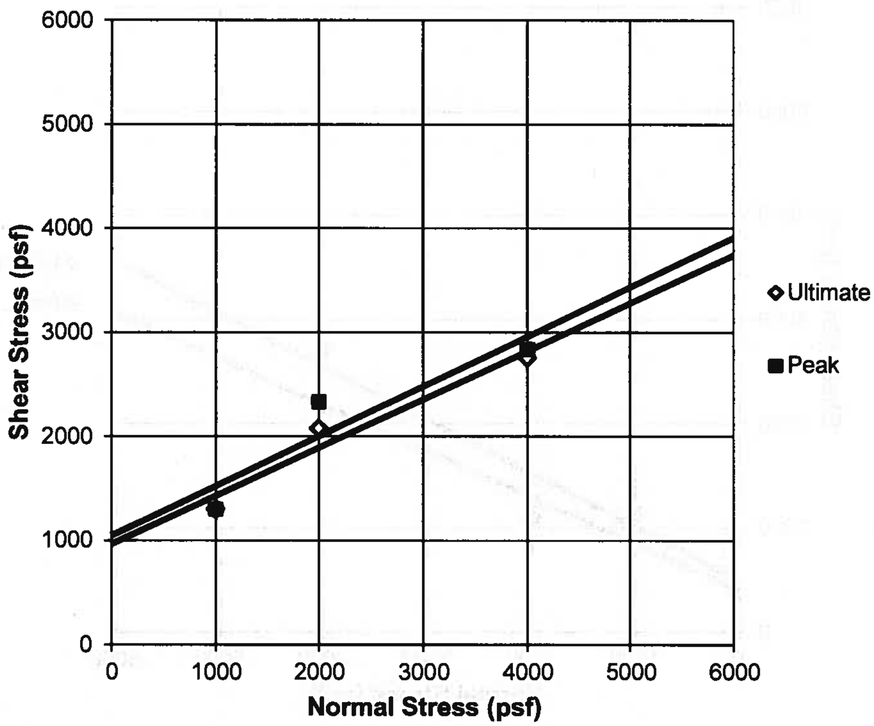
Results	
ϕ (Ultimate)	24 degrees
ϕ (Peak)	24 degrees
c (Ultimate)	965 psf
c (Peak)	1050 psf

DATE: 12/12/2011

DESCRIPTION: afe - SM

☑ Natural

☐ Remold



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PROJECT NO. G1218-52-01

FIG. B-75

SAMPLE NO.: B57-3

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	29.4%	31.0%	32.4%
Dry Density (pcf)	91.8	89.7	90.9
Saturation*	97.1%	97.2%	104.6%
Height (inches)	1	1	1
AFTER TEST			
Water Content	42.3%	41.3%	42.2%
Dry Density (pcf)	97.5	94.3	98.4
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	1130	1085	2036
Peak Stress (psf)	1159	1266	2700
Rate (in/min)	0.01	0.01	0.01

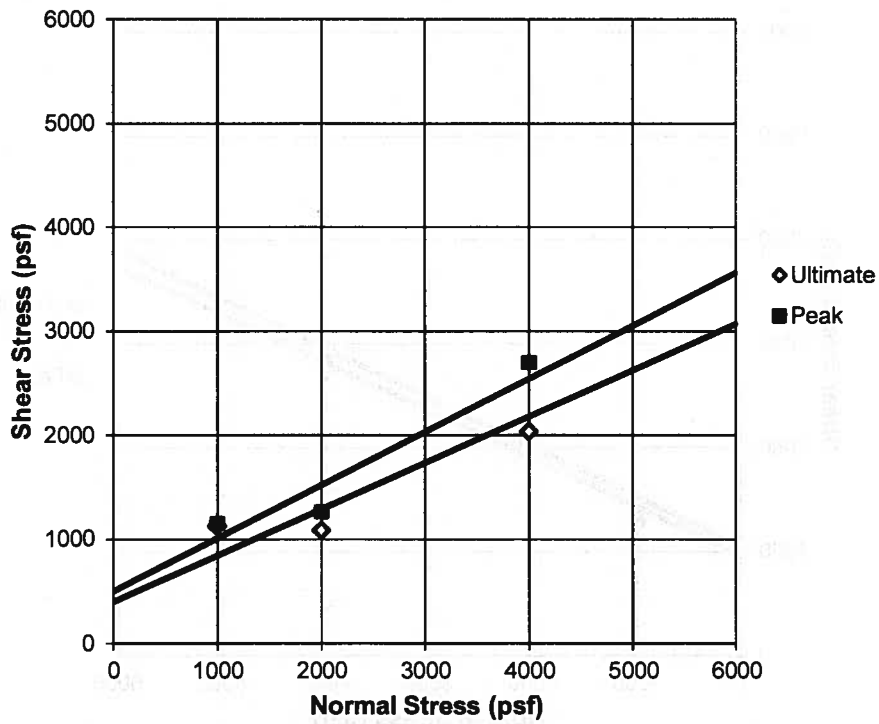
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	24 degrees
ϕ (Peak)	27 degrees
c (Ultimate)	400 psf
c (Peak)	500 psf

DATE: 12/29/2011
DESCRIPTION: Tplv - ML

☑ Natural

☐ Remold



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6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
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SW/SW

DIRECT SHEAR TEST DATA

PORTOLA CENTER
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01 | FIG. B-76

SAMPLE NO.: B57-5

Test Data			
Load	1 K	2 K	4 K
INITIAL			
Water Content	18.8%	18.9%	20.2%
Dry Density (pcf)	102.2	104.6	102.2
Saturation*	80.3%	86.1%	86.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	42.3%	41.3%	42.2%
Dry Density (pcf)	97.5	94.3	98.4
FAILURE			
Normal Stress (psf)	1000	2000	4000
Ultimate Stress (psf)	794	1721	2994
Peak Stress (psf)	1629	1731	3004
Rate (in/min)	0.01	0.01	0.01

*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	27 degrees
ϕ (Peak)	27 degrees
c (Ultimate)	600 psf
c (Peak)	900 psf

DATE: 11/29/2011

DESCRIPTION: Tplv - ML

☑ Natural

☐ Remold

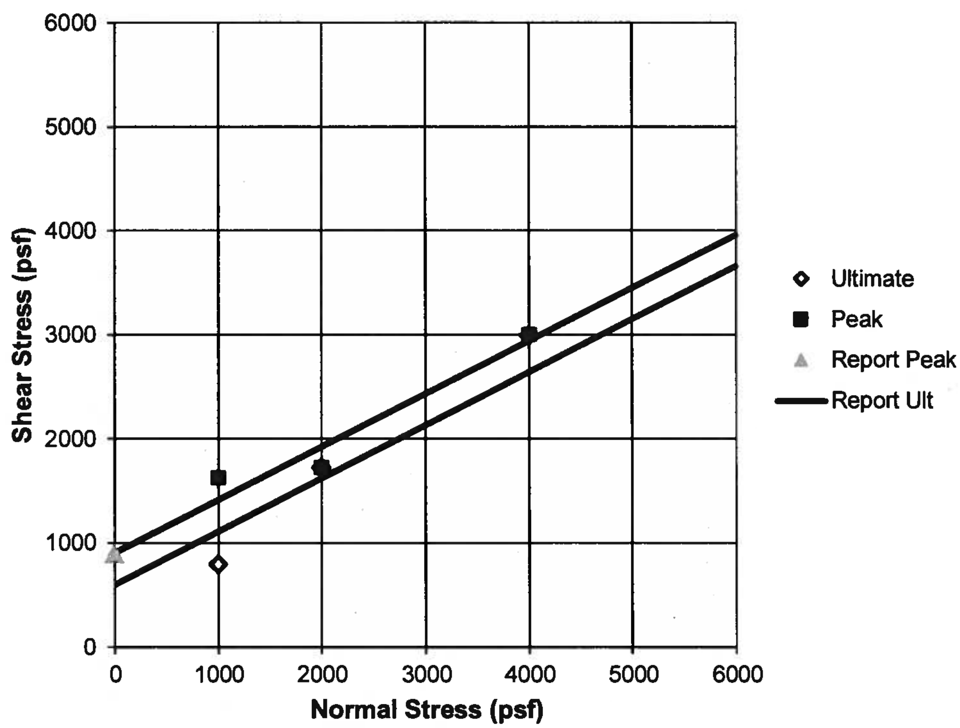

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FIG. B-77

APPENDIX C

APPENDIX C

SLOPE STABILITY ANALYSES

We performed the slope stability analyses using the two-dimensional computer software *GeoStudio2007* developed by Geo-Slope International Ltd. We analyzed the critical modes of potential slip surfaces including rotational-mode and block-mode based on Spencer's method. The soil parameters used, case conditions, and the calculated factors of safety are presented herein. Plots of analyses' results, including the soil stratigraphy, potential failure surfaces, and calculated factors of safety, are attached within this appendix.

We estimated the shear strength characteristics of the existing geologic units based on laboratory direct shear tests on samples obtained during our field investigation in accordance with ASTM D 3080 (see Appendix B). Table C-I presents the soil parameters used for the stability analyses. We used peak shear strengths on the existing materials (Tplv, Tps-slt, Tps, and BPS) for seismic design in accordance with SP 117 recommendations. In addition, we increased the shear strengths for the formational materials on the western portion of the property due to calculated slope stability analyses (i.e. using a factor of safety of 1.2 for existing conditions on cross-section Q-Q′).

TABLE C-I
SUMMARY OF SOIL PROPERTIES USED FOR SLOPE STABILITY ANALYSES

Geologic Unit/Material	Density (pcf)	Cohesion (psf)	Friction Angle (degrees)
Compacted Fill/Engineered Fill (Qcf/Afe)	120	500	28
MSE Wall backfill (MSE)	120	500	32
Alluvium (Qal)	120	500	23
Terrace Deposits (Qt)	120	300	29
Puente Formation-Soquel Member (Tps)	125	400	33
Puente Formation-Soquel Member (Tps) [Seismic]	125	800	34
Puente Formation-Soquel Member (Tps-slt)	115	400	33
Puente Formation-Soquel Member (Tps-slt) [Seismic]	115	900	30
Puente Formation-La Vida Member (Tplv)	115	300	30
Puente Formation-La Vida Member (Tplv) [Seismic]	115	900	30
Puente Formation-Soquel Member/La Vida Member along Bedding (Tps-slt/Tplv along bedding)	115	250	24
Bedding Plane Shear (BPS) [East Pad]	115	30	9
Bedding Plane Shear (BPS) [West Pad]	115	20	15
Bedding Plane Shear (BPS) [Seismic]	115	125	12

We selected Cross Sections A-A′ through D-D′, G-G′, J-J′, Q-Q′ through X-X′, DD-DD′, EE-EE′, and GG-GG′ to perform the slope stability analyses. Table C-II provides a summary of cases analyzed and calculated factors of safety. The case conditions, including the assumed buttresses, shear pins, reinforced MSE walls, and soil nail walls are also indicated in the table. A minimum factor of safety of 1.5 and 1.1 under static and pseudo-static conditions, respectively, is currently required by the City of Lake Forest for slope stability. Results of slope stability analyses, surficial slope stability calculations, and selected shear strength parameters of soil based on the laboratory test results is presented in figures herein.

TABLE C-II
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
A-A′	AA-Case1	MSE Wall (Miragrid 7XT/10'), rotational-mode analysis, static condition	1.87
A-A′	AA-Case1s	MSE Wall (Miragrid 7XT/10'), rotational-mode analysis, pseudo-static condition	1.49
B-B′	BB-Case1	Upper Slope, Lower BPS, MSE Wall (Miragrid 7XT/20',7XT/20'), block-mode analysis, static condition	1.15
B-B′	BB-Case-2	Upper Slope, Lower BPS, 55-foot buttress, MSE Wall (Miragrid 7XT/20',7XT/20'), block-mode analysis, static condition	1.50
B-B′	BB-Case-2_EQ	Upper Slope, Lower BPS, 55-foot buttress, MSE Wall (Miragrid 7XT/20',7XT/20'), block-mode analysis, seismic condition	1.30
B-B′	BB-Case-2	Upper Slope, Lower BPS, 55-foot buttress, MSE Wall (Miragrid 7XT/20',7XT/20'), along bedding, block-mode analysis, static condition	1.52
B-B′	BB-Case-2	Upper Slope, Middle BPS, 55-foot buttress, MSE Wall (Miragrid 7XT/20',7XT/20'), block-mode analysis, static condition	1.55
B-B′	BB-Case-2	Upper Slope, 55-foot buttress, MSE Wall (Miragrid 7XT/20',7XT/20'), rotational-mode analysis, static condition	1.28
B-B′	BB-Case-3	Upper Slope, 55-foot buttress, MSE Wall (Miragrid 7XT/20', 10XT/80'), rotational-mode analysis, static condition	1.52
B-B′	BB-Case-3	Upper Slope, 55-foot buttress, MSE Wall (Miragrid 7XT/20', 10XT/80'), rotational-mode analysis, seismic condition	1.16
B-B′	BB-Case-3	Lower Slope, MSE Wall (Miragrid 7XT/20'), rotational-mode analysis, static condition	1.61
B-B′	BB-Case-3	Lower Slope, MSE Wall (Miragrid 7XT/20'), rotational-mode analysis, seismic condition	1.22
C-C′	CC-Case1 _GridRadius1	Upper MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT-20'), rotational-mode analysis, static condition	1.08
C-C′	CC-Case2 _GridRadius1	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), rotational-mode analysis, static condition	1.50

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
C-C′	CC-Case2 _GridRadius1	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), rotational-mode analysis, seismic condition	1.15
C-C′	CC-Case2 _Block2	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), middle BPS, block-mode analysis, static condition	0.97
C-C′	CC-Case3 _Block3	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), lower BPS, 80-foot buttress, block-mode analysis, static condition	1.52
C-C′	CC-Case3 _Block2	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), middle BPS, 80-foot buttress, block-mode analysis, static condition	1.50
C-C′	CC-Case3 _Block2B	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), along bedding, 80-foot buttress, block-mode analysis, static condition	1.78
C-C′	CC-Case3 _Block2 _EQ	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), middle BPS, 80-foot buttress, block-mode analysis, seismic condition	1.23
C-C′	CC-Case3 _Block3 _EQ	Upper MSE Walls (Miragrid 7XT/20', 7XT/70', 7XT-90'), lower BPS, 80-foot buttress, block-mode analysis, seismic condition	1.23
C-C′	CC-Case3_ GridRadius2	Lower MSE Walls (Miragrid 7XT/20', 7XT/20'), rotational-mode analysis, static condition	1.31
C-C′	CC-Case4_ GridRadius2	Lower MSE Walls (Miragrid 7XT/20', 7XT/50'), rotational-mode analysis, static condition	1.51
C-C′	CC-Case4_ GridRadius2	Lower MSE Walls (Miragrid 7XT/20', 7XT/50'), rotational-mode analysis, seismic condition	1.15
C-C′	CC-Case4 _Block2	Lower MSE Walls (Miragrid 7XT/20', 7XT/50'), middle BPS, block-mode analysis, static condition	1.73
C-C′	CC-Case4 _Block2B	Lower MSE Walls (Miragrid 7XT/20', 7XT/50'), along bedding, block-mode analysis, static condition	2.03
C-C′	CC-Case4 _Block1	Lower MSE Walls (Miragrid 7XT/20', 7XT/50'), upper BPS, block-mode analysis, static condition	1.96
D-D′	DD-Case1_ Block3	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), lower BPS, block-mode analysis, static condition	1.57
D-D′	DD-Case1_ Block3_EQ	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), lower BPS, block-mode analysis, seismic condition	1.10
D-D′	DD-Case1_ Block2	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), middle BPS, block-mode analysis, static condition	1.33
D-D′	DD-Case2_ Block2	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), middle BPS, 40-foot buttress, block-mode analysis, static condition	1.51
D-D′	DD-Case2_ Block2	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), middle BPS, 40-foot buttress, block-mode analysis, seismic condition	1.23
D-D′	DD-Case2_ Block1	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), upper BPS, 40-foot buttress, block-mode analysis, static condition	1.69

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
D-D′	DD-Case2_ GridRadius	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/20'), 40-foot buttress, rotational-mode analysis, static condition	1.45
D-D′	DD-Case3_ GridRadius	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/60'), 40-foot buttress, rotational-mode analysis, static condition	1.52
D-D′	DD-Case3_ GridRadius_ EQ	MSE Walls (Miragrid 7XT/20', 7XT/20', 7XT/60'), 40-foot buttress, rotational-mode analysis, seismic condition	1.18
G-G′	GG-Case1_ Block1	Lower slope, upper BPS, block-mode analysis, static condition	4.44
G-G′	GG-Case1_ Block1	Upper MSE Wall (7XT/20'), lower BPS, block-mode analysis, static condition	1.56
G-G′	GG-Case1_ Block1_EQ	Upper MSE Wall (7XT/20'), lower BPS, block-mode analysis, seismic condition	1.28
G-G′	GG-Case1_ Block3	Upper MSE Wall (7XT/20'), upper BPS, block-mode analysis, static condition	1.37
G-G′	GG-Case2_ Block3	Upper MSE Wall (7XT/20'), upper BPS, 25-foot buttress, block-mode analysis, static condition	1.50
G-G′	GG-Case2_ Block3_EQ	Upper MSE Wall (7XT/20'), upper BPS, 25-foot buttress, block-mode analysis, seismic condition	1.25
G-G′	GG-Case2_ Block3B	Upper MSE Wall (7XT/20'), along bedding, 25-foot buttress, block-mode analysis, static condition	1.99
G-G′	GG-Case2_ GridRadius	Upper MSE Wall (7XT/20'), 25-foot buttress, rotational-mode analysis, static condition	2.09
G-G′	GG-Case2_ GridRadius_ EQ	Upper MSE Wall (7XT/20'), 25-foot buttress, rotational-mode analysis, seismic condition	1.44
J-J′	JJ-Case1_ Block1	Lower MSE Wall (Miragrid 7XT/20'), upper BPS, block-mode analysis, static condition	1.31
J-J′	JJ-Case1_ Block2	Lower MSE Wall (Miragrid 7XT/20'), lower BPS, block-mode analysis, static condition	1.44
J-J′	JJ-Case2_ Block2	Lower MSE Wall (Miragrid 7XT/20'), lower BPS, 25-foot buttress, block-mode analysis, static condition	1.58
J-J′	JJ-Case2_ Block1	Lower MSE Wall (Miragrid 7XT/20'), upper BPS, 25-foot buttress, block-mode analysis, static condition	1.62
J-J′	JJ-Case2_ Block2B	Lower MSE Wall (Miragrid 7XT/20'), along bedding, 25-foot buttress, block-mode analysis, static condition	1.93
J-J′	JJ-Case2_ Block2_EQ	Lower MSE Wall (Miragrid 7XT/20'), lower BPS, 25-foot buttress, block-mode analysis, seismic condition	1.10
J-J′	JJ-Case2_ GridRadius1	Lower MSE Wall (Miragrid 7XT/20'), 25-foot buttress, rotational-mode analysis, static condition	1.92
J-J′	JJ-Case2_ GridRadius1_EQ	Lower MSE Wall (Miragrid 7XT/20'), 25-foot buttress, rotational-mode analysis, seismic condition	1.36
J-J′	JJ-Case2_ GridRadius2	Middle MSE Wall (Miragrid 7XT/20'), rotational-mode analysis, static condition	1.69

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
J-J′	JJ-Case2_ GridRadius3	Upper MSE Wall (Miragrid 7XT/10'), rotational-mode analysis, static condition	2.29
Q-Q′	QQ-Case1	Existing, block-mode analysis, static condition, Increased BPS parameters (cohesion = 20 psf, friction = 15 deg.)	1.20
Q-Q′	QQ-Case3	Proposed grade, rotational-mode analysis, static condition,	1.97
Q-Q′	QQ-Case4	Proposed grade, block-mode analysis, static condition	0.89
Q-Q′	QQ-Case5	Proposed grade, shear pin (90 kips/foot), block-mode analysis along BPS, static condition,	1.52
Q-Q′	QQ-Case24	Proposed grade, shear pin (135 kips/foot), block-mode analysis along BPS, seismic condition	1.11
Q-Q′	QQ-Case6	Proposed grade, above shear pin (135 kips/foot), block-mode analysis along BPS, static condition	1.53
Q-Q′	QQ-Case6s	Proposed grade, above shear pin (135 kips/foot), block-mode analysis along BPS, seismic condition	1.15
Q-Q′	QQ-Case7	Proposed grade, below shear pin (135 kips/foot), block-mode analysis along BPS, static condition	1.02
Q-Q′	QQ-Case8	Proposed grade, below shear pin (135 kips/foot), 50-foot-buttress, block-mode analysis along BPS, static condition	1.52
Q-Q′	QQ-Case8s	Proposed grade, below shear pin (135 kips/foot), 50-foot-buttress, block-mode analysis along BPS, seismic condition	1.18
Q-Q′	QQ-Case8b	Temporary backcut for 50-foot-buttress, below shear pin (135 kips/foot), 1½:1 slope, block-mode analysis along BPS, static condition	1.24
Q-Q′	QQ-Case23	Temporary backcut for buttress, block-mode analysis along BPS, static condition	0.99
Q-Q′	QQ-Case25-s2	Proposed grade, through shear pins (80 kips/foot and 55 kips/foot), block-mode analysis along BPS, seismic condition	1.11
Q-Q′	QQ-Case15	Proposed grade, through upper shear pin (80 kips/foot) and above lower shear pin (55 kips/foot), block-mode analysis along BPS, static condition	1.84
Q-Q′	QQ-Case16	Proposed grade, below upper shear pin (80 kips/foot) and through lower shear pin (55 kips/foot), block-mode analysis along BPS, static condition	2.48
Q-Q′	QQ-Case25-s4	Proposed grade, below upper shear pin (80 kips/foot) and through lower shear pin (55 kips/foot), block-mode analysis along BPS, seismic condition	1.62
Q-Q′	QQ-Case25-s5	Proposed grade, through shear pins (80 kips/foot) and through lower shear pin (55 kips/foot), block-mode analysis along BPS, seismic condition	1.11
Q-Q′	QQ-Case14	Proposed grade, through shear pins (80 kips/foot) and through lower shear pin (55 kips/foot), block-mode analysis along BPS, static condition	2.33
Q-Q′	QQ-Case18	Proposed grade, below shear pins (80 kips/foot and 55 kips/foot) block-mode analysis along BPS, static condition	1.52

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
Q-Q′	QQ-Case18s	Proposed grade, below shear pins (80 kips/foot and 55 kips/foot) block-mode analysis along BPS, seismic condition	1.16
Q-Q′	QQ-Case20	Proposed grade, above shear pins (block-mode analysis along bedding, static condition	2.28
Q-Q′	QQ-Case19	Proposed grade, below shear pins (block-mode analysis along bedding, static condition	1.89
Q-Q′	QQ-Case22	Soil nail stabilization (35 feet long, 5 feet horizontal, 8 feet downslope), block-mode analysis along BPS, static condition	1.50
R-R′	RR-Case1	MSE Walls (Miragrid 7XT/10', 7XT/30', 7XT/30', 7XT/14'), block-mode analysis along upper BPS, static condition	1.02
R-R′	RR-Case2	MSE Walls (Miragrid 7XT/10', 7XT/30', 7XT/30', 7XT/14'), through shear pin (150 kips/foot) block-mode analysis along upper BPS, static condition	1.53
R-R′	RR-Case2-s2	MSE Walls (Miragrid 7XT/10', 7XT/30', 7XT/30', 7XT/14'), through shear pin (370 kips/foot) block-mode analysis along upper BPS, static condition	1.10
R-R′	RR-Case3	MSE Walls (Miragrid 7XT/10', 7XT/30', 7XT/30', 7XT/14'), above shear pin (370 kips/foot) block-mode analysis along upper BPS, static condition	1.85
R-R′	RR-Case4	MSE Walls (Miragrid 7XT/10', 7XT/30', 7XT/30', 7XT/14'), below shear pin (370 kips/foot) block-mode analysis along upper BPS, static condition	1.00
R-R′	RR-Case5b	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (370 kips/foot), 85-foot buttress block-mode analysis along upper BPS, static condition	1.51
R-R′	RR-Case5bs	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (370 kips/foot), 85-foot buttress block-mode analysis along upper BPS, static condition	1.18
R-R′	RR-Case5c	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (370 kips/foot), 85-foot buttress rotational-mode analysis, static condition	1.51
R-R′	RR-Case5cs	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (370 kips/foot), 85-foot buttress rotational-mode analysis, seismic condition	1.15
R-R′	RR-Case5g	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (275 kips/foot), 85-foot buttress block-mode analysis along upper BPS, static condition	2.23
R-R′	RR-Case5gs	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below shear pin (275 kips/foot), 85-foot buttress block-mode analysis along upper BPS, seismic condition	1.10

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
R-R′	RR-Case5e1	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), shear pin (275 kips/foot), block-mode analysis along lower BPS, static condition	1.36
R-R′	RR-Case5e	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), extended shear pin (275 kips/foot), block-mode analysis along lower BPS, static condition	2.35
R-R′	RR-Case5es	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), extended shear pin (275 kips/foot), block-mode analysis along lower BPS, seismic condition	1.24
R-R′	RR-Case5h	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), above extended shear pin (275 kips/foot), block-mode analysis along lower BPS, static condition	2.51
R-R′	RR-Case5i	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below extended shear pin (275 kips/foot), block-mode analysis along lower BPS, static condition	1.76
R-R′	RR-Case5is	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below extended shear pin (275 kips/foot), block-mode analysis along lower BPS, seismic condition	1.36
R-R′	RR-Case5j	MSE Walls (Miragrid 7XT/61-65', 7XT/72-79', 7XT/73-87', 7XT/75-88'), below extended shear pin (275 kips/foot), block-mode analysis along bedding, static condition	1.78
R-R′	RR-Case6	Upper Slope, block-mode analysis along BPS, static condition	1.05
R-R′	RR-Case7	Upper Slope, through shear pin (15 kips/foot), block-mode analysis along BPS, static condition	1.61
R-R′	RR-Case7s1	Upper Slope, through shear pin (15 kips/foot), block-mode analysis along BPS, seismic condition	1.19
R-R′	RR-Case8	Upper Slope, above shear pin (15 kips/foot), block-mode analysis along BPS, static condition	1.74
R-R′	RR-Case8s	Upper Slope, above shear pin (15 kips/foot), block-mode analysis along BPS, seismic condition	1.16
R-R′	RR-Case9	Upper Slope, below shear pin (15 kips/foot), block-mode analysis along BPS, static condition	1.72
R-R′	RR-Case10	Upper Slope, below shear pin (15 kips/foot), block-mode analysis along bedding, static condition	2.07
S-S′	SS-Case3a	Proposed grade, rotational-mode analysis, static condition	2.15
S-S′	SS-Case3	Proposed grade, block analysis along BPS, static condition	0.95
S-S′	SS-Case5	Proposed grade, through shear pin (45 kips/foot), block analysis along BPS, static condition	1.60
S-S′	SS-Case5s2	Proposed grade, through shear pin (55 kips/foot), block analysis along BPS, seismic condition	1.13
S-S′	SS-Case6	Proposed grade, above shear pin (55 kips/foot), block analysis along BPS, static condition	1.53

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
S-S′	SS-Case7	Proposed grade, below shear pin (55 kips/foot), block analysis along BPS, static condition	1.04
S-S′	SS-Case8	Proposed grade, below shear pin (55 kips/foot), 80-foot buttress, block analysis along BPS, static condition	1.63
T-T′	TT-Case2-a	Upper slope, rotational-mode analysis, static condition	2.52
T-T′	TT-Case2	Upper slope, block-mode analysis, static condition	1.24
T-T′	TT-Case4	Upper slope, through shear pin (30 kips/foot), block-mode analysis along BPS, static condition	1.54
T-T′	TT-Case4-s2	Upper slope, through shear pin (95 kips/foot), block-mode analysis along BPS, seismic condition	1.10
T-T′	TT-Case5	Upper slope, above shear pin (95 kips/foot), block-mode analysis along BPS, static condition	1.76
T-T′	TT-Case5s	Upper slope, above shear pin (95 kips/foot), block-mode analysis along BPS, seismic condition	1.10
T-T′	TT-Case6	Upper slope, below shear pin (95 kips/foot), block-mode analysis along BPS, static condition	1.26
T-T′	TT-Case7	Upper slope, below shear pin (95 kips/foot), 35-foot buttress, block-mode analysis along BPS, static condition	1.55
T-T′	TT-Case15	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), rotational-mode analysis, static condition	1.53
T-T′	TT-Case15s1	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), rotational-mode analysis, seismic condition	1.16
T-T′	TT-Case16	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), block-mode analysis along upper BPS, static condition	1.42
T-T′	TT-Case17	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), though shear pin (95 kips/foot), block-mode analysis along upper BPS, static condition	1.90
T-T′	TT-Case17s	7XT/25', 7XT/10'), though shear pin (95 kips/foot), block-mode analysis along upper BPS, seismic condition	1.10
T-T′	TT-Case18	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), above shear pin (95 kips/foot), block-mode analysis along upper BPS, static condition	1.81
T-T′	TT-Case18s	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), above shear pin (95 kips/foot), block-mode analysis along upper BPS, seismic condition	1.11
T-T′	TT-Case20	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), block-mode analysis along middle BPS, static condition	1.25
T-T′	TT-Case21	Lower MSE Walls (Miragrid 7XT/20', 7XT/25', 7XT/25', 7XT/10'), through shear pin (350 kips/foot), block-mode analysis along middle BPS, static condition	2.04

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
T-T′	TT-Case21s	Lower MSE Walls (Miragrid 7XT/20’, 7XT/25’, 7XT/25’, 7XT/10’), through shear pin (350 kips/foot), block-mode analysis along middle BPS, seismic condition	1.10
T-T′	TT-Case22	Lower MSE Walls (Miragrid 7XT/20’, 7XT/25’, 7XT/25’, 7XT/10’), block-mode analysis along lower BPS, static condition	1.57
T-T′	TT-Case23s	Lower MSE Walls (Miragrid 7XT/20’, 7XT/25’, 7XT/25’, 7XT/10’), through shear pin (130 kips/foot), block-mode analysis along lower BPS, seismic condition	1.10
U-U′	UU-Case1	Upper MSE Walls (Miragrid 7XT/20’, 7XT/20’), lower BPS, block-mode analysis, static condition	0.87
U-U′	UU-Case2	Upper MSE Walls (Miragrid 7XT/20’, 7XT/20’), lower BPS, 165-foot buttress, block-mode analysis, static condition	1.55
U-U′	UU-Case2_ EQ	Upper MSE Walls (Miragrid 7XT/20’, 7XT/20’), lower BPS, 165-foot buttress, block-mode analysis, seismic condition	1.10
U-U′	UU-Case2	Upper MSE Walls (Miragrid 7XT/20’, 7XT/20’), along bedding, 165-foot buttress, block-mode analysis, static condition	1.52
U-U′	UU-Case2	Upper MSE Walls (Miragrid 7XT/20’, 7XT/20’), 165-foot buttress, rotational-mode analysis, static condition	1.41
U-U′	UU-Case3	Upper MSE Walls (Miragrid 7XT/20’, 7XT/70’), 165-foot buttress, rotational-mode analysis, static condition	1.50
U-U′	UU-Case3	Upper MSE Walls (Miragrid 7XT/20’, 7XT/70’), 165-foot buttress, rotational-mode analysis, seismic condition	1.15
U-U′	UU-Case3	Lower MSE Walls (Miragrid 7XT/20’, 7XT/20’), along BPS, block-mode analysis, static condition	1.49
U-U′	UU-Case4	Lower MSE Walls (Miragrid 7XT/20’, 7XT/20’), along BPS, 10-foot buttress, block-mode analysis, static condition	1.56
U-U′	UU-Case4_EQ	Lower MSE Walls (Miragrid 7XT/20’, 7XT/20’), along BPS, 10-foot buttress, block-mode analysis, seismic condition	1.24
U-U′	UU-Case4	Lower MSE Walls (Miragrid 7XT/20’, 7XT/20’), 10-foot buttress, rotational-mode analysis, static condition	1.40
U-U′	UU-Case5	Lower MSE Walls (Miragrid 7XT/70’, 7XT/20’), 10-foot buttress, rotational-mode analysis, static condition	1.50
U-U′	UU-Case5	Lower MSE Walls (Miragrid 7XT/70’, 7XT/20’), 10-foot buttress, rotational-mode analysis, seismic condition	1.12
V-V′	VV-Case1	MSE Walls (Miragrid 7XT/20’, 7XT/20’), middle BPS, block-mode analysis, static condition	1.70
V-V′	VV-Case1	MSE Walls (Miragrid 7XT/20’, 7XT/20’), middle BPS, block-mode analysis, seismic condition	1.13
V-V′	VV-Case1	MSE Walls (Miragrid 7XT/20’, 7XT/20’), upper BPS, block-mode analysis, static condition	0.68
V-V′	VV-Case2	MSE Walls (Miragrid 7XT/20’, 7XT/20’), 100-foot buttress, upper BPS, block-mode analysis, static condition	1.53

TABLE C-II (Continued)
SUMMARY OF SLOPE STABILITY ANALYSES

Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
V-V′	VV-Case2	MSE Walls (Miragrid 7XT/20', 7XT/20'), 100-foot buttress, along bedding, block-mode analysis, static condition	1.41
V-V′	VV-Case3	MSE Walls (Miragrid 7XT/20', 7XT/20'), 100-and 25-foot buttresses, along bedding, block-mode analysis, static condition	1.52
V-V′	VV-Case3	MSE Walls (Miragrid 7XT/20', 7XT/20'), 100-and 25-foot buttresses, rotational-mode analysis, static condition	1.53
V-V′	VV-Case4s	MSE Walls (Miragrid 7XT/20', 7XT/20'), 100-and 25-foot buttresses, rotational-mode analysis, static condition	1.18
W-W′	WW-Case1	Upper slope, rotational-mode analysis, static condition	1.78
W-W′	WW-Case2	Upper slope, block-mode analysis along BPS, static condition	1.00
W-W′	WW-Case4	Upper slope, through shear pin (90 kips/foot), block-mode analysis along BPS, static condition	1.53
W-W′	WW-Case4s-2	Upper slope, through shear pin (130 kips/foot), block-mode analysis along BPS, seismic condition	1.12
W-W′	WW-Case5	Upper slope, above shear pin (130 kips/foot), block-mode analysis along BPS, static condition	1.53
W-W′	WW-Case5s	Upper slope, above shear pin (130 kips/foot), block-mode analysis along BPS, seismic condition	1.10
W-W′	WW-Case6	Upper slope, below shear pin (130 kips/foot), block-mode analysis along BPS, static condition	1.33
X-X′	XX-Case1	Existing slope, rotational-mode analysis, static condition	2.04
X-X′	XX-Case2	Existing slope, block-mode analysis, static condition	2.09
X-X′	XX-Case3	Soil nail wall (20' long, 5-foot horizontal and vertical spacing, 1-inch diameter steel bars), rotational-mode analysis, static condition	1.92
X-X′	XX-Case4	Soil nail wall (20' long, 5-foot horizontal and vertical spacing, 1-inch diameter steel bars), line load (5 kips/foot) rotational-mode analysis, static condition	2.04
DD-DD′	DD-DD-Case1	MSE Wall (7XT/10'), rotational-mode analysis, static condition	1.96
DD-DD′	DD-DD-Case1s	MSE Wall (7XT/10'), rotational-mode analysis, seismic condition	1.53
DD-DD′	DD-DD-Case2	MSE Wall (7XT/10'), block-mode analysis along bedding, static condition	2.12
DD-DD′	DD-DD-Case3	MSE Wall (7XT/10'), block-mode analysis along middle BPS, static condition	2.39
DD-DD′	DD-DD-Case3s	MSE Wall (7XT/10'), block-mode analysis along middle BPS, seismic condition	1.51
EE-EE′	EE-EE-Case1	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), rotational-mode analysis, static condition	1.51

TABLE C-II (Concluded)
SUMMARY OF SLOPE STABILITY ANALYSES

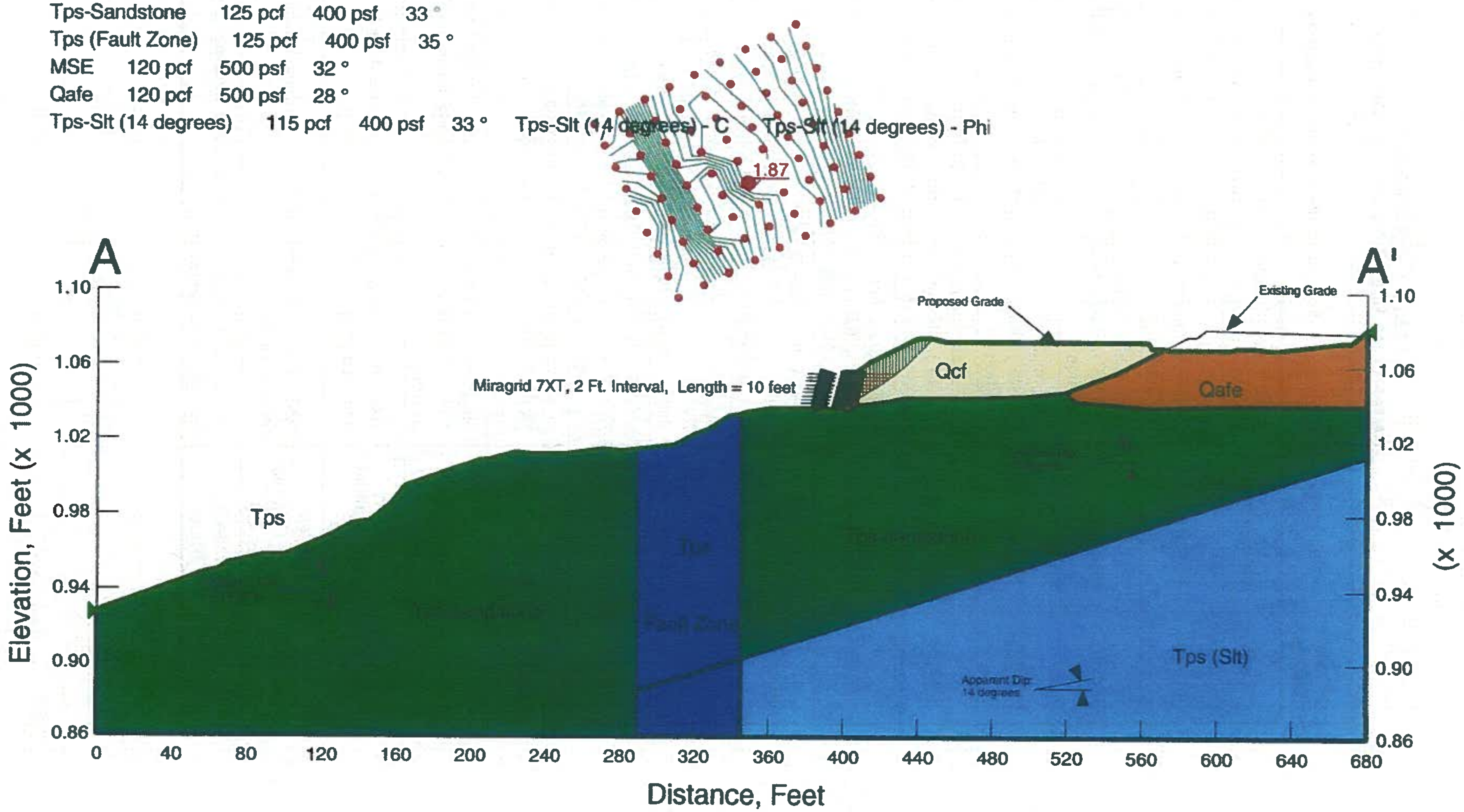
Cross Section	File Name	Condition of Slope Stability Analyses	Calculated Factor of Safety
EE-EE′	EE-EE-Case1s	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), rotational-mode analysis, seismic condition	1.16
EE-EE′	EE-EE-Case2	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), block-mode analysis along upper BPS, static condition	1.62
EE-EE′	EE-EE-Case2s	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), block-mode analysis along upper BPS, seismic condition	1.12
EE-EE′	EE-EE-Case3	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), block-mode analysis along middle BPS, static condition	1.26
EE-EE′	EE-EE-Case3a	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), through shear pin (90 kips/foot), block-mode analysis along middle BPS, static condition	1.52
EE-EE′	EE-EE-Case3a-s	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), through shear pin (140 kips/foot), block-mode analysis along middle BPS, seismic condition	1.10
EE-EE′	EE-EE-Case4	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), above shear pin (140 kips/foot), block-mode analysis along middle BPS, static condition	1.59
EE-EE′	EE-EE-Case4s	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), above shear pin (140 kips/foot), block-mode analysis along middle BPS, seismic condition	1.13
EE-EE′	EE-EE-Case5	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), below shear pin (140 kips/foot), block-mode analysis along middle BPS, static condition	1.73
EE-EE′	EE-EE-Case6	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), block-mode analysis along lower BPS, static condition	1.62
EE-EE′	EE-EE-Case6s	MSE Walls (Miragrid 10XT/52'-55', 7XT/60', 7XT/51-63', 7XT/45'), block-mode analysis along lower BPS, seismic condition	1.19
GG-GG′	GGGG-Case1_GridRadius	MSE Wall (Miragrid 2XT/5'), rotational-mode analysis, static condition	1.90
GG-GG′	GGGG-Case1_GridRadius_EQ	MSE Wall (Miragrid 2XT/5'), rotational-mode analysis, seismic condition	1.41
GG-GG′	GGGG-Case1_Block	MSE Wall (Miragrid 2XT/5'), along bedding, block-mode analysis, static condition	1.91

Portola Center - North
Project No. G1218-52-01
Name: AA -Case 1.gsz
Date: 3/25/2013 Time: 1:32:04 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °
Tps-Sandstone	125 pcf	400 psf	33 °
Tps (Fault Zone)	125 pcf	400 psf	35 °
MSE	120 pcf	500 psf	32 °
Qafe	120 pcf	500 psf	28 °
Tps-Slt (14 degrees)	115 pcf	400 psf	33 ° Tps-Slt (14 degrees) - C Tps-Slt (14 degrees) - Phi

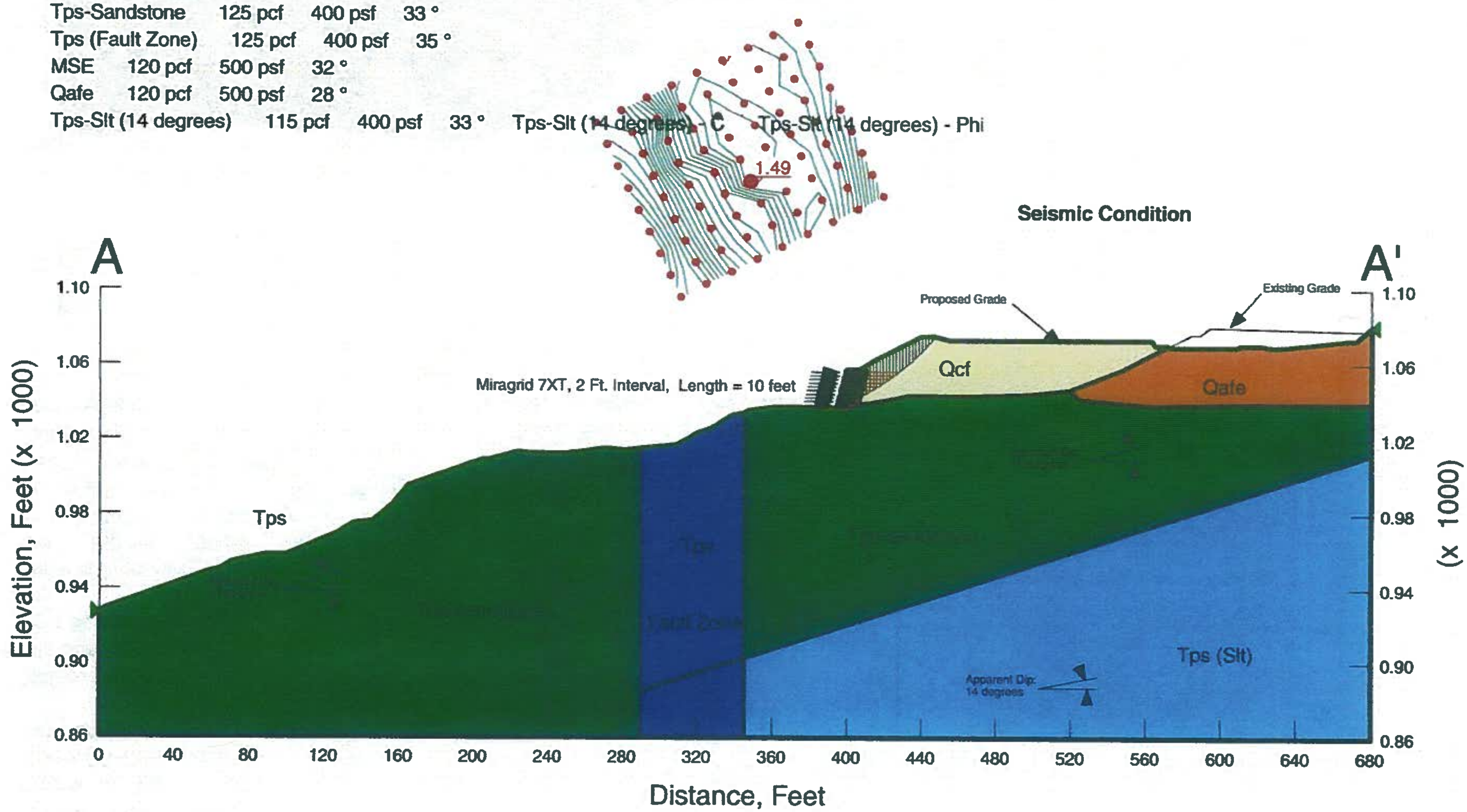


Portola Center - North
Project No. G1218-52-01
Name: AA -Case 1s.gsz
Date: 3/25/2013 Time: 1:33:29 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps (Fault Zone)	125 pcf	400 psf	35 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (14 degrees)	115 pcf	400 psf	33 °	Tps-Slt (14 degrees) - C	Tps-Slt (14 degrees) - Phi

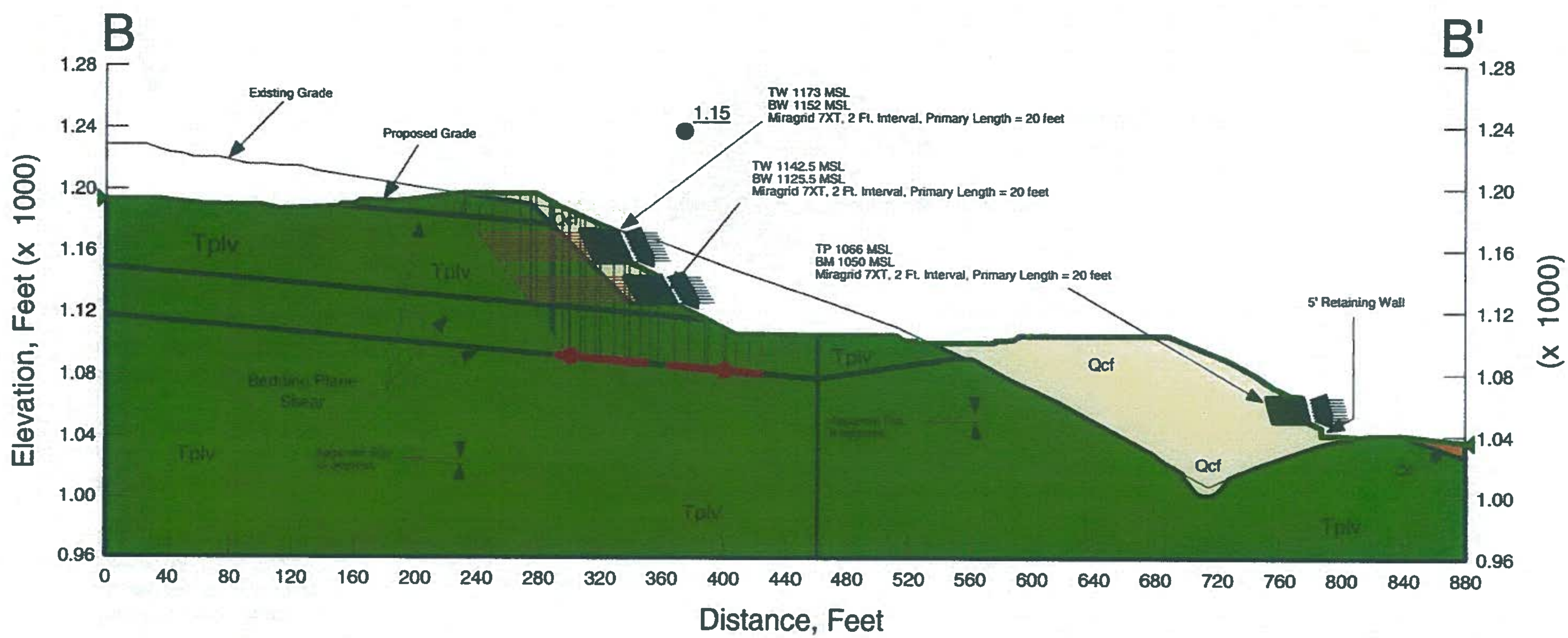


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-1.gsz
Date: 3/27/2013 Time: 12:59:42 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

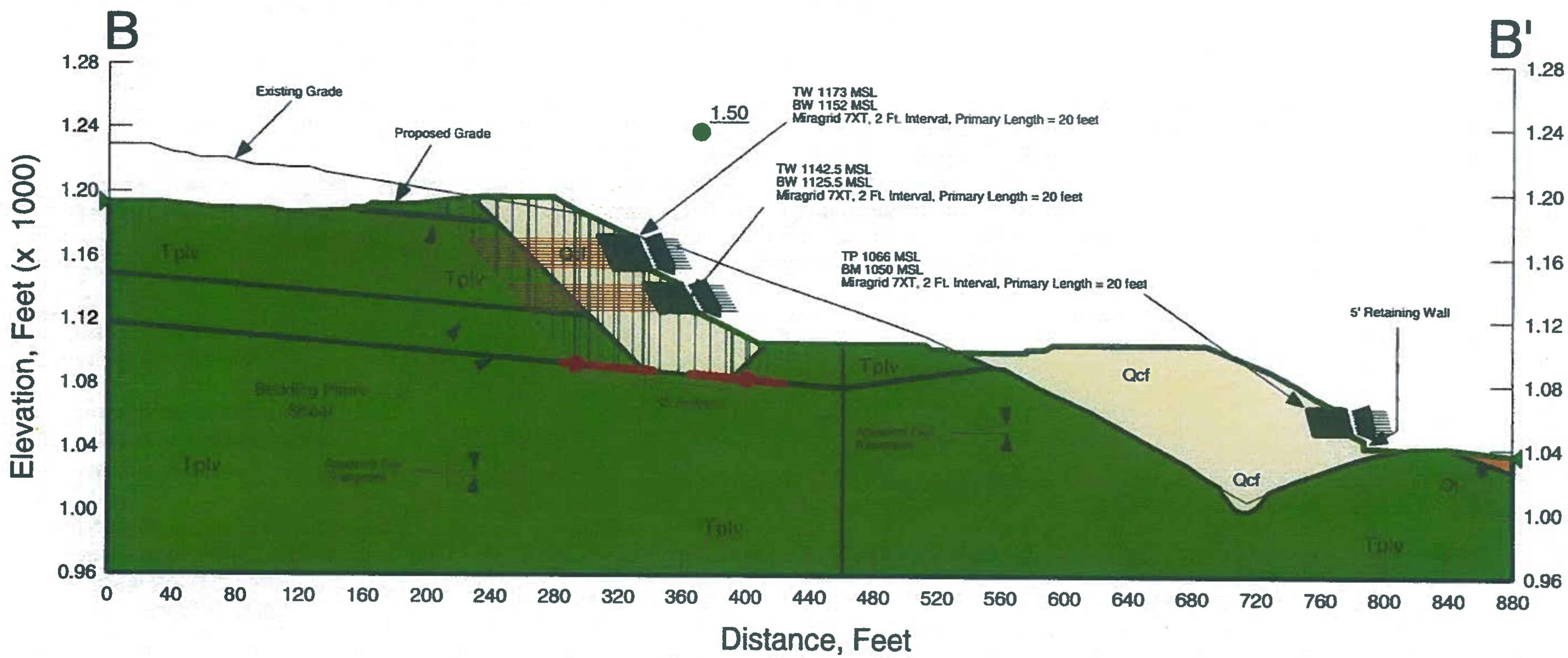


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-2.gsz
Date: 3/27/2013 Time: 9:21:07 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

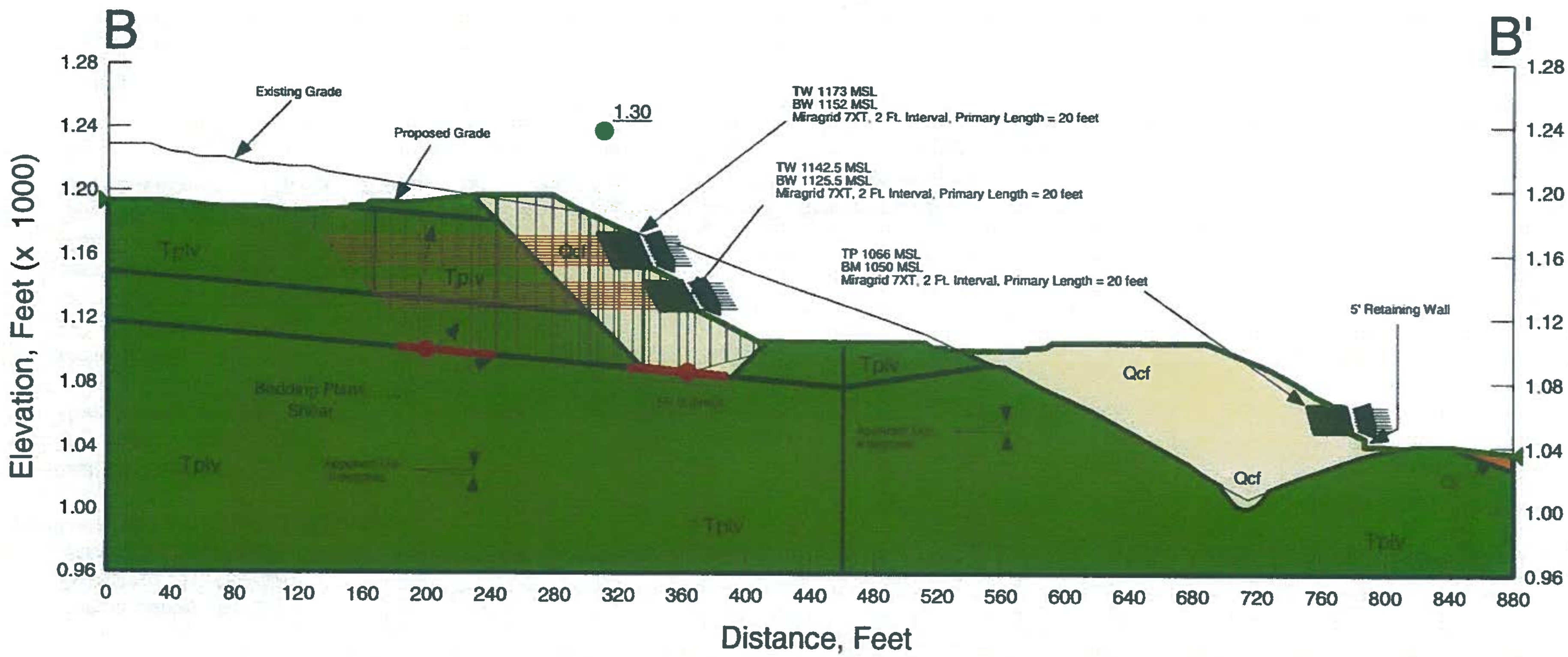


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-2_EQ.gsz
Date: 3/27/2013 Time: 9:39:48 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	900 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	900 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

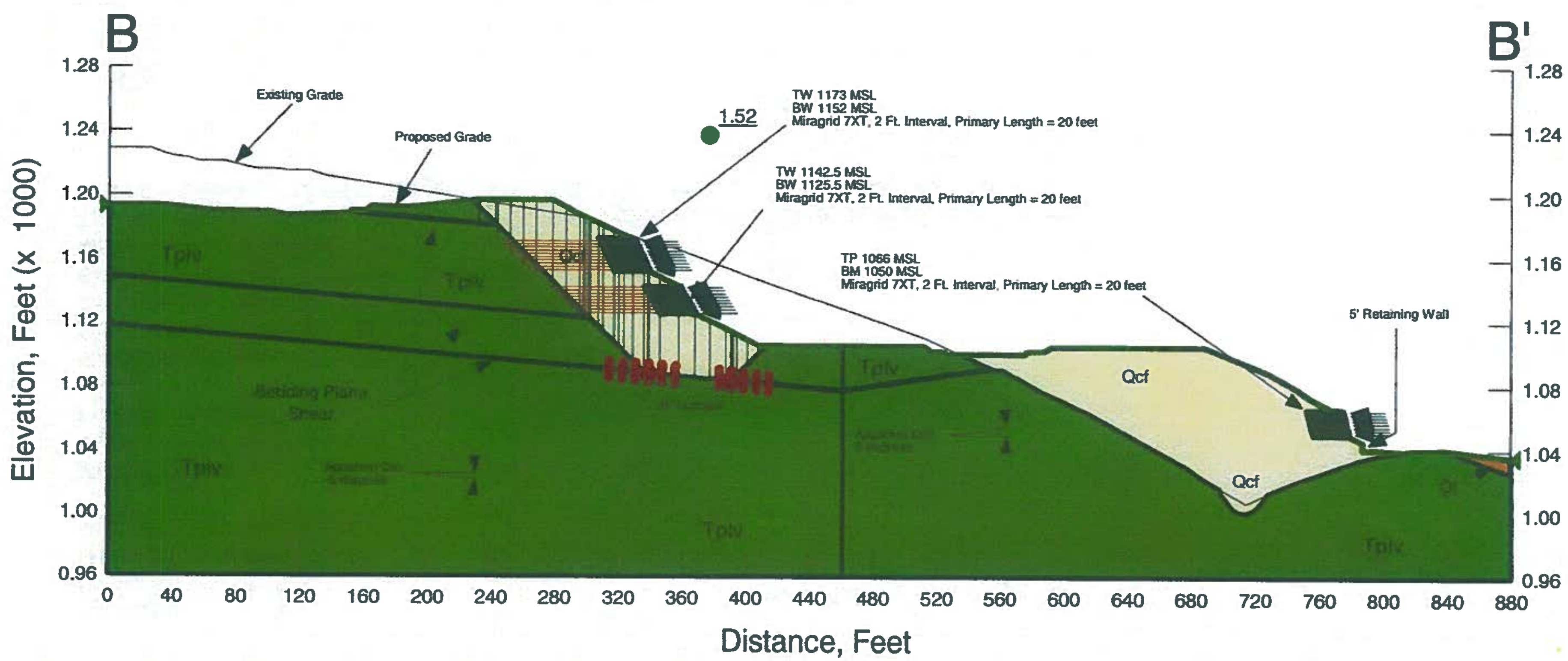


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-2.gsz
Date: 3/27/2013 Time: 9:29:13 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

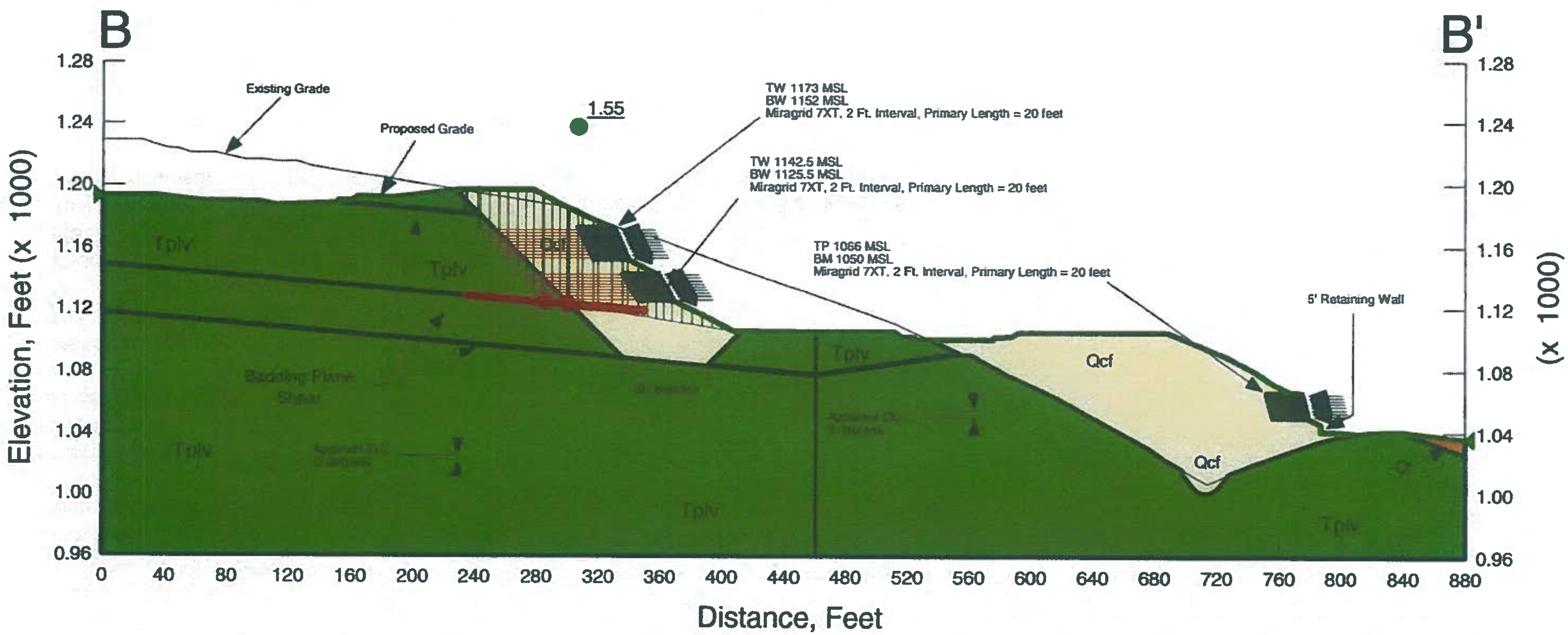


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-2.gsz
Date: 3/27/2013 Time: 9:52:20 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

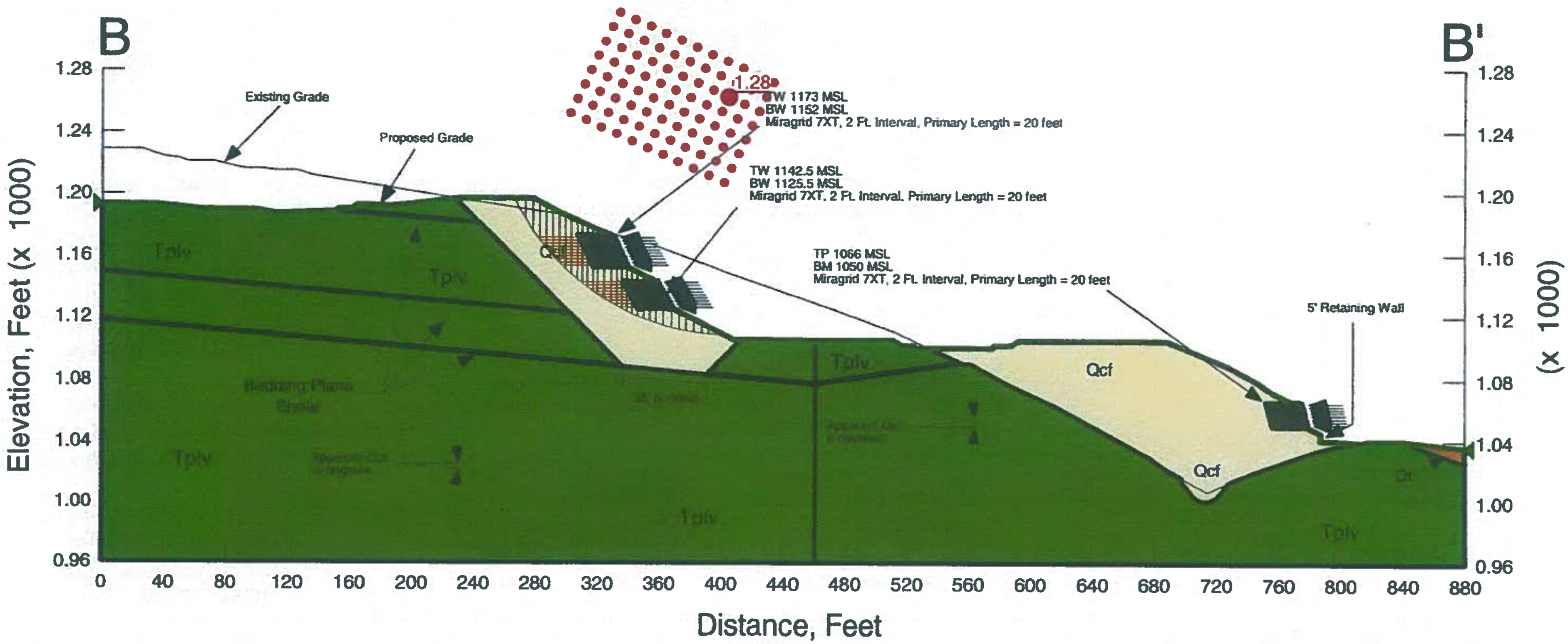


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-2.gsz
Date: 3/27/2013 Time: 9:32:04 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

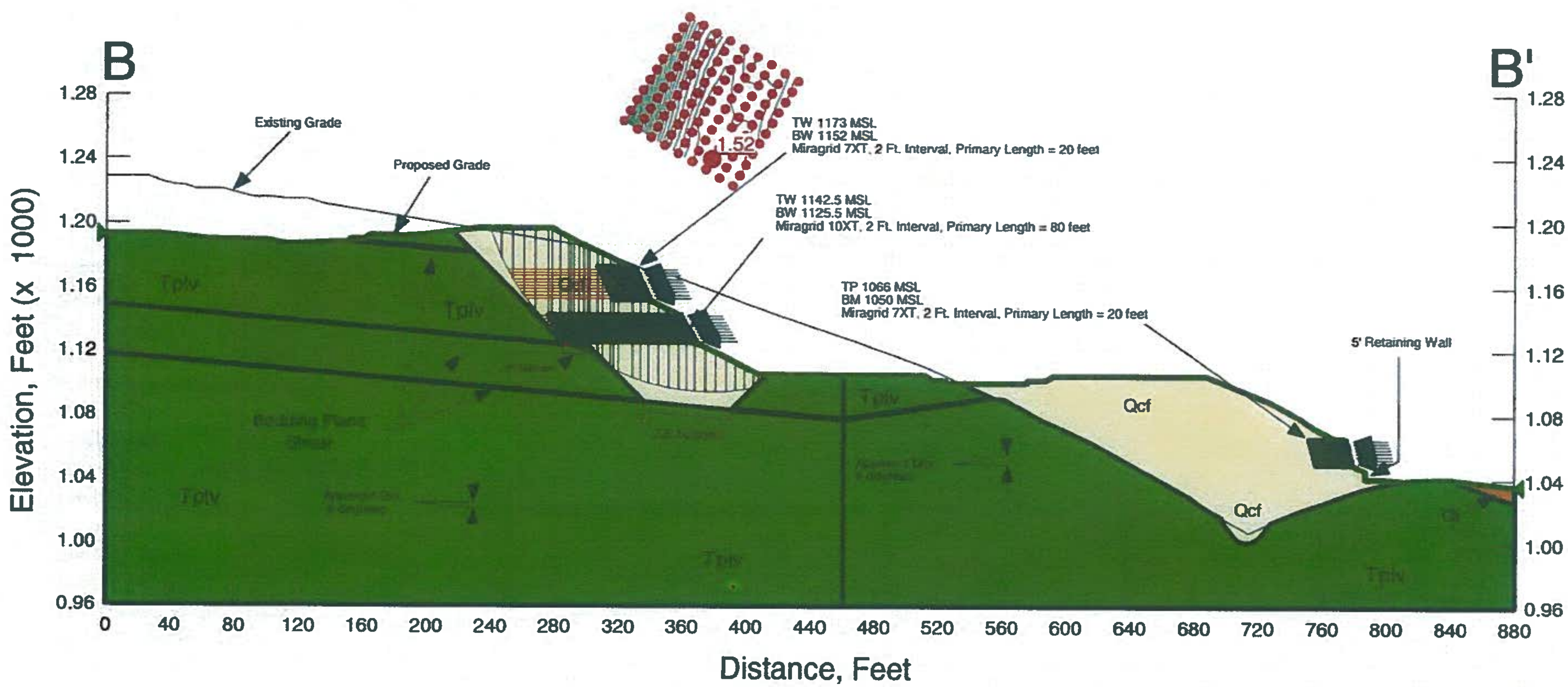


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-3.gsz
Date: 3/27/2013 Time: 12:52:46 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

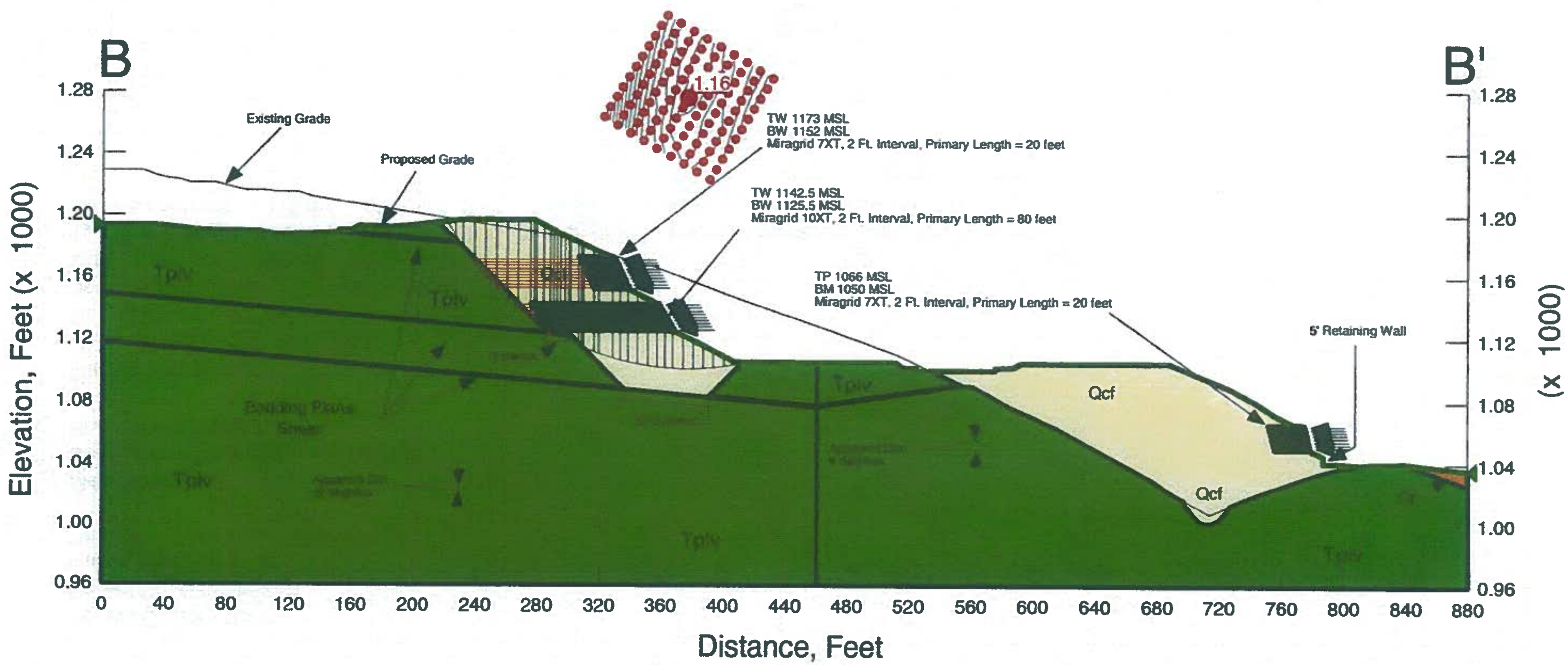


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-3.gsz
Date: 3/27/2013 Time: 12:53:50 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

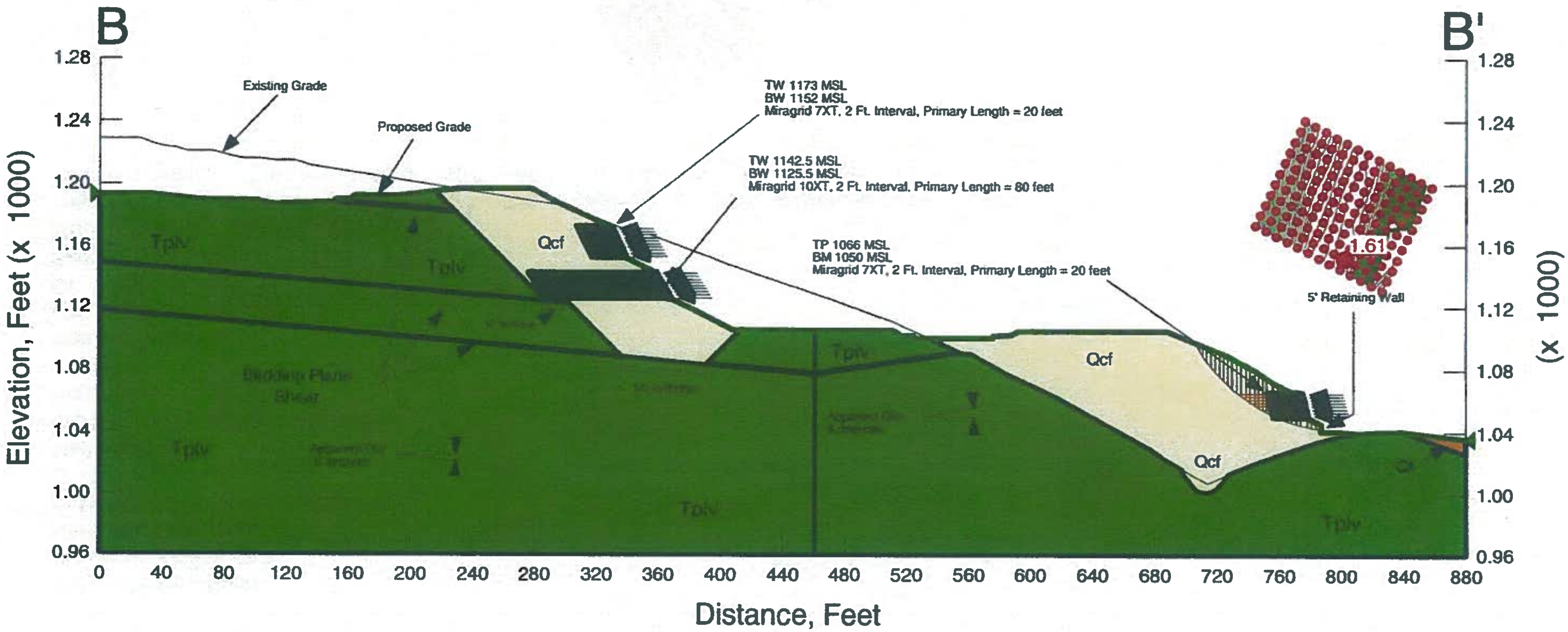


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-3.gsz
Date: 3/27/2013 Time: 12:56:31 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

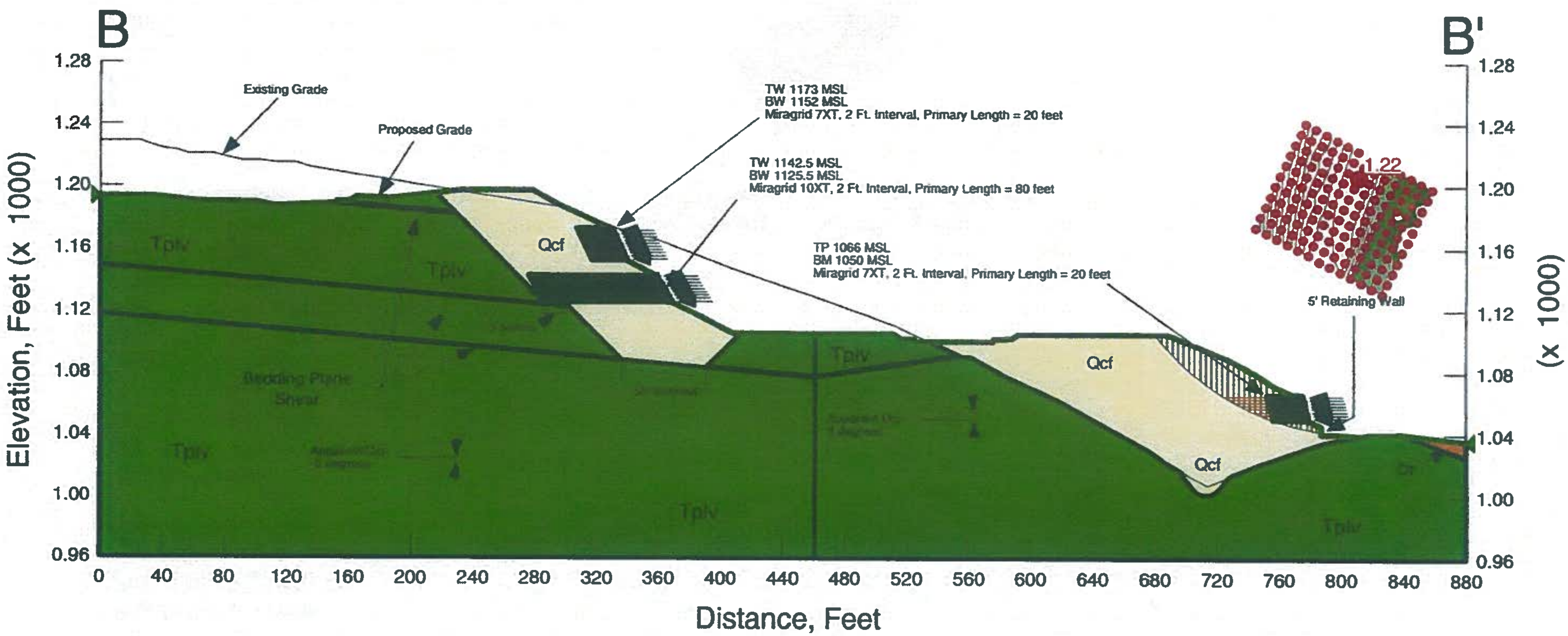


Portola Center - North
Project No. G1218-52-01
Name: BB-Case-3.gsz
Date: 3/27/2013 Time: 12:57:13 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qt	120 pcf	300 psf	29 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (8 degrees)	115 pcf	300 psf	30 °	Tplv (8 degrees) - C	Tplv (8 degrees) - Phi
Tplv (-5 degrees)	115 pcf	300 psf	30 °	Tplv (-5 degrees) - C	Tplv (-5 degrees) - Phi

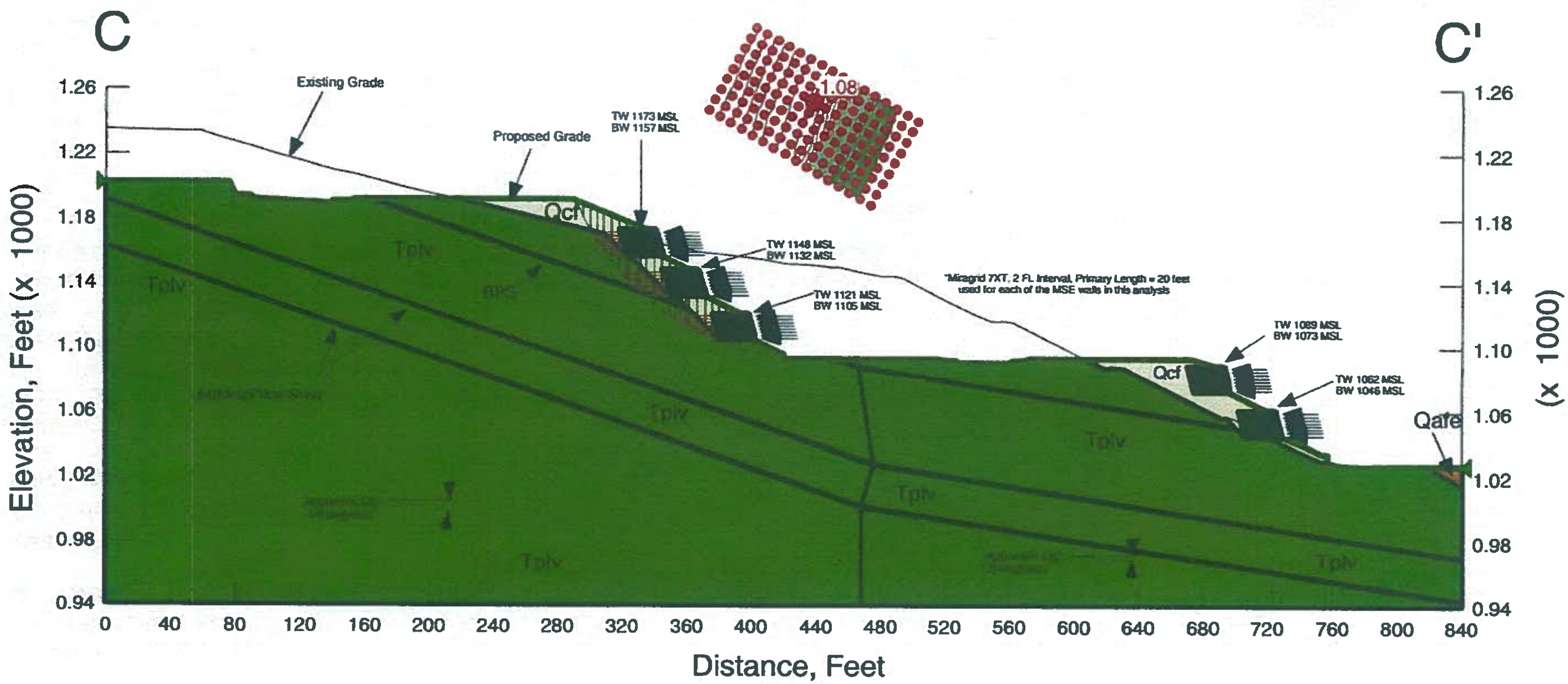


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 1_GridRadius1.gsz
Date: 3/21/2013 Time: 3:19:15 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

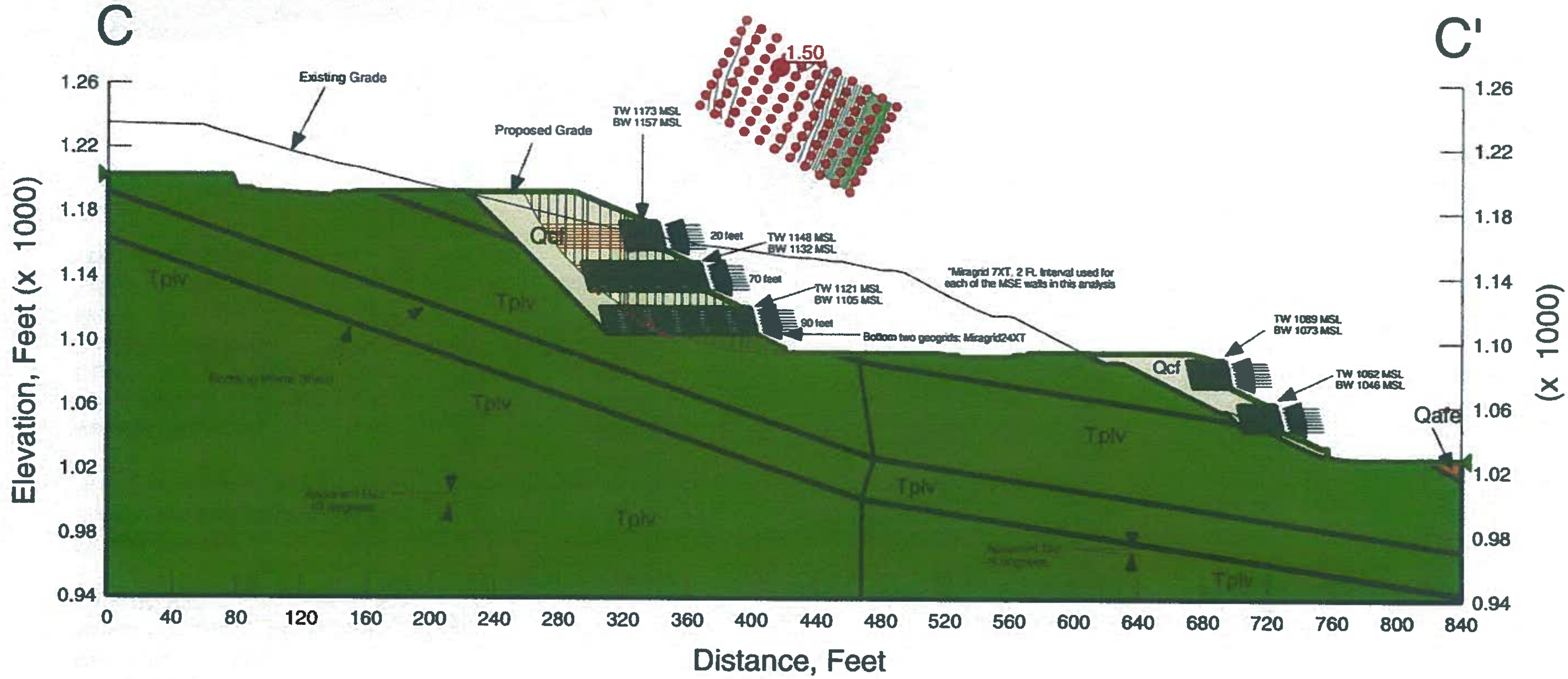


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 2_GridRadius1.gsz
Date: 3/21/2013 Time: 3:23:51 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

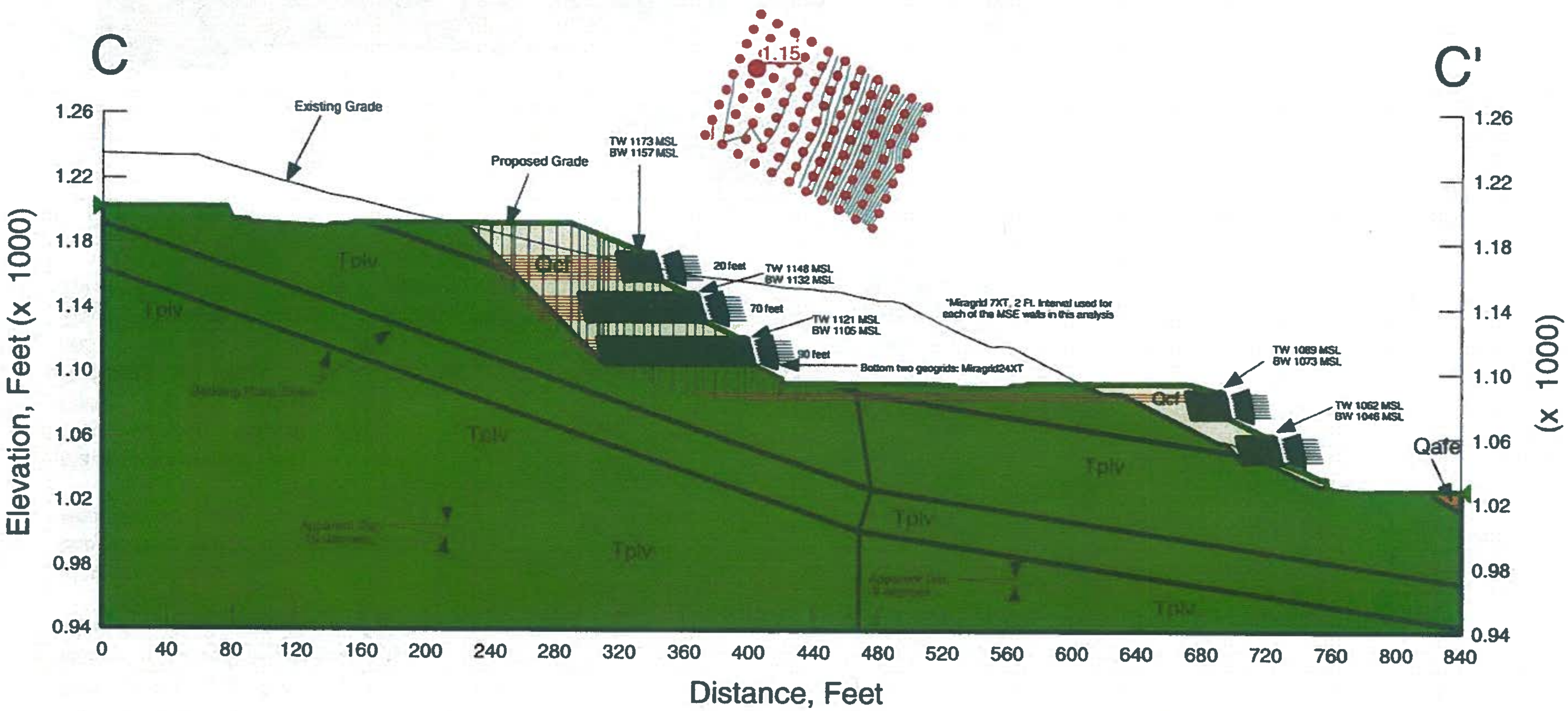


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 2_GridRadius1_EQ.gsz
Date: 3/21/2013 Time: 3:26:21 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

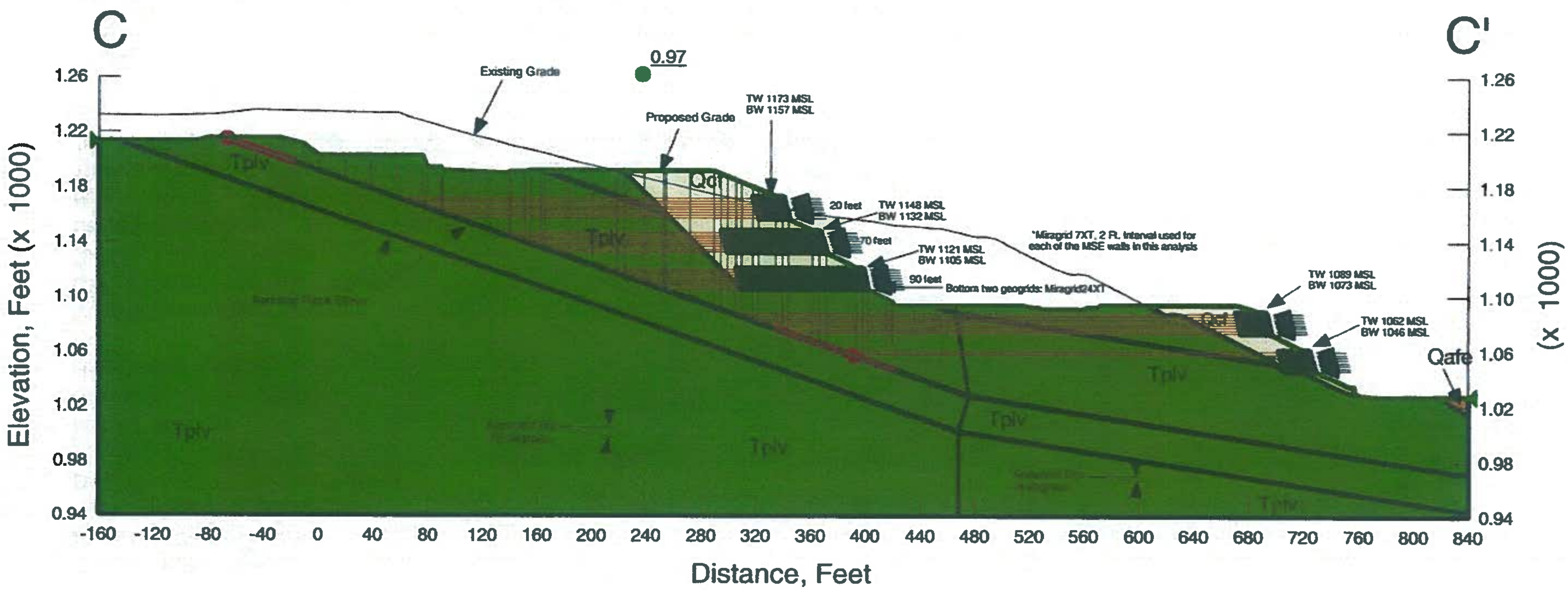
Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)



Portola Center - North
Project No. G1218-52-01
Name: CC-Case 2_Block2.gsz
Date: 3/14/2013 Time: 12:21:48 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-9 degrees) 115 pcf 300 psf 30 ° Tplv - C (-9 degrees) Tplv - Phi (-9 degrees)
Tplv (-19 degrees) 115 pcf 300 psf 30 ° Tplv - C (-19 degrees) Tplv - Phi (-19 degrees)

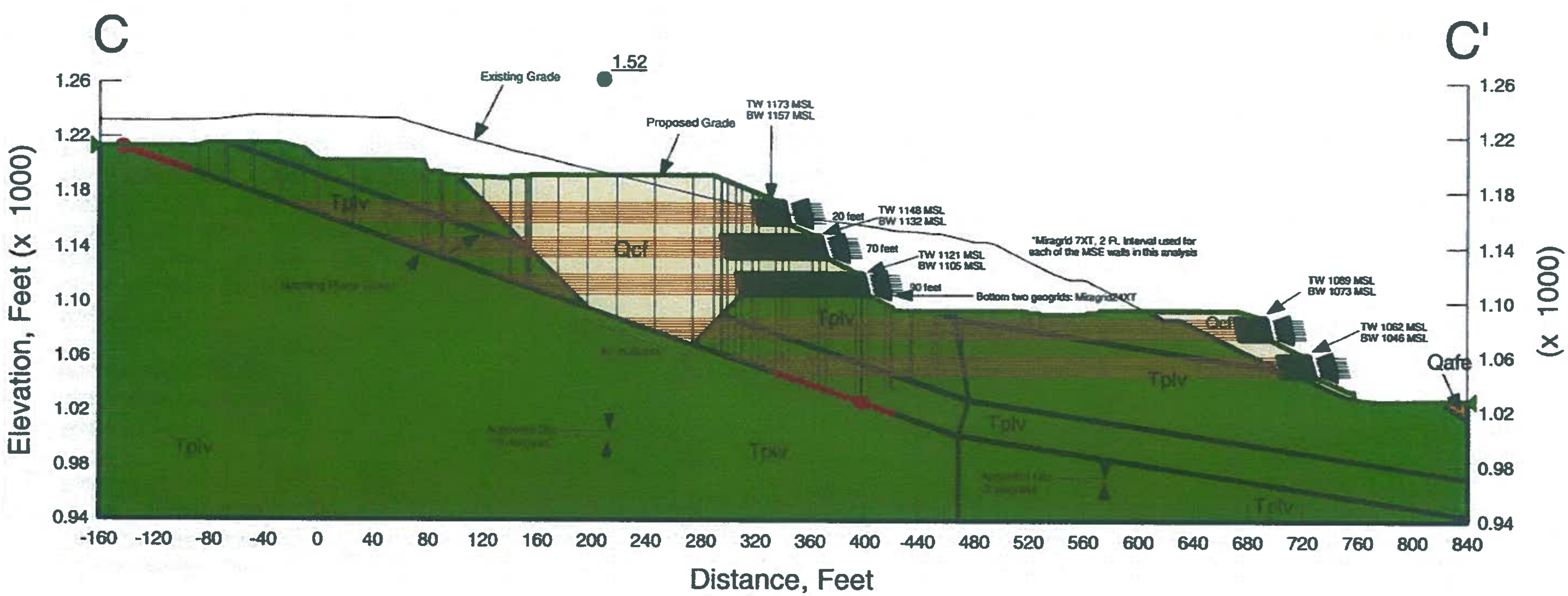


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_Block3.gsz
Date: 3/14/2013 Time: 12:50:10 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

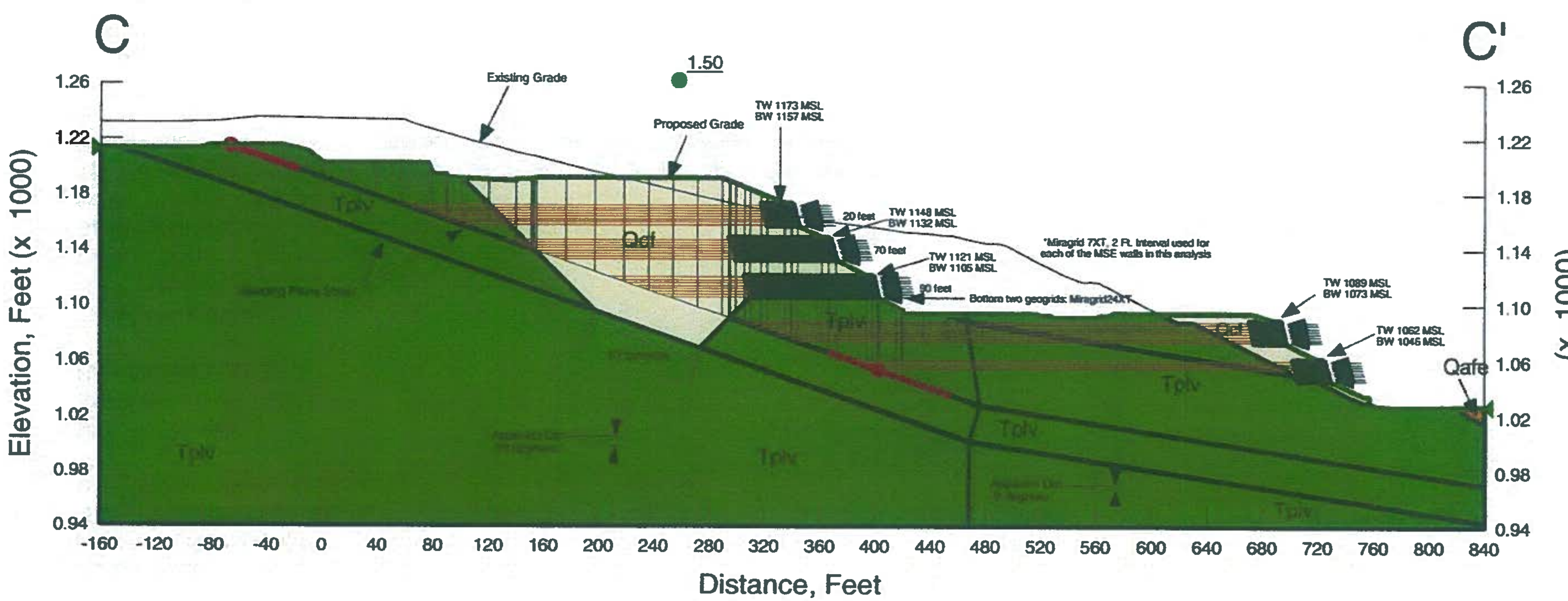


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_Block2.gsz
Date: 4/1/2013 Time: 10:39:06 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

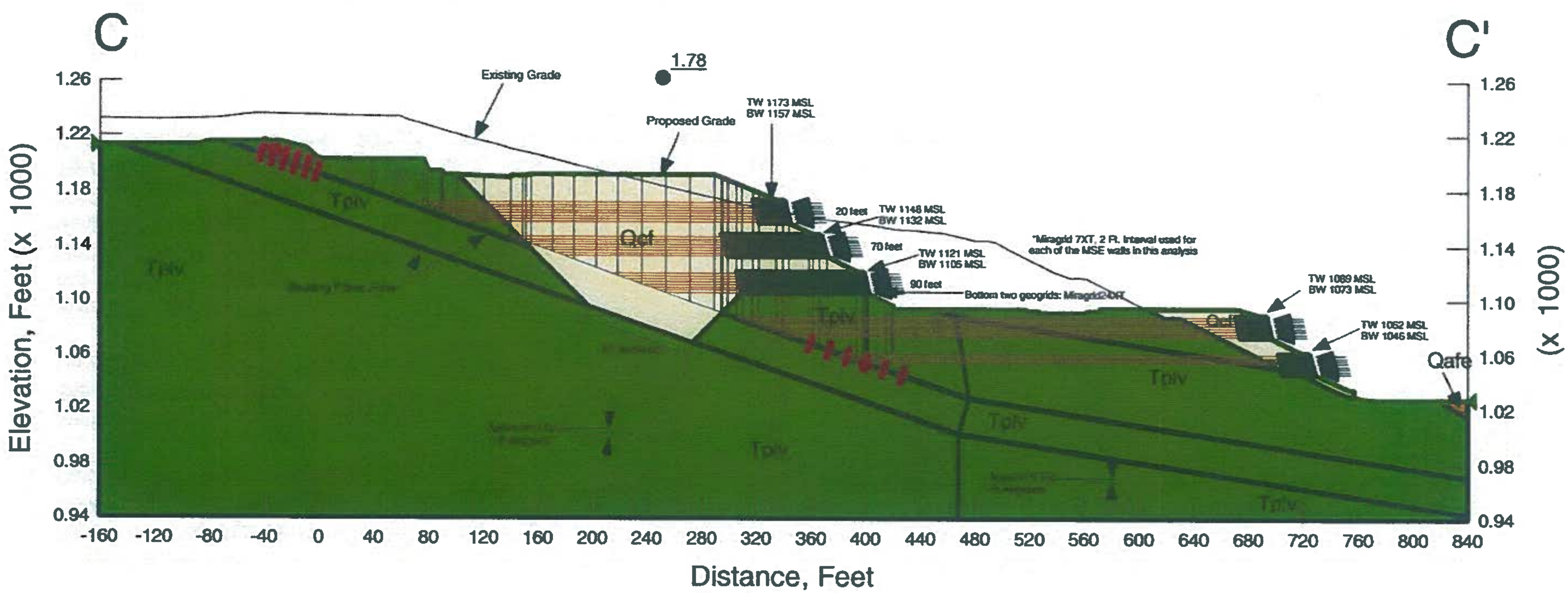


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_Block2B.gsz
Date: 3/14/2013 Time: 12:58:09 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

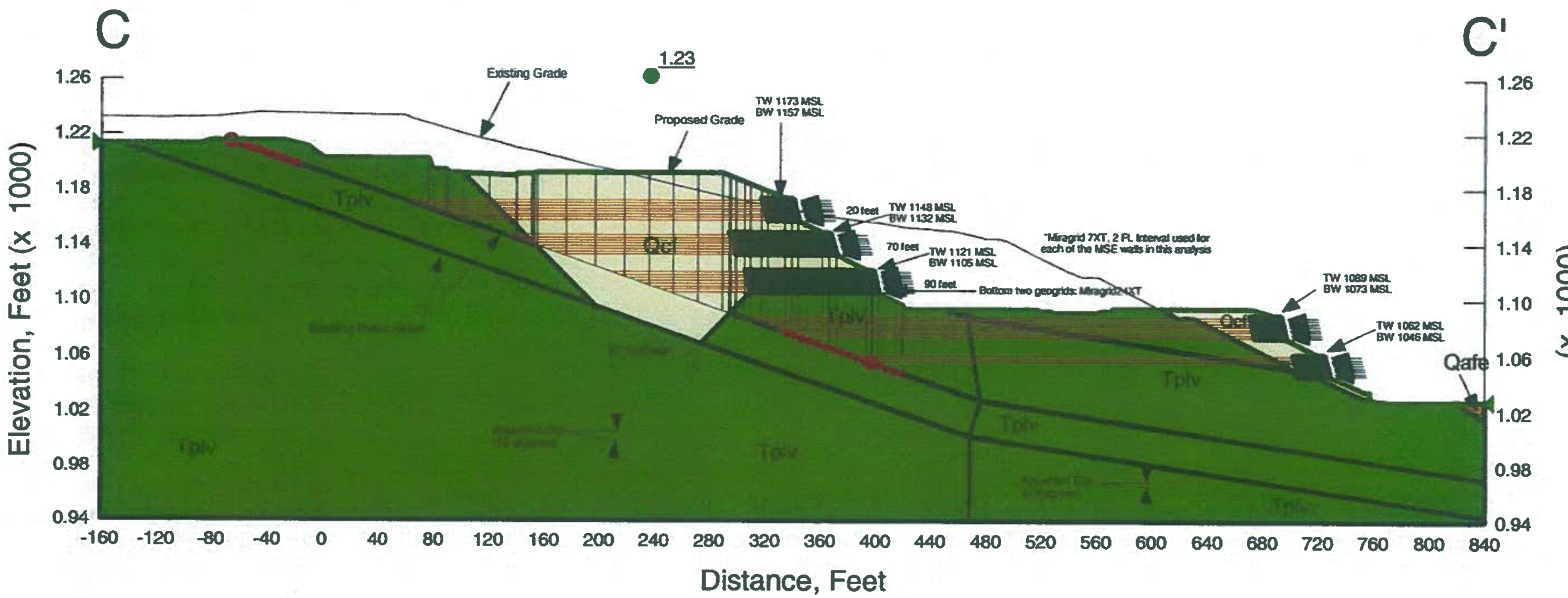


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_Block2_EQ.gsz
Date: 3/26/2013 Time: 9:07:13 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	900 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	900 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

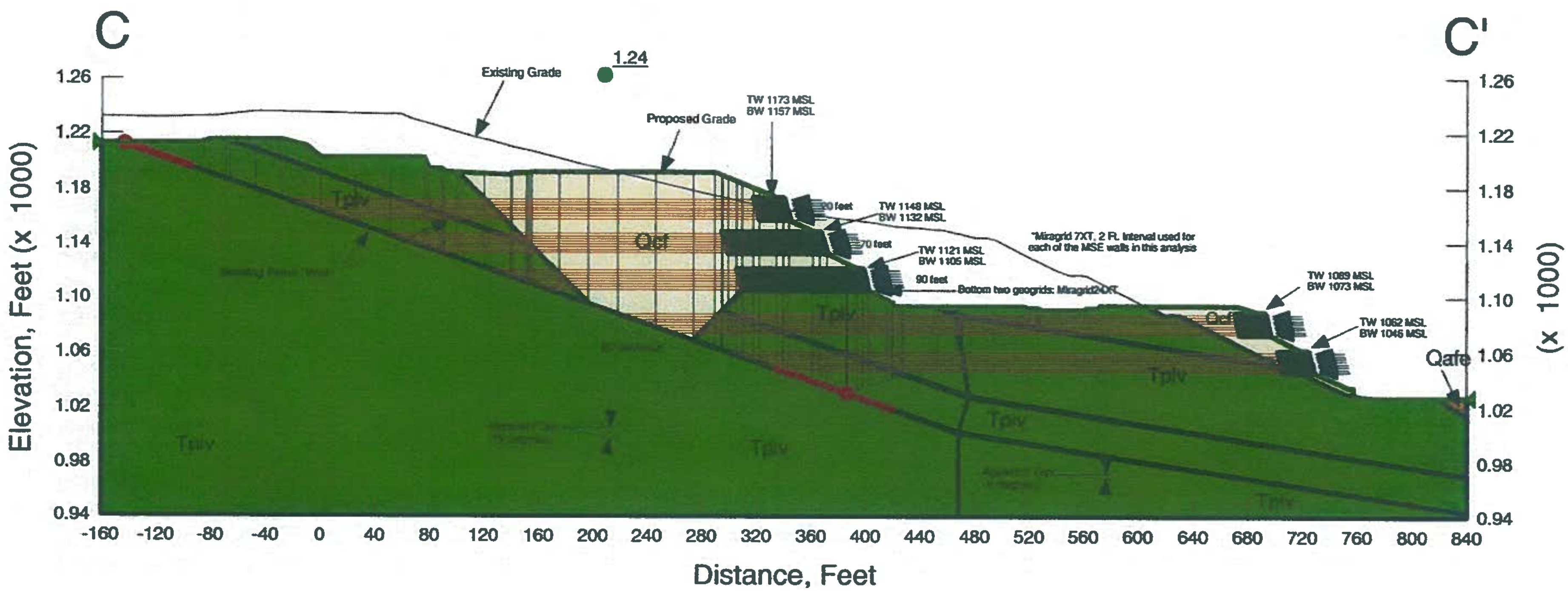


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_Block3_EQ.gsz
Date: 3/26/2013 Time: 9:21:50 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	900 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	900 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

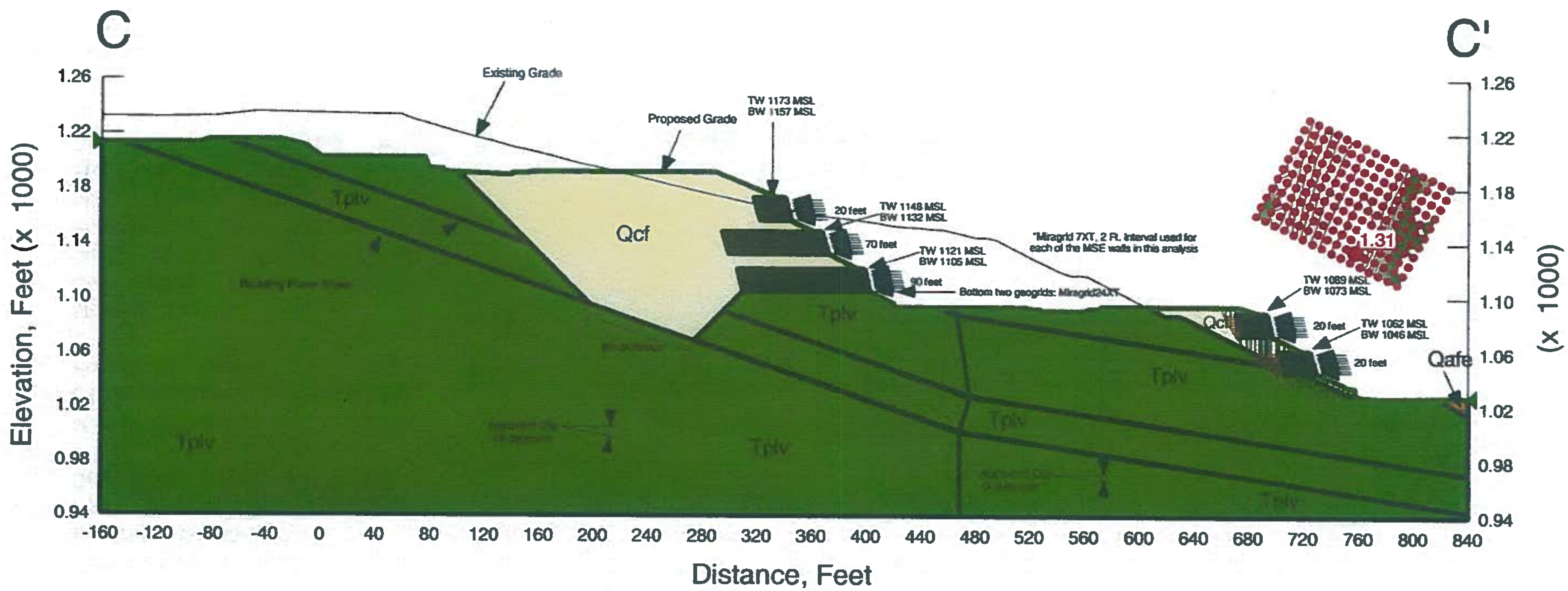


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 3_GridRadius2.gsz
Date: 3/26/2013 Time: 9:31:46 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

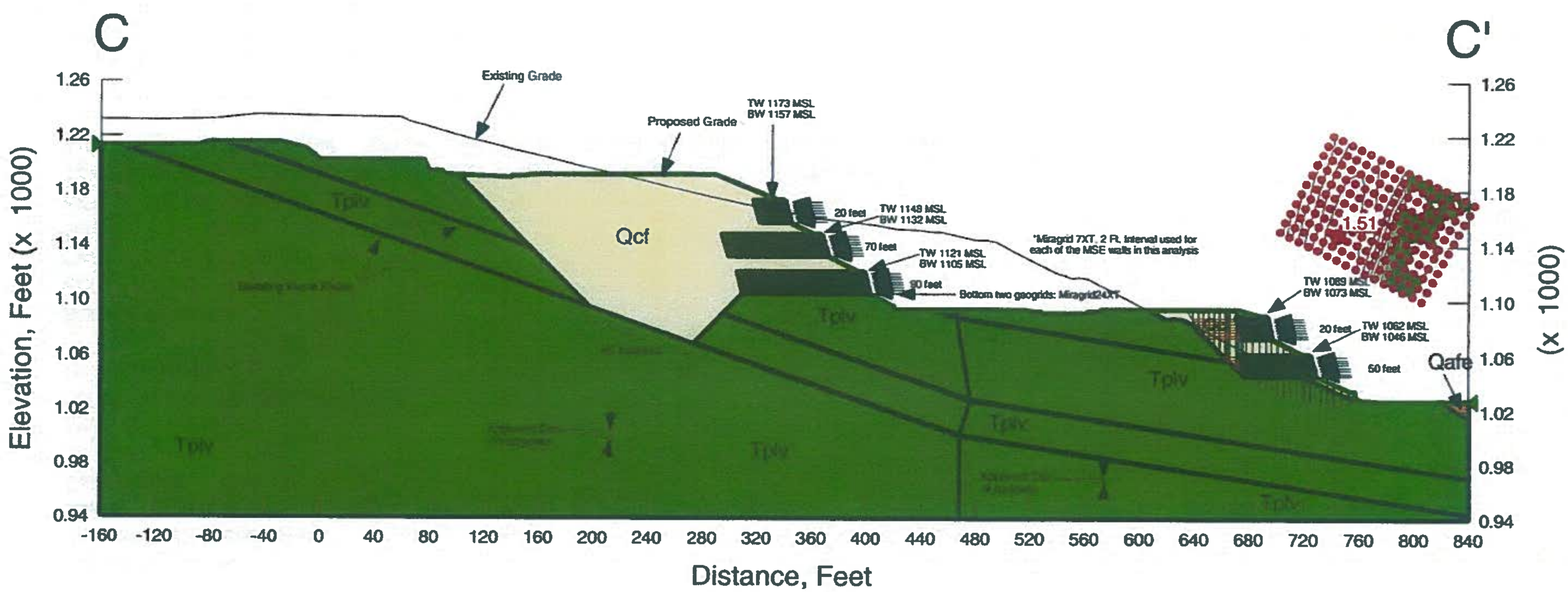


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 4_GridRadius2.gsz
Date: 3/26/2013 Time: 9:41:39 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

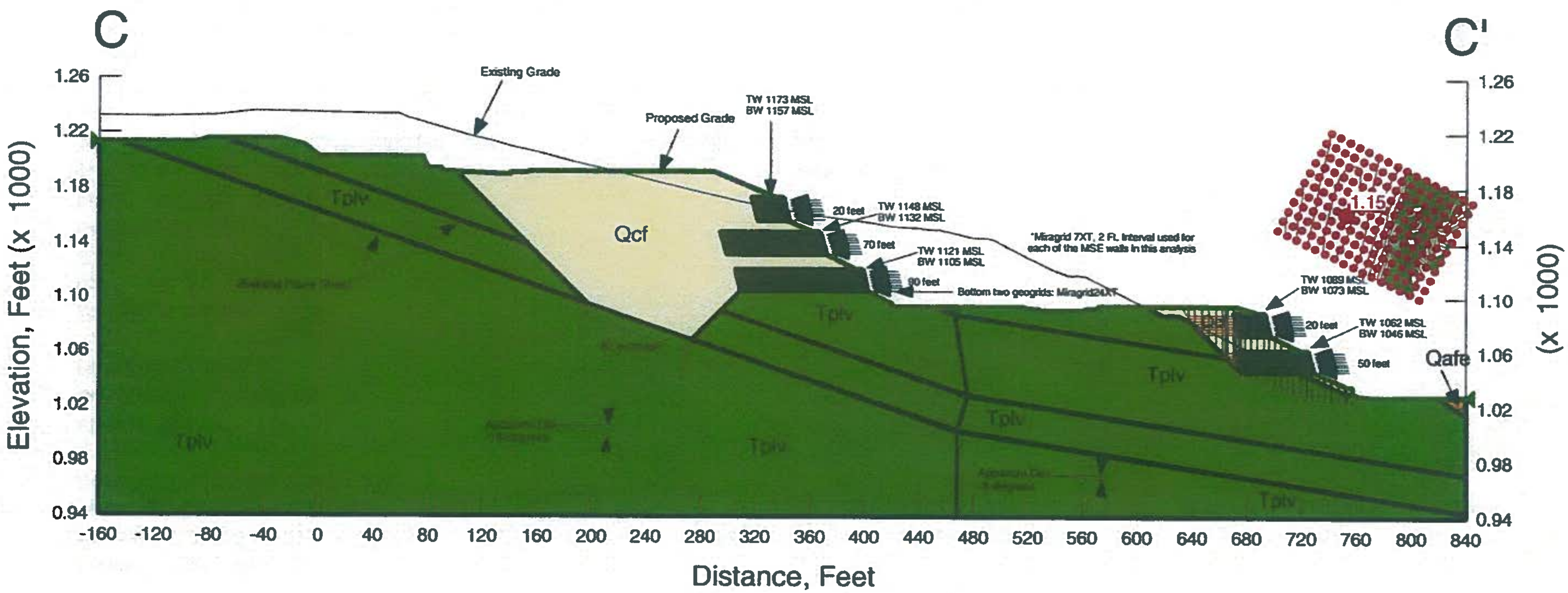


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 4_GridRadius2_EQ.gsz
Date: 3/26/2013 Time: 9:43:29 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

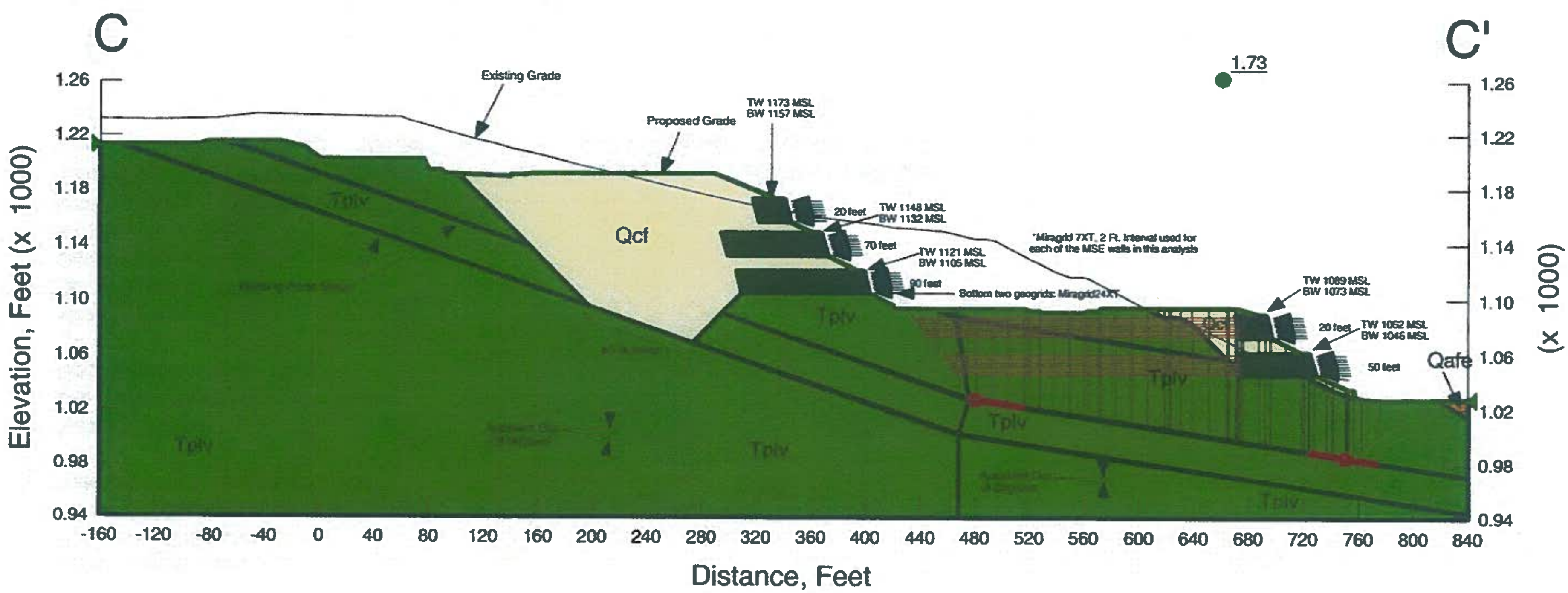


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 4_Block2.gsz
Date: 3/26/2013 Time: 9:56:41 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)

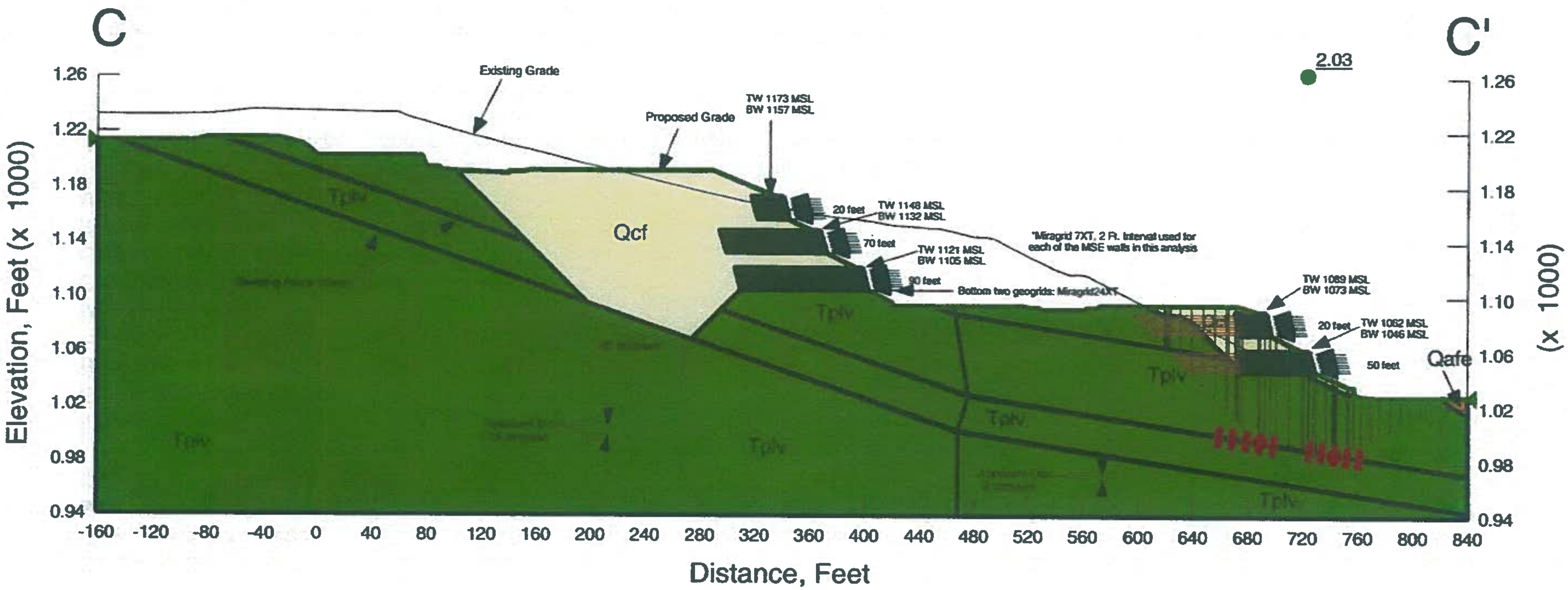


Portola Center - North
Project No. G1218-52-01
Name: CC-Case 4_Block2B.gsz
Date: 3/27/2013 Time: 1:34:51 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

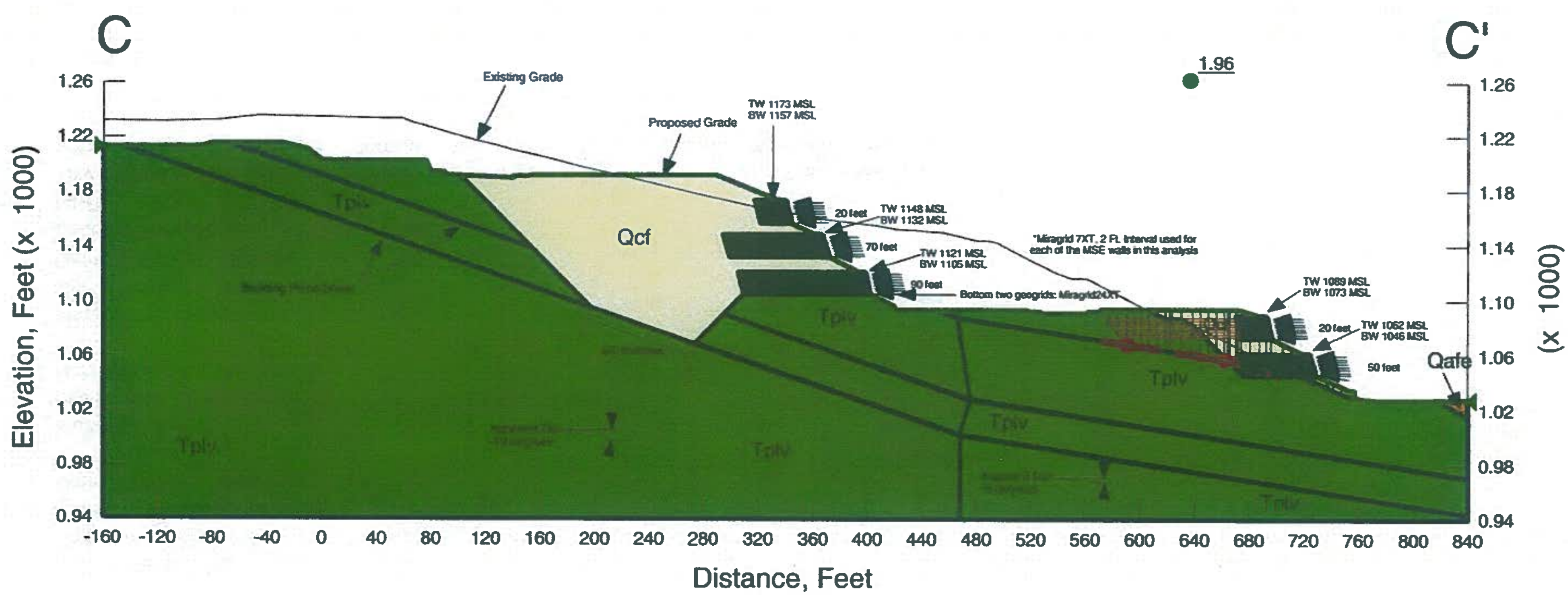
Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-9 degrees)	115 pcf	300 psf	30 °	Tplv - C (-9 degrees)	Tplv - Phi (-9 degrees)
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tplv - C (-19 degrees)	Tplv - Phi (-19 degrees)



Portola Center - North
Project No. G1218-52-01
Name: CC-Case 4_Block1.gsz
Date: 3/26/2013 Time: 9:54:25 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-9 degrees) 115 pcf 300 psf 30 ° Tplv - C (-9 degrees) Tplv - Phi (-9 degrees)
Tplv (-19 degrees) 115 pcf 300 psf 30 ° Tplv - C (-19 degrees) Tplv - Phi (-19 degrees)

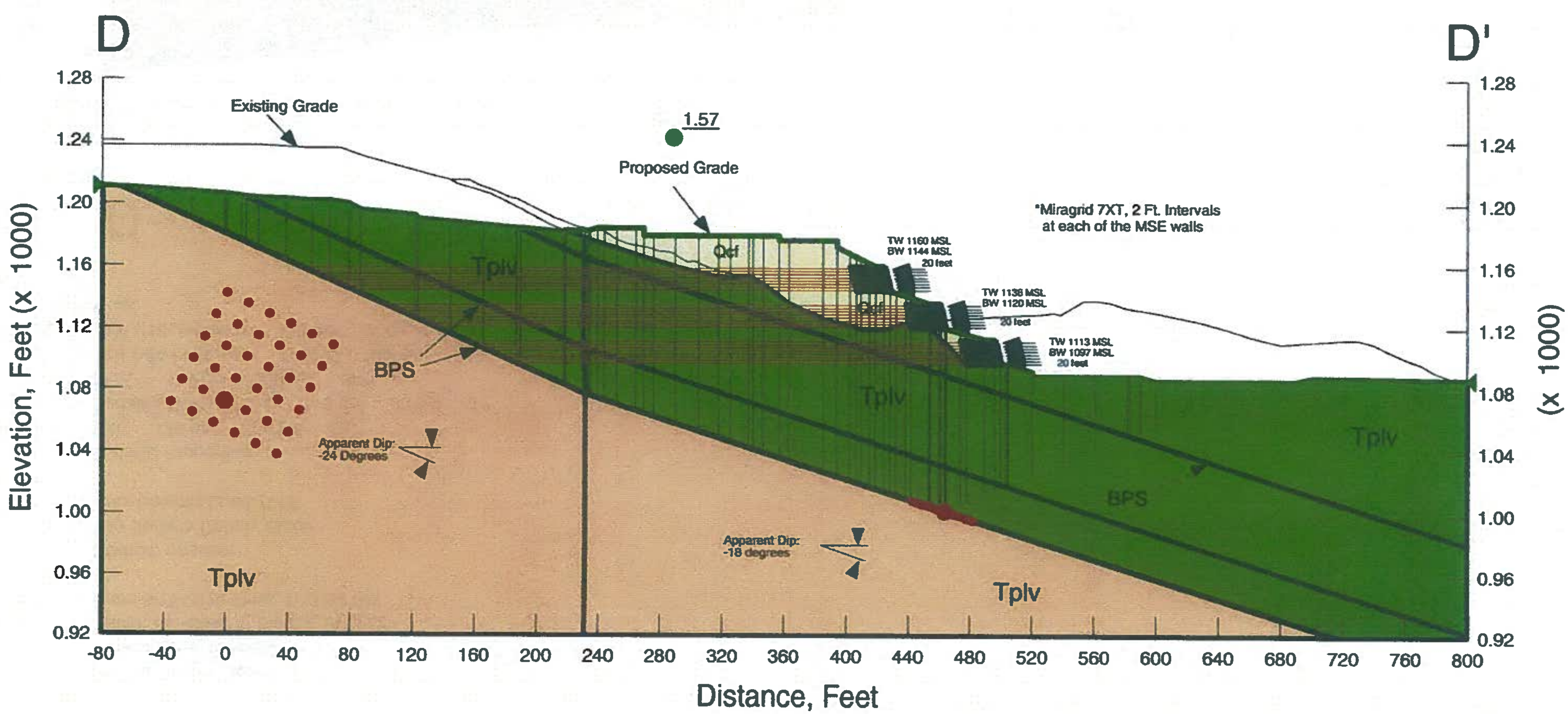


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 1_Block3.gsz
Date: 3/15/2013 Time: 1:23:46 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi
Rock					

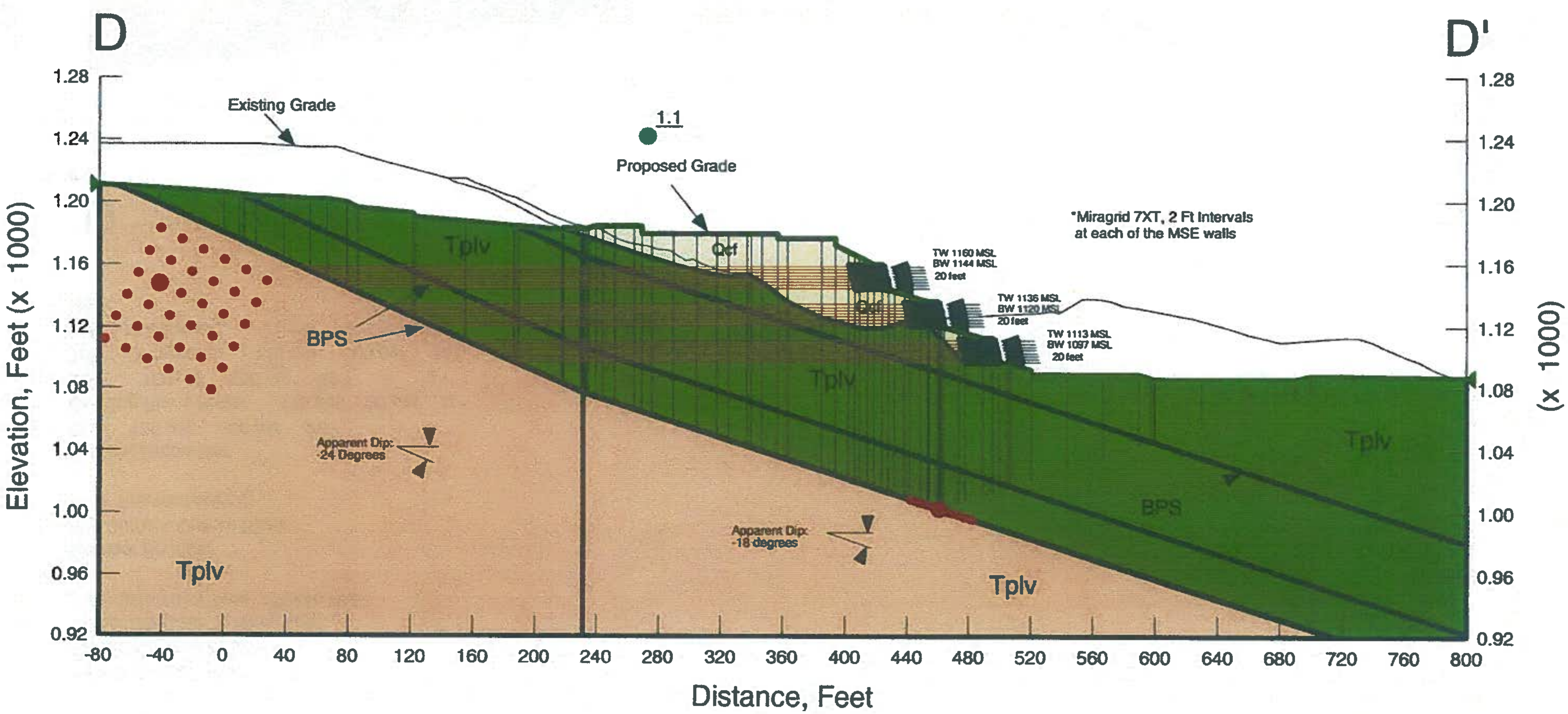


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 1_Block3_EQ.gsz
Date: 3/15/2013 Time: 1:17:53 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

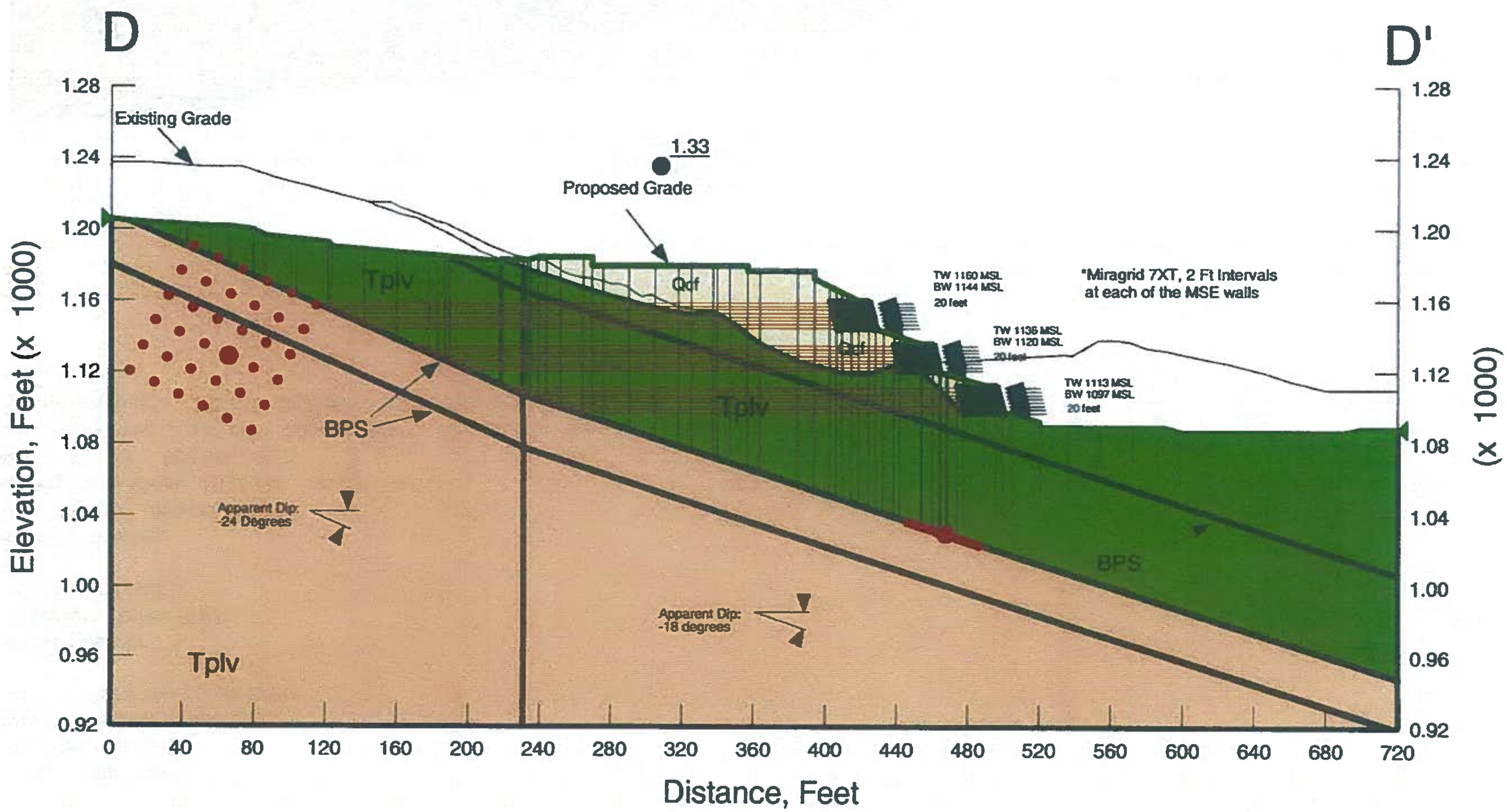
Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi
Rock					



Portola Center - North
Project No. G1218-52-01
Name: DD-Case 1_Block2.gsz
Date: 3/15/2013 Time: 10:11:20 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

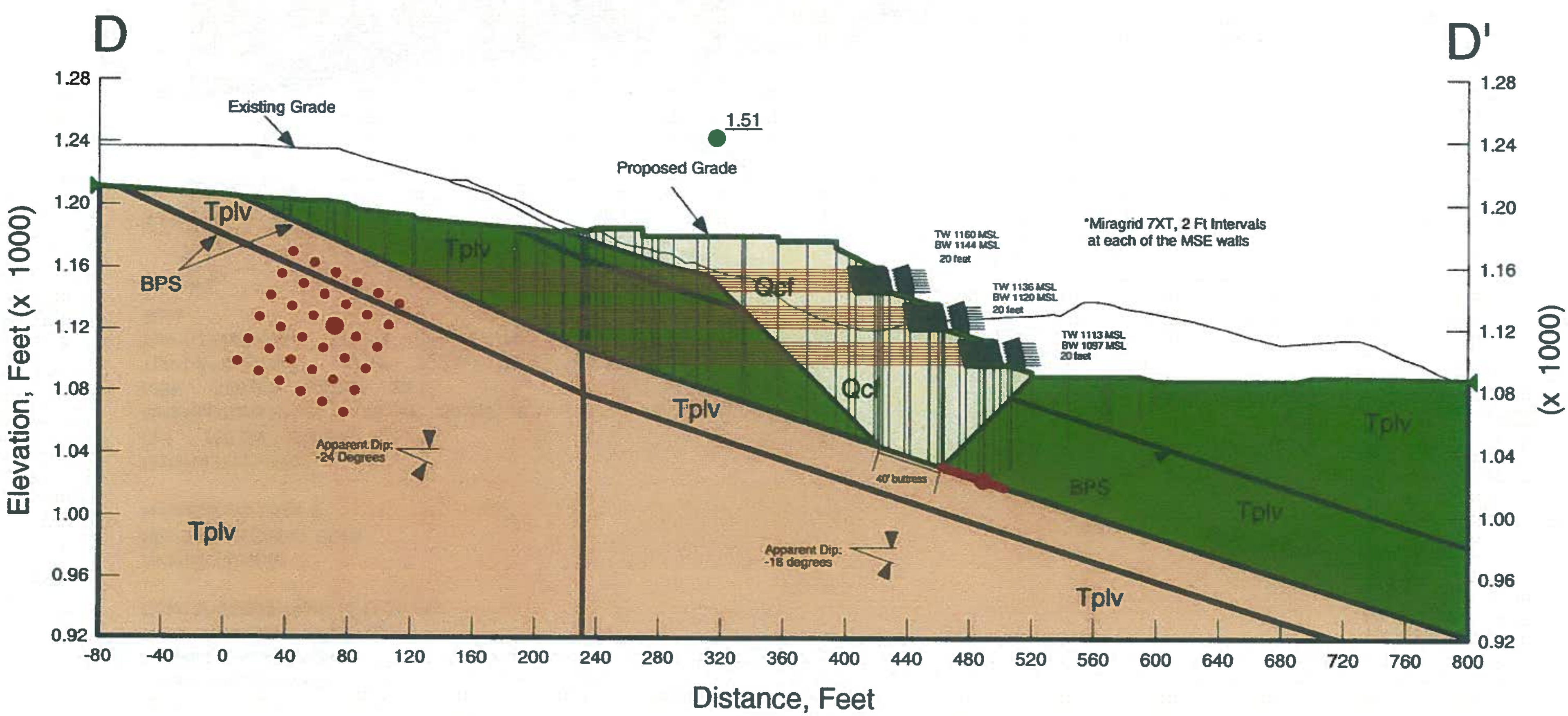
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-24 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-24 deg) - C Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-18 degrees) - C Tps-Slt (-18 degrees) - Phi
Rock



Portola Center - North
Project No. G1218-52-01
Name: DD-Case 2_Block2.gsz
Date: 3/15/2013 Time: 3:40:45 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-24 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-24 deg) - C Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-18 degrees) - C Tps-Slt (-18 degrees) - Phi
Rock

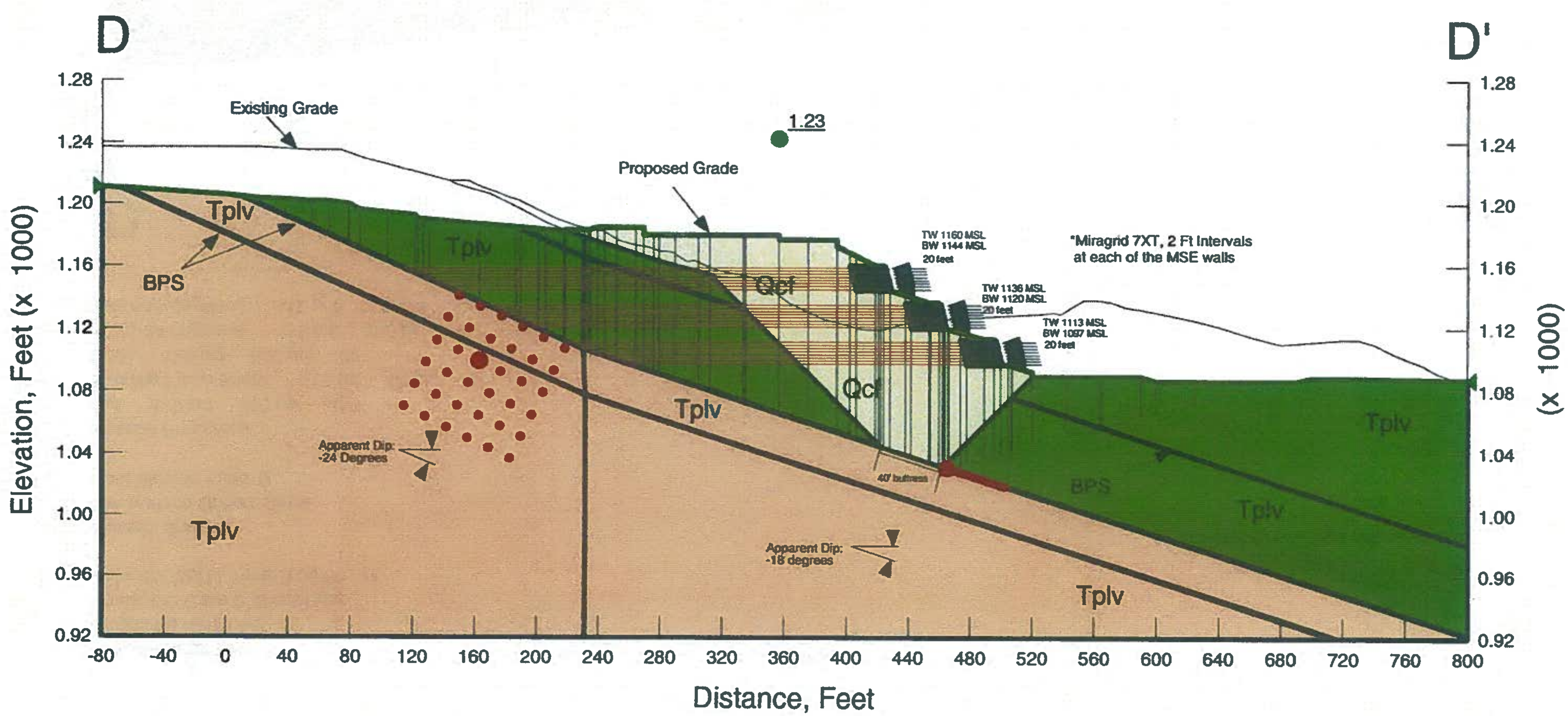


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 2_Block2_EQ.gsz
Date: 3/27/2013 Time: 3:30:58 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	900 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	900 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi
Rock					

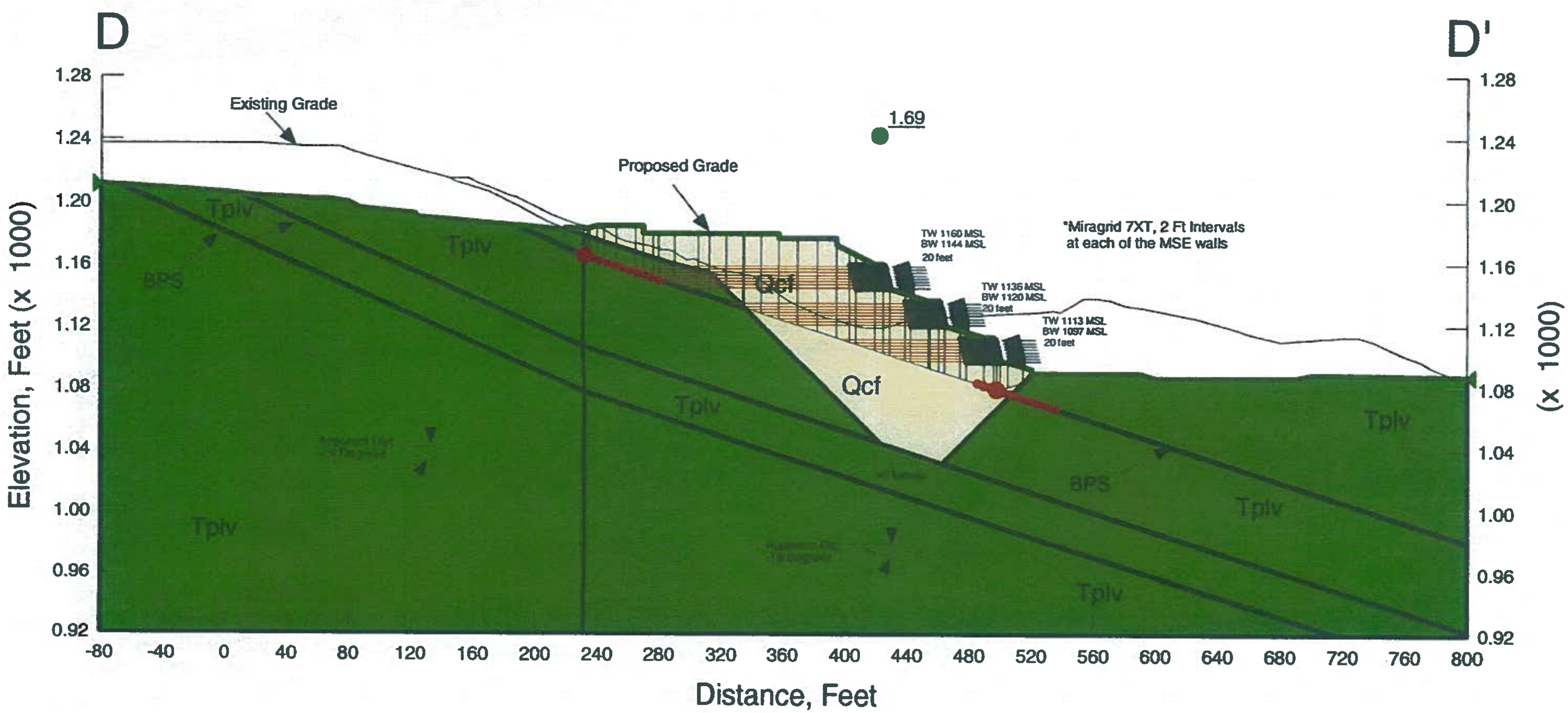


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 2_Block1.gsz
Date: 3/27/2013 Time: 3:36:33 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi

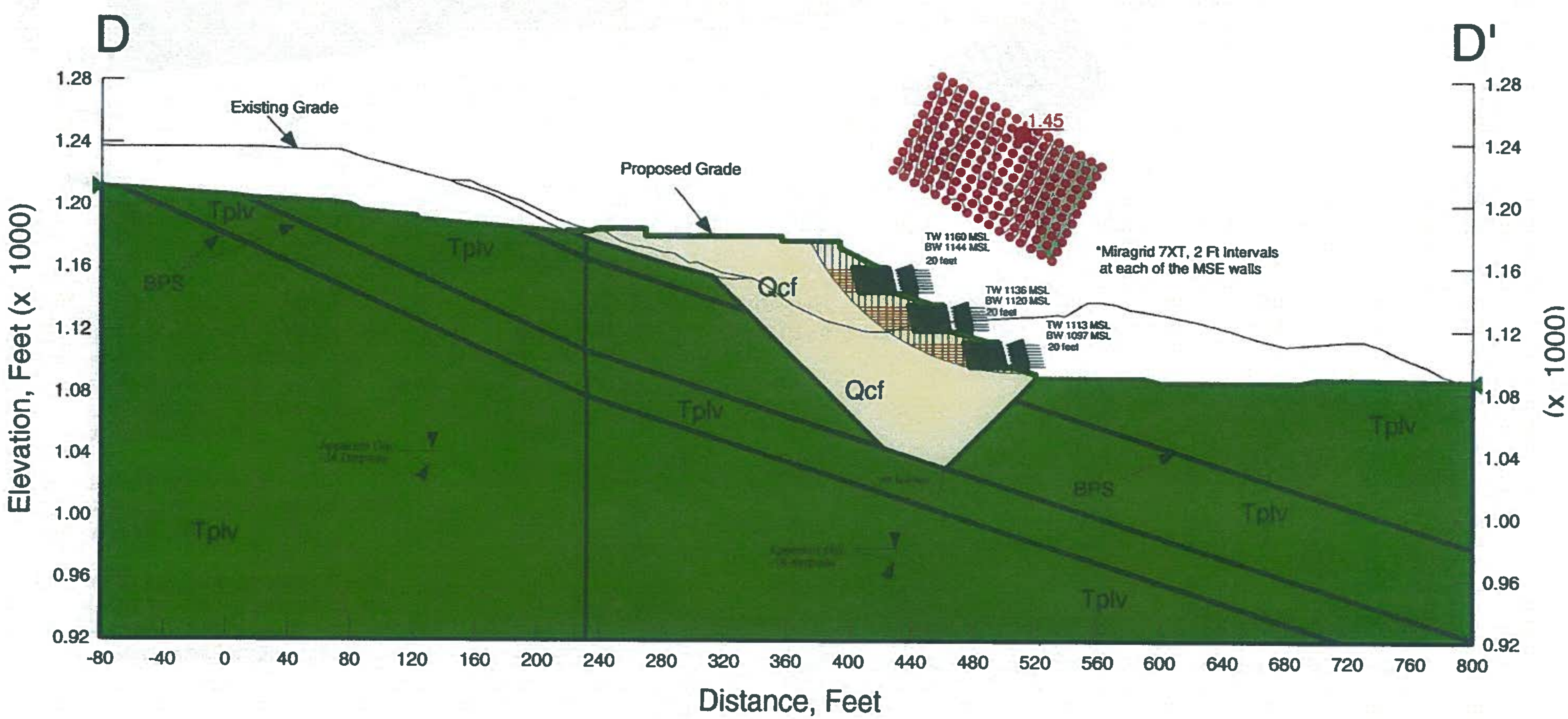


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 2_GridRadius.gsz
Date: 3/27/2013 Time: 3:42:33 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

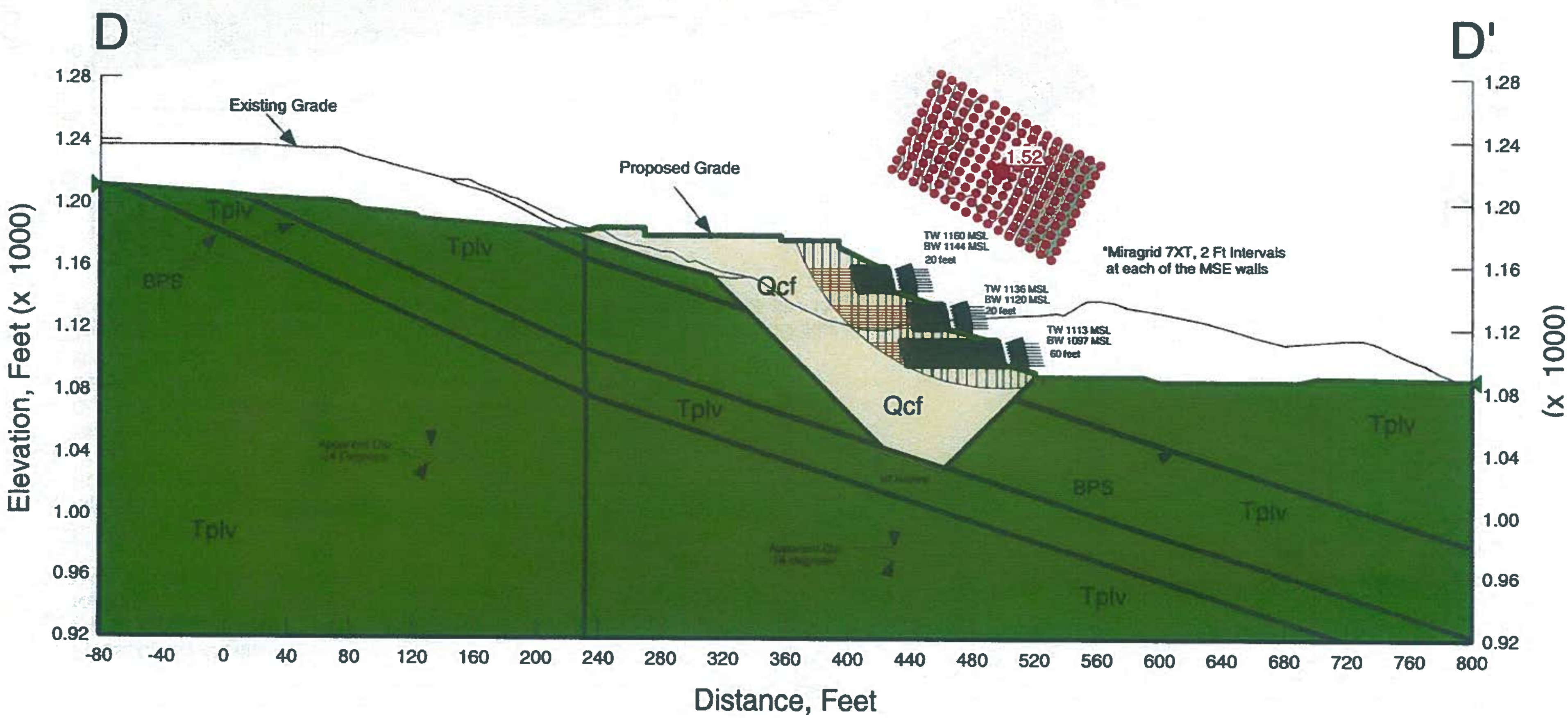
Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: DD-Case 3_GridRadius.gsz
Date: 3/27/2013 Time: 3:44:58 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-24 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-24 deg) - C Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-18 degrees) - C Tps-Slt (-18 degrees) - Phi

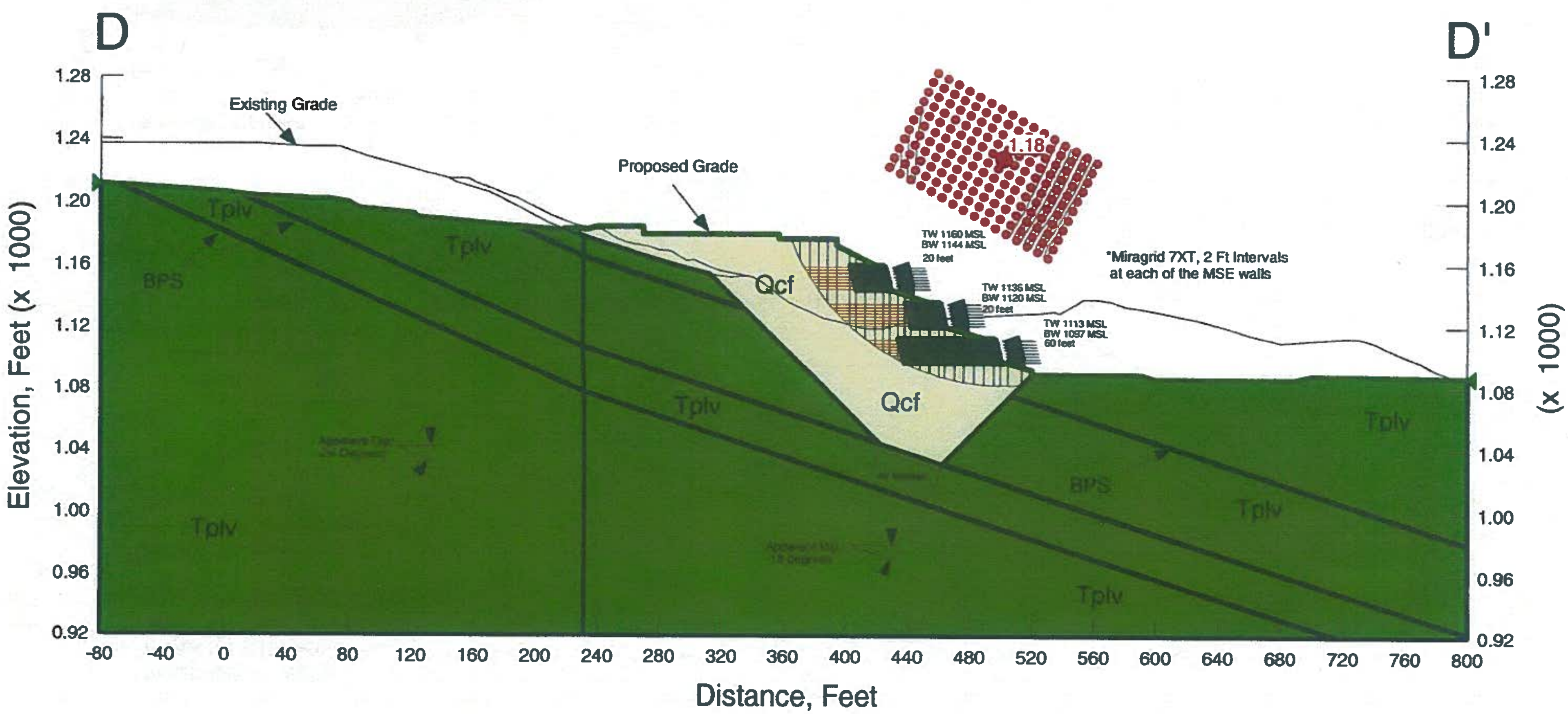


Portola Center - North
Project No. G1218-52-01
Name: DD-Case 3_GridRadius_EQ.gsz
Date: 3/27/2013 Time: 3:46:10 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-24 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-24 deg) - C	Tps-Slt (-24 deg) - Phi
Tplv (-18 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-18 degrees) - C	Tps-Slt (-18 degrees) - Phi

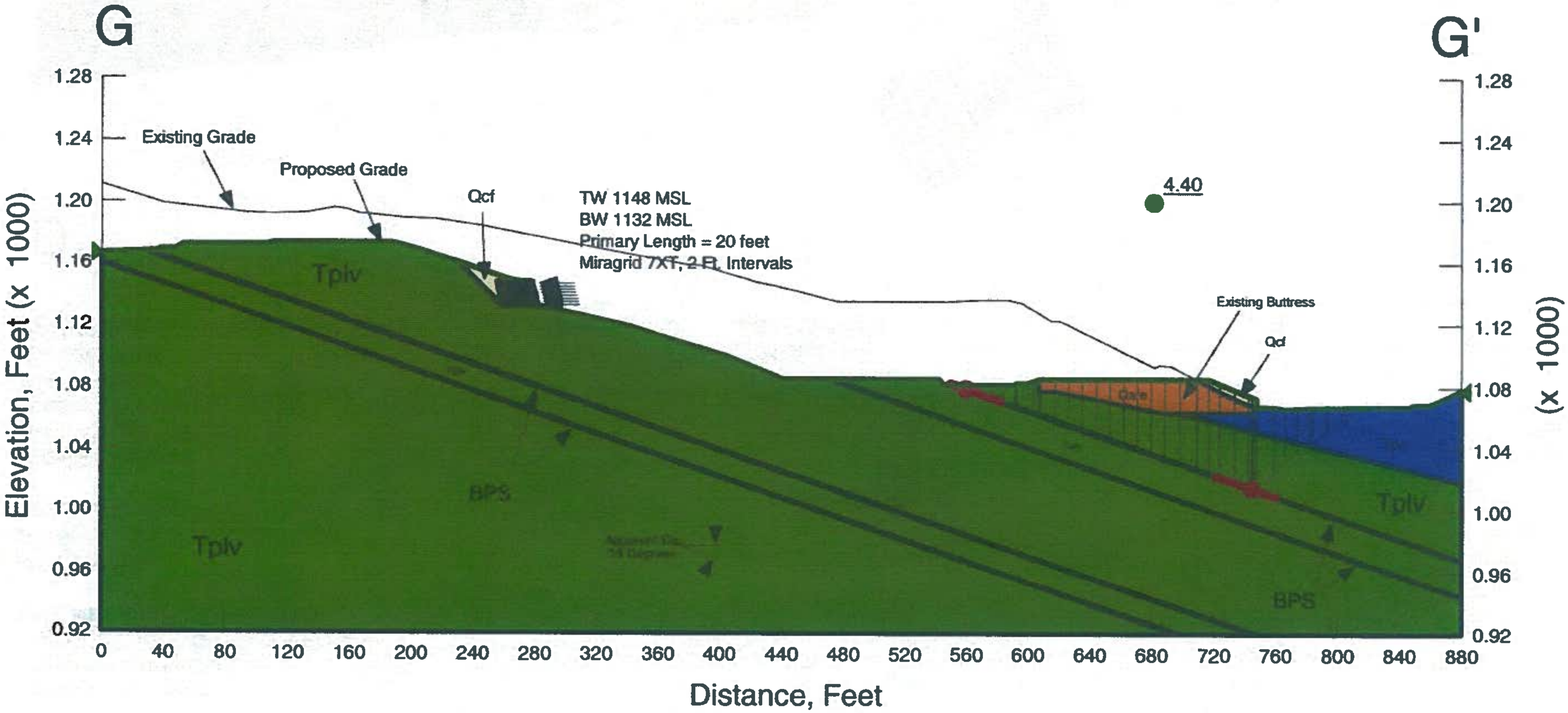


Portola Center - North
Project No. G1218-52-01
Name: GG-Case 1_Block1.gsz
Date: 4/10/2013 Time: 10:18:02 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-19 degrees) - C	Tps-Slt (-19 degrees) - Phi



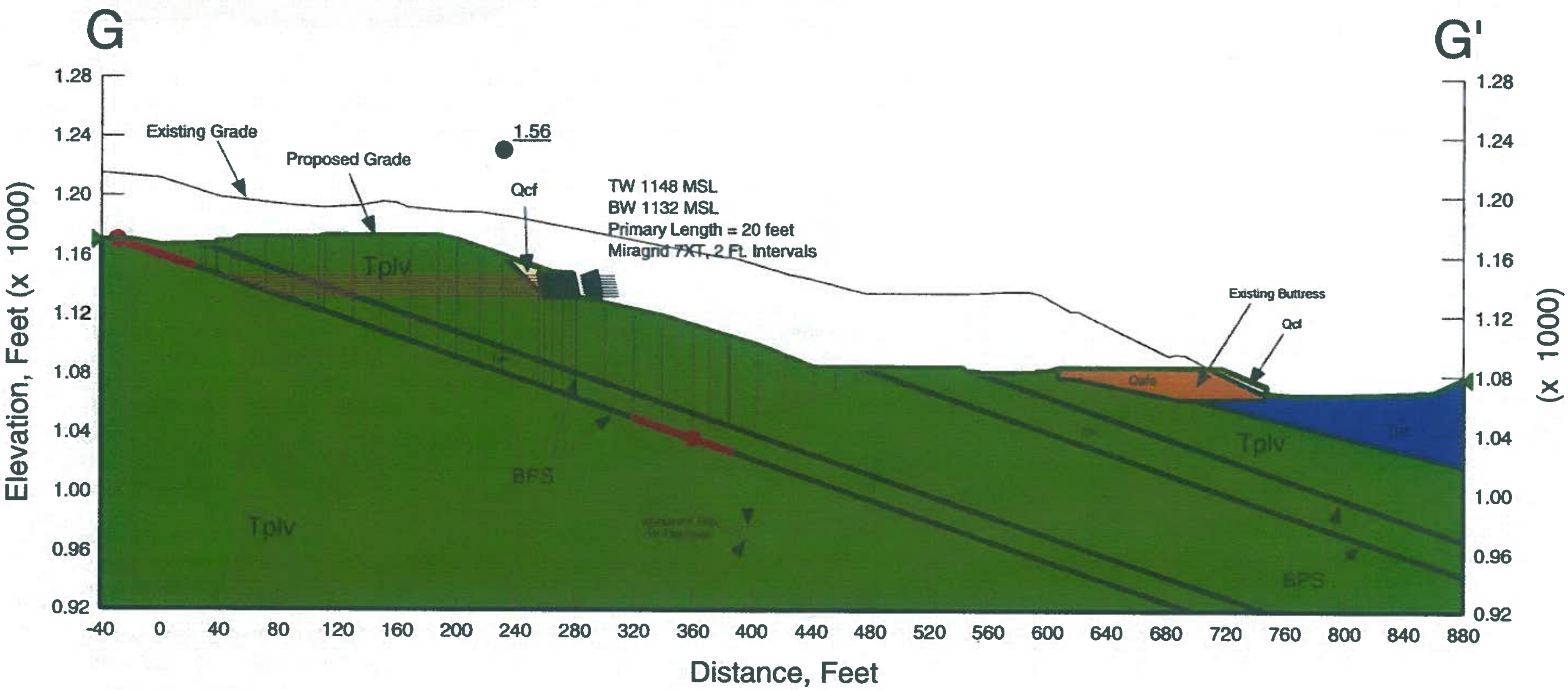
Portola Center - North
Project No. G1218-52-01
Name: GG-Case 1_Block4.gsz
Date: 4/10/2013 Time: 10:19:07 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °
Qafe	120 pcf	500 psf	28 °
Tps-Sandstone	125 pcf	400 psf	33 °
Bedding Plane Shear	115 pcf	30 psf	9 °
MSE	120 pcf	500 psf	32 °
Tplv (-19 degrees)	115 pcf	300 psf	30 °

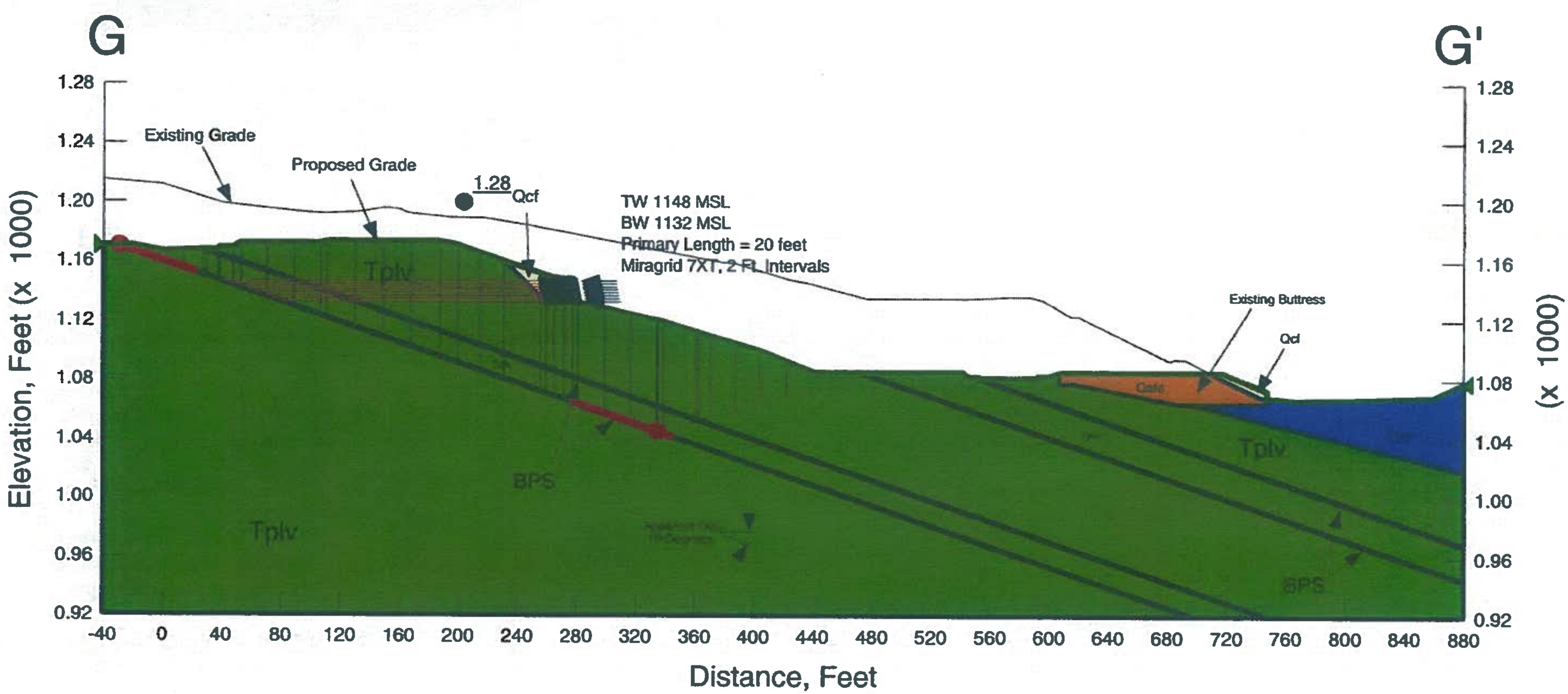
Tps-Slt (-19 degrees) - C   Tps-Slt (-19 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: GG-Case 1_Block4_EQ.gsz
Date: 4/10/2013 Time: 10:20:37 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 33 °
Bedding Plane Shear 115 pcf 125 psf 12 °
MSE 120 pcf 500 psf 32 °
Tplv (-19 degrees) 115 pcf 900 psf 30 ° Tps-Slt (-19 degrees) - C Tps-Slt (-19 degrees) - Phi

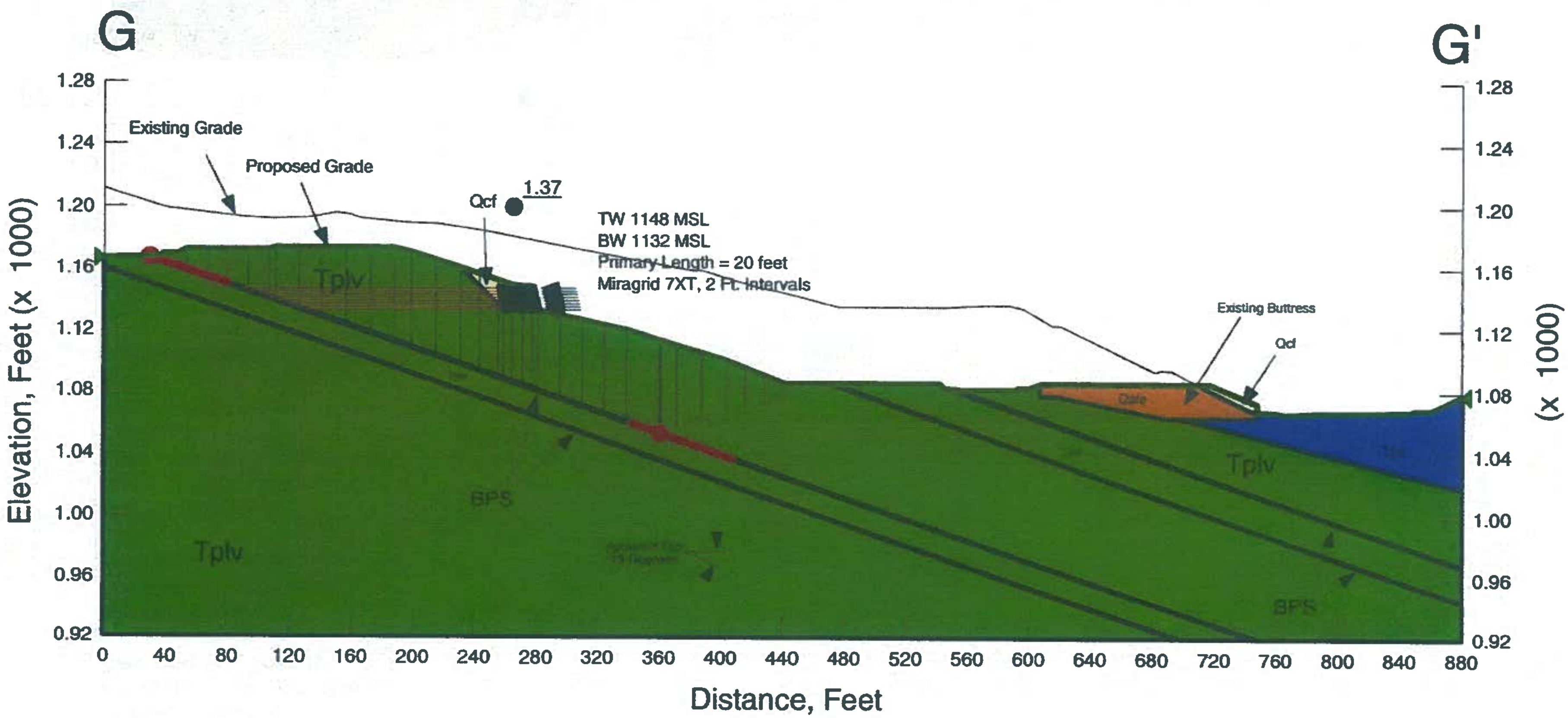


Portola Center - North
Project No. G1218-52-01
Name: GG-Case 1_Block3.gsz
Date: 4/10/2013 Time: 10:22:08 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

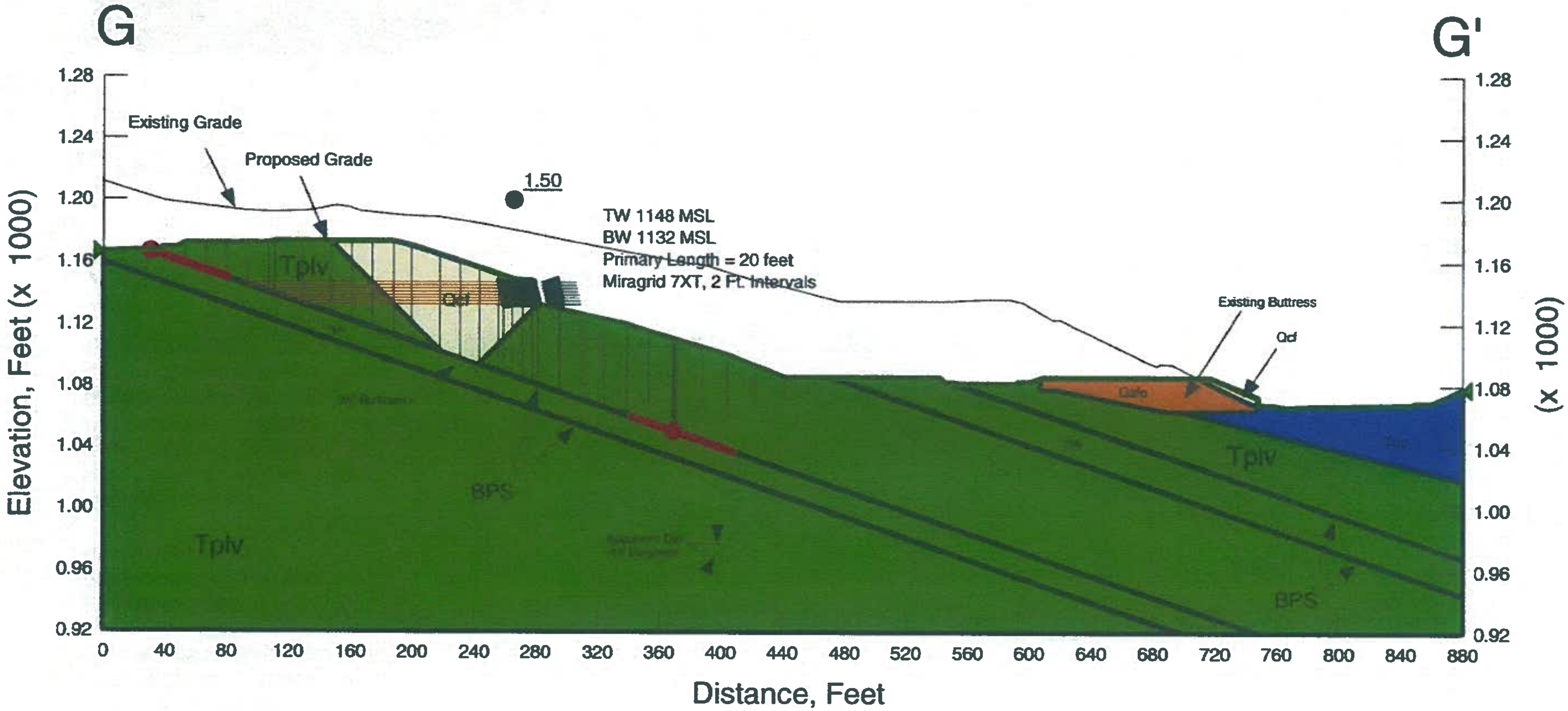
Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-19 degrees) - C	Tps-Slt (-19 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: GG-Case 2_Block3.gsz
Date: 4/10/2013 Time: 10:23:11 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 33 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-19 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-19 degrees) - C Tps-Slt (-19 degrees) - Phi

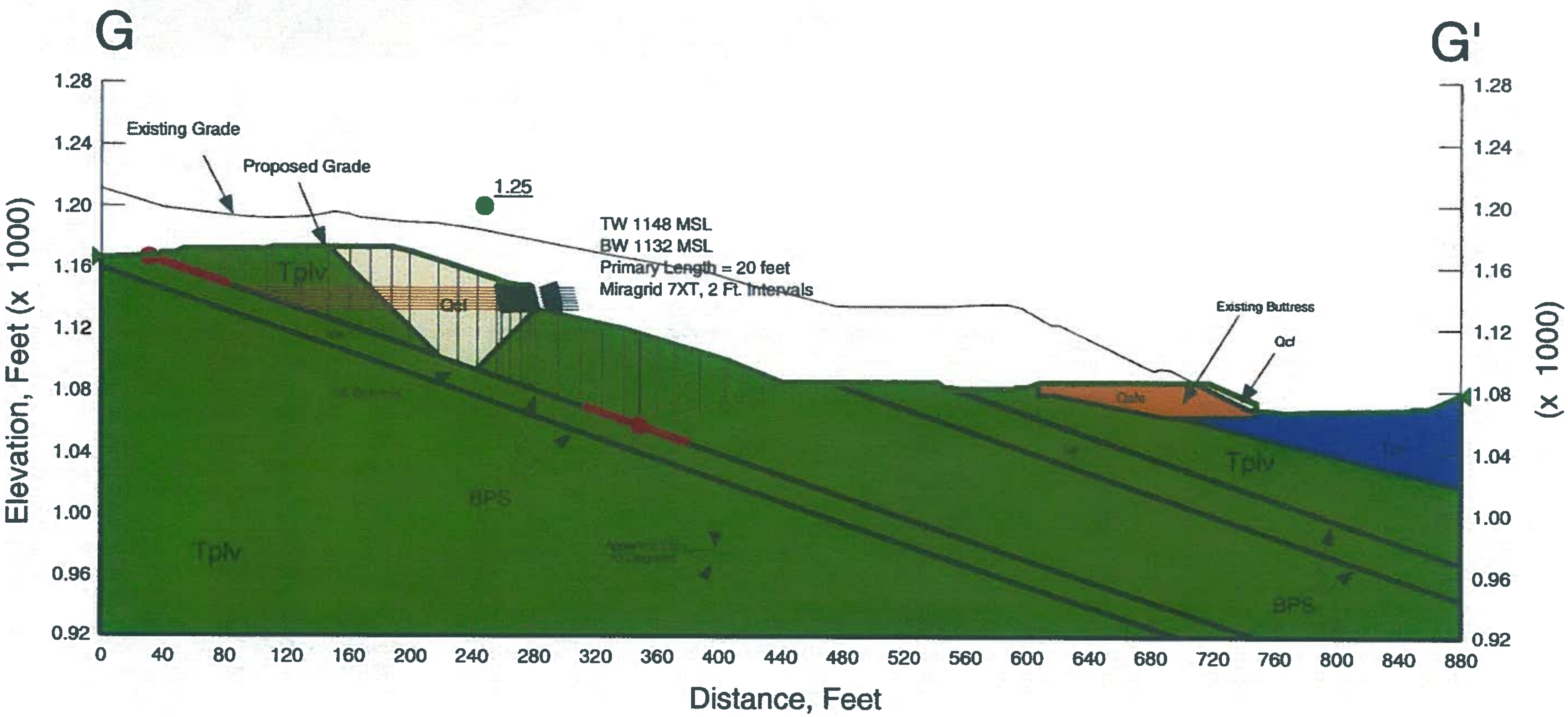


Portola Center - North
Project No. G1218-52-01
Name: GG-Case 2_Block3_EQ.gsz
Date: 4/10/2013 Time: 11:00:16 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

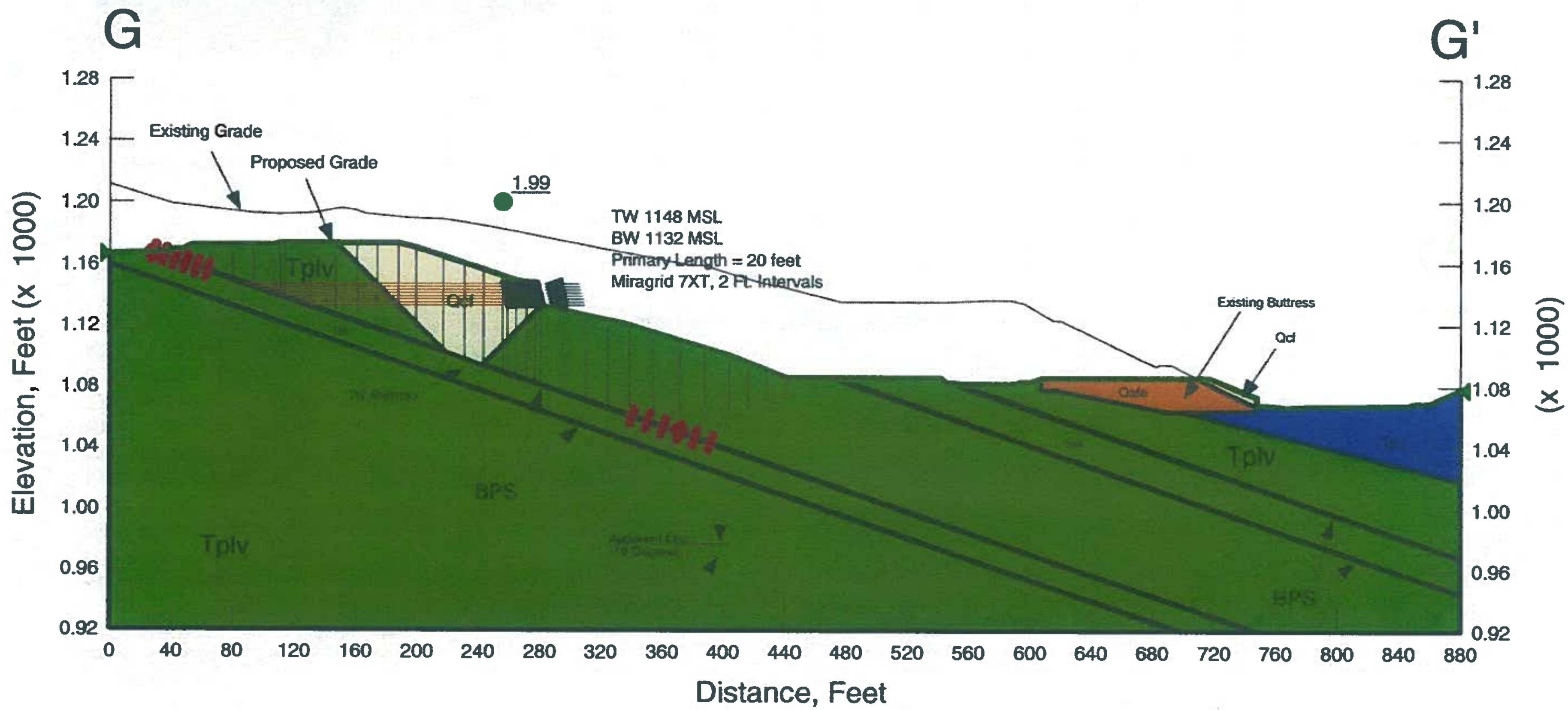
Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (-19 degrees) - C	Tps-Slt (-19 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: GG-Case 2_Block3B.gsz
Date: 4/10/2013 Time: 11:01:29 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 33 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-19 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-19 degrees) - C Tps-Slt (-19 degrees) - Phi

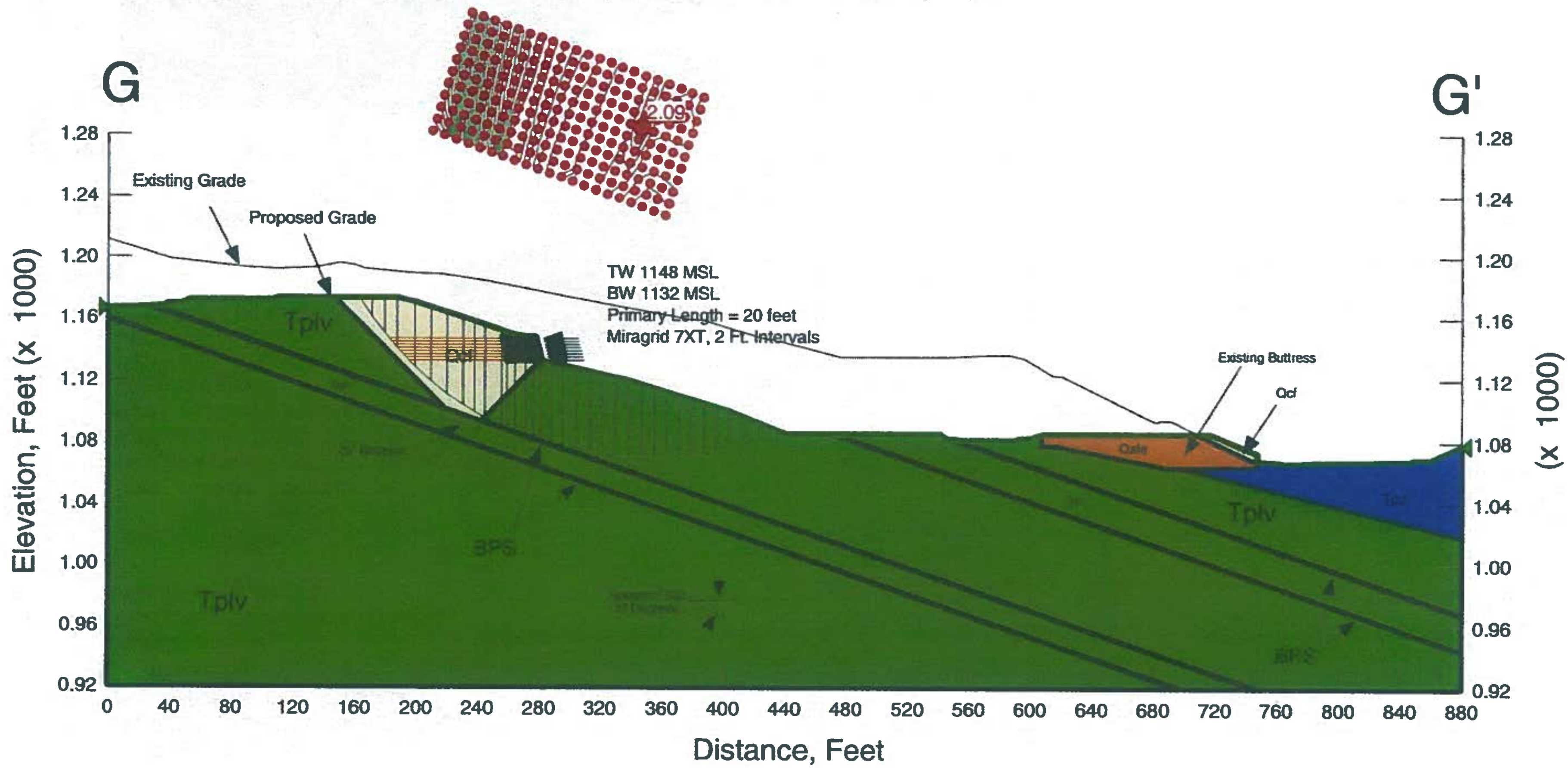


Portola Center - North
Project No. G1218-52-01
Name: GG-Case 2_GridRadius.gsz
Date: 4/10/2013 Time: 11:03:29 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-19 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-19 degrees) - C	Tps-Slt (-19 degrees) - Phi

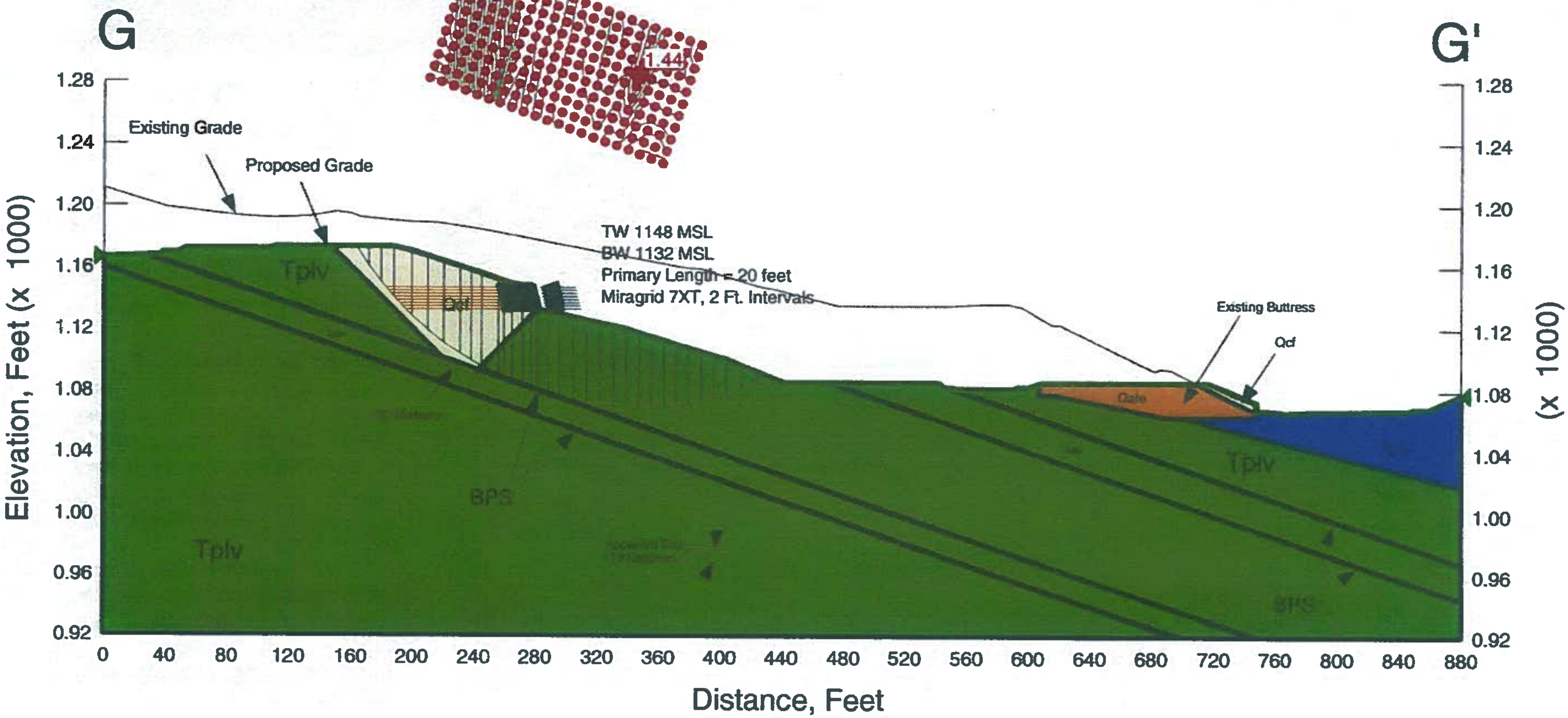


Portola Center - North
Project No. G1218-52-01
Name: GG-Case 2_GridRadius_EQ.gsz
Date: 4/10/2013 Time: 11:04:43 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

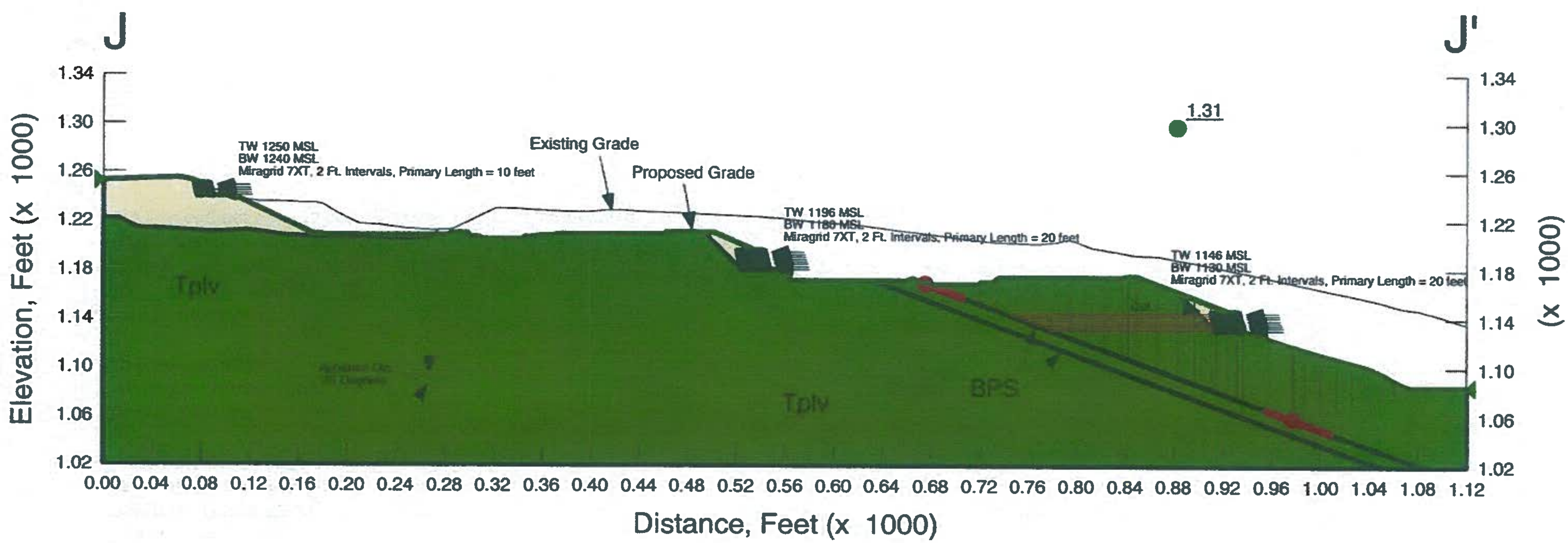
Qcf	120 pcf	500 psf	28 °
Qafe	120 pcf	500 psf	28 °
Tps-Sandstone	125 pcf	400 psf	33 °
Bedding Plane Shear	115 pcf	30 psf	9 °
MSE	120 pcf	500 psf	32 °
Tplv (-19 degrees)	115 pcf	300 psf	30 ° Tps-Slt (-19 degrees) - C Tps-Slt (-19 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 1_Block1.gsz
Date: 3/18/2013 Time: 4:39:08 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi

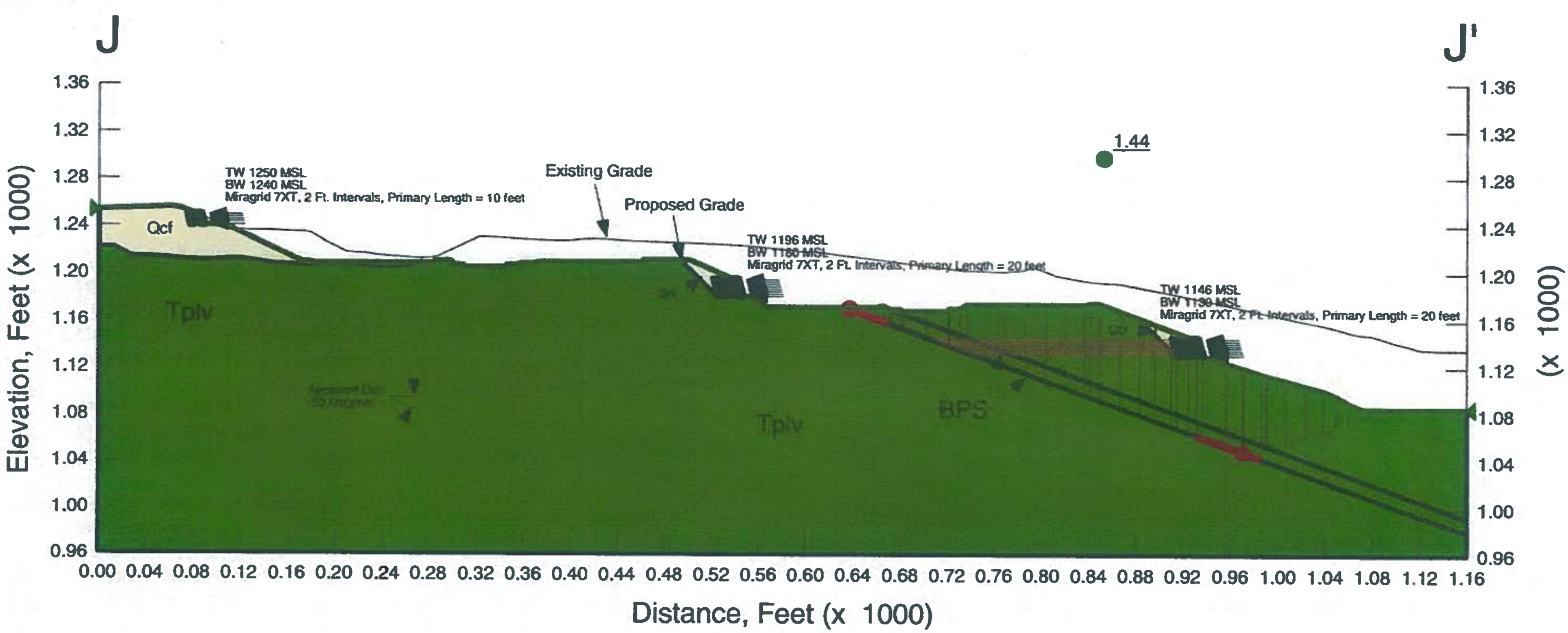


Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 1_Block2.gsz
Date: 3/18/2013 Time: 4:51:04 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

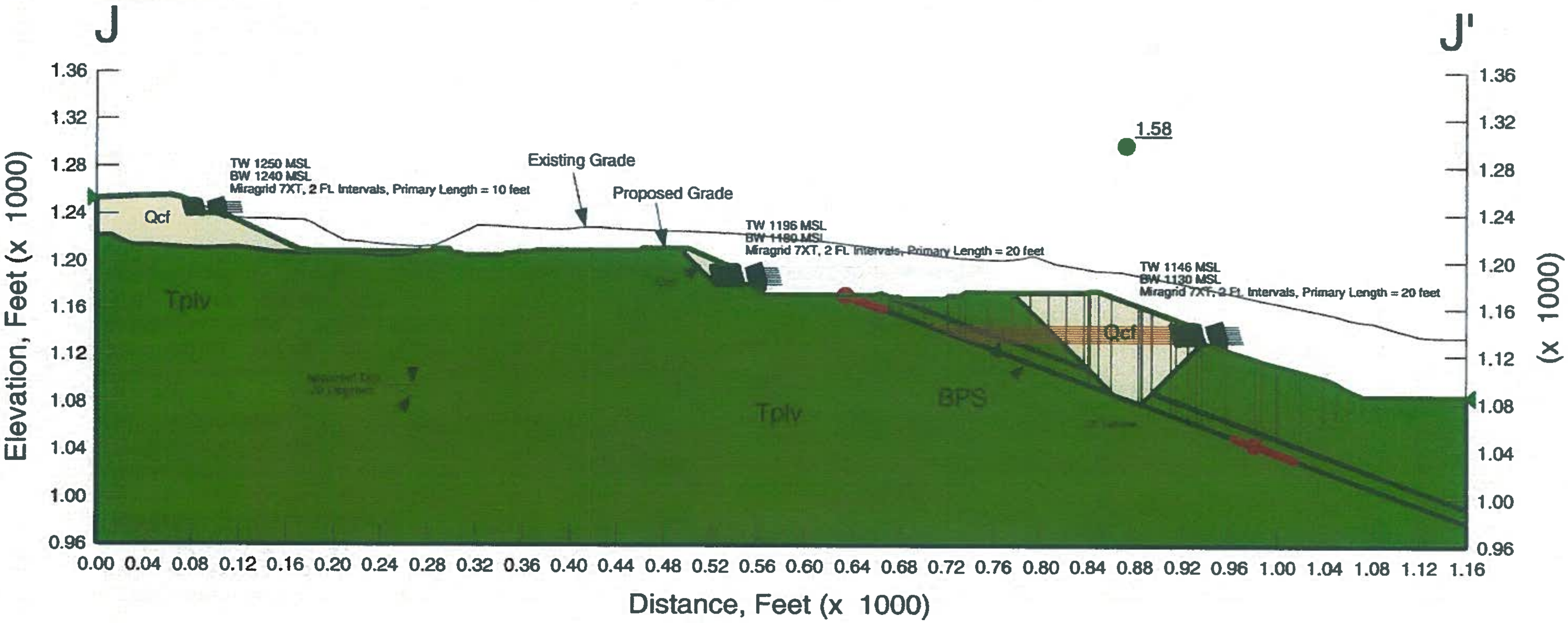
Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-20 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-20 degrees) - C	Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_Block2.gsz
Date: 3/19/2013 Time: 9:09:33 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi

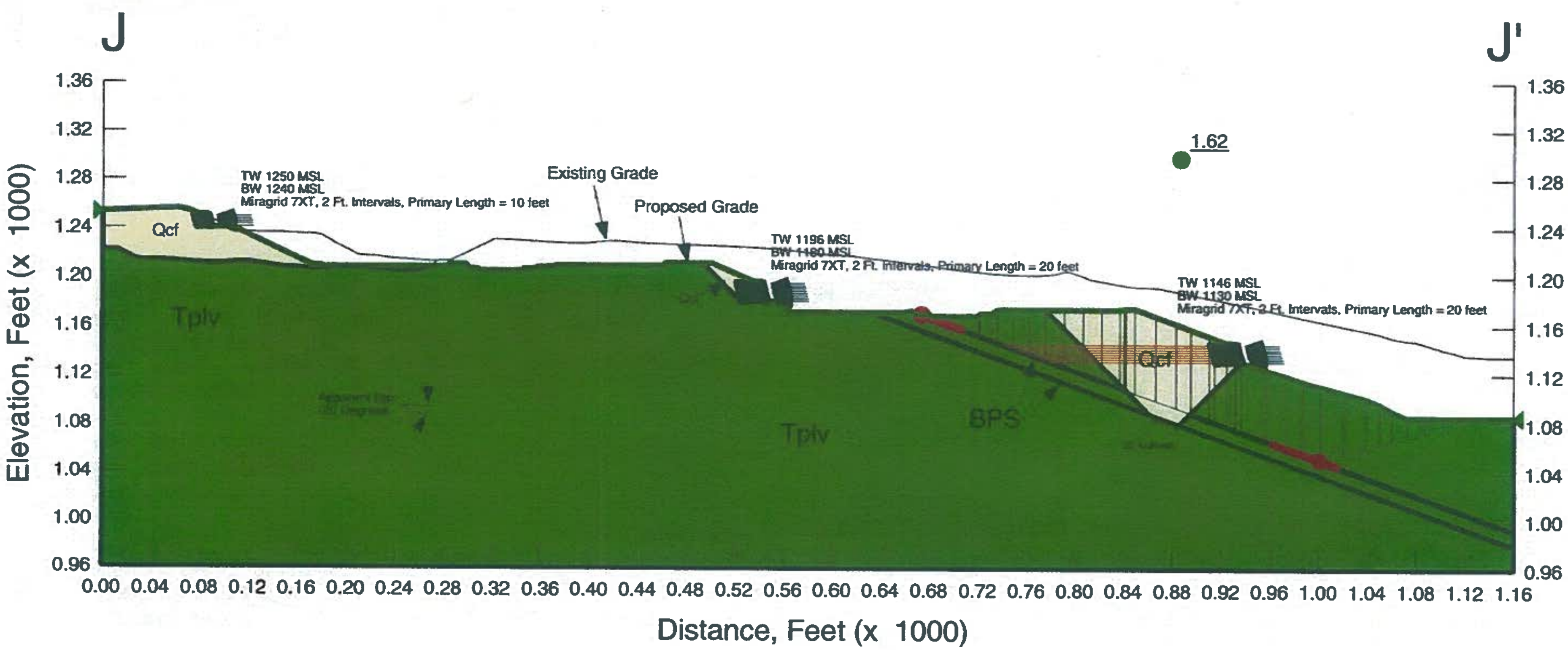


Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_Block1.gsz
Date: 3/22/2013 Time: 9:21:02 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

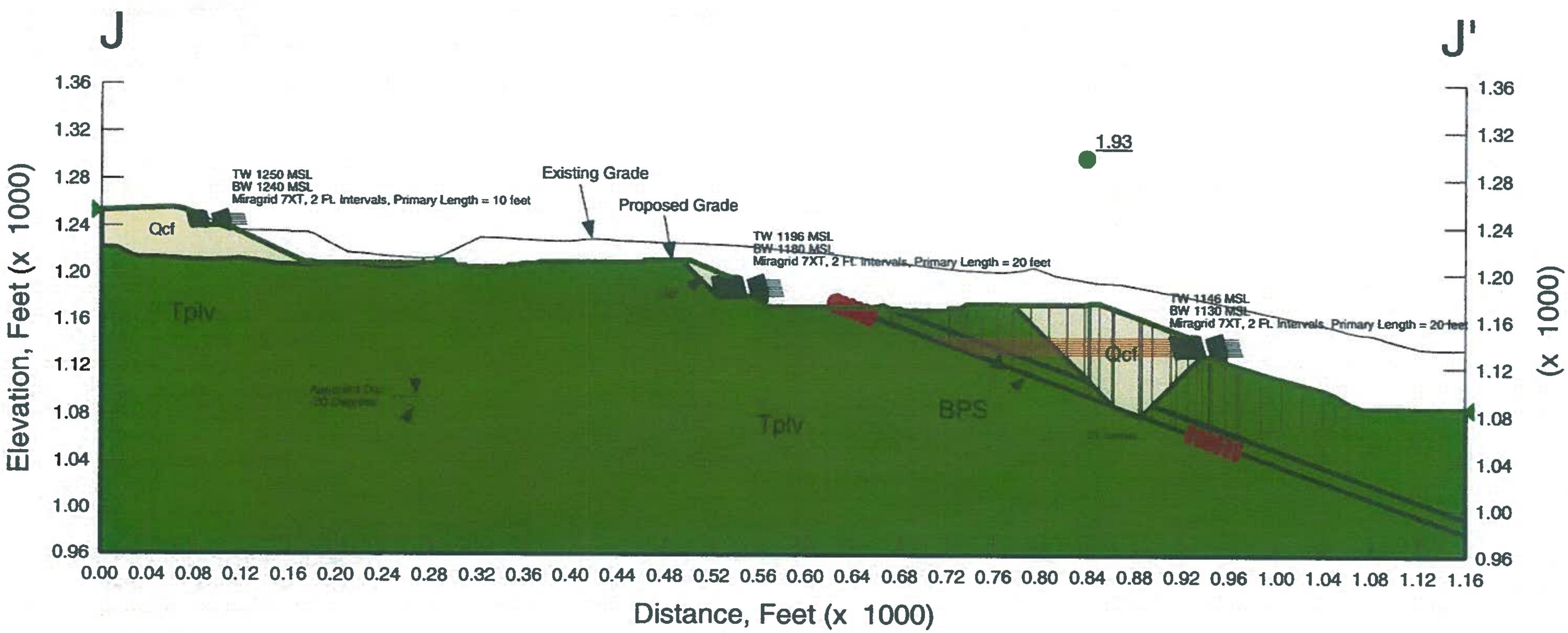
Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-20 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-20 degrees) - C	Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_Block2B.gsz
Date: 3/22/2013 Time: 9:17:57 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

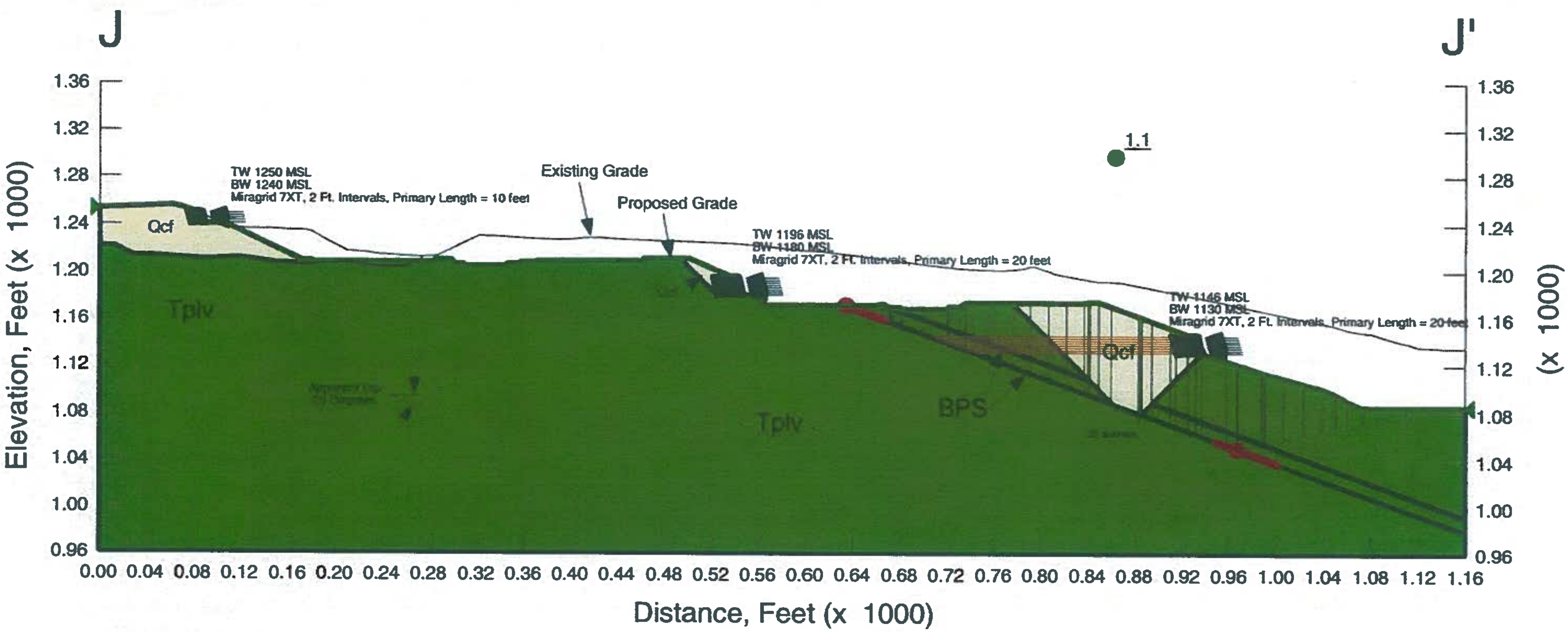
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_Block2_EQ.gsz
Date: 3/19/2013 Time: 9:11:46 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

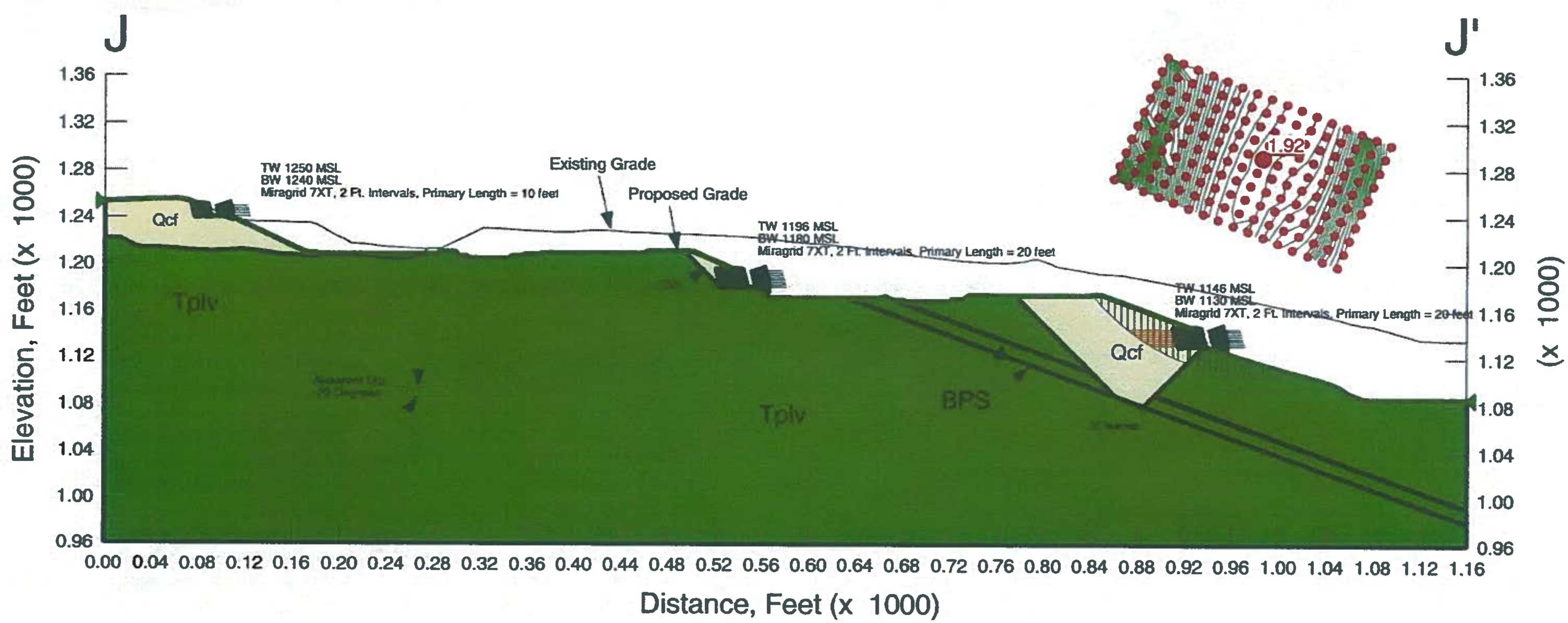
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_GridRadius1.gsz
Date: 3/22/2013 Time: 9:23:48 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

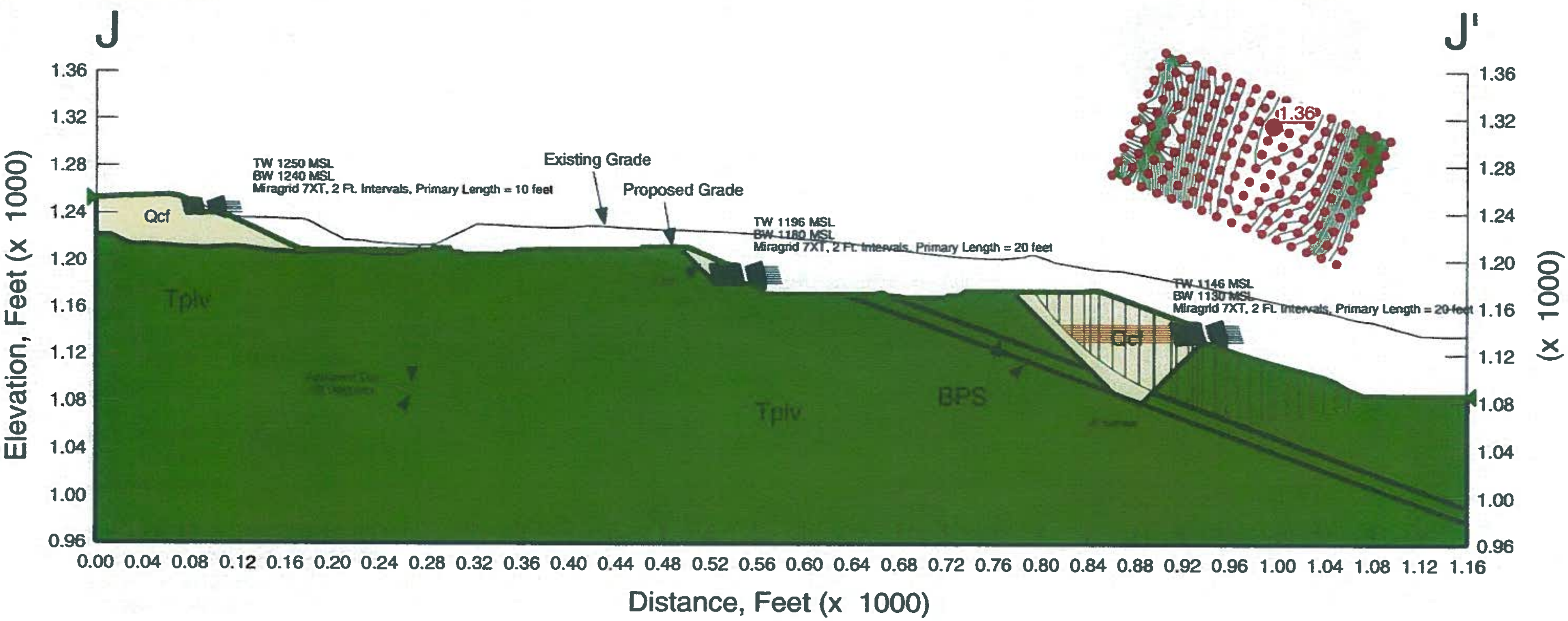
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_GridRadius1_EQ.gsz
Date: 3/22/2013 Time: 9:25:26 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

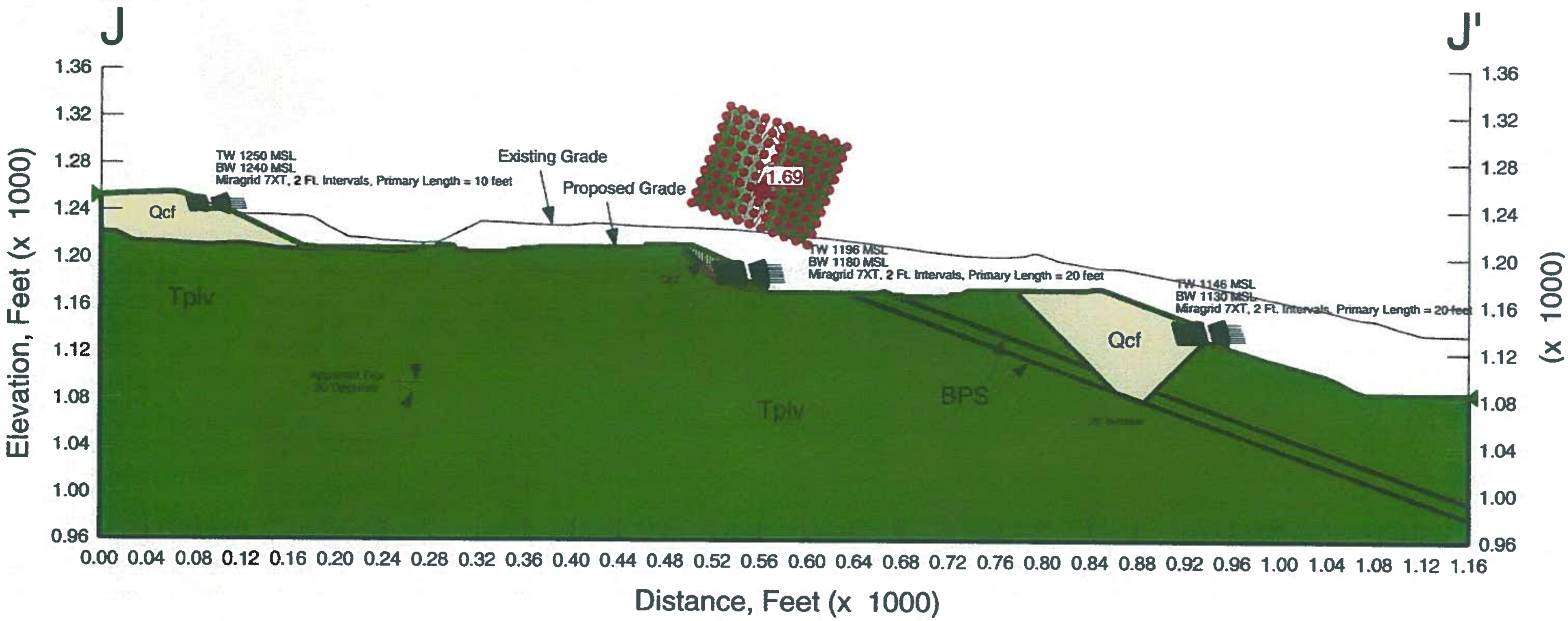
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_GridRadius2.gsz
Date: 3/22/2013 Time: 9:28:26 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

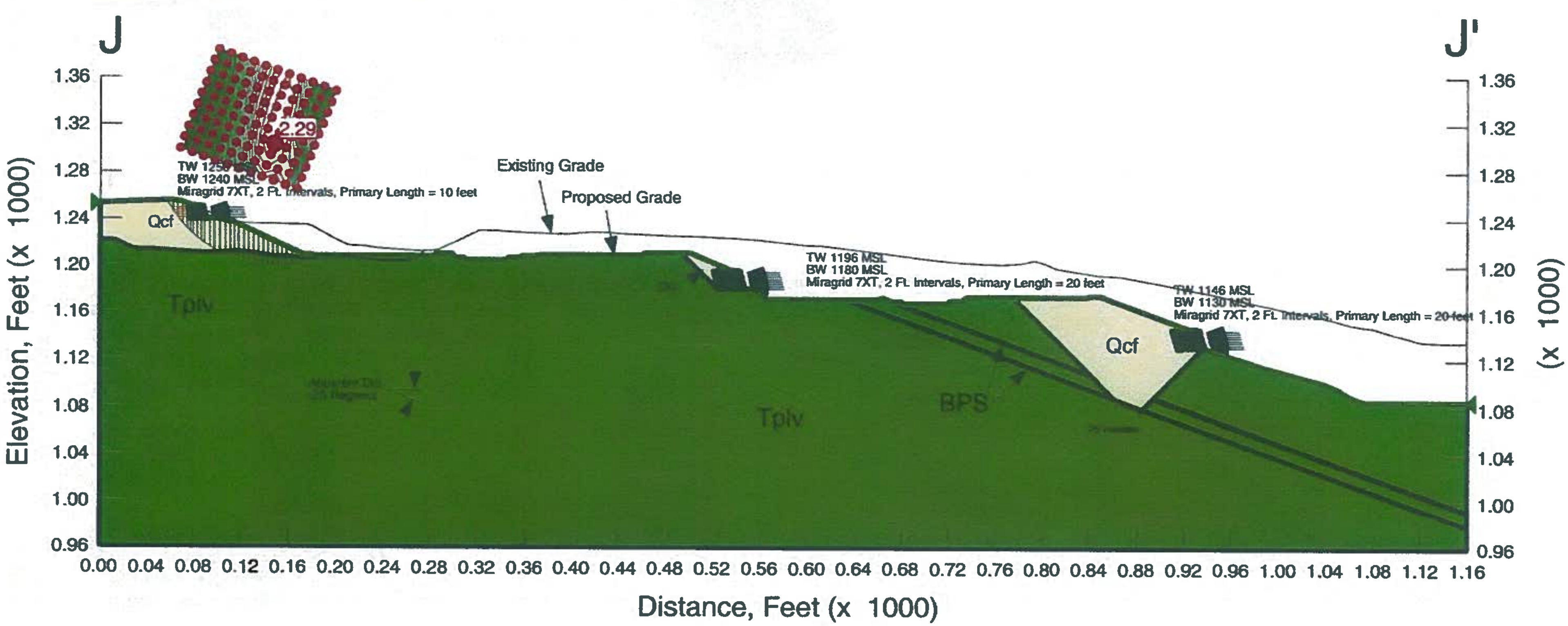
Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi



Portola Center - North
Project No. G1218-52-01
Name: JJ-Case 2_GridRadius3.gsz
Date: 3/22/2013 Time: 9:29:14 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-20 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-20 degrees) - C Tps-Slt (-20 degrees) - Phi

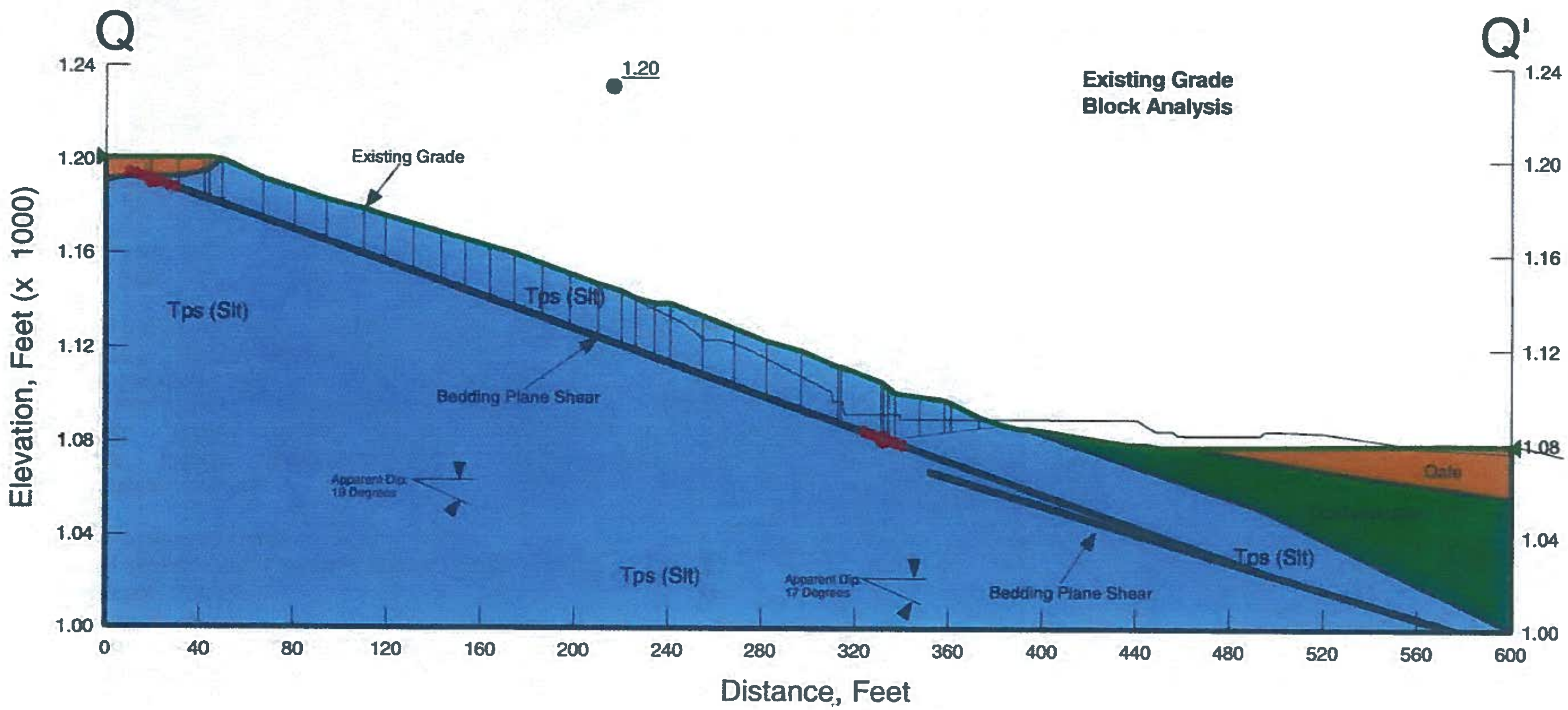


Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 1.gsz
Date: 3/26/2013 Time: 10:17:33 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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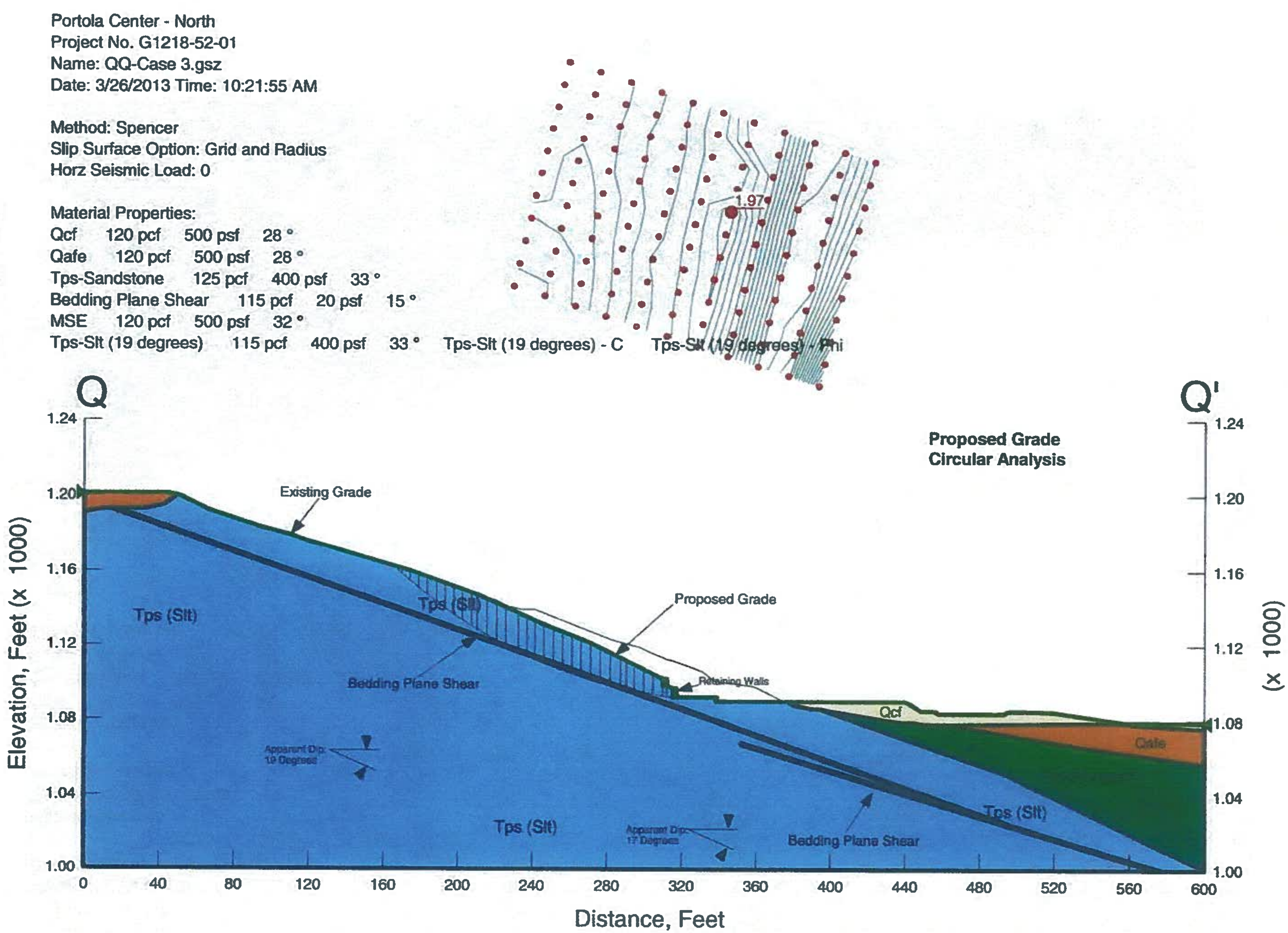

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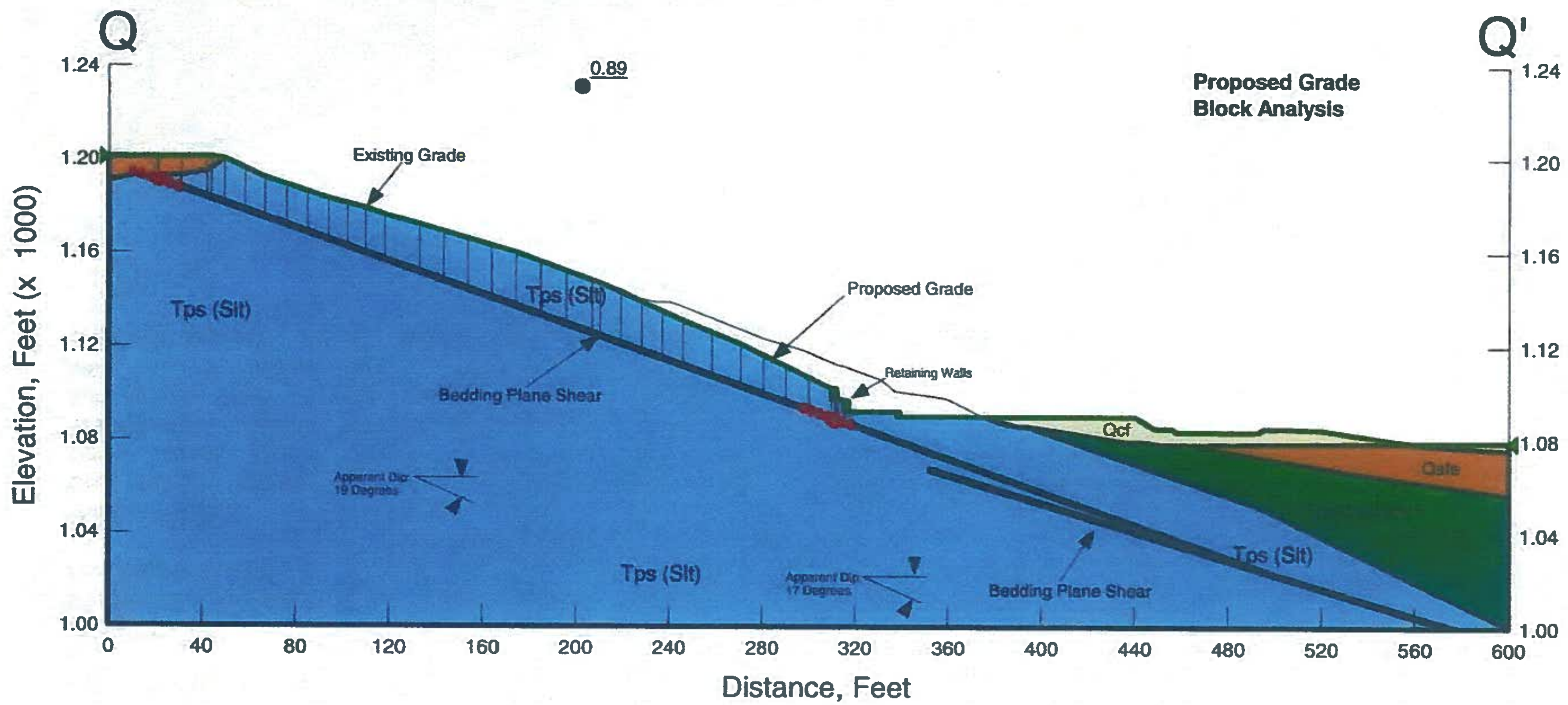
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 4.gsz
Date: 3/26/2013 Time: 10:22:54 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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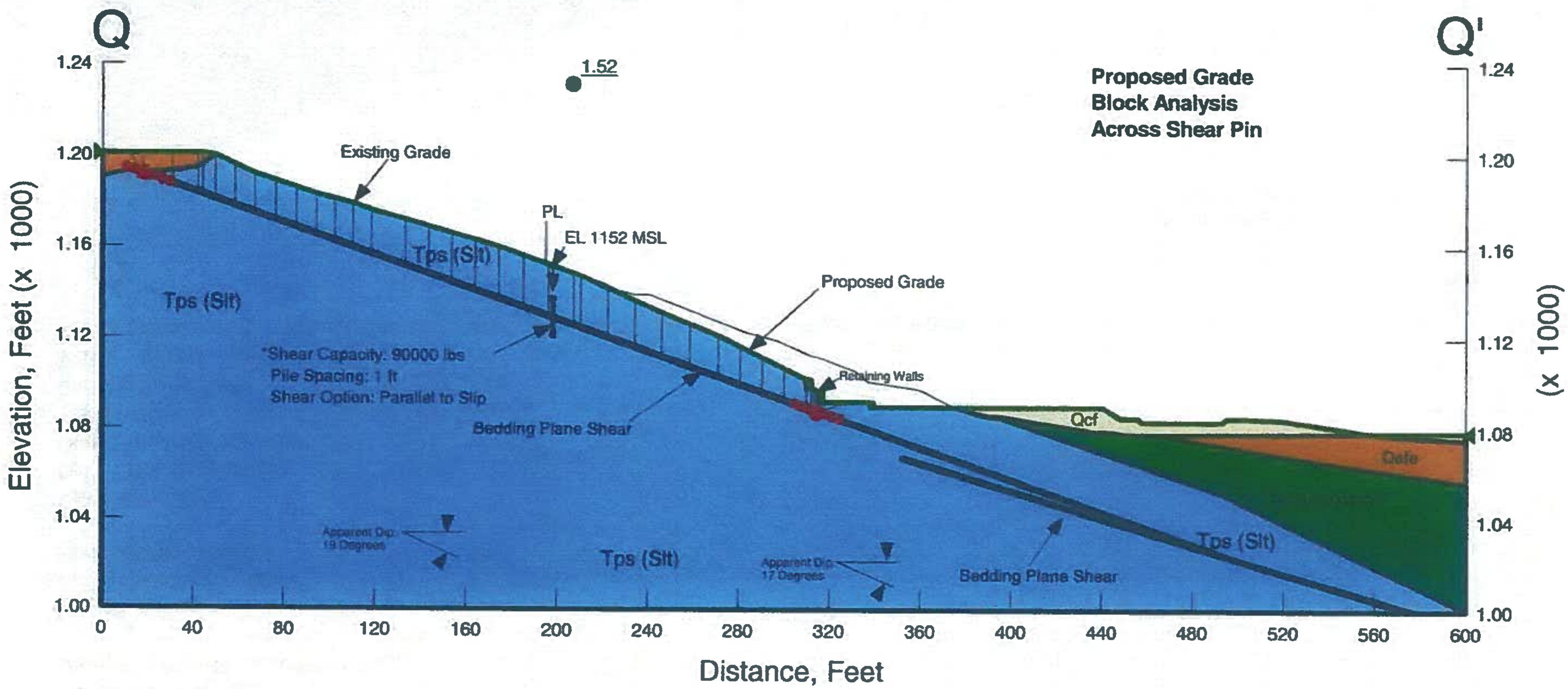
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 5.gsz
Date: 3/26/2013 Time: 10:24:11 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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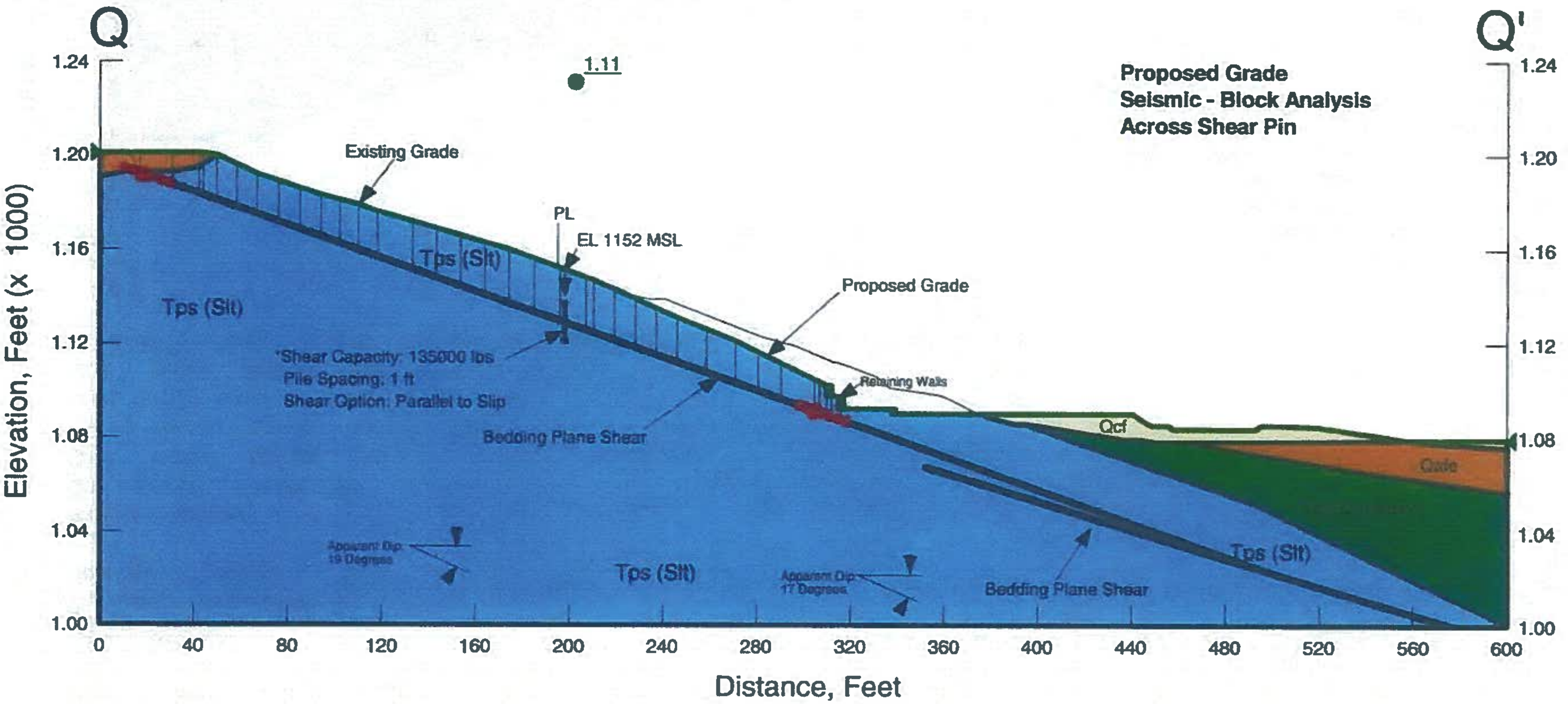
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 24.gsz
Date: 3/26/2013 Time: 10:16:11 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 800 psf 34 °
Bedding Plane Shear 115 pcf 125 psf 12 °
MSE 120 pcf 500 psf 32 °
Tps-Slt (19 degrees) 115 pcf 900 psf 30 ° Tps-Slt (19 degrees) - C Tps-Slt (19 degrees) - Phi



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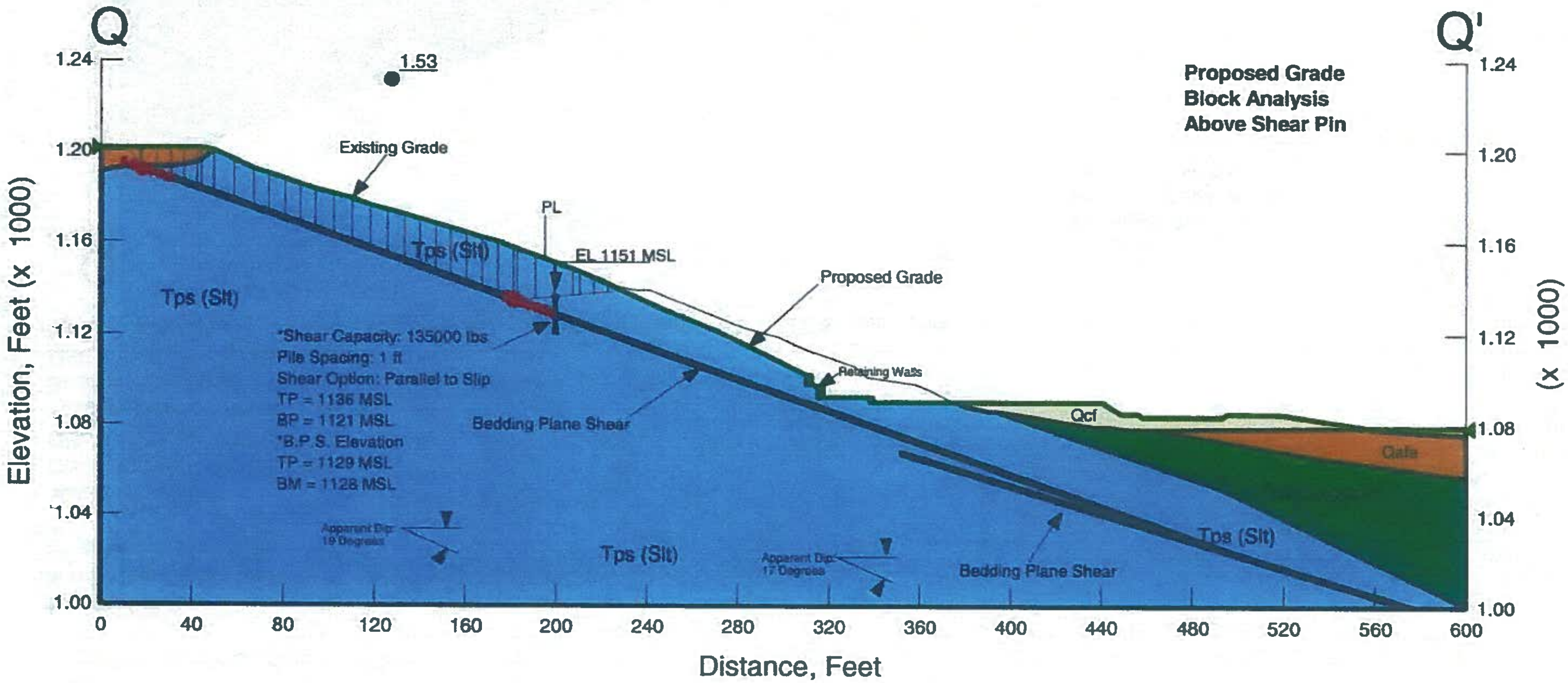
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 6.gsz
Date: 3/26/2013 Time: 11:03:09 AM

Method: Spencer
Slip Surface Option: Block
Horz.Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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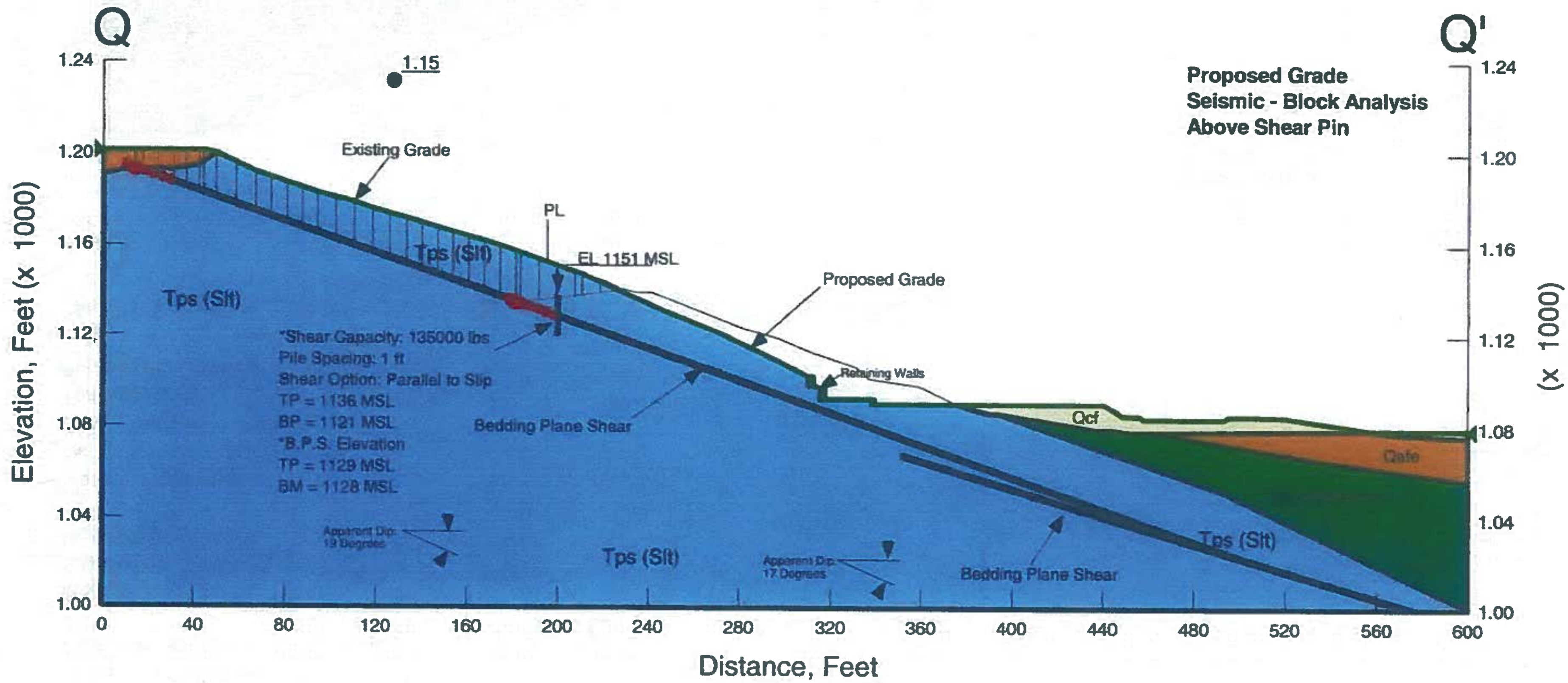
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 6s.gsz
Date: 3/26/2013 Time: 11:09:52 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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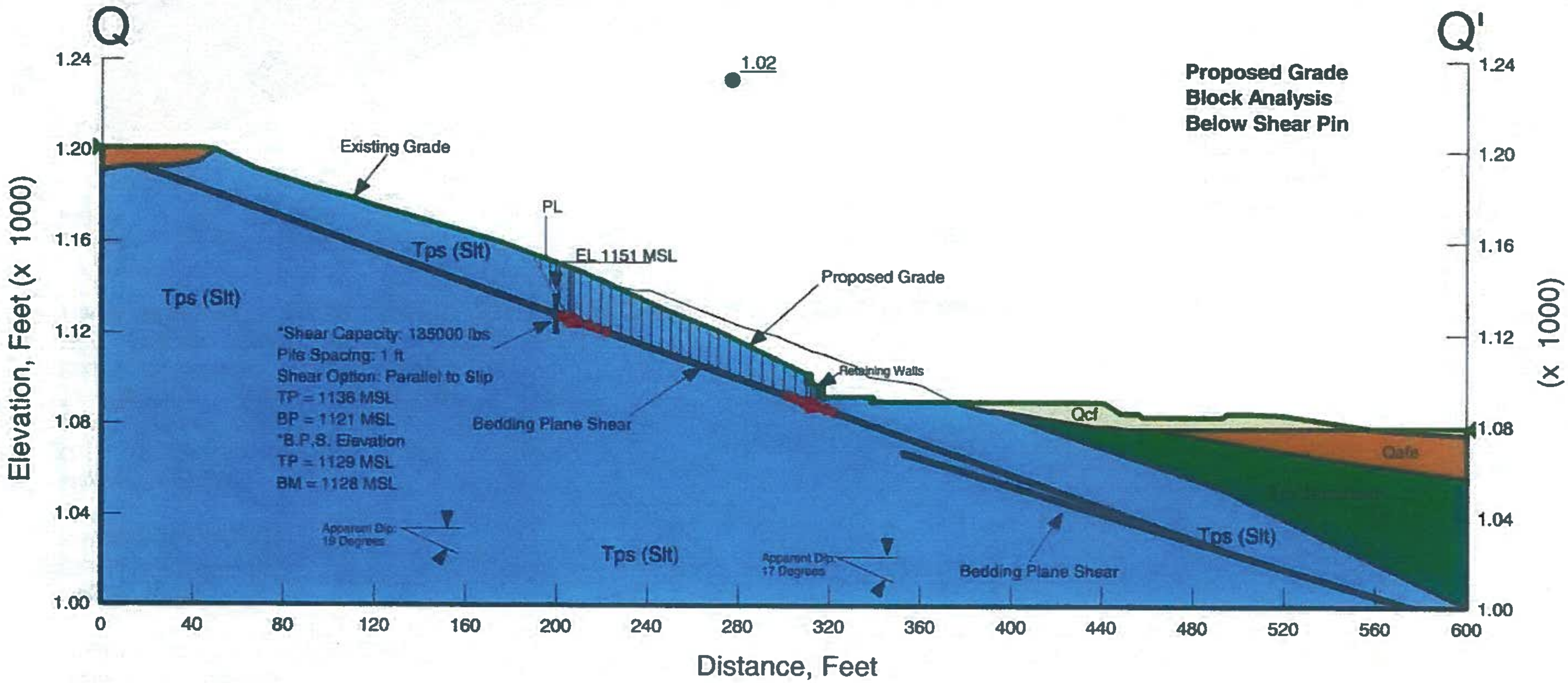
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 7.gsz
Date: 3/26/2013 Time: 11:15:07 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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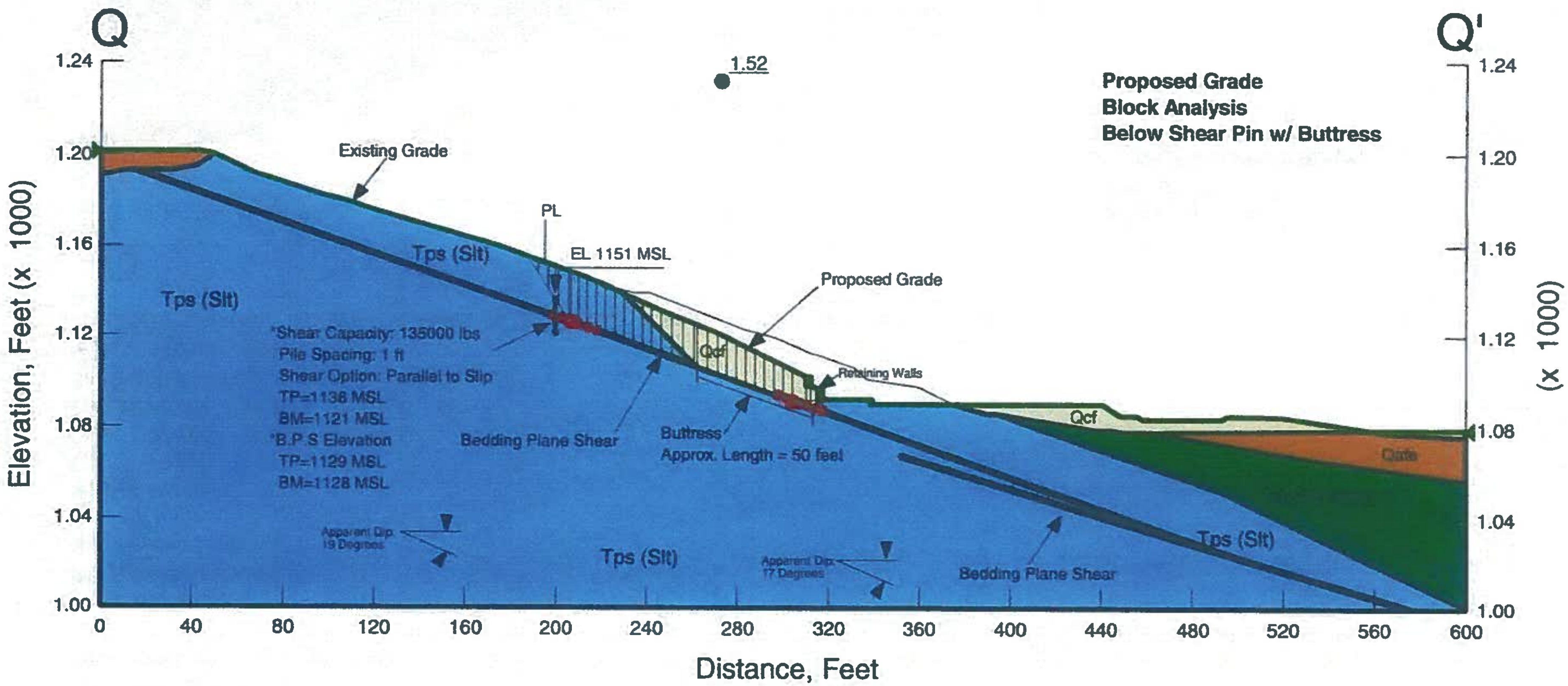
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 8.gsz
Date: 3/26/2013 Time: 11:18:45 AM

Method: Spencer
Slip Surface Option: Block.
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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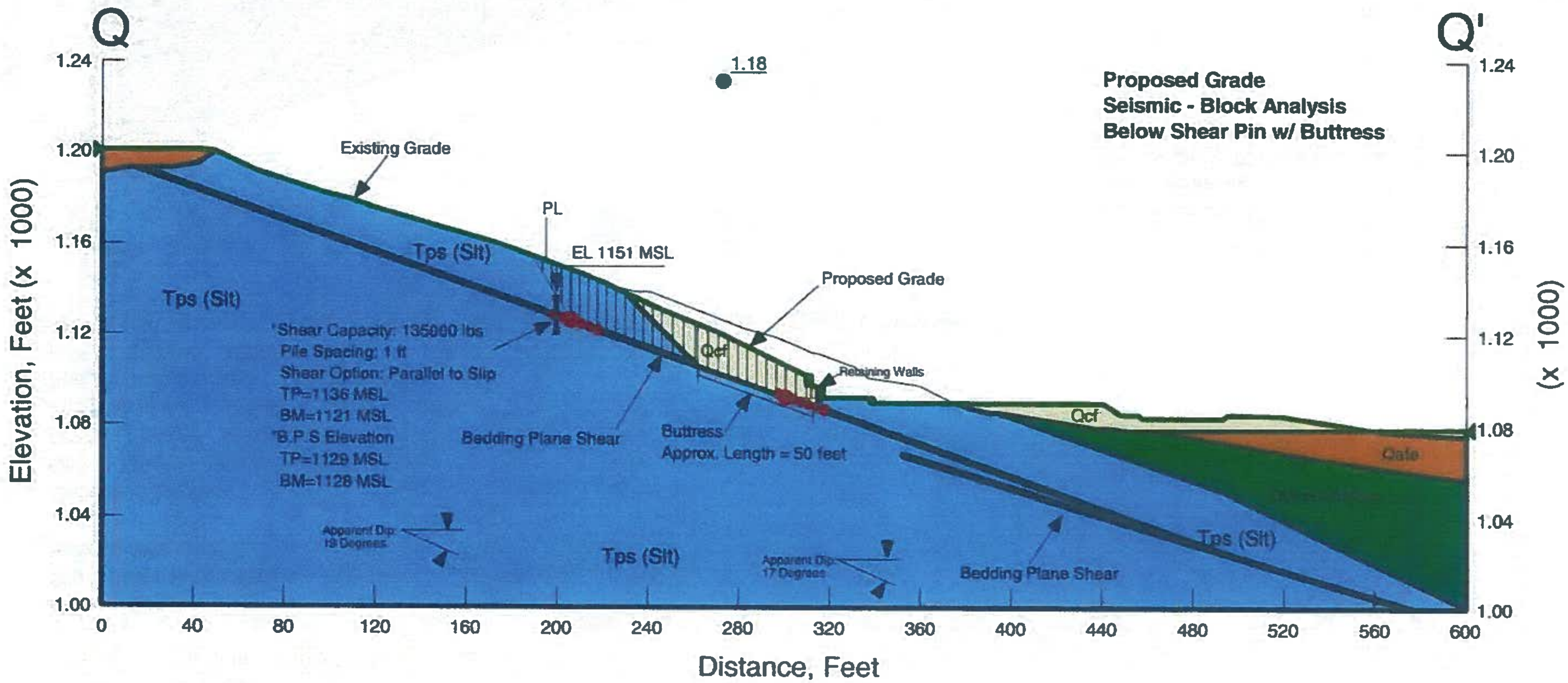
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 8s.gsz
Date: 3/26/2013 Time: 1:23:56 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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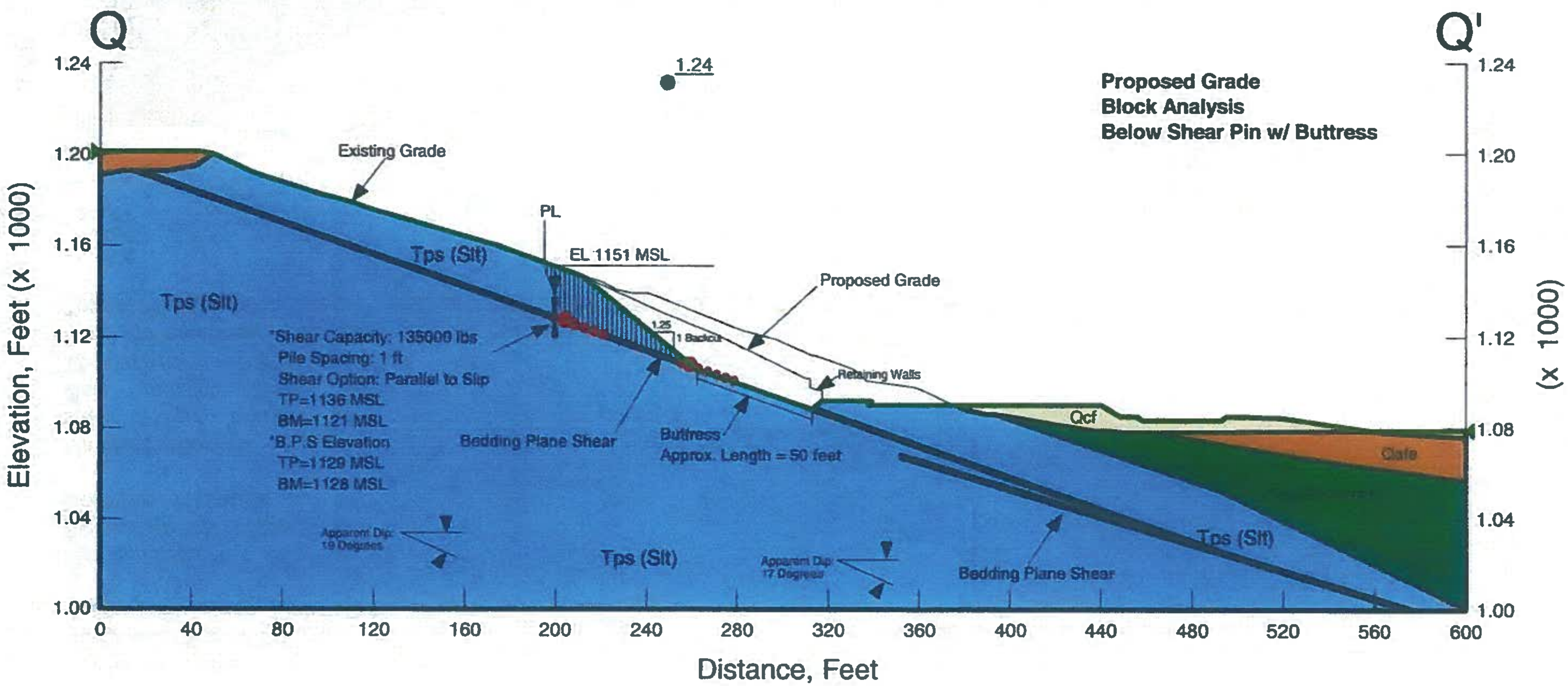
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 8b.gsz
Date: 4/8/2013 Time: 1:41:15 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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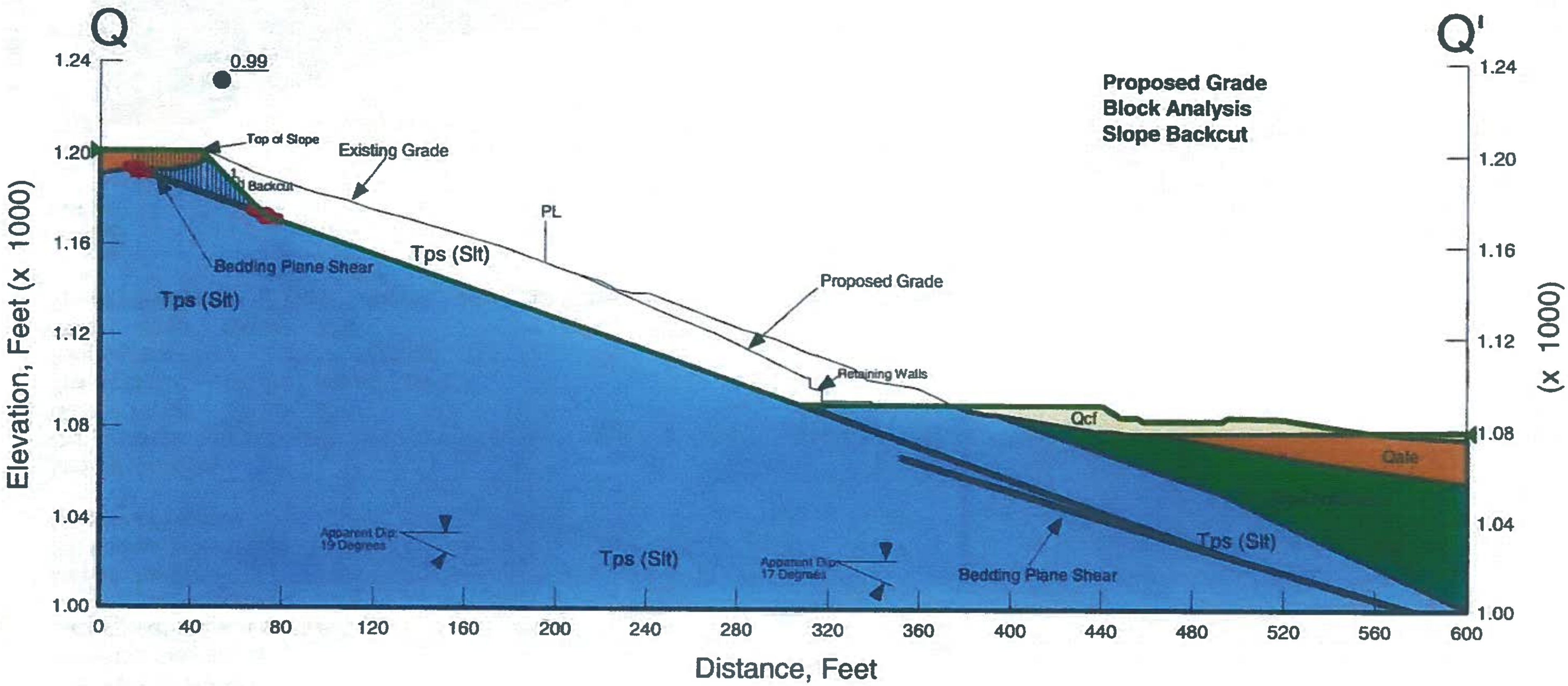
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 23.gsz
Date: 4/8/2013 Time: 1:48:13 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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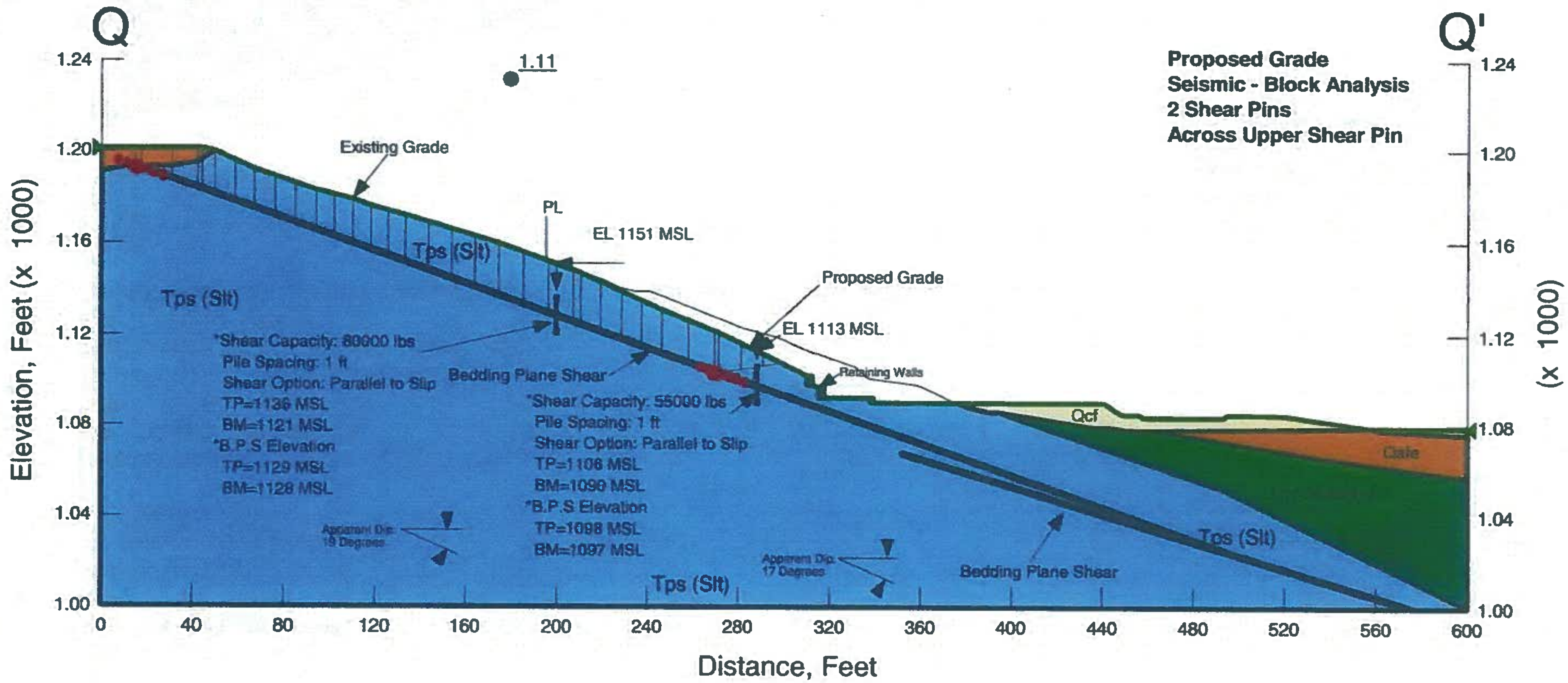
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 25-s2.gsz
Date: 3/26/2013 Time: 3:57:41 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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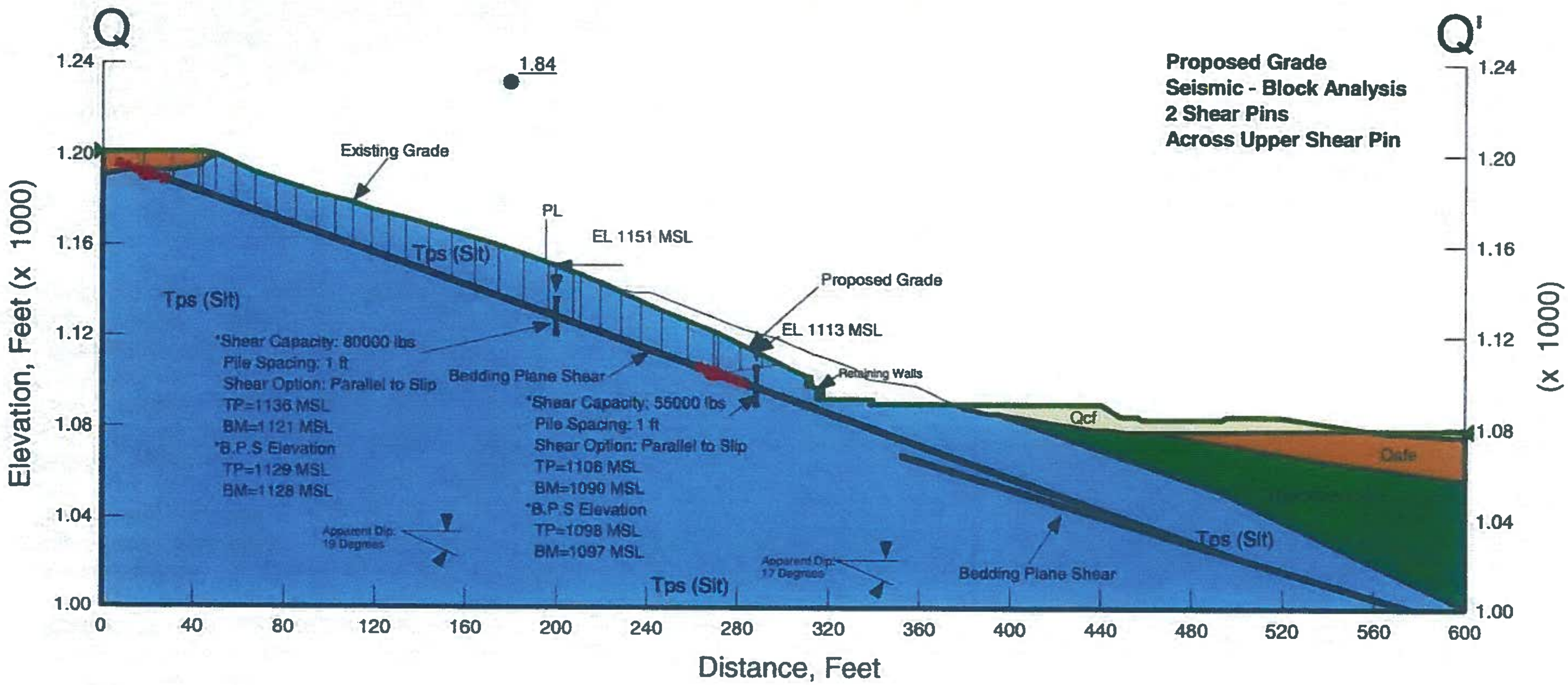
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 15.gsz
Date: 3/26/2013 Time: 4:00:20 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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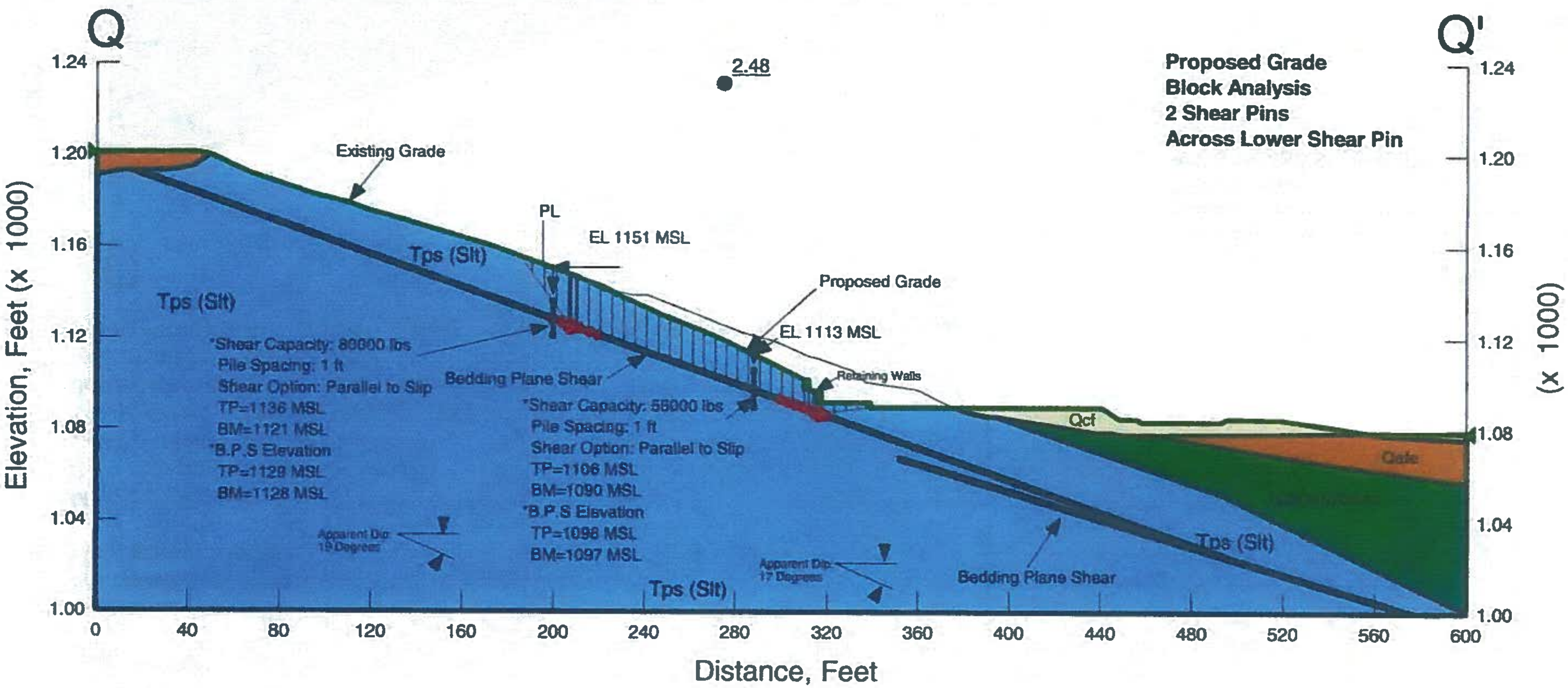
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 16.gsz
Date: 3/26/2013 Time: 4:10:04 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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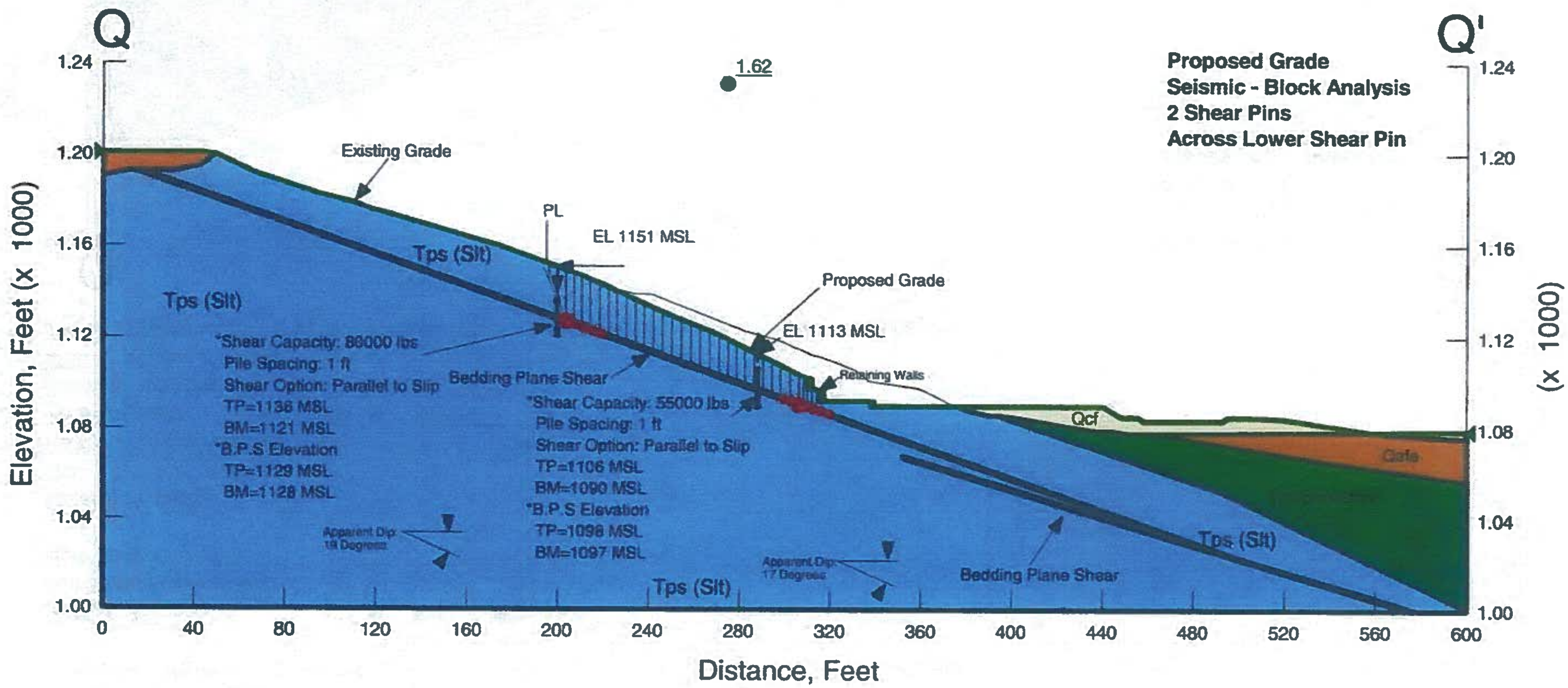
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 25-s4.gsz
Date: 3/26/2013 Time: 4:05:07 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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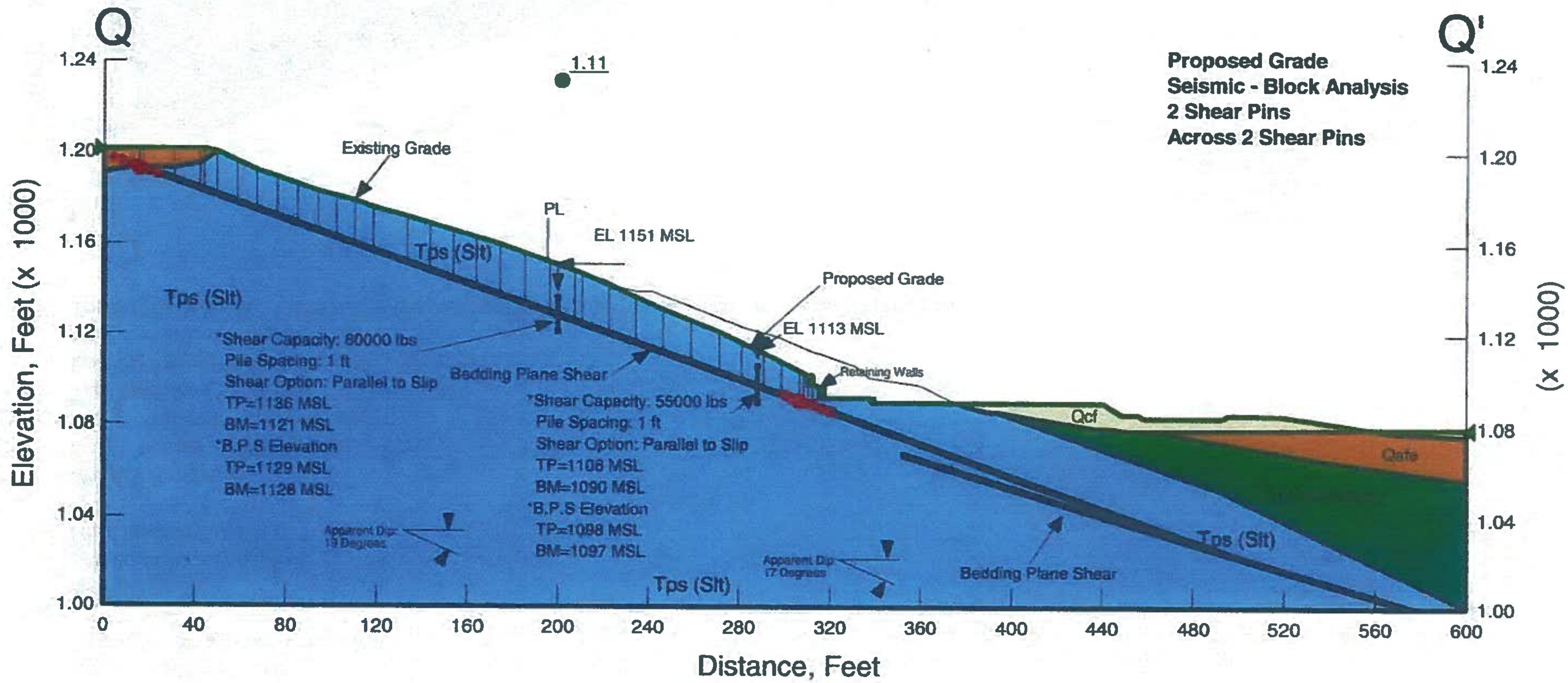
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 25-s5.gsz
Date: 3/26/2013 Time: 4:13:59 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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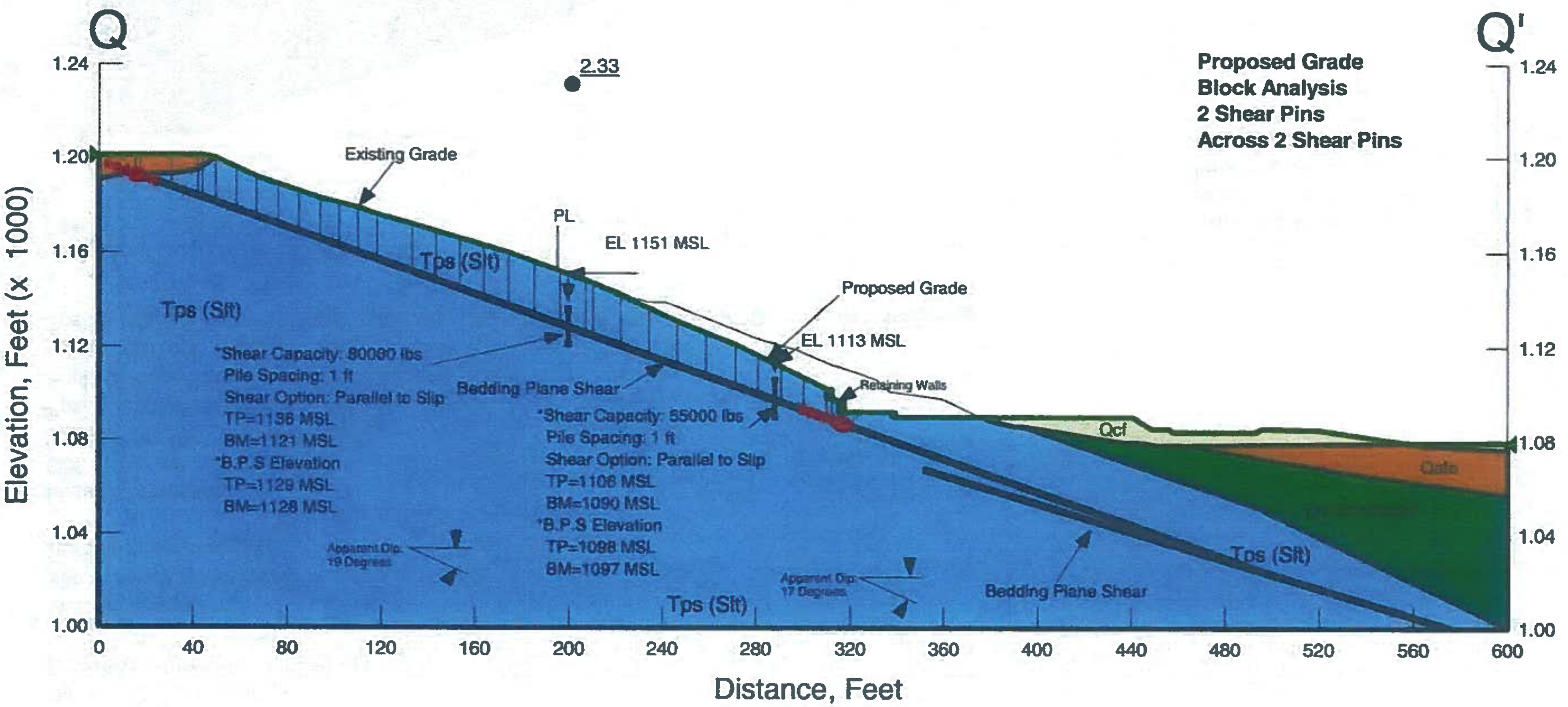
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 14.gsz
Date: 3/26/2013 Time: 4:19:13 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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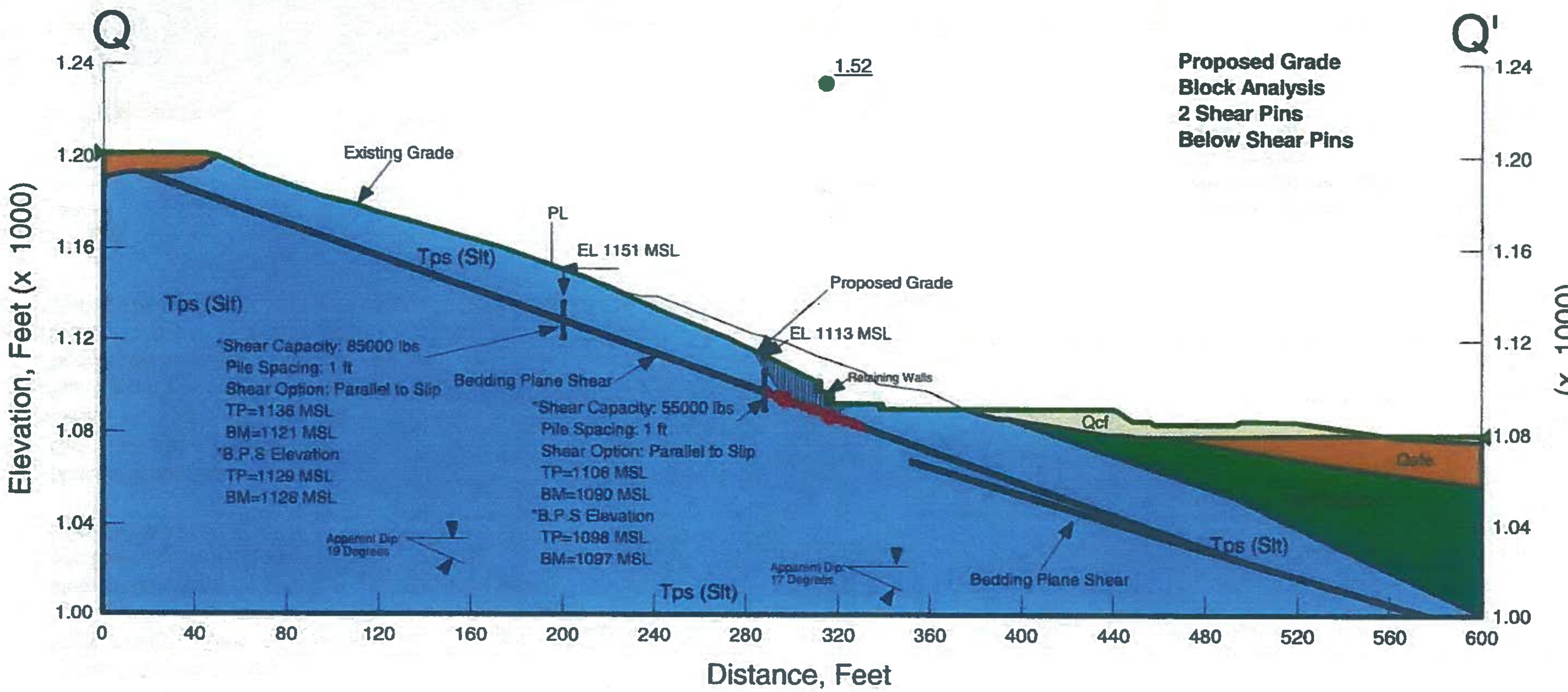
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 18.gsz
Date: 3/26/2013 Time: 4:30:39 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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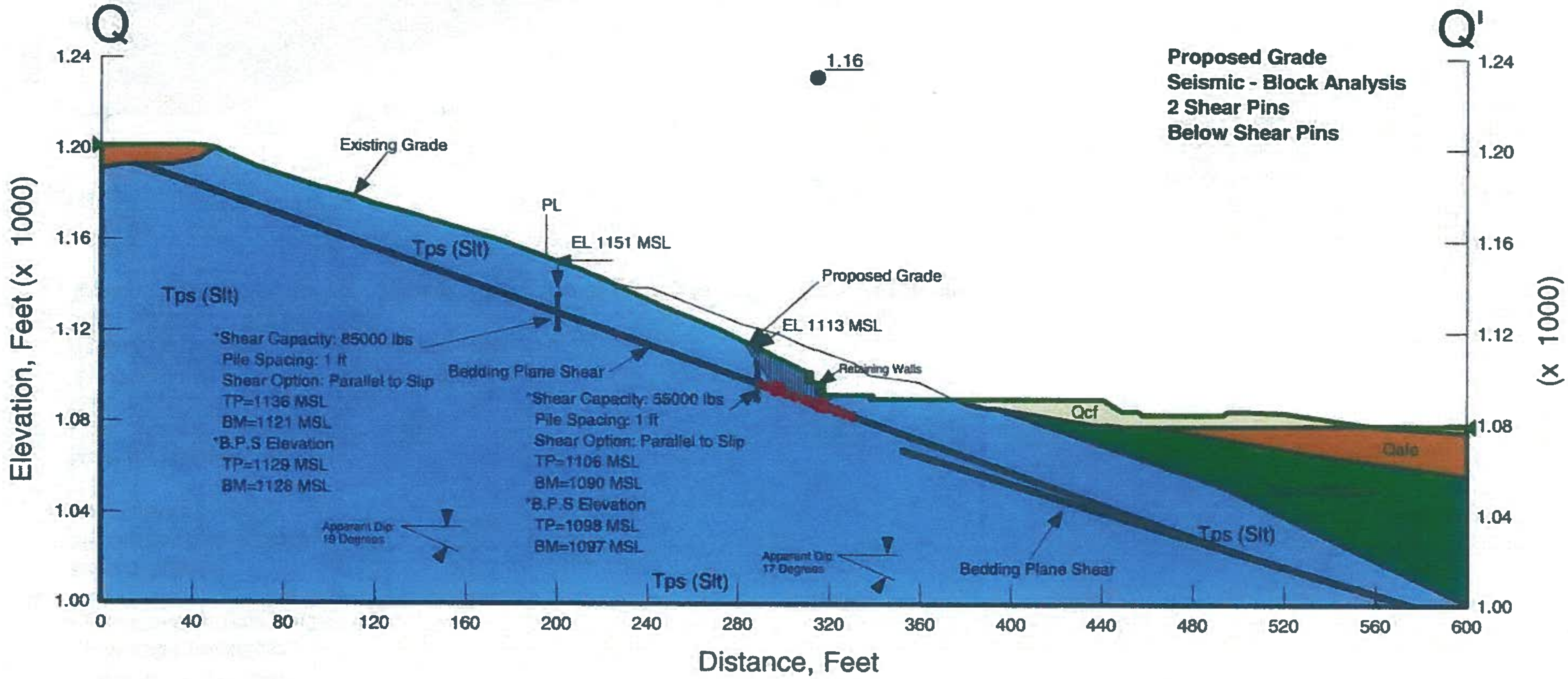
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 18s.gsz
Date: 3/26/2013 Time: 4:26:37 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 35 °
Bedding Plane Shear 115 pcf 20 psf 15 °
MSE 120 pcf 500 psf 32 °
Tps-Slt (19 degrees) 115 pcf 400 psf 33 ° Tps-Slt (19 degrees) - C Tps-Slt (19 degrees) - Phi



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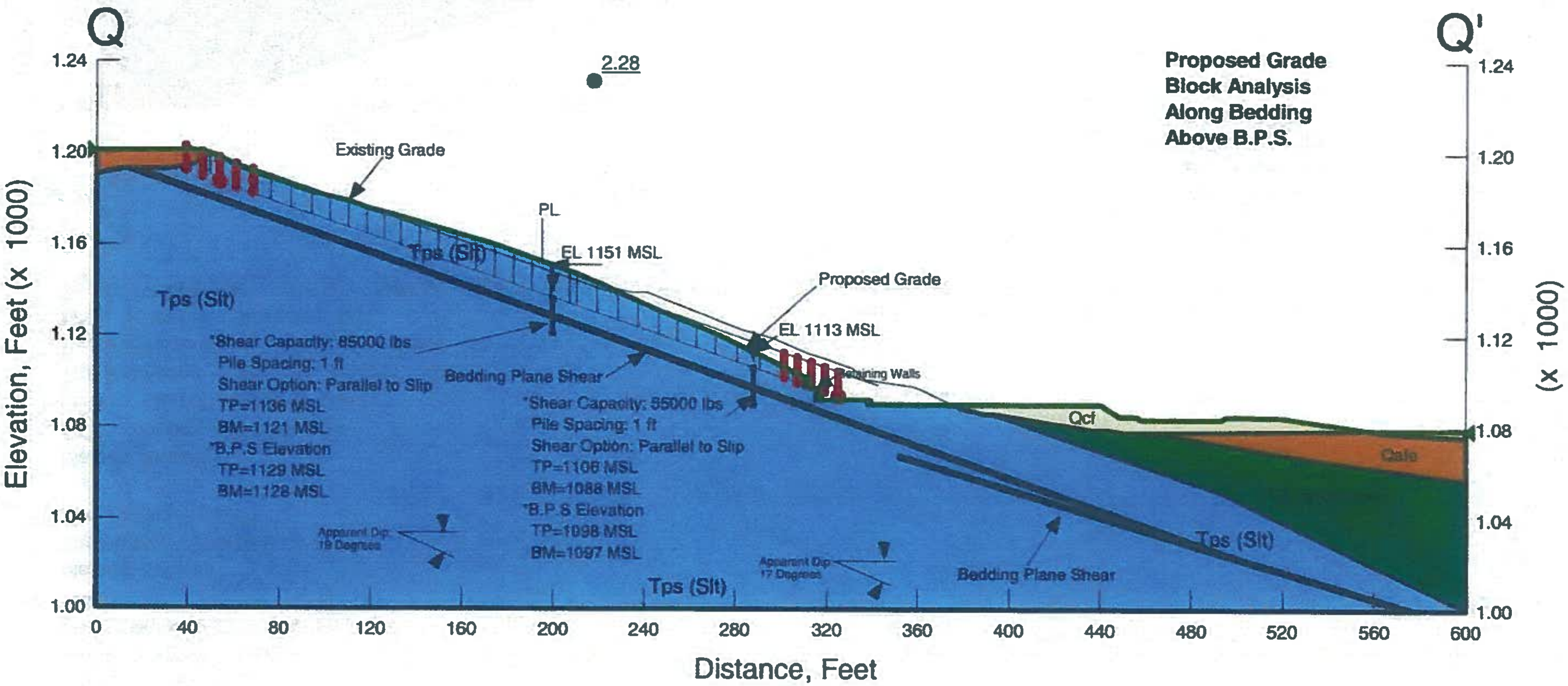
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 20.gsz
Date: 3/26/2013 Time: 4:47:52 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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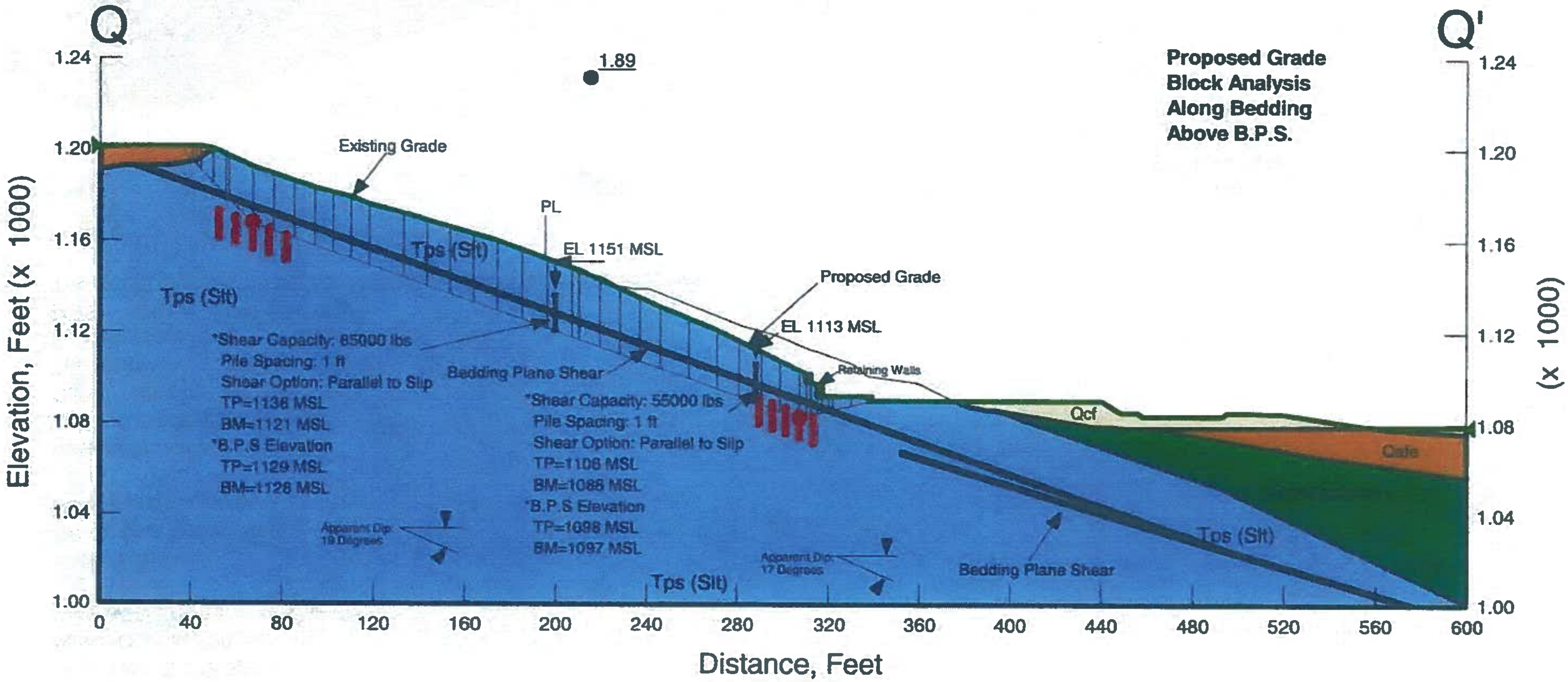
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 19.gsz
Date: 3/26/2013 Time: 4:51:20 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



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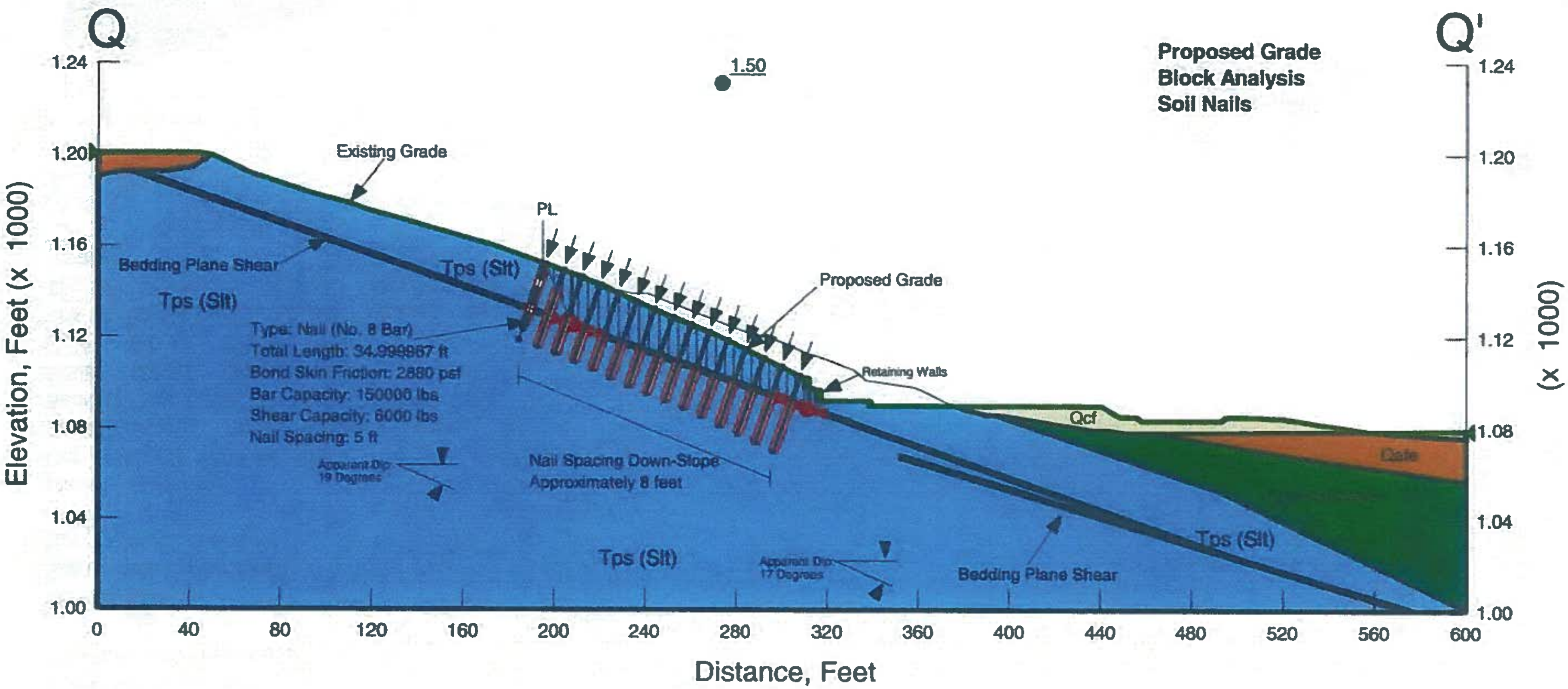
Portola Center - North
Project No. G1218-52-01
Name: QQ-Case 22.gsz
Date: 3/26/2013 Time: 3:38:05 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 degrees) - C	Tps-Slt (19 degrees) - Phi



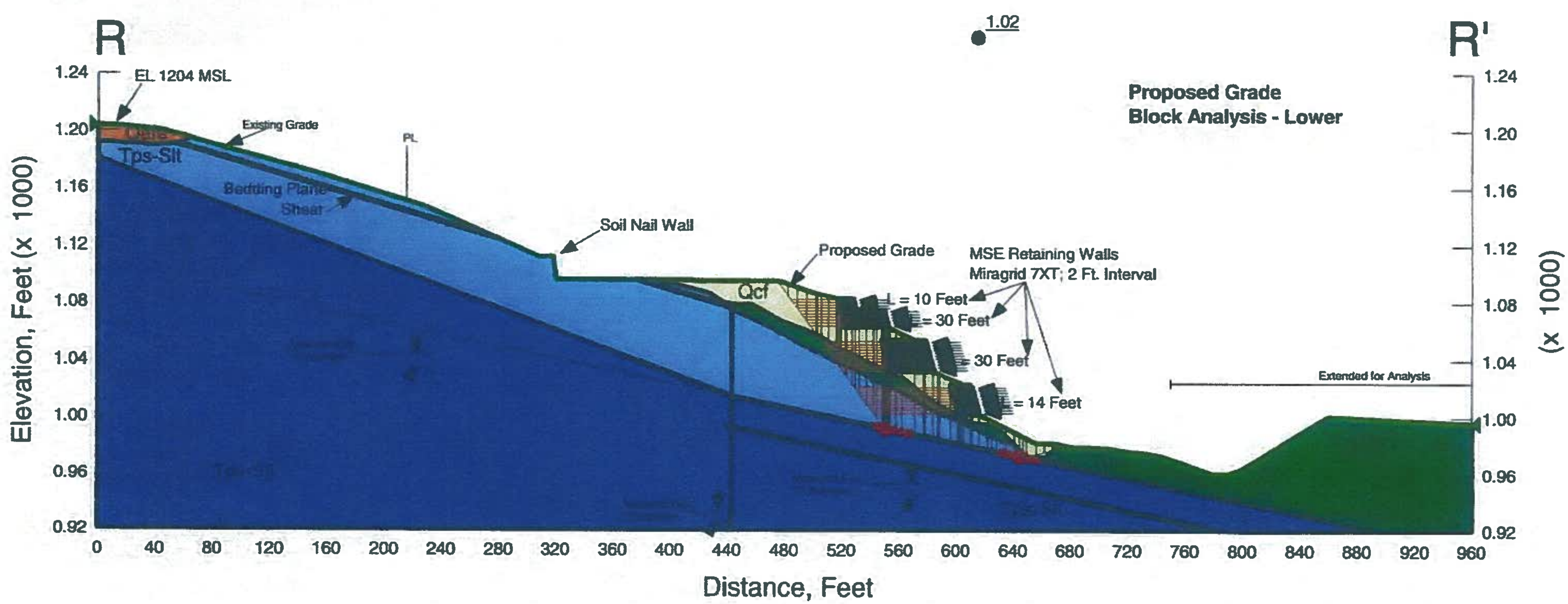
X:\Engineering and Geology\ENGINEER PROGRAMS, GUIDES, ETC\EngrgPrg\GEO-SLOPE2007\Projects\G1218-52-01 (Portola - North)\March 2013 - West\QQ-Case 22.gsz

Portola Center - North
Project No. G1218-52-01
Name: RR-Case 1.gsz
Date: 4/3/2013 Time: 4:06:42 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

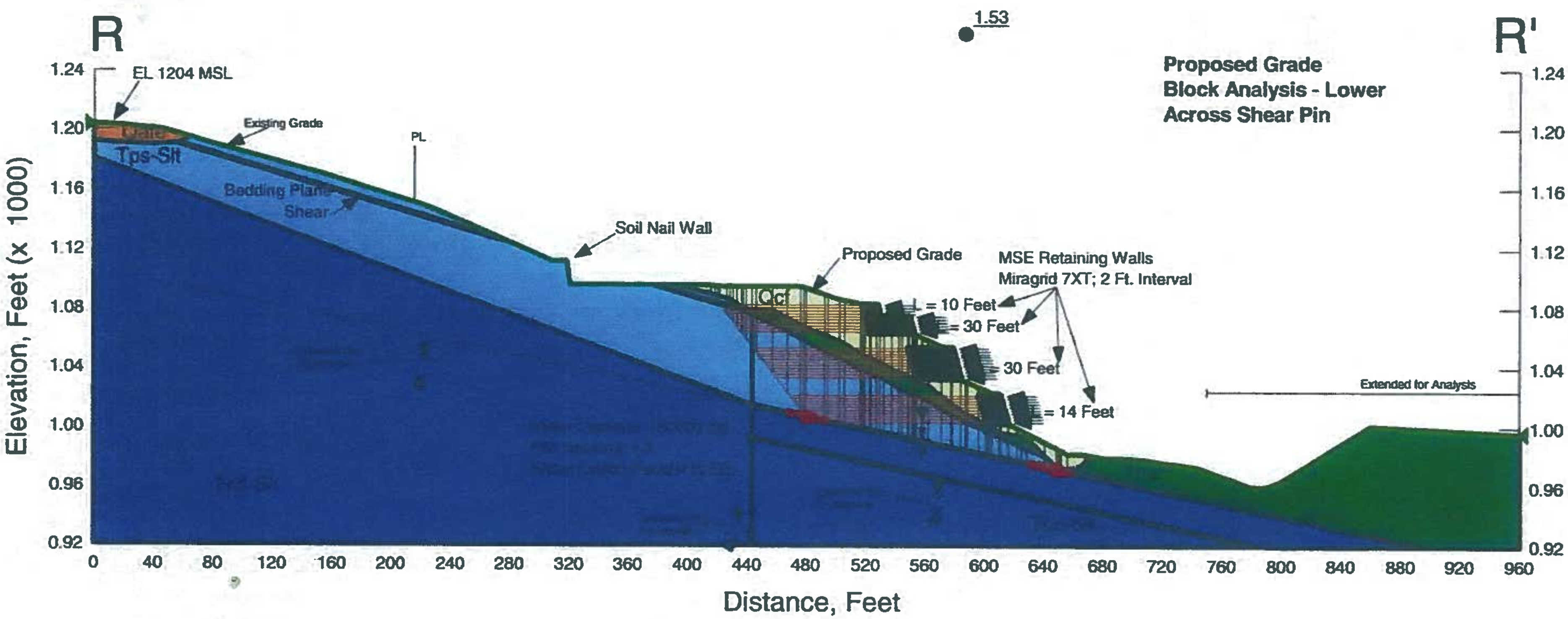


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 2.gsz
Date: 4/3/2013 Time: 4:01:11 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock.					

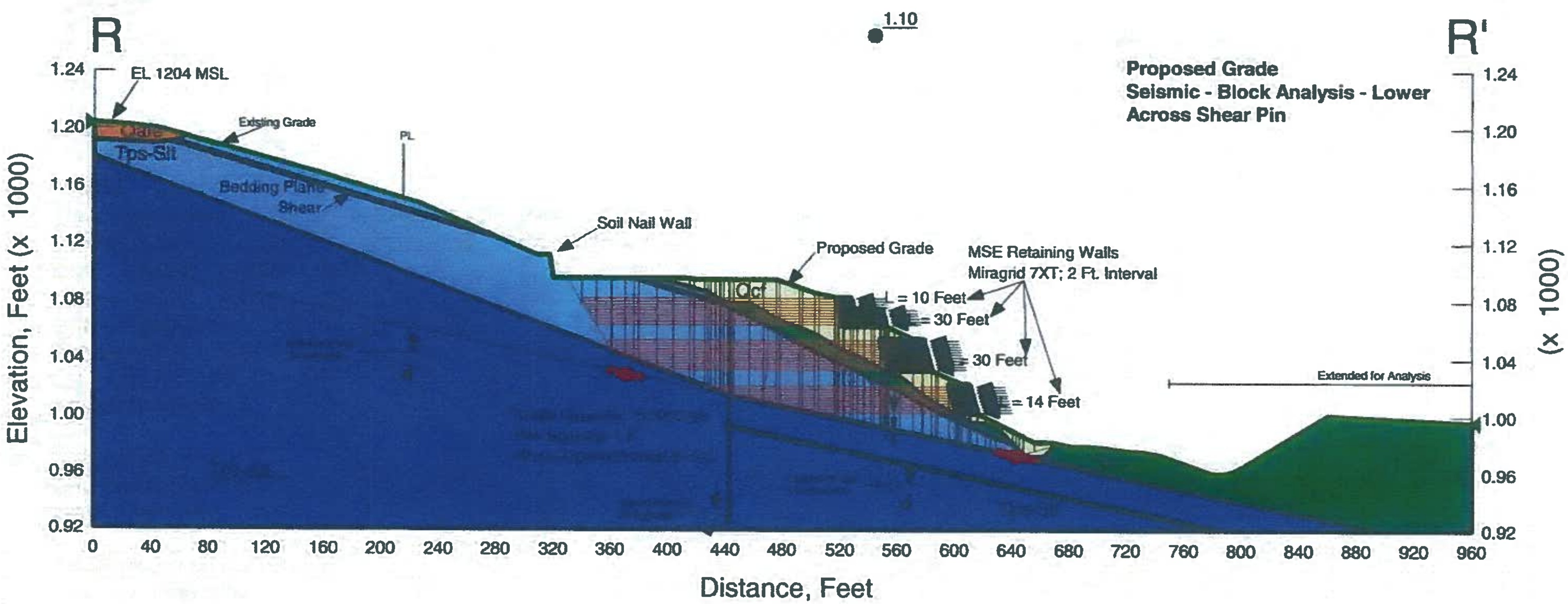


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 2-s2.gsz
Date: 4/2/2013 Time: 10:09:34 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

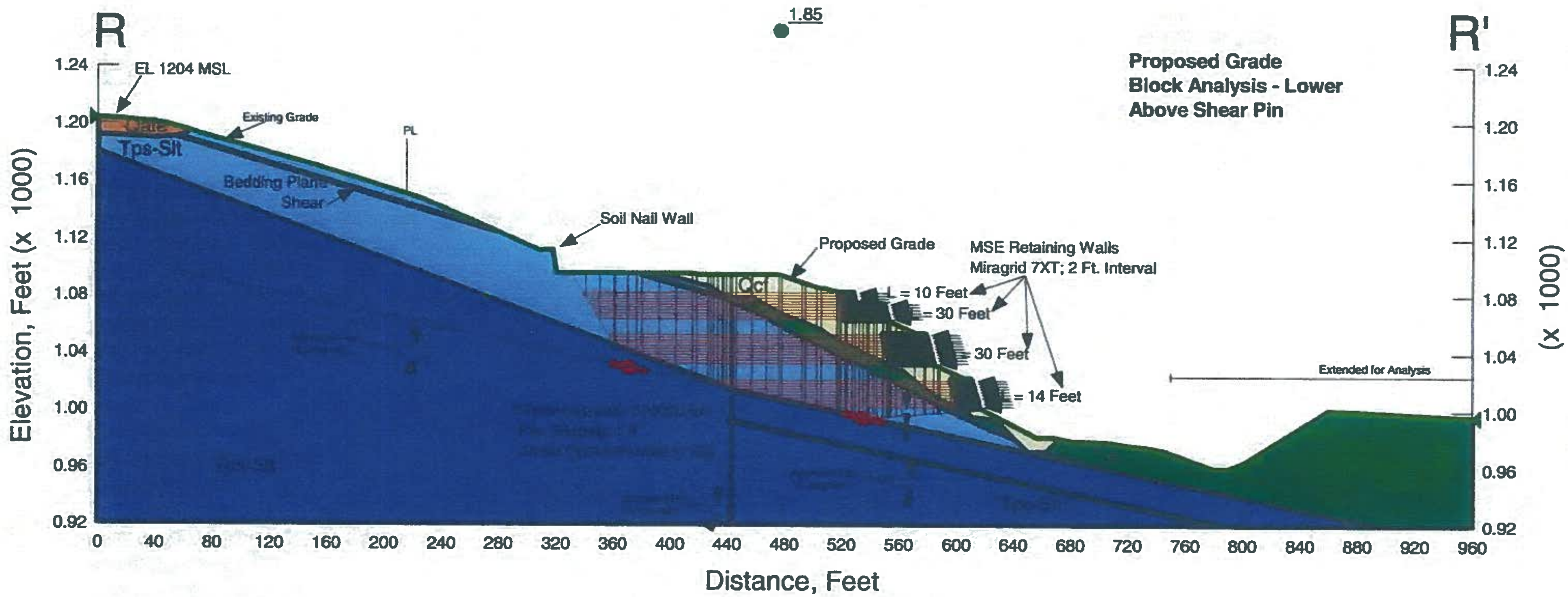


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 3.gsz
Date: 4/3/2013 Time: 4:08:20 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

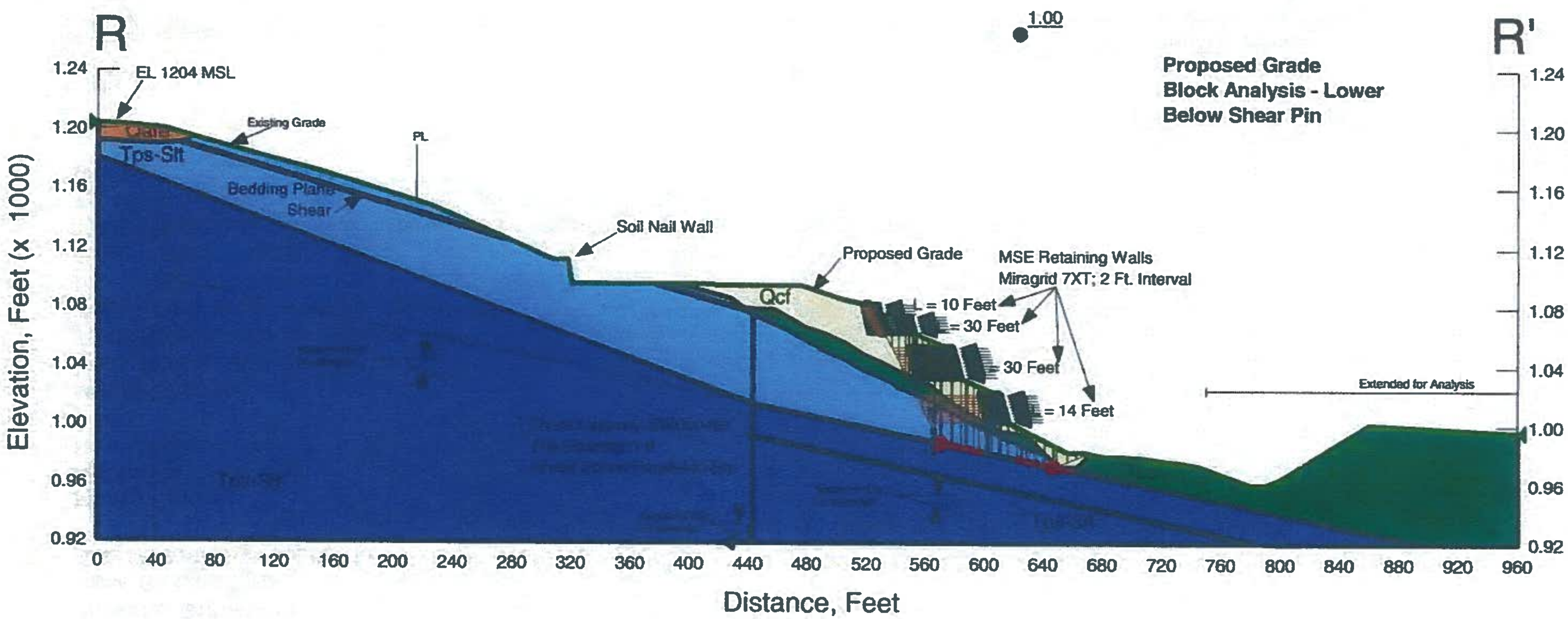


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 4.gsz
Date: 4/3/2013 Time: 4:10:54 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

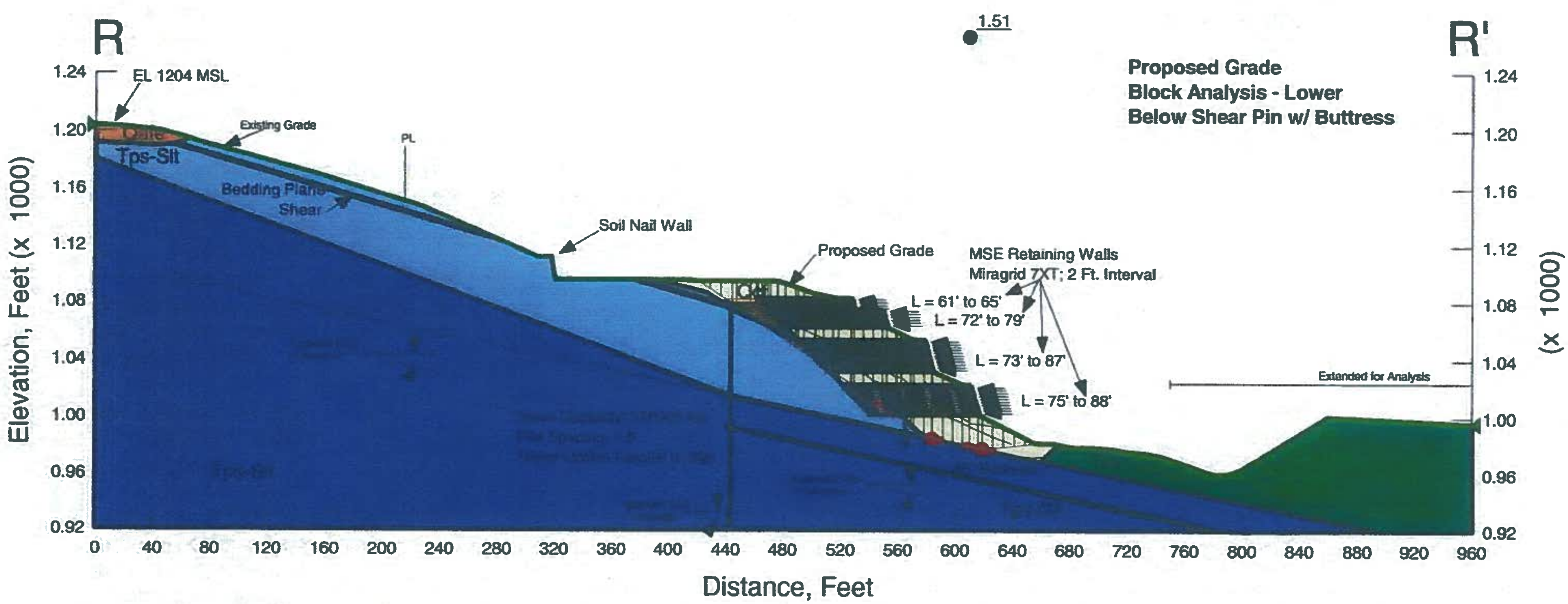


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5b.gsz
Date: 4/3/2013 Time: 4:13:00 PM

Method: Spencer
Slip,Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

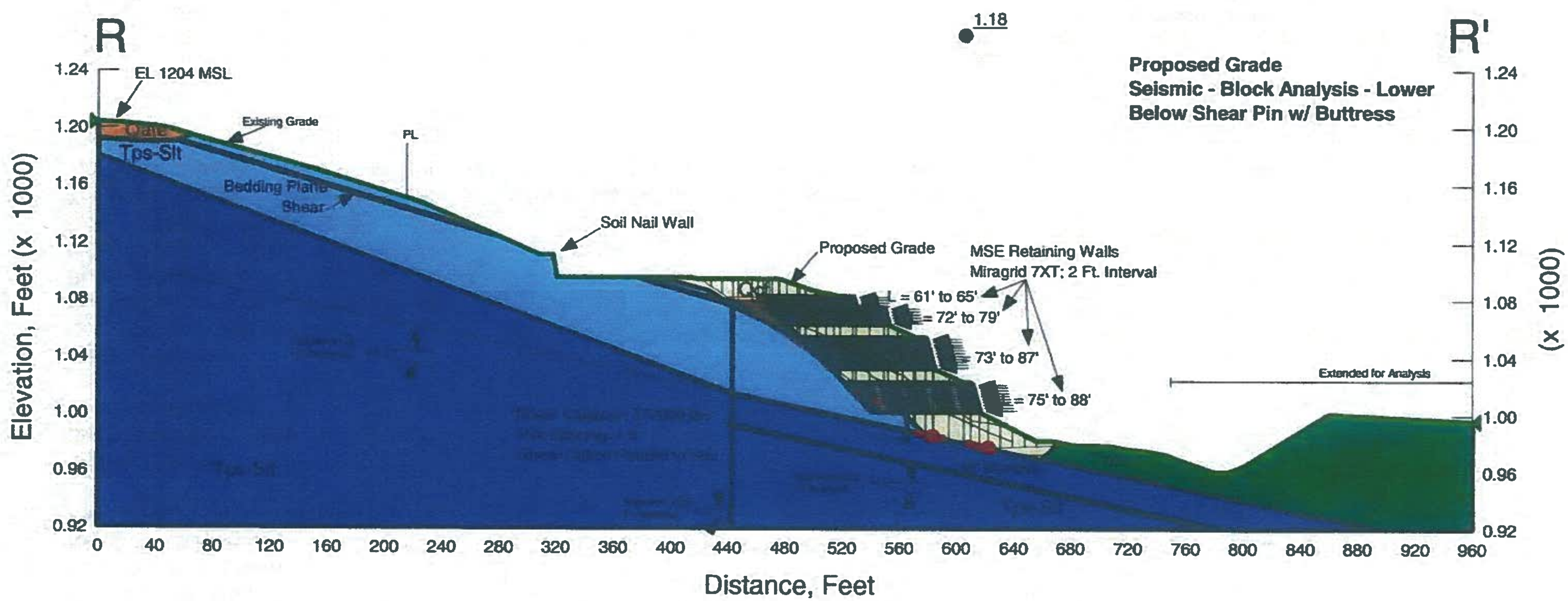


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5bs.gsz
Date: 4/3/2013 Time: 4:15:23 PM

Method: Spencer
Slip Surface Option: Block
Horz.Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

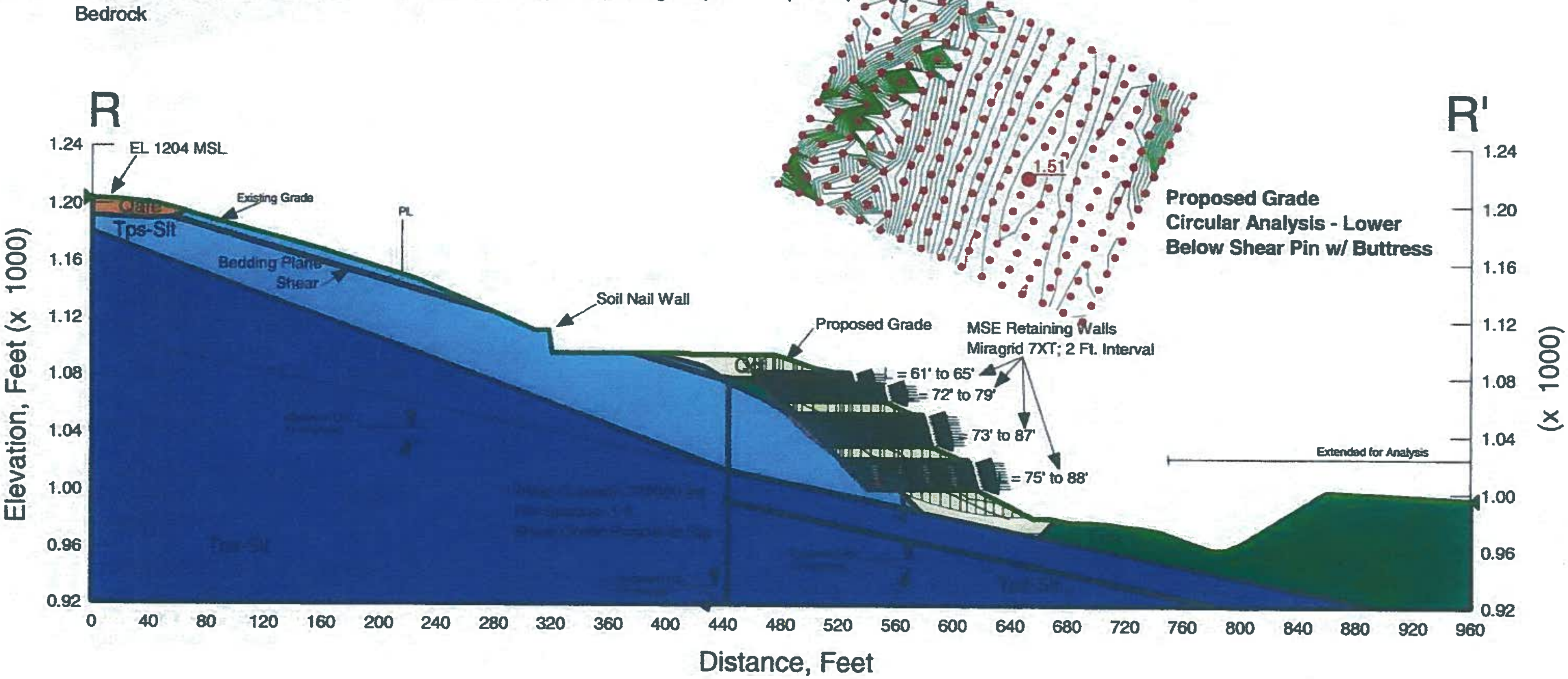


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5c.gsz
Date: 4/3/2013 Time: 4:16:20 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

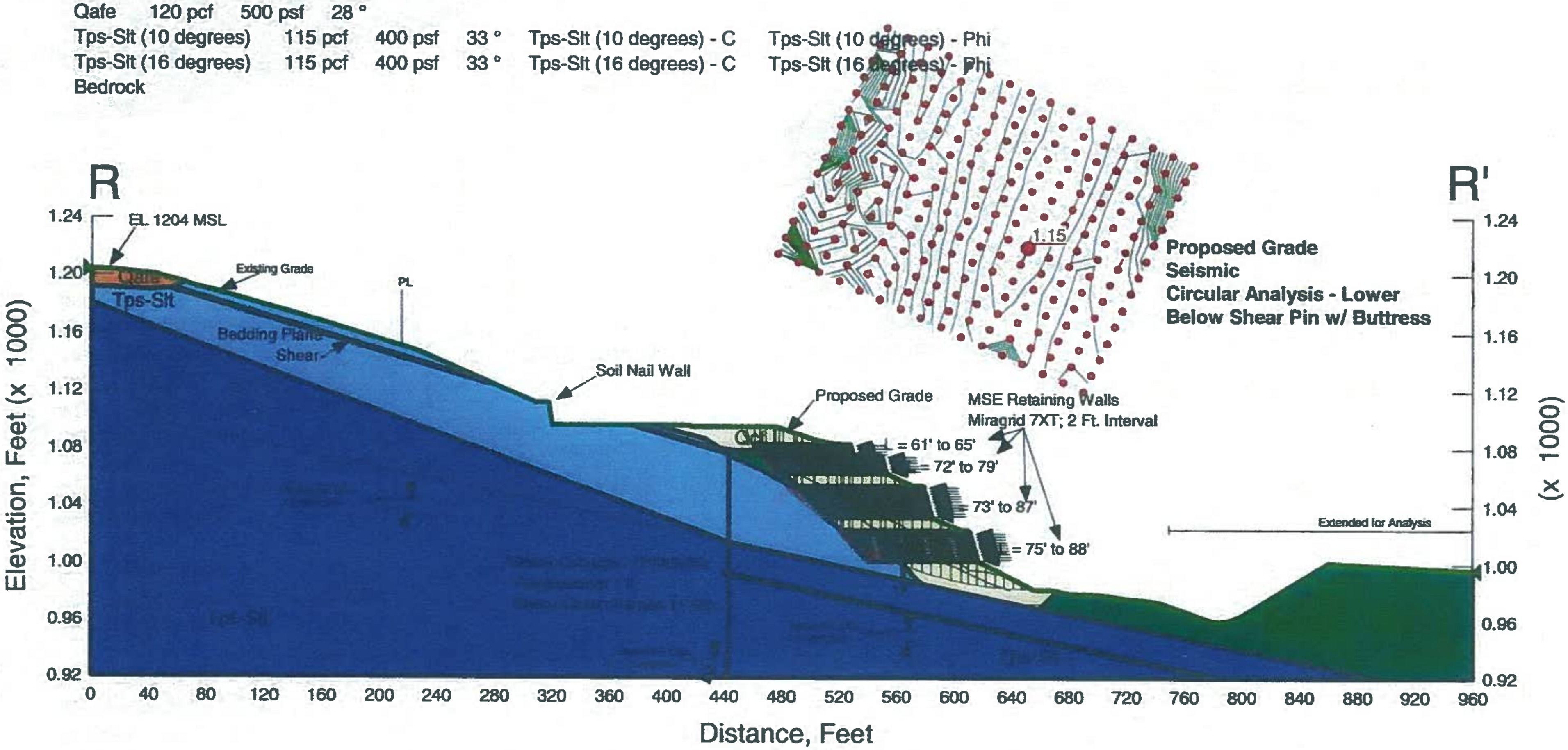


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5cs.gsz
Date: 4/3/2013 Time: 4:17:56 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115,pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

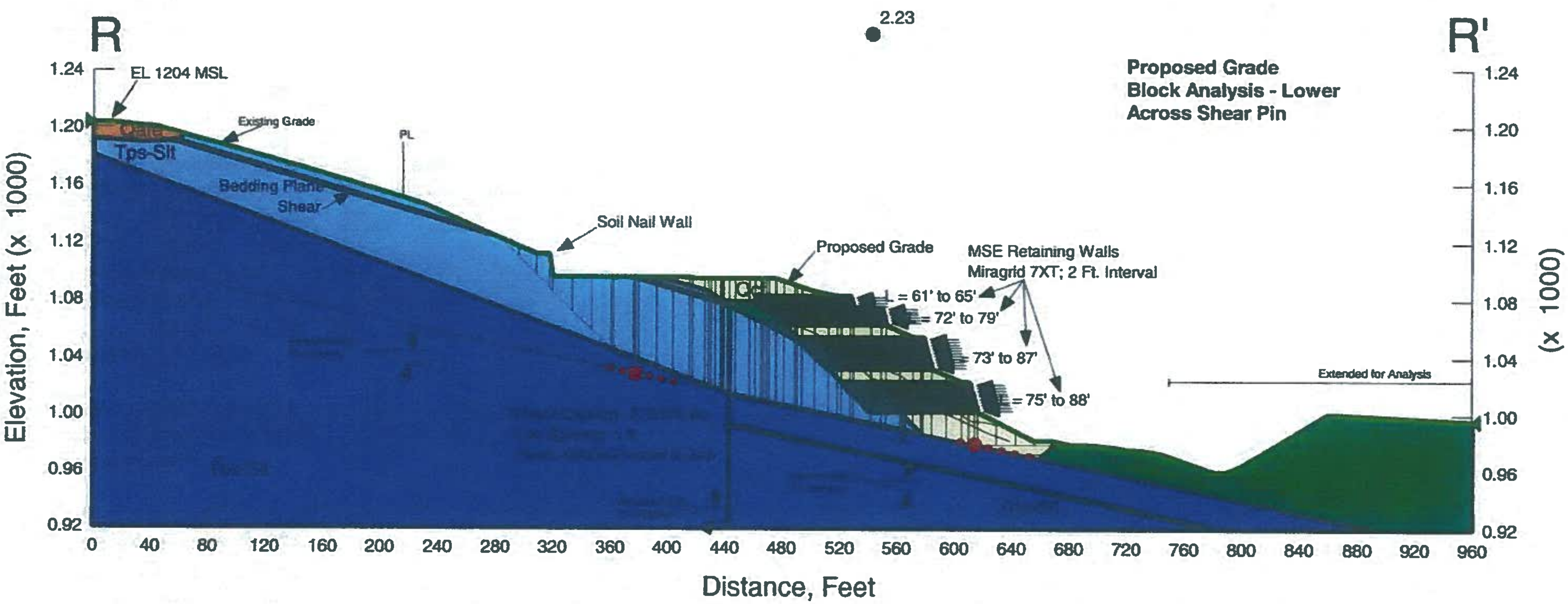


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5g.gsz
Date: 4/3/2013 Time: 3:52:07 PM

Method: Spencer
Slip-Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

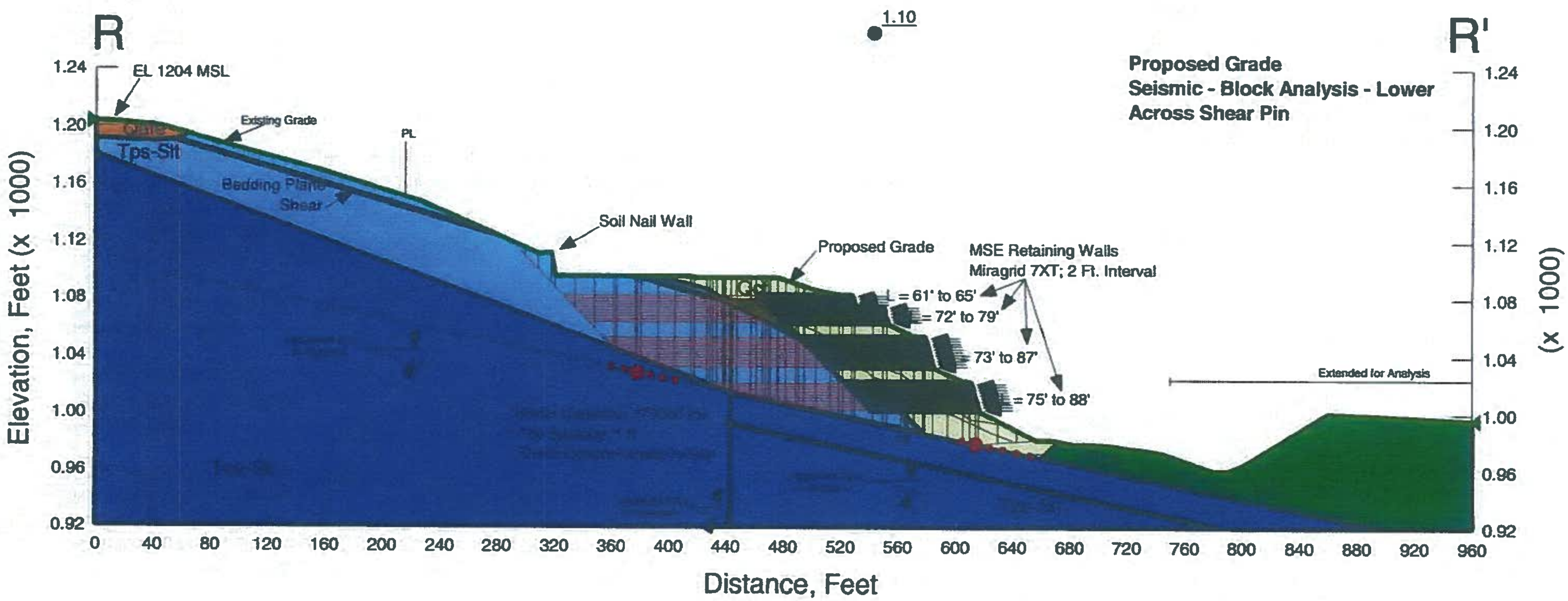


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5gs.gsz
Date: 4/3/2013 Time: 3:48:32 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi
Bedrock					

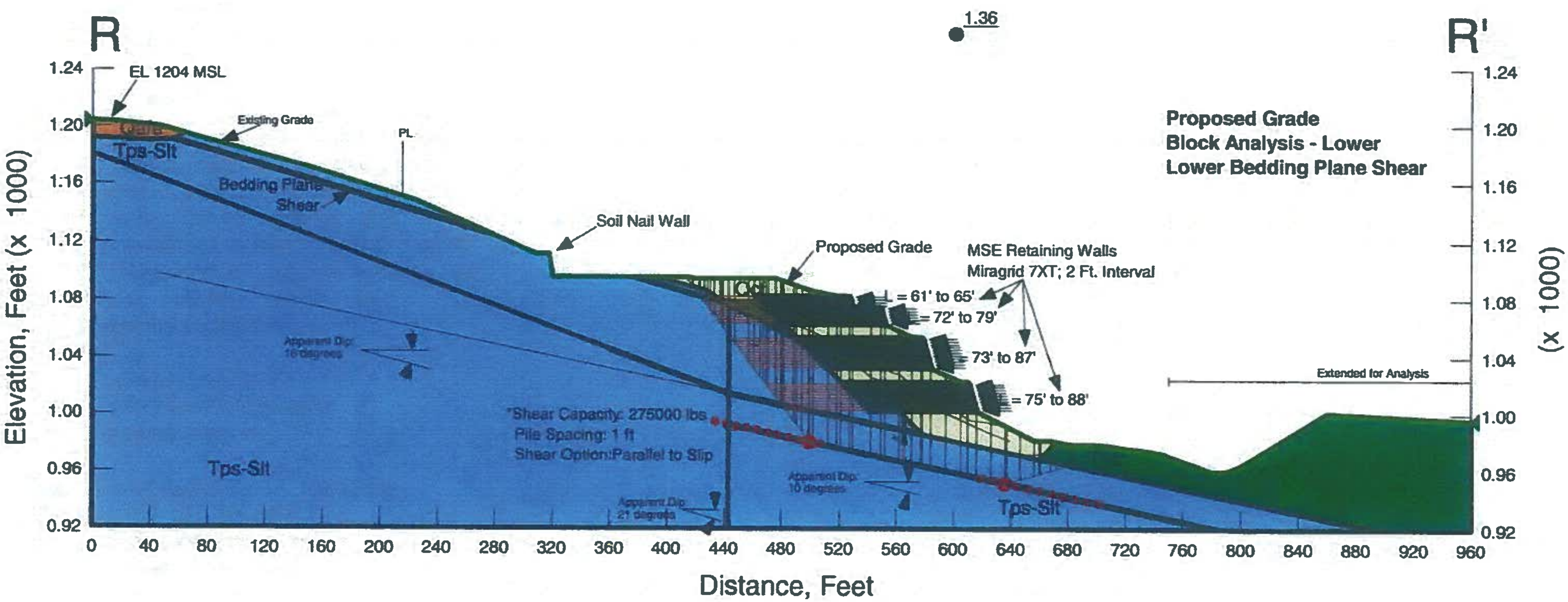


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5e1.gsz
Date: 4/10/2013 Time: 12:29:38 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

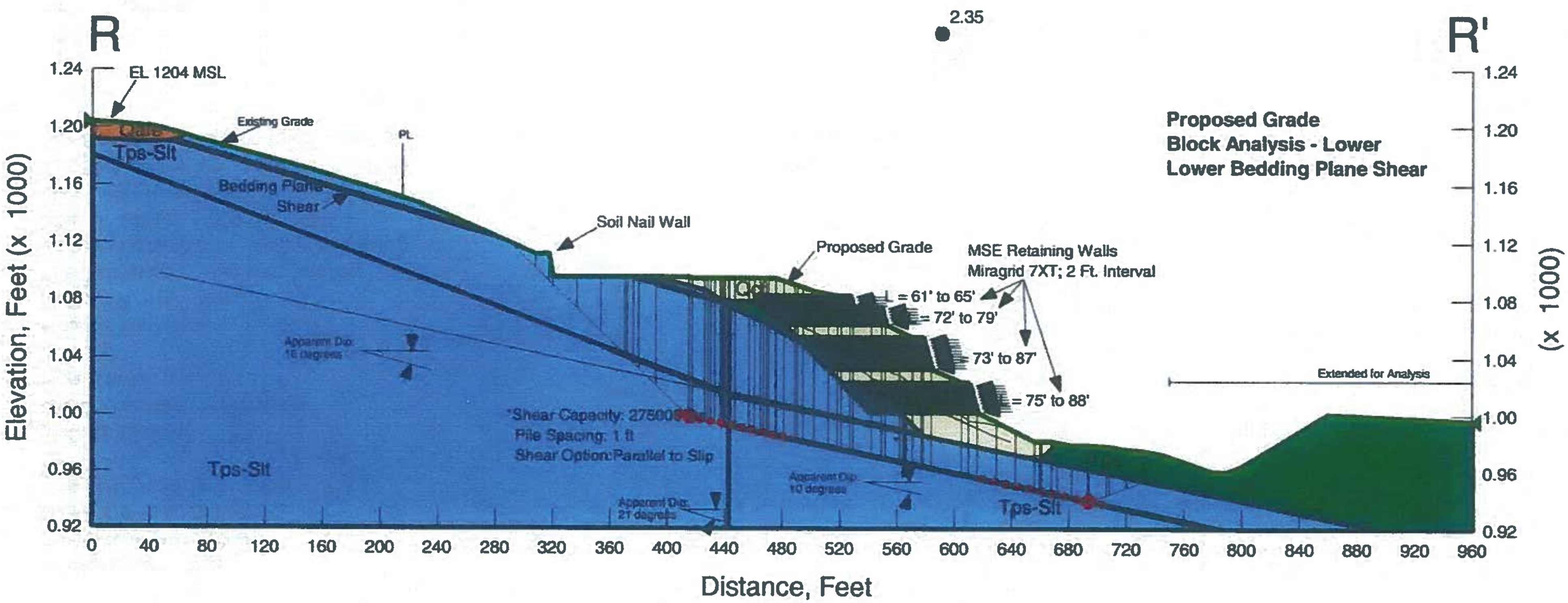


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5e.gsz
Date: 4/3/2013 Time: 4:28:52 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

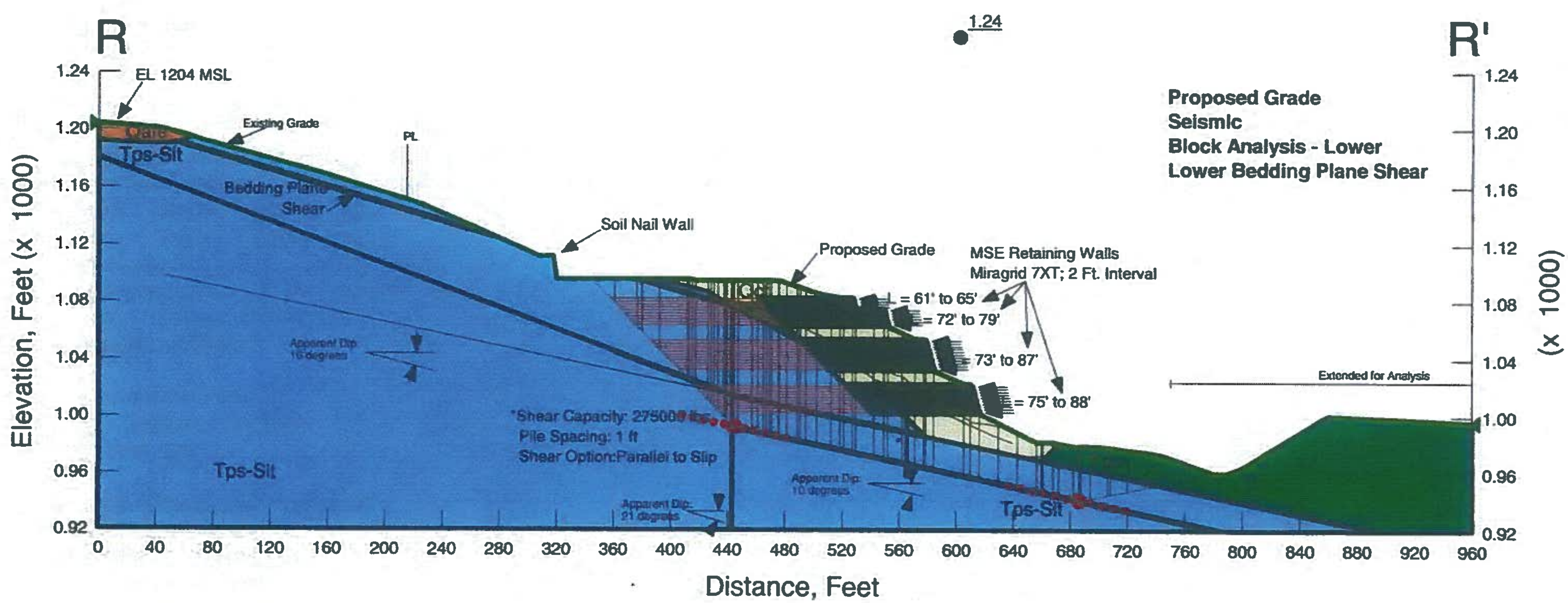


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5es.gsz
Date: 4/3/2013 Time: 4:33:43 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

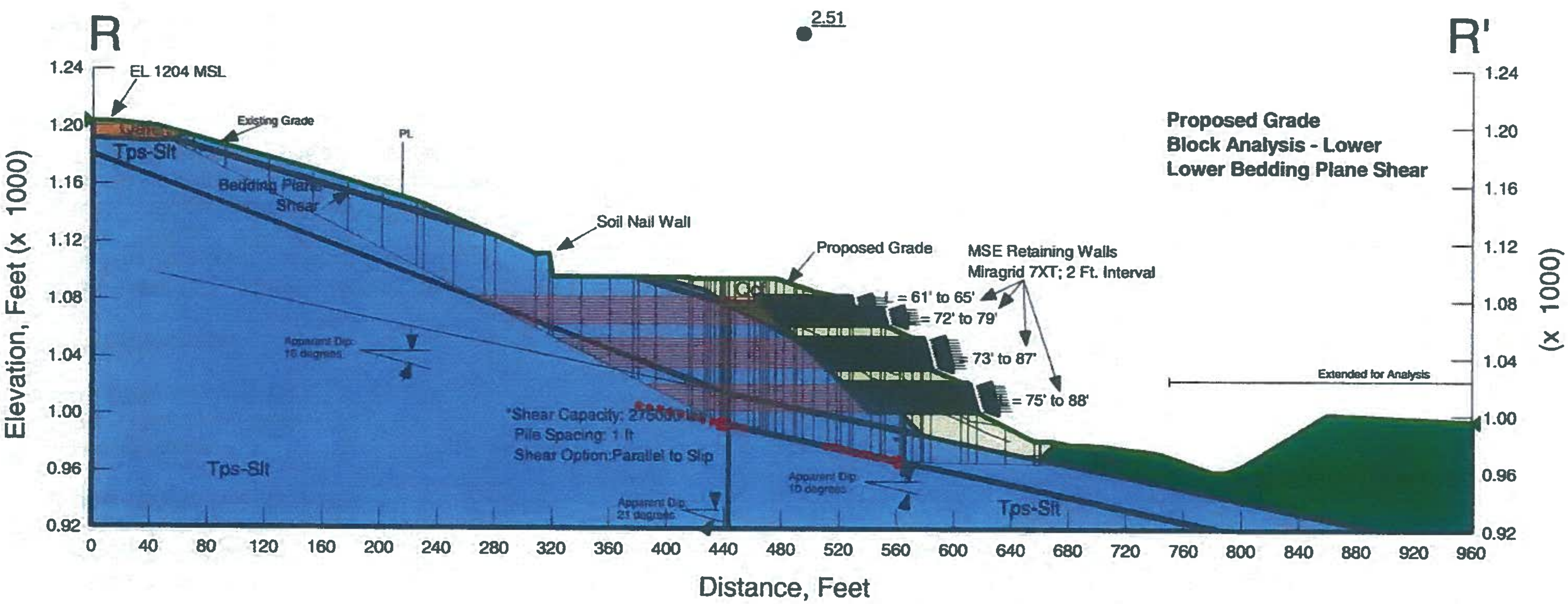


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5h.gsz
Date: 4/3/2013 Time: 4:49:08 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

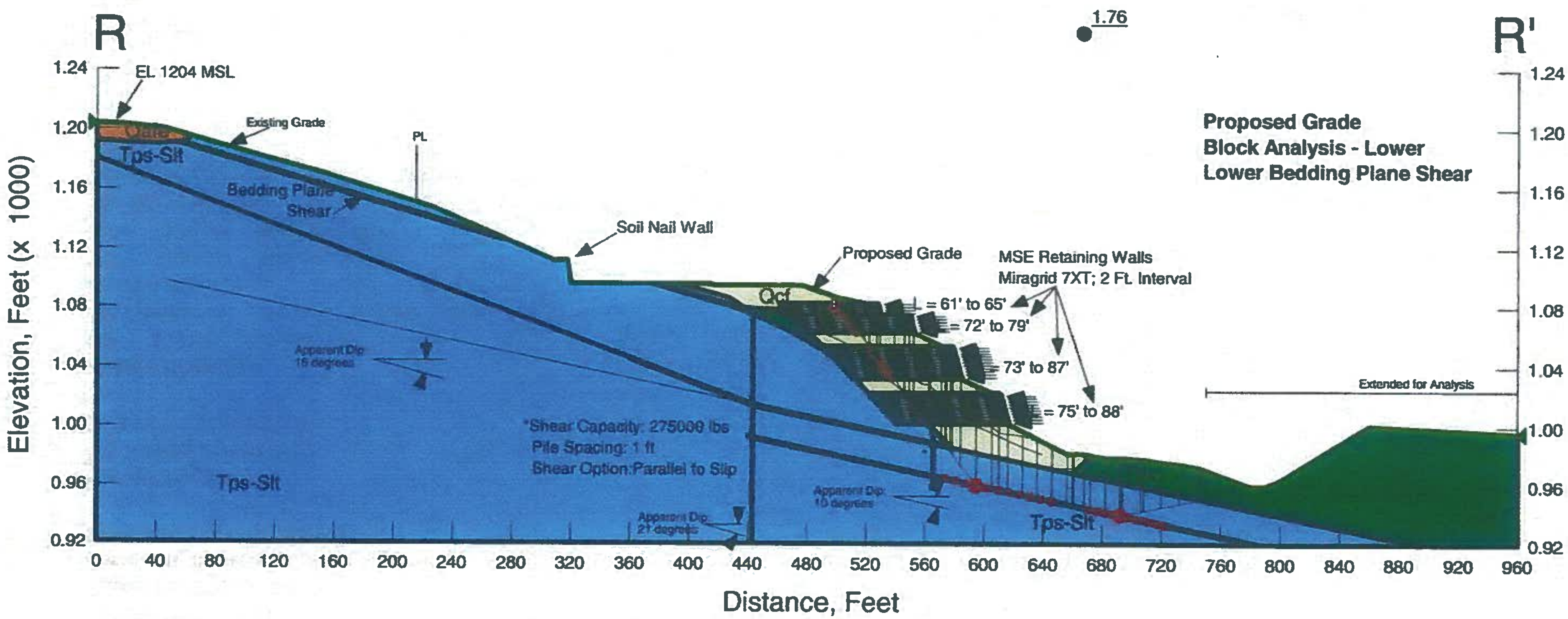


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5i.gsz
Date: 4/3/2013 Time: 4:52:10 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

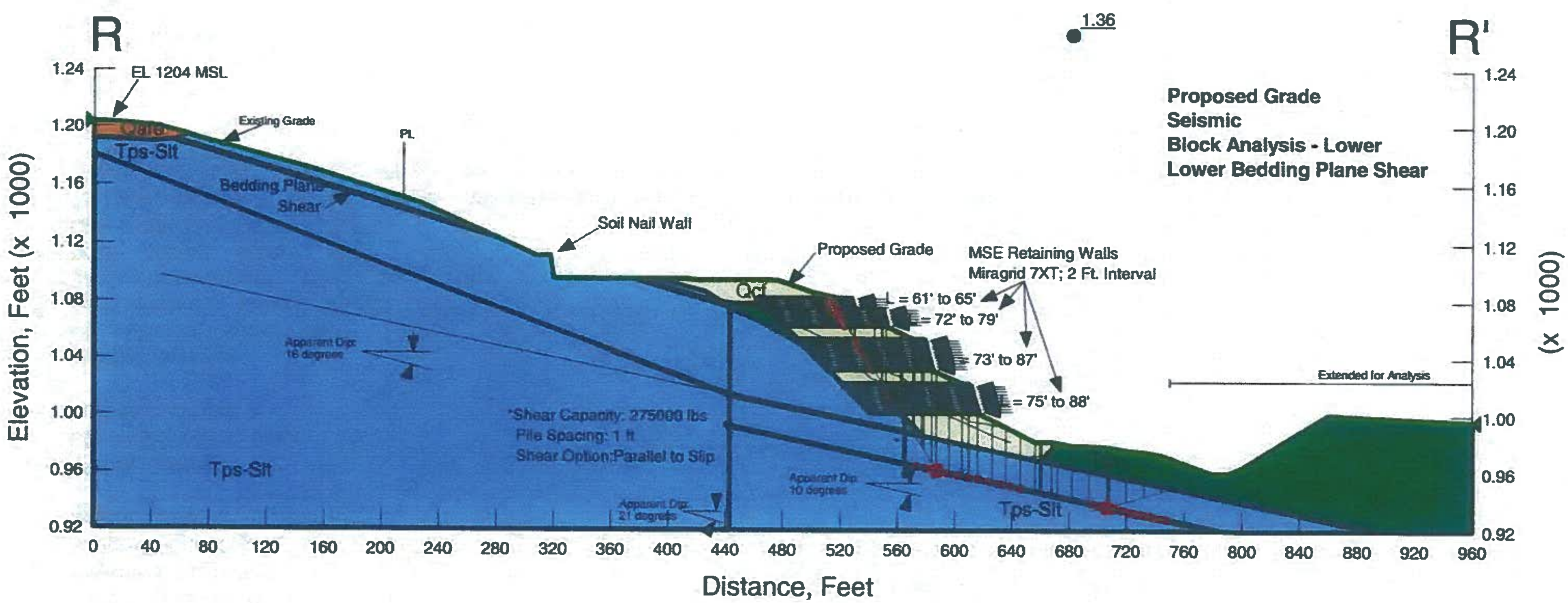


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5is.gsz
Date: 4/3/2013 Time: 4:43:28 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

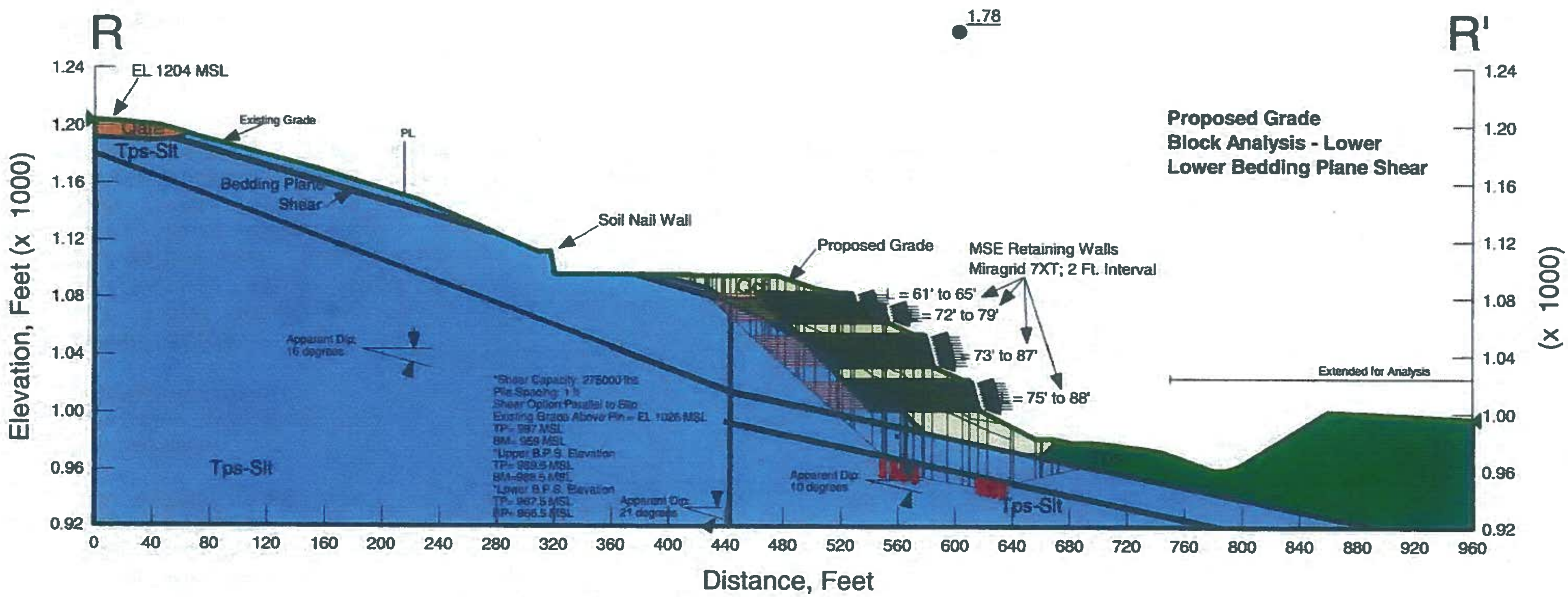


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 5j.gsz
Date: 4/3/2013 Time: 5:10:33 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

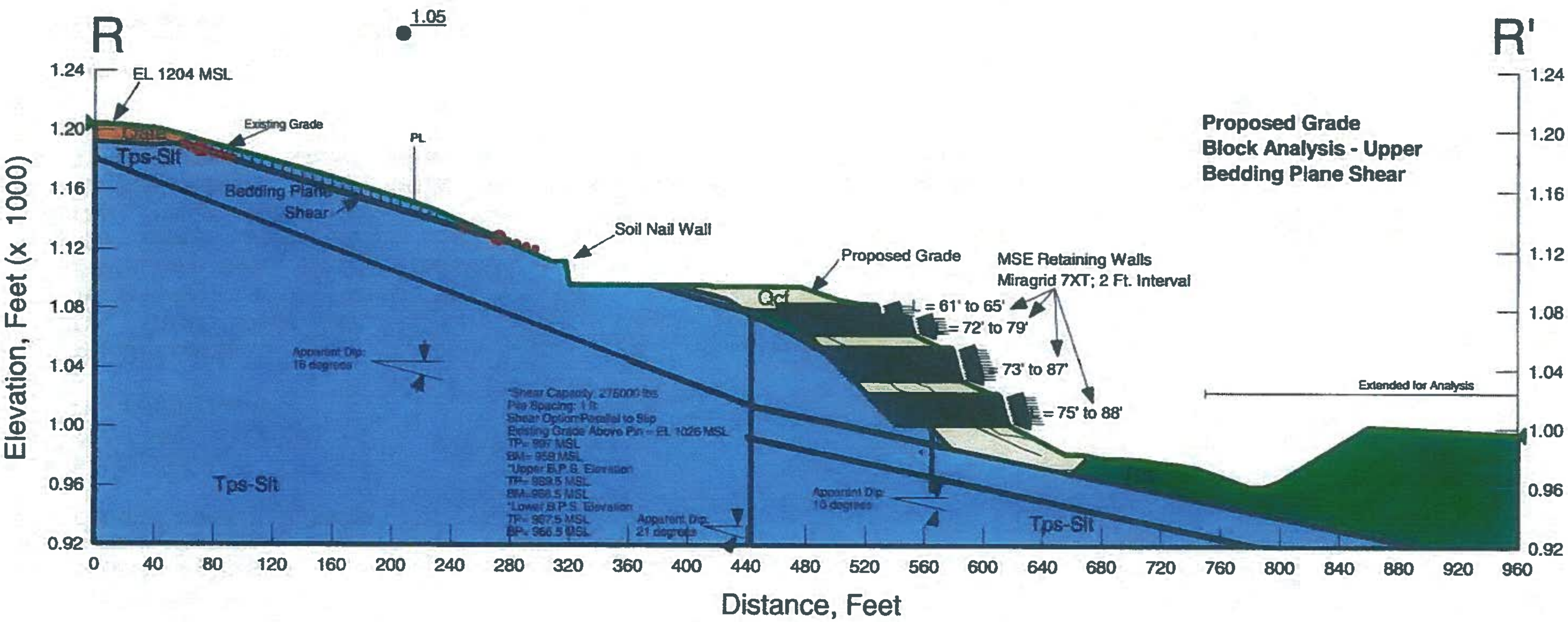


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 6.gsz
Date: 4/4/2013 Time: 8:57:48 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

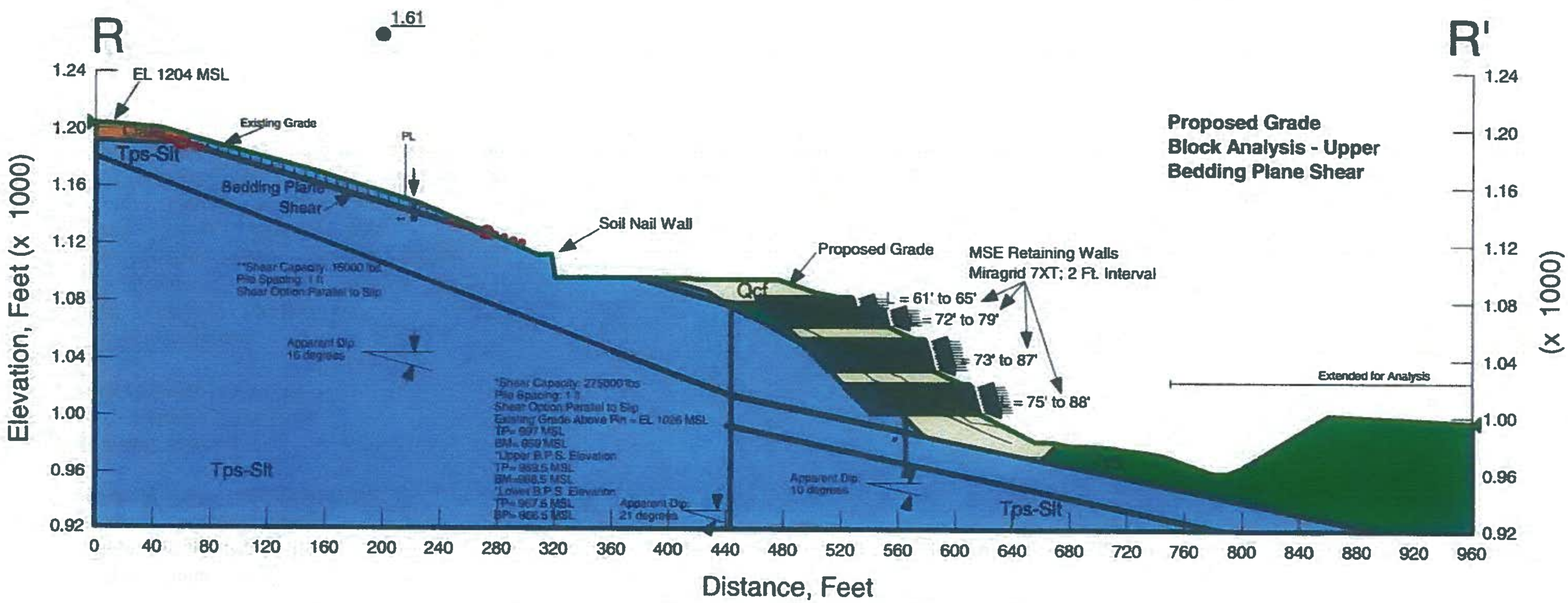


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 7.gsz
Date: 4/4/2013 Time: 9:21:16 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

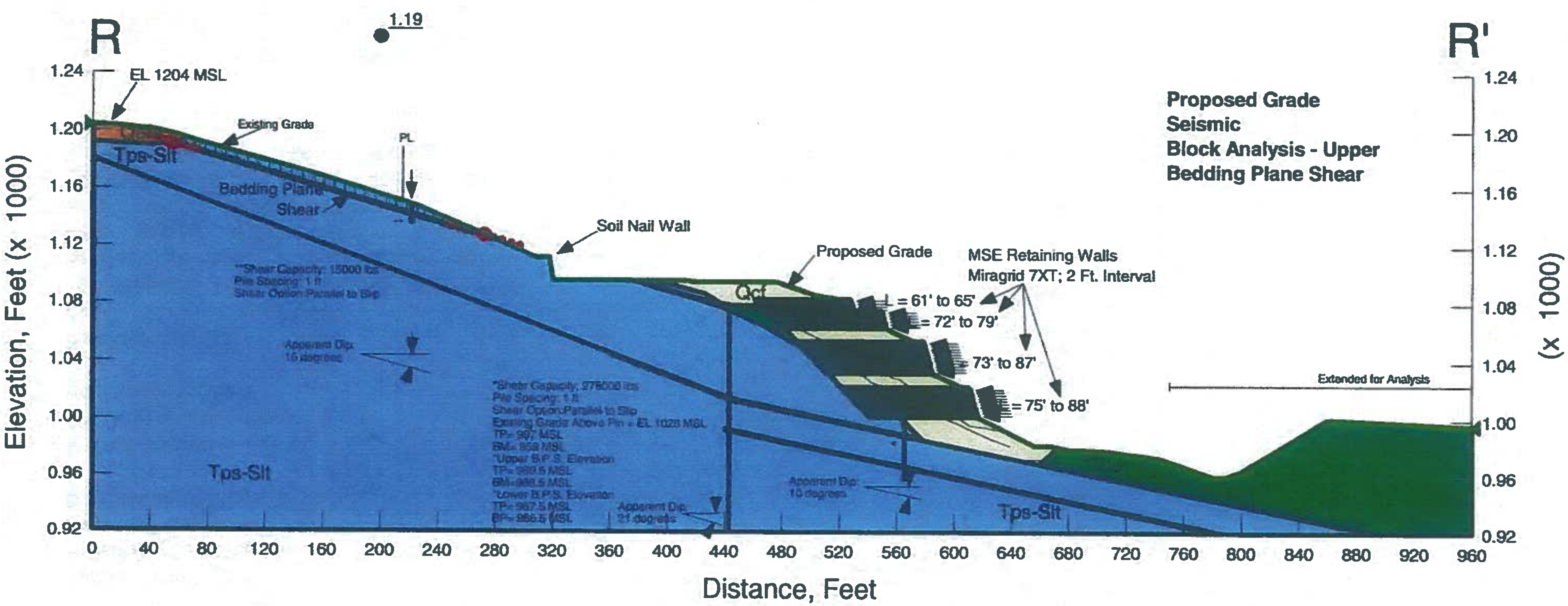


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 7s1.gsz
Date: 4/4/2013 Time: 9:26:45 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

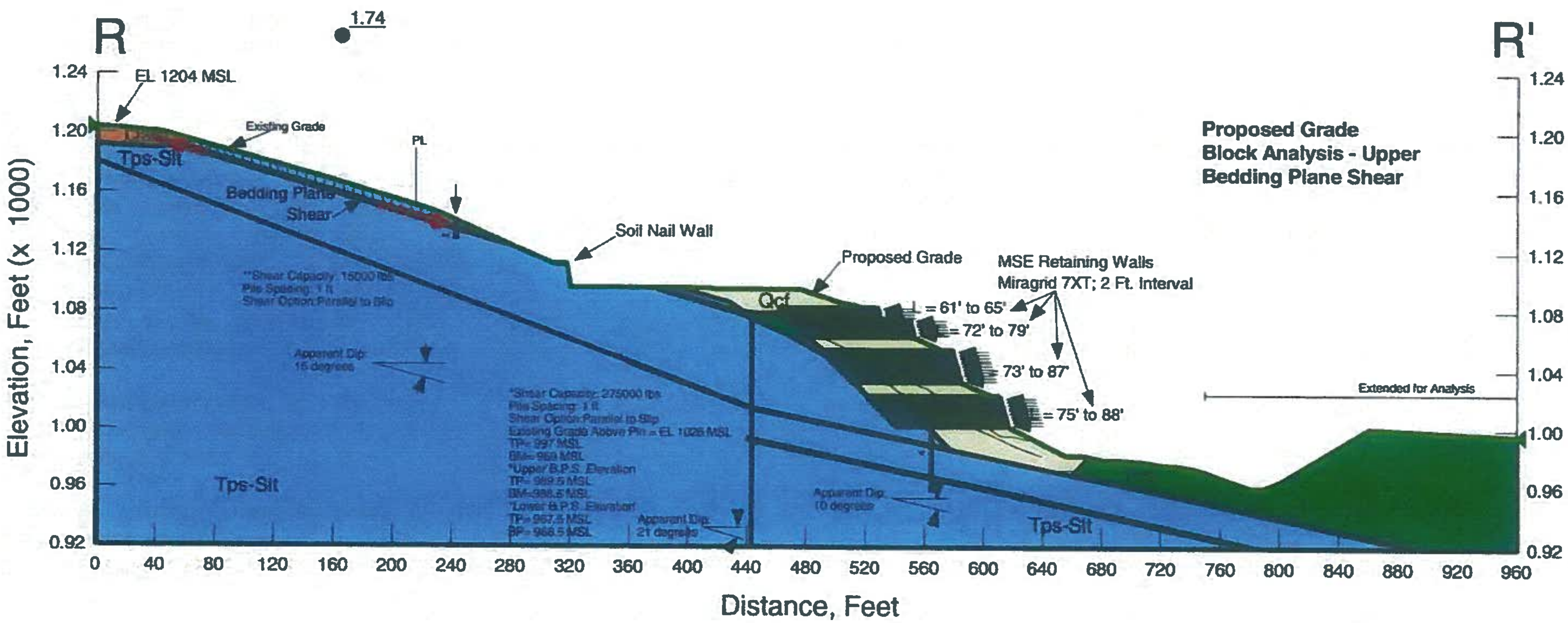


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 8.gsz
Date: 4/4/2013 Time: 9:37:52 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

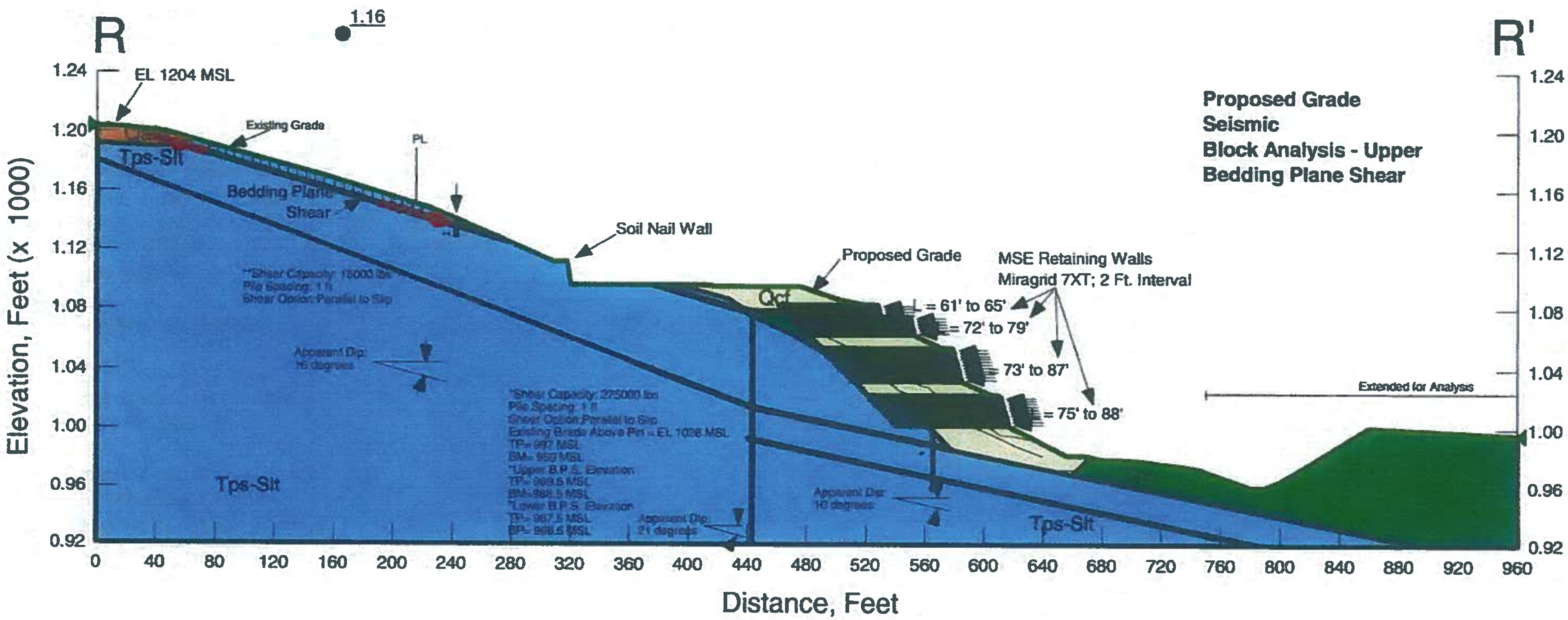


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 8s.gsz
Date: 4/4/2013 Time: 9:40:11 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	900 psf	30 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	900 psf	30 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

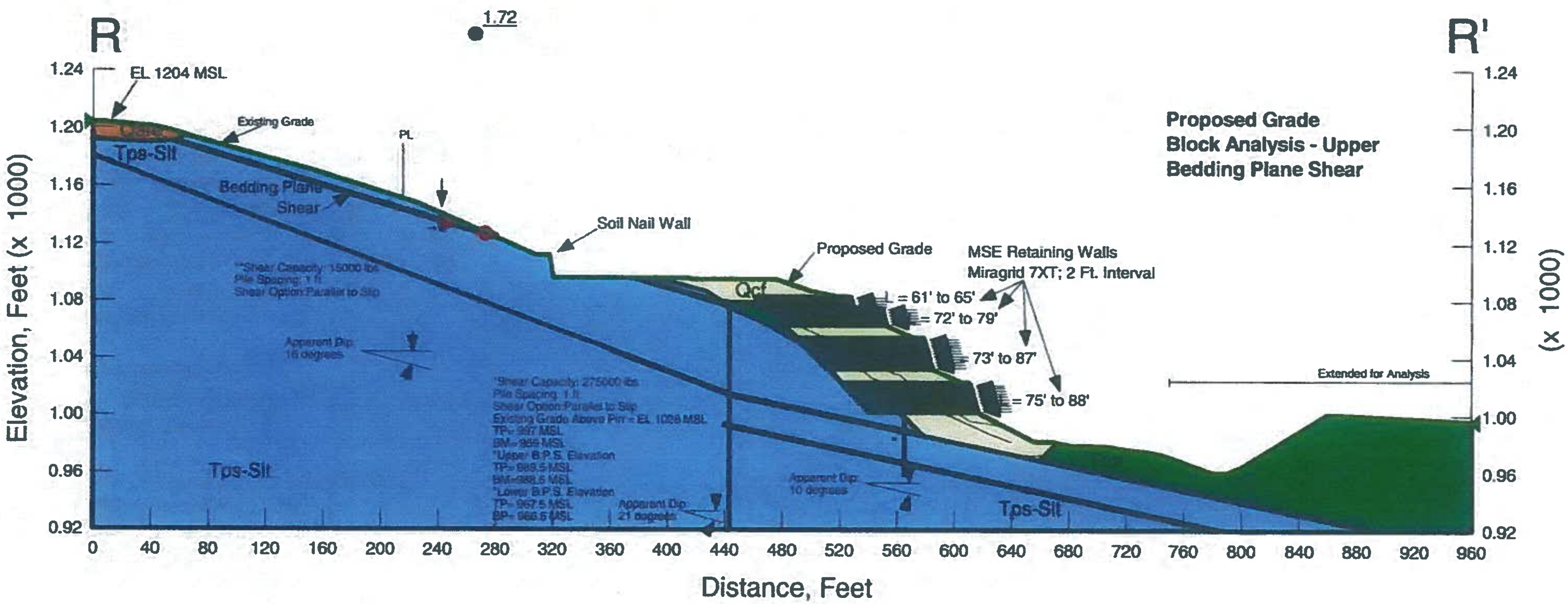


Portola Center - North
Project No. G1218-52-01
Name: RR-Case 9.gsz
Date: 4/4/2013 Time: 9:51:44 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi

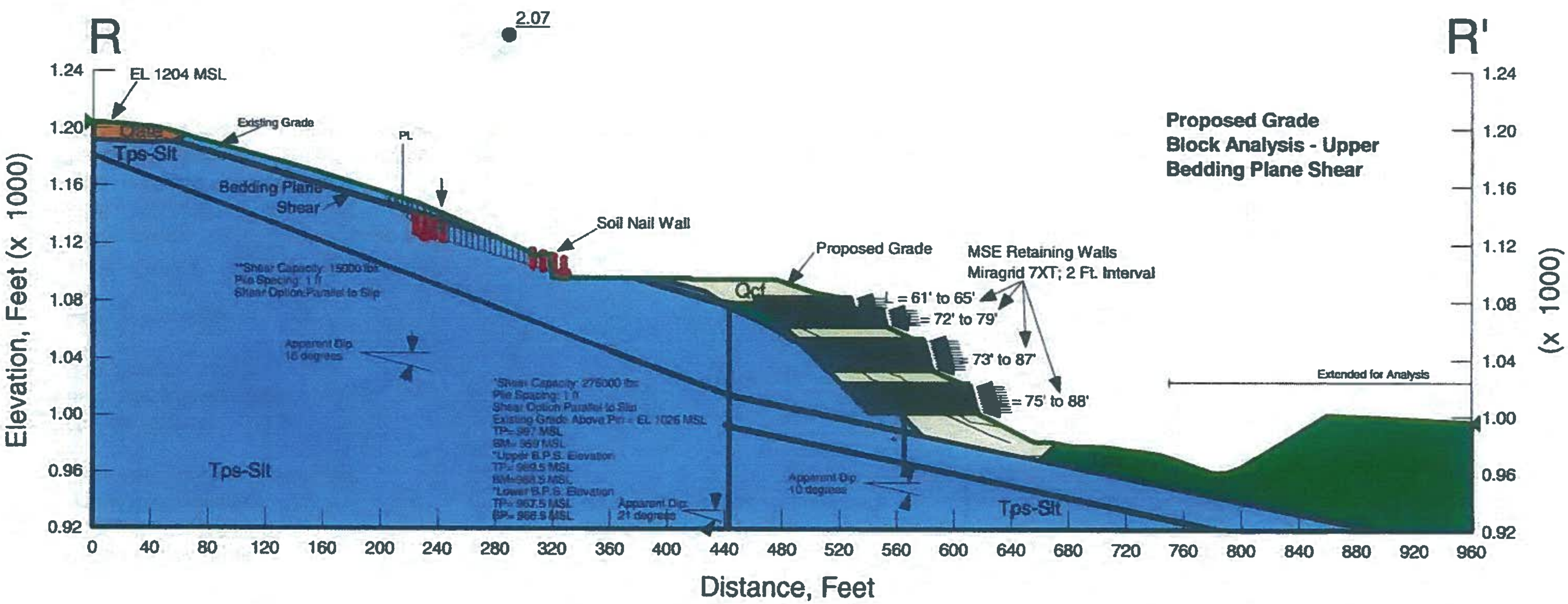


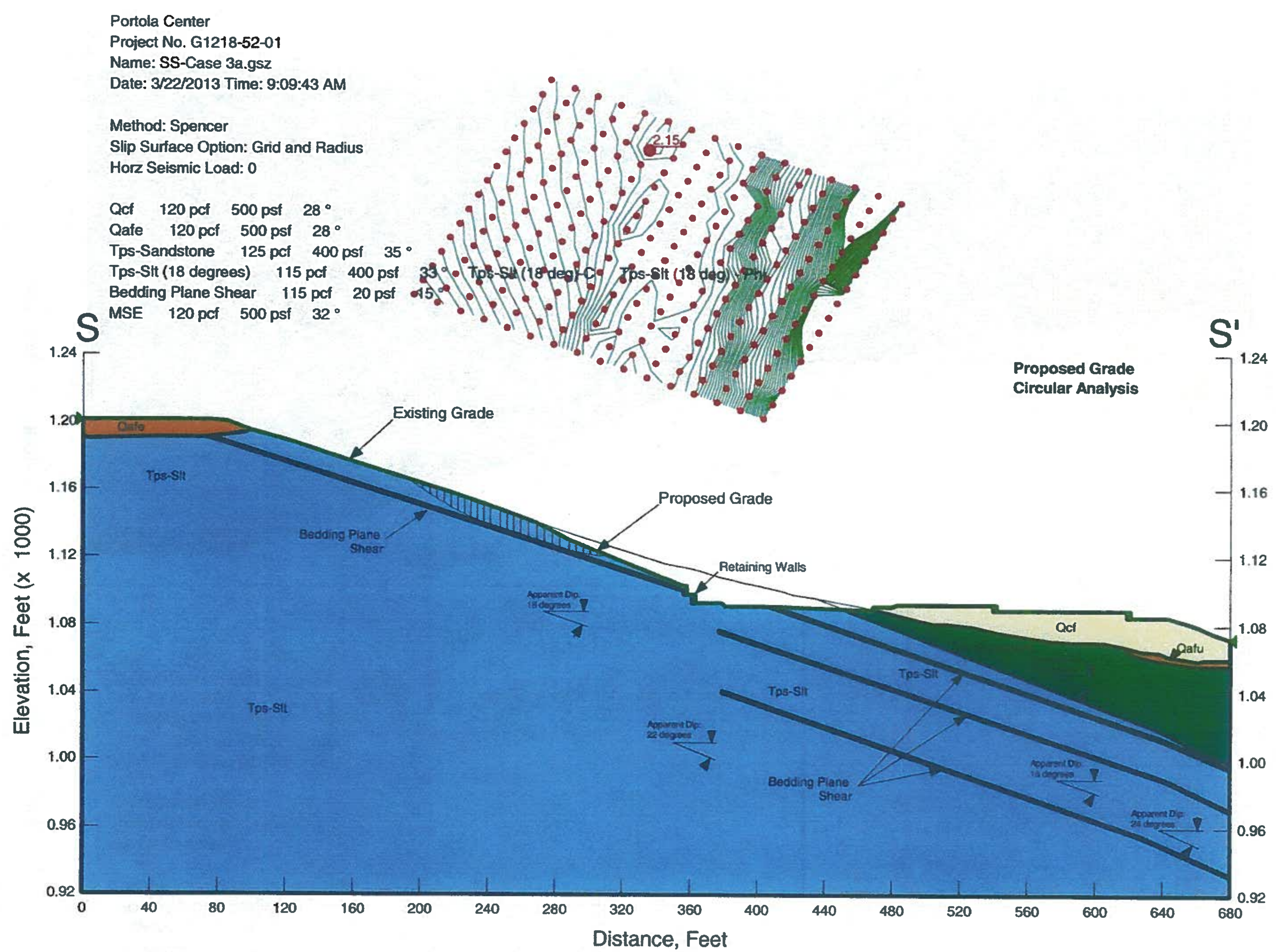
Portola Center - North
Project No. G1218-52-01
Name: RR-Case 10.gsz
Date: 4/4/2013 Time: 10:21:36 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (10 degrees)	115 pcf	400 psf	33 °	Tps-Slt (10 degrees) - C	Tps-Slt (10 degrees) - Phi
Tps-Slt (16 degrees)	115 pcf	400 psf	33 °	Tps-Slt (16 degrees) - C	Tps-Slt (16 degrees) - Phi





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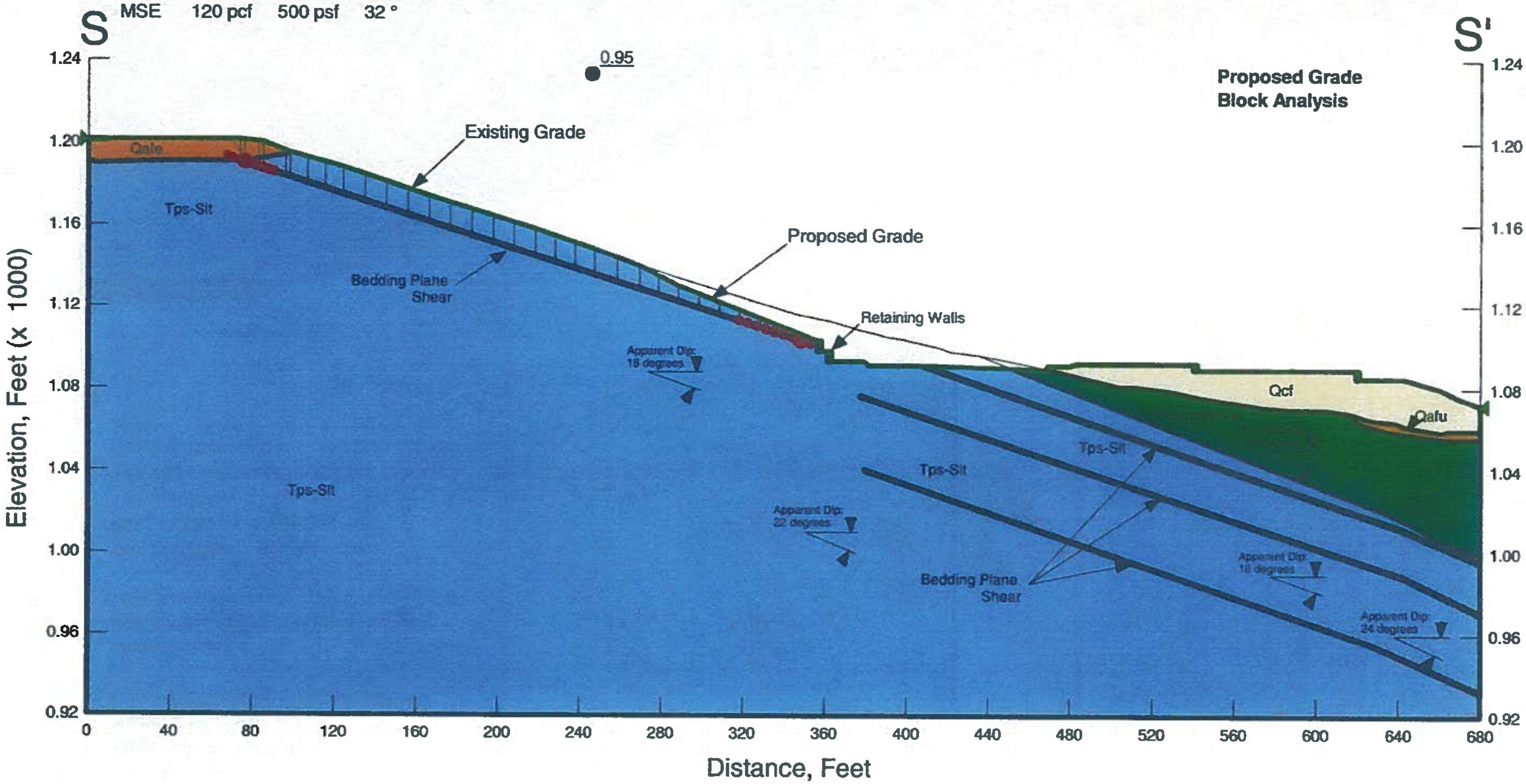
Portola Center
Project No. G1218-52-01
Name: SS-Case 3.gsz
Date: 3/12/2013 Time: 4:58:31 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	23 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Tps-Slt (18 degrees)	115 pcf	400 psf	33 °	Tps-Slt (18 deg)-C	Tps-Slt (18 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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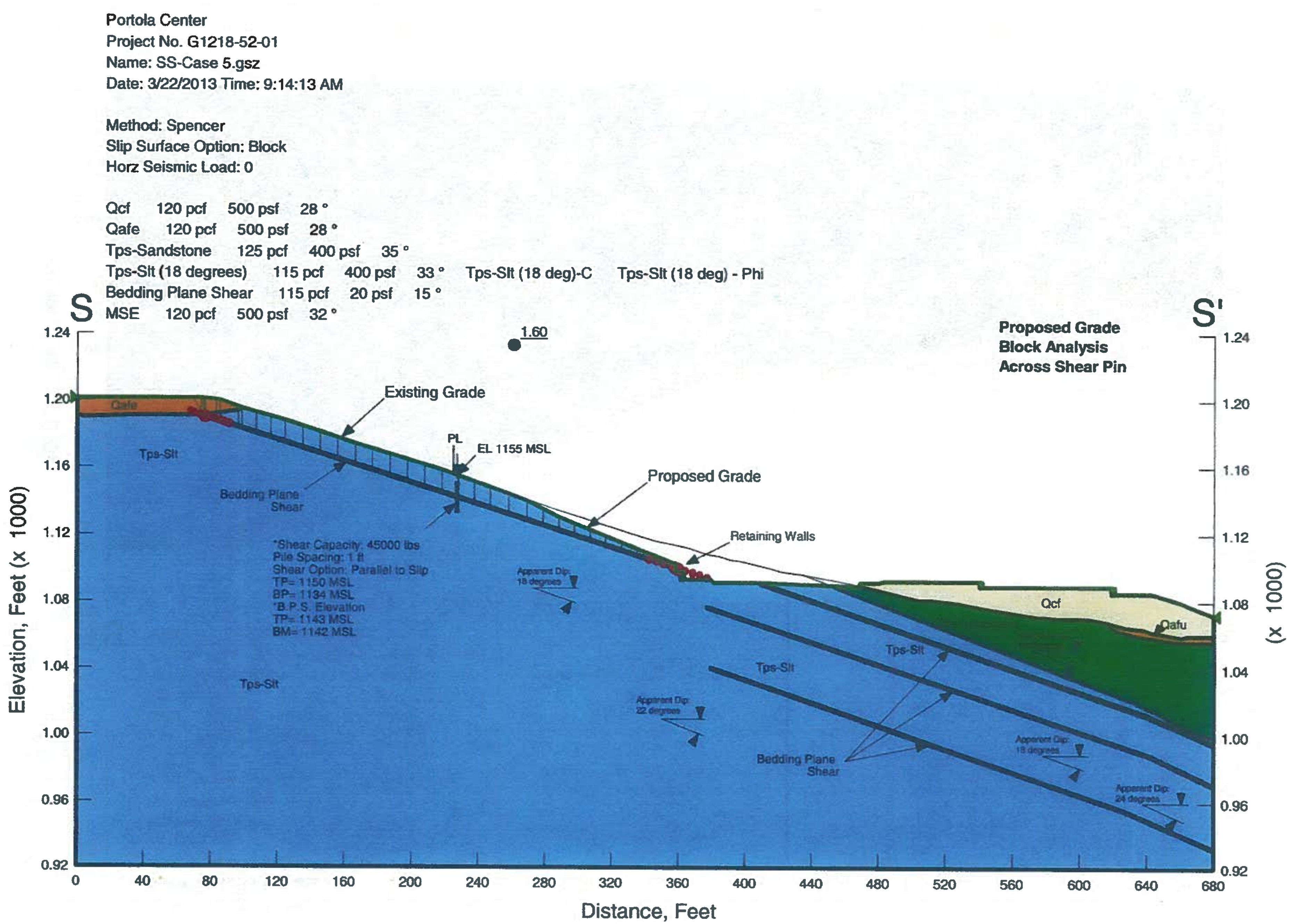

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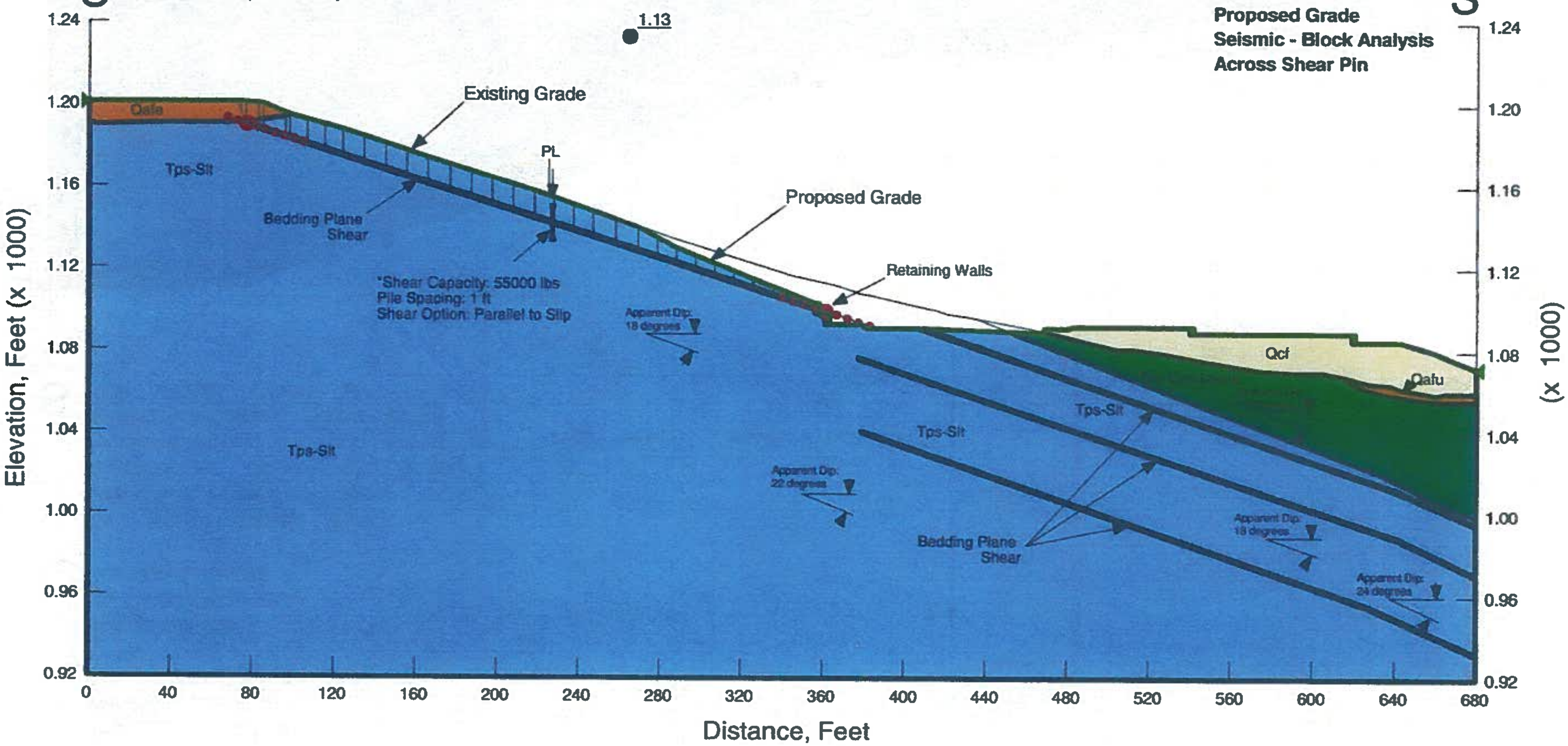
Portola Center
Project No. G1218-52-01
Name: SS-Case 5-s2.gsz
Date: 4/4/2013 Time: 10:55:21 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (18 degrees)	115 pcf	900 psf	30 °	Tps-Slt (18 deg)-C	Tps-Slt (18 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		



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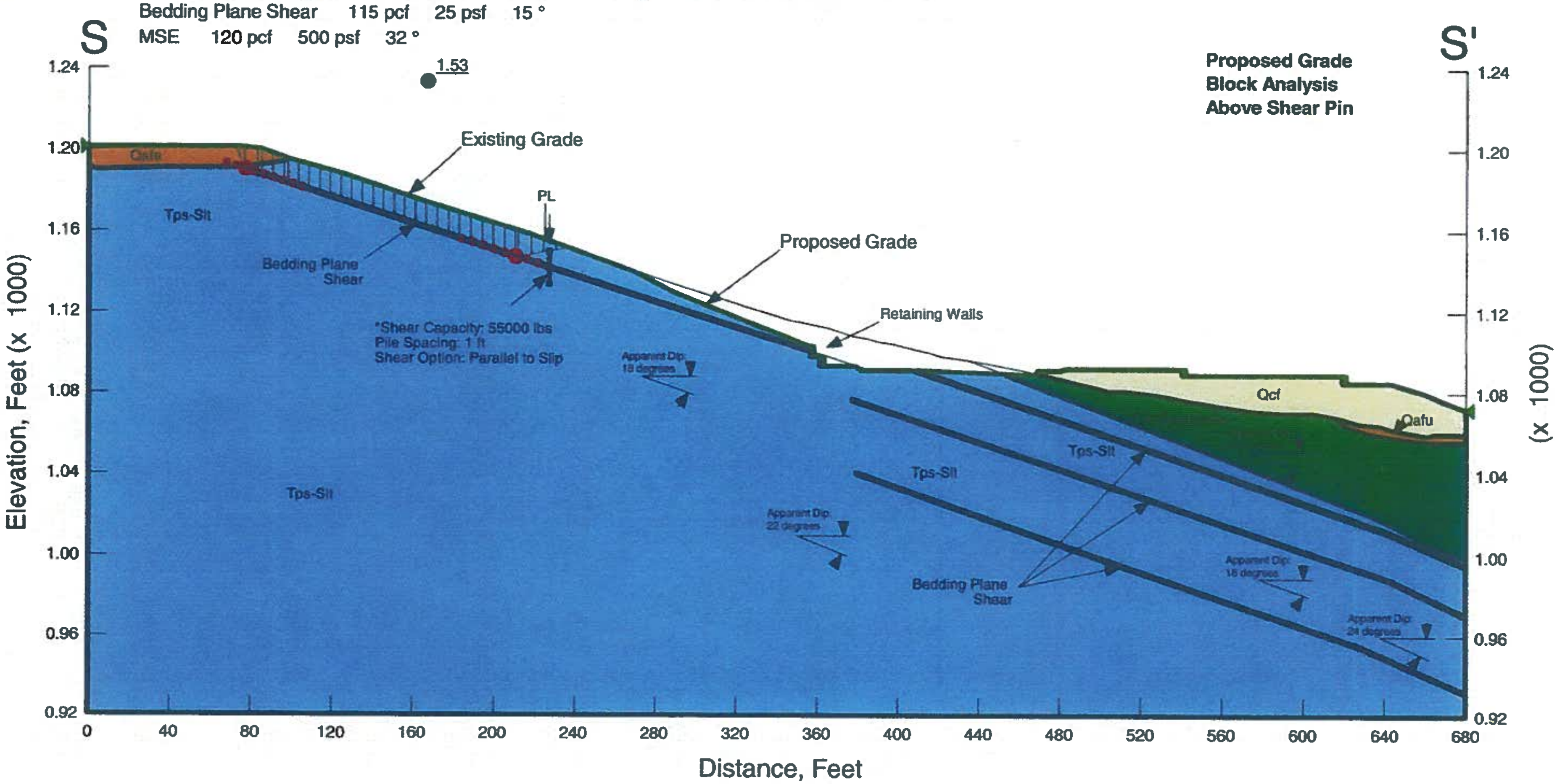
Portola Center
Project No. G1218-52-01
Name: SS-Case 6.gsz
Date: 4/4/2013 Time: 11:00:14 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (18 degrees)	115 pcf	400 psf	33 °	Tps-Slt (18 deg)-C	Tps-Slt (18 deg) - Phi
Bedding Plane Shear	115 pcf	25 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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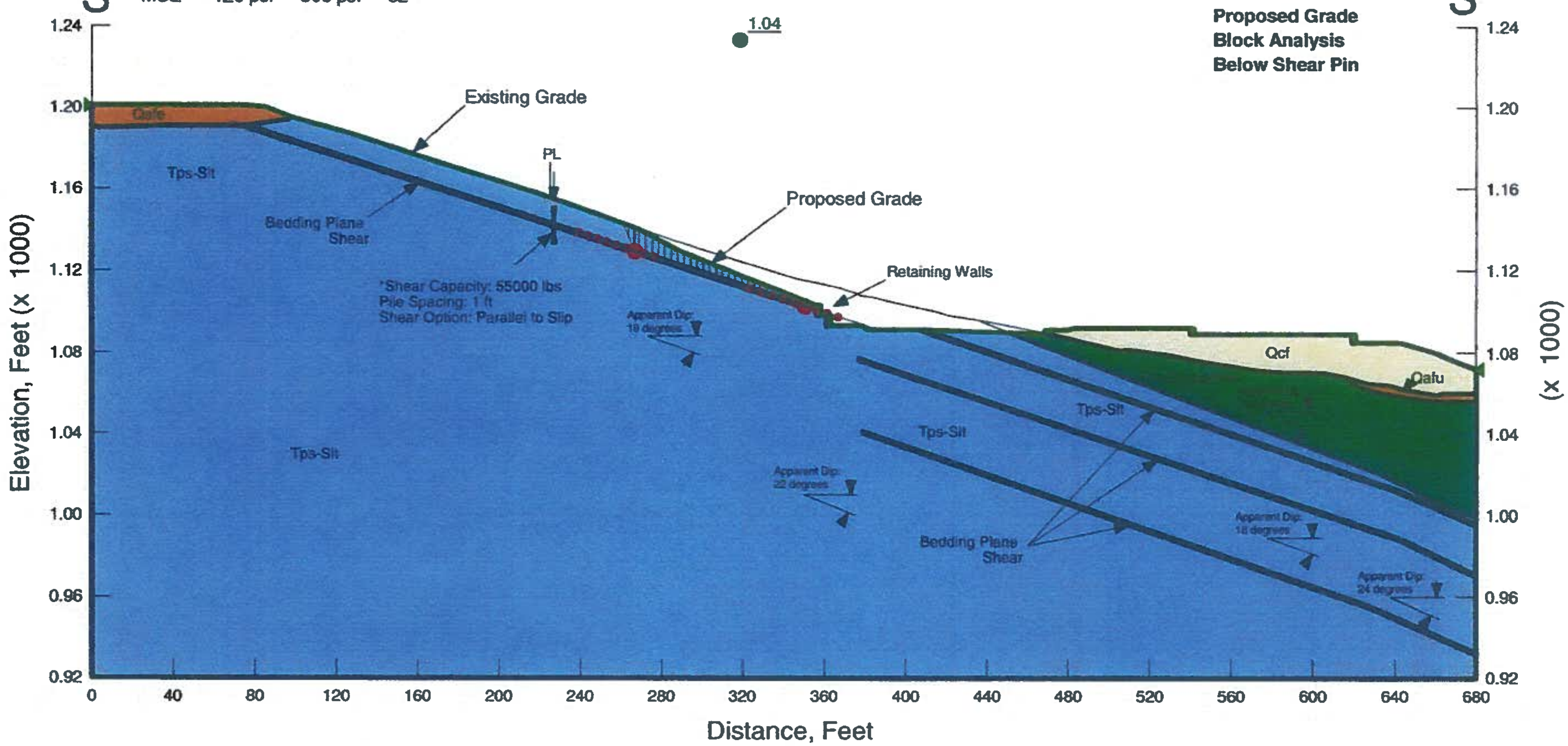
Portola Center
Project No. G1218-52-01
Name: SS-Case 7.gsz
Date: 4/4/2013 Time: 11:05:00 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (18 degrees)	115 pcf	400 psf	33 °	Tps-Slt (18 deg)-C	Tps-Slt (18 deg) - Phi
Bedding Plane Shear	115 pcf	25 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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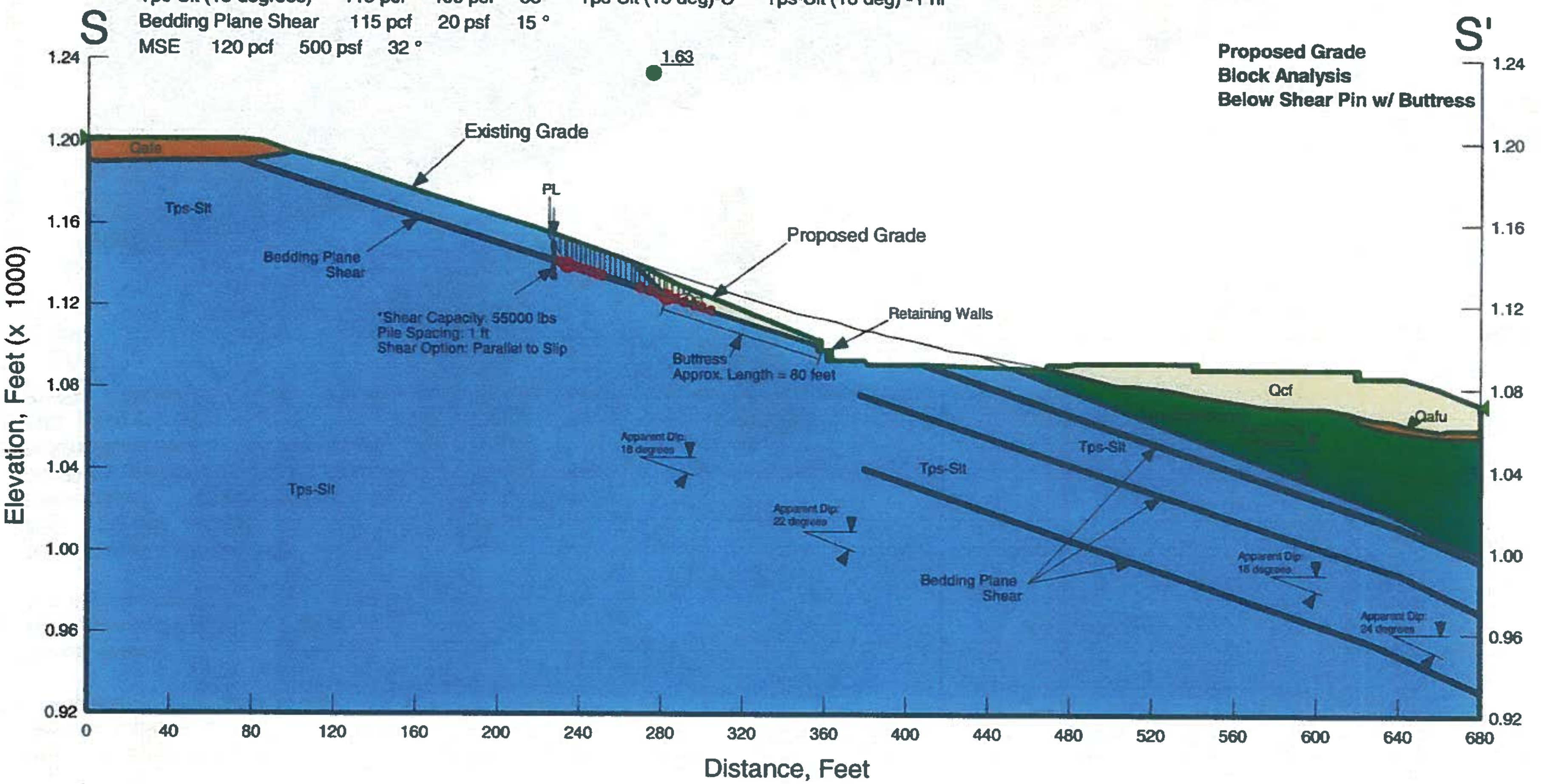
Portola Center
Project No. G1218-52-01
Name: SS-Case 8.gsz
Date: 4/4/2013 Time: 11:07:31 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Tps-Slt (18 degrees)	115 pcf	400 psf	33 °	Tps-Slt (18 deg)-C	Tps-Slt (18 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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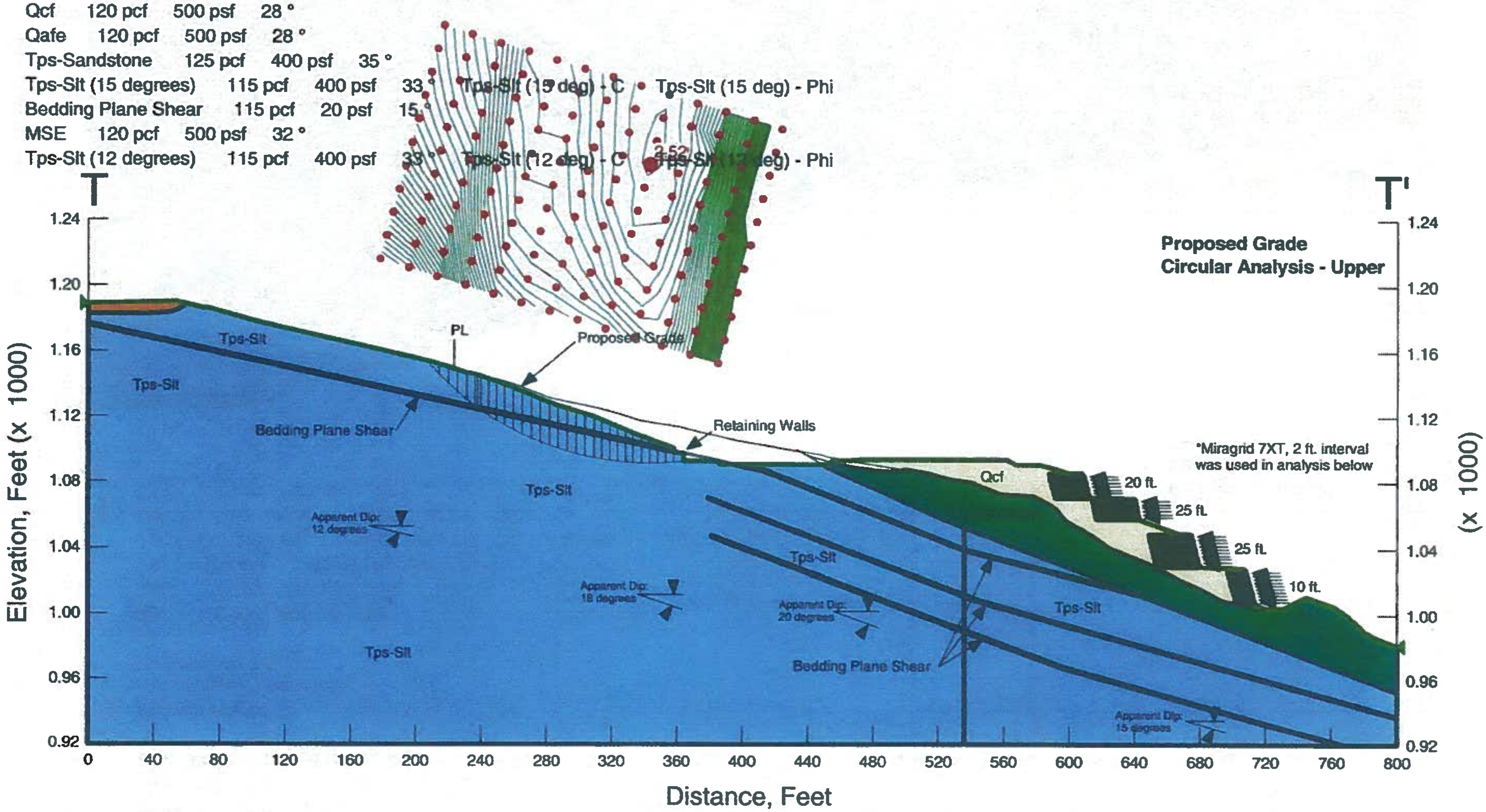
Portola Center
Project No. G1218-52-01
Name: TT-Case 2-a.gsz
Date: 3/25/2013 Time: 10:14:11 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °
Qafe	120 pcf	500 psf	28 °
Tps-Sandstone	125 pcf	400 psf	35 °
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °
Bedding Plane Shear	115 pcf	20 psf	15 °
MSE	120 pcf	500 psf	32 °
Tps-Slt (12 degrees)	115 pcf	400 psf	33 °



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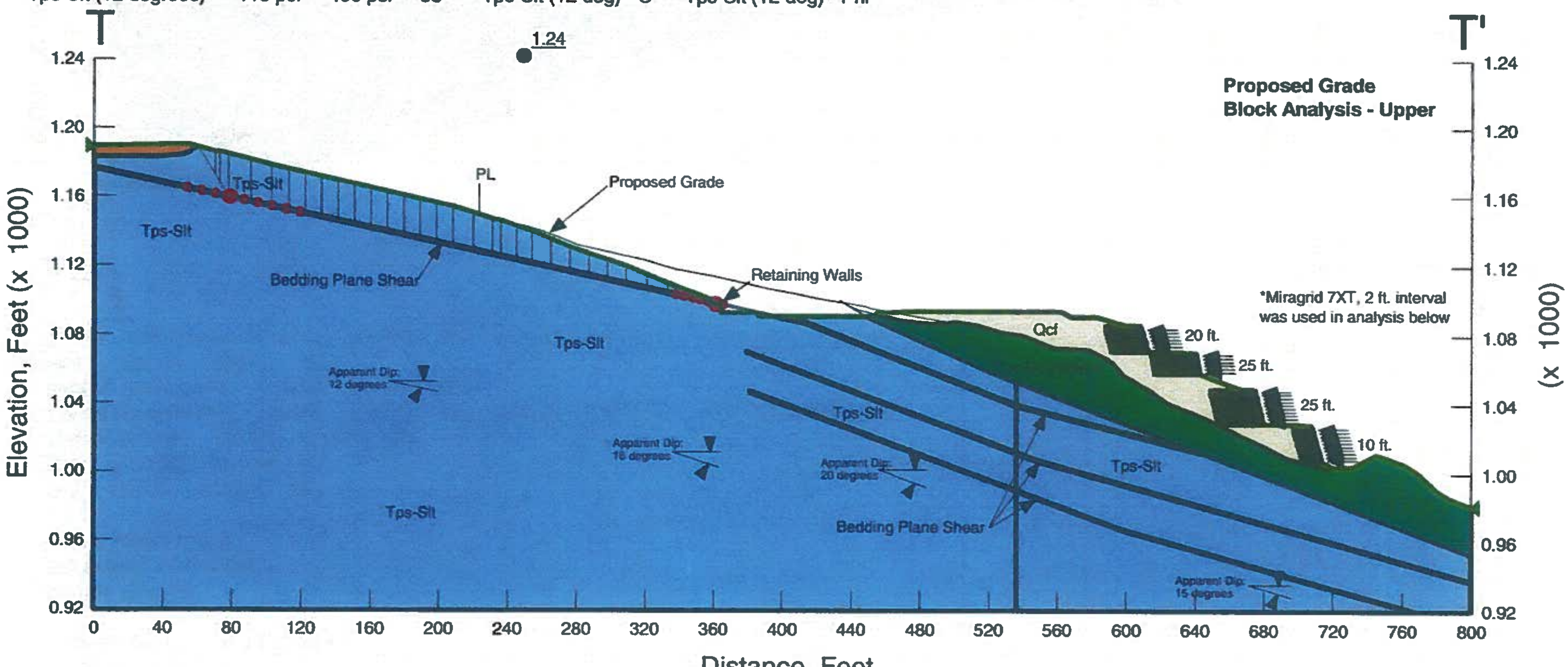
Portola Center
Project No. G1218-52-01
Name: TT-Case 2.gsz
Date: 3/25/2013 Time: 10:23:46 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	400 psf	33 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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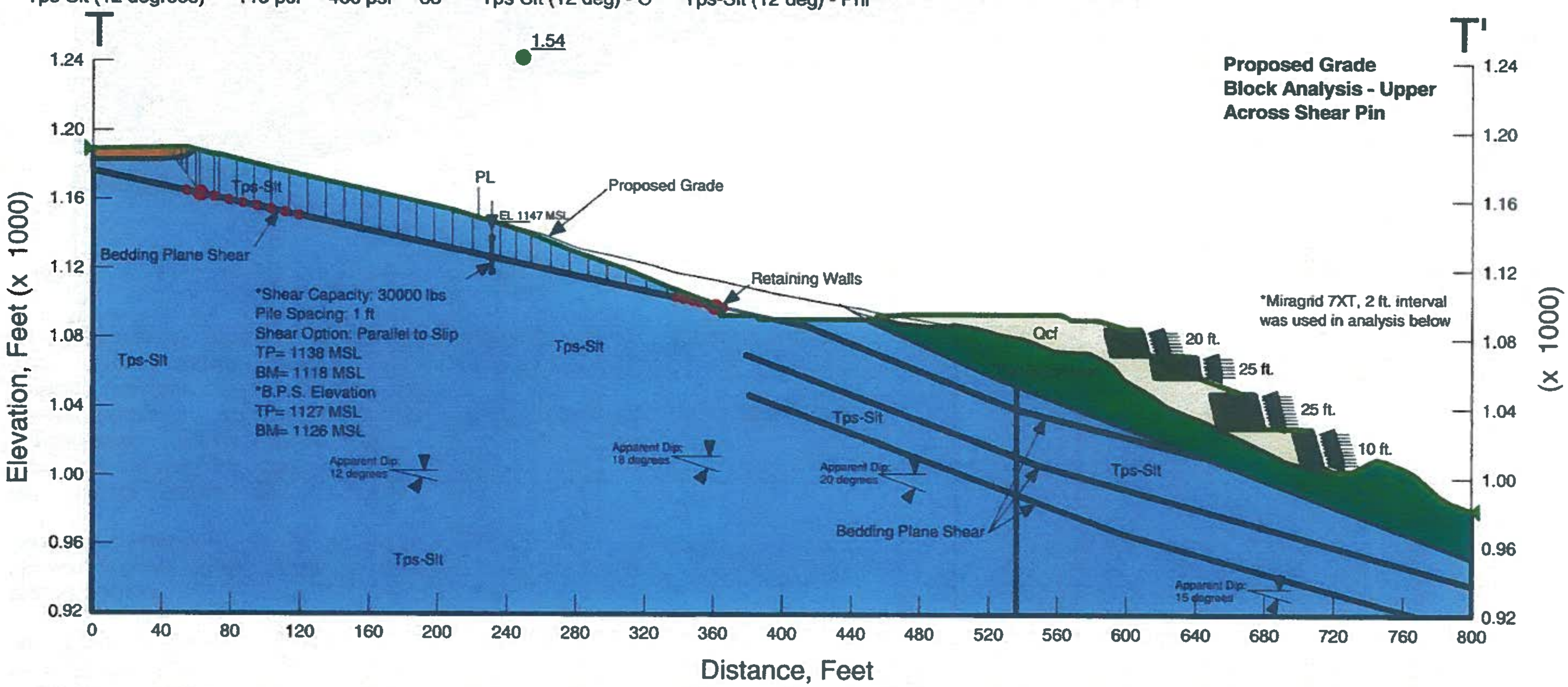
Portola Center
Project No. G1218-52-01
Name: TT-Case 4.gsz
Date: 3/25/2013 Time: 10:25:32 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 35 °
Tps-Slt (15 degrees) 115 pcf 400 psf 33 ° Tps-Slt (15 deg) - C Tps-Slt (15 deg) - Phi
Bedding Plane Shear 115 pcf 20 psf 15 °
MSE 120 pcf 500 psf 32 °
Tps-Slt (12 degrees) 115 pcf 400 psf 33 ° Tps-Slt (12 deg) - C Tps-Slt (12 deg) - Phi



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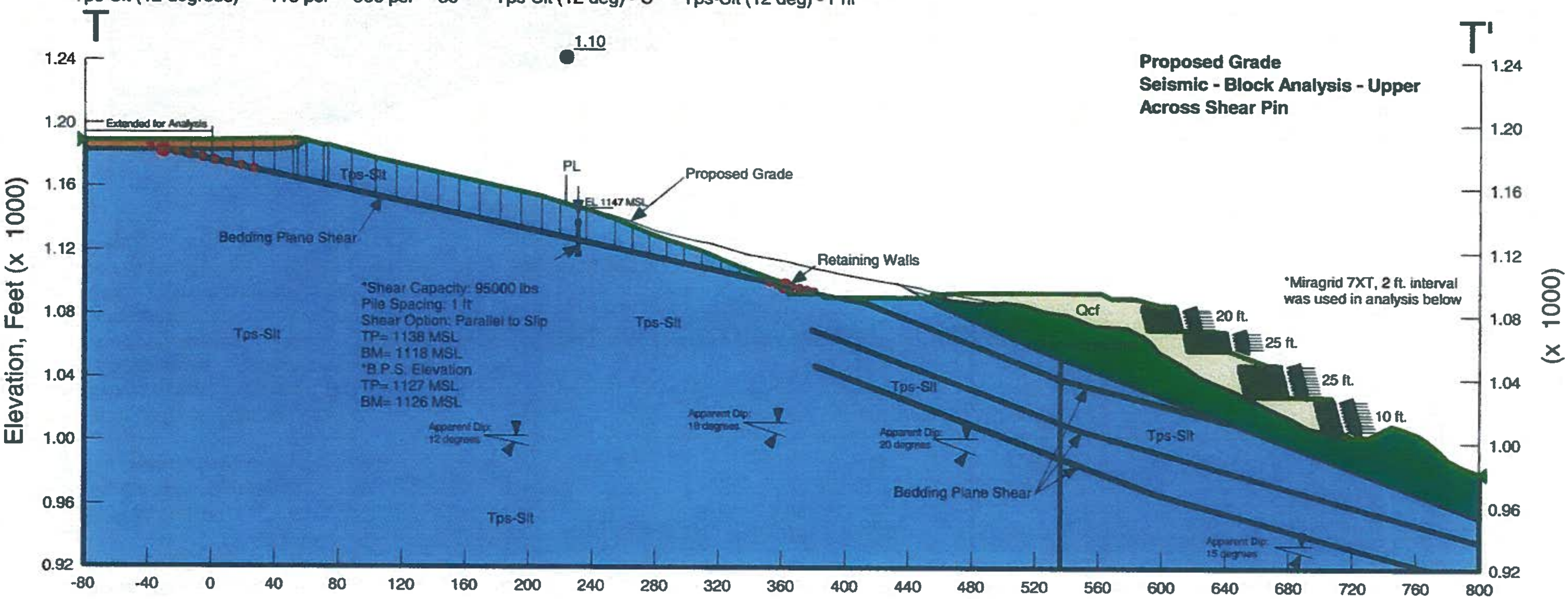
Portola Center
Project No. G1218-52-01
Name: TT-Case 4s-2.gsz
Date: 4/10/2013 Time: 12:45:11 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (15 degrees)	115 pcf	900 psf	30 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	900 psf	30 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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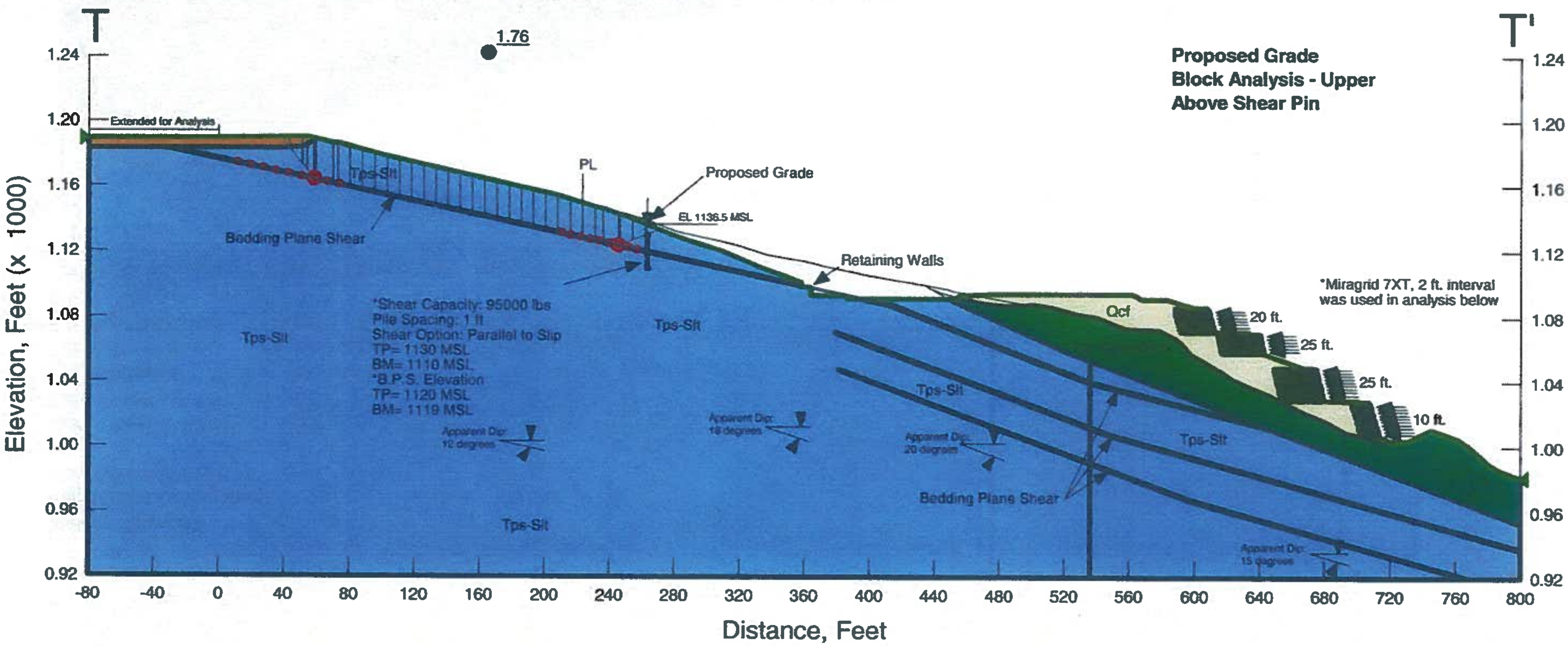
Portola Center
Project No. G1218-52-01
Name: TT-Case 5.gsz
Date: 4/10/2013 Time: 1:03:42 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	400 psf	33 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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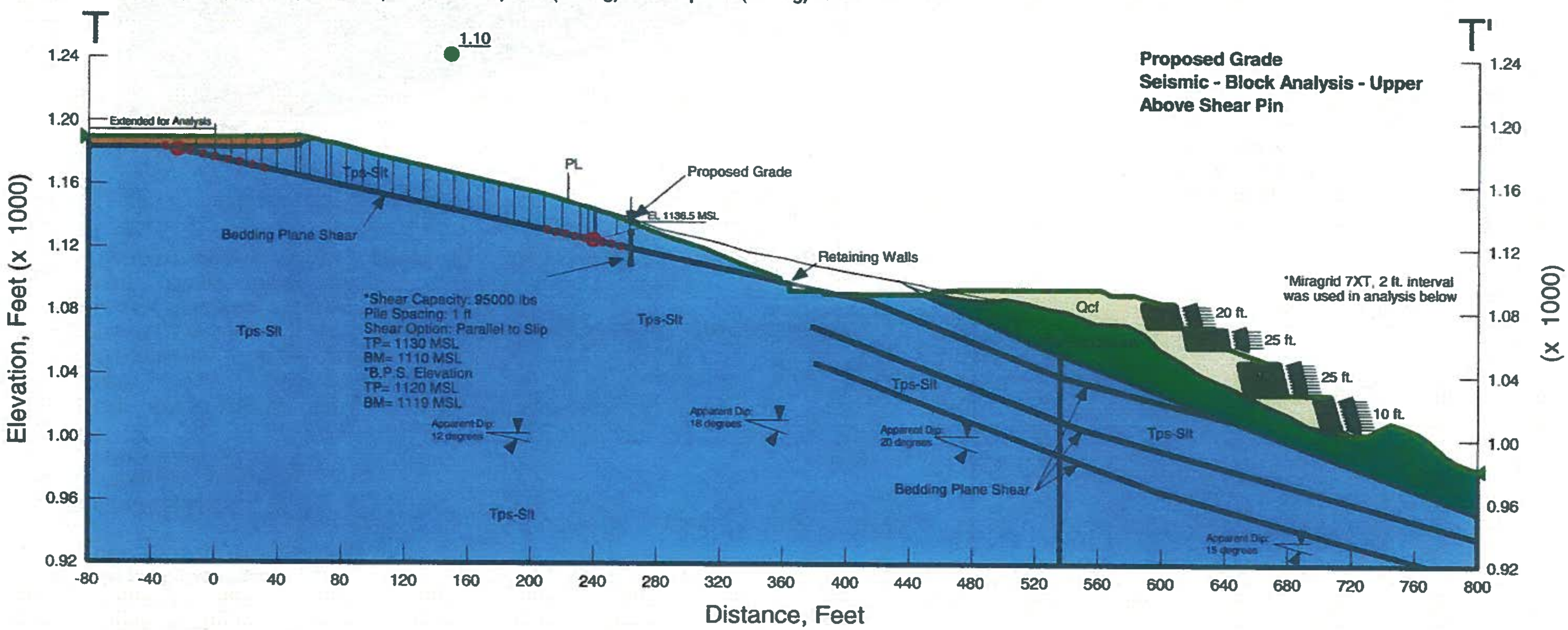
Portola Center
Project No. G1218-52-01
Name: TT-Case 5s.gsz
Date: 4/10/2013 Time: 12:58:54 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (15 degrees)	115 pcf	900 psf	30 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	900 psf	30 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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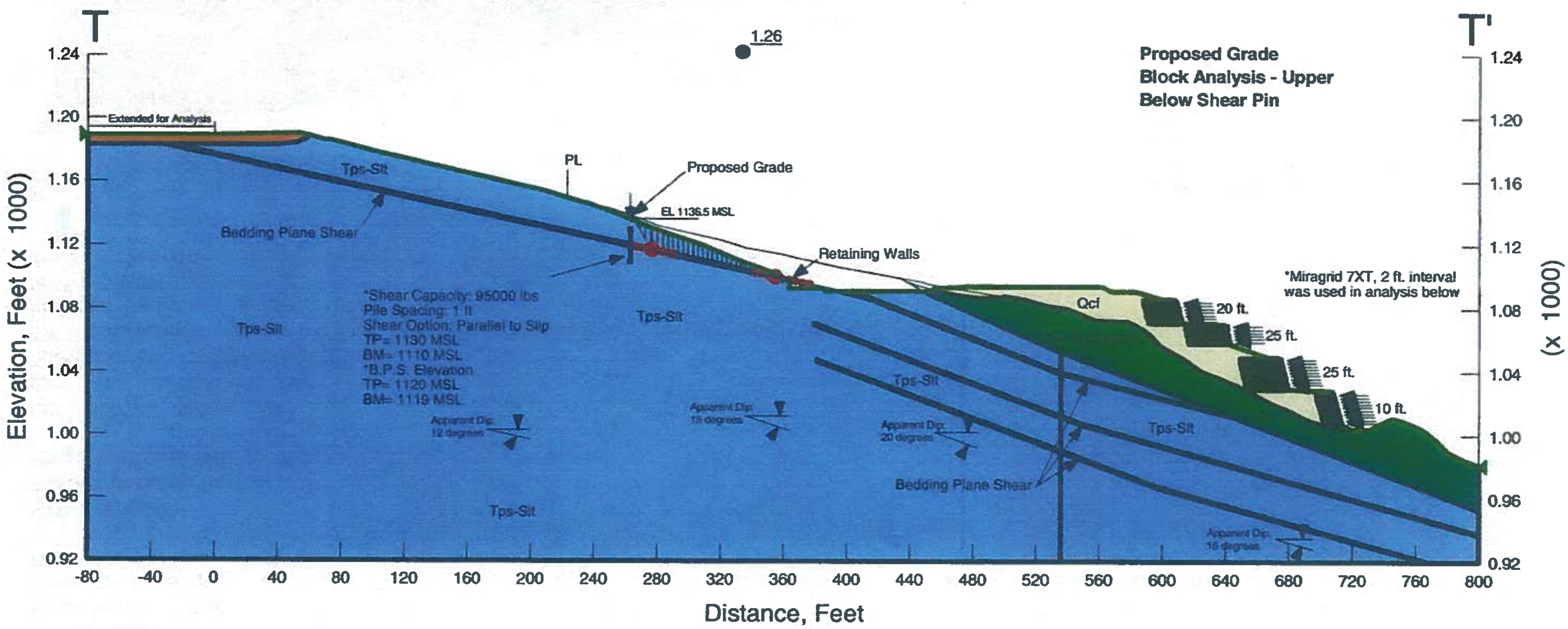
Portola Center
Project No. G1218-52-01
Name: TT-Case 6.gsz
Date: 4/10/2013 Time: 1:13:12 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	400 psf	33 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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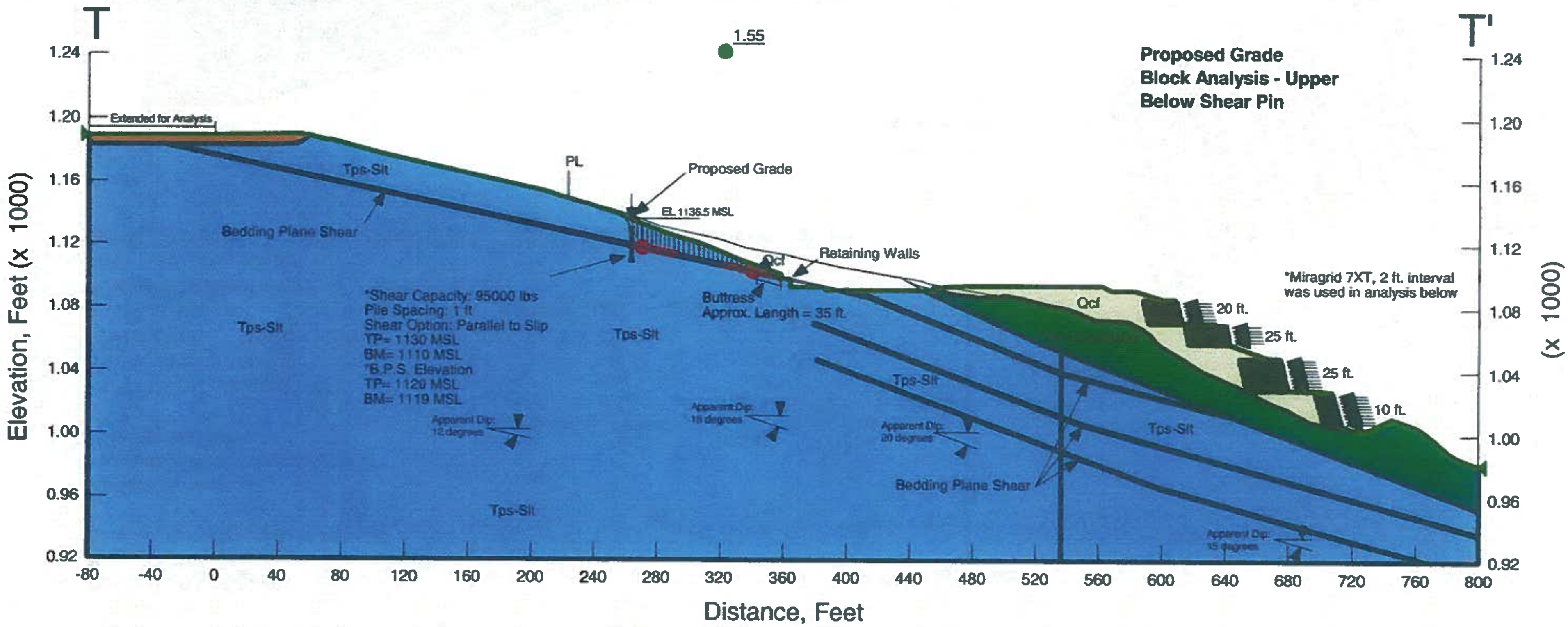
Portola Center
Project No. G1218-52-01
Name: TT-Case 7.gsz
Date: 4/10/2013 Time: 1:23:35 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (12 degrees)	115 pcf	400 psf	33 °	Tps-Slt (12 deg) - C	Tps-Slt (12 deg) - Phi



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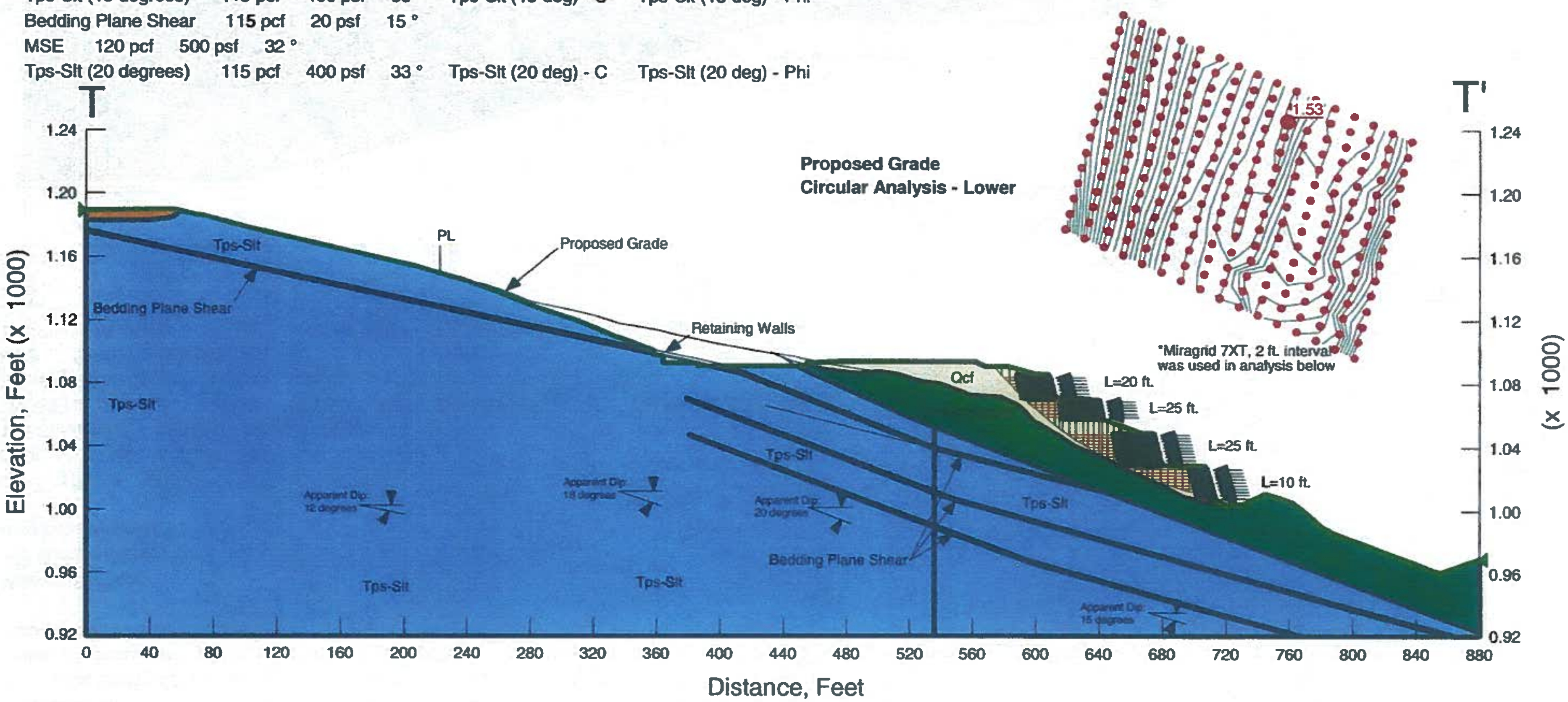
Portola Center
Project No. G1218-52-01
Name: TT-Case 15.gsz
Date: 4/5/2013 Time: 1:06:56 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi



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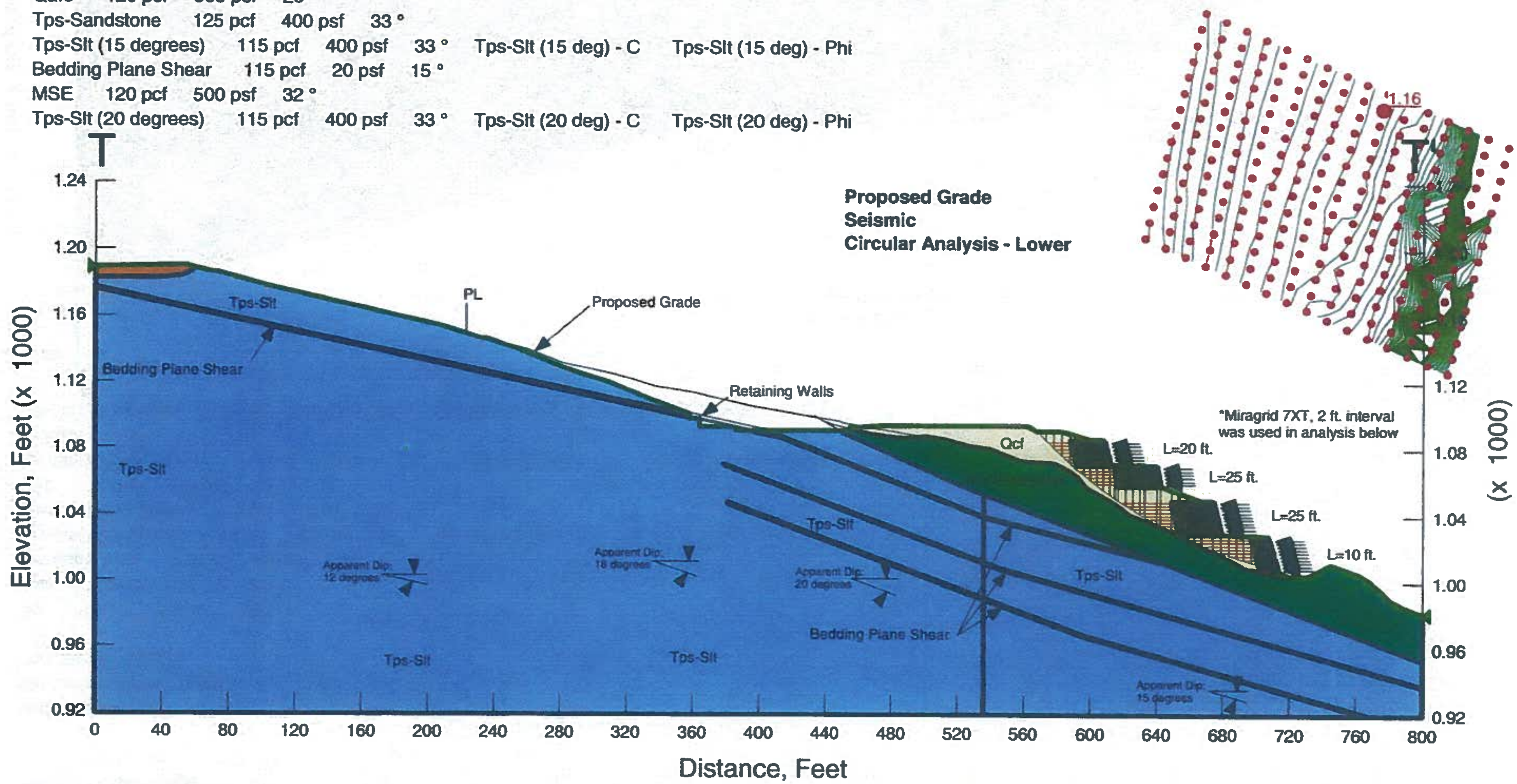
Portola Center
Project No. G1218-52-01
Name: TT-Case 15s1.gsz
Date: 4/5/2013 Time: 1:08:37 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi



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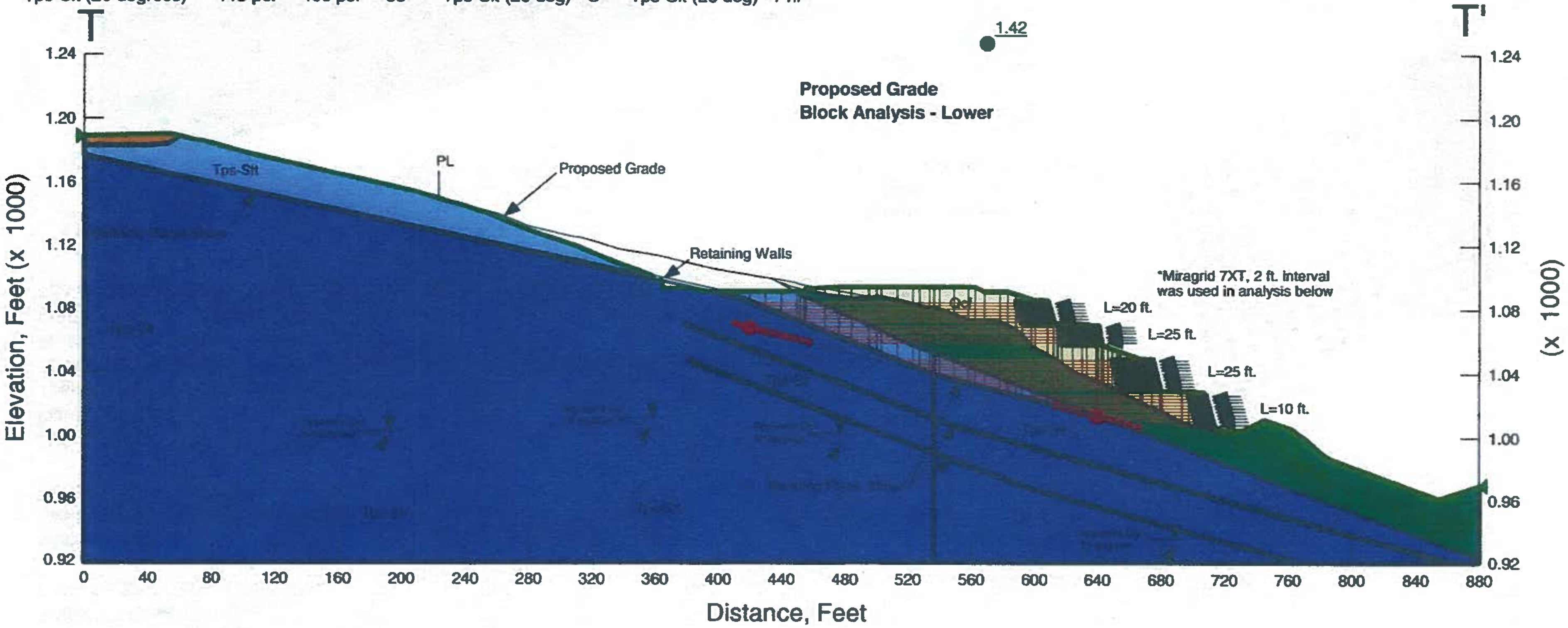
Portola Center
Project No. G1218-52-01
Name: TT-Case 16.gsz
Date: 4/5/2013 Time: 1:10:17 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees) (2)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi
Bedrock					
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi



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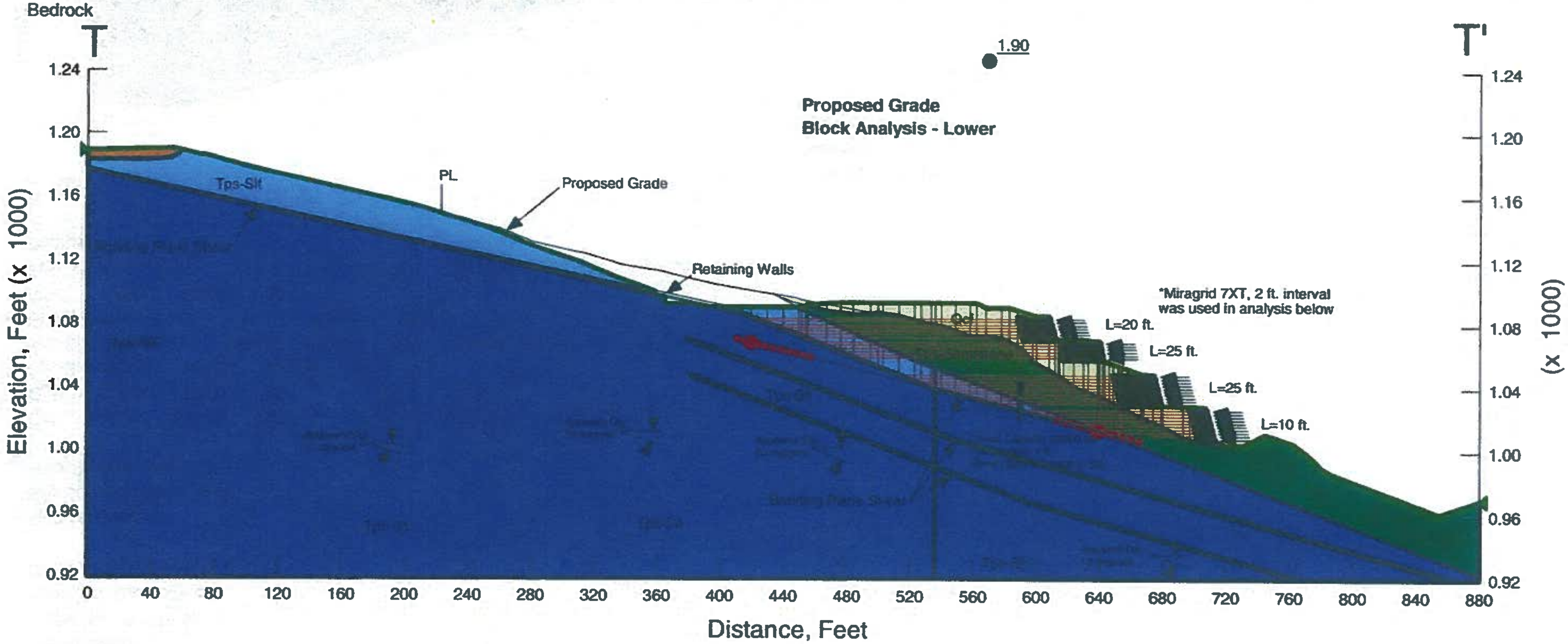
Portola Center
Project No. G1218-52-01
Name: TT-Case 17.gsz
Date: 4/5/2013 Time: 1:11:15 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi
Bedrock					



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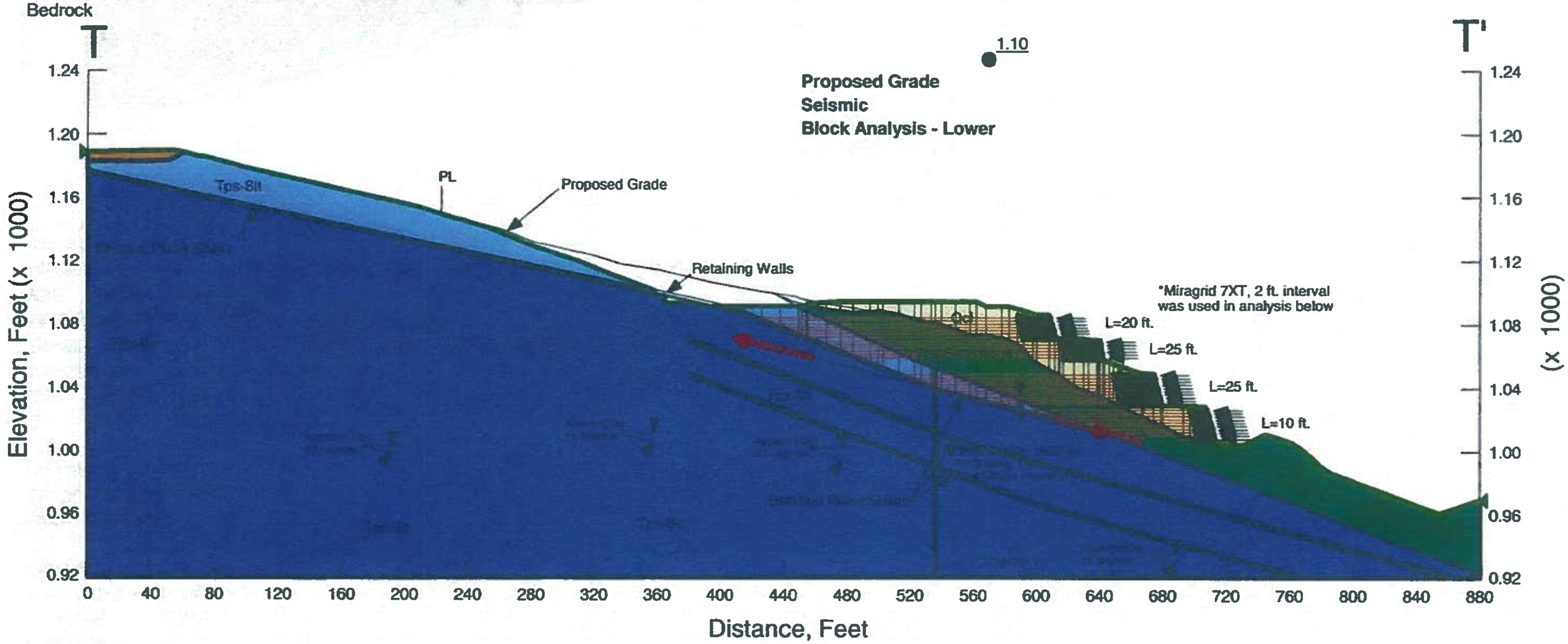
Portola Center
Project No. G1218-52-01
Name: TT-Case 17s.gsz
Date: 4/5/2013 Time: 1:12:21 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (15 degrees)	115 pcf	900 psf	30 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	900 psf	30 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi
Bedrock					



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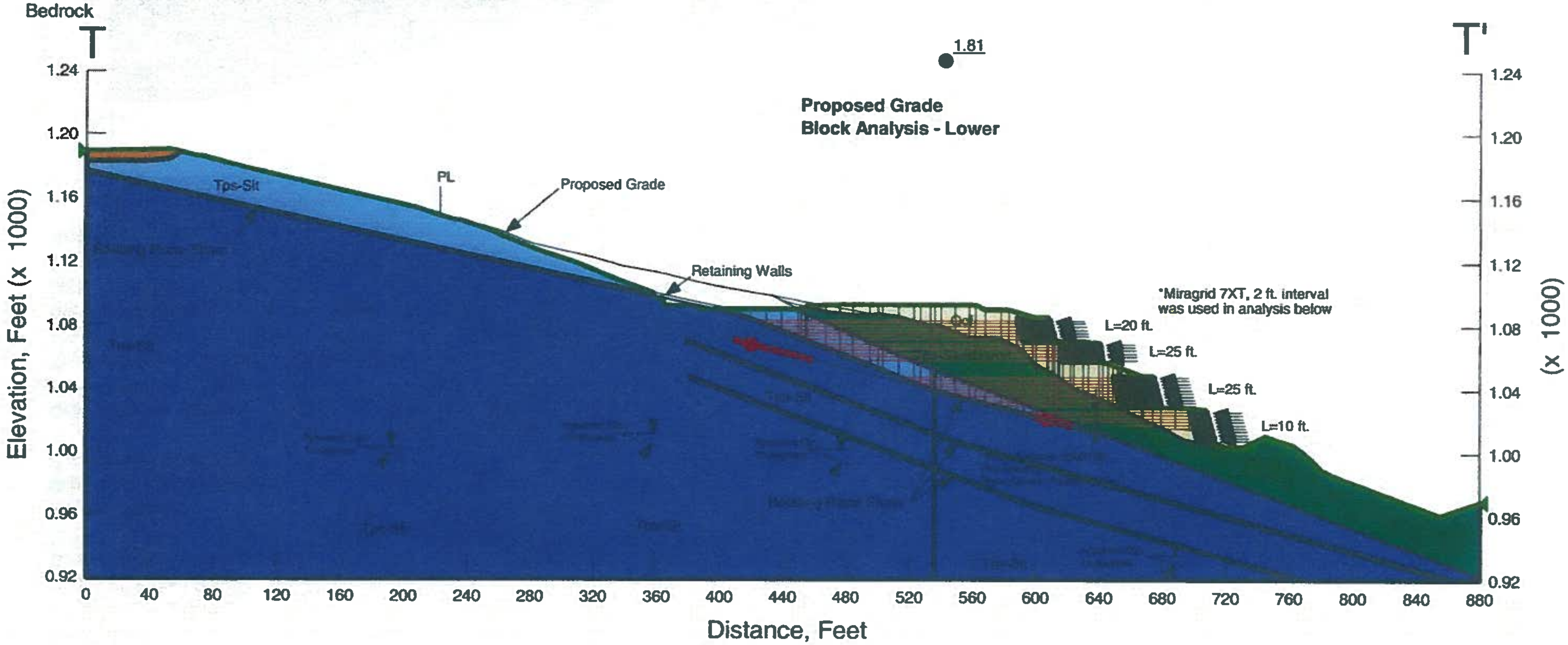
Portola Center
Project No. G1218-52-01
Name: TT-Case 18.gsz
Date: 4/5/2013 Time: 1:14:23 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi
Bedrock					



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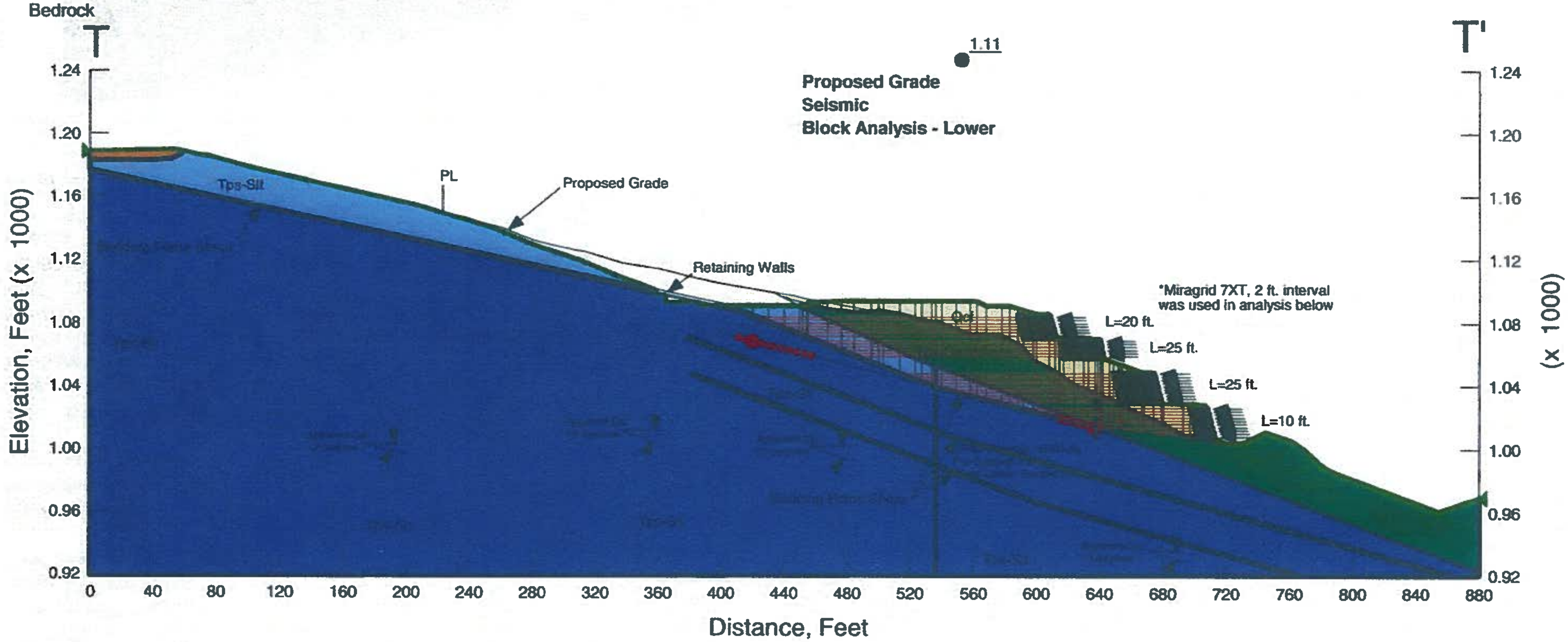
Portola Center
Project No. G1218-52-01
Name: TT-Case 18s.gsz
Date: 4/5/2013 Time: 1:16:02 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg) - C	Tps-Slt (20 deg) - Phi
Bedrock					



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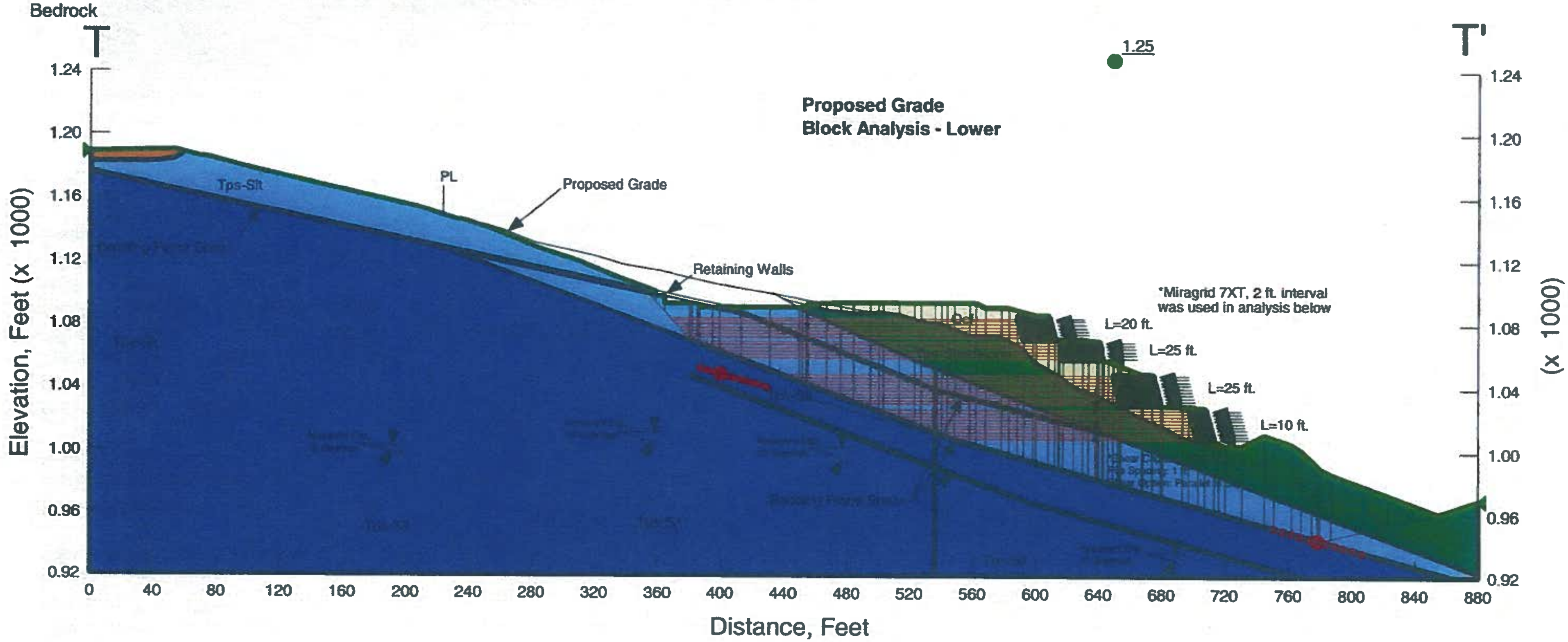
Portola Center
Project No. G1218-52-01
Name: TT-Case 20.gsz
Date: 4/5/2013 Time: 12:42:40 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg)-C	Tps-Slt (20 deg)-Phi
Bedrock					



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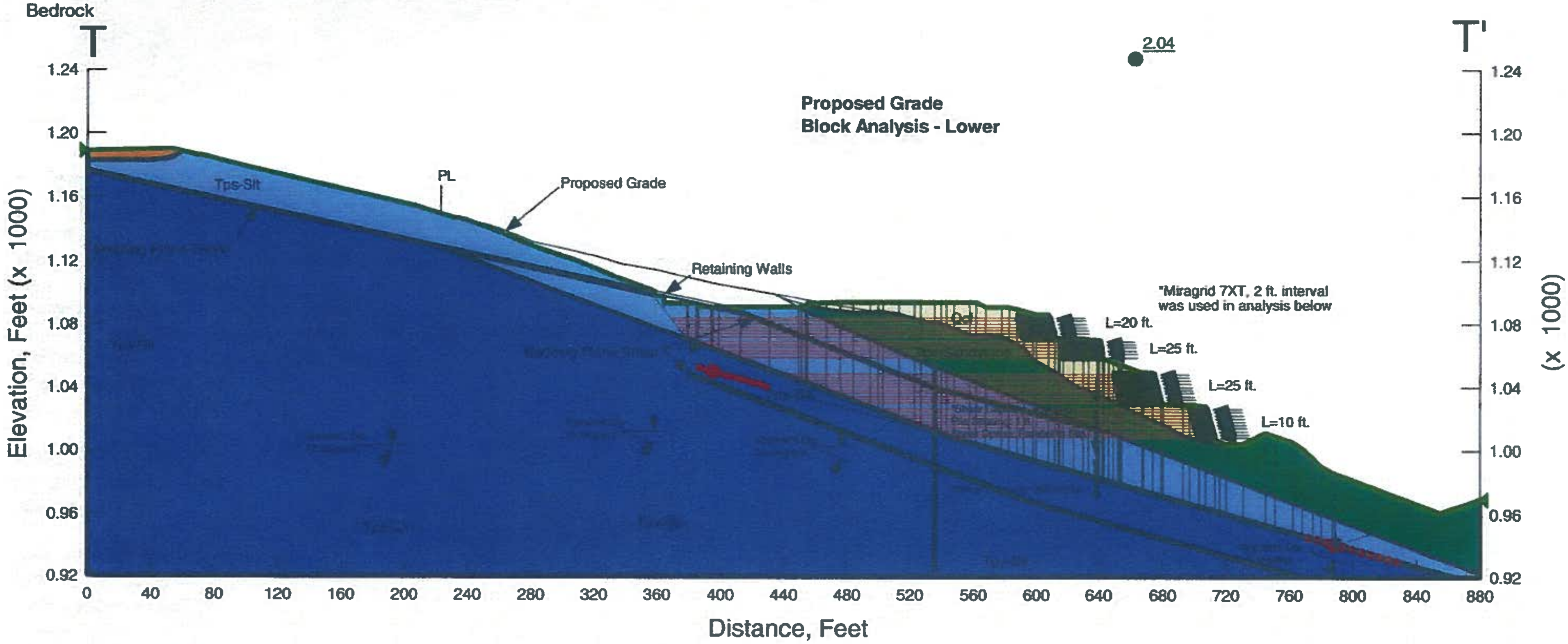
Portola Center
Project No. G1218-52-01
Name: TT-Case 21.gsz
Date: 4/5/2013 Time: 2:26:48 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg)-C	Tps-Slt (20 deg)-Phi
Bedrock					



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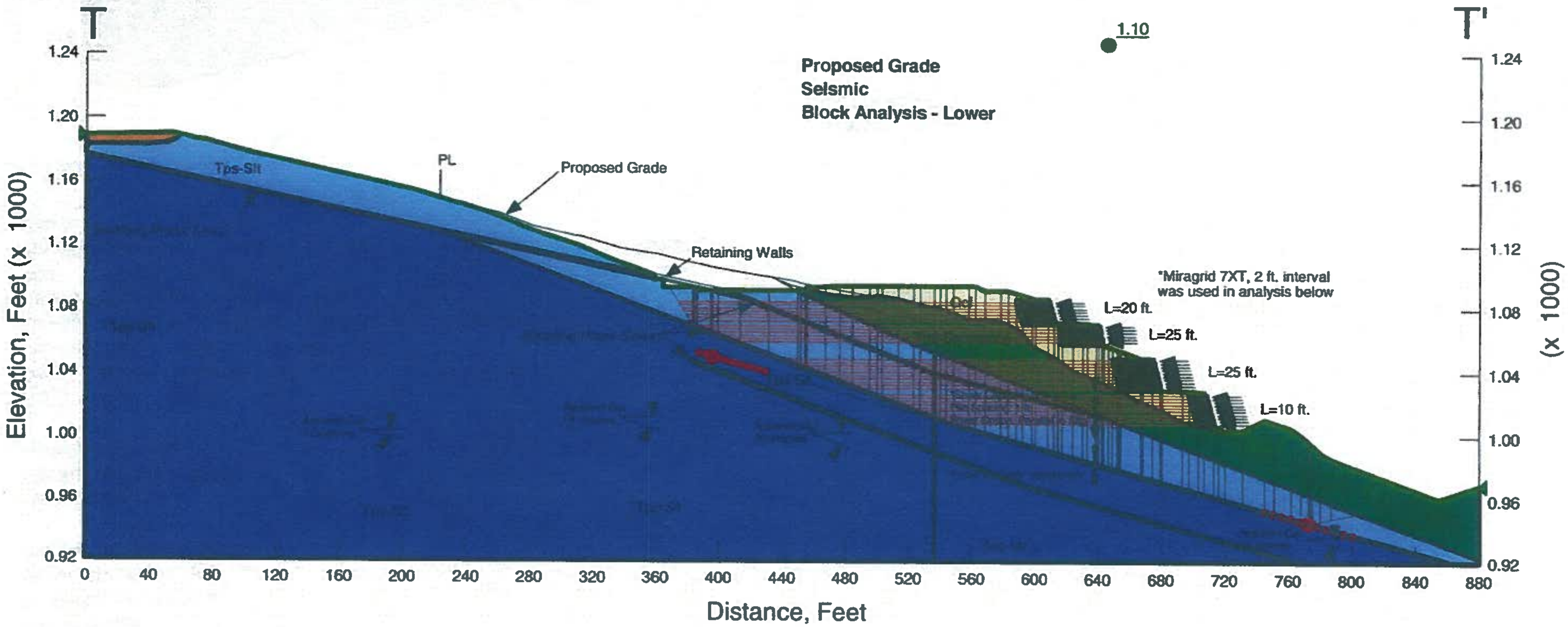
Portola Center
Project No. G1218-52-01
Name: TT-Case 21s.gsz
Date: 4/5/2013 Time: 2:25:29 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (15 degrees)	115 pcf	900 psf	30 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	900 psf	30 °	Tps-Slt (20 deg)-C	Tps-Slt (20 deg)-Phi
Bedrock					



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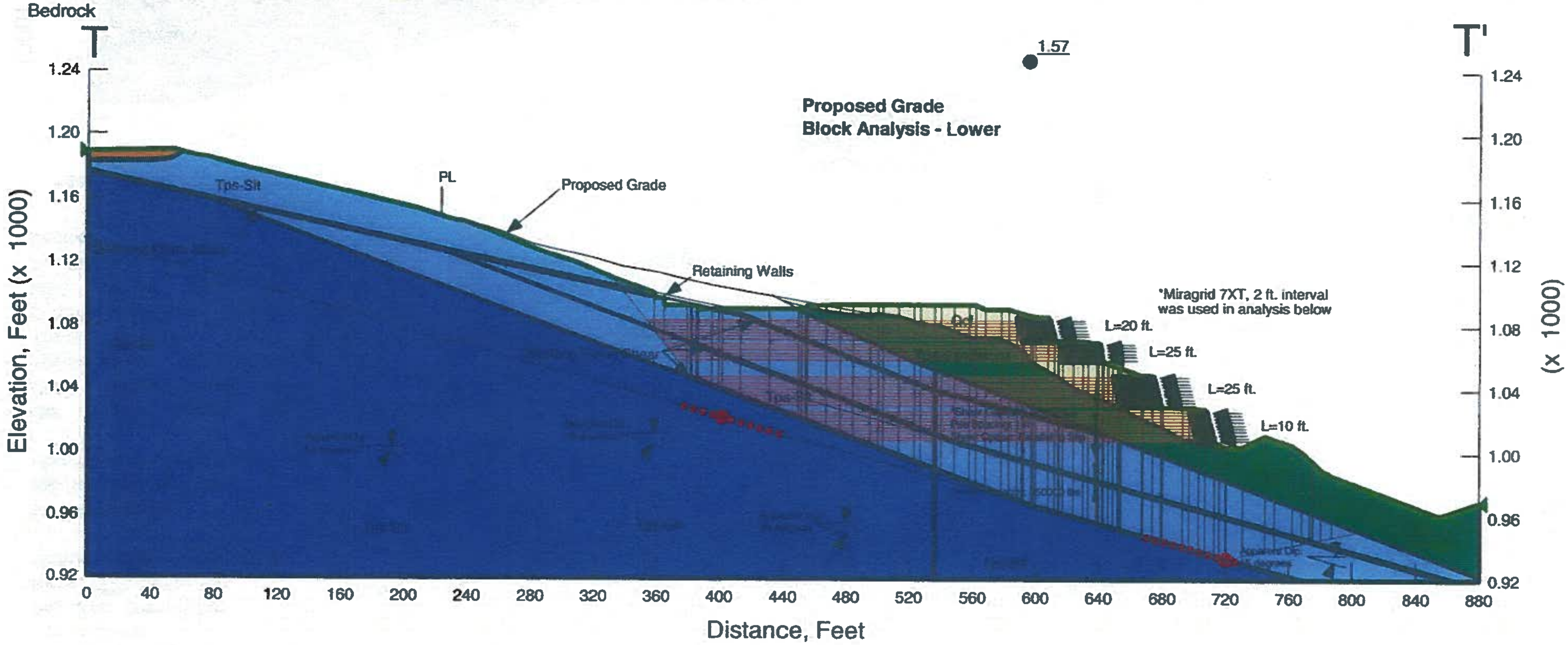
Portola Center
Project No. G1218-52-01
Name: TT-Case 22.gsz
Date: 4/5/2013 Time: 2:32:53 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	400 psf	33 °	Tps-Slt (20 deg)-C	Tps-Slt (20 deg)-Phi
Bedrock					



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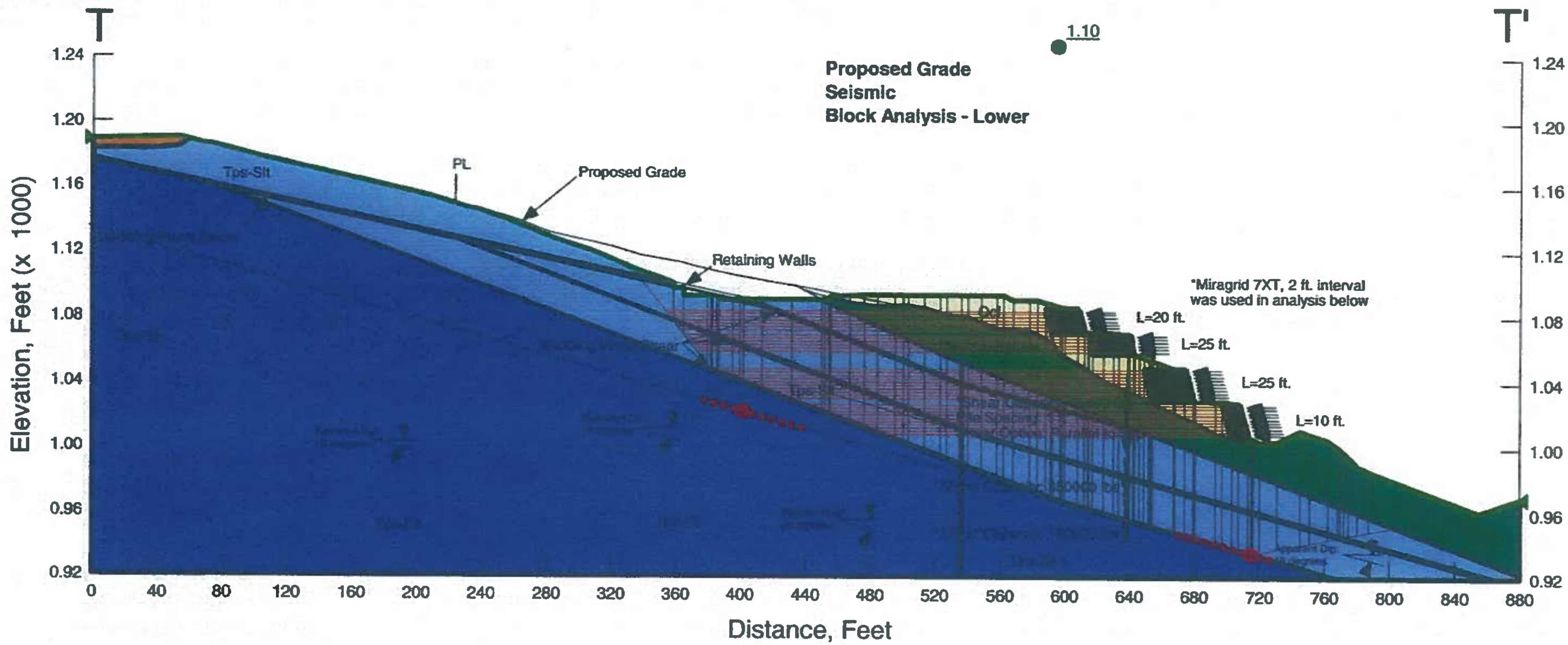
Portola Center
Project No. G1218-52-01
Name: TT-Case 23s.gsz
Date: 4/5/2013 Time: 2:37:58 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (15 degrees)	115 pcf	900 psf	30 °	Tps-Slt (15 deg) - C	Tps-Slt (15 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tps-Slt (20 degrees)	115 pcf	900 psf	30 °	Tps-Slt (20 deg)-C	Tps-Slt (20 deg)-Phi
Bedrock					



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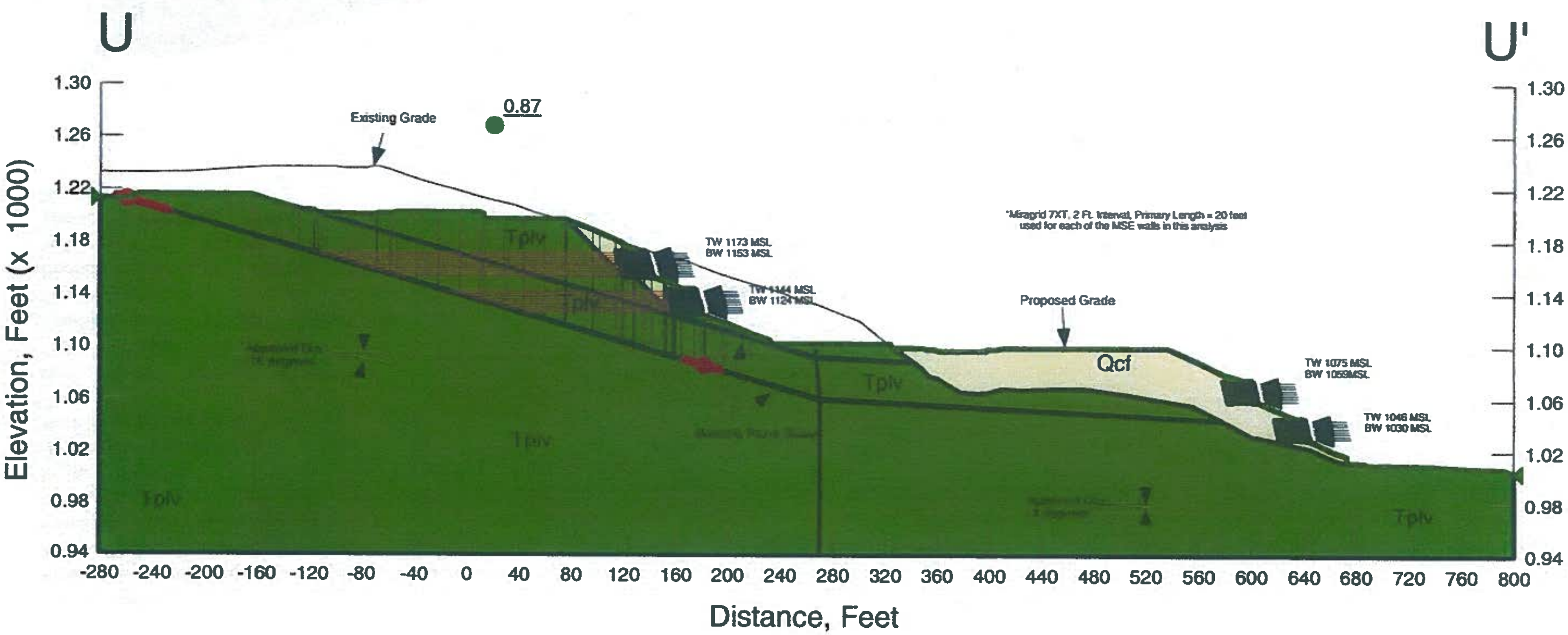
Portola Center - North
Project No. G1218-52-01
Name: UU-Case 1.gsz
Date: 3/20/2013 Time: 1:58:37 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

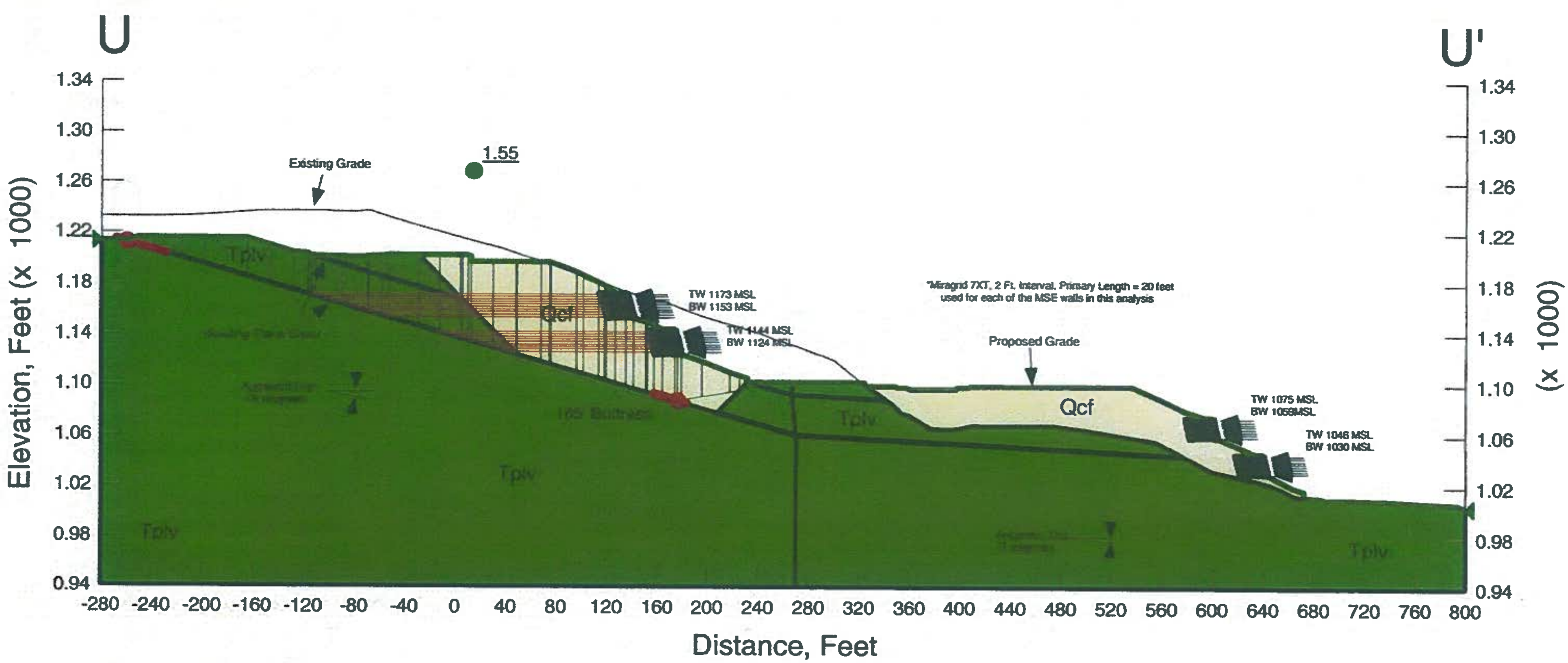


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 2.gsz
Date: 3/26/2013 Time: 12:56:54 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

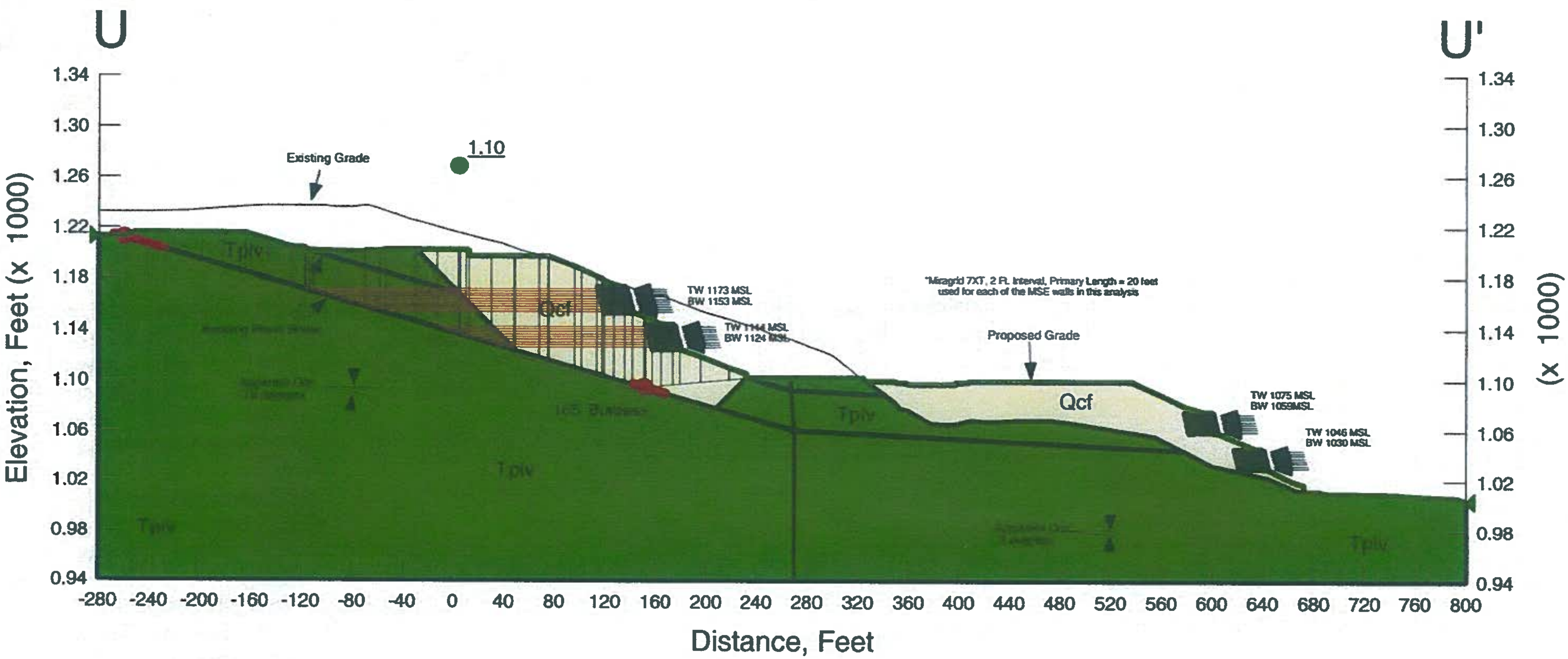


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 2_EQ.gsz
Date: 3/26/2013 Time: 1:02:43 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	900 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	900 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

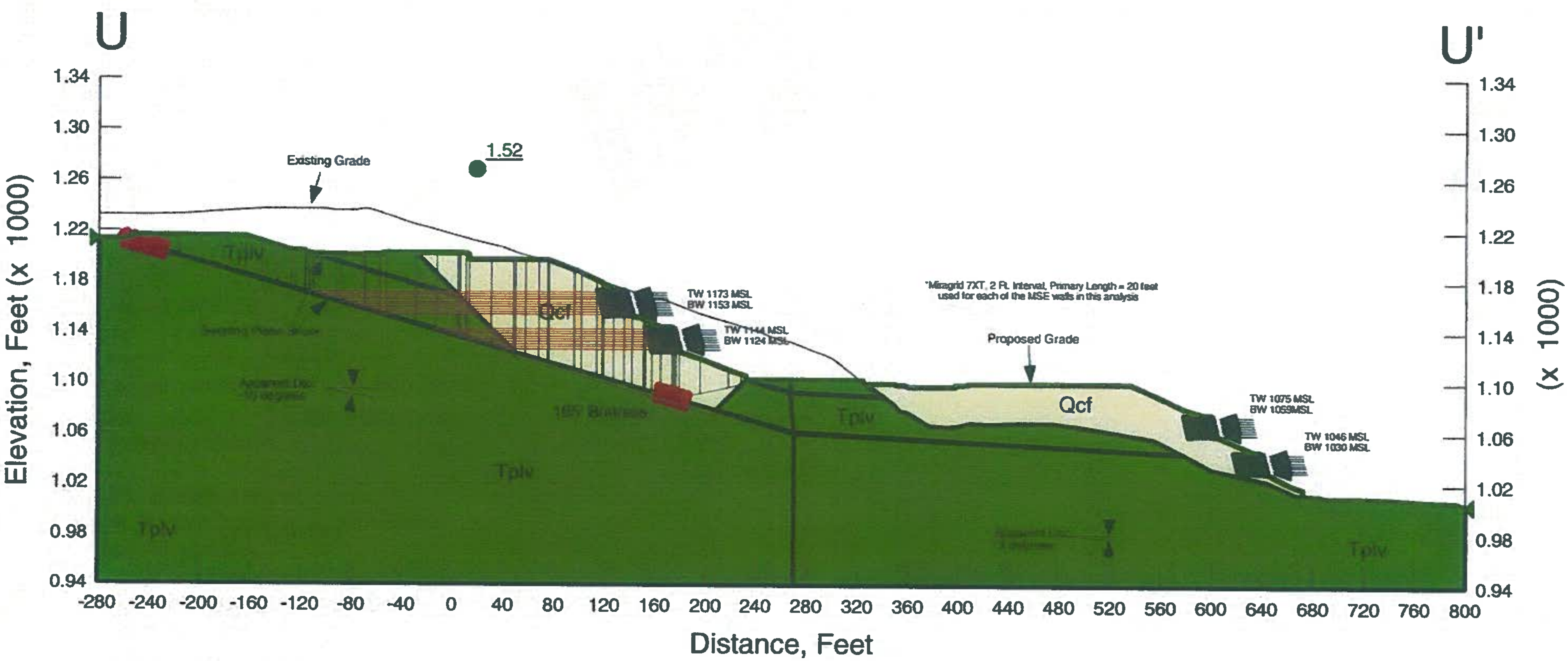


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 2.gsz
Date: 3/26/2013 Time: 12:57:22 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

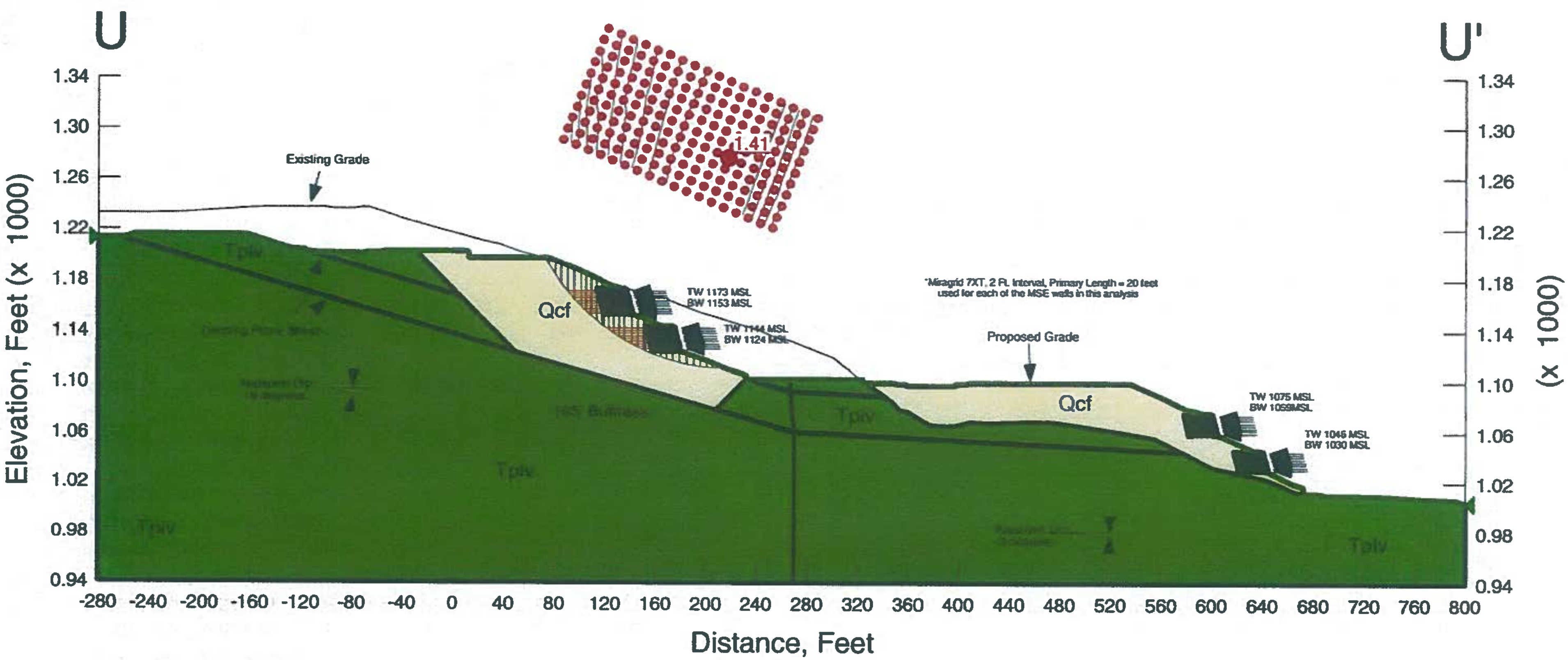


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 2.gsz
Date: 3/26/2013 Time: 1:05:20 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

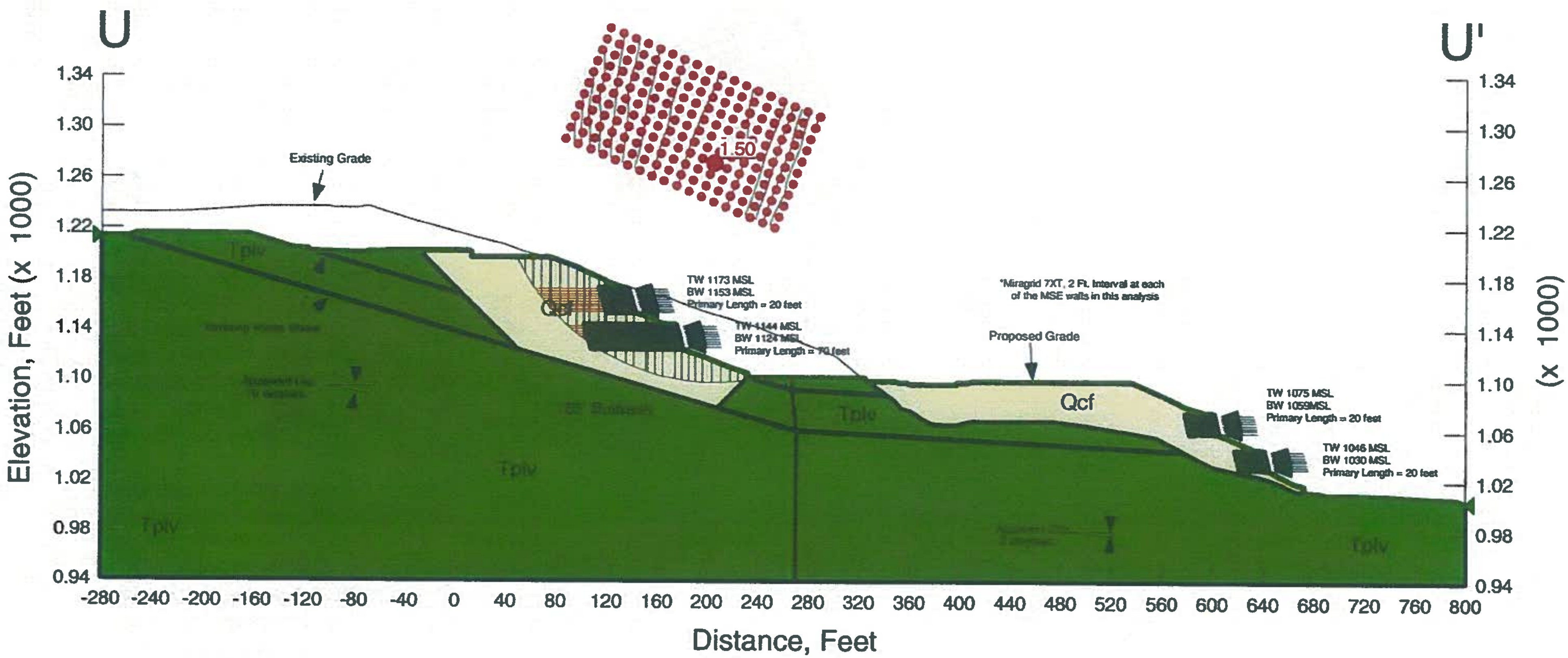


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 3.gsz
Date: 3/26/2013 Time: 1:13:55 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

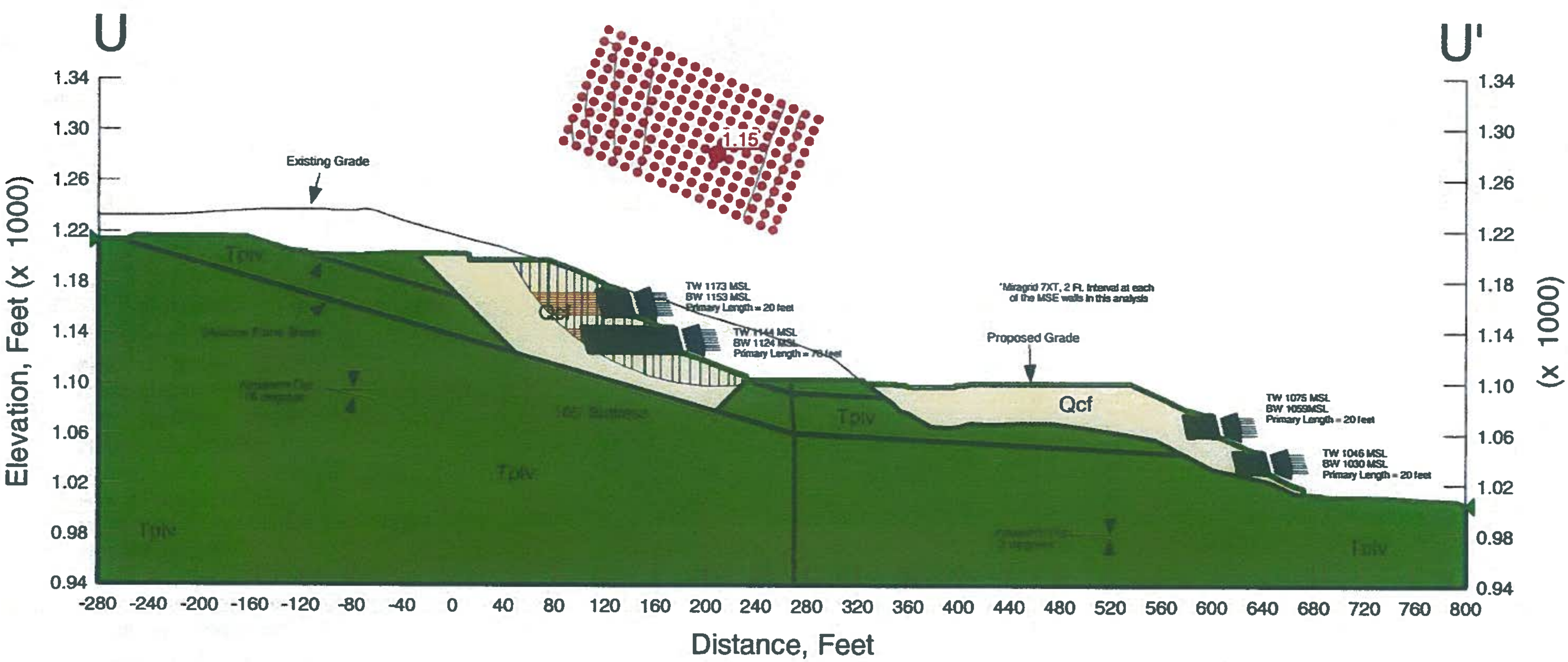


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 3.gsz
Date: 3/26/2013 Time: 1:15:03 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

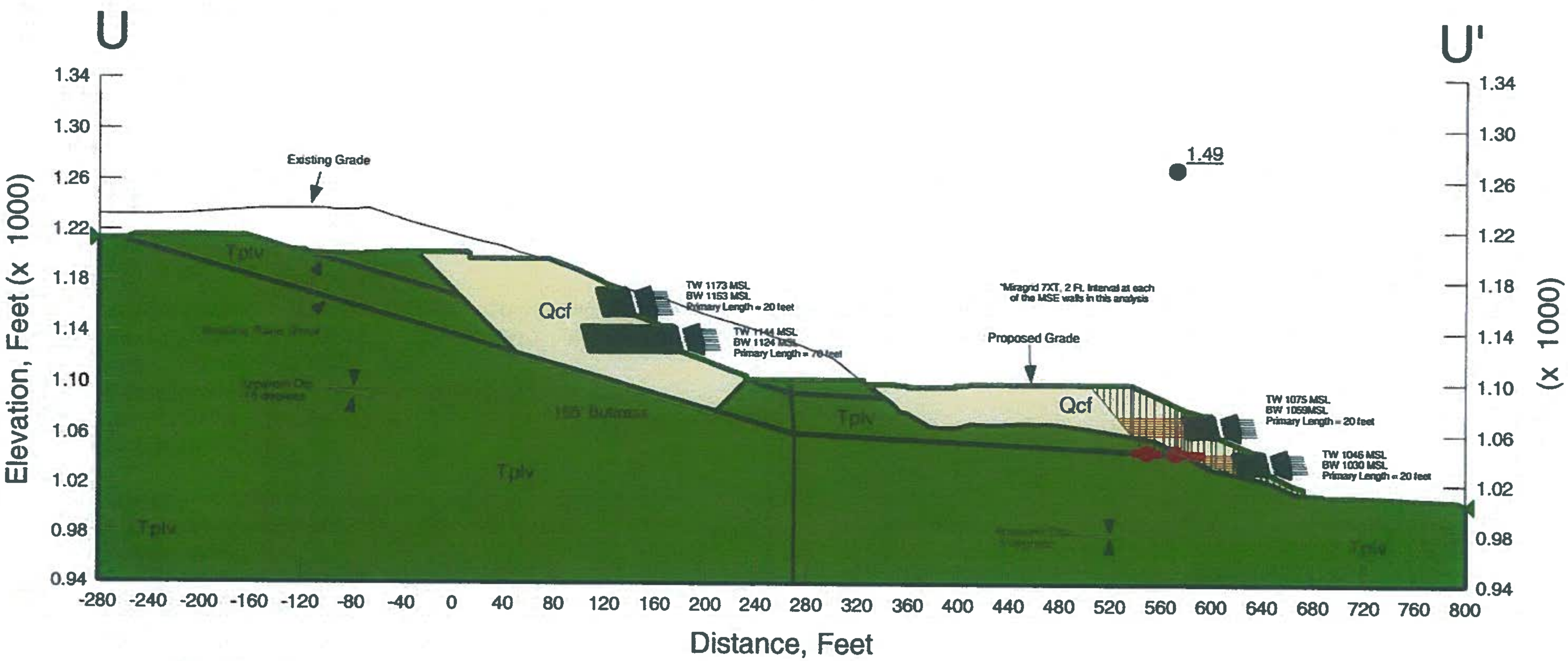
Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)



Portola Center - North
Project No. G1218-52-01
Name: UU-Case 3.gsz
Date: 3/26/2013 Time: 1:18:58 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-16 degrees) 115 pcf 300 psf 30 ° Tplv - C (-16 degrees) Tplv - Phi (-16 degrees)
Tplv (-3 degrees) 115 pcf 300 psf 30 ° Tplv - C (-3 degrees) Tplv - Phi (-3 degrees)

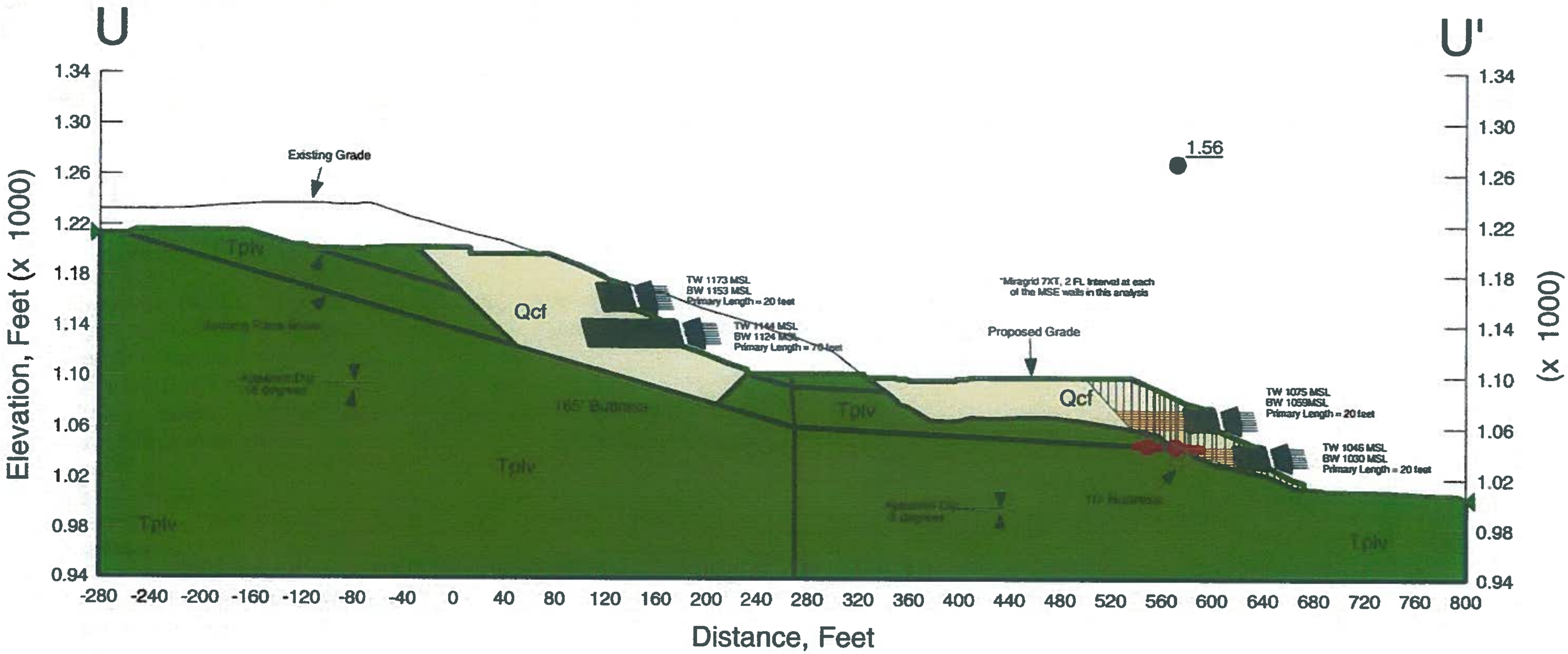


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 4.gsz
Date: 3/26/2013 Time: 1:46:17 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

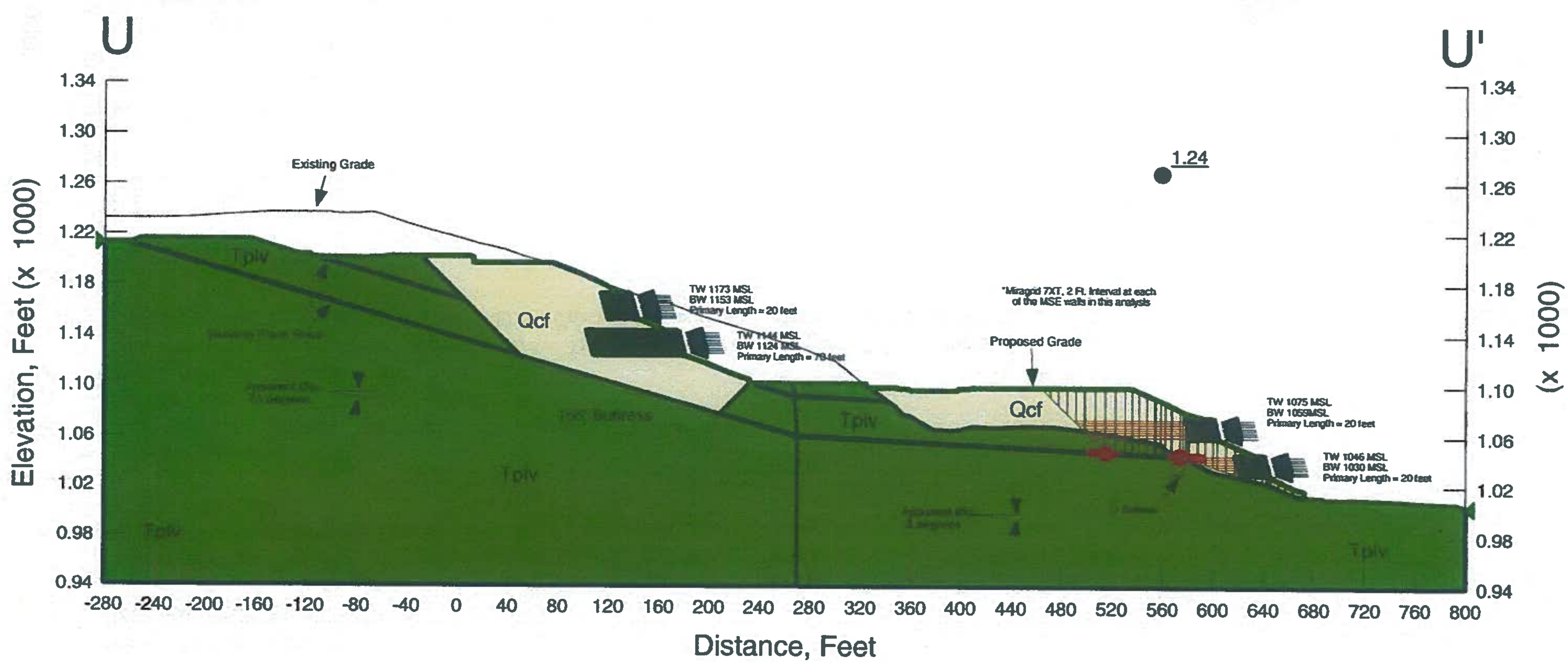


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 4_EQ.gsz
Date: 3/26/2013 Time: 2:02:16 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	900 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	900 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

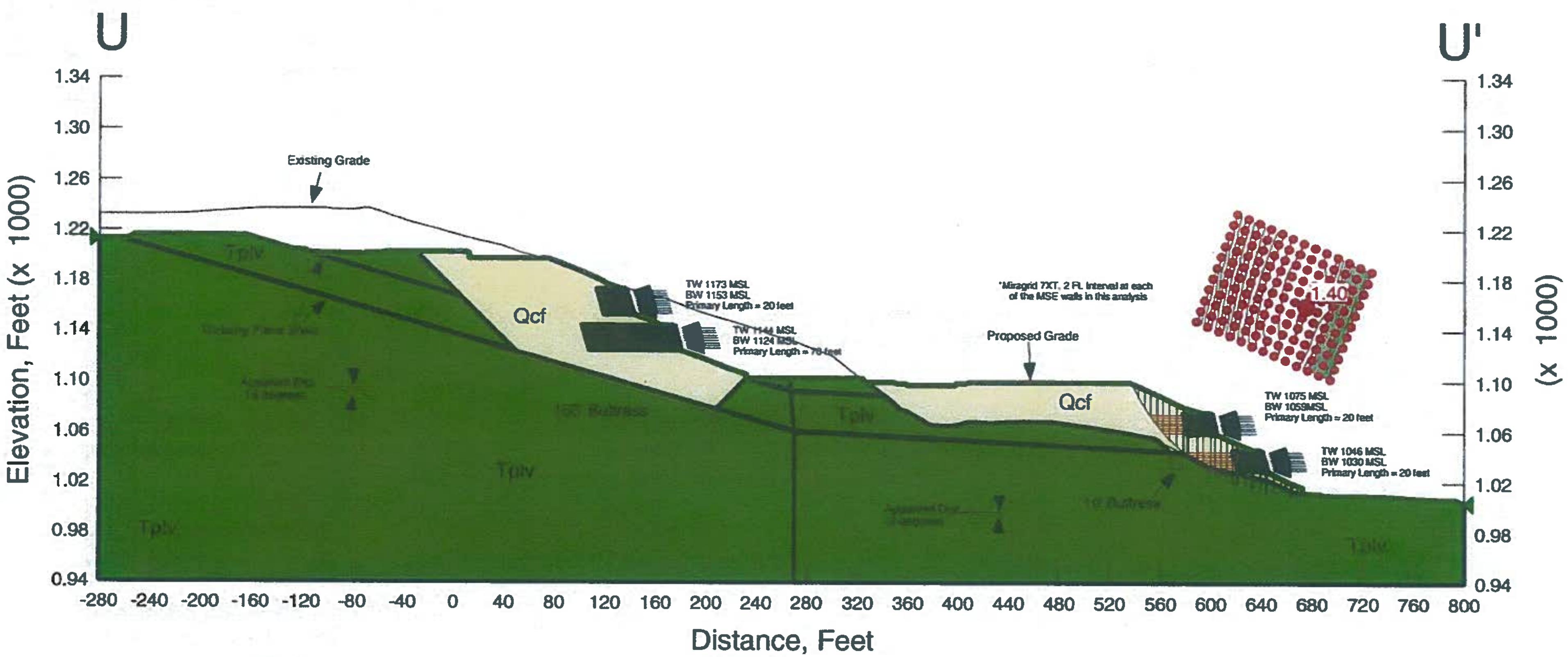


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 4.gsz
Date: 3/26/2013 Time: 2:04:39 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

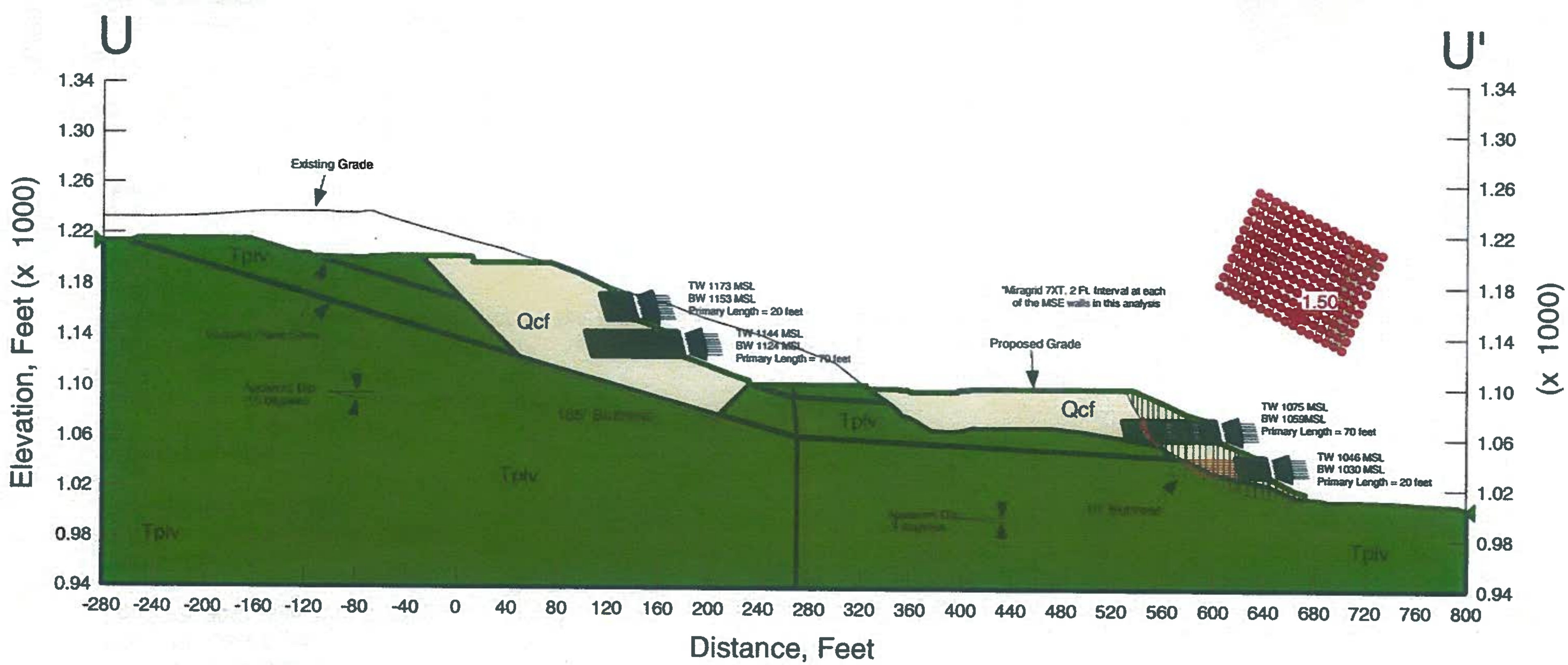


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 5.gsz
Date: 3/26/2013 Time: 2:17:56 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

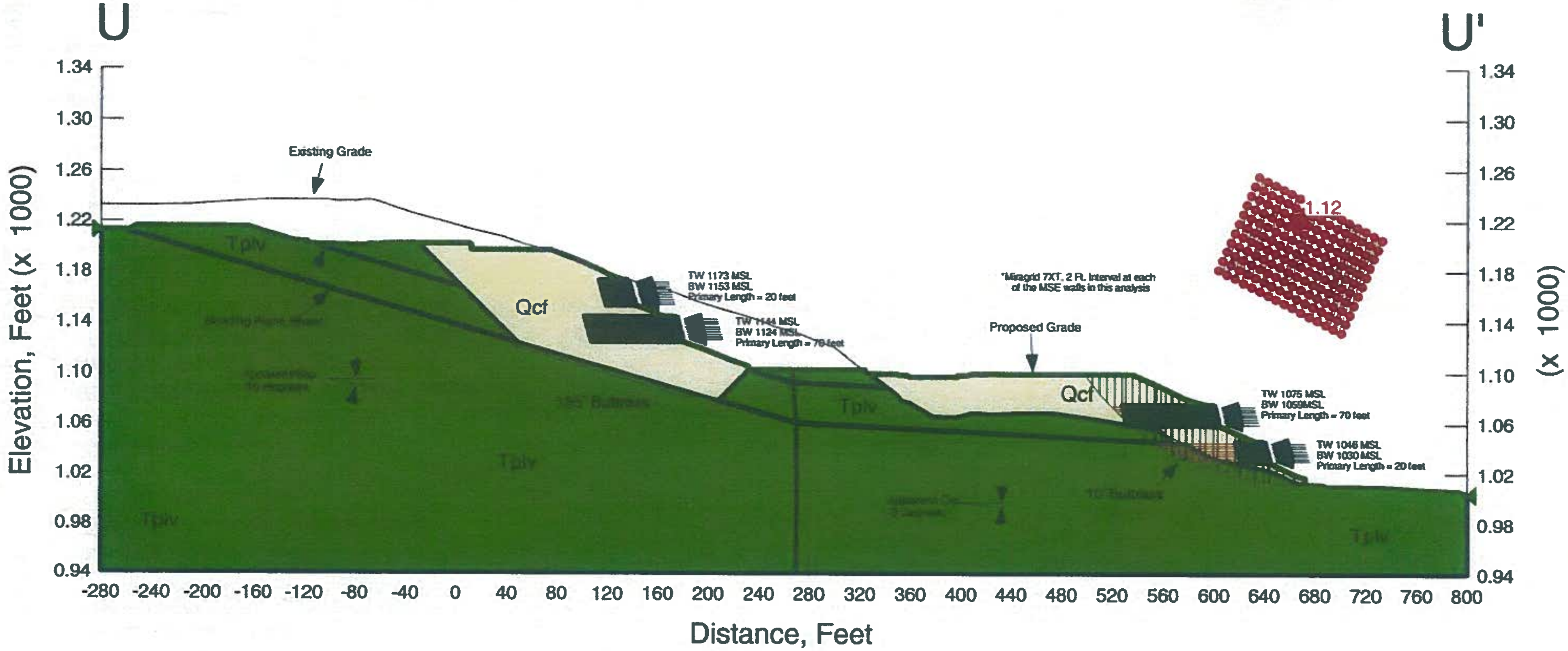


Portola Center - North
Project No. G1218-52-01
Name: UU-Case 5.gsz
Date: 3/26/2013 Time: 2:19:32 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-16 degrees)	115 pcf	300 psf	30 °	Tplv - C (-16 degrees)	Tplv - Phi (-16 degrees)
Tplv (-3 degrees)	115 pcf	300 psf	30 °	Tplv - C (-3 degrees)	Tplv - Phi (-3 degrees)

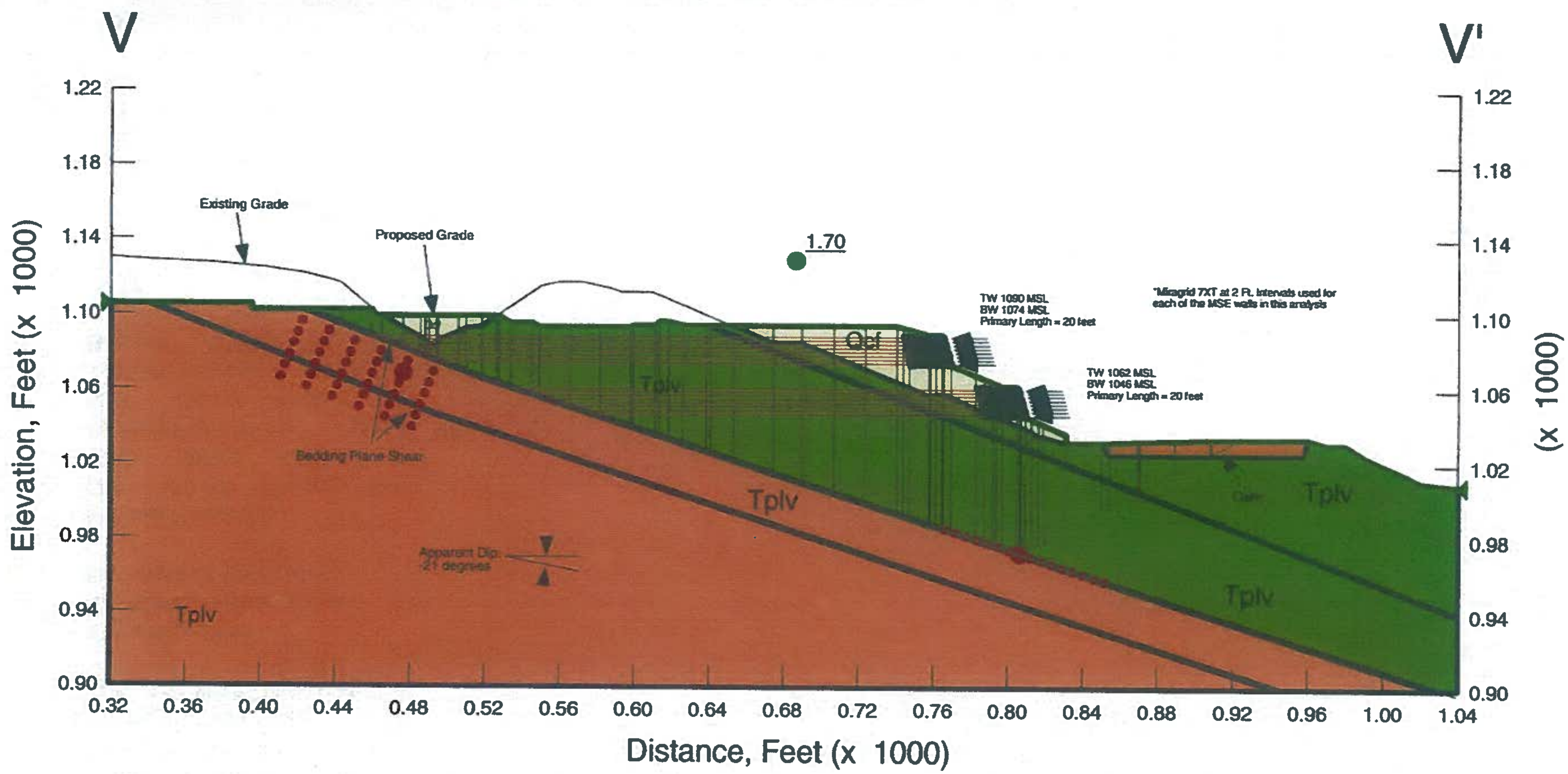


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 1.gsz
Date: 3/21/2013 Time: 1:23:07 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)
Bedrock					

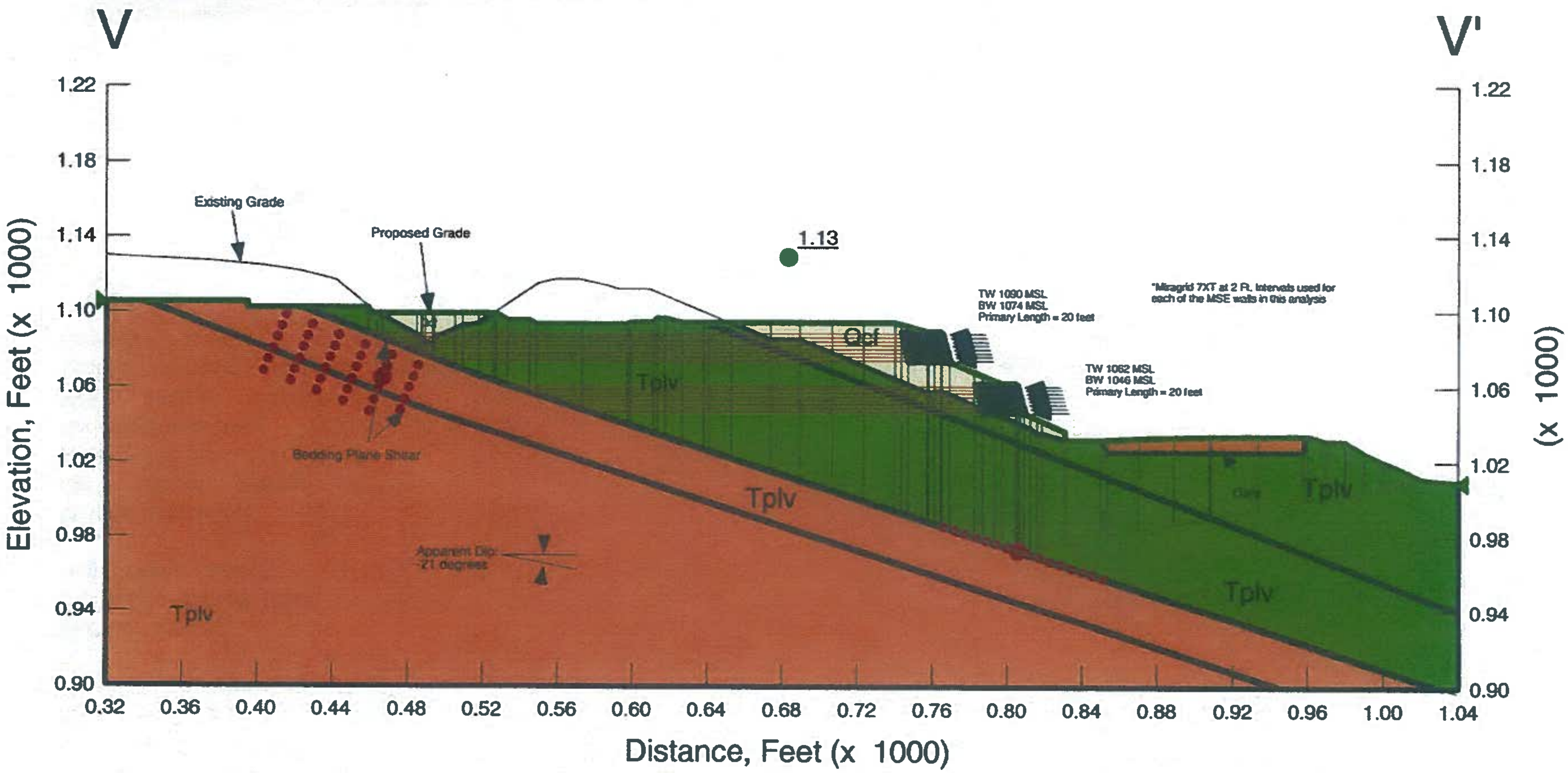


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 1.gsz
Date: 3/21/2013 Time: 1:24:17 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)
Bedrock					

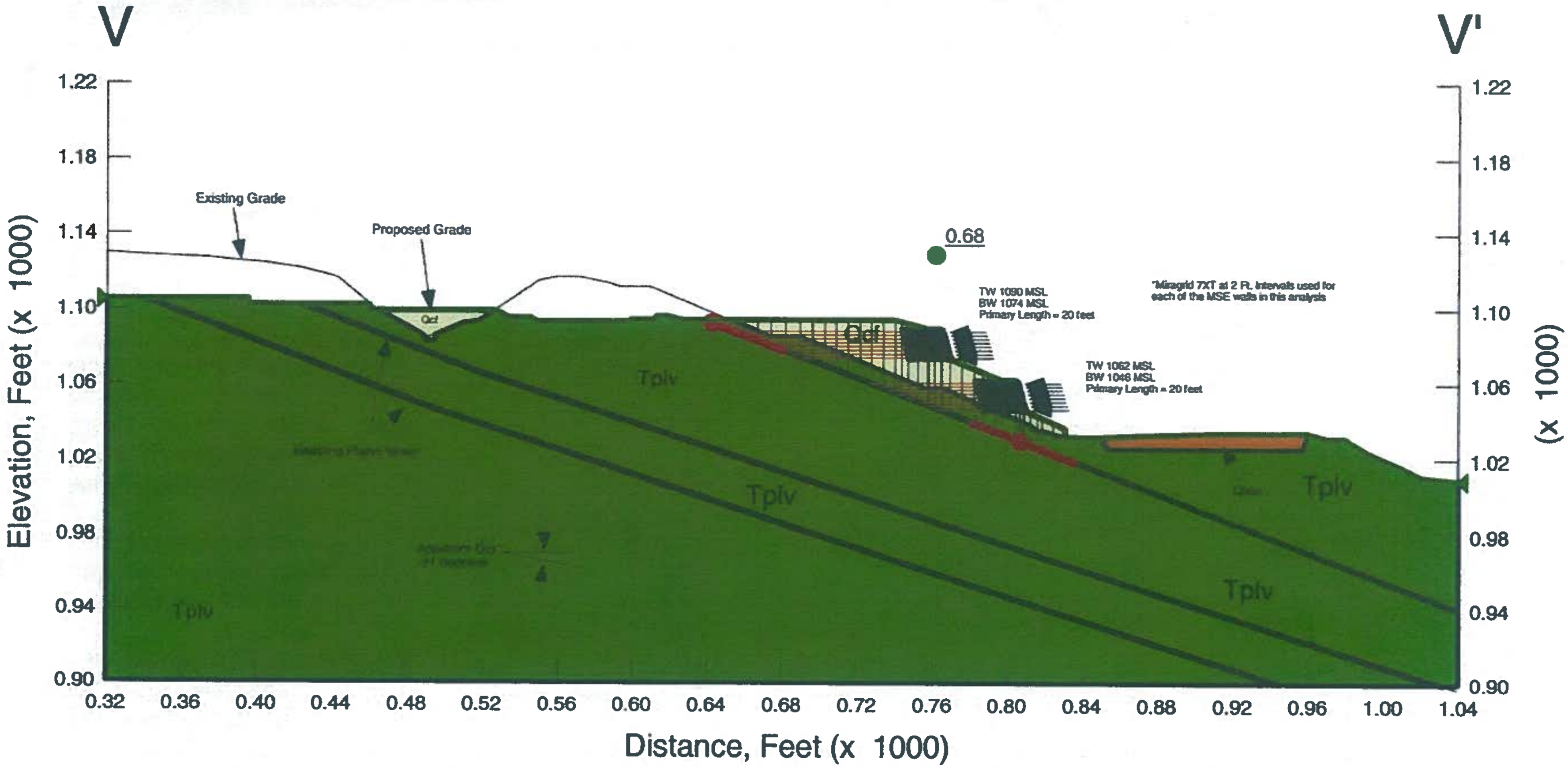


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 1.gsz
Date: 3/21/2013 Time: 1:20:24 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)

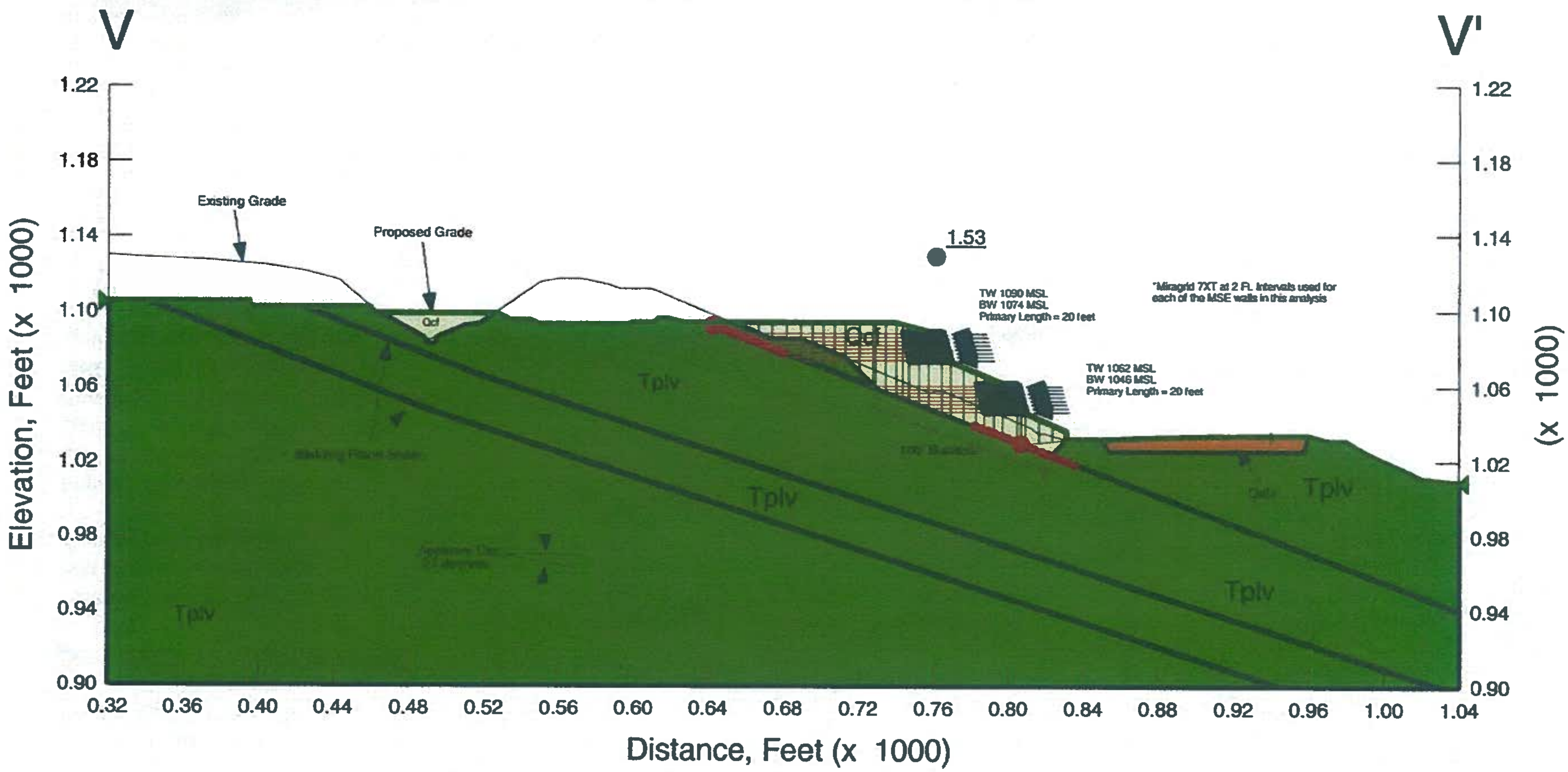


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 2.gsz
Date: 3/21/2013 Time: 1:33:22 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)

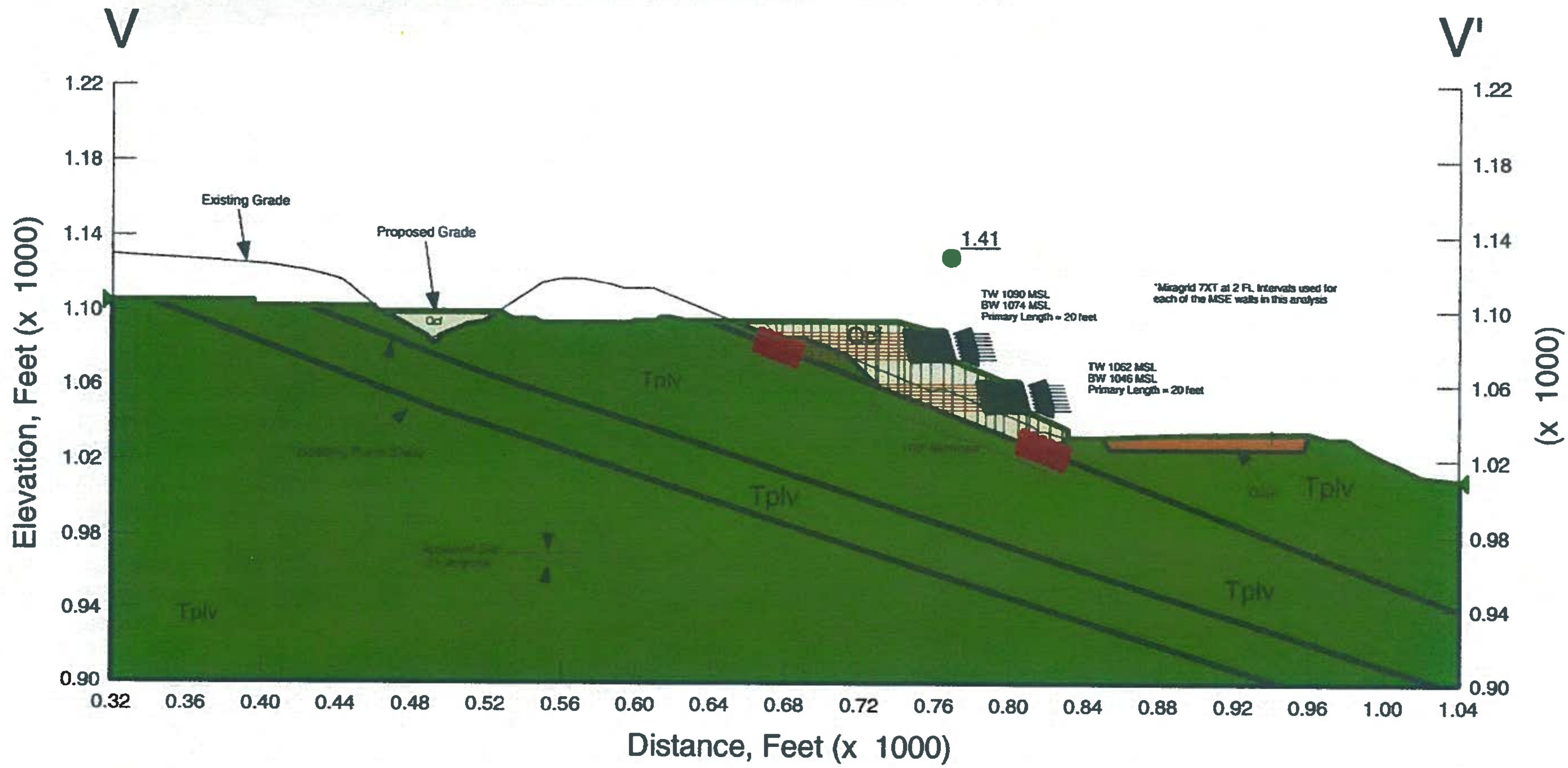


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 2.gsz
Date: 3/21/2013 Time: 1:45:48 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)

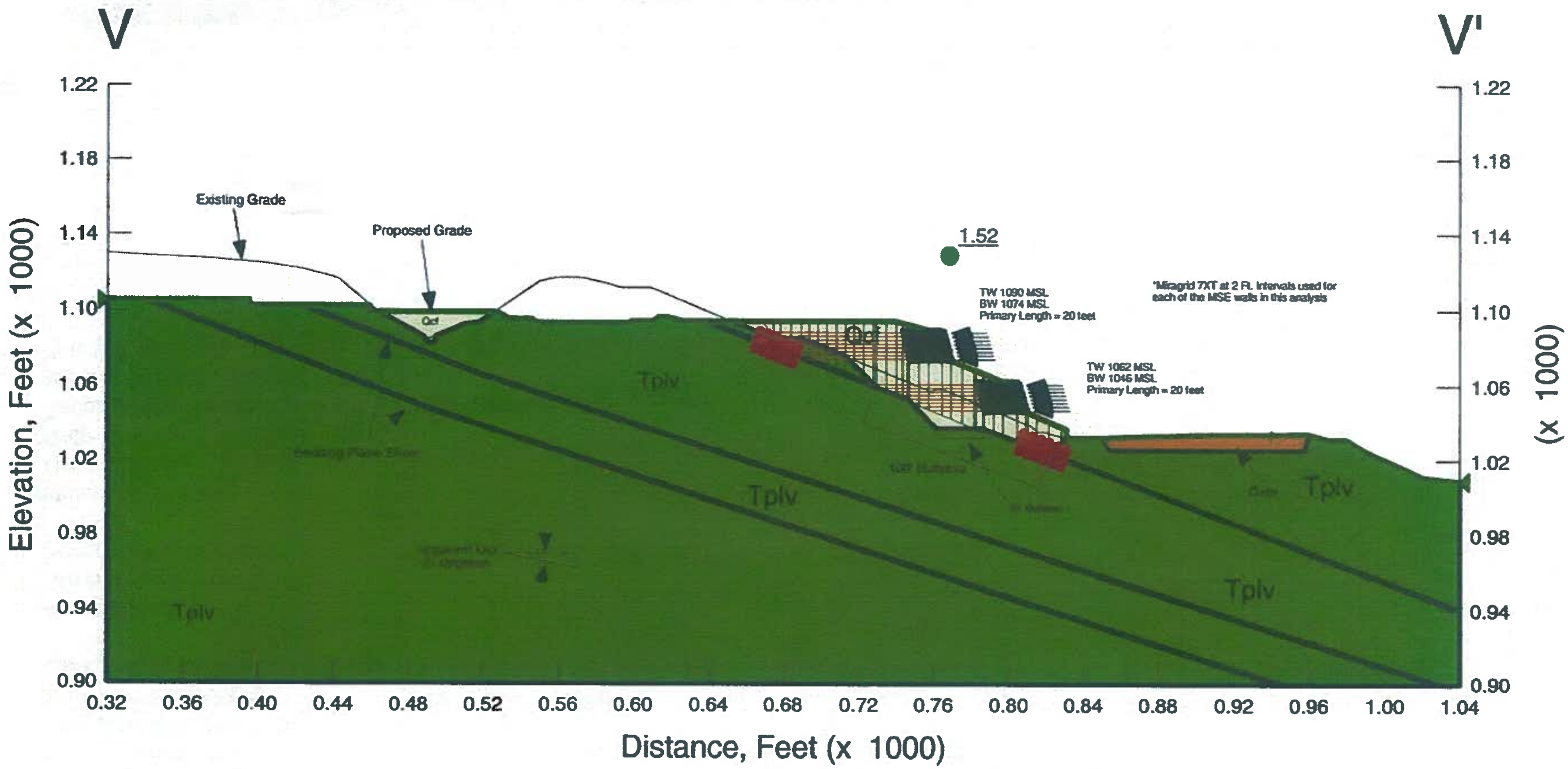


Portola Center - North
Project No. G1218-52-01
Name: VV-Case 3.gsz
Date: 3/26/2013 Time: 2:44:34 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

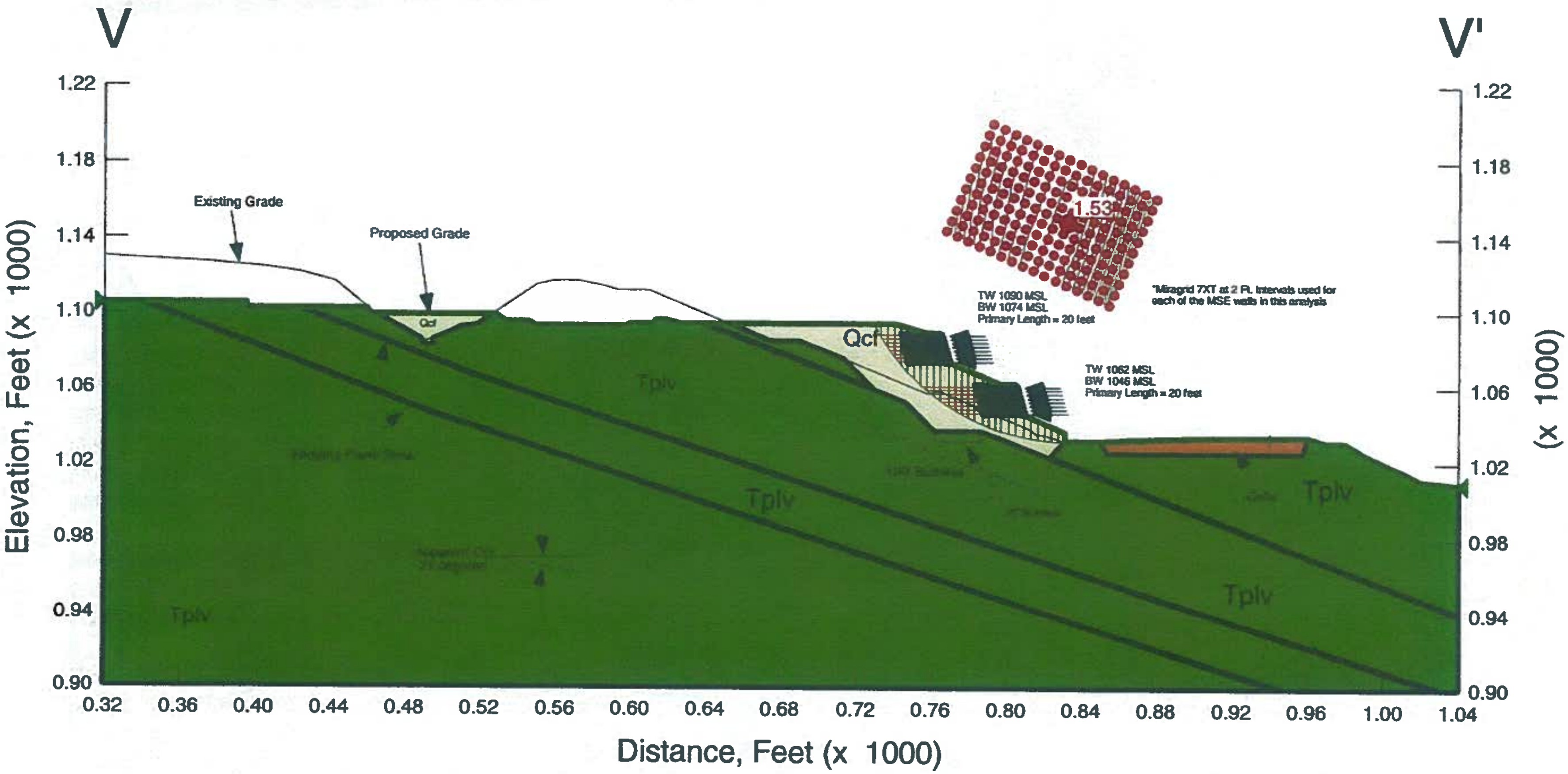
Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Bedding Plane Shear	115 pcf	30 psf	9 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-21 degrees)	115 pcf	300 psf	30 °	Tplv - C (-21 degrees)	Tplv - Phi (-21 degrees)



Portola Center - North
Project No. G1218-52-01
Name: VV-Case 3.gsz
Date: 3/26/2013 Time: 2:51:21 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Bedding Plane Shear 115 pcf 30 psf 9 °
MSE 120 pcf 500 psf 32 °
Tplv (-21 degrees) 115 pcf 300 psf 30 ° Tplv - C (-21 degrees) Tplv - Phi (-21 degrees)



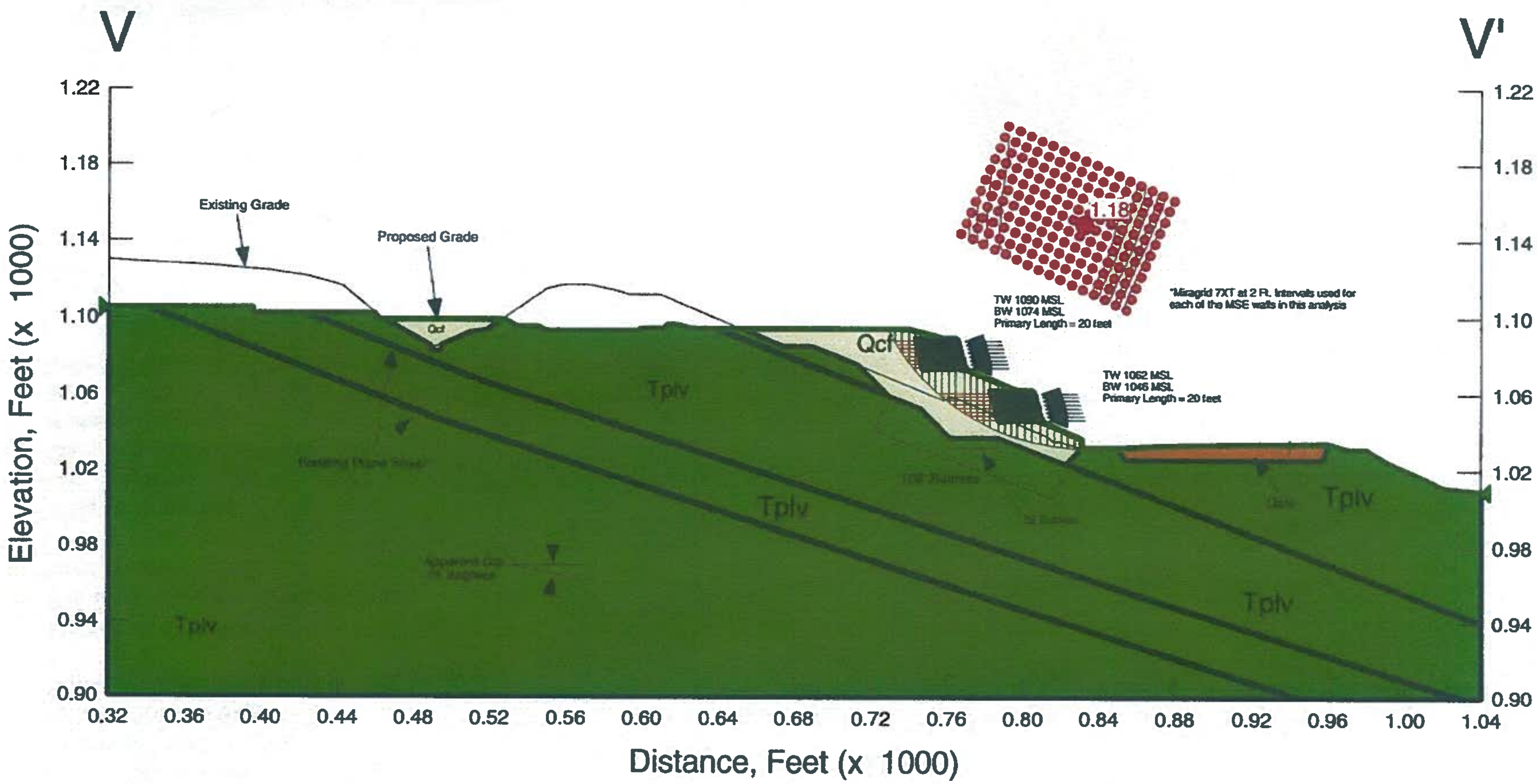
Portola Center - North
Project No. G1218-52-01
Name: VV-Case 3.gsz
Date: 3/26/2013 Time: 2:53:02 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:

Qcf	120 pcf	500 psf	28 °
Qafe	120 pcf	500 psf	28 °
Bedding Plane Shear	115 pcf	30 psf	9 °
MSE	120 pcf	500 psf	32 °
Tplv (-21 degrees)	115 pcf	300 psf	30 °

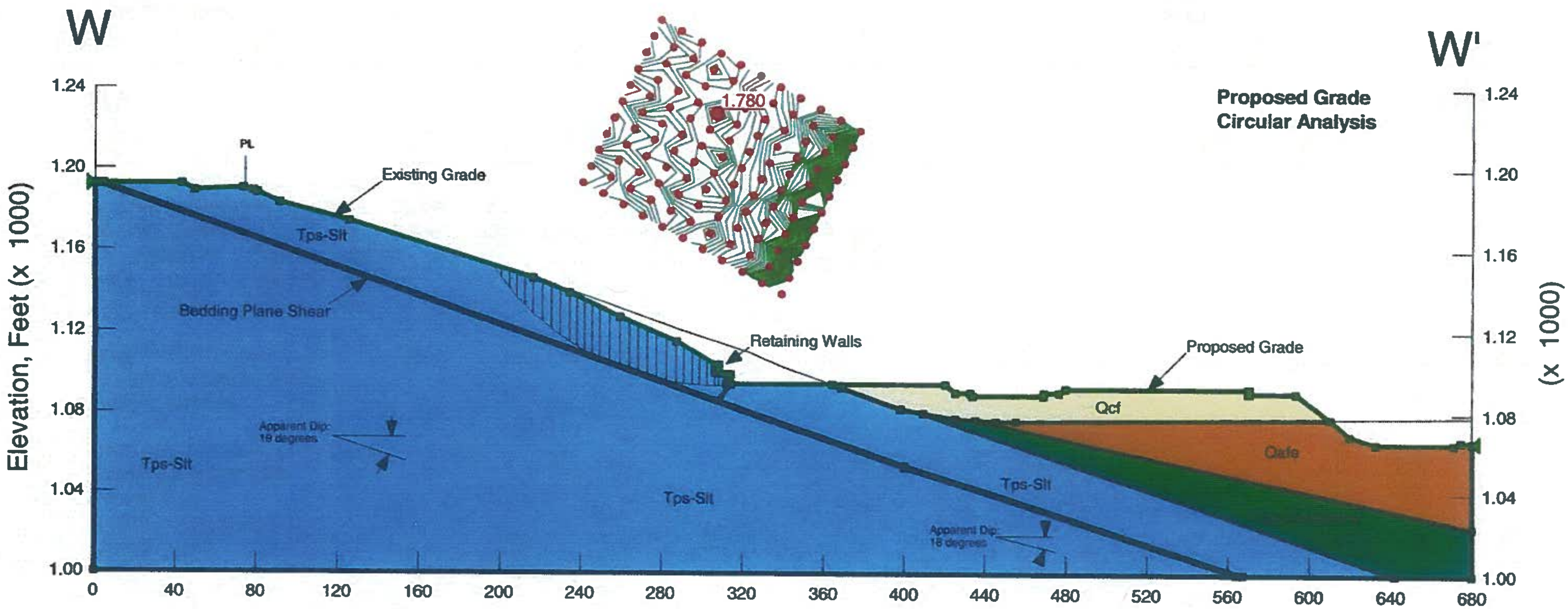
Tplv - C (-21 degrees) Tplv - Phi (-21 degrees)



Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 1.gsz
Date: 4/4/2013 Time: 11:33:27 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horiz Seismic Load:0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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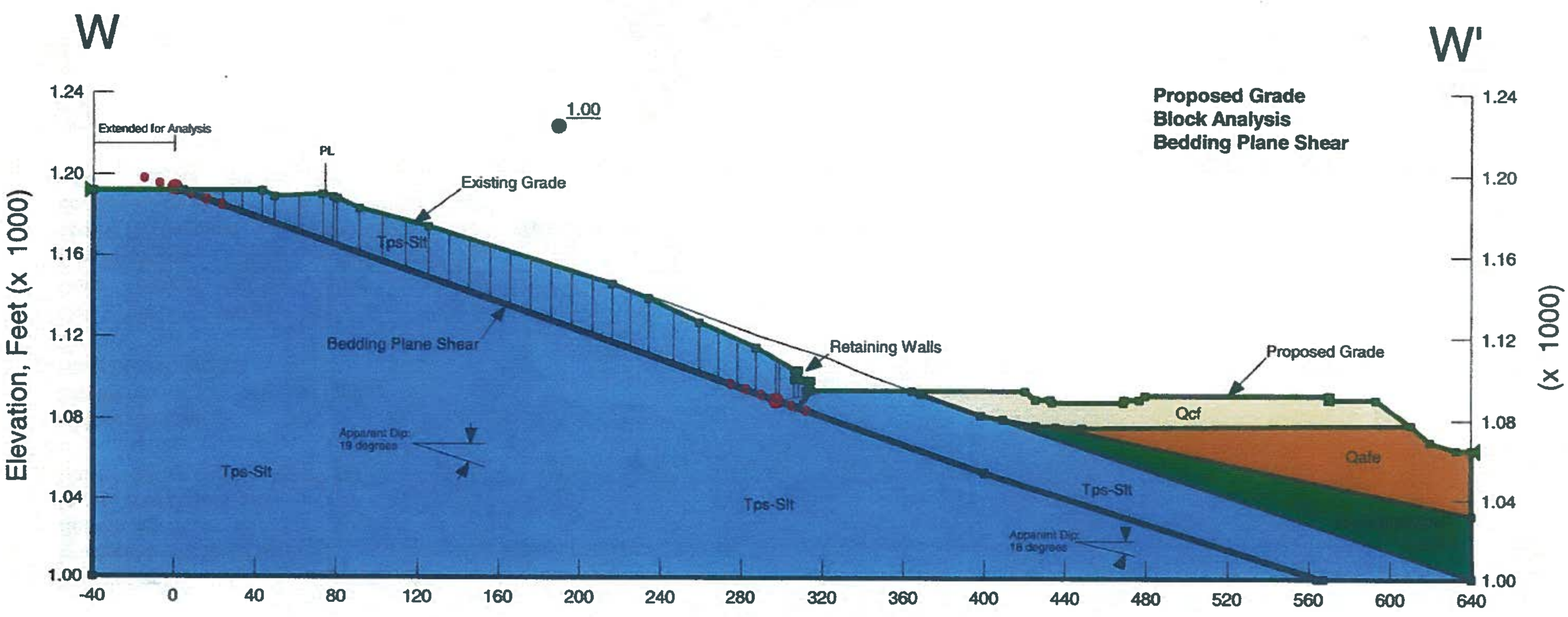
Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 2.gsz
Date: 4/4/2013 Time: 11:35:29 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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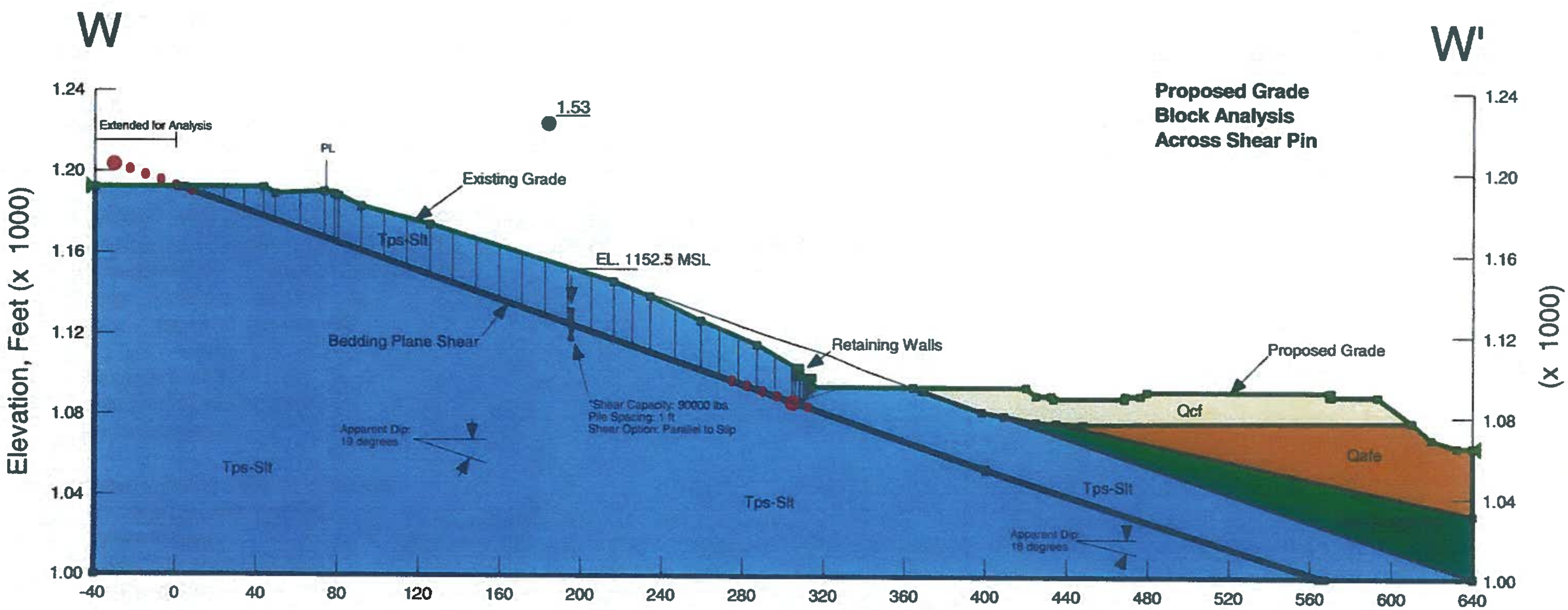
Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 4.gsz
Date: 4/4/2013 Time: 11:37:26 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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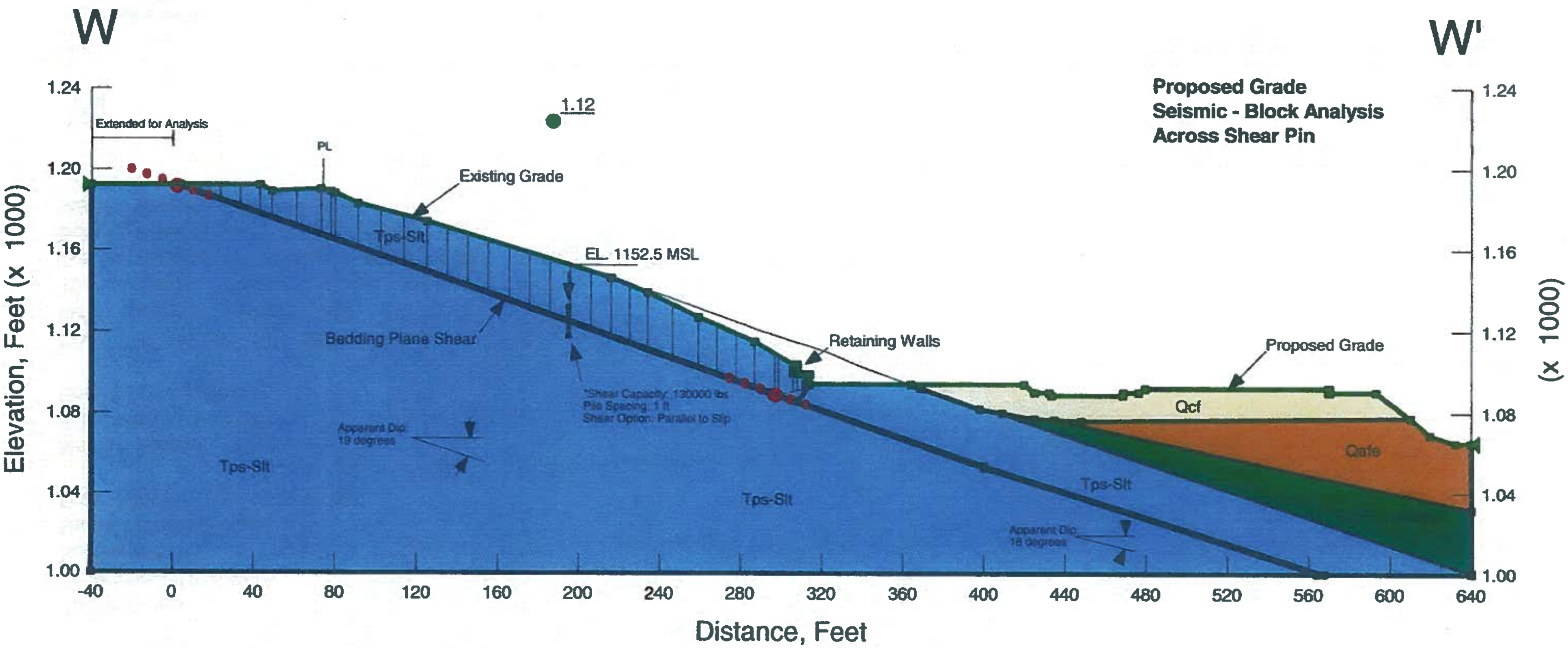
Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 4s-2.gsz
Date: 4/4/2013 Time: 11:45:25 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		



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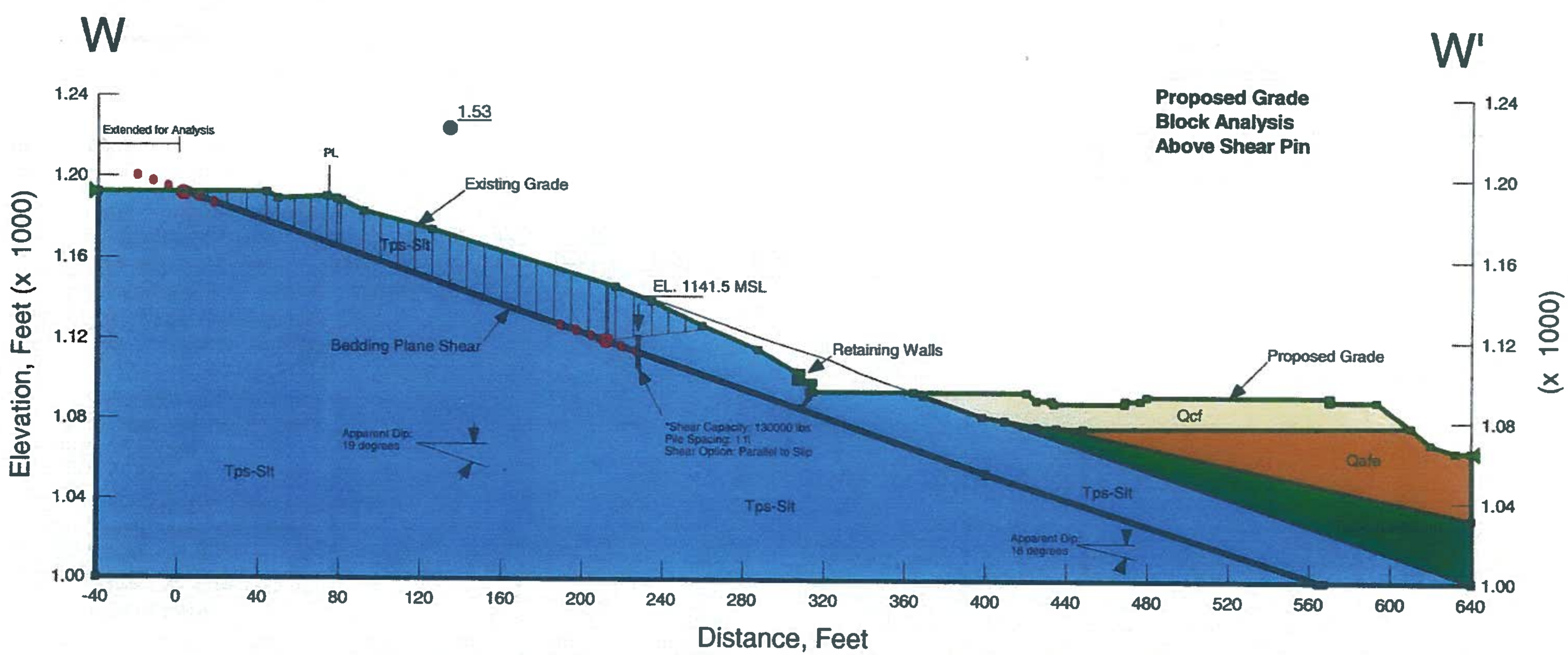
Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 5.gsz
Date: 4/4/2013 Time: 11:46:51 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	35 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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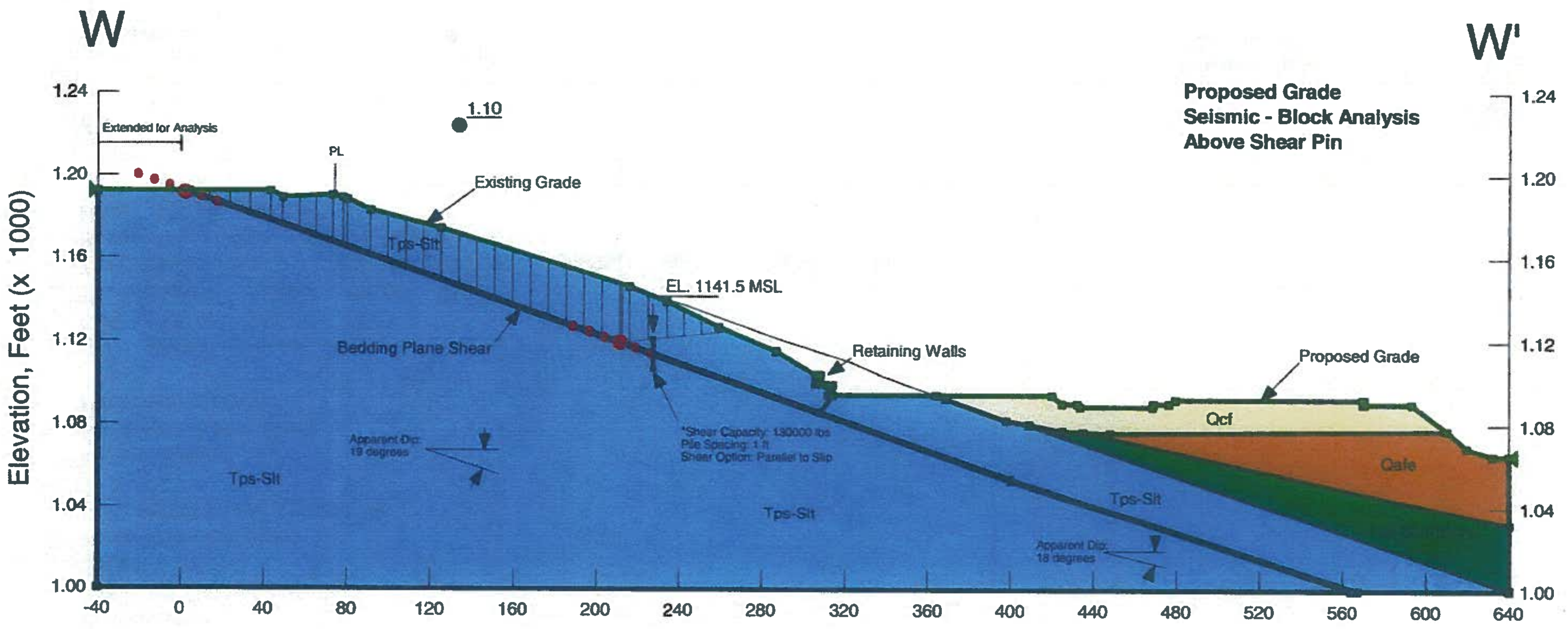
Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 5s.gsz
Date: 4/4/2013 Time: 11:49:28 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0.15

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (19 degrees)	115 pcf	900 psf	30 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		

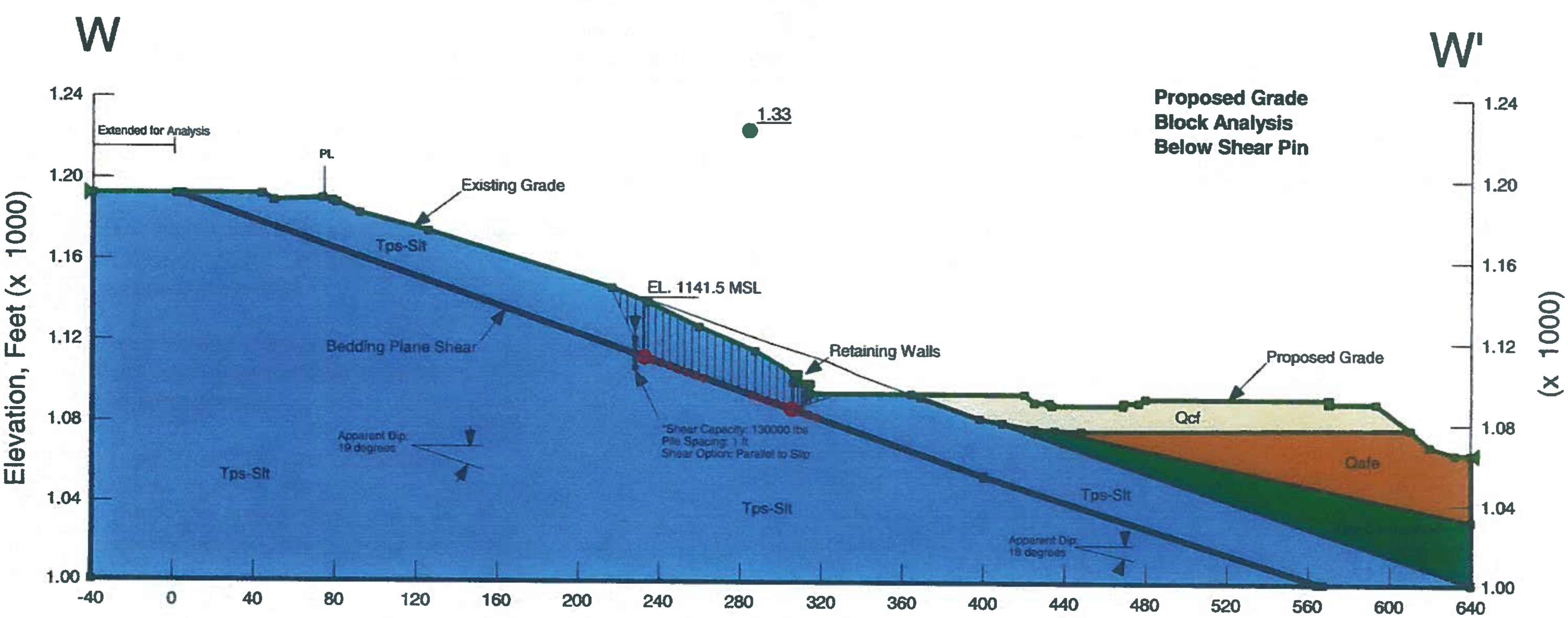


X:\Engineering and Geology\ENGINEER PROGRAMS, GUIDES, ETC\EngrgPrg\GEO-SLOPE2007\Projects\G1218-52-01 (Portola - North)\March 2013 - West\WW-Case 5s.gsz

Portola Center
Project No. G1218-52-01
Section W-W'
Name: WW-Case 6.gsz
Date: 4/4/2013 Time: 11:58:38 AM

Method: Spencer
Slip Surface Option: Block
Horiz Seismic Load:0

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (19 degrees)	115 pcf	400 psf	33 °	Tps-Slt (19 deg) - C	Tps-Slt (19 deg) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		



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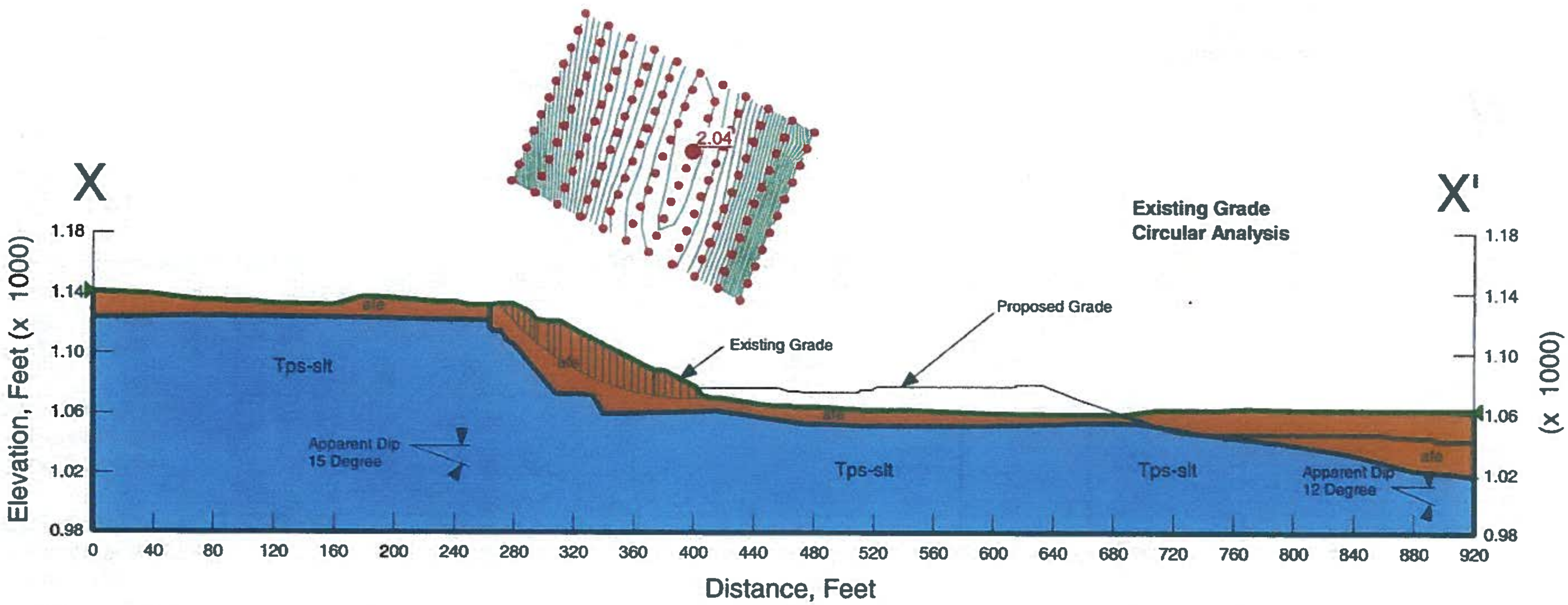
Portola Center - North
Project No. G1218-52-01
Name: XX-Case 1.gsz
Date: 3/27/2013 Time: 11:09:08 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qafe	120 pcf	500 psf	28 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-slt-C (15 degree)	Tps-slt-Phi (15 degree)



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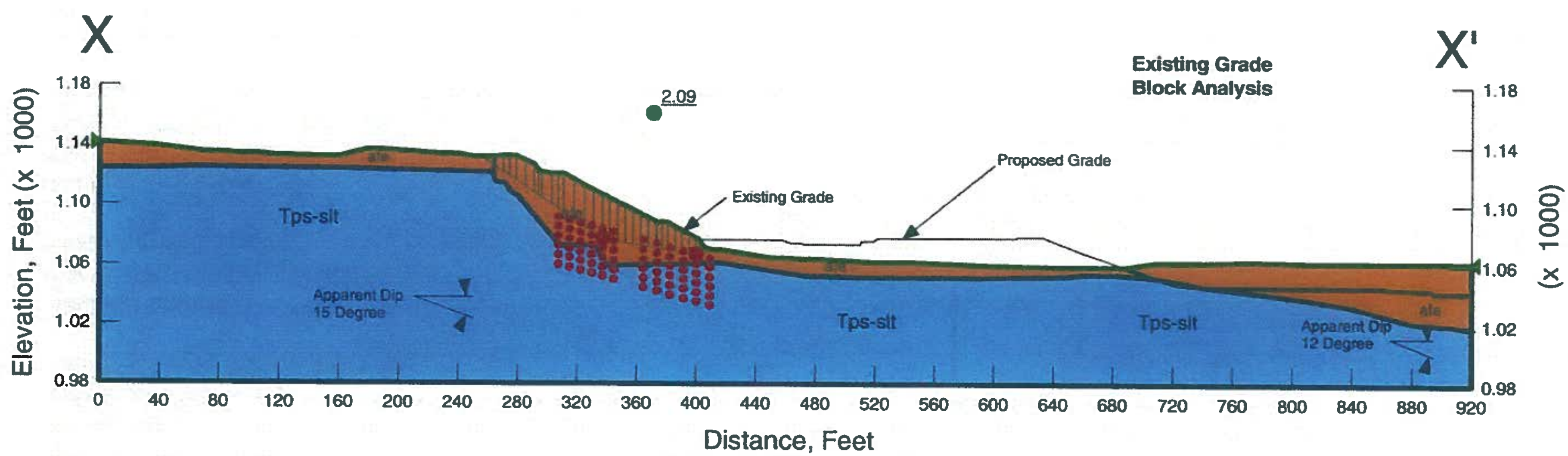
Portola Center - North
Project No. G1218-52-01
Name: XX-Case 2.gsz
Date: 3/27/2013 Time: 11:27:32 AM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qafe	120 pcf	500 psf	28 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-slt-C (15 degree)	Tps-slt-Phi (15 degree)



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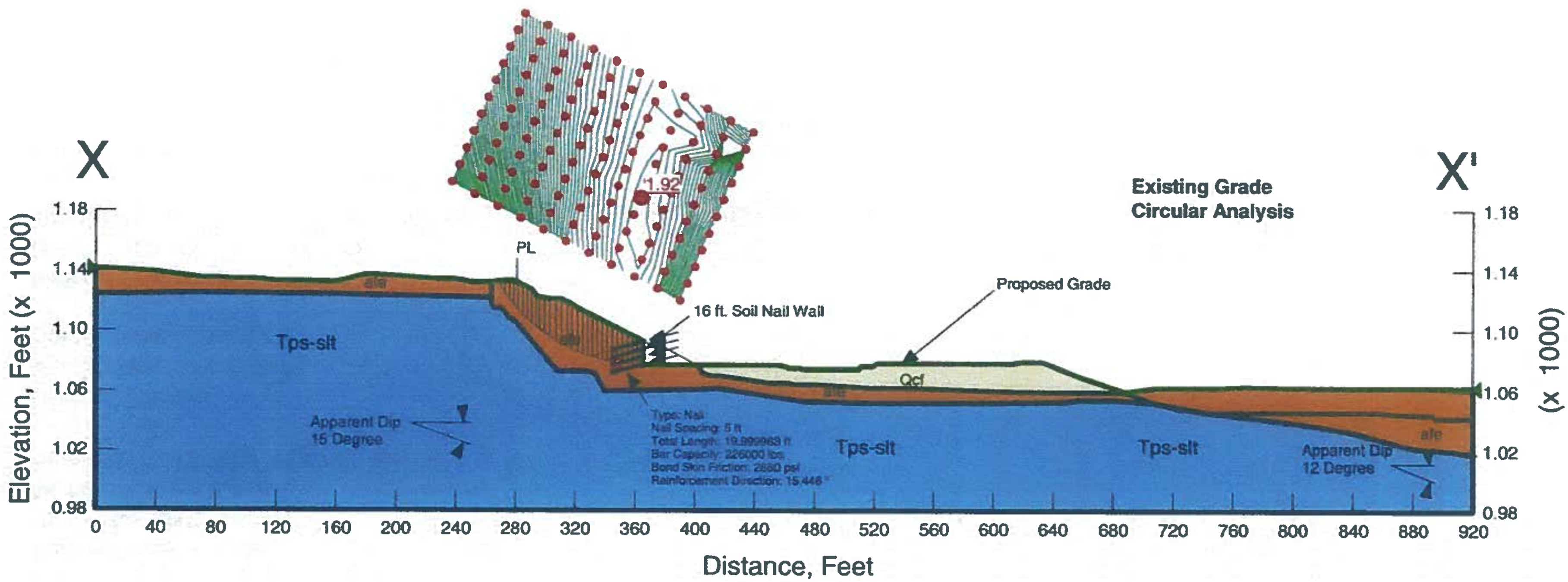
Portola Center - North
Project No. G1218-52-01
Name: XX-Case 3.gsz
Date: 3/27/2013 Time: 2:48:41 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:
Qcf 120 pcf 500 psf 28 °
Qafe 120 pcf 500 psf 28 °
Tps-Slt (15 degrees) 115 pcf 400 psf 33 ° Tps-slt-C (15 degree) Tps-slt-Phi (15 degree)



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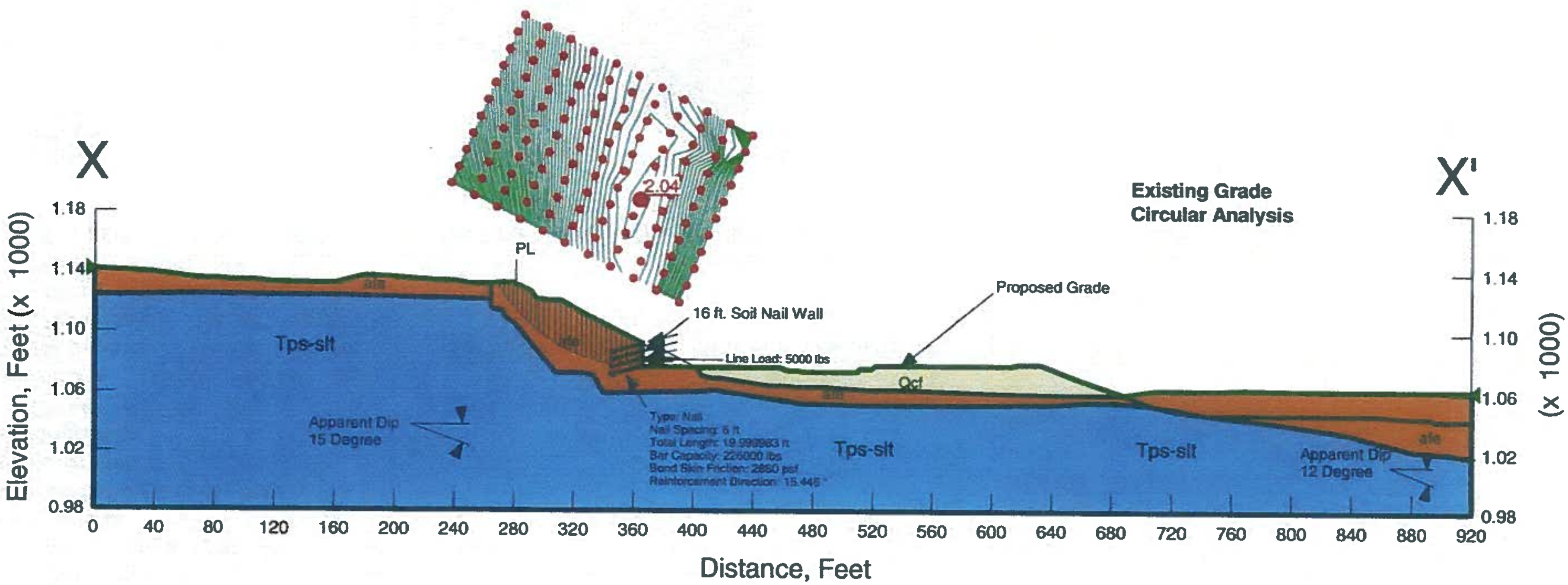
Portola Center - North
Project No. G1218-52-01
Name: XX-Case 4.gsz
Date: 3/27/2013 Time: 2:51:15 PM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	28 °		
Tps-Slt (15 degrees)	115 pcf	400 psf	33 °	Tps-slt-C (15 degree)	Tps-slt-Phi (15 degree)



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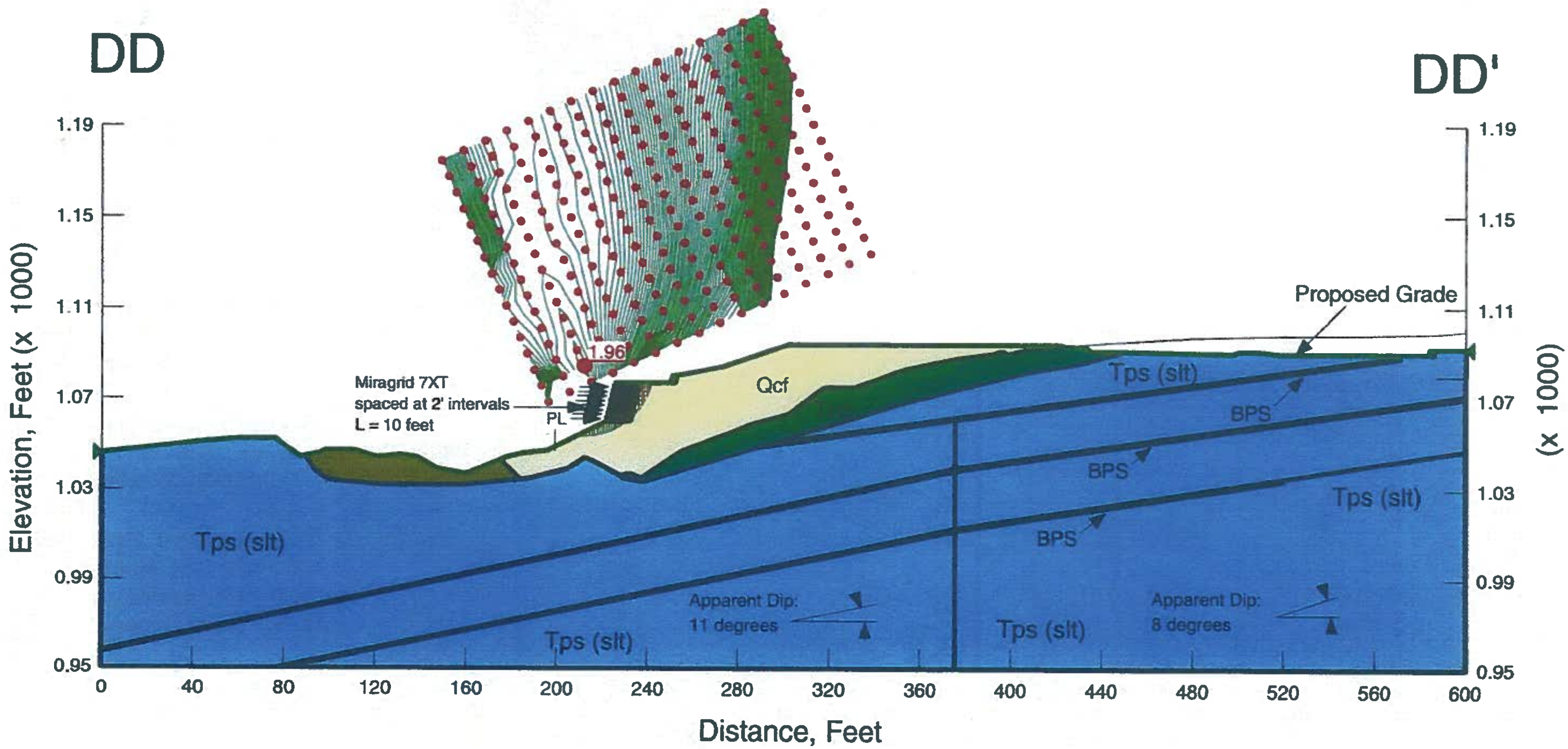
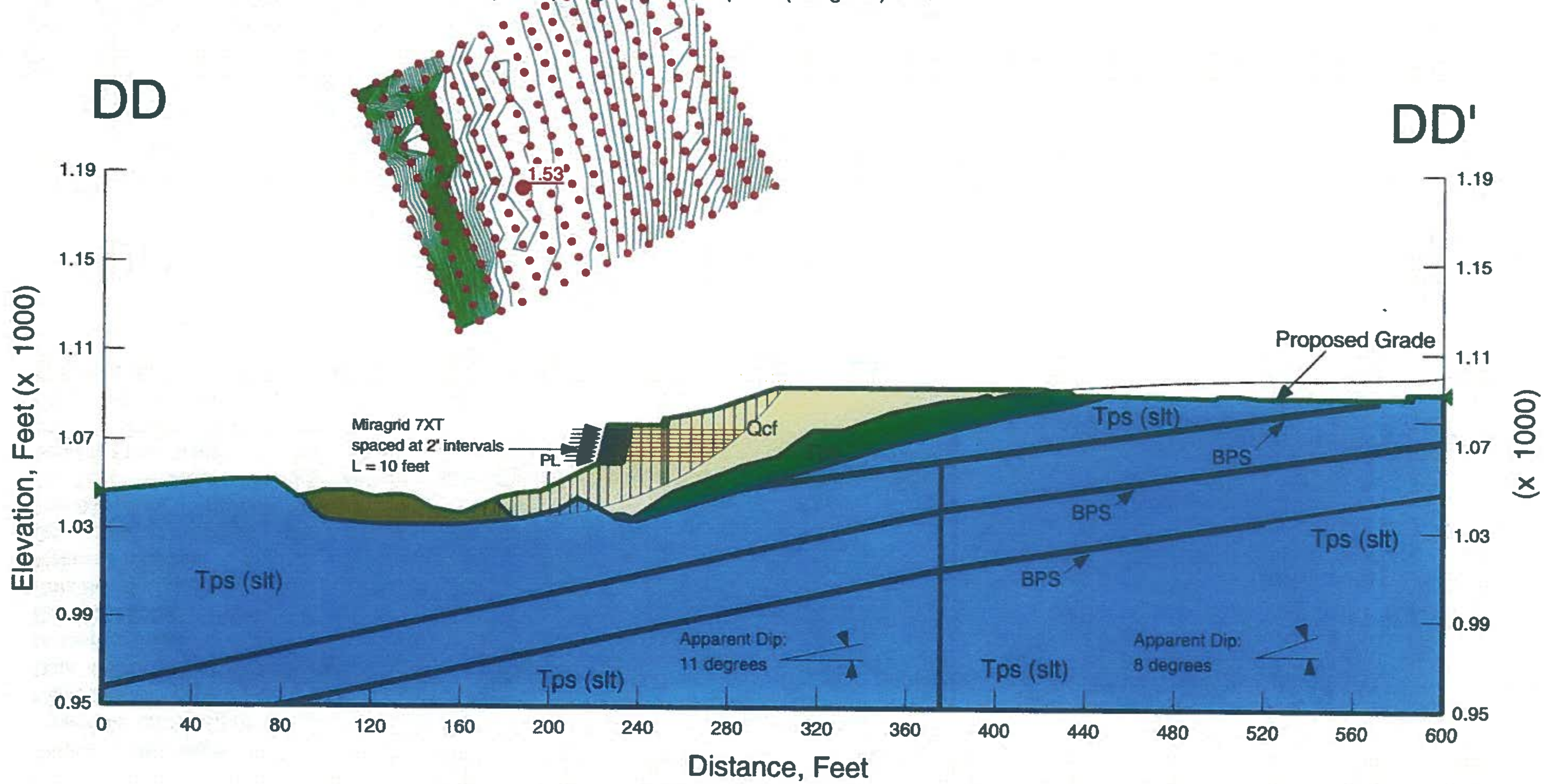
Portola Center - North
Project No. G1218-52-01
Name: DD-DD'-Case 1.gsz
Date: 4/8/2013 Time: 12:13:52 PM
Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (11 degrees)	115 pcf	400 psf	33 °	Tps-Slt (11 degrees) - C	Tps-Slt (11 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qls	120 pcf	300 psf	29 °		
Tps-Slt (8 degrees)	115 pcf	400 psf	33 °	Tps-Slt (8 degrees) - C	Tps-Slt (8 degrees) - Phi



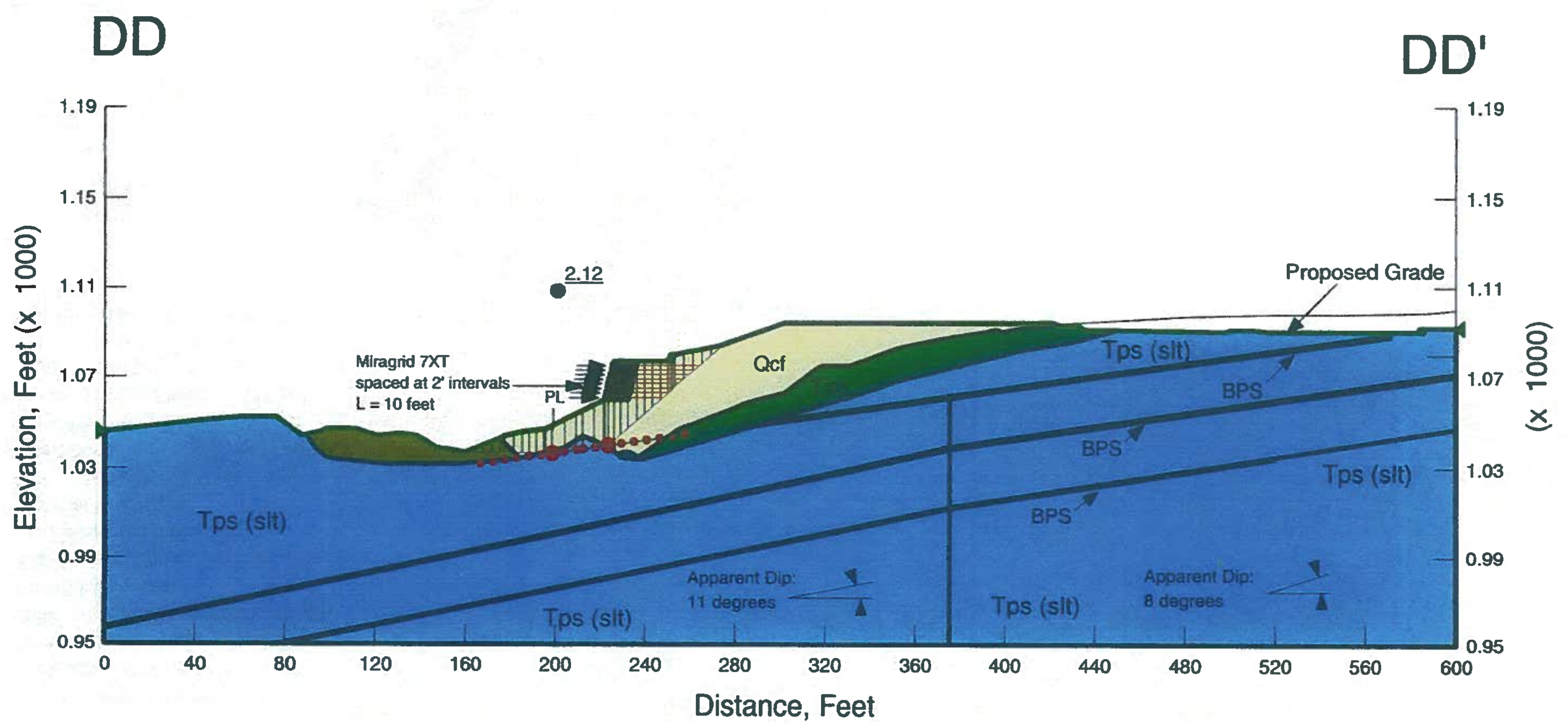
Portola Center - North
Project No. G1218-52-01
Name: DD-DD'-Case 1s.gsz
Date: 4/8/2013 Time: 12:15:42 PM
Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (11 degrees)	115 pcf	400 psf	33 °	Tps-Slt (11 degrees) - C	Tps-Slt (11 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qls	120 pcf	300 psf	29 °		
Tps-Slt (8 degrees)	115 pcf	400 psf	33 °	Tps-Slt (8 degrees) - C	Tps-Slt (8 degrees) - Phi

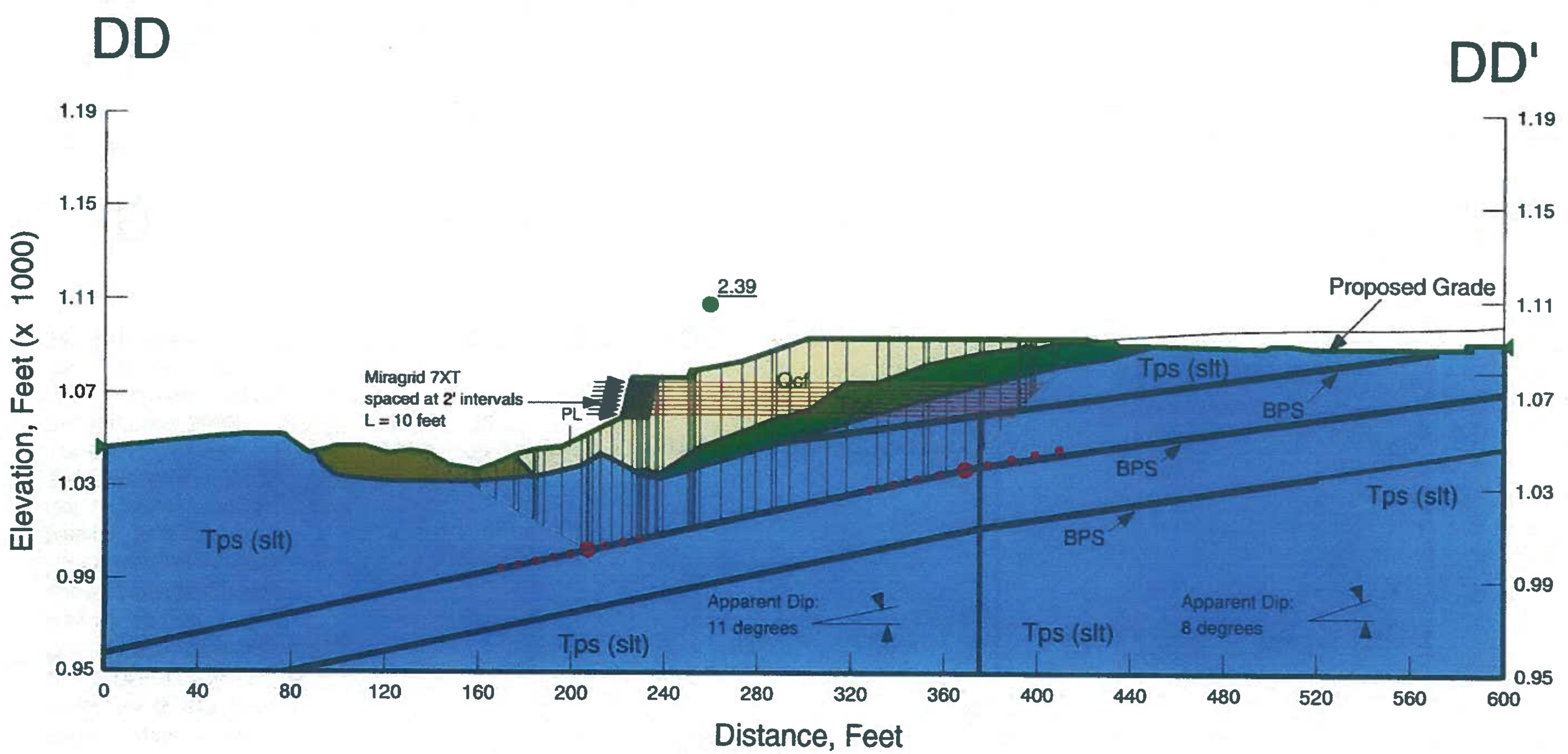


Portola Center - North
Project No. G1218-52-01
Name: DD-DD'-Case 2.gsz
Date: 4/8/2013 Time: 12:30:25 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (11 degrees)	115 pcf	400 psf	33 °	Tps-Slt (11 degrees) - C	Tps-Slt (11 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qls	120 pcf	300 psf	. 29 °		
Tps-Slt (8 degrees)	115 pcf	400 psf	33 °	Tps-Slt (8 degrees) - C	Tps-Slt (8 degrees) - Phi

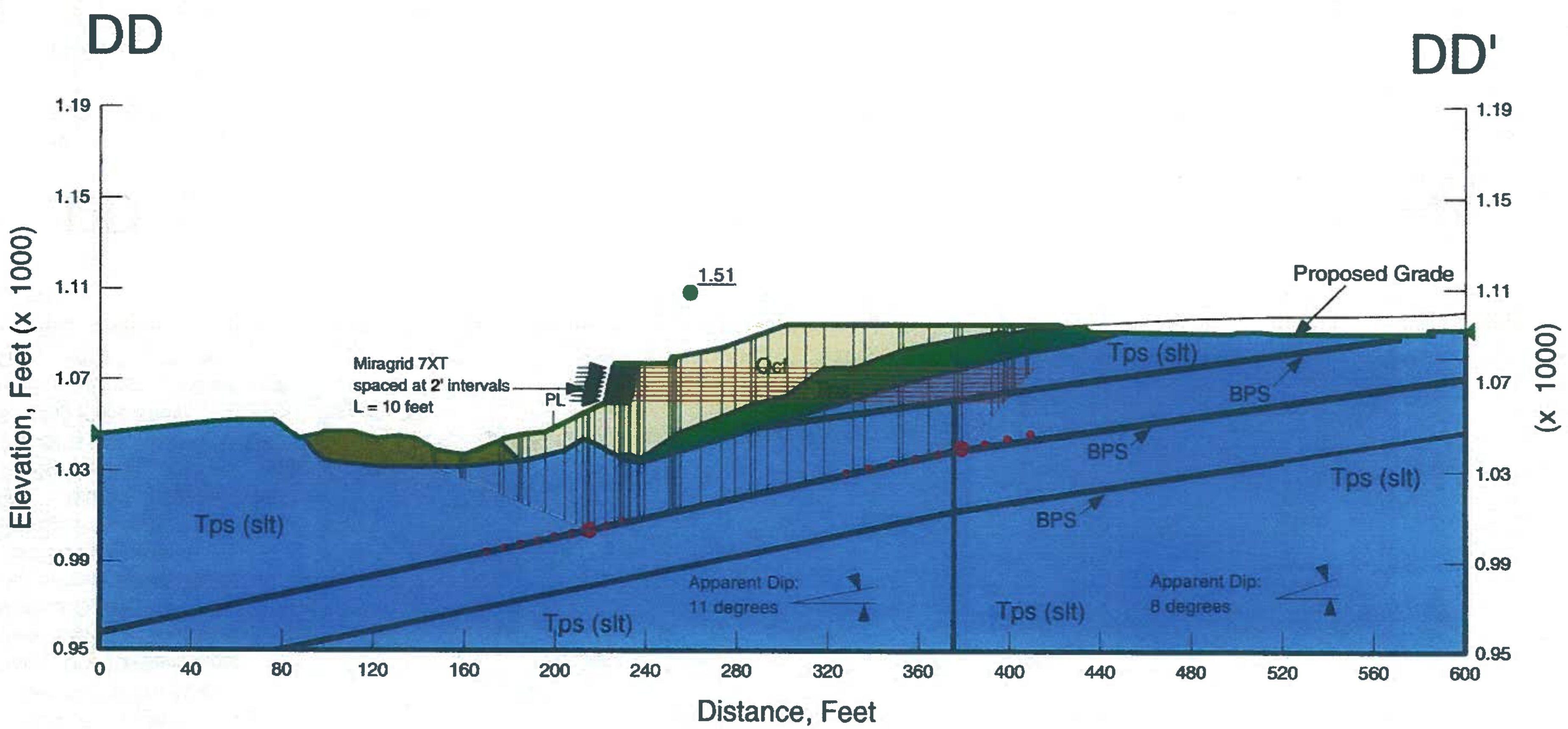


Portola Center - North
Project No. G1218-52-01
Name: DD-DD'-Case 3.gsz
Date: 4/8/2013 Time: 12:40:17 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:
Qcf 120 pcf 500 psf 28 °
Tps-Sandstone 125 pcf 400 psf 33 °
Tps-Slt (11 degrees) 115 pcf 400 psf 33 ° Tps-Slt (11 degrees) - C Tps-Slt (11 degrees) - Phi
Bedding Plane Shear 115 pcf 20 psf 15 °
MSE 120 pcf 500 psf 32 °
Qls 120 pcf 300 psf 29 °
Tps-Slt (8 degrees) 115 pcf 400 psf 33 ° Tps-Slt (8 degrees) - C Tps-Slt (8 degrees) - Phi



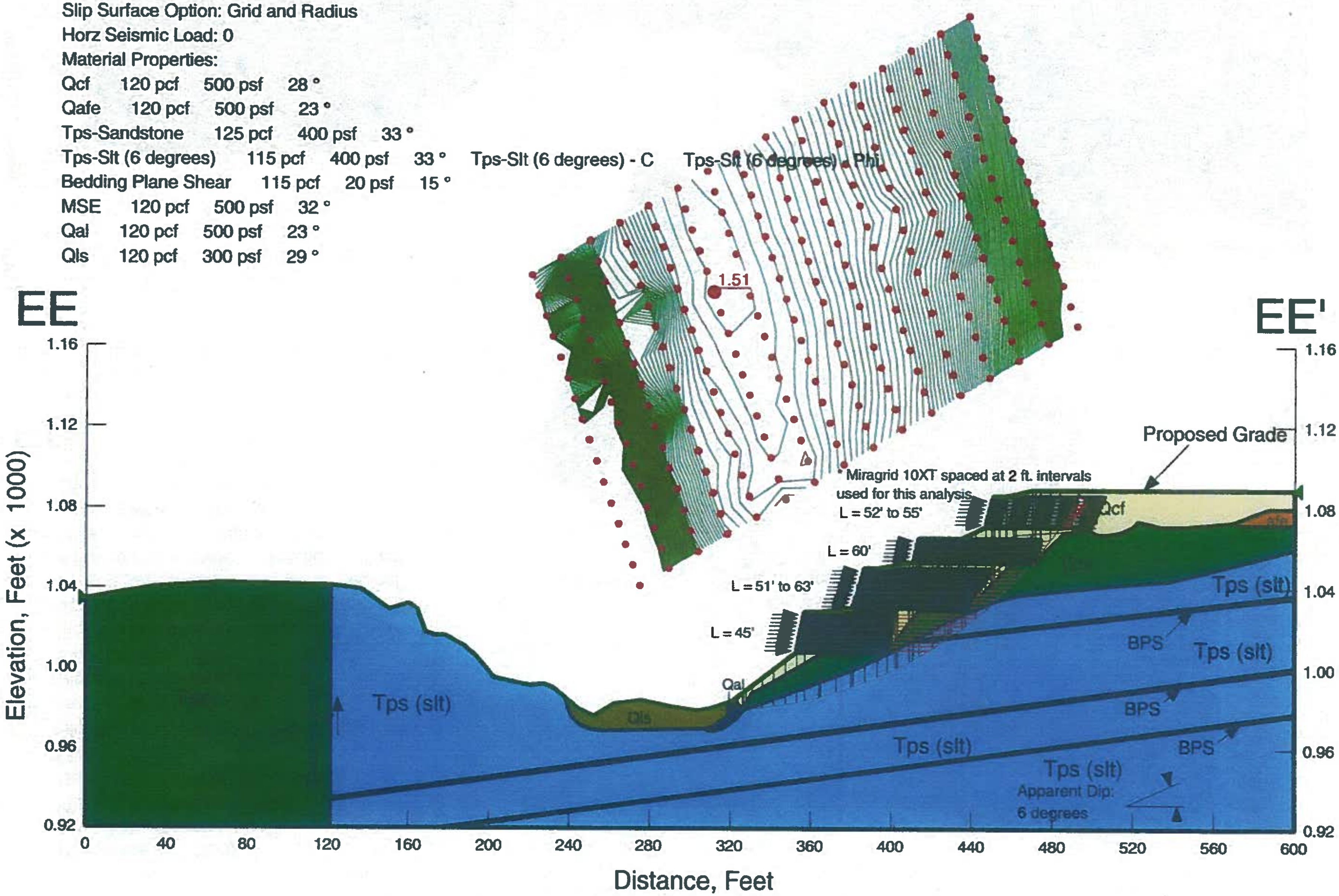
Portola Center - North
Project No. G1218-52-01
Name: DD-DD'-Case 3s.gsz
Date: 4/8/2013 Time: 12:42:49 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (11 degrees)	115 pcf	900 psf	30 °	Tps-Slt (11 degrees) - C	Tps-Slt (11 degrees) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qls	120 pcf	300 psf	29 °		
Tps-Slt (8 degrees)	115 pcf	900 psf	30 °	Tps-Slt (8 degrees) - C	Tps-Slt (8 degrees) - Phi



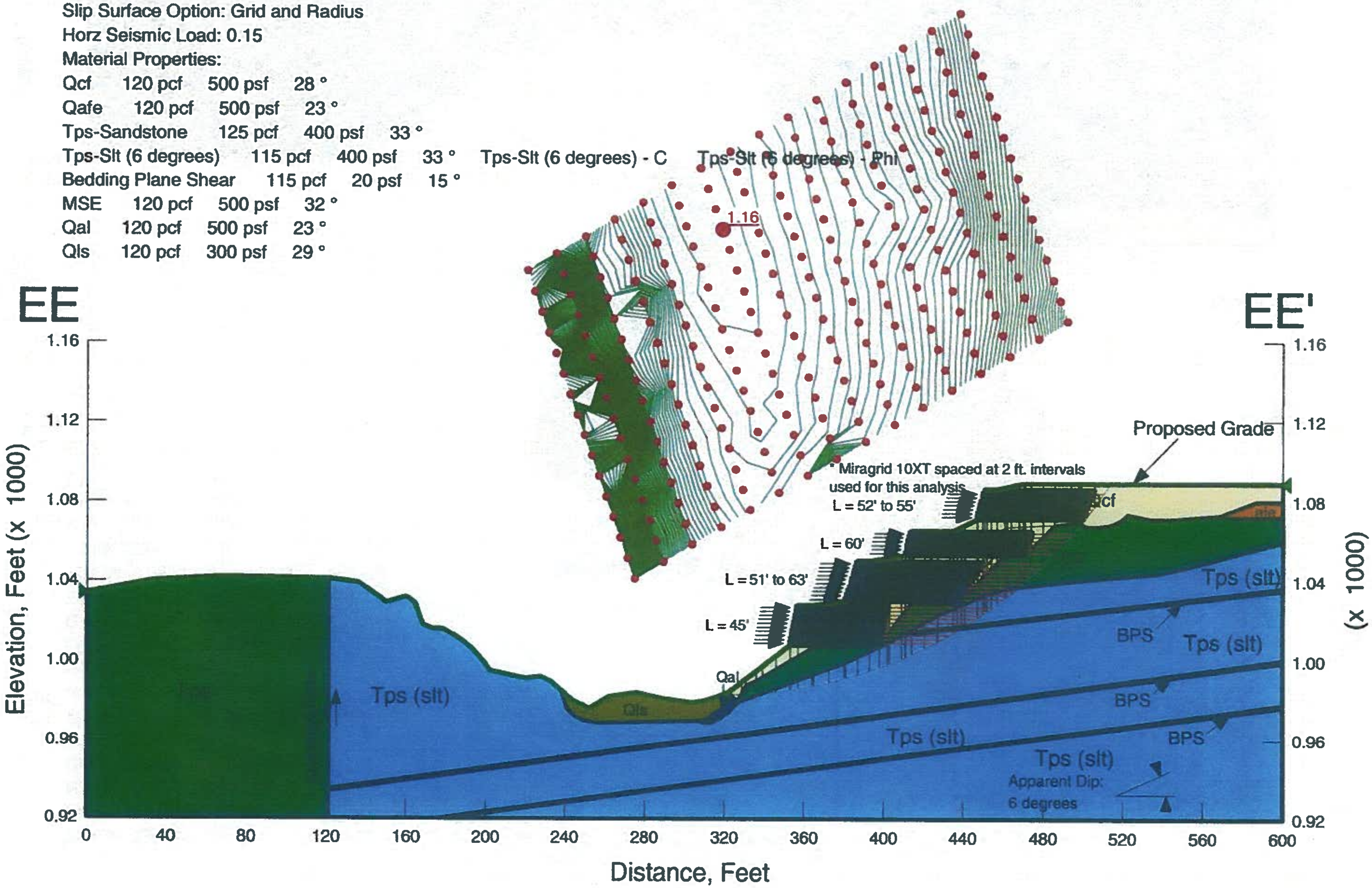
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 1.gsz
Date: 4/8/2013 Time: 12:47:39 PM
Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



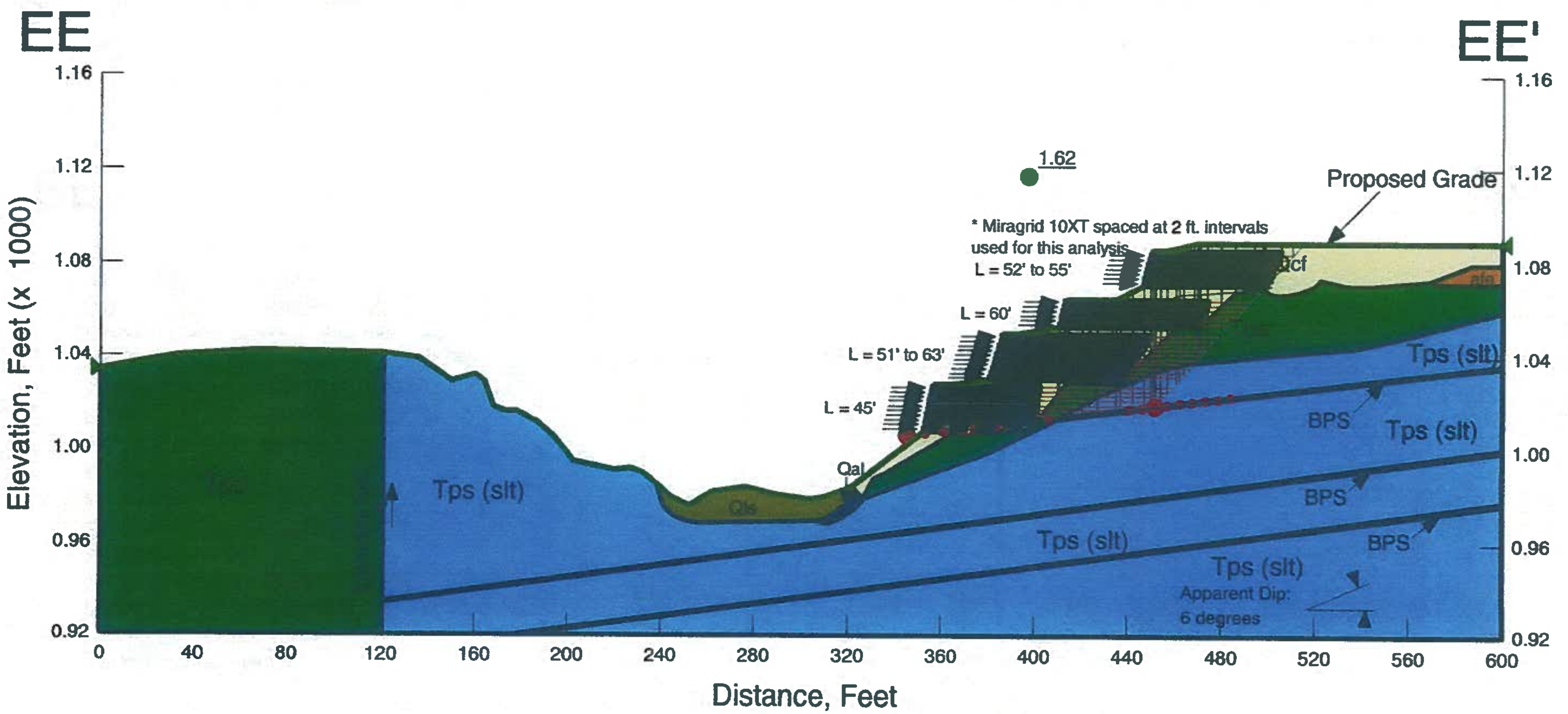
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 1s.gsz
Date: 4/8/2013 Time: 12:48:54 PM
Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



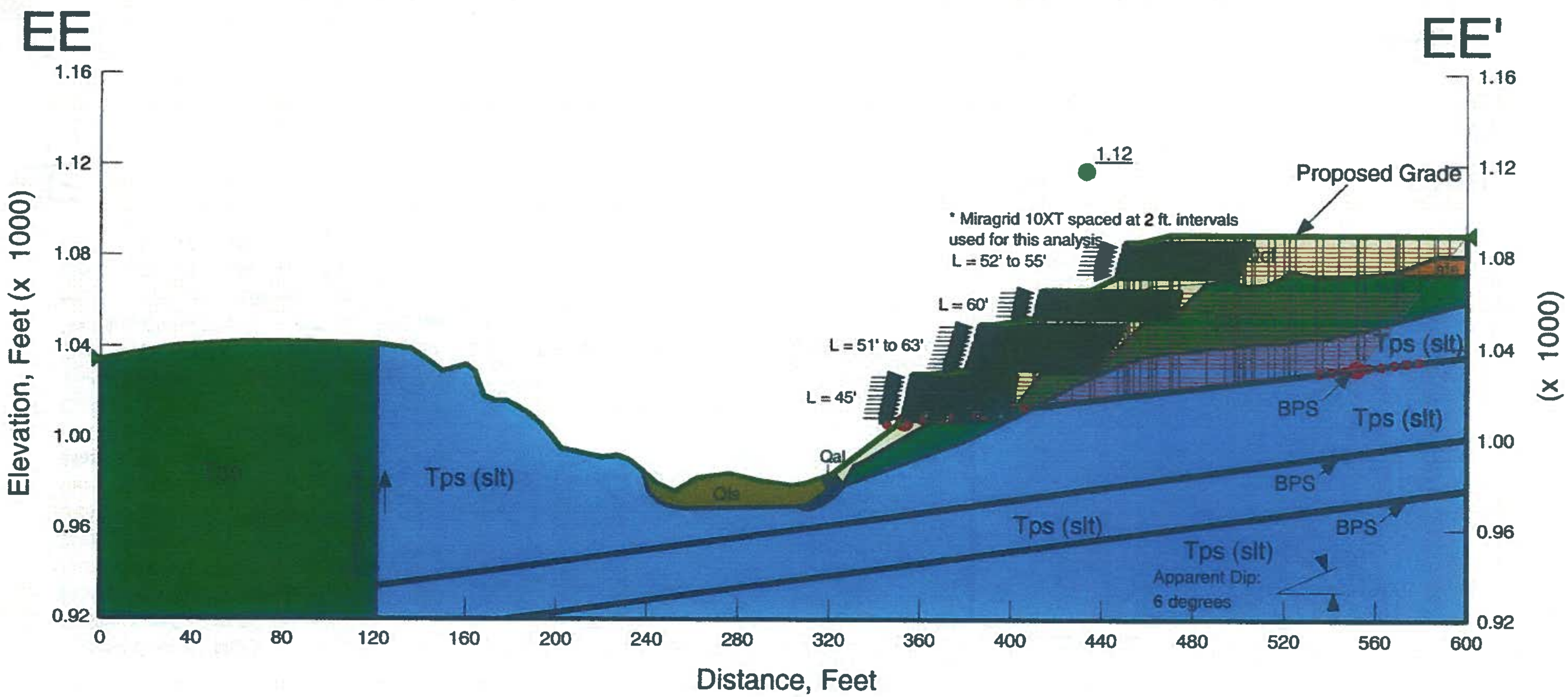
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 2.gsz
Date: 4/8/2013 Time: 12:49:50 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



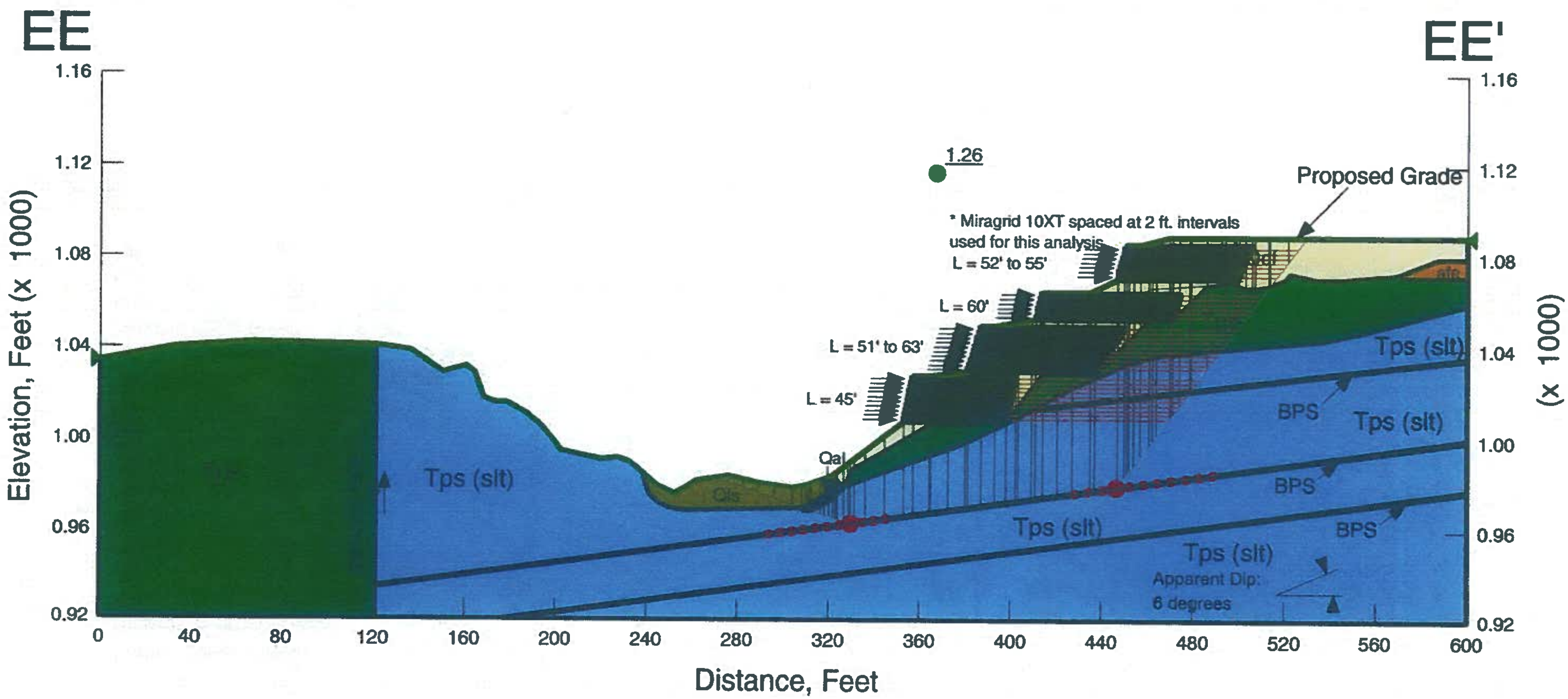
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 2s.gsz
Date: 4/8/2013 Time: 12:51:02 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (6 degrees)	115 pcf	900 psf	30 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



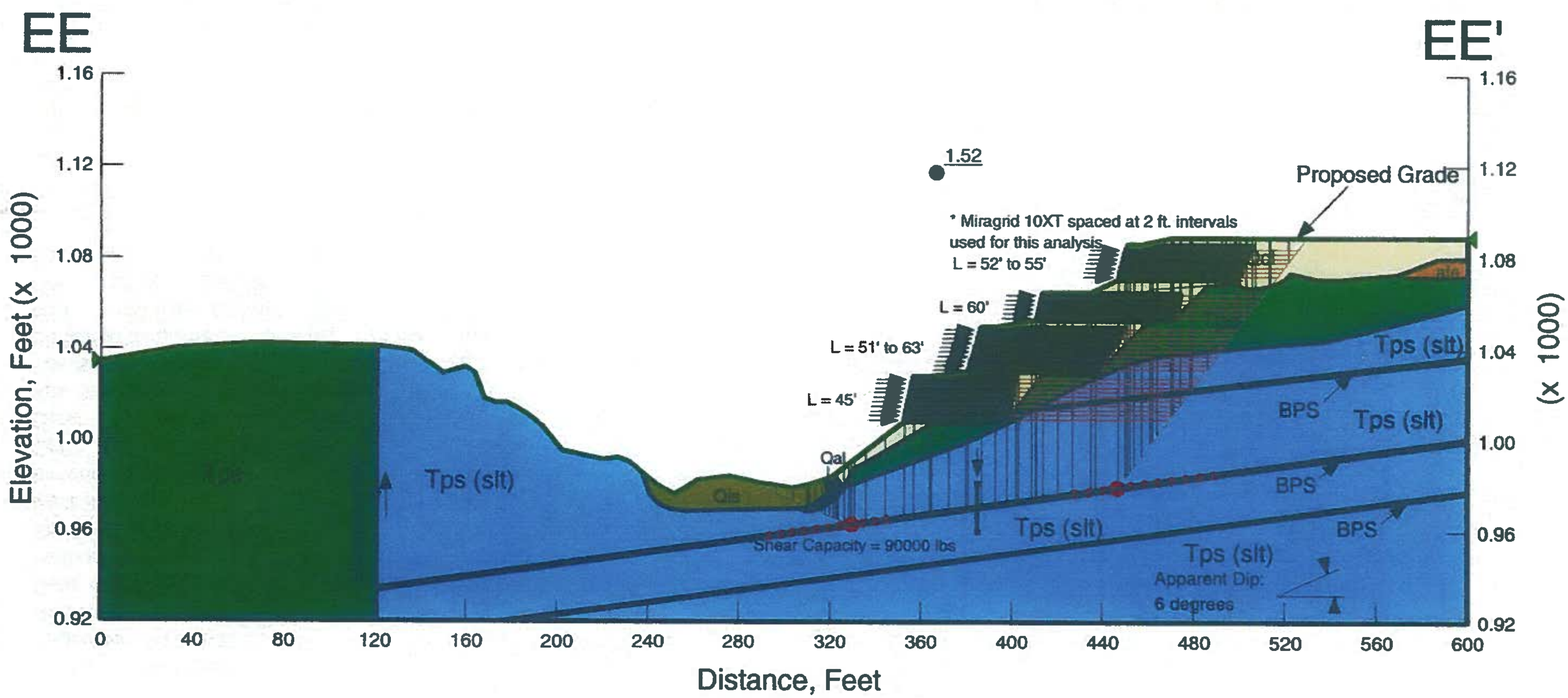
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 3.gsz
Date: 4/8/2013 Time: 12:51:40 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



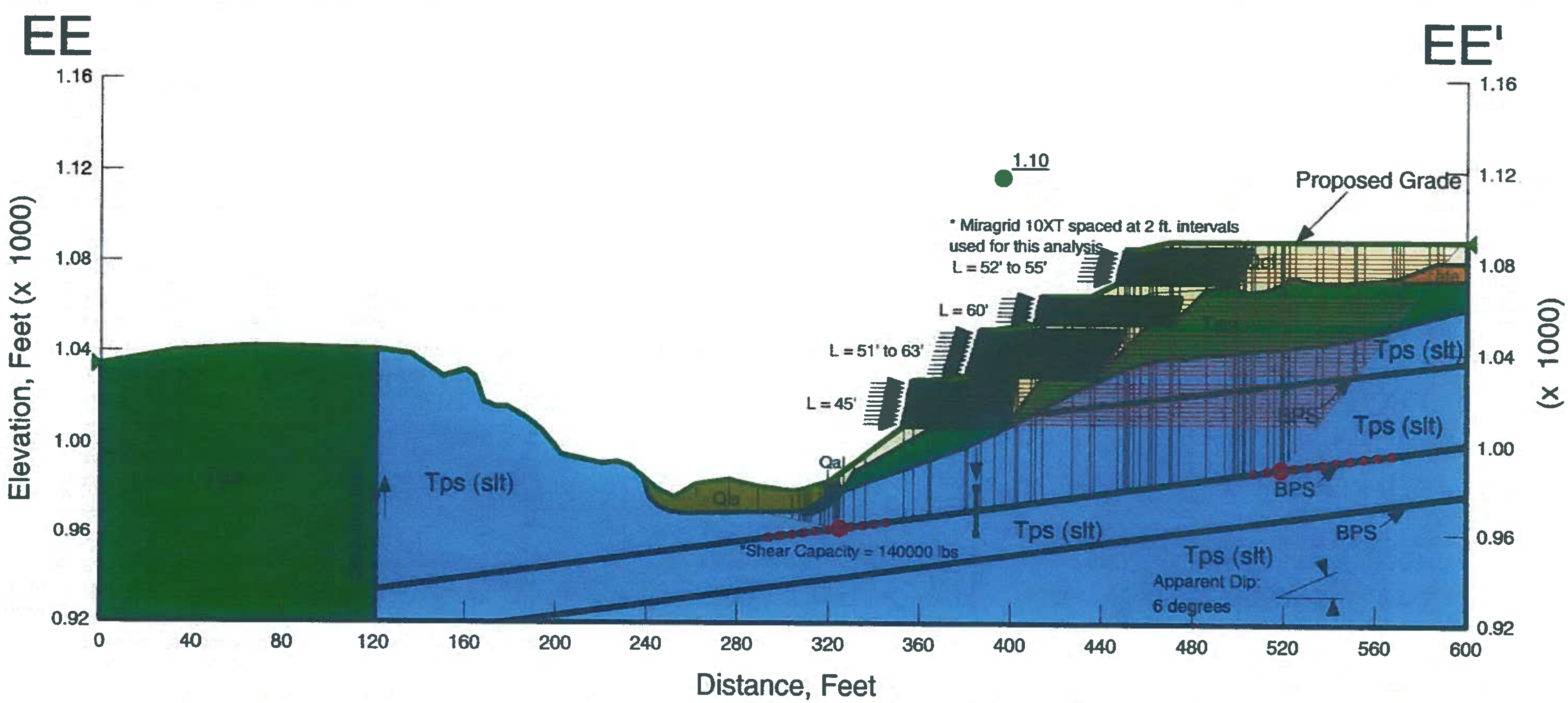
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 3a.gsz
Date: 4/8/2013 Time: 12:52:34 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



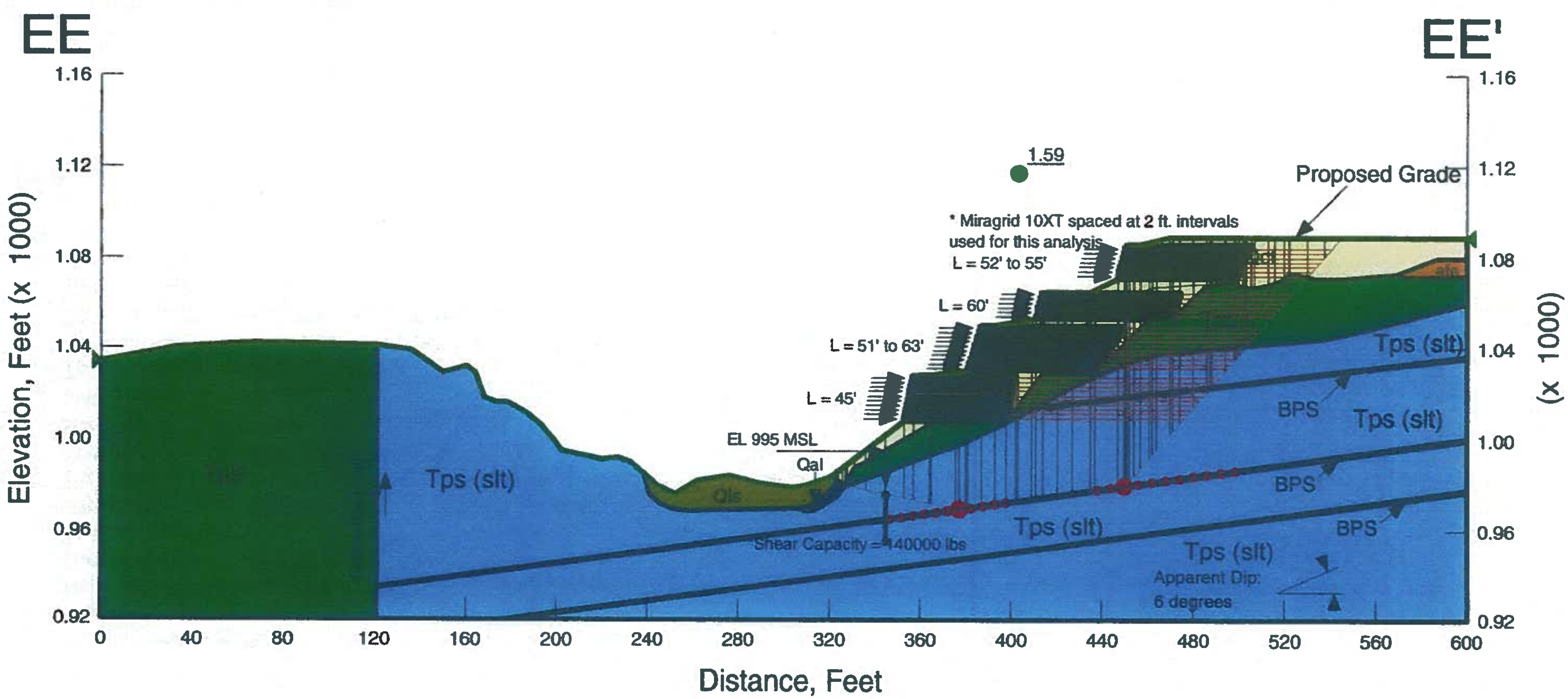
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 3a-s.gsz
Date: 4/8/2013 Time: 12:53:42 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (6 degrees)	115 pcf	900 psf	30 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



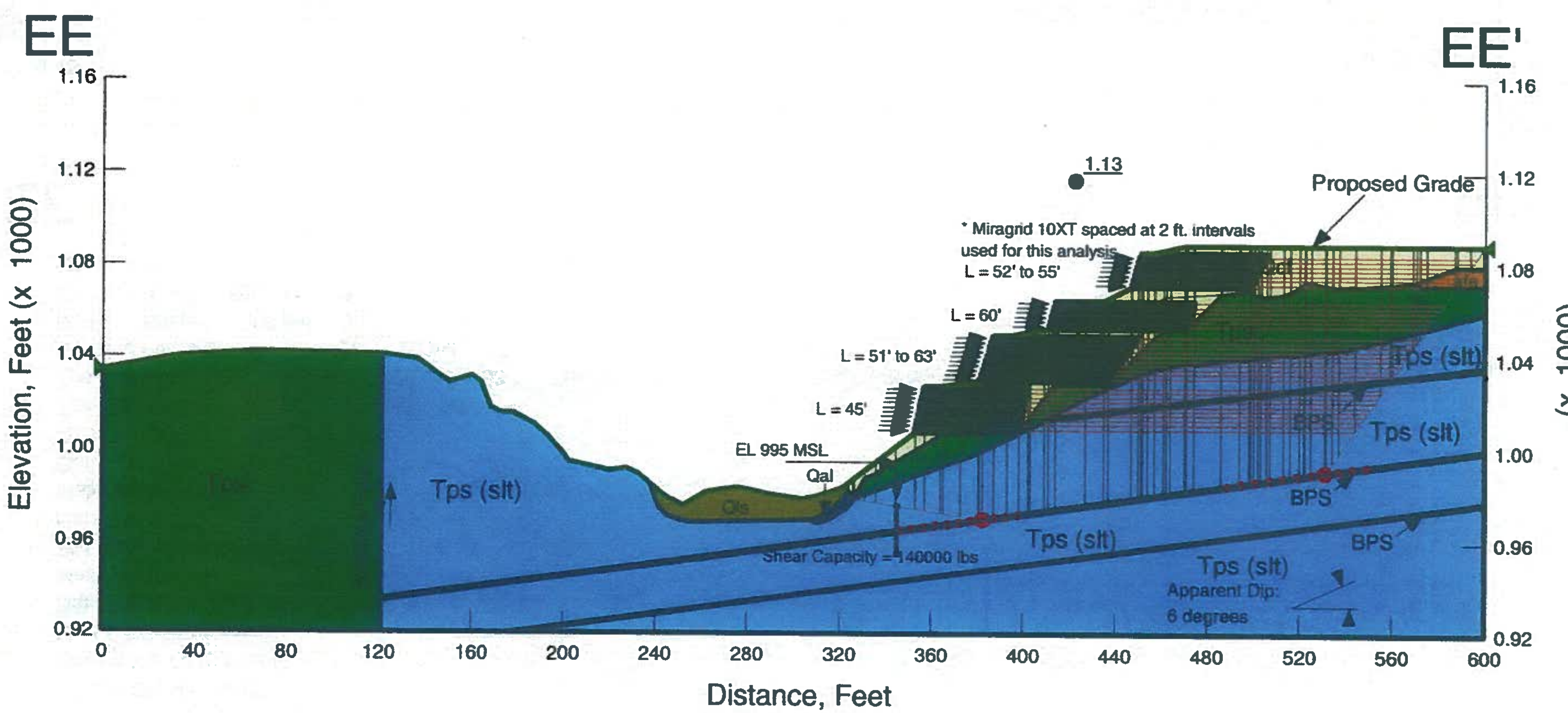
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 4.gsz
Date: 4/8/2013 Time: 12:55:02 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



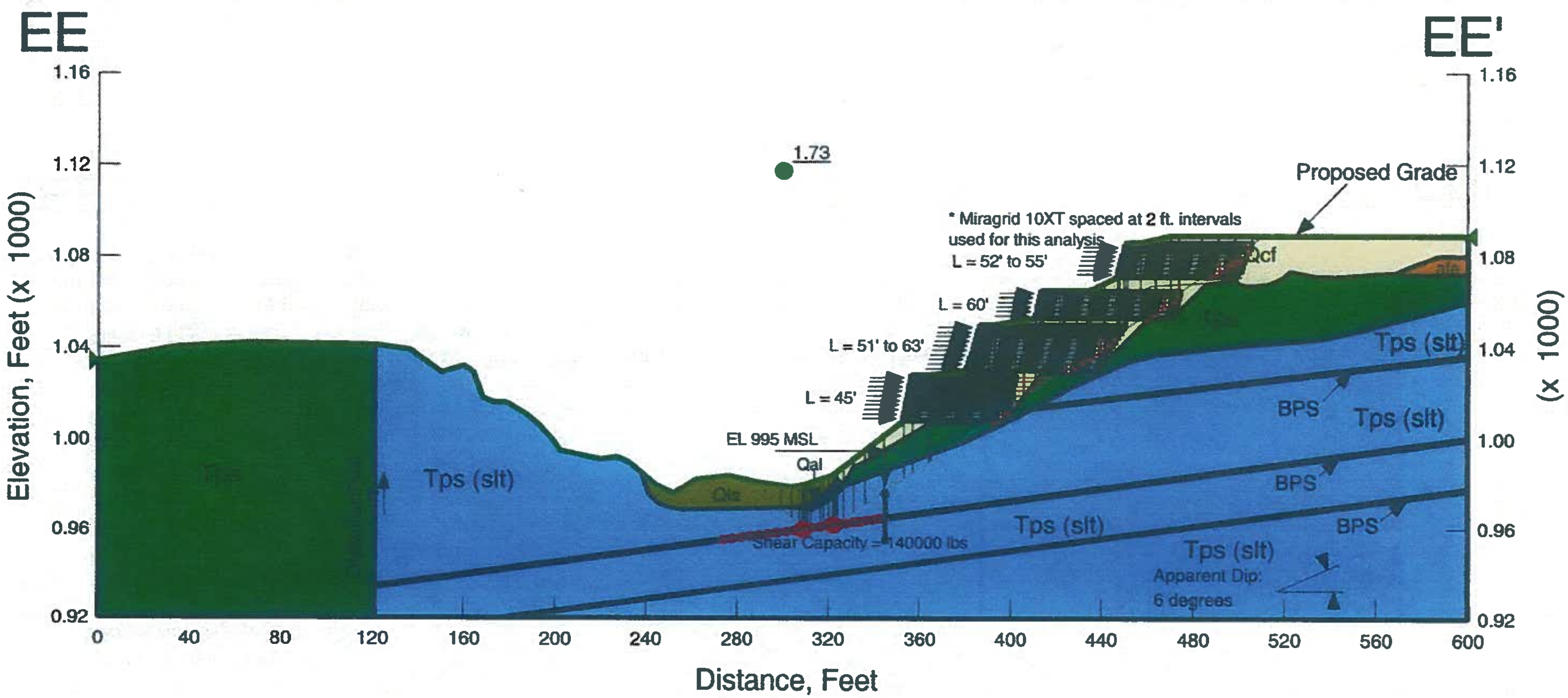
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 4s.gsz
Date: 4/8/2013 Time: 12:56:10 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (6 degrees)	115 pcf	900 psf	30 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



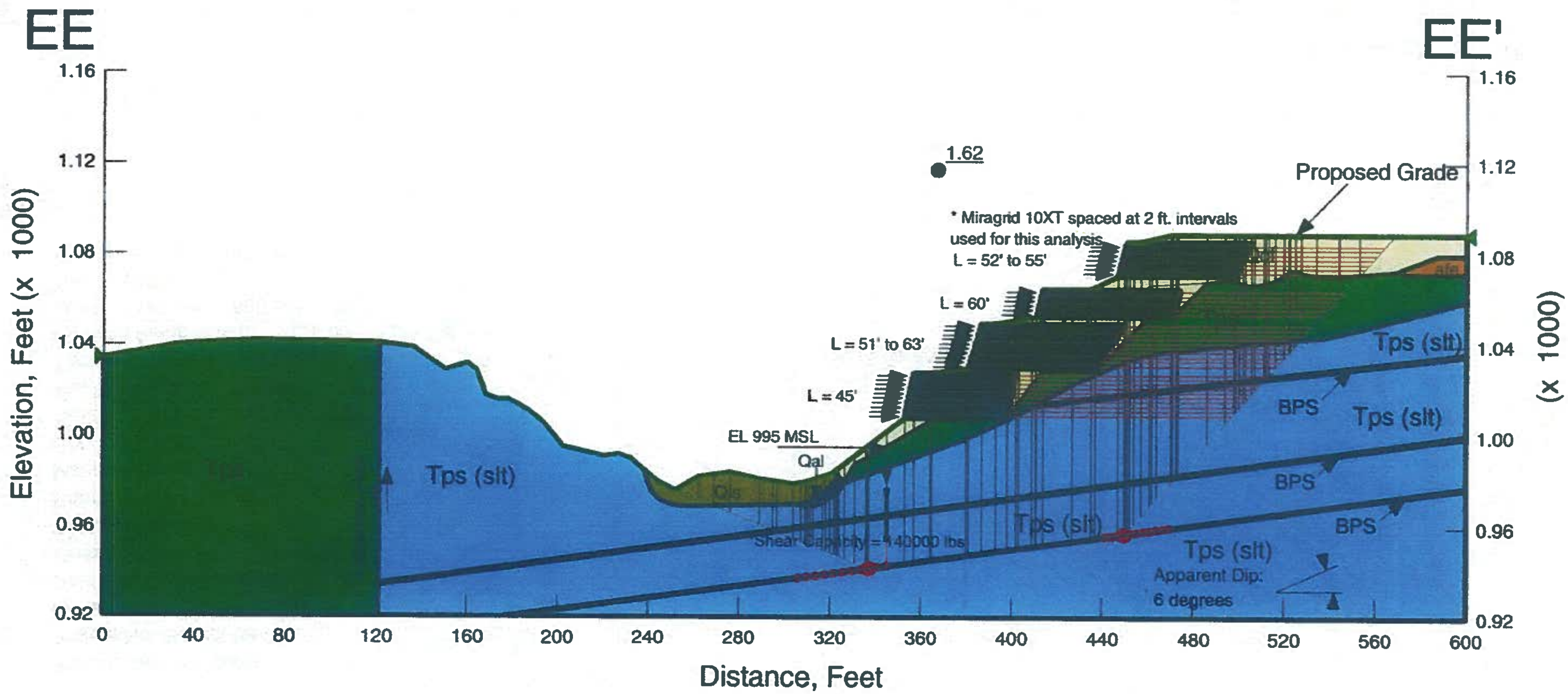
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 5.gsz
Date: 4/8/2013 Time: 12:57:00 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



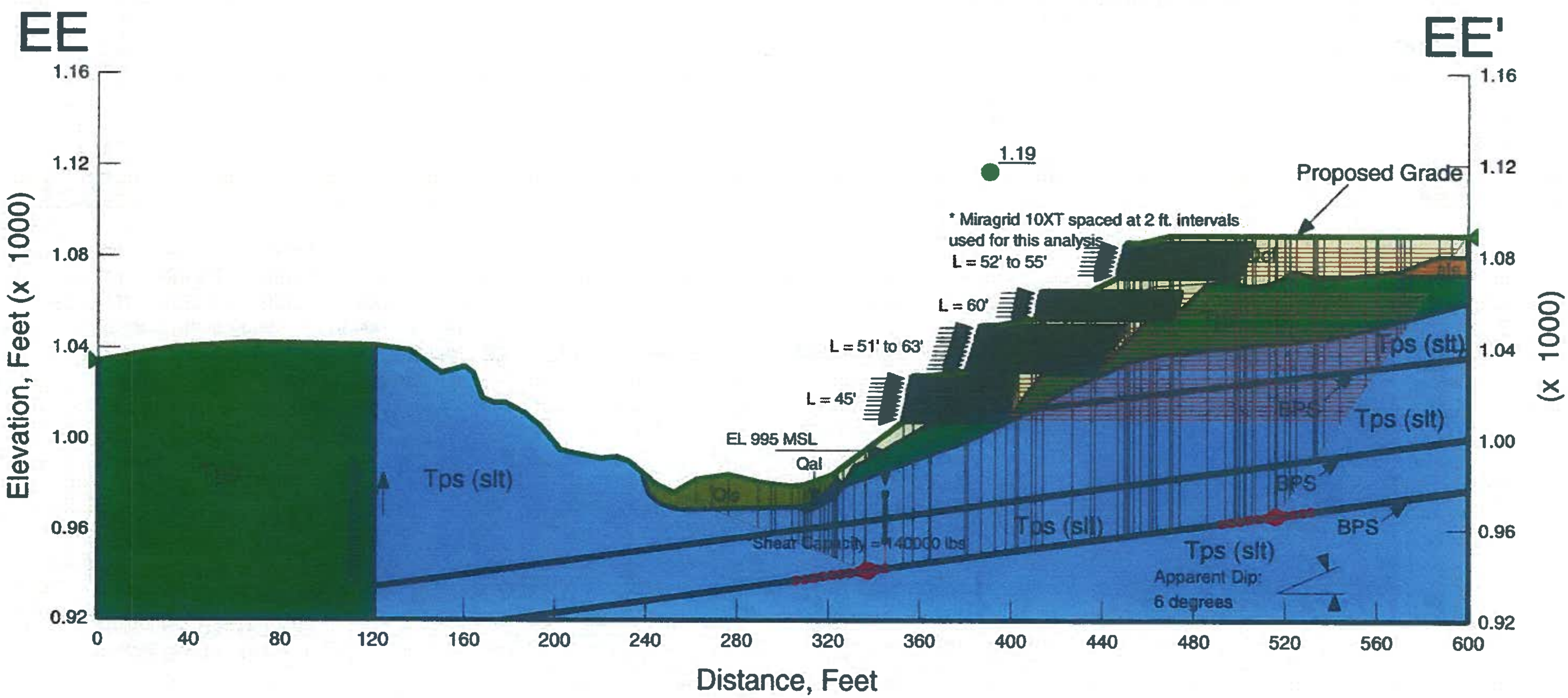
Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 6.gsz
Date: 4/8/2013 Time: 12:59:09 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	400 psf	33 °		
Tps-Slt (6 degrees)	115 pcf	400 psf	33 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	20 psf	15 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		



Portola Center - North
Project No. G1218-52-01
Name: EE-EE'-Case 6s.gsz
Date: 4/8/2013 Time: 1:00:28 PM
Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0.15
Material Properties:

Qcf	120 pcf	500 psf	28 °		
Qafe	120 pcf	500 psf	23 °		
Tps-Sandstone	125 pcf	800 psf	34 °		
Tps-Slt (6 degrees)	115 pcf	900 psf	30 °	Tps-Slt (6 degrees) - C	Tps-Slt (6 degrees) - Phi
Bedding Plane Shear	115 pcf	125 psf	12 °		
MSE	120 pcf	500 psf	32 °		
Qal	120 pcf	500 psf	23 °		
Qls	120 pcf	300 psf	29 °		

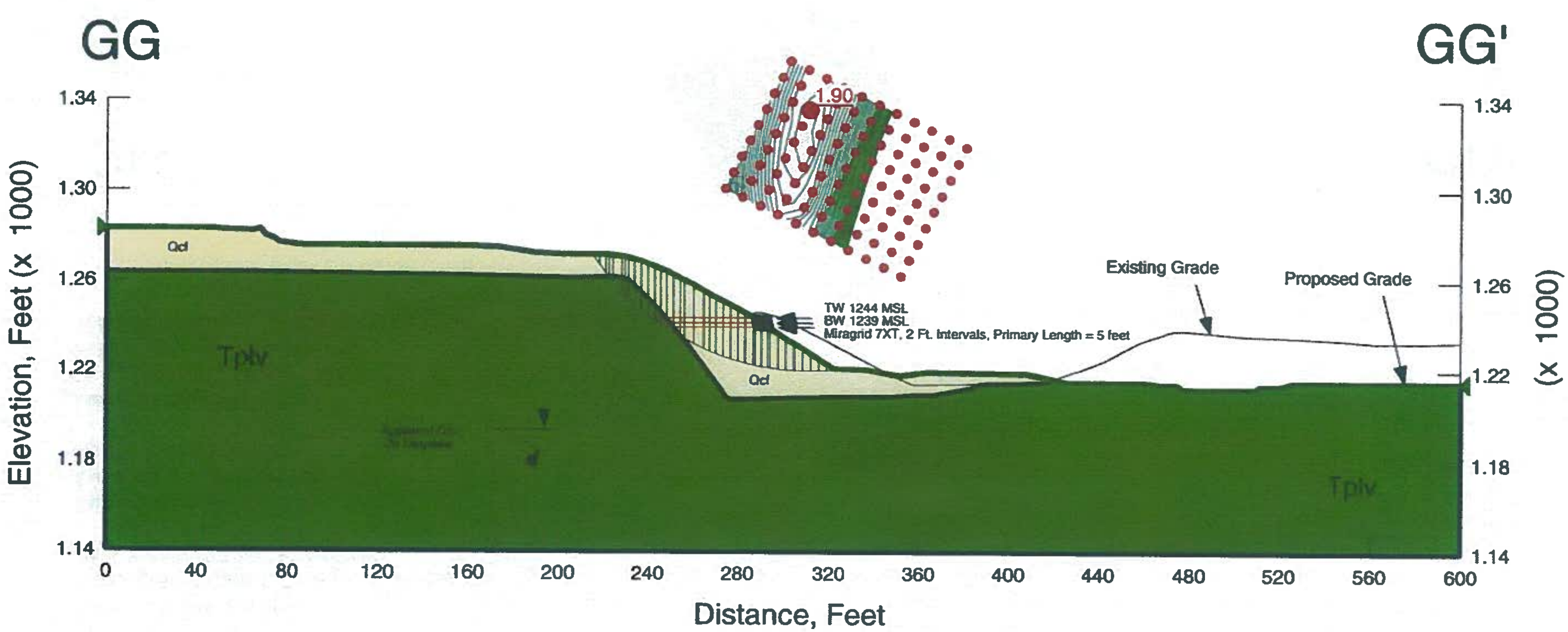


Portola Center - North
Project No. G1218-52-01
Name: GGGG-Case 1_GridRadius.gsz
Date: 3/22/2013 Time: 8:52:52 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0

Material Properties:

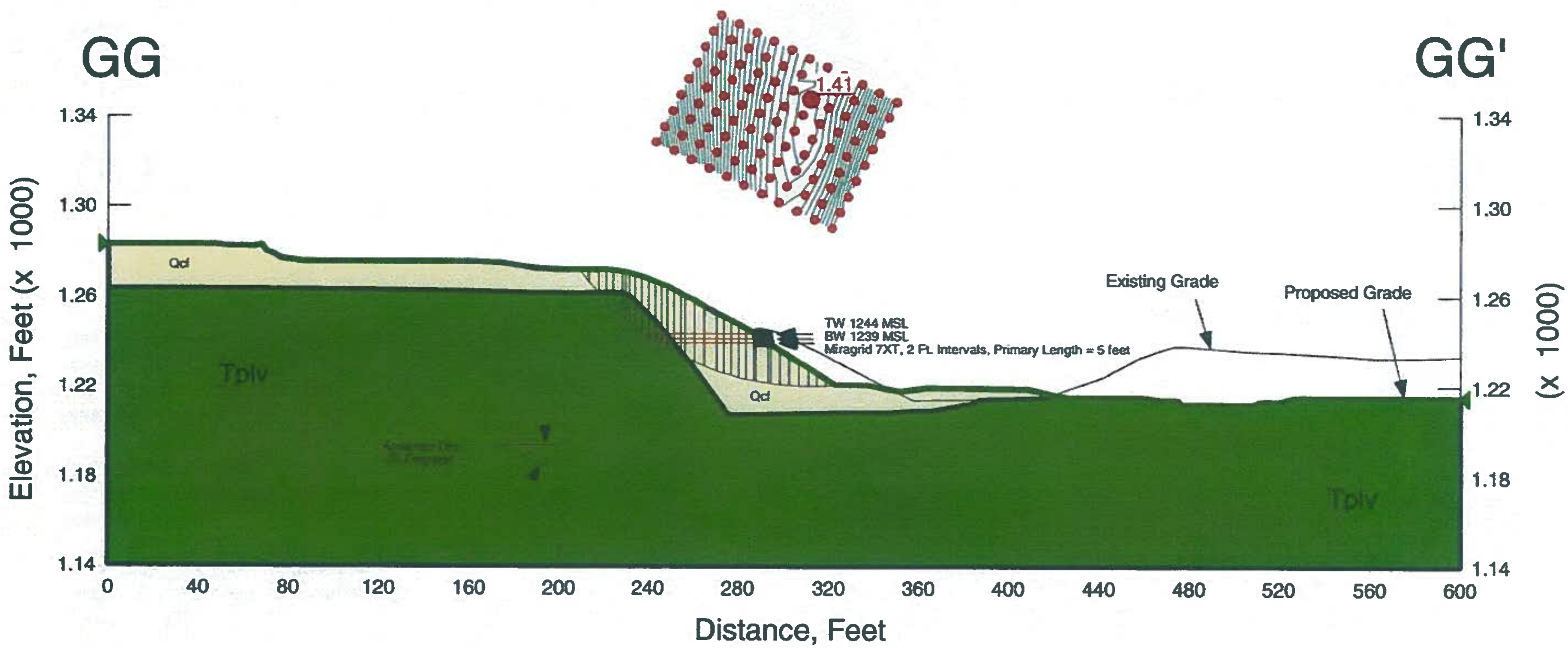
Qcf	120 pcf	500 psf	28 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-25 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-25 deg) - C	Tps-Slt (-25 deg) - Phi



Portola Center - North
Project No. G1218-52-01
Name: GGGG-Case 1_GridRadius_EQ.gsz
Date: 3/22/2013 Time: 8:54:46 AM

Method: Spencer
Slip Surface Option: Grid and Radius
Horz Seismic Load: 0.15

Material Properties:
Qcf 120 pcf 500 psf 28 °
MSE 120 pcf 500 psf 32 °
Tplv (-25 degrees) 115 pcf 300 psf 30 ° Tps-Slt (-25 deg) - C Tps-Slt (-25 deg) - Phi

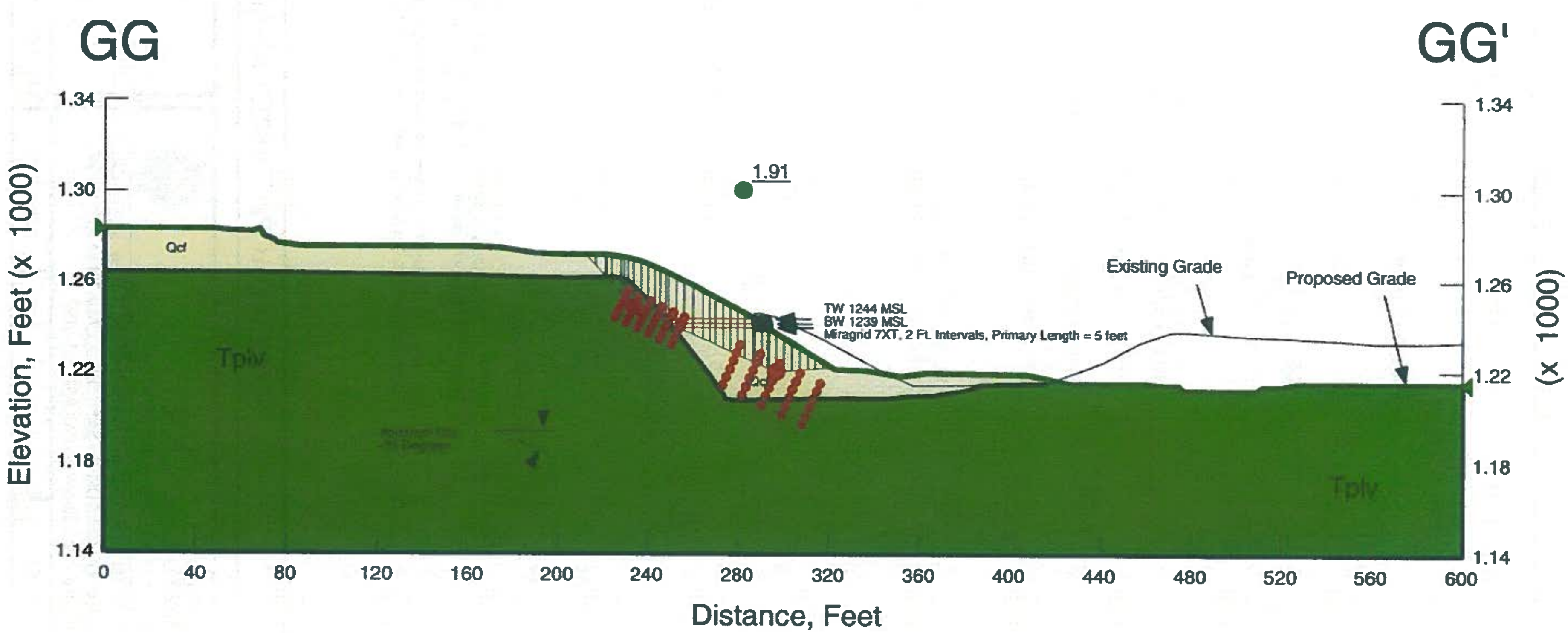


Portola Center - North
Project No. G1218-52-01
Name: GGGG-Case 1_Block.gsz
Date: 3/27/2013 Time: 4:11:22 PM

Method: Spencer
Slip Surface Option: Block
Horz Seismic Load: 0

Material Properties:

Qcf	120 pcf	500 psf	28 °		
MSE	120 pcf	500 psf	32 °		
Tplv (-25 degrees)	115 pcf	300 psf	30 °	Tps-Slt (-25 deg) - C	Tps-Slt (-25 deg) - Phi



ASSUMED CONDITIONS :

SLOPE HEIGHT	H	= Infinite
DEPTH OF SATURATION	Z	= 3 feet
SLOPE INCLINATION	2.0 : 1.0 (Horizontal : Vertical)	
SLOPE ANGLE	i	= 26.6 degrees
UNIT WEIGHT OF WATER	γ_w	= 62.4 pounds per cubic foot
TOTAL UNIT WEIGHT OF SOIL	γ_t	= 120.0 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	= 28 degrees
APPARENT COHESION	C	= 500 pounds per square foot

SLOPE SATURATED TO VERTICAL DEPTH Z BELOW SLOPE FACE
SEEPAGE FORCES PARALLEL TO SLOPE FACE

ANALYSIS :

$$FS = \frac{C + (\gamma_t - \gamma_w)\ Z \cos^2 i \tan \phi}{\gamma_t\ Z \sin i \cos i} = 4.0$$

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1......Haefell, R. *The Stability of Slopes Acted Upon by Parallel Seepage*, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62

2......Skempton, A. W., and F.A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81

SURFICIAL SLOPE STABILITY ANALYSIS - FILL SLOPES

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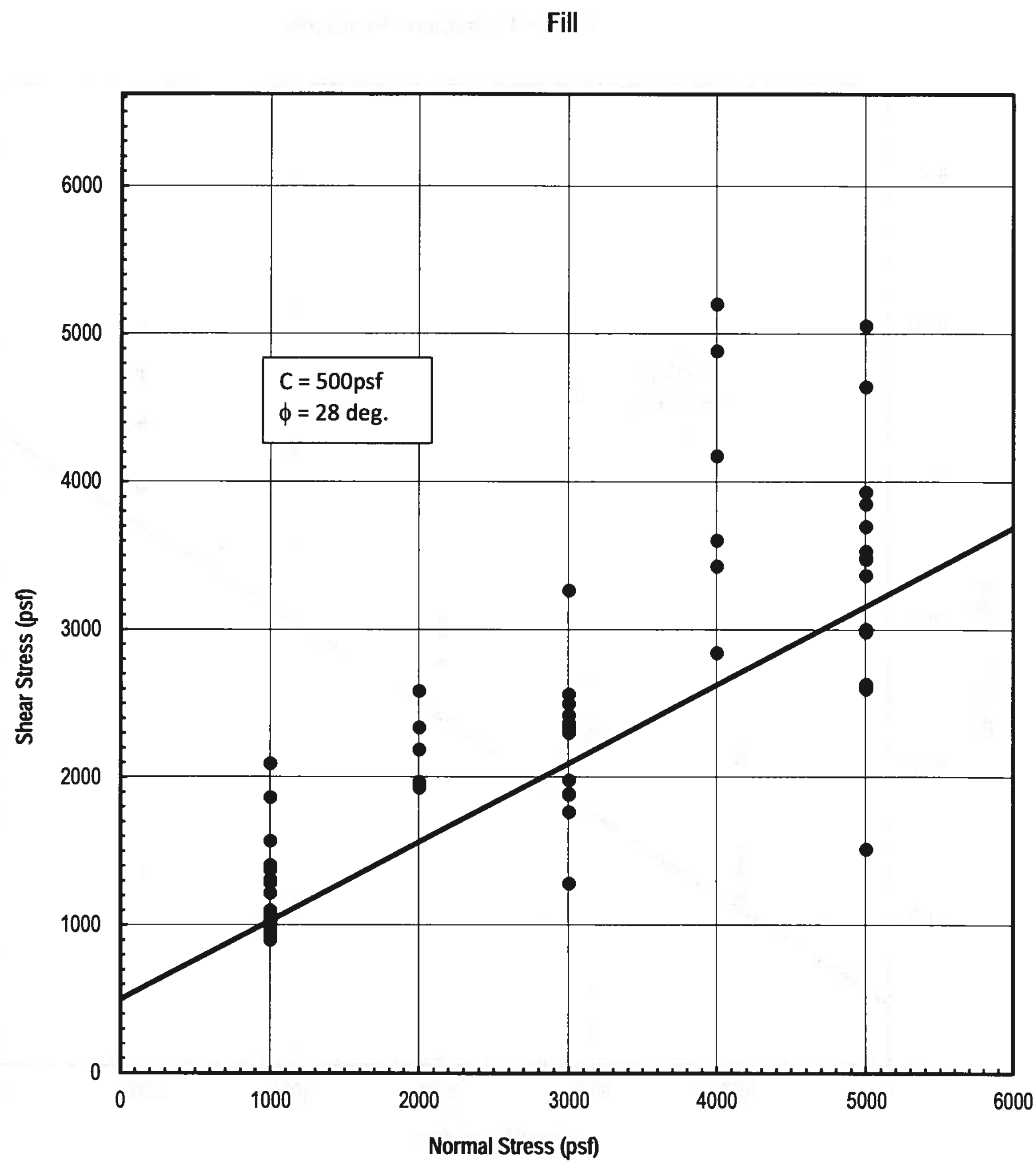
PORTOLA CENTER NORTH
TM #17300
LAKE FOREST, CALIFORNIA

SW / RA		DSK/GTYPD	PROJECT NO. G1218 - 52 - 01



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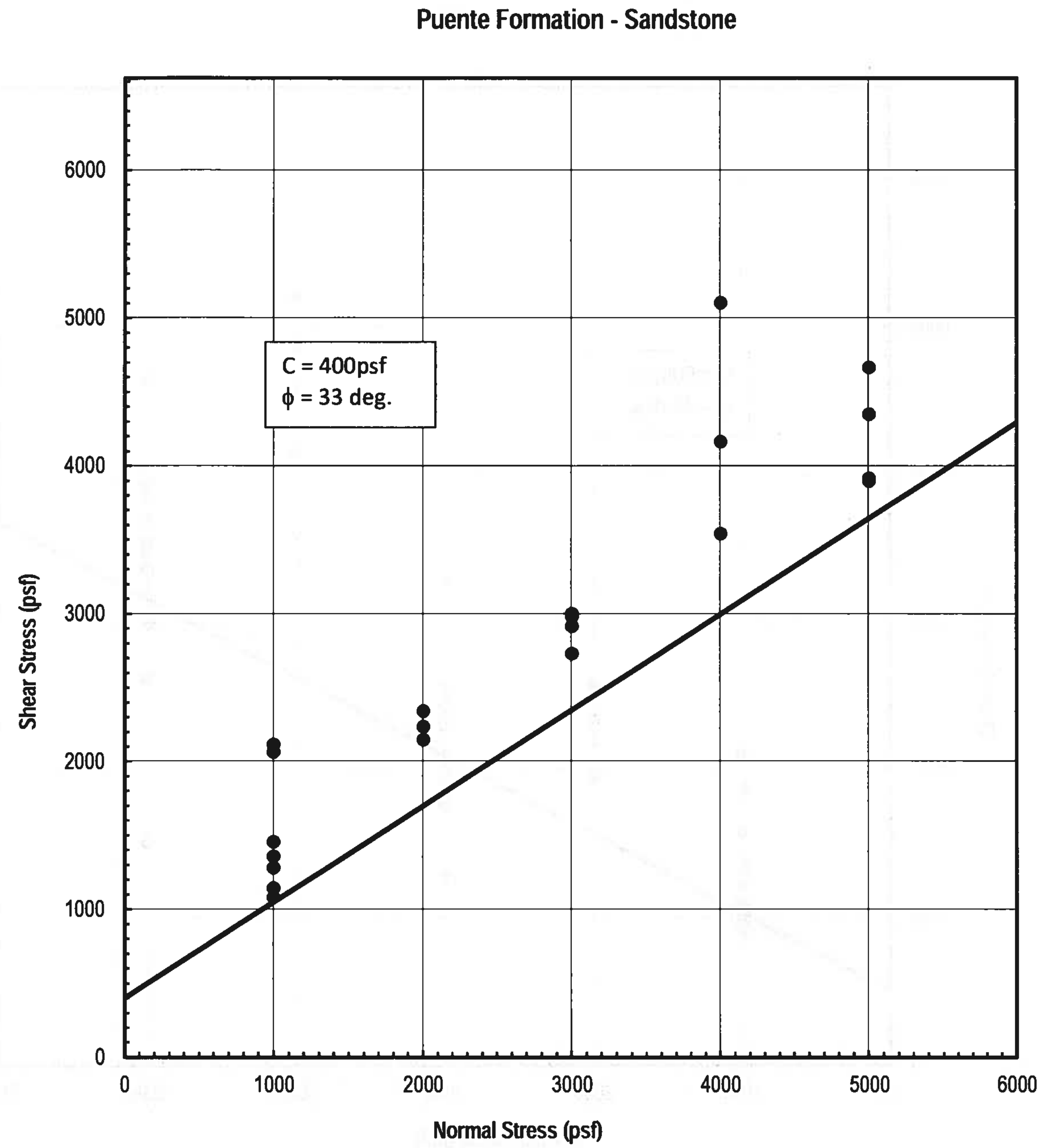
SW/SW

SHEAR STRENGTH TEST RESULTS

PORTOLA CENTER NORTH
TM #17300
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01



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SHEAR STRENGTH TEST RESULTS

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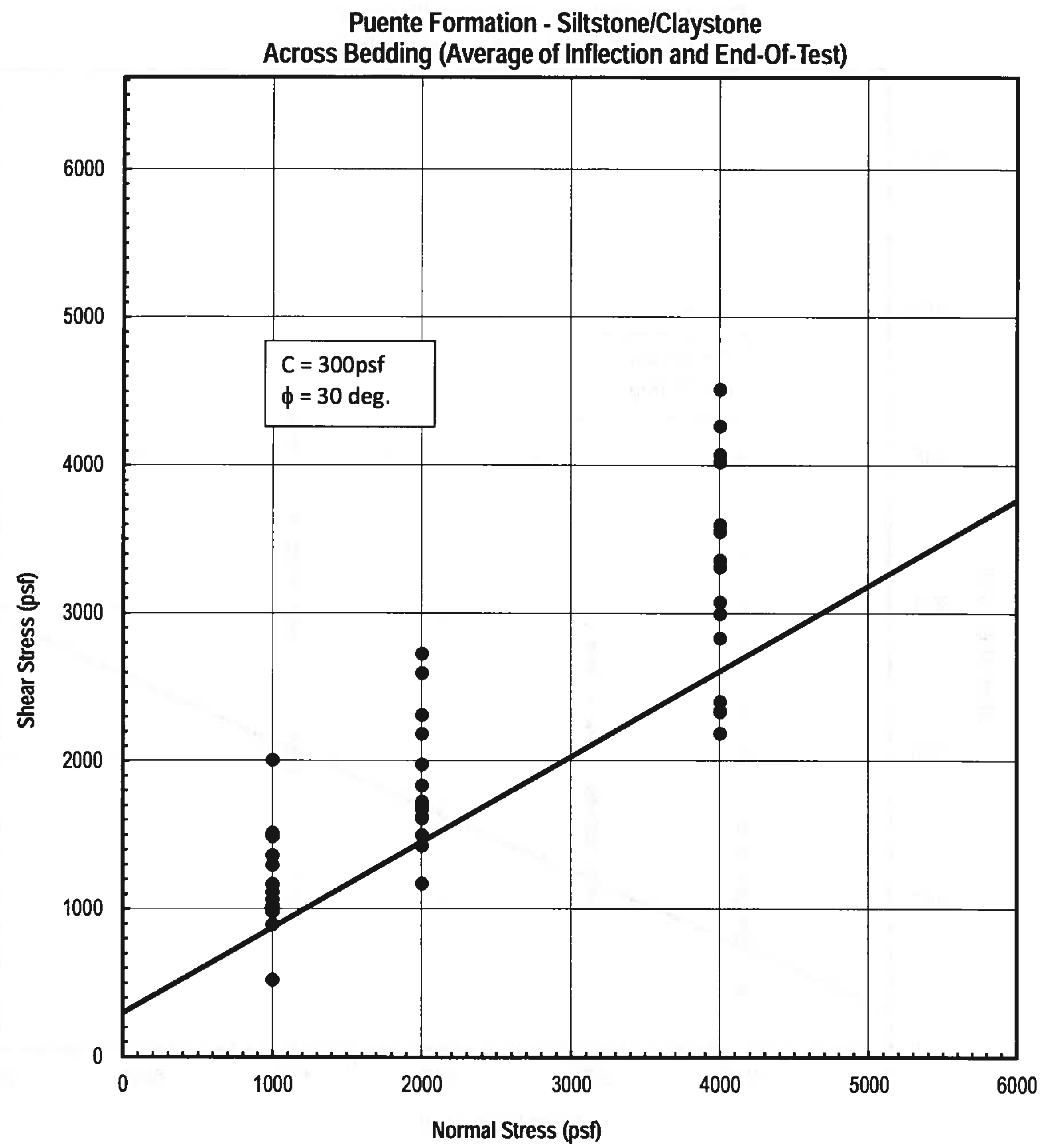
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01



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SHEAR STRENGTH TEST RESULTS

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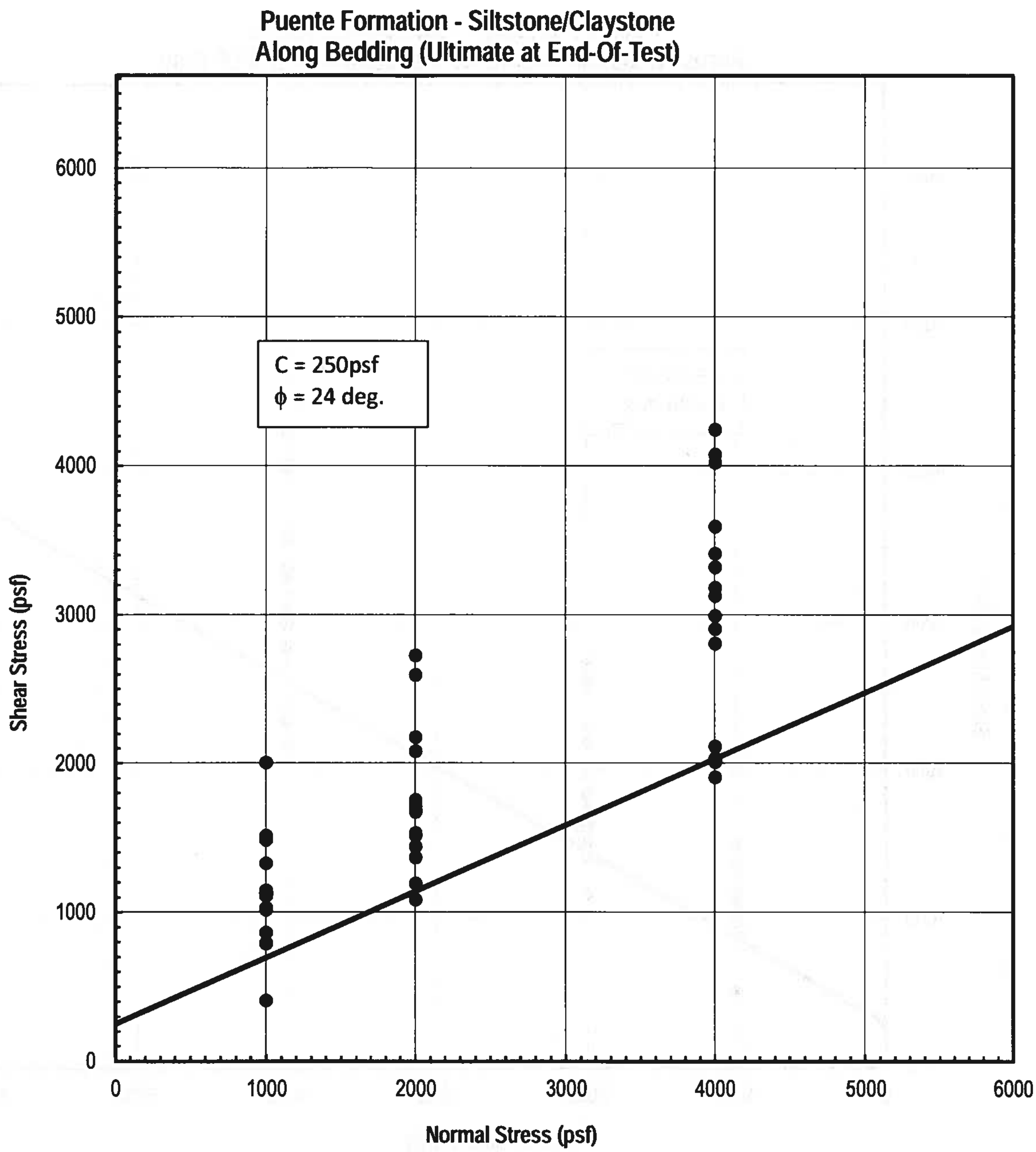

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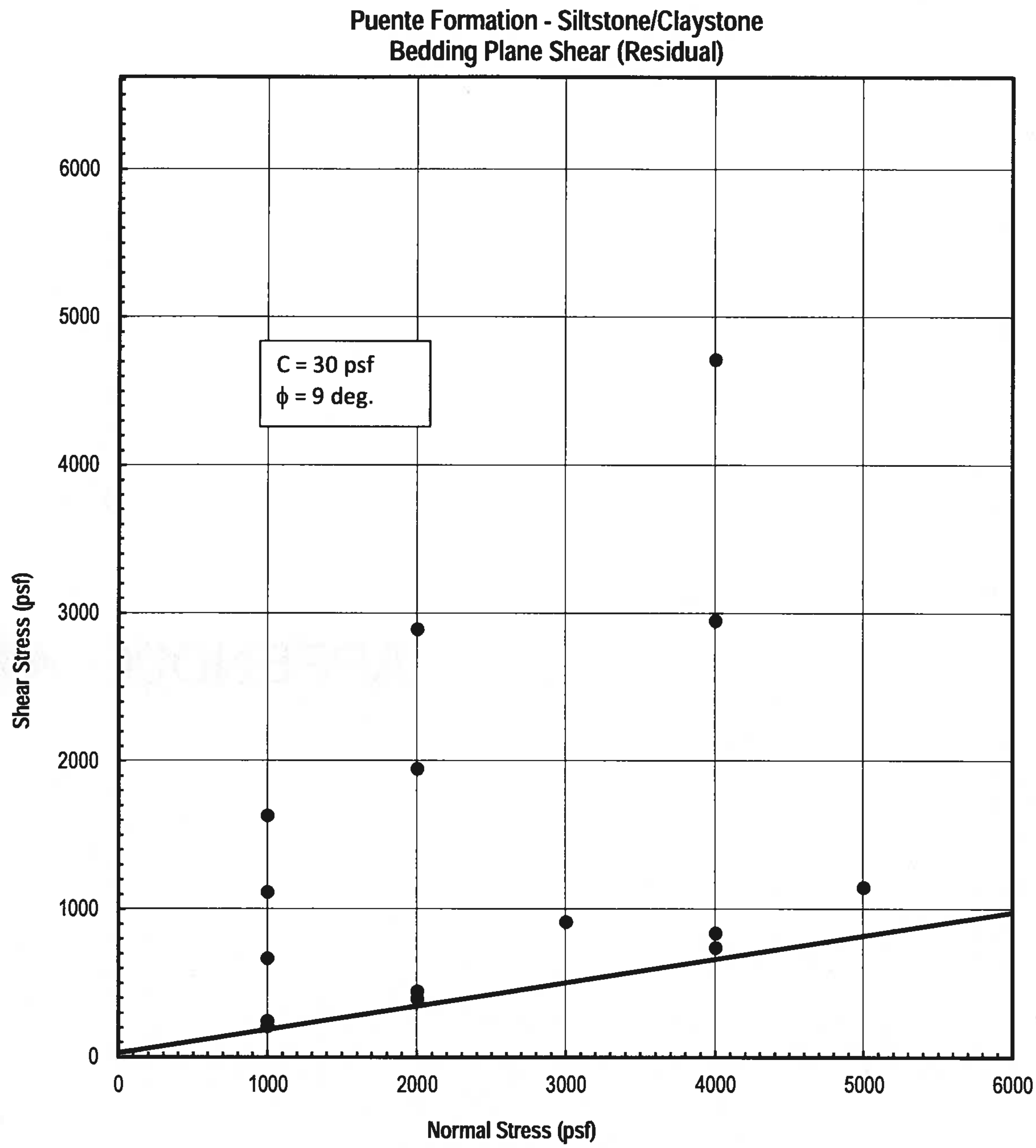

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SW/SW

SHEAR STRENGTH TEST RESULTS

PORTOLA CENTER NORTH
TM #17300
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01

APPENDIX D

APPENDIX D

RECOMMENDED GRADING SPECIFICATIONS

FOR

PORTOLA CENTER NORTH
TENTATIVE TRACT NO. 17300
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-52-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

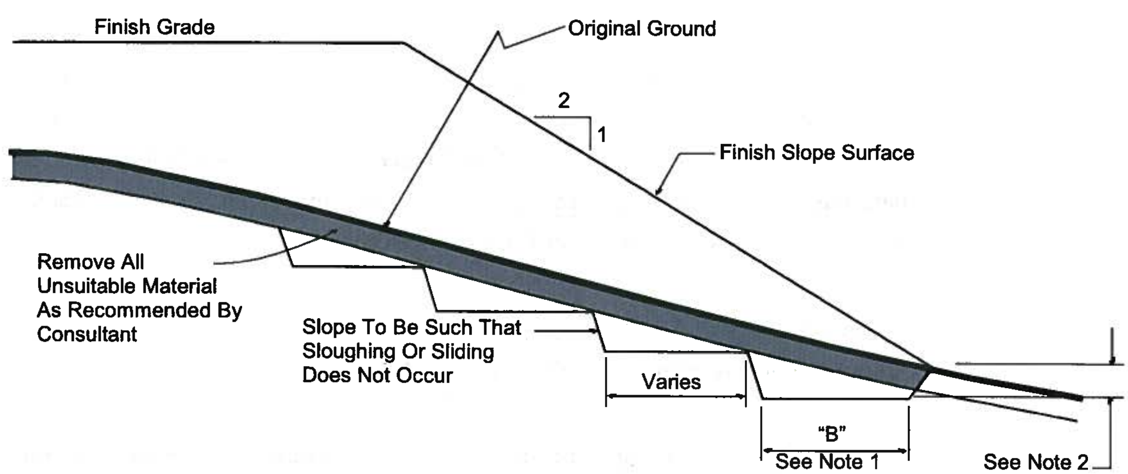
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557-02.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557-02. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196-93, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. OBSERVATION AND TESTING

7.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

7.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

7.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

7.5 The Consultant should observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6 Testing procedures shall conform to the following Standards as appropriate:

7.6.1 Soil and Soil-Rock Fills:

7.6.1.1 Field Density Test, ASTM D 1556-02, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938-08A, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3 Laboratory Compaction Test, ASTM D 1557-02, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test, ASTM D 4829-03, *Expansion Index Test.*

7.6.2 Rock Fills

7.6.2.1 Field Plate Bearing Test, ASTM D 1196-93 (Reapproved 1997) *Standard Method for Nonreparative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

8.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

9.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

9.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

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2. Boore, D. M. and G. M Atkinson (2008), *Ground-Motion Prediction for the Average Horizontal Component of PGA, PGV, and 5%-Damped PSA at Spectral Periods Between 0.01 and 10.0 S*, Earthquake Spectra, Volume 24, Issue 1, pages 99-138, February 2008.

3. California Division of Mines and Geology (CDMG), 2000, *Seismic Hazard Evaluation of El Toro 7.5-Minute Quadrangle, Orange County, California,* Open File Report 200-013.

4. California Division of Mines and Geology (CDMG), 2001, *State of California Seismic Hazard Zones, El Toro Quadrangle,* Official Map, released January 17.

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7. Campbell, K. W. and Y. Bozorgnia, 2008, *NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s*, Preprint of version submitted for publication in the NGA Special Volume of Earthquake Spectra, Volume 24, Issue 1, pages 139-171, February 2008.

8. Chiou, Brian S. J. and Robert R. Youngs, 2008, *A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra,* preprint for article to be published in NGA Special Edition for Earthquake Spectra, Spring 2008.

9. Fife, D. L., 1974, *Geology of the South Half of the El Toro Quadrangle, Orange County, California,* California Dept. of Conservation, Division of Mines and Geology, Special Report 110, map scale 1:12,000.

10. Geocon Incorporated, 2012, *Deformation Analysis, Portola Center (South and North), Tentative Tract Nos. 15353 and 17300, Lake Forest, California,* August 14.

11. Jennings, Charles W. and Bryant, William A., 2010, *Fault Activity Map of California,* California Division of Mines and Geology Map No. 6.

12. Orange County, 2004, *Safety Element of the General Plan.*

13. Morton, P. K. and Miller, R. V., 1981, *Geologic Map of Orange County, California, Showing Mines and Mineral Deposits*, California Division of Mines and Geology Bulletin 204, Plate 1.

14. Pacific Soils Engineering, Inc., 1998, *Grading Plan Review, 40-Scale Preliminary Grading Plans, Tract 14127, Trabuco Canyon Area, County of Orange, California,* dated June 24, Work Order 102234-V1.

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