

**FOR CONTRACT NO.: 07-4T3504
PROJECT ID: 0700020019**

INFORMATION HANDOUT

MATERIALS INFORMATION

FOUNDATION REPORT
April 18, 2011

ROUTE: 07-Ker-5755

Memorandum

*Flex your power!
Be energy efficient!*

To: SEAN SAMUEL
Branch Chief, Structural Design Section 2
Office of Transportation Architecture
Structure Design Services
Division of Engineering Services

Date: April 18, 2011
File: 06-KER-5755
07-4T3501
Project No.0700020019
Frazier Sand Storage

Attn: Tom Mesich

From: DEPARTMENT OF TRANSPORTATION
Division of Engineering Services
Geotechnical Services
Geotechnical Design - North

Subject: Foundation Report

Introduction

Per your request, dated December 13, 2010, a Foundation Report is prepared to provide geotechnical recommendations for the Frazier Sand Storage project. The building is located on the northwest side of Interstate 5 at approximately PM 0.8 in Kern County. See Plate No. 1 for Vicinity Map.

Existing Facilities and Proposed Improvements

The storage building is proposed to be constructed approximately 700 ft southwest of the Southbound Tejon Pass rest area. There is no existing structure at the site. Access to the storage building will be from the rest area or the frontage road called Lebec Road. This building will be used as sand and salt storage. The building is proposed to be founded on strip footings which extend the perimeter of the building. The footings are also proposed to support the free-standing walls that retain the bulk materials this building is designed to contain.

Pertinent Reports and Investigations

In preparing this report, the following documents were reviewed:

1. California Building Code (2007 Edition).

2. USGS Earthquake Hazard Program: <http://earthquake.usgs.gov/hazards/>
3. Four Cone Penetration soundings (CPT), performed on Mar. 24, 2011, at the proposed site.
4. Geologic Map of California – Los Angeles sheet (California Division of Mines and Geology, 1969).
5. Site Plan, Floor Plan, General Plan, Sections, and Foundation Pedestal Details provided by Division of Engineering Services, Office of Transportation Architecture.
6. As-built LOTB's: Cuddy Creek Bridge Widening (Br. 50-48 R/L), dated January 1963; Cuddy Creek Wash Bridge Widening (Br. 50-48 R/L), dated January 1963.

Geology and Seismicity

The California Department of Conservation, Division of Mines and Geology, Geologic Map of California, Los Angeles sheet, 1969, was used to determine the geologic formations in the project location. A section from these maps showing the project location is attached as Plate No. 2, Geology Map. The project location is mapped as being in an area of recent alluvial deposits (Qal), Mesozoic Granite and Adamellite (gr^a), and Pre-Cretaceous Metasedimentary Rocks (ms).

The following seismic design parameters are in accordance to the 2007 California Building Code:

- Site Class: D
- Mapped spectral accelerations for short periods (S_s): 2.124g
- Mapped spectral accelerations for the 1-second period (S_1): 1.086g
- Surface Displacement from Fault Rupture: The building is located within the Garlock Fault zone. However, this building is being designed for sand storage and has minimal human occupancy. Relocation of the proposed storage building is not necessary.

Field Investigation

Field investigation was performed on March 24, 2011, and four in-situ Cone Penetration Tests (CPT's) were performed. CPT soundings were advanced to the maximum depth of 50 ft. Geotechnical analyses performed for this project are based on findings from these investigations as well as the as-built LOTB's of a nearby structure that is 0.22 mile from the site. See Attachment for CPT soundings locations and results.

Geotechnical Conditions

According to CPT Soundings and a site visit on March 24, 2011 and as-built LOTB's, the site is underlain by recent alluvial deposits which consist of fine to coarse grained, medium dense to dense sand with gravels and lenses of silt.

Ground Water Condition

Since the project site is located in a low population area within the Lebec Mountains, there is no pertinent Department of Water Resources (DWR) monitoring well data near the project area; therefore, no DWR record of groundwater levels was used. Groundwater was not encountered during CPT testing. According to two as-built LOTB's, no groundwater was encountered during the time extend of those subsurface exploration. Based on the above evidence, groundwater is approximated to be deeper than 20 ft. Groundwater is not likely to be encountered during construction.

Liquefaction

Due to the soil at the proposed site consists of primarily dense sandy materials, liquefaction potential is considered to be low.

Frost Depth

According to the Kern County engineering department, there is no frost concern within the proposed area.

Foundation Recommendations

Vertical Bearing Pressure

According to the Foundation Plan provided by the Office of Transportation Architecture, the proposed structure will be supported on 9-ft wide strip footings. A maximum allowable bearing pressure of 1.0 tsf (2000 psf) can be used. The spread footings should be embedded at least 2 feet below existing ground surface or the lowest of the adjacent finished grade.

Lateral Pressures

The lateral passive resistance of $400H$ psf (or 400 psf/ft) may be used where H is the embedment depth. The coefficient of sliding friction of 0.3 may be used. There is no increase in lateral passive resistance for short-term loading.

Moisture Barrier

A vinyl membrane with a minimum thickness of 6 mils should be placed over 4 inches of draining granular materials. The membrane should be covered by 3 inches of sand to aid in a uniform concrete cure.

Slope Stability

The sand storage building is proposed to be built on a relatively flat surface. There is no potential for slope instability.

Lateral Spreading

Since liquefaction potential is low at the proposed site, and the proposed site is on flat surface, lateral spreading concern is minimal.

Settlement

The estimated total and differential settlement is less than 0.5 inch.

Subgrade Modulus

The subgrade modulus for slab design, k , shall be taken as 174psi/in (or 150 tons/ft³).

Corrosive Soil Consideration

Corrosion test was performed on a sample obtained from 0 to 5 ft below ground surface. The Minimum Resistivity is tested to be 8775 ohm-cm and pH is 7.34. The site is determined to be non-corrosive for foundation element.

Construction Considerations

Spreading footing should be placed on firm soil. If non-suitable materials are encountered during construction, these materials should be removed and re-compacted, or the footing elevation may

be lowered to a firm base. If un-anticipated geological conditions are encountered during excavation of the footing, the Office of Geotechnical Design – North should be contacted for more recommendations. Standard specification for structural backfill shall be followed.

Project Information

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

LOTB for Frazier Sand Storage.

Data and information included in the Information Handout provided to the bidders and contractors are:

Foundation Report for EA 07-4T3501, dated April 18, 2011.

Data and information available for inspection at the District Office:

None.

Data and information available for inspection at the Transportation Laboratory are:

None.

If any changes to the structure are proposed during the final project design, the Office of Geotechnical Design – North should review those changes to determine if the foundation recommendation herein still applies.

A full-sized Log of Test Boring (LOTB) which is to be incorporated into the project plans is being prepared by Geotechnical Services, Office of Geotechnical Support Branch D – Contracts, Graphics & Records, and will be forwarded when completed. Mrs. Irma Gamarra-Remmen of the Contracts, Graphic & Records branch may be contacted directly for information on the LOTB.

If you have any questions or comments, please call me, Carolyn Zhen-Ru, at (916) 227-1055 or my supervisor, John Huang, at (916) 227-1037.

SEAN SAMUEL
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Frazier Sand Storage
Kern 5755

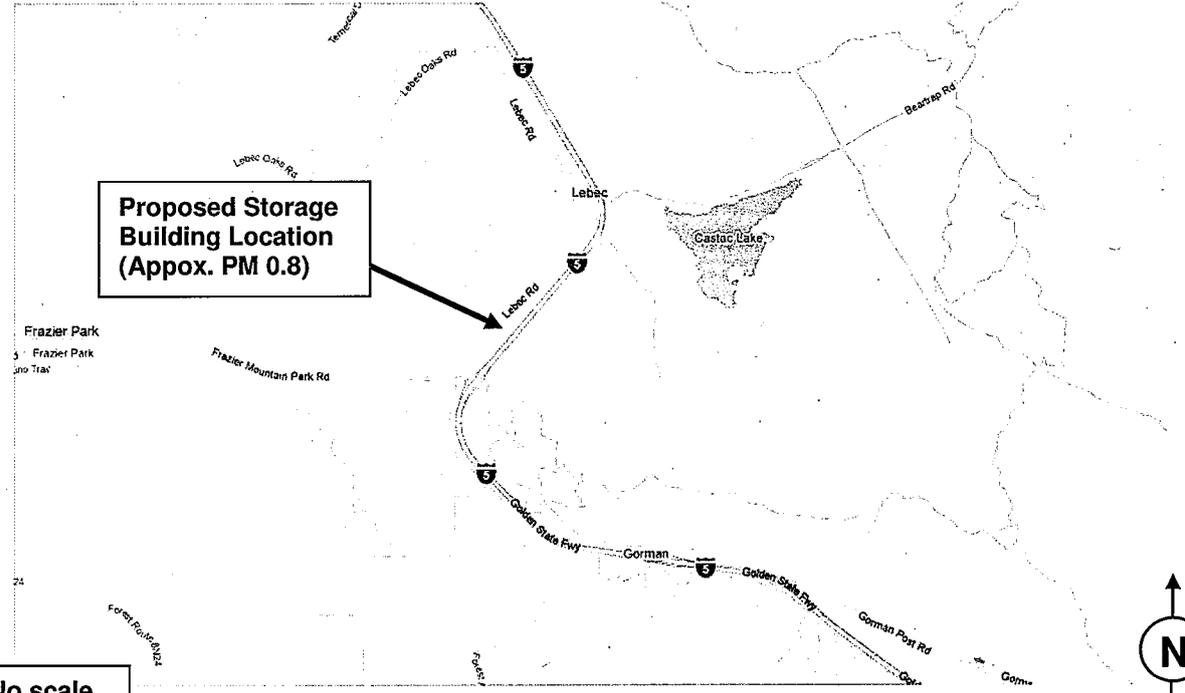
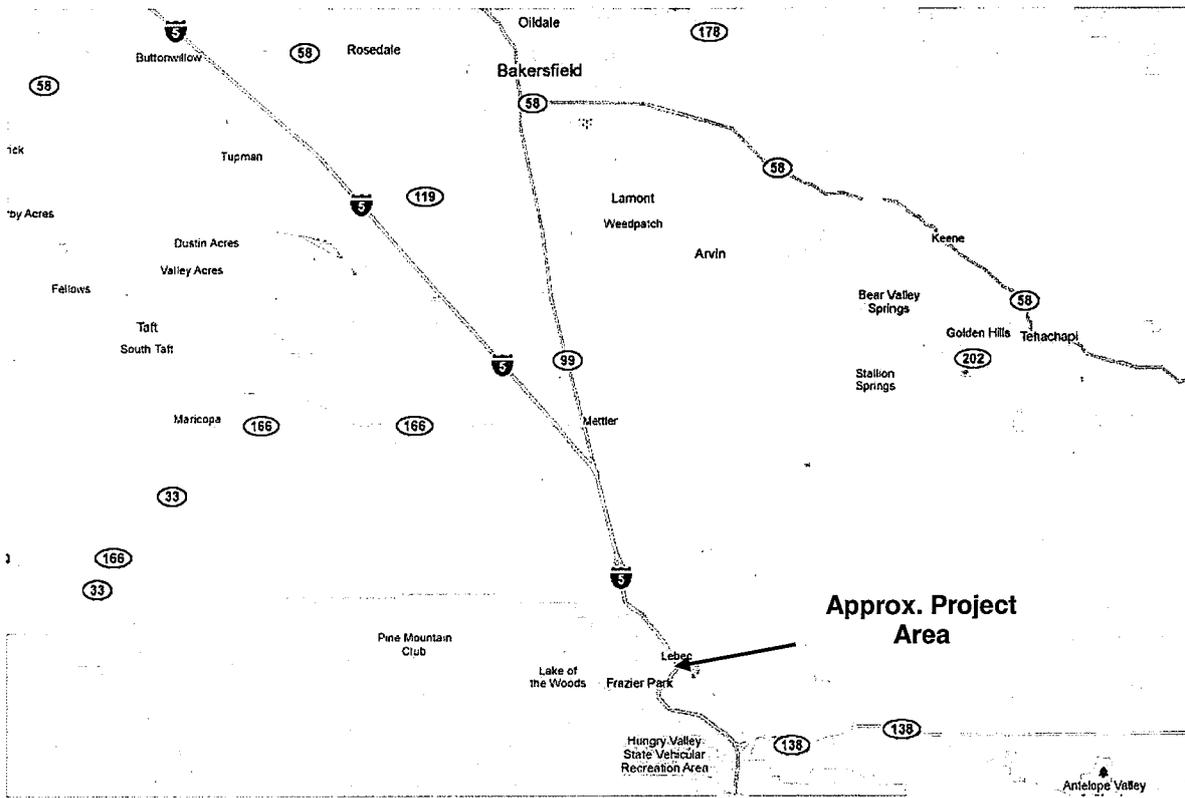


CAROLYN ZHEN-RU, P.E.
Transportation Engineer, Civil
Office of Geotechnical Design – North
Branch E

C: District Project Manager, Eric Wang
GS Corporate, Mark Willian
DES Office Engineer, not yet assigned
District Materials Engineer, Kirsten Stahl
Structure Construction R.E. Pending File

ATTACHMENTS:

Plate 1 – Vicinity Map
Plate 2 – Geology Map
Plate 3 – CPT Locations
CPT Records (3 sheets)



No scale



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Date: March 2011

VICINITY MAP

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Plate
 No. 1



Geology base map from California Division of Mines and Geology – Geologic Map of California, Los Angeles sheet, dated 1969

Explanation of Relevant Formations:

Qal –Recent Alluvium – Alluvium, unconsolidated valley and stream deposits; locally includes dissected fans; lake and marsh deposits in the Sierra Nevada probably Pleistocene age in part; coarse granitic fanglomerate along eastern base of Sierra Nevada.

gr^a –Mesozoic Granite and Adamellite – Coarse grained, equigranular, rusty appearing biotite grante. Holocrystalline, medium-grained quartz monzonite, locally ranging from granodiorite to granite.

ms –Pre-Cretaceous Metasedimentary Rocks – Quartzite or rocks predominantly quartzite of the Kernville “Series”.



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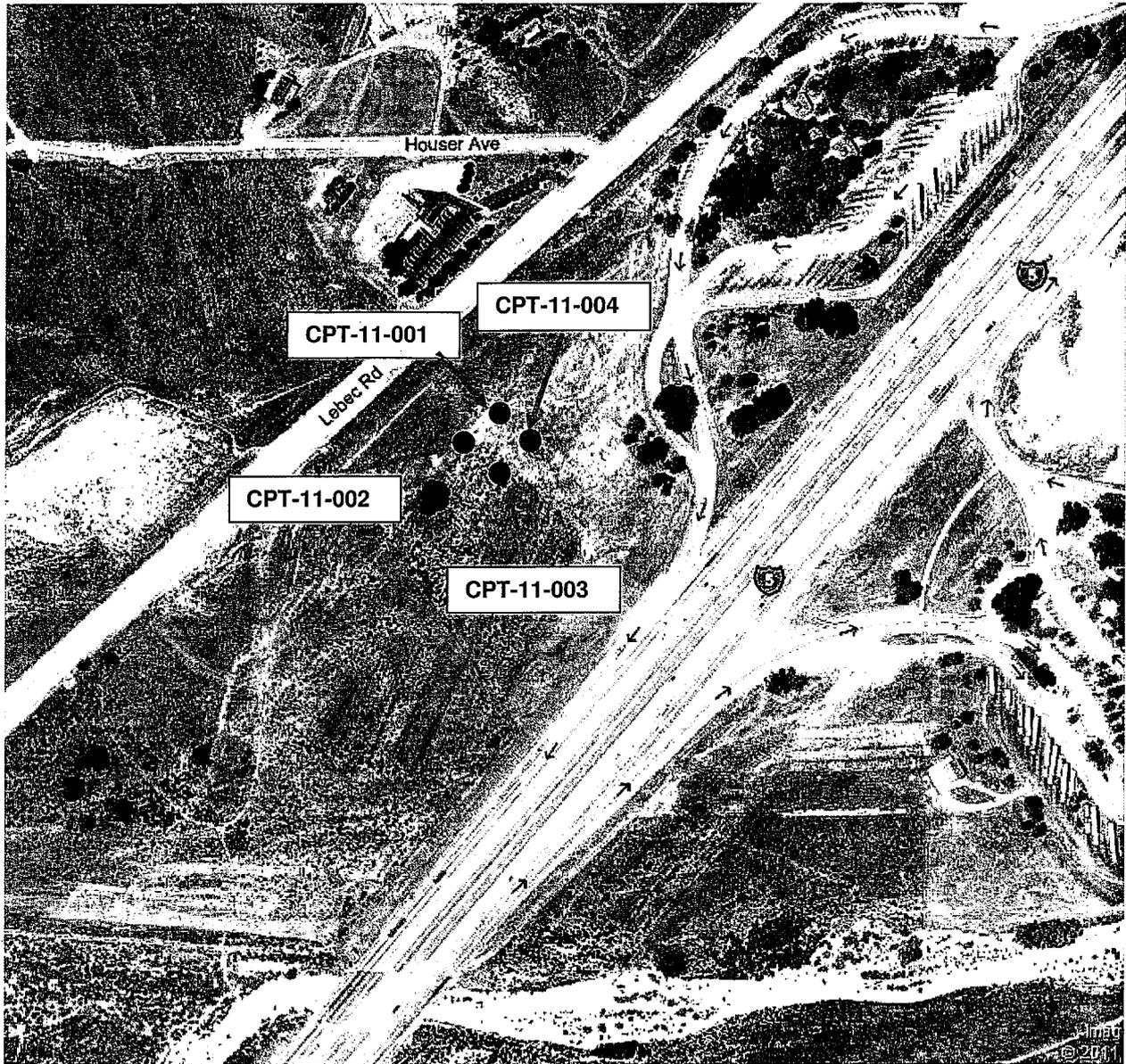
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GEOLOGY MAP

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Plate
 No. 2



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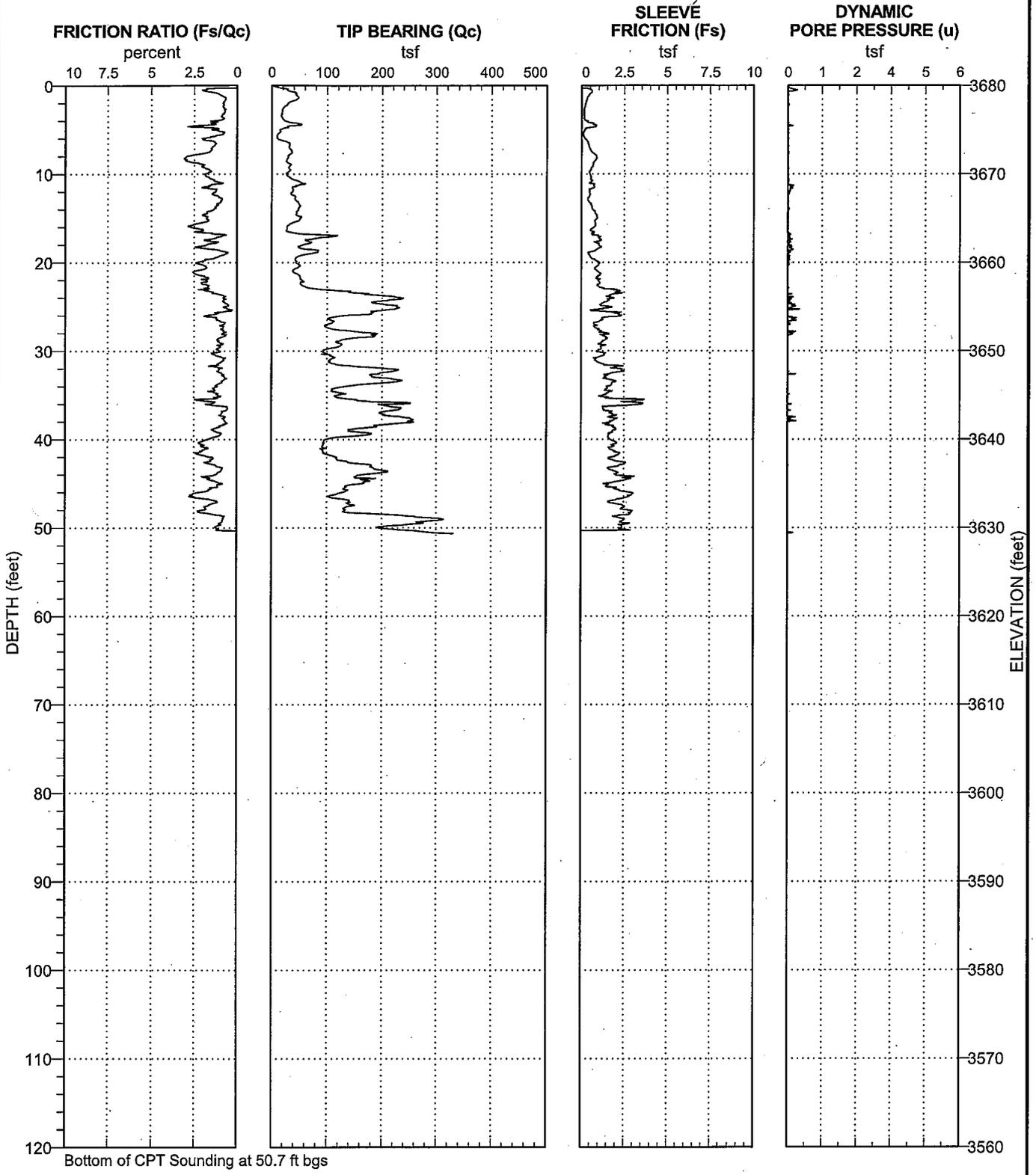
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CPT LOCATIONS

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Plate
 No. 3

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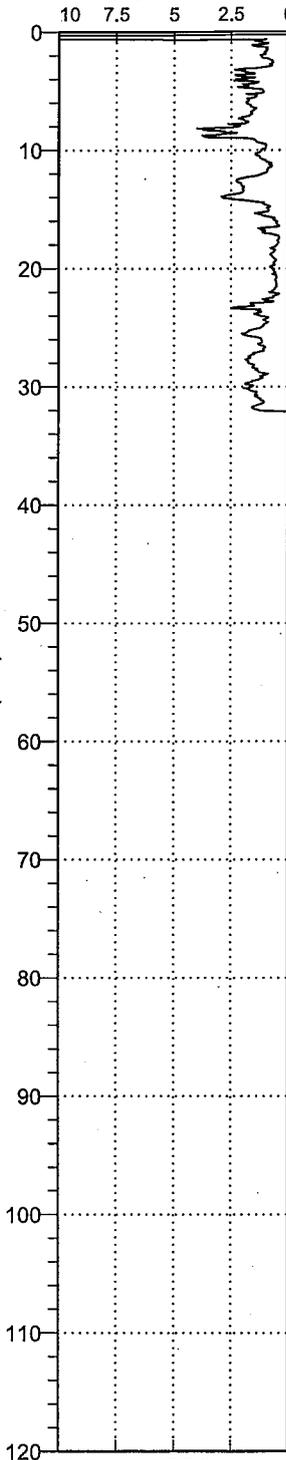


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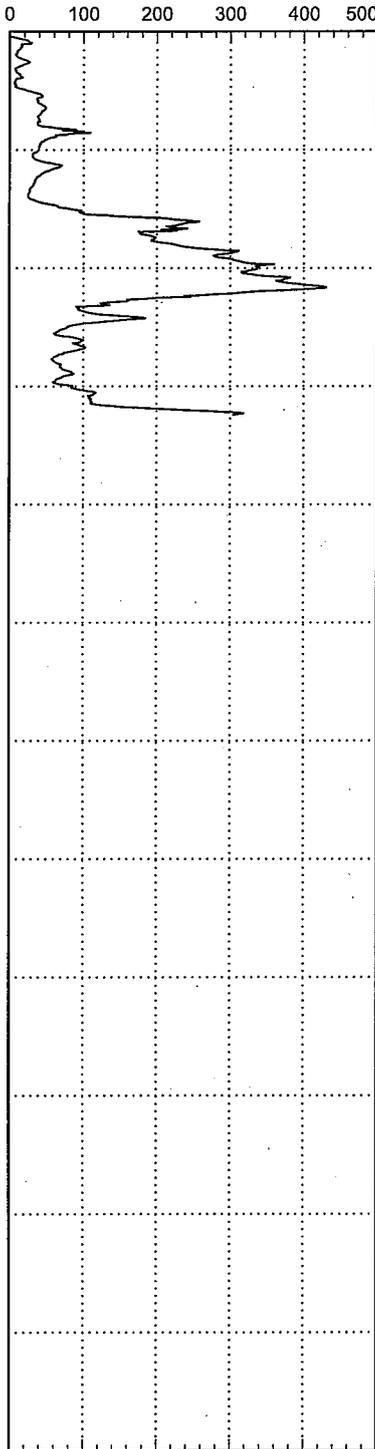
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| PROJECT OR BRIDGE NAME Frazier Sand Storage | | | | | |
| BRIDGE NUMBER N/A | | PREPARED BY C Zhen-Ru | | DATE 4-1-11 | SHEET 1 of 1 |

DEPTH (feet)

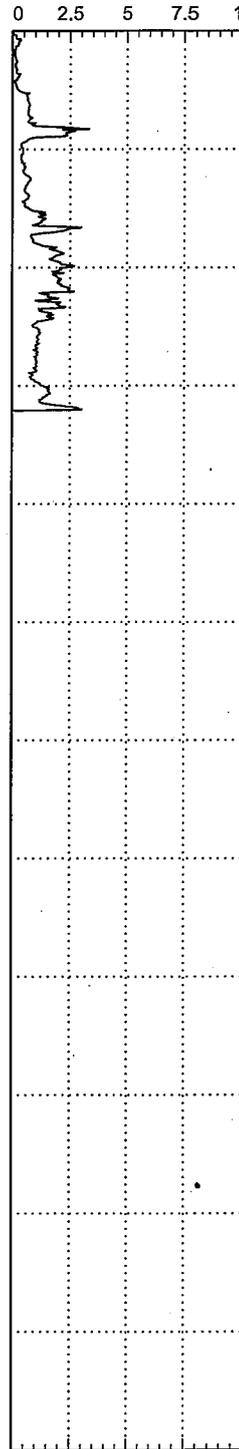
FRICTION RATIO (Fs/Qc)
percent



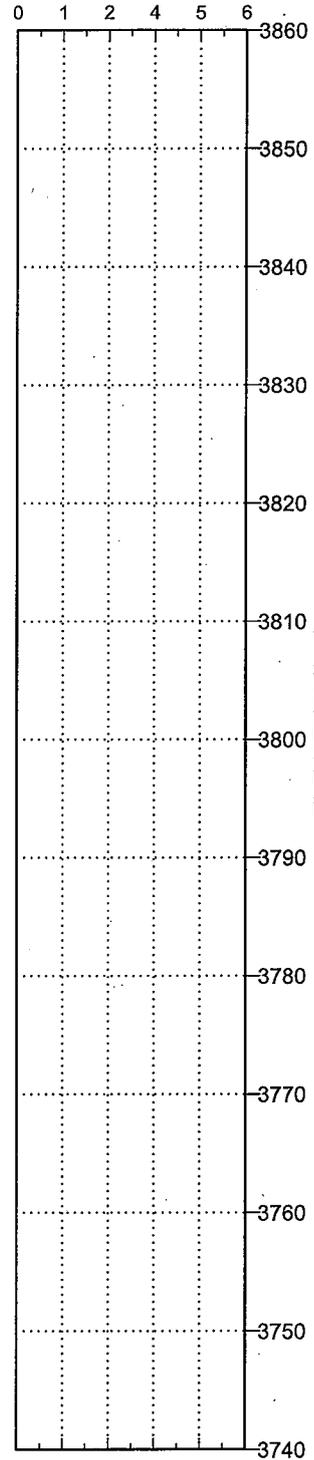
TIP BEARING (Qc)
tsf



SLEEVE FRICTION (Fs)
tsf



DYNAMIC PORE PRESSURE (u)
tsf



ELEVATION (feet)

Bottom of CPT Sounding at 32.4 ft bgs

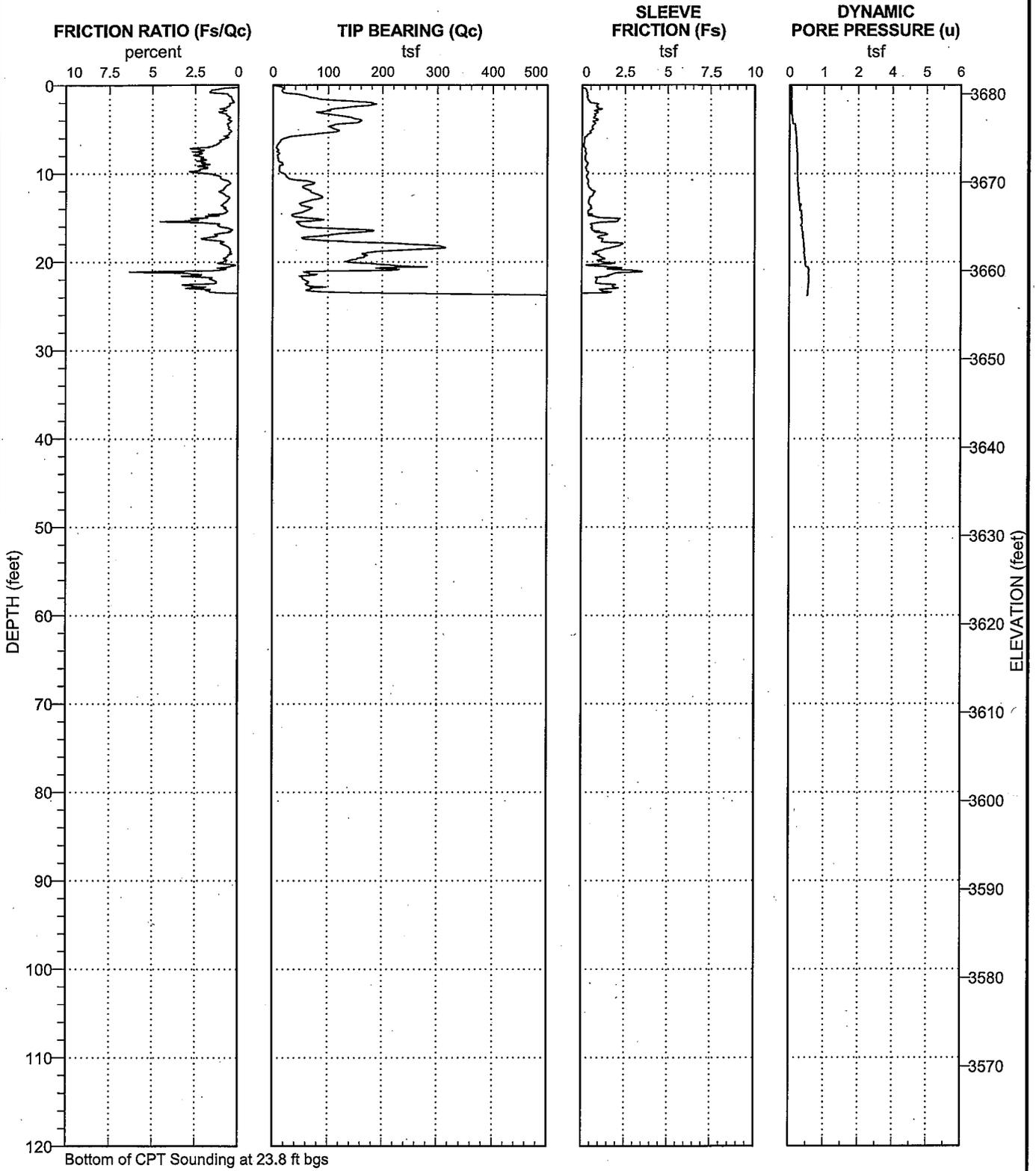
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| REPORT TITLE BORING RECORD | | | | HOLE ID CPT-11-002 | |
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| BRIDGE NUMBER N/A | | PREPARED BY C Zhen-Ru | | DATE 4-1-11 | SHEET 1 of 1 |

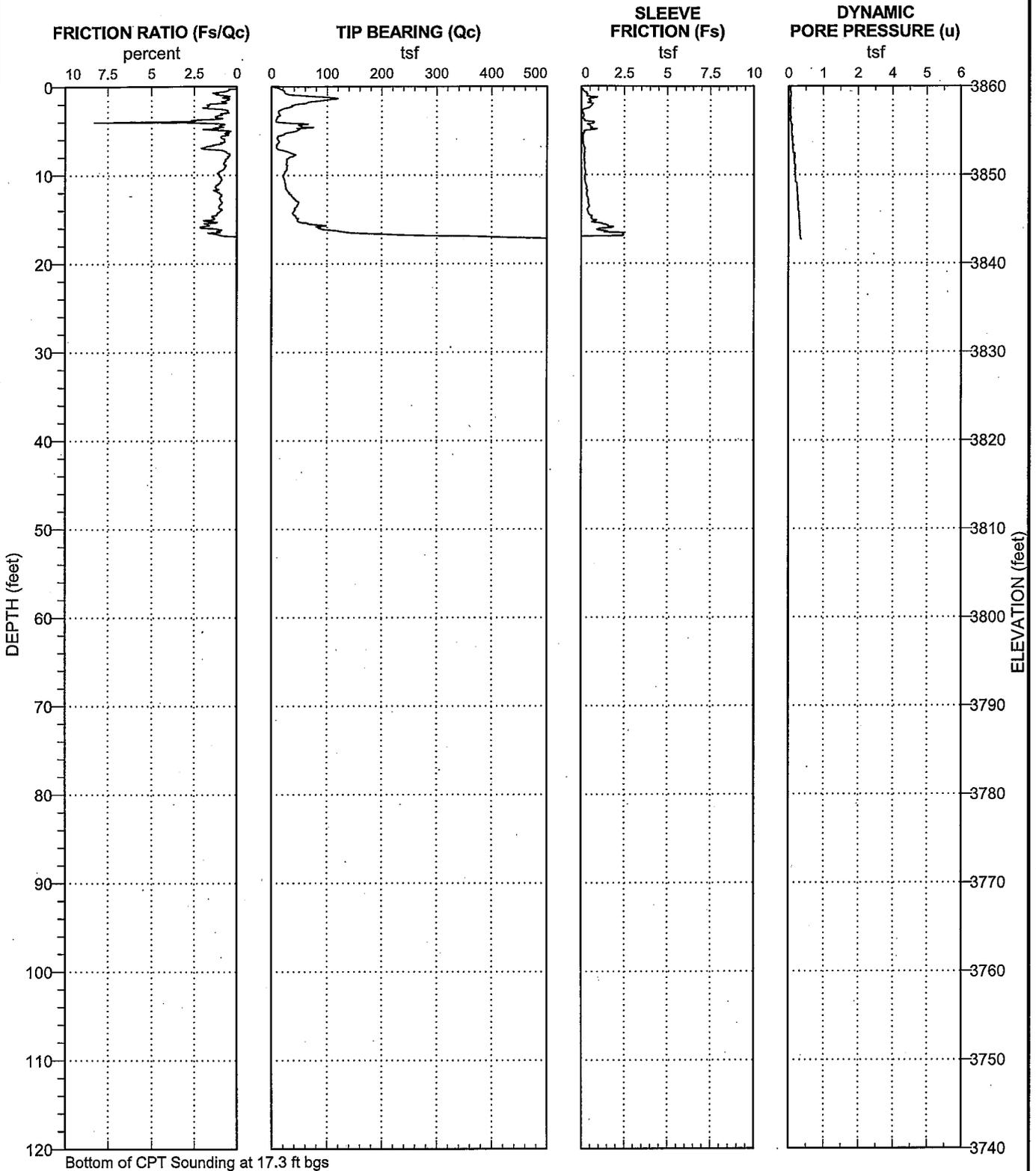
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| REPORT TITLE BORING RECORD | | | | HOLE ID CPT-11-003 | |
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| REPORT TITLE BORING RECORD | | | | HOLE ID CPT-11-004 | |
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| BRIDGE NUMBER N/A | | PREPARED BY C Zhen-Ru | | DATE 4-1-11 | SHEET 1 of 1 |