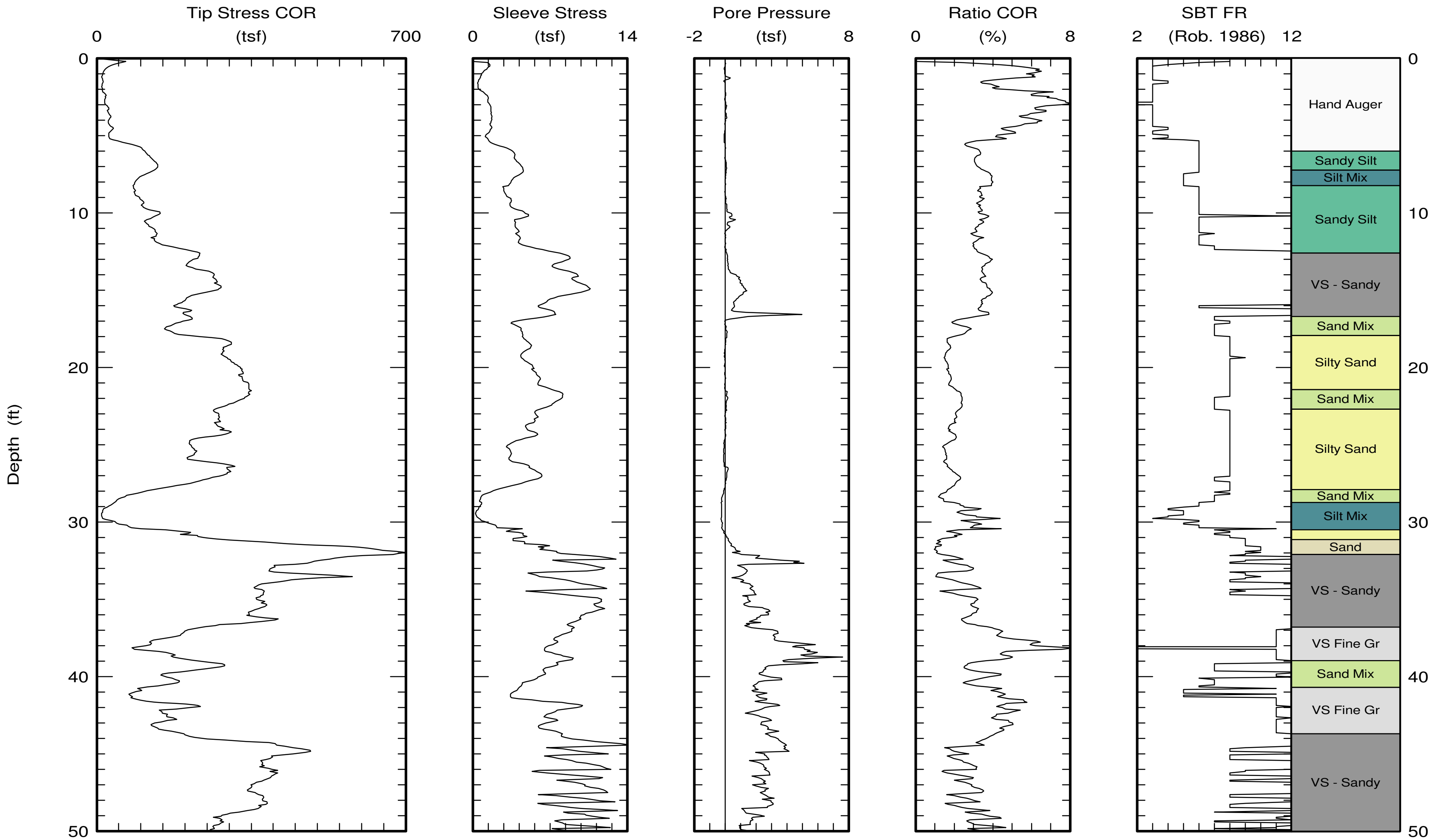
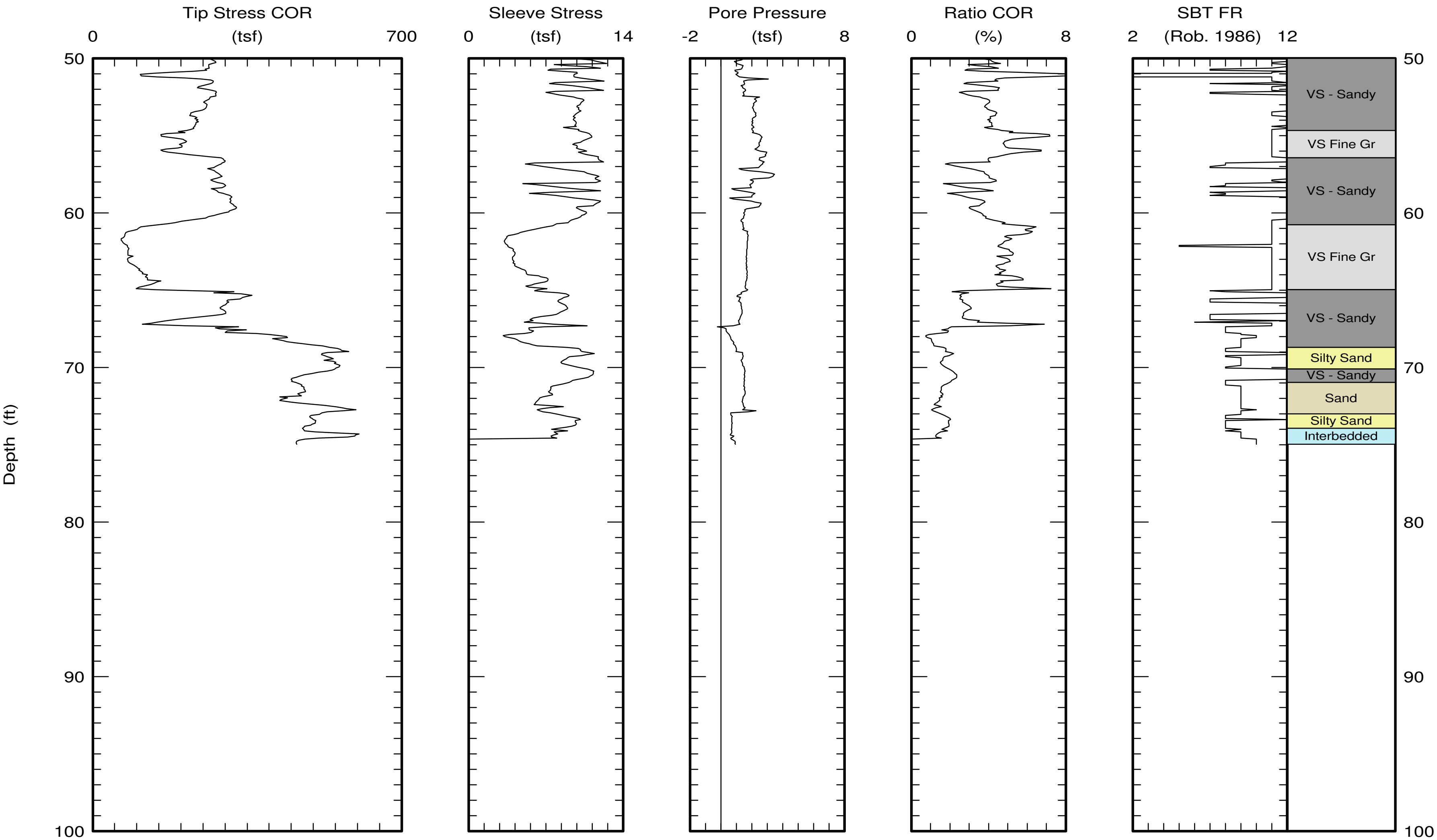
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/Feb/2011 Test ID: T3-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 74.99 (ft)

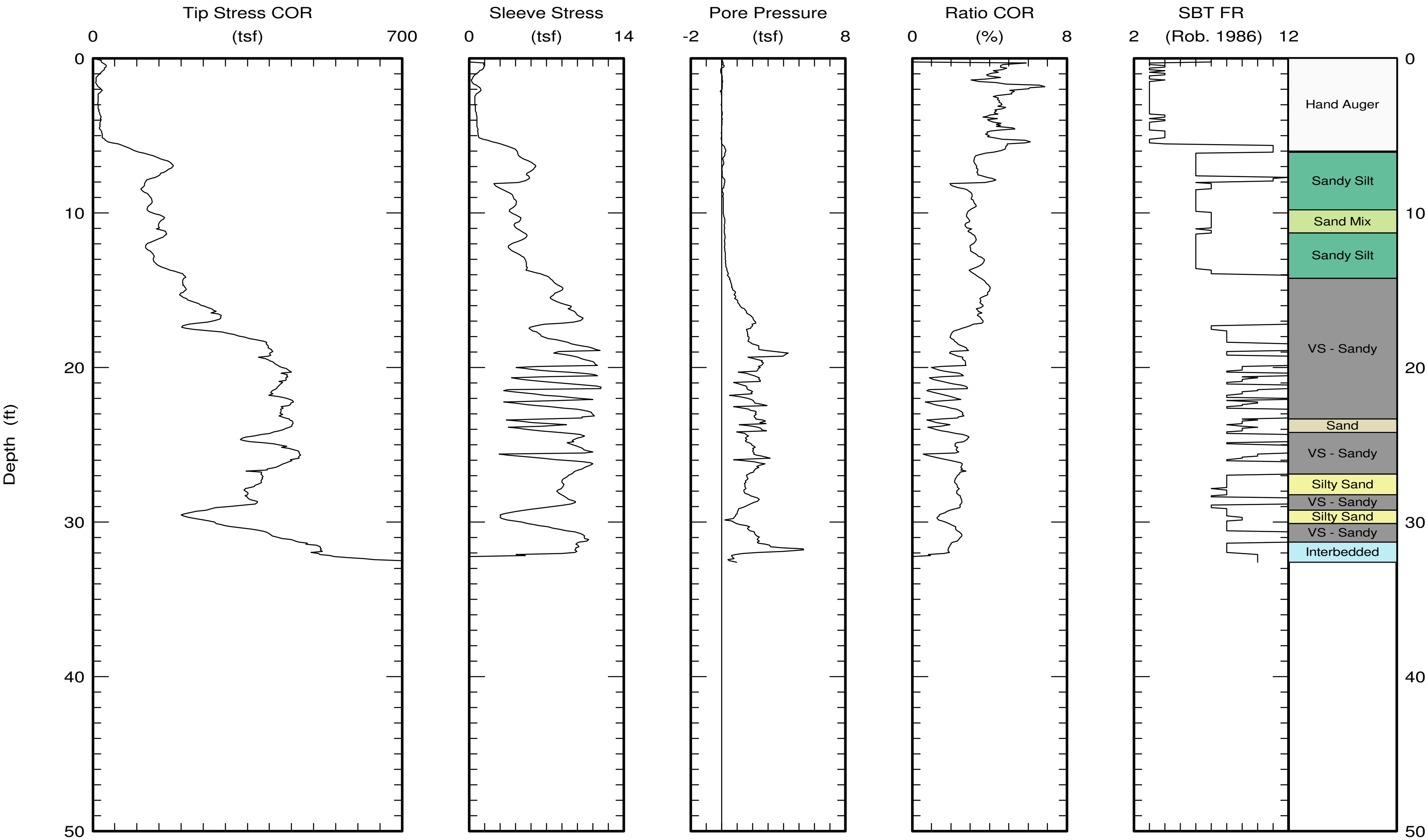
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/Feb/2011 Test ID: T3-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 74.99 (ft)

Test ID: T3-C4
File: Z25F1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/Feb/2011 Test ID: T3-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 32.60 (ft)

Test ID: T3-C5
File: Z25F1102C.ECP

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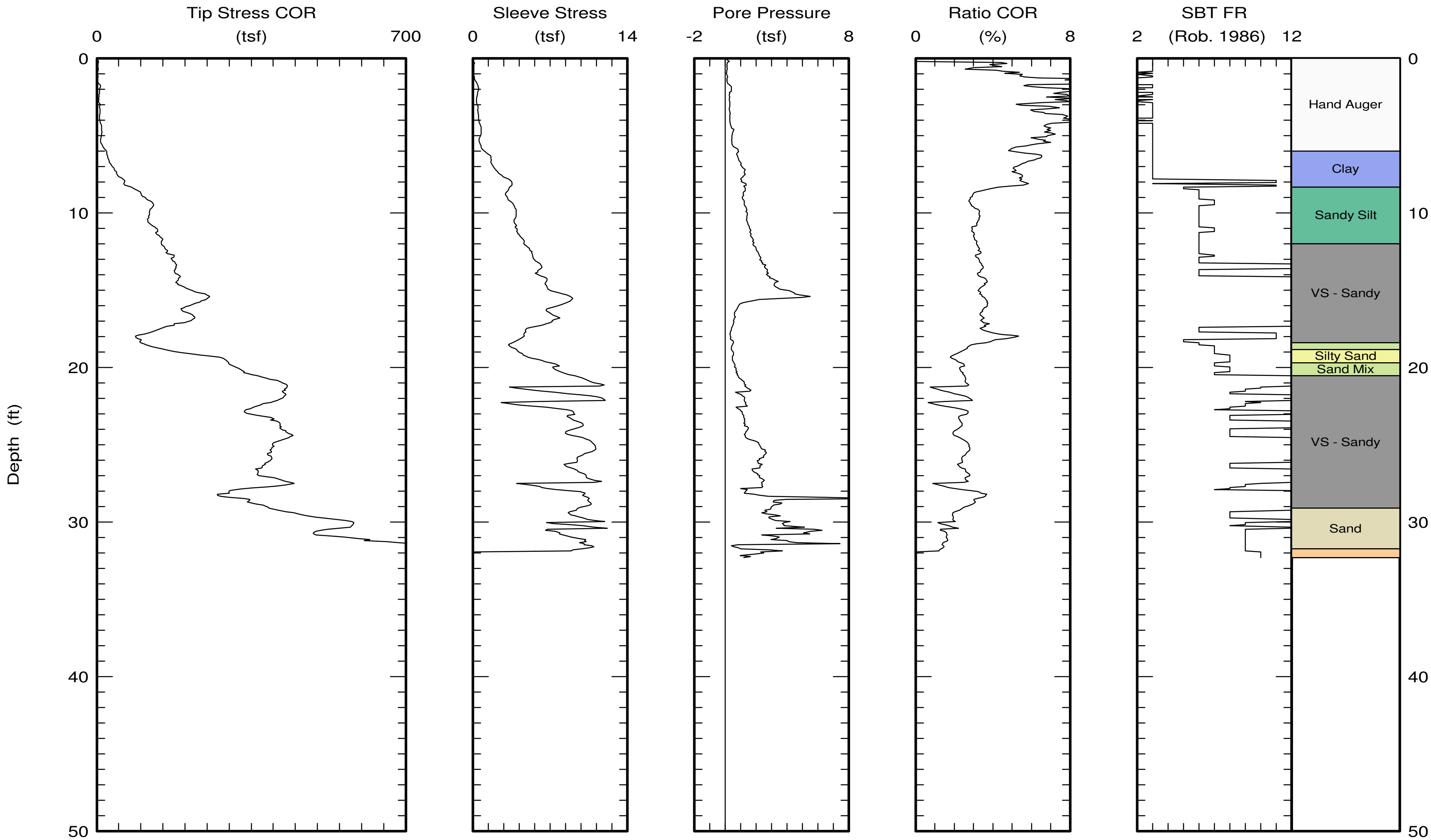
www.kehoetesting.com

CPT Data
30 ton rig

Date: 25/Feb/2011
Test ID: T3-C6
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 32.31 (ft)

Test ID: T3-C6
File: Z25F1103C.ECP

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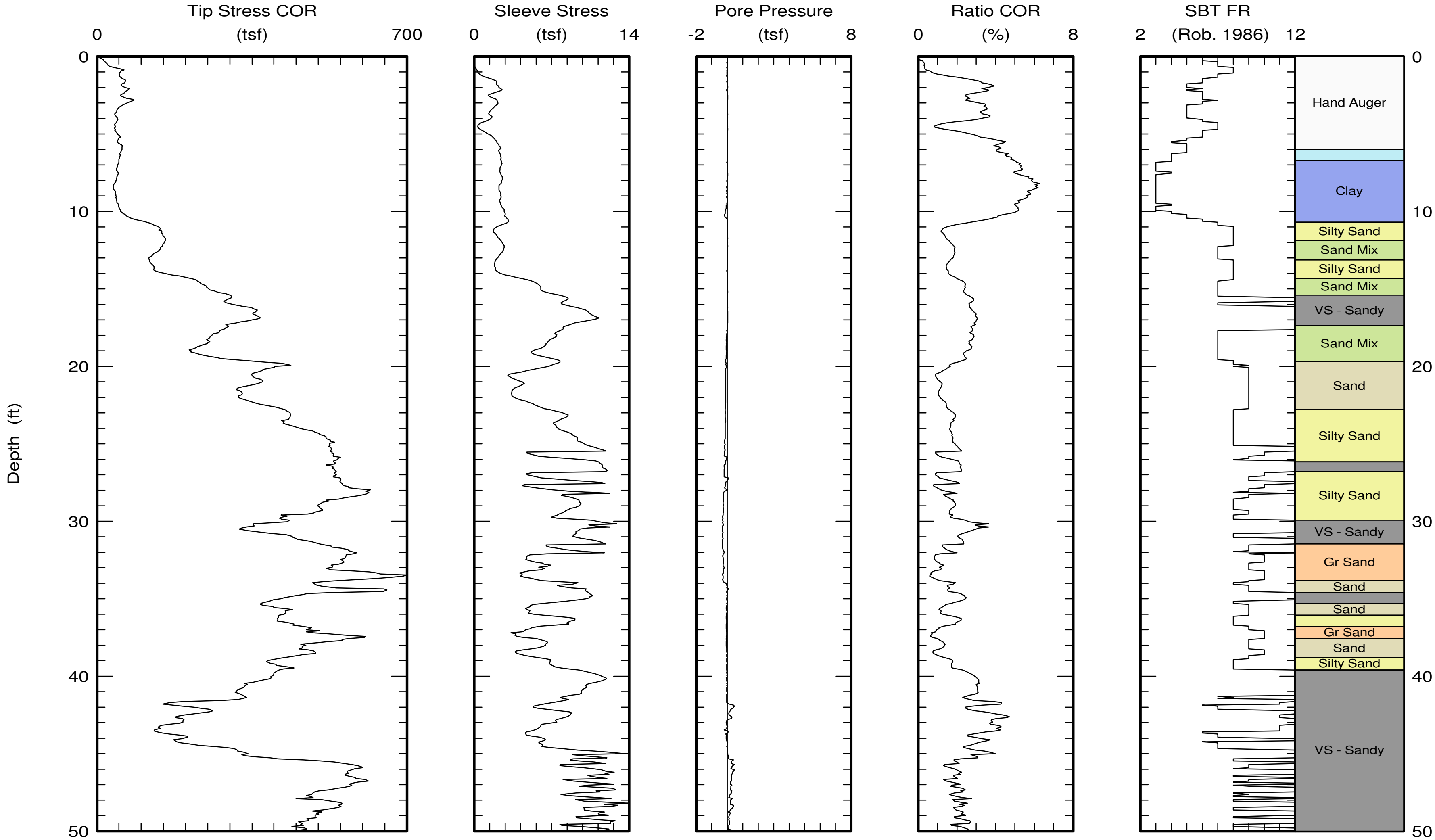
CPT Data
30 ton rig

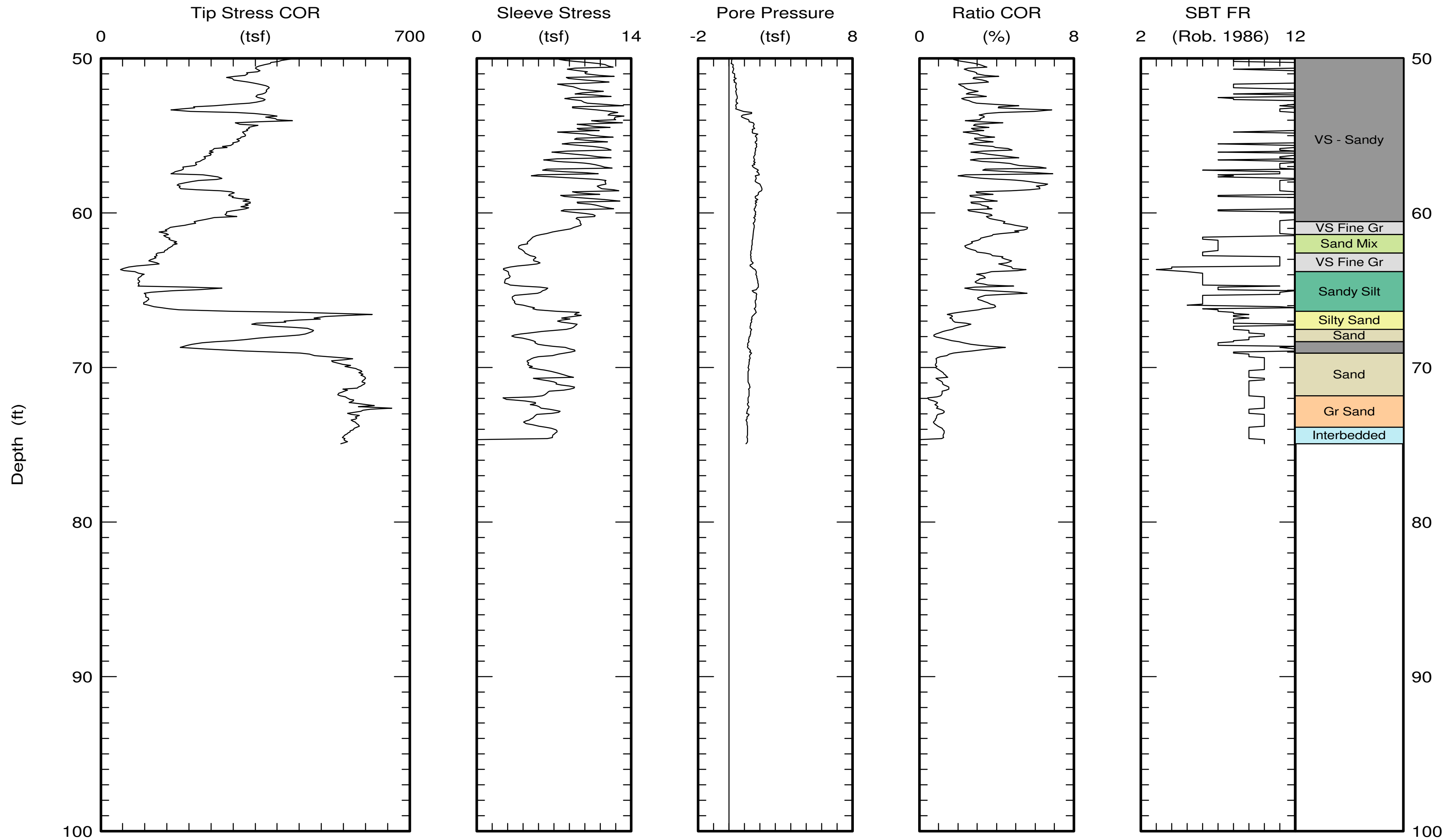
Date: 03/Mar/2011
Test ID: T3-C7
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 74.96 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C7 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 74.96 (ft)

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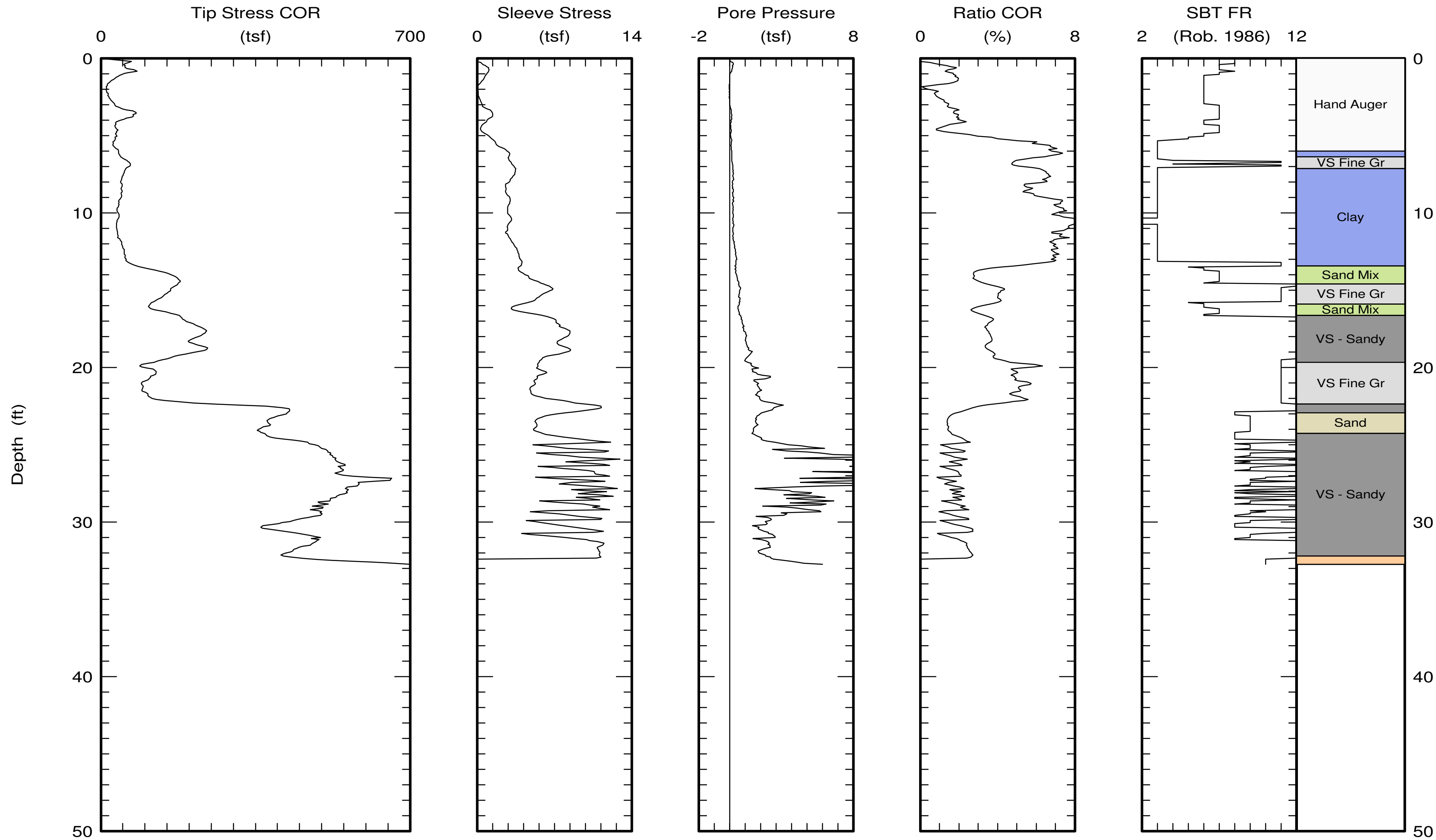
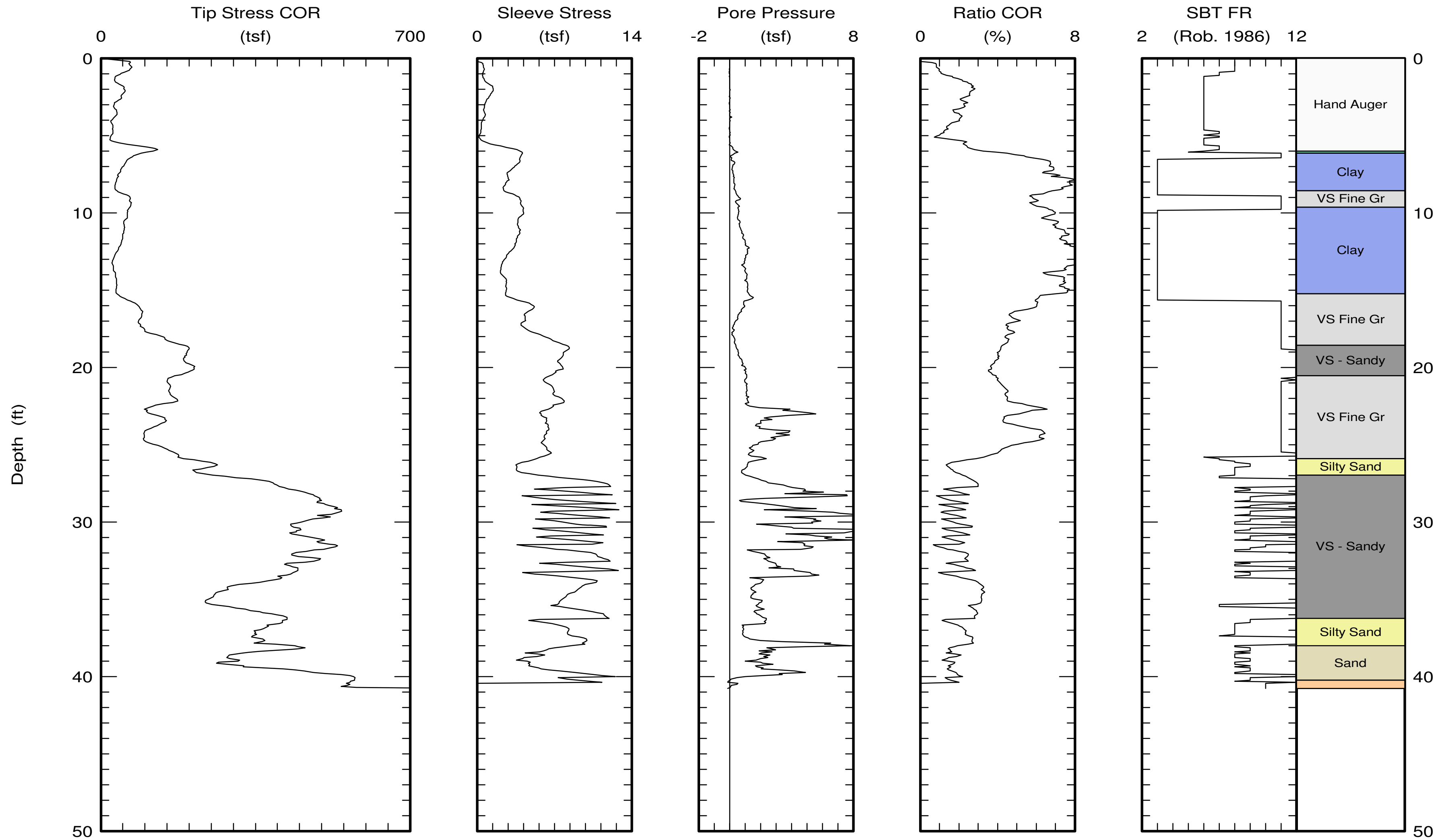
CPT Data 30 ton rig	Date: 25/Feb/2011 Test ID: T3-C8 Project: LosAngeles
Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



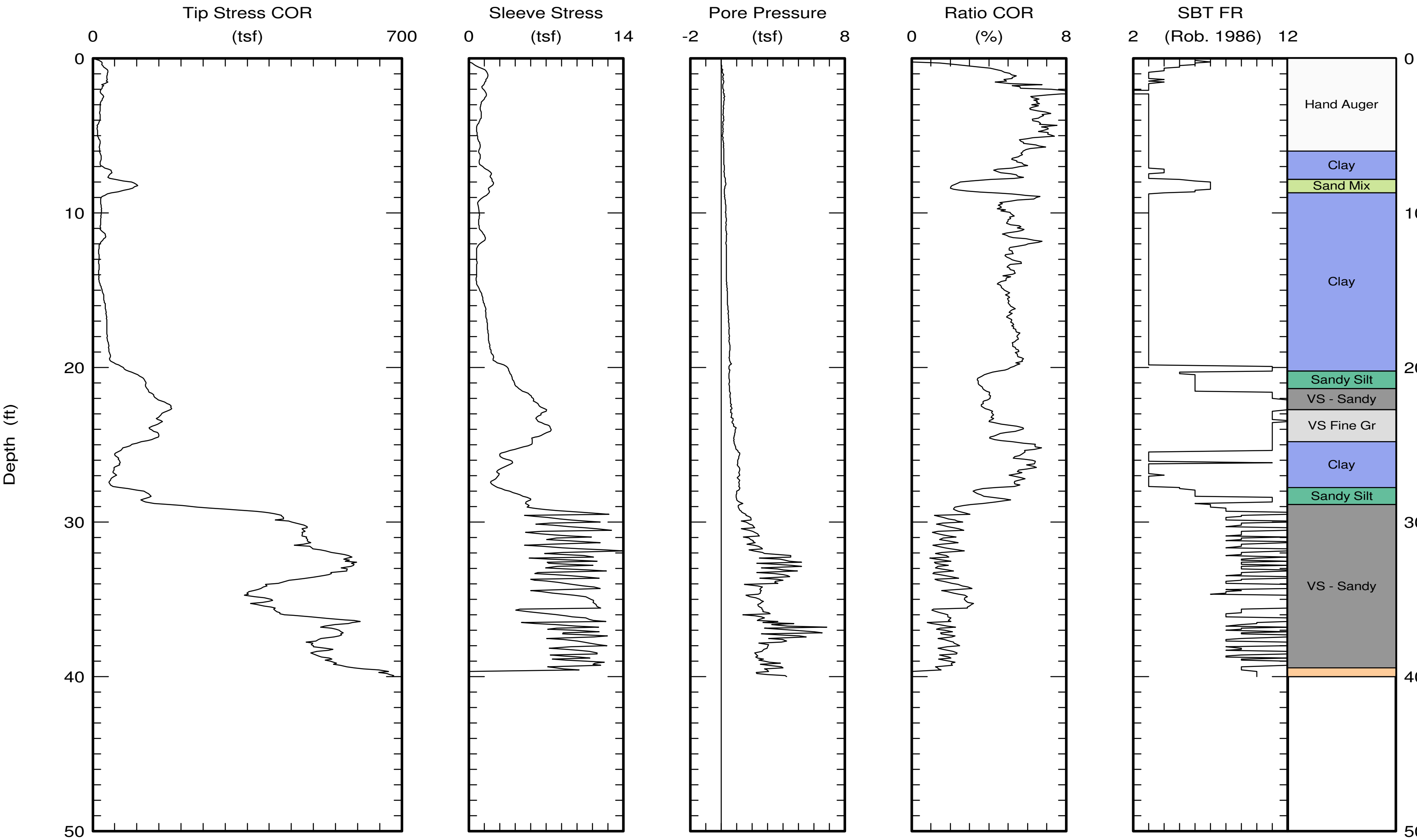
Maximum depth: 32.75 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Feb/2011 Test ID: T3-C9 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 40.79 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Feb/2011 Test ID: T3-C10 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 40.01 (ft)

Test ID: T3-C10
File: Z28F1102C.ECP

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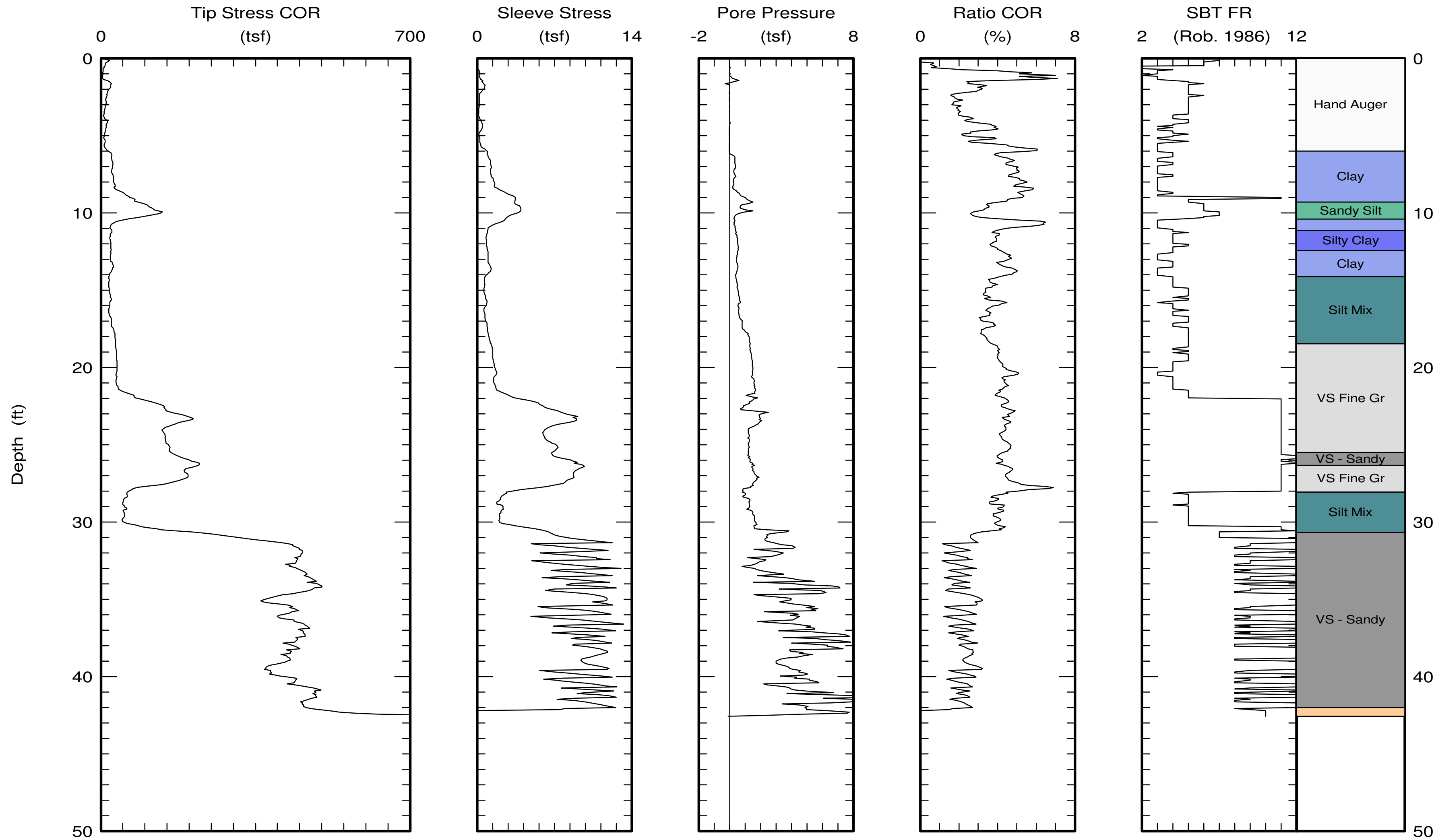
CPT Data
30 ton rig

Date: 01/Mar/2011
Test ID: T3-C11
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 42.58 (ft)

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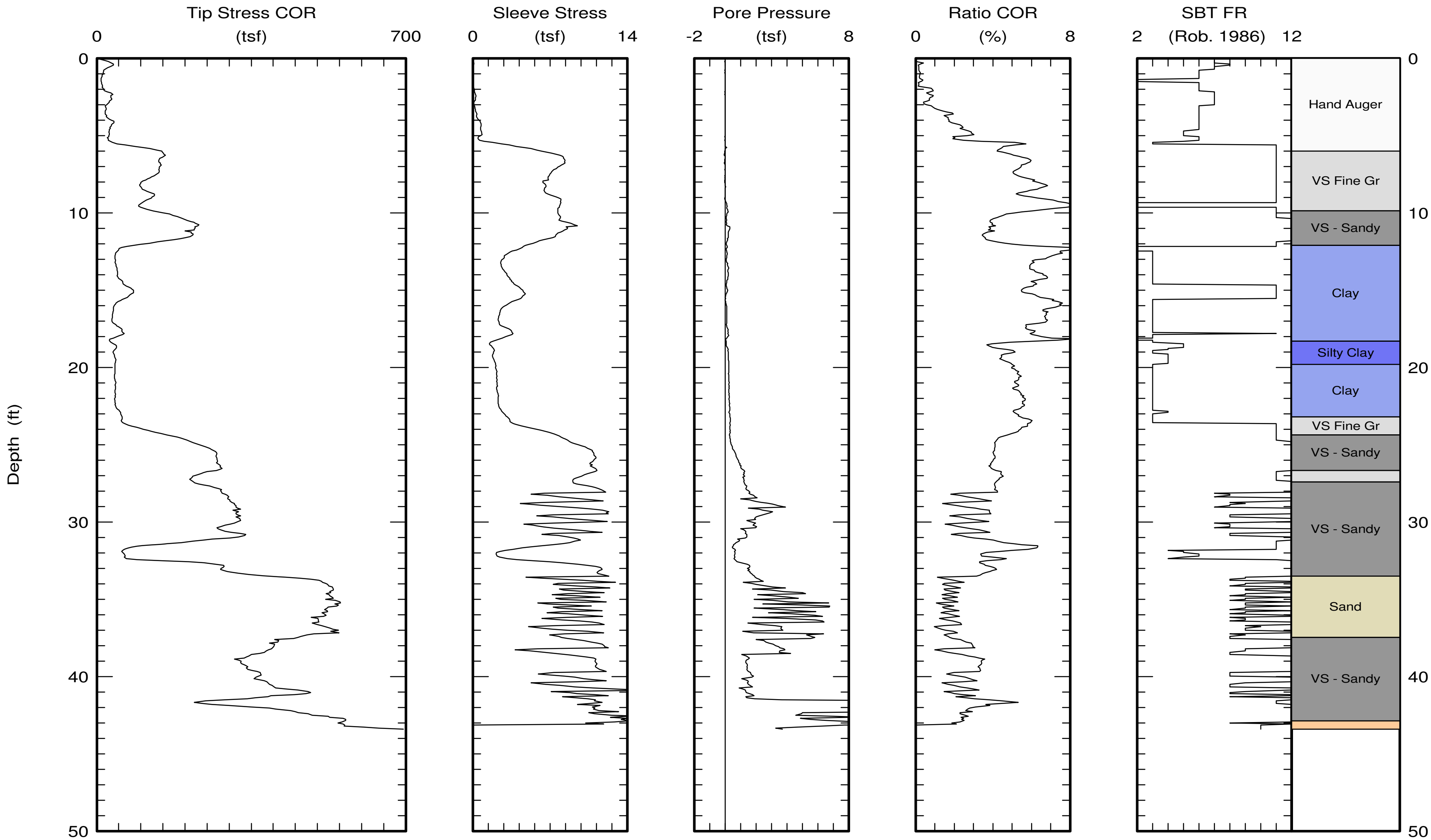
www.kehoetesting.com

CPT Data
30 ton rig

Date: 28/Feb/2011
Test ID: T3-C12
Project: LosAngeles

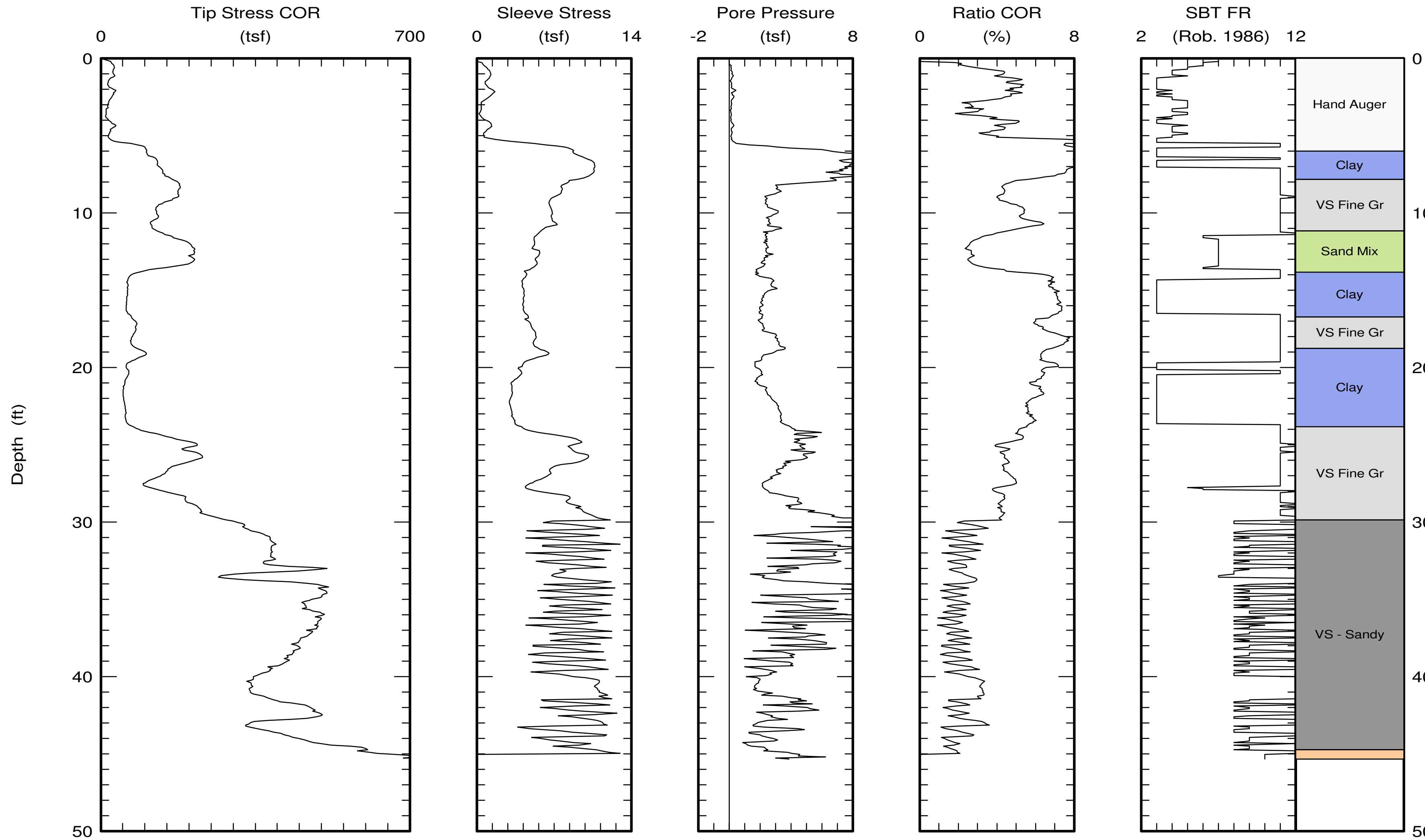
Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 43.43 (ft)

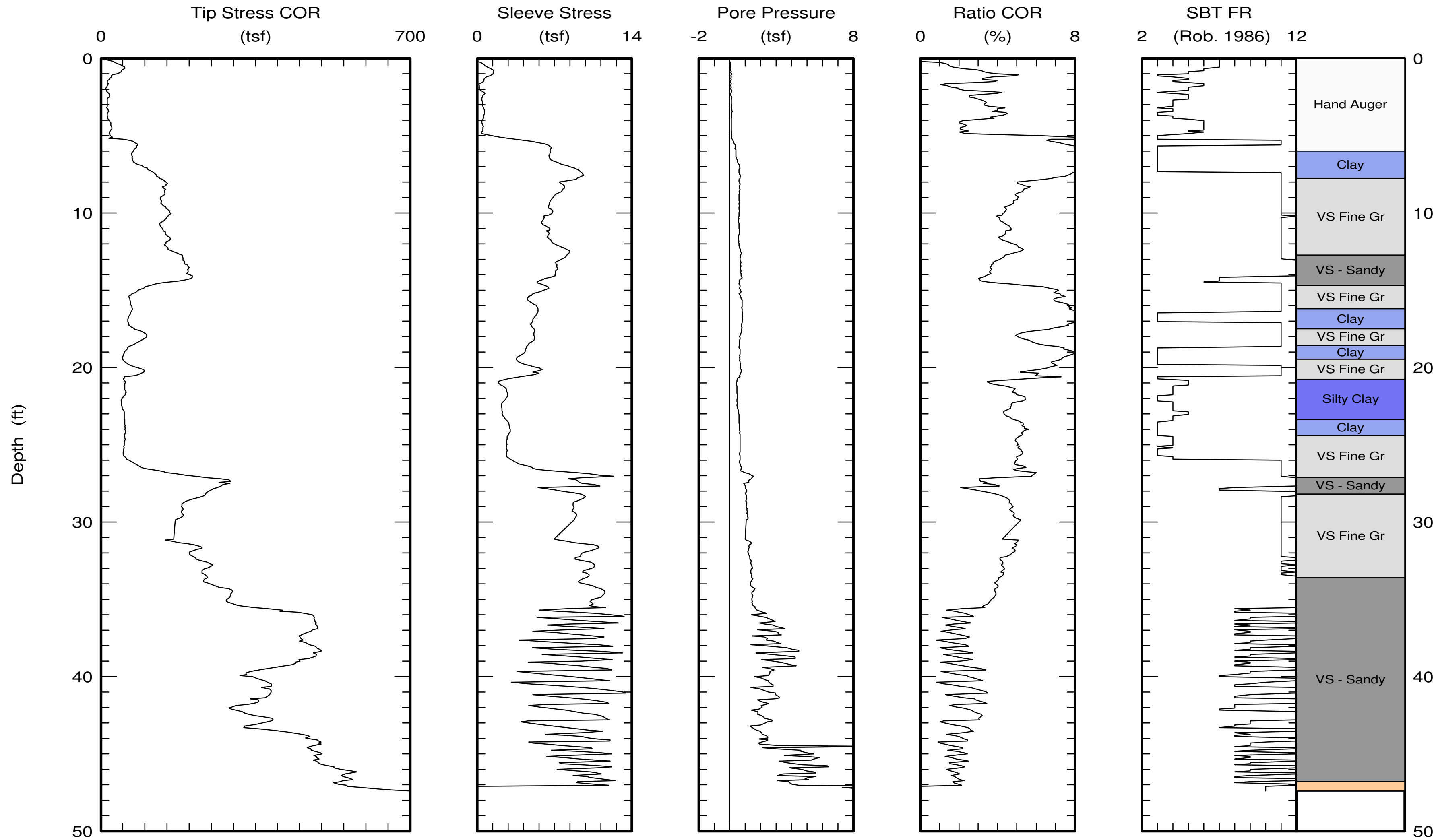
Test ID: T3-C12
File: Z28F1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Feb/2011 Test ID: T3-C13 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



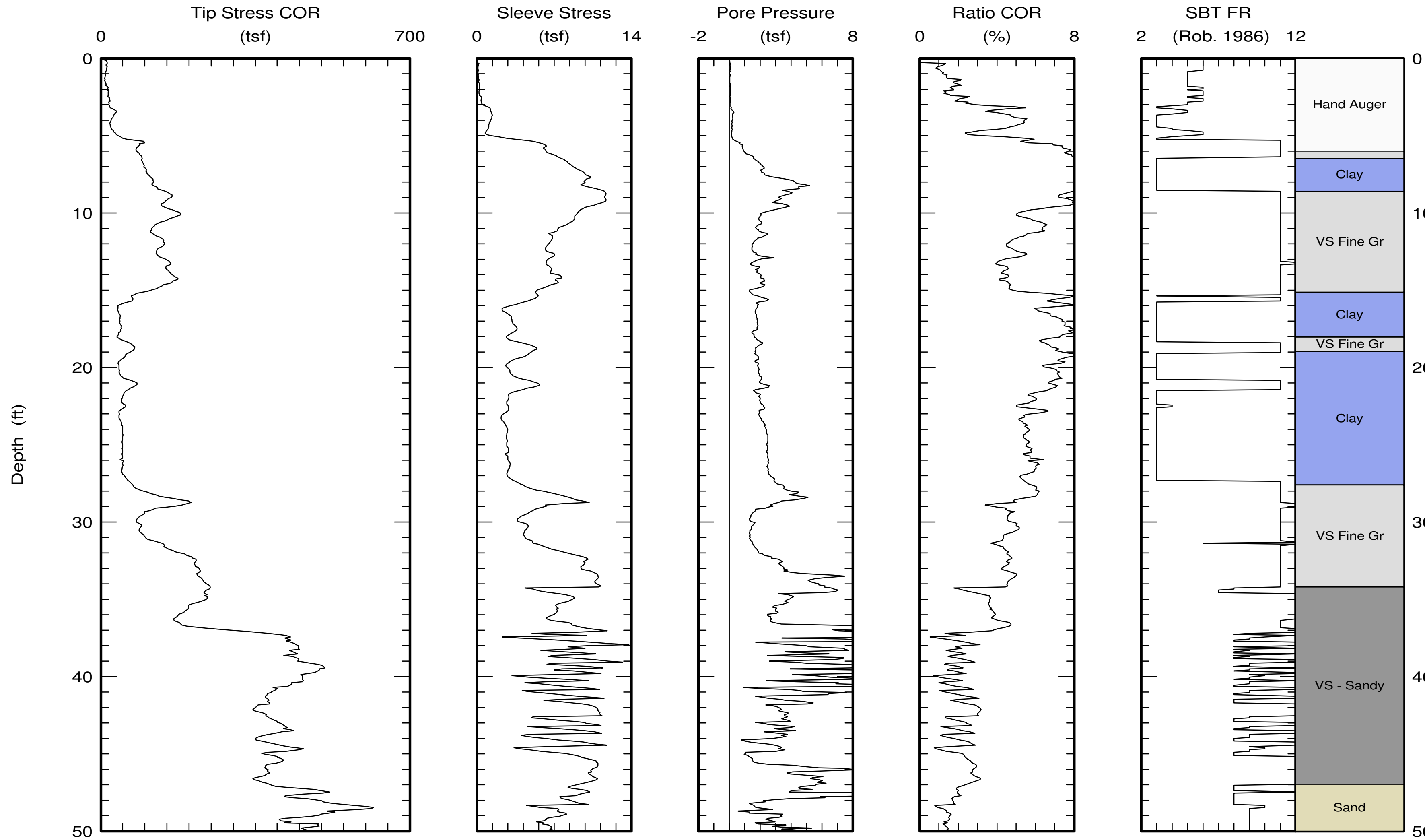
Maximum depth: 45.35 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Feb/2011 Test ID: T3-C14 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 47.41 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C15 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

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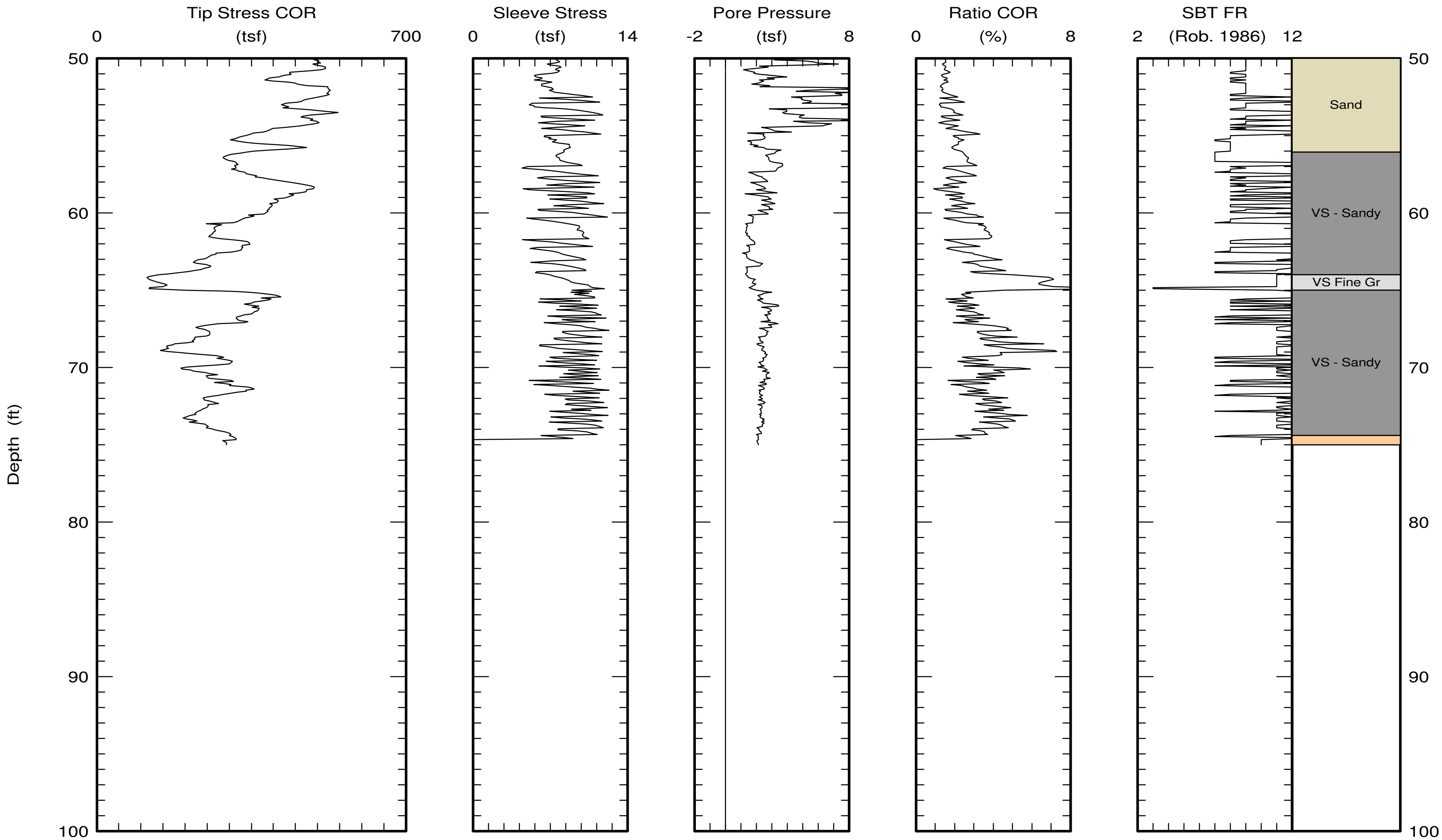
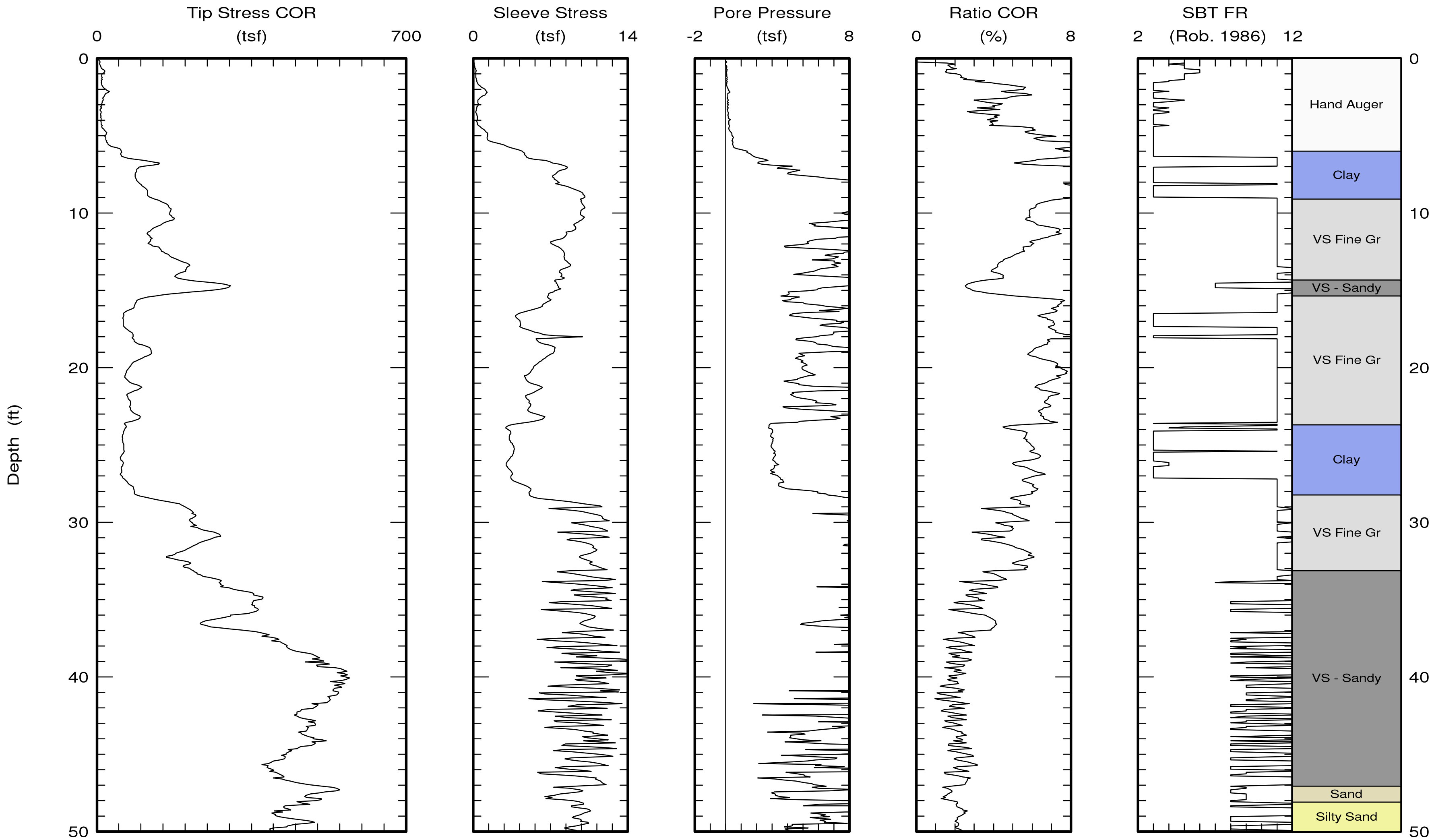
Test ID: T3-C15
File: Z01M1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C15 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C16 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 50.96 (ft)

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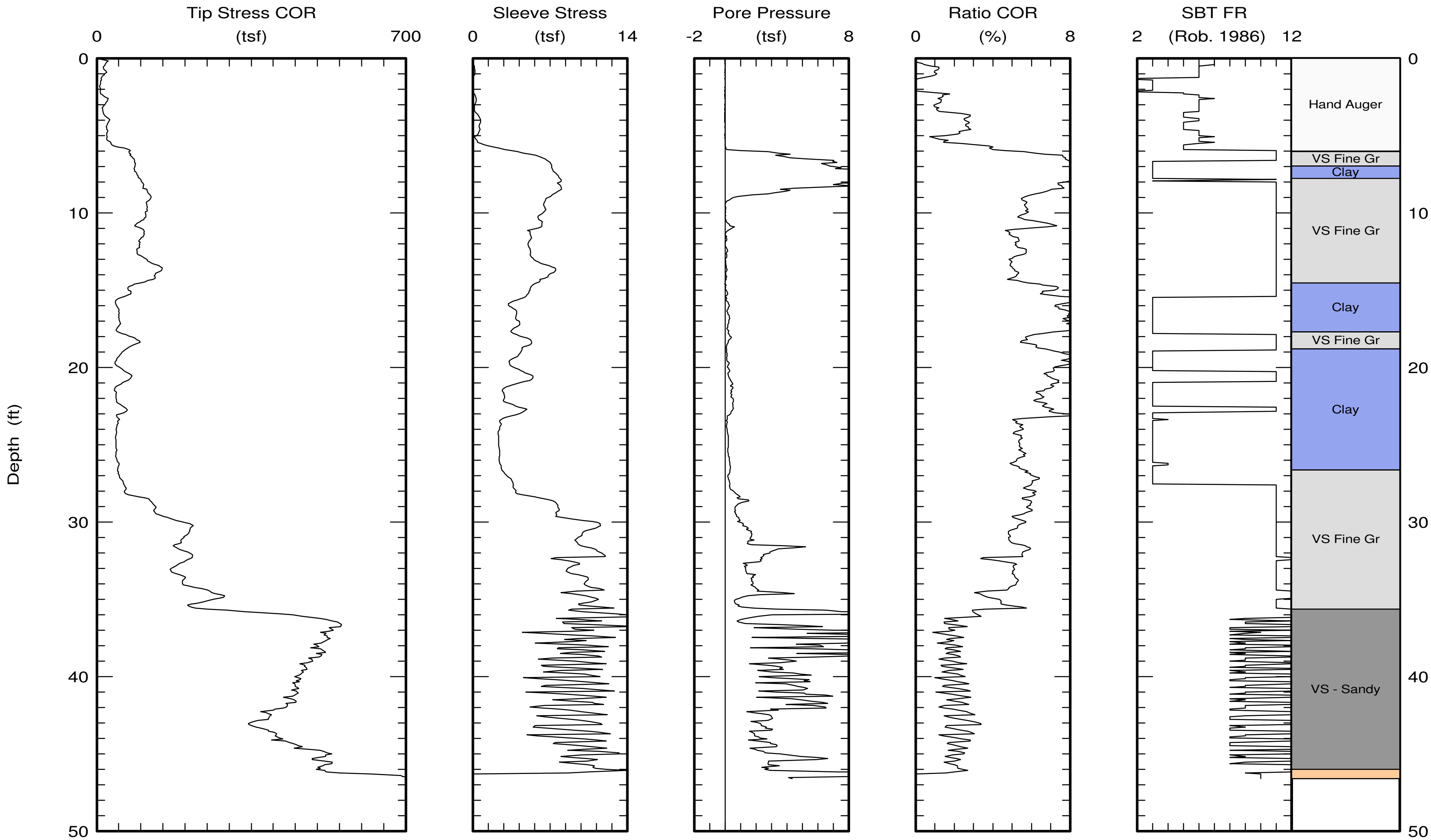
CPT Data
30 ton rig

Date: 01/Mar/2011
Test ID: T3-C17
Project: LosAngeles

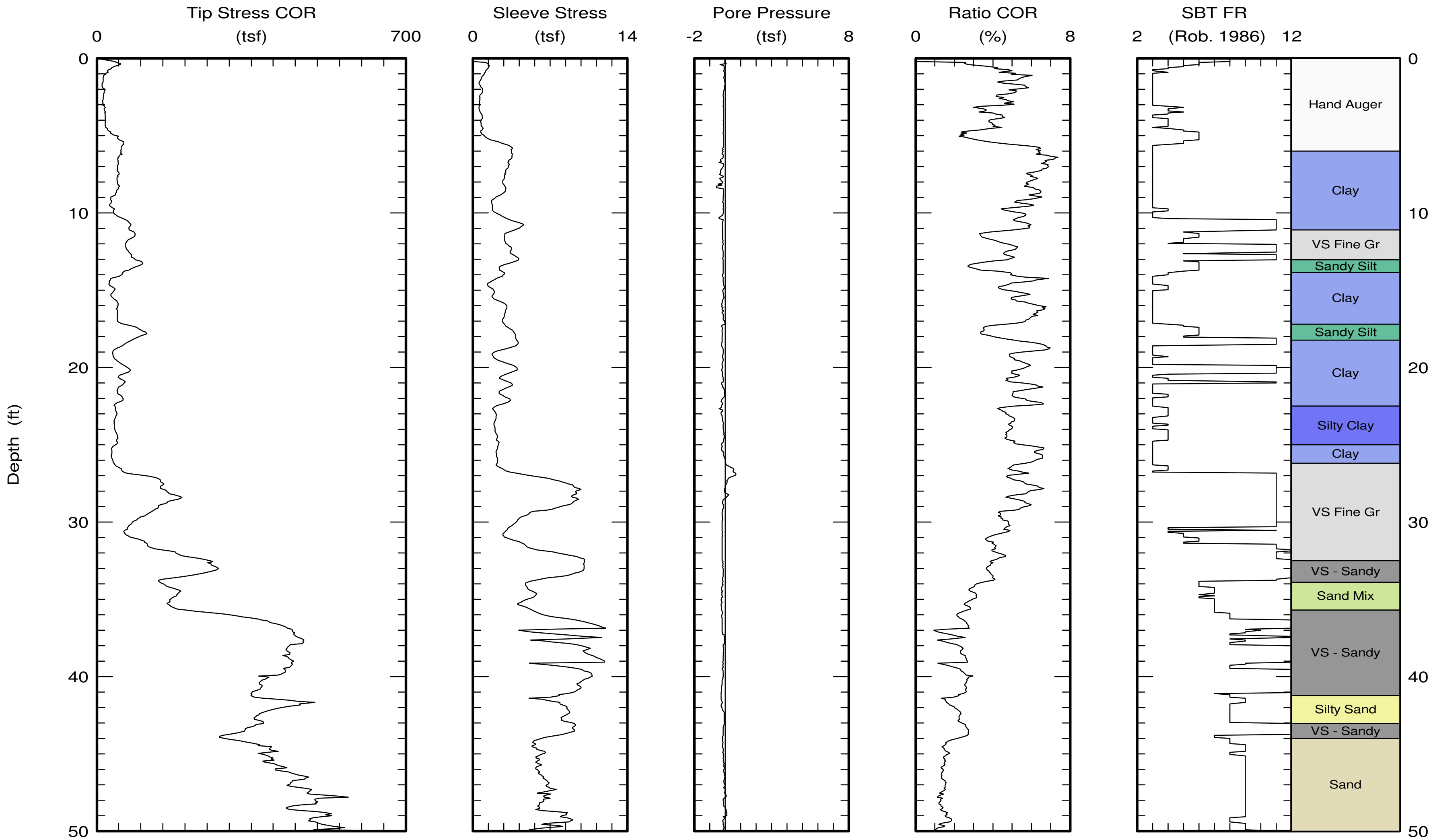
Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 46.60 (ft)

Test ID: T3-C17
File: Z01M1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C18 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

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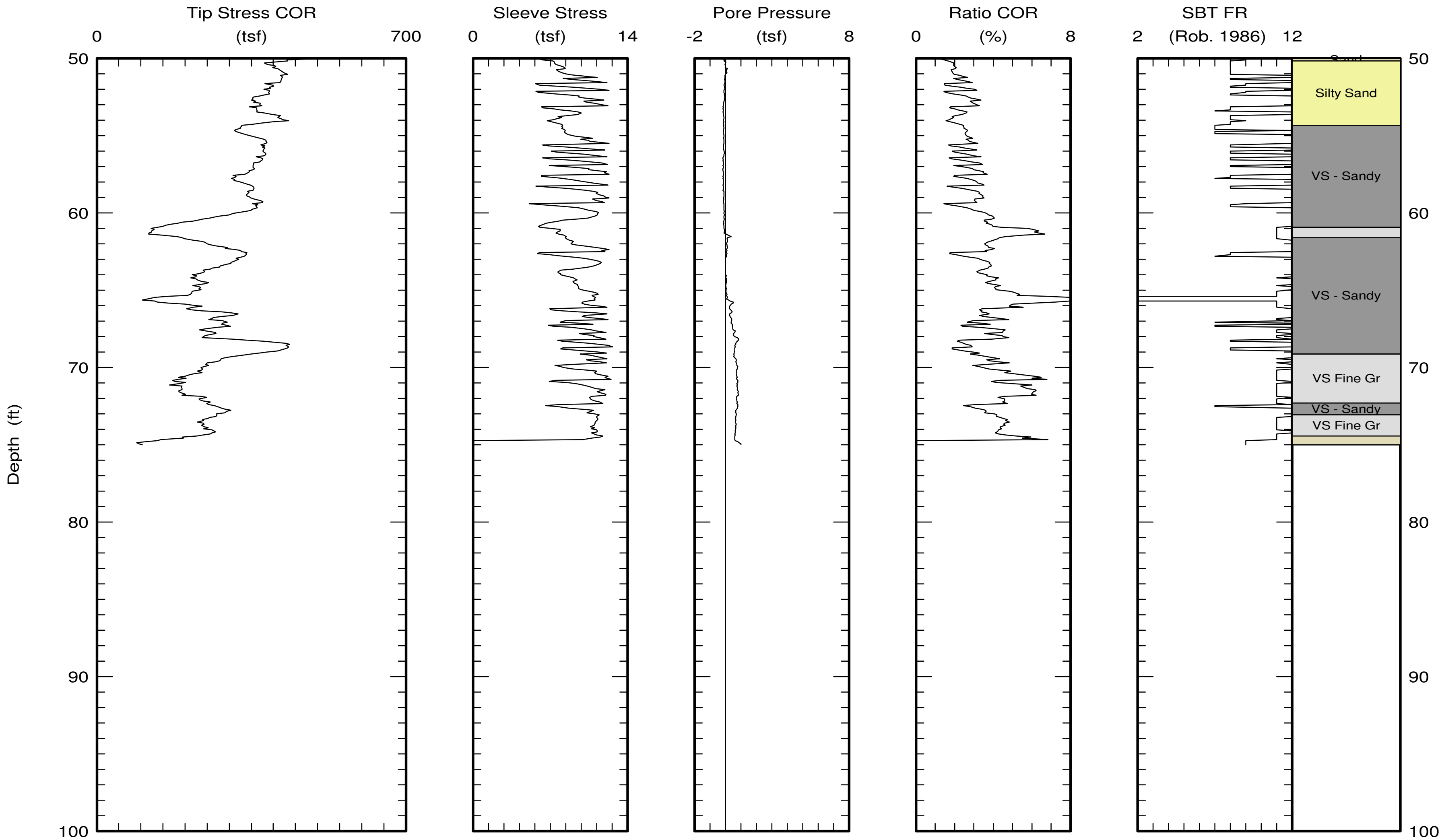
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C18 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

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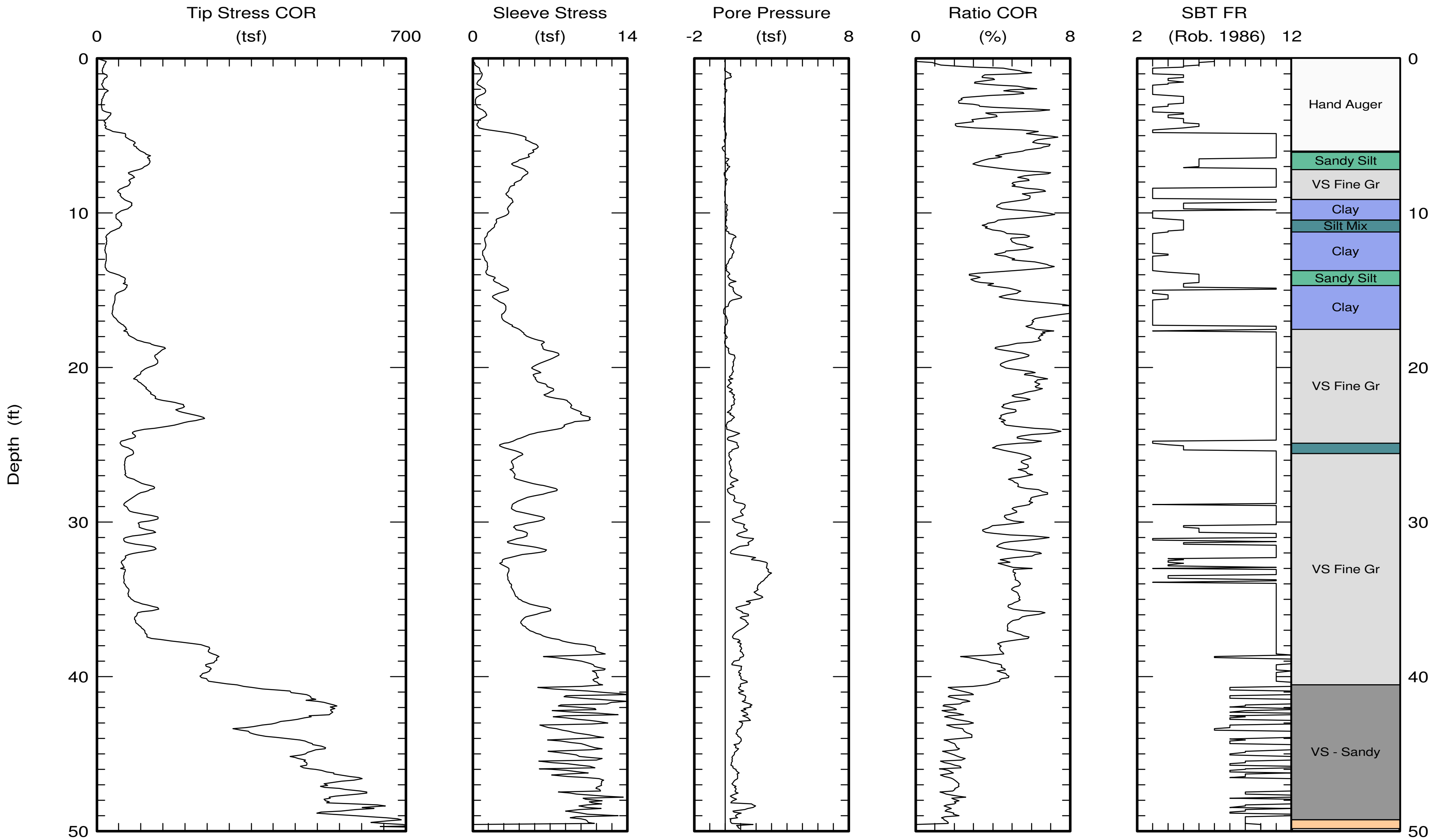
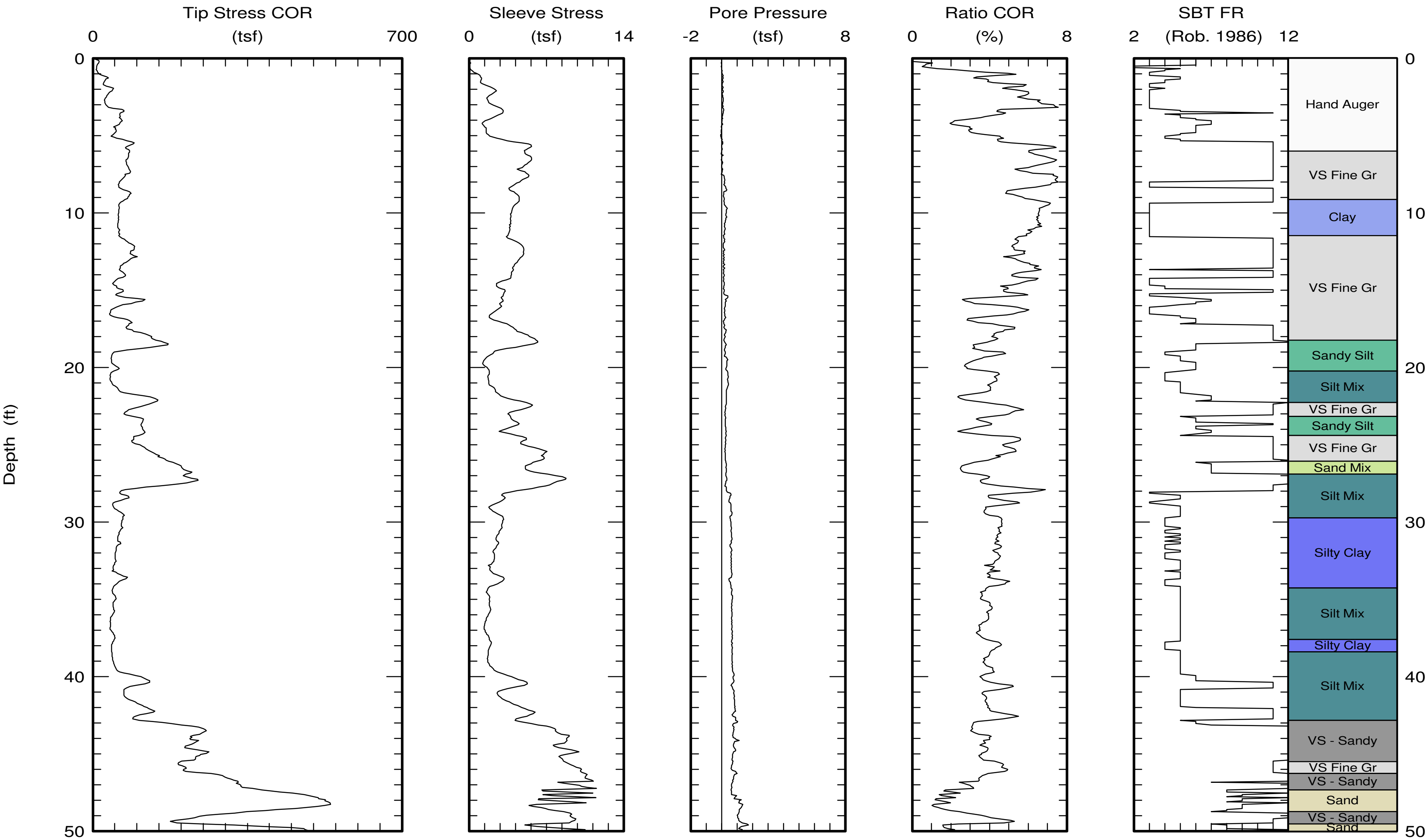
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C19 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 49.86 (ft)

Test ID: T3-C19
File: Z02M1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Centry Park	



Maximum depth: 50.95 (ft)

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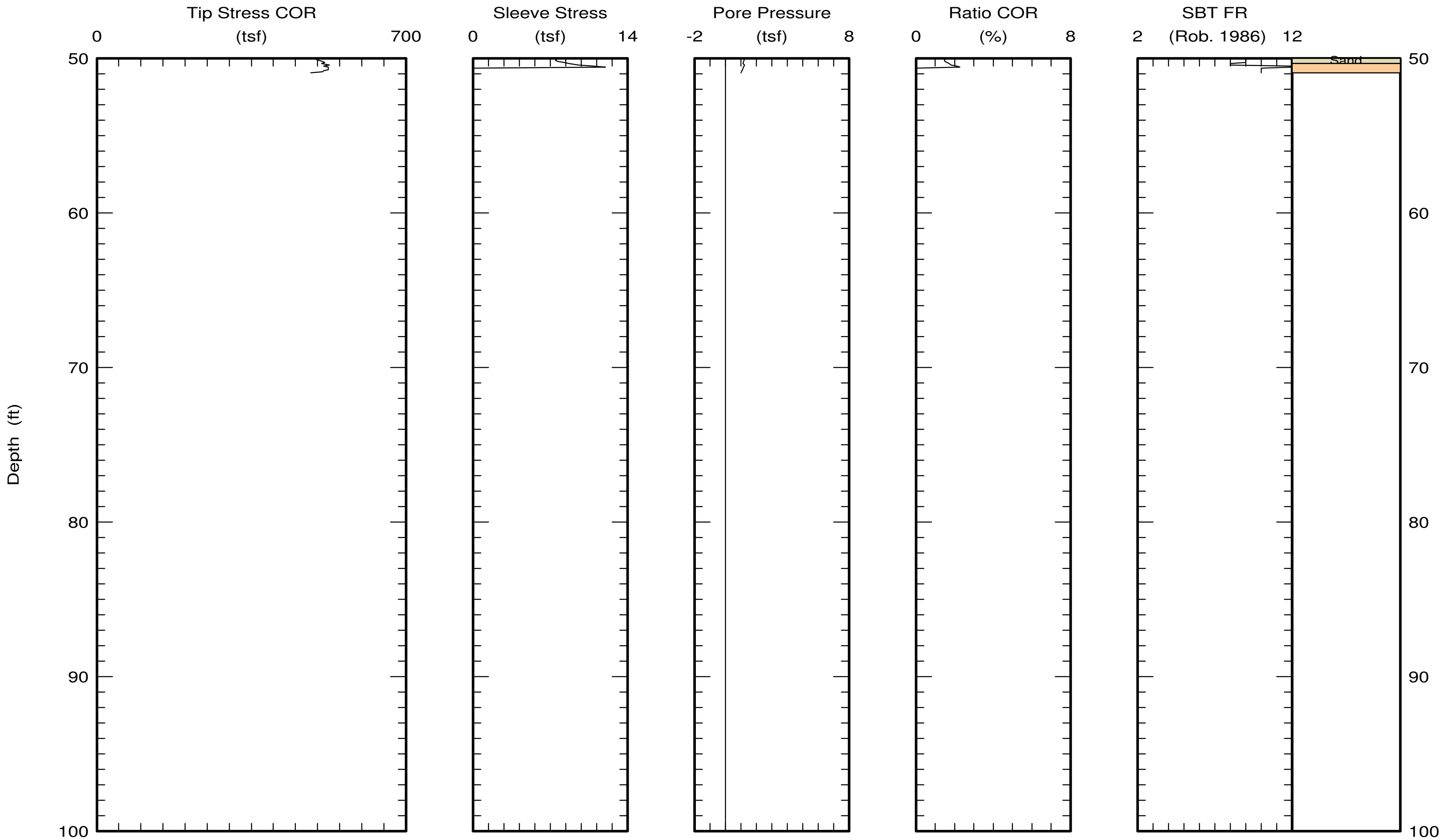
Test ID: T3-C20

File: Z03M1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Centry Park	



Maximum depth: 50.95 (ft)

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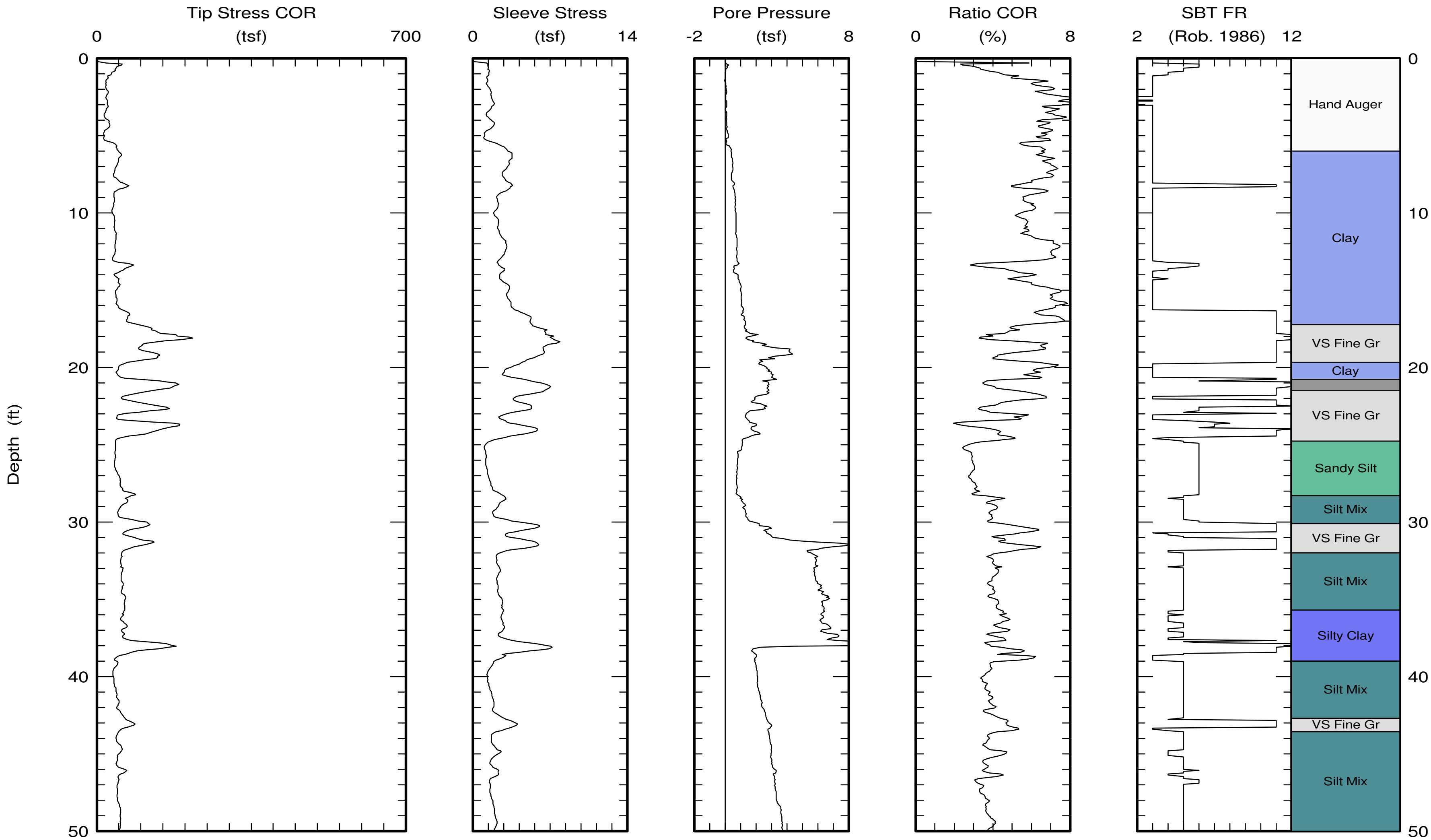
CPT Data
30 ton rig

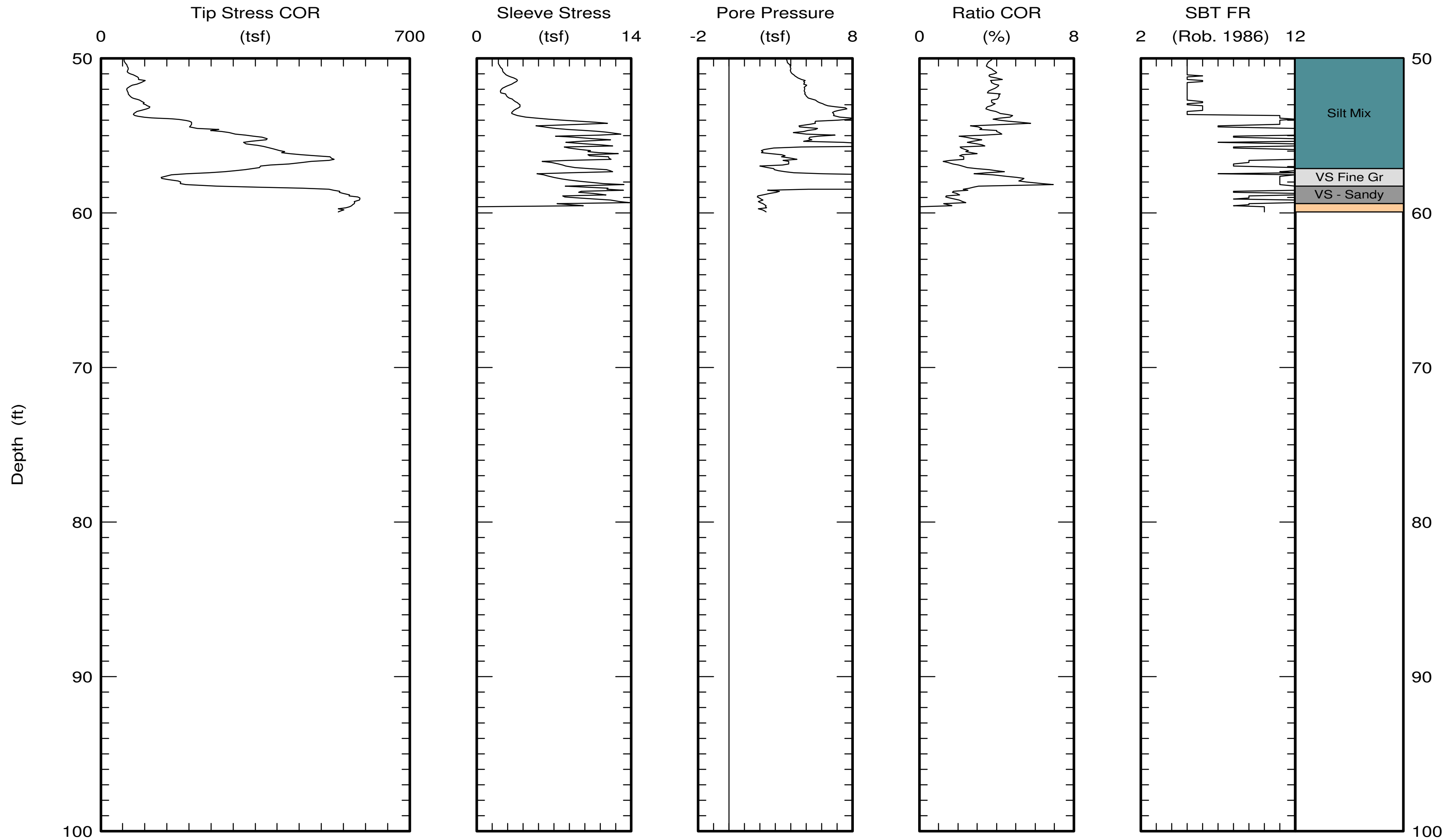
Date: 23/Feb/2011
Test ID: T3-C21
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



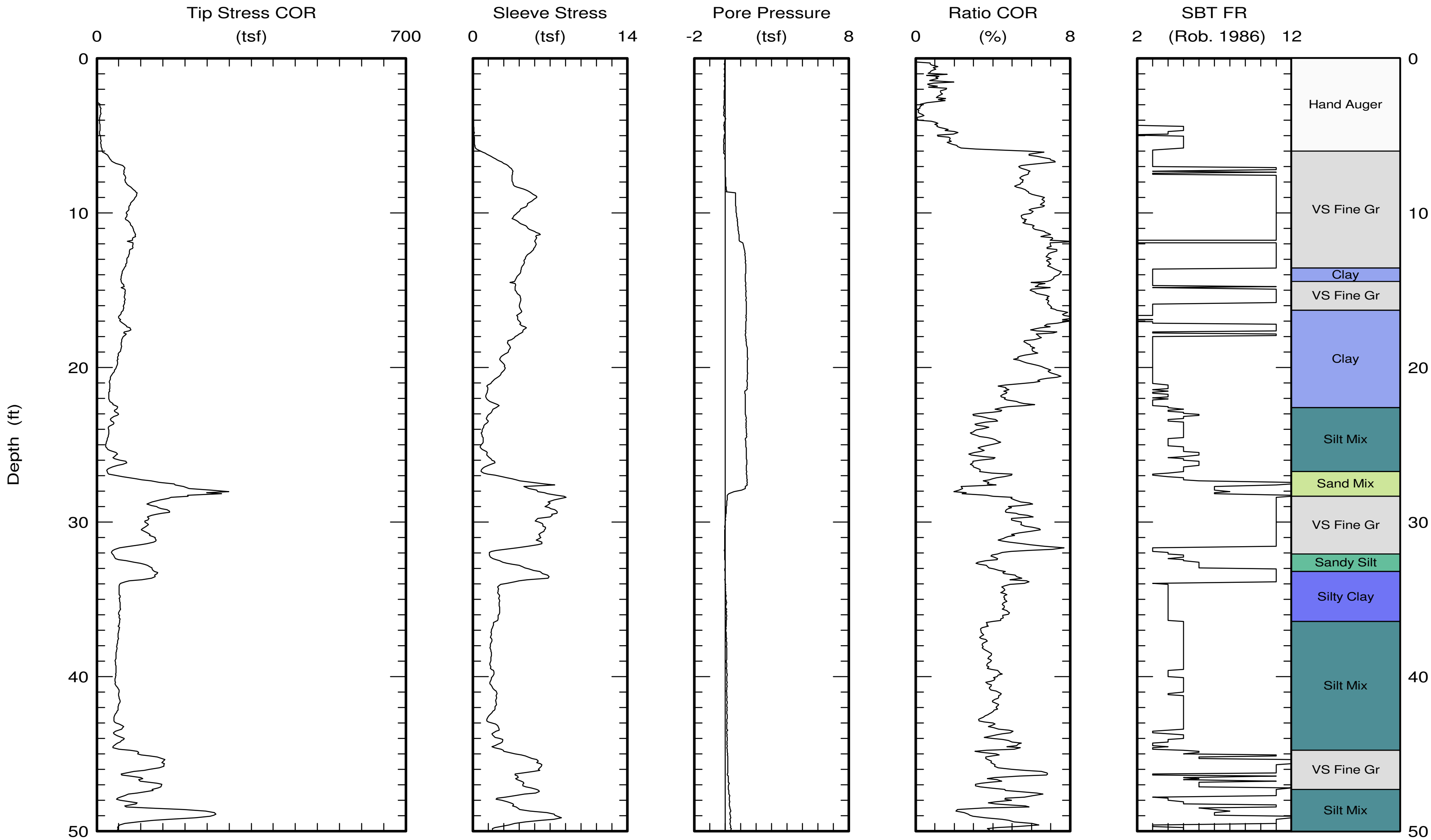
Maximum depth: 59.96 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/Feb/2011 Test ID: T3-C21 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 59.96 (ft)

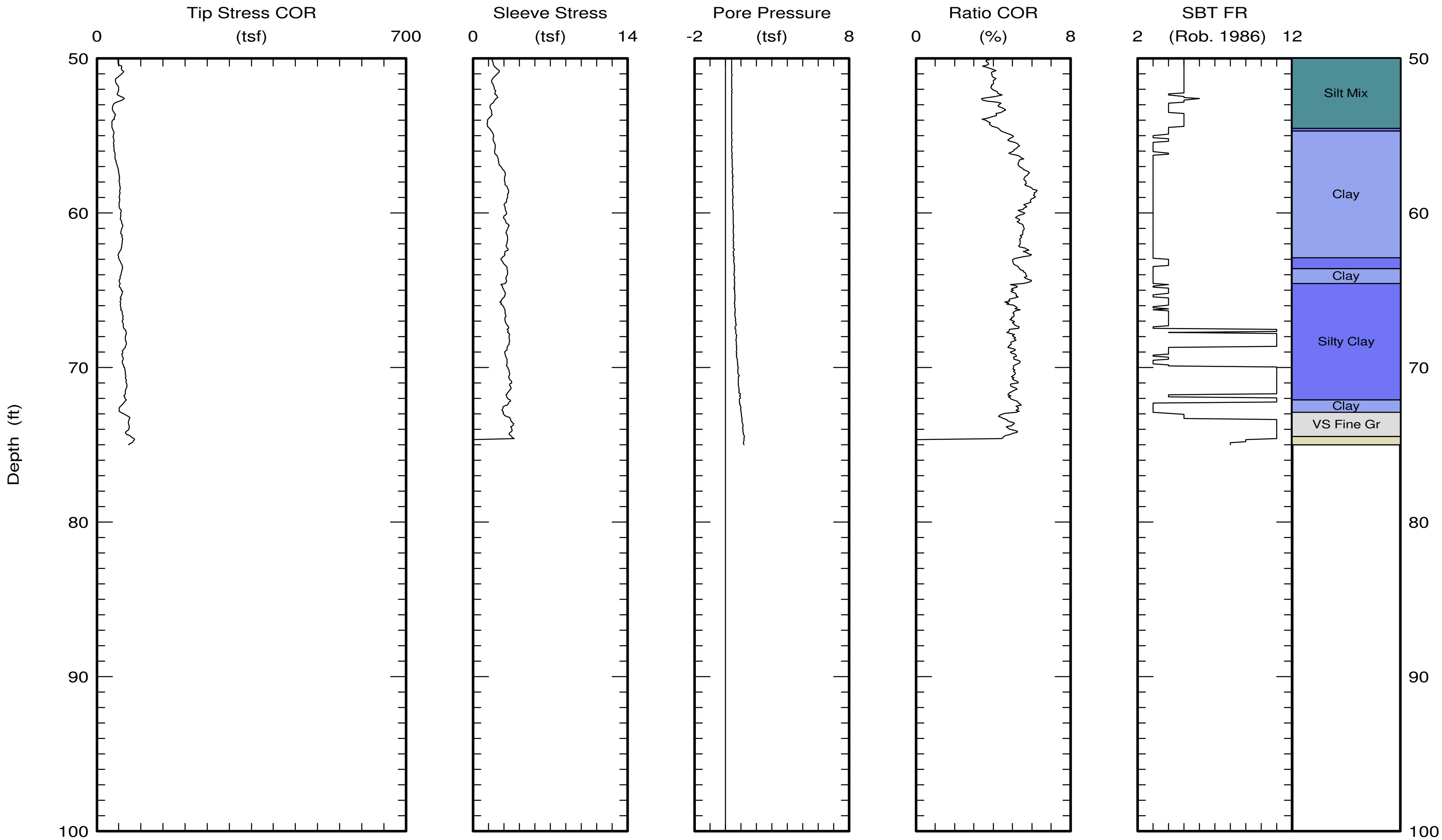
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C22 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 75.01 (ft)

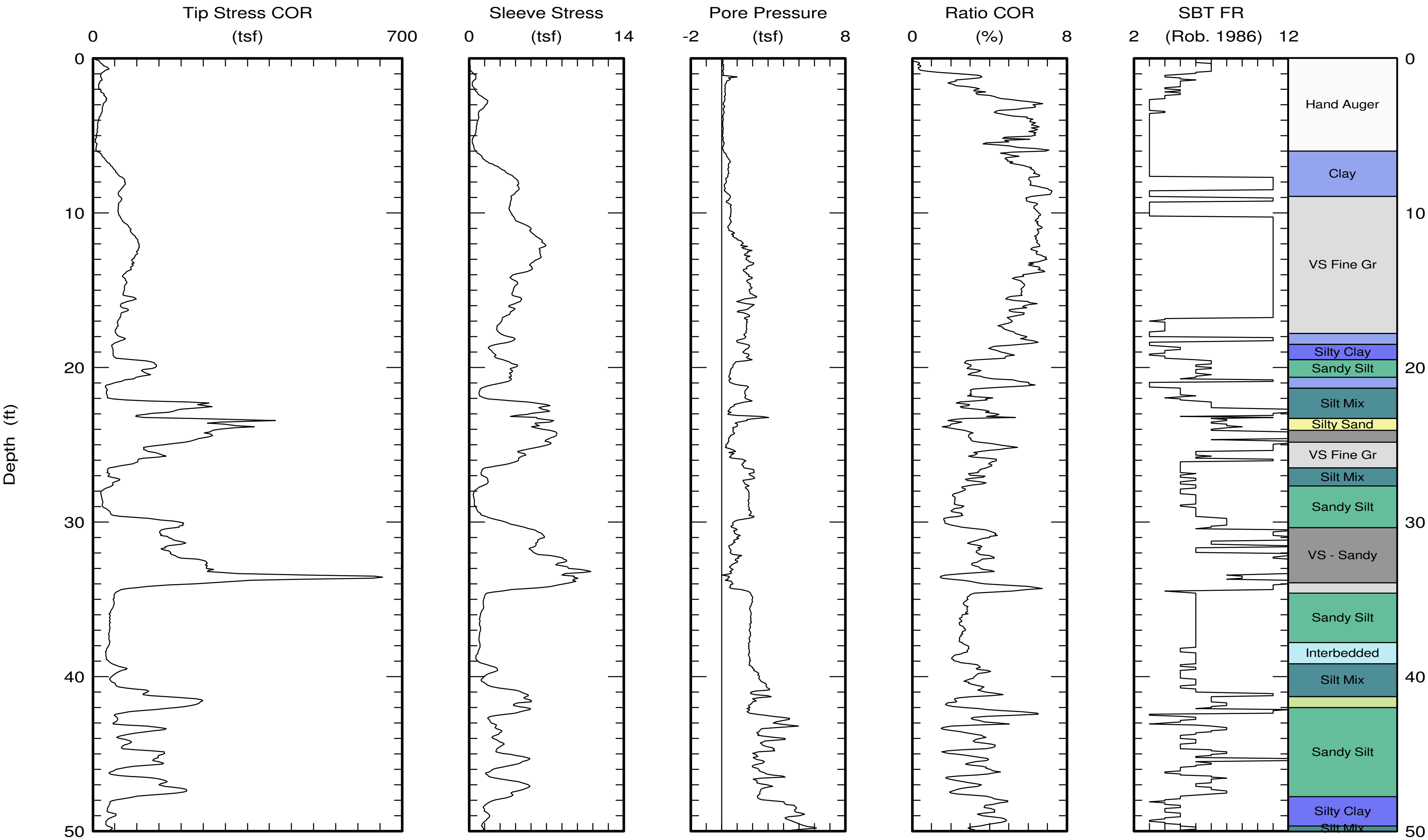
Test ID: T3-C22
File: Z22F1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C22 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 75.01 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C23 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

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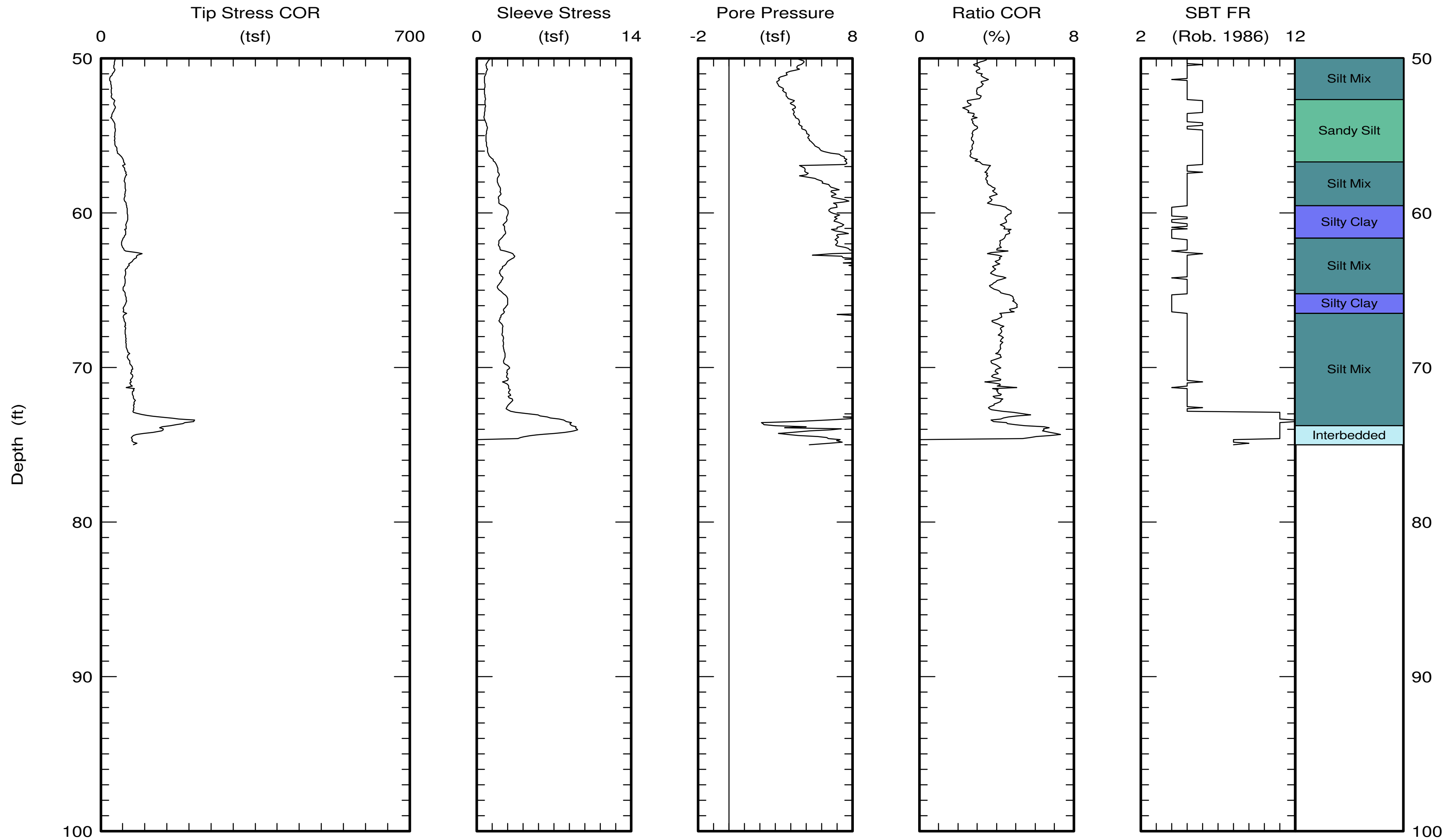
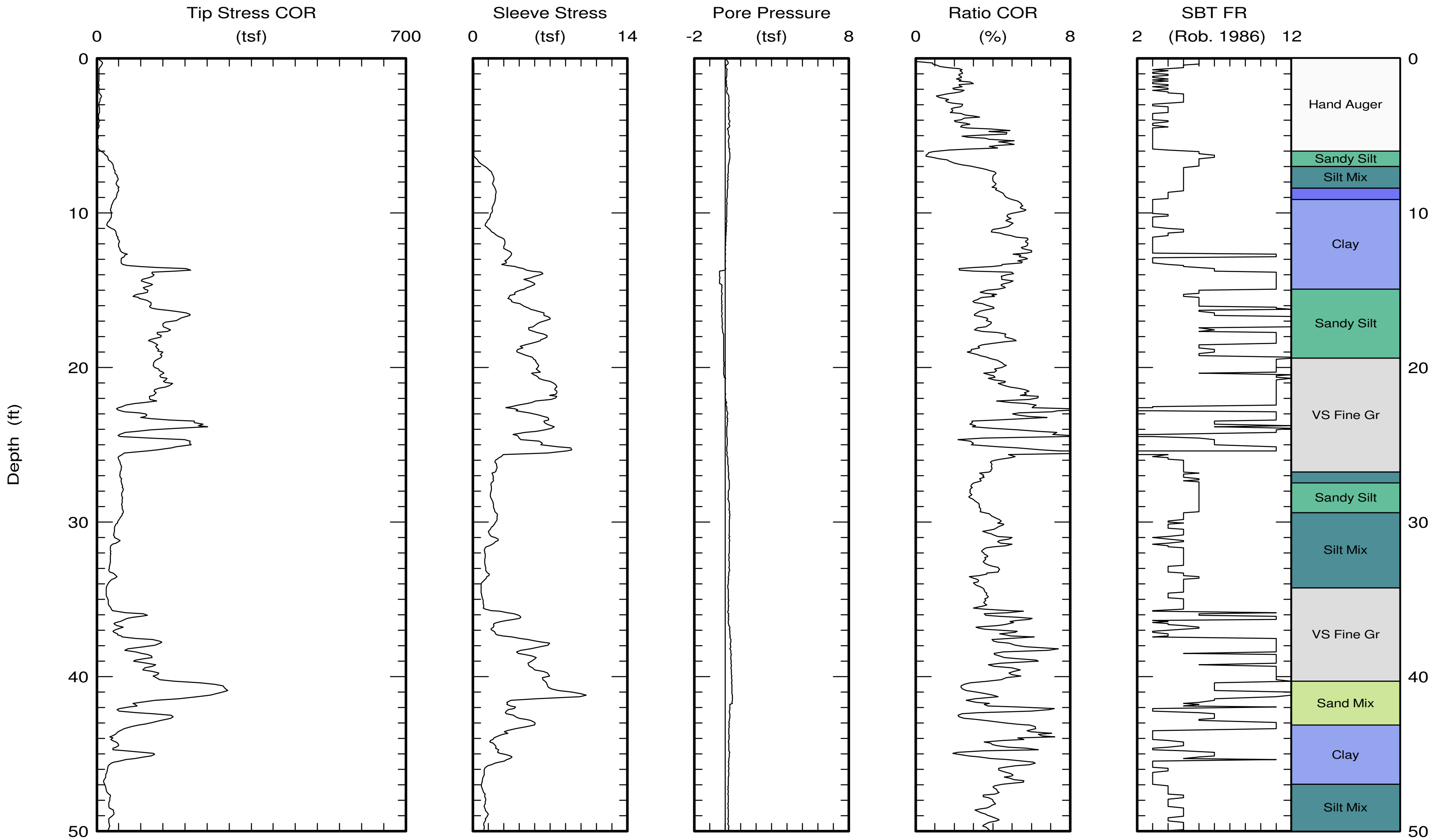
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C23 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C24 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 75.15 (ft)

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Test ID: T3-C24
File: Z22F1103C.ECP

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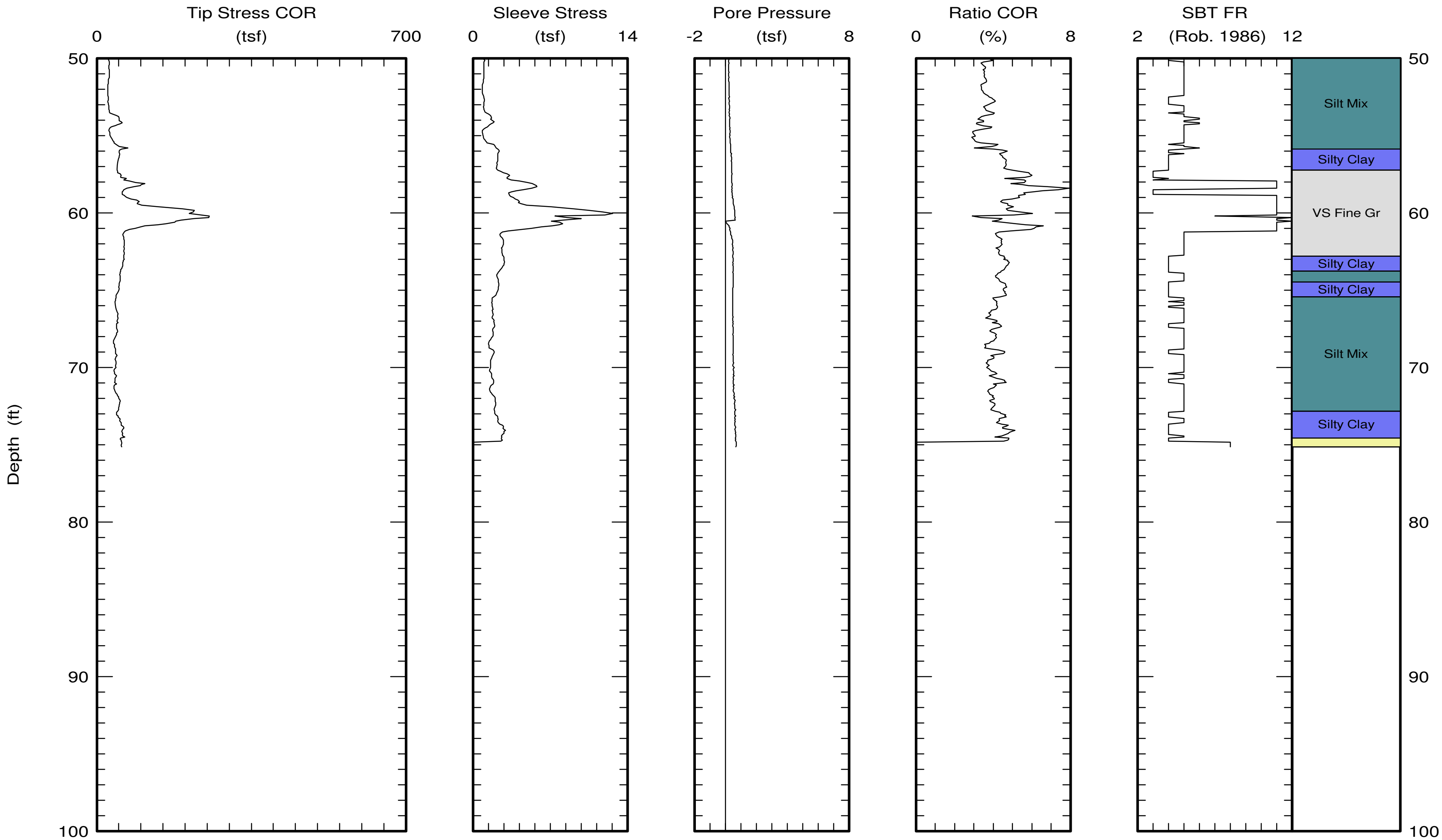
CPT Data
30 ton rig

Date: 22/Feb/2011
Test ID: T3-C24
Project: LosAngeles

Customer: MACTEC
Job Site: WestsideSubwayExtension/Century Park



Maximum depth: 75.15 (ft)
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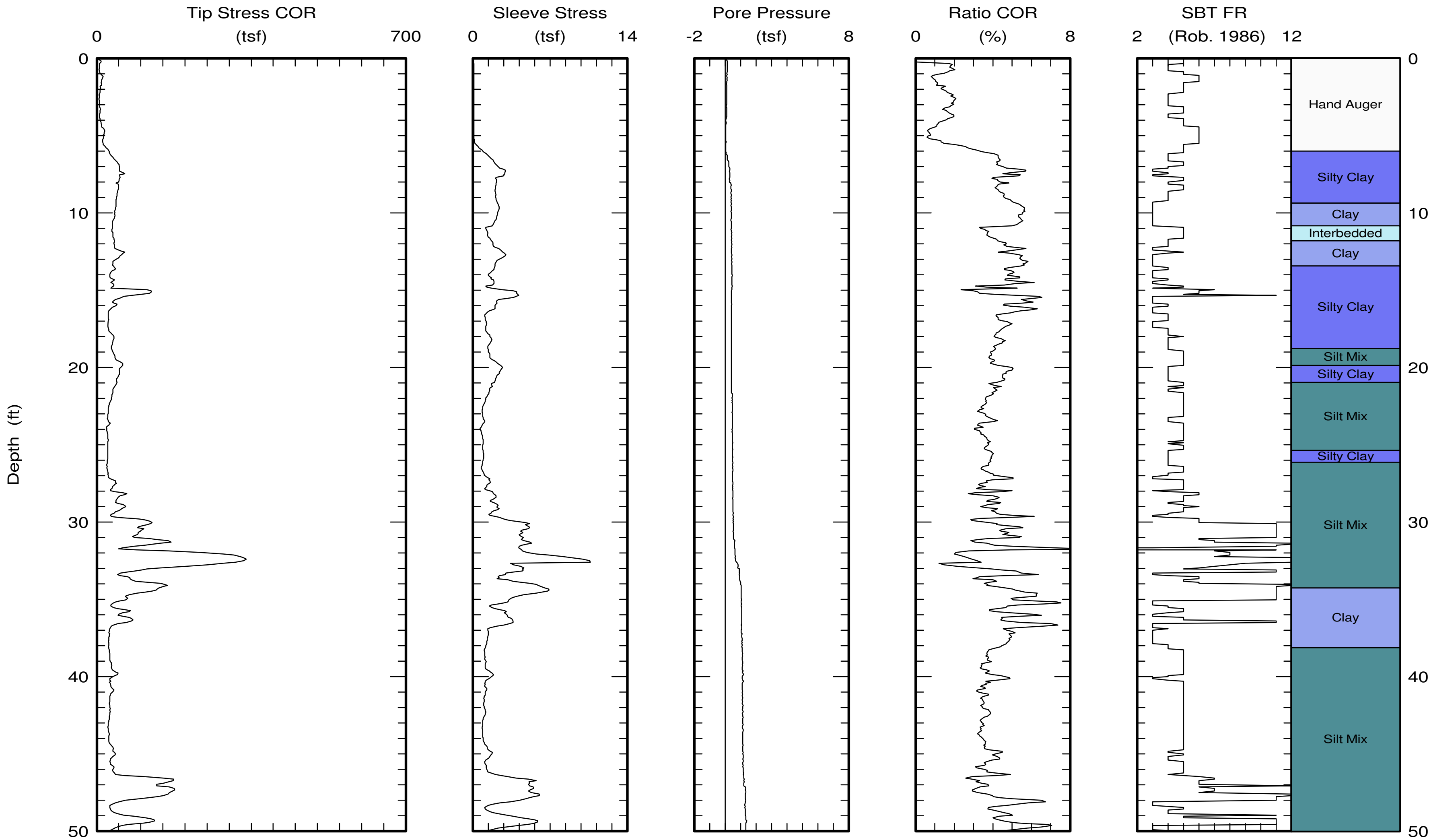
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C25 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 75.09 (ft)

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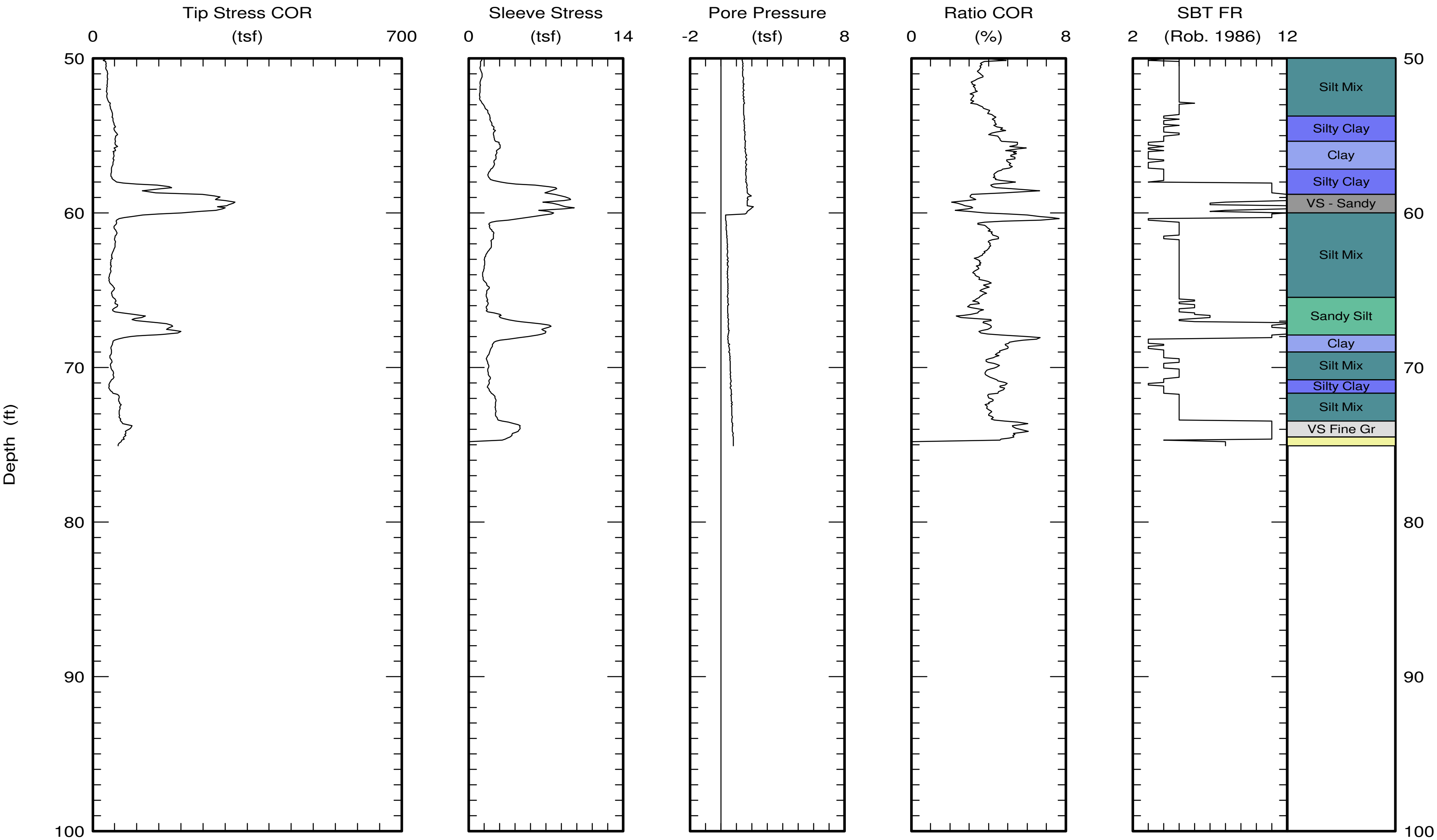
Test ID: T3-C25
File: Z22F1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C25 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 75.09 (ft)

Test ID: T3-C25
File: Z22F1102C.ECP

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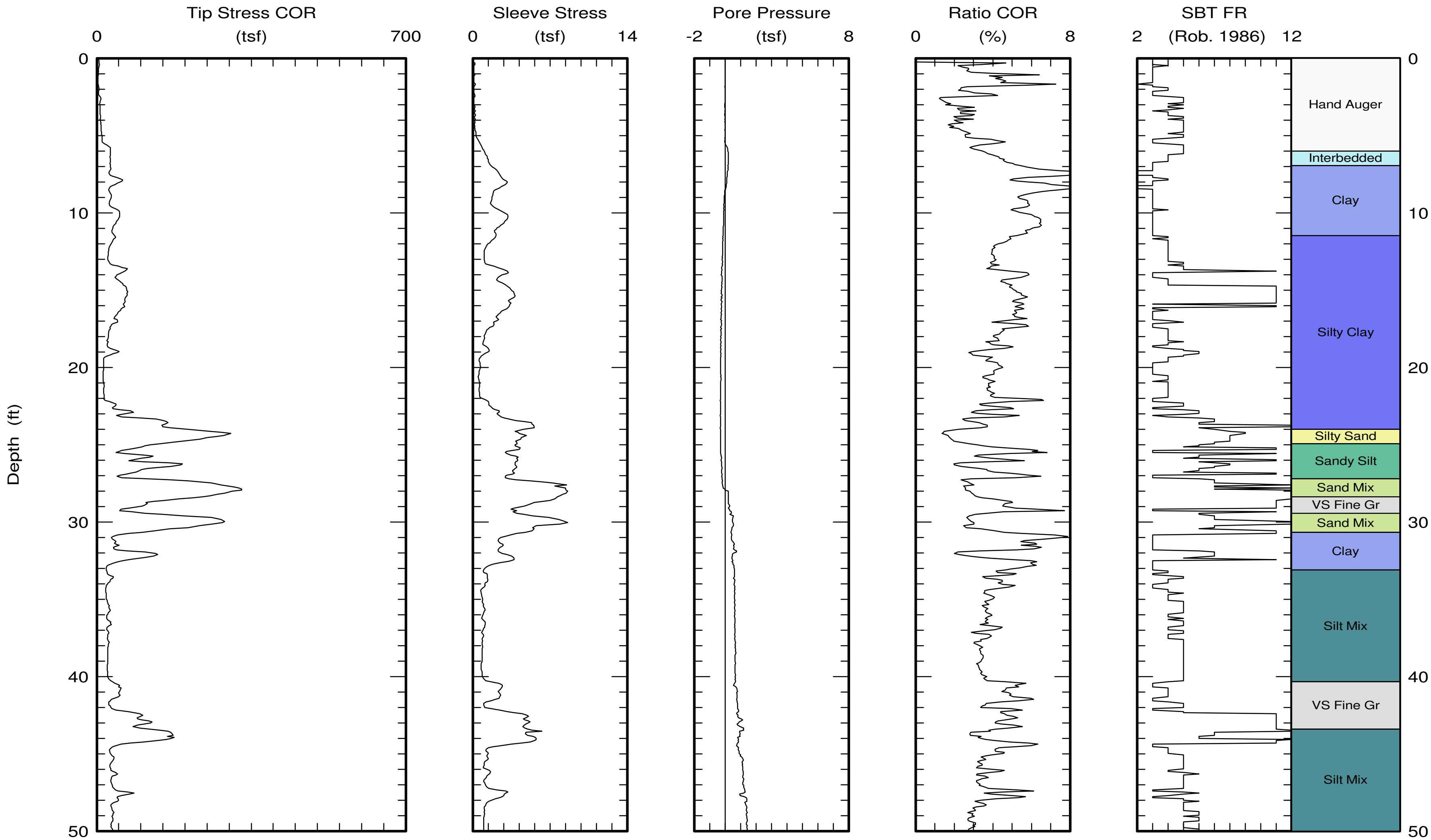
www.kehoetesting.com

CPT Data
30 ton rig

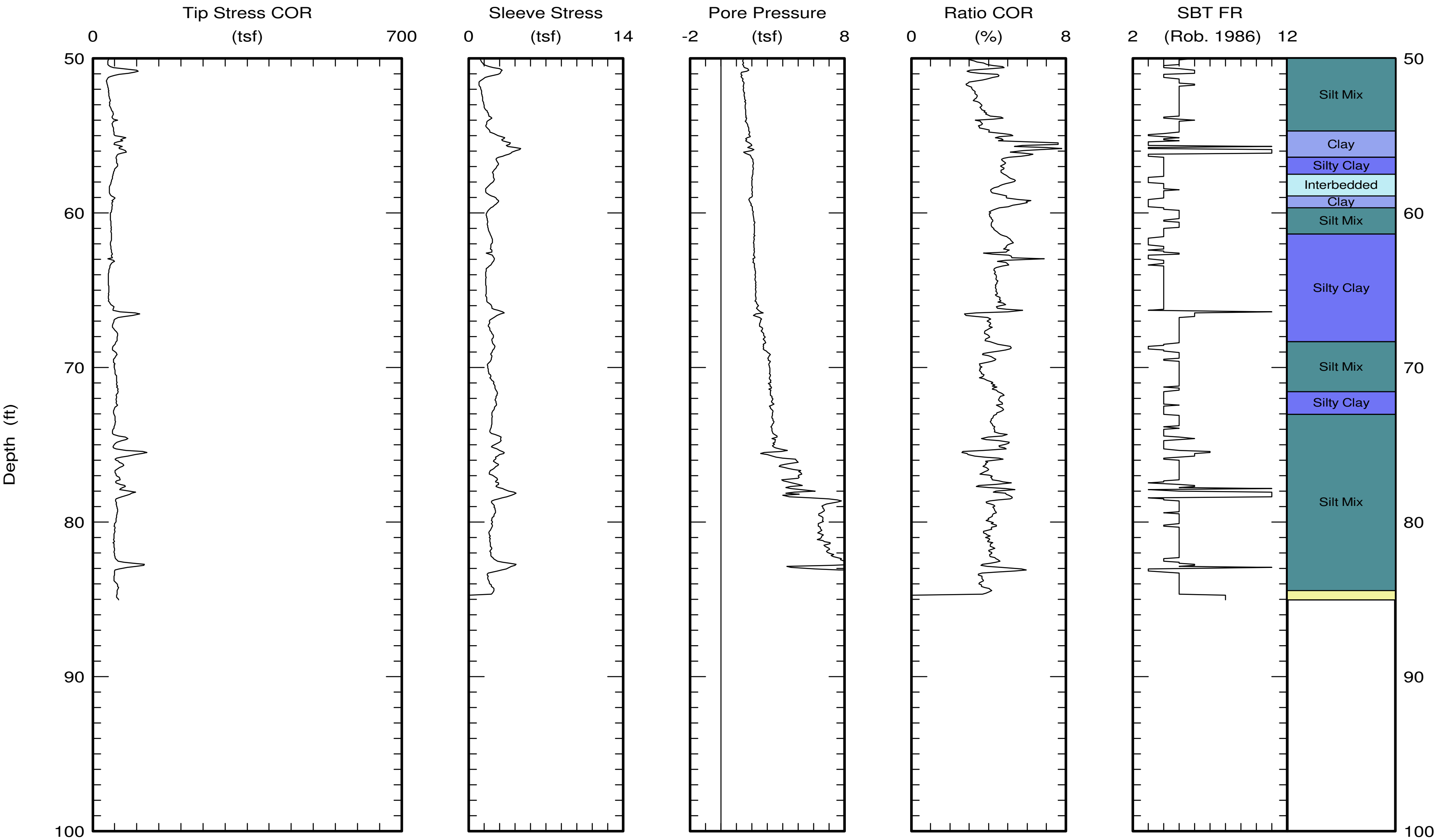
Date: 22/Feb/2011
Test ID: T3-C26
Project: LosAngeles

Customer: MACTEC
Job Site: WestsideSubwayExtension/Century Park



Maximum depth: 85.04 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 22/Feb/2011 Test ID: T3-C26 Project: LosAngeles
	Customer: MACTEC Job Site: WestsideSubwayExtension/Century Park	



Maximum depth: 85.04 (ft)

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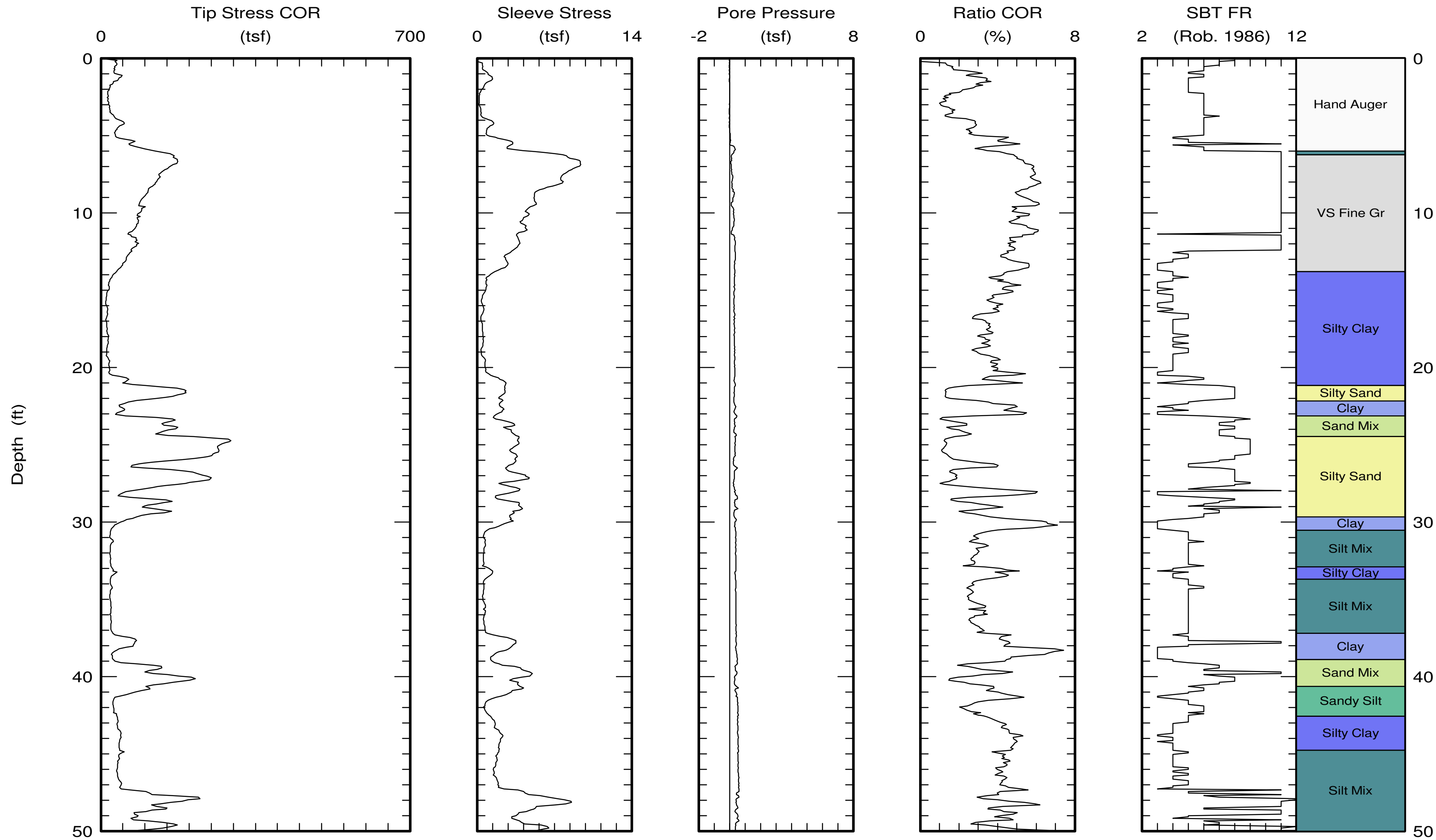
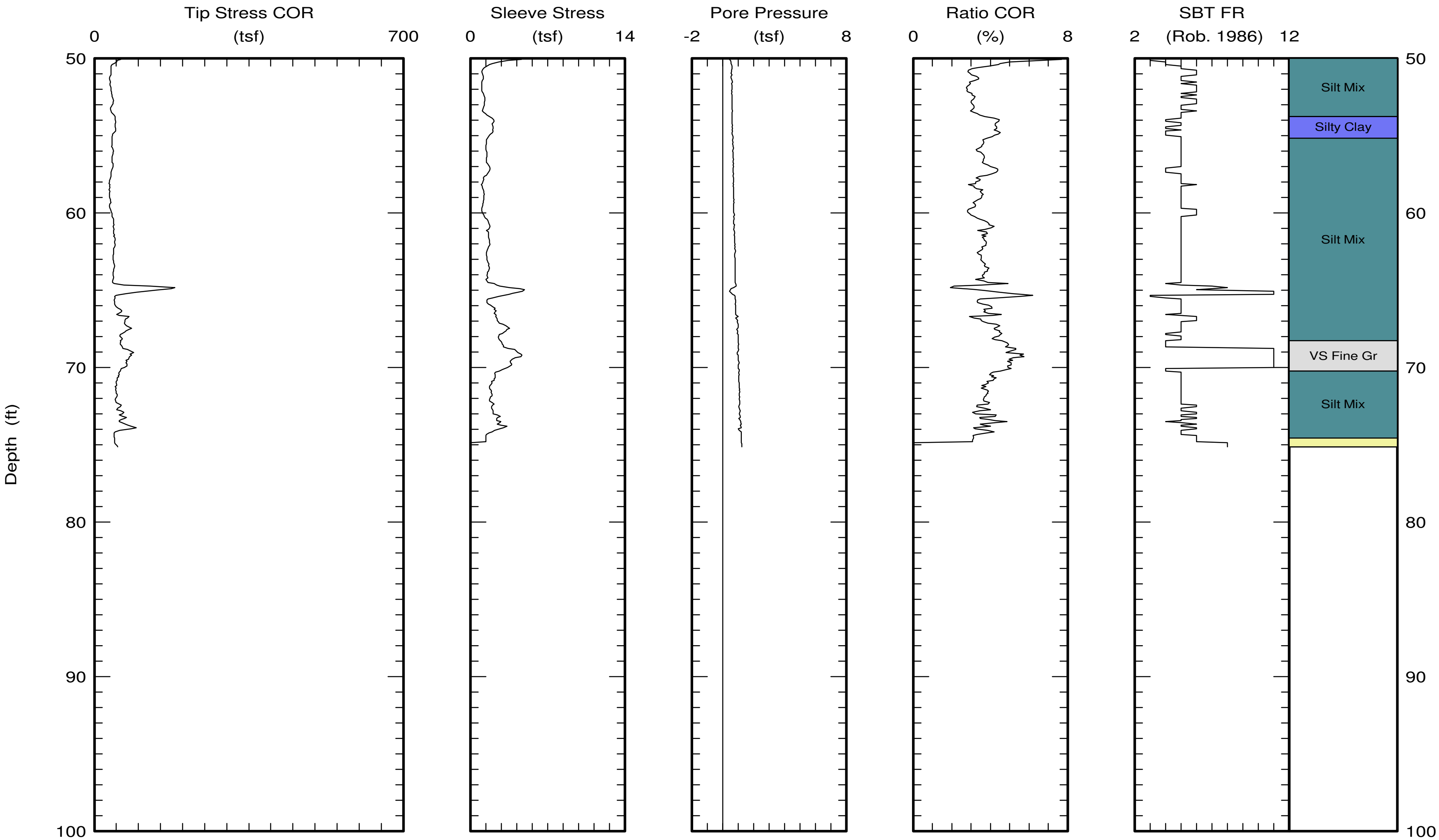
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 09/Mar/2011 Test ID: T3-C27 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.16 (ft)

Test ID: T3-C27
File: Z09M1102C.ECP

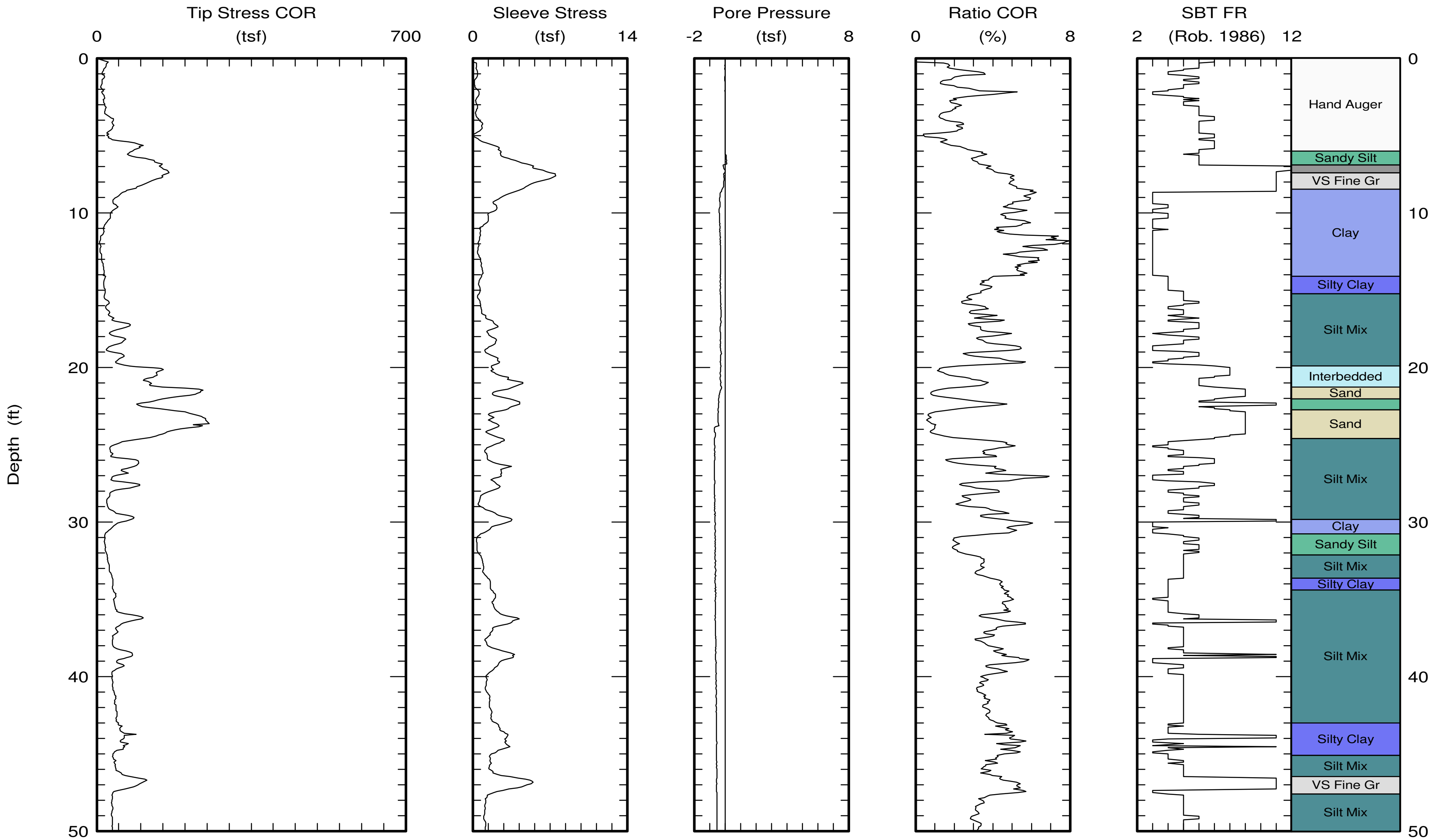
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 09/Mar/2011 Test ID: T3-C27 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.16 (ft)

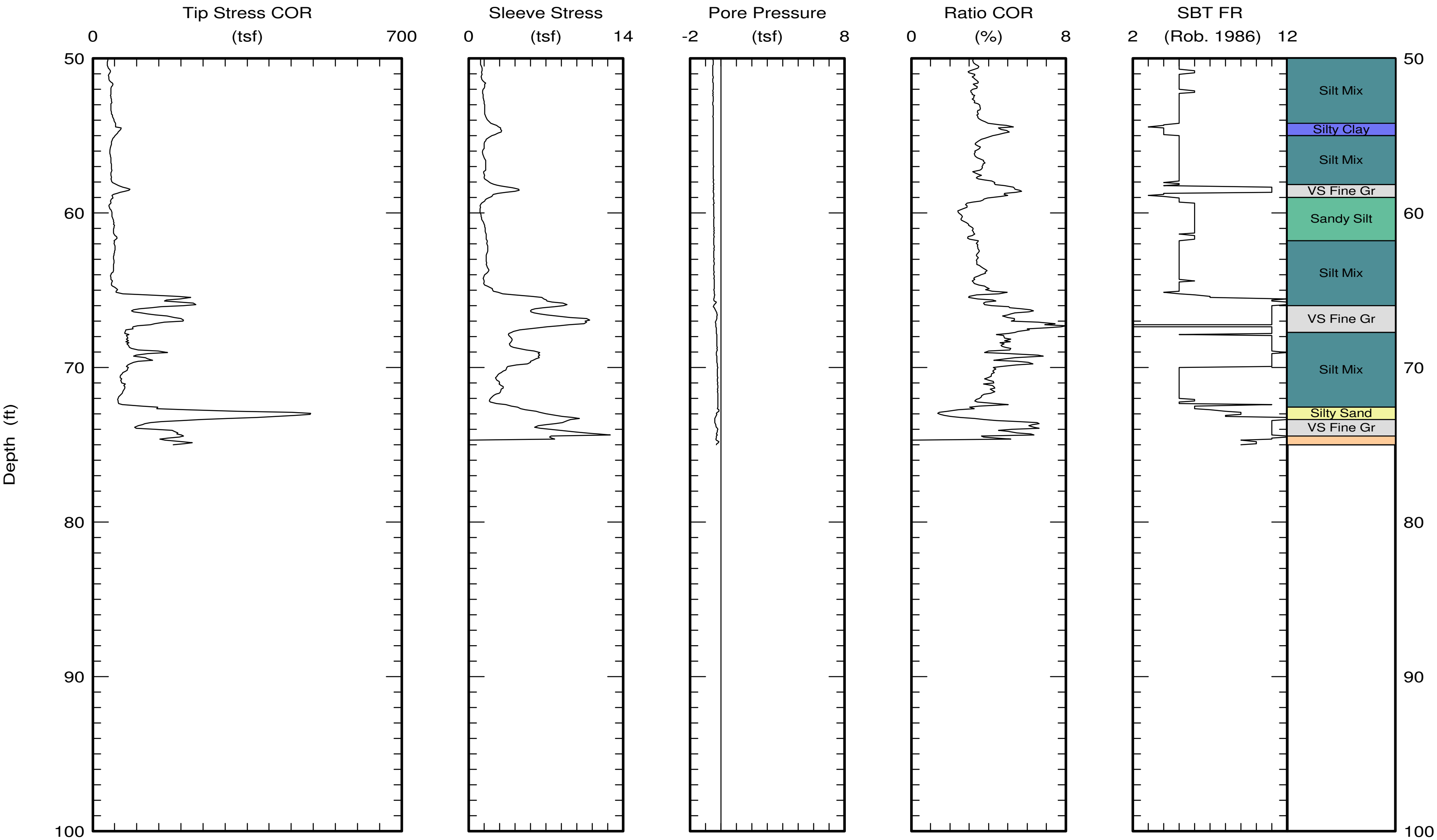
Test ID: T3-C27
File: Z09M1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 09/Mar/2011 Test ID: T3-C29 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 09/Mar/2011 Test ID: T3-C29 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.02 (ft)

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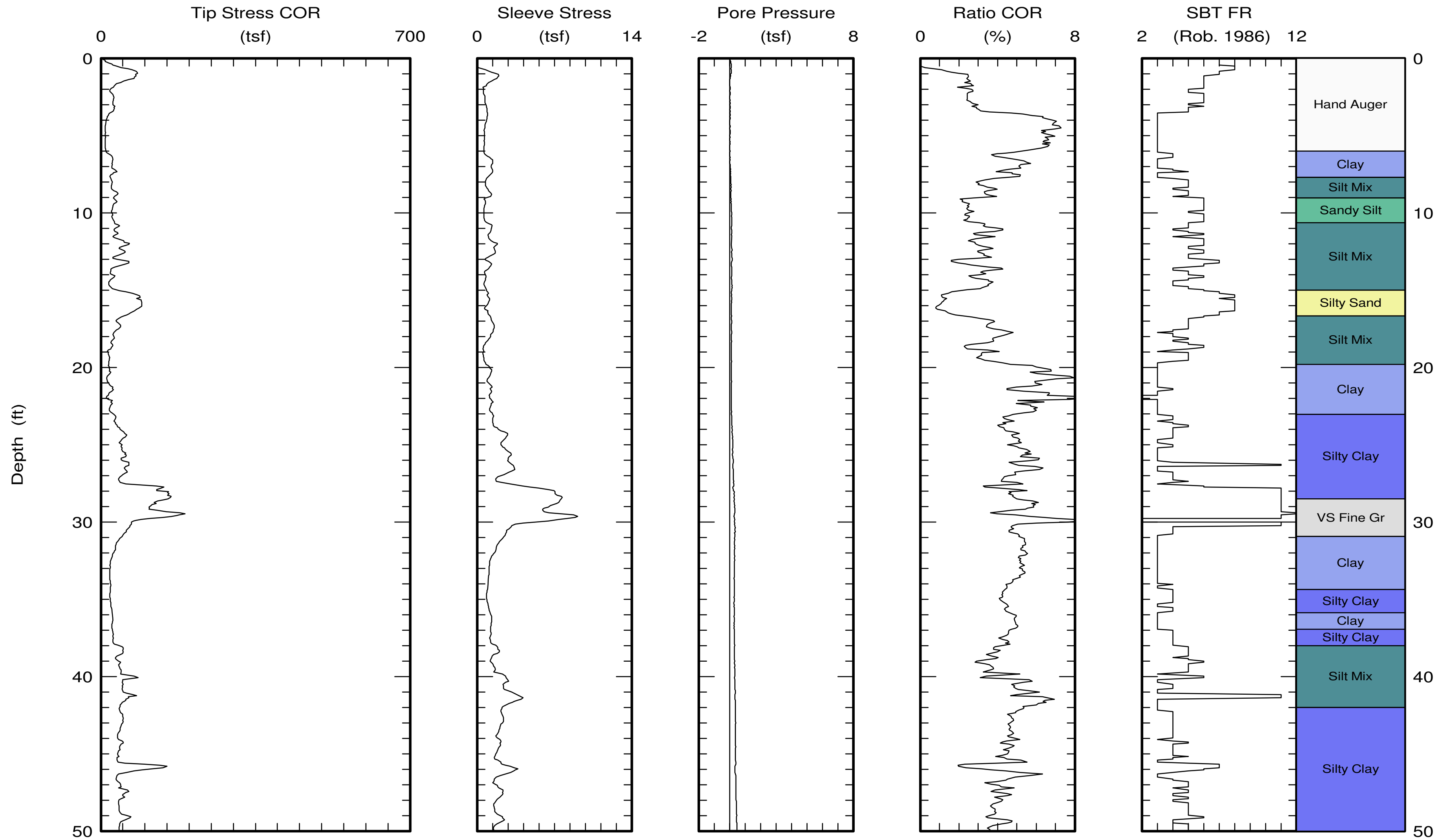
Test ID: T3-C29
File: Z09M1101C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 01/Mar/2011
Test ID: T3-C30
Project: LosAngeles

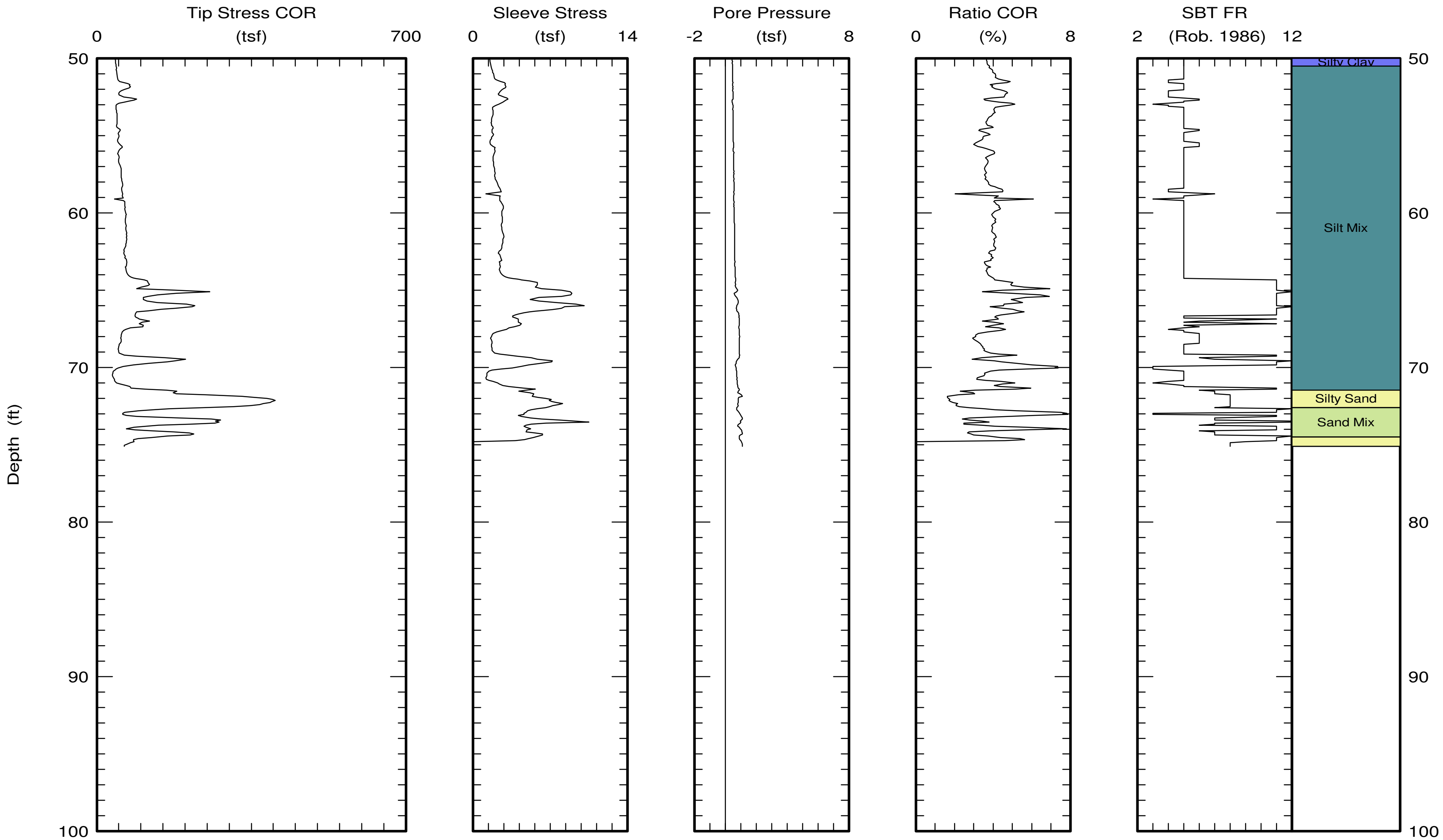
Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 75.12 (ft)

Test ID: T3-C30
File: Z01M1106C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C30 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.12 (ft)

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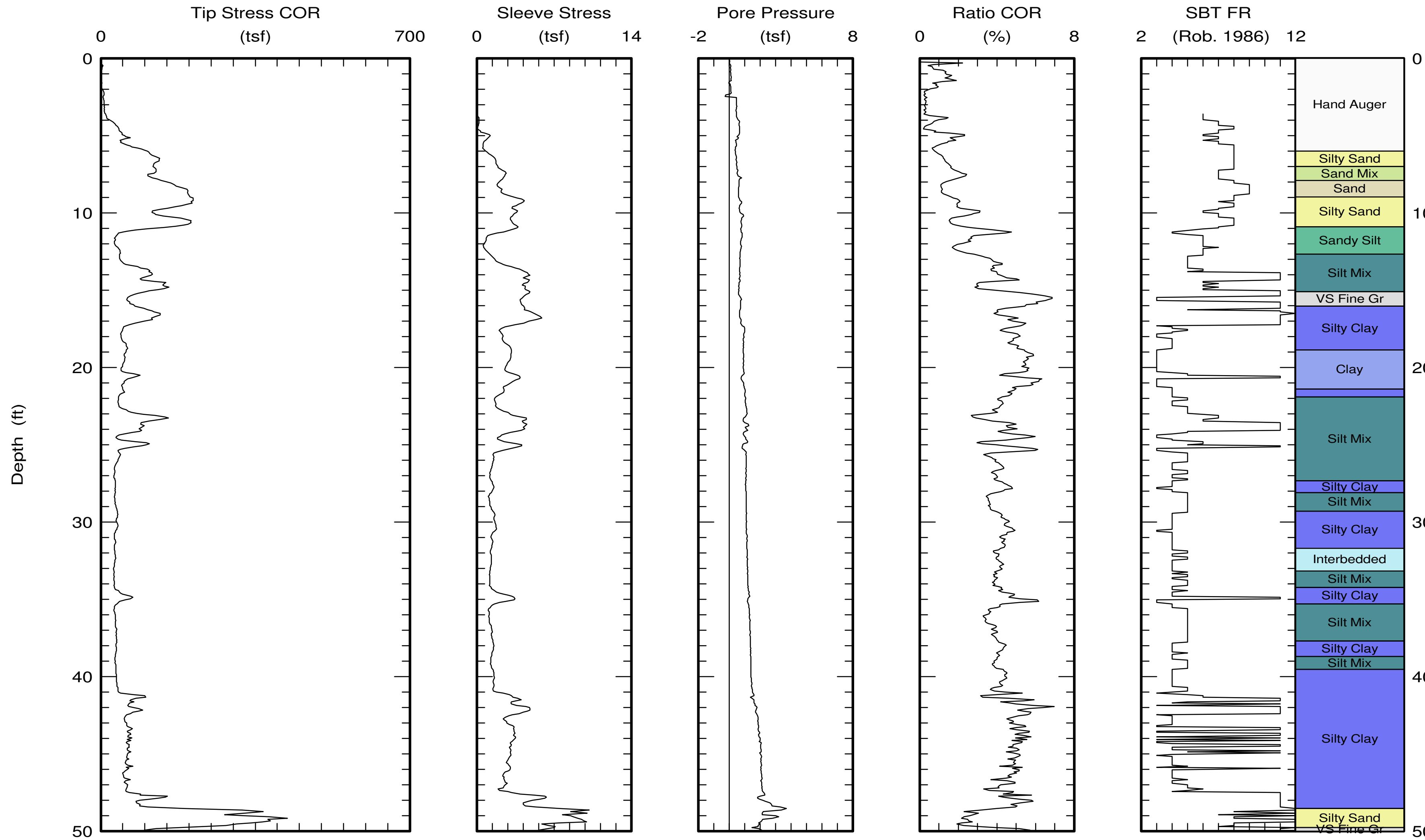
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C31 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.06 (ft)

Test ID: T3-C31
File: Z03M1102C.ECP

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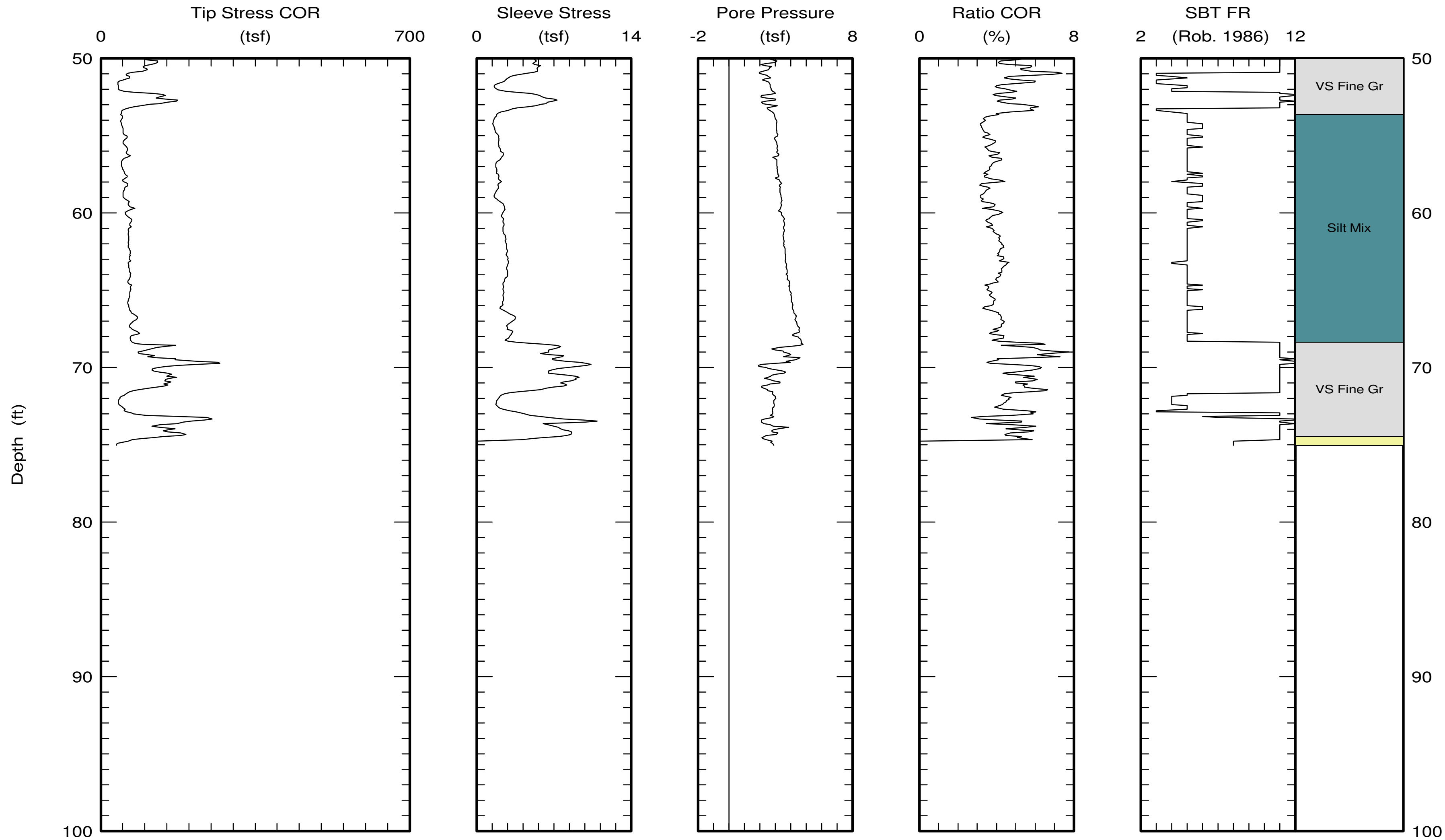
www.kehoetesting.com

CPT Data
30 ton rig

Date: 03/Mar/2011
Test ID: T3-C31
Project: LosAngeles

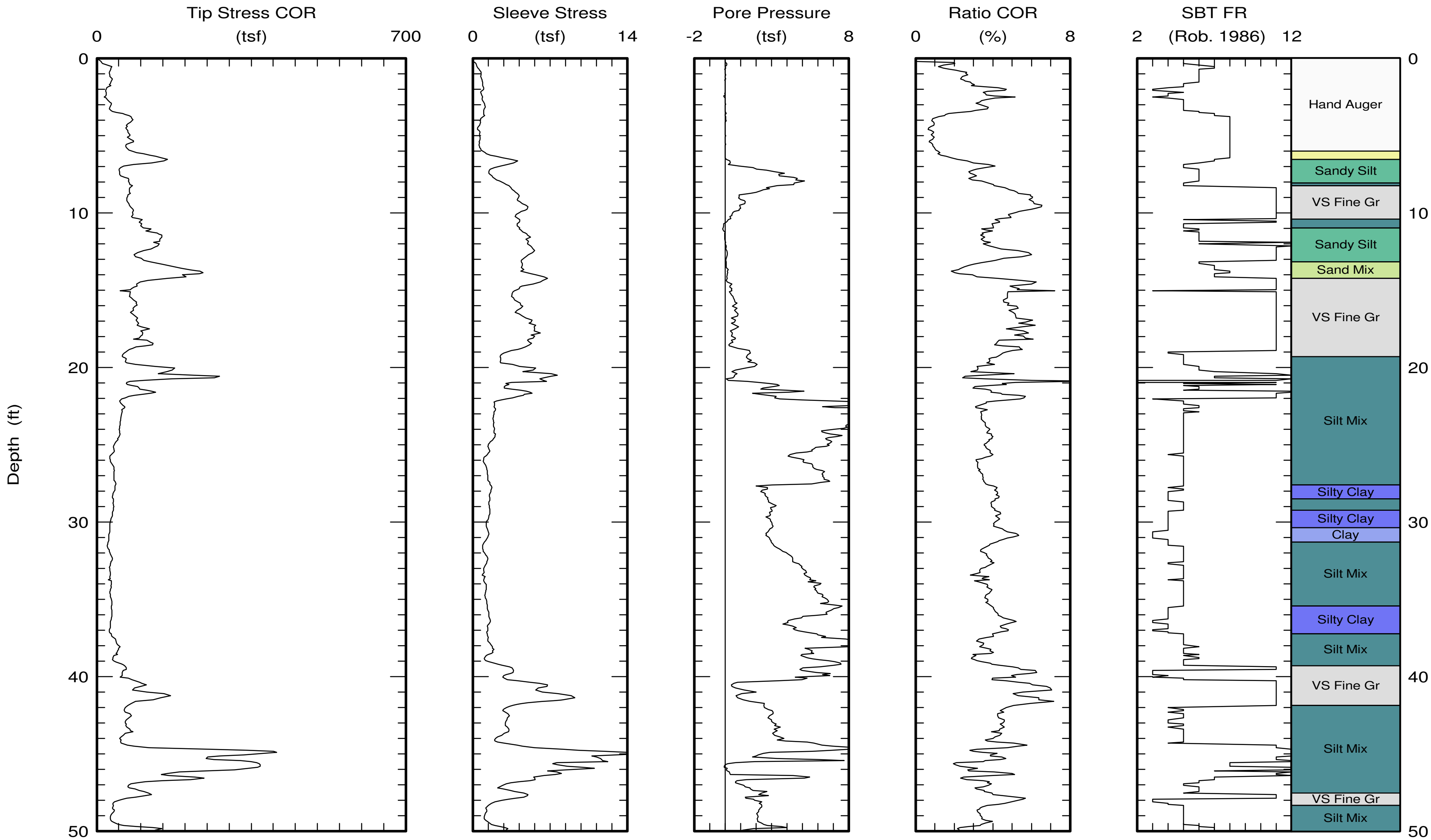
Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 75.06 (ft)

Test ID: T3-C31
File: Z03M1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C32 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.18 (ft)

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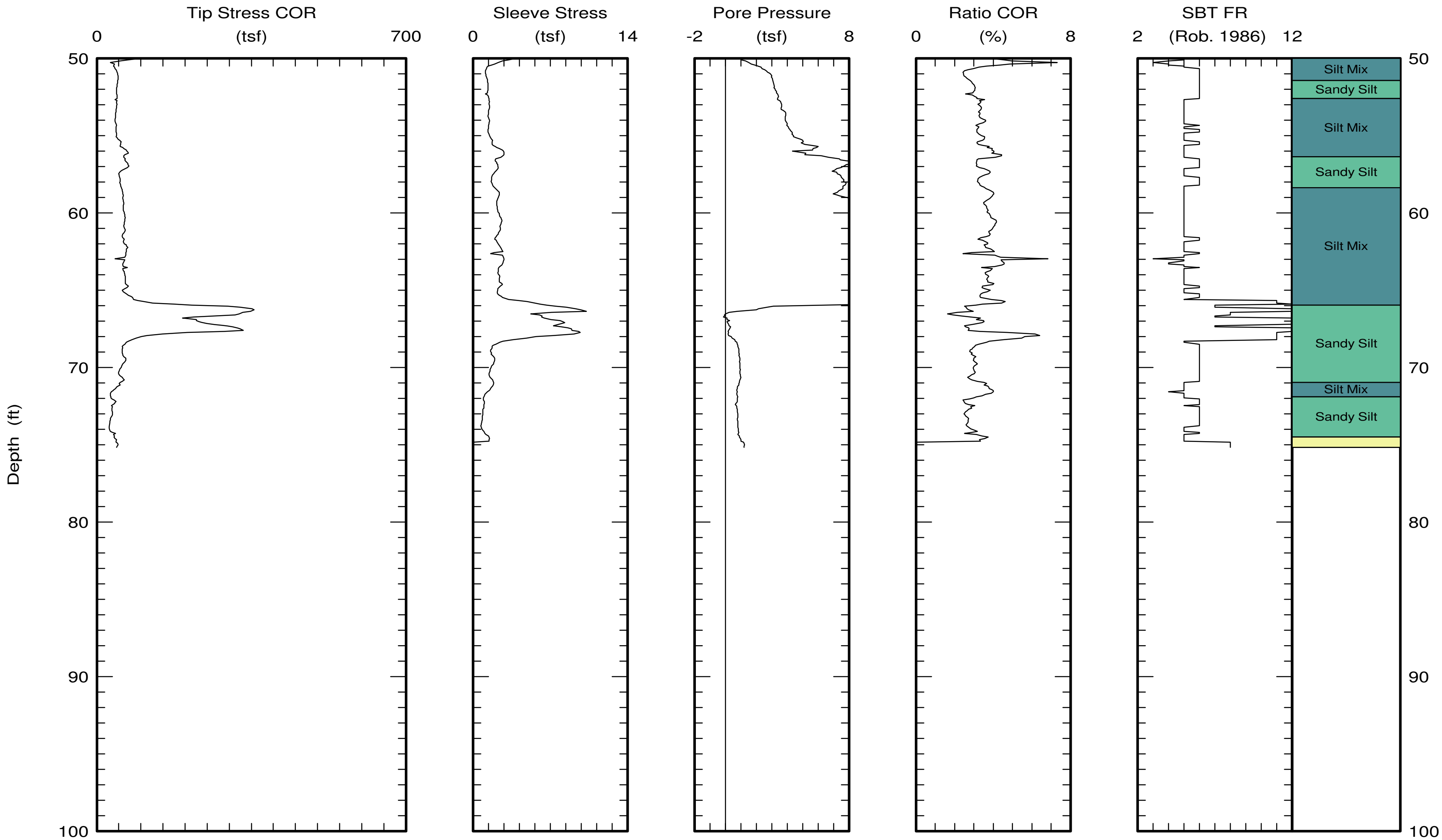
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Mar/2011 Test ID: T3-C32 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.18 (ft)

Test ID: T3-C32
File: Z03M1101C.ECP

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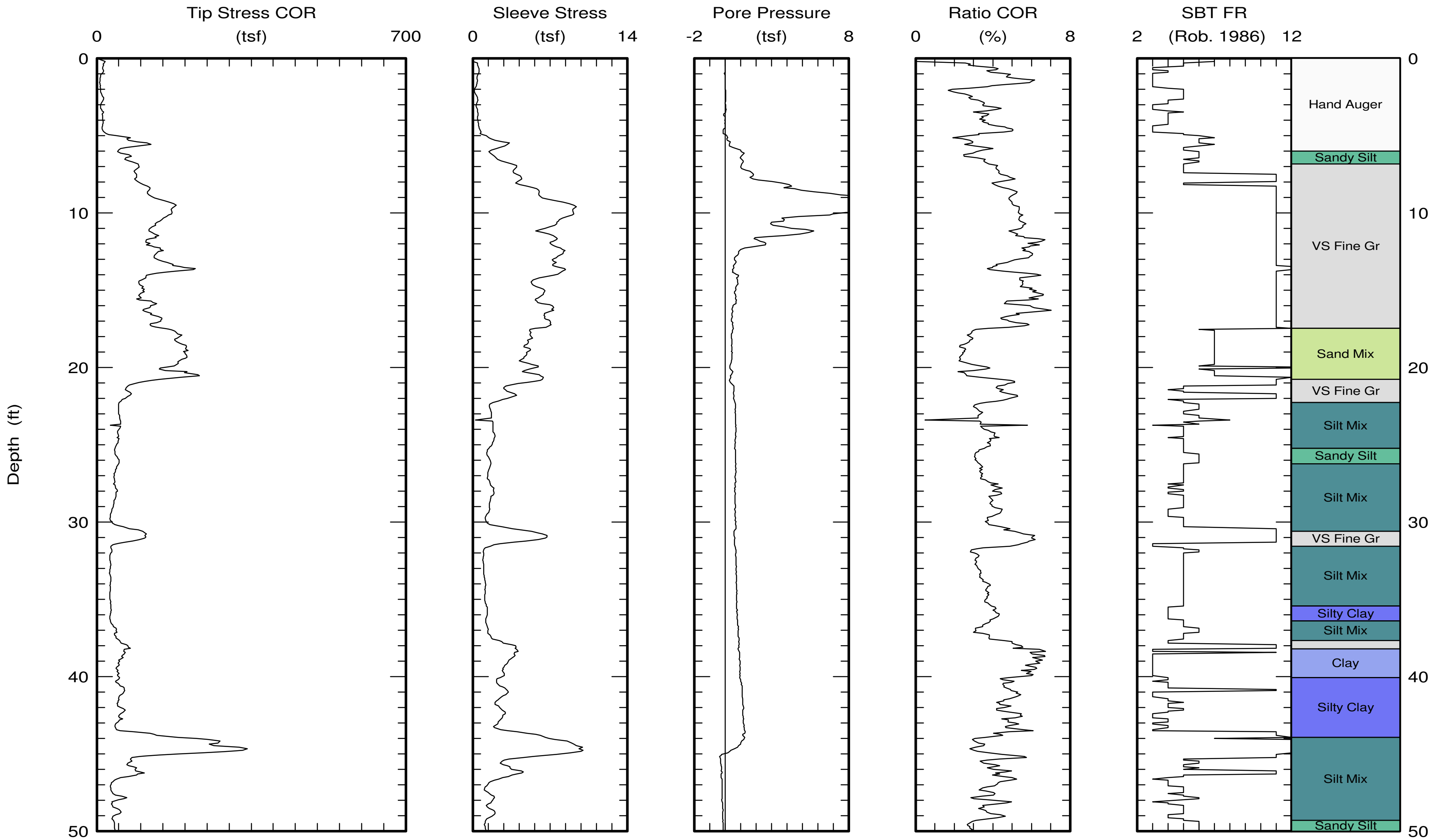
www.kehoetesting.com

CPT Data
30 ton rig

Date: 02/Mar/2011
Test ID: T3-C33
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 65.59 (ft)

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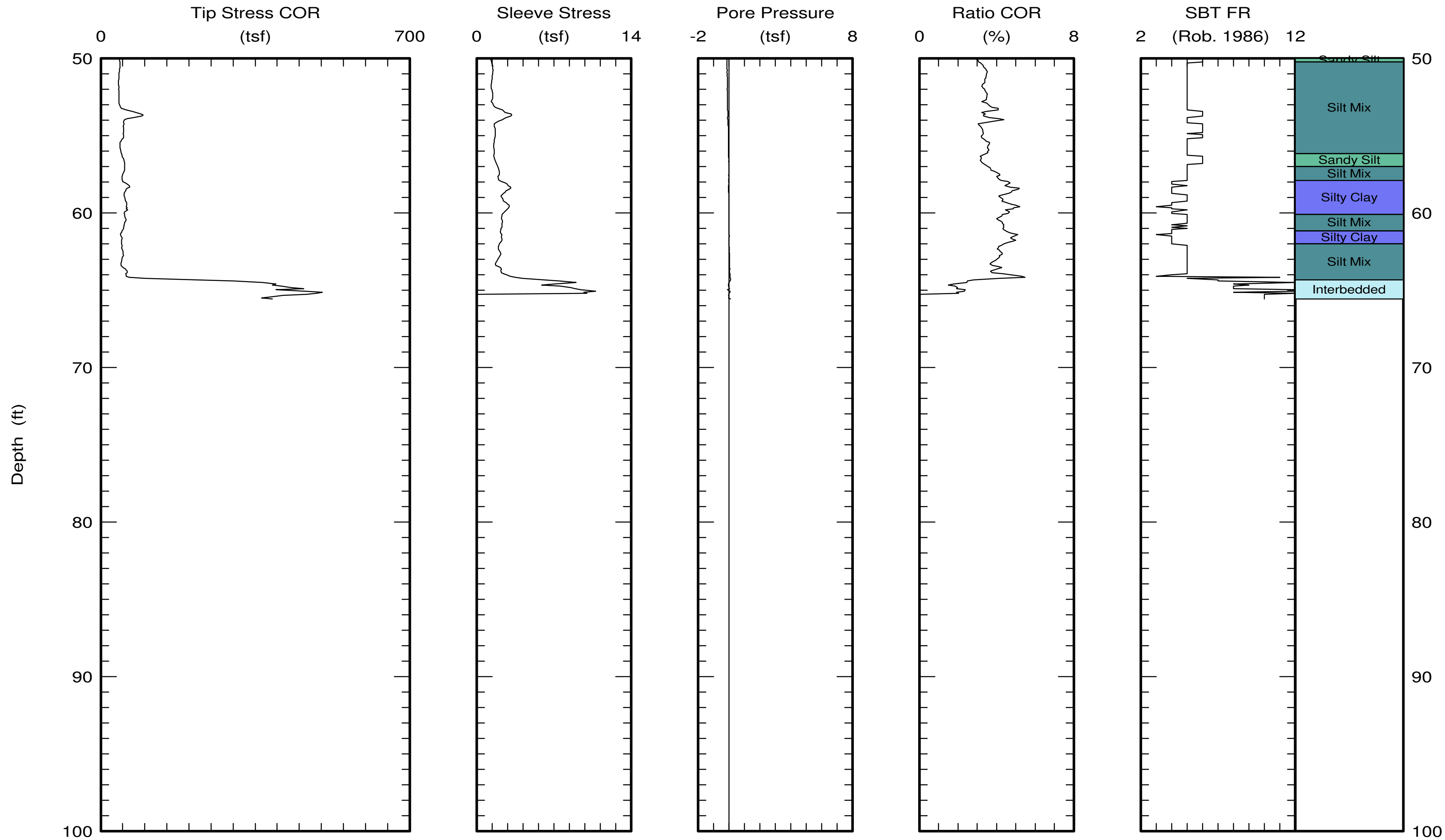
Test ID: T3-C33
File: Z02M1103C.ECP

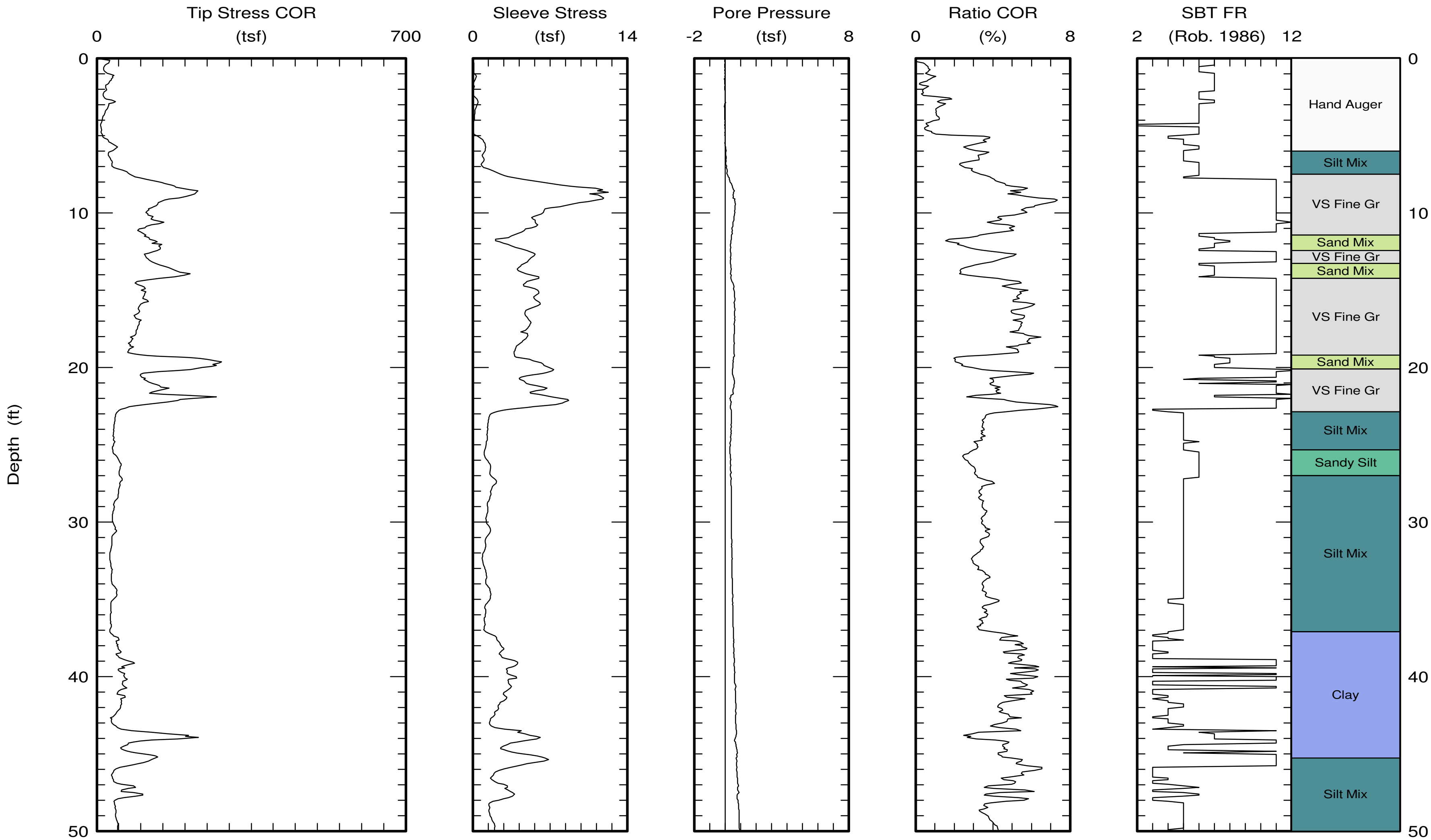
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C33 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 65.59 (ft)

Test ID: T3-C33
File: Z02M1103C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C34 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.04 (ft)

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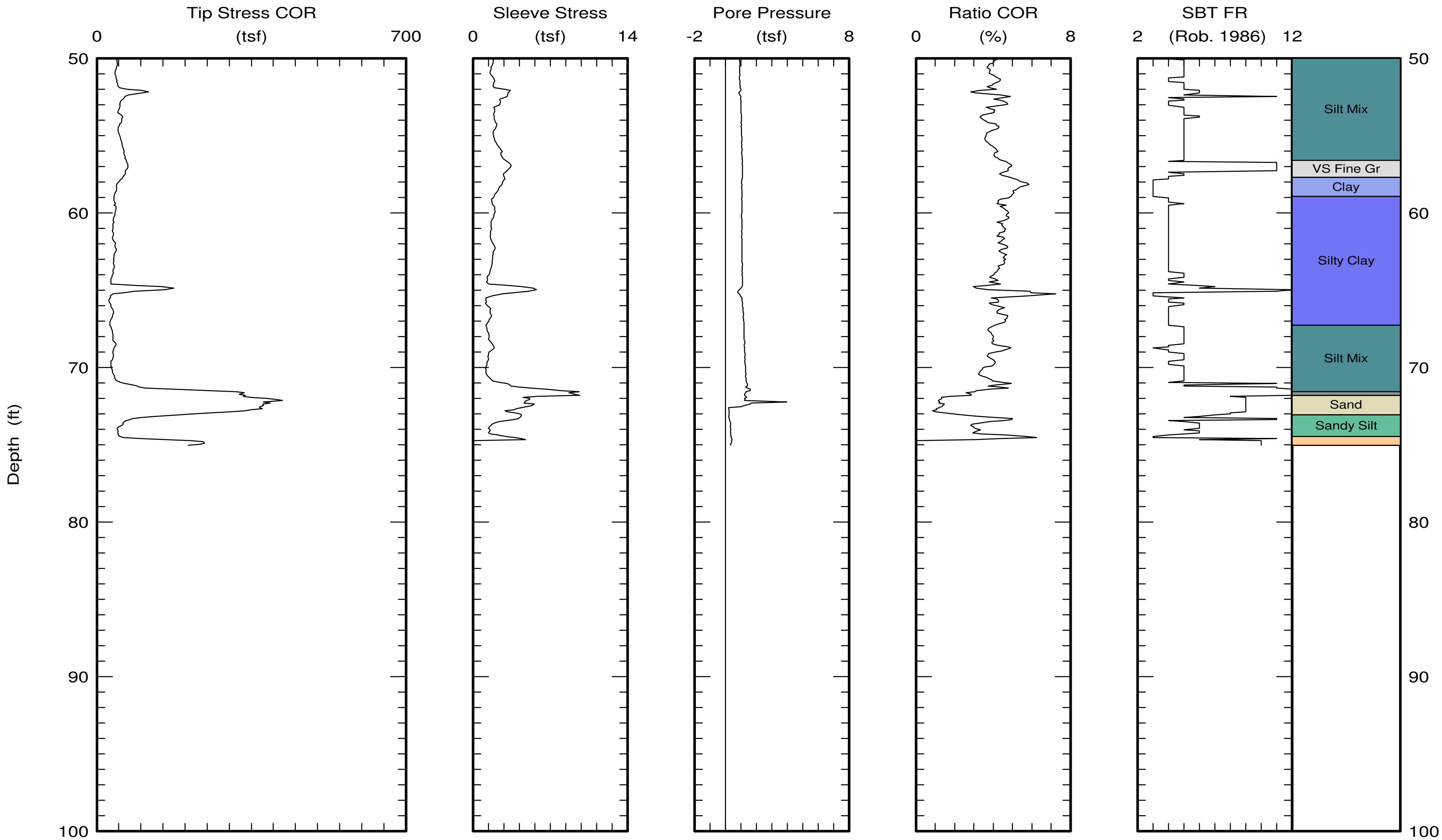
Test ID: T3-C34
File: Z02M1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C34 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.04 (ft)

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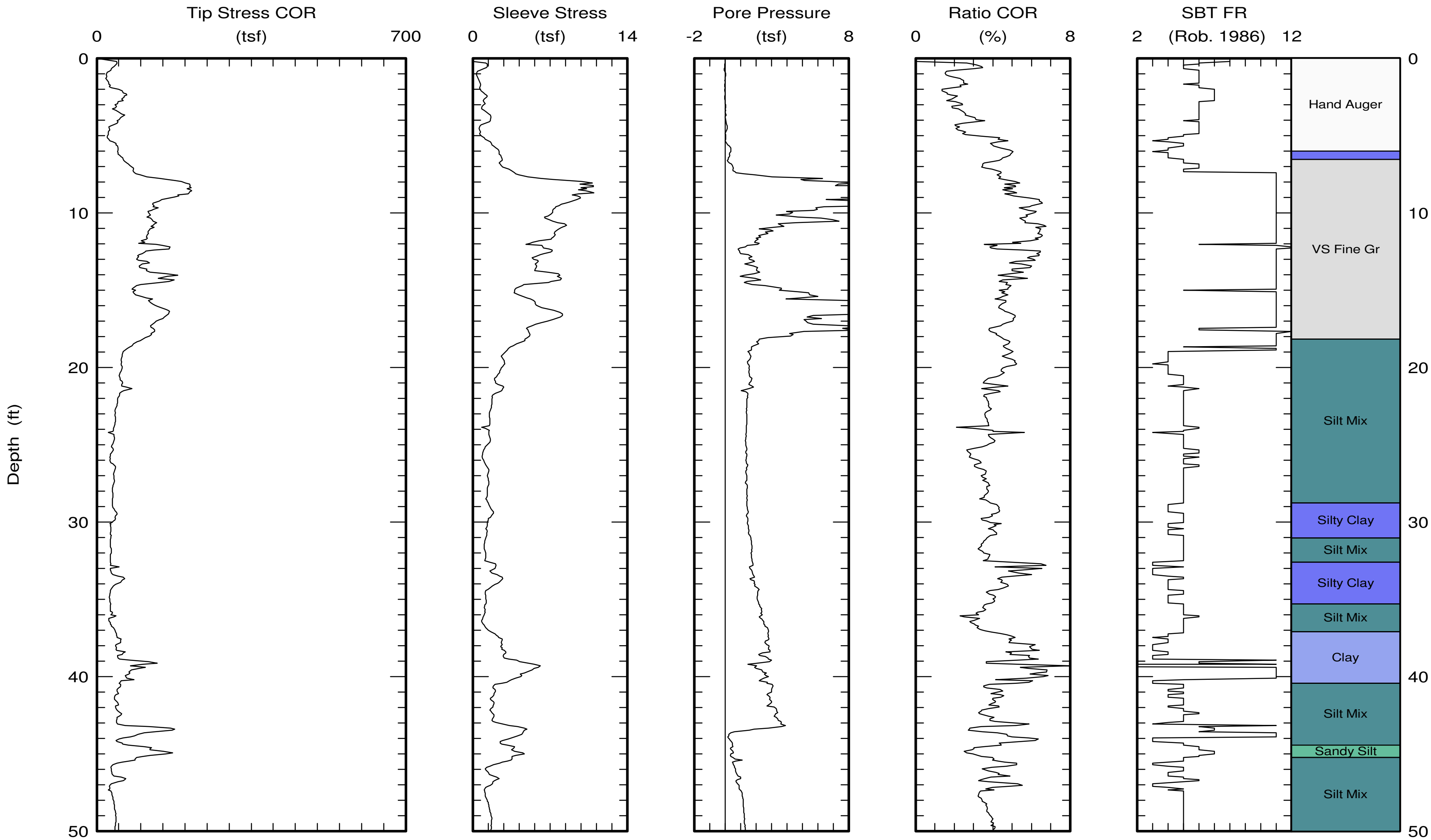
www.kehoetesting.com

CPT Data
30 ton rig

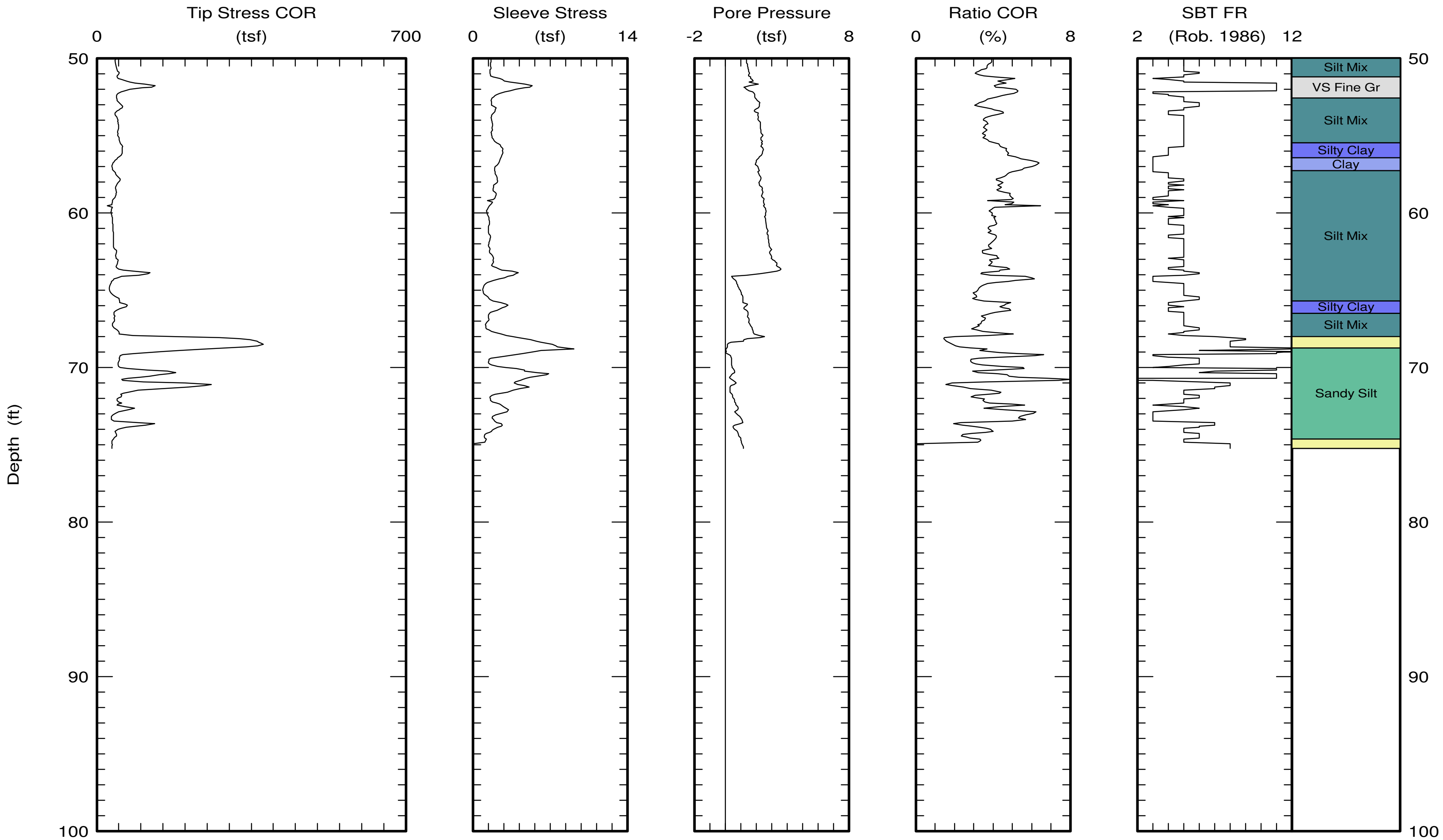
Date: 02/Mar/2011
Test ID: T3-C35
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 75.25 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Mar/2011 Test ID: T3-C35 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 75.25 (ft)

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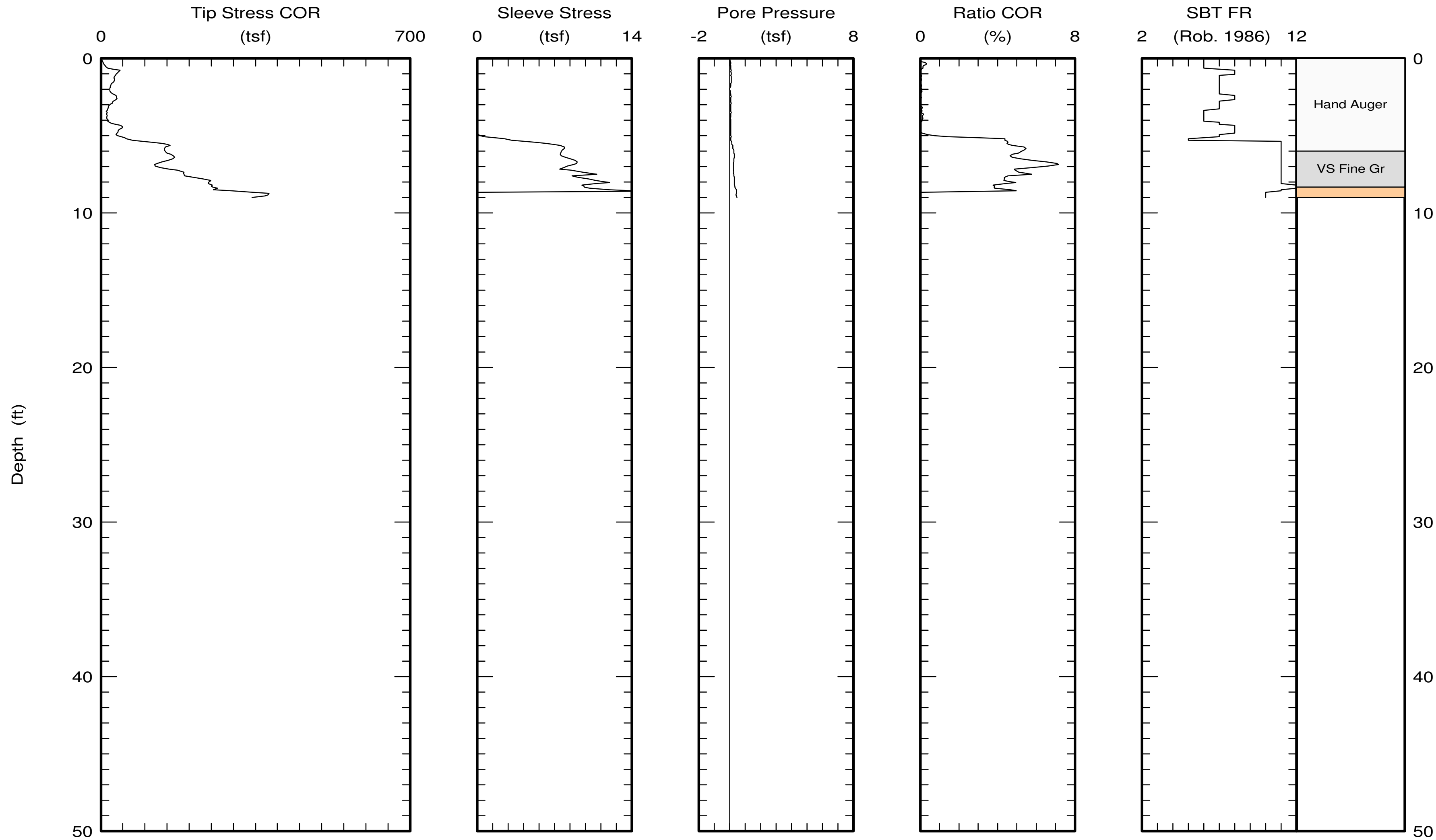
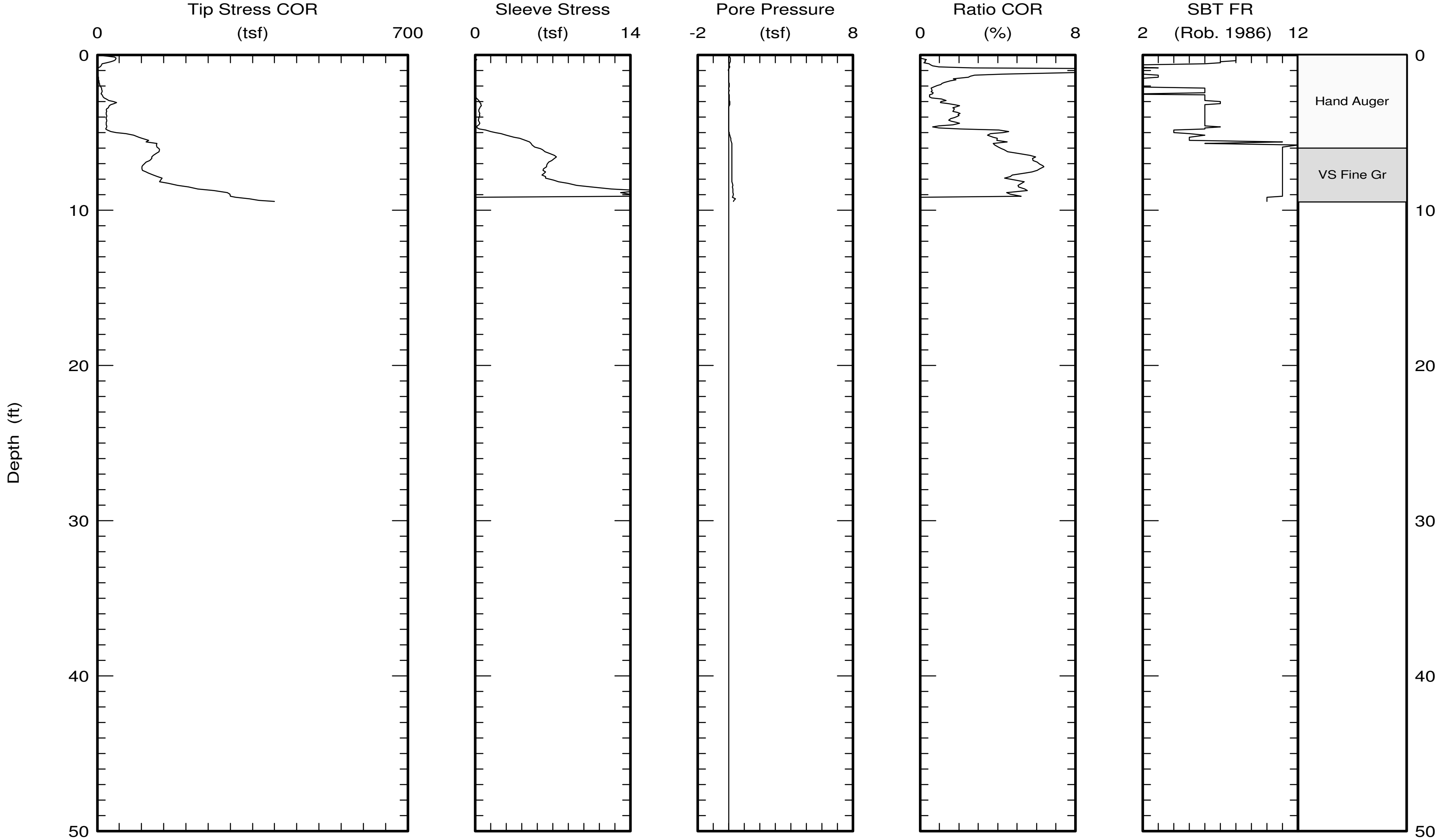
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C36 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 9.01 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Mar/2011 Test ID: T3-C37 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Century Park	



Maximum depth: 9.47 (ft)

Test ID: T3-C37
File: Z01M1106C.ECP

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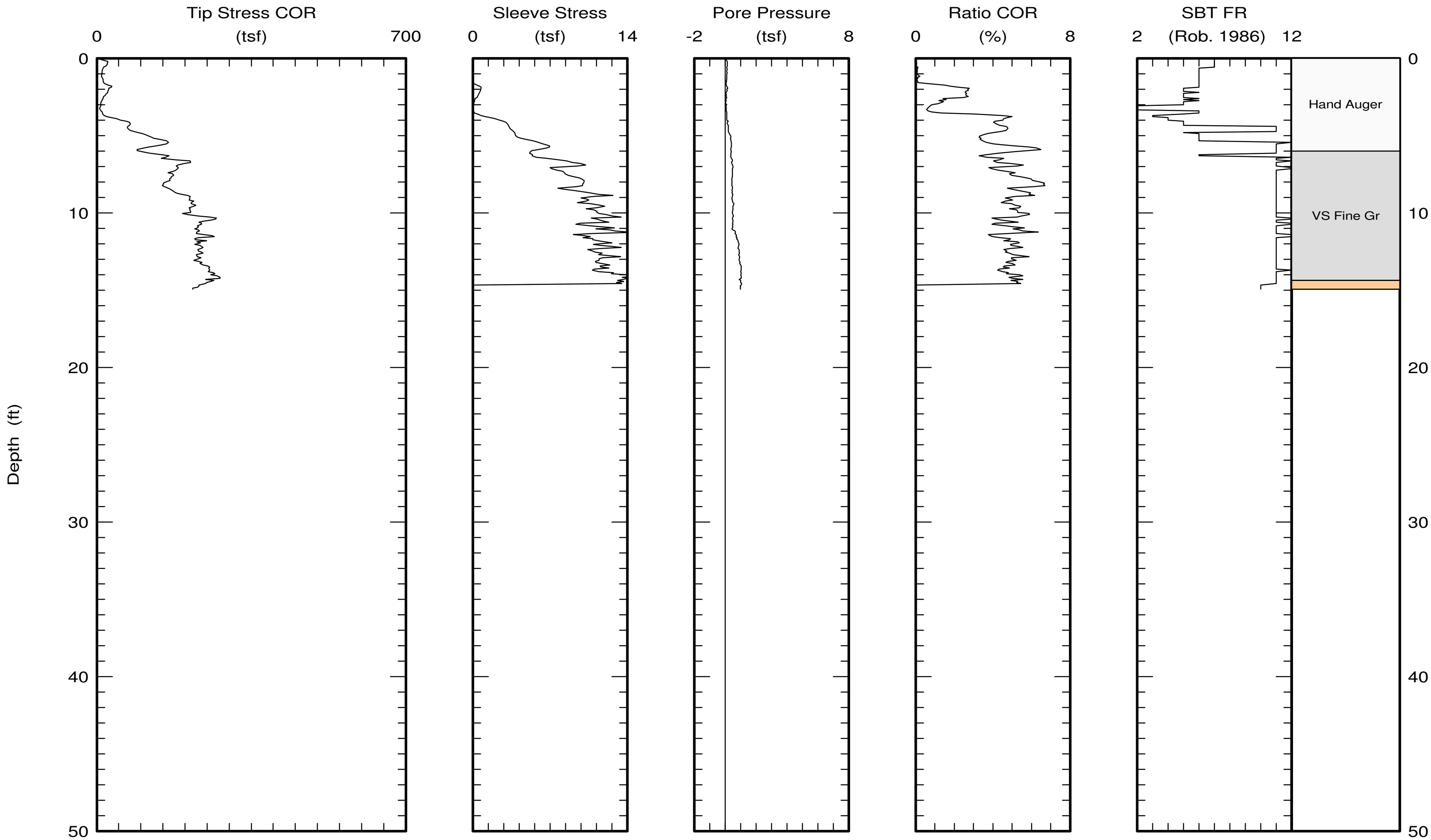
www.kehoetesting.com

CPT Data
30 ton rig

Date: 01/Mar/2011
Test ID: T3-C38
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 14.96 (ft)

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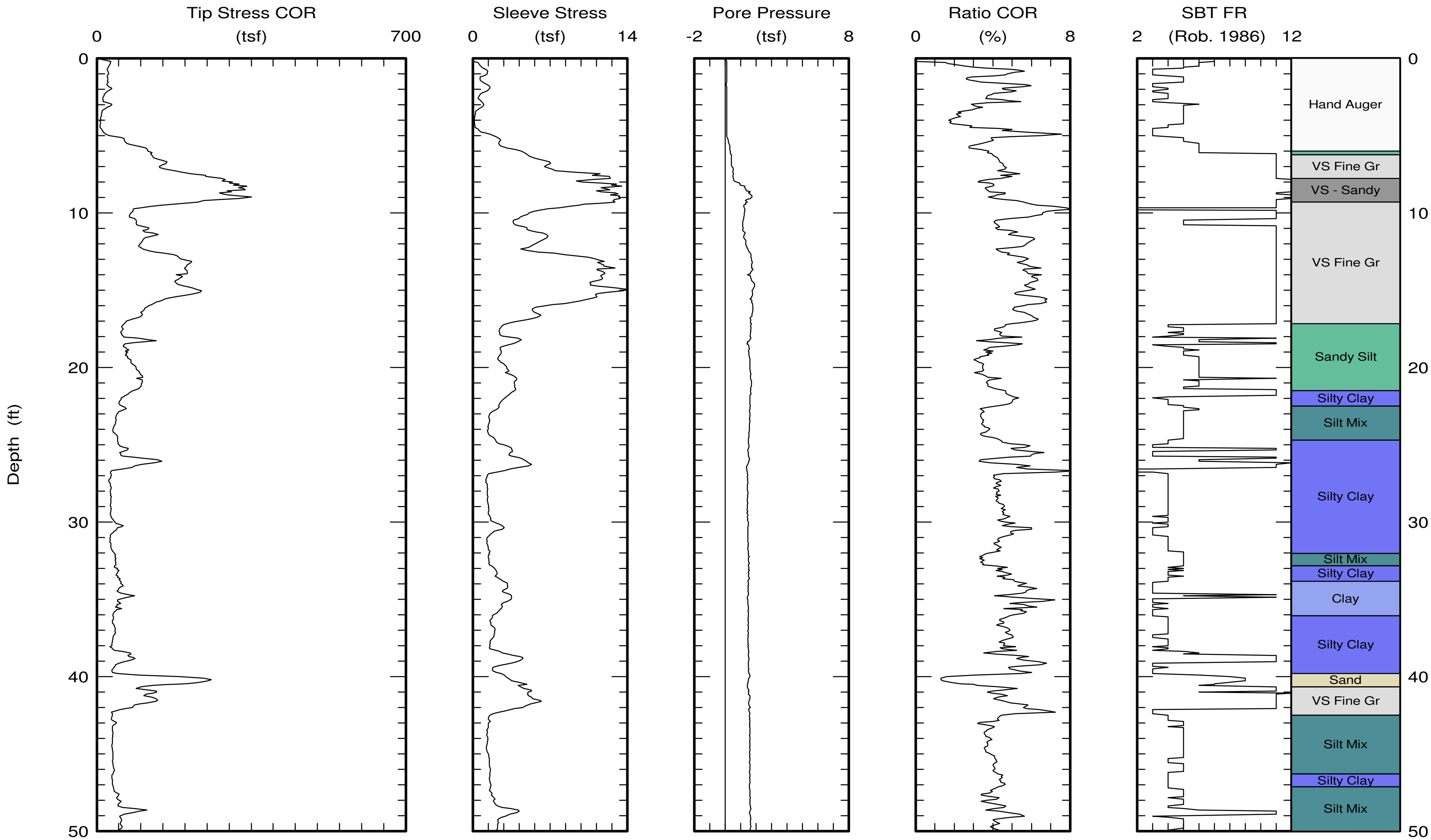
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 01/Mar/2011
Test ID: T3-C39
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 75.04 (ft)
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Test ID: T3-C39
File: Z01M1107C.ECP

Kehoe Testing & Engineering
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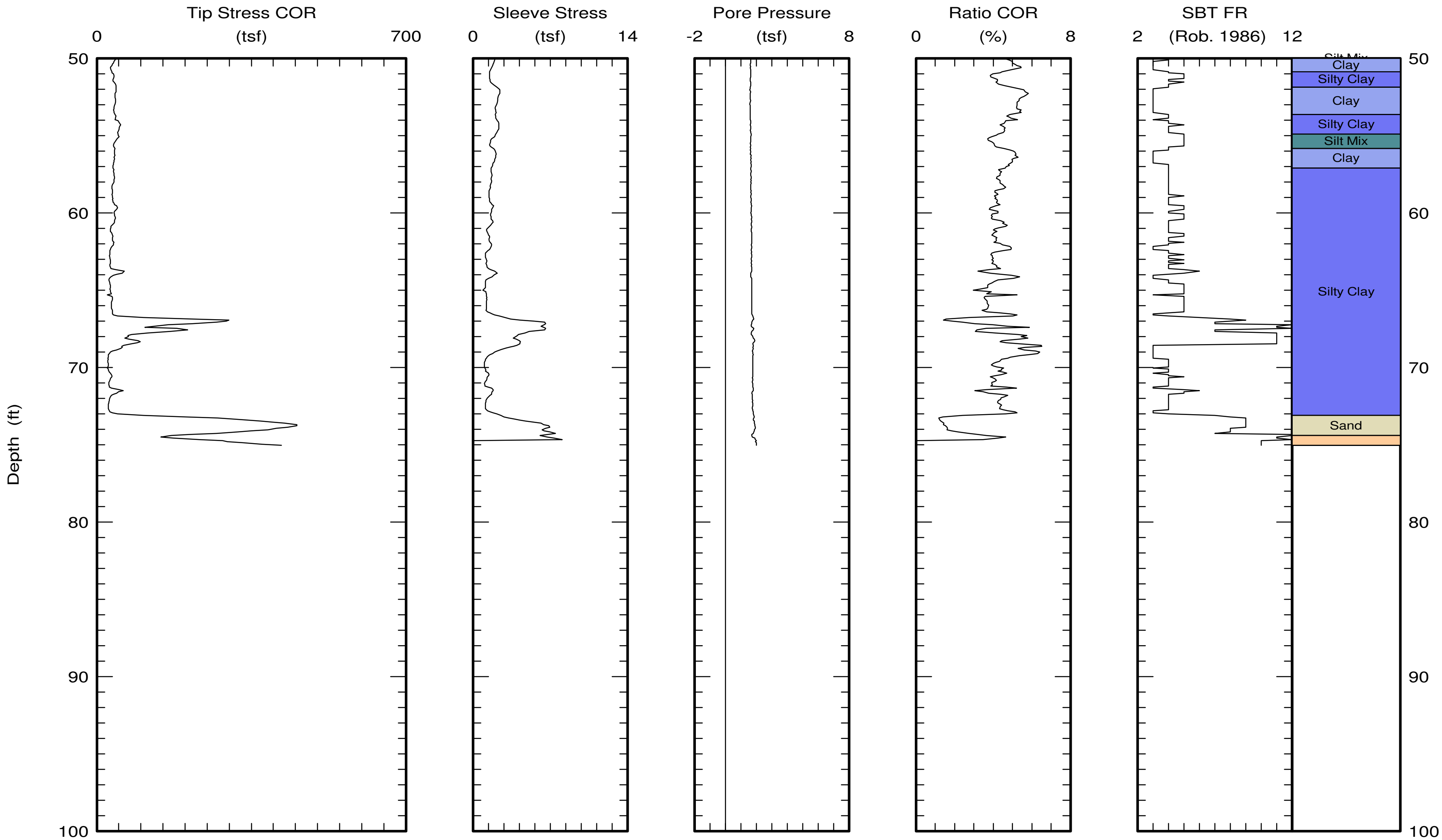
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

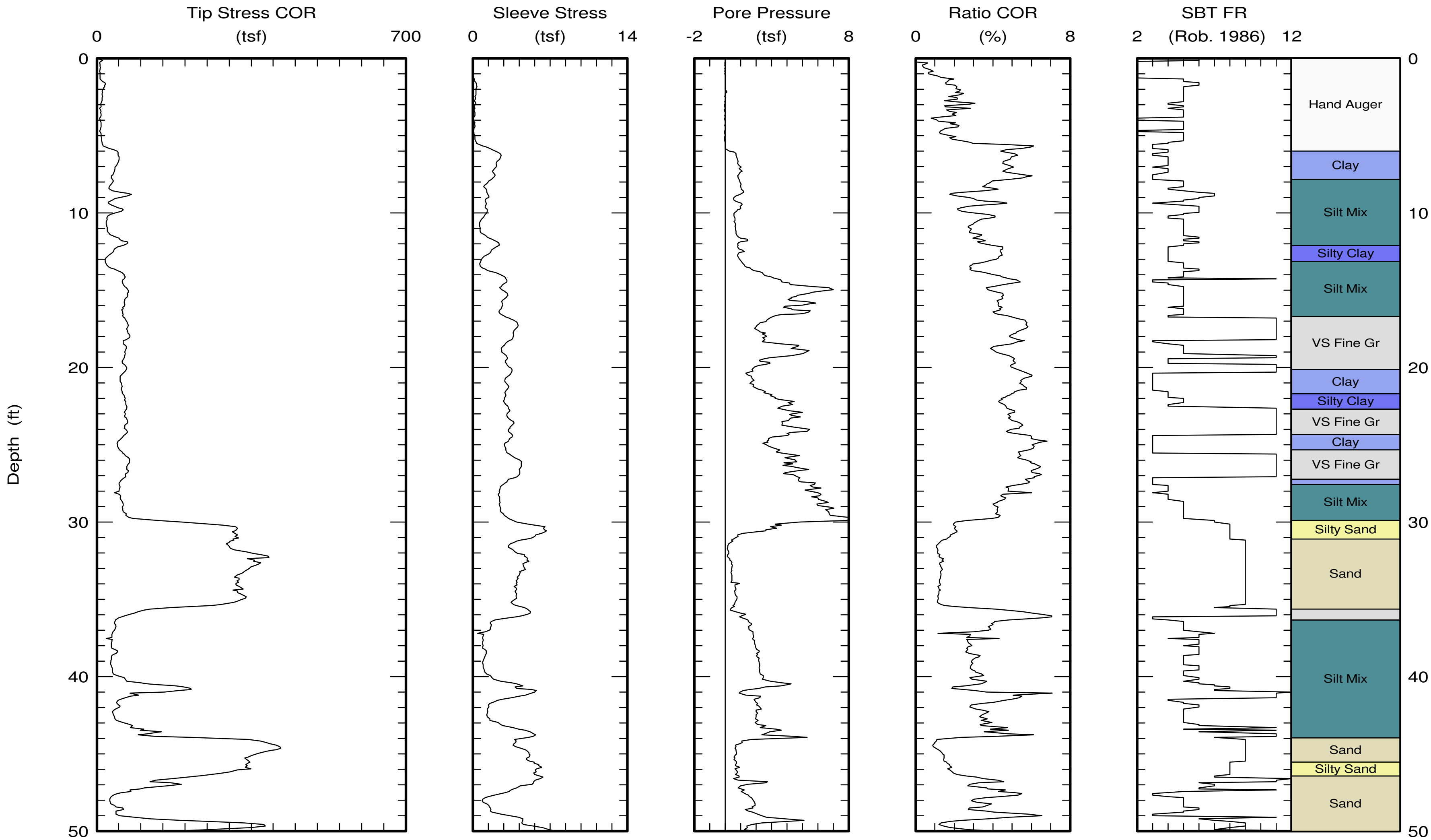
Date: 01/Mar/2011
Test ID: T3-C39
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Century Park



Maximum depth: 75.04 (ft)
Page 2 of 2

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C1 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.21 (ft)

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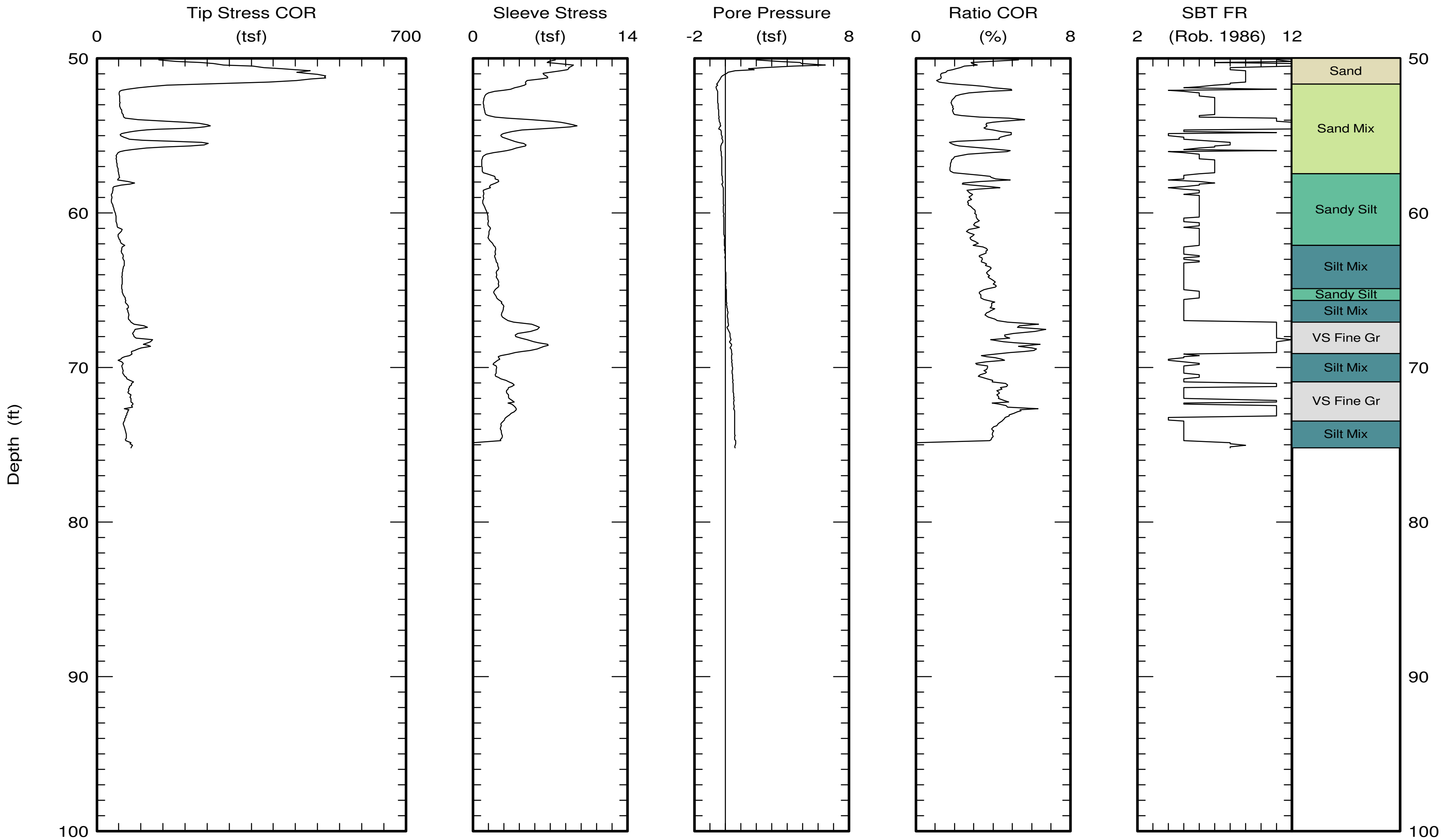
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C1 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.21 (ft)

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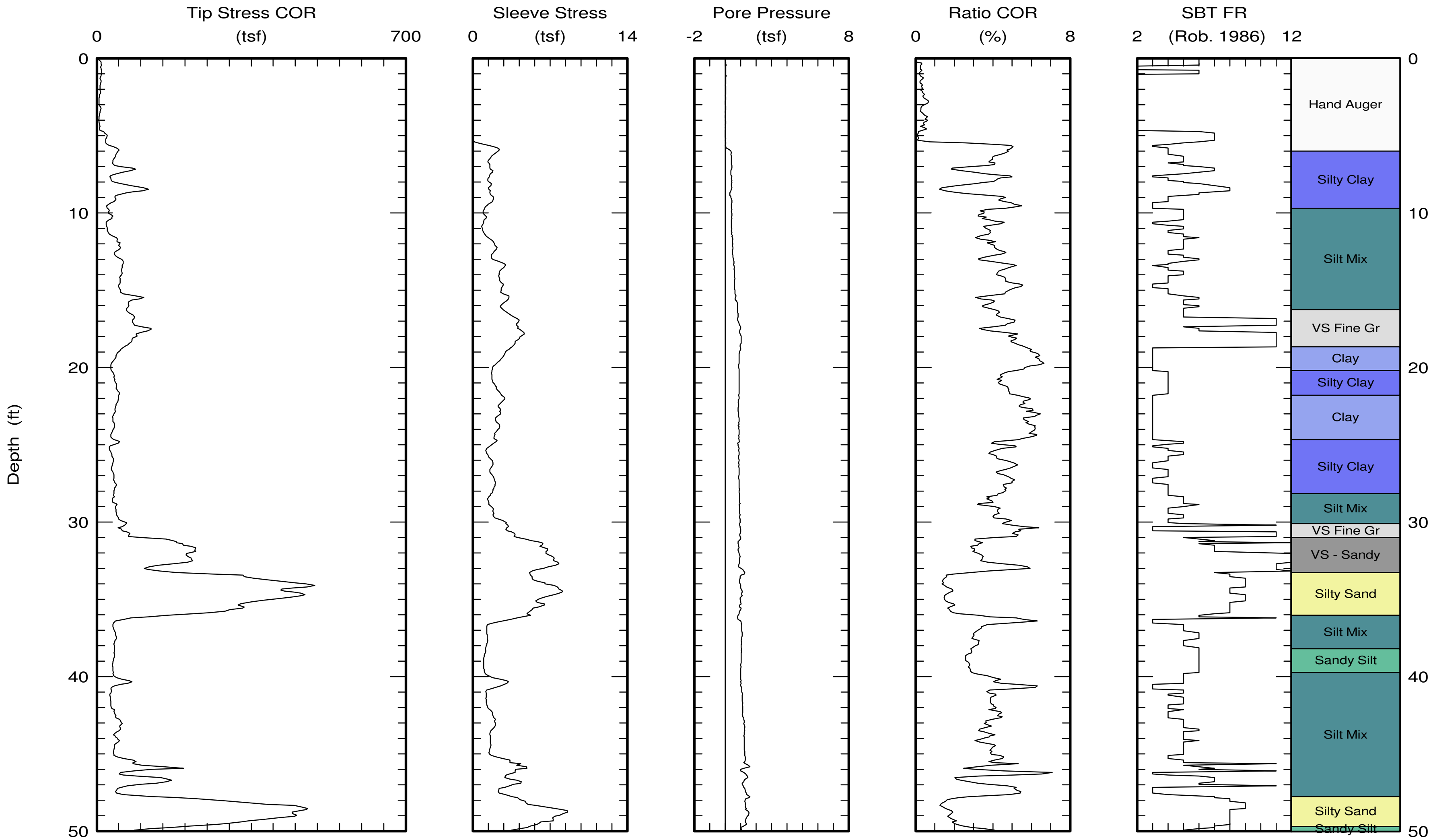
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C2 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr	



Maximum depth: 75.34 (ft)

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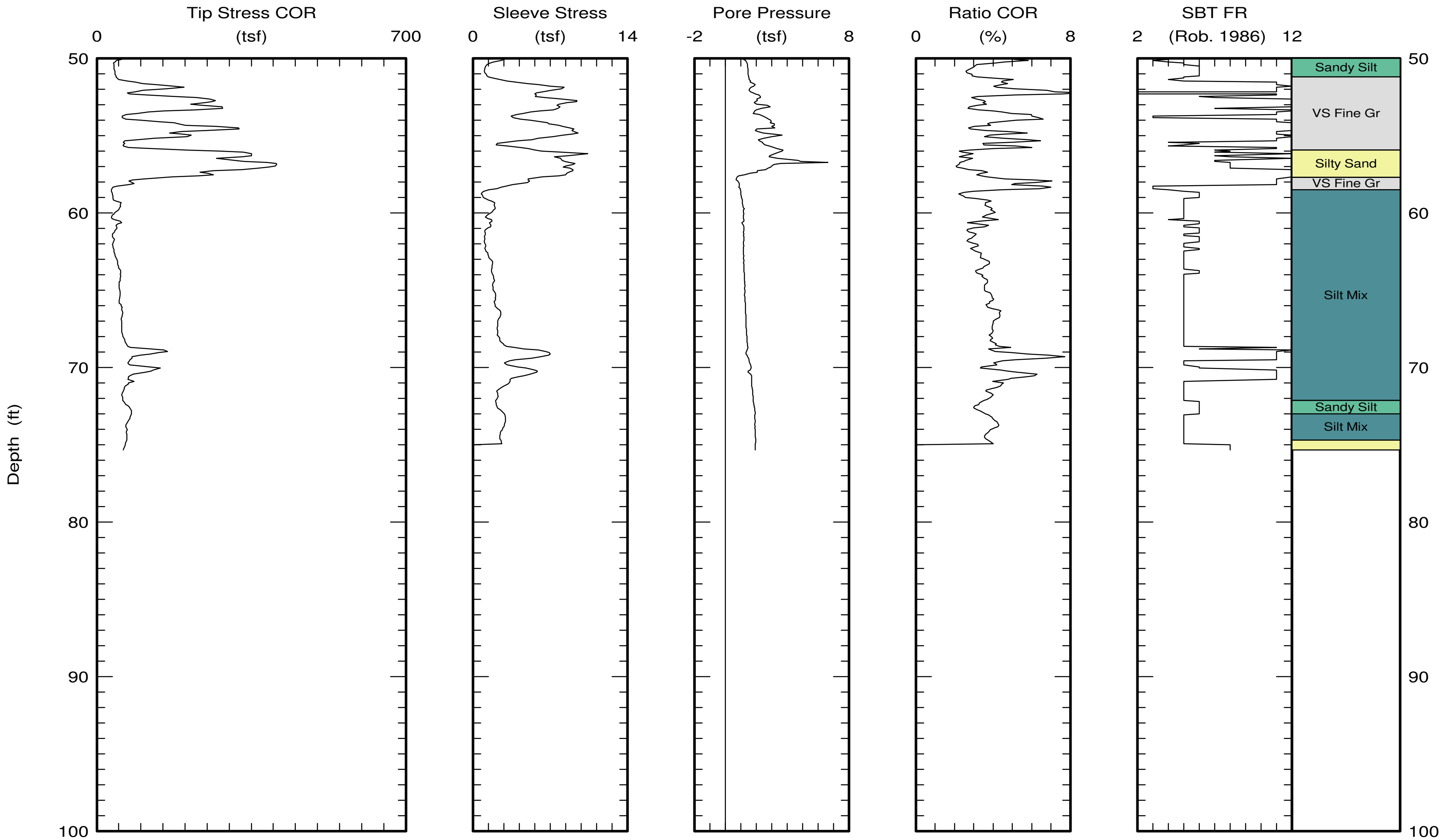
Test ID: T4-C2
File: Z26F1102C.ECP

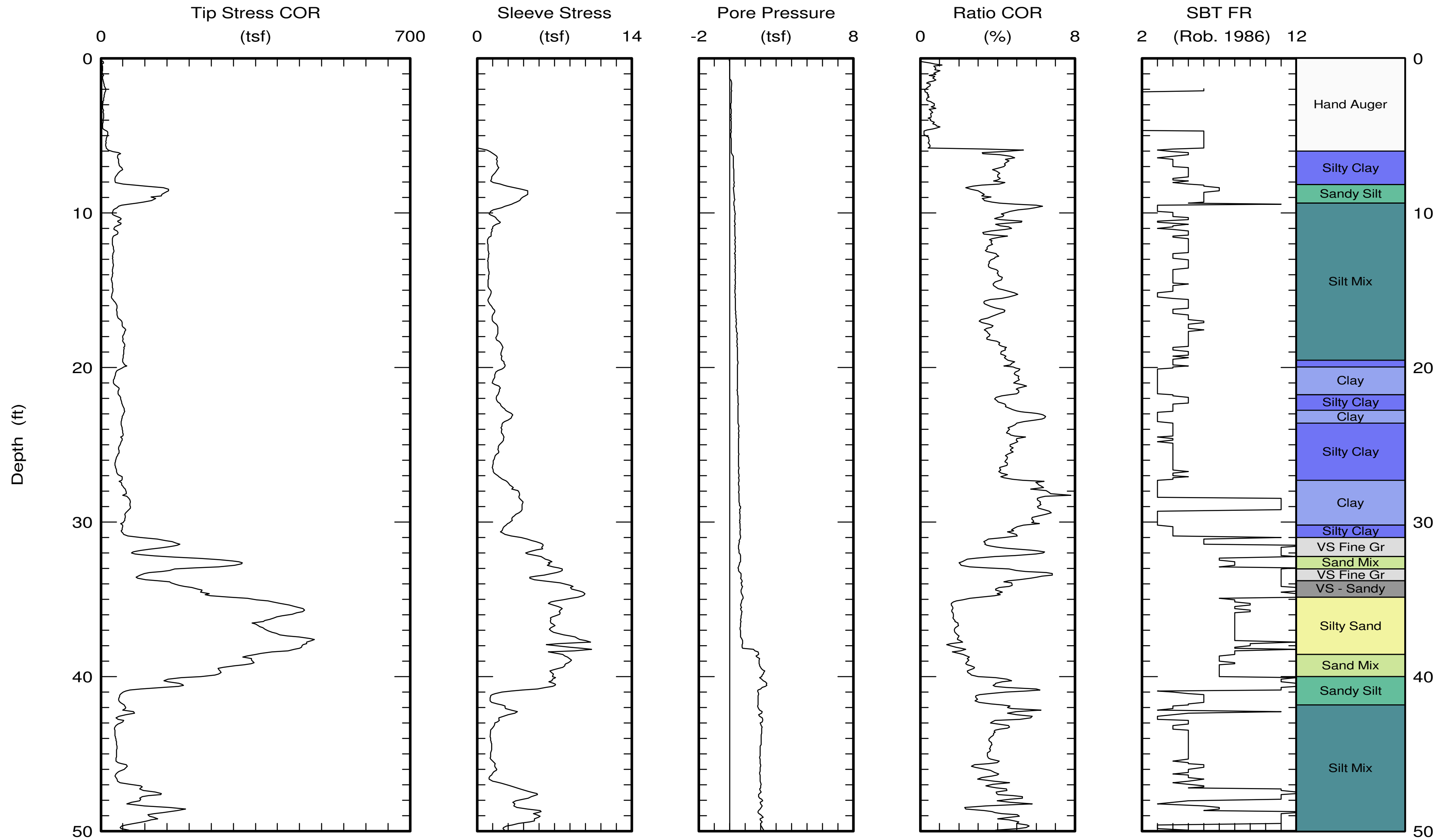
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C2 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr	



Maximum depth: 75.34 (ft)

Test ID: T4-C2
File: Z26F1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C3 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.05 (ft)

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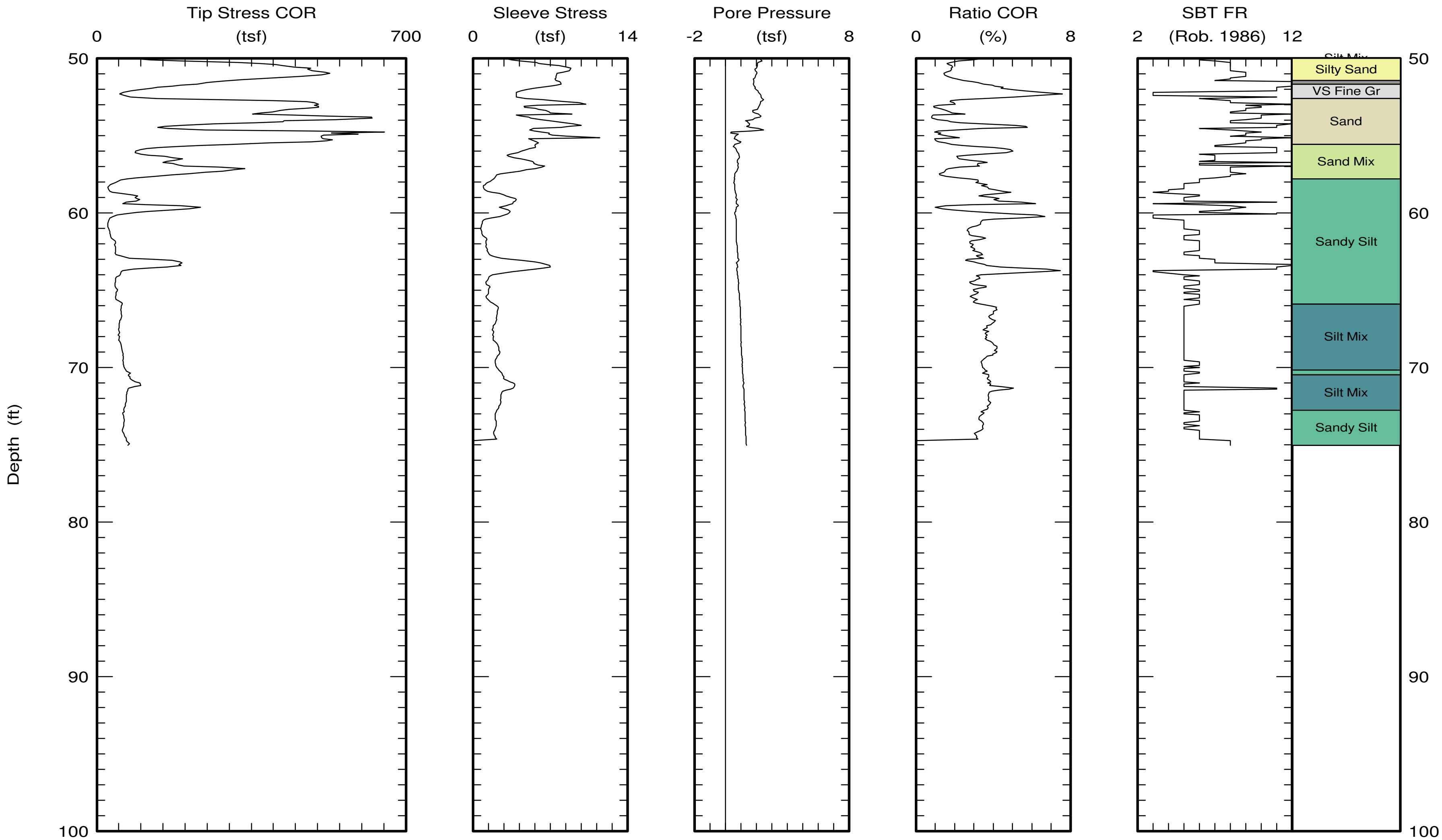
Test ID: T4-C3
File: Z26F1103C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C3 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.05 (ft)

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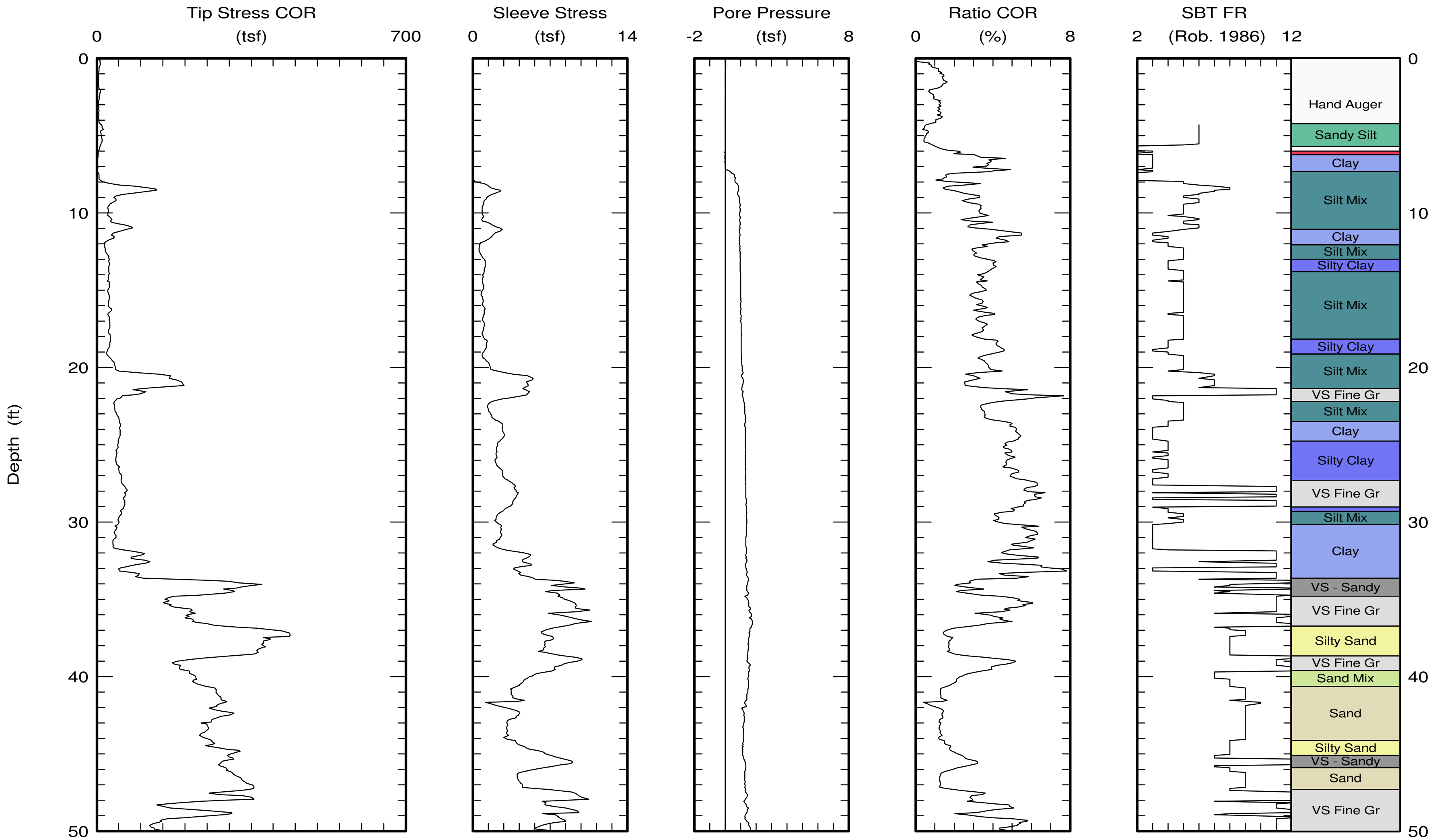
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.14 (ft)

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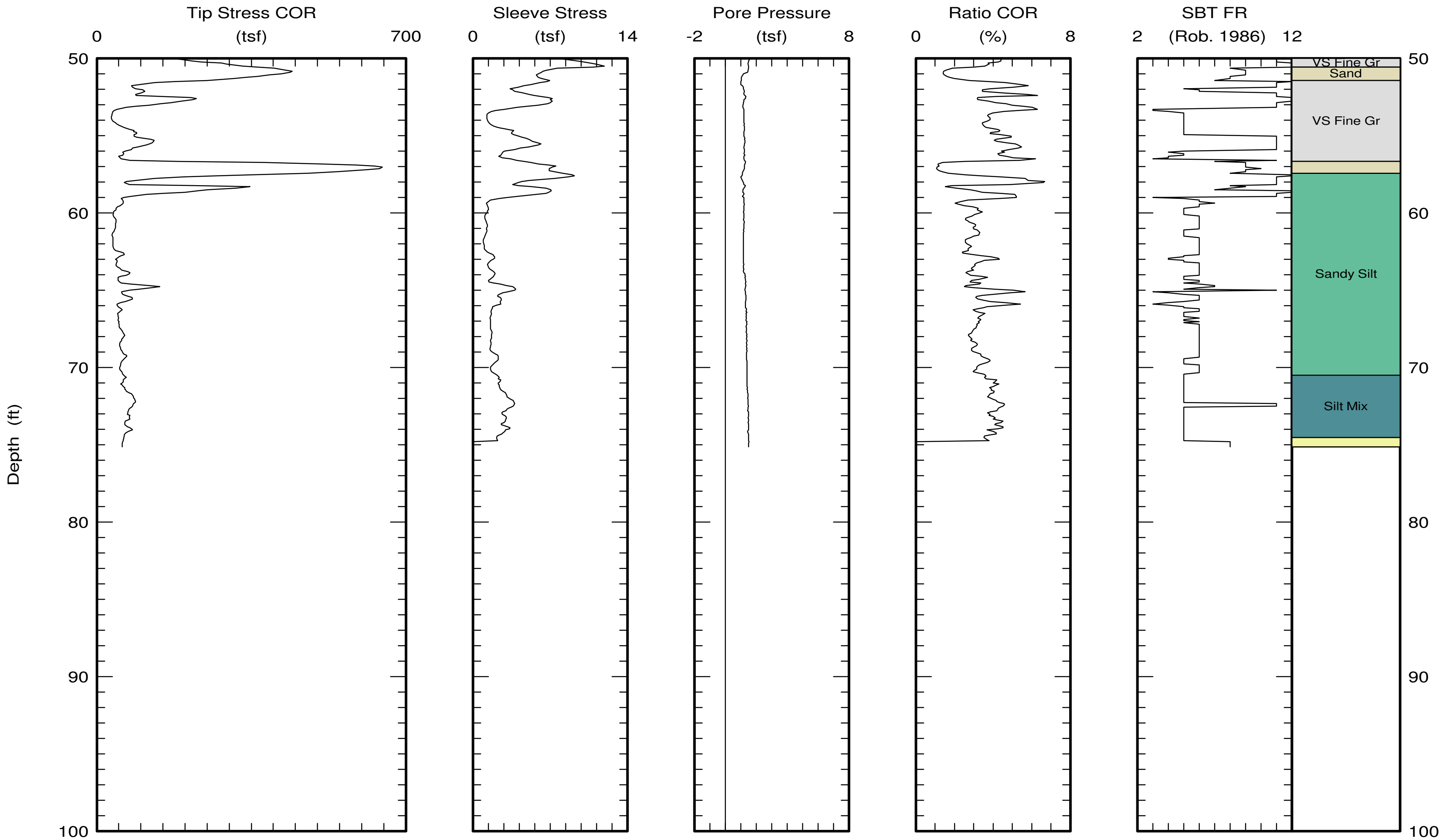
Test ID: T4-C4

File: Z26F1104C.ECP

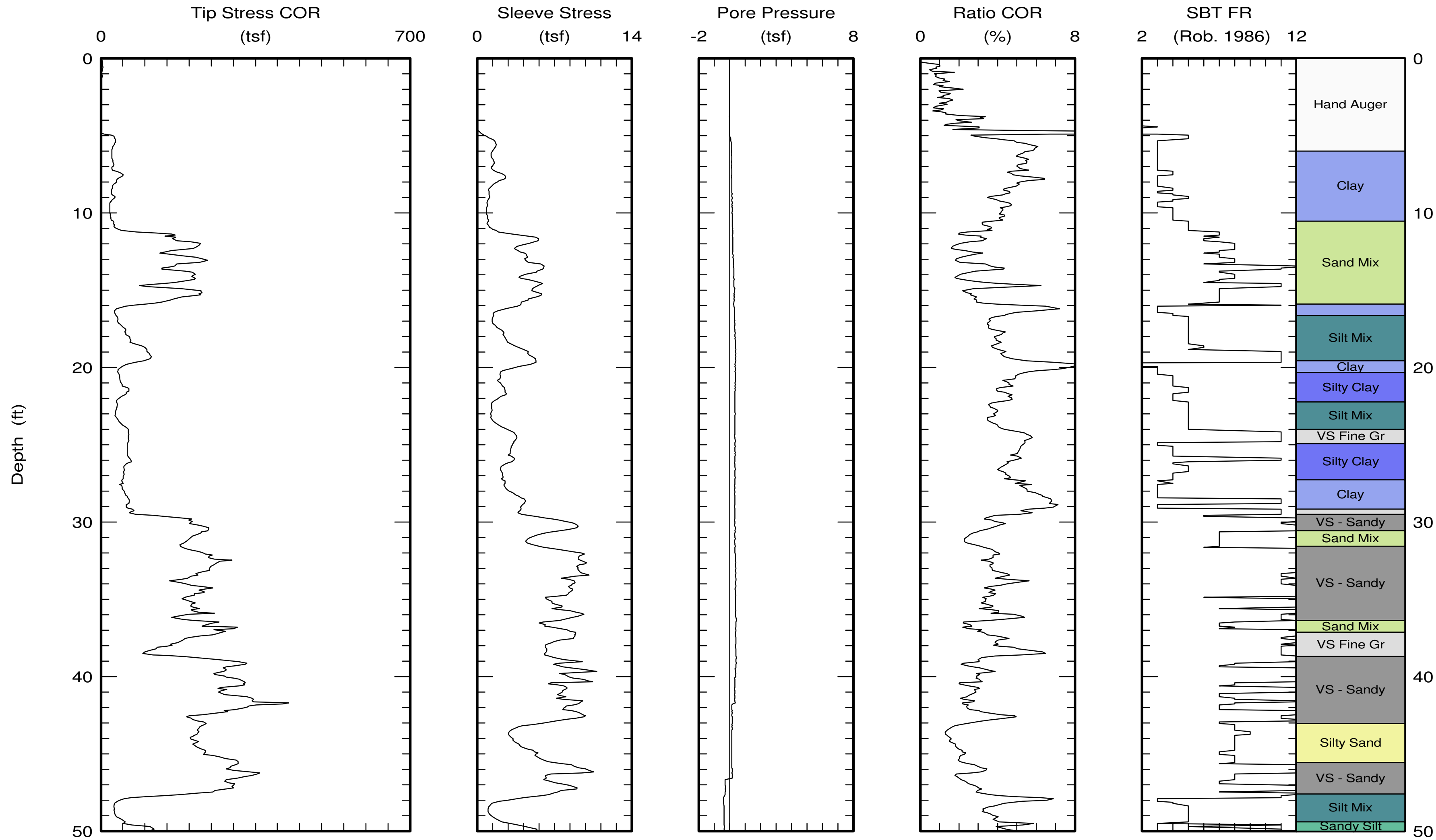
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.14 (ft)

Test ID: T4-C4
File: Z26F1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.10 (ft)

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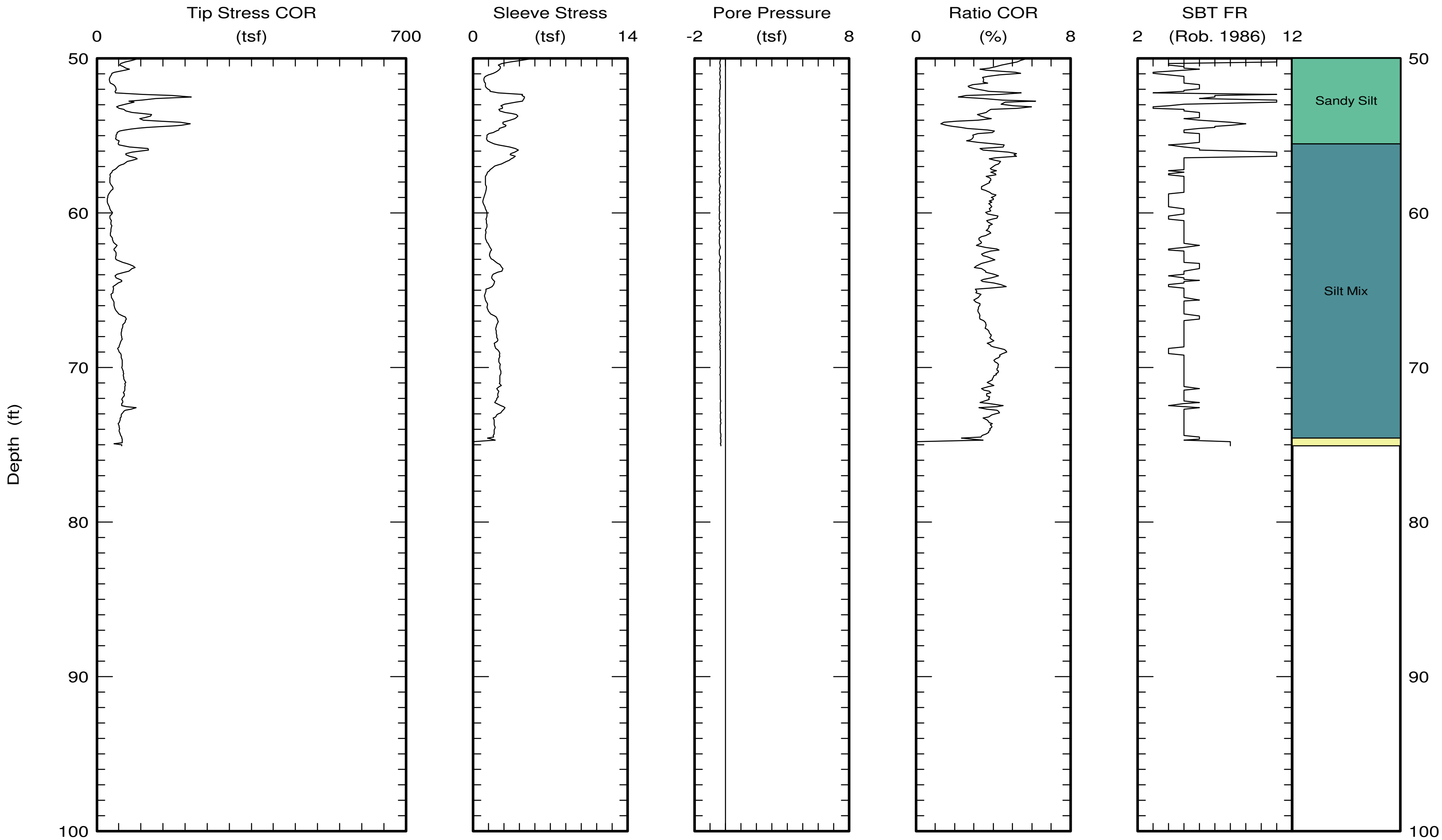
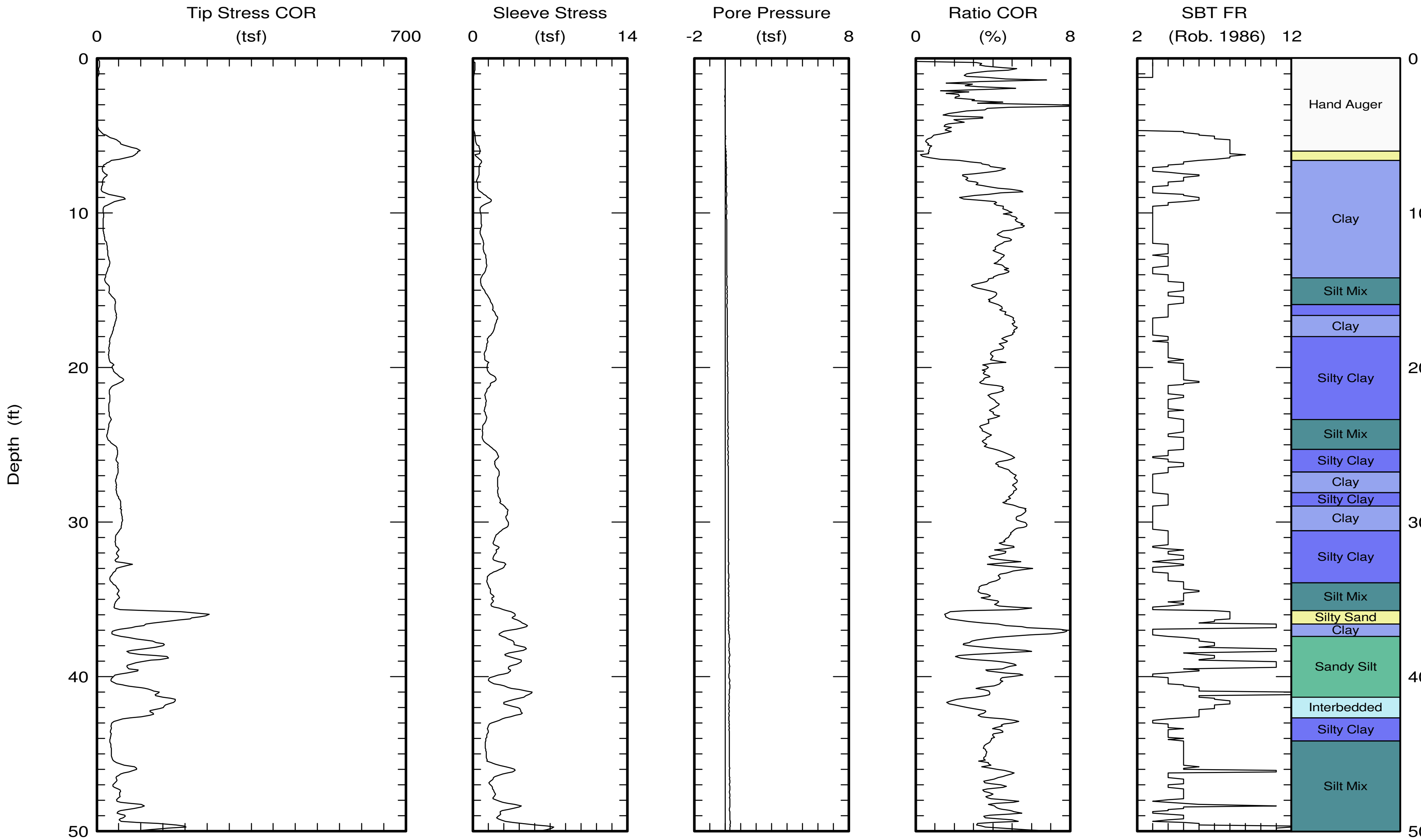
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.10 (ft)

Test ID: T4-C5
File: Z26F1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C6 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 58.32 (ft)

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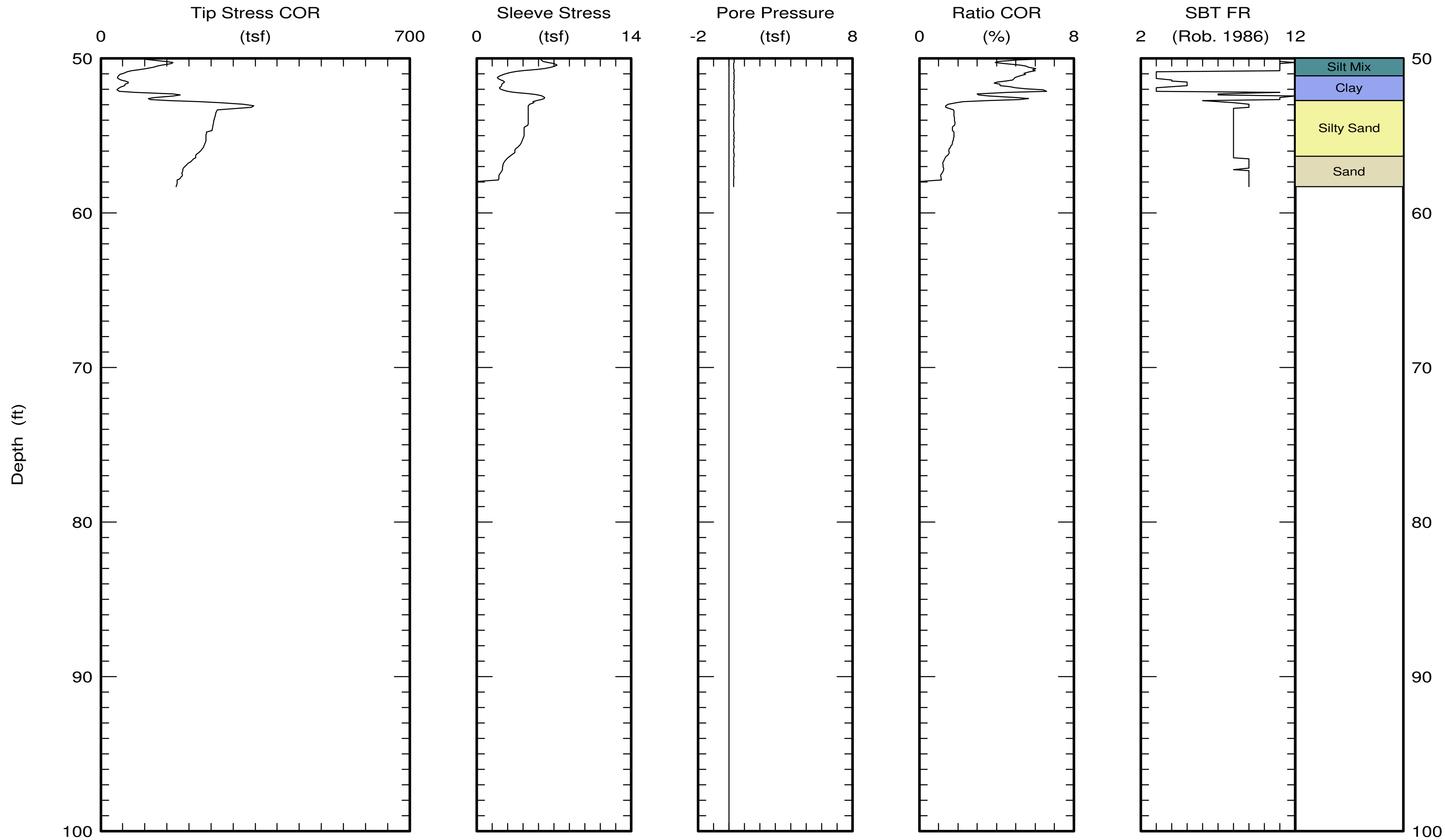
CPT Data
30 ton rig

Date: 26/Feb/2011
Test ID: T4-C6
Project: LosAngeles

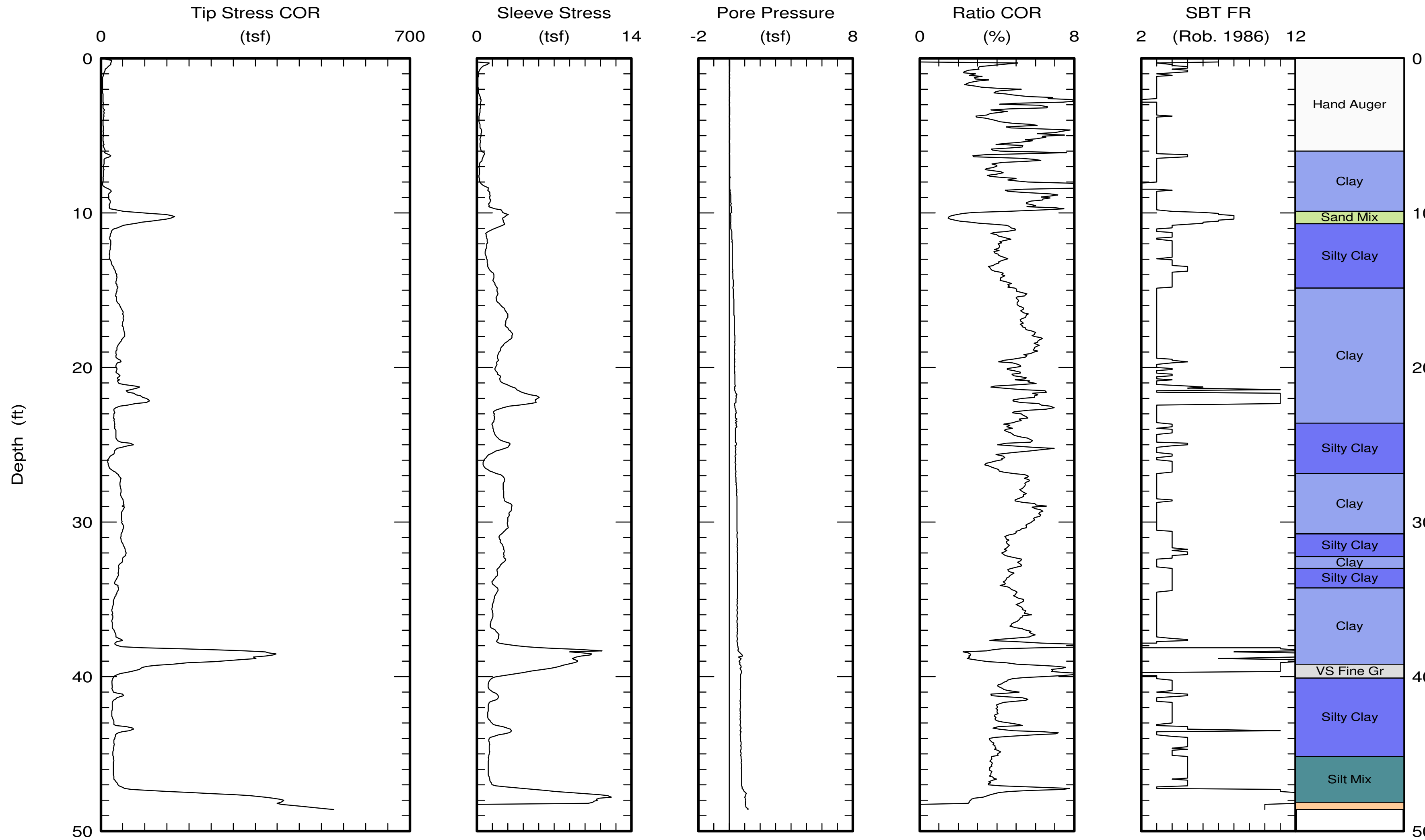
Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 58.32 (ft)

Test ID: T4-C6
File: Z26F1106C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Feb/2011 Test ID: T4-C7 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 48.63 (ft)

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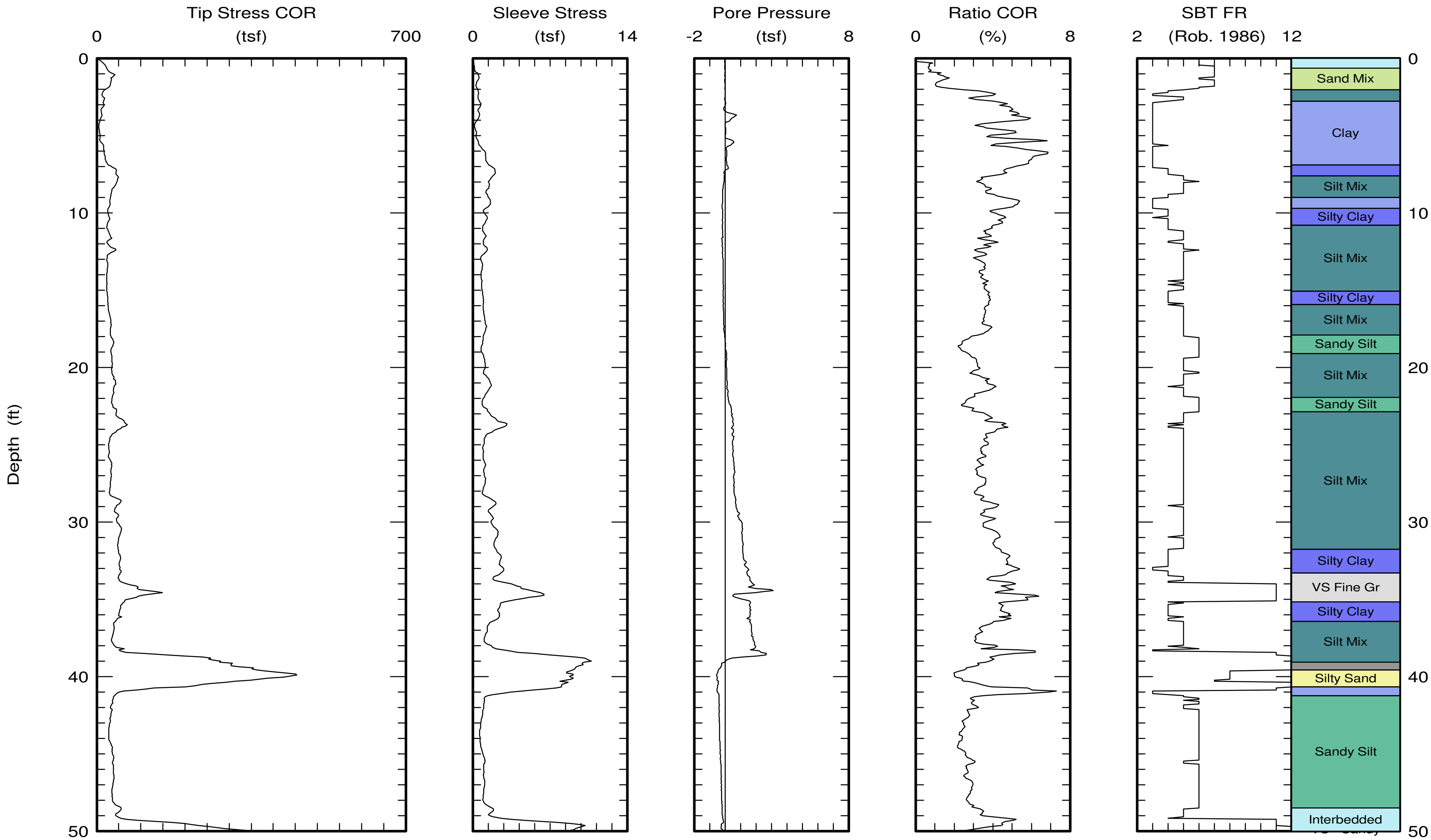
www.kehoetesting.com

CPT Data
30 ton rig

Date: 28/Jan/2011
Test ID: T4-C9
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.06 (ft)

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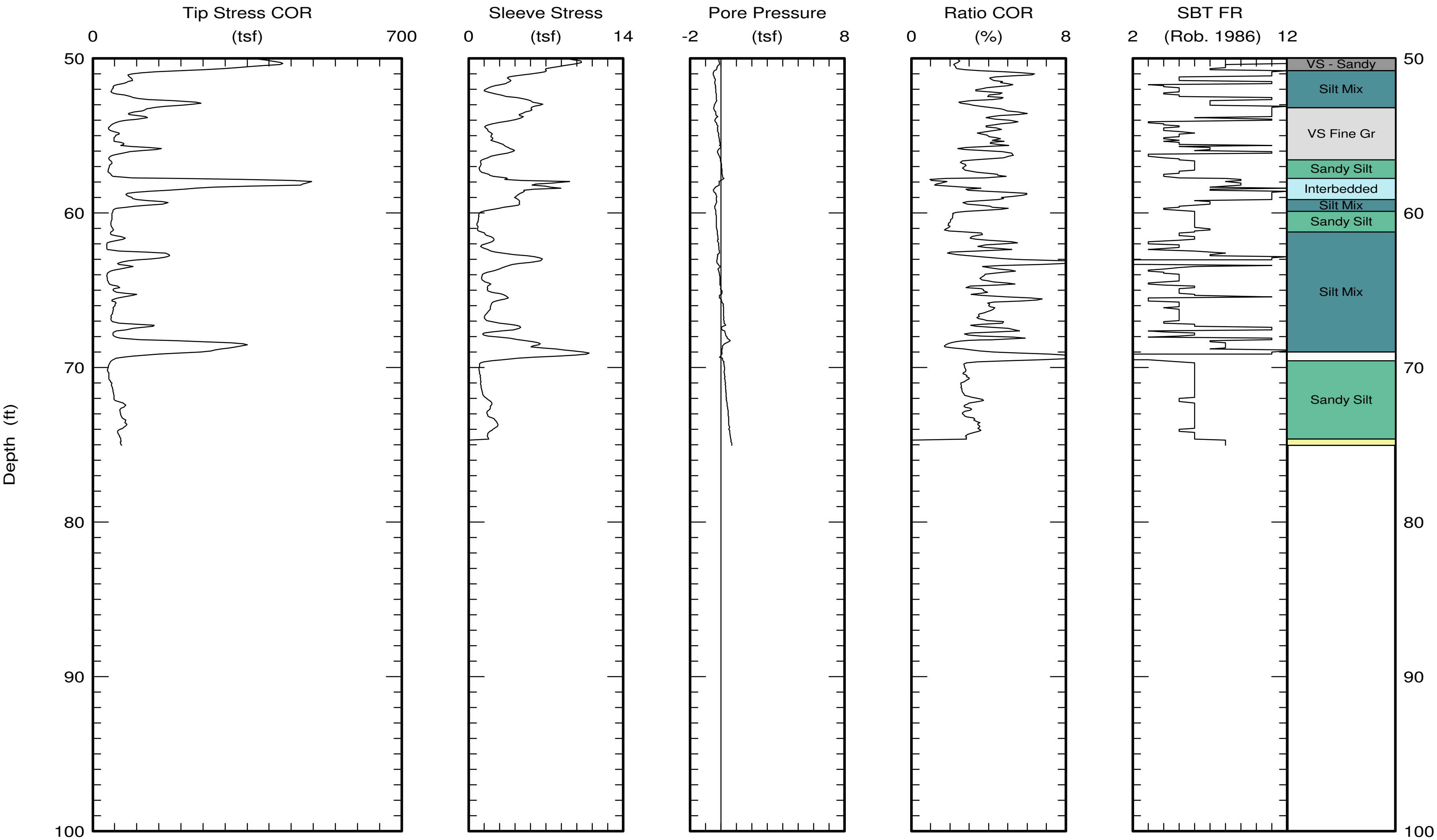
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Jan/2011 Test ID: T4-C9 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.06 (ft)

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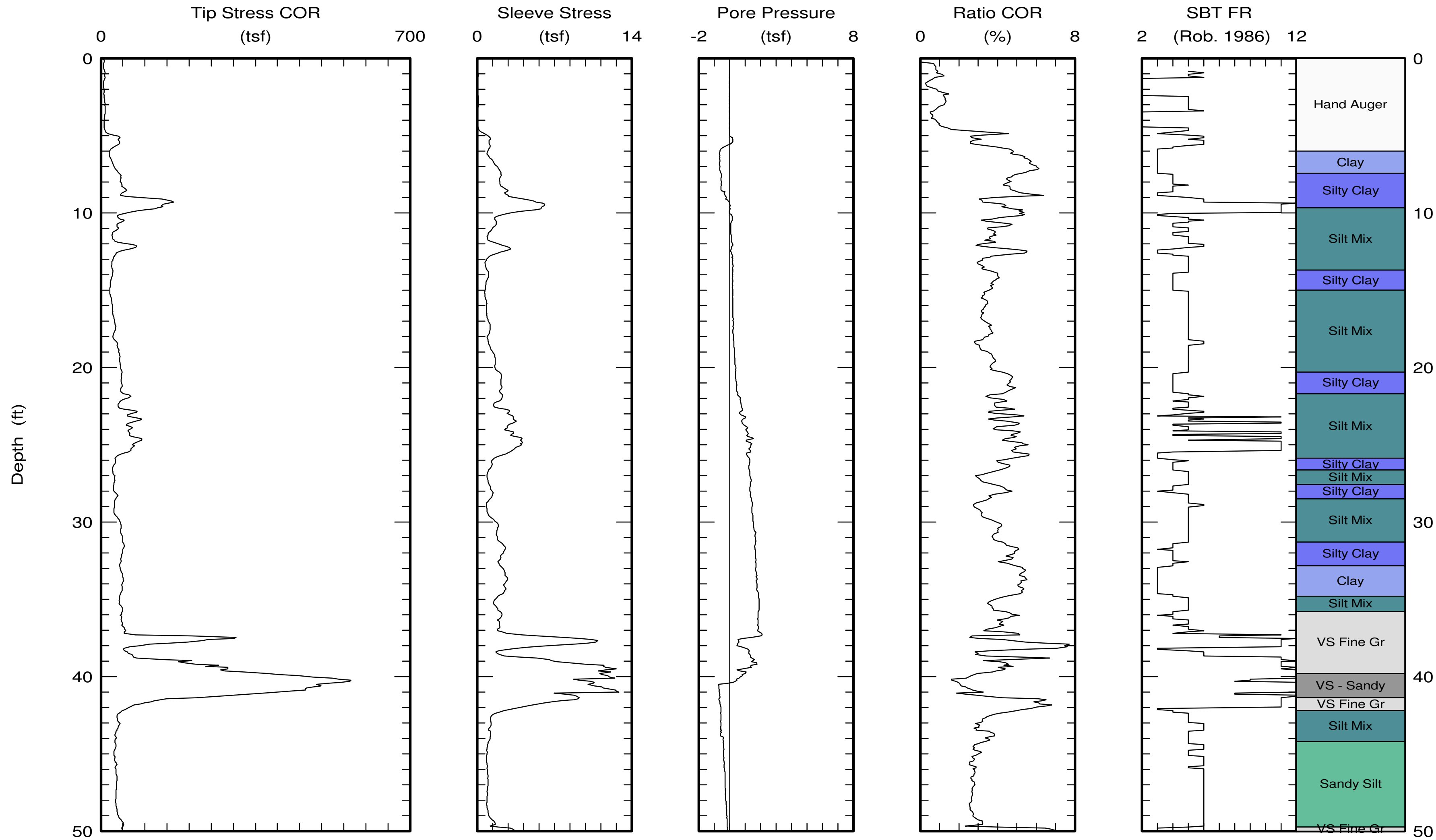
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 31/Jan/2011 Test ID: T4-C10 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 95.05 (ft)

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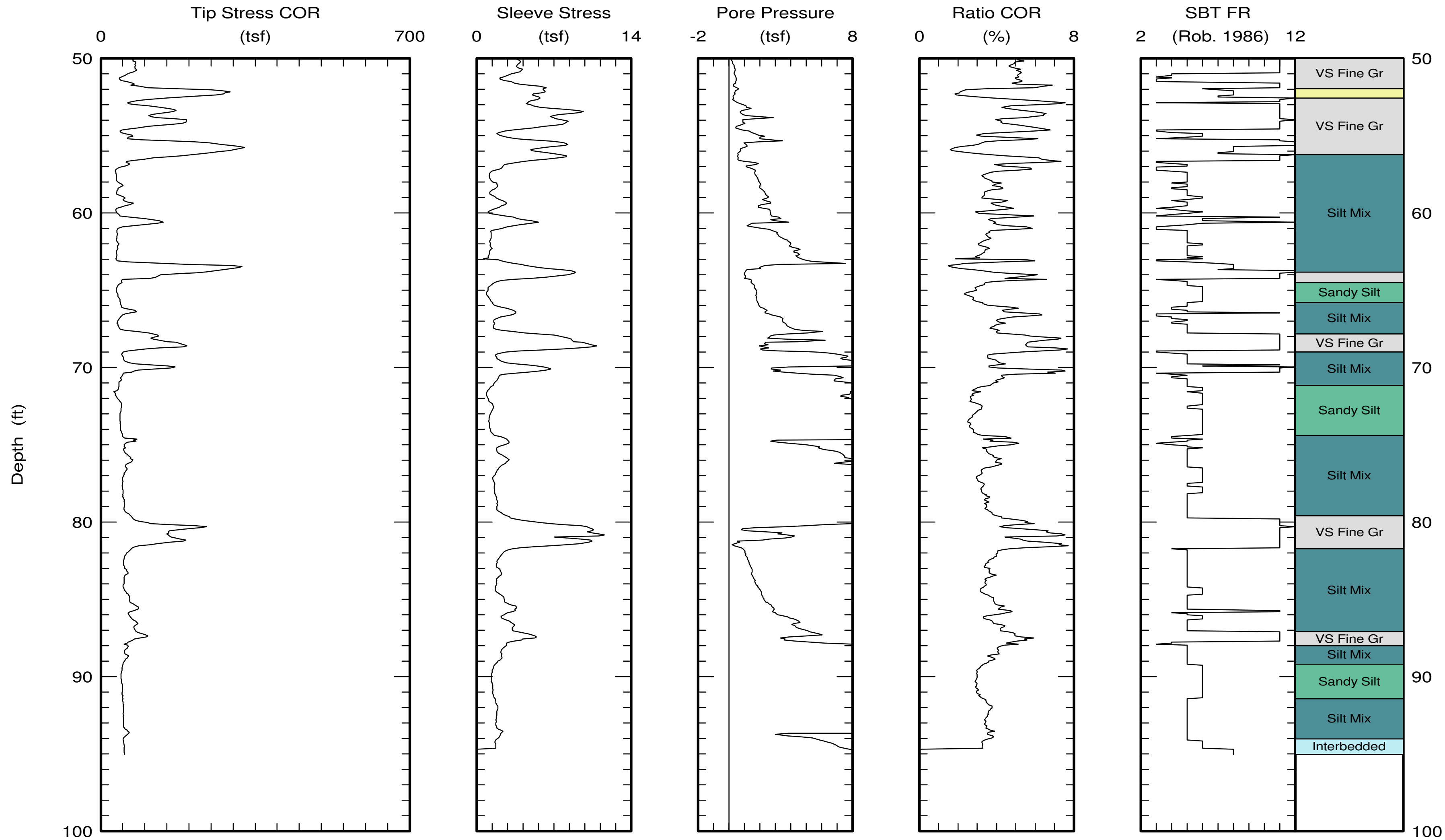
CPT Data
30 ton rig

Date: 31/Jan/2011
Test ID: T4-C10
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 95.05 (ft)

Test ID: T4-C10
File: Z31J1101C.ECP

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Fax: (714) 901-7289
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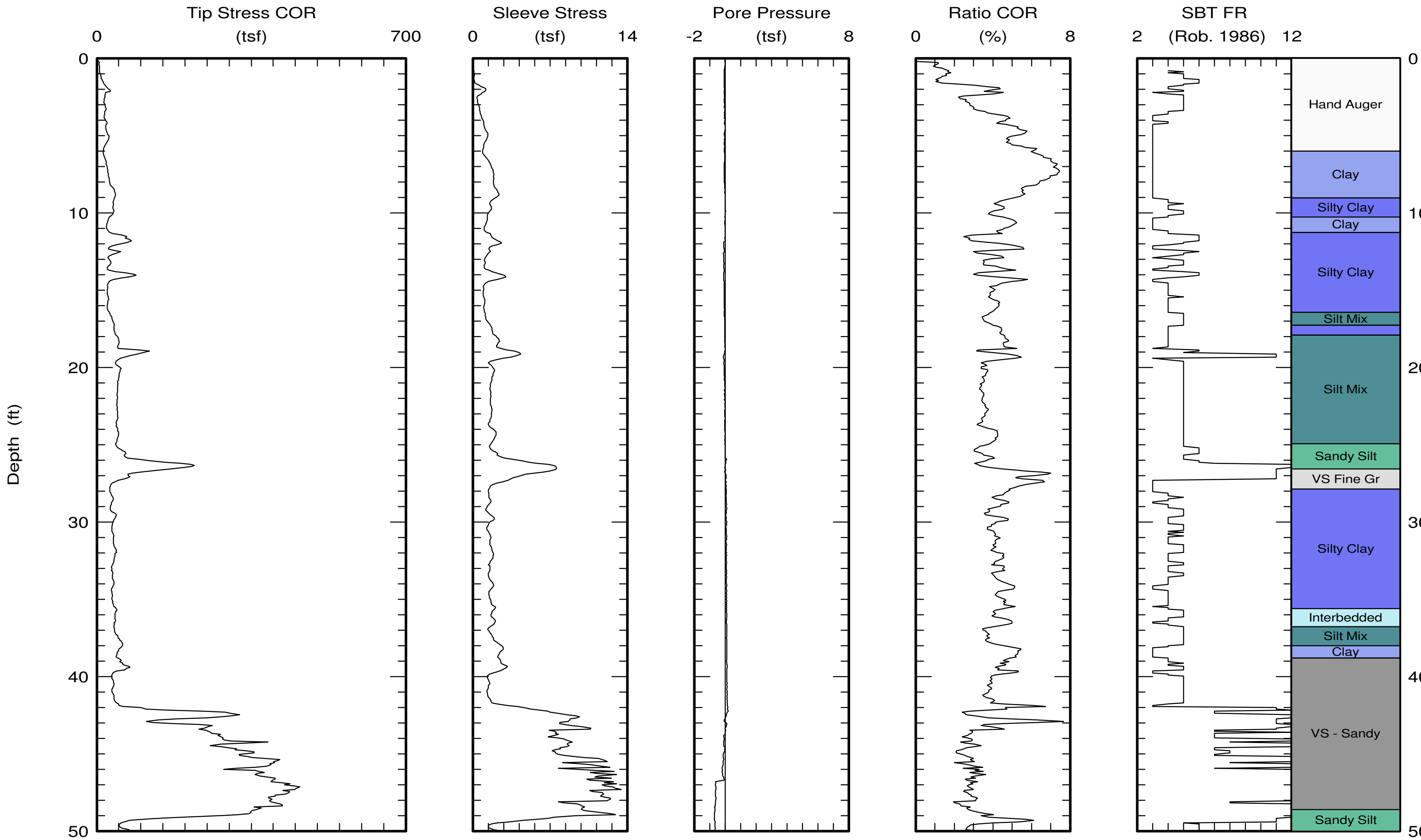
www.kehoetesting.com

CPT Data
30 ton rig

Date: 28/Jan/2011
Test ID: T4-C11
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.

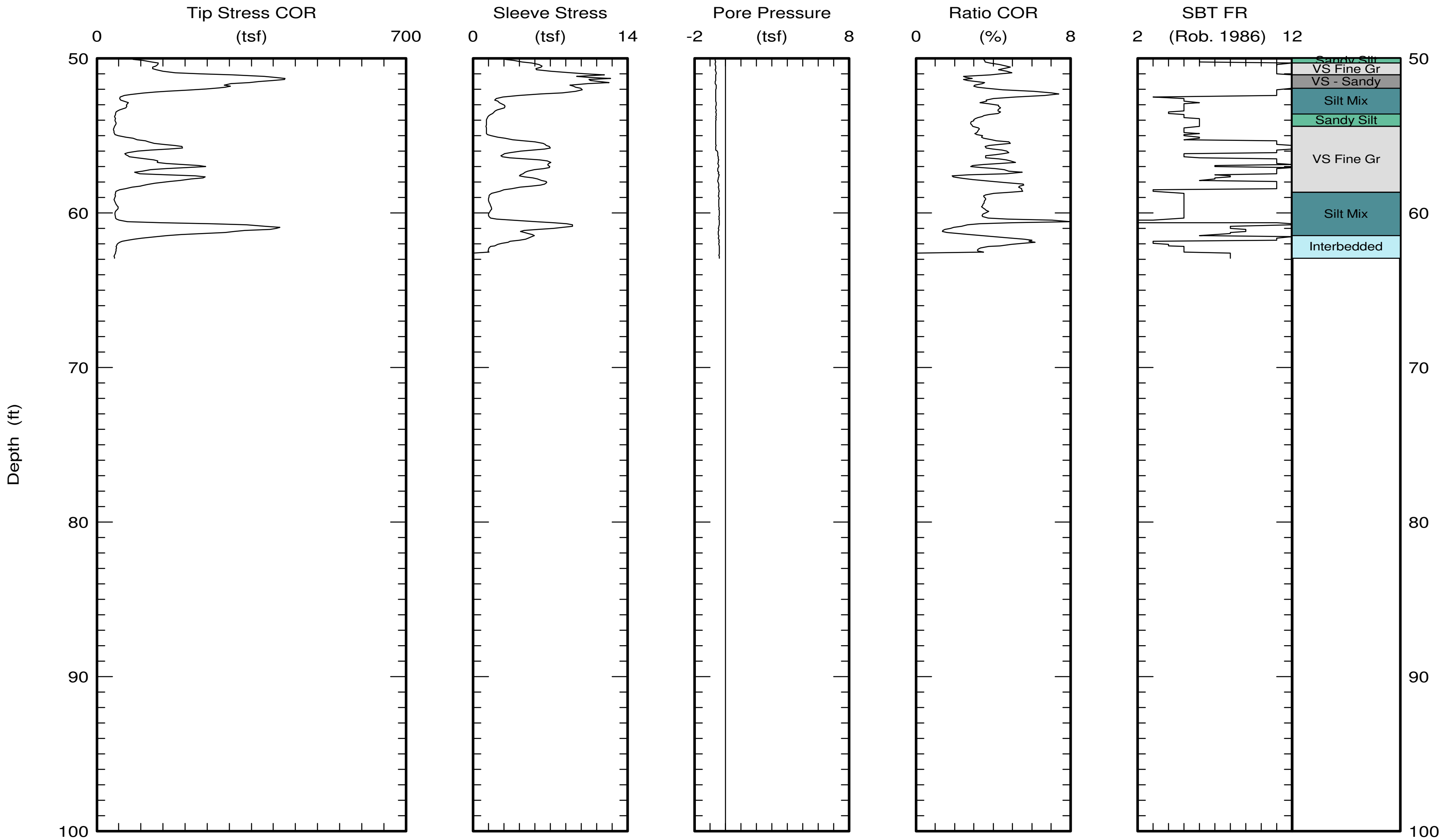


Maximum depth: 62.96 (ft)

Page 1 of 2

Test ID: T4-C11
File: Z28J1103C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Jan/2011 Test ID: T4-C11 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 62.96 (ft)

Test ID: T4-C11
File: Z28J1103C.ECP

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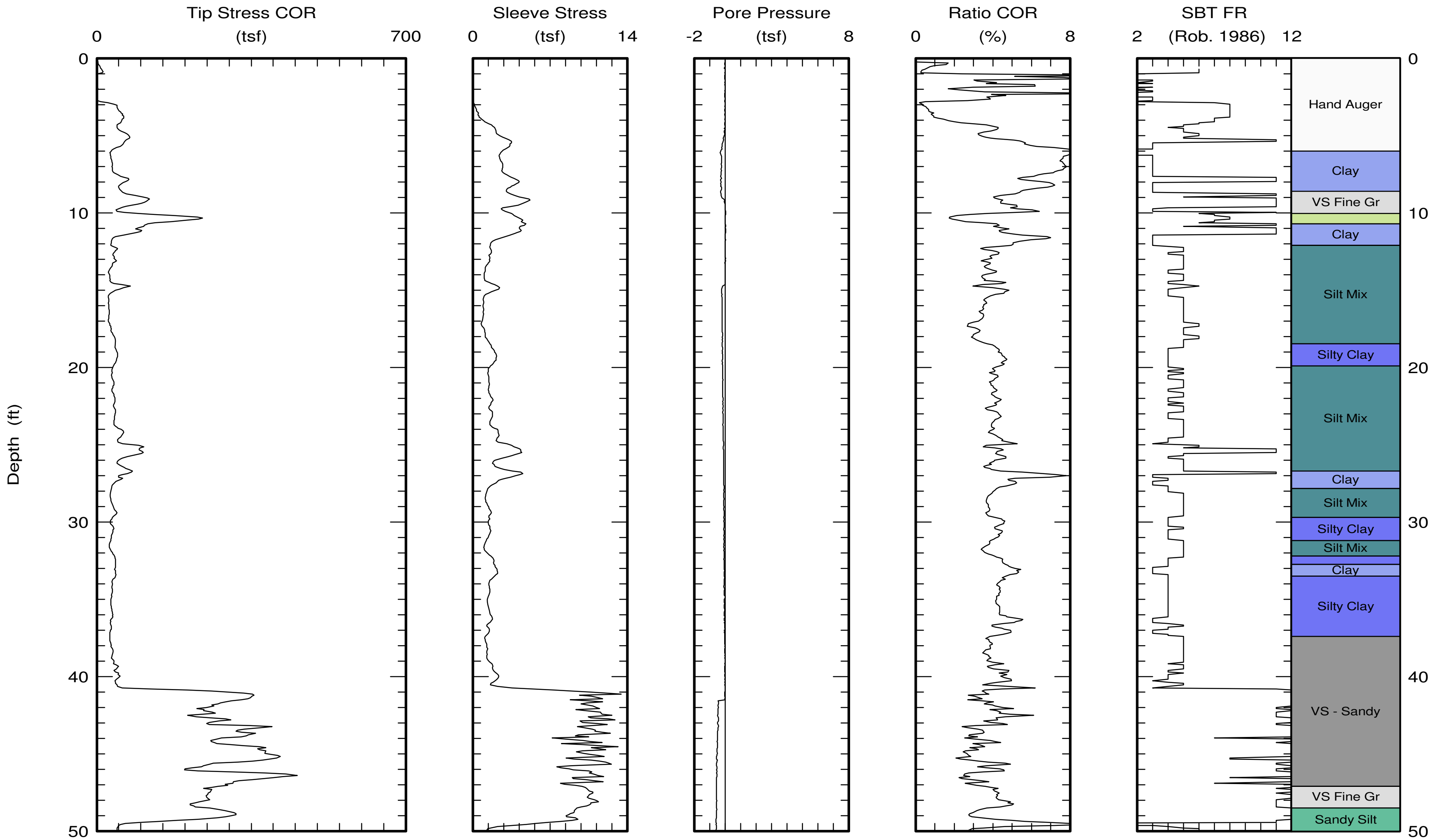
CPT Data
30 ton rig

Date: 28/Jan/2011
Test ID: T4-C12
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.01 (ft)

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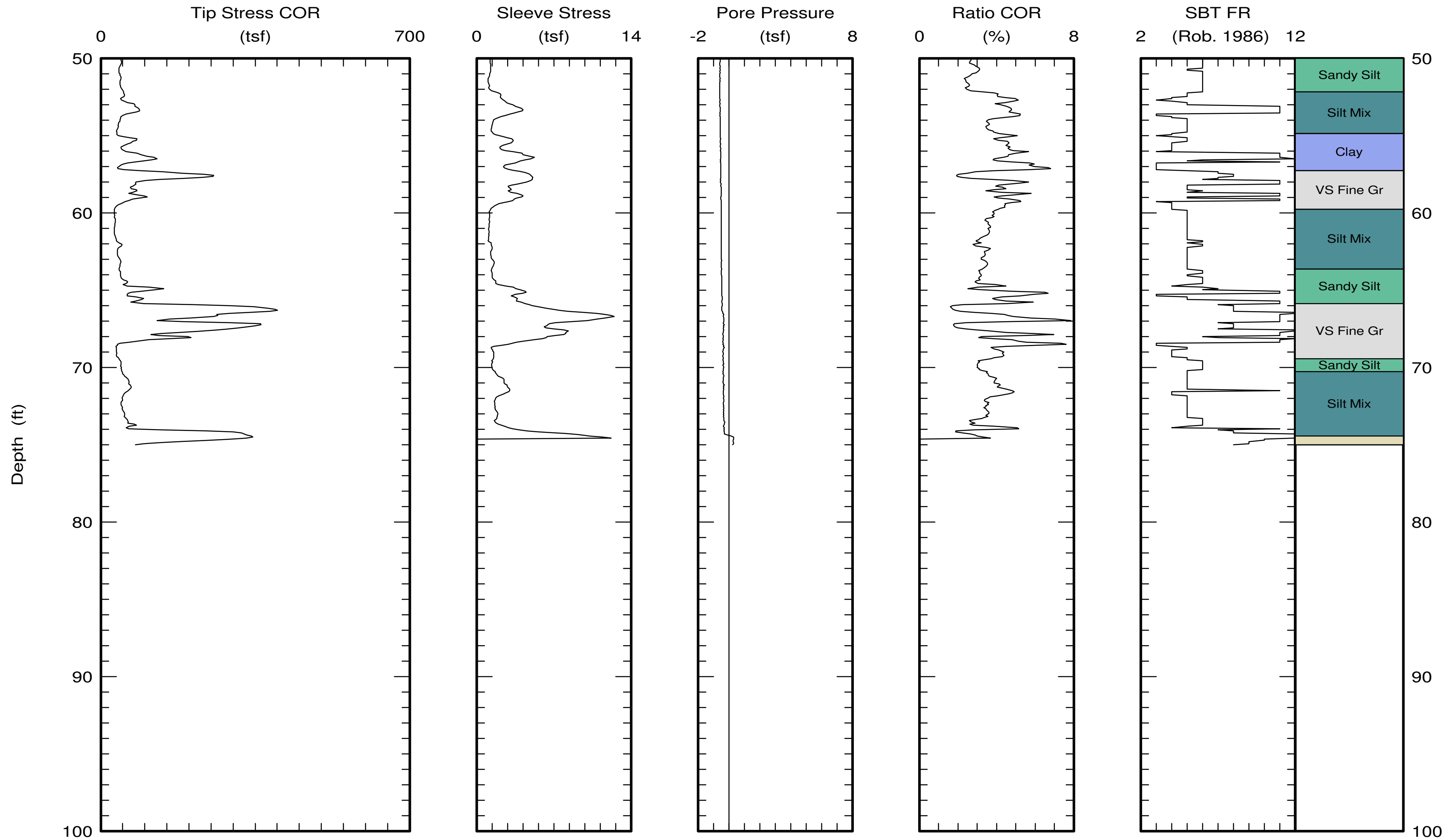
CPT Data
30 ton rig

Date: 28/Jan/2011
Test ID: T4-C12
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.01 (ft)

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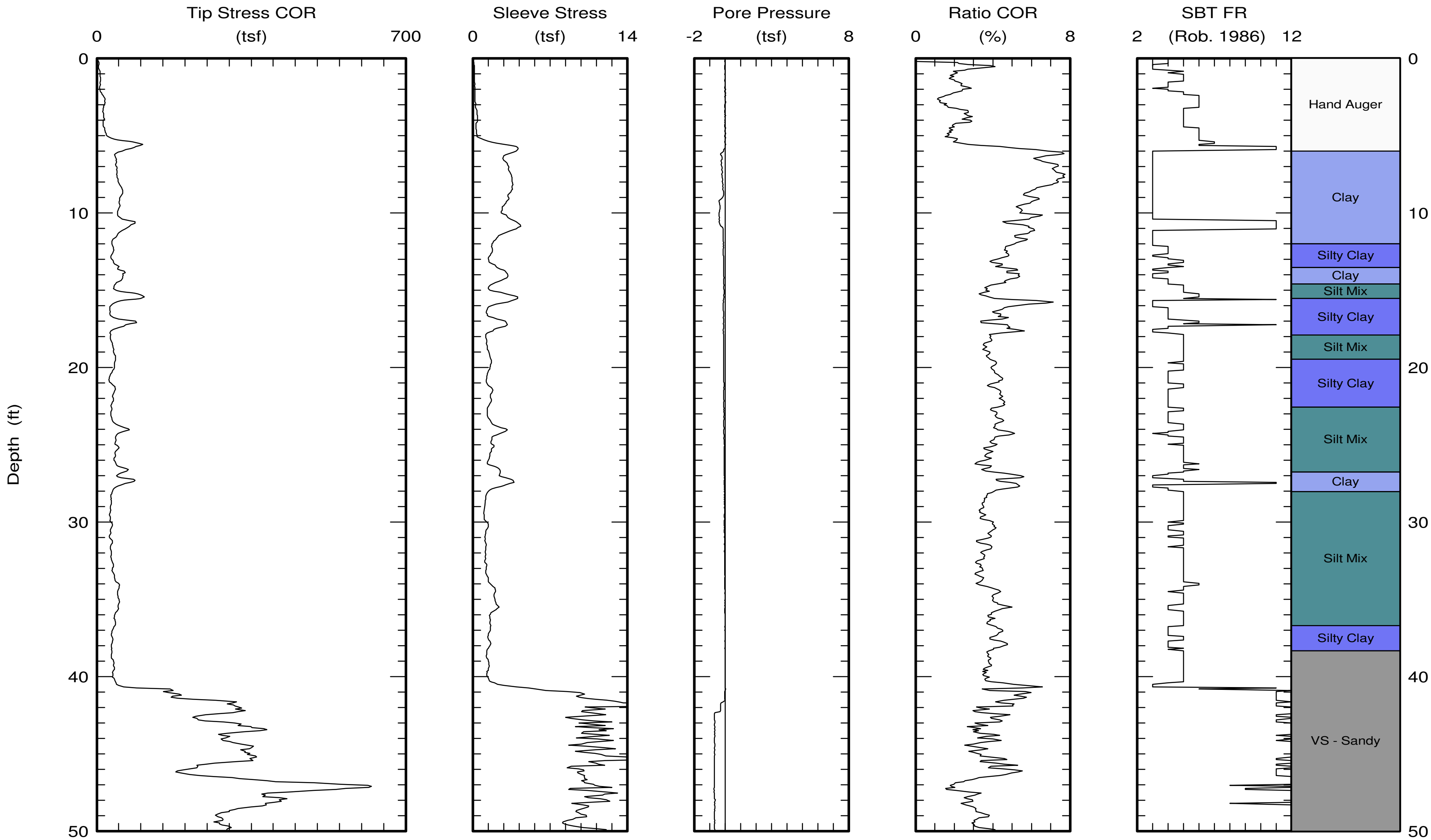
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Jan/2011 Test ID: T4-C13 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.04 (ft)

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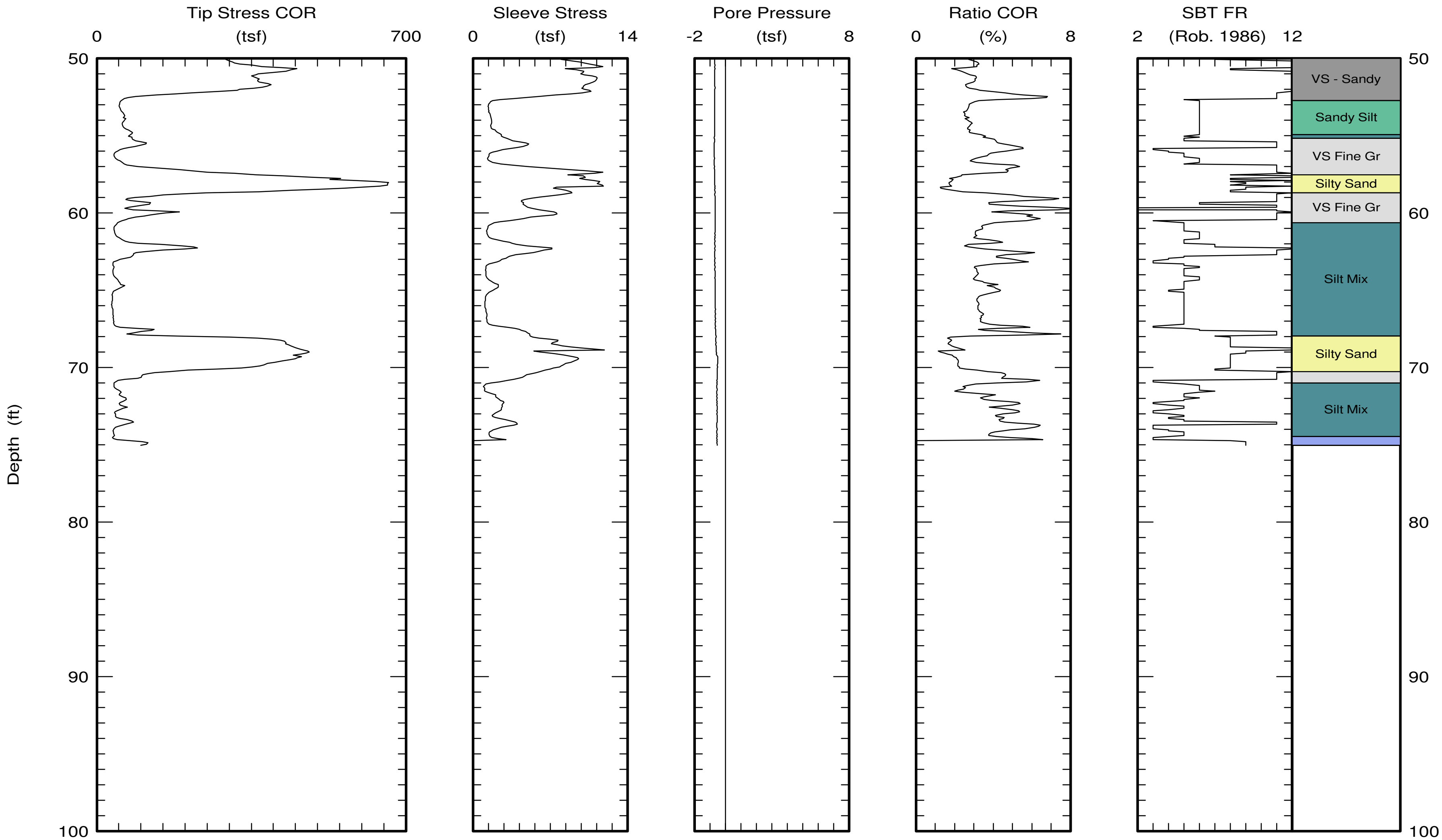
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 28/Jan/2011 Test ID: T4-C13 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.04 (ft)

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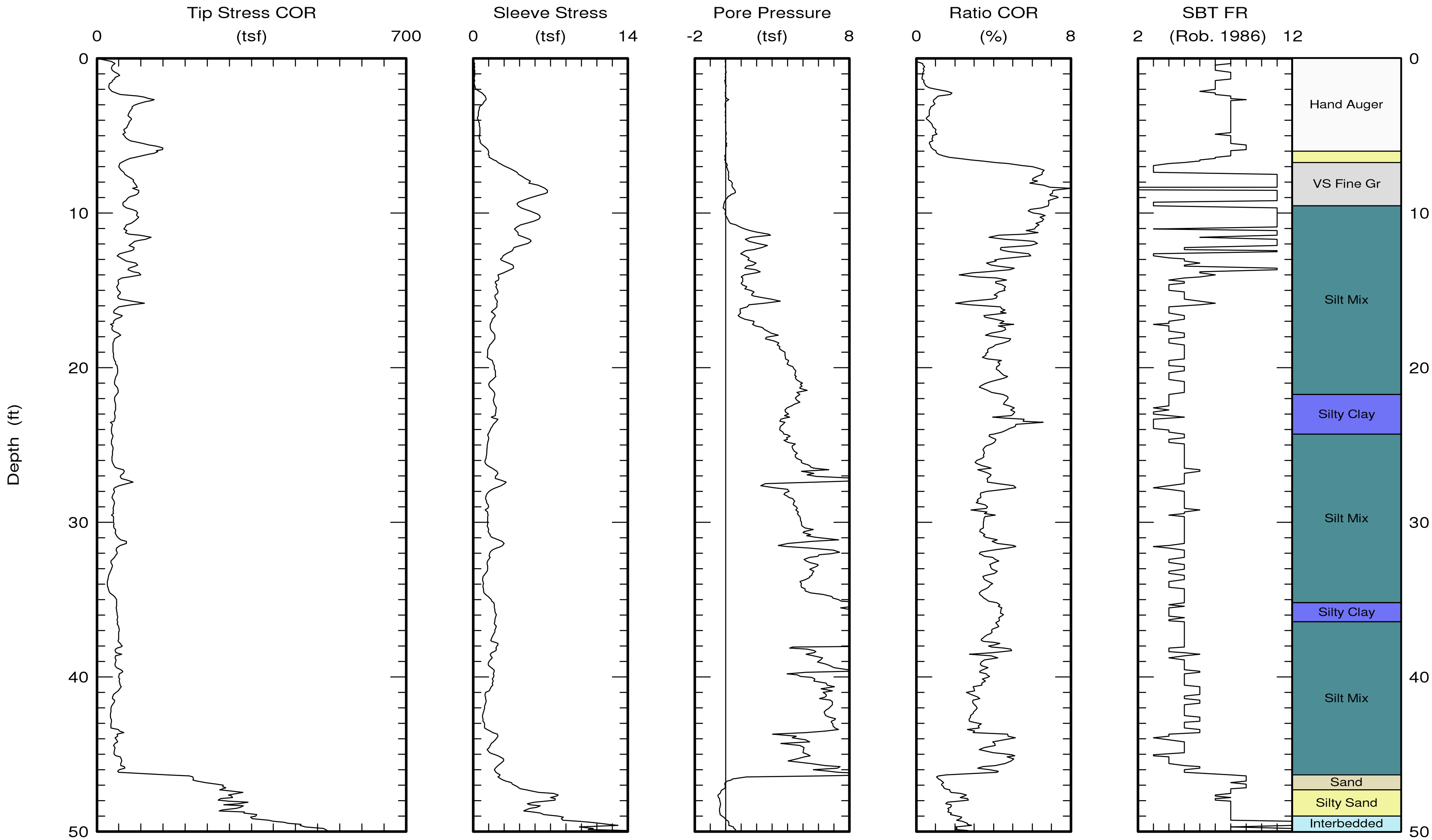
CPT Data
30 ton rig

Date: 01/Feb/2011
Test ID: T4-C14
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 50.32 (ft)

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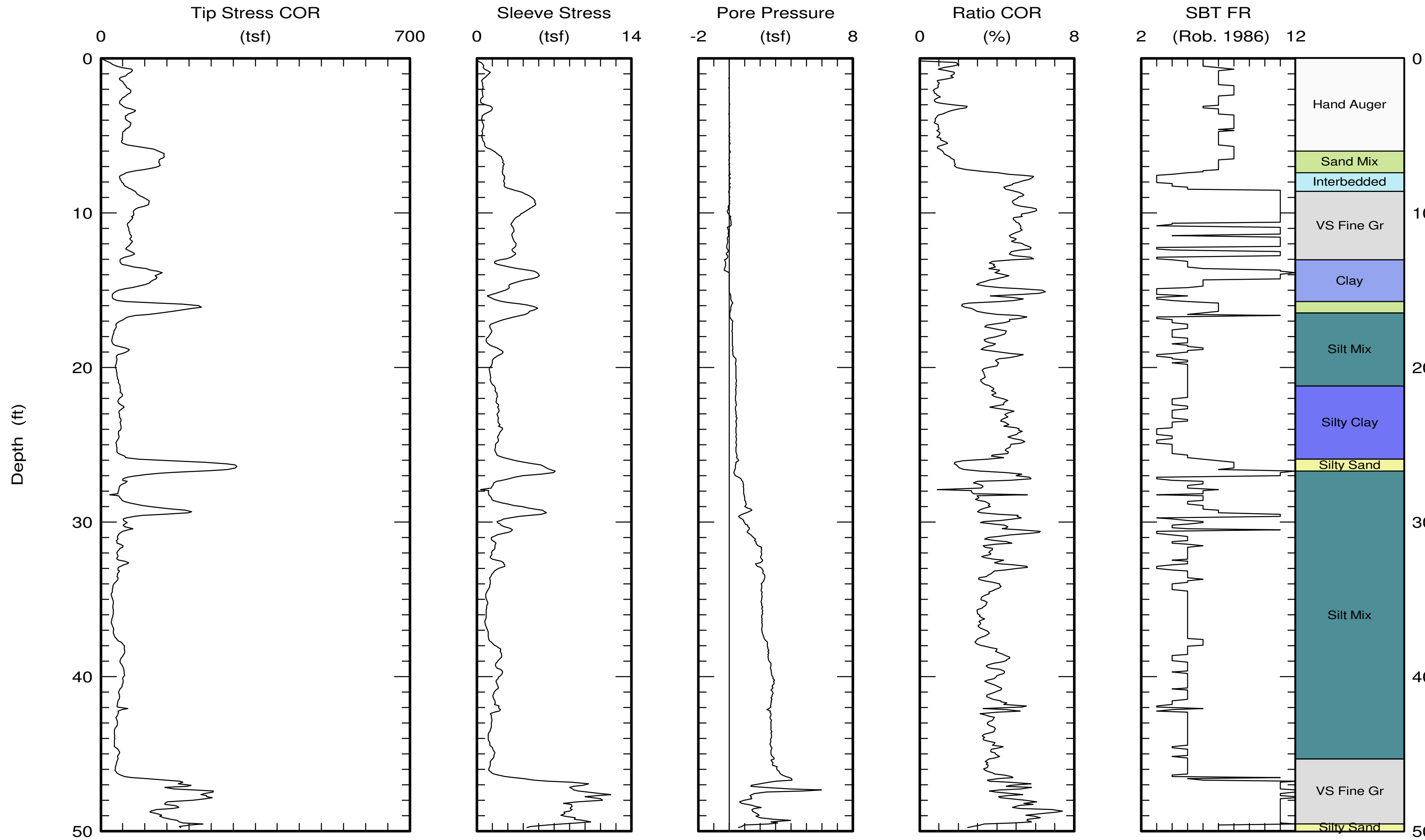
Test ID: T4-C14
File: Z01F1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C15 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 53.54 (ft)

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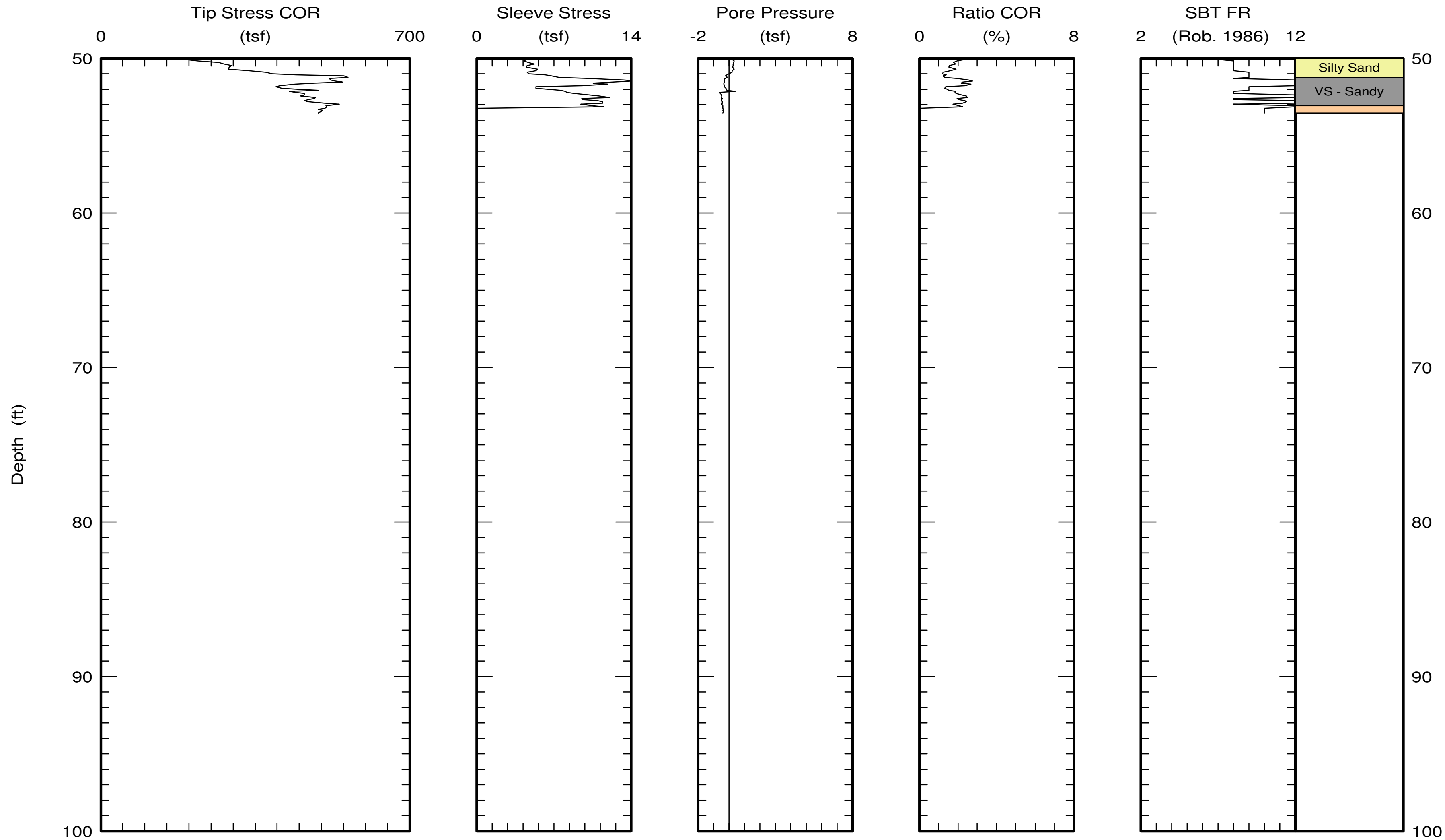
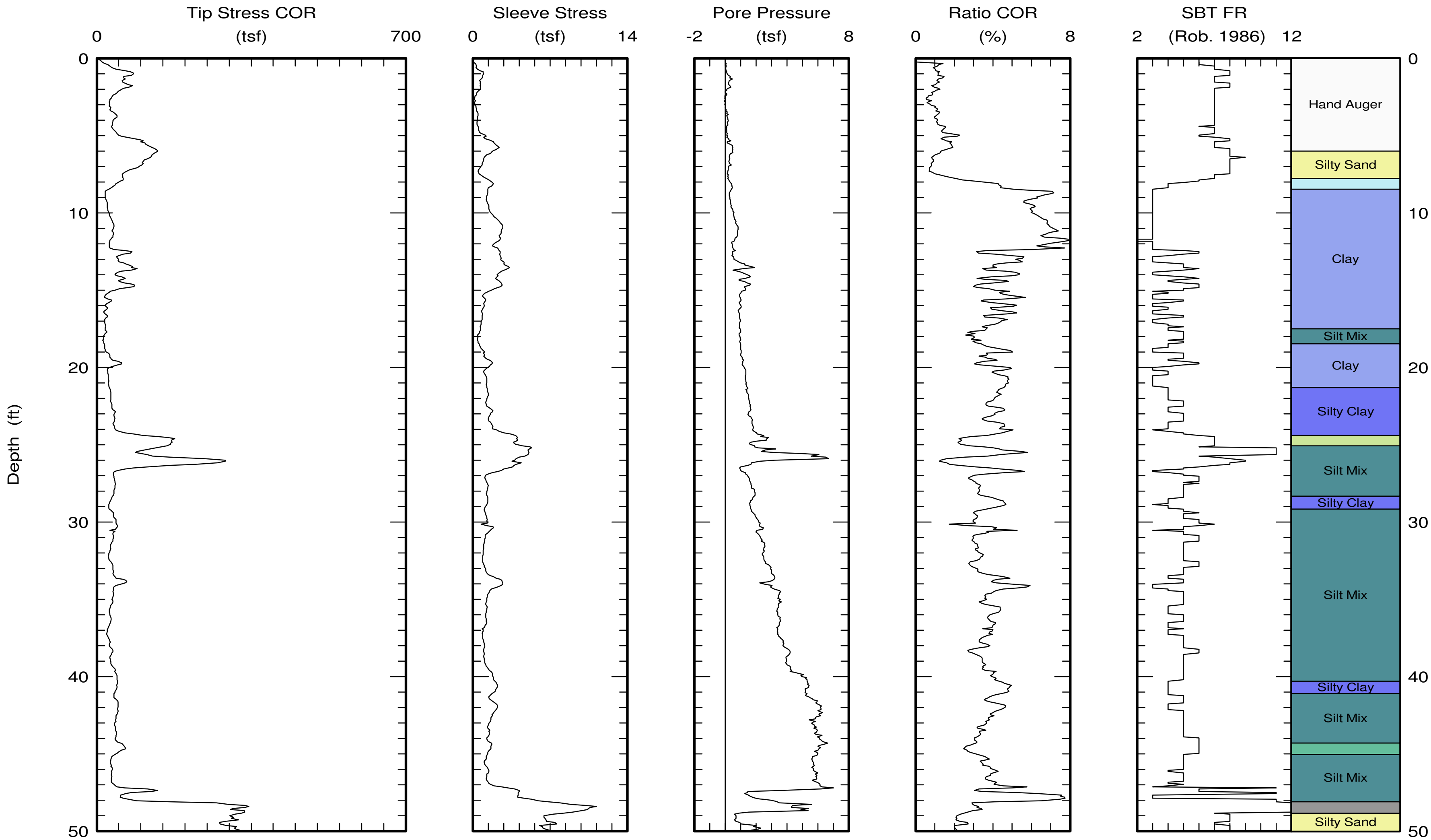
Test ID: T4-C15
File: Z01F1103C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C15 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 53.54 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Feb/2011 Test ID: T4-C16 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.08 (ft)

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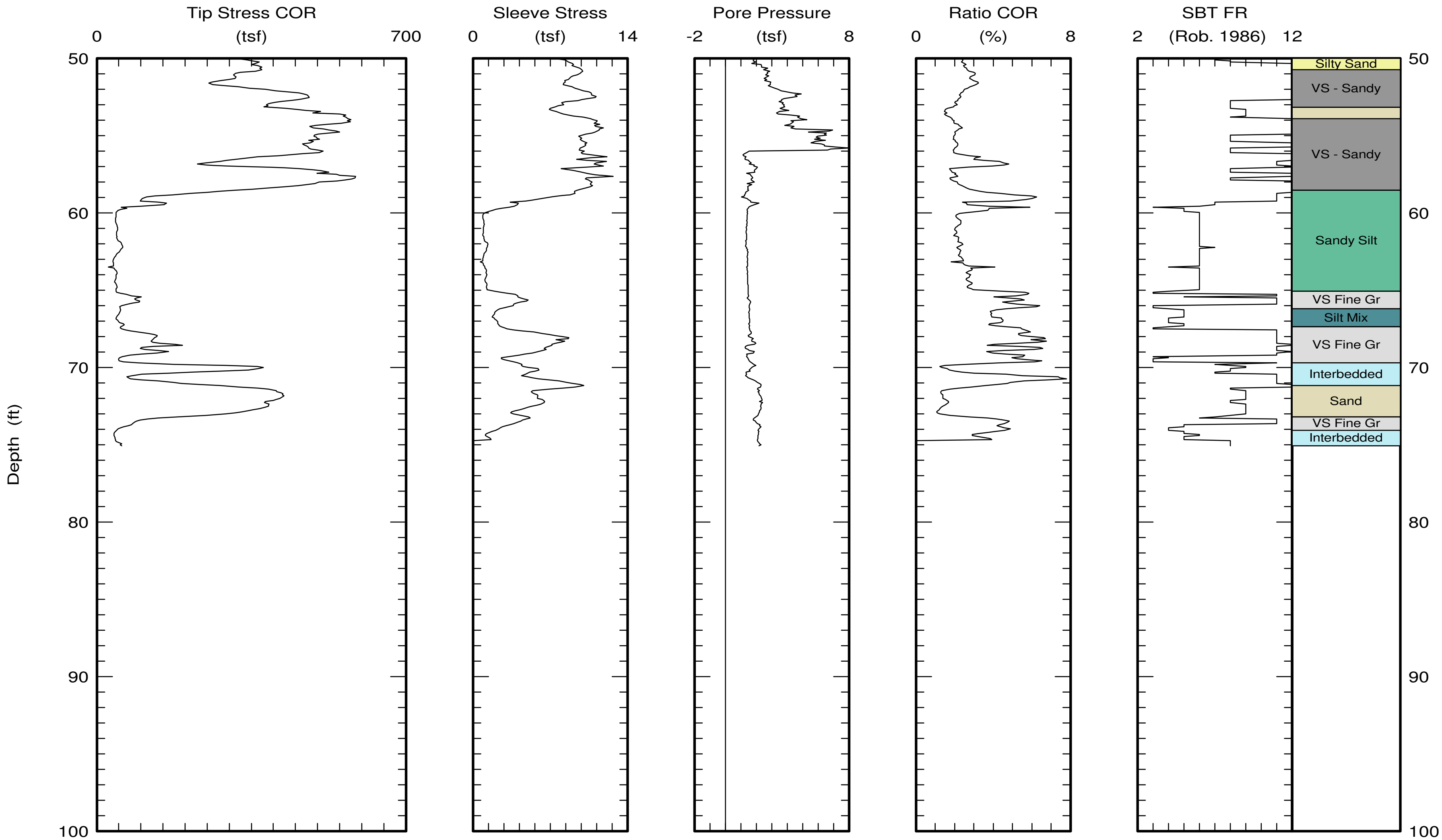
CPT Data
30 ton rig

Date: 02/Feb/2011
Test ID: T4-C16
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.08 (ft)

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Test ID: T4-C16
File: Z02F1102C.ECP

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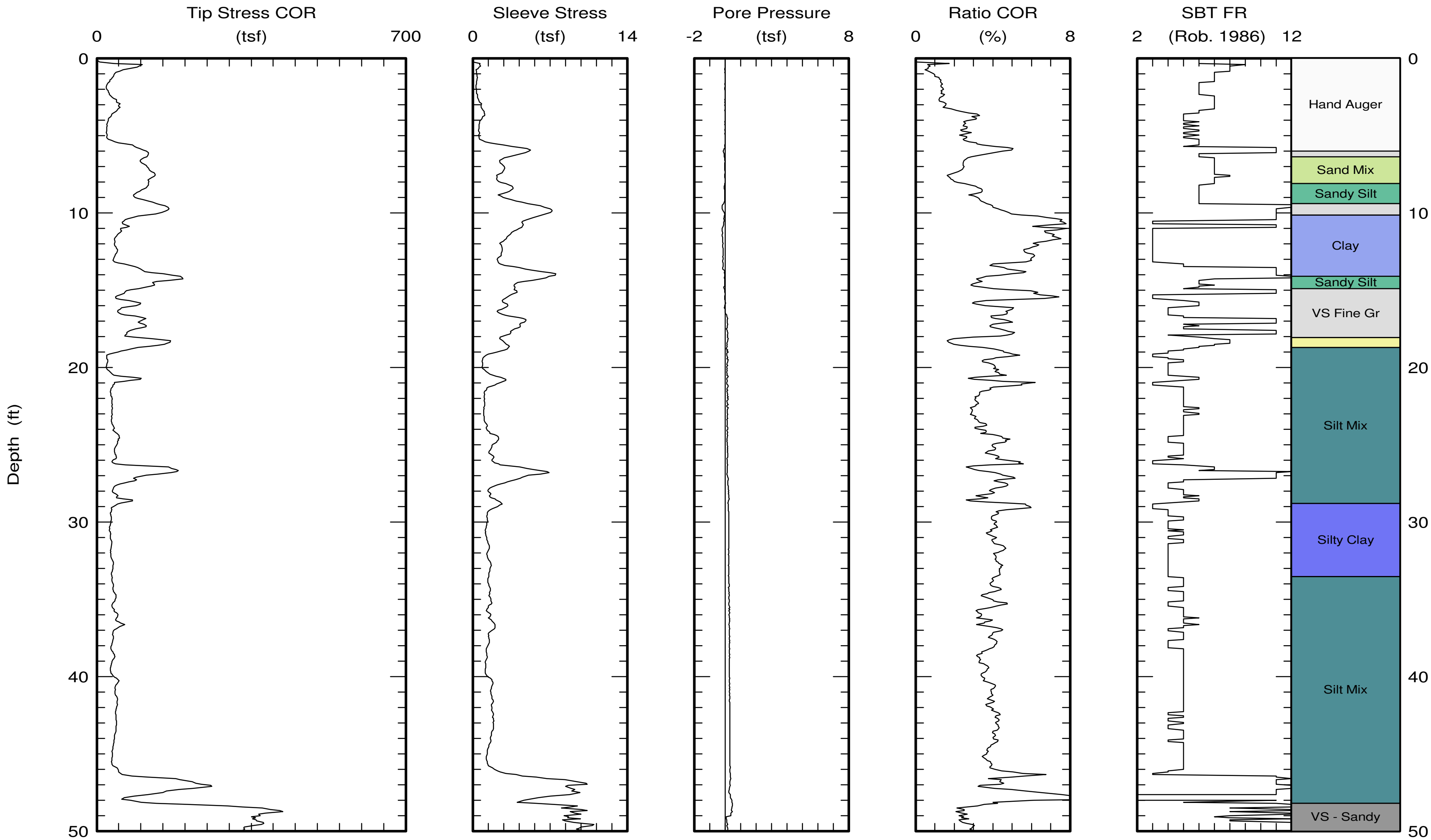
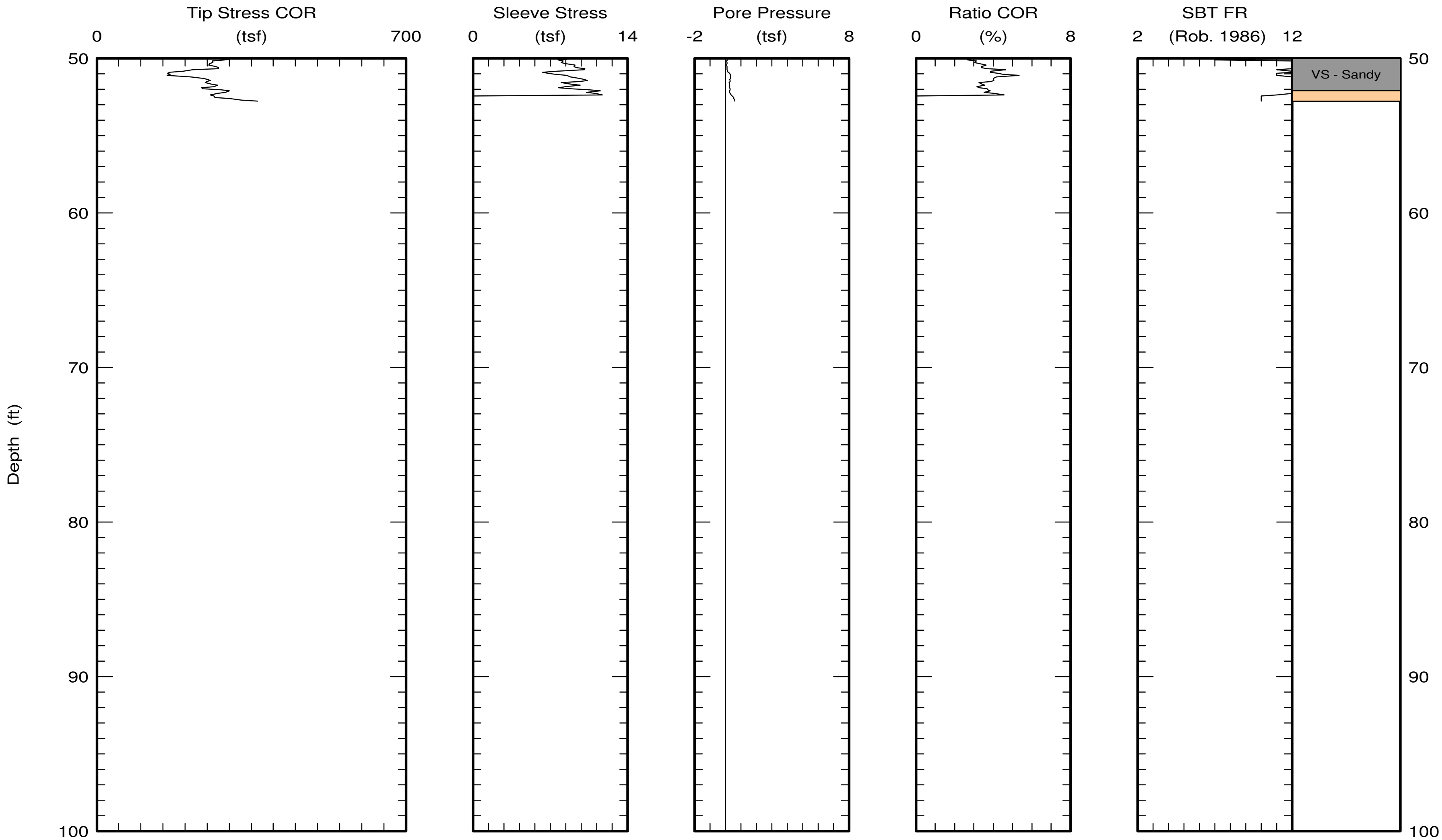
CPT Data 30 ton rig		Date: 01/Feb/2011 Test ID: T4-C17 Project: BeverlyHills
Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive		



Maximum depth: 52.78 (ft)

Test ID: T4-C17
File: Z01F1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C17 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 52.78 (ft)

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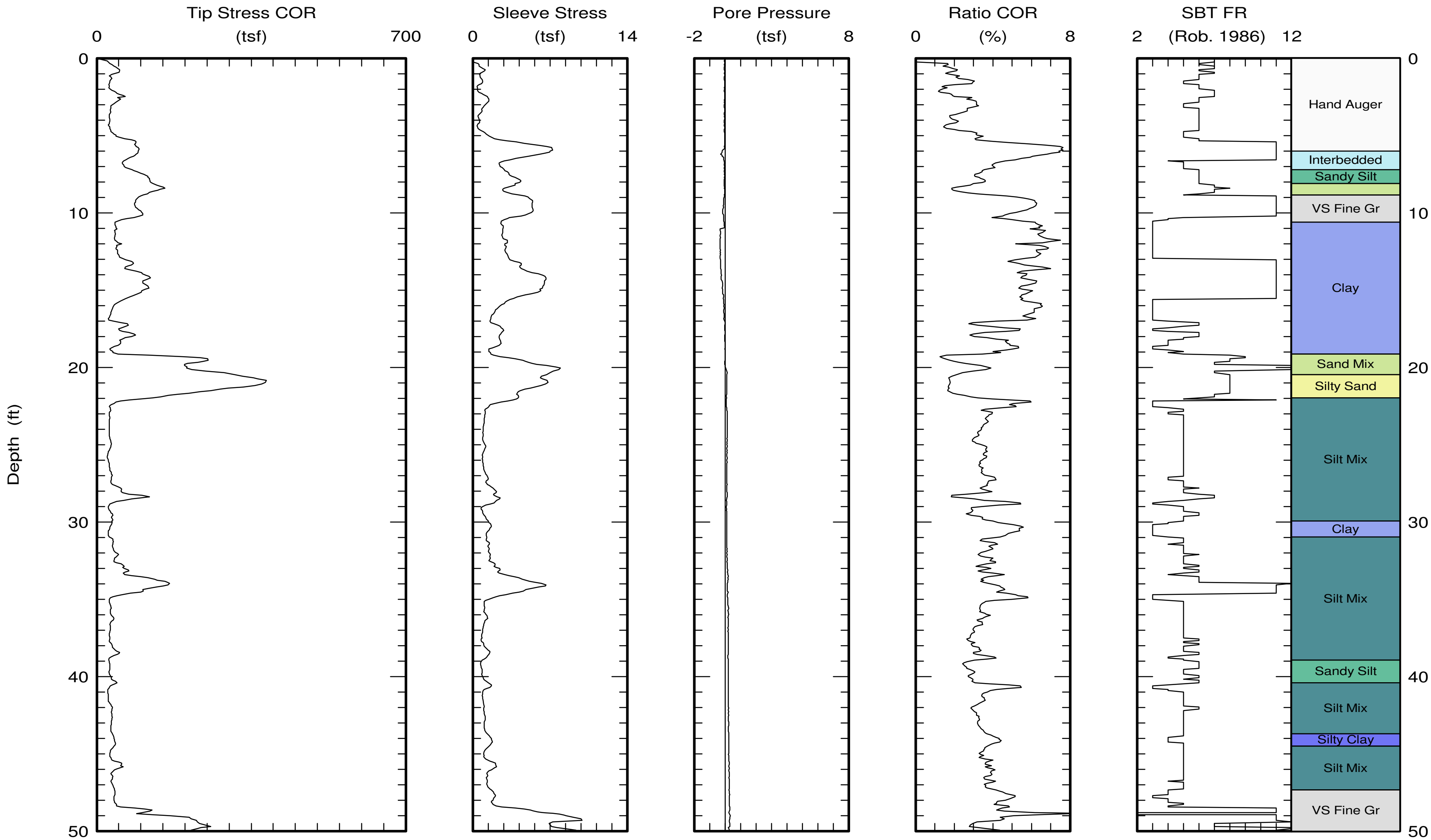
CPT Data
30 ton rig

Date: 01/Feb/2011
Test ID: T4-C18
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Drive



Maximum depth: 57.38 (ft)

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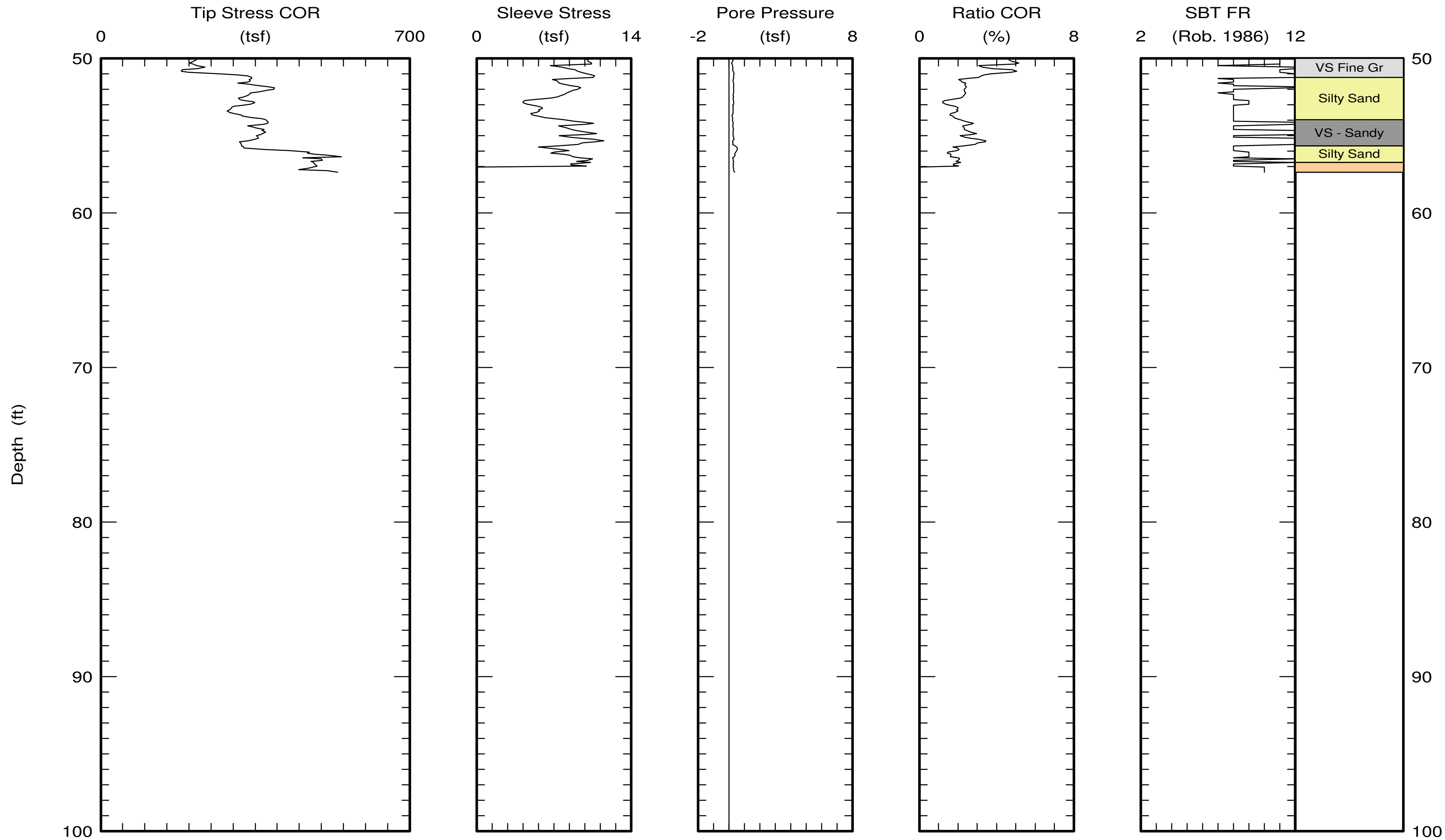
Test ID: T4-C18
File: Z01F1106C.ECP

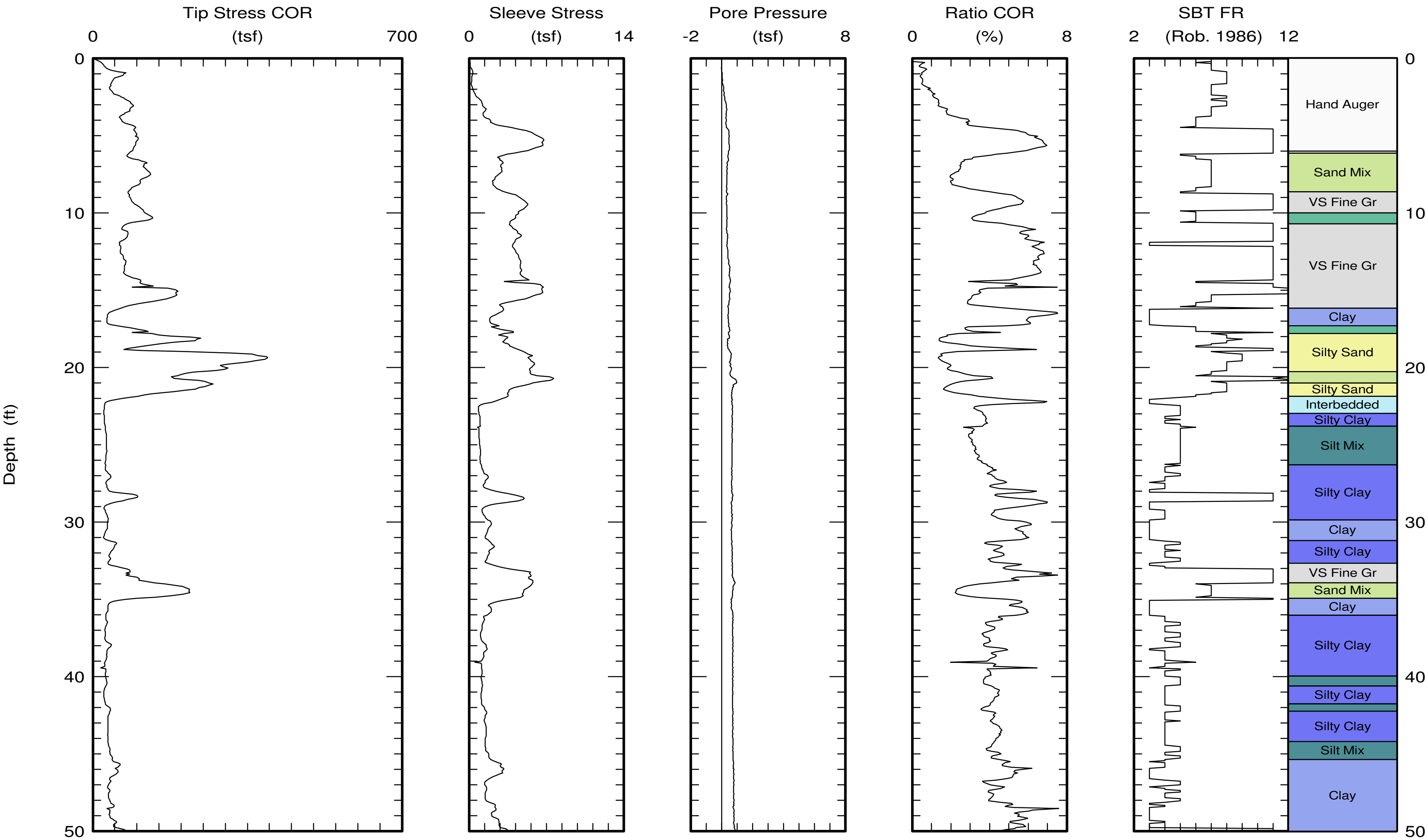
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C18 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 57.38 (ft)

Test ID: T4-C18
File: Z01F1106C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Feb/2011 Test ID: T4-C19 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 60.79 (ft)

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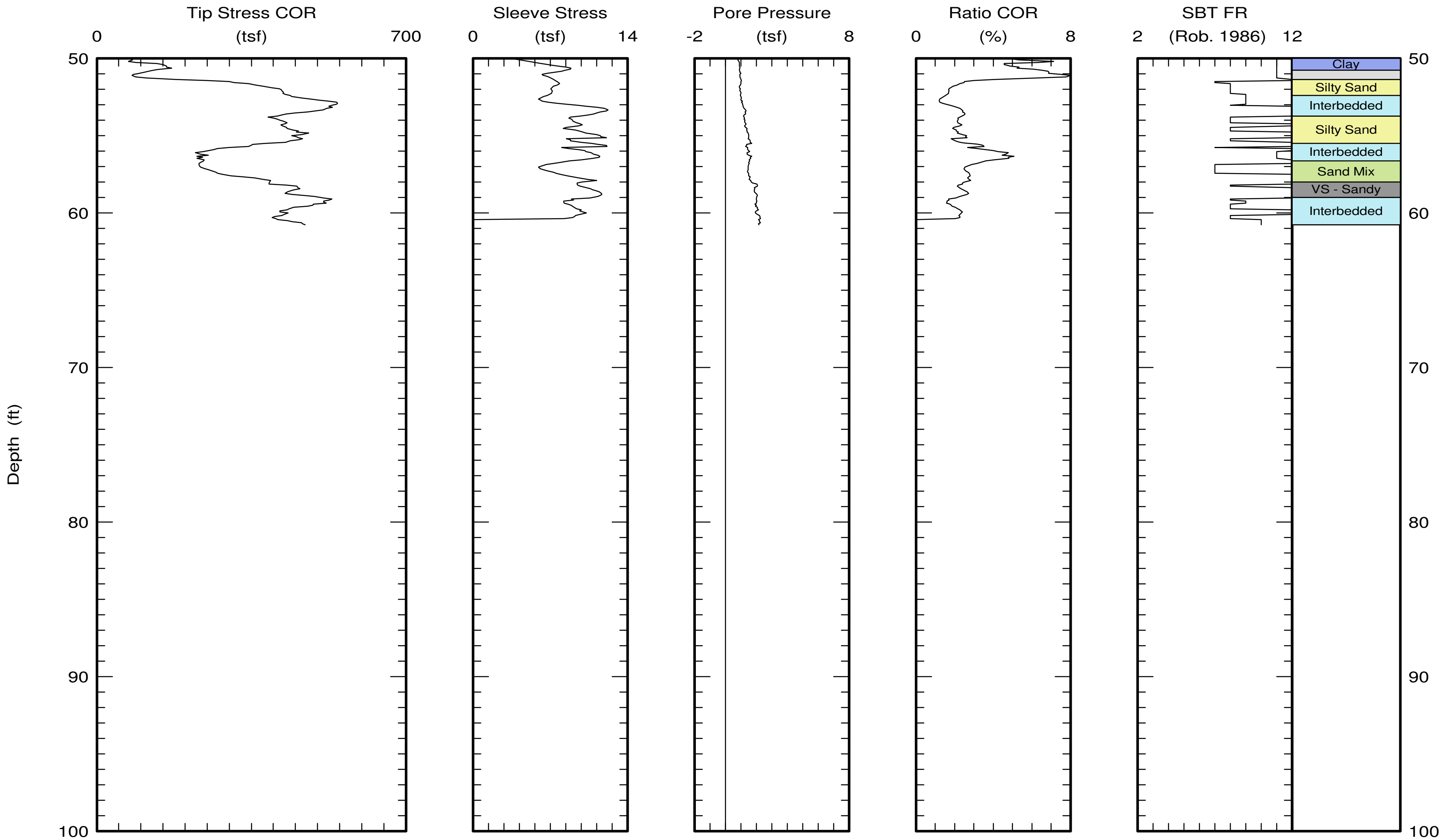
CPT Data
30 ton rig

Date: 02/Feb/2011
Test ID: T4-C19
Project: LosAngeles

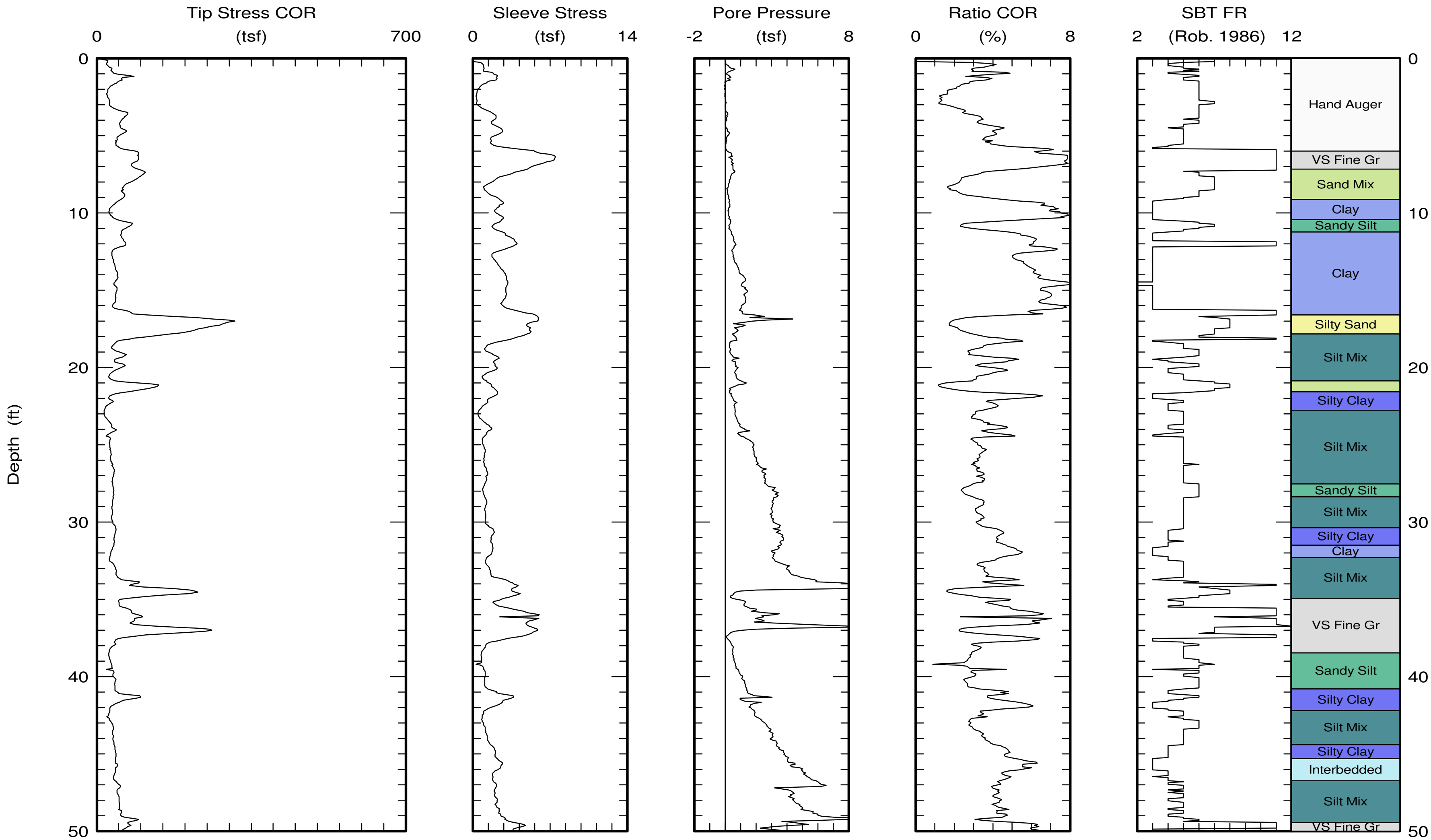
Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 60.79 (ft)
Page 2 of 2

Test ID: T4-C19
File: Z02F1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 54.25 (ft)

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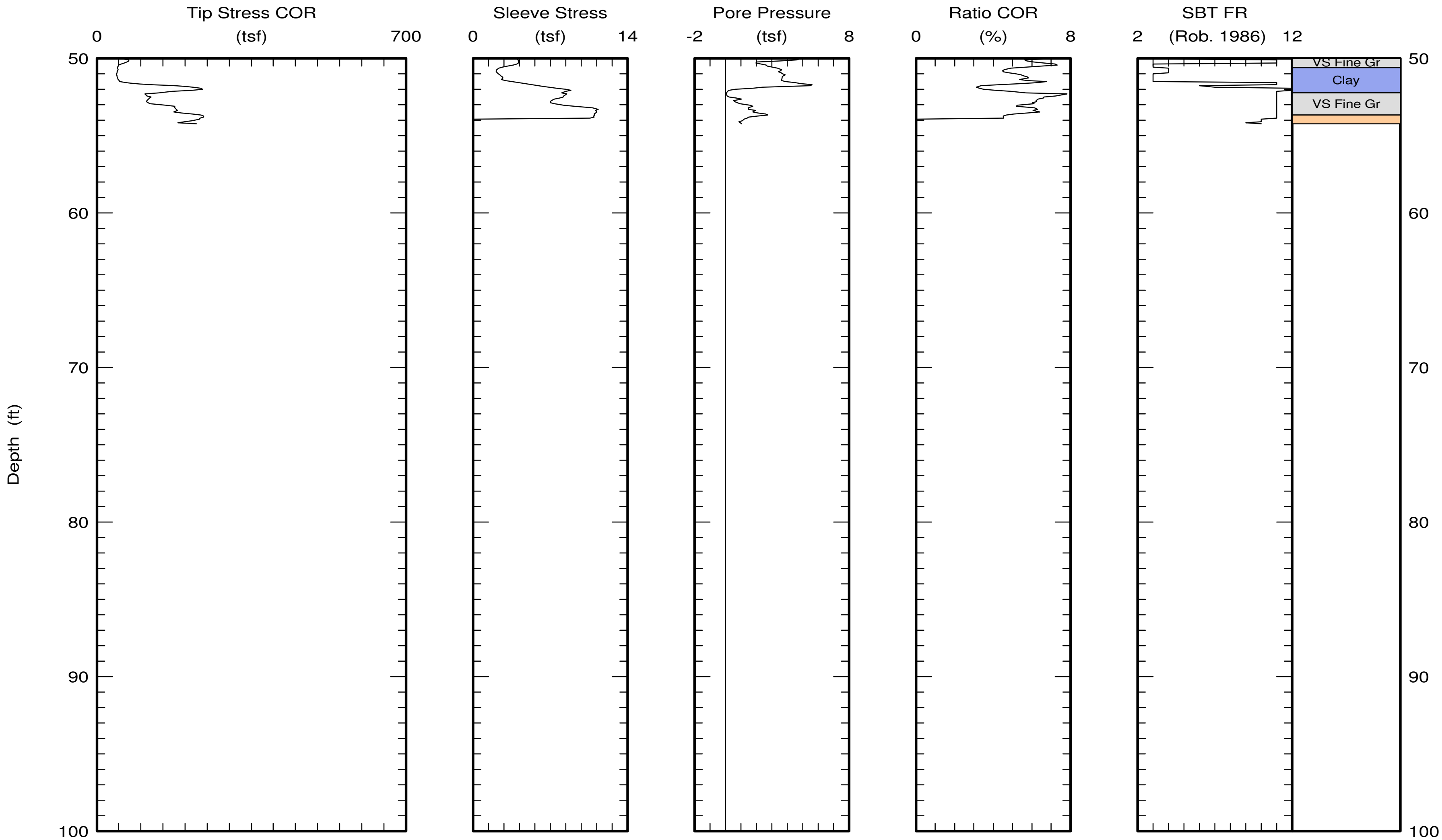
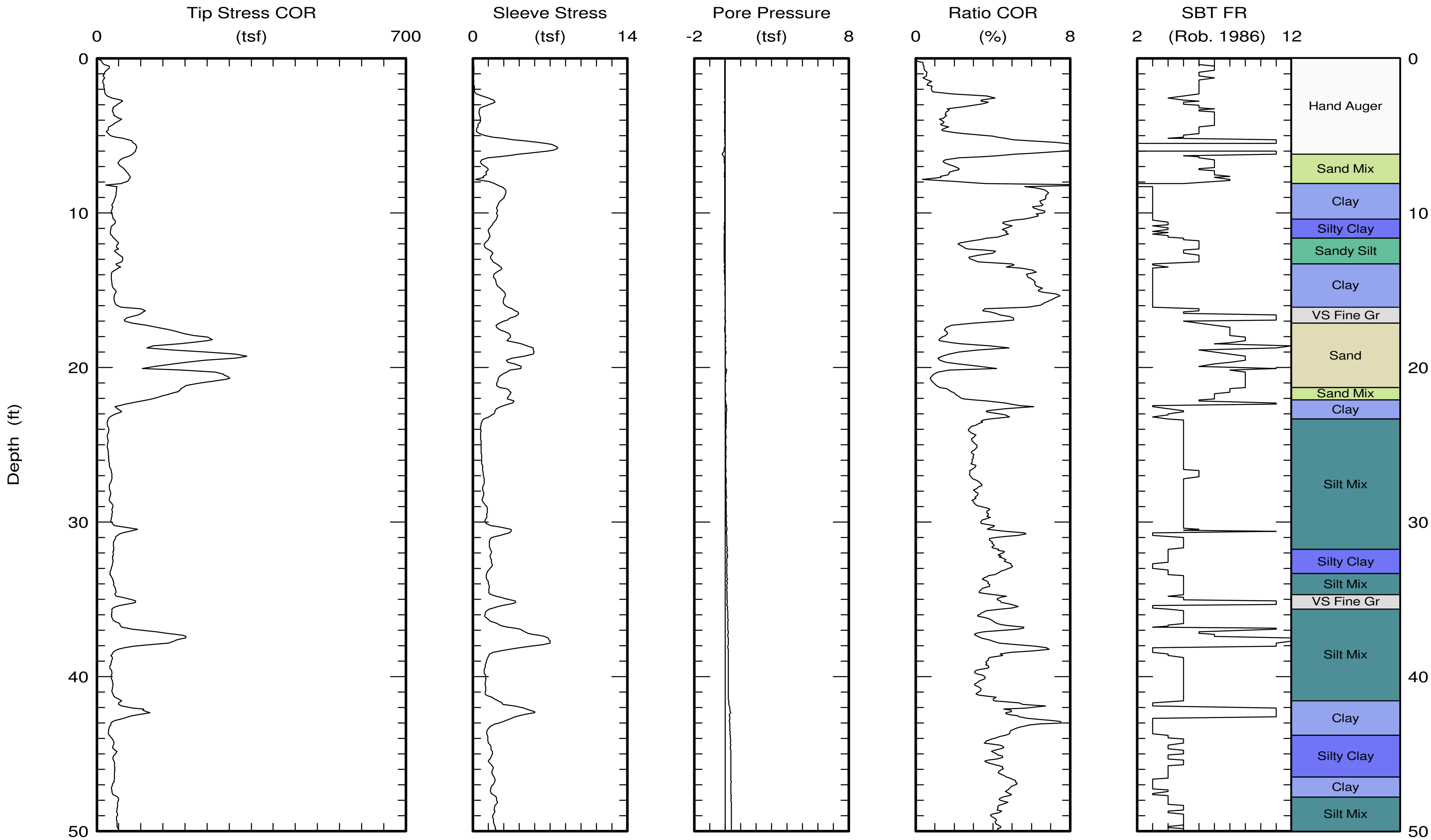
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



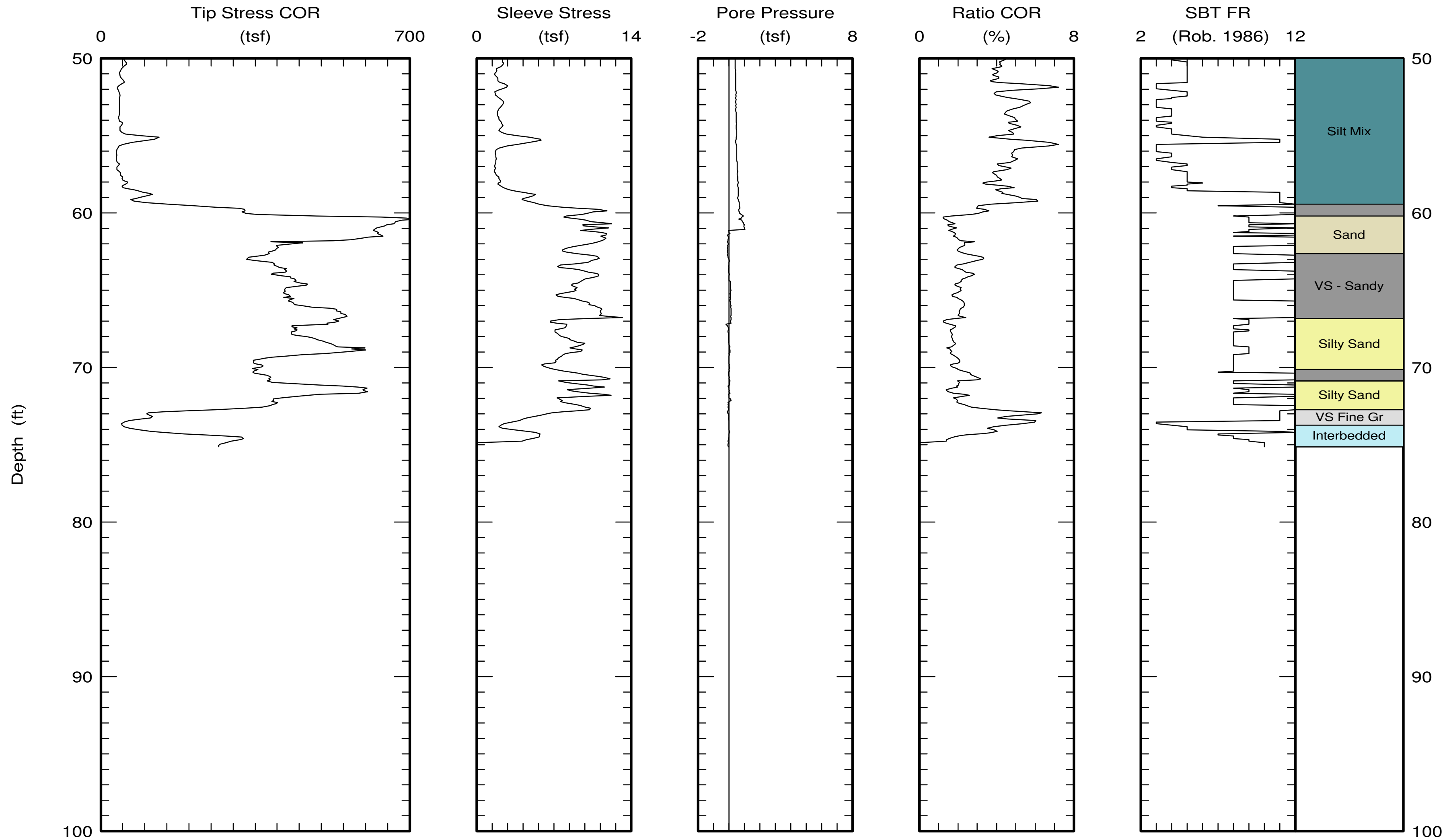
Maximum depth: 54.25 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C21 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.16 (ft)

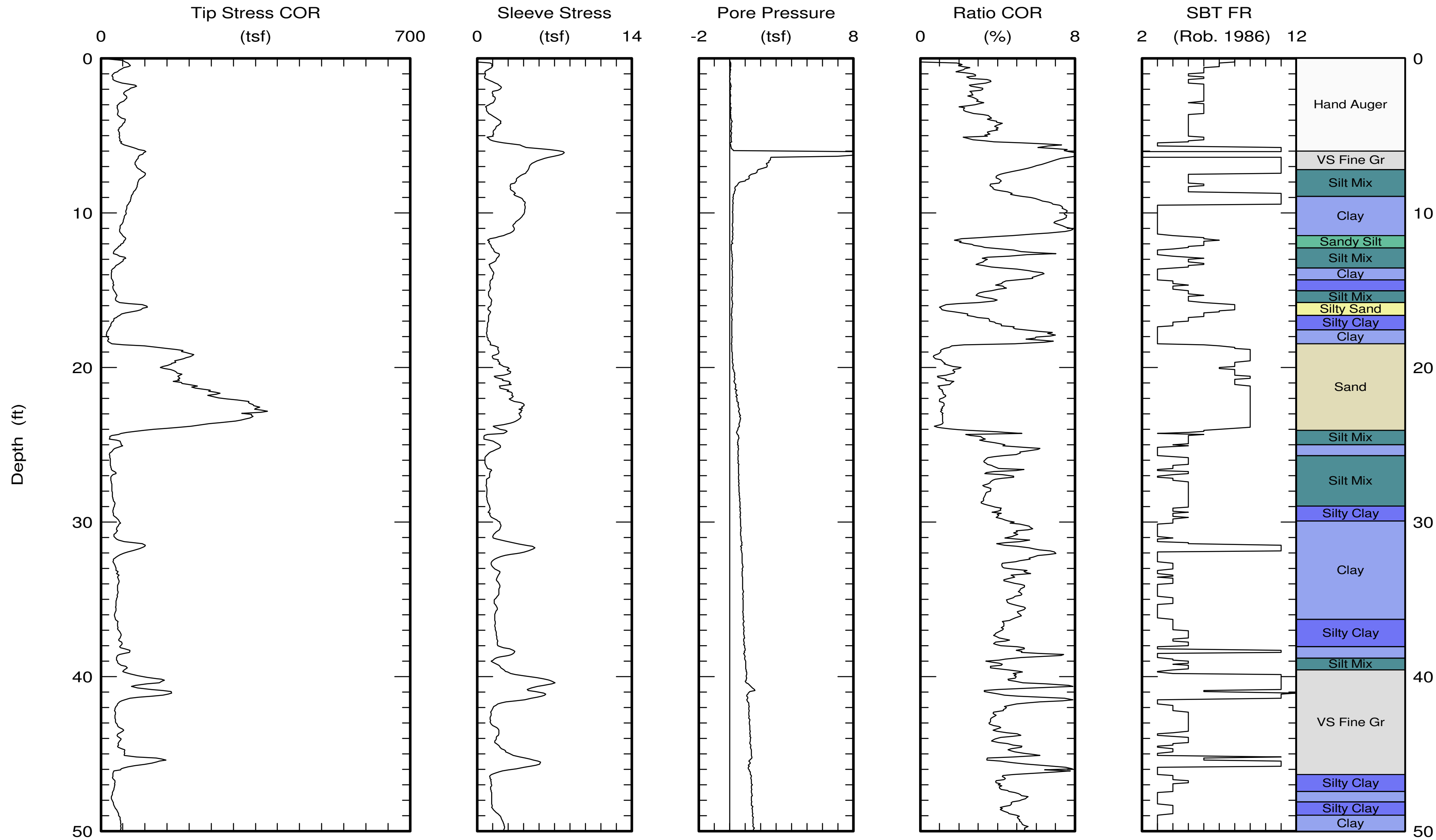
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 01/Feb/2011 Test ID: T4-C21 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.16 (ft)

Test ID: T4-C21
File: Z01F1102C.ECP

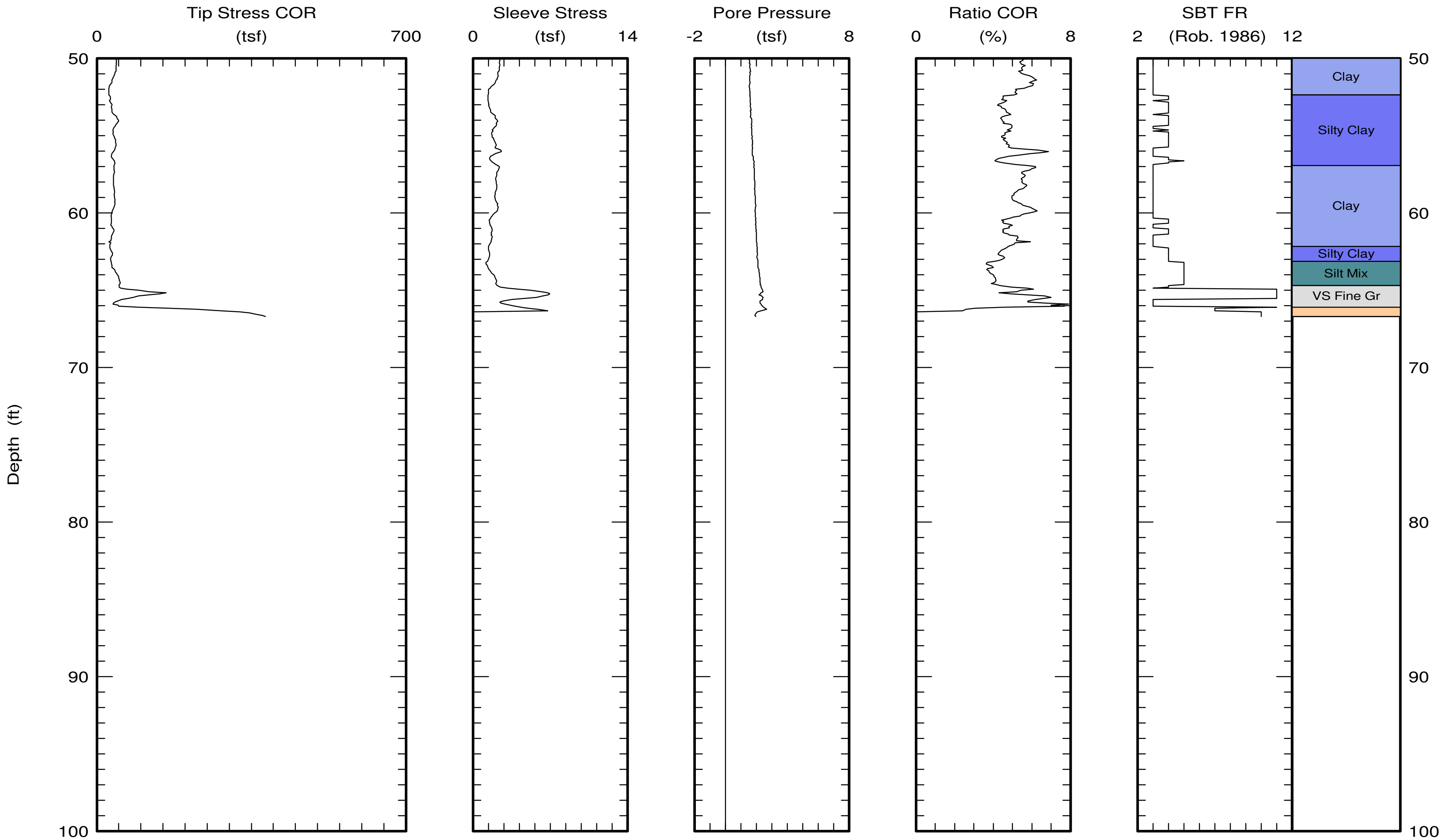
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C22 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 66.71 (ft)

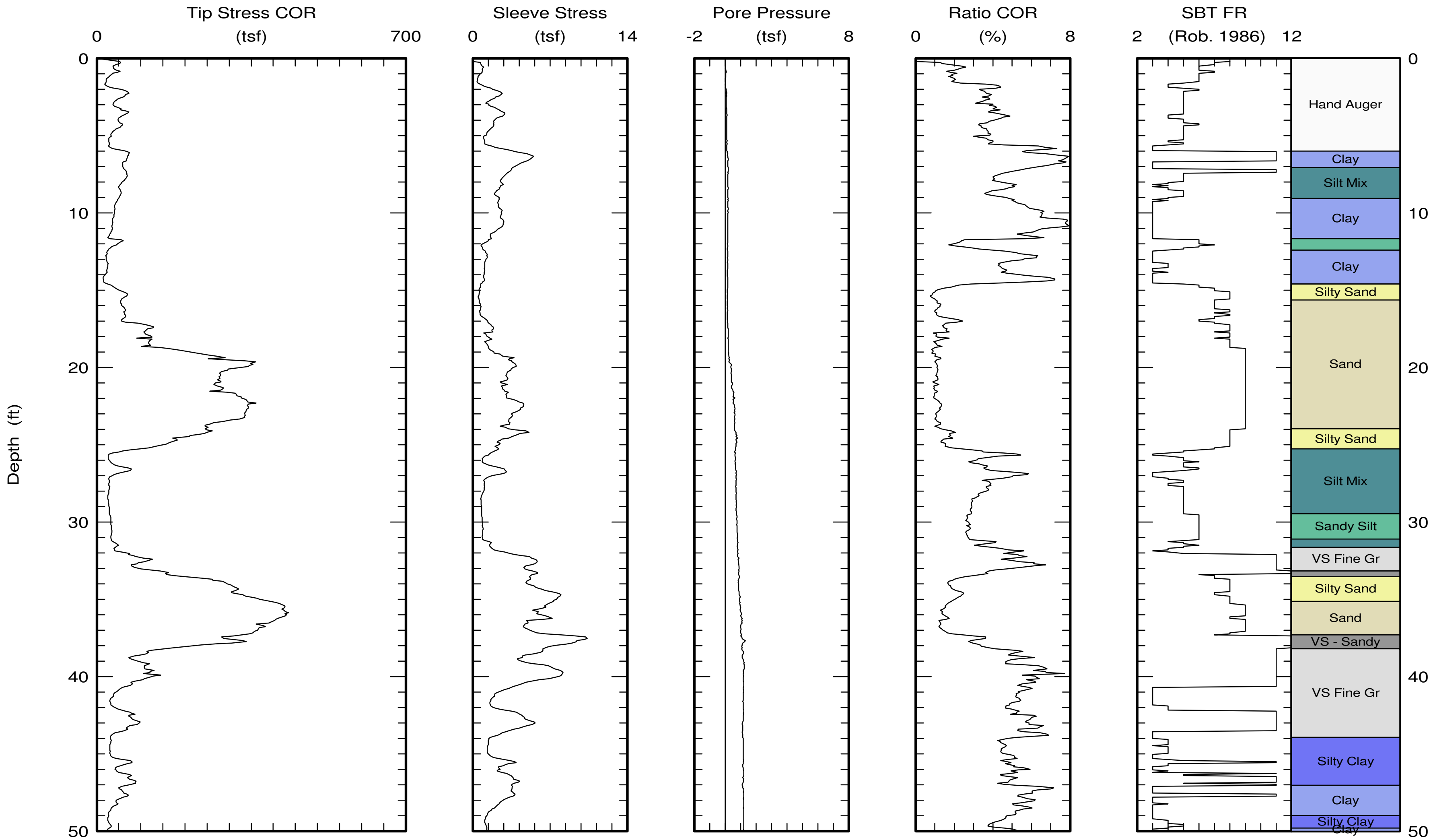
Test ID: T4-C22
File: Z03F1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C22 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 66.71 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C23 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.08 (ft)

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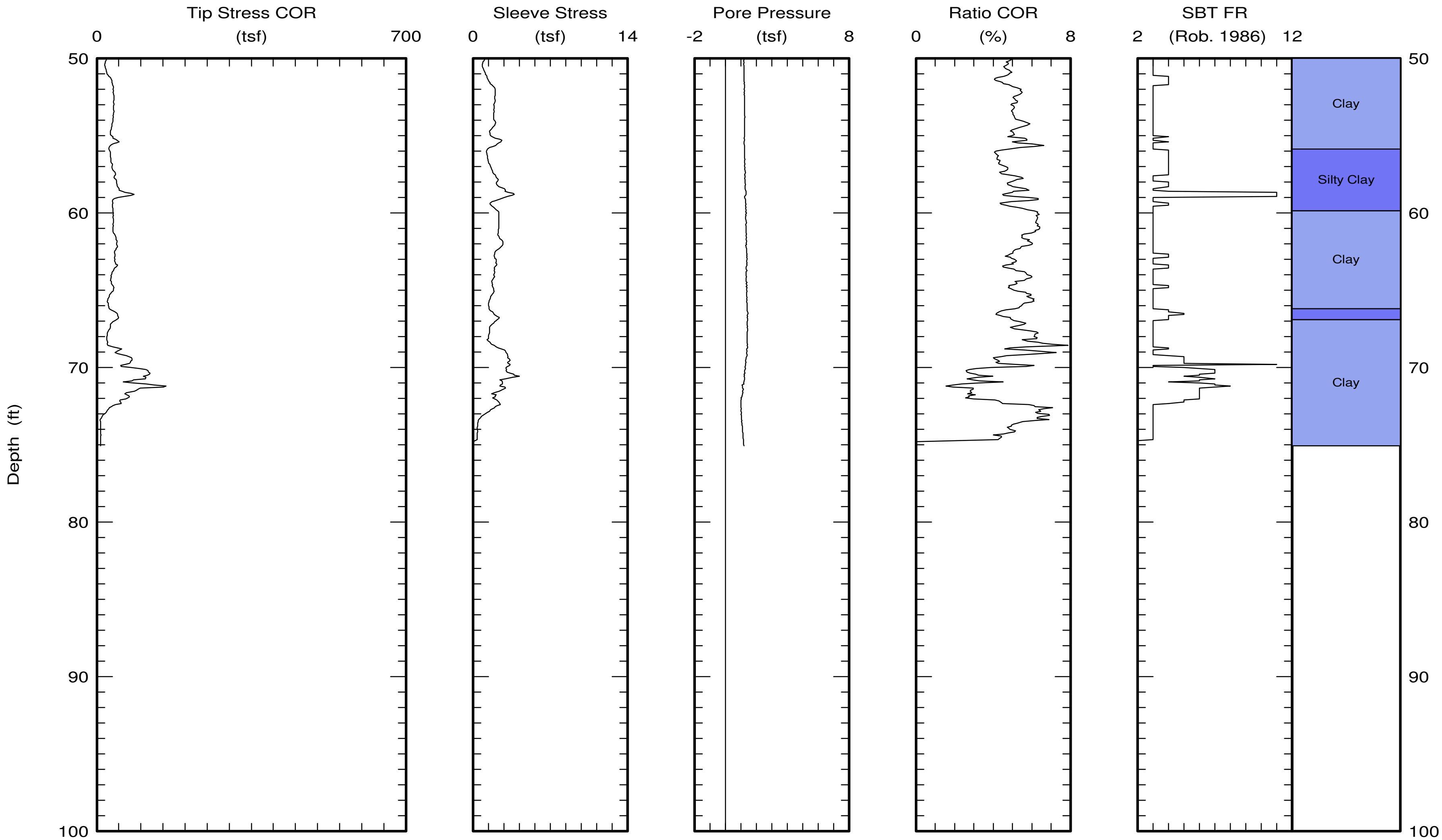
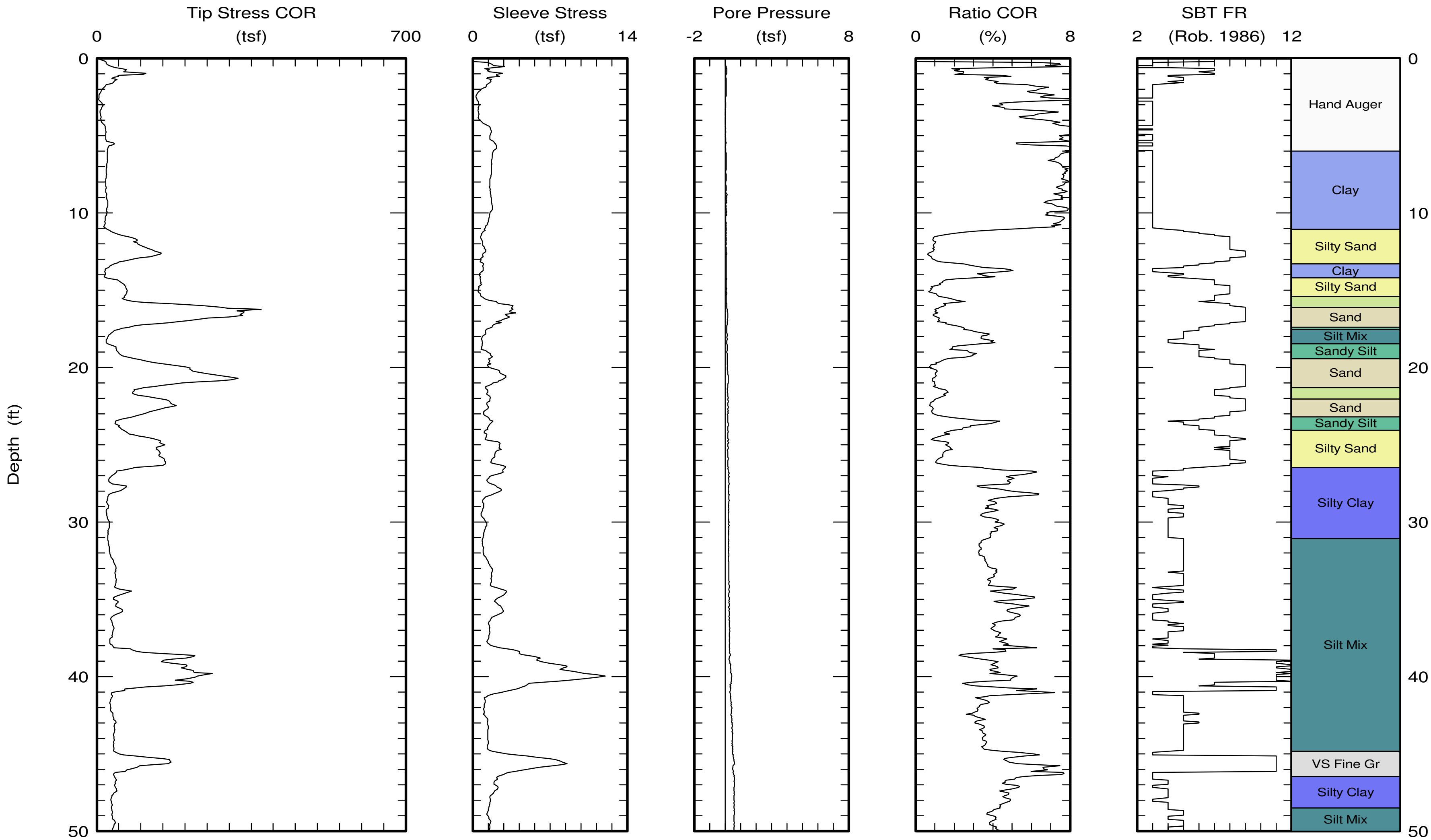
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C23 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.08 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 03/Feb/2011 Test ID: T4-C24 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 63.10 (ft)

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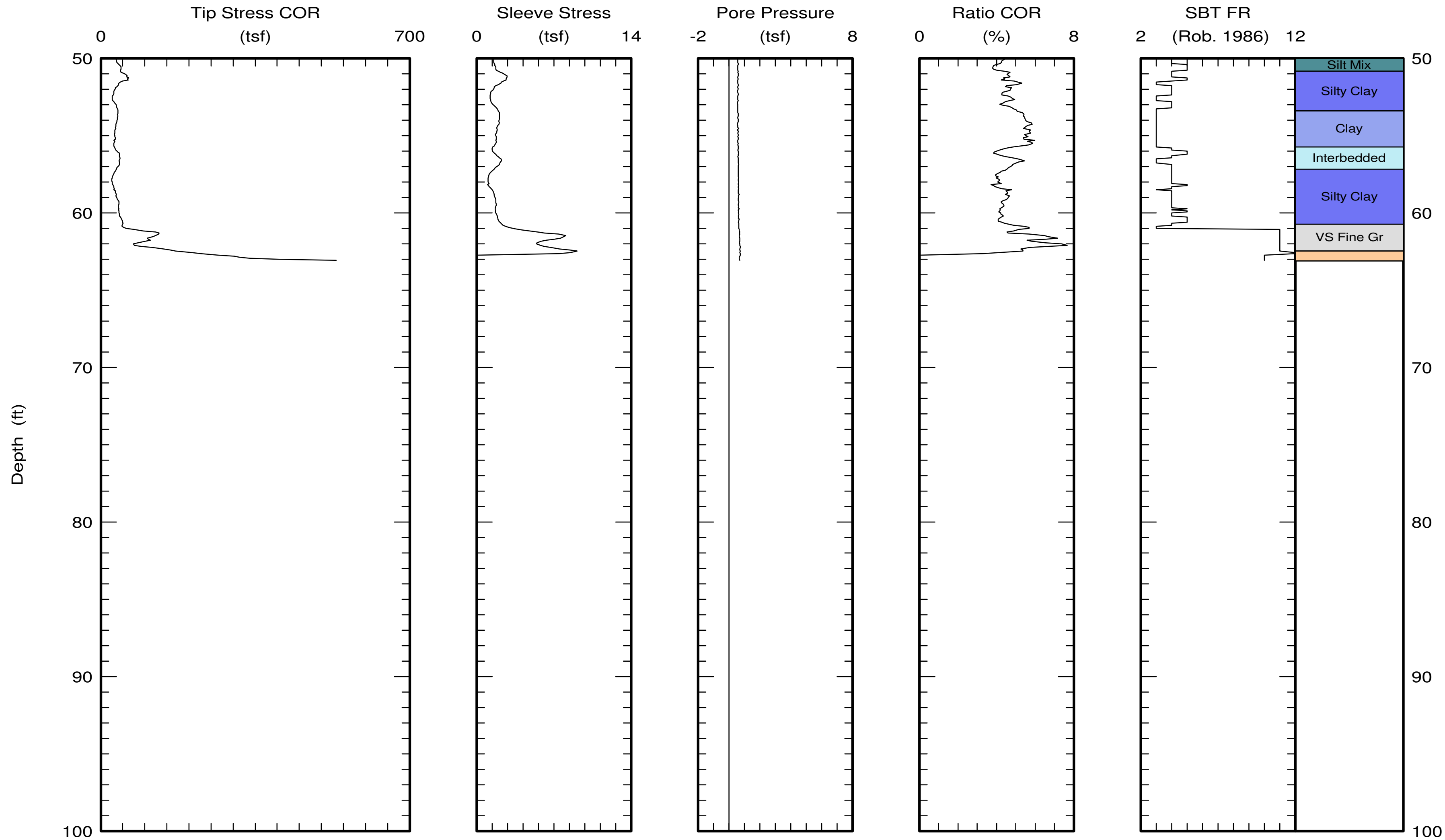
CPT Data
30 ton rig

Date: 03/Feb/2011
Test ID: T4-C24
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 63.10 (ft)
Page 2 of 2

Test ID: T4-C24
File: Z03F1104C.ECP

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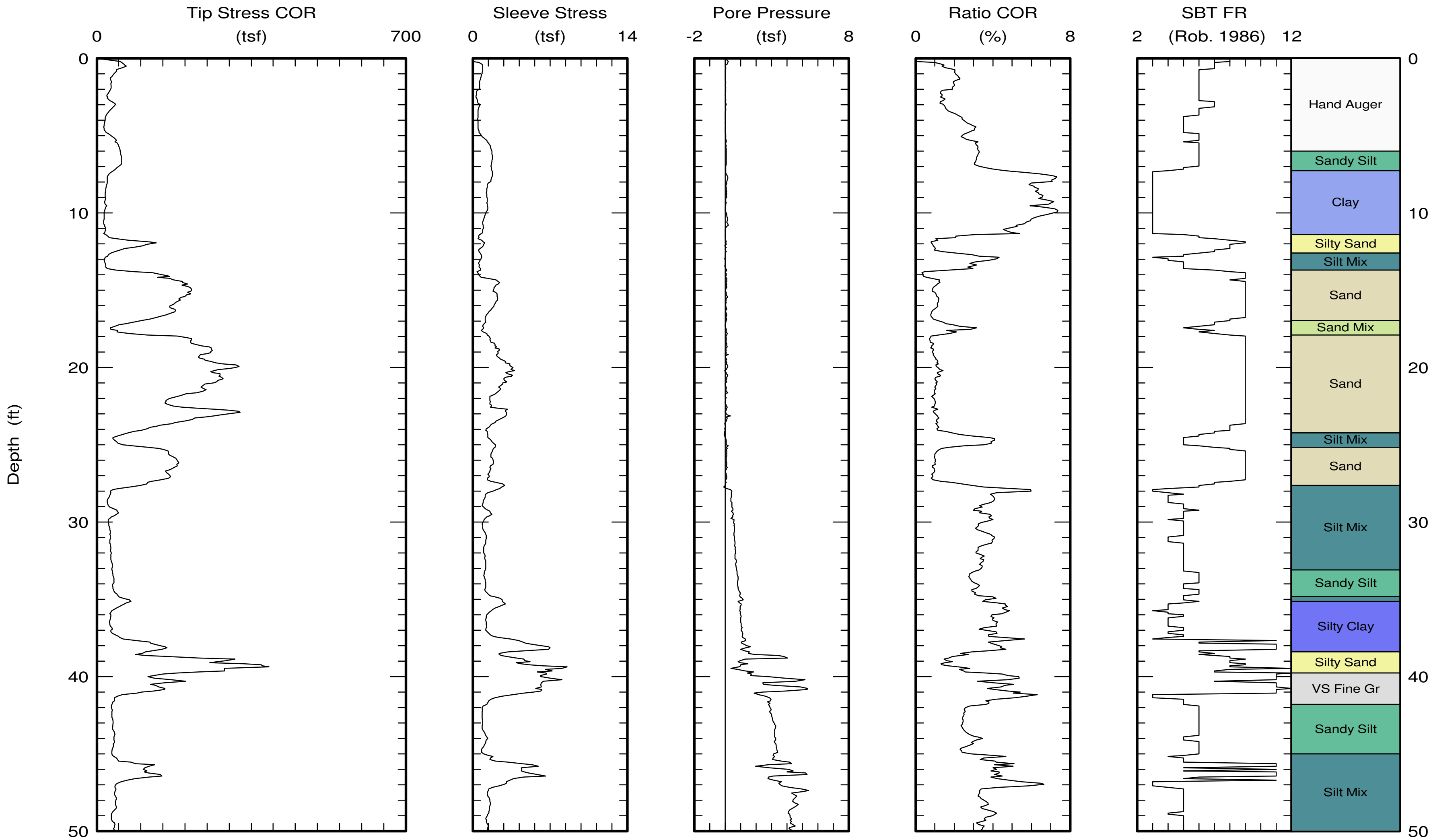
CPT Data
30 ton rig

Date: 26/Jan/2011
Test ID: T4-C25
Project: BeverlyHills

Customer: MACTEC Engineering & Consulting, Inc.
Job Site: Westside Subway Extension/Durant Drive



Maximum depth: 75.02 (ft)

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Test ID: T4-C25
File: Z26J1103C.ECP

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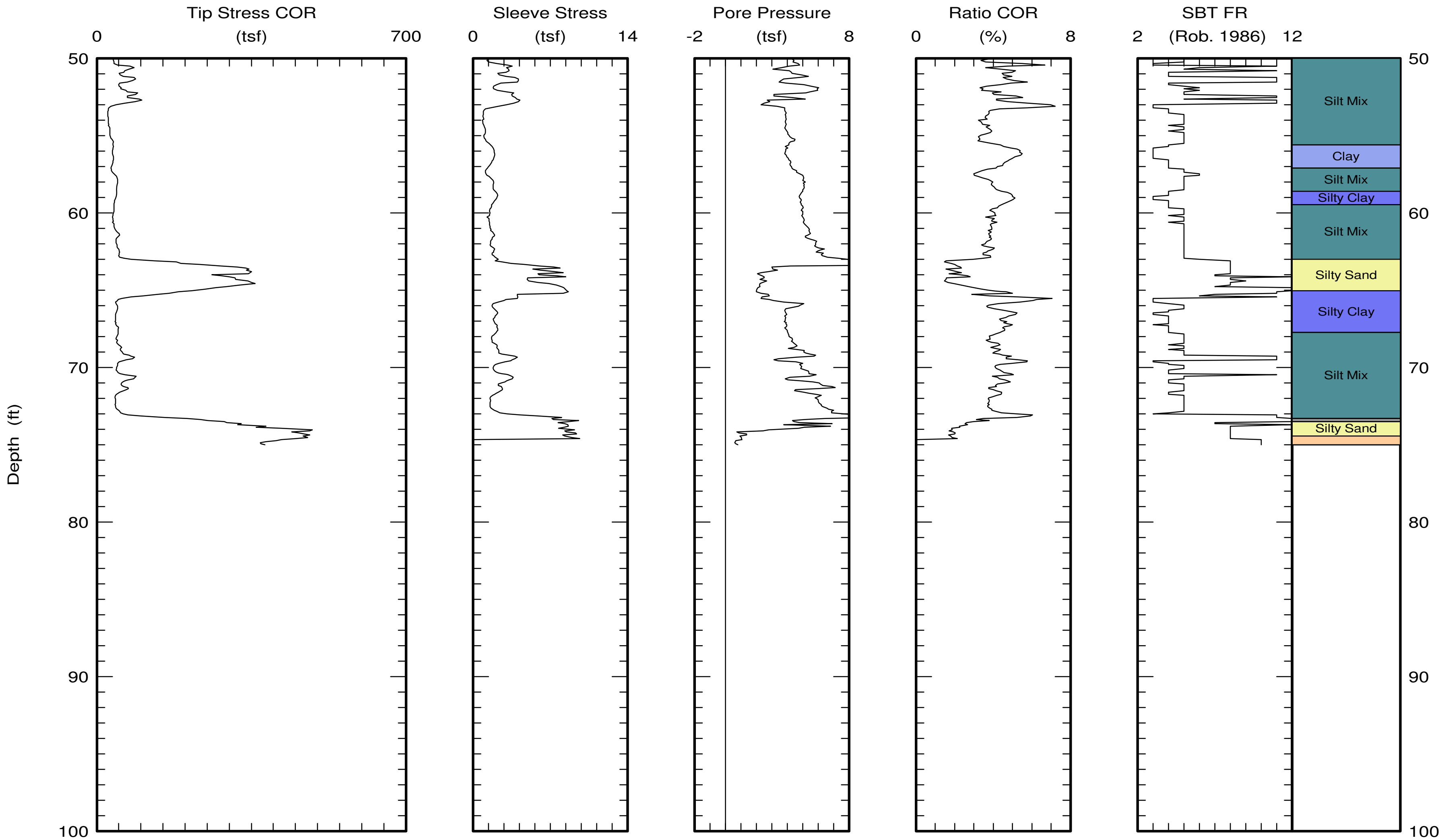
www.kehoetesting.com

CPT Data
30 ton rig

Date: 26/Jan/2011
Test ID: T4-C25
Project: BeverlyHills

Customer: MACTEC Engineering & Consulting, Inc.
Job Site: Westside Subway Extension/Durant Drive



Maximum depth: 75.02 (ft)
Page 2 of 2

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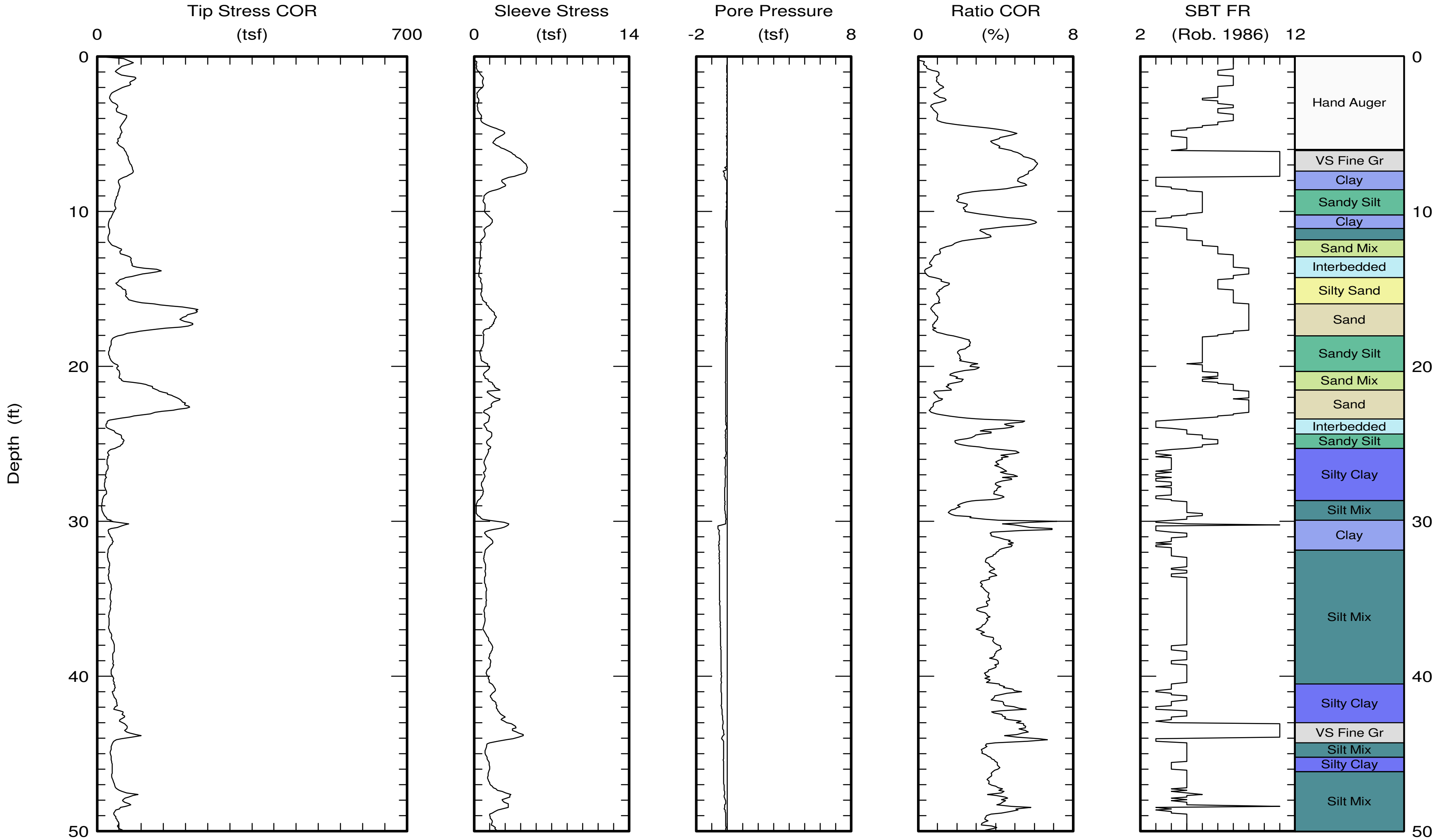
www.kehoetesting.com

CPT Data
30 ton rig

Date: 26/Jan/2011
Test ID: T4-C26
Project: BeverlyHills

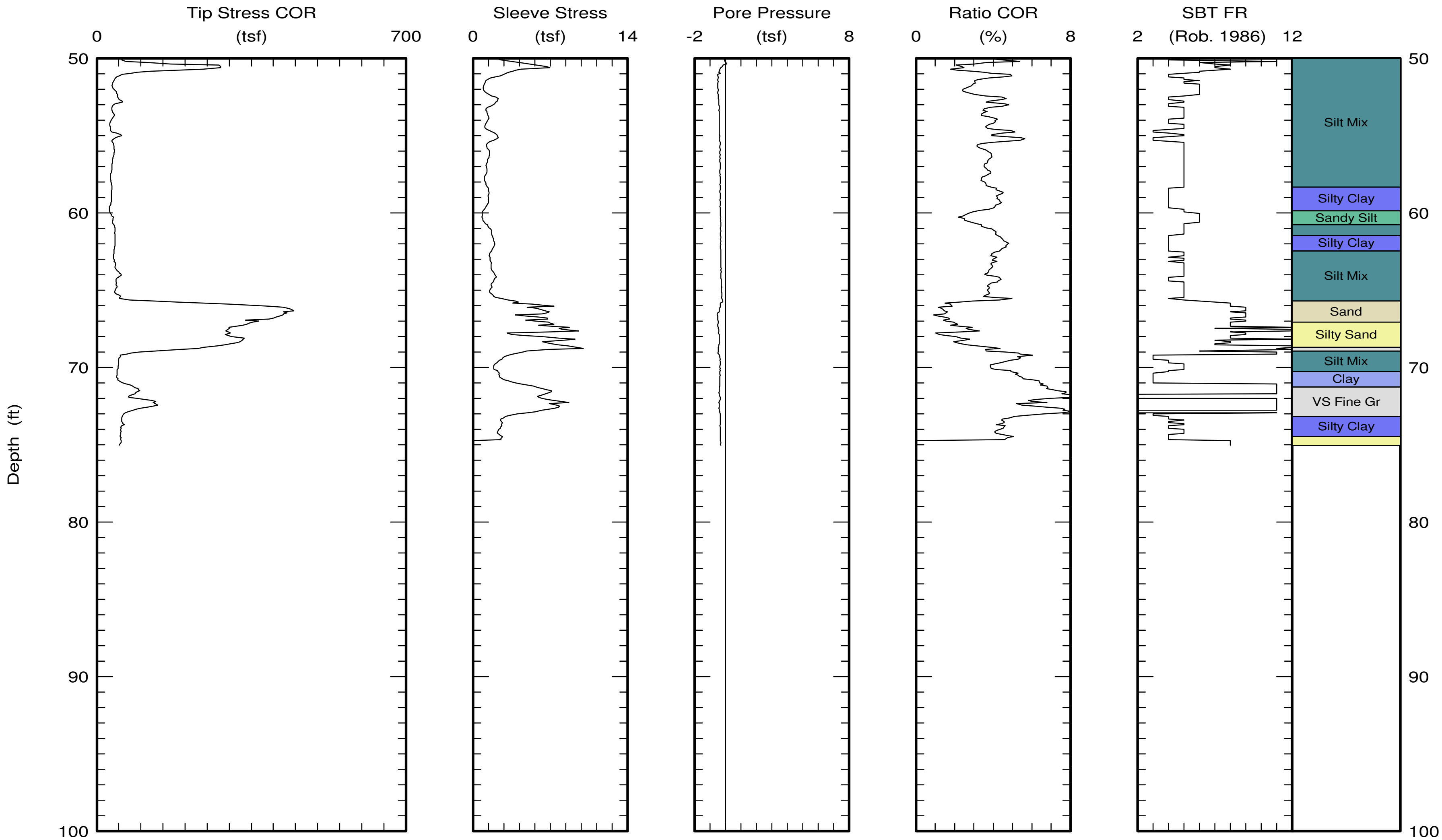
Customer: MACTEC
Job Site: Westside Subway Extension/Durant Drive



Maximum depth: 75.06 (ft)

Test ID: T4-C26
File: Z26J1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Jan/2011 Test ID: T4-C26 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 75.06 (ft)

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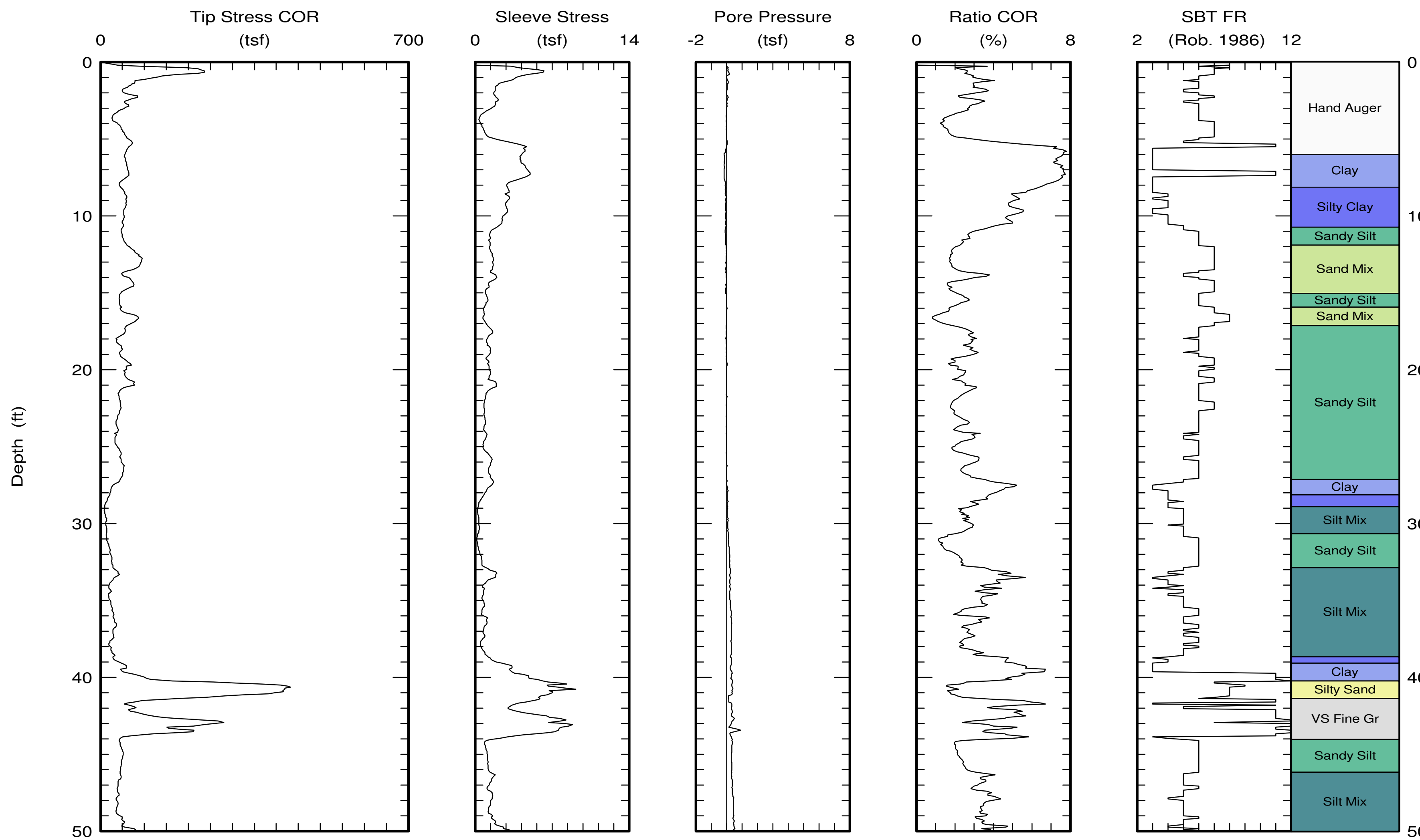
Test ID: T4-C26
File: Z26J1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Jan/2011 Test ID: T4-C27 Project: BeverlyHills
	Customer: MACTEC Engineering & Consulting, Inc. Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 75.04 (ft)

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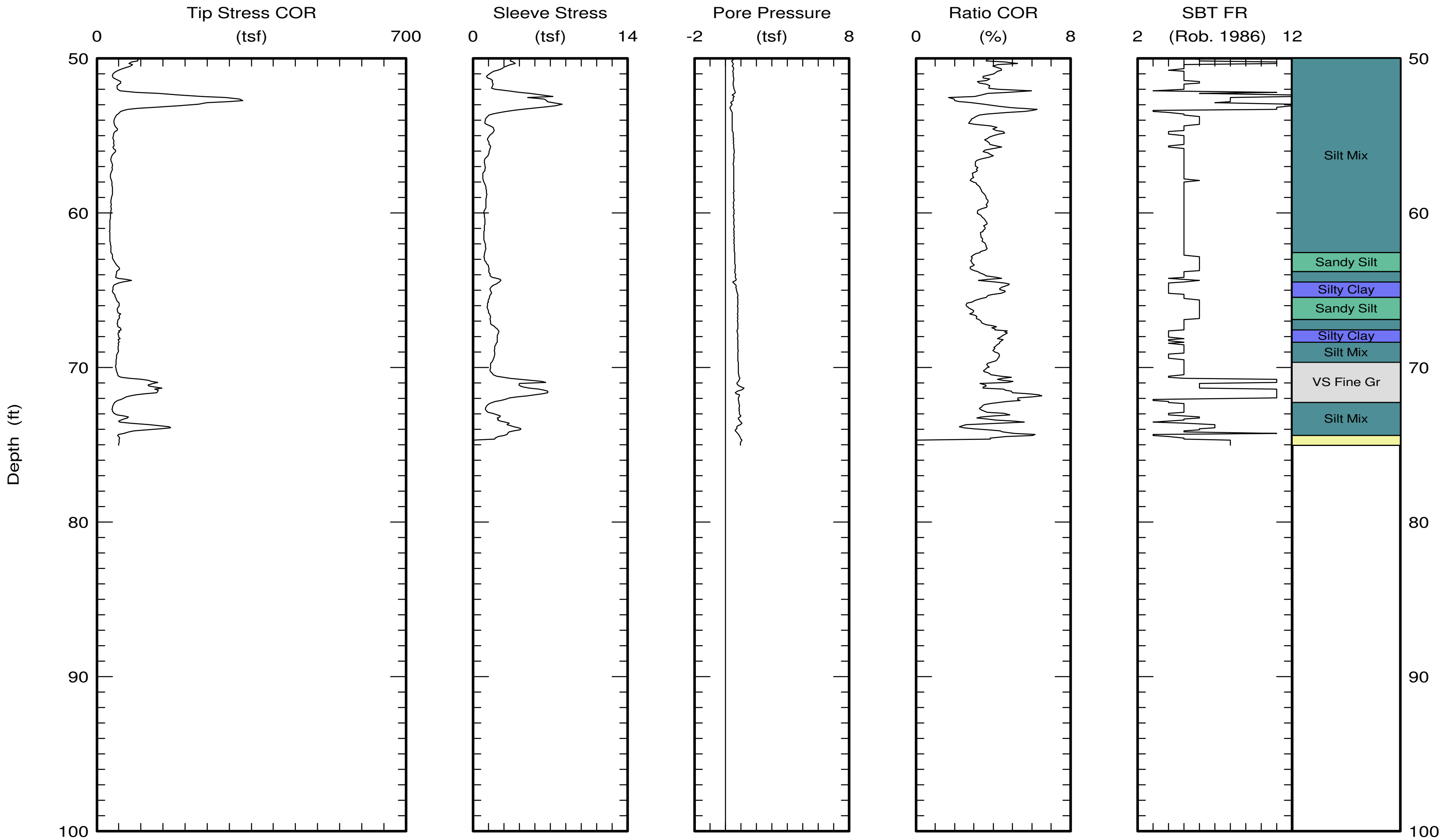
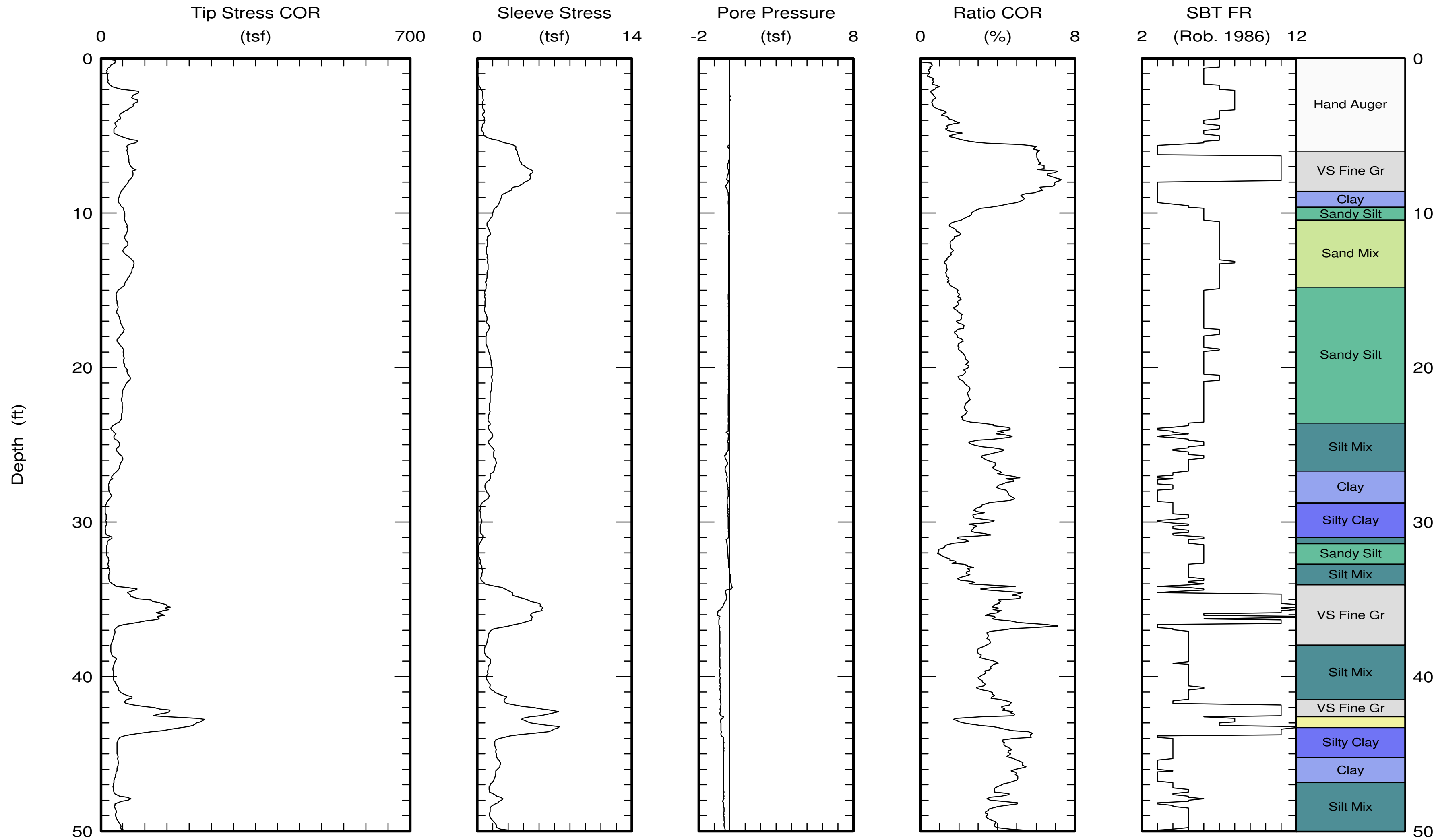
www.kehoetesting.com

CPT Data 30 ton rig	Date: 26/Jan/2011 Test ID: T4-C27 Project: BeverlyHills
Customer: MACTEC Engineering & Consulting, Inc. Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 75.04 (ft)
Page 2 of 2

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 27/Jan/2011 Test ID: T4-C28 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Drive	



Maximum depth: 75.08 (ft)

Test ID: T4-C28
File: Z27J1101C.ECP

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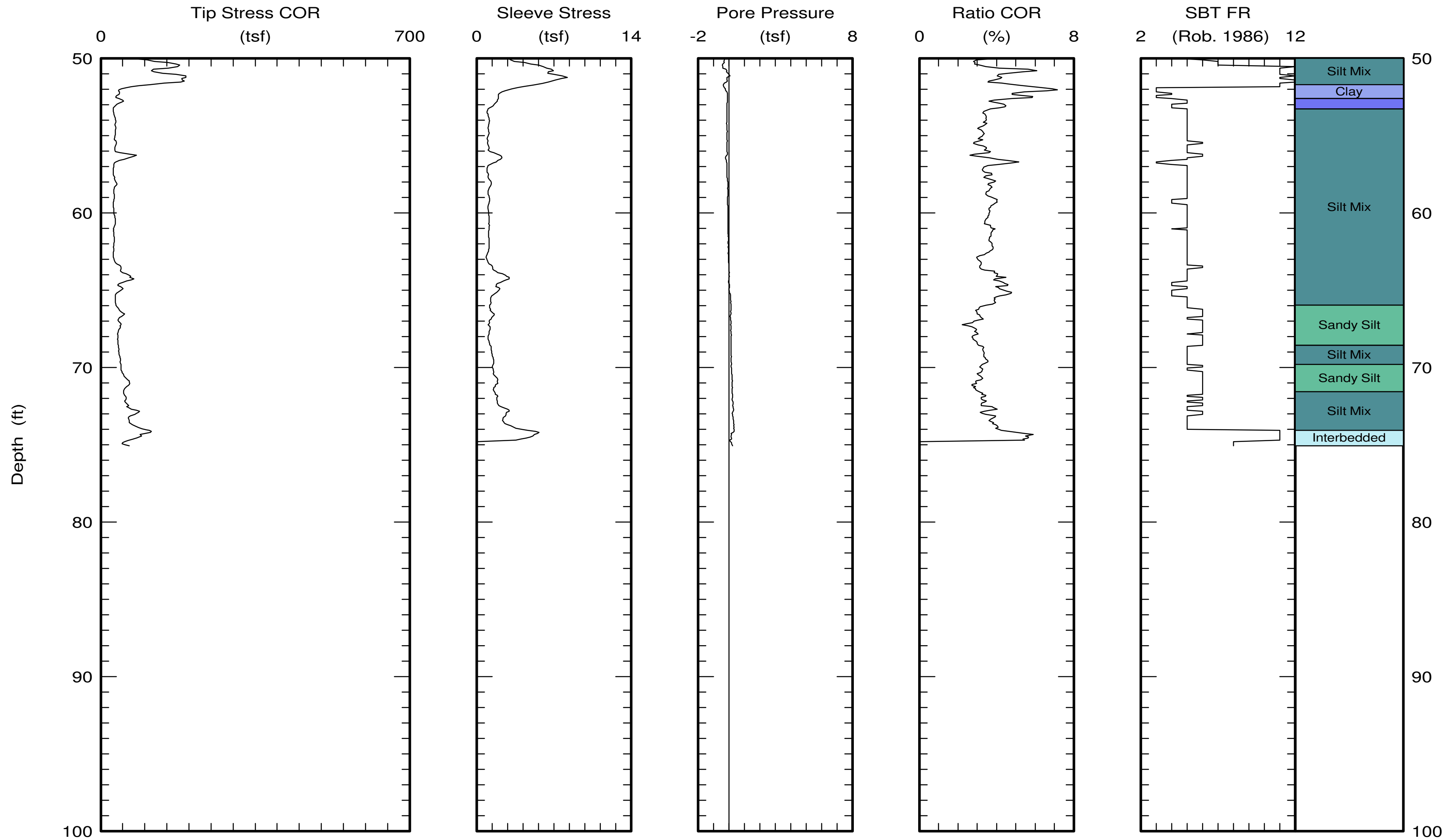
www.kehoetesting.com

CPT Data
30 ton rig

Date: 27/Jan/2011
Test ID: T4-C28
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Drive



Maximum depth: 75.08 (ft)
Page 2 of 2

Test ID: T4-C28
File: Z27J1101C.ECP

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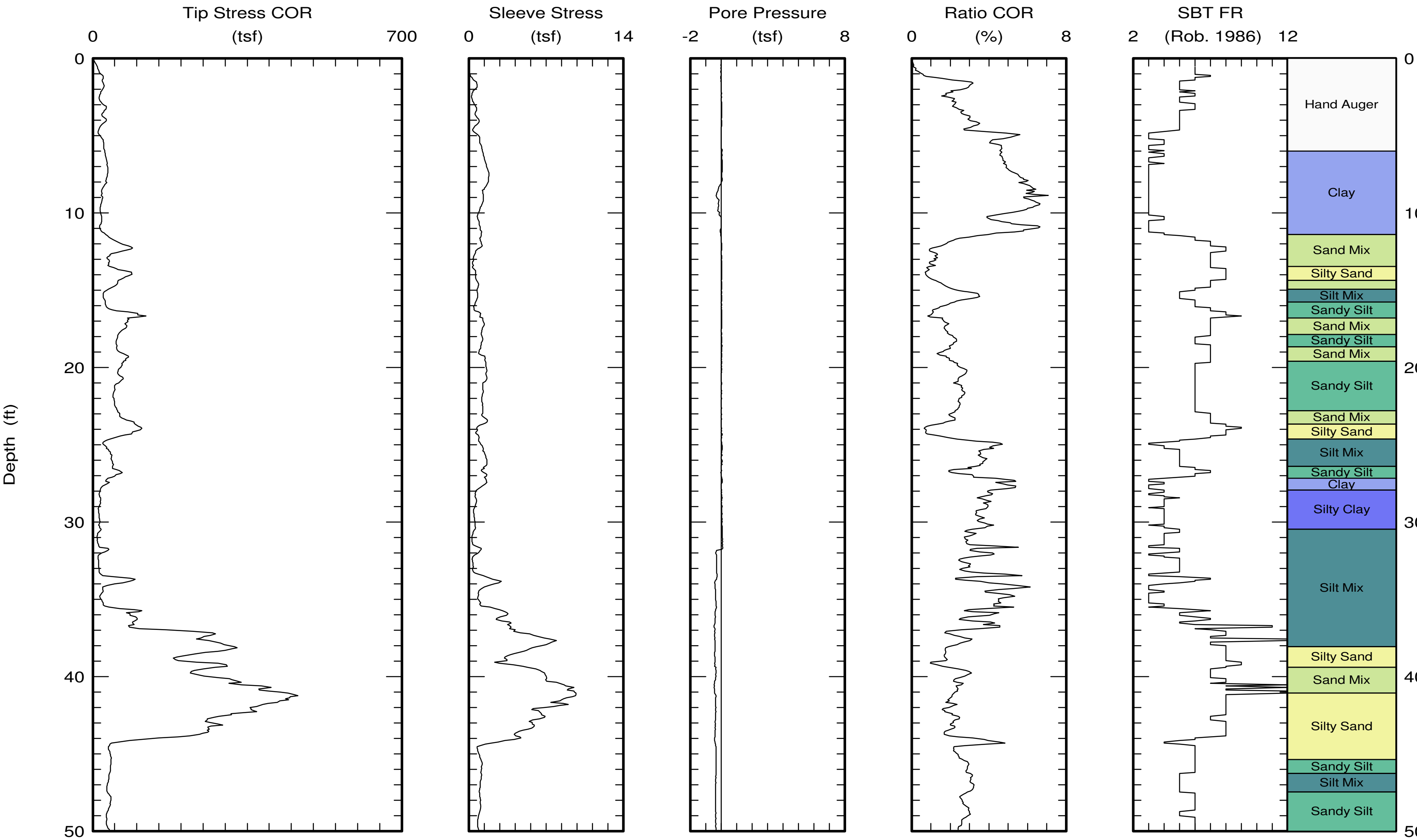
www.kehoetesting.com

CPT Data
30 ton rig

Date: 27/Jan/2011
Test ID: T4-C29
Project: BeverlyHills

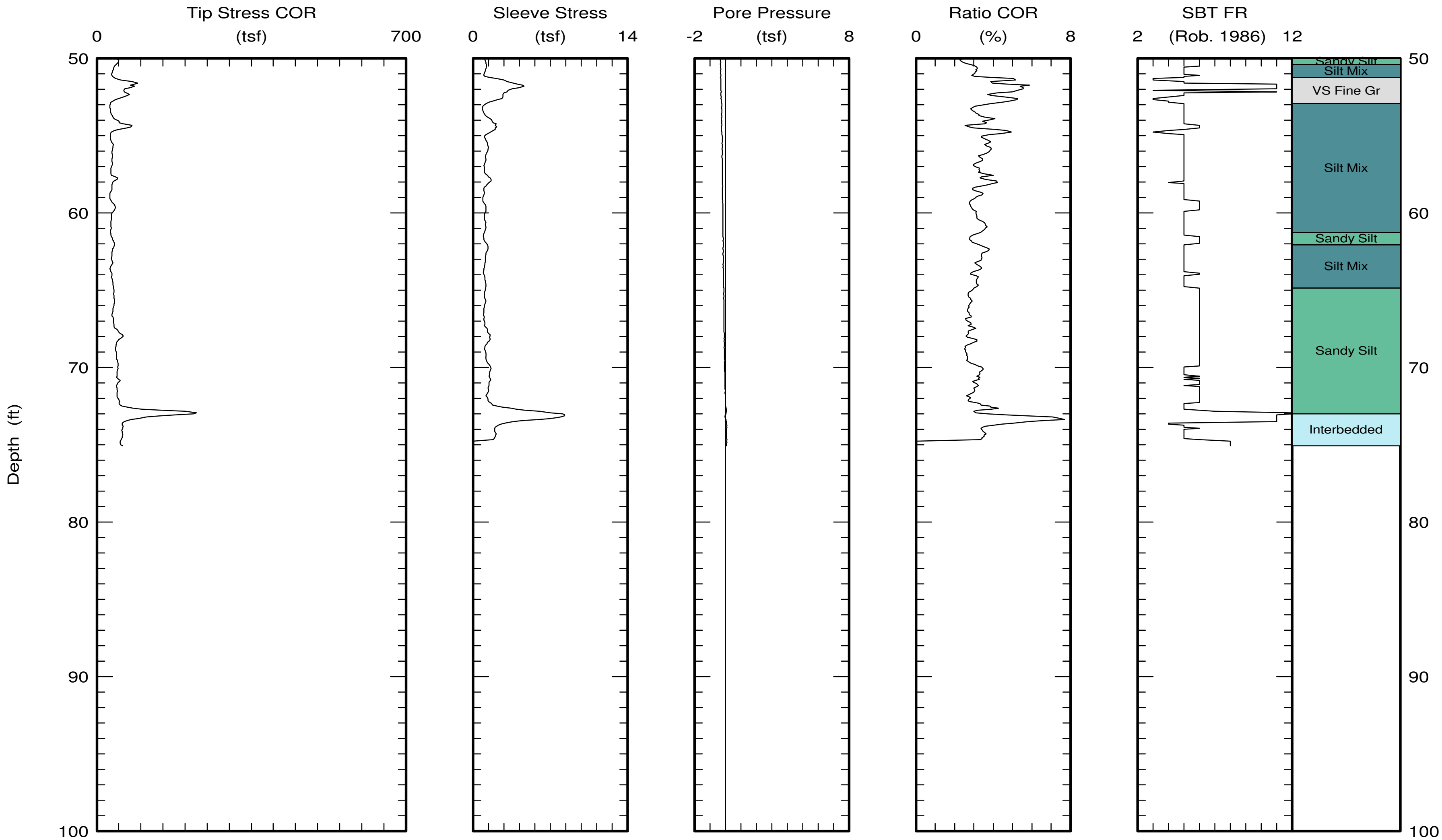
Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.07 (ft)

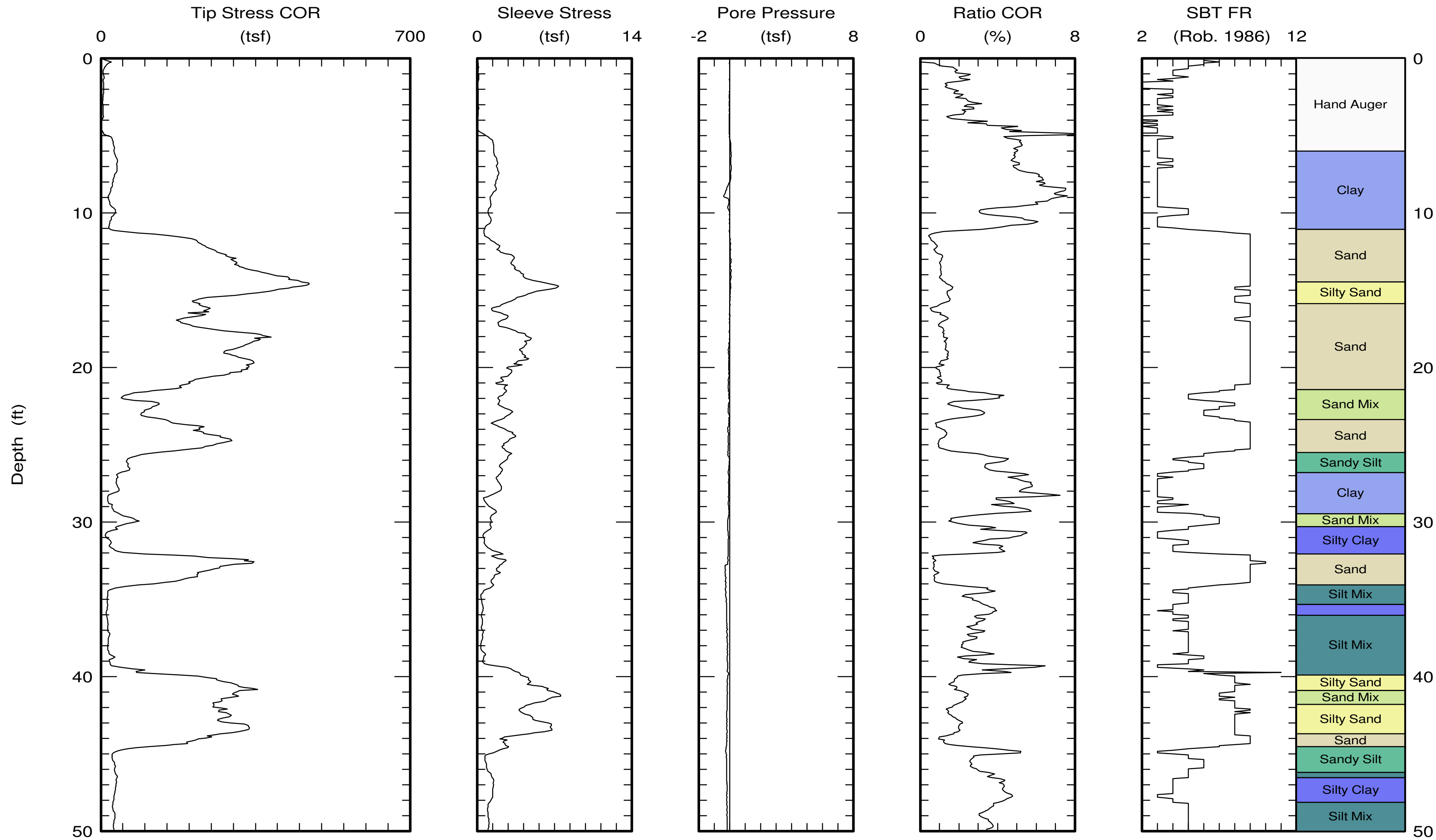
Page 1 of 2

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 27/Jan/2011 Test ID: T4-C29 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.07 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 27/Jan/2011 Test ID: T4-C30 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.06 (ft)

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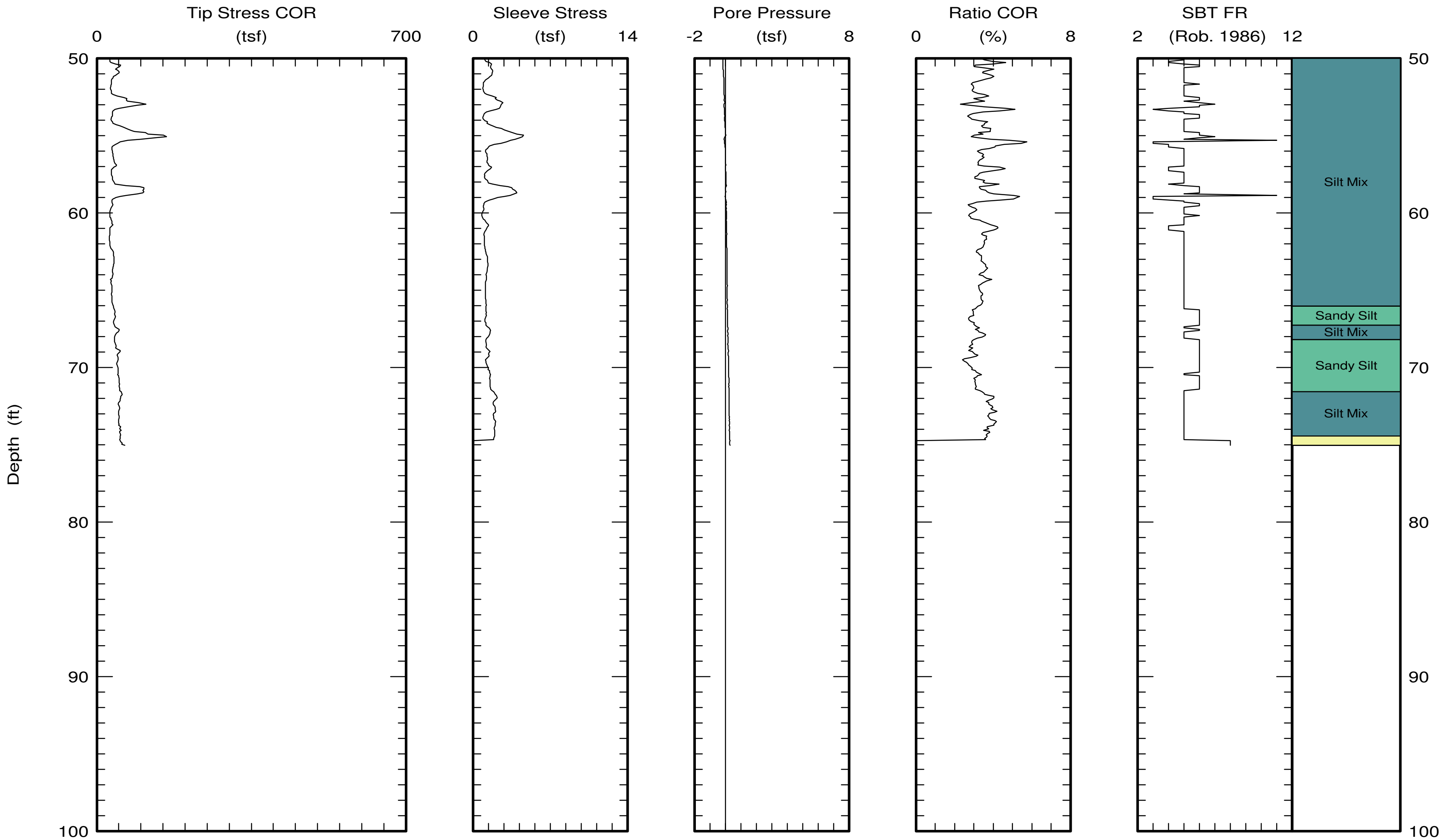
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 27/Jan/2011 Test ID: T4-C30 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.06 (ft)

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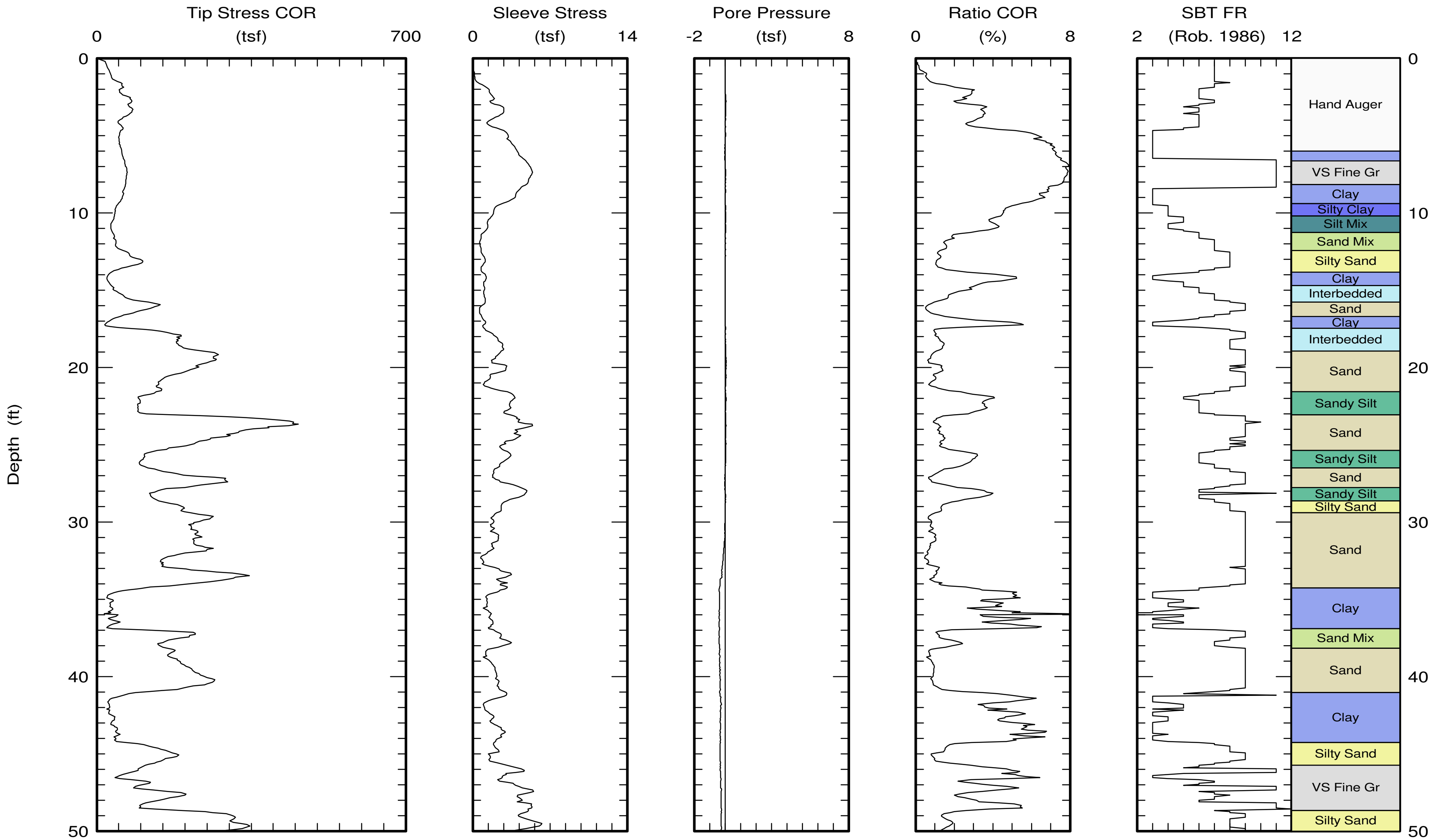
Kehoe Testing & Engineering	CPT Data	Date: 27/Jan/2011
Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	30 ton rig	Test ID: T4-C31 Project: BeverlyHills
	Customer: MACTEC Job Site: Westside Subway Extension/Durant Dr.	



Maximum depth: 75.01 (ft)

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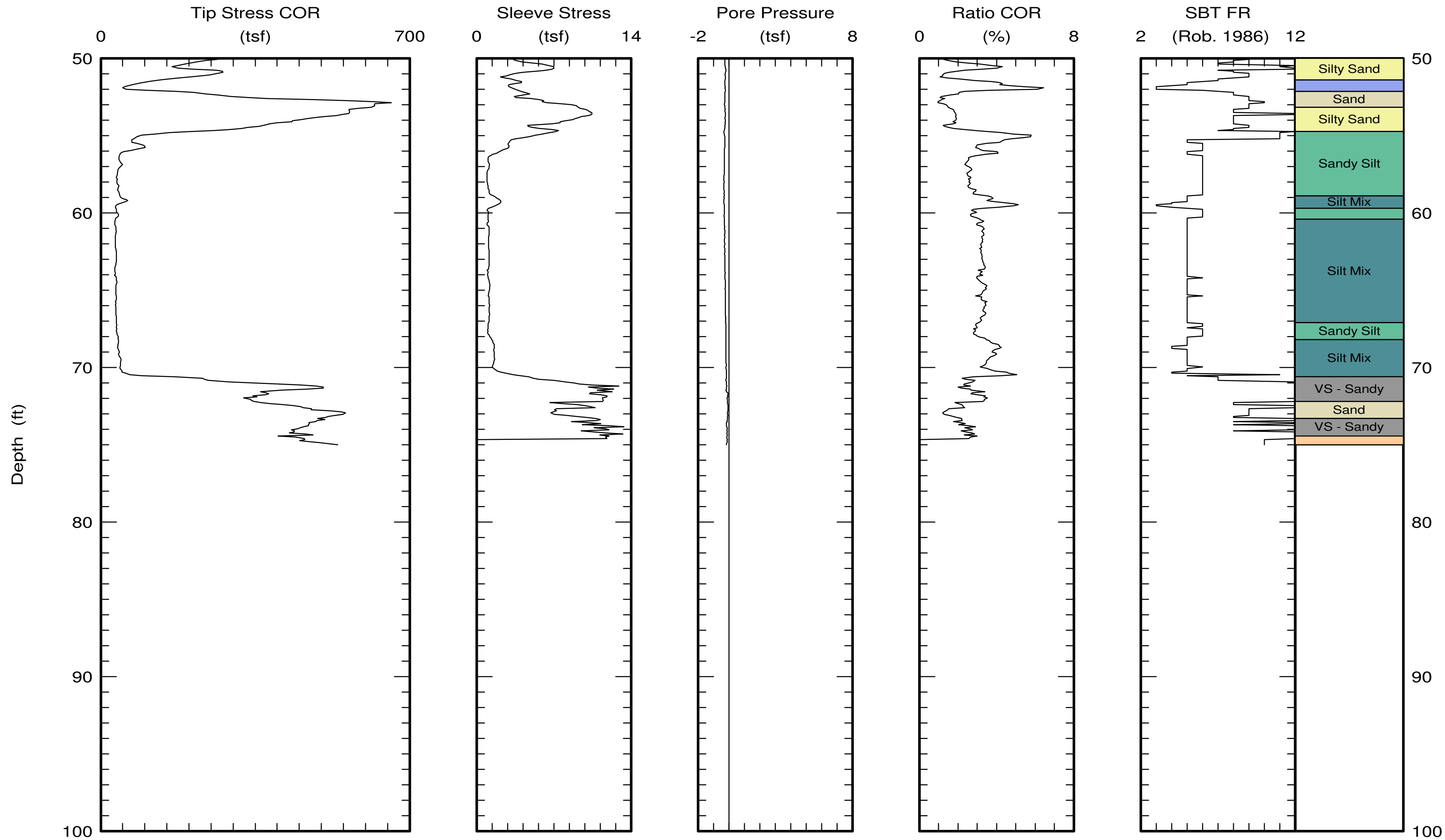
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

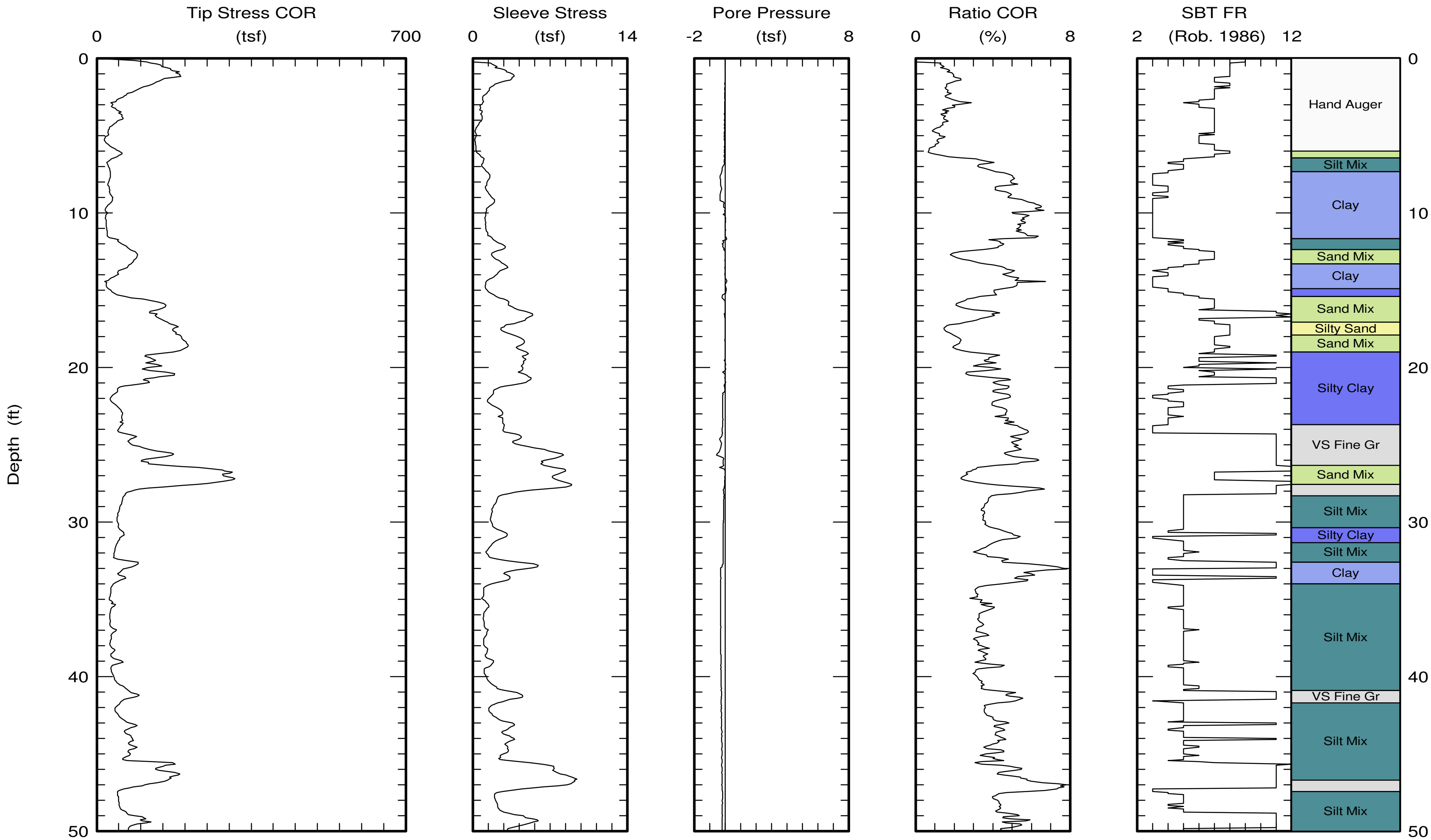
Date: 27/Jan/2011
Test ID: T4-C31
Project: BeverlyHills

Customer: MACTEC
Job Site: Westside Subway Extension/Durant Dr.



Maximum depth: 75.01 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C1 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



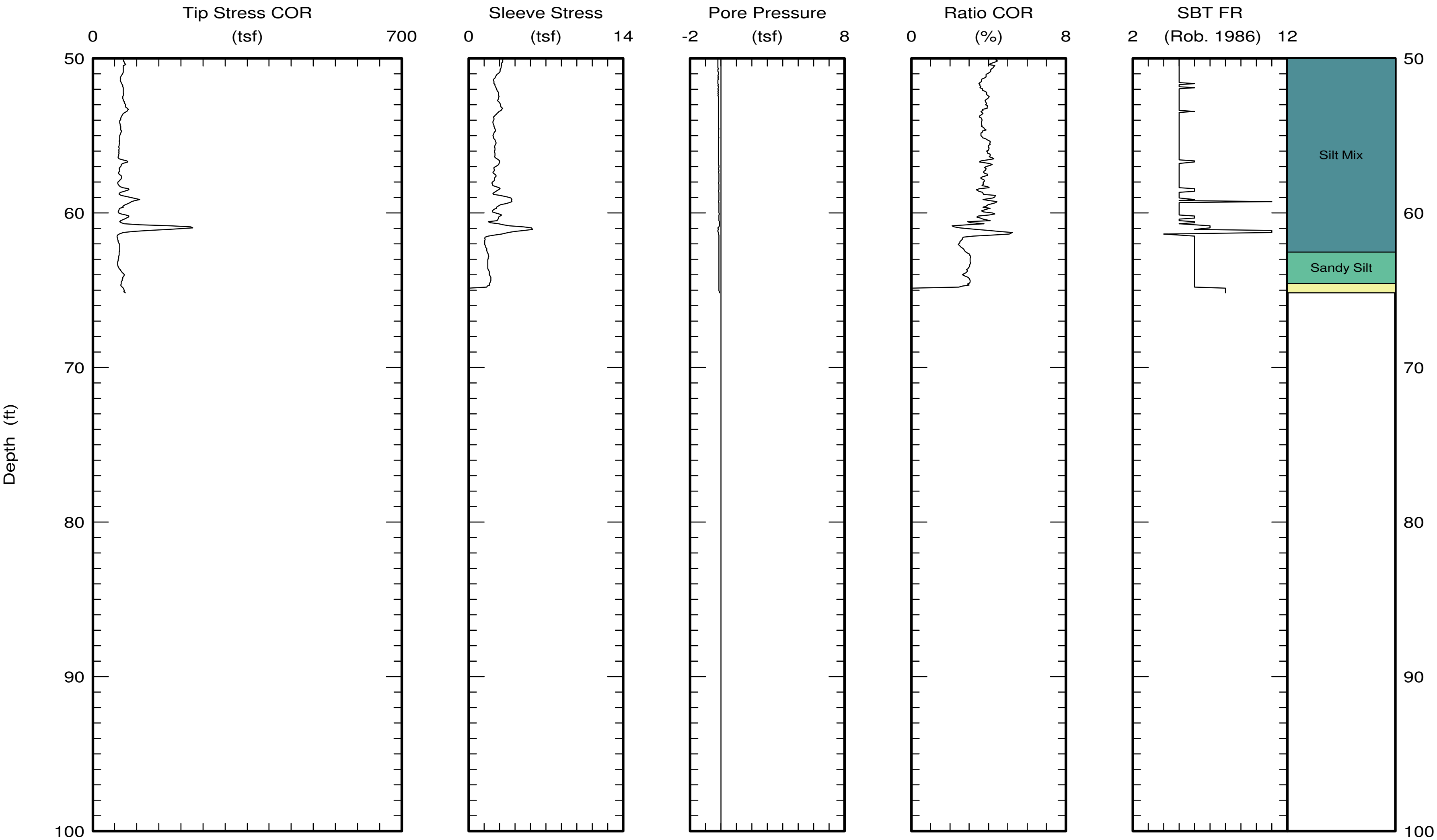
Maximum depth: 65.19 (ft)

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 14/May/2011
Test ID: T7-C1
Project: LosAngeles

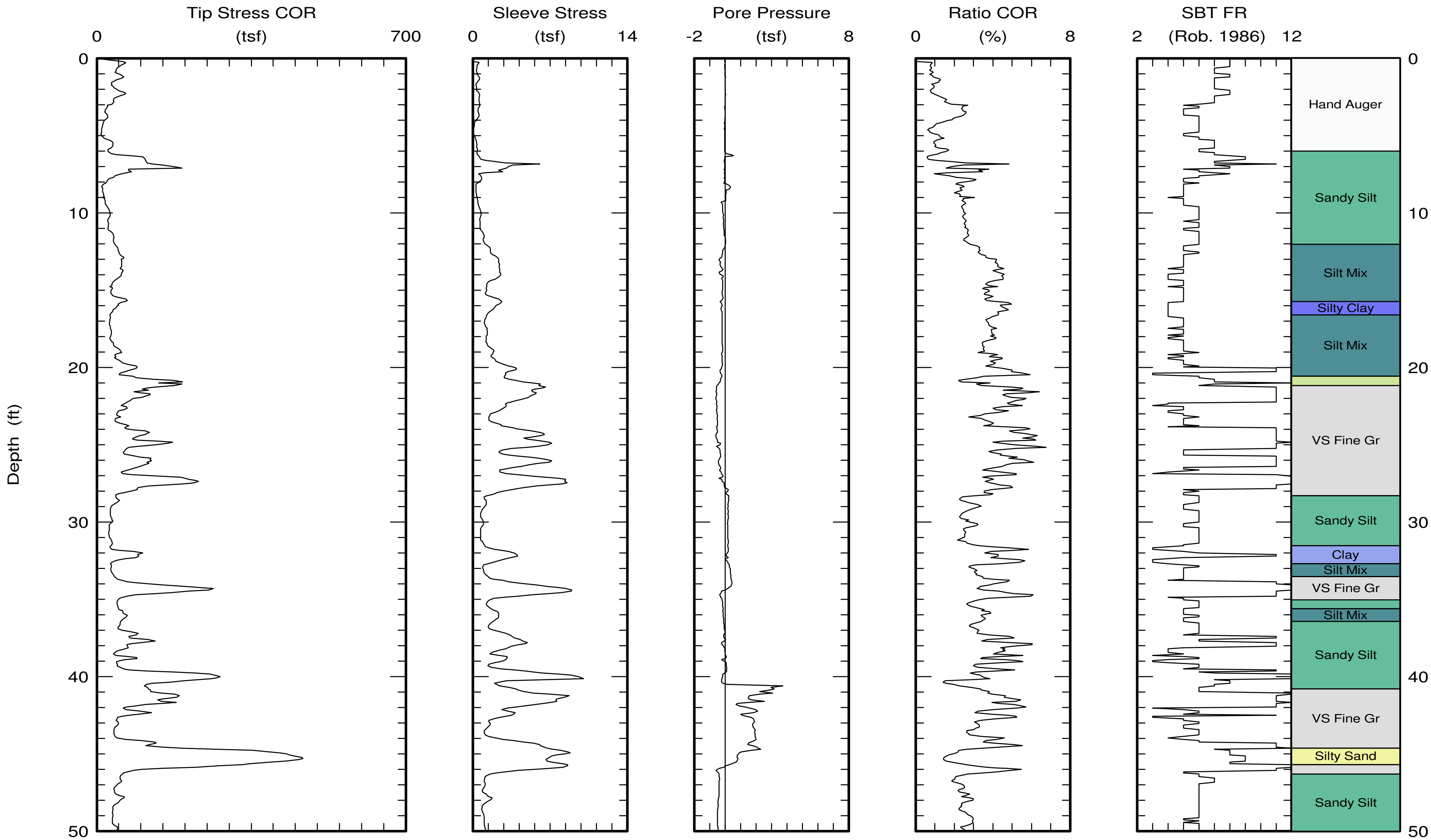
Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 65.19 (ft)

Test ID: T7-C1
File: Z14Y1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C2 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 78.09 (ft)

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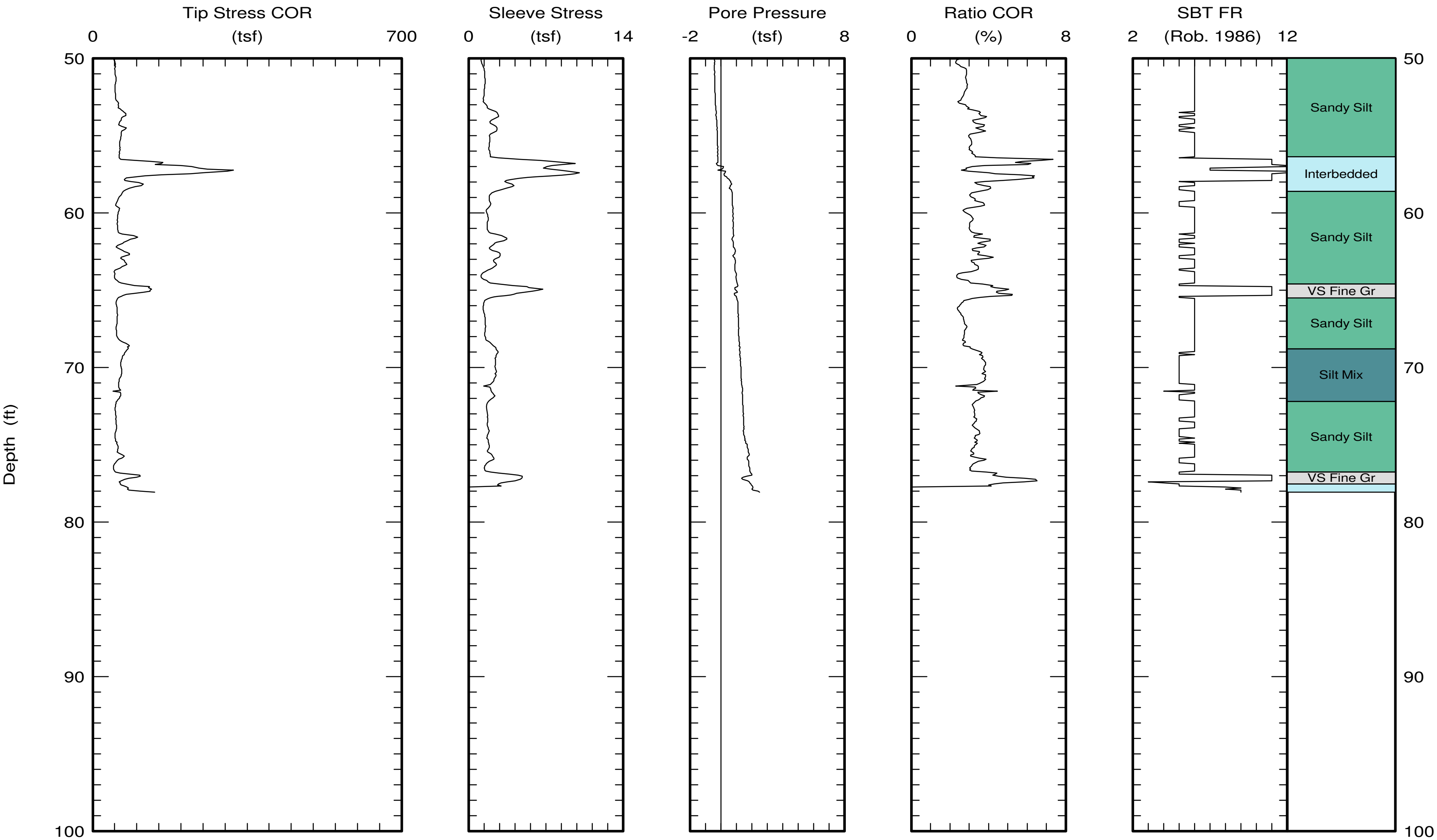
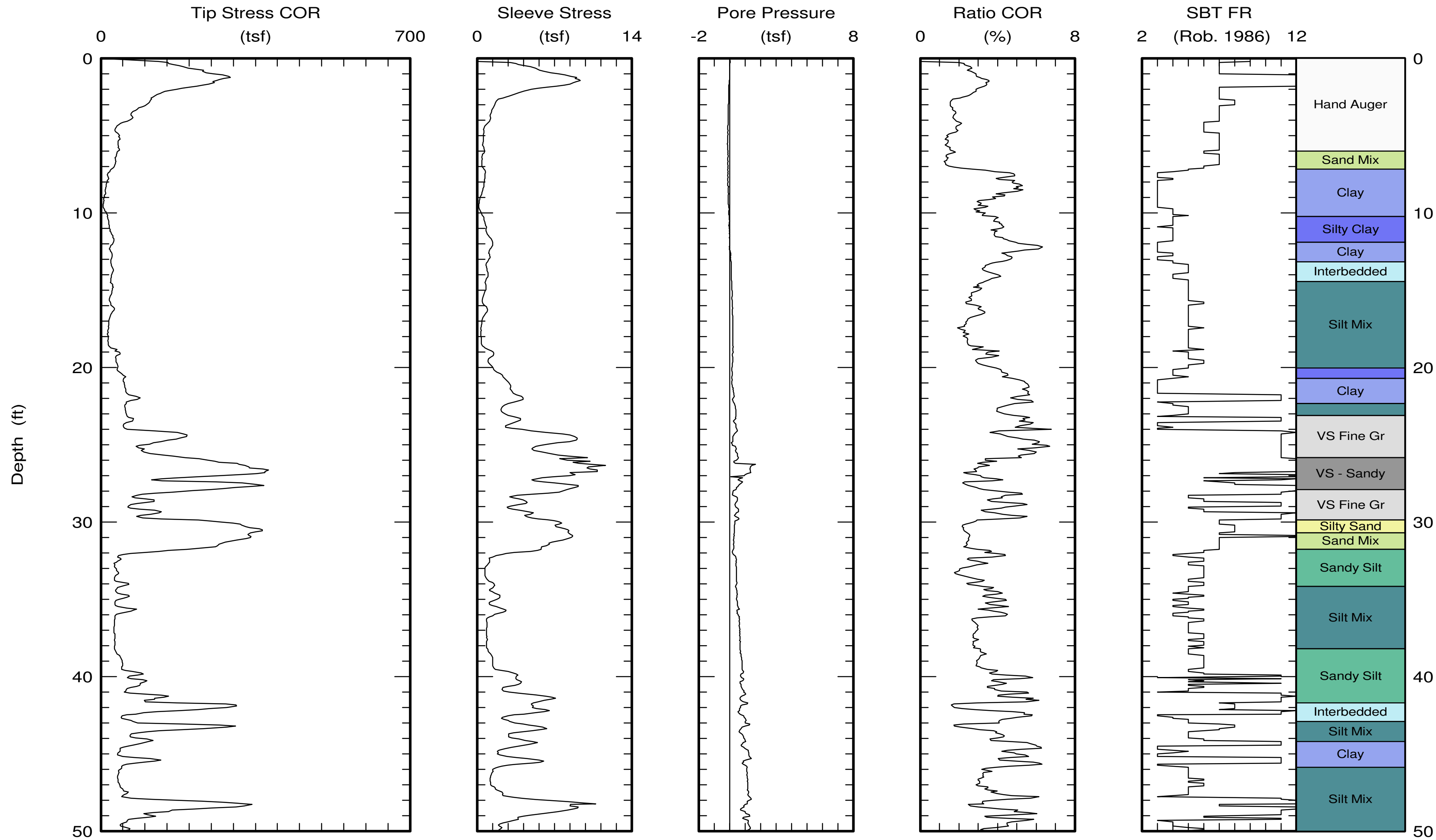
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C2 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 78.09 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C3 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 80.12 (ft)

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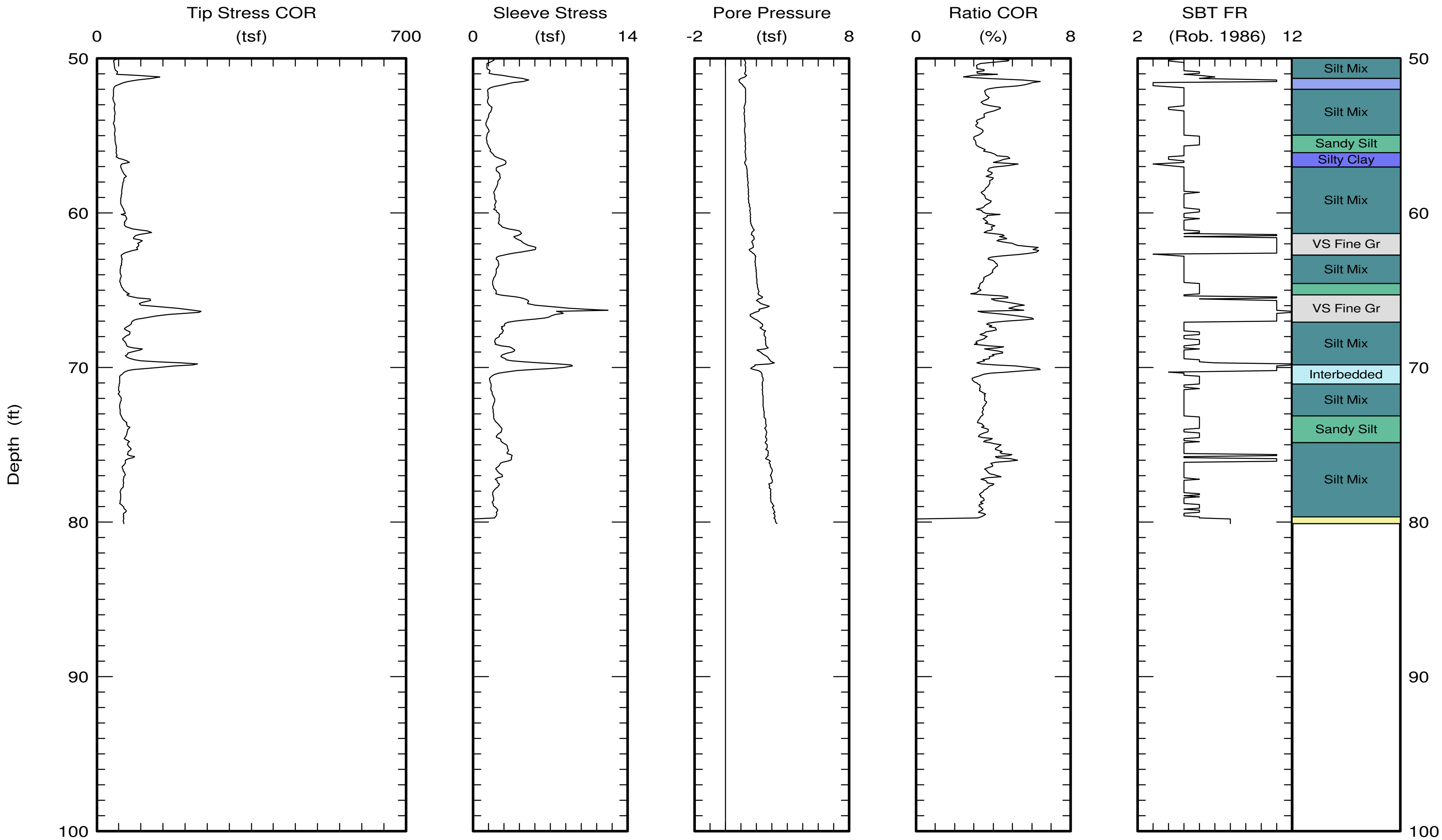
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C3 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 80.12 (ft)

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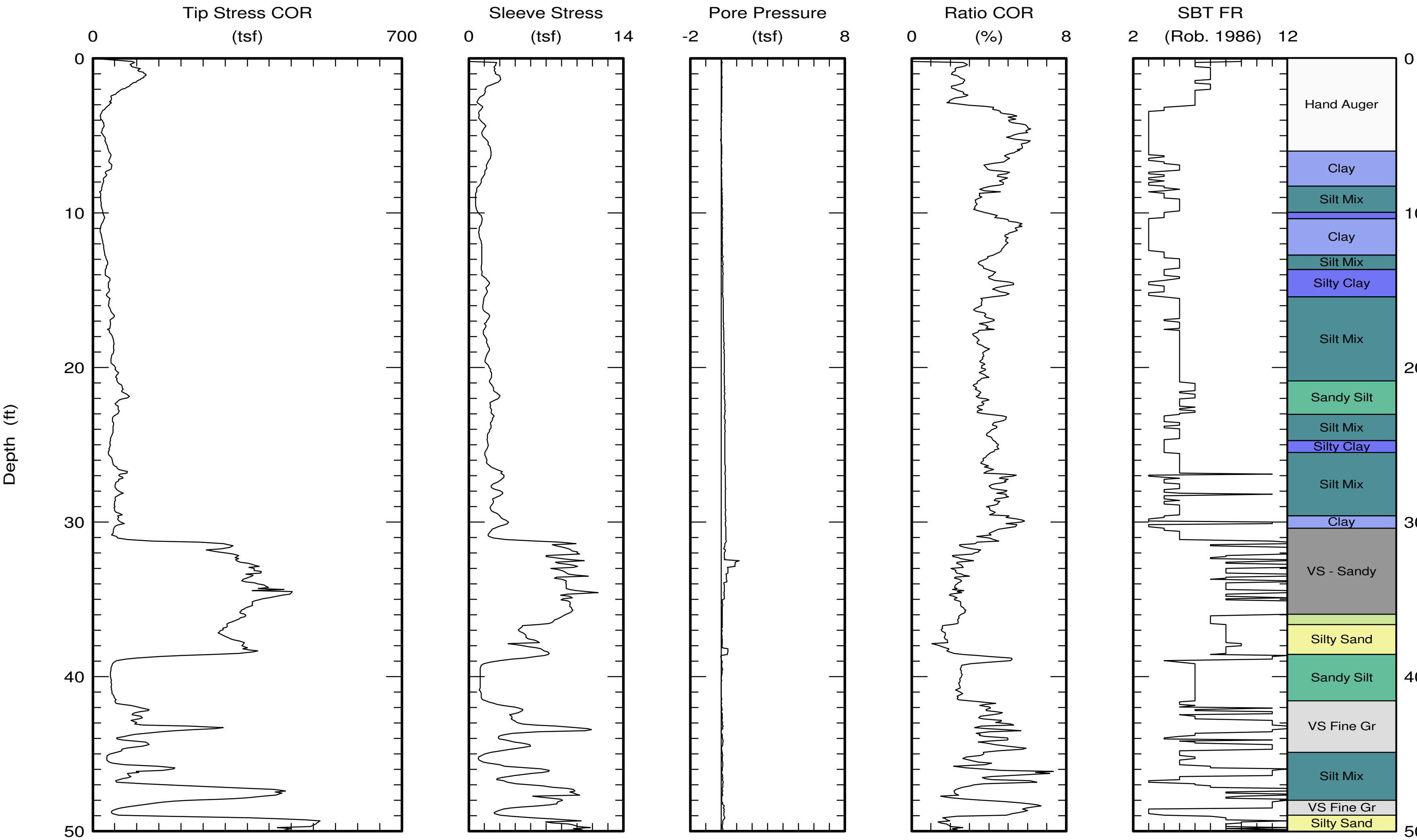
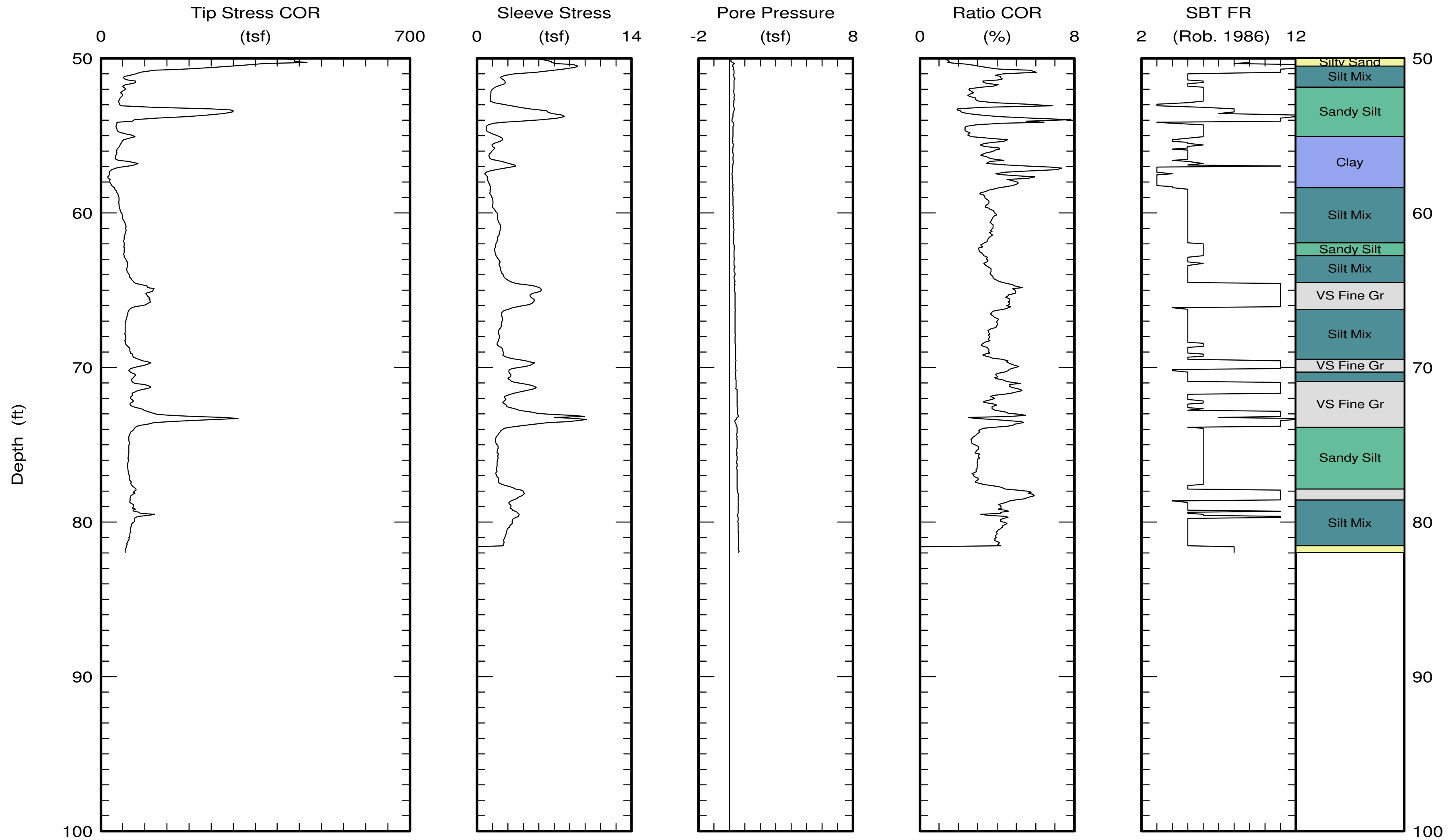
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 81.97 (ft)

Test ID: T7-C4
File: Z14Y1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C4 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 81.97 (ft)

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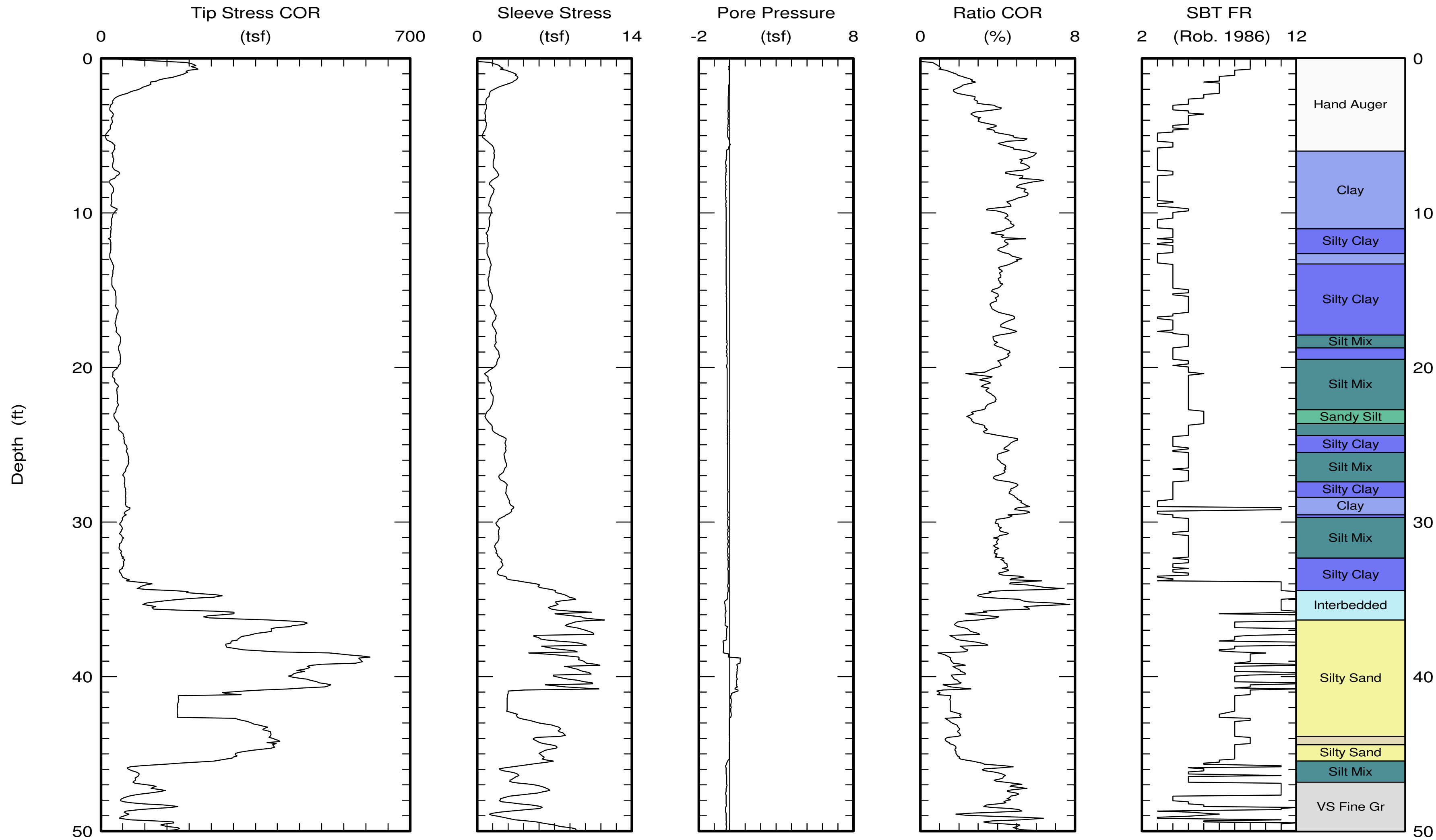
Test ID: T7-C4
File: Z14Y1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 77.11 (ft)

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Test ID: T7-C5

File: Z14Y1105C.ECP

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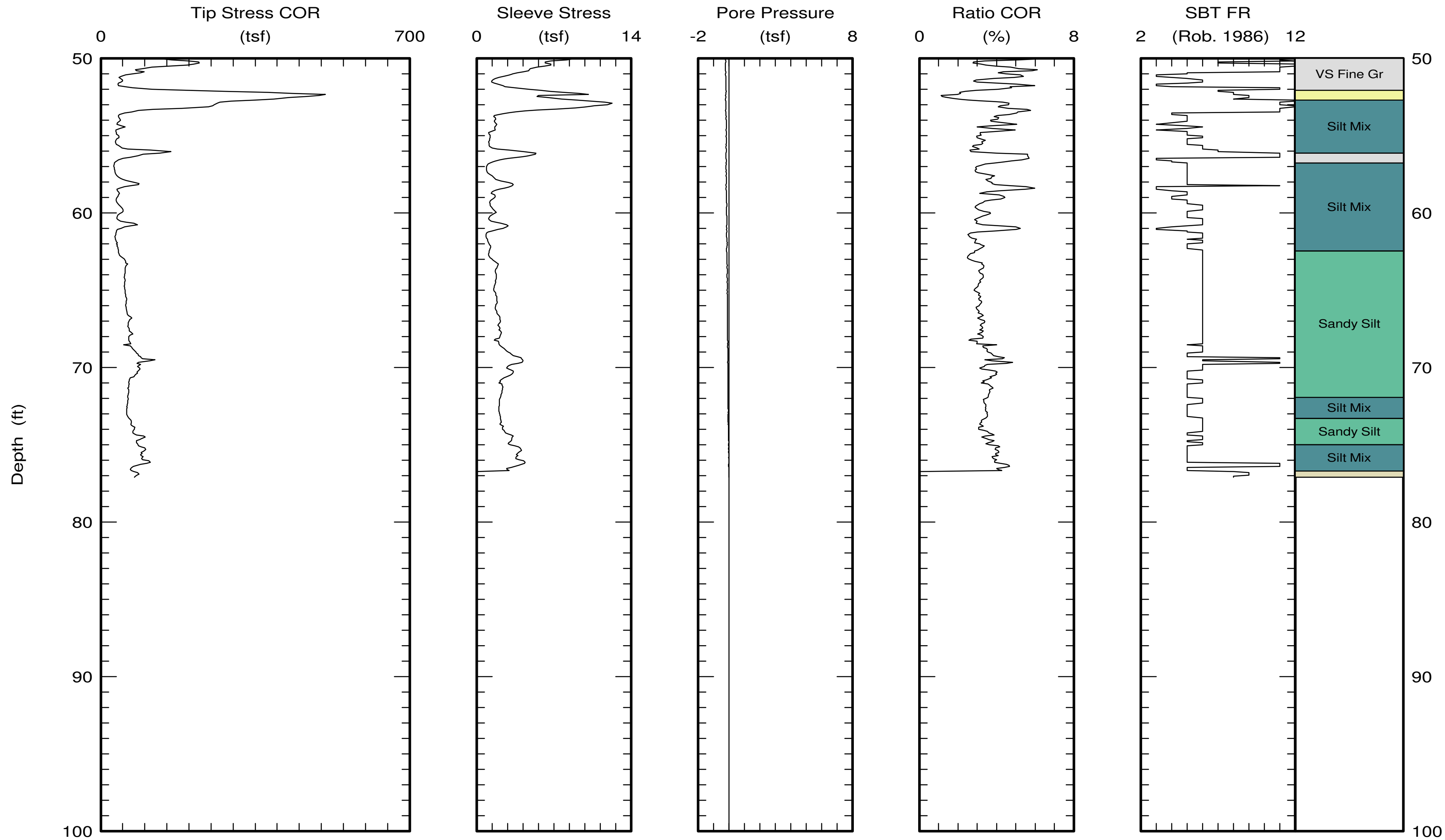
www.kehoetesting.com

CPT Data
30 ton rig

Date: 14/May/2011
Test ID: T7-C5
Project: LosAngeles

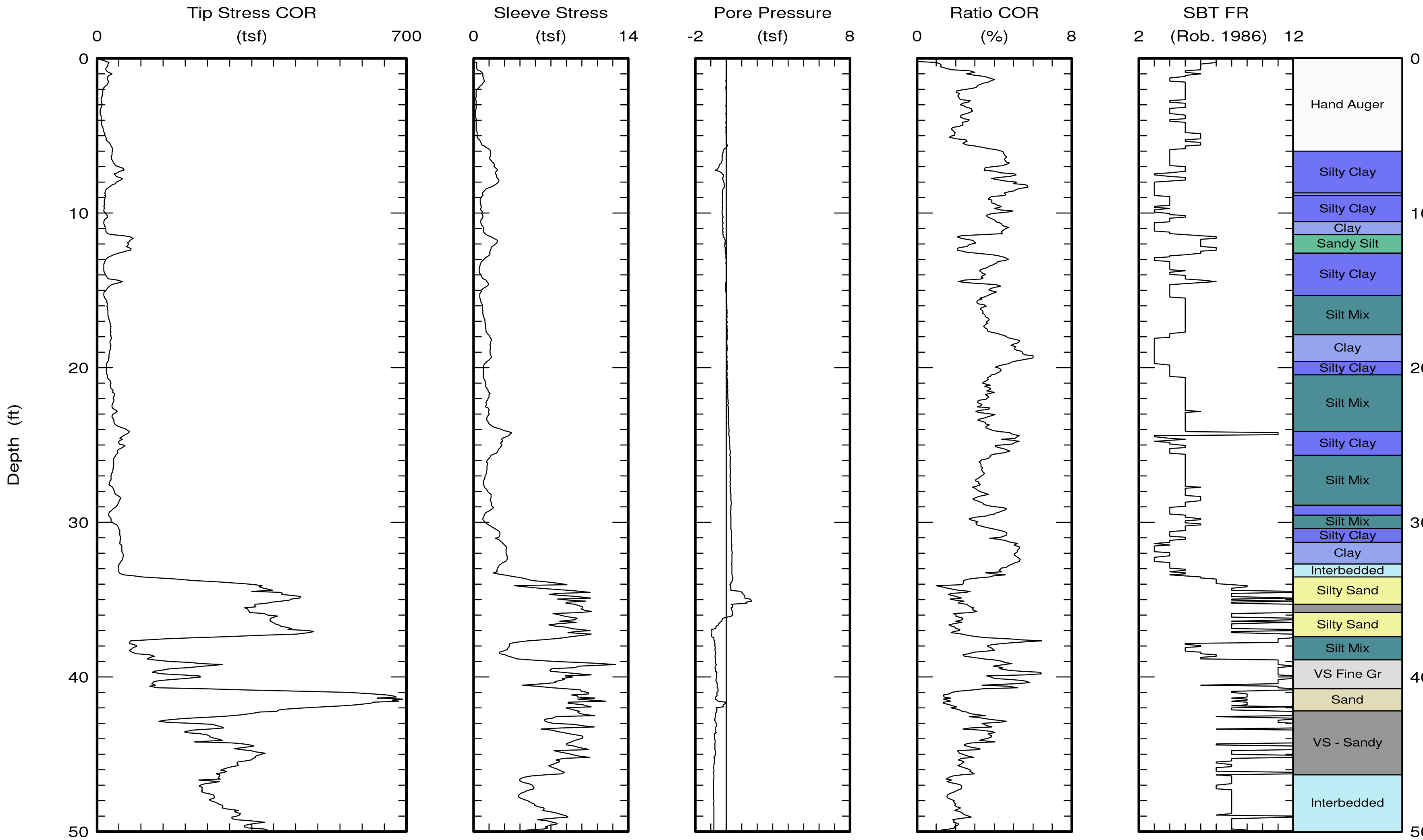
Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 77.11 (ft)

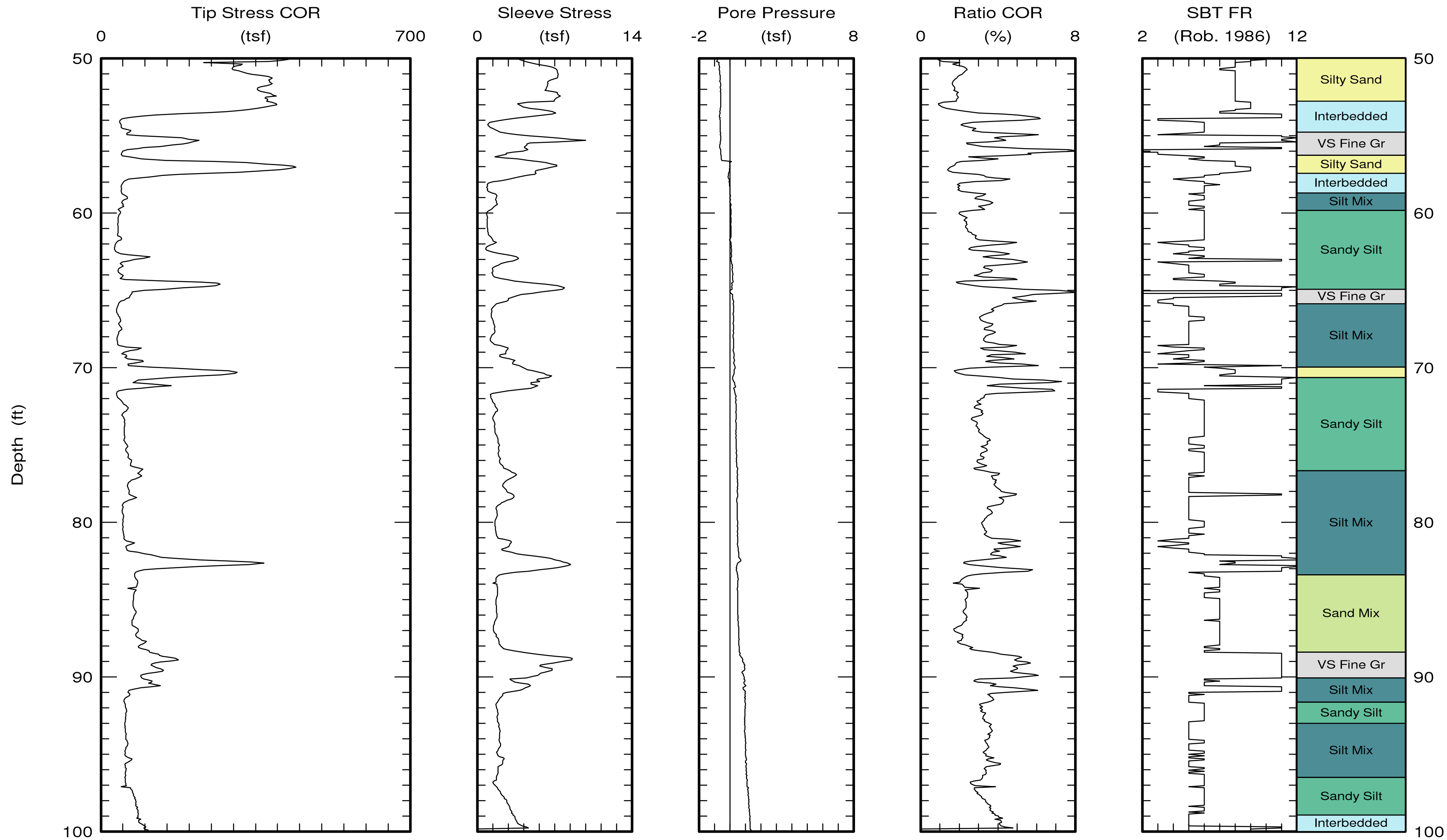
Test ID: T7-C5
File: Z14Y1105C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C7 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.14 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C7 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.14 (ft)

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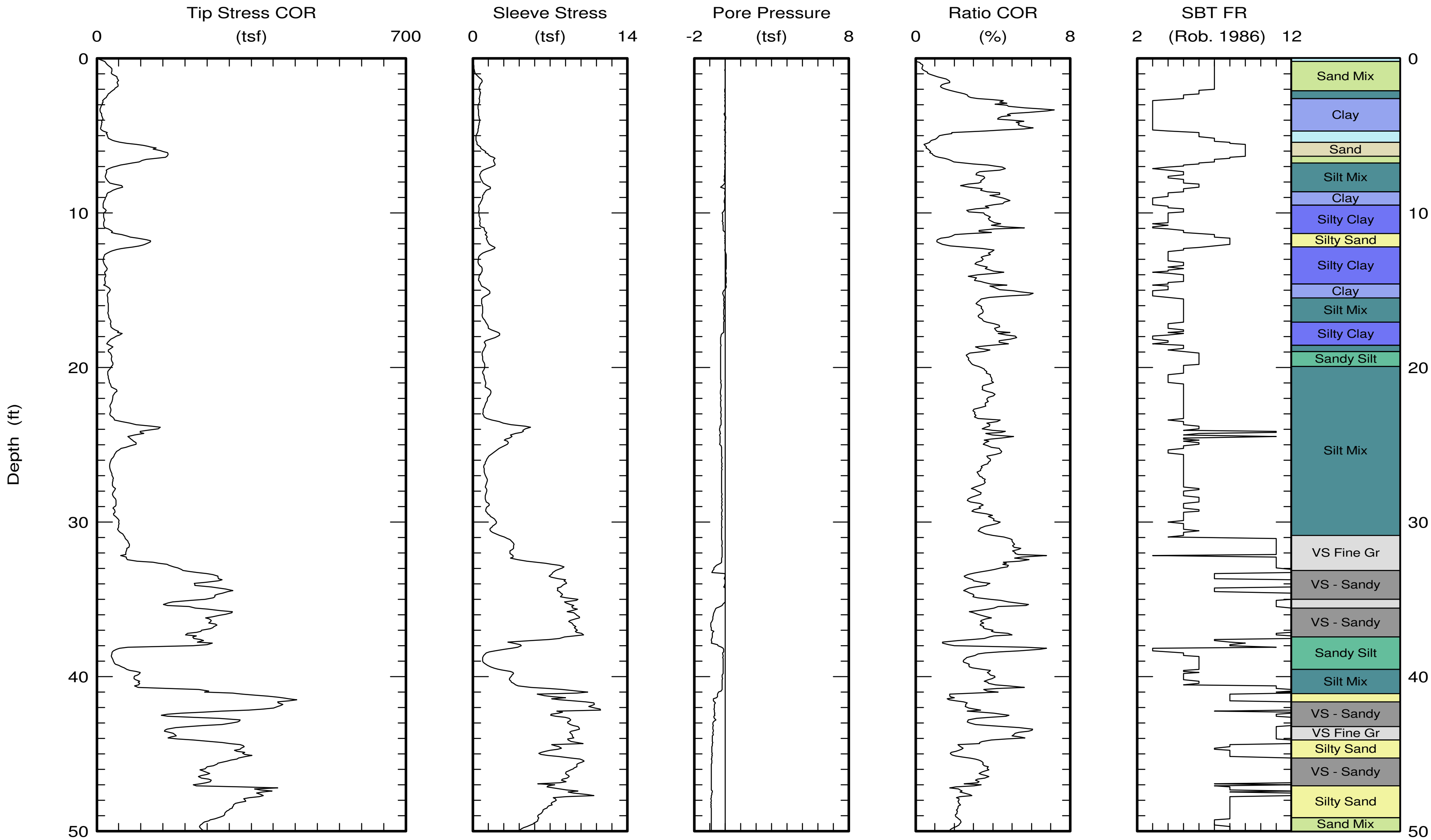
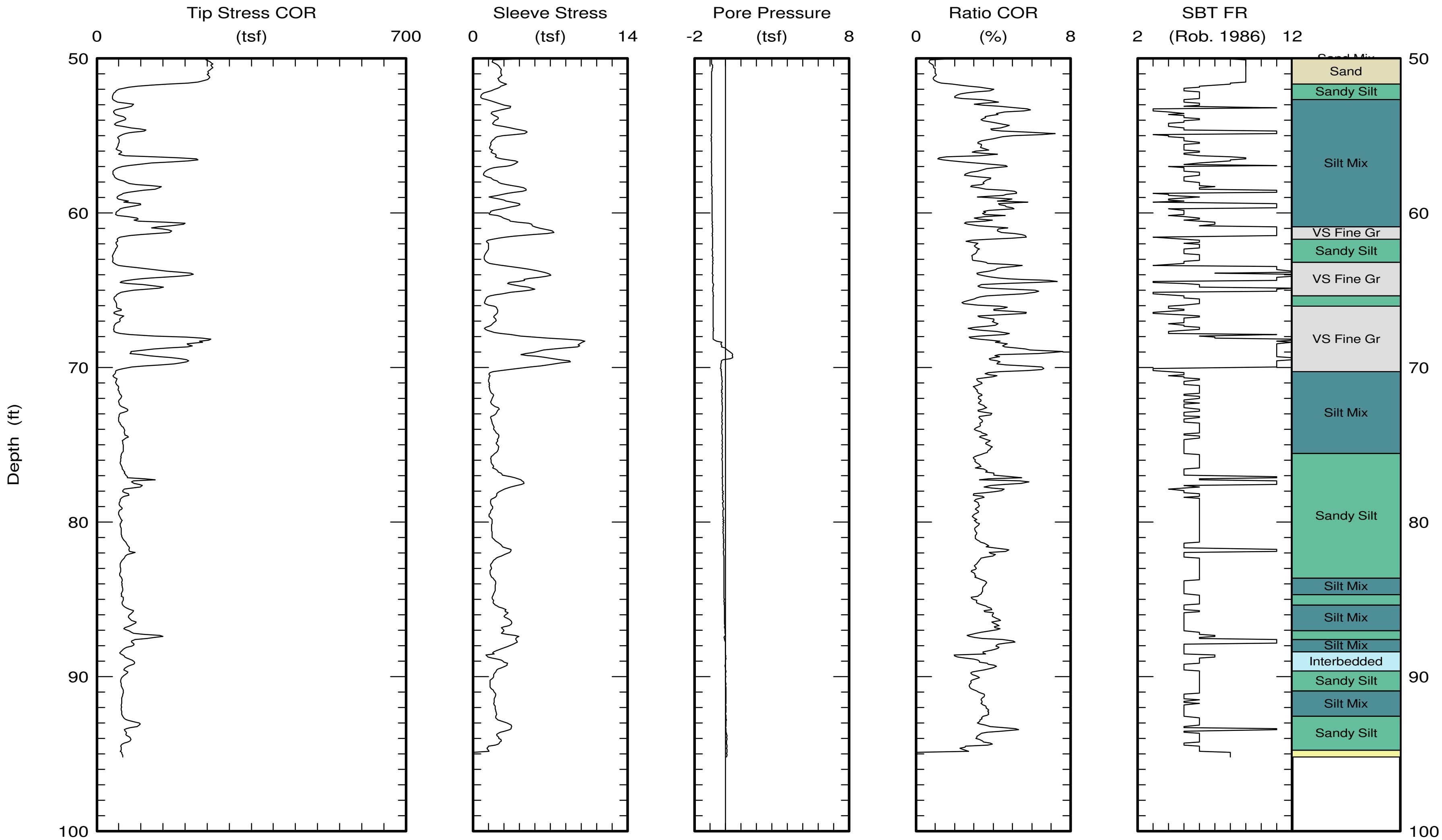
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 13/May/2011 Test ID: T7-C8 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 95.20 (ft)

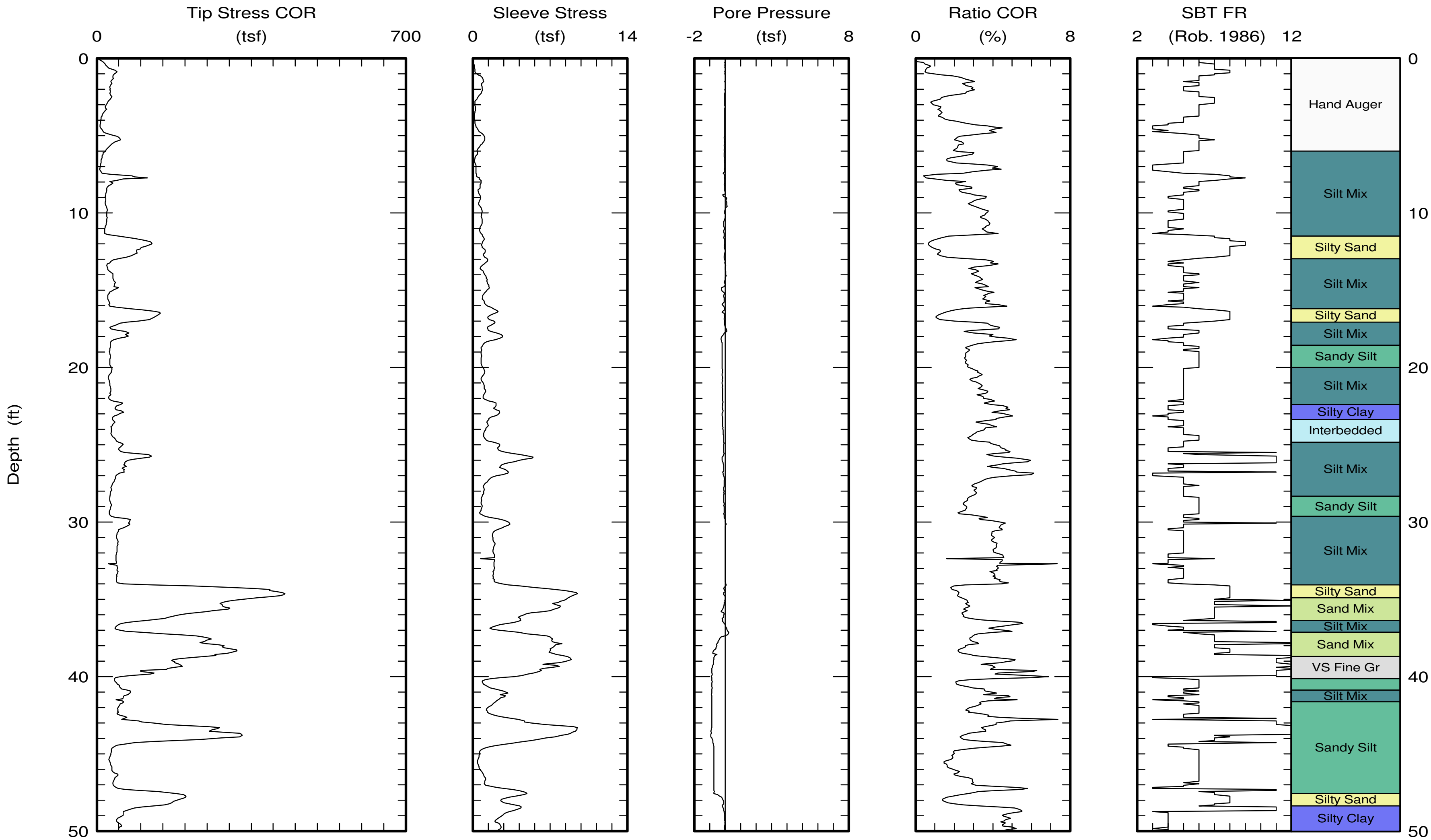
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 13/May/2011 Test ID: T7-C8 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 95.20 (ft)

Page 2 of 2

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 13/May/2011 Test ID: T7-C9 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 90.91 (ft)

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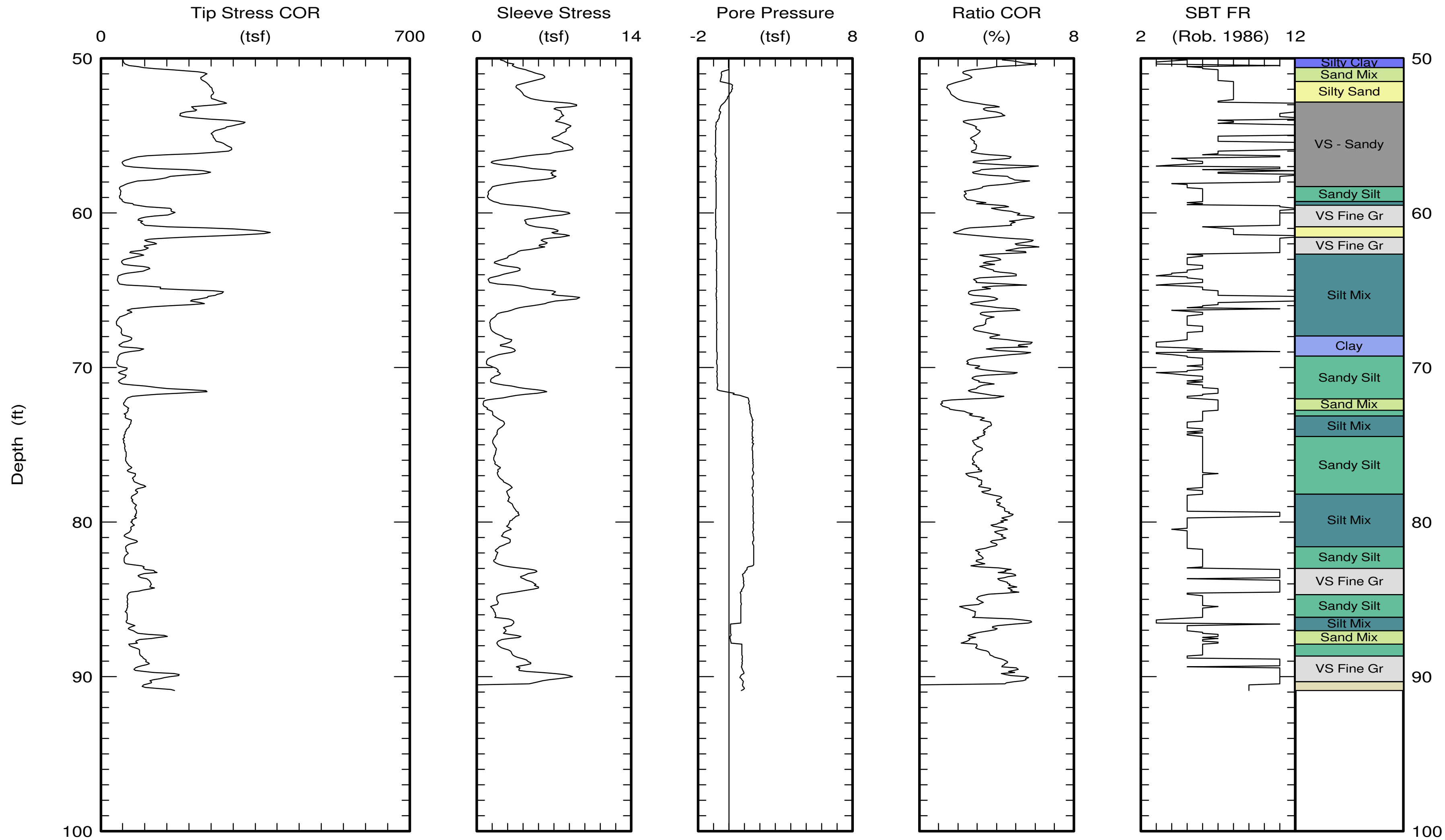
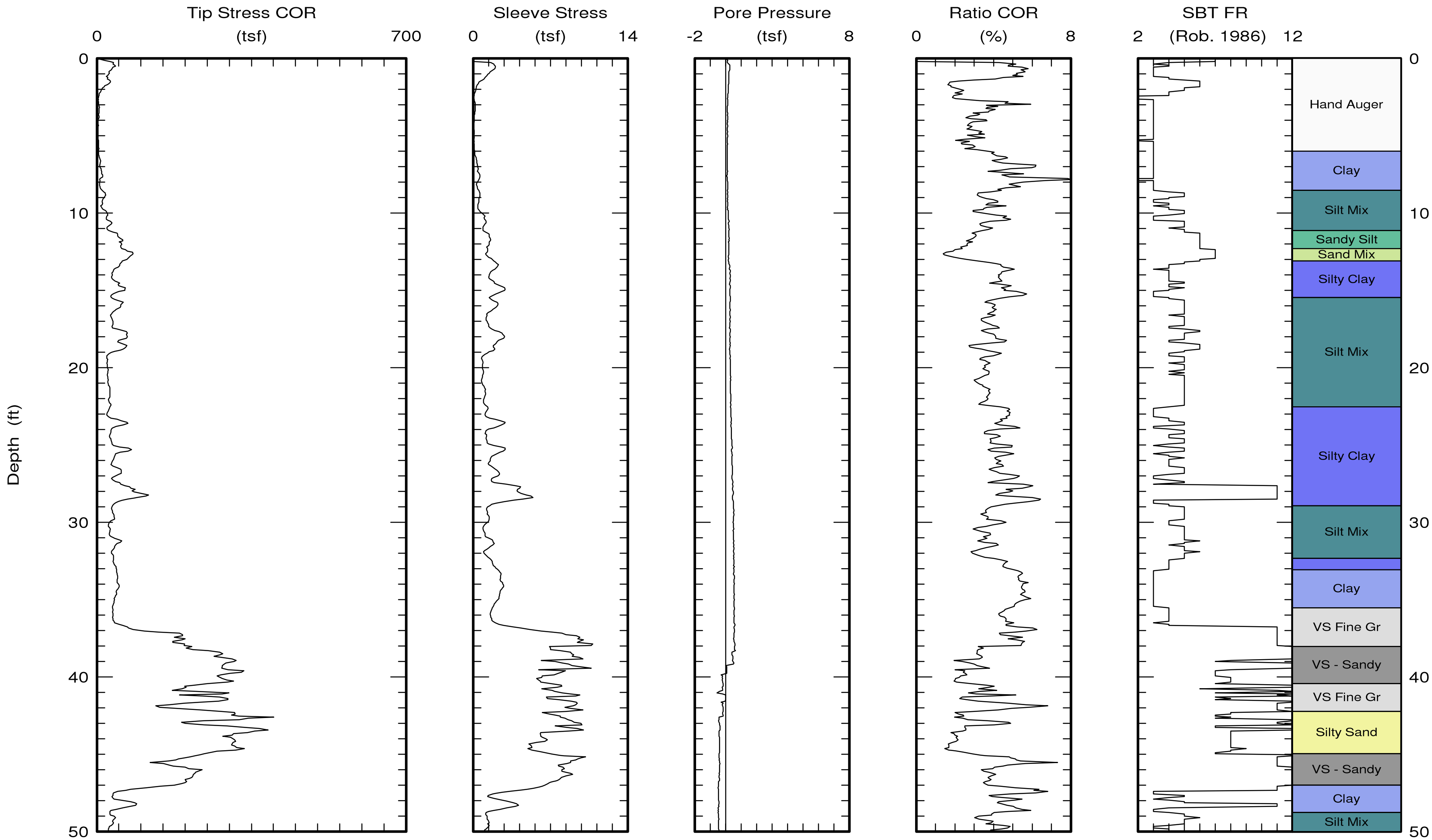
Test ID: T7-C9
File: Z13Y1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 13/May/2011 Test ID: T7-C9 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 90.91 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C10 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.06 (ft)

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Test ID: T7-C10
File: Z14Y1102C.ECP

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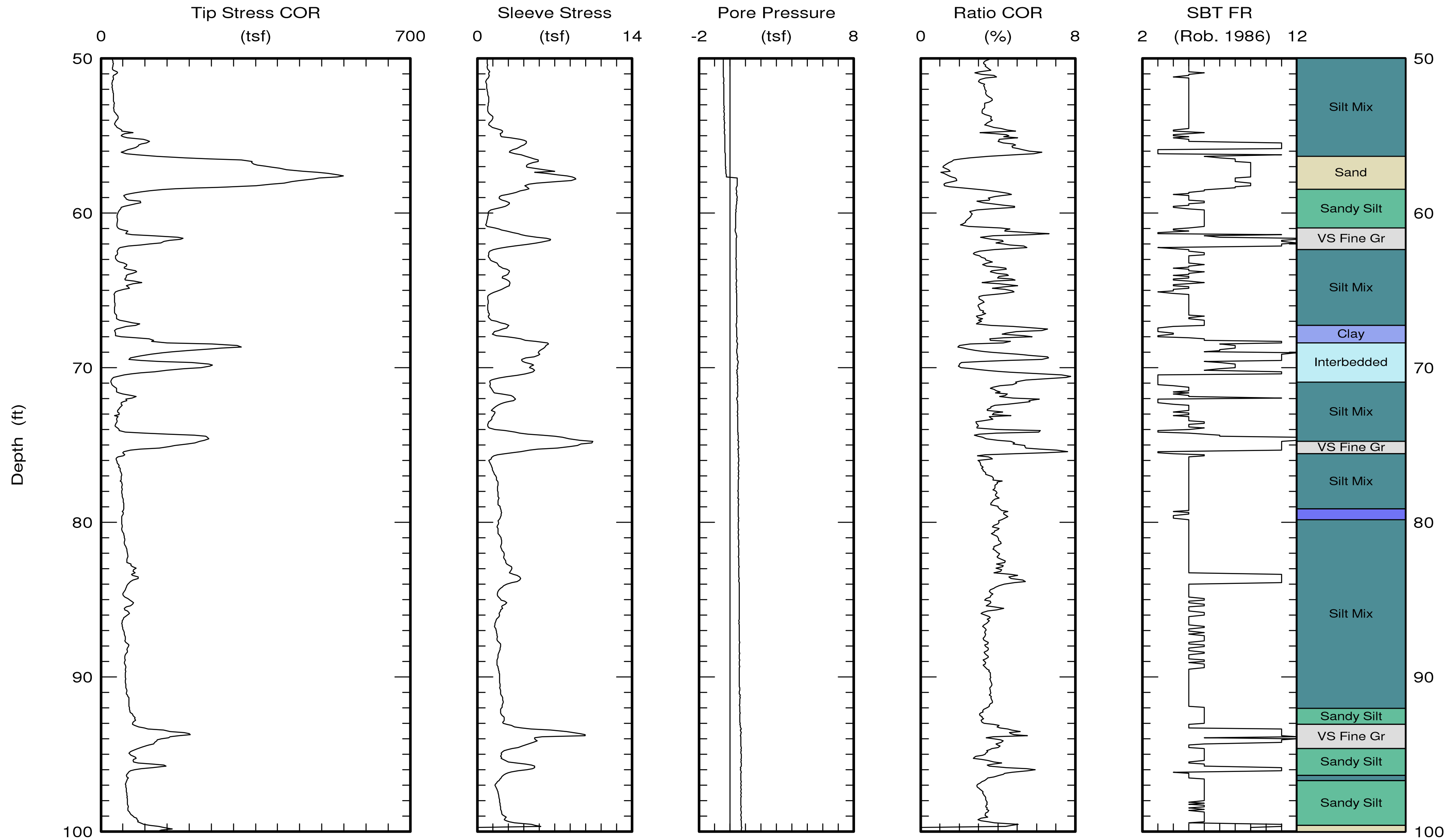
www.kehoetesting.com

CPT Data
30 ton rig

Date: 14/May/2011
Test ID: T7-C10
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 100.06 (ft)
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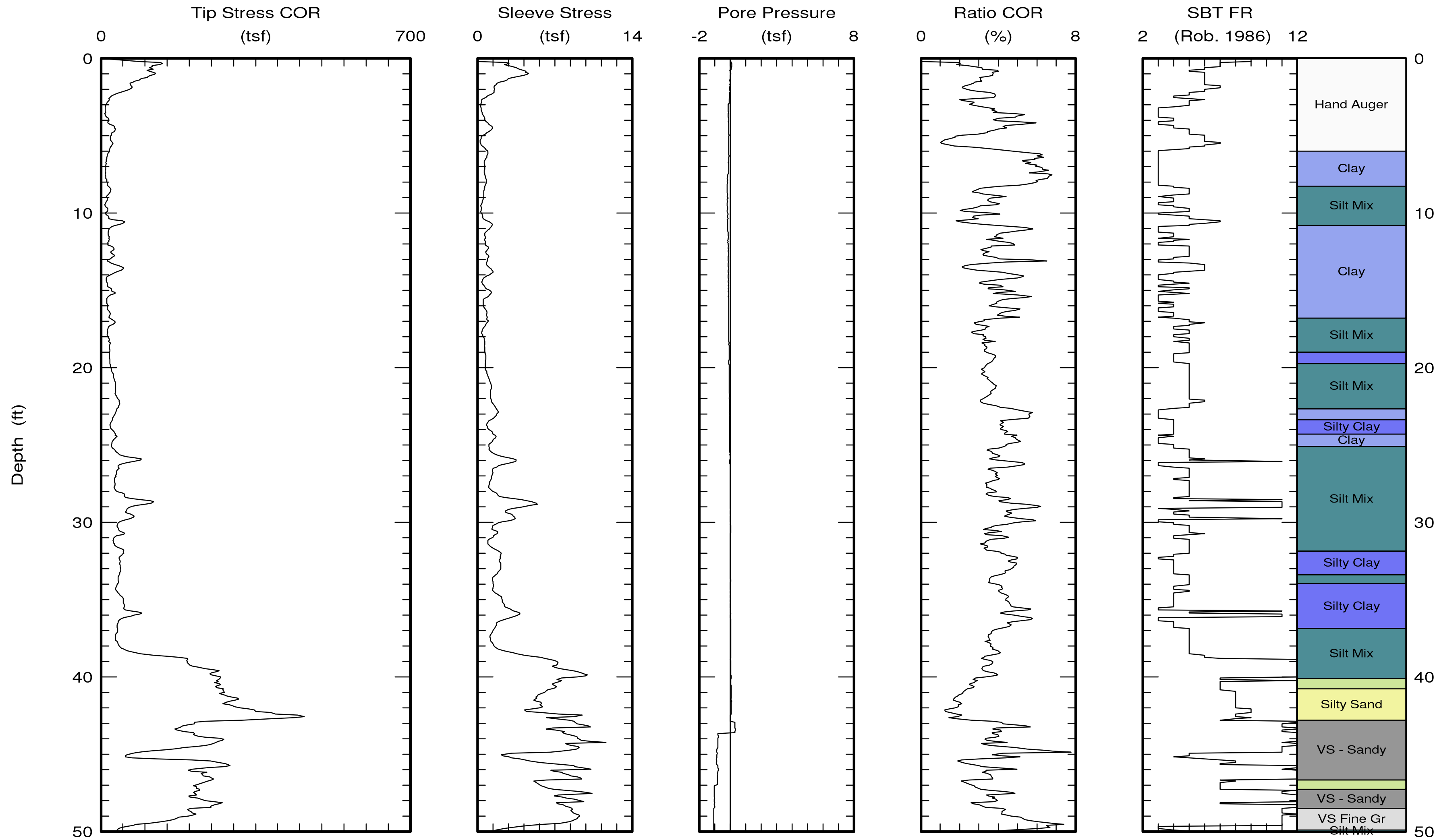
Test ID: T7-C10
File: Z14Y1102C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C11 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.07 (ft)

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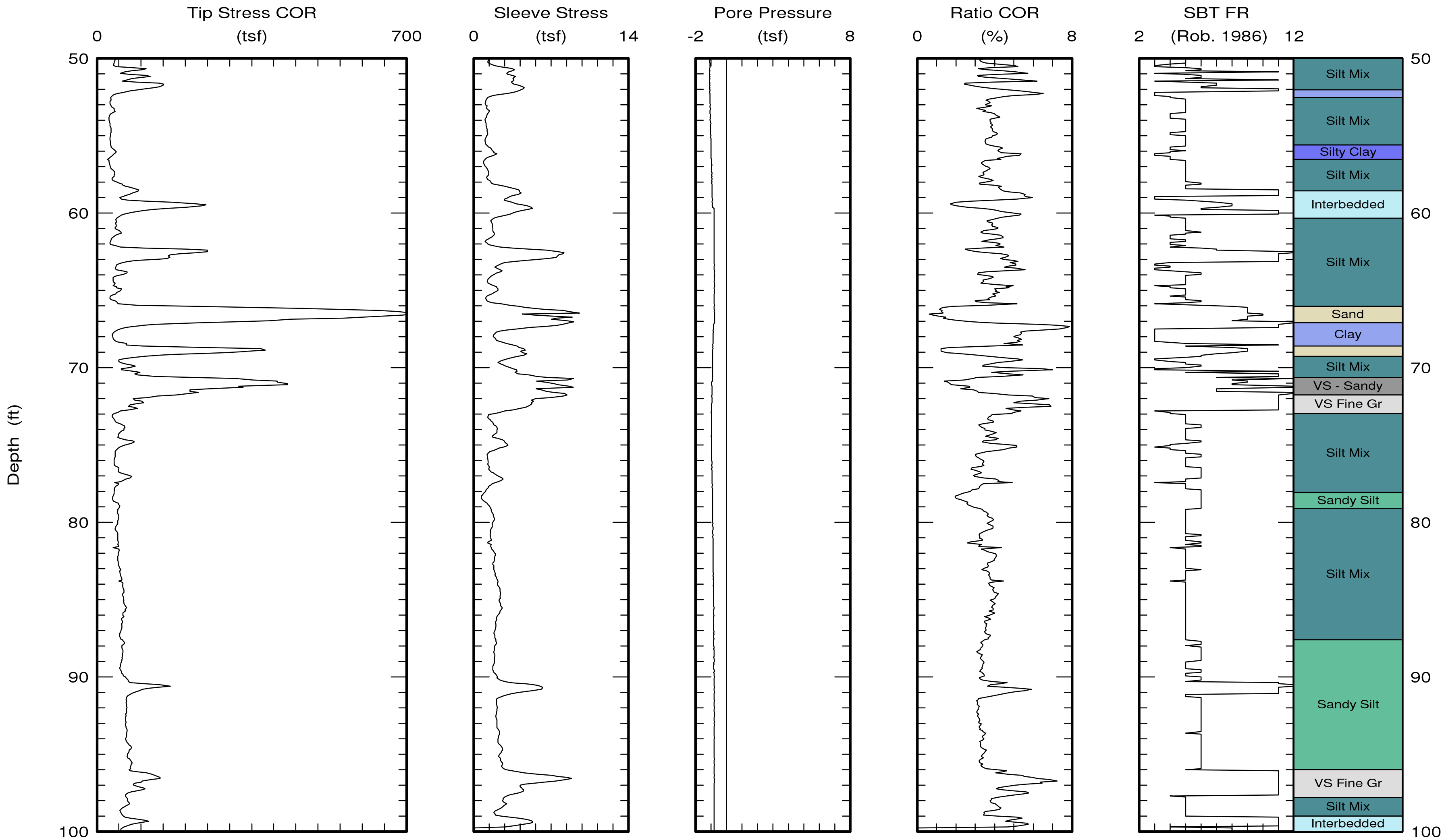
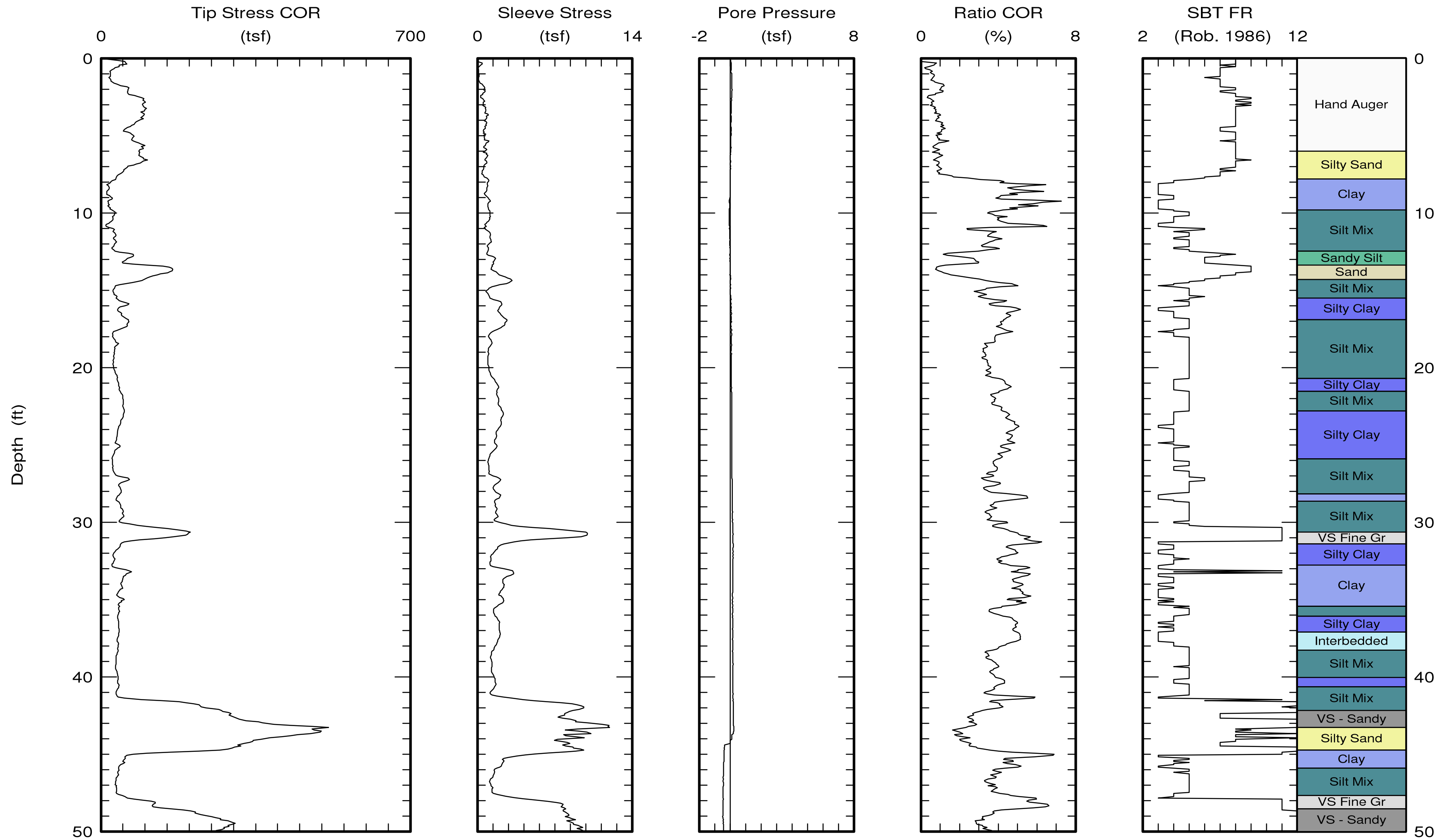
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C11 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.07 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C12 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.10 (ft)

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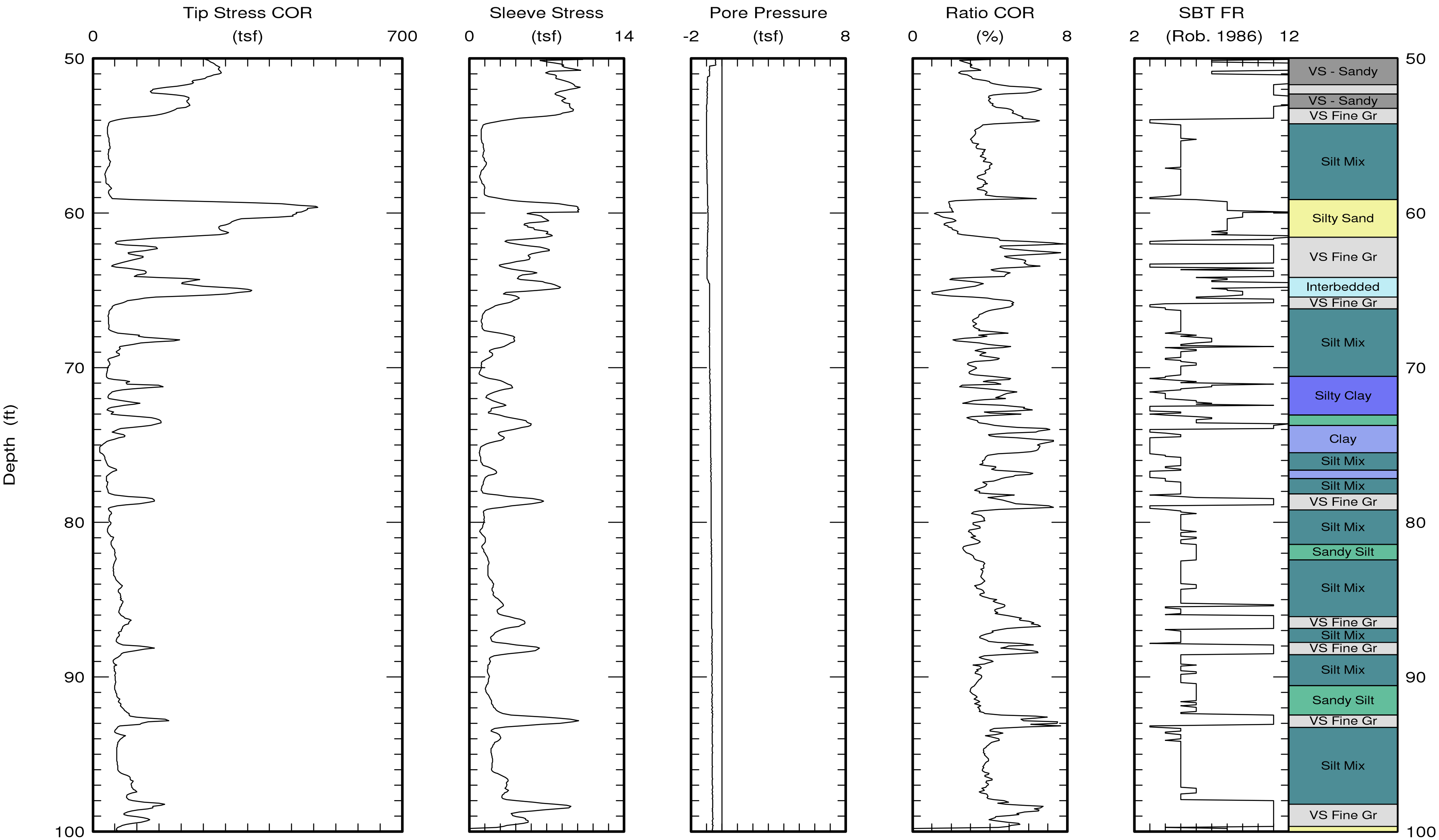
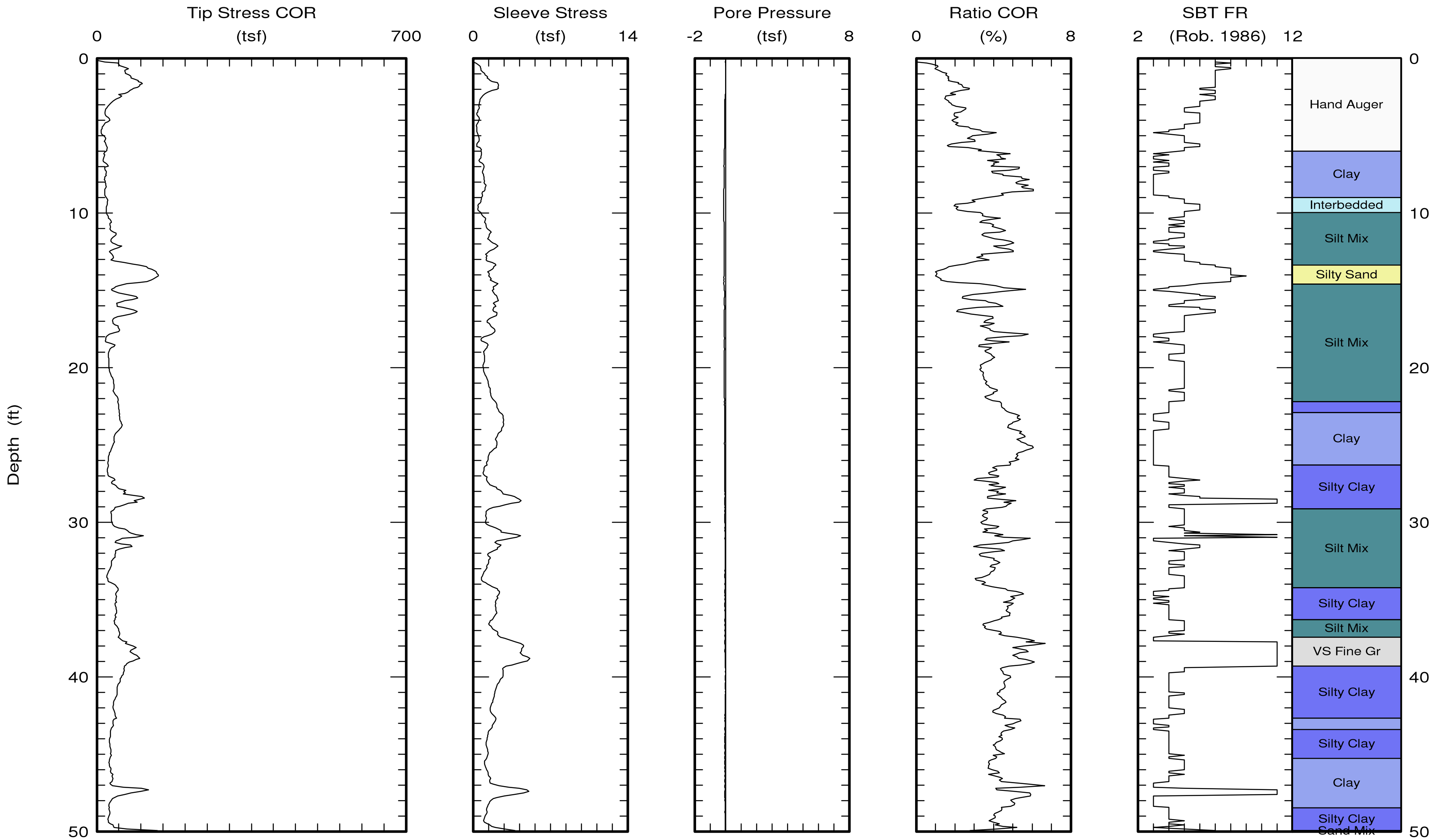
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C12 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.10 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 14/May/2011 Test ID: T7-C13 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 100.03 (ft)

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Test ID: T7-C13

File: Z14Y1104C.ECP

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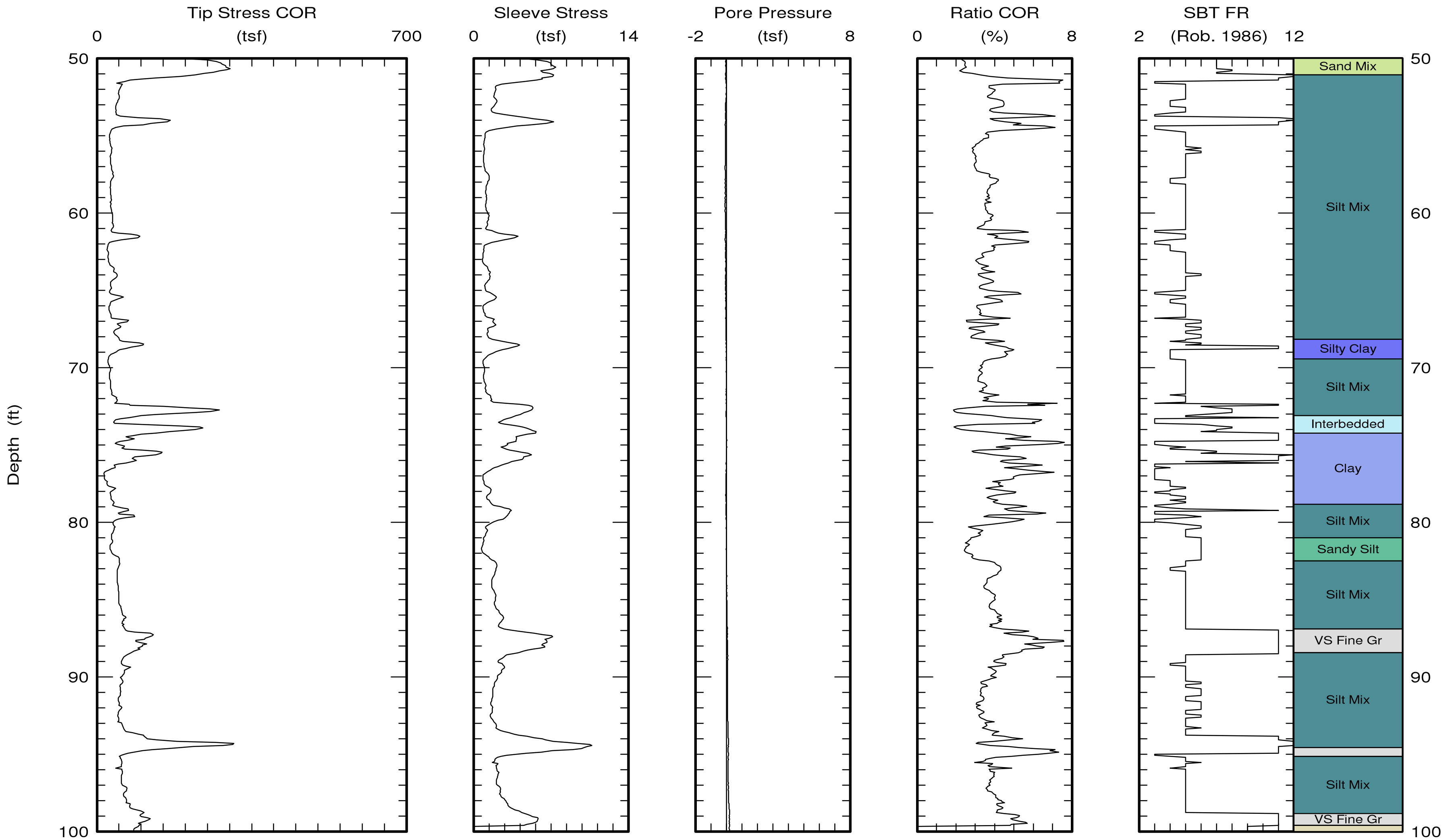
www.kehoetesting.com

CPT Data
30 ton rig

Date: 14/May/2011
Test ID: T7-C13
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 100.03 (ft)
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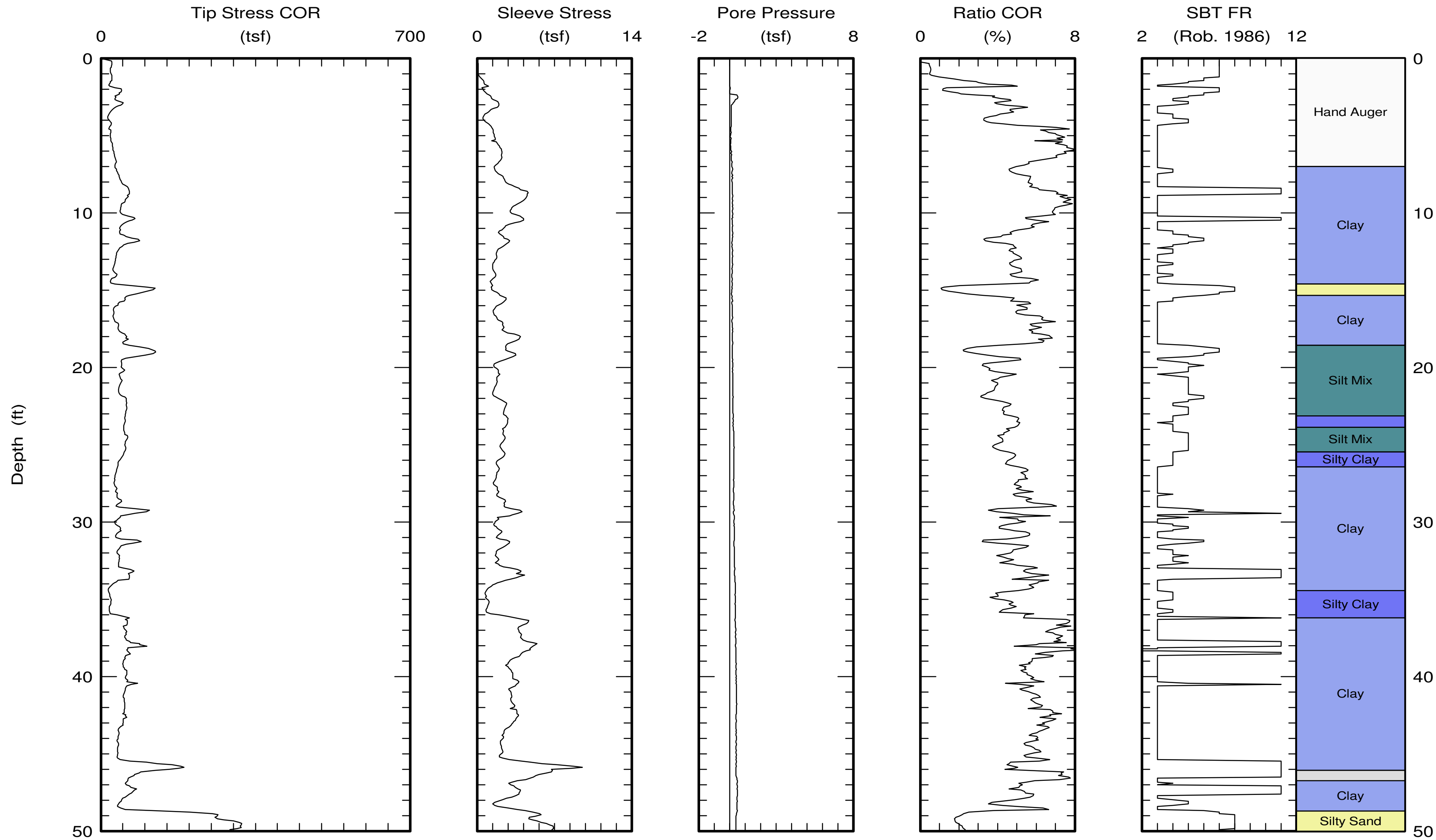
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Jun/2011 Test ID: T7-C14 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.10 (ft)

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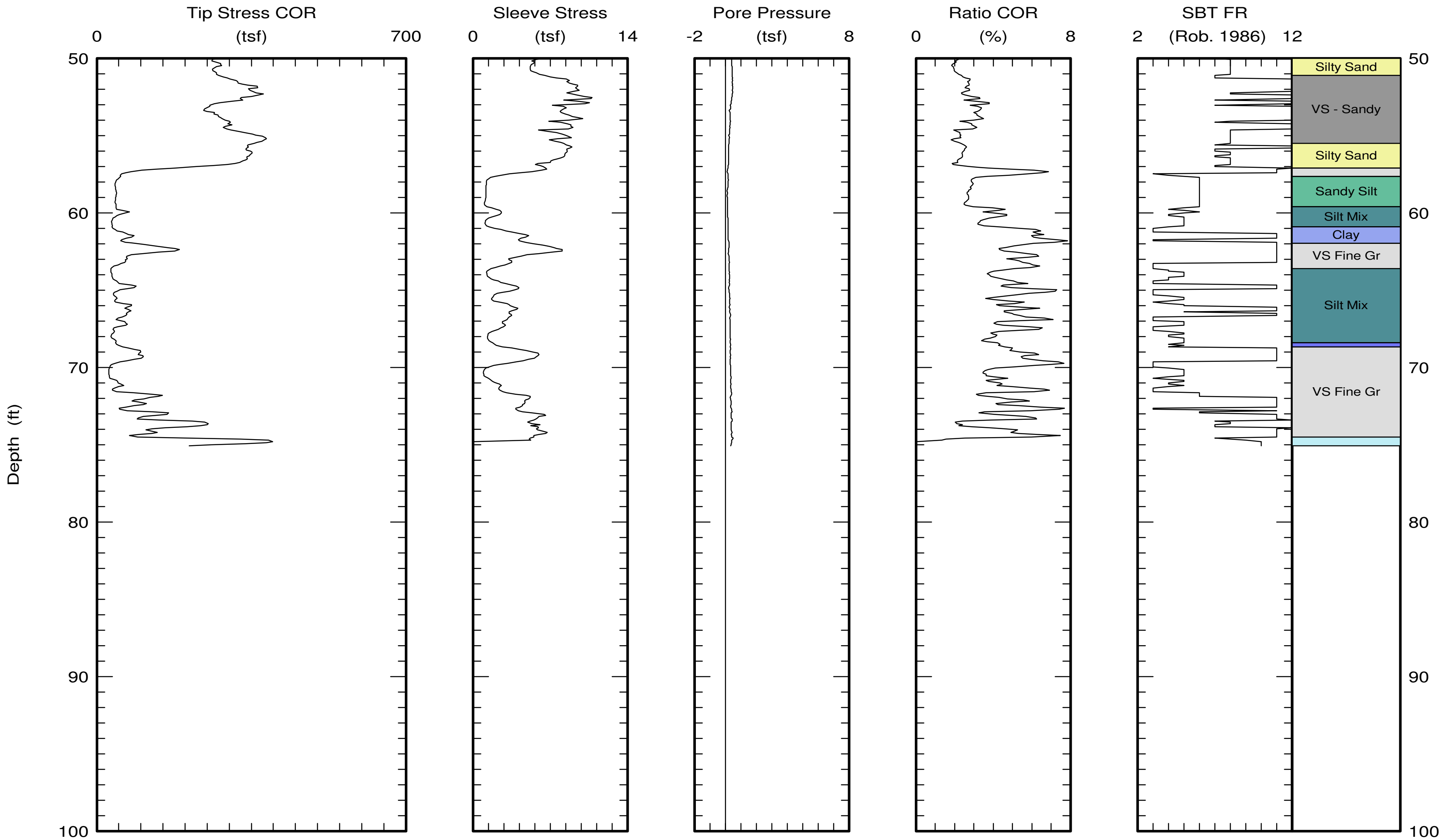
www.kehoetesting.com

CPT Data
30 ton rig

Date: 02/Jun/2011
Test ID: T7-C14
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 75.10 (ft)

Test ID: T7-C14
File: Z02U1103C.ECP

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Fax: (714) 901-7289
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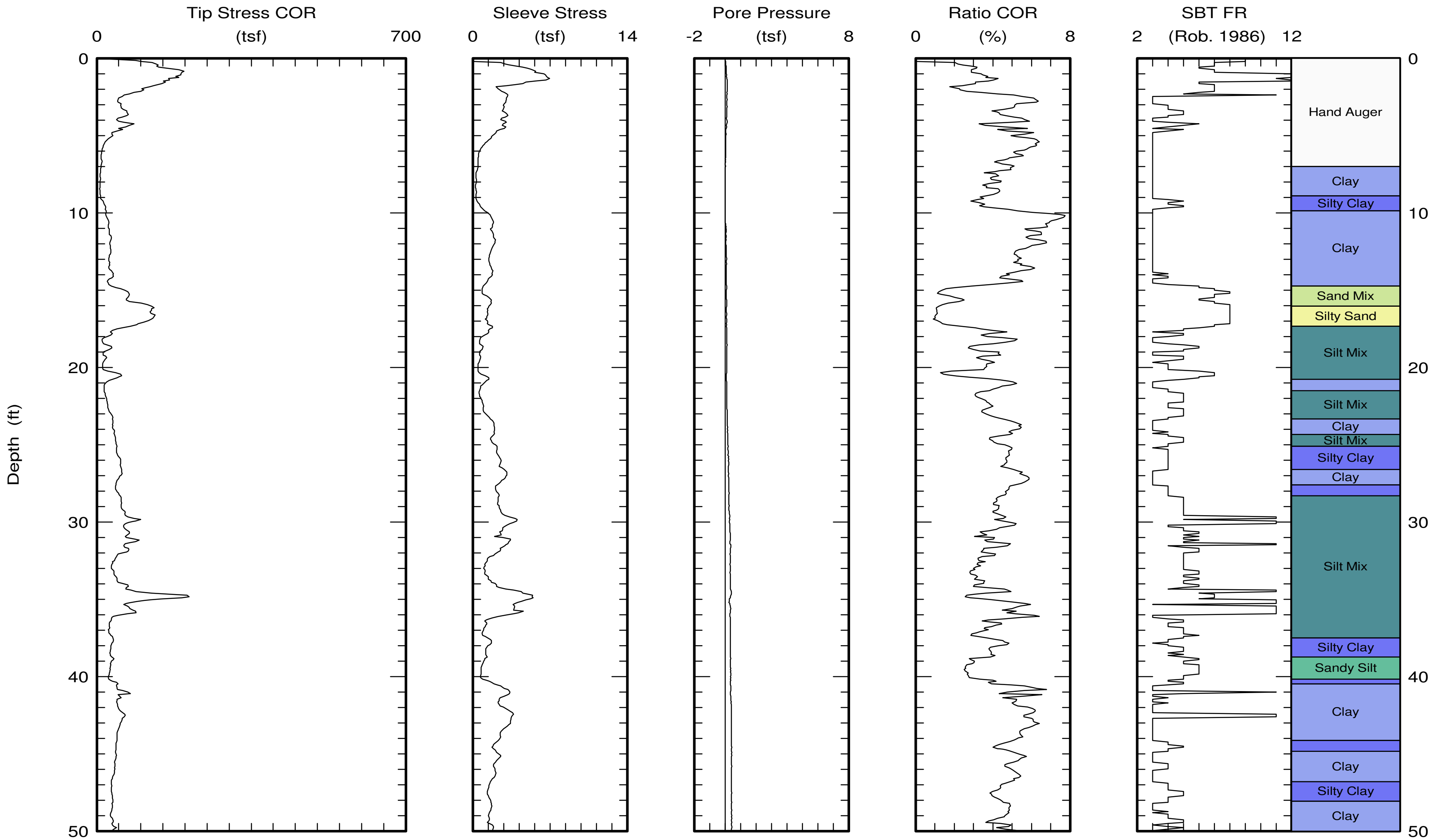
www.kehoetesting.com

CPT Data
30 ton rig

Date: 02/Jun/2011
Test ID: T7-C15
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 68.87 (ft)

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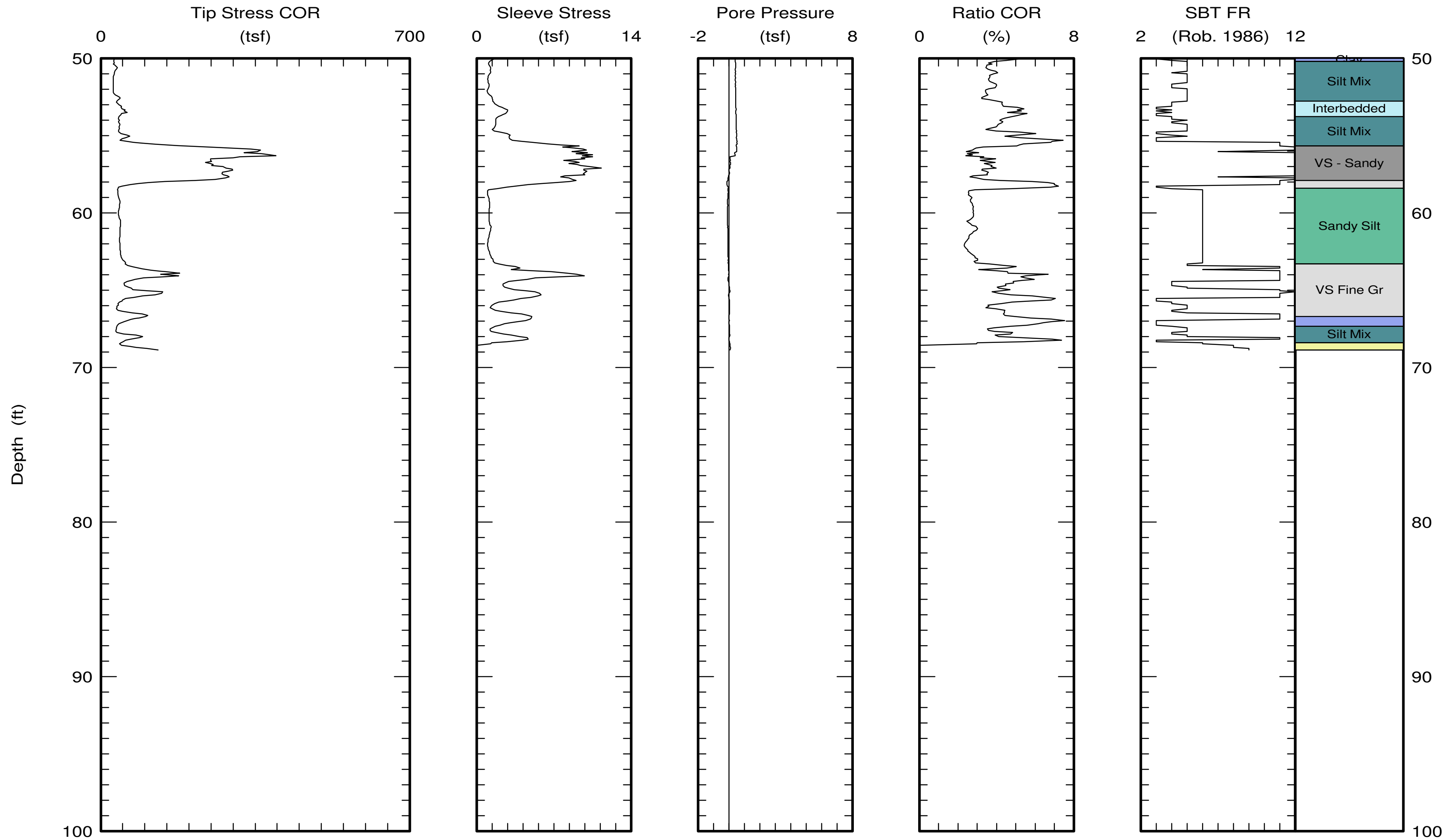
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 02/Jun/2011
Test ID: T7-C15
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 68.87 (ft)
Page 2 of 2

Test ID: T7-C15
File: Z02U1102C.ECP

Kehoe Testing & Engineering
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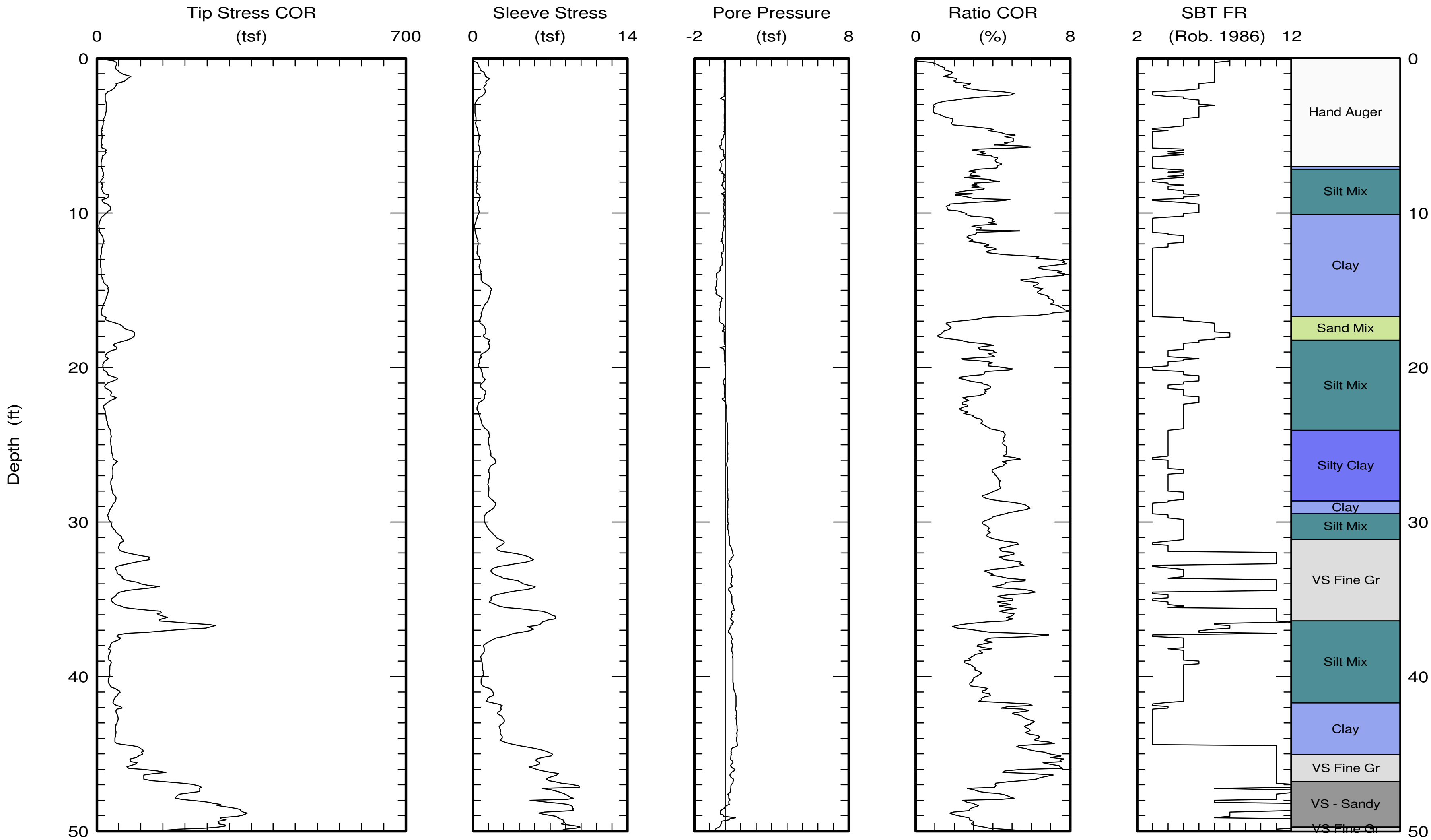
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 02/Jun/2011
Test ID: T7-C16
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 75.00 (ft)
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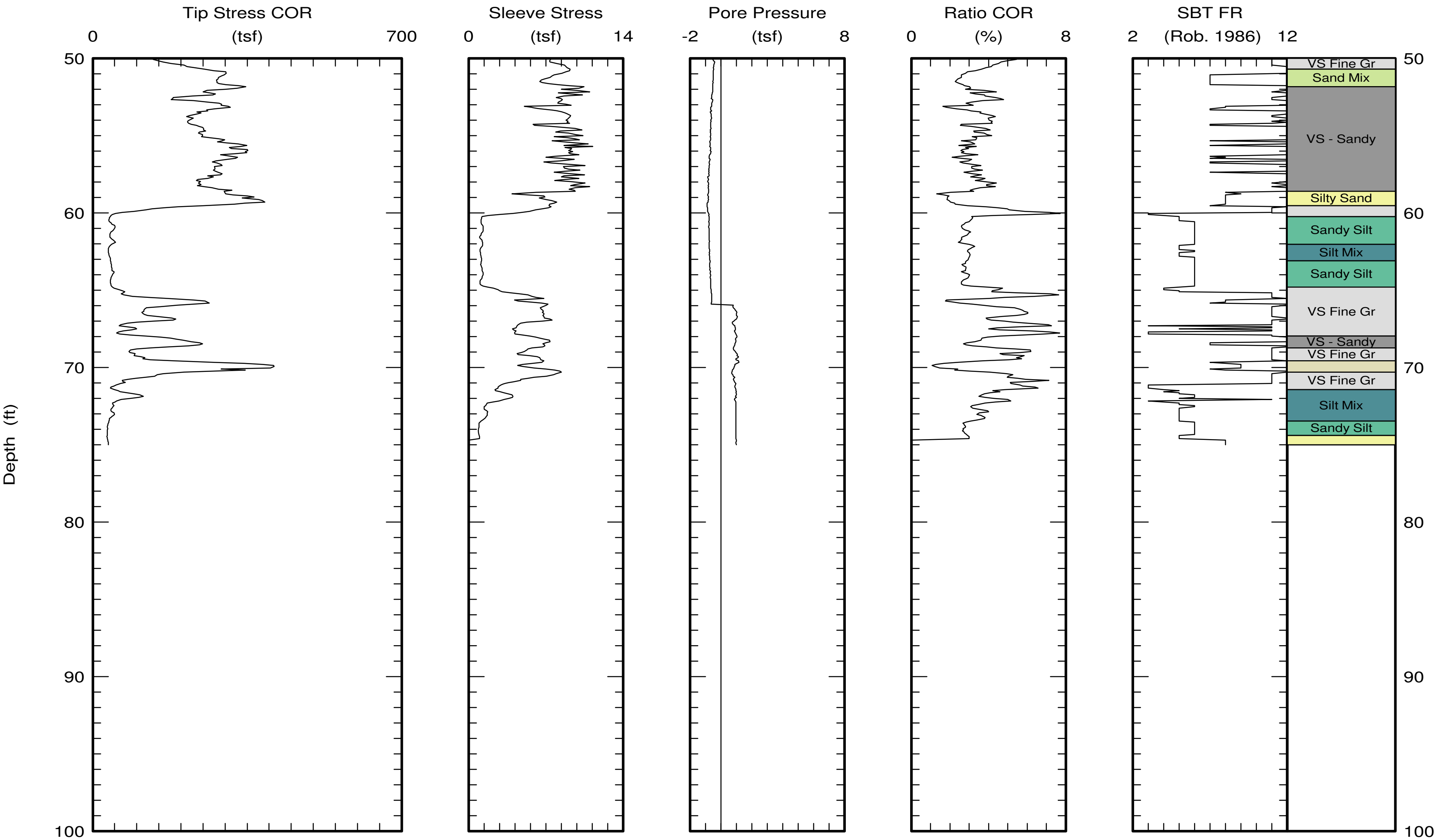
Test ID: T7-C16
File: Z02U1101C.ECP

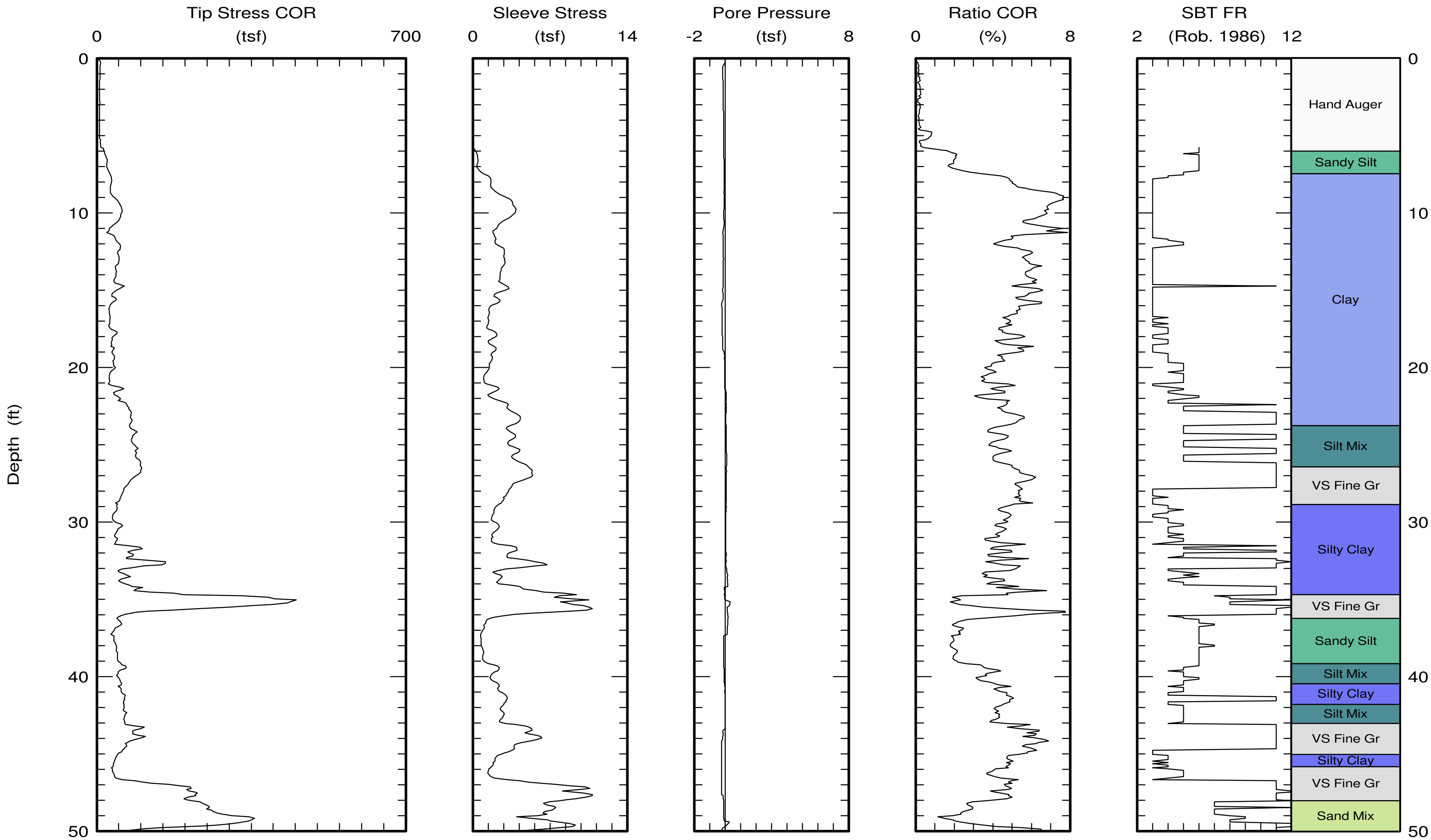
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 02/Jun/2011 Test ID: T7-C16 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.00 (ft)

Test ID: T7-C16
File: Z02U1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 30/Jun/2011 Test ID: T7-C17 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 74.41 (ft)

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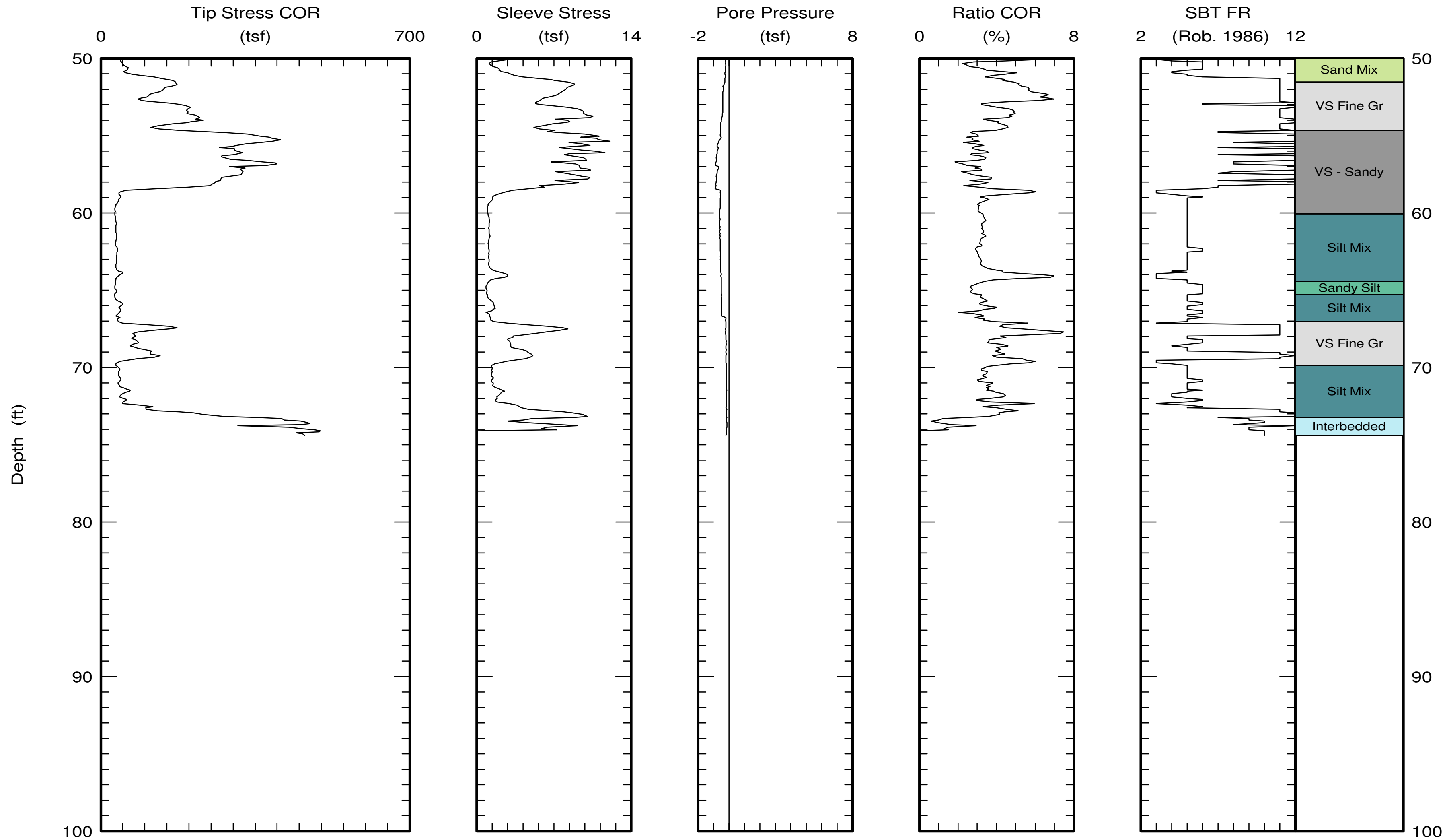
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Jun/2011
Test ID: T7-C17
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 74.41 (ft)

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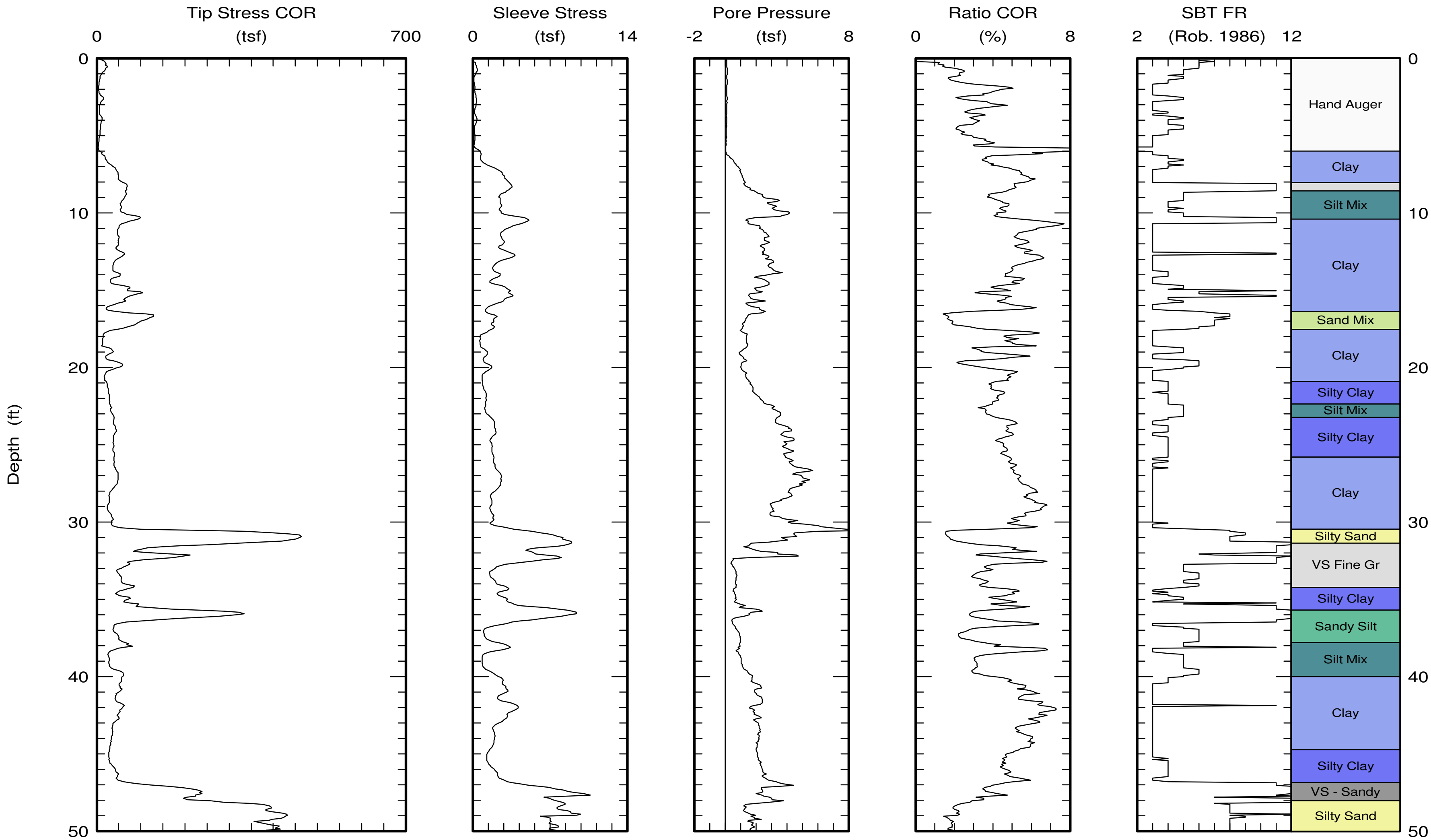
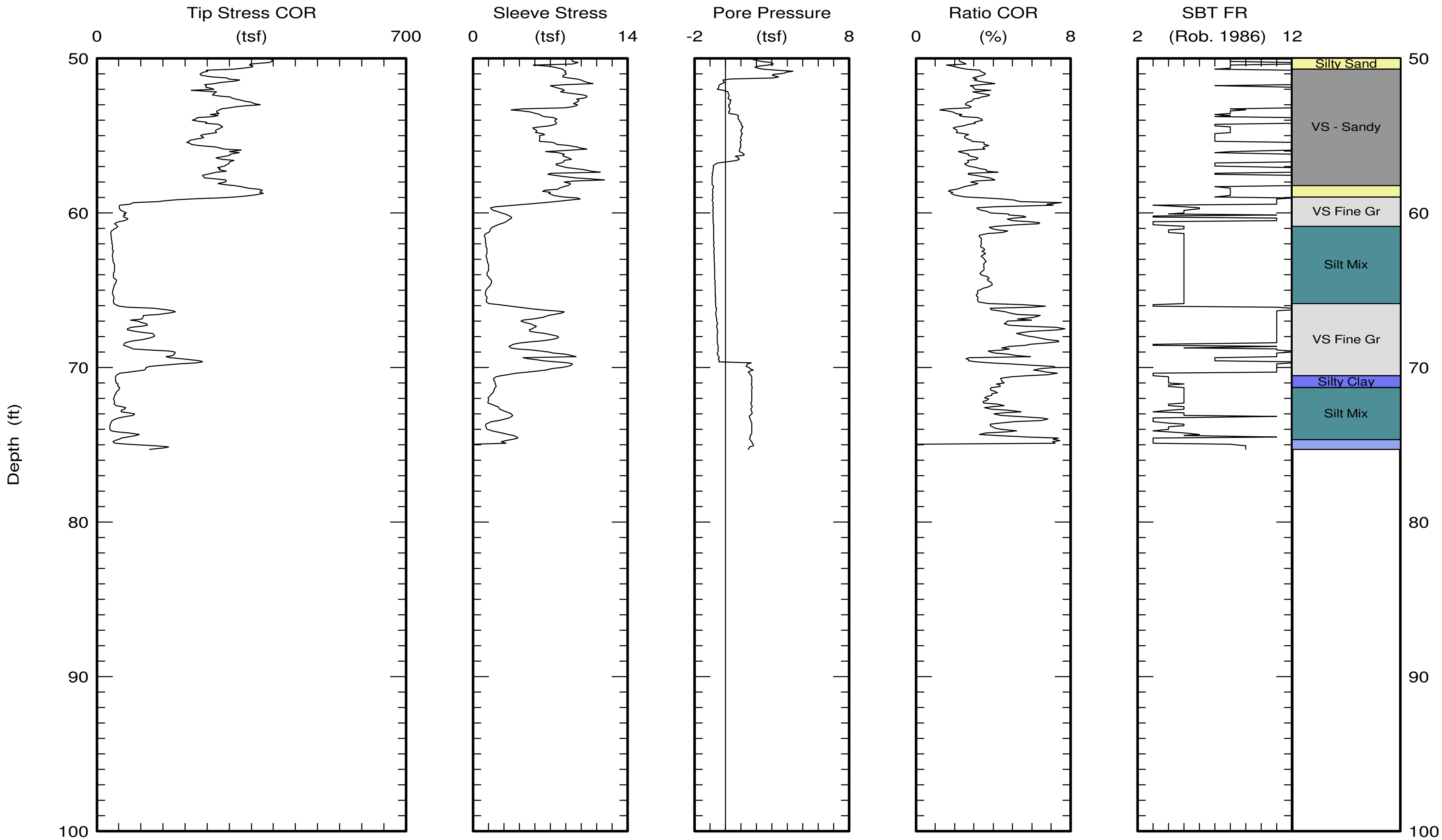
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/May/2011 Test ID: T7-C18 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.32 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/May/2011 Test ID: T7-C18 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.32 (ft)

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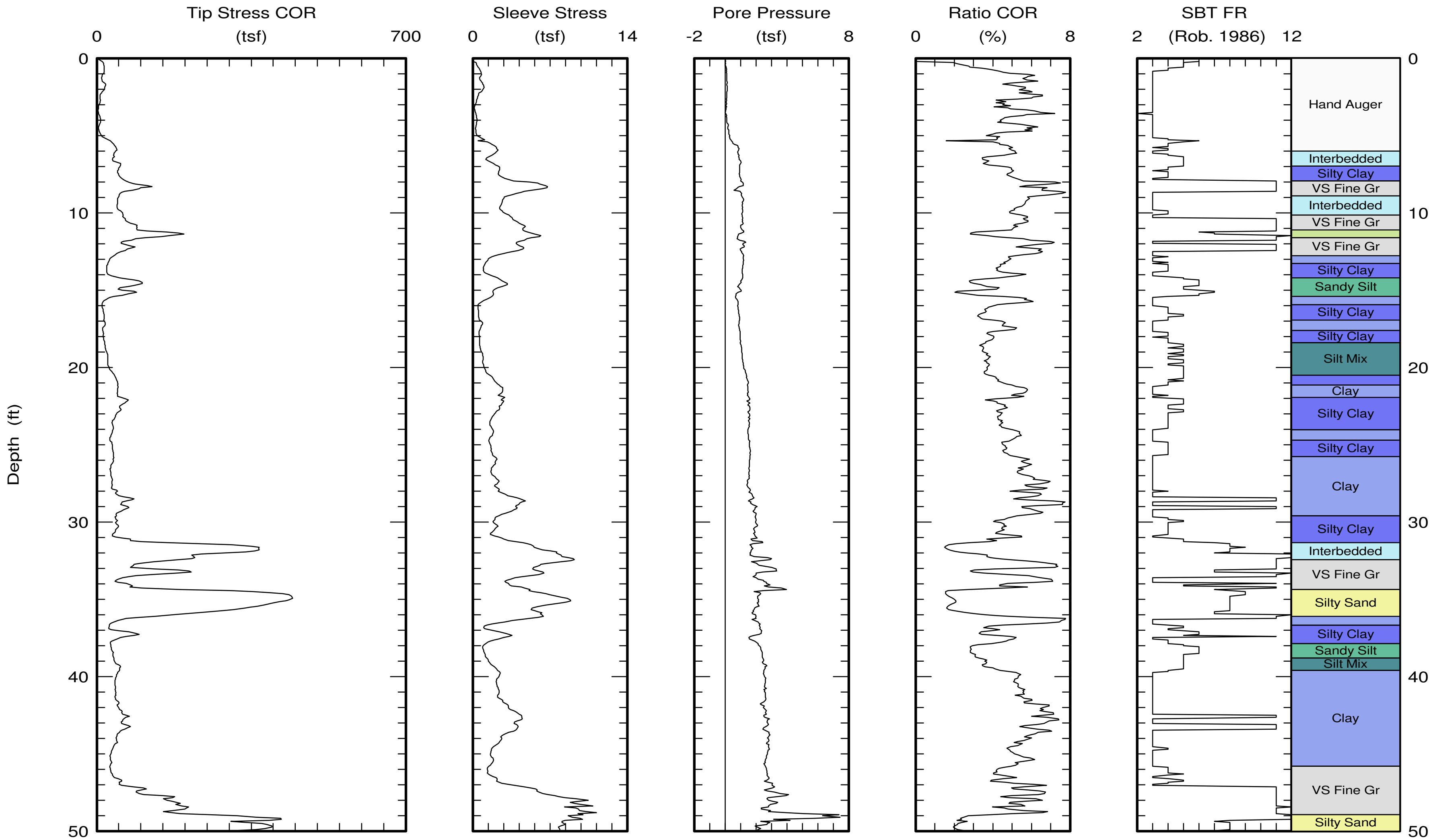
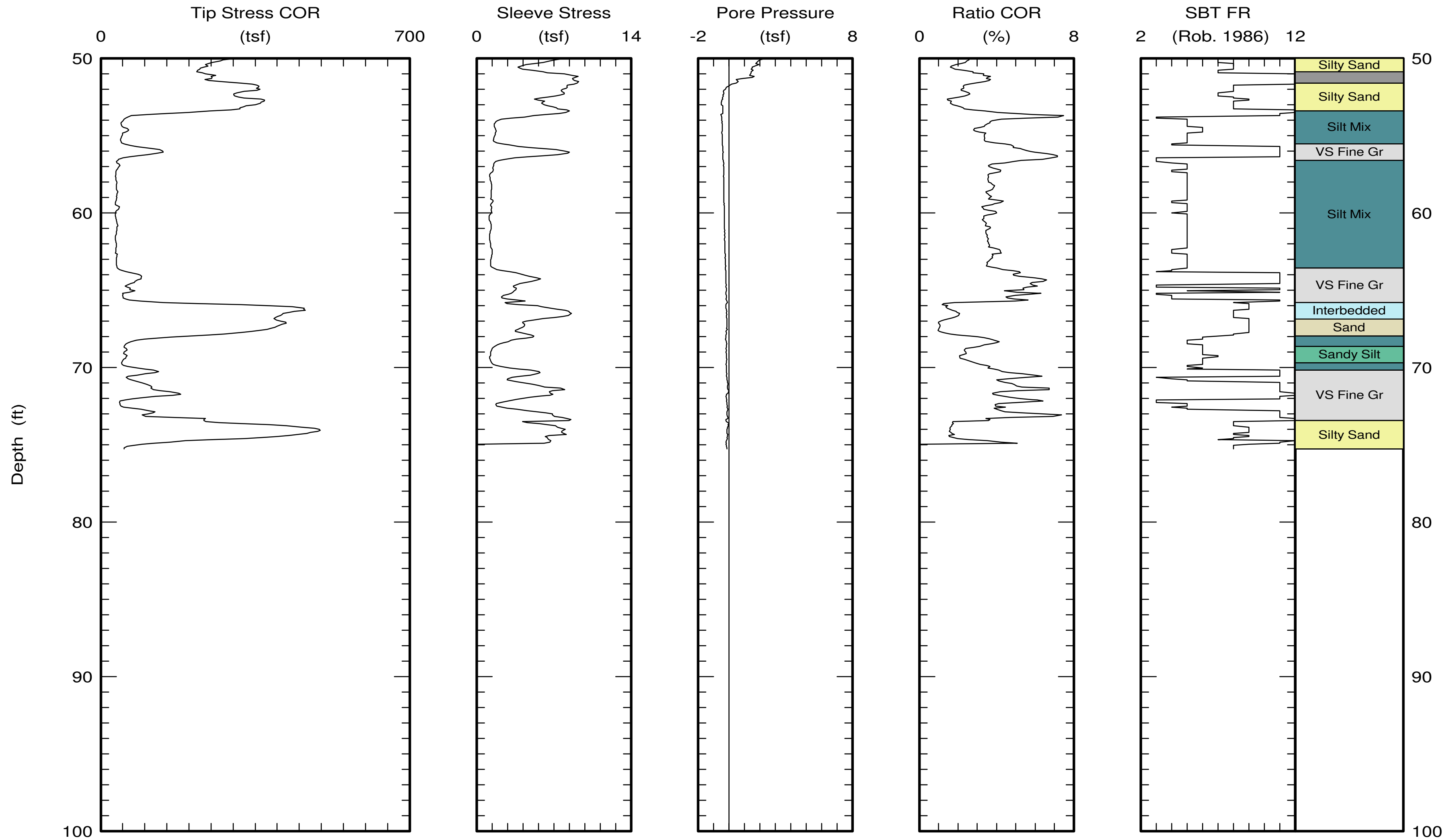
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C19 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



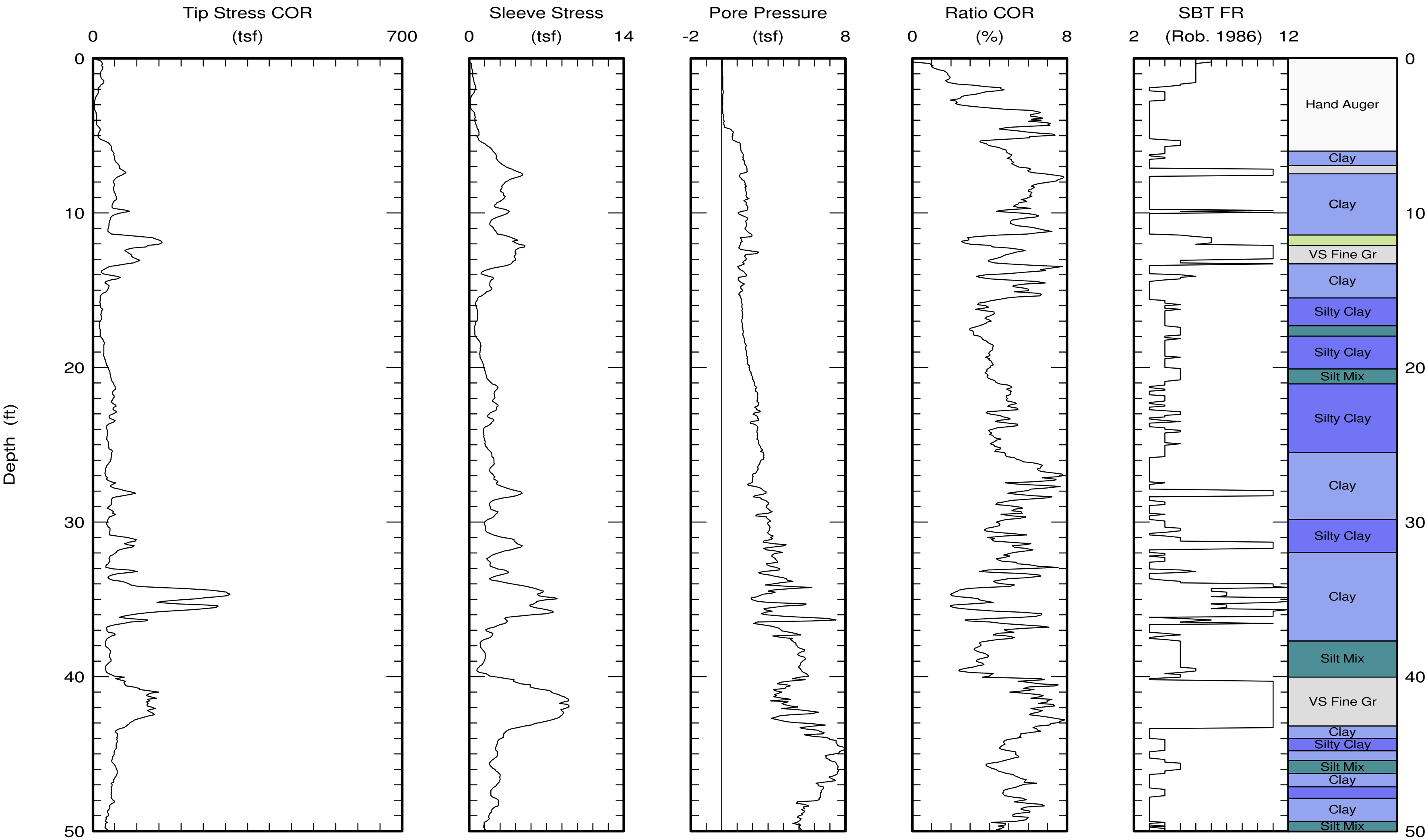
Maximum depth: 75.28 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C19 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.28 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.24 (ft)

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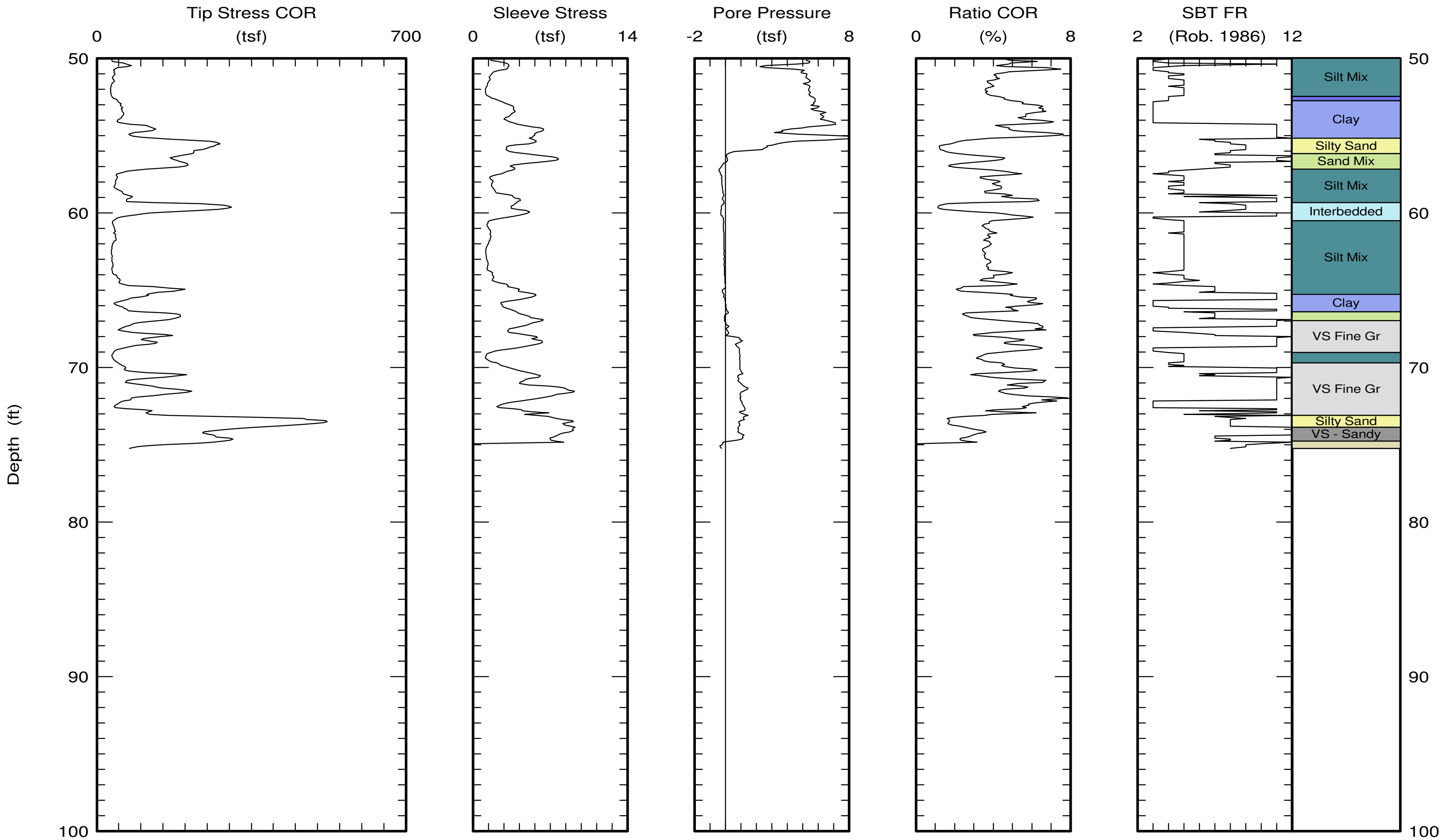
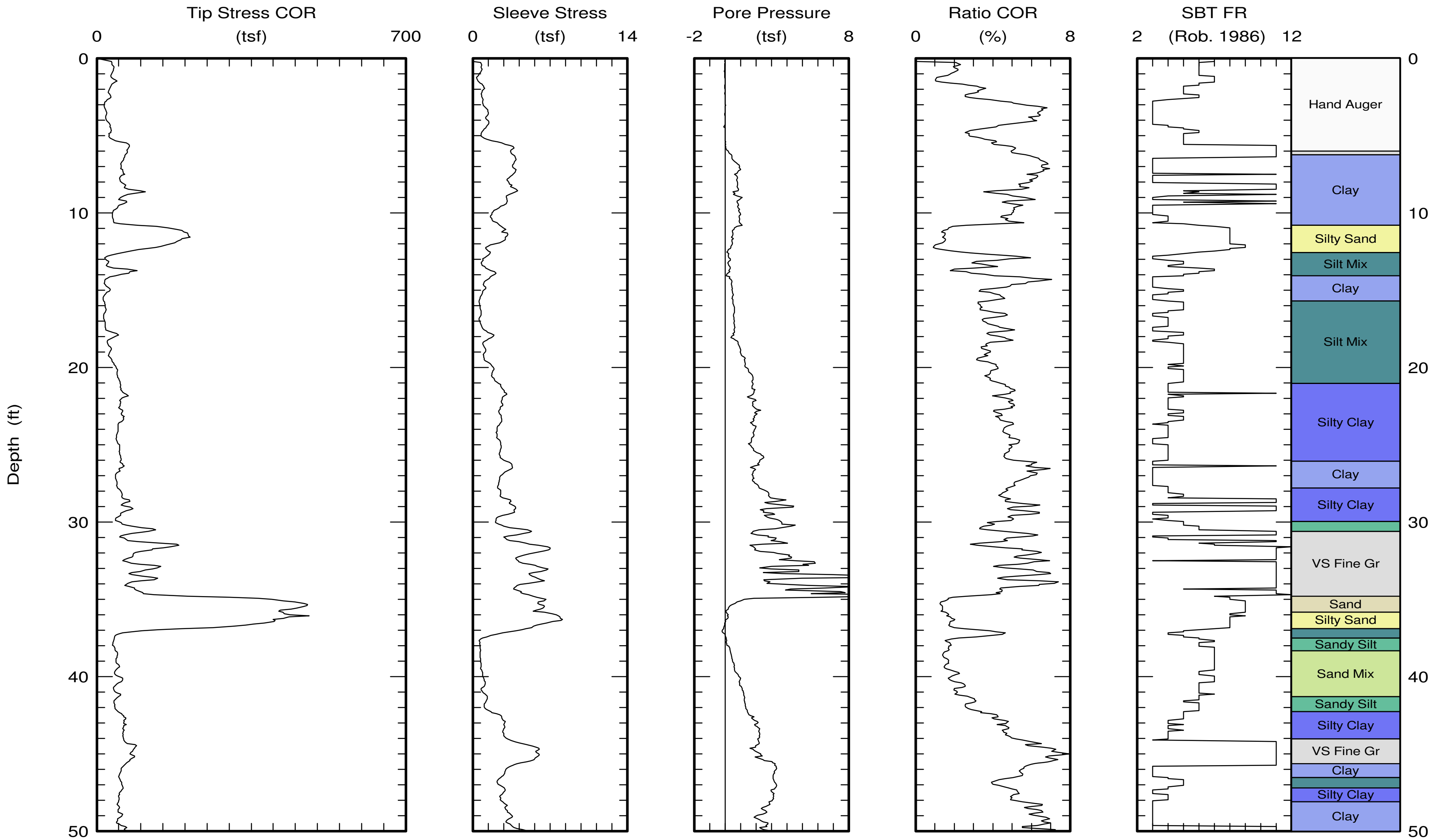
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C20 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.24 (ft)

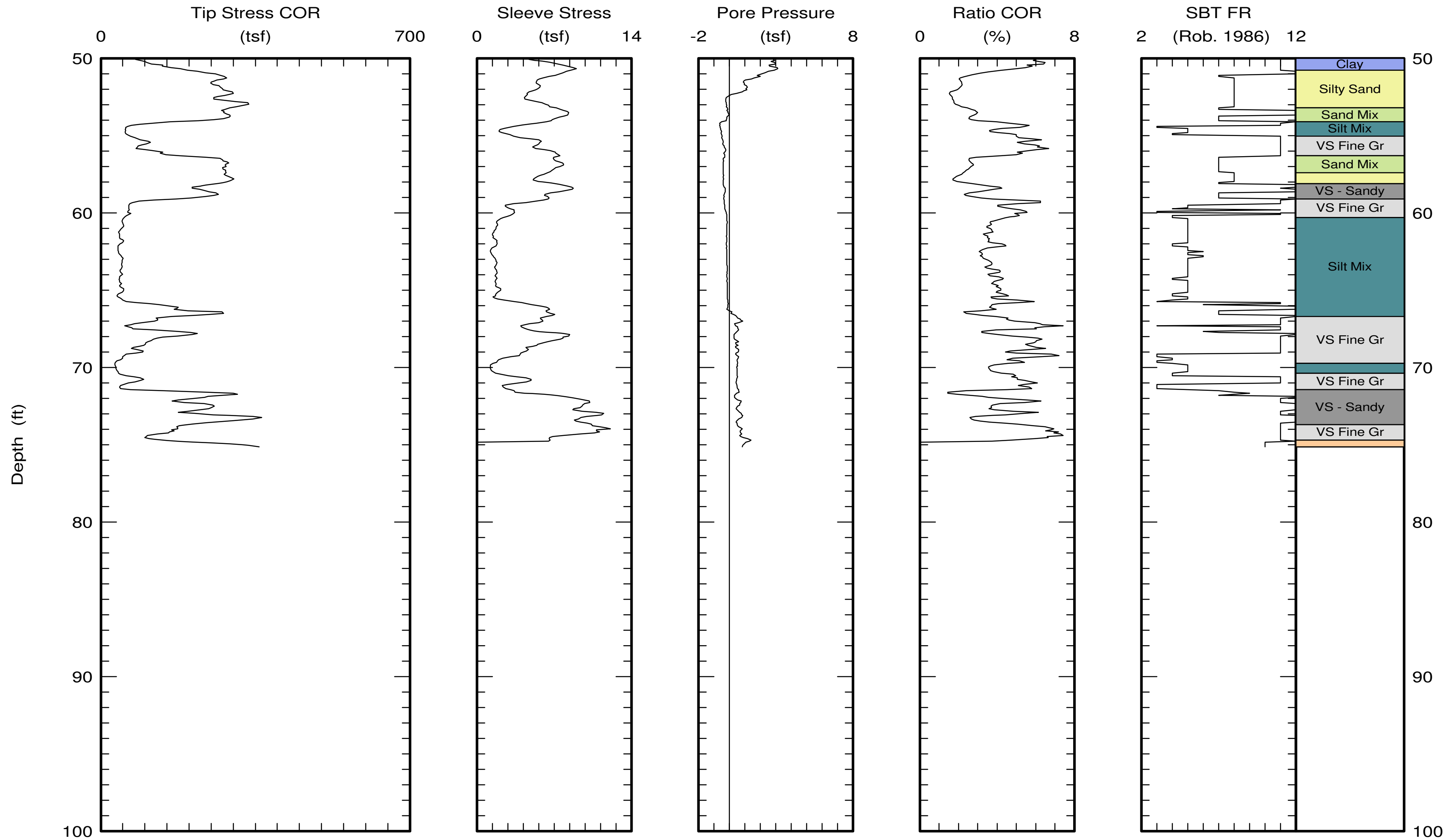
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C21 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.14 (ft)

Test ID: T7-C21
File: Z23Y1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 23/May/2011 Test ID: T7-C21 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 75.14 (ft)

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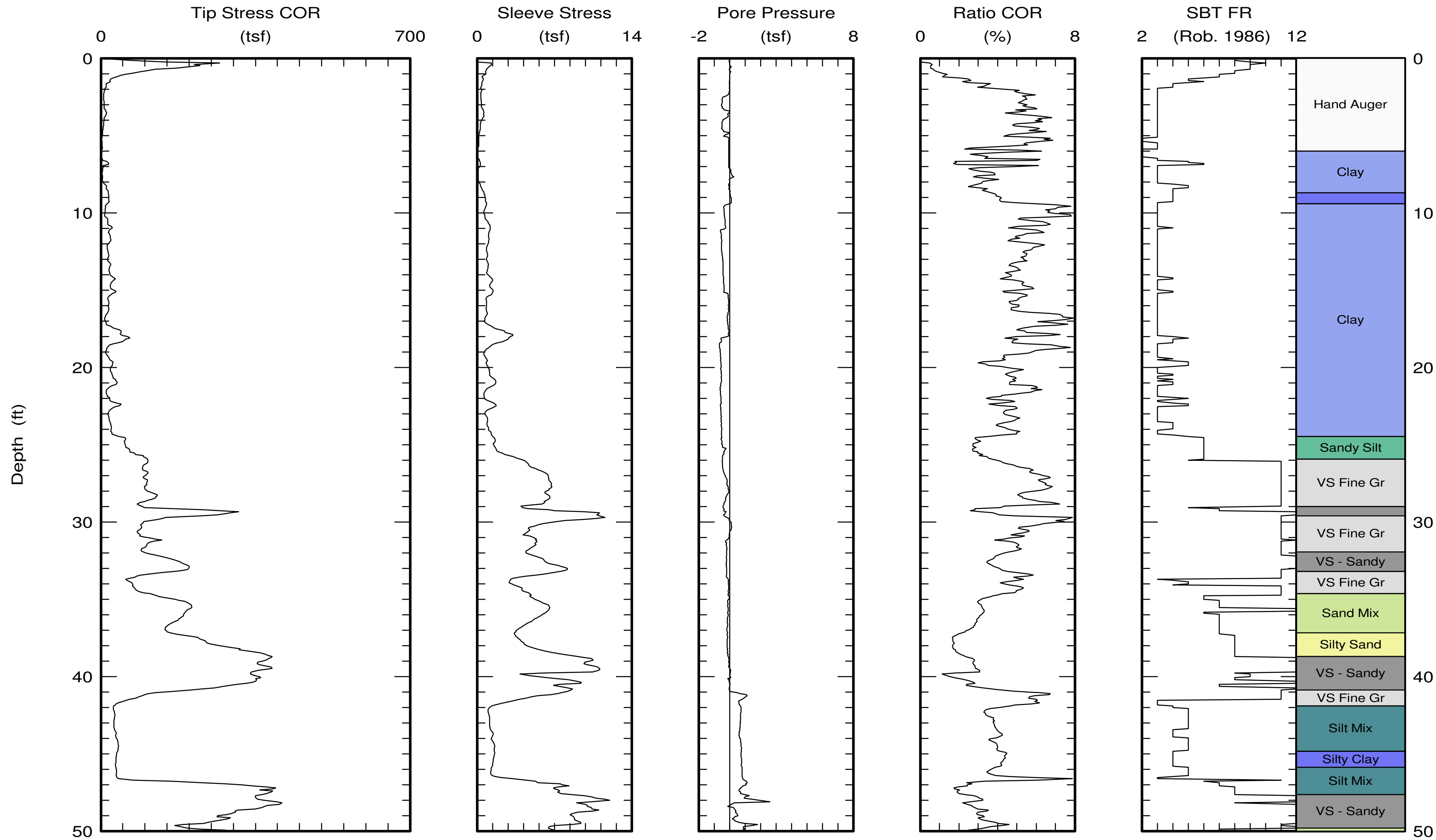
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2011 Test ID: T8-C1 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 56.72 (ft)

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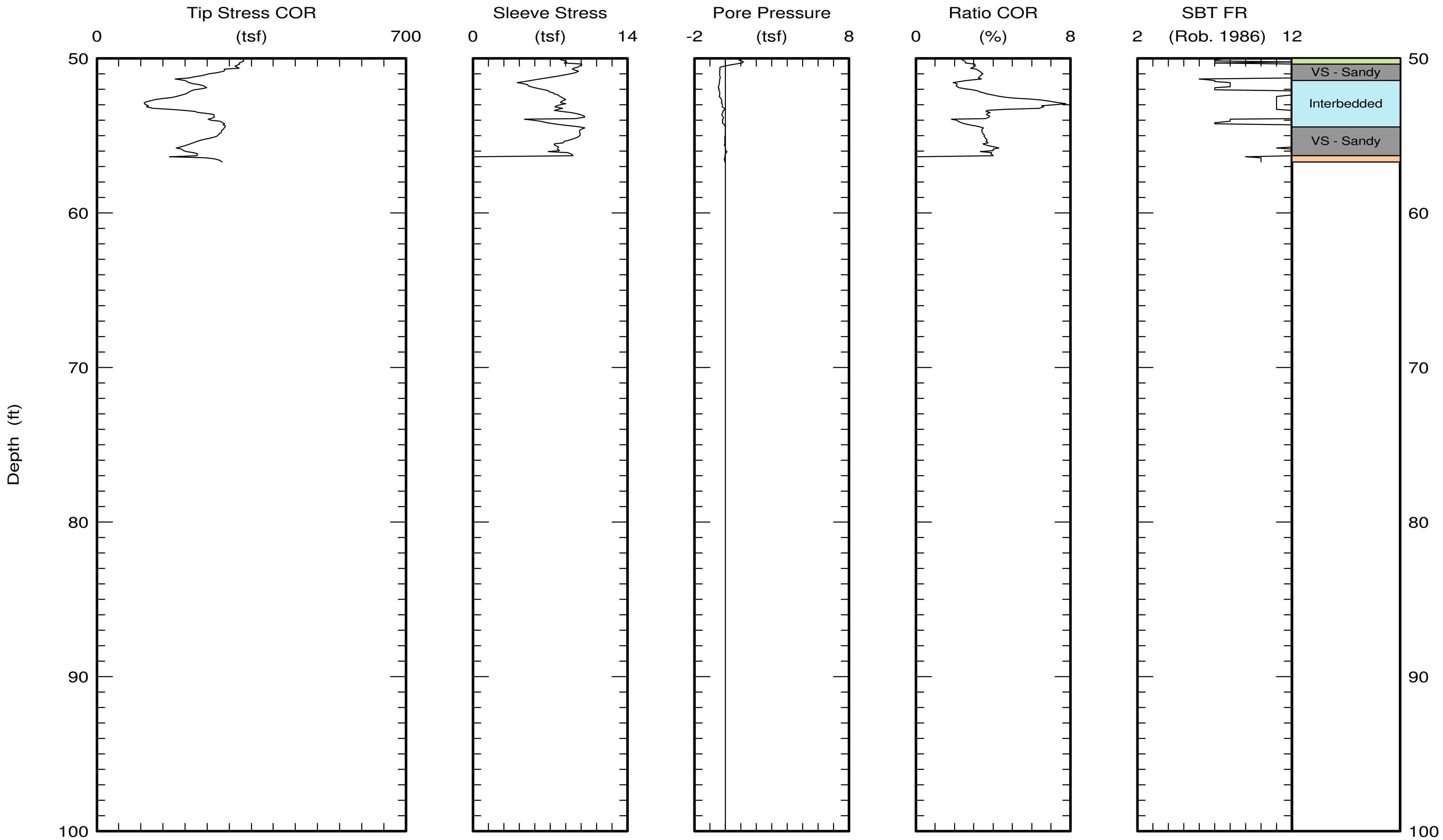
Test ID: T8-C1
File: Z24Y1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2011 Test ID: T8-C1 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



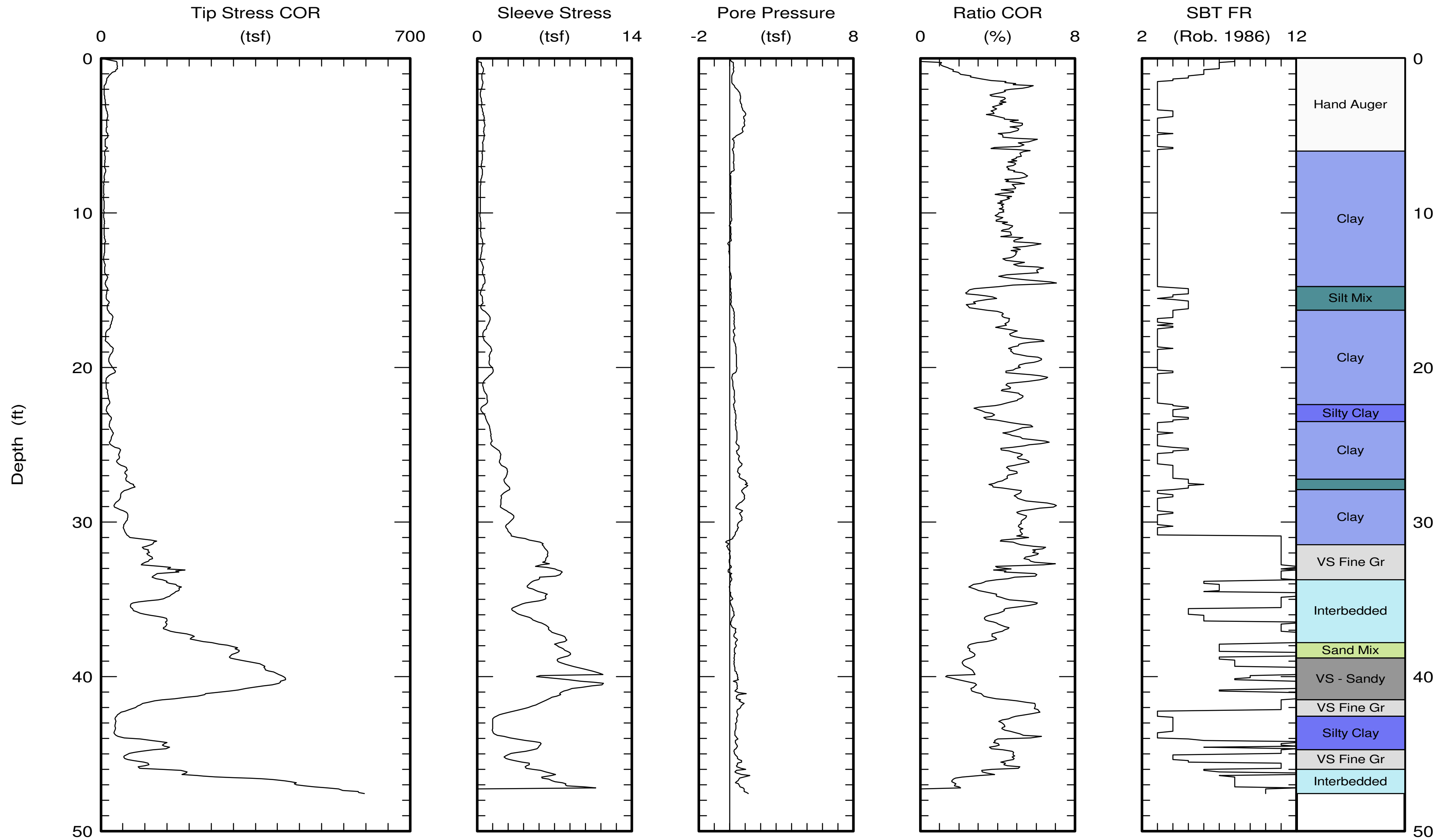
Maximum depth: 56.72 (ft)

Page 2 of 2

Test ID: T8-C1

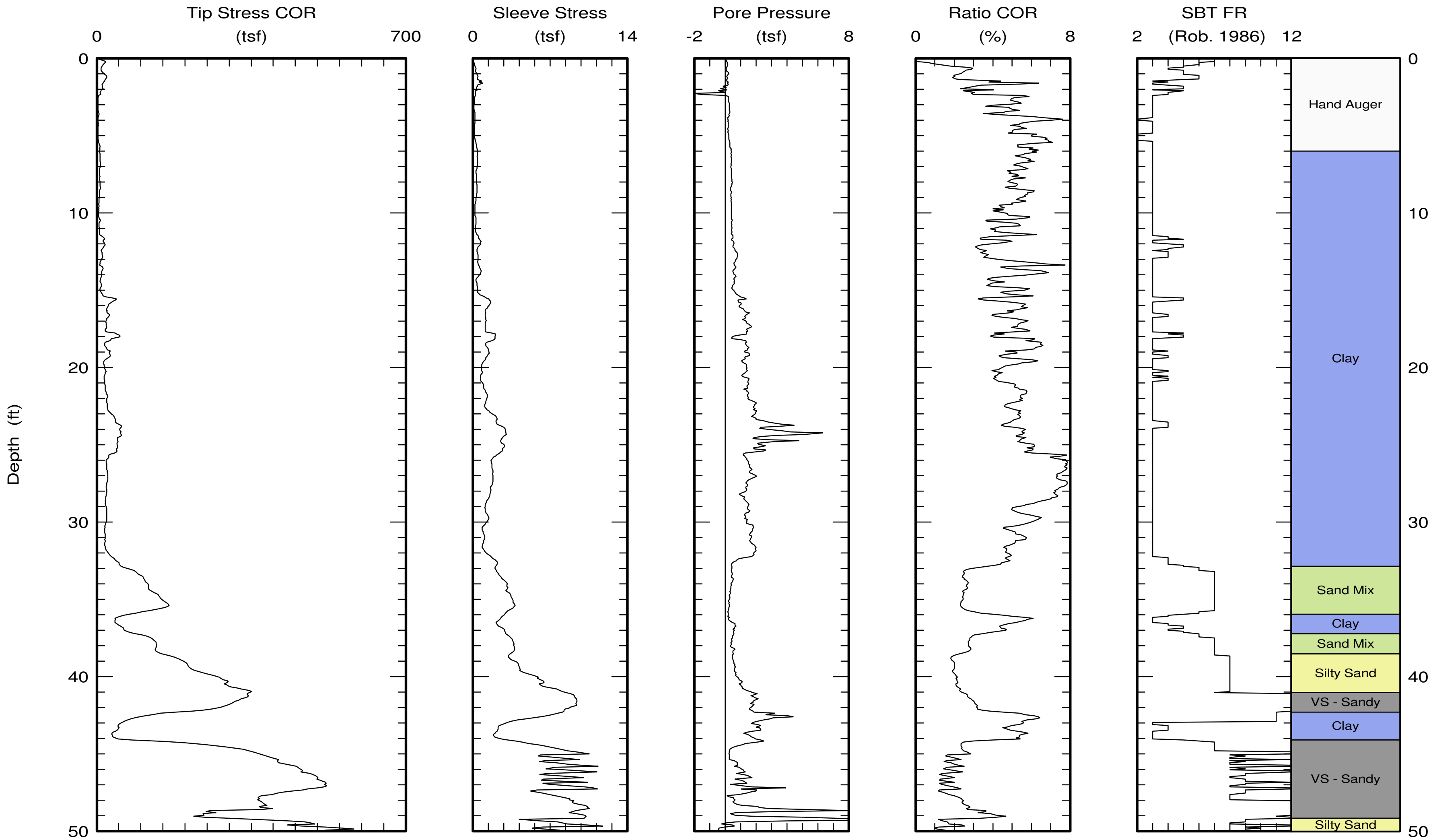
File: Z24Y1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2011 Test ID: T8-C2 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 47.58 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2011 Test ID: T8-C3 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 53.07 (ft)

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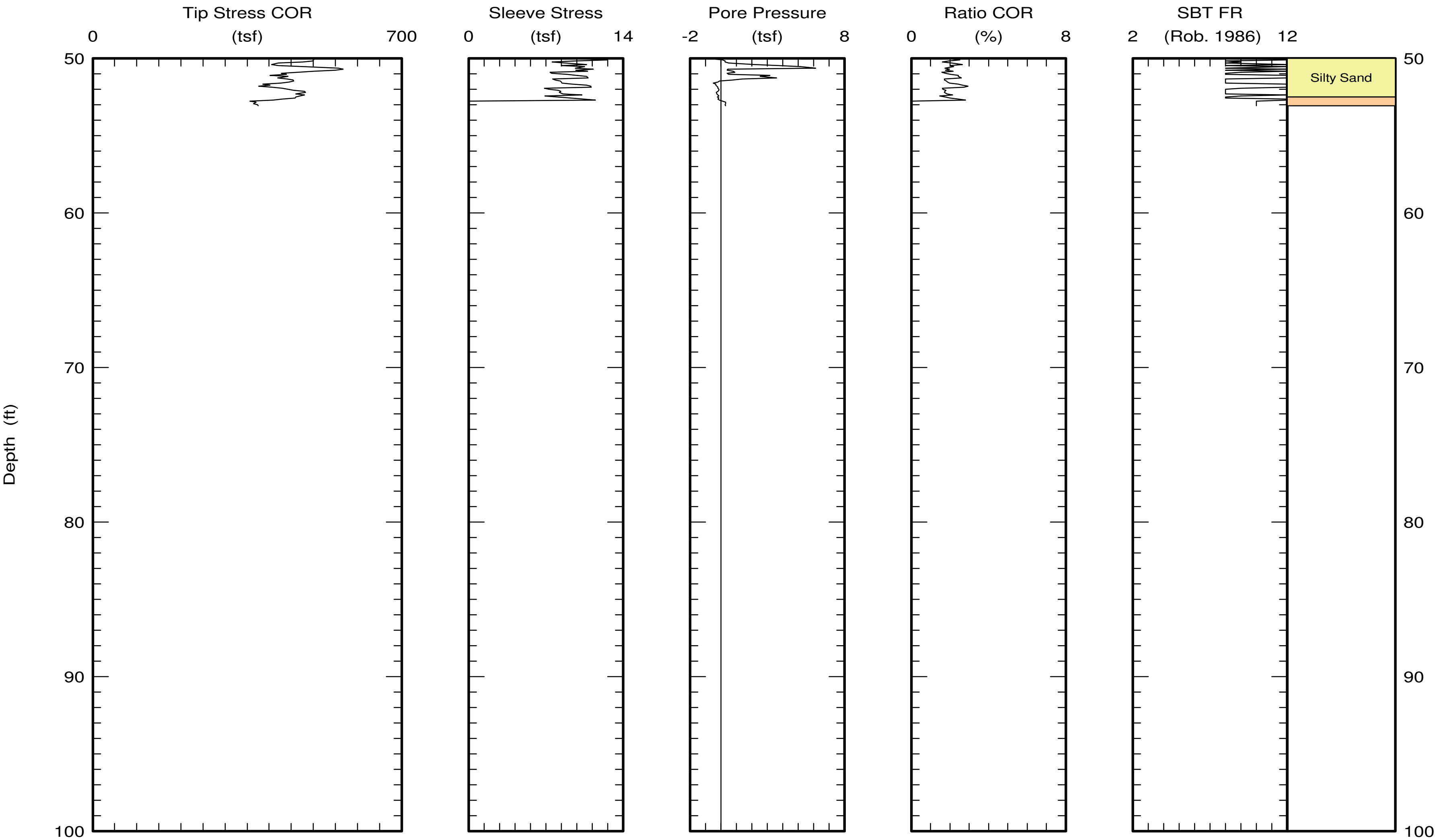
Test ID: T8-C3
File: Z24Y1103C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 24/May/2011
Test ID: T8-C3
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



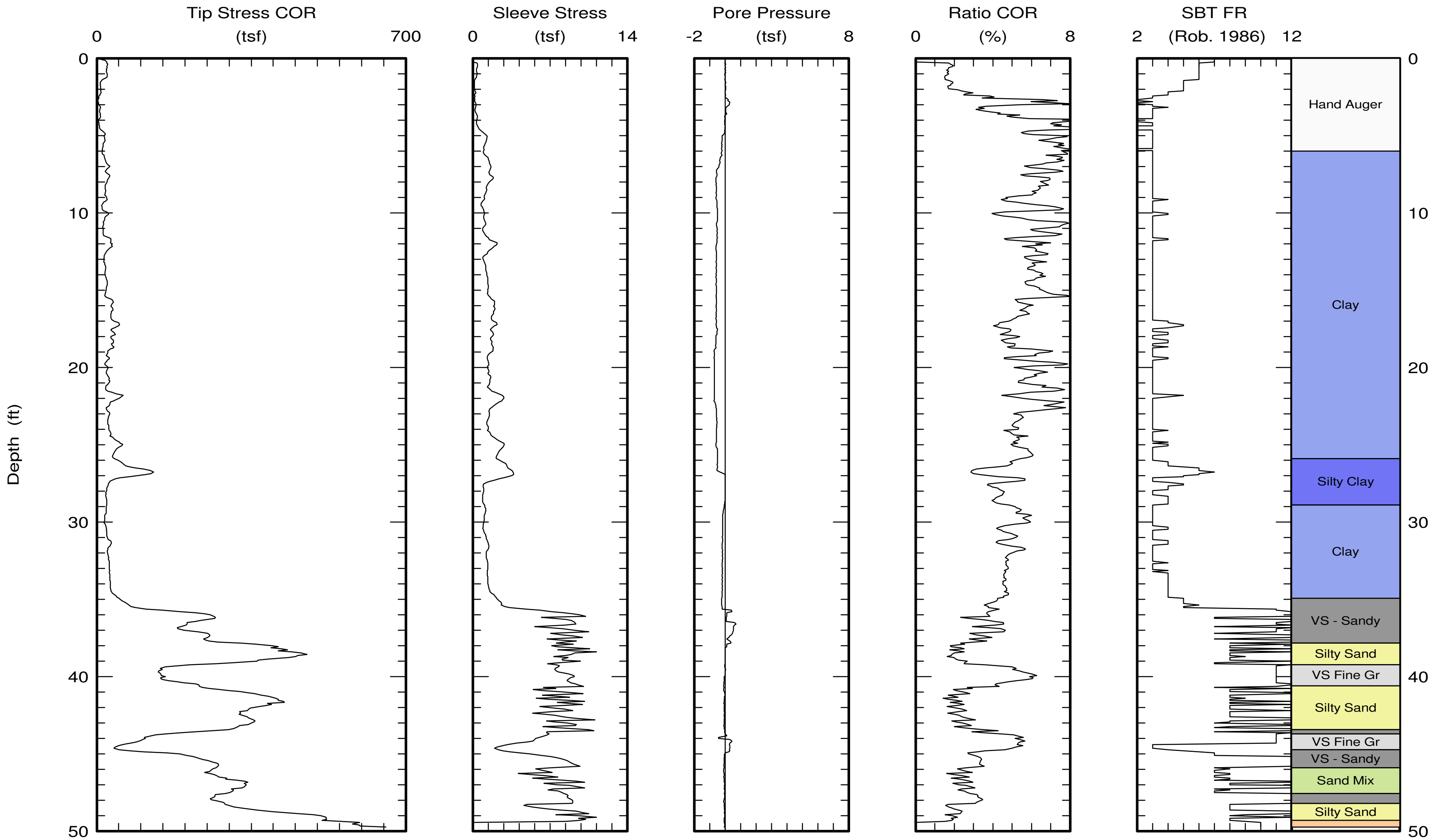
Maximum depth: 53.07 (ft)

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 21/May/2011
Test ID: T8-C4
Project: LosAngeles

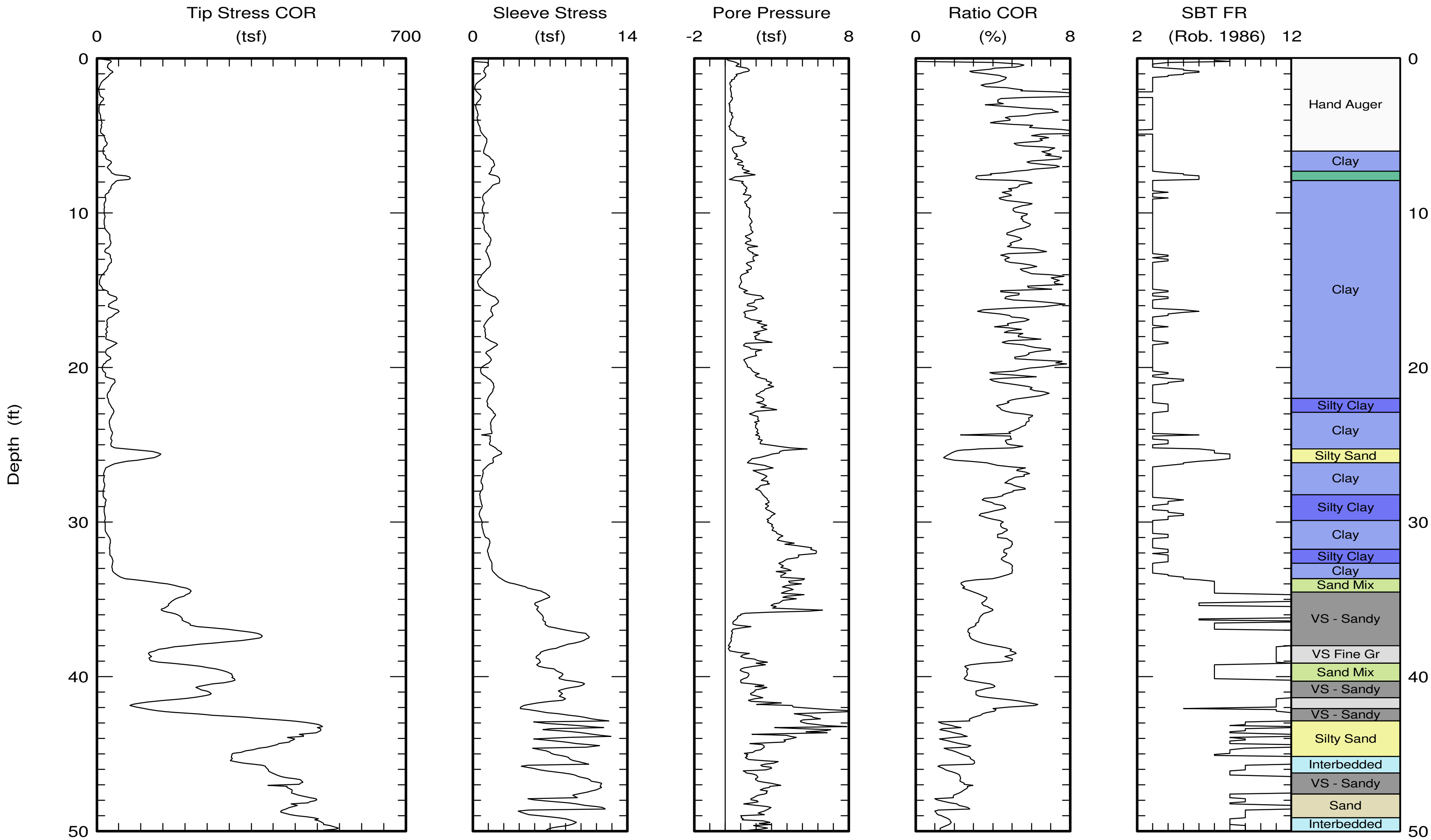
Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 49.74 (ft)

Test ID: T8-C4
File: Z21Y1108C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 21/May/2011 Test ID: T8-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 53.78 (ft)

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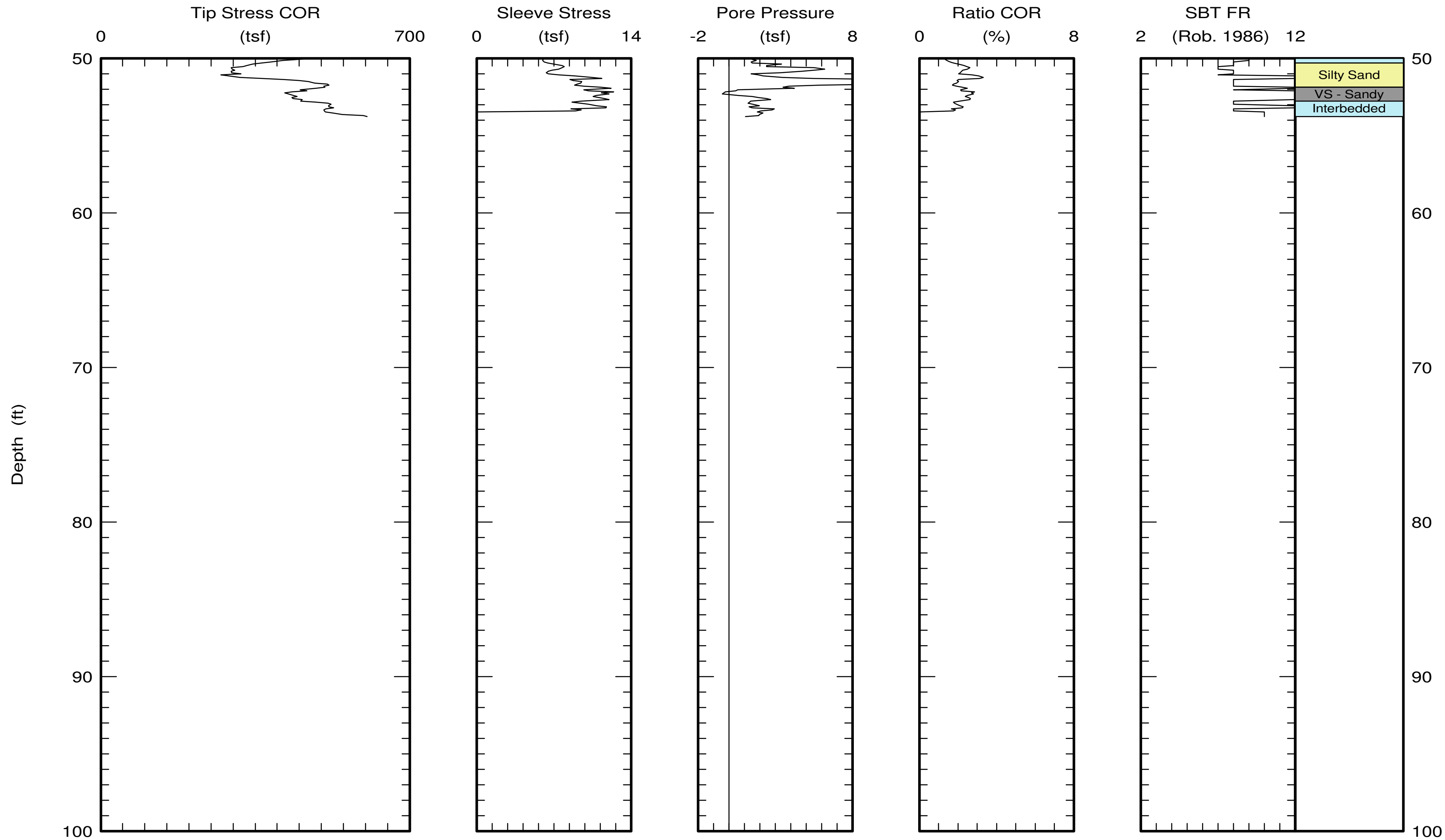
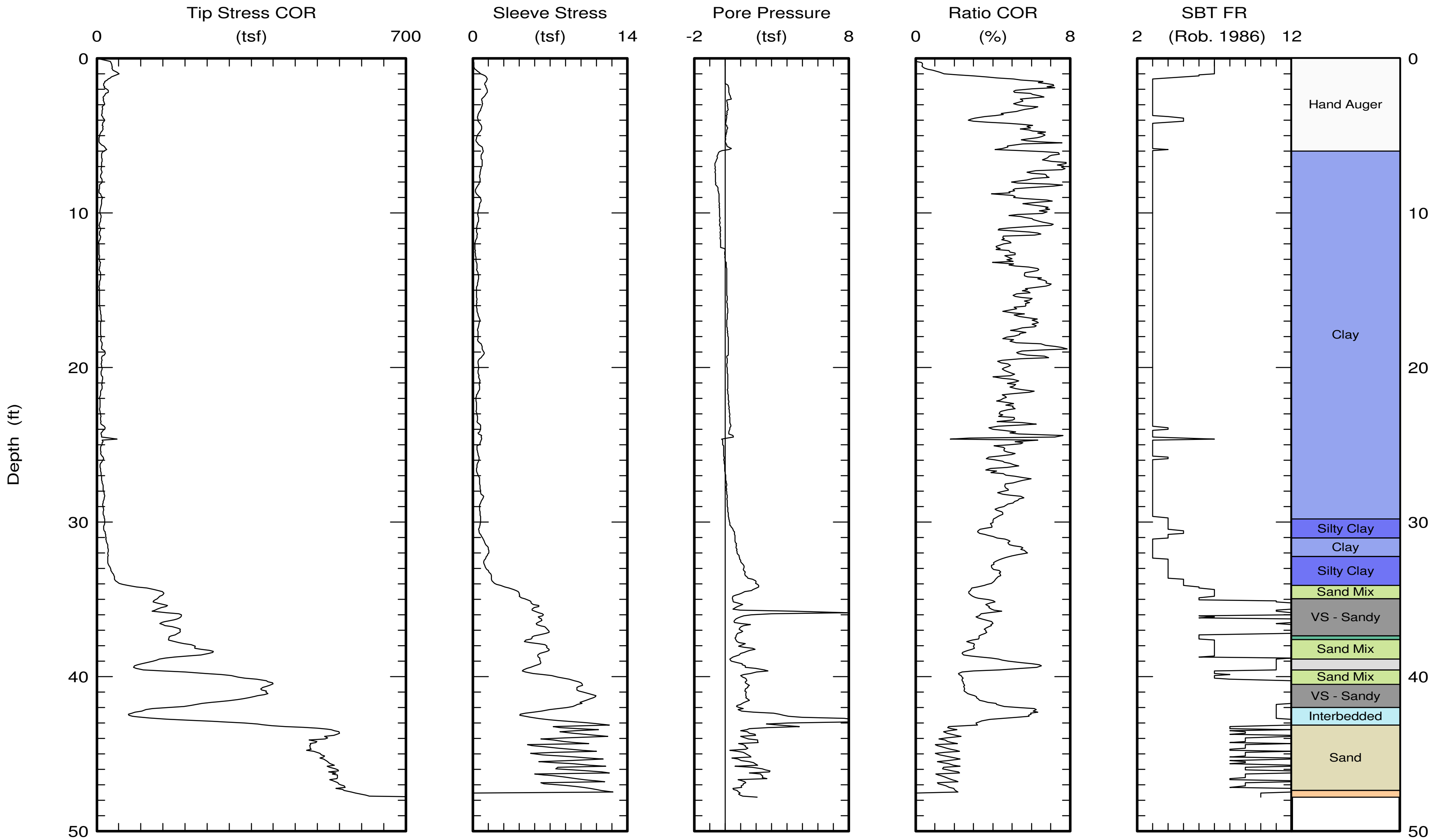
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 21/May/2011 Test ID: T8-C5 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



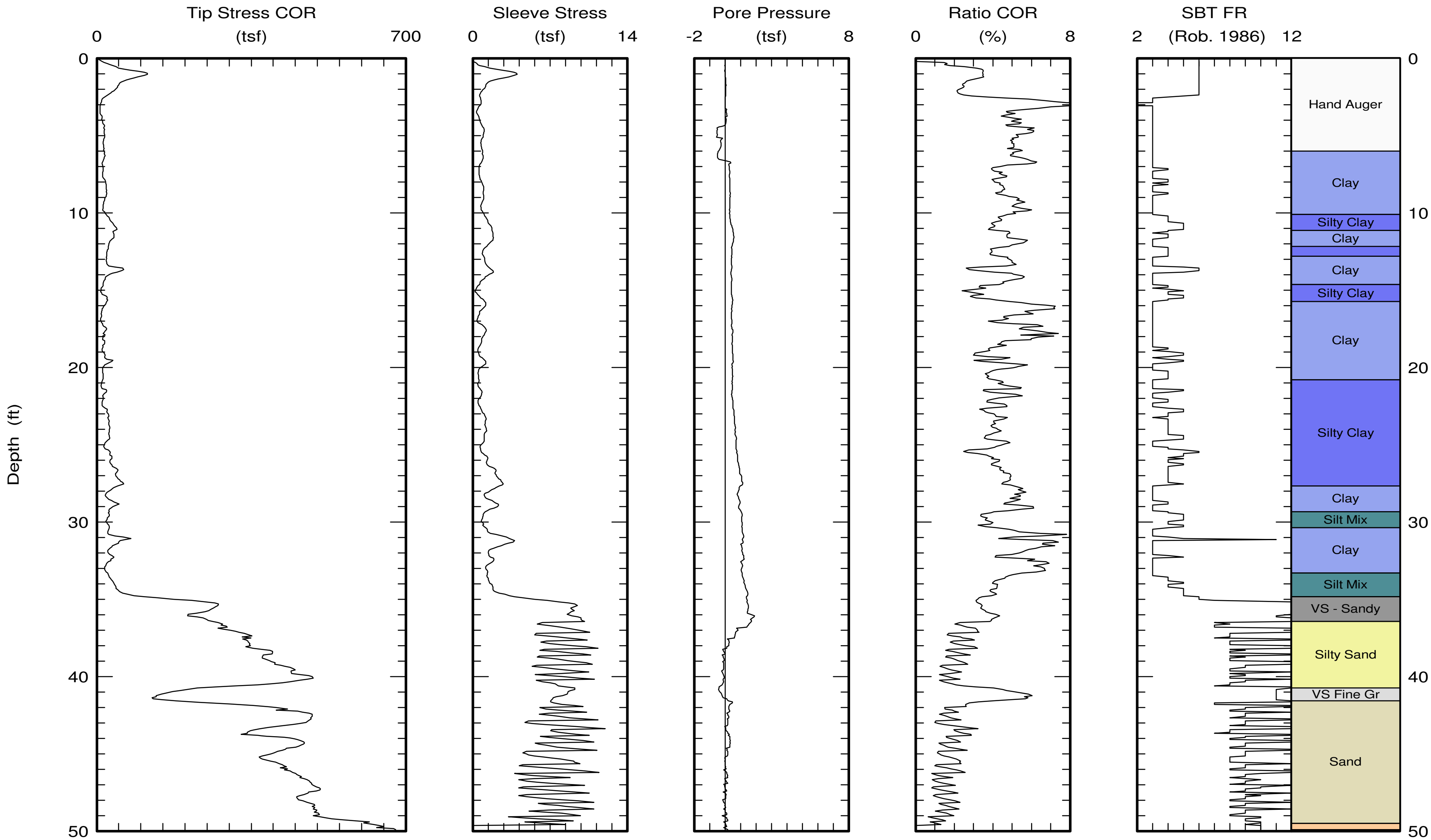
Maximum depth: 53.78 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 21/May/2011 Test ID: T8-C6 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 47.82 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 21/May/2011 Test ID: T8-C7 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



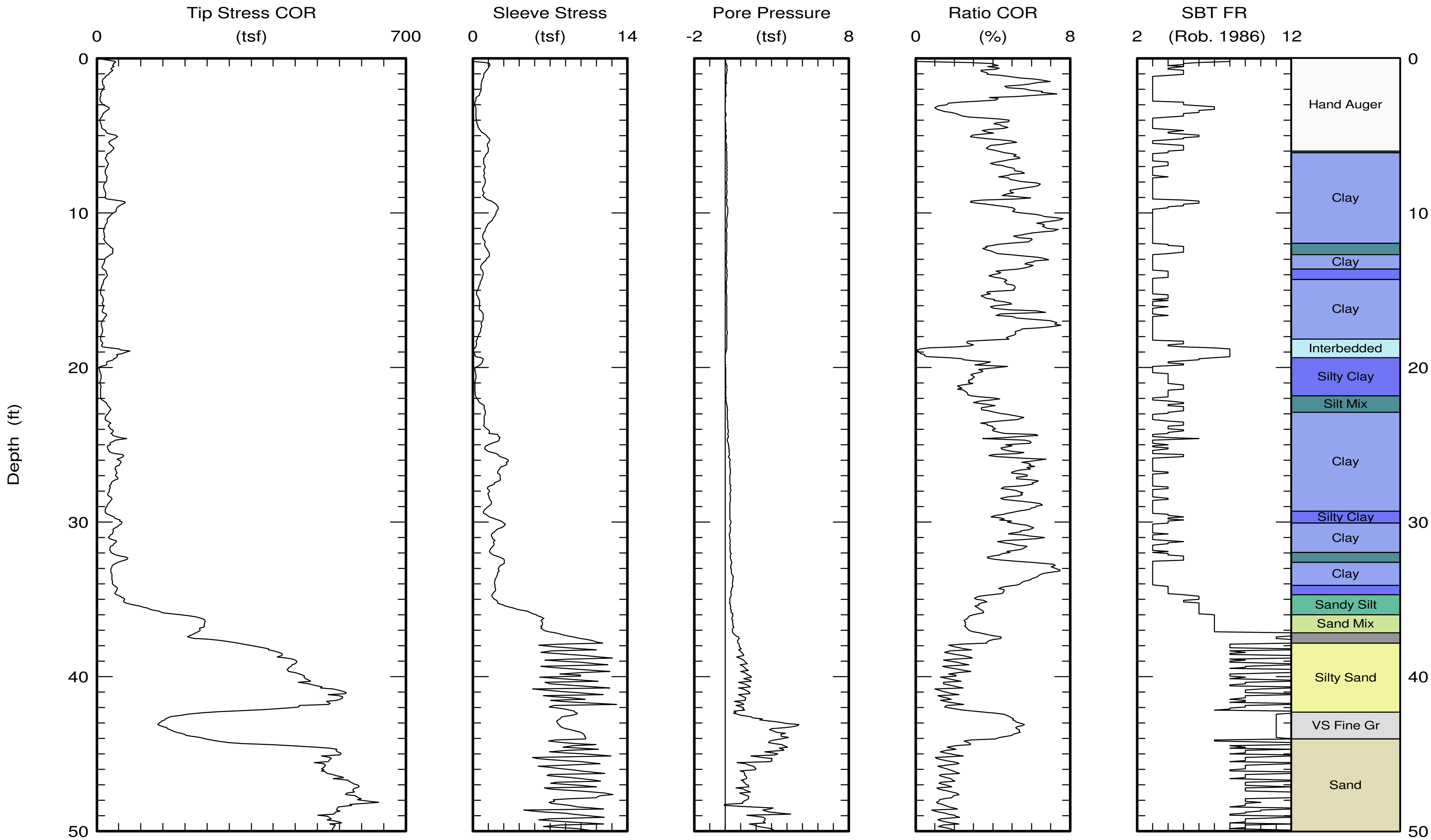
Maximum depth: 49.92 (ft)

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 21/May/2011
Test ID: T8-C8
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 53.75 (ft)

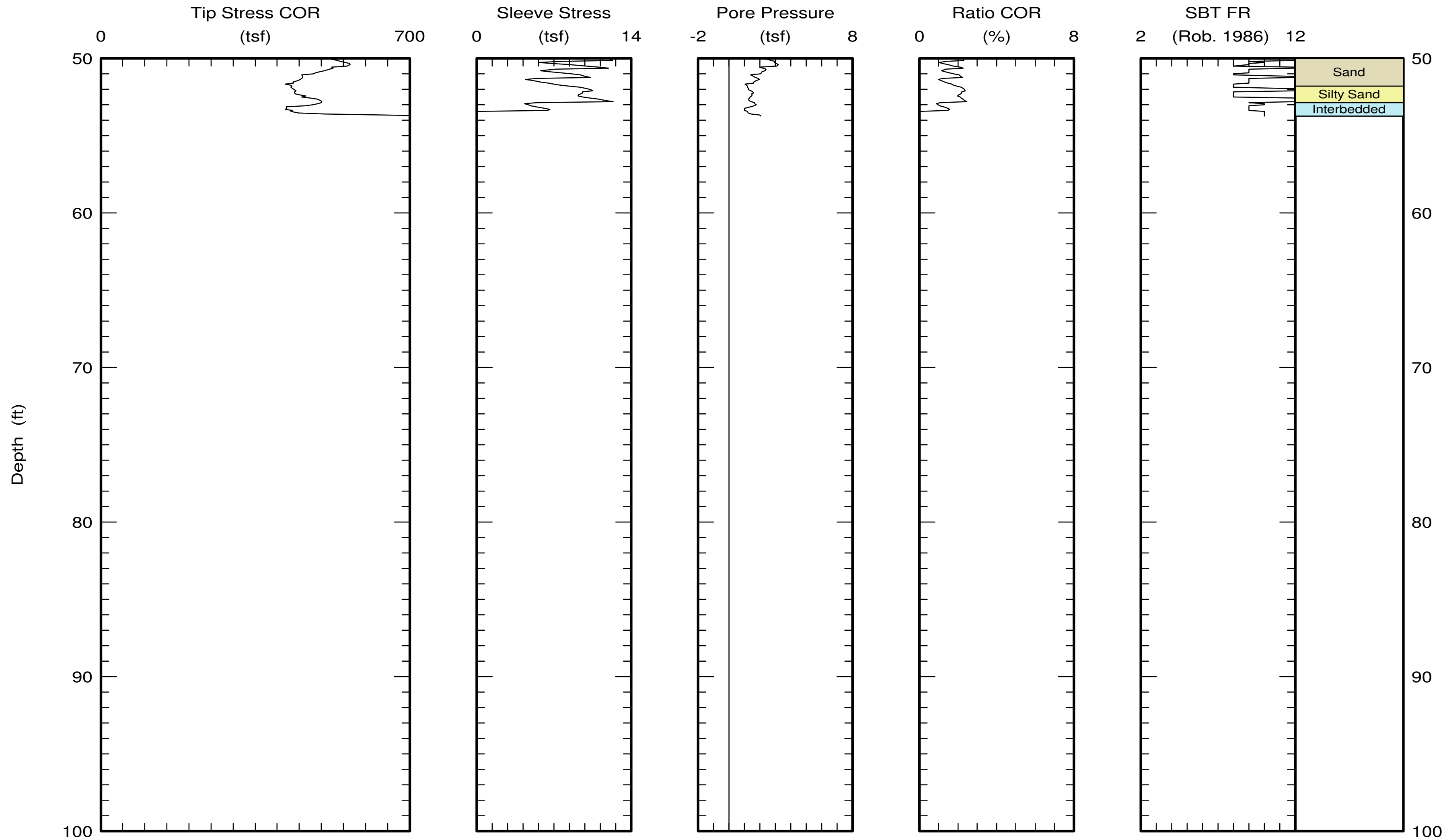
Test ID: T8-C8
File: Z21Y1102C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 21/May/2011
Test ID: T8-C8
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 53.75 (ft)

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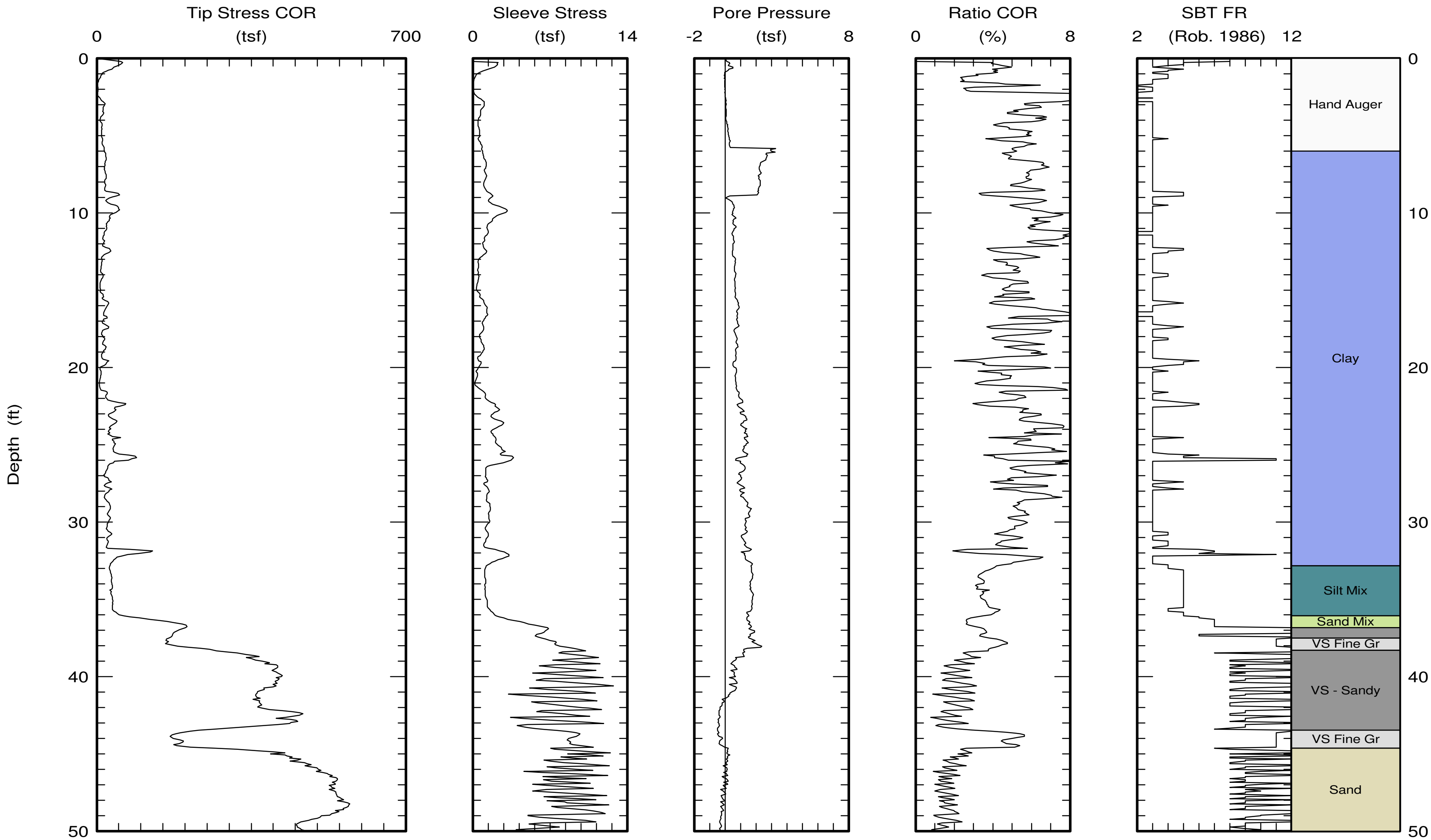
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/May/2011 Test ID: T8-C9 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 53.11 (ft)

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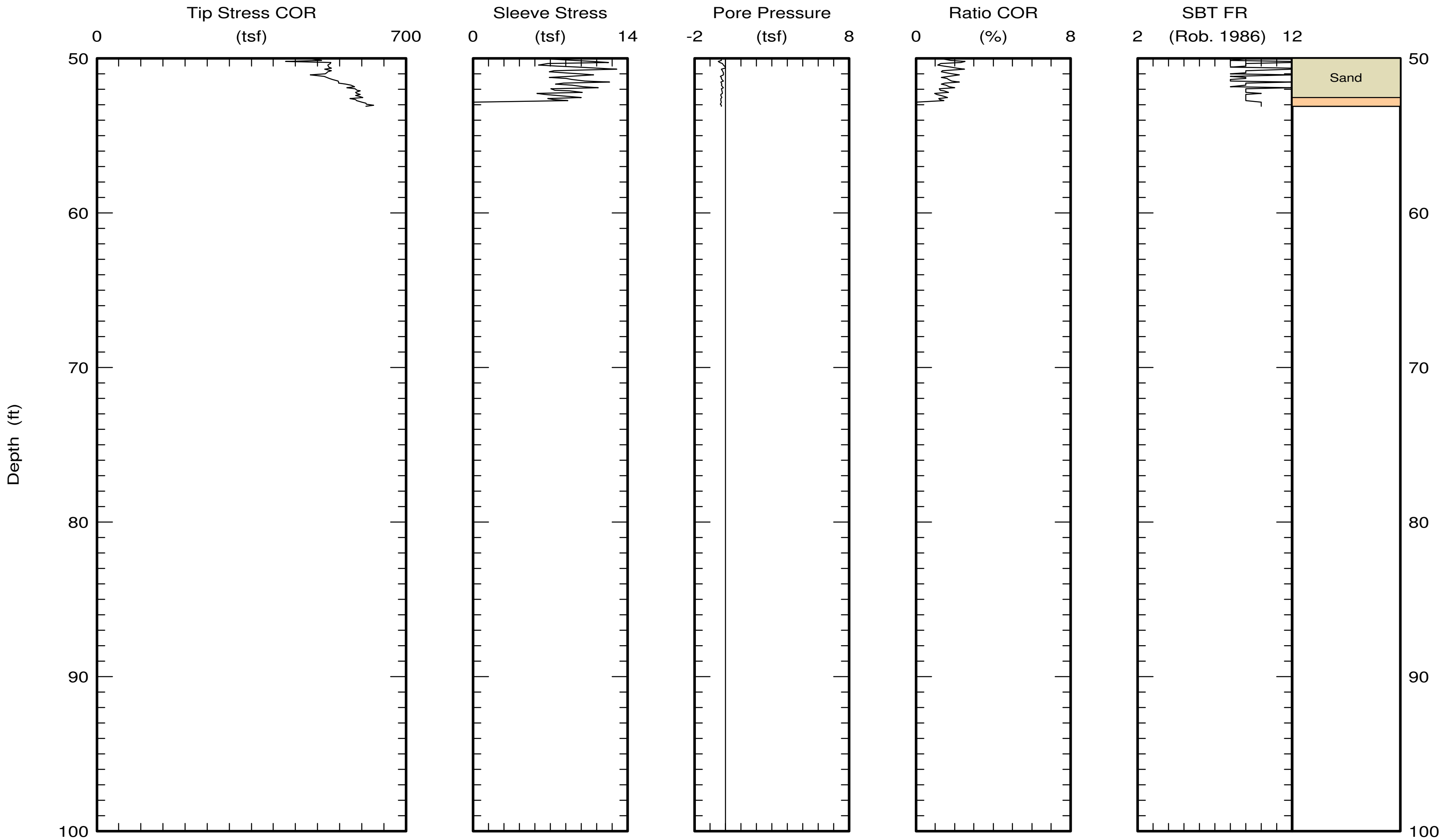
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/May/2011 Test ID: T8-C9 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 53.11 (ft)

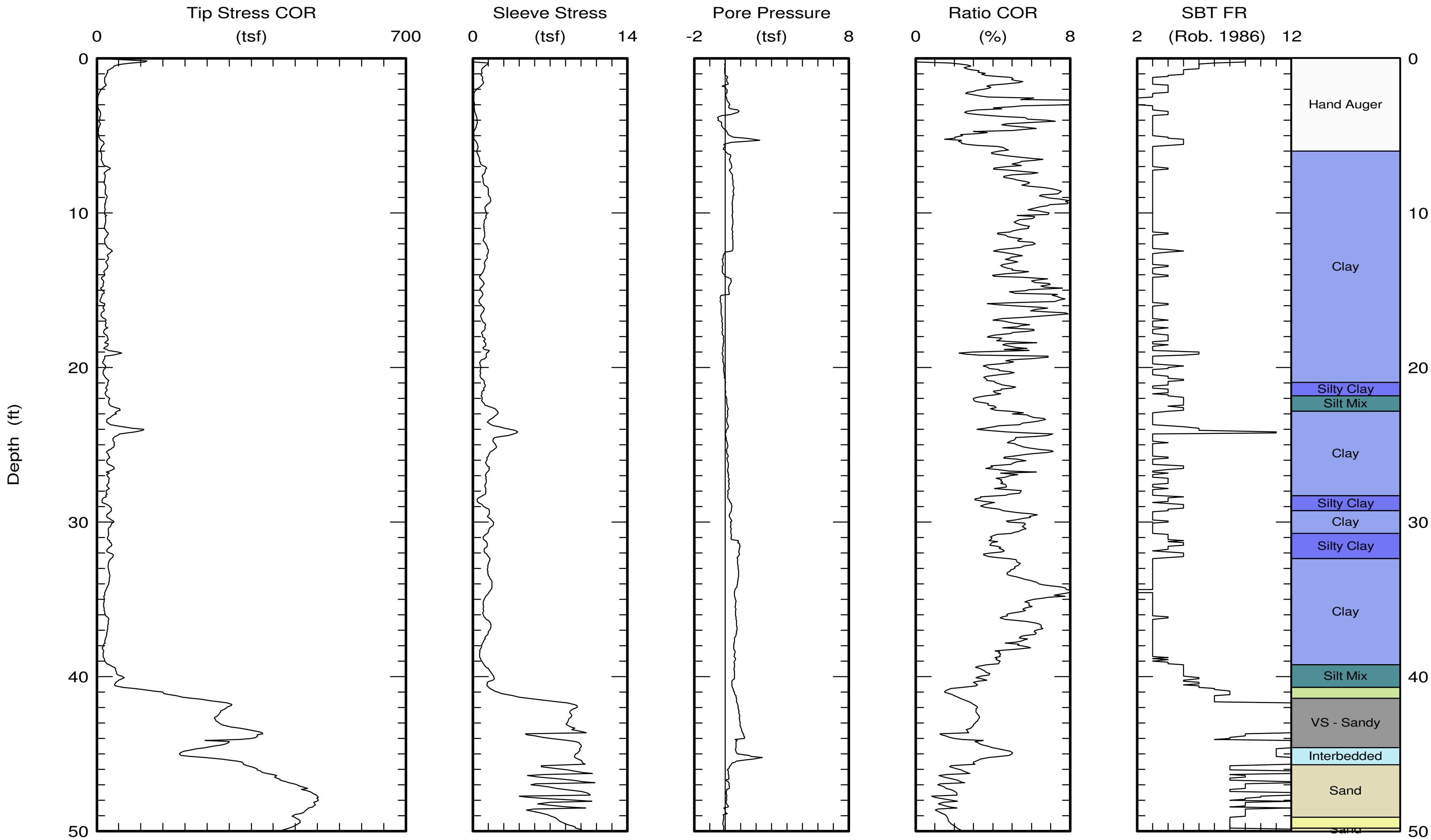
Test ID: T8-C9
File: Z26Y1102C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 26/May/2011
Test ID: T8-C10
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 53.08 (ft)
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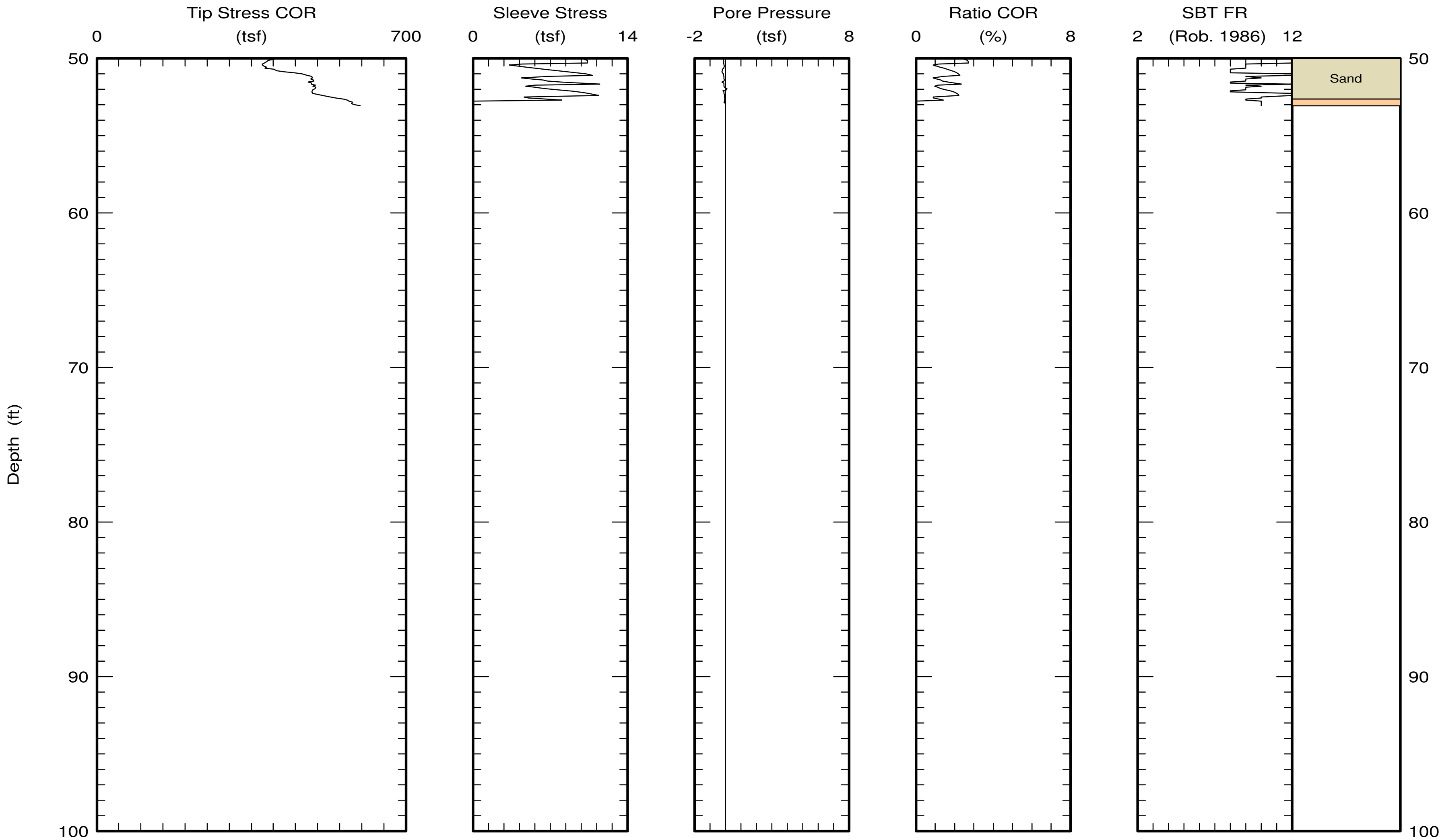
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 26/May/2011
Test ID: T8-C10
Project: LosAngeles

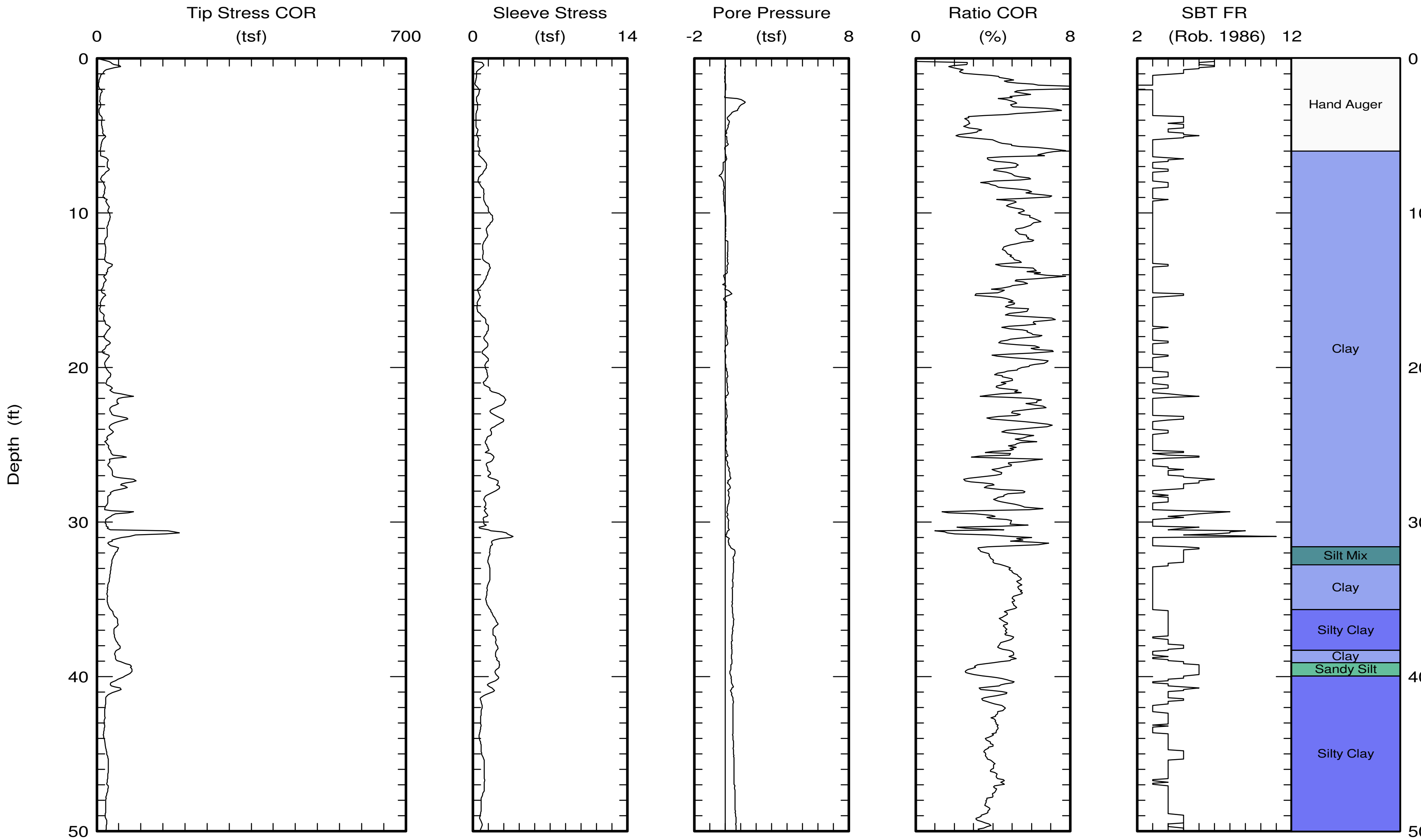
Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 53.08 (ft)
Page 2 of 2

Test ID: T8-C10
File: Z26Y1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/May/2011 Test ID: T8-C11 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 58.60 (ft)

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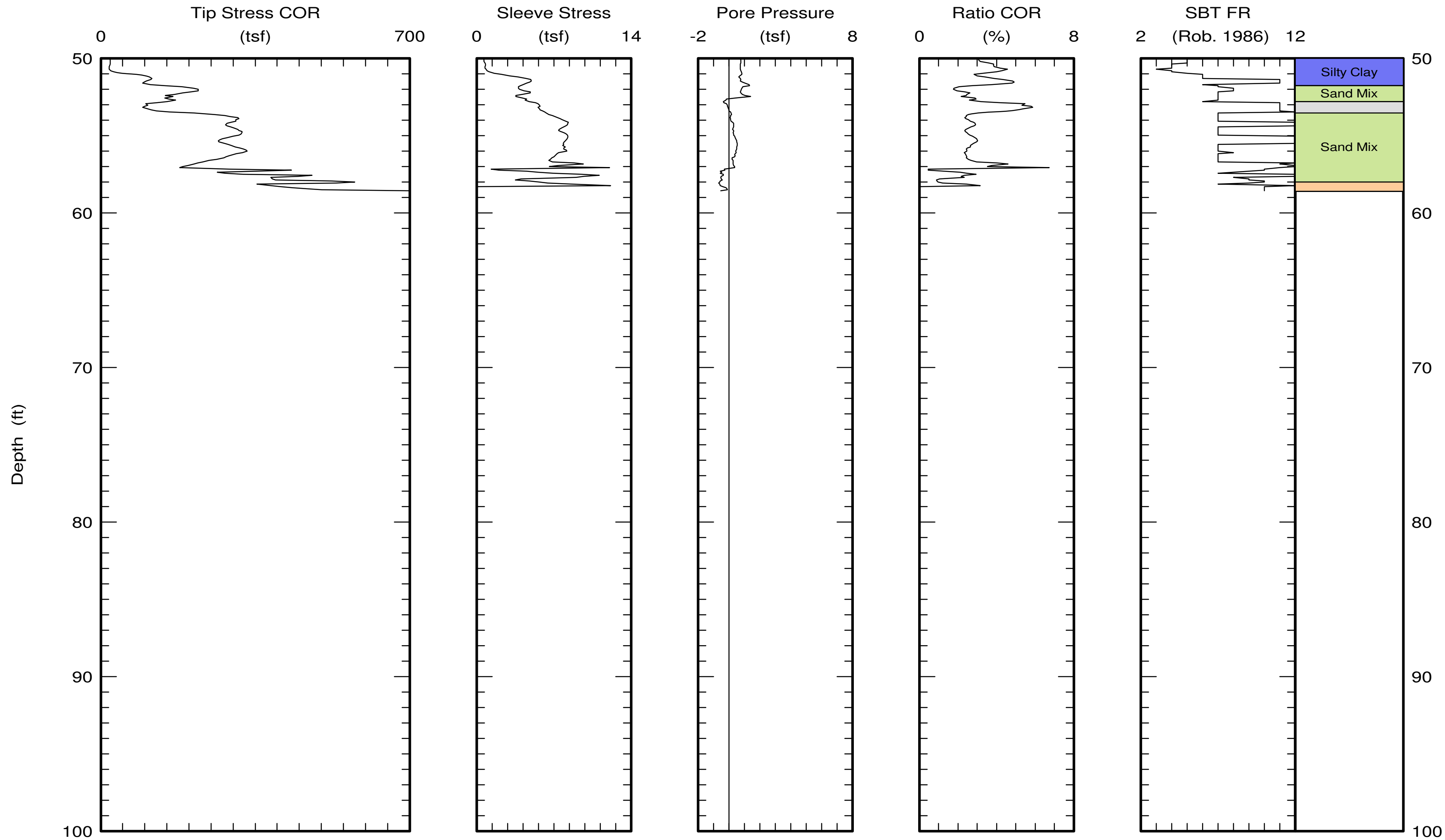
Test ID: T8-C11

File: Z25Y1101C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/May/2011 Test ID: T8-C11 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 58.60 (ft)

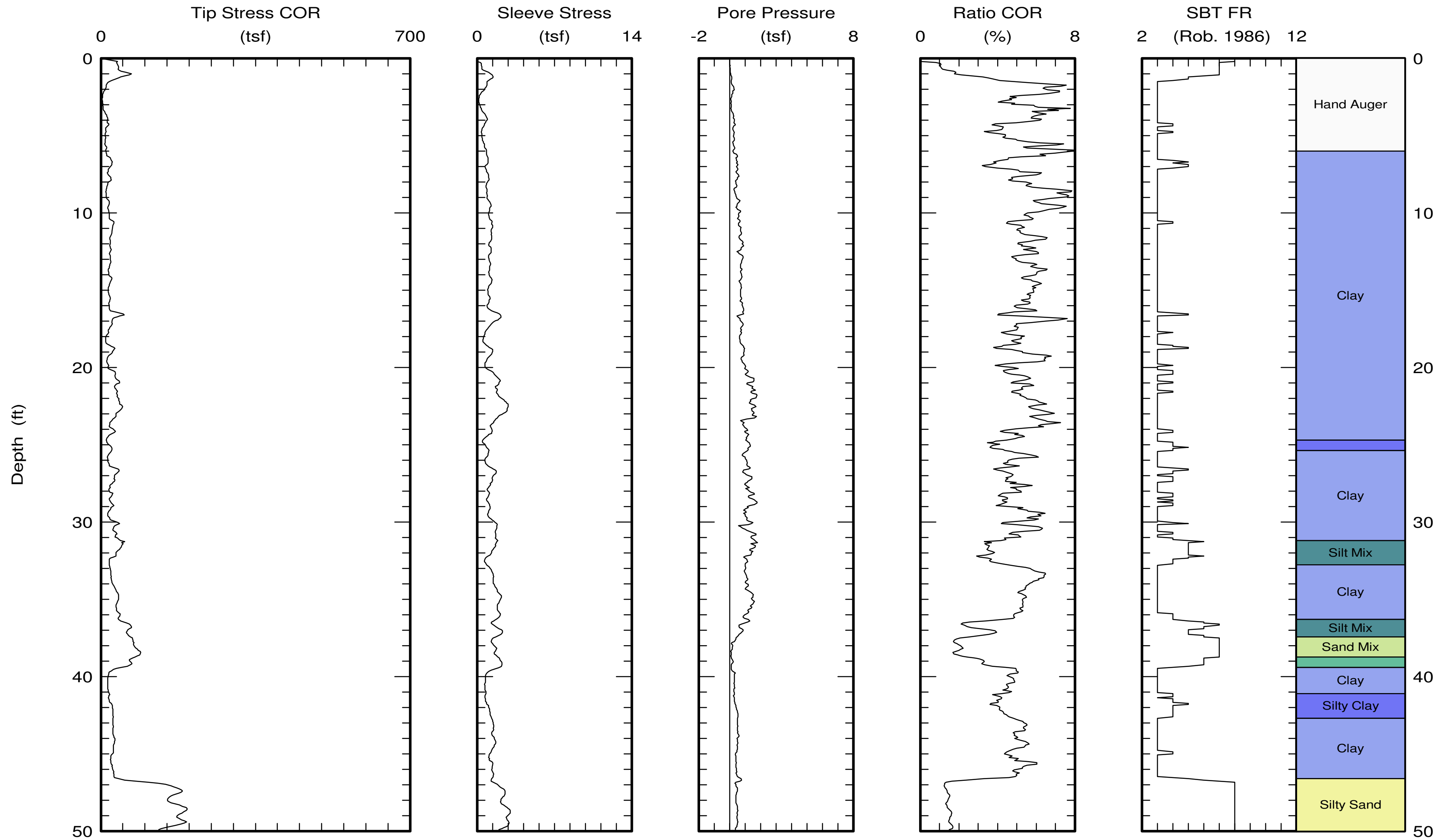
Test ID: T8-C11
File: Z25Y1101C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 24/May/2011
Test ID: T8-C12
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 55.46 (ft)
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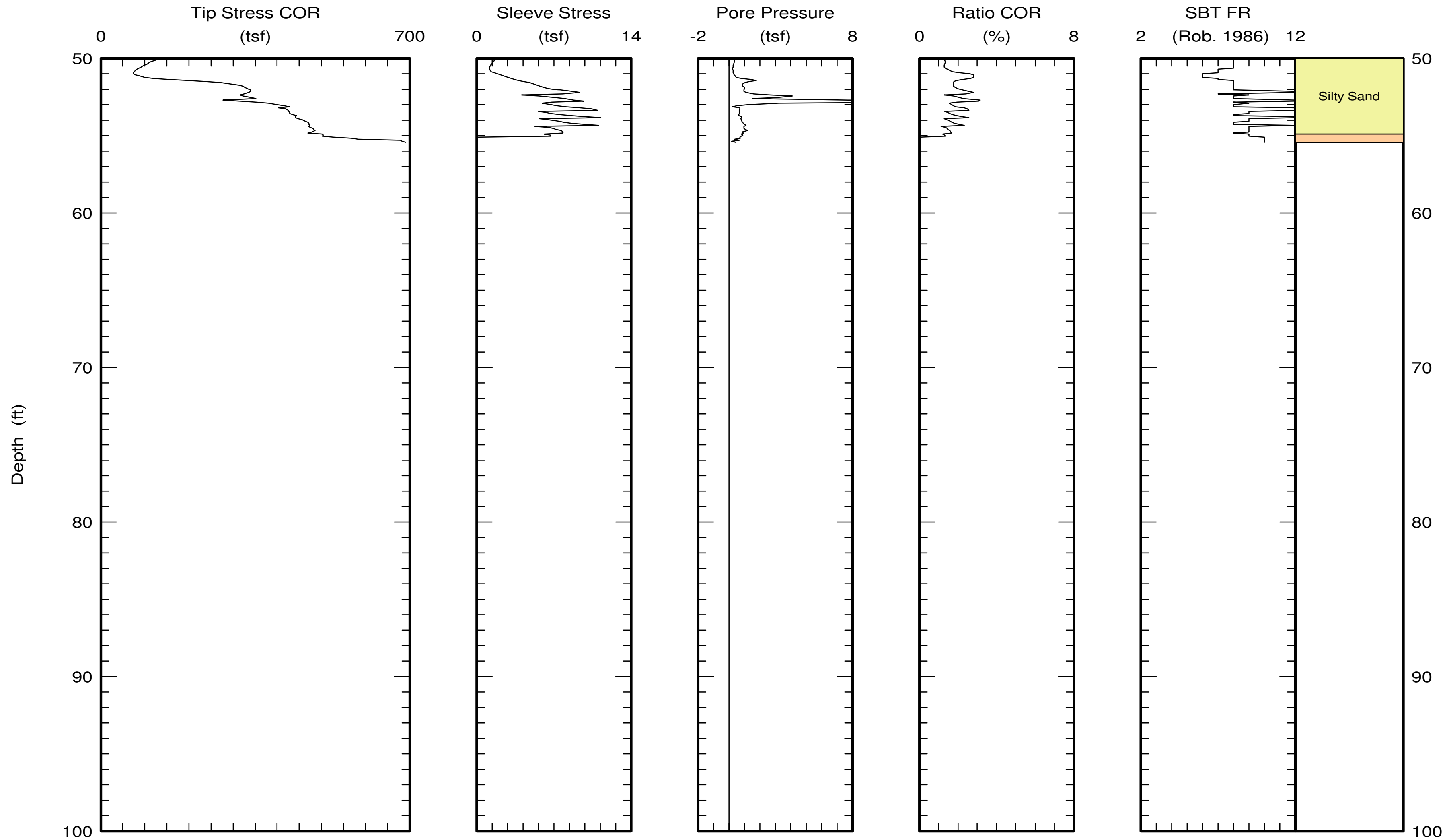
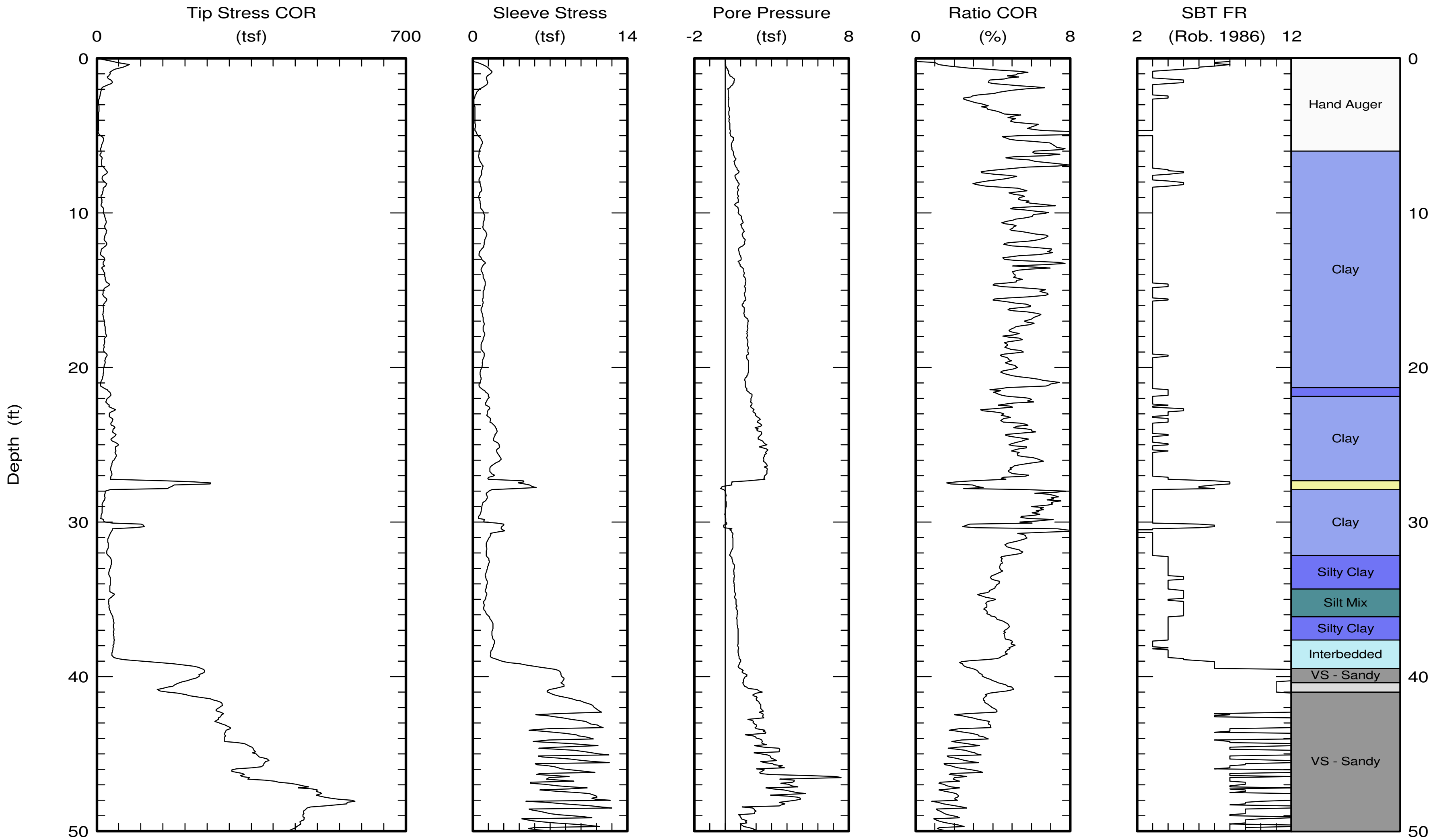
Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2011 Test ID: T8-C12 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 55.46 (ft)

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/May/2011 Test ID: T8-C13 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 56.44 (ft)

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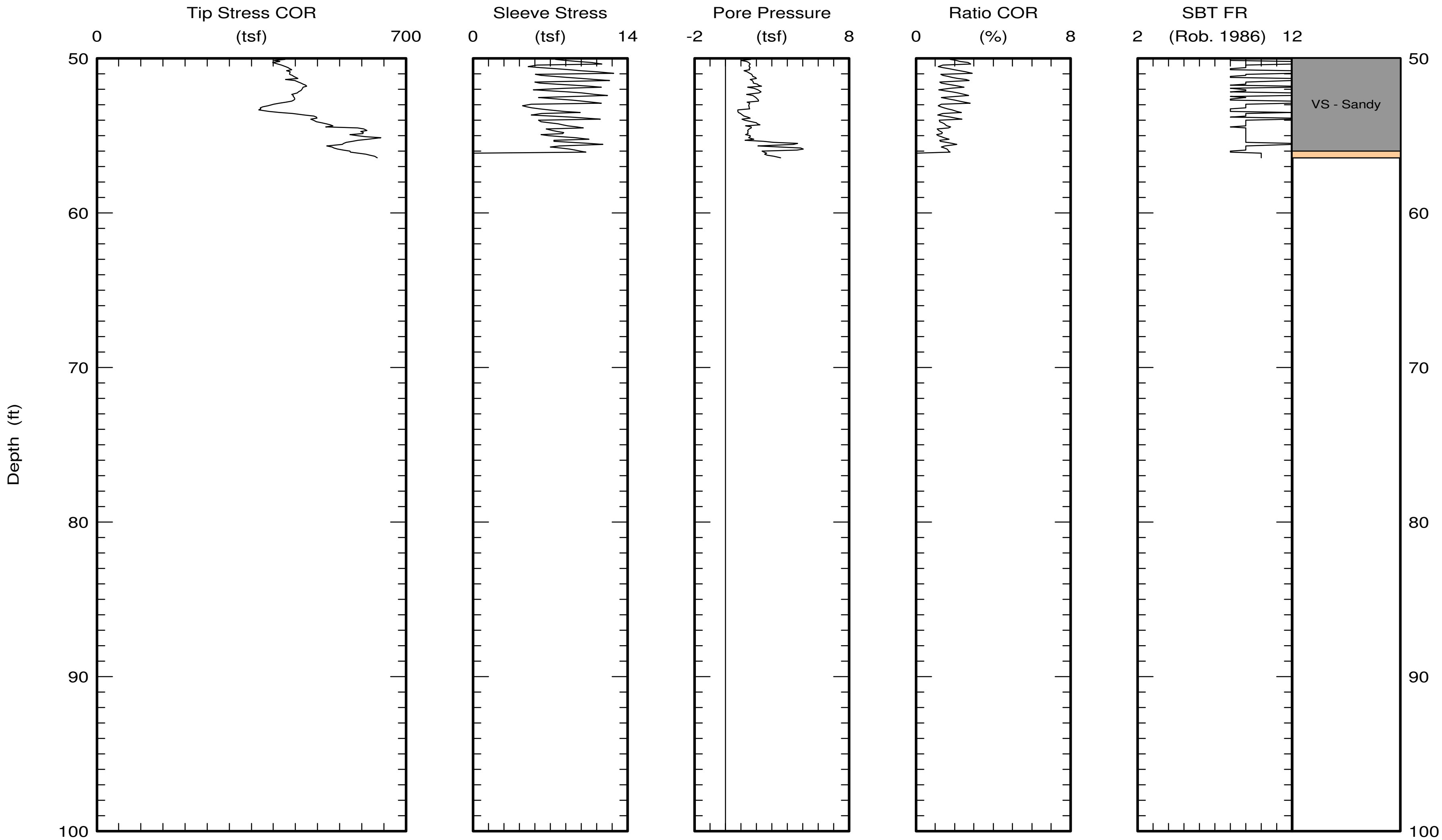
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 25/May/2011
Test ID: T8-C13
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 56.44 (ft)
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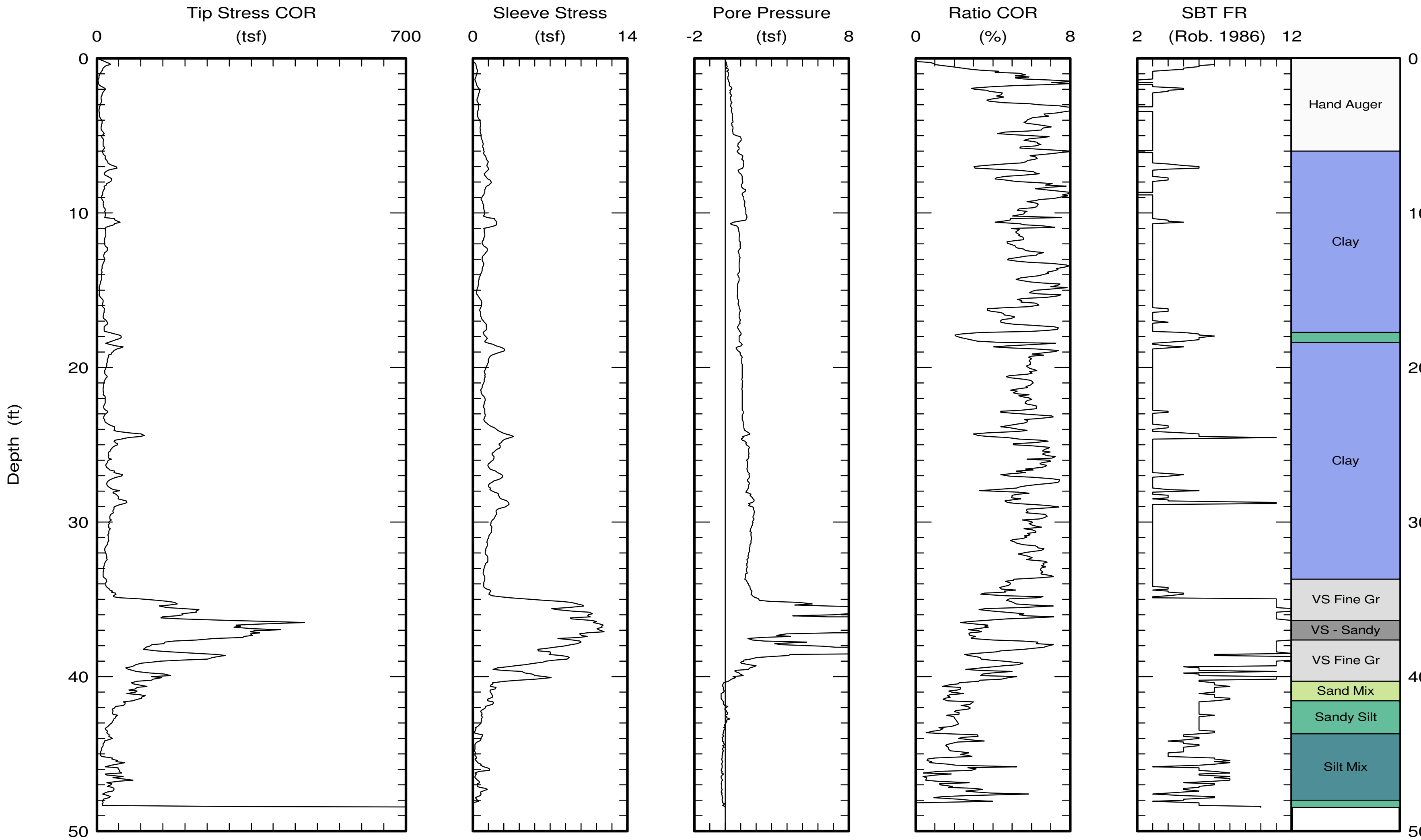
Test ID: T8-C13
File: Z25Y1102C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 25/May/2011
Test ID: T8-C14
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 48.49 (ft)

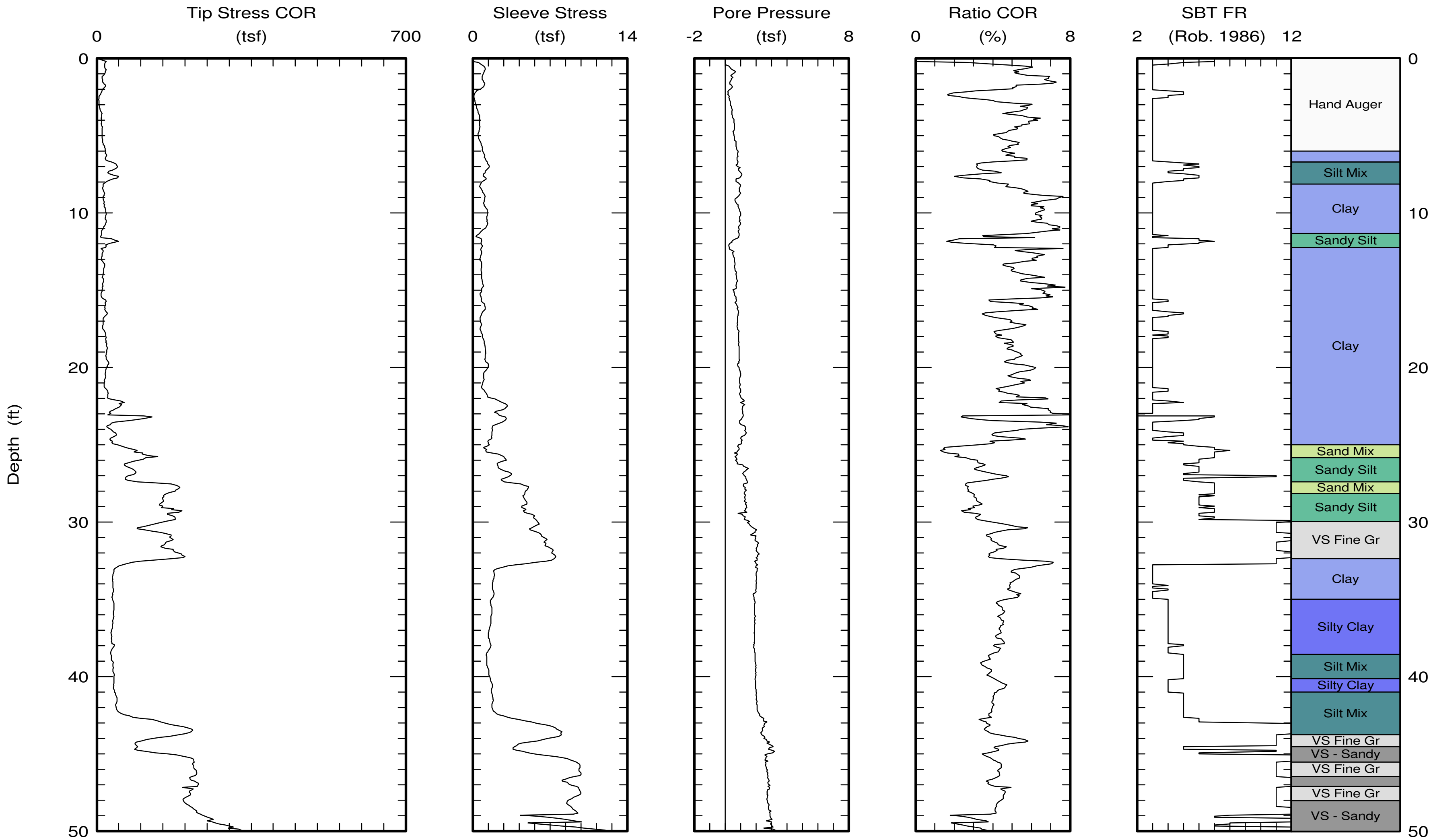
Test ID: T8-C14
File: Z25Y1103C.ECP

Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 25/May/2011
Test ID: T8-C15
Project: LosAngeles

Customer: MACTEC
Job Site: Westside Subway Extension



Maximum depth: 56.83 (ft)
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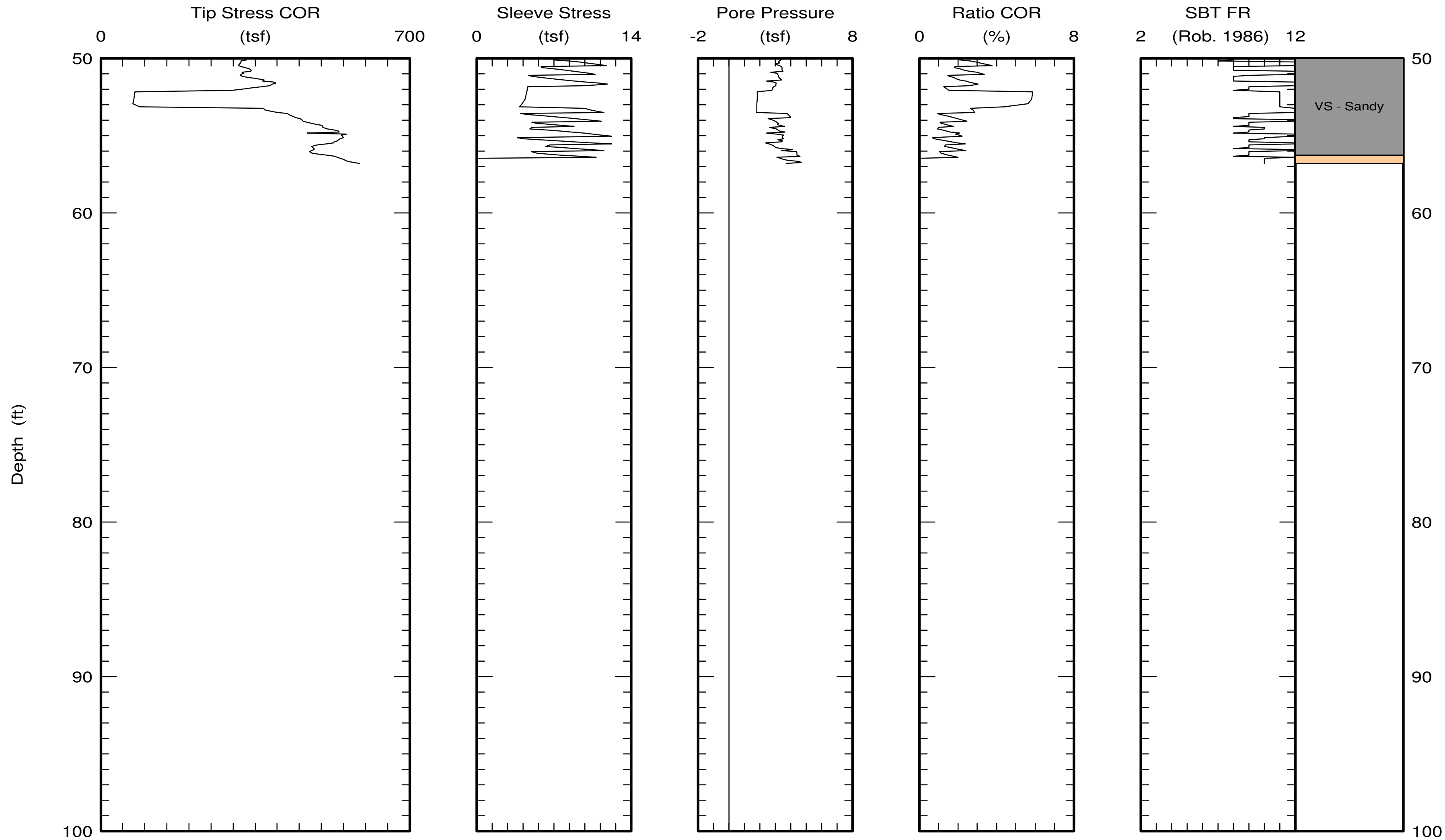
Test ID: T8-C15
File: Z25Y1104C.ECP

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/May/2011 Test ID: T8-C15 Project: LosAngeles
	Customer: MACTEC Job Site: Westside Subway Extension	



Maximum depth: 56.83 (ft)

Test ID: T8-C15
File: Z25Y1104C.ECP

APPENDIX D—GEOVISION REPORTS

Contents

FINAL REPORT

HIGH RESOLUTION SEISMIC REFLECTION SURVEY

LA METRO WESTSIDE SUBWAY EXTENSION PROJECT
Los Angeles, California

GEO*Vision* Project No. 10500

Prepared for

AMEC Environment & Infrastructure
5628 E. Slauson Avenue
Los Angeles, CA 90040-2922
(323) 889-5300

Prepared by

GEO*Vision* Geophysical Services
1124 Olympic Drive
Corona, CA 92881
(951) 549-1234

October 14, 2011

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1 INTRODUCTION

A high-resolution seismic reflection survey was conducted in the vicinity of a portion of the proposed MTA-Westside Extension in Santa Monica, Beverly Hills and Los Angeles, California between January 4 and July 2, 2011. This investigation complements a previous seismic reflection survey completed by **GEO***Vision* in 2010 (**GEO***Vision*, 2010). The purpose of the seismic reflection survey was to map the location of the Santa Monica fault and ancillary faults beneath seismic lines located on Avenue of the Stars (Transect 1), Santa Monica Boulevard (Transect 2), Century Park West (Transect 3), Durant Drive (Transect 4) and Moreno Drive (Transect 7), as shown in Figure 1.

Both compressional (P) and shear (S) wave seismic reflection data were acquired during this investigation. The seismic line geometries with line length and GPS data are presented as Table 1. Locations of the AMEC boreholes located near the geophysical transects are included in Table 2. Because the site is located in an urban area with significant traffic noise (ambient vibrations), the seismic reflection surveys were generally conducted at night using vibratory energy sources.

The following sections include a discussion of the seismic reflection technique, equipment and field procedures, data processing, interpretation of the seismic reflection data and a summary of the investigation.

Table 1 Seismic Line Geometry

Transect	Station	Line Length (ft)	Easting (US Ft)	Northing (US ft)
1: S-Wave	101		6,435,810	1,843,818
1: S-Wave	1,159	2,116	6,434,606	1,845,510
1: P-Wave	101		6,435,810	1,843,818
1: P-Wave	524	2,115	6,434,606	1,845,510
2: S-Wave	101		6,434,519	1,844,638
2: S-Wave	1,679	3,156	6,436,937	1,846,663
2: P-Wave	101		6,434,519	1,844,638
2: P-Wave	732	3,155	6,436,936	1,846,662
3: S-Wave	101		6,434,718	1,843,194
3: S-Wave	667	1,132	6,434,062	1,844,116
3: P-Wave	101		6,434,718	1,843,194
3: P-Wave	327	1,130	6,434,063	1,844,115
4: S-Wave	101		6,437,081	1,846,151
4: S-Wave	700	1,198	6,436,113	1,845,455
4: P-Wave	101		6,437,081	1,846,151
4: P-Wave	340	1,195	6,436,116	1,845,457
7: S-Wave	101		6,436,684	1,845,585
7: S-Wave	488	774	6,436,095	1,846,040
7: P-Wave	101		6,436,684	1,845,585
7: P-Wave	256	775	6,436,095	1,846,040

Notes:

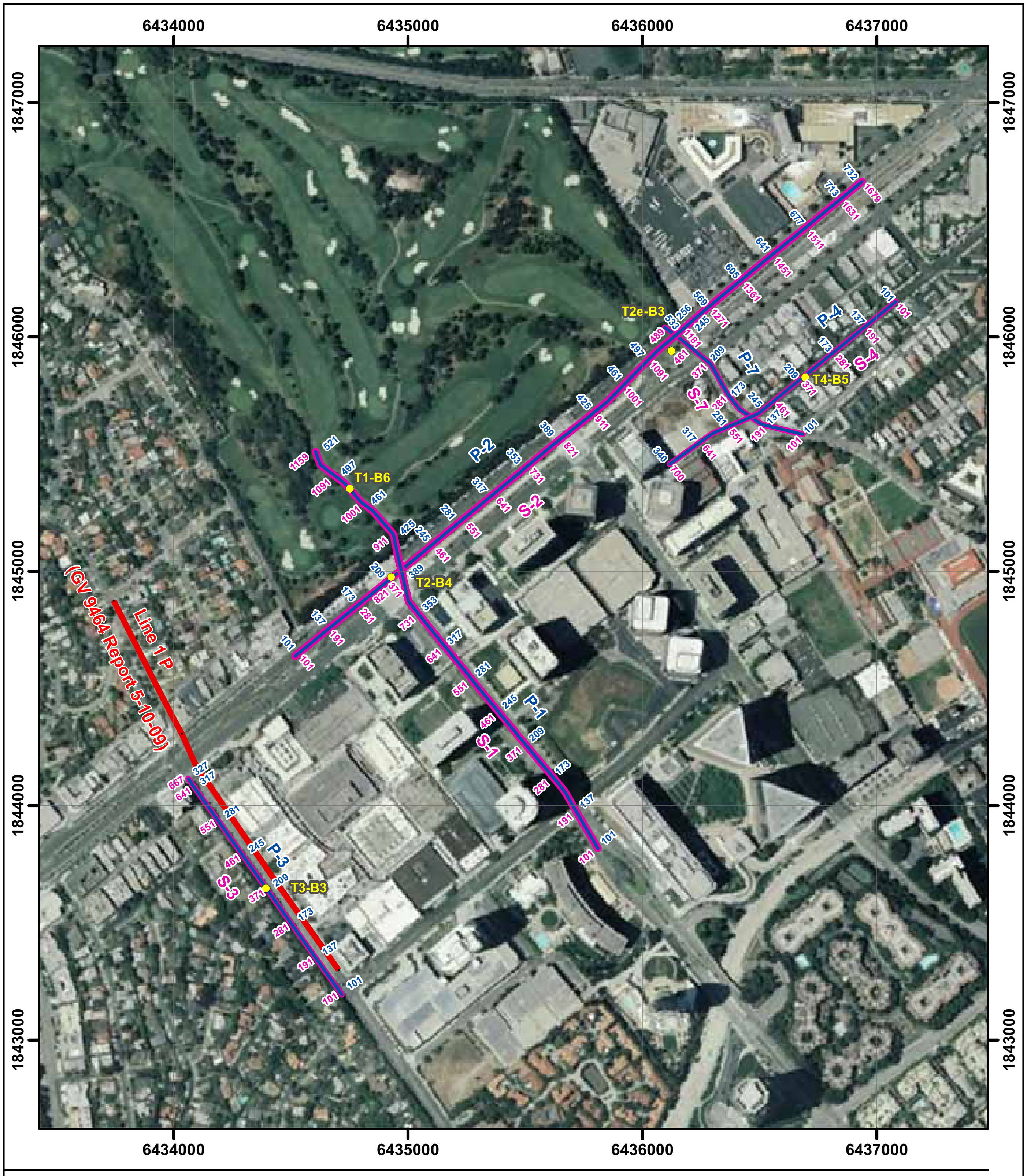
1. Coordinates in CA State Plane, NAD83, Zone V (0405), US Survey Feet
2. S-Wave Station Spacing = 2 ft / P-Wave Station Spacing = 5 ft

Table 2 AMEC Borehole Locations with P-S Suspension Logging

Name	Easting (US ft)	Northing (US ft)	Elev (ft)
T1-B6	6,434,752	1,845,353	278
T2-B4	6,434,928	1,844,976	-
T2E-B3	6,436,124	1,845,941	-
T3-B3	6,434,394	1,843,648	279
T4-B5	6,436,695	1,845,828	260

Notes:

1. Coordinates supplied by AMEC
2. Coordinates in CA State Plane, NAD83, Zone V (0405), US Survey Feet



Legend

- Approximate Borehole Location
- P-wave Transect with Stations every 180'
- S-wave Transect with Stations every 180'
- Seismic Reflection Line (GV 9464 Report 5-10-09)

0 300 600 900
Feet

N

NOTES:
1. California State Plane Coordinate System NAD 83 Zone V (0405) US Feet
2. Base Image Source: ESRI, i-cubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP

GEOVision geophysical services

Date:	9/9/2011
GV Project:	10500
Developed by:	W Dalrymple
Drawn by:	T Rodriguez
Approved by:	V Gonzalez
File Name:	GV_10500-1.MXD

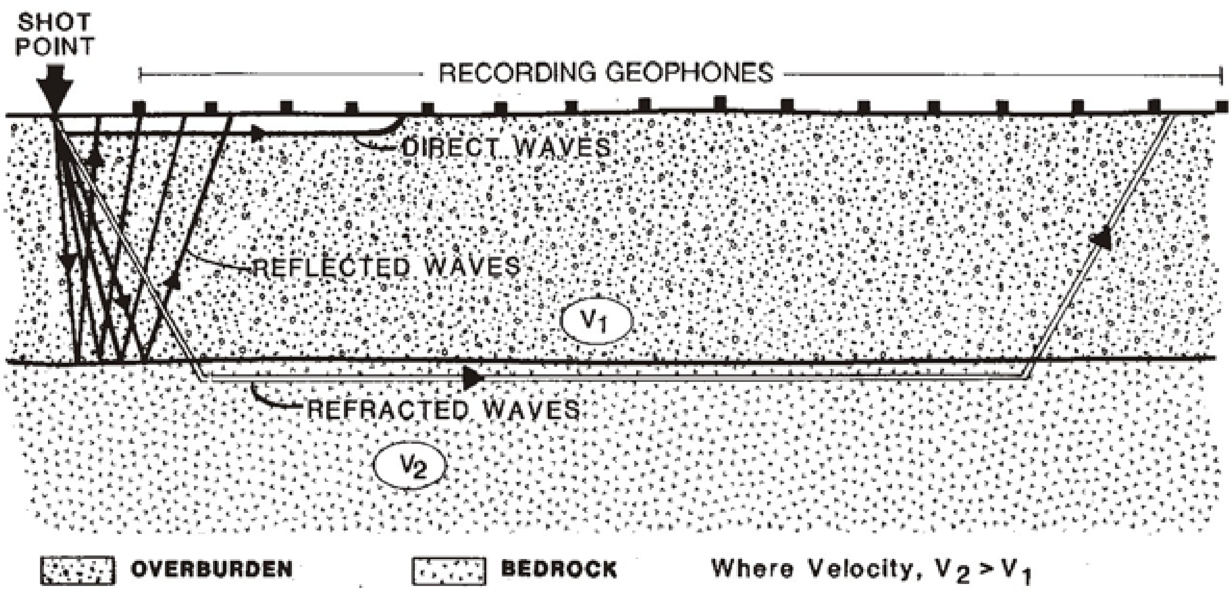
FIGURE 1
SITE MAP

LA METRO WESTSIDE SUBWAY EXTENSION PROJECT
LOS ANGELES, CA

PREPARED FOR
AMEC Environment & Infrastructure

2 SEISMIC REFLECTION BACKGROUND

The seismic reflection technique is detailed in numerous geophysical texts (Dobrin and Savit, 1988; Telford, Geldart and Sheriff, 1990) and, therefore, only a brief synopsis of the technique is included in this report. The seismic reflection method involves projecting a wave down from the surface and then recording the returning wave back at the surface as it reflects off formations at depth. In accordance with Snell's Law, seismic energy will be reflected, refracted and diffracted at boundaries in the subsurface (Figure 2). The main design consideration for a successful seismic reflection survey is the ability to separate the reflected energy from other



arrivals in processing.

Figure 2 Seismic Raypath Geometry

A seismic reflection occurs when an acoustic wave front encounters an impedance boundary in the subsurface. Seismic impedance depends on both the velocity and density of a rock and impedance boundaries occur where these rock properties change abruptly, usually due to changes in lithology. The reflection coefficient, R, across an interface, is expressed by a function relating the acoustic impedance of adjacent layers. R determines the relative amplitude of the reflected wavelet.

$$R = \frac{\sigma_2 V_2 - \sigma_1 V_1}{\sigma_2 V_2 + \sigma_1 V_1}$$

where, R = reflection coefficient

σ_1, σ_2 = mass density of the material on each side of the interface

V_1, V_2 = seismic wave velocity on each side of the interface

The sign of the reflection coefficient determines the polarity of the reflected wave. The magnitude of the reflection coefficient is critical to obtaining usable data. The seismic reflection technique will not work if the acoustic contrast is not sufficient to produce a clear reflection, regardless of the survey parameters or processing techniques employed. The ability of the seismic reflection method to detect an individual sedimentary bed is not only a function of the acoustic impedance at the top and bottom of the bed, but also depends on the layer thickness. The minimum resolvable bed thickness (vertical resolution) is generally accepted as one quarter of the wavelength at the target depth.

$$VR = \frac{\lambda}{4} = \frac{V}{4f}$$

where, VR = vertical resolution
λ = dominant wavelength of the reflected energy
V = seismic wave velocity above the reflector
f = dominant frequency of the reflector

Geologic discontinuities such as faults are generally clearly discernable providing the offset is greater than the vertical resolution. Faults with offsets smaller than the vertical resolution can often be interpreted by diffraction pattern aligned along the fault plane, providing noise levels in the data are not too high.

When a reflecting boundary exists, it is important to optimize the field procedure and acquisition parameters to maximize the quality of the final processed data. Choosing the best field parameters involves determining the relative importance of several competing objectives, such as site constraints, equipment capabilities and processing needs.

In all geophysical surveys, the objective is to extract the usable data (i.e., in this case, reflections from various lithologic boundaries) from the unwanted background information (source generated and ambient noise). In reflection seismology, it is desirable to record high frequency, high signal-to-noise ratio reflection events from the boundary of interest. The frequency of a reflection event is largely determined by the source input frequency and the filtering effect of the ground. Often, the target reflector frequency is similar to that commonly recorded for coherent noise (in particular, the noise from ground roll), making it difficult or impossible to selectively filter out the noise. Isolation of the reflection events requires careful design of field acquisition parameters (e.g. source/receiver geometry, source and receiver types) and recording parameters (e.g. sampling rate, filter settings). With modern 24-bit A/D acquisition systems it is very unusual to apply acquisition filters (filtering before data is stored), except for automatic anti-alias filters.

Sufficient data redundancy, or fold, which is the number of individual source receiver pairs with a reflection occurring from the same midpoint (common midpoint or common depth point) on a geologic horizon, is also an important survey design parameter. Maximum fold is equal to the number of live channels divided by twice the shot station spacing. Therefore, shot locations at every station (geophone spacing) with 144 channel recording capability results in a maximum fold of 72. Data quality always degrades at the ends of a seismic line because the fold on the first trace of a processed seismic section is one (i.e. only 1 source receiver pair used to generate the trace), with fold increasing incrementally with increasing station numbers.

The seismic reflection technique can be divided into two categories based on the type of source used. Compressional (P) waves propagate through the earth as a change in pressure and are the same as the sound waves we hear. Particle motion for P-waves is parallel with the direction of propagation of the wave. Shear (S) waves propagate through the earth by shearing adjacent particles. Particle motion in S-waves is perpendicular to the direction of wave propagation.

The S-wave technique can often image to shallow depth and have better vertical resolution than the P-wave reflection technique. For a given frequency, shear waves will have approximately 1/2 to 1/8 the wavelength of the corresponding P-waves. This is due to the fact that S-waves travel at about one half the velocity of P-waves in the unsaturated zone and from about one eighth to one half the velocity of P-waves in the saturated zone. Although S-waves do not propagate as far through the earth as P-waves, when offsets are short (such as in environmental or engineering applications), shear waves can often provide twice the resolution, or better, and can image structures at shallower depths. Additionally, it is often possible to image seismic reflections as shallow as 15 to 20 ft on S-wave seismic sections compared to 40 to 50 ft on P-wave seismic sections, especially in saturated sediments.

The frequency content of seismic reflection data is a function of both the energy source and the medium through which the energy travels. Vibratory sources have control of the frequency input to the ground, unlike impulsive sources such as a hammer or explosive. With a vibratory source, the frequency input into the ground is a function of the beginning and ending frequencies of the sweep, the length of the sweep and ground coupling. The second factor is the transmission and attenuation of various frequency components in the subsurface, often termed the "earth response". In general, there are two primary objectives in designing a sweep for high-resolution reflection surveys:

1. To record useful seismic signals at the geophones with as high a frequency as possible.
2. To start the low end of the sweep such that the appropriate depth of penetration is achieved without generating intolerable ground roll.

3 PROCEDURES

3.1 Seismic Reflection Equipment

3.1.1 P-Wave Reflection Equipment

Key equipment used to collect the high resolution seismic reflection data as shown in Figures 3 and 4 included:

- Aries with ARAM II cable-based seismic acquisition system, configured for 144 channels
- Seismic Source Company Force Two Universal Encoder and Force Two Vibrator Controller
- IVI EnviroVibe vibratory seismic source (Figure 4)
- OYO Geospace 28-Hz vertical geophones (P-wave)
- Seismic cables

The Aries/ARAM II system includes the central system, which consists of a multi-processor computer, multiple monitors, and multiple output devices; data acquisition software consisting of project management and data quality control modules; and ground equipment consisting of 24-bit 8 channel Remote Acquisition Modules (RAM's), seismic cables and sealed batteries for each RAM.

Figure 3 Aries/ARAM II Seismic Acquisition System

Figure 4   IVI EnviroVibe Vibratory Seismic Source

For this project, an IVI EnviroVibe (Figure 4) was used as the P-wave energy source. Vibratory sources function by oscillating a mass through a user-defined range of frequencies, which are transmitted into the ground. This is known as a “sweep.” At the instant the vibrator begins its sweep, the seismograph begins recording the signals received from the geophones. Simultaneously, the sweep being produced by the vibrator is recorded on an auxiliary channel within the seismograph. The seismic record is obtained by cross correlating the recorded signals from the geophones with the known sweep generated by the vibrator.

3.1.2 S-Wave Reflection Equipment

Key equipment used to collect the high resolution seismic reflection data included:

- Oyo DAS-1 Seismograph (144 channel system) coupled to a computer with SEISNET acquisition software (Figure 5)
- Input/Output Inc. RLS240M roll box (Figure 5)
- Proprietary Electromechanical Microvibrator for S-wave survey (Figure 6)
- Oyo Geospace 40-Hz horizontal geophones (S-wave)
- Seismic cables and jumper cables

The Oyo DAS-1 Seismograph (DAS) is a 24-bit, 48-channel seismic acquisition system. During this investigation the DAS was coupled to two 48-channel expansion modules to obtain 144-channel recording capability. Coupling the DAS to a computer with the SEISNET seismic acquisition software allows for real-time correlation of the seismic records, filtering, display and printing of shot records and writing of data to CD-ROM.

Figure 5   Oyo DAS-1 Recording System

Figure 6   S-Wave Electromechanical Vibrator (Microvib)

Vibratory sources function by oscillating a mass through a user-defined range of frequencies, which are transmitted into the ground. This is known as a "sweep." At the instant the vibrator begins its sweep, the seismograph begins recording the signals received from the geophones.

Simultaneously, the sweep being produced by the vibrator is recorded on an auxiliary channel within the seismograph. The seismic record is obtained by cross correlating the recorded signals from the geophones with the known sweep generated by the vibrator.

3.2 Site Preparation

Each seismic line was marked at the appropriate group interval (station/geophone spacing) using a fiberglass tape measure and surveyors paint with every 8th (P-wave) or 10th (S-wave) station labeled for reference during data acquisition. The first station is typically labeled as station 101 with proceeding stations sequentially numbered along the profile. A 5 ft group interval was used for the P-wave reflection survey and a 2 ft group interval was used for the S-wave reflection survey. The endpoints, bends and extensions of each seismic line were surveyed using a Trimble ProXRS GPS system with OmniSTAR submeter, real-time differential corrections. The locations of the seismic lines are summarized in Table 1 and are accurate to about 1 meter (3.2 feet). The relative elevation profiles for each line were also surveyed using a Nikon NPL-362 total station system. Geophones were hot glued to the asphalt/concrete or spiked in dirt/grass at the appropriate group interval and cabled into the seismograph. Seismic equipment was then set up for parameter testing and data acquisition as discussed in following sections.

3.3 Parameter Testing

Source parameter testing was carried out during data collection of the previous survey detailed in **GEO***Vision,* 2010. The same parameters were used with only slight variations during this phase. Some variations were implemented in response to data quality/output from the previous survey. The receiver interval and geophone array (single geophone) had been determined before the start of the survey. Sweeps of varying frequency bandwidths were recorded into a full (144 trace) off-end or split spread configuration in an effort to bracket the usable frequencies returning to the geophones from the subsurface. The initial testing, aided by frequency filtering in the recording instruments, determined that a sweep range of 20-240 Hz and 30-250 Hz achieved the objectives of broad bandwidth, good depth of penetration and minimal ground roll generation for the P- and S-wave reflection surveys, respectively.

With the frequency range selected, the duration and number of sweeps necessary to produce good signal-to-noise content on the shot records remained to be determined. After testing various combinations, it was determined that four, 8 second sweeps (P-wave) and four, 8 second sweeps (S-wave) provided sufficient energy to overcome ambient noise levels, if at all possible, at the site and satisfy the data acquisition schedule. Longer sweep lengths and additional stacking did not appear to improve signal content on the shot records.

3.4 Data Acquisition Parameters

The data acquisition parameters for the S- and P-wave seismic line are summarized in Tables 3 and 4 below:

Table 3 P-Wave Data Acquisition Parameters

Shot Spacing	5 ft
Geophone Group Interval	5 ft
Maximum CDP Fold	72
Maximum Offset	717.5 ft
Minimum Offset	2.5 ft
Spread Geometry	Asymmetric Split Spread
Seismograph	Aries/ARAM II Seismic Acquisition System
Number of Channels	144
Sample Rate	0.5 ms
Record Length	9 sec (8 sec sweep, 1 sec listen)
Field Filters	3Hz lo-cut, 410 Hz hi-cut
Seismic Source	IVI Minivib (20 to 240 Hz, Linear, 8-second sweep, 4 sweeps/station)
Geophones	OYO Geospace 28 Hz vertical geophone

Table 4 S-Wave Data Acquisition Parameters

Shot Spacing	2 ft, centered on half stations
Geophone Group Interval	2 ft
Maximum CDP Fold	72
Maximum Offset	287 ft
Minimum Offset	1 ft
Spread Geometry	Split Spread
Seismograph	OYO DAS-1 Recorder
Number of Channels	144
Sample Rate	0.5 ms
Record Length	8.5 seconds (8 second sweep, 0.5 second listen)
Field Filters	3 Hz lo-cut
Seismic Source	Electromechanical vibrator (25 to 225 Hz, Linear, 8-second sweep, 4 sweeps/station)
Geophones	OYO Geospace 40 Hz horizontal geophone, perpendicular to line

3.5 Data Acquisition Procedures

3.5.1 P-Wave Data Acquisition Procedures

The data acquisition parameters for the P-wave seismic reflection survey are summarized in Table 3. Seismic reflection data were acquired with 144 live channels. Based on the source testing discussed previously, the IVI EnviroVibe was used as the energy source with four 8 second 20 to 240 Hz sweeps.

At the start of data acquisition, the EnviroVibe was positioned a 1/2 station from the end geophone and nominally offset about 6 feet from the seismic line to permit the buggy mounted seismic source to drive along the side of the line. A Seismic Source Company Force Two Universal Encoder linked the seismic acquisition system to a Force Two Vibrator Controller Unit in the EnviroVibe. When the seismic observer initiated the sweep sequence in the recording truck, a signal was sent to the vibrator via radio link to start the sweep and the seismic acquisition system began recording. During the sweep, a synthetic pilot trace was generated by the vibrator and sent to the seismograph. This pilot sweep is recorded on auxiliary channel 1 for correlation with the recorded data from the geophones. Data were transmitted from the RAM's to the computer where the seismic acquisition software was used to display data, apply data filters and write data to hard disk. All data were saved in SEG-Y format and later copied to DVD and external hard disk for backup.

At the beginning of the line, a raw data stack was displayed on the computer screen. This provided a check to ensure that the seismograph was being triggered correctly. Survey parameters were verified (i.e. source location, receiver spacing, etc.) and cable and RAM connections were checked. The noise monitor on the seismic acquisition system was checked to identify any ambient noise problems and to isolate and correct or document any noisy or dead receiver channels. The noise monitor was also used to confirm the correct geometry settings by lightly tapping the first and last active geophones.

Each line was started with the energy source located at station 101.5 and, therefore, the first shot had 1 channel live behind and 143 channels live in front of the vibrator. The vibrator was then "walked" into the spread at 1-station increments recording the first 144 stations until there were 72 channels behind and 72 channels in front (station 172.5). At this point the survey was run in a split spread configuration. With a split spread, the live channels and vibrator were moved typically forward at 1-station increments, keeping the vibrator at the center of the active spread until the last live channel was reached. Once the last live channel was reached, the vibrator was "walked" off the spread, in the reverse process to the start of the line. The last source location was at station ½ a station past the last station with no stations ahead and 144 stations behind the vibrator.

Surface structures, open road lanes and sensitive locations (i.e. golf course) limited the placement of some of the shot points. In some cases these shots were completed with a greater offset or skipped if the location was not available for use.

3.5.2 S-Wave Data Acquisition Procedures

The data acquisition parameters for the S-wave seismic reflection survey are summarized in Table 4. Seismic reflection data were acquired with 144 live channels. Based on the source testing discussed previously, the MicroVib was used as the energy source with four 8 second 25 to 225 Hz sweeps.

At the start of data acquisition, the source was positioned between the appropriate receiver stations. The microvib was connected to the seismograph via a trigger cable. When the operator pushed the trigger button in the recording truck, a signal was sent to the vibrator to start the sweep sequence and the OYO DAS-1 seismograph began recording. During the sweep, a synthetic pilot trace was generated by the vibrator and sent to the seismograph. This pilot sweep is recorded on auxiliary channel 1 for correlation with the recorded data from the geophones. Data were transmitted from the seismograph to a computer where seismic acquisition software was used to correlate data, display data, print selected records and write data to hard drive and DVD-ROM.

At the beginning of the line an uncorrelated sweep was viewed on the computer screen. This provided a check to ensure that the vibrator was operating properly and that the seismograph was being triggered correctly. Array parameters (i.e. source location, sweep configuration, receiver spacing, etc.) and connections were then checked. The noise monitor on the seismograph was checked to identify any ambient noise problems and to isolate and correct any noisy or dead receiver channels. The noise monitor was also used to confirm the correct setting on the roll box by lightly tapping the first and last active phone.

Each line was started with the energy source located at station 101.5 and, therefore, the first shot had 1 channel live behind and 143 channels live in front of the vibrator. The vibrator was then "walked" into the spread at 1-station increments recording the first 144 stations until there were

72 channels behind and 72 channels in front (station 172.5). At this point the survey was run in a split spread configuration. With a split spread, the live channels and vibrator were typically moved forward at 1-station increments, keeping the vibrator at the center of the active spread until the last live channel was reached. Once the last live channel was reached, the vibrator was "walked" off the spread, in the reverse process to the start of the line. The last source location was at station ½ a station past the last station with no stations ahead and 144 stations behind the vibrator.

Surface structures, open road lanes and sensitive locations (i.e. golf course) limited the placement of some of the shot points. In some cases, these shots were completed with a greater offset or skipped if the location was not available for use.

4 DATA PROCESSING

The seismic reflection data were processed by Sterling Seismic Services of Denver, Colorado. The processing flow for the data is based on a standard common mid point (CMP) reflection processing sequence with modifications for specific conditions at the survey site. Tables 5 and 6 below show each step in the processing sequence leading to the final stacks used for interpretation for the S- and P-wave reflection data, respectively.

The seismic section resulting from processing sequences 1 to 17 in Table 5 and 1 to 16 in Table 6 is referred to as the Final Stack. Additional post stack processing steps (item 18 in Table 5 and 17 in Table 6) consisting of: application of a frequency wavenumber (FX) predictive deconvolution enhancement filter; spectral balancing over the 30 to 240 Hz (S-wave) or the 24 to 224 Hz (P-wave) frequency range; and Kirchhoff time migration were applied to the seismic sections to improve resolution. Band pass filters were also applied to seismic sections presented in the report.

Table 5 Processing Sequence for S-Wave Data

Sequence #	Description
1	SEG2 TO INTERNAL FORMAT CONVERSION
2	VIBROSEIS CORRELATION
3	GEOMETRY, SURVEY IMPORT AND TRACE EDITING
4	TRUE AMPLITUDE GAIN RECOVERY
5	ELEVATION / DATUM STATICS APPLICATION: DAT UM: INTERMEDIATE FLOATING/NMO DATUM VC: 3000 FEET/SEC
6	TRACE TO TRACE EDITING
7	SURFACE CONSISTENT AMPLITUDE ANALYSIS AND COMPENSATION
8	MINIMUM PHASE CORRECTION FILTER FOR VIBROSEIS DATA
9	SURFACE CONSISTENT DECONVOLUTION: TYPE: SPIKING OPERATOR LENGTH: 100 MSEC NOISE: 0.1%
10	SPECTRAL WHITENING: 20-225 HZ
11	COMMON DEPTH POINT GATHERS: PASS 1: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 1: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION PASS 2: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 2: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION
12	LINEAR VELOCITY NOISE ATTENUATION FILTER
13	TIME-VARIANT AMPLITUDE SCALING
14	PASS 3: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 3: NORMAL MOVEOUT CORRECTIONS AND MUTE APPLICATION PASS 3: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION
15	CDP CONSISTENT TRIM STATICS
16	COMMON DEPTH POINT STACK
17	FINAL DATUM CORRECTION: DATUM: 300 FEET (S1, 2, 3 AND 7), 280 FEET (S4) VC: 3000 FEET/SEC
18	ENHANCED STACK OPTIONS SPECTRAL BALANCING: 28-228 HZ FX PREDICTIVE DECONVOLUTION ENHANCEMENT FILTER KIRCHHOFF TIME MIGRATION – 95% SMOOTHED RMS VELOCITIES

Table 6 Processing Sequence for P-Wave Data

Sequence #	Description
1	SEGY TO INTERNAL FORMAT CONVERSION
2	GEOMETRY, SURVEY IMPORT AND TRACE EDITING
3	FIRST BREAK PICKING AND REFRACTION SOLUTION
3	TRUE AMPLITUDE GAIN RECOVERY
4	TRACE TO TRACE EDITING
5	SURFACE CONSISTENT AMPLITUDE ANALYSIS AND COMPENSATION
6	MINIMUM PHASE CORRECTION FILTER FOR VIBROSEIS DATA
7	SURFACE CONSISTENT DECONVOLUTION: TYPE: SPIKING OPERATOR LENGTH: 180 MSEC NOISE: 0.1%
8	SPECTRAL BALANCING: 20-240 HZ
9	ELEVATION/REFRACTION/DATUM STATICS APPLICATION: REFRACTION DATUM: 400 FT PROCESS ING DATUM: FLOATING/NMO VC: 6000 FEET/SEC
10	COMMON DEPTH POINT GATHERS: PASS 1: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 1: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION PASS 2: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 2: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION
11	LSURFACE CONSISTENT INEAR VELOCITY NOISE ATTENUATION
12	TIME-VARIANT AMPLITUDE EQUALIZATION
13	PASS 3: NORMAL MOVEOUT VELOCITY AND MUTE ANALYSIS PASS 3: FINAL NORMAL MOVEOUT CORRECTIONS AND MUTE APPLICATION PASS 3: SURFACE CONSISTENT AUTOMATIC STATICS APPLICATION
14	CDP CONSISTENT TRIM STATICS
15	COMMON DEPTH POINT STACK
16	FINAL DATUM CORRECTION: REFRACTION DATUM: 400 FT ELEVAT ION EQUIVALENT: 300 FT (P1), 325 FT (P3 TO P7), 340 FT (P2) VC: 6000 FT/SEC
17	ENHANCED STACK OPTIONS SPECTRAL BALANCING: 24-224 HZ FX PREDICTIVE DECONVOLUTION ENHANCEMENT FILTER KIRCHHOFF TIME MIGRATION – 95% SMOOTHED RMS VELOCITIES

5 INTERPRETATION

5.1 Overview

The processed P- and S-wave seismic sections for Transects 1, 2, 3, 4 and 7 along with P and S wave velocity logs from selected boreholes are presented as Figures 7 to 28 and 32 to 44. P-wave reflection data from Line 1 (**GEO***Vision*, 2010), located adjacent to Transect 3 is also included as Figures 29 to 31. These figures include the following:

- P-wave seismic section for each line with post stack processing (spectral balancing and FX predictive deconvolution) and with a 10-20-175-200 Hz band pass filter applied. Referred to as seismic section in figure caption.
- Migrated P-wave seismic section for each line with post stack processing (spectral balancing, FX predictive deconvolution and Kirchhoff time migration) and with a 10-20-175-200 Hz band pass filter applied. Referred to as migrated seismic section in figure caption.
- Interpreted P-wave seismic section for each line with post stack processing (spectral balancing and FX predictive deconvolution) and with a 10-20-175-200 Hz band pass filter applied.
- S-wave seismic section with a 20-30-150-175 Hz band pass filter applied. Referred to as seismic section in figure caption.
- Migrated S-wave seismic section with a 20-30-150-175 Hz band pass filter applied. Referred to as migrated seismic section in figure caption.
- Interpreted S-wave seismic section with a 20-30-150-175 Hz band pass filter applied.

These figures represent the seismic reflection data in a trace amplitude format with a band pass filter applied. The trace amplitude format displays the relative signal strength as energy is reflected from various subsurface features using either a color or grayscale display. The seismic sections included herein are displayed using a grayscale color bar with the white and black representing the highest amplitude positive and negative polarity reflections, respectively. The figures are presented with two-way travel time in seconds on the vertical axis and both distance along the profile in feet and seismic station on the horizontal axis.

Either PetraSeis, a module of the Petra geologic evaluation package by HIS, Inc., or Kingdom Software 2dPAK® Version 8.4 2-D seismic interpretation package developed by Seismic Micro Technology, Inc. were used to display and interpret the seismic data. Typical applications of seismic interpretation software packages include incorporation of well data and seismic data for the generation of maps, calculation of synthetic seismograms, application of velocities to convert travel times to depths, contouring, GIS mapping, seismic data filtering, attribute calculation, digital picking of horizons, fault mapping and a host of other applications. The SeiSee seismic viewing package was also used to view the seismic sections and export bitmap files.

An attempt was made to approximately tie the distance axis on the seismic sections to that on the AMEC geologic cross sections. Generally, the distances on the seismic sections and cross sections are within 5 ft in areas where the cross sections and seismic lines are coincident and differ significantly where the seismic line and cross section locations diverge. For further spatial reference the approximate locations of boreholes were projected onto the seismic sections. On Transect 1, the seismic line and cross section locations are relatively coincident southeast of Santa Monica Blvd. and relative positions agree to within about 5 ft. Northwest of Santa Monica Blvd. the seismic line and geologic cross section locations diverge and relative distances may differ by up to 40 ft. On Transect 2, the locations of the geologic cross section and seismic line are approximately coincident and, therefore, relative positions agree to within about 5 ft. On Transect 3 and Line 1 (**GEO***Vision*, 2010), the locations of the geologic cross section and seismic line are approximately coincident and, therefore, relative positions agree to within about 5 ft. On Transect 4, the locations of the geologic cross section and seismic line are not coincident west of South Moreno Drive, resulting in up to a 10 ft difference in the relative position scales. On Transect 7, the locations of the geologic cross section and seismic line are approximately coincident except for the northern portion of the seismic line and relative positions agree to within about 5 to 10 ft.

The purpose of this investigation was to identify major faults that occur close enough to the ground surface to present a hazard to the proposed subway tunnel. Due to the severe discontinuities and lateral velocity variation often observed in near surface sediments, time to depth conversions were not performed on the seismic data. However, the data were tied to borings in five separate locations where P-S suspension logs had been acquired. The P-S suspension log measures P-wave and S-wave velocities over a 3 foot interval at discrete depth points in the borehole. The borings where the P-S suspension logs were acquired were T1-B6, T2-B4, T2E-B3, T3-B3 and T4-B5. The location of these borings relative to each geophysical transect are shown in Figure 1. The P-S Suspension logging is presented in **GEO***Vision*, 2011 and discussed as it relates to the seismic interpretation in following sections. The borehole velocity logs were used to determine approximate depths in the vicinity of each borehole and place an approximate depth scale on the seismic sections. This depth scale was estimated by calculating the two way travel time for various depths, the velocity logs and averaging the depths if multiple boreholes were logged along a seismic transect. On the P-wave seismic sections, except for Transect 3, depths were extrapolated to 500 ft by assuming that sediments beneath the boreholes were saturated with P-wave velocity of 6,000 ft/s. The approximate depth scales have not been adjusted for elevation differences between the boreholes and depths are likely to vary by 10 to 20% along each profile due to lateral velocity variation. It should also be noted that other data processing steps, specifically the seismic refractions statics applied during P-wave processing will have an influence on depths, which were not accounted for. Depending upon lateral velocity variation and geologic complexity, it may not be possible to extrapolate depth information from a single borehole across a seismic line. Therefore, the depths on the seismic sections should be considered a guide rather than precise depth. In fact, to quantify lateral velocity variability at the site, the average S-wave velocity of the upper 100 ft was calculated for each of the borehole velocity logs and found to vary from 928 to 1,191 ft/s, a 28% variation.

The preferred method of correlating seismic reflectors to specific geologic horizons is through the use of a vertical seismic profile (VSP), preferably using the same source as used for the seismic reflection survey. VSP's were not conducted as part of this study as the purpose of the investigation was fault location rather than mapping of subsurface stratigraphy. However, where useful, synthetic seismograms were generated from the Oyo P-S suspension velocity logs and correlated with the seismic sections. It should be noted that synthetic seismograms calculated from velocity logs alone do not consider density variations that also contribute to overall reflectivity.

As is typical with seismic reflection data, data quality decreases on the edges of the section due to a decrease in data redundancy (fold). Potential faulting is most easily observed by identifying disruptions in continuous reflectors, diffractions, offset bedding, abrupt changes in apparent dip of bedding and other potential geologic structures indicative of faulting. Without good reflectivity in the seismic section (i.e. multiple parallel reflectors from geologic strata), fault interpretation is limited to identification of diffractions and other discontinuities and may be highly subjective. Depending upon the amount of reflectivity in the seismic section, alternate interpretations of the seismic data may be possible. As an example, multiple offset reflectors are necessary to estimate the orientation of a possible fault and to make conclusive interpretation of the presence of a fault. If only a single clear reflector is present in a seismic section, then apparent small offsets or disruptions in the reflector are not conclusive evidence of faulting and accurate identification of fault orientation is not possible. The most conclusive and accurate fault interpretation is made when offsets in multiple reflectors are visible, thus allowing accurate interpretation of the fault plane, and when the fault can be tracked through multiple seismic lines. Although diffractions alone may provide evidence of faults with offsets smaller than the vertical resolution of the survey, care should be taken with interpretation because other geologic structures such as pinch outs, gravel lenses, etc. may also give rise to diffractions.

5.2 Transect 1

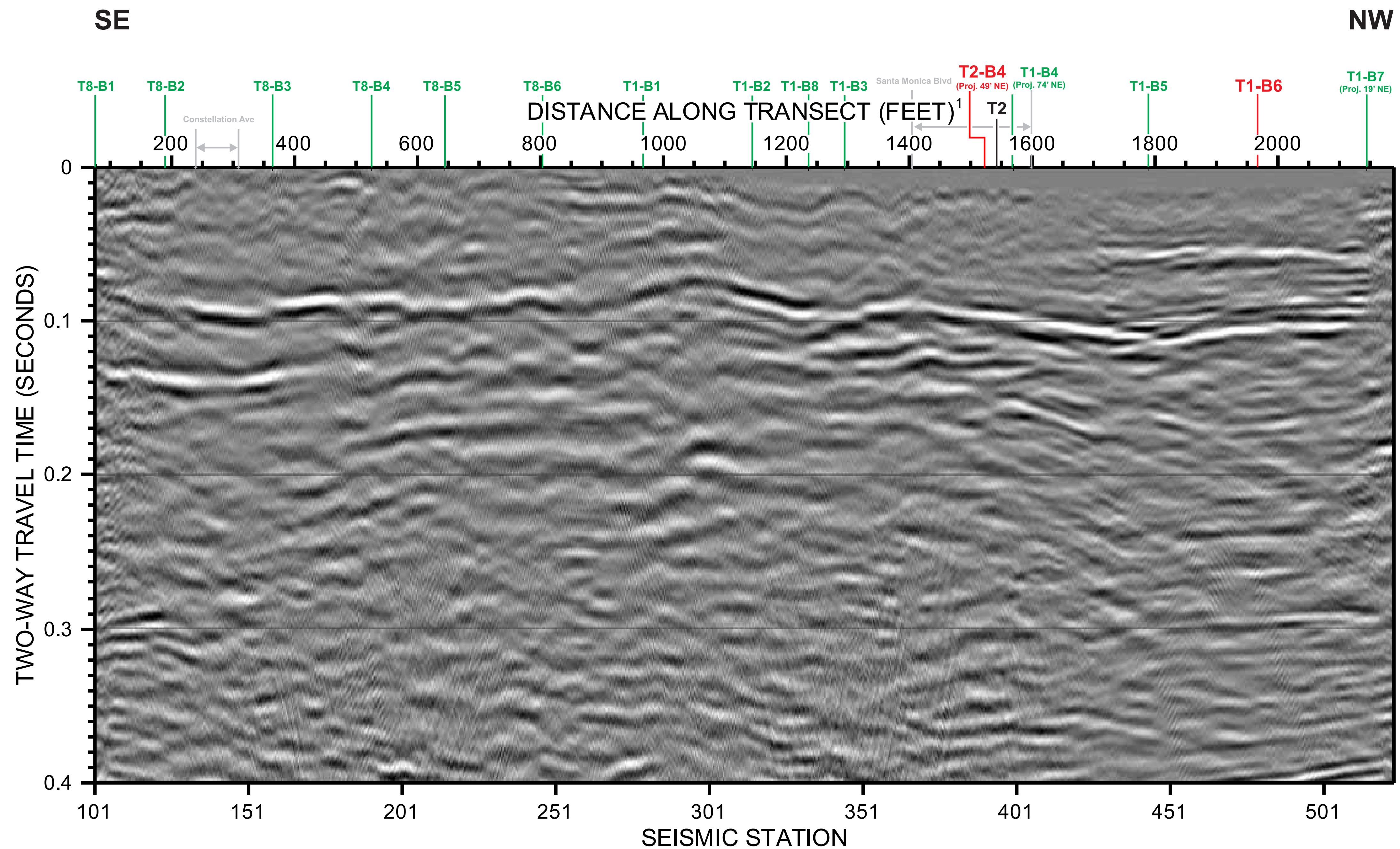
The location of the Transect 1 P- and S-wave seismic profile, which was acquired along Avenue of the Stars, is shown on Figure 1. Unmigrated and migrated P-wave seismic sections for Transect 1, with post stack processing, are presented as Figures 7 and 8, respectively. The borehole T1-B6 P-S suspension log is included as Figure 9. The interpreted unmigrated P-wave seismic section for Transect 1 is presented as Figure 10. Unmigrated and migrated S-wave seismic sections for Transect 1 are presented as Figures 11 and 12, respectively and the interpreted S-wave seismic section is presented as Figure 13.

The P-S suspension log for borehole T1-B6 (Figure 9) presents P- and S-wave velocity to a depth of about 140 ft. At a depth of about 18 ft, P-wave velocity increases abruptly at the top of the saturated zone below which velocity is generally between 5,500 and 6,500 ft/s. S-wave velocity generally increases gradually with depth with the lower envelope of the velocity likely associated with clays and silts and the upper envelope associated with sands and gravels. There are thin (less than 5 ft thick) high velocity layers, at depths of about 48 and 110 ft, that are likely associated with gravel or cemented sand layers. These layers are too thin to give rise to prominent seismic reflection events. Synthetic seismic sections are not presented for this velocity log as they did not reveal additional information.

The P-wave seismic section for Transect 1 (Figures 7, 8 and 10) has good reflectivity with several discontinuous reflectors between 0.06 and 0.2 seconds (approximately 50 to 500 ft). No significant groundwater barriers are observed on seismic records, even though this seismic line is only located about 1,400 ft northeast of the 2010 Line 1 and Transect 3, both of which cross a groundwater barrier. However, inspection of the seismic refraction event associated with the water table identified a small step in the water table near a position of 1,275 ft and a change in the water table gradient (deepening to the southeast near a position of 1,050 ft). These anomalous zones associated with saturated sediments may or may not be associated with faulting. The S-wave seismic section for Transect 1 generally has poor reflectivity, likely due to a combination of traffic noise overpowering the microvib, subsurface infrastructure in the vicinity of the seismic line and absence of coherent geologic reflectors. Therefore, interpretation of potential fault-like structures was made using the P-wave seismic section, its interpreted structures transferred to the S-wave section for collaboration.

Interpretation of the seismic reflection data were generally limited to the identification of discontinuities caused by offset geologic layers or termination of geologic units that could be tracked through the seismic section and, thereby, possibly associated with faulting. Several anomalous zones that could be associated with faulting are identified on the P-wave seismic section (Figure 10) at approximate relative positions of: 850; 1,240; 1,300; 1,400 and 1,675 ft. The fault-like structures identified at about 850 is associated with a disruption and change in apparent dip of the reflector at 0.09 s, a possible diffraction or discontinuity at 0.18 s and 1,050 ft and several disrupted reflectors. This fault-like structure is also associated with the possible change in the water table gradient discussed above. There is no conclusive evidence that this fault-like structure gets shallower than the 0.09 s reflector, which is on the order of 150 ft deep. The fault-like structure identified at about 1,240 ft is the most significant structure identified on the seismic section and gives rise to a significant disruption on the reflector at 0.09 s. This structure, which is associated with the small step in the water table discussed above, could alternatively be interpreted as two closely spaced distinct structures. The fault-like structures located at about 1,300 and 1,400ft are identified based on disruptions of the reflector at 0.09 s and minor disruptions in underlying reflectors. The possible fault-like structure identified at about 1,675 ft is identified from the termination of a reflector at 0.06 s and a change in apparent dip and disruptions in the reflector at 0.1 s. The S-wave seismic section (Figure 13) neither supports nor refutes the presence of the fault-like structures discussed above. The fault-like structures identified on the P-wave seismic section are, however, shown on the S-wave seismic section for reference.

Additional, shallow dipping potential faults were identified in borehole and CPT data near the northwest end of the seismic line. Two structures depicting this fault zone are shown on the P-wave and S-wave seismic sections for reference. The presence of these structures is not supported or refuted on the P-wave section (Figure 10) because they do not pass through any reflectors until the northwest end of the line. Fault-like structures are plausible on the S-wave seismic section (Figure 13), but poor reflectivity makes confirmation inconclusive. Extension of the seismic lines to the northwest may have facilitated interpretation of these structures.



LEGEND

T2-B4 (Proj. 49' NE) — P-S Logging Borehole Location

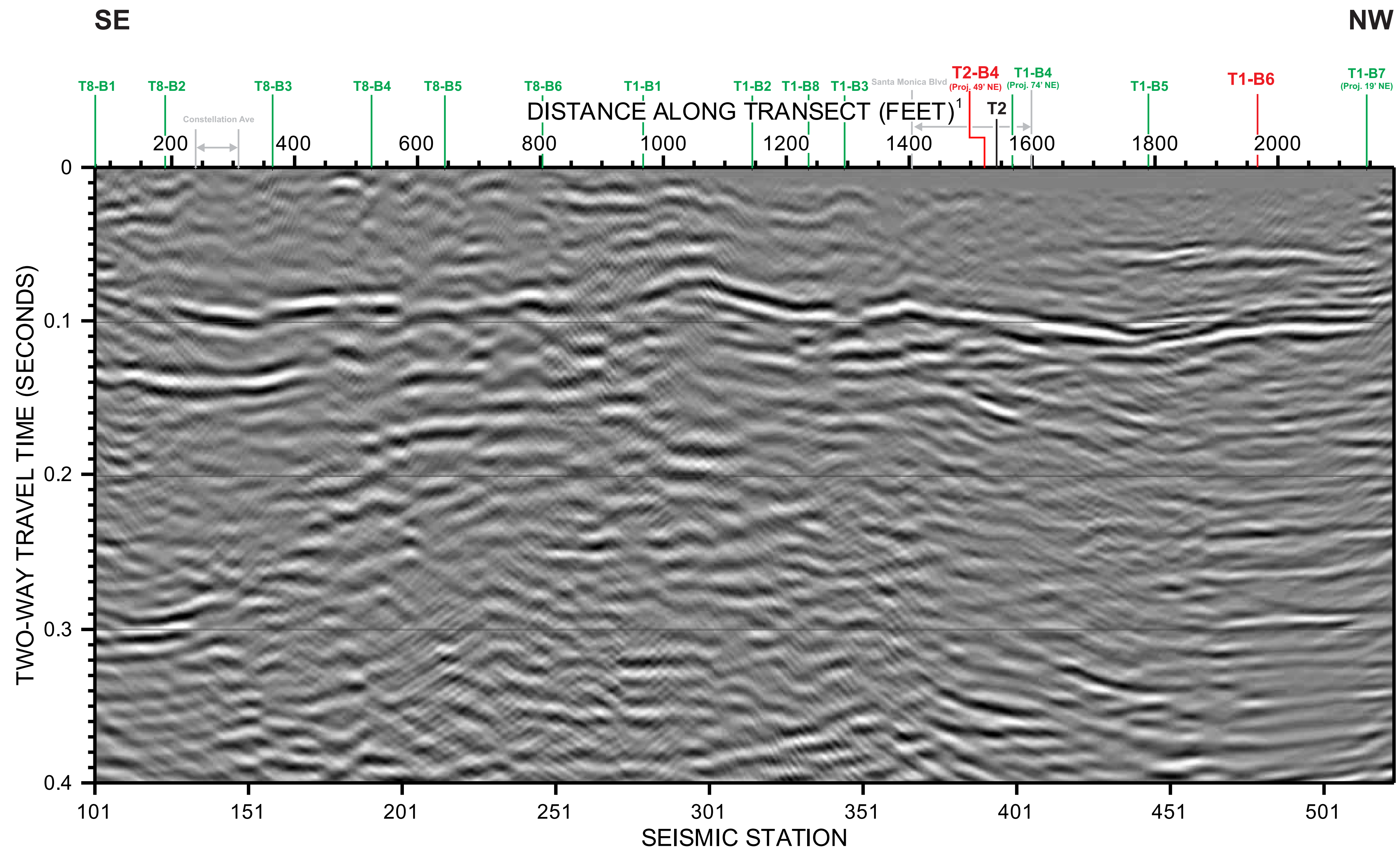
T1-B4 (Proj. 74' NE) — Borehole Location

T2 — Line Intersection

Santa Monica Blvd — Street Intersection

Note:
1. Distances approximately tied to the geologic cross section where coincident with the seismic line. See report for details.

GEOVision geophysical services	FIGURE 7 TRANSECT 1 - P-WAVE SEISMIC SECTION WITHOUT INTERPRETATION
Project # 10500 Date: SEPT 8, 2011 Drawn By: DALRYMPLE Approved By: [signature] File C:\GVPROJECTS\10500\F7.cdr	MTA-WESTSIDE EXTENSION AVE OF THE STARS LOS ANGELES, CALIFORNIA PREPARED FOR AMEC ENVIRONMENT & INFRASTRUCTURE



LEGEND

T2-B4 (Proj. 49' NE) — P-S Logging Borehole Location

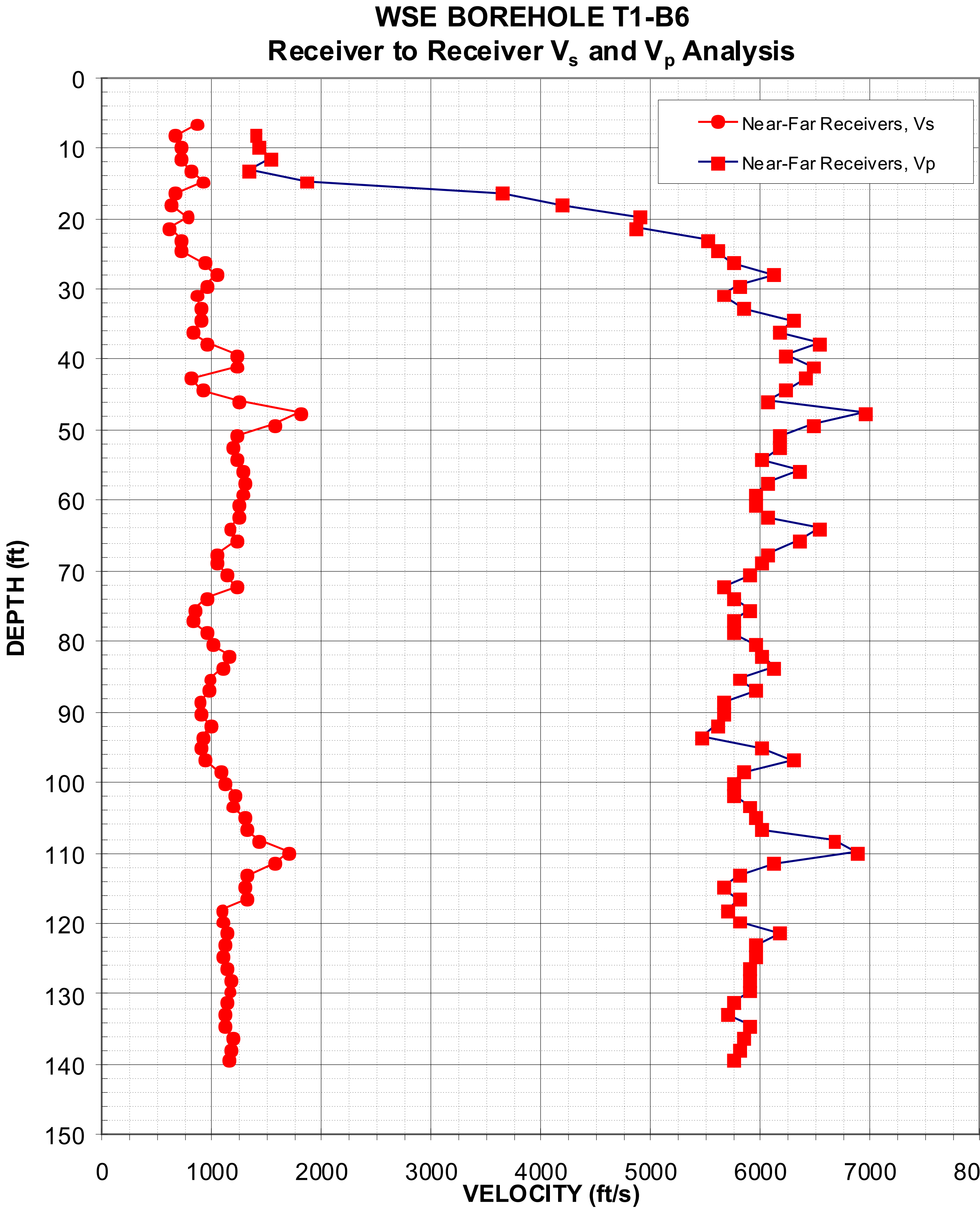
T1-B4 (Proj. 74' NE) — Borehole Location

T2 — Line Intersection

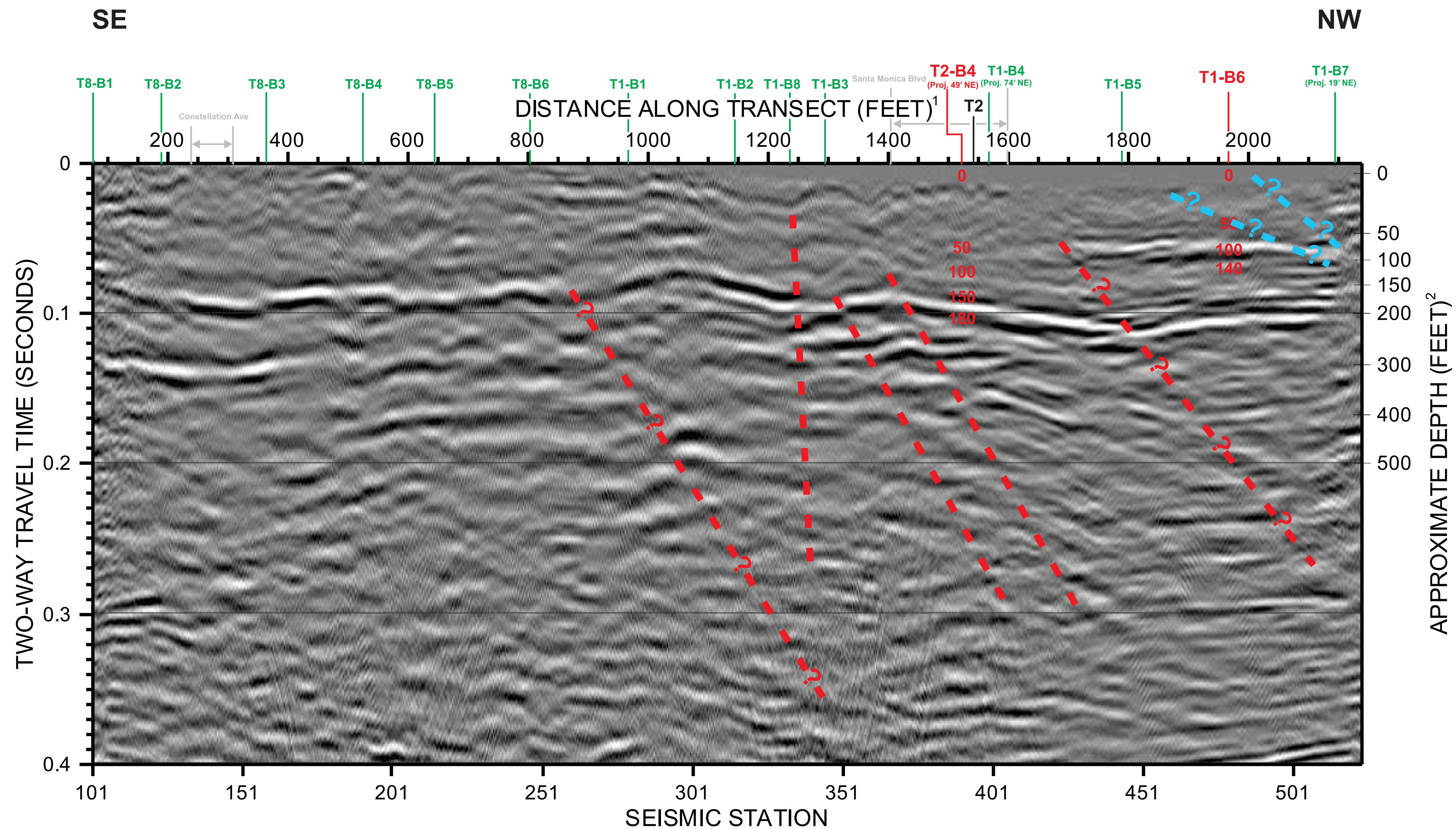
Santa Monica Blvd — Street Intersection

Note:
1. Distances approximately tied to the geologic cross section where coincident with the seismic line. See report for details.

GEOVision geophysical services	FIGURE 8 TRANSECT 1 - P-WAVE MIGRATED SEISMIC SECTION WITHOUT INTERPRETATION
Project # 10500 Date: SEPT 8, 2011 Drawn By: DALRYMPLE Approved By: [signature] File C:\GVPROJECTS\10500\F8.cdr	MTA-WESTSIDE EXTENSION AVE OF THE STARS LOS ANGELES, CALIFORNIA PREPARED FOR AMEC ENVIRONMENT & INFRASTRUCTURE



GEOVision geophysical services	FIGURE 9 BOREHOLE T1-B6 P-S SUSPENSION LOG
Project # 10500 Date: SEPT 9, 2011 Drawn By: DALRYMPLE	MTA-WESTSIDE EXTENSION AVE OF THE STARS LOS ANGELES, CALIFORNIA
Approved By: [signature] File C:\GVPROJECTS\10500\F9.cdr	PREPARED FOR AMEC ENVIRONMENT & INFRASTRUCTURE



LEGEND

T2-B4 (Proj. 49' NE) — P-S Logging Borehole Location and Estimated Depths

T1-B4 (Proj. 74' NE) — Borehole Location

T2 — Seismic Line Intersection

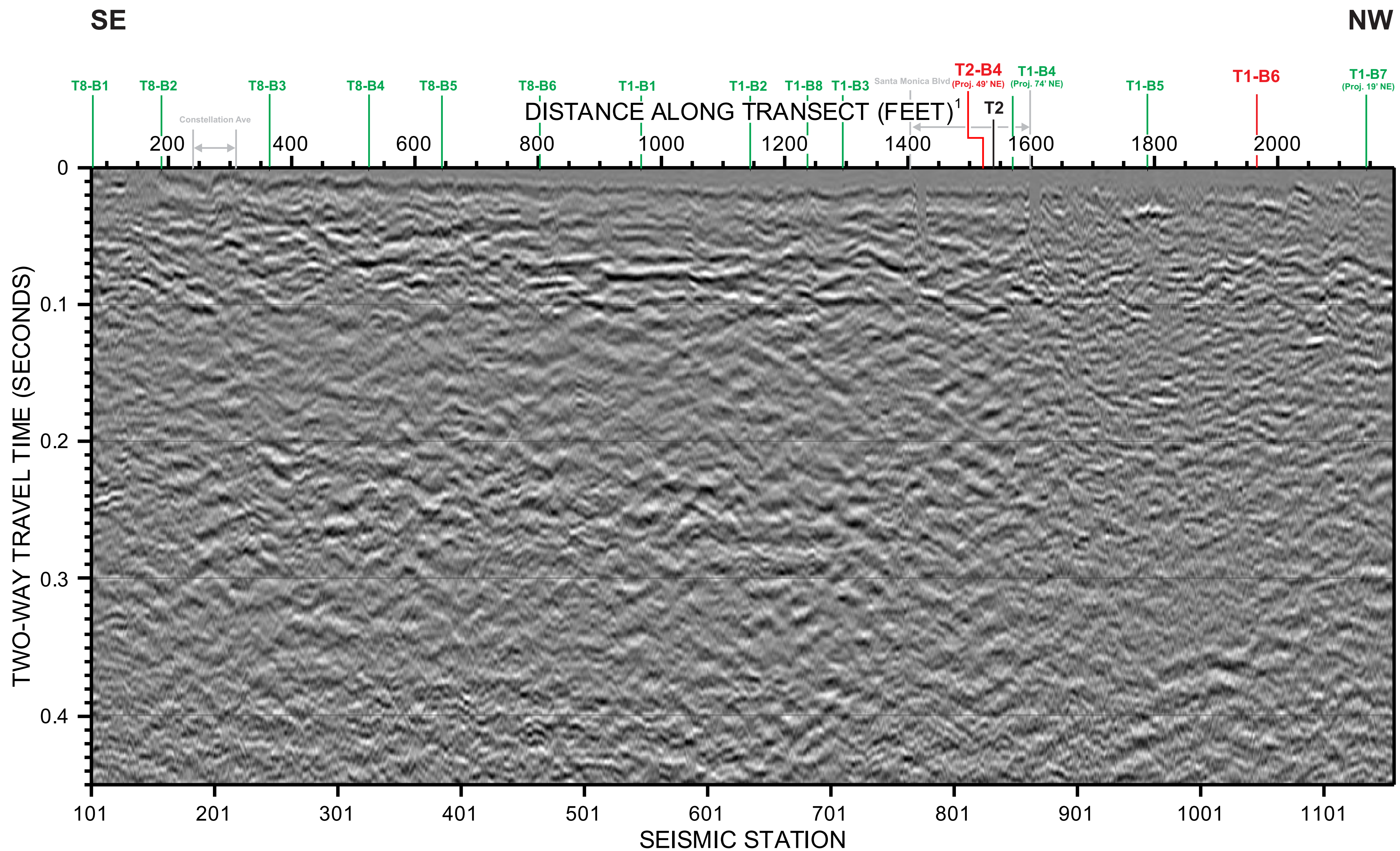
Santa Monica Blvd — Street Intersection

Red dashed line with ? — Fault Inferred on Basis of Reflector Truncations, Vertical Offsets of Major Reflectors, and/or Significant Lateral Changes in Reflector Amplitude (dashed where approximate, queried where uncertain)

Blue dashed line with ? — Possible Fault Identified on Geologic Cross Section but Inconclusive on Seismic Section

Note:
1. Distances approximately tied to the geologic cross section where coincident with the seismic line. See report for details.
2. Depths are approximate and may vary by 20%.

GEOVision geophysical services	FIGURE 10 TRANSECT 1 - P-WAVE SEISMIC SECTION WITH INTERPRETATION
Project # 10500 Date: rev OCT 14, 2011 Drawn By: DALRYMPLE	MTA-WESTSIDE EXTENSION AVE OF THE STARS LOS ANGELES, CALIFORNIA
Approved By: [signature] File C:\GVPROJECTS\10500\F10.cdr	PREPARED FOR AMEC ENVIRONMENT & INFRASTRUCTURE



LEGEND

T2-B4 (Proj. 49' NE) P-S Logging Borehole Location

T1-B4 (Proj. 74' NE) Borehole Location

T2 Line Intersection

Santa Monica Blvd Street Intersection

Note:
1. Distances approximately tied to the geologic cross section where coincident with the seismic line. See report for details.

GEOVision geophysical services	FIGURE 11 TRANSECT 1 - S-WAVE SEISMIC SECTION WITHOUT INTERPRETATION
Project # 10500 Date: SEPT 8, 2011	MTA-WESTSIDE EXTENSION AVE OF THE STARS LOS ANGELES, CALIFORNIA
Drawn By: DALRYMPLE Approved By: [signature] File C:\GVPROJECTS\10500\F11.cdr	PREPARED FOR AMEC ENVIRONMENT & INFRASTRUCTURE