

TOMPKINS COUNTY, NEW YORK
HIGHWAY DIVISION

REQUEST FOR PROPOSALS

FOR

CR 115, BROOKTONDALE ROAD
GEOTECHNICAL INVESTIGATION & SLOPE
STABILIZATION ENGINEERING SERVICES

TOWNS OF CAROLINE AND DRYDEN



CONTRACT NO. HW-14-23

OCTOBER, 2014



NOTE: PROPOSAL SIGN OFF SHEET AND REQUIRED QUANTITY OF ALL DOCUMENTS MUST BE INCLUDED WITH RESPONSE FOR SUBMITTAL CONSIDERATION

TOMPKINS COUNTY, NEW YORK

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ENGINEERING SERVICES

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1.0 PROJECT ANNOUNCEMENT

- 1.1 NOTICE IS HEREBY GIVEN that Proposals for engineering services related to geotechnical investigation and stabilization design for a stretch of Brooktondale Road (CR115) along Six-Mile Creek in the Towns of Caroline and Dryden will be received until **11:30 AM** local time on **TUESDAY NOVEMBER 18, 2014** at the Tompkins County Finance Department, Purchasing Division, 2nd Floor, 125 East Court Street, Ithaca, New York, 14850, Attention: Ms. Lisa Hall.
- 1.2 Request for Proposal (RFP) packages are available for download at www.tompkinscountyny.gov/purchase/current-rfps, or at the Tompkins County Purchasing Division, (submission address above), phone number (607) 274-5500.
- 1.3 In addition to the address above, the RFP may be examined at the Tompkins County Highway Division, 170 Bostwick Road, Ithaca, NY. Technical questions may be addressed to Mr. Carl E. Martel, P.E., cmartel@tompkins-co.org, submitted in writing no later than **12:00 p.m., Friday, November 7, 2014**. Answers will be posted to the website listed above by **Wednesday, November 12, 2014**.
- 1.4 Tompkins County reserves the right to waive any informalities, to reject any and all submittals, and to negotiate with any respondent to this RFP.

Lisa Hall
Buyer

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2.0 CONTACT INFORMATION

2.1 Project Manager:

Carl E. Martel, P. E (607) 274-0317
Assistant Highway Director (607) 272-8489 FAX
Tompkins County Highway Division
170 Bostwick Rd.
Ithaca, New York 14850
e-mail: cmartel@tompkins-co.org

2.2 Purchasing:

Lisa Hall (607) 274-5500
Buyer (607) 274-5505 FAX
Tompkins County Finance Department
125 East Court St.
Ithaca, New York 14850
e-mail: lhall@tompkins-co.org

3.0 INSTRUCTIONS TO RESPONDENTS

- 3.1. Respondents shall read all documents contained in this Request for Proposal (RFP) package. Failure to do so does not excuse respondent from abiding by all instructions, terms, and conditions.
- 3.2. Responses shall be submitted to the exact location indicated in the specifications no later than the date and time indicated.
- 3.3. Interested parties may obtain the RFP on-line at:
<http://www.tompkinscountyny.gov/purchase/current-rfps>

Respondents are responsible for reporting, in writing, any errors found in the RFP to Tompkins County Purchasing, 125 E. Court Street, Ithaca, NY 14850, or purchase@tompkins-co.org. Failure to report errors constitutes acceptance as written.
- 3.4. Respondents must submit any questions regarding any portion of the specifications in writing to cmartel@tompkins-co.org by the date provided. Answers will be provided no later than four (4) calendar days prior to the proposal due date. Verbal questions may not be entertained.
- 3.5. The County reserves the right to “Revise” or “Amend” the RFP prior to the proposal due date by written “Addenda”. It is the respondent’s responsibility to ascertain whether any addenda have been issued prior to submitting its proposal.

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- 3.6. No charge shall be allowed for federal, state, municipal sales, surcharges, or excise taxes from which the County is exempt. Exemption certificates will be forwarded to the successful respondent upon request.
- 3.7. Respondents must provide one original printed copy of their proposal responses, with original signatures, and one digital copy.
- 3.8. Respondents shall submit their proposal in a sealed package or envelope with the following information on the outside:
 - A. Title of Bid - "**Proposal – Brooktondale Stabilization** "
 - B. Date & Time of Proposal Submission Deadline
 - C. Company Name
- 3.9. The following forms are to be submitted with the proposal package.
 - A. Bid/Proposal Sign-off Form, filled out in its entirety
 - B. Acord Insurance Certificate, completed and signed by insurance agent
 - C. Affidavit of Non-Collusion, signed and dated
 - D. Anti-Discrimination Form, signed and dated
 - E. Prevailing Wage Receipt Acknowledgement
 - F. Vendor Responsibility Form, filled out in its entirety
 - G. W-9 Form, Request for Taxpayer Identification Number and Certification
 - H. Living Wage Form, filled out in its entirety
 - I. Any other information required in the bid specifications
- 3.10. In an effort to promote greater use of recycled and environmentally preferable products and minimize waste, all responses submitted should comply with the following guidelines:
 - A. All copies should be printed double sided
 - B. All submittals and copies should be printed on recycled paper with a minimum post-consumer content of 30%.
 - C. Unnecessary samples, attachments or documents not specifically asked for should not be submitted.
- 3.11. Respondents shall submit names and resumes for the Project Manager and all other key personnel designated to provide services. In addition, respondents shall submit:
 - A discussion of respondent's understanding of the scope of services and proposed investigative approach.
 - Brief descriptions of completed projects of similar size and scope, illustrating the qualifications of the prime and all sub-consultants.
 - Complete cost proposals for engineering services described in the RFP. Proposed costs shall be broken down into principal project phases.
 - A listing of standard hourly rates for personnel that may provide services for this contract.

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- A listing disclosing all sub-consultants or associate consultants supplying services for this contract.
 - A statement affirming eligibility to practice engineering in New York State.
- 3.12. Failure to submit any of the above data may result in the rejection of the proposal as non-responsive. Furthermore, the County reserves the right to require the respondent to supply any additional information it deems necessary to determine the successful responsive/responsible respondent and further to waive any minor informalities it deems to be in its best interest.
- 3.13. Upon request, respondents submitting proposals will be supplied with contract award information as soon as it becomes available.
- 3.14. All proposals submitted to Tompkins County become the property of Tompkins County and are subject to Public Information Policy. Any confidential information, such as a company's financial status, if required by the specifications, shall be submitted in a separate sealed envelope with the word "CONFIDENTIAL" on the outside.
- 3.15. The apparent silence of the specifications as to any details or the omission from it of a detailed description concerning any point shall be interpreted as meaning that only the best commercial practices are to prevail and that only materials and workmanship of first quality are to be used, specified, or accepted.
- 3.16. Tompkins County reserves the right to consider a proposal "incomplete" or "non-responsive" if it is not submitted in accordance with the provision of the specifications, or to waive informalities in any proposal as received. The County also reserves the right to reject any and all proposals that do not prove to be in the best interest of the County without cause.
- 3.17. This invitation to respond does not commit the County to award a contract, nor shall the County be responsible for any cost or expense that may be incurred by the respondent in preparing and submitting a response or any cost incurred prior to the execution of a contract.
- 3.18. The County reserves the right to cancel the contract without cause with a minimum of thirty (30) days written notice. Termination or cancellation of the contract will not relieve the respondent of any obligations or liabilities resulting from any acts committed by the respondent prior to the termination of the contract. The respondent may cancel the contract with one hundred-twenty (120) days written notice.
- 3.19. A Respondent selected to supply services for a design project shall be barred from bidding on the construction or supply and installation of the designed project to avoid conflict of interest.
- 3.20. Tompkins County encourages the payment of livable wages whenever practical and reasonable.

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4.0 GENERAL CONDITIONS

- 4.1. **Method of Award:** The County reserves the right to award a contract to the respondents who submit proposals that prove to be in the best interest of the County. The County has the sole discretion and reserves the right to cancel this request, reject any/all responses, to waive any/all informalities and/or irregularities if it is deemed to be in the best interest of the County to do so.
- 4.2. **Contract Extension:** The County agrees, under the General Municipal Laws of New York State to allow all authorized users who wish to utilize any contract(s) awarded as a result of this solicitation to do so. However, it is understood that the extension of such contract(s) is at the discretion of the respondent and the respondent is only bound to the contract(s) between itself and the County.
- 4.3. **Term of Contract:** The term shall be specified within the detailed specifications.
- 4.4. **Contract Award:** Contract award, if any, will be made within forty-five (45) calendar days of due date. Contract(s) shall be awarded to the respondent(s) submitting the proposal that proves to be in the best interest of the County.
- 4.5. **Contract(s):** The successful respondent will be required to sign a Tompkins County contract. Tompkins County will not sign any company's service agreement, contract or any other form of agreement. Tompkins County reserves the right to extract certain language from a company's agreement and incorporate it into a Tompkins County contract if mutually agreeable.
- 4.6. **Invoices:** Invoices shall be mailed directly to the ordering department. Invoices mailed to the incorrect location may not be forwarded thus causing delay in payment.
- 4.7. **Environmentally Preferable Products:** Environmentally preferable products are those that have a lesser or reduced effect on human health and the environment when compared with competing products that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product. Bidders able to supply products containing recycled and environmentally preferable materials that meet or exceed the specifications and performance requirements are encouraged to offer them in bids and proposals.
- 4.8. **Non-Appropriation Clause:** In accordance with New York State General Municipal Law, the County will not be liable for any purchases or contracts for goods or services for which funding is not available. As a result, the respondent agrees to hold the County harmless for any contracts let for which funding either does not currently exist or for which funding has been removed prior to the authorization to proceed. Should it become necessary for the County to cancel a project after an order to proceed has been issued, the County will only be liable for and the respondent agrees to only assess those financial damages that it can prove to have incurred as a result of the contract cancellation.

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- 4.9. **Training:** If required, training shall take place during regular business hours. Training shall be provided until all County personnel involved in the contract are adequately trained.
- 4.10. **Deviations:** Deviations to the specifications are to be so noted and fully explained. Tompkins County reserves the right to accept any or all deviations if it proves to be in the best interest of the County.
- 4.11. **Prevailing Wages (Public Work projects only):** All respondents submitting proposals for Public Work projects are required to conform to all current NYS Prevailing Wage Laws. A copy of the Prevailing Wage Rates applicable to the project, **Prevailing Rate Case Number (PRC#) 2014009910**, are available at the New York State Department of Labor web site. The successful respondent(s) is responsible for complying with all current labor rates and regulations throughout the duration of any contract resulting from this RFP. The County will only pay and the respondent agrees only to charge prevailing wage rates for those employees of any organization that are required by New York State law to receive said rates in the course of doing work for the County. No payments will be made to any consultant covered under this contract prior to consultant supplying the County with certified payrolls in accordance with the New York State Department of Labor regulations. Corporations and Partnerships submitting proposals are hereby informed that ALL personnel working on this project must be paid the prevailing rate or above in accordance with the current New York State Labor Laws in effect during the term of the project. This includes all owners, partners, and other management and other employees as required. Respondents currently on the NYS Department of Labor Debarred list will not be considered for award of this contract. By submitting a proposal for consideration the respondent is indicating that they are currently in good standing with the NYS Department of Labor.
- 4.12. **Workforce Diversity and Inclusion:** Tompkins County government is committed to creating a diverse and fully inclusive workplace that strengthens our organization and enhances our ability to adapt to change by developing and maintaining:
- A. An organization-wide understanding and acceptance of the purpose and reasons for diversity;
 - B. Recruitment and retention policies that assure a diverse workforce;
 - C. A workplace environment that is welcoming and supportive of all;
 - D. Awareness, understanding, and education regarding diversity issues;
 - E. Zero tolerance for expressions of discrimination, bias, harassment, or negative stereotyping toward any person or group;
 - F. A workforce ethic that embraces diversity and makes it the norm for all interactions, including delivery of services to the public.

Respondents are encouraged to include an outline of their diversity policy in their proposal response.

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- 4.13. **Contract Re-Assignment:** The respondent shall not re-assign any portion of any contract that results from this solicitation without the express written consent of Tompkins County.
- 4.14. **Corporate Compliance: FEDERAL FUNDING COMPLIANCE.** The respondent agrees to comply with all Federal, State, and local laws and regulations governing the provision of goods and services under this Contract. To the extent that federal funds are provided to the respondent under this contract, the respondent agrees that it will comply with all applicable federal laws and regulations, including but not limited to those laws and regulations under which the Federal funds were authorized.

Further, respondent agrees to comply with the County's Compliance Plan regarding Federal and State fraud and abuse laws; the Compliance Plan can be reviewed at www.tompkinscountyny.gov or a copy can be obtained at Tompkins County Administration, 125 East Court Street, Ithaca, New York 14850.

Respondents that are providers of healthcare services certify that the respondent, and all employees, directors, officers and subcontractors of the respondent, are not "excluded individuals or entities" under Federal and/or New York State statutes, rules and regulations, and to determine if any of them are on or have been added to the exclusion list.

The respondent shall promptly notify Tompkins County if any employee, director, officer or subcontractor is on or has been added to the exclusion list. The County reserves the right to immediately cancel this contract, at no penalty to the County, if any employee, director, officer or subcontractor is on or has been added to the exclusion list.

By submitting a proposal, you are attesting to that fact that you and/or the provider, which you represent, have not been sanctioned nor excluded by any of the aforementioned entities.

- 4.15. **Iranian Energy Sector Divestment:** By submitting a response to this solicitation, the Respondent hereby represents that it is in compliance with New York State General Municipal Law Section 103-g entitled "Iranian Energy Sector Divestment", in that said Respondent has not:
- A. Provided goods or services of \$20 Million or more in the energy sector of Iran including, but not limited to, the provision of oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran; or
 - B. Acted as a financial institution and extended \$20 Million or more in credit to another person for forty-five days or more, if that person's intent was to use the credit to provide goods or services in the energy sector of Iran.

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Any Respondent who has undertaken any of the above and is identified on a list created pursuant to Section 165-a (3)(b) of the New York State Finance Law as a person engaging in investment activities in Iran, shall not be deemed a responsible bidder pursuant to Section 103 of the New York State General Municipal Law.

Except as otherwise specifically provided herein, every Respondent submitting a response to this solicitation must certify and affirm the following under penalties of perjury: "By submission of this response to solicitation, each Respondent and each person signing on behalf of any Respondent certifies, and in the case of a joint response, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each Respondent is not on the list created pursuant to NYS Finance Law Section 165-a (3)(b)."

Except as otherwise specifically provided herein, any response to this solicitation that is submitted without having complied with subdivision (1) above, shall not be considered for award. In any case where the Respondent cannot make the certifications as set forth in detail the reasons therefore. The County reserves the right, in accordance with General Municipal Law Section 103-g to award the contract to any Respondent who cannot make the certification on a case-by-case basis under the following circumstances:

- (1) The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Respondent has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging any new investments in Iran; or
- (2) The County of Tompkins has made a determination that the goods and services are necessary for the County to perform its functions and that, absent such an exemption, the County of Tompkins would be unable to obtain the goods or services for which the Bid is offered. Such determination shall be made by the County in writing and shall be a public document.

4.16. **Living Wage:** Tompkins County must consider the wage levels and benefits, particularly health care, provided by contractors when awarding bids or negotiating contracts, and to encourage the payment of livable wages whenever practical and reasonable.

If Respondent certifies on Attachment No. 8 that employees directly providing services outlined in this contract are NOT paid a living wage, the department contract representative may have a conversation with the Respondent and/or the provider which it represents to understand the cost implications of achieving the living wage threshold, whether there are structural barriers impacting the ability to pay the living wage, plans to improve wages over time, generous fringe benefits, or other considerations that should be applied when addressing the question of whether it is practical or reasonable to meet the living wage threshold including the cost required to bring the contract to the living wage threshold.

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5.0 SCOPE OF SERVICES AND PROJECT PHASES

- 5.1. Statement of Project. The Tompkins County Highway Division seeks professional engineering services for geotechnical investigations and design of slope stabilization measures for Brooktondale Road (a.k.a. County Road 115) in the Towns of Caroline and Dryden. Degradation of nearby Six-Mile Creek has caused the road to fail. The project will stabilize and restore the highway, both protecting the natural environment and maintaining the safety and integrity of County infrastructure.
- 5.1.1. Brooktondale Road is a two-lane, rural collector highway built by NYSDOT as Route 330 in the 1960s, but now owned and maintained by Tompkins County. In 2010 its annual daily traffic volume was 2,268 vehicles per day. It connects New York State Route 79 in the Town of Dryden with the hamlet of Brooktondale to the south and east in the Town of Caroline, generally paralleling the course of Six-Mile Creek. The area is principally residential with some agricultural activity.
- 5.1.2. Banks Road intersects Brooktondale Road approximately 450 feet south of the Caroline-Dryden town line. In 2006 the bridge carrying Banks Road over Six-Mile Creek (BIN 3209730) failed due to slope failure within stream embankment soils following a high water event. Visible evidence of soils failure extended from the bridge to several hundred feet downstream (north) along the creek. In addition, cracking and settlement were observed in the shoulder of Brooktondale Road within 200 feet of the intersection. The bridge on Banks Road was replaced in 2008. A geologic report regarding failure of the Banks Road bridge is included as Attachment 11.
- 5.1.3. In 2010, approximately 300 feet of Brooktondale Road failed between a gas transmission pipeline about 75 feet north of the Caroline-Dryden town line and the Banks Road intersection. Failure followed construction of creek side embankments and rock cross vanes within as little as 150 feet of the road. This work was part of a stabilization project at the pipeline's crossing of the creek. The failed roadway was excavated to one foot below grade and restored over geotextile filter fabric.
- 5.1.4. In 2012, following tropical storms Irene and Lee, the same area of Brooktondale Road exhibited atypical roughness requiring the road to be again repaved to pre-failure condition. Much of the pipeline related creek improvements built in 2010 were also damaged by these events.
- 5.1.5. The project area is bounded on the south by the intersection of Banks Road. From there, the project limits extend approximately 500 feet north along Brooktondale Road. The project area is bounded on the west by Six-Mile Creek. Approximate location is longitude W 76.421° : latitude N 42.396°.
- 5.1.6. Construction is scheduled for the year 2015.
- 5.1.7. All work undertaken as a result of this RFP shall be 100% locally funded.

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5.1. Scope of Engineering Services To Be Performed

- 5.1.1. The consultant shall complete approved investigations and design work and prepare final plans, specifications, and construction estimates. Typically, the design shall utilize NYSDOT Standard Specifications in effect at the time of letting. Plans shall be in US customary units.
- 5.1.2. Engineering services will include geotechnical analyses; hydraulic analyses, if deemed necessary; development of preliminary and final plans, cross-sections, technical specifications, and cost estimates; and availability for telephone and on-site consultation during bidding and construction phases.
- 5.1.3. Respondents shall be aware that LIDAR derived contours (year 2010) shall be made available for Consultant use. (Topographic surveys of the project area shall incorporate County planimetric (GIS) data.)
- 5.1.4. Geotechnical findings and mitigation recommendations shall be submitted in a design report.
- 5.1.5. Consultant shall be required during the design phase to attend a maximum of two (2) meetings with Tompkins County personnel to determine and/or review project components.
- 5.1.6. Attendance at legislative meetings and pre-bid meetings is not required.
- 5.1.7. Attendance at public informational meetings is required when deemed necessary by the County.
- 5.1.8. Right-of-way mapping, appraisal, and negotiation services are not required.
- 5.1.9. Tompkins County shall be responsible for obtaining NYSDEC and US Army Corps of Engineers permits for stabilization construction. Consultant(s) shall provide engineering drawings and other documents for permit applications, if required.
- 5.1.10. The consultant will provide special notes and specifications for inclusion in construction bidding documents. Tompkins County shall be responsible for assembling documents for bidding.
- 5.1.11. Tompkins County shall coordinate advertisement of construction documents and receive and analyze bids.
- 5.1.12. The consultant shall provide engineering services related to construction, including availability for telephone and on-site consultation during construction; approval of shop drawings; revision of plans when found to be appropriate by the County; preparation of cost estimates; and other construction engineering tasks.

5.2. Project Phases

5.2.1. Investigations, Reporting, and Preliminary Design

- Provide all approved subsurface investigations, laboratory analyses, and monitoring.
- Analyze investigative findings to determine needed stabilization alternatives.

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- Conduct hydraulic analyses to determine stream channel mitigations, if needed.
- Prepare typical roadway and stream cross-sections as required for design.
- Report recommended stabilization options with preliminary plans, specifications, and cost estimates to County.

5.2.2. Final Design Phase: Plans, Specifications, & Estimates

- Finalize plans and technical specifications setting forth detailed construction requirements. Transmit digital plan and specification files.
- Complete final cost estimates.

5.2.3. Construction Phase

- Attend pre-construction and job progress meetings, as required.
- Complete shop drawing reviews.
- Provide consultation as required with the County regarding contractor questions.
- Provide on-site inspection of critical aspects of the work, if required.
- Recommend testing of construction materials, if required.
- Prepare cost estimates pertaining to revisions of plans.

6.0 PROJECT SCHEDULE

6.1.	Receive Consultant Proposals	November 18, 2014
6.2.	Select Consultant & Negotiate Agreement.....	December 9, 2014
6.3.	Notice To Proceed With Investigations & Design.....	December 23, 2014
6.4.	Submit Investigative Findings & Preliminary Plans to County	June 1, 2015
6.5.	Submit Final Plans, Specifications & Estimate to County.....	July 8, 2015
6.6.	Advertise Construction Documents.....	July 20, 2015
6.7.	Bid Opening.....	August 4, 2015
6.8.	Construction Contract Awarded by County	August 18, 2015
6.9.	Notice To Proceed With Construction.....	August 20, 2015
6.10.	Construction Completed	November 6, 2015
6.11.	Agreements Closed Out	December 18, 2015

BID/PROPOSAL SIGN-OFF SHEET
ADDENDUM ACKNOWLEDGMENT

Please check off and sign for items below and submit this required sheet with your bid packet; the bid may be rejected if the required documents are not included with the bid.

	DONE	INITIALS
1. Proposal completed. Submit printed original and a copy on CD		
2. Proof of insurance coverage (Acord Insurance Certificate) in amounts required by specification signed by insurance agent enclosed		
3. Non-Collusive affidavit completed		
4. Anti-Discrimination clause completed		
5. Addenda (if issued) received - List Addendum # and dates		
6. Prevailing Wage Rate Receipt completed		
7. Vendor Responsibility Form completed		
8. W-9 Taxpayer Identification and Certification		
9. Living Wage Form		
10. NYS Engineering/Surveying licensing and eligibility statement		
11. Agree to all Terms & Conditions as provided within the specifications		
12. Bid Sign-Off (This) Form Completed		

By signing below the respondent is certifying that:

1. All information provided herein is true and correct to the best of their knowledge.
2. The respondent has read and understands the specifications in their entirety and that the response is made in accordance therewith, and;
3. The respondent possesses the capabilities, resources, and personnel necessary to provide efficient and successful service to the County, and;
4. The respondent will be held responsible for any and all discrepancies, errors, etc. in the discounts or rebates which are discovered during the contract term or up to and including three (3) fiscal years following the County's annual audit.

Name/Title of Authorized Person Submitting Bid

Signature of Authorized Person Submitting Bid

Firm or Corporation Making Bid

Telephone

Address

Fax

(Remit to address (if different than above))

TYPE 4 TOMPKINS COUNTY INSURANCE AND INDEMNIFICATION

The Successful Bidder Shall Maintain and Agree to the Following:

(Engineer, Architect, etc.) hereinafter referred to as Design Professional, shall hold harmless and indemnify, including reasonable costs of defense, Tompkins County, and its officers, employees, agents, and elected officials for injury or death to any person or persons or damage to property arising out of the negligent acts, errors or omissions of the Design Professional, its employees, subcontractors or agents with the exception of all actions and claims arising out of the negligence of Tompkins County. The Contractor shall maintain the following minimum limits of insurance or as required by law, whichever is greater.

A.) **Workers' Compensation and New York Disability** - Statutory Coverage Employer's Liability - Unlimited.

B.) **Commercial General Liability** including, contractual, independent contractors, products/completed operations - Occurrence Form required.

• Each Occurrence	\$1,000,000
• General Aggregate	2,000,000
• Products/Completed Operations Aggregate	2,000,000
• Personal and Advertising Injury	1,000,000
• Fire Damage Legal	50,000
• Medical Expense	5,000

- **General Aggregate** shall apply separately to the project prescribed in the contract

* Tompkins County and its officers, employees, agents and elected officials are to be included as **Additional Insureds**

C.) **Business Auto Coverage** - Liability for Owned, \$1,000,000 CSL or
Hired and Non-Owned Autos 500,000 Per Person BI
1,000,000 Per Accident BI
250,000 PD Split Limits

* Tompkins County and its officers, employees, agents and elected officials are to be included as **Additional Insureds**

D.) **Professional Liability** - \$1,000,000 **OR** **Errors and Omissions Liability** - \$1,000,000

All insurance shall be written with insurance carriers licensed by the State of New York Insurance Department and have a Best's rating of A IX or better. Proof of insurance shall be provided on the Tompkins County Certificate of Insurance (copy attached) including the Contract Number. The accord Certificate of Insurance or insurance company certificate may be used for proof of Workers' Compensation and Disability. All Certificates shall contain a 30-day notice of cancellation, non-renewal or material change to Tompkins County. All Certificates must be signed by a licensed agent or authorized representative of the insurance company. Broker signature is not acceptable. Certificates of Insurance shall be submitted with the proposal.

Fillable form at - <http://www.tompkinscountyny.gov/files/purchase/bidforms/SampleAcordInsuranceCertificate.pdf>



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:		
	PHONE (A/C, No, Ext):	FAX (A/C, No):	
E-MAIL ADDRESS:			
INSURED	INSURER(S) AFFORDING COVERAGE		NAIC #
	INSURER A :		
	INSURER B :		
	INSURER C :		
	INSURER D :		
	INSURER E :		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	\$
	<input type="checkbox"/> COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	\$
	<input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR						MED EXP (Any one person)	\$
							PERSONAL & ADV INJURY	\$
							GENERAL AGGREGATE	\$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	\$
	<input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC							\$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	\$
	<input type="checkbox"/> ANY AUTO						BODILY INJURY (Per person)	\$
	<input type="checkbox"/> ALL OWNED AUTOS	<input type="checkbox"/> SCHEDULED AUTOS					BODILY INJURY (Per accident)	\$
	<input type="checkbox"/> HIRED AUTOS	<input type="checkbox"/> NON-OWNED AUTOS					PROPERTY DAMAGE (Per accident)	\$
								\$
	UMBRELLA LIAB						EACH OCCURRENCE	\$
	<input type="checkbox"/> EXCESS LIAB	<input type="checkbox"/> OCCUR					AGGREGATE	\$
		<input type="checkbox"/> CLAIMS-MADE						\$
	DED	RETENTION \$						\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						WC STATU-TORY LIMITS	OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? (Mandatory in NH)	Y/N					E.L. EACH ACCIDENT	\$
	If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					E.L. DISEASE - EA EMPLOYEE	\$
							E.L. DISEASE - POLICY LIMIT	\$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

CANCELLATION

	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

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AFFIDAVIT OF NON-COLLUSION

NAME OF RESPONDER: _____ PHONE NO.: _____ FAX NO.: _____

BUSINESS ADDRESS: _____ EMAIL: _____

I hereby attest that I am the person responsible within my firm for the final decision as to the price(s) and amount of the proposal, or If not, that I have written authorization, enclosed herewith, from that person to make the statements set out below on his/her behalf and on behalf of my company.

I further attest that:

1. The prices in this bid/proposal have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition with any other contractor, responder or potential bidder; and
2. Neither the price(s), nor the amount of this bid/proposal, have been disclosed to any other firm or person who is a responder or potential responder on this project, and will not be so disclosed prior to bid/proposal opening; and
3. No attempt has been made or will be made to solicit, cause or induce any company or person to refrain from responding to this RFB/RFP, or to submit a bid/proposal higher than the proposal of this company, or any intentionally high or non-competitive bid/proposal or other complementary proposal; and
4. The bid/proposal of my company is made in good faith and not pursuant to any agreement or discussion with, or inducement from any firm or person to submit a complementary proposal; and
5. My company has not offered or entered into a subcontract or agreement regarding the purchase of materials or services from any other company or person, or offered, promised or paid cash of anything of any value to any company or person, whether in connection with this or any other project, in consideration for an agreement or promise by a company or person to refrain from responding to this RFB/RFP or to submit a complementary bid/proposal on this project; and
6. My company has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any company or person, and has not been promised or paid cash or anything of value by and company or person, whether in connection with this or any project, in consideration for my company's submitting a complementary bid/proposal or agreeing to do so on this project; and
7. I have made a diligent inquiry of all members, officers, employees, and agents of my company with responsibilities relating to the preparation, approval or submission of my company's proposal on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion act or other conduct inconsistent with any statements and representations made in this affidavit.

8. By submission of this proposal I certify that I have read, am familiar with, and will comply with any and all segments of these specifications.

The person signing this proposal, under the penalties of perjury, affirms the truth thereof.

Signature & Company Position

Print Name & Company Position

Company Name

Date Signed

Federal I.D. Number

ANTI-DISCRIMINATION CLAUSE

During the performance of this contract, (the contractor) hereby agrees as follows:

(a) The contractor will not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, color, creed, ethnicity, Vietnam-era veteran status, disabled veteran, marital status, disability, national origin, or status as an ex-offender. Such action shall be taken with reference, but not be limited, to: recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

(b) The contractor will send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commissioner for Human Rights, advising such labor union or representative of the contractor's agreement under clauses (a) through (f) hereinafter called "non-discrimination clauses". If the contractor was directed to do so by the contracting agency as part of the bid or negotiation of this contract, the contractor shall request such labor union or representative to furnish him with as written statement that such labor union or representative either will affirmatively cooperate, within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment and the terms and conditions of employment under this contract shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the contractor shall promptly notify the State Commission for Human Rights of such failure or refusal.

(c) The contractor will post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses (a) and (b) and such provisions of the State's and local Tompkins County Laws against discrimination as the State Commission for Human Rights shall determine.

(d) The contractor will state, in all solicitations or advertisements for employees placed by or on behalf of the contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.

(e) The contractor will comply with the provisions of Sections 291-299 of the Executive Law and the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General and the Industrial Commissioner for purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.

(f) This contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the contracting agency upon the basis of a finding made by the State Commission for Human Rights that the Contractor may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State, until he satisfies the State Commission for Human Rights that he has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such finding shall be made by the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to the Contractor and opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law. The Contractor will include the provisions of clauses (a) through (f) in every subcontract or purchase order in such a manner that such provisions be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontract or purchase order as the contracting agency may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor shall promptly so notify the Attorney General, requesting him to intervene and protect the interests of the State of New York.

GENERAL CONDITIONS ACCEPTED BY:

Firm: _____

By: _____

Date: _____

Title: _____

Tompkins County

Vendor Responsibility Questionnaire

VENDOR IS: <input type="checkbox"/> PRIME CONTRACTOR		<input type="checkbox"/> SUB-CONTRACTOR	
IDENTIFICATION NUMBER :		WEBSITE ADDRESS:	
VENDOR'S LEGAL BUSINESS NAME:		D/B/A – DOING BUISNESS AS: (if applicable)	
ADDRESS OF PRIMARY PLACE OF BUSINESS:		ADDRESS OF PRIMARY PLACE OF BUSINESS IN <i>NEW YORK STATE</i> (if different):	
TELEPHONE:		TELEPHONE:	
FAX:		FAX:	
AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE:			
NAME:			
TITLE:			
TELEPHONE:			
EMAIL:			
LIST ALL OF THE VENDOR'S PRINCIPLE OWNERS:			
NAME:		TITLE:	
NAME:		TITLE:	
A DETAILED EXPLANATION IS RQUIRED FOR EACH QUESTION ANSWERED WITH A "YES", AND MUST BE PROVIDED AS ANO ATTACHMENT TO THE COMPLETE QUESTIONNAIRE. YOU MUST PROVIDE ADEQUATE DETAILS OR DOCUMENTS TO AID THE COUNTY IN MAKING A DETERMINATION OF VENDOR RESPONSIBILITY. YOU MUST NUMBER EACH RESPONSE TO MATCH THE QUESTION NUMBER.			
<p>1. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, OR D/B/A OTHER THAN THOSE LISTED ABOVE? List all other business name(s), Federal Employer Identification Number(s) or D/B/A names and the dates that these names or numbers were/are in use. Explain the relationship to the vendor.</p> <p style="text-align: center;"><input type="checkbox"/> YES <input type="checkbox"/> NO</p>			
<p>2. ARE THERE ANY INDIVIDUALS NOW SERVING IN A MANAGERIAL OR CONSULTING CAPACITY TO THE VENDOR, INCLUDING PRINCIPAL OWNERS AND OFFICERS, WHO NOW SERVE OR IN THE PAST ONE (1) YEARS HAVE SERVED AS:</p> <p>a) An elected or appointed public official or officer? <input type="checkbox"/> YES <input type="checkbox"/> NO <i>List each individual's name, business title, the name of the organization and position elected or appointed to, and dates of service.</i></p> <p>b) An officer of any political party organization in Tompkins County, whether paid or unpaid? <input type="checkbox"/> YES <input type="checkbox"/> NO <i>List each individual's name, business title or consulting capacity and the official political position held with applicable service dates.</i></p>			
<p>3. WITHIN THE PAST FIVE (5) YEARS HAS THE VENDOR, ANY INDIVIDUAL(S) SERVING IN A MANAGERIAL OR CONSULTING CAPACITY, PRINCIPAL OWNER(S), OFFICER(S), MAJOR STOCKHOLDER(S), AFFILIATE OR ANY PERSON INVOLVED IN THE BIDDING OR CONTRACTING PROCESS:</p> <p>a) 1. Been suspended or terminated by a local, state or federal authority in connection with a contract or contracting process; 2. Been disqualified for cause as a bidder on any permit, license, concession franchise or lease; 3. Entered into an agreement to a voluntary exclusion from bidding/contracting; 4. Been subject to an administrative proceeding or civil action seeking specific performance or restitution in connection with any local, state, or federal government contract; 5. Been denied an award of a local, state or federal government contract, had a contract suspended or had a contract terminated for non-responsibility; or 6. Had a local, state, or federal government contract suspended or terminated for cause prior to the completion of the term of the contract. <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>b) Been indicted, convicted, received a judgment against them or a grant of immunity for any business related conducting constituting a crime under local, state or federal including but not limited to, fraud, extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>			

<p>c) Been issued a citation, notice, violation order, or are pending an administrative hearing or proceeding or determination of violations of:</p> <p>1. Federal, state or local health laws, rules or regulations. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>
<p>4. IN THE PAST THREE (3) YEARS, HAS THE VENDOR OR ITS AFFILIATES HAD ANY CLAIMS, JUDGMENTS, INJUNCTIONS, LIENS, FINES OR PENALTIES SECURED BY ANY GOVERNMENTAL AGENCY? Indicate if this is applicable to the submitting vendor or affiliate. State whether the situation(s) was a claim, judgment, injunction, lien or other with an explanation. Provide the name(s) and address(es) of the agency, the amount of the original and outstanding balance. If any of these items are open, unsatisfied, indicate the status of each item as “open” or “unsatisfied”. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>
<p>5. DURING THE PAST THREE (3) YEARS, HAS THE VENDOR FAILED TO:</p> <p>a) File any returns or pay any applicable federal, state or city taxes? Identify the taxing jurisdiction, type of tax, liability year(s), and tax liability amount the vendor failed to file/pay and the current status of the liability. <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>b) File returns or pay New York State unemployment insurance? Indicate the year(s) the vendor failed to file/pay the insurance and the current status of the liability. <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>c) Property Tax Indicate the year(s) the vendor failed to file. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>
<p>6. HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR IT’S AFFILIATES WITHIN THE PAST SEVEN (7) YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR IT’S AFFILIATES REGARDLESS OF THE DATE OF FILING? Indicate if this is applicable to the submitting vendor or affiliate. If it is an affiliate, include the affiliate’s name and FEIN. Provide the court name, address and docket number. Indicate if the proceedings have been initiated, remain pending, or have been closed. If closed, provide the date closed. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>
<p>7. IS THE VENDOR CURRENTLY INSOLVENT, OR DOES VENDOR CURRENTLY HAVE REASON TO BELIEVE THAT AN INVOLUNTARY BANKRUPTCY PROCEEDING MAY BE BROUGHT AGAINST IT? Provide financial information to support the vendor’s current position, for example, Current Ration, Debt Ration, Age of Accounts Payable, Cash Flow and any documents that will provide the agency with an understanding of the vendor’s situation. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>
<p>8. IN THE PAST FIVE (5) YEARS, HAS THE VENDOR OR ANY AFFILIATES:</p> <p>a) Defaulted or been terminated on, or had its surety called upon to complete any contract (public or private) awarded; Indicate if this is applicable to the submitting vendor or affiliate. Detail the situation(s) that gave rise to the negative action, any corrective action taken by the vendor and the name of the contracting agency. <input type="checkbox"/> YES <input type="checkbox"/> NO</p>

**TOMPKINS COUNTY
VENDOR RESPONSIBILITY QUESTIONNAIRE**

FEIN#

CERTIFICATION:

The undersigned: recognizes that this questionnaire is submitted for the express purpose of assisting Tompkins County in making a determination regarding an award of contract or approval of a subcontract; acknowledges that the County may in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein; acknowledges that intentional submission of false or misleading information may constitute a felony under Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in contract termination; and states that the information submitted in this questionnaire and any attached pages is true, accurate and complete.

The undersigned certifies that he/she:

- Has not altered the content of the questions in the questionnaire in any manner;
- Has read and understands all of the items contained in the questionnaire and any pages attached by the submitting vendor;
- Has supplied full and complete responses to each item therein to the best of his/her knowledge, information and belief;
- Is knowledgeable about submitting vendor's business and operations;
- Understands that Tompkins County will rely on the information supplied in the questionnaire when entering into a contract with the vendor;
- Is under duty to notify the Tompkins County Purchasing Division of any material changes to the vendor's responses.

Name of Business: _____ Signature of Owner _____

Address: _____ Printed Name of Signatory _____

City, State, Zip _____ Title _____

Sworn before me this _____ day of _____, 20____;

Notary Public

Printed Name

Signature

Date

Engineering Services
CR 115, BROOKTONDALE ROAD GEOTECHNICAL INVESTIGATION & SLOPE STABILIZATION

Form W-9 (Rev. 12-2011)

Page 2

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,
- The U.S. grantor or other owner of a grantor trust and not the trust, and
- The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS a percentage of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Also see *Special rules for partnerships* on page 1.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account, for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name/disregarded entity name" line.

Partnership, C Corporation, or S Corporation. Enter the entity's name on the "Name" line and any business, trade, or "doing business as (DBA) name" on the "Business name/disregarded entity name" line.

Disregarded entity. Enter the owner's name on the "Name" line. The name of the entity entered on the "Name" line should never be a disregarded entity. The name on the "Name" line must be the name shown on the income tax return on which the income will be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a domestic owner, the domestic owner's name is required to be provided on the "Name" line. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on the "Business name/disregarded entity name" line. If the owner of the disregarded entity is a foreign person, you must complete an appropriate Form W-8.

Note. Check the appropriate box for the federal tax classification of the person whose name is entered on the "Name" line (Individual/sole proprietor, Partnership, C Corporation, S Corporation, Trust/estate).

Limited Liability Company (LLC). If the person identified on the "Name" line is an LLC, check the "Limited liability company" box only and enter the appropriate code for the tax classification in the space provided. If you are an LLC that is treated as a partnership for federal tax purposes, enter "P" for partnership. If you are an LLC that has filed a Form 8832 or a Form 2553 to be taxed as a corporation, enter "C" for C corporation or "S" for S corporation. If you are an LLC that is disregarded as an entity separate from its owner under Regulation section 301.7701-3 (except for employment and excise tax), do not check the LLC box unless the owner of the LLC (required to be identified on the "Name" line) is another LLC that is not disregarded for federal tax purposes. If the LLC is disregarded as an entity separate from its owner, enter the appropriate tax classification of the owner identified on the "Name" line.

Engineering Services

CR 115, BROOKTONDALE ROAD GEOTECHNICAL INVESTIGATION & SLOPE STABILIZATION

Other entities. Enter your business name as shown on required federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name/disregarded entity name" line.

Exempt Payee

If you are exempt from backup withholding, enter your name as described above and check the appropriate box for your status, then check the "Exempt payee" box in the line following the "Business name/disregarded entity name," sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

The following payees are exempt from backup withholding:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),
 2. The United States or any of its agencies or instrumentalities,
 3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,
 4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or
 5. An international organization or any of its agencies or instrumentalities.
- Other payees that may be exempt from backup withholding include:
6. A corporation,
 7. A foreign central bank of issue,
 8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,
 9. A futures commission merchant registered with the Commodity Futures Trading Commission,
 10. A real estate investment trust,
 11. An entity registered at all times during the tax year under the Investment Company Act of 1940,
 12. A common trust fund operated by a bank under section 584(a),
 13. A financial institution,
 14. A middleman known in the investment community as a nominee or custodian, or
 15. A trust exempt from tax under section 664 or described in section 4947.

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 9
Broker transactions	Exempt payees 1 through 5 and 7 through 13. Also, C corporations.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 5
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 7 ²

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney, and payments for services paid by a federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on page 2), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, below, and items 4 and 5 on page 4 indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on the "Name" line must sign. Exempt payees, see *Exempt Payee* on page 3.

Signature requirements. Complete the certification as indicated in items 1 through 3, below, and items 4 and 5 on page 4.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

Engineering Services

CR 115, BROOKTONDALE ROAD GEOTECHNICAL INVESTIGATION & SLOPE STABILIZATION

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes.

Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee ¹
b. So-called trust account that is not a legal or valid trust under state law	The actual owner ¹
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulation section 1.671-4(b)(2)(i)(A))	The grantor ⁴
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁴
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulation section 1.671-4(b)(2)(i)(B))	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your Individual name and you may also enter your business or "DBA" name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 1.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Attachment to Tompkins County contracts as of December 2013

Contractor's Representation—Livable Wage Policy

Livable Wage Policy: By policy, Tompkins County must “consider the wage levels and benefits, particularly health care, provided by contractors when awarding bids or negotiating contracts, and to encourage the payment of livable wages whenever practical and reasonable.”

Paying the living wage rate to all employees directly involved in providing the contracted County service is not mandatory. However, the attainment of a broadly-applied living wage is a County goal and is therefore an important consideration applied by the County when reviewing contract proposals.

The Current Living Wage: The Living Wage in Tompkins County is computed by the Alternatives Federal Credit Union (AFCU) and is currently \$12.62 per hour if the employer contributes at least half the cost of an employee's health insurance/benefit cost and \$13.94 per hour if the employer does not make such a contribution. The rate will be adjusted again in May 2015.

Requirement of All Contractors: As a part of its proposal or contract representations, a prospective service contractor must advise the County whether it will pay the AFCU livable wage rate to all Covered Employees directly involved in the provision of the contracted service, including employees of any subcontractor engaged to assist in providing the service.

Additionally, contractors are asked to estimate the number of employees who will be directly involved in the provision of the contracted service.

Covered Employees include all full- and part-time employees, other than those Excluded Employees described below, who are directly involved in the provision of the contracted service, including employees of sub-contractors engaged to assist in providing the service.

Excluded Employees are:

- Employees under the age of 18
- Seasonal or temporary employees (90 days or less)
- Volunteers
- Employees in a probationary status (90 days or less)
- Those employed in a sheltered or supported work environment
- Employees participating in a limited-duration (90 day) job training program
- Employees participating in an academic work-study or academic internship program
- Employees participating in mandated welfare-to-work programs
- Employees paid pursuant to a collective bargaining agreement

Contractor's Living Wage Representation

Approximately how many Covered Employees, including employees of any subcontractor involved in providing the service, will be involved in the provision of the contracted service? _____

Will all Covered Employees, including employees of any subcontractors directly involved in the provision of County services, be paid at least the living wage?

Yes

No

Contractor Name: _____

If you answered “Yes” to the Living Wage Representation and are awarded the County contract, you will be expected to maintain all employees directly involved in the provision of services under this contract at or above the living wage as of the time of execution of the contract for the duration of the contract.

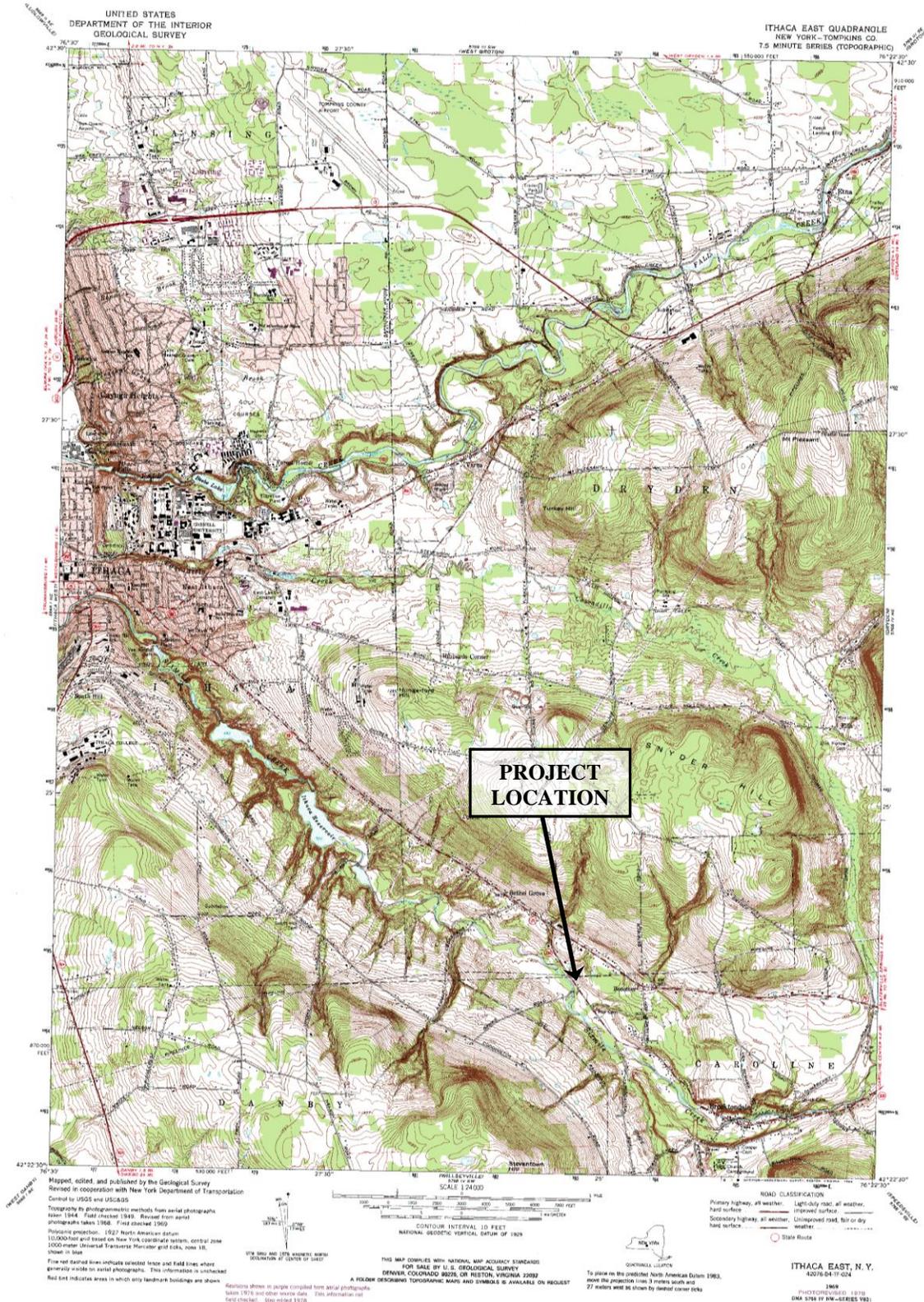
If you answered “No,” your response will be among the considerations applied by the County in making its contract award. As a part of contract negotiations, the County may request additional information from you regarding the basis of this response.

GIS Data Standards and Protocol

- The standard geo-referencing format for Tompkins County digital spatial data is New York State Plane Central coordinate grid system in feet, based on the 1983 North American Datum and GRS80 Spheroid.
- The standard software file format for spatial data is ESRI's ArcGIS format (vector or raster) file geodatabase. The County's preference is to receive digital data products in the standard geo-referenced file formats. If it is not possible for the consultant to provide the digital spatial data in the standard format, the County may accept the data as a geo-referenced Arc/Info export (.e00) file, or ArcView shapefile (.shp). Export files from other GIS software packages may be acceptable, but must be pre-approved by the County. CAD drawings are acceptable for schematics, plans, and applicable drawings where attribute values are non essential to the project. All CAD drawings must be in (.DWG, .DGN or .DXF) format(s) and should be geo-referenced. Please note that CAD drawing formats and non-geo-referenced files are not acceptable for GIS related projects where both attributes values and geometry are essential to the project.
- In addition, the contractor is required to submit FGDC compliant metadata for each spatial data set. The delivery format of all digital data products must be clearly defined in responses to Requests for Proposals and/or the final contract for services. Early in the project, the consultant must also review their proposed data structure, file format, geo-referencing standard and metadata content with the Tompkins County Planning Department and/or the GIS Division of the Information Technology Services Department to ensure that final digital data products will meet our GIS requirements.
- Existing County developed map and digital GIS data products can be made available to the contractor based on County data distribution standards and policy.
- All County developed maps and data used by the consultant in any publications (project reports, proposals, maps, etc.) should be properly cited as such.
- A digital version of each presentation map should be provided in Adobe Acrobat (.PDF) file format.

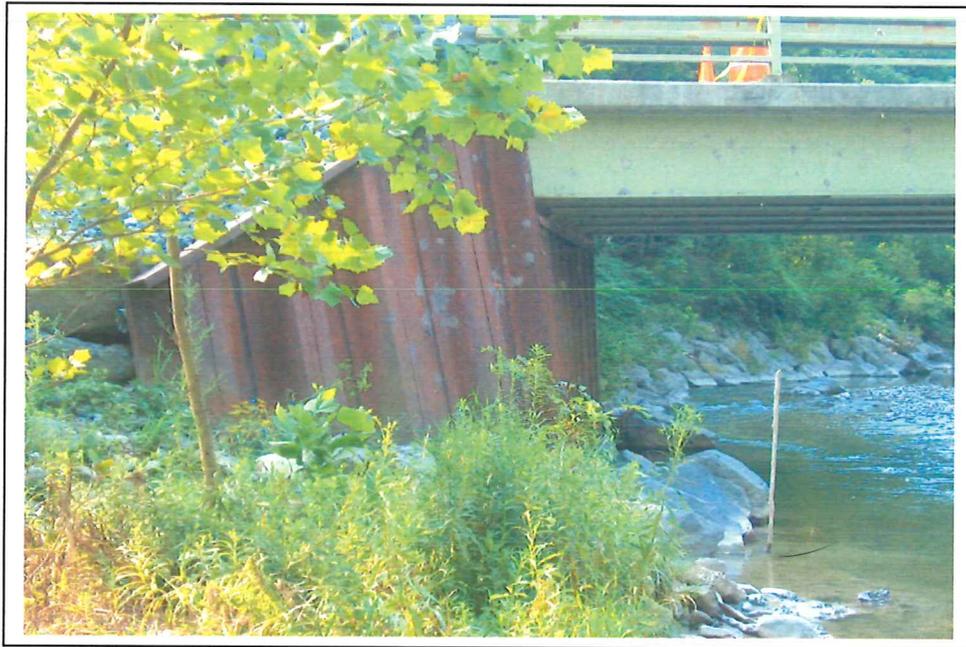
LOCATION MAP

Latitude: N 42.396° Longitude: W 76.421°



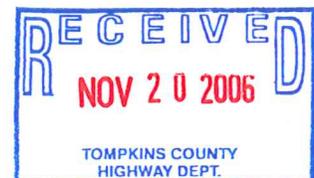
GARY L. WOOD, PE
CONSULTING CIVIL ENGINEER

**SUBSURFACE INVESTIGATION
AND
INTERIM RECOMMENDATIONS**
FOR
BANKS ROAD BRIDGE RECONSTRUCTION
TOWN OF CAROLINE
TOMPKINS COUNTY
NEW YORK
BIN 3209730



PREPARED FOR
TOMPKINS COUNTY FACILITIES
BOSTWICK ROAD
ITHACA, NY 14850

14 NOVEMBER 2006



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- 3 Topographic Map
- 4 Stability Analyses
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- 6 Geofoam Information

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PRACTICING GEOTECHNICAL, SITE, AND CONSTRUCTION MATERIALS ENGINEERING

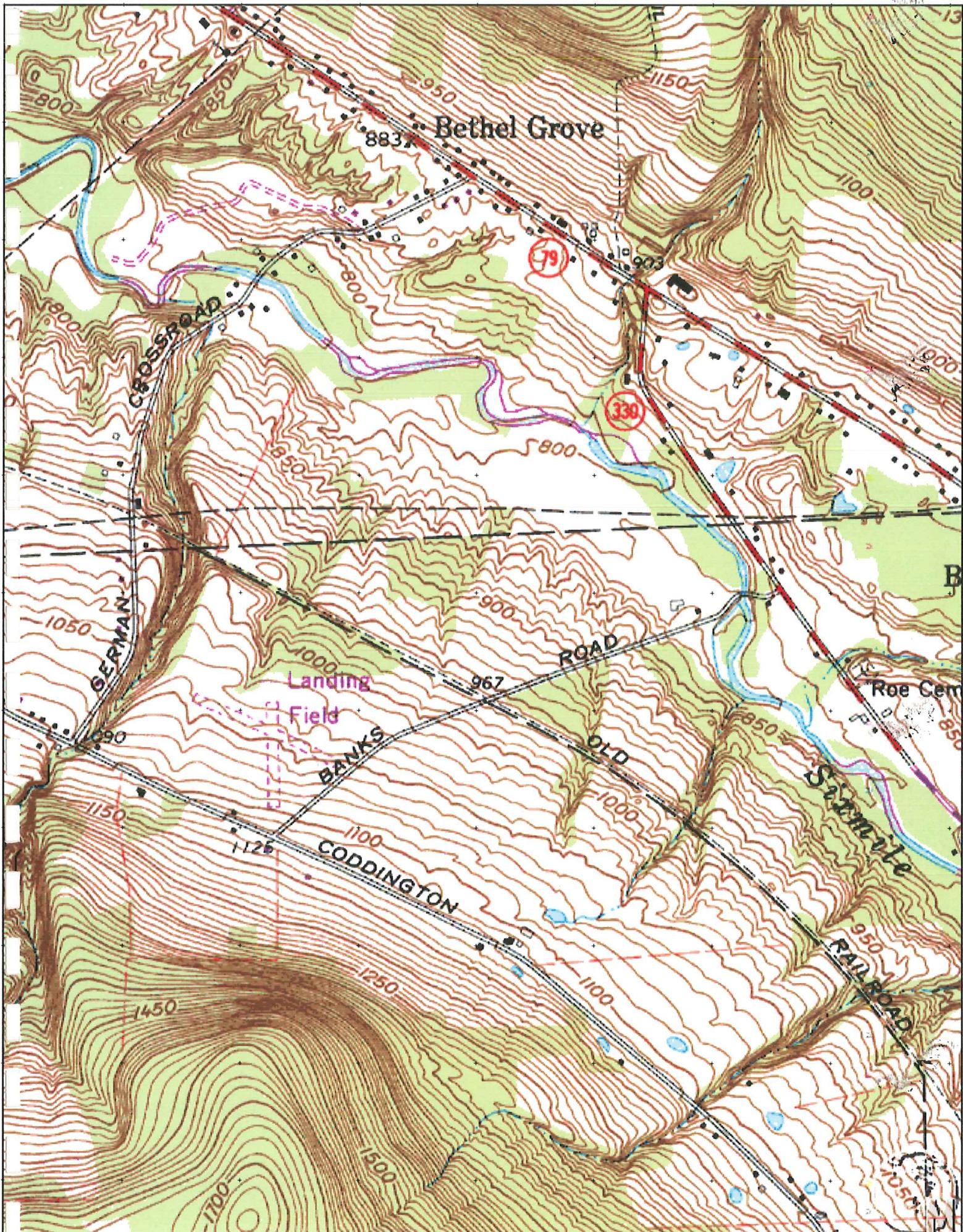
1.0 EXECUTIVE SUMMARY

- 1.1 An enlarged copy of the USGS Topographic Map¹ is provided on the following page to show the location and setting of the subject-bridge. Note, however, that the alignment shown is that of a former bridge, before the current bridge was constructed in 1988. Two borings were made as part of that relocation² and, although not appended to this study, they will be referenced.
- 1.2 The photographs in Appendix 5 provide an introduction to the site and the slide. Note that North, as referred to in the captions as well as throughout this report, is in the downstream direction.
- 1.3 The recommendations presented are for the restoration of the Easterly abutment, which failed as a consequence of the heavy rainfall experienced in June of this year. They are based on the information from four conventional soil borings that were made under the writer's direction. The locations and depths of the borings were as directed by the writer. The detailed record of the information obtained is the **Subsurface Logs** in Appendix 1. These logs were prepared in conjunction with the driller's field logs and a review of the soil samples by a laboratory technician. A "Legend" describing the classification procedures and nomenclature, along with a description of the *Standard Penetration Test* sampling procedure is also provided.
- 1.5 The natural moisture content of all of the recovered samples was determined as this data provides information regarding the density and strength of the soil – especially of clays such as encountered on this site. Other laboratory tests were performed using conventional ASTM³ protocols and the data sheets are provided in Appendix 2. These provided both empirical and quantitative data for the subsequent analyses.
- 1.6 The Tompkins County Department of Public Works provided a contemporaneous survey of the bridge and slide area, which is attached as Appendix 3. This map is also the location plan for the borings.
- 1.7 Based on the analyses which will be described subsequently, it is recommended that the fill which was placed for the roadway approach be removed and replaced with **geofam** as described in Appendix 6. This will remove the superimposed weight which is the driving force causing the slide.

¹ A portion of the *Ithaca East* map of the US Geologic Survey's 7 ½ minute topographic maps.

² *Soils Investigation and Foundation Recommendations for Banks Road & Coon Club Bridges*, by the writer, April 1987.

³ The standards-setting American Society for Testing and Materials. Copies of these standards can be provided if requested.



2.0 EXISTING CONDITIONS

- 2.1 The County topographic survey in Appendix 3 and the photographs in Appendix 5 describe the surface conditions. Note that the photographs show the failure zone and the tilt of the existing sheet pile abutment on the East side of the stream.
- 2.2 The existing bridge, which was constructed about 1988, is supported on a steel sheet pile abutment. The depth of these piles is not known (at least to the writer). However, the boring made at that time showed a dense bearing stratum at a depth of 45 feet, below the ground surface. No elevations were obtained, but it is estimated from the current borings that this is at elevation 62, more or less. The approximate location of this boring is shown on the County's topographic survey.
- 2.3 The empirical data that was obtained includes the "N" values from the *Standard Penetration Test*⁴ which are listed on the Subsurface Logs, along with the laboratory Natural Moisture Contents of the recovered samples. In addition, twelve Atterberg Limits tests were performed on representative samples and these data sheets are included in Appendix 2, along with summaries of the test data. Two Undisturbed samples were recovered and the detailed description of the contents, along with photographs are included in this appendix. It was also possible to perform pocket penetrometer tests on these samples, and the resulting estimated Unconfined Compressive Strengths (Cu) are included in the data summary.
- 2.3 The Atterberg Limits tests determine arbitrarily-defined moisture contents which are called the "Liquid Limit" and the "Plastic Limit" – terms which are fairly self-descriptive. From these the "Liquididity Index" (LI) is calculated as follows:

$$LI = (\text{Natural Moisture Content} - \text{Plastic Limit}) / (\text{Liquid Limit} - \text{Plastic Limit})$$

This has the following somewhat empirical relationships:

LI > 1: The natural moisture content is greater than the liquid limit and any manipulation of the soils will reduce it to a slurry.

LI = 1: The natural moisture is equal to the liquid limit and most clays will have an unconfined compressive strength (Cu) in the undisturbed state of .5 to 2 ksf.

LI = 0: The natural moisture is equal to the plastic limit and the unconfined compressive strength is likely to be in the range of 2 to 10 ksf.

LI < 0: The natural moisture content is less than the plastic limit and the clay is hard.

The table on the following page is a summary of the data from boring B06-03, which is "typical" of the soil profile

⁴ As defined in the Legend, Appendix 1, and further described in the background sheet which is also included.

It is apparent from these data that the upper 14 feet, more or less, is a very weak CLAY deposit, with natural moisture contents near the liquid limits. It is followed by a 2 foot layer of *medium* strength CLAY (Cu of perhaps 7 +/- ksf); then by what should be a very weak layer (Cu of about 1 ksf) even though the "N" value is the same as the previous layer, to a depth of about 20 feet. Following down the soil profile, the strength increases, in an apparent "Till"⁵ deposit.

DATA SUMMARY

Boring B06-03

Sample #	Depth	NWC %	LL %	PL %	Liquidity Index	Classification ⁶	"N"
2	2 - 4	21.5	N/P	N/P		Sand with 100% < #10 & 19% < #200 sieve	
4	6 - 8	33.6	34.3	17.1	+1.0	Clay- Med. Plasticity	WOH
6	10 - 12	37.9	39.7	23.2	+0.9	Clay- Med. Plasticity	WOH
7	12 - 14	42.2	45.8	24.6	+0.8	Clay- Med. Plasticity	WOH
9	16 - 18	18.4	23.4	16.6	+0.3	Inorg. Clay/low plasticity	4
10	18 - 20	24.7	22.4	15.8	+1.3	Inorg. Clay/low plasticity	4
12	22 - 24	19.6	30.2	18.8	+0.1	Clay- Med. Plasticity	25
14	26 - 28	7.4	15.6	11.9	-1.2	Cohesionless	51

2.4 Short – term groundwater observations are not reliable, especially in clay soils. But it is apparent that the entire soil profile is saturated – that is, all void spaces are filled with water. In general, free-flowing groundwater would not be expected in these relatively impervious soils. However, an artesian flow has developed in Boring B06-02, which is believed to be through sand partings, such as those found in the undisturbed sample between 28 and 30 feet in B06-01. Parenthetically, this is the kind of detail that cannot be obtained from split-spoon samples and one reason for attempting the more difficult undisturbed sampling procedure.⁷

2.5 The site is considered to be **Site Class D** in respect to seismic design⁸; the resulting design parameters are:

MCE Parameters - Conterminous 48 States
 Zip Code - 14881, Central Latitude = , 42.406517,
 Central Longitude = , -076.312234

Data are based on the 0.10 deg grid set

Period, SA		
(sec.), (%g)		
0.2, 17.9,	Map Value, Soil Factor of 1.0	
1.0, 7.0,	Map Value, Soil Factor of 1.0	
MCE Parameters x Specified Soil Factors		
0.2, 28.6,	Soil Factor of 1.60	
1.0, 16.8,	Soil Factor of 2.40	

⁵ That is, a deposit that has been overridden by subsequent glaciers.

⁶ As classified by the Casagrande Plasticity Chart, except for Sample #2 which is Non-Plastic.

⁷ Although, Boring #2 from the 1987 investigation was made on the West bank, it shows "varved clay with sand lenses" below 29 feet.

⁸ This is based on not meeting the threshold values for Class E as shown on Table 1615.1.1 of the *Building Code of New York*.

3.0 ANALYSES

- 3.1 The failure has the appearance of a classic, deep-seated, arc failure. The evidence is a fissure along the upper surface on the slope and an upwelling of material at the toe of the failure. In this case it is also apparent that the bottoms of the sheet piles have moved outward. These features can be seen in the photographs in Appendix 5. Further evidence of the instability of this area is indicated by Photograph 8 which shows the patch over a smaller, less consequential failure in the shoulder of Brooktondale Road, starting about 100 feet to the North of Banks Road.
- 3.2 Following the premise of the preceding paragraph, a computer analysis was made using the *PCSTABL 4 computer* program developed by the Federal Highway Administration. These analyses used the Bishop Circular Arc method, with soil properties which were derived from the test data and empirical evidence. Four conditions were analyzed, viz:
- 1) The original slope before construction of the bridge and, more importantly, fill was placed for the approach.
 - 2) The configuration of the bridge and fill before the failure occurred, with (a) water level near the bottom of the bridge girders, and (b) with the water level at a normal stage
 - 3) The results of reducing the weight of the bridge approach, which will subsequently be presented as the recommended reconstruction.
- 3.3 Each of the conditions described above is represented by a graphical summary in Appendix 4. Each of these show the ten most critical failure surfaces found, and their respective factors of safety. These are the most critical of one hundred surfaces that were analyzed, using an iterative process with boundaries set by the writer. The results are:

<u>Condition Represented</u>	<u>Minimum Safety Factor</u>	<u>Title on Chart</u>
1	1.16	Banks Rd. # 1
2 a	0.98	Banks Rd. #2a
2 b	0.98	Banks Rd. #2b
3	1.15	Banks Rd. #3

4.0 INTERPRETATIONS AND RECOMMENDATIONS:

- 4.1 Both the empirical evidence of other incipient slides in the area and analytical evidence of a safety factor of only 1.16, suggests that this area has been historically on the verge of failure. And, although this failure appears to have been triggered by the high water in the stream in June of this year, the analyses indicate that the water level does not have a significant influence – the safety factor for both 2a & 2b is 0.98. It must have some, even if marginal, influence however since the failure occurred during a period of high water.
- 4.2 There should also be concern over settlement under the weight of any new fill that might be placed. One evidence of this is the average "N" values throughout the several

borings. These indicate that the indigenous soil, below the fill that was placed for the bridge approach (B06-01), has been pre-consolidated under its (the fill's) weight in the ensuing eighteen years.

Boring	B06-01	B06-02	B06-03	B06-04	87 B1
Average "N" ⁹	7.7	4.9	2.2	4.0	3.7

- 4.3 One classic method of stabilizing slope failures such as this, is to place an additional load on the toe of the failure surface, to counterbalance the weight of the soil above which is the driving force causing the failure. In the current case, however, this would mean placing additional new load over very compressible soils and thereby starting new settlement, as well as placing material within the stream. Either of these are sufficient reasons to not consider this as an option.
- 4.3 The use of soil nails to restrain the abutment from rotation has been suggested. While this might be an acceptable solution in some situations, in this case the failure zone extends beyond (to the North of) the bridge proper. Thus the remediation would entail some expansion of the work area. Furthermore, this failure is the result of the lack of strength of the soil below the stream bed. This means it would be necessary to install the nails at about the bottom of stream and rely on the strength of the piles as cantilevers above and below that point. Finally, the nails would have to be very long in order to place them in a sufficiently competent soil. Additional borings to the East would be required to develop the soil characteristics of the failure zone.
- 4.4 This leads to the recommendation that the "driving force" which is causing the rotation, be reduced by removal of the heavy fill that the bridge approach is built on. This would be replaced with lightweight "geofoam", as described in Appendix 6. The recommendation is to remove the fill that was placed for the original bridge construction and replace it with the geofoam blocks. Analyses #1 & #3 compare the effect and show that the safety factor is almost identical after installation of the geofoam to the "natural" condition. Finally, although the safety factor is less than 1.25 which would usually be considered a threshold, it is enhanced by the sheet piles which will intercept any failure surface, if they are driven to refusal.
- 4.5 The existing sheet piles are deformed to the point where they no longer have the required structural capacity¹⁰. Therefore, these should be extracted and new piles driven to refusal, which is expected to occur near elevation 65. These will provide the structure to support the deck (in a manner similar to the existing header or ledger beam system), scour protection, and confinement for the geofoam. For the last purpose, the piles will have to extend along both sides of the roadway a distance of perhaps 60 feet. In plan view, this should look like the existing abutment and wingwalls; with extensions from the ends of the wingwalls tapering back to the ends of the guide rails. This entire area would be filled with the geofoam.

⁹ Considering only the samples above the till layer, and below the fill in B06-01.

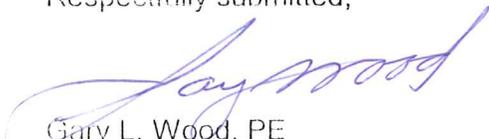
¹⁰ The County provided their survey data which shows the piles as having a slope of about 20% for the wingwalls to 5% under the bridge deck. These measurements, which were taken between 7/6/06 and 10/12/06, show that there is little, if any, continuing movement.

- 4.6 Piles driven to refusal can be designed to support the vertical loads, as previously stated. The as – driven capacity should be verified by means of dynamic pile testing. It is cautioned that the pile section chosen will have to be checked closely for buckling as the portion above the stream be will have no lateral support, and the soft clay below the stream will provide very little lateral confinement. This is actually an improvement from the existing condition as there will not be any lateral load from the roadway embankment.

5.0 CONCLUDING REMARKS

- 5.1 This has been designated an "interim report" because it is anticipated that questions the writer had not anticipated may arise as the design progresses. These are elicited and can be addressed within the scope of the current commission.
- 5.2 We are also available to review the design documents to help assure understanding of the intent of this report.
- 5.3 Although it is not considered an urgent matter, an attempt should be made to plug the artesian flow from B06-02 that was described in ¶2.5. It is anticipated this can be done by opening the hole up to depth of about 2 feet and filling it with bentonite clay.
- 5.4 This report is prepared as an instrument of service and the work was conducted in accordance with the requirements of the N.Y. State Building Code, except that full-time observation of the drilling process was not provided. No other warranty is expressed or implied.

Respectfully submitted,



Gary L. Wood, PE

APPENDIX 1



Subsurface Logs

STANDARD PENETRATION TEST

Standard Penetration Test

The standard penetration test (SPT) can be performed during a test boring program to obtain a measure of the soil resistance to dynamic penetration, as well as to obtain a disturbed sample of the soil. Although the test can be performed in a wide variety of soils, the most consistent results are found in sandy soils where large gravel particles are absent. Almost all U.S. soil drilling rigs are equipped to perform the SPT.

As described by Schmertmann (25), "...many engineers in the U.S.A. do not recognize that the SPT *N* values provide, when used together with sample classification, at best only rough qualitative data for preliminary design purposes" and "consider the SPT as merely a convenient method for obtaining stratigraphy and samples for classification and place no design reliance on *N* values".

Procedure. The detailed procedure for the standard penetration test is described in ASTM D 1586 (26). Additional useful information is given in: (2, 25 through 30). Schmertmann (31) presents a complete theoretical analysis of the statics and dynamics of the SPT.

To perform the test, the drilling crew, after advancing the test boring to the desired depth, first removes the string of drill rods slowly and cleans out the hole to the desired depth of testing. During this procedure, the head of water in the hole is maintained at or above the groundwater level to avoid an inflow of water into the hole that can disturb the soil and cause erroneously low (conservative) test results. After the drilling tools are removed, a standard 51 mm (2 in) O.D. split spoon sampler, shown in Figure 5-6a, is attached to the drill rods and lowered carefully to the bottom of the hole. With the sampler resting at the bottom of the hole, a 63.6 kg (140 lb) weight is allowed to fall freely 762 mm (30 in) to a collar that is attached to the top of the drill string until 460 mm (18 in) of penetration has been achieved (or 100 blows have been applied). Alternatively, but less commonly, a 63.6 kg (140 lb) pin-guided weight is allowed to drop freely on the top of the drill string. The setup for the SPT is shown in Figure 5-12.

The number of blows is recorded for each of three 152 mm (6 in) intervals; the first is generally considered a seating drive, and the number of blows for the final 305 mm (12 in) is reported as the *N* value. After the sampler has been brought back to the surface, the samples are removed and classified, before being placed into jars, labeled and sealed with wax for transport.

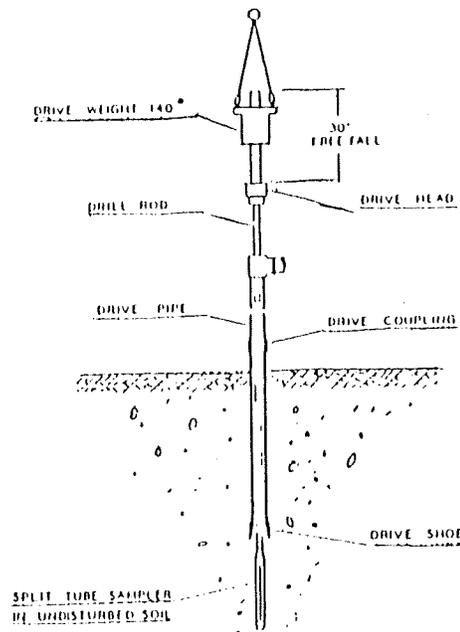


Figure 5-12. Driving Sampler for Standard Penetration Test

Source: Reference (5), p. 55

Although the N value was originally developed for estimating the design of driven piles, it has since been correlated with a number of soil engineering properties. Many of these correlations are crude and have little theoretical basis. Table 5-4a shows a general correlation of N value with relative density, the latter parameter itself being extremely difficult to determine with accuracy, even in the laboratory. One of the more common uses of the N value is to estimate the relative density and friction angle, and the bearing capacity factors for spread footings in sandy soil. Figure 5-13a shows the correlation of Gibbs and Holtz (32) for relative density of sands, and Figure 5-13b shows the correlation of Peck, Hanson and Thornburn (33) for friction angle and bearing capacity factors. Figure 5-13c is used to estimate the correction factor for overburden stress to be used with Figure 5-13b. The various correlations with N value usually are conservative.

Several authors have also correlated N values with the unconfined compressive strength of clays (Table 5-4b), but these correlations should be used with caution for design purposes because most clays are at least minimally sensitive. A dynamic test such as the SPT may imply a strength significantly different from that which exists in the field.

LEGEND

1. These borings were made between 25 and 27 July 2006 by Parratt-Wolff, Inc. of East Syracuse New York. Samples of the soil were retrieved using the procedure described in ASTM D1586 titled "Standard Method for Penetration Test and Split-Barrel Sampling of Soils". Two undisturbed samples were also obtained and a third attempt failed.
2. The locations of the borings were established by the writer and later located by the County survey crew.
3. Our soil descriptions shown on the logs are based upon a visual examination of the recovered soil samples by a laboratory technician, and generally follow the Burmister system, which is the common contemporary practice in this region.

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.		
Soil Type	Soil Particle Size	
Boulder	> than 12"	
Cobble	3"-12"	
Gravel-Coarse	3"-3/4"	
-Fine	3/4"-#4	
Sand-Coarse	#4-#10	
-Medium	#10-#40	
-Fine	#40-#200	
Silt-Non Plastic (Granular)	Coarse Grained (Granular)	
Clay-Plastic (Cohesive)		
Silt-Non Plastic (Granular)		Fine Grained
Clay-Plastic (Cohesive)		

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35-50
"some"	20-35
"little"	10-20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

The relative compactness or consistency is described in accordance with the following terms.				Varved -Horizontal uniform, thin layers or seams of soil (s). Layer -Soil deposit more than 6" thick Seam -Soil deposit less than 6" thick Parting -Soil deposit less than 1/4" thick. Laminated -Irregular, horizontal and angled seams or partings of soil (s).
Granular Soils		Cohesive Soils		
Term	Blow per Foot, N	Term	Blow per Foot, N	
Loose	<11	Very Soft	<3	
Firm	11-30	Soft	3-5	
Compact	31-50	Medium	6-15	
Very Compact	>51	Stiff	16-25	
		Hard	>26	
(Large particles in the soil matrix will often significantly influence the blows per foot recorded during this procedure.)				

The demarcations between strata are based upon the visual classification of the soil samples, as well as the driller's notes. Solid lines are where changes were noted by the driller, while dashed lines are based upon the recovered samples only. Where no division is indicated it is because the samples were part of the same geologic unit. In any case, the transition may be gradual, and the borings may not entirely reflect conditions between either samples or other borings.

The reported water level readings are to be used with caution. Short-term readings may not reflect actual conditions, even at the time when made. In addition, levels will probably change with antecedent rainfall, season of the year, or other changes such as development or altered water courses.

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PROJECT BANKS ROAD BRIDGE

PREPARED FOR Tompkins County Dept. of Public Works
Tompkins County, NY

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607-753-8421

4. The column headings on the boring logs have the following meanings:

N - The Standard Penetration Resistance as defined in note 1.

% Moisture - The natural water content of the recovered soil samples as determined by laboratory procedure.

Color - The predominant color of the recovered sample in its natural moisture condition, using the following abbreviations:

blk-black	multi-multiple colors, (different materials)
red-red	var-variegated or multicolored, usually streaked as a result of leaching
lt-light	
brn-brown	
yel-yellow	
drk-dark	
gry-grey	
grn-green	

5. Rock Core Description

R-1, etc.: sequential Run Number

RQD: Rock Quality Designation-the cumulative length of all core pieces whose individual lengths are greater than four inches, divided by the length of the core run.

MPF: Rate of penetration in minutes per foot

Rec: Percent of the overall depth of the run actually recovered.

Component	Term	Defining Characteristic
bedding thickness	laminated	< 0.1 in.
	very thin bedded	0.1-1.0 in.
	thin bedded	1.0-4.0 in.
	medium bedded	4.0-12.0 in.
	thick bedded	12.0-36.0 in.
hardness	massive	> 36 in.
	soft	scratched with fingernail
	medium hard	scratched with a knife
	hard	difficult to scratch w/knife
	very hard	can't be scratched w/knife
joint or fracture spacing	very close	< 1.0 in.
	close	1.0-2.0 in.
	moderately close	2.0--12.0 in.
	wide	12.0-36.0 in.
	very wide	> 36.0 in.
weathering state	fresh	
	slightly weathered	slight discoloration inward from open fractures
	moderately weathered	Discoloration throughout fracture, weaker minerals such as feldspar are decomposed.
	highly weathered	Most minerals are somewhat decomposed. Specimens can be crumbled by hand with effort and easily scraped by a knife.
	extremely weathered	Rock is decomposed to extent that it looks like soil, but original fabric or structure are preserved.

6. Symbols used.



SAND



SILT



ROCK



ORGANICS



Driller's water level observation



CLAY



TILL



GRAVEL



FILL

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DEPTH (feet)	SAMPLE	N°	% MOISTURE	COLOR	DESCRIPTION
2	1	11	5.9	brn	0.3' of ASPHALT (f) GRAVEL, (f-c) sand, some clay
4	2	10	9.5	brn	(f-m) GRAVEL, (f-c) sand, some clay
6	3	13	8.6	brn	(more clay found in sample)
8	4	8	8.8	brn	same
10	5	8	4.3	brn	(f) GRAVEL, (f-m) sand
12	6	13	12.3	brn	clayey, (f-m) GRAVEL, some sand same
14	7	18	15.1	brn	same
16	8	11	17.3	brn	
18	9	8	23.9	brn	
20	10	WOH	23.4	gry	CLAY, little silt same
22	11	4	35.5	gry	CLAY
24	12	4	33.0	gry	CLAY
26	13	1	21.7	gry	CLAY
28	14	7	14.9	gry	CLAY, little silt, little (c) sand, trace gravel
30	Shelby Tube				
32	15	9	13.5	gry	silty CLAY, little sand
34	16	18	12.2	gry	silty CLAY, some sand, little (f) gravel
36	17	17	13.9	gry	silty CLAY, some(f-m) gravel
38	18	35	19.6	gry	CLAY, little silt
40	19	11	21.9	gry	clayey SILT
42	20	40	10.7	gry	clayey SILT, some sand, trace gravel (more gravel found in sample)
44	21	29	13.6	gry	
46	22	44	13.7	gry	silty CLAY, some sand, some gravel
48	23	24	12.3	gry	clayey GRAVEL, silt, (f-c) sand
50	24	50/4	8.1	gry	clayey poorly-graded GRAVEL, silt, (f-c) sand, stone fragments

Boring terminated at 48.9 ft.

- Note: 1. WOH denotes sample spoon advanced under just the Weight Of the Hammer and rods.
2. Water was first encountered at 14.0 ft.; 38.0 ft. on completion of boring.

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607-753-8421

B06-02 G.S. elev=100.88

DEPTH (feet)	SAMPLE	% N*	% MOISTURE	COLOR	DESCRIPTION
2	1	10	12.6	brn	silty (f) SAND, (f) gravel, little clay
					same
4	2	9	9.8	brn	silty (f-c) SAND, (f) gravel, stone fragments, clay
6	3	6	14.4	brn	CLAY, (single 1' stone)
8	4	5	26.1	gry	CLAY, trace sand, trace gravel
10	5	6	29.9	gry	CLAY
12	6	WOH	23.7	gry	CLAY
14	7	3	22.4	gry	CLAY
16	8	WOH	25.5	gry	CLAY
18	9	4	24.1	gry	CLAY
20	10	4	25.6	gry	CLAY
22	11	1	23.4	gry	CLAY
24	12	4	27.7	gry	CLAY
26	13	2	27.0	gry	silty CLAY
28	14	18	18.3	gry	silty CLAY, trace gravel
30	15	24	19.9	gry	silty CLAY
32	16	9	21.6	gry	CLAY
34	17	23	21.4	gry	CLAY
36	18	86	19.1	gry	silty CLAY w/shale fragments
38	19	99	8.7	gry	silty CLAY w/sand, (f-m) gravel, stone fragments
40	20	68	14.8	gry	CLAY w/little sand, little (f) gravel, stone fragment
42	21	75	6.7	gry	clayey GRAVEL, silt, stone fragments

Boring terminated at 41.7 ft.

Note:

1. WOH denotes sample spoon advanced under just the Weight Of the Hammer and rods.
2. Driller recorded water at at depth of 4.0 ft. while drilling.
3. Driller noted a "rock" while driving Sample 3.

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607-753-8421

B06-03 G.S. elev.=96.31

DEPTH (feet)	SAMPLE	"N"	% MOISTURE	COLOR	DESCRIPTION
2	1	2	36.1	brn	CLAY, SILT, & (f) SAND
					(f-m) SAND, little clay, little gravel
4	2	4	21.5	brn	
6	3	WOH	22.7	gry	CLAY
8	4	WOH	33.6	gry	CLAY
10	5	WOH	44.3	gry	CLAY
12	6	WOH	37.9	gry	CLAY
14	7	WOH	42.2	gry	CLAY
16	8	WOH	38.4	gry	CLAY, trace gravel
18	9	4	18.4	gry	CLAY, trace (c) sand, trace (f) gravel
20	10	4	24.7	gry	CLAY, little silt, trace gravel
22	11	15	13.9	gry	CLAY, little silt
24	12	25	19.6	gry	CLAY, little silt
26	13	15	21.1	gry	same
28	14	51	7.4	gry	CLAY, w/some gravel, silt
30	15	89/.8	11.5	gry	same

Boring terminated at 29.3 ft.

Note:

1. WOH denotes sample spoon advanced under just the Weight Of the Hammer and rods.
2. Driller recorded water at at depth of 0.3 ft. while drilling.

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B06-04 G.S. elev.=96.31

DEPTH (feet)	SAMPLE	"N"	% MOISTURE	COLOR	DESCRIPTION
2					STONE FILL
4					No Recovery
6			3" Shelby Tube		
8	1	WOH	25.5	gry	CLAY
10			3" Shelby Tube		
12	2	WOH	39.3	gry	CLAY
14	3	WOH	47.5	gry	CLAY
16	4	WOH	24.9	gry	CLAY
18	5	4	18.7	gry	CLAY, lense of silt & (v.f.) sand
20	6	13	20.5	gry	SILT, little clay
22	7	15	14.5	gry	CLAY, little silt, trace gravel
24	8	39	12.9	gry	CLAY, some silt & (f) sand, little gravel
26	9	18	22.3	gry	CLAY, some gravel, (shale)
28	10	47	8.7	gry	CLAY, some gravel, stone fragment
30	11	62	8.3	gry	CLAY, (f-c) sand, :(f) gravel
32	12	61	9.0	gry	clayey (f-c) SAND, (f) gravel

Boring terminated at 32.0 ft.

Note:

1. WOH denotes sample spoon advanced under just the Weight Of the Hammer and rods.
2. Driller noted ground water @ 18.0 ft. while drilling.
3. This boring was made on fill placed in the stream.

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APPENDIX 2



Laboratory Test Data



Undisturbed Samples
B06-01 28 to 30 feet (top)
Note angular gravel

B06-04 8 to 10 feet (bottom)
Note rounded gravel

UNDISTURBED SAMPLE PREPARATION

Depth (feet)	Visual Description	Penetrometer Tests			Trovone Tests (tsf)	Specimen # Test
		1/4" mm (kg/cm ²)	1 mm (kg)	20mm (kg)		
28.0	Soft CLAY	0				1-105 A.L. <i>Xnat</i>
28.35	Med. CLAY w/ Sand Partings	1.7, 1.7 0.9, 1.1	3.5 4.5	>10		2-104 A.L.
29.00	Stiff CLAY w/ Sand Partings	2.0, 2.5 0.5, 0.5	2.8	8.2		3-100
29.65	CLAY w/ embedded rounded gravel (1" max)	2.5, 3.0 2.2				4-111 <i>Xnat</i>

Natural Moisture Contents					
Specimen #	Tare #	Tare Weight (gms)	Tare + Moist. Weight (gms)	Tare + Dry Weight (gms)	Moisture Content (%)
1	7A	21.69	89.18	77.29	21.4
2	T37	22.05	60.27	53.03	23.4
3	T34	21.61	82.27	69.23	27.4
4	3	20.87	77.29	72.87	8.5

Comments: All samples are Gray

105 : $X_{nat} = 130.3$ #1A^s, $X_{nat} = 21.4$ $X_{dry} = 107.3$ pct

S.G. = 2.72 & e = 0.50

SAMPLE DESCRIPTION		Gary L. Wood, PE	
		2630 Sugarbush Lane	(607)753-8421
		Dryden, NY 13053	FAX: (607)753-8421
Boring No.:	06-01	Project Name: <u>BANKS ROAD BRIDGE</u>	
Sample No.:		Location:	
Classified By: <u>GLW</u>	Depth: <u>28-30</u>	Client: <u>Tompkins County DPW</u>	
Lab Identification No.:	Date: <u>15 Aug</u>	File Name:	

UNDISTURBED SAMPLE PREPARATION

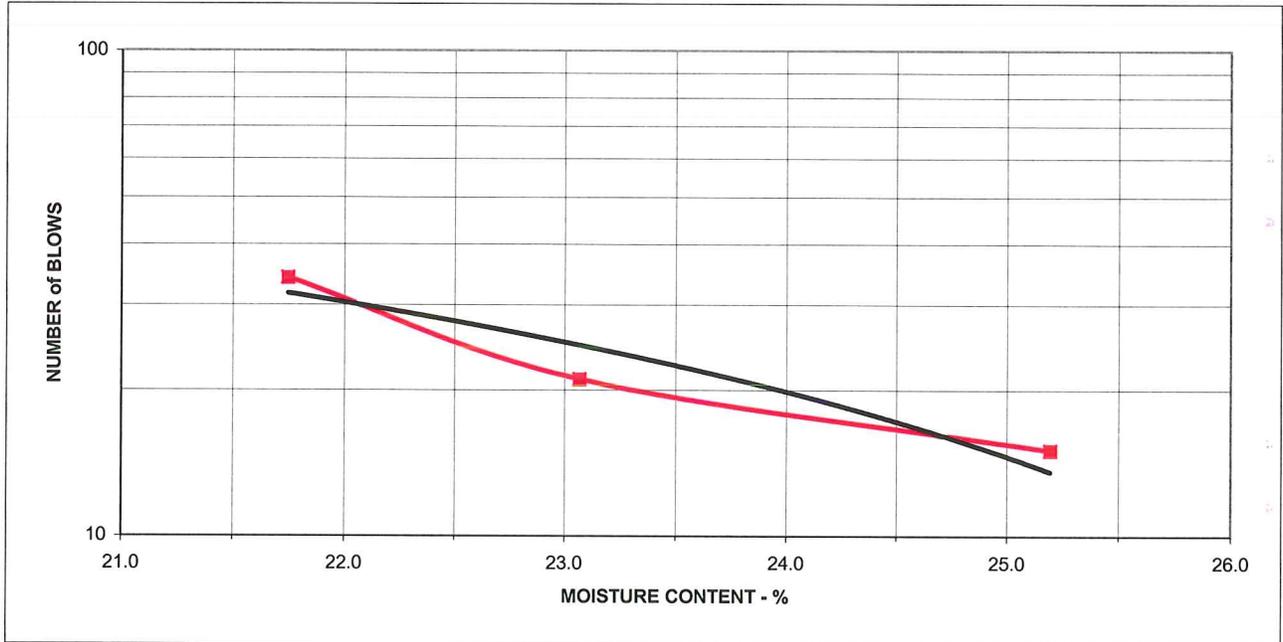
Depth	Visual Description	Penetrometer Tests			Trovone Tests (tsf)	Specimen # Test
		1/4" mm (kg/cm ²)	1 mm (kg)	mm (kg)		
8.0	Stiff Gray CLAY	.4, .7				1
8.35	Same	.4				2 101
8.65		1.4, .5				Snat
8.90	Same w/ embedded angular gravel	.4				3 A.L.
9.10		1.5, 1.7				4 Snat
9.25		1.9				5

Specimen #	Tare #	Tare Weight (gms)	Tare + Moist. Weight (gms)	Tare + Dry Weight (gms)	Moisture Content (%)
1	T46	21.27	91.97	91.67	0.4
2	T35	21.54	92.66	96.28	29.9
3	98-5	22.06	133.91	111.86	24.5
4	102	88.20	605.5	570.7	22.4
5	R-9	21.49	68.92	59.44	23.3

Comments: $102 : 0.24' \phi \times .20' lq = 605.5 - 88.20 = 517.3 \text{ gms} = 1.14 \text{ \#}$
 $Vol = .0090 \text{ ft}^3 \quad \gamma_{nat} = \frac{1.14 \text{ \#}}{.009 \text{ ft}^3} = 126.7 \text{ \#/ft}^3 \quad \gamma_{dry} = 103.5 \text{ \#/ft}^3$
 $\gamma_w = 23.1 \text{ \#/ft}^3 \quad V_w = .37 \quad V_s = .63$
 $S.G. = \frac{102.9}{(.63)(62.4)} = 2.62 \text{ OK} \quad e = .59$

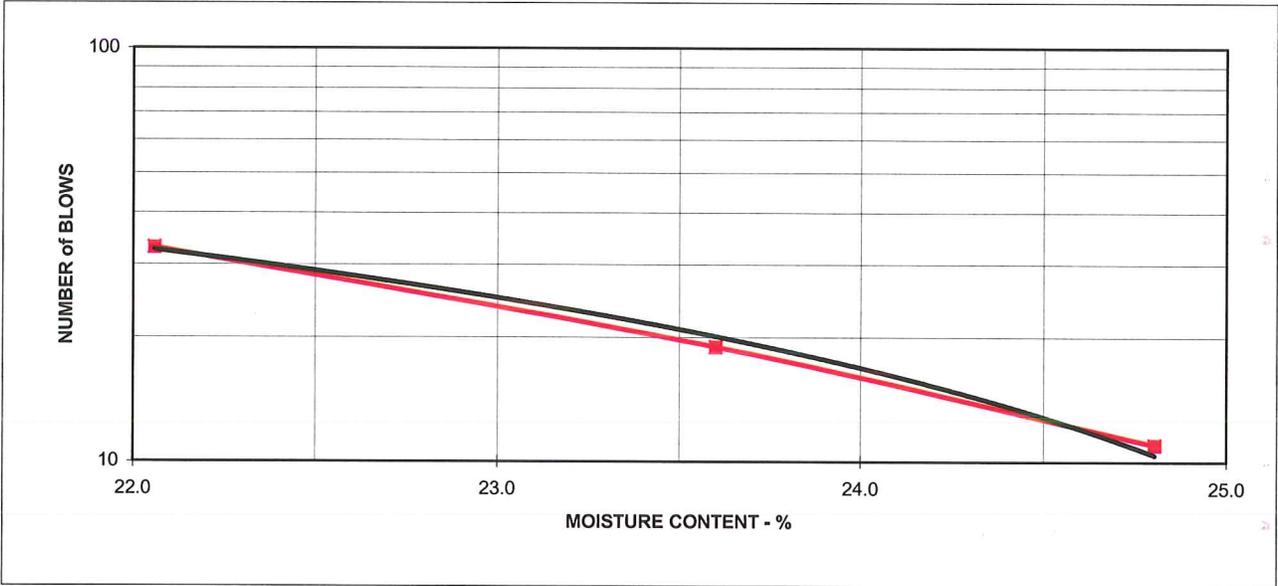
SAMPLE DESCRIPTION		Gary L. Wood, PE	
		2630 Sugarbush Lane	(607)753-8421
		Dryden, NY 13053	FAX: (607)753-8421
Boring No.:	B06-04	Project Name: <i>BANKS ROAD BRIDGE</i>	
Sample No.:		Location:	
Classified By: <i>GLW</i>	Depth: 8'-10'	Client: <i>Tompkins County DPW</i>	
Lab Identification No.:	Date: <i>15 Aug</i>	File Name:	

BANKS ROAD BRIDGE
BORING: B06-01
DEPTH: 28.00-28.35
DATE: 10 August 06
undisturbed sample(typical fill)



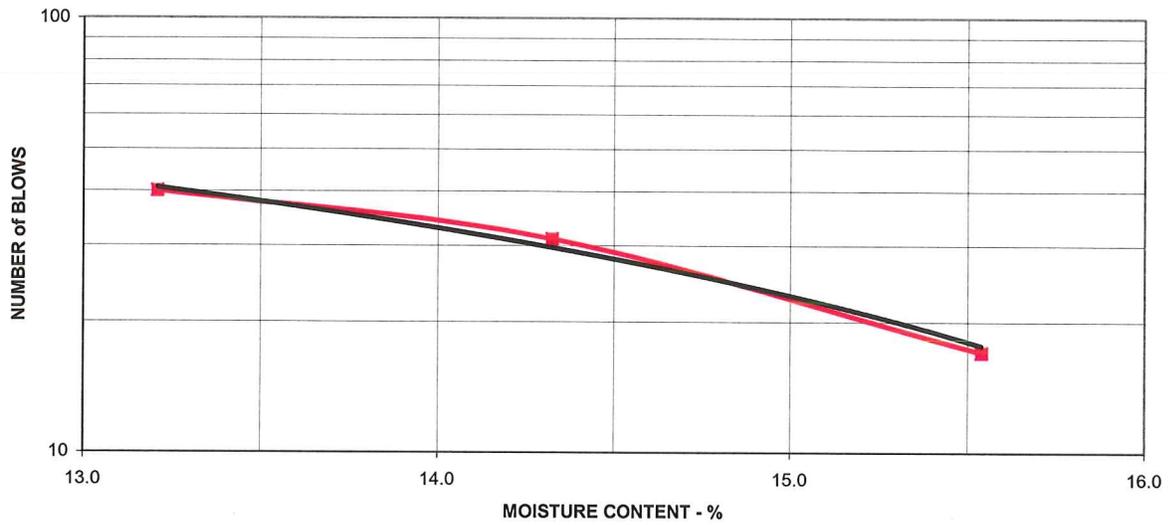
INDEX PROPERTIES	
NMC (%):	21.4
LIQUID LIMIT:	23.0
PLASTIC LIMIT:	15.7
PLASTIC INDEX:	7.3
LIQUIDITY INDEX:	0.8

BANKS ROAD BRIDGE
BORING: B06-01
DEPTH: 28.35-29.00
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%):	23.4
LIQUID LIMIT:	23.0
PLASTIC LIMIT:	14.5
PLASTIC INDEX:	8.5
LIQUIDITY INDEX:	1.0

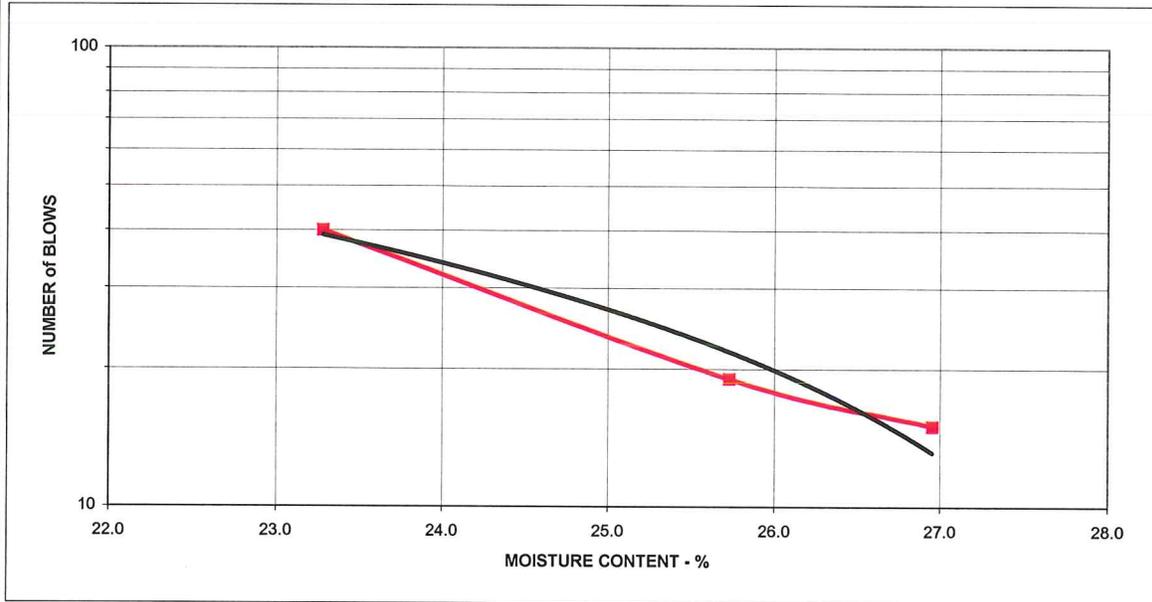
**BANKS ROAD BRIDGE
BORING: B06-01
DEPTH: 29.65-30.00
DATE: 10 August 06**



INDEX PROPERTIES	
NMC (%) :	8.5
LIQUID LIMIT :	13.7
PLASTIC LIMIT :	11.5
PLASTIC INDEX :	2.2
LIQUIDITY INDEX :	-1.4

chart 4

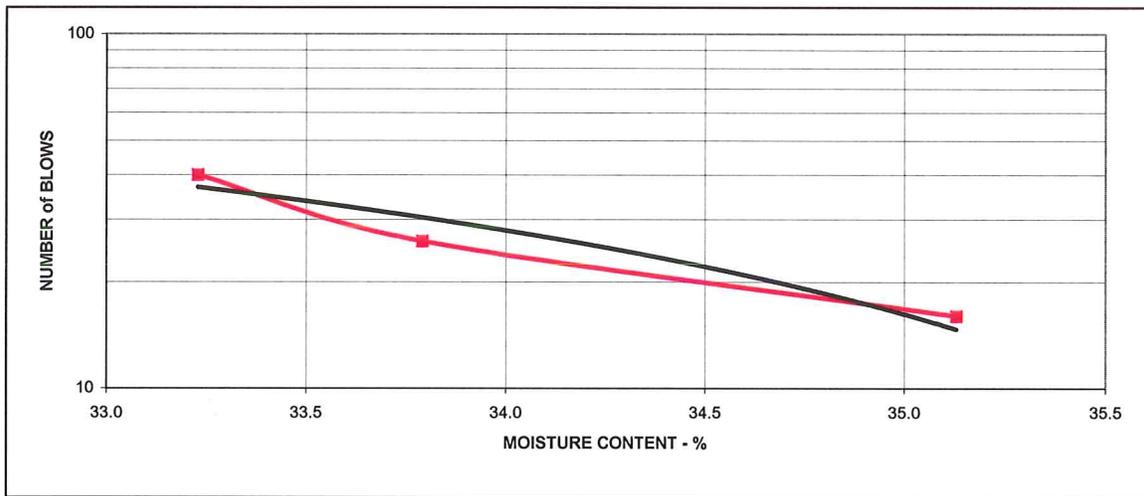
BANKS ROAD BRIDGE
BORING: B06-04
DEPTH: 8.65 - 8.90
DATE: 10 August 06
undisturbed sample



INDEX PROPERTIES	
NMC (%):	24.5
LIQUID LIMIT:	25.3
PLASTIC LIMIT:	18.1
PLASTIC INDEX:	7.2
LIQUIDITY INDEX:	0.9

(chart 7)

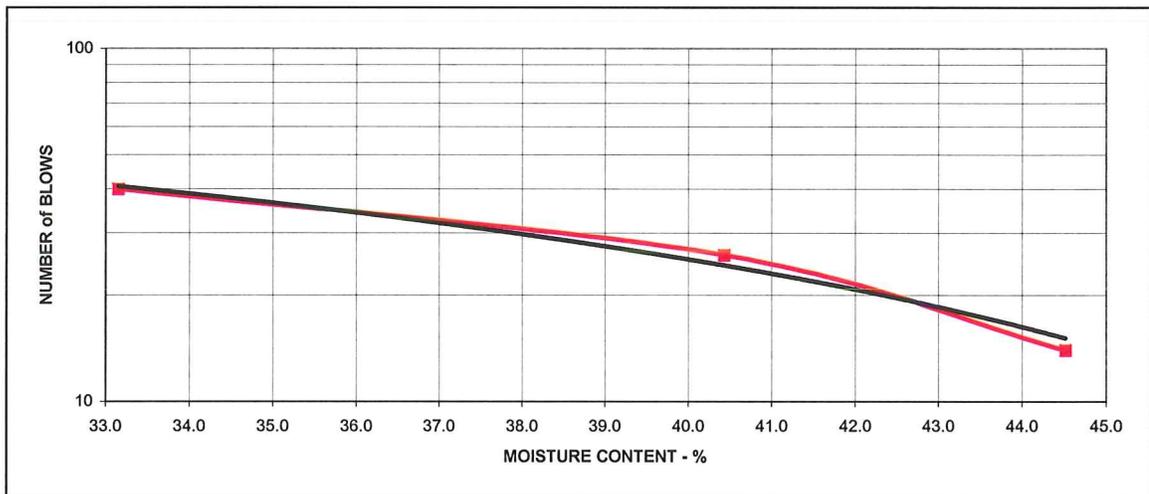
BANKS ROAD BRIDGE
SAMPLE: B06-03, S #4
DEPTH: 6' - 8'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%):	33.6
LIQUID LIMIT:	34.3
PLASTIC LIMIT:	17.1
PLASTIC INDEX:	17.2
LIQUIDITY INDEX:	1.0

chart 5

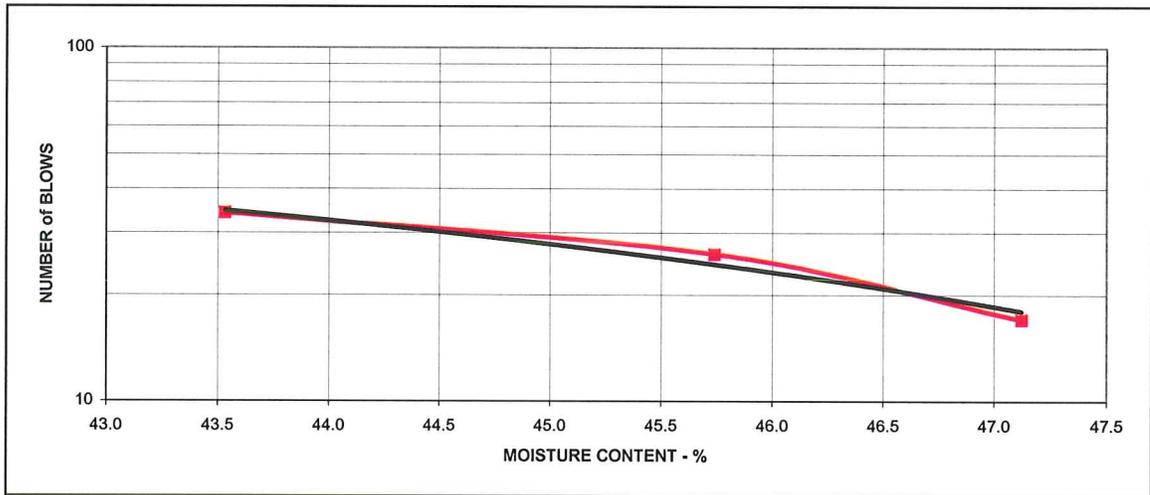
BANKS ROAD BRIDGE
SAMPLE: B06-03, S#6
DEPTH: 10' - 12'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%):	37.9
LIQUID LIMIT:	39.7
PLASTIC LIMIT:	23.2
PLASTIC INDEX:	16.5
LIQUIDITY INDEX:	0.9

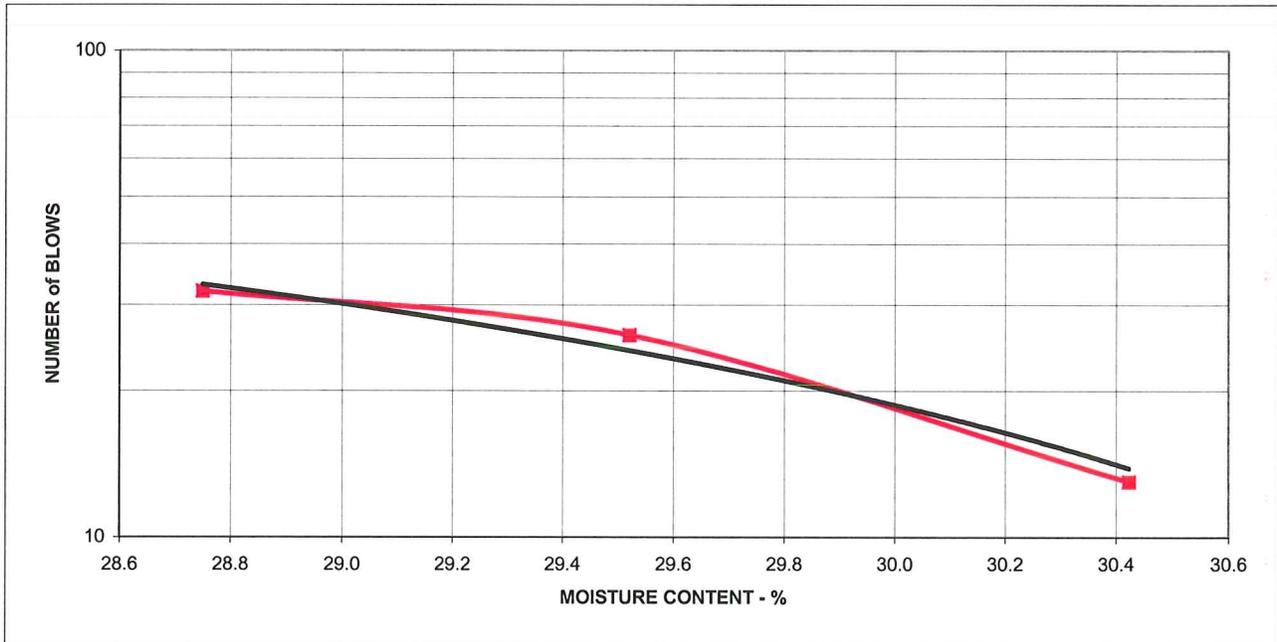
(chart 6)

BANKS ROAD BRIDGE
SAMPLE: B06-03, S#7
DEPTH: 12' - 14'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%) :	42.2
LIQUID LIMIT:	45.4
PLASTIC LIMIT:	24.6
PLASTIC INDEX:	20.8
LIQUIDITY INDEX:	0.8

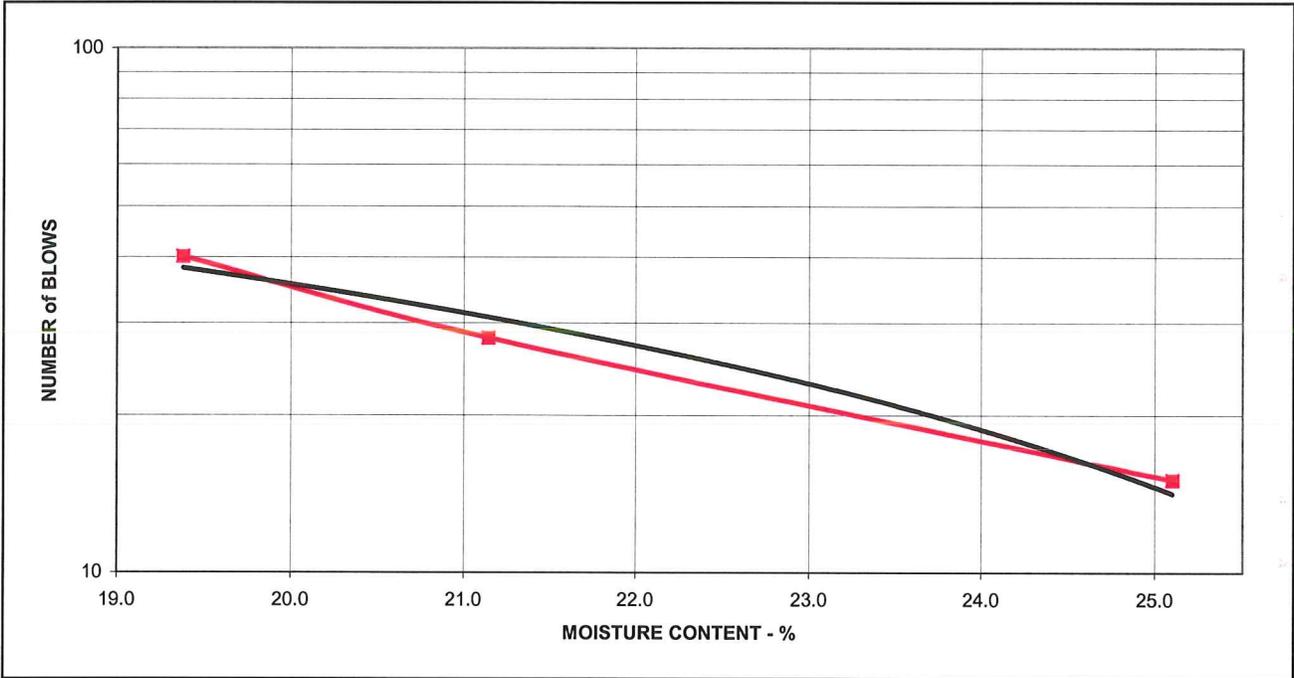
BANKS ROAD BRIDGE
SAMPLE: B06-03, S #9
DEPTH: 16' -18'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%):	18.4
LIQUID LIMIT:	29.4
PLASTIC LIMIT:	16.6
PLASTIC INDEX:	12.8
LIQUIDITY INDEX:	0.1

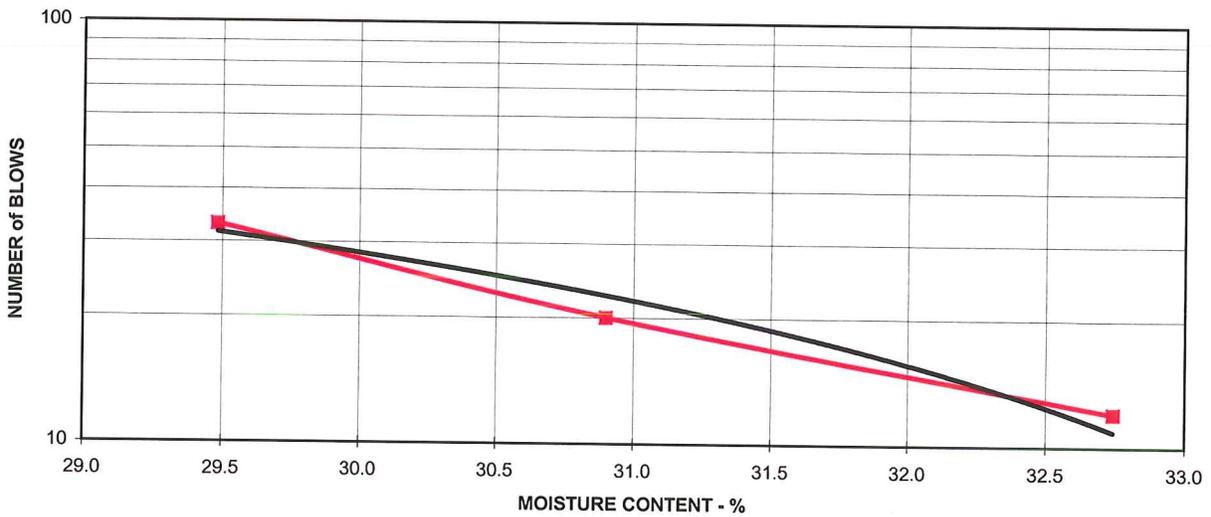
chart 4

BANKS ROAD BRIDGE
SAMPLE: B06-03, S #10
DEPTH: 18' - 20'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%):	24.7
LIQUID LIMIT:	22.4
PLASTIC LIMIT:	15.8
PLASTIC INDEX:	6.6
LIQUIDITY INDEX:	1.3

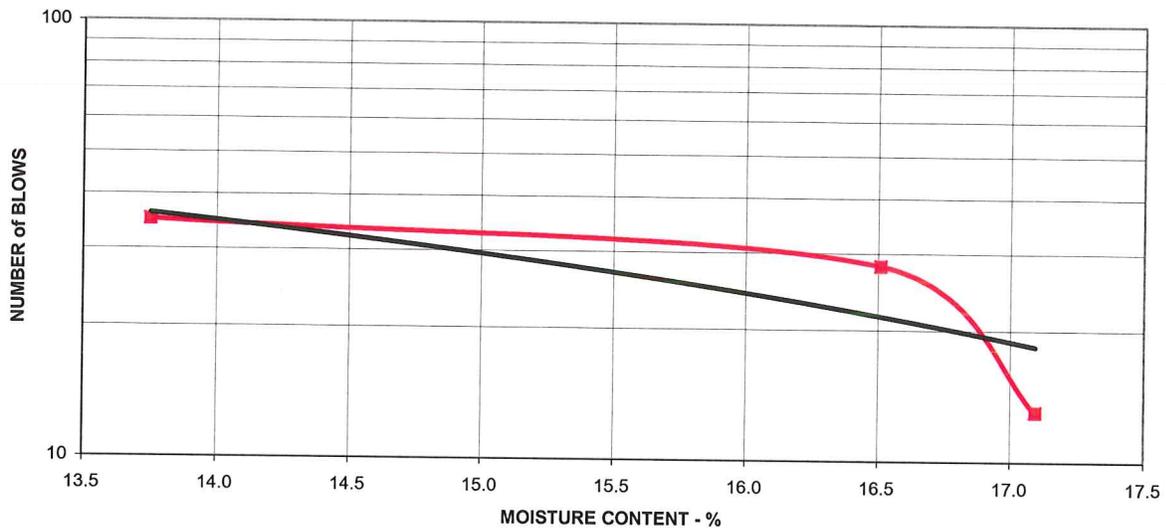
BANKS ROAD BRIDGE
SAMPLE: B06-03, S#12
DEPTH: 22' - 24'
DATE: 10 August 06



INDEX PROPERTIES

NMC (%):	19.6
LIQUID LIMIT:	30.2
PLASTIC LIMIT:	18.8
PLASTIC INDEX:	11.4
LIQUIDITY INDEX:	0.1

BANKS ROAD BRIDGE
SAMPLE: B06-03, S #14
DEPTH: 26' - 28'
DATE: 10 August 06



INDEX PROPERTIES	
NMC (%)	7.4
LIQUID LIMIT:	15.6
PLASTIC LIMIT:	11.9
PLASTIC INDEX:	3.7
LIQUIDITY INDEX:	-1.2

CHUNK DENSITY
PROJECT: Banks Road Bridge
DATE: 25 Oct 06
TESTING BY: GLW

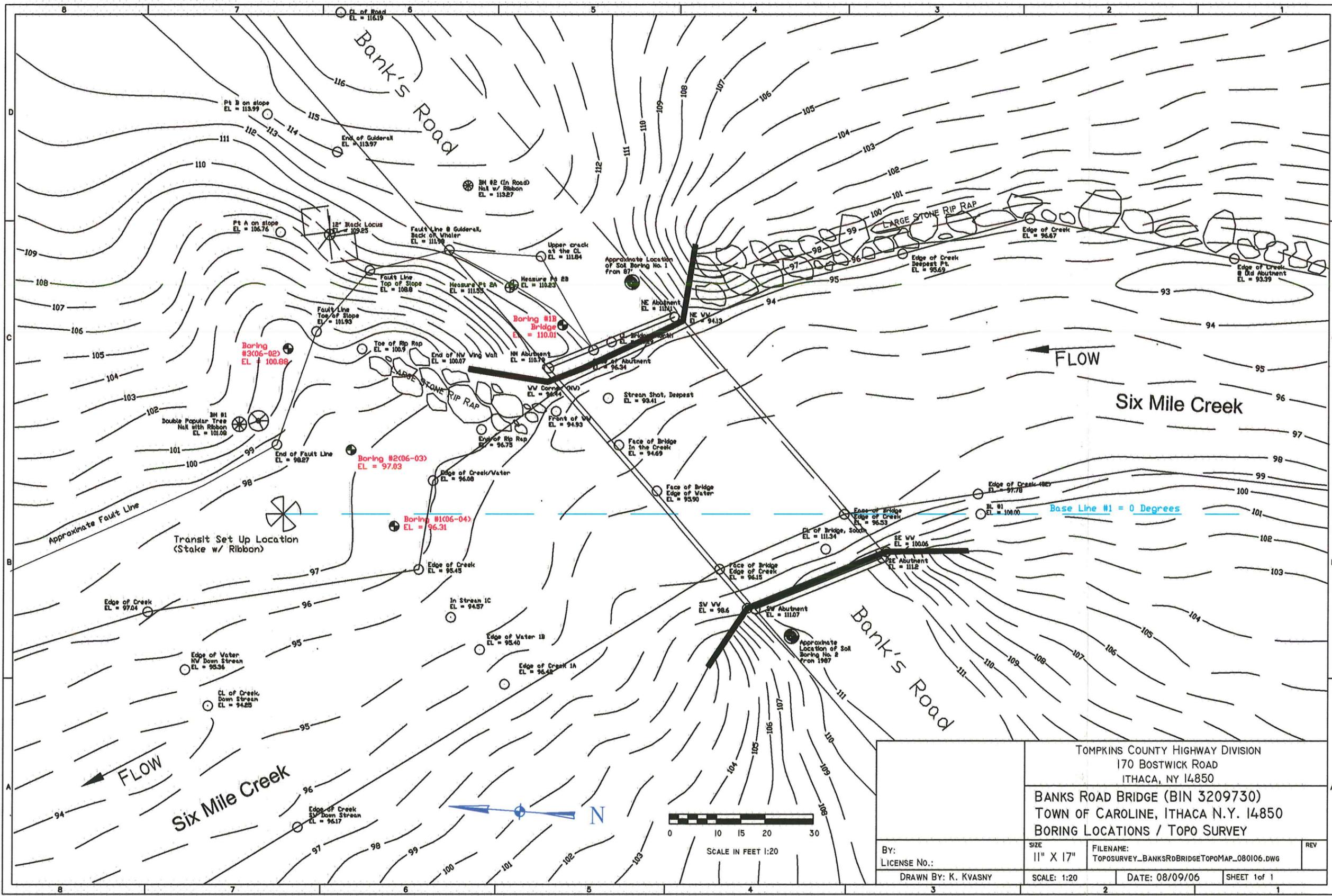
Specific Gravity Wax: 0.9
 Density Water: 62.4 lb./cu. ft.

Sample Number #	Natural Weight Sample (lb.)	Weight Sample + Wax (lb.)	Submerged Weight Sample + Wax (lb.)	Weight Wax (lb.)	Volume Wax (cu. ft.)	Weight Water Displaced (lb.)	Volume Water Displaced (cu. ft.)	Volume Sample + Wax (cu. ft.)	Volume Sample (cu. ft.)	Natural Density Sample (lb./cu. ft.)	Moisture Content %	Dry Density Sample (lb./cu. ft.)
B06-01: 111	0.20	0.21	0.09	0.00990	0.000176	0.114	0.00183	0.00183	0.00166	120.0	8.50	110.6
B06-01: 105	0.28	0.29	0.15	0.00760	0.000135	0.143	0.00230	0.00230	0.00216	130.3	21.40	107.4

APPENDIX 3



Topographic Map



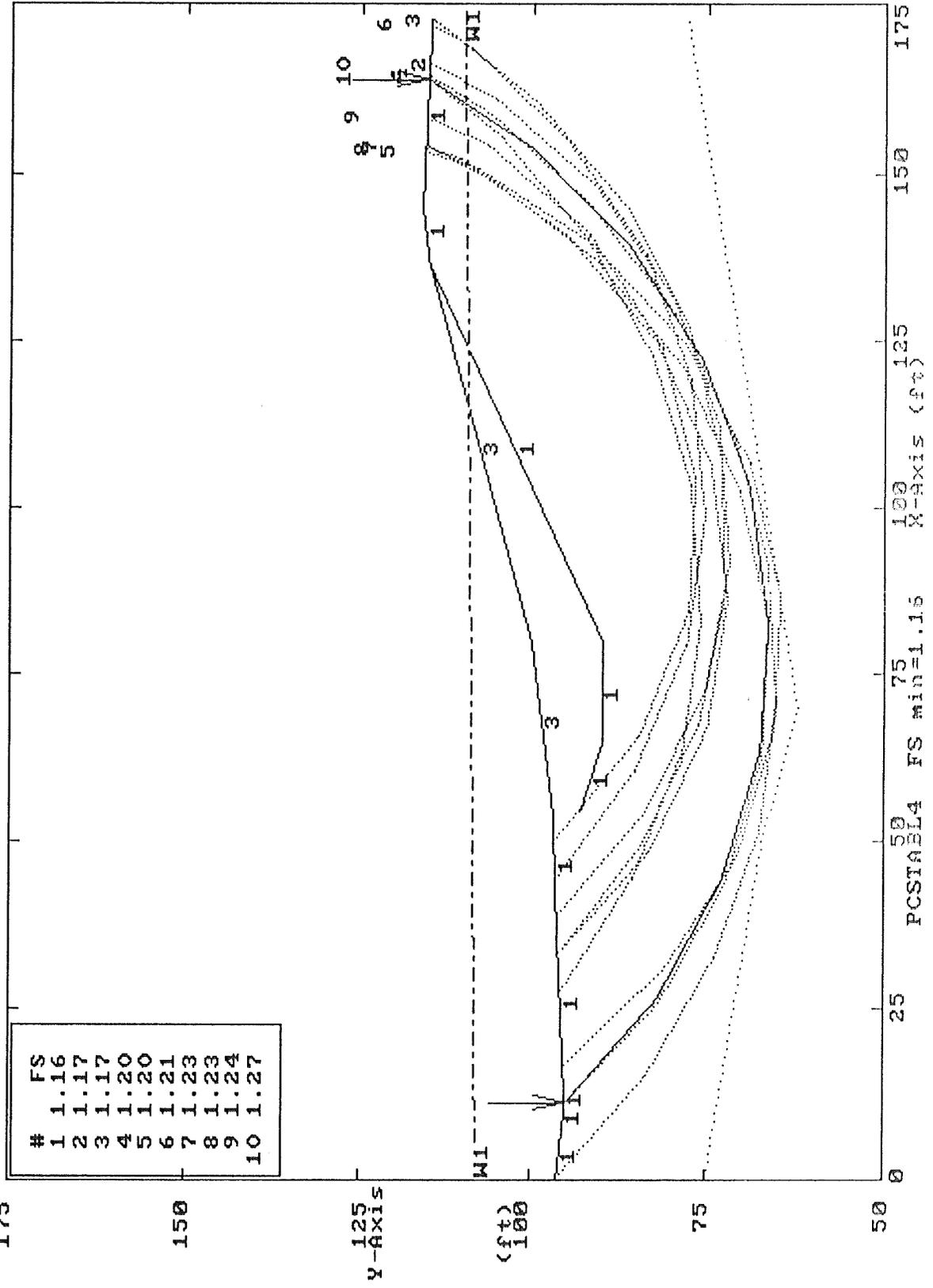
TOMPKINS COUNTY HIGHWAY DIVISION 170 BOSTWICK ROAD ITHACA, NY 14850			
BANKS ROAD BRIDGE (BIN 3209730) TOWN OF CAROLINE, ITHACA N.Y. 14850 BORING LOCATIONS / TOPO SURVEY			
BY:	SIZE:	FILENAME:	REV:
LICENSE No.:	11" X 17"	TOPOSURVEY_BANKSRDBRIDGE_TopoMAP_080106.DWG	
DRAWN BY: K. KVASNY	SCALE: 1:20	DATE: 08/09/06	SHEET 1 of 1

APPENDIX 4



Stability Analysis

Ten Most Critical. C:\BANKSIA.PLT By: G.L. Wood 11-16-06 11:35am



175
150
125
100
75
50
0

Y-axis (ft)

0 25 50 75 100 125 150 175

X-axis (ft)

PCSTAB4 FS min=1.16

banks Rd.#1

9
 46.3 7.7 45.56 1
 7 45.56 11. 45. 1
 45. 13.4 45. 1
 4 45. 37.3 46.32 1
 7.3 46.32 54.5 47. 1
 5 47. 80. 50. 3
 50. 136.2 65. 3
 6.2 65. 145.6 66. 1
 6 66. 173. 65. 1
 5 43. 65. 40. 1
 40. 80. 40. 1
 40. 136.2 65. 1

1
 05. 105. 350. 0. 0. 0. 0
 35. 145. 0. 40. 0. 0. 0
 105. 500. 0. 0. 0. 0
 145. 3000. 0. 0. 0. 0

METER

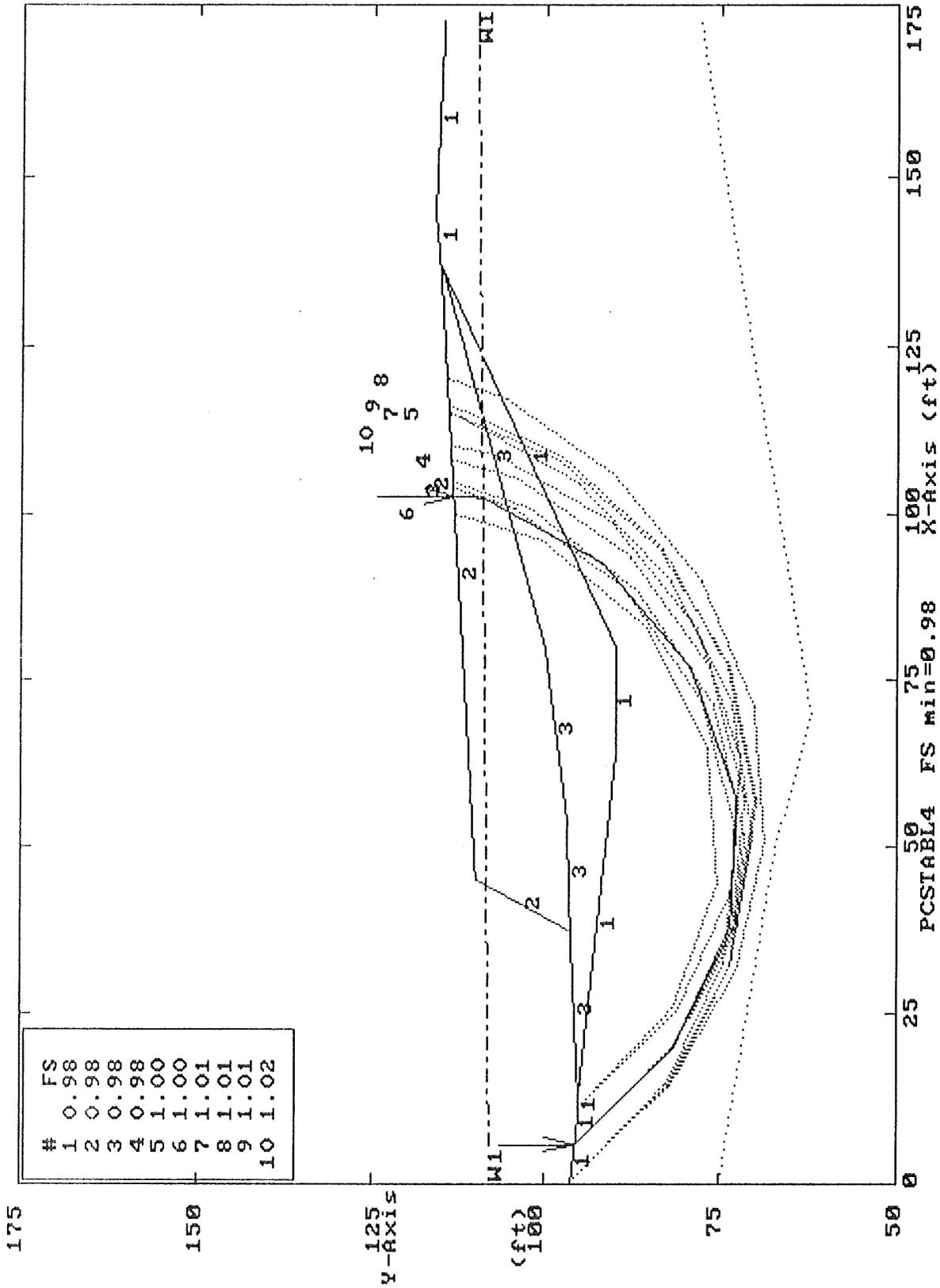
2.4
 58.
 7. 60.
 ITS
 1
 25. 50. 17.
 17. 70. 12.
 12. 173. 28.

IRCL2-Bishop circular, search.

10
 50. 100. 173. 0. 20. 0. 0.

Ten Most Critical. C:BANKS.PLT By: G.L. Wood 11-16-06 12:10pm

Banks Rd.#2a



anks Rd.#2a

8
 46.3 7.7 45.56 1
 7 45.56 11. 45. 1
 45. 13.4 45. 1
 4 45. 37.3 46.32 3
 7.3 46.32 45. 60. 2
 60. 136.2 65.2 2
 1.2 65.2 145.6 66. 1
 5.6 66. 173. 65. 1
 7.3 46.3 54.5 47. 3
 5 47. 80. 50. 3
 6. 50. 136.2 65. 3
 3.4 45. 65. 40. 1
 40. 80. 40. 1
 40. 136.2 65. 1

OIL

105. 350. 0. 0. 0. 0
 35. 145. 0. 40. 0. 0. 0
 05. 105. 500. 0. 0. 0. 0
 145. 3000. 0. 0. 0. 0

WER

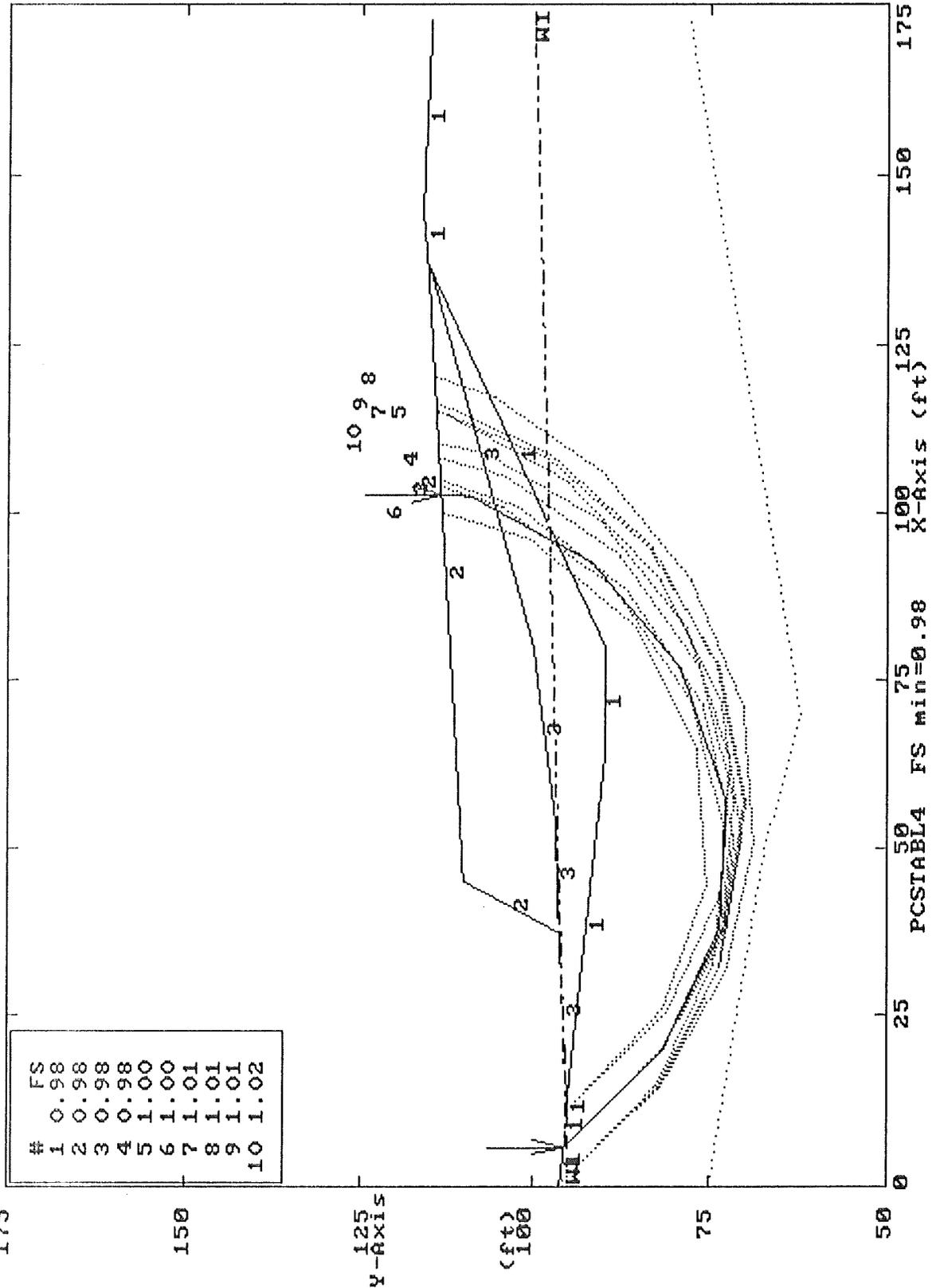
62.4

58.
 75. 60.

LIMITS

25. 50. 17.
 0. 17. 70. 12.
 12. 173. 28.
 CL2-Bishop circular, search.
 10
 50. 100. 173. 0. 20. 0. 0.

Ten Most Critical. C:BANKS.PLI By: G.L. Wood 11-16-06 12:07pm



PROFIL C:BANKS PCSTABL Version 4M /O(0, 50)

Banks Rd.#2b

4 8
 0. 46.3 7.7 45.56 1
 7.7 45.56 11. 45. 1
 1. 45. 13.4 45. 1
 3.4 45. 37.3 46.32 3
 37.3 46.32 45. 60. 2
 45. 60. 136.2 65.2 2
 36.2 65.2 145.6 66. 1
 145.6 66. 173. 65. 1
 37.3 46.3 54.5 47. 3
 4.5 47. 80. 50. 3
 0. 50. 136.2 65. 3
 13.4 45. 65. 40. 1
 5. 40. 80. 40. 1
 0. 40. 136.2 65. 1

BOIL

05. 105. 350. 0. 0. 0. 0
 135. 145. 0. 40. 0. 0. 0
 105. 105. 500. 0. 0. 0. 0
 45. 145. 3000. 0. 0. 0. 0

WATER

62.4
 . 15.
 175. 50.

LIMITS

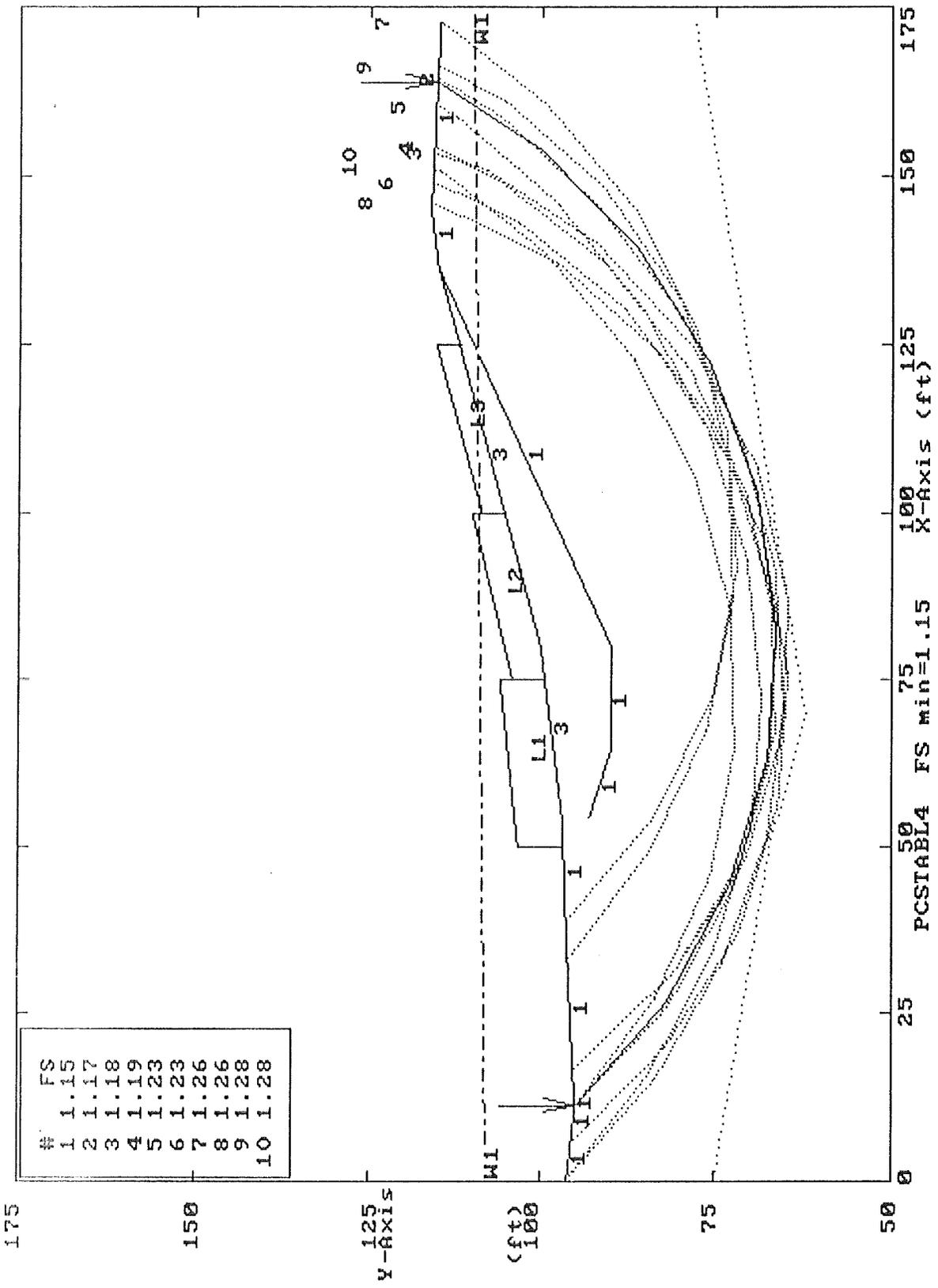
1
 . 25. 50. 17.
 50. 17. 70. 12.
 70. 12. 173. 28.

IRCL2-Bishop circular, search.

10 10
 0. 50. 100. 173. 0. 20. 0. 0.

Ten Most Critical. C:BANKS#3.PLT By: G.L. Wood 11-16-06 11:15am

#	FS
1	1.15
2	1.17
3	1.18
4	1.19
5	1.23
6	1.23
7	1.26
8	1.26
9	1.28
10	1.28



Banks Rd.#3

2 9
0. 46.3 7.7 45.56 1
7.7 45.56 11. 45. 1
1. 45. 13.4 45. 1
13.4 45. 37.3 46.32 1
37.3 46.32 54.5 47. 1
4.5 47. 80. 50. 3
0. 50. 136.2 65. 3
136.2 65. 145.6 66. 1
145.6 66. 173. 65. 1
4.5 43. 65. 40. 1
65. 40. 80. 40. 1
80. 40. 136.2 65. 1

OIL

105. 105. 350. 0. 0. 0. 0
35. 145. 0. 40. 0. 0. 0
105. 105. 500. 0. 0. 0. 0
145. 145. 3000. 0. 0. 0. 0

WATER

62.4

0. 58.
75. 60.

DADS

0. 75. 400. 0.
5. 100. 300. 0.
100. 125. 200. 0.

LIMITS

1
. 25. 50. 17.
50. 17. 70. 12.
10. 12. 173. 28.

IRCL2-Bishop circular, search.

10 10

0. 50. 100. 173. 0. 20. 0. 0.

APPENDIX 5



Site Photographs



1 View looking Southerly at the failed East abutment



2 View looking Southerly at the fault line in the pavement



3 View looking Easterly at the pavement break



4 Looking Southerly from B06-02 along fault line



5 B06-02 with hole containing artesian water in foreground



6 View looking Northerly showing the line of clay demarcating the toe of the failure zone.



7 Close up of the clay in the preceding photo



8 Patch on similar slippage line on Brooktondale Road

ENGINEERING REPORT

Soils Investigation & Recommendations

Tompkins County DPW
Bridge Rehabilitation Project
Banks Road & Coon Club Bridges

10 April 1987

Prepared for:
Tompkins County Department of Public Works
Bostwick Road
Ithaca, NY 14850



Prepared by:
GARY L. WOOD, P.E.

2630 Sugarbush Lane
Dryden, N.Y. 13053

Telephone
607-753-8421

1.0 SCOPE

- 1.1 The investigation for these projects consisted of two conventional soil borings at the site of the Banks Road bridge and one boring at the site of the Coon Club bridge. The results of these borings, along with a sketch depicting their locations, is presented on drawings entitled "Boring Logs" in Appendix A of this report. Appendix A is also prefaced by a legend which describes procedures used in making these borings. Appendix B contains a description of both the sampling procedure and the procedure used in classifying the recovered samples.
- 1.2 All of the samples recovered for these projects were of the split-spoon variety. No undisturbed samples were deemed necessary, but additional split-spoon samples were obtained to better define the zone directly below the anticipated bottom of foundations. No laboratory testing was deemed necessary at this time.

2.0 SITE DESCRIPTION

- 2.1 Both of these project sites are located in the Town of Caroline, Tompkins County, NY. These locations are depicted on sections of the USGS 7.5 Minute Quadrangle Sheets which follow as Figures 1 (Banks Road) and 2 (Coon Club).
- 2.2 The site of the relocated Banks Road bridge, which is 100± feet from the existing bridge, is underlain with a deep lacustrine deposit. The borings disclosed a surficial layer of granular material (sand and gravel or just gravel) which extends just a few feet below the bottom of the stream. Below this depth, the soft clays were encountered throughout the entire depth investigated by the borings (51.5' in B-1 and 32' in B-2). The water levels in the borings, as observed by the driller, were as follows:

<u>Boring #</u>	<u>Date</u>	<u>Time</u>	<u>Casing @</u>	<u>Hole @</u>	<u>Water @</u>
B-1	3/20/87	9:30 AM	4.5	7.0	3.5
	3/20/87	1:30 PM	4.9	50.0	28.7
	3/20/87	2:00 PM	Out	25.7	3.0

<u>Boring #</u>	<u>Date</u>	<u>Time</u>	<u>Casing @</u>	<u>Hole @</u>	<u>Water @</u>
B-2	3/20/87	3:00 PM	0	2.0	1.5
	3/20/87	5:00 PM	29.0	31.7	21.3
	3/20/87	5:20 PM	Out	4.0	1.0

2.3 The soils underlying the Coon Club site are generally granular (that is, gravels), although with significant amounts of clay. The driller's water level observations are as follows:

B-1	3/31/87	9:53 AM	4.0	5.0	5.0
		11:45 AM	24.5	26.5	12.5
		12:10 PM	Out	7.0	4.8

3.0 RECOMMENDATIONS

3.1 Banks Road Site

It seems intuitively apparent that a deep foundation (that is, piles) will be required in these deep clay deposits. Although some skin friction can be developed in these materials, it is so small as to make end bearing piles the only logical alternative. In particular, it would appear that such piles can be seated in the clayey GRAVEL which is encountered at about 40 feet below existing grade. For example, it would appear that a timber pile with a 19-inch tip circumference, and fitted with a driving shoe, could be seated about 2 feet into this material at which point it would have an allowable capacity of about 15 tons. Alternatively, a lightweight steel 'H' section (8 by 36 lb.) could also be seated in this same material and could be assigned the following allowable capacities:

<u>Depth Below Bearing Stratum</u>	<u>Allowable Pile Capacity</u>
3 Feet	15 Tons
5 Feet	25 Tons
10 Feet	50 Tons

Regardless of the type of pile used, the traditional blow counts should not be used as a driving criterion. That is, one should look for the required depth of penetration into the bearing stratum as indicated by a substantial increase in blow count in the vicinity of the 40-foot depth (that is, below presently existing grade).

Consideration should also be given to the effect that any embankment placed either side of the proposed abutments will have on these soft clay deposits. In particular, the placement of several feet of fill is likely to cause measurable amounts of settlement. This should not be a matter of concern as long as the embankment is placed before the abutment is constructed; otherwise, the settlement induced by the placement of the fill could produce an unacceptable additional loading on the piles.

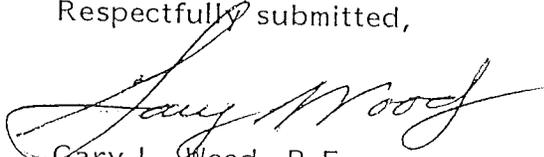
3.2 Coon Club Site

It would appear that the Coon Club site is compatible with either spread foundations or deep foundations. If spread foundations are used, it was presumed that they would be seated very near the surface of the clayey gravel which was encountered at a depth of 8 feet. It is noted that this material will be quite sensitive to moisture, making it imperative that the Contractor do a good job of diverting and controlling surface water. If this is accomplished, an allowable bearing capacity of about 2.5 tons per square foot can be used in the design of the foundation. Alternatively, piles can be used and it is anticipated that they will reach practical refusal at a depth near that at which the boring was terminated. Furthermore, there is some question as to the driveability of wood piles in this material. Even if fitted with driving shoes, and noting that some of the materials appear to be more sandy than gravelly, it is questionable as to what depth wood piles can be driven. Knowing that the existing bridge is seated on such piles, an effort should be made to research what actually happened during their construction. Alternatively, steel piles could be assigned bearing capacities similar to those previously prescribed for the Banks Road site, based upon the depth of embedment below the top of the granular stratum which starts at a depth of about 8 feet. Here again, it is the depth of penetration that should be used as driving criterion rather than blow counts.

4.0 SUMMARY

4.1 The preceding recommendations were based upon foundation types which it is anticipated might be practical solutions for these projects. I would welcome the opportunity to review the final design for its compatibility with the assumptions on which they were based.

Respectfully submitted,



Gary L. Wood, P.E.
Consulting Engineer

j
4/10/87

GARY L. WOOD, PE
CONSULTING CIVIL ENGINEER

**SUPPLEMENTAL INVESTIGATION
and
DESIGN MEMORANDUM**

for

BANKS ROAD BRIDGE RECONSTRUCTION
TOWN OF CAROLINE
TOMPKINS COUNTY
NEW YORK

**PREPARED FOR
LABELLA ASSOCIATES, PC
300 STATE STREET
ROCHESTER, NY
14614**

20 AUGUST 2007 (REV)

GARY L. WOOD, P.E.

2630 SUGARBUSH LANE • DRYDEN, NY 13053
PHONE: (607) 753-8421 • FAX: (607) 753-8421
EMAIL: gwood13@twcny.rr.com

PRACTICING GEOTECHNICAL, SITE, AND CONSTRUCTION MATERIALS ENGINEERING

INTRODUCTION

The purpose of this interim document is to provide preliminary information for project development. It is a supplement to the previous report, which was dated 14 November 2006.

The supplemental field investigation, on which this is based, consisted of three additional soil borings that are represented by Subsurface Logs attached as Appendix 1. These were located to form a profile along Banks Road from right to left. The following table summarizes basic information.

<u>Boring Number</u>	<u>Ground Surface</u>	<u>Estimated Elevations¹</u>		<u>Bearing Stratum</u>
		<u>Location¹⁾</u>	<u>Original Ground</u>	
07-01	70 Ft. Right	113.5	107	64
06-01 ²⁾	40 Ft. Right	110.0	100	64
B-1 ³⁾	40 Ft. Right	99?	99?	60
B-2	40 Ft. Left	103?	103	80
07-02	50 Ft. Left	110.7	96	80
07-03	125 Ft. Left	109.5	105	80

LABORATORY ANALYSIS

The natural water content was determined on all samples and the results are included on the logs.

In addition, two undisturbed (Shelby Tube) samples were obtained⁴⁾ and subjected to the following laboratory tests:

Natural water content
Atterberg Limits
Consolidation
Unconsolidated, Undrained triaxial shear

The data from these tests were used to evaluate the three principal concerns regarding this project, which are discussed as follows.

- ¹⁾ Distance from centerline of the existing bridge.
- ²⁾ From the November 2006 Report.
- ³⁾ From the April 1987 Report.
- ⁴⁾ Only two were successful out of five attempts.

¹ Elevations referenced are based on same datum as the County Topographic survey

PILE CAPACITY

It is apparent the piles can be driven through the existing embankment and soft upper strata, to the till that was referred to as "bearing stratum" in the Introduction. The static analysis indicates these will develop a combination of skin friction and end bearing in more or less equal proportions. Since the end bearing will be developed in the till soil (rather than unyielding rock), there will be sufficient relaxation to permit development of the skin friction as well. Also, it will not be necessary to add an allowance for down drag, even though there will be some compression or settlement in the clay stratum.

The static analysis, it is estimated that the 60 or 80 kips allowable capacities can be developed as follows:

<u>Pile size</u>	<u>Allowable Capacity</u>	<u>Tip Elevation</u>	
		<u>Right Abutment</u>	<u>Left Abutment</u>
H 12 x 74	60 Kips	46	50
H 14 x 102	80 Kips	46	50

These allowable values are based on a safety factor of 2.25 that presumes both Wave Equation analysis and Dynamic measurement during driving.⁵⁾ In respect to the dynamic measurement, at least two piles should be tested for each abutment, which slightly exceeds the requirements of ¶ 4.5.1.8.⁶⁾

SLOPE STABILITY

The following is a summary of the general stratification, as revealed by the borings:

<u>Boring Number</u>	<u>Ground Surface</u>	<u>Elevation</u>		
		<u>Top of Soft Clay</u>	<u>Top of Silty Clay</u>	<u>Top of Till</u>
07-01	113.5	94	74	64
06-01	110.0	92	78	64
06-02	100.9	97	76	67
06-03	96.3	92	74	68
06-04	96.3	93	74	70
07-02	110.7	94	84	80
07-03	109.5	96	88	80

This shows there is a soft clay layer that varies from about 20 feet thick on the Easterly limit of the profile to about 8 feet on the Westerly side; followed by more stiff silty clay that is nominally about 10 feet thick.

⁵⁾ See Table 4.5.6.2A of the AASTHO Standard Specifications for Highway Bridges.

⁶⁾ Like the previous referenced, this and subsequent references are to the AASHTO standard.

The triaxial tests found a peak strength of 2.74 psi for the upper layer and 5.44 psi for the lower layer. This test represents the condition where the soil becomes saturated from high water and does not have sufficient time to relieve the pore pressure as the water level (from the stream) recedes, which is the most critical condition. These strength properties will be used in performing stability analysis, similar to those in Appendix 4 of the 2006 report, once the choice between the two restoration alternatives has been made.

Particular note should be made that the reduction in superimposed weight and resulting driving force, that will occur as a result of the relocation of the right abutment, as shown on drawing ALT-2, will have a similar effect to the use of geofoam as recommended in the 2006 report. In other words, this will reduce the driving force tending to cause the rotational failure on the right abutment, which is more critical than the left abutment due to the greater thickness of the soft clay stratum.

SETTLEMENT

The third consideration is settlement, which was evaluated by means of the consolidation tests. These tests showed pre-consolidation pressures of 3.4 and 5.0 kips for the soft clay and silty clay strata, respectively. Consequently, consolidation and resulting settlement, under the embankment loading that was applied during the original construction would have been along the recompression portion of both curves. Therefore there was no significant settlement, as evidenced by the lack of any "bump" between the approach and the abutment of the existing bridge. Since neither of the current proposals include a grade increase, this is not a concern.

CONCLUDING REMARKS

This report was prepared to address the ramifications of the two proposed alternatives for the repair or reconstruction. From the geotechnical perspective, the replacement option (ALT-2) is preferable because it mitigates the slope stability problem without having any apparent adverse impacts.

Finally, it is anticipated that additional refinement will be required as the design progresses.

Respectfully submitted,

Gary L. Wood, PE



APPENDIX 1

Subsurface Logs

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

Project: Banks Road Bridge
 Location: Caroline, New York

Boring No.: BO7-01

Project No.: 207074-D

Date Started: 07/06/07

Date Completed: 07/07/07

Reference Elevation: N/A

SUBSURFACE LOG

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks
	Number	SPT Blows	N-Value			
21	8	1 1 2 3	3	2.0	Gray CLAY, wet	
22						
23	9	2 3 2 4	5	2.0	similar	
24						
25	10	WH WH WH 1	-	2.0	similar	
26						
27	11	1 3 2 3	5	2.0	similar	
28						
29	T-1		-	0	No recovery	
30						
31	T-2		-	1.5		
32						
33	12	WH WH WH 2	-	2.0	Gray CLAY, moist	
34						
35	13	WH WH WH 2	-	2.0	similar with little silt and sand, saturated	
36						
37	14	WH 2 3 4	5	2.0	similar	
38						
39	15	3 5 9 9	14	0.3	Gray SILT and CLAY, wet	
40						

Sampling Method: ASTM D-1586, unless otherwise noted.

Notes: 4 1/4" ID Hollow Stem Augers

Visually Classified by: Driller

File: 207074-D/tech/BO7-01

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

SUBSURFACE LOG

Project: Banks Road Bridge
 Location: Caroline, New York

Boring No.: BO7-01
 Project No.: 207074-D
 Date Started: 07/06/07
 Date Completed: 07/07/07
 Reference Elevation: N/A

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks
	Number	SPT Blows	N-Value			
41	16	3 7 11 12	18	0.7	similar with medium-coarse SAND, moist	
42						
43	17	9 10 11 14	21	1.8	similar, no coarse sand, moist	
44						
45	18	4 6 8 12	14	2.0	similar, wet	
46						
47	19	9 11 12 12	23	2.0	similar, moist	
48						
49	20	WH WH 7 8	7	0.7	similar, wet	
50						Drove solid AW Rod Point from 50' - 55.5'.
51					----- Probable TILL layer	50.0' - 51.0' - 18 51.0' - 51.5' - 11 51.5' - 52.0' - 23 52.0' - 52.5' - 30 52.5' - 53.0' - 41 53.0' - 53.5' - 40 53.5' - 54.0' - 47 54.0' - 54.5' - 56 54.5' - 55.0' - 86 55.0' - 55.5' - 85
52						
53						
54						
55						
56					End of Borehole	WH - Weight of Hammer.
57						No water levels were recorded.
58						
59						
60						

Sampling Method: ASTM D-1586, unless otherwise noted.

Visually Classified by: Driller

Notes: 4 1/4" ID Hollow Stem Augers

File: 207074-D/tech/BO7-01

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

Project: Banks Road Bridge
 Location: Caroline, New York

Boring No.: BO7-02

Project No.: 207074-D

Date Started: 07/02/07

Date Completed: 07/05/07

Reference Elevation: N/A

SUBSURFACE LOG

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks
	Number	SPT Blows	N-Value			
0						No samples taken above 10 feet.
1						
2						
3						Encountered auger refusal at 6.0', changed to pipe casing for remainder of hole.
4						
5						
6						
7						
8						
9						
10						
11	1	43 100-3	-	0.3	Coarse GRAVEL, Some Brown Sand, damp	
12					similar	
13	2	8 10 14 10	24	0.6		
14					similar, top half of sample wet, Brown GRAVEL and Silty SAND, moist	Probable depth of Fill.
15	3	2 7 6 4	13	1.1		
16					Brown GRAVEL and SAND, saturated	
17	4	3 1 2 2	3	1.4	Gray CLAY	
18						Lost Tube in hole.
19	T-1		-	0		
20						

Sampling Method: ASTM D-1586, unless otherwise noted.

Visually Classified by: Driller

Notes: 4 1/4" ID Hollow Stem Augers / 4" Casing

File: 207074-D/tech/BO7-02

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

SUBSURFACE LOG

Boring No.: BO7-02
 Project No.: 207074-D
 Date Started: 07/02/07
 Date Completed: 07/05/07
 Reference Elevation: N/A

Project: Banks Road Bridge
 Location: Caroline, New York

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks
	Number	SPT Blows	N-Value			
21	5		-	0	No recovery	No blow counts recorded due to lost tube which was recovered with sample spoon.
22						
23						
24					No recovery	
25	T-2		-	0		
26						
27	6	1 1 4 4	5	0.9	Gray CLAY, Some Silt, moist	
28						
29	7	22 7 9 10	16	1.8	Gray SILT, Some Clay, little fine sand, moist	
30						
31	8	3 5 16 30	21	1.5	Gray SILT, CLAY, SAND and GRAVEL, moist	
32						
33	9	40 35 50-.2	-	0.8	Gray SAND and GRAVEL, SHALE fragments, damp	
34						
35	10	19 25 28 32	53	0.6	Gray SAND and GRAVEL, little clay, damp	
36						
37	11	40 50-.1	-	0.3	Gray SAND and GRAVEL, little clay, damp	
38						
39					End of Borehole	No water levels were recorded.
40						

Sampling Method: ASTM D-1586, unless otherwise noted.

Visually Classified by: Driller

Notes: 4 1/4" ID Hollow Stem Augers / 4" Casing

File: 207074-D/tech/BO7-02

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

Project: Banks Road Bridge
 Location: Caroline, New York

Boring No.: BO7-03

Project No.: 207074-D

Date Started: 07/05/07

Date Completed: 07/06/07

Reference Elevation: N/A

SUBSURFACE LOG

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks
	Number	SPT Blows	N-Value			
0					Asphalt at surface 1.0'	Probable depth of Fill.
1	1	10 14	-	0.4	FILL: GRAVEL and SAND, damp	
2					similar	
3	2	32 26 27 26	53	0.8		
4					Gray CLAY, Some Sand and fine Gravel, moist	
5	3	12 6 14 15	20	1.4		
6					Brown SAND and GRAVEL, moist	
7	4	33 19 14 12	33	1.3		
8					similar	
9	5	12 15 15 14	30	0.4		
10					similar	Used pipe casing to 10 feet, then augers for the remainder of the hole.
11	6	11 12 11 10	23	0.8		
12					similar, saturated	
13	7	4 1 1 2	2	1.3	Gray CLAY	
14						
15	T-1		-	0		
16					Gray CLAY, saturated	
17	8	WH WH WH 1	-	2.0		
18					similar with fine sand or silt lenses	
19	9	WH WH 3 3	3	2.0		
20						

Sampling Method: ASTM D-1586, unless otherwise noted.

Visually Classified by: Driller

Notes: 4 1/4" ID Hollow Stem Augers / 4" Casing

File: 207074-D/tech/BO7-03

GeoLogic NY, Inc.

PO Box 350
 Homer, NY 13077
 607-749-5000
 607-749-5063 (fax)

Project: Banks Road Bridge
 Location: Caroline, New York

Boring No.: BO7-03

Project No.: 207074-D

Date Started: 07/05/07

Date Completed: 07/06/07

Reference Elevation: N/A

SUBSURFACE LOG

Depth (ft)	Sample			Recovery (ft.)	MATERIAL DESCRIPTION	Remarks	
	Number	SPT Blows	N-Value				
21	10	2 3 3 3	6	1.8	Gray SILT, Some Clay, fine SAND seams, wet	Till below 29 +/- feet.	
22	11	8 8 12 9	20	1.1	Gray SAND and GRAVEL, Some Silt and Clay, wet		
23		similar, moist					
24	12	5 6 5 5	11	1.0	similar, damp		
25		similar, moist					
26	13	5 8 9 12	17	1.2	similar, damp		
27		similar, damp					
28	14	4 15 21 42	36	1.1	similar, Some Clay, moist		
29		similar, damp					
30	15	18 29 30 41	59	0.9	similar, moist		
31		similar, moist					
32	16	38 40 48 31	88	0.9	similar		
33		similar					
34	17	18 23 32 26	55	1.1	similar		
35		similar					
36					End of Borehole		Water level at 10.0'.
37							With casing out, hole caved at 10.0'.
38							
39							
40							

Sampling Method: ASTM D-1586, unless otherwise noted.

Visually Classified by: Driller

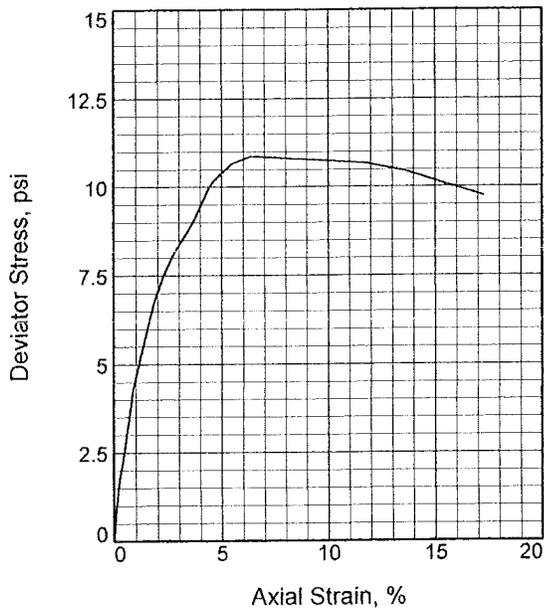
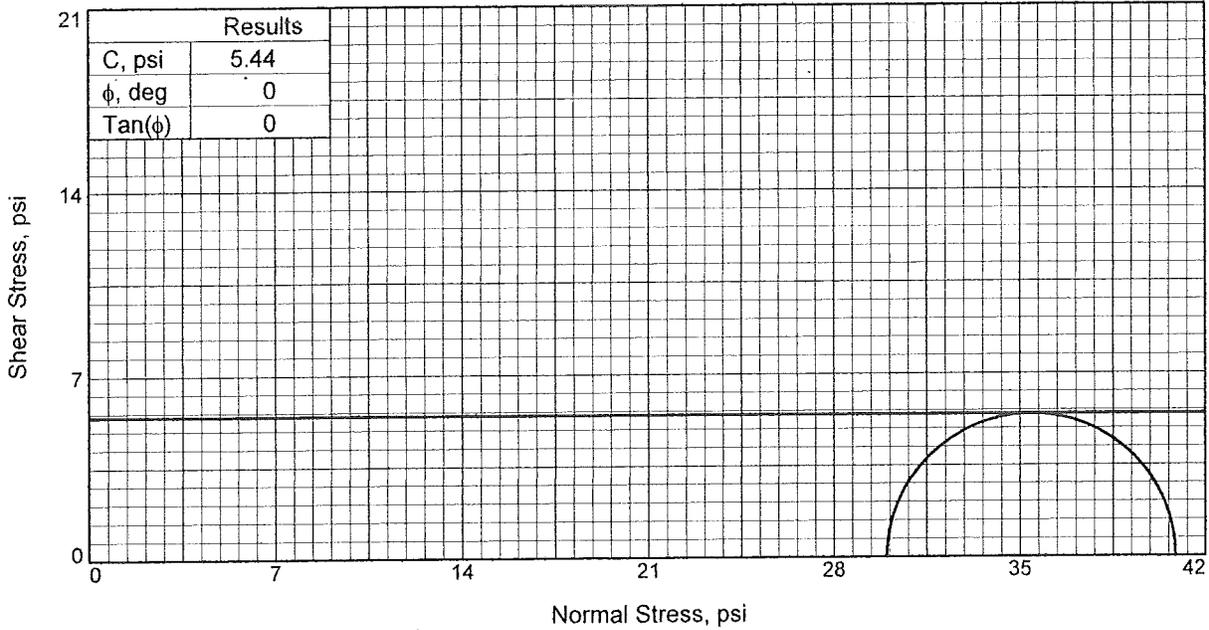
Notes: 4 1/4" ID Hollow Stem Augers / 4" Casing

File: 207074-D/tech/BO7-03

APPENDIX 2



Laboratory Test Data



Sample No.		1
Initial	Water Content,	35.6
	Dry Density, pcf	85.6
	Saturation,	102.2
	Void Ratio	0.9115
	Diameter, in.	2.79
	Height, in.	6.60
At Test	Water Content,	35.0
	Dry Density, pcf	85.6
	Saturation,	100.6
	Void Ratio	0.9115
	Diameter, in.	2.79
	Height, in.	6.60
Strain rate, in./min.		0.06
Back Pressure, psi		0.0
Cell Pressure, psi		30.0
Fail. Stress, psi		10.9
Strain, %		6.4
Ult. Stress, psi		9.7
Strain, %		
σ_1 Failure, psi		40.9
σ_3 Failure, psi		30.0

Type of Test:
Unconsolidated Undrained

Sample Type: UNDISTURBED

Description: Gray moist clay

LL= 40 PL= 21 PI= 19

Assumed Specific Gravity= 2.62

Remarks:

Client: GARY L. WOOD

Project: BROOKS ROAD BRIDGE

Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396

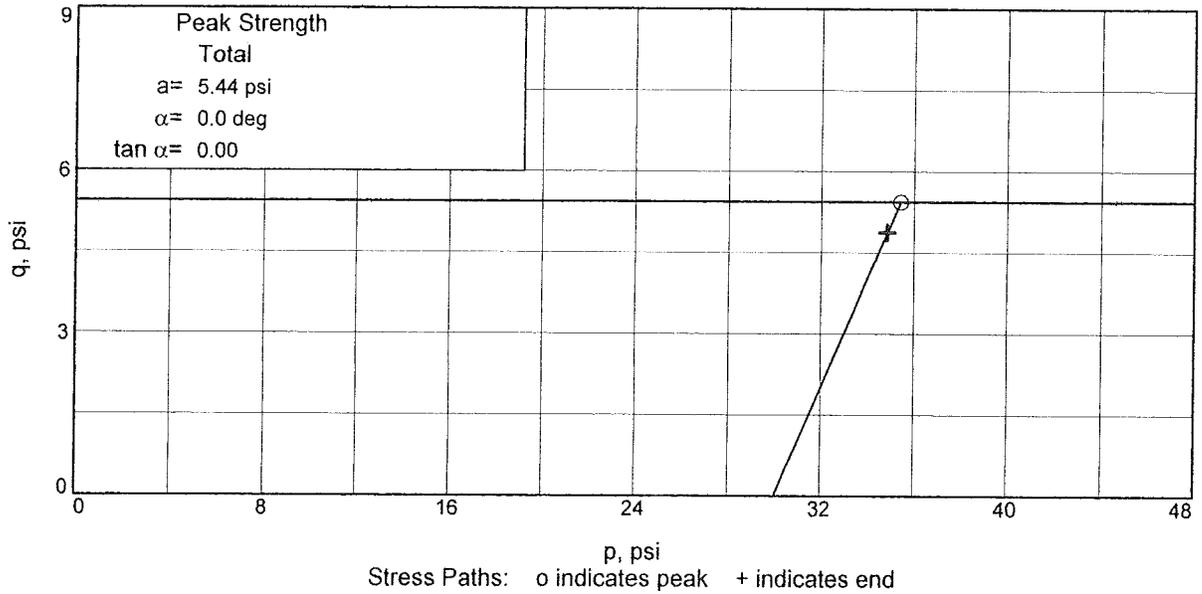
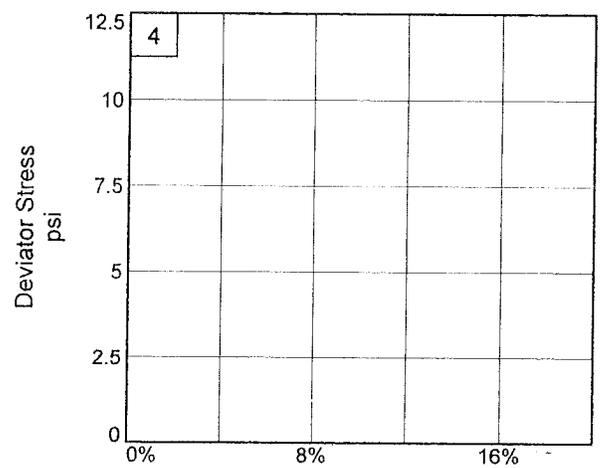
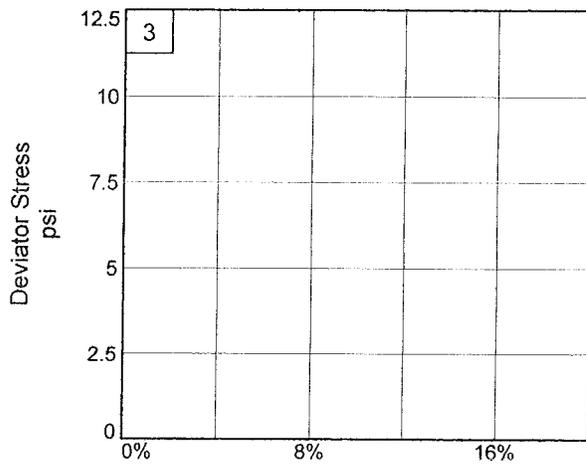
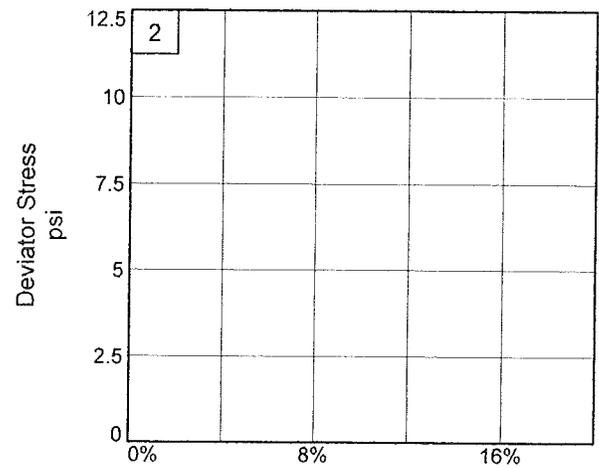
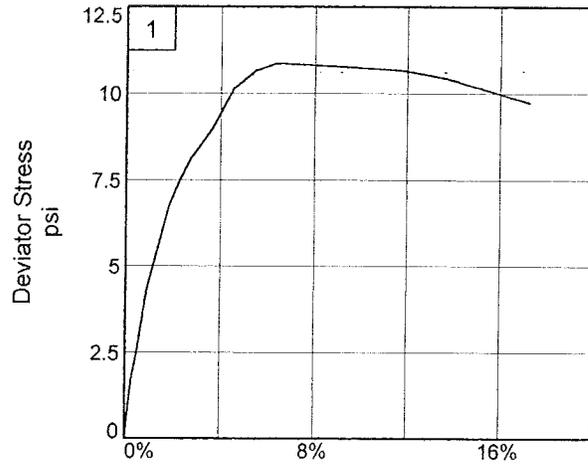
Sample Number: ID #22396 **Depth:** 30'-32'

Proj. No.: L-07119 **Date:** RECIEVED JULY 12,2007

TRIAXIAL SHEAR TEST REPORT
PW Laboratories, Inc.

Plate TWO A

Tested By: PE Checked By: DPB



Client: GARY L. WOOD

Project: BROOKS ROAD BRIDGE

Location: BORING #07-01, T-2, DEPTH 30'-32', ID #22396

Project No.: L-07119

Plate TWO B

Depth: 30'-32'

PW Laboratories, Inc.

Tested By: PE

Checked By: DPB

TRIAxIAL COMPRESSION TEST

7/26/07

Unconsolidated Undrained

10:55 AM

Date: RECIEVED JULY 12,2007
Client: GARY L. WOOD
Project: BROOKS ROAD BRIDGE
Project No.: L-07119
Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396
Depth: 30'-32' **Sample Number:** ID #22396
Description: Gray moist clay
Remarks:
Type of Sample: UNDISTURBED
Assumed Specific Gravity: 2.62 **LL:** 40 **PL:** 21 **PI:** 19
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	326.650	1314.500
Moisture content: Dry soil+tare, gms.	276.830	995.200
Moisture content: Tare, gms.	136.770	82.400
Moisture, %	35.6	35.0
Moist specimen weight, gms.	1228.7	
Diameter, in.	2.79	
Area, in. ²	6.11	
Height, in.	6.60	
Wet Density, pcf	116.0	
Dry density, pcf	85.6	
Void ratio	0.9115	
Saturation, %	102.2	

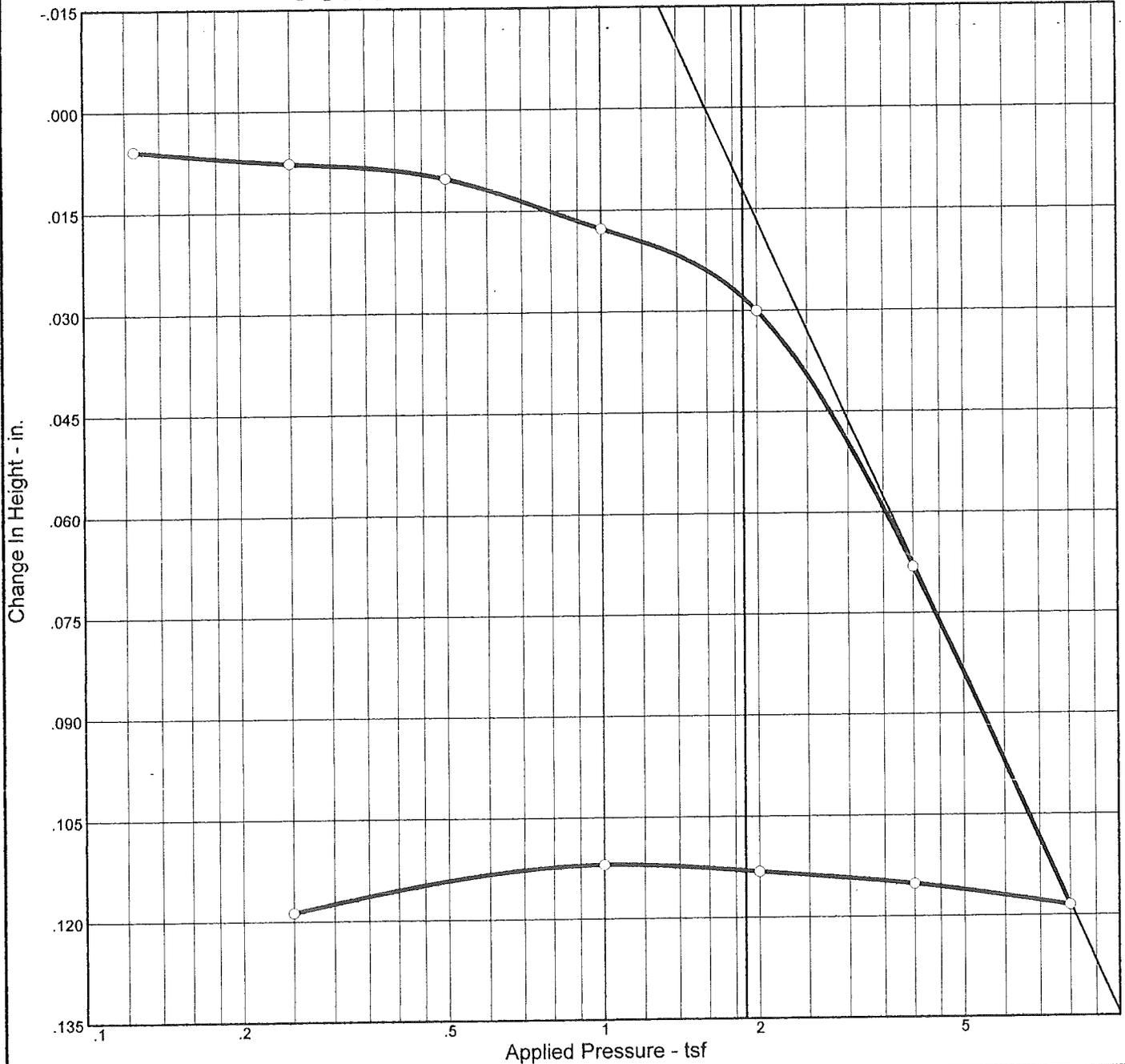
Test Readings for Specimen No. 1

Cell pressure = 30.00 psi
Back pressure = 0.00 psi
Strain rate, in./min. = 0.06
Fail. Stress = 10.87 psi at reading no. 13
Ult. Stress = 9.74 psi at reading no. 19

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress psi	Minor Princ. Stress psi	Major Princ. Stress psi	1:3 Ratio	P psi	Q psi
0	0.0000	8.00	0.0	0.0	0.00	30.00	30.00	1.00	30.00	0.00
1	0.0060	12.00	4.0	0.1	0.65	30.00	30.65	1.02	30.33	0.33
2	0.0120	16.00	8.0	0.2	1.31	30.00	31.31	1.04	30.65	0.65
3	0.0180	19.00	11.0	0.3	1.79	30.00	31.79	1.06	30.90	0.90
4	0.0240	21.00	13.0	0.4	2.12	30.00	32.12	1.07	31.06	1.06
5	0.0300	23.00	15.0	0.5	2.44	30.00	32.44	1.08	31.22	1.22
6	0.0600	35.00	27.0	0.9	4.38	30.00	34.38	1.15	32.19	2.19
7	0.1200	50.00	42.0	1.8	6.75	30.00	36.75	1.22	33.37	3.37
8	0.1500	55.00	47.0	2.3	7.51	30.00	37.51	1.25	33.76	3.76
9	0.1800	59.00	51.0	2.7	8.11	30.00	38.11	1.27	34.06	4.06
10	0.2400	65.00	57.0	3.6	8.98	30.00	38.98	1.30	34.49	4.49
11	0.3000	73.00	65.0	4.5	10.15	30.00	40.15	1.34	35.07	5.07
12	0.3600	77.00	69.0	5.5	10.67	30.00	40.67	1.36	35.34	5.34
13	0.4200	79.00	71.0	6.4	10.87	30.00	40.87	1.36	35.44	5.44
14	0.5400	80.00	72.0	8.2	10.81	30.00	40.81	1.36	35.41	5.41
15	0.6600	81.00	73.0	10.0	10.75	30.00	40.75	1.36	35.37	5.37
16	0.7800	82.00	74.0	11.8	10.67	30.00	40.67	1.36	35.34	5.34
17	0.9000	82.00	74.0	13.6	10.45	30.00	40.45	1.35	35.23	5.23
18	1.0200	81.00	73.0	15.5	10.10	30.00	40.10	1.34	35.05	5.05
19	1.1400	80.00	72.0	17.3	9.74	30.00	39.74	1.32	34.87	4.87

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P _c (tsf)	C _c	C _r	Initial Void Ratio
Saturation	Moisture									
99.9 %	36.4 %	83.7	40	19	2.62		2.47	0.44	0.02	0.954

MATERIAL DESCRIPTION								USCS	AASHTO
Gray moist clay								--	--

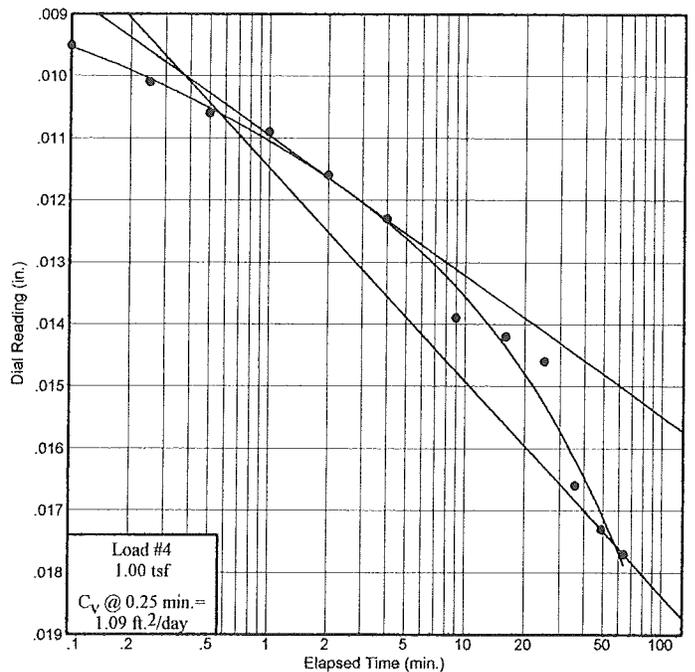
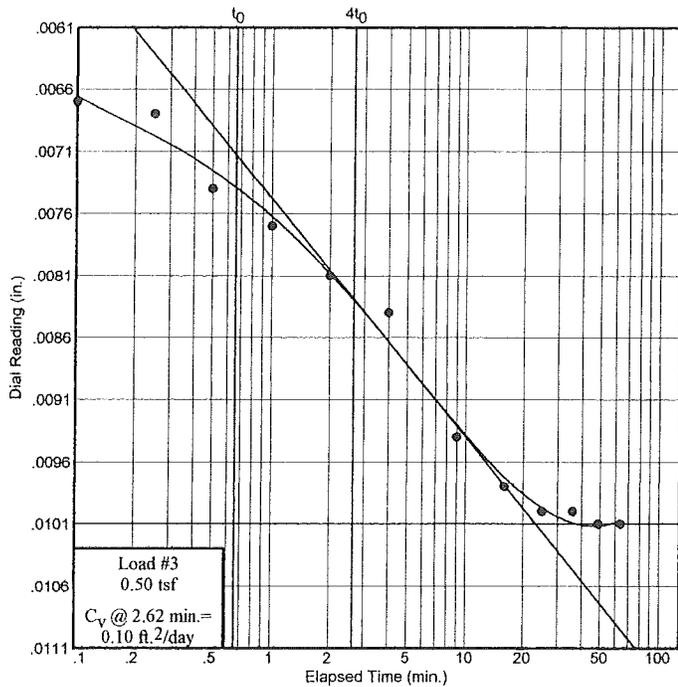
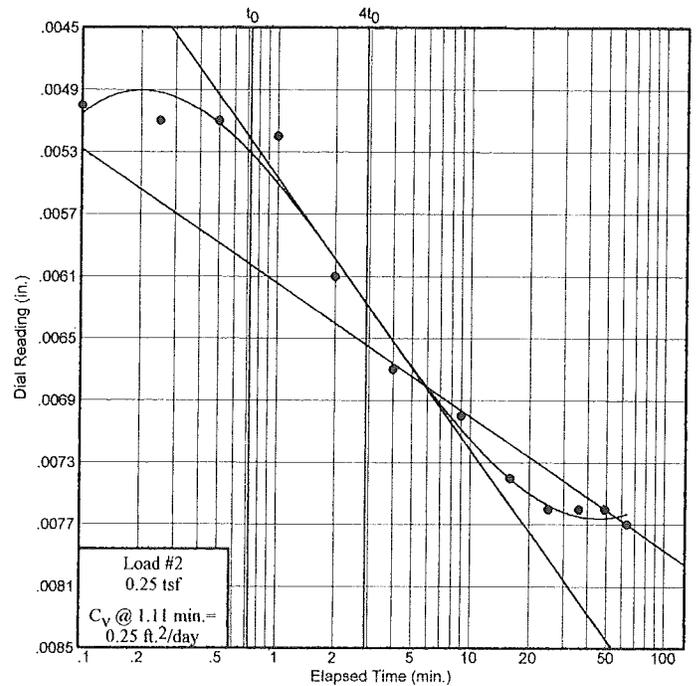
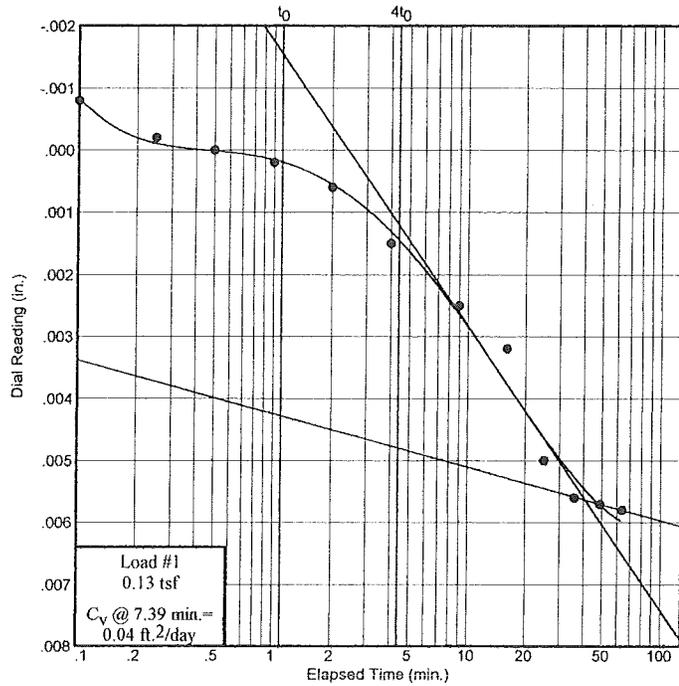
<p>Project No. L-07119 Client: GARY L. WOOD</p> <p>Project: BROOKS ROAD BRIDGE</p> <p>Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396</p> <p style="text-align: center;">CONSOLIDATION TEST REPORT</p> <p style="text-align: center; font-size: 1.5em; font-weight: bold;">PW Laboratories, Inc.</p>	<p>Remarks: CORRECTED FOR SYSTEM DEFLECTION</p>
<p>Plate TWO</p>	

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396



Dial Reading vs. Time

PW Laboratories, Inc.

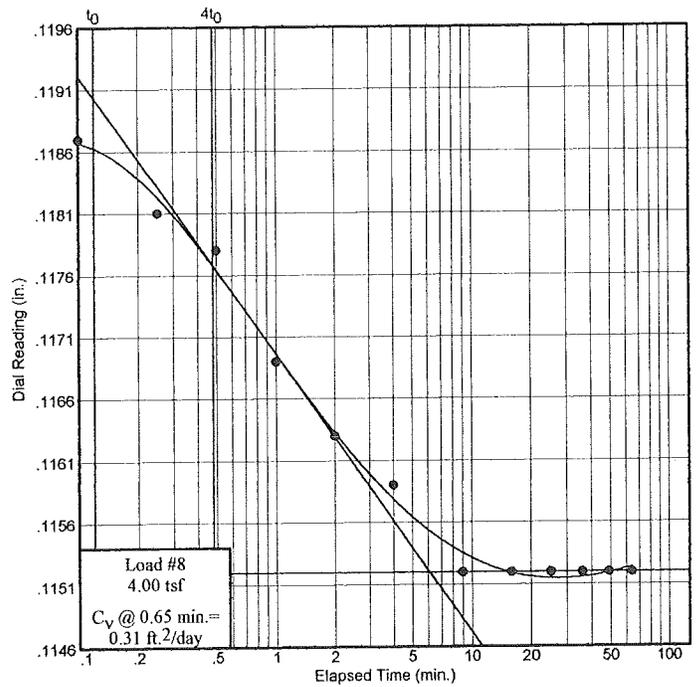
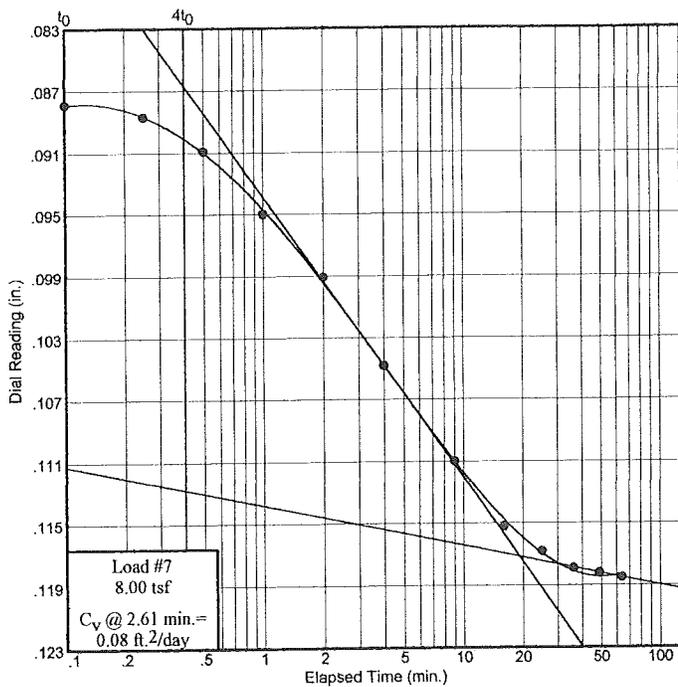
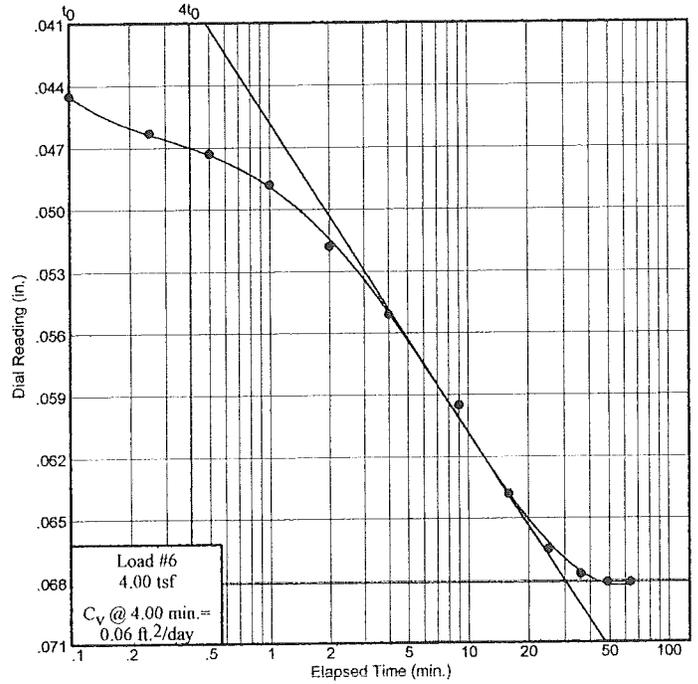
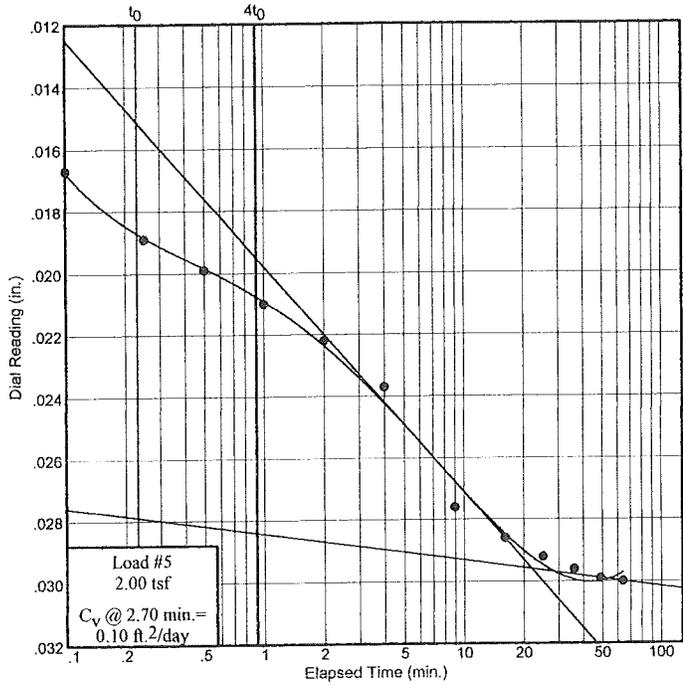
Plate TWO

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396



Dial Reading vs. Time

PW Laboratories, Inc.

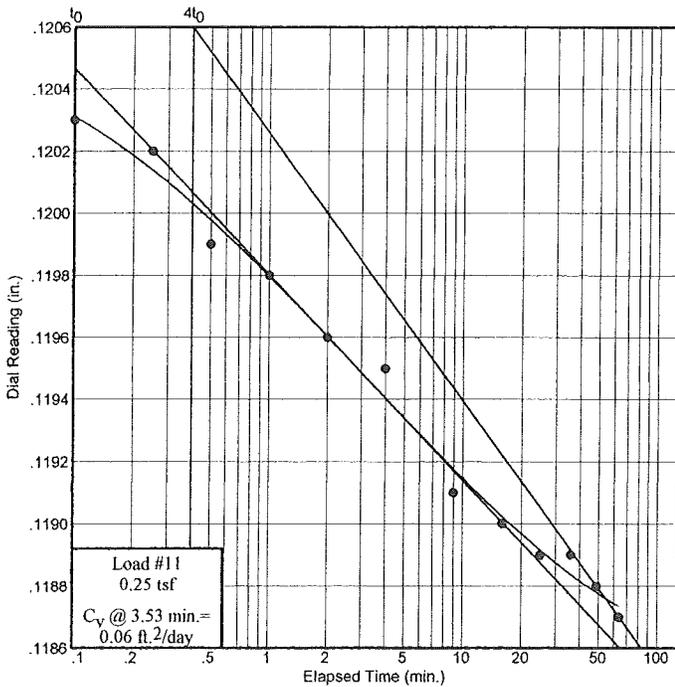
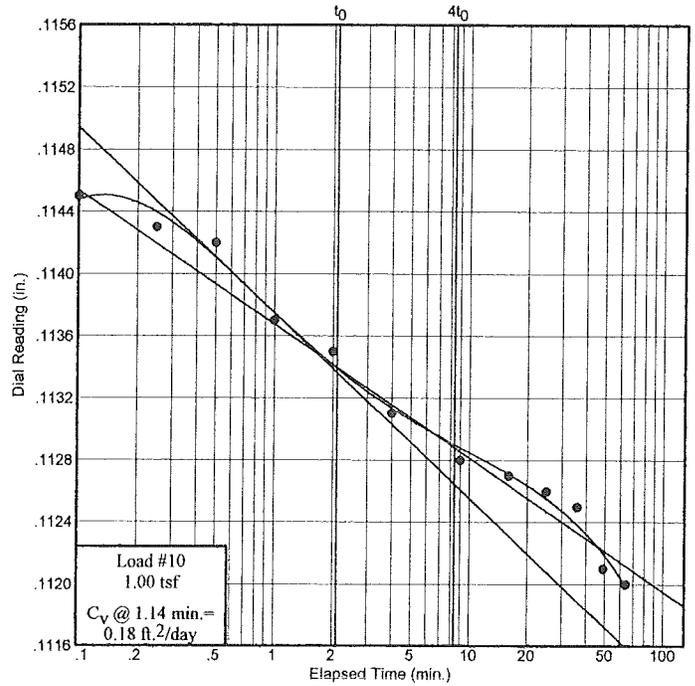
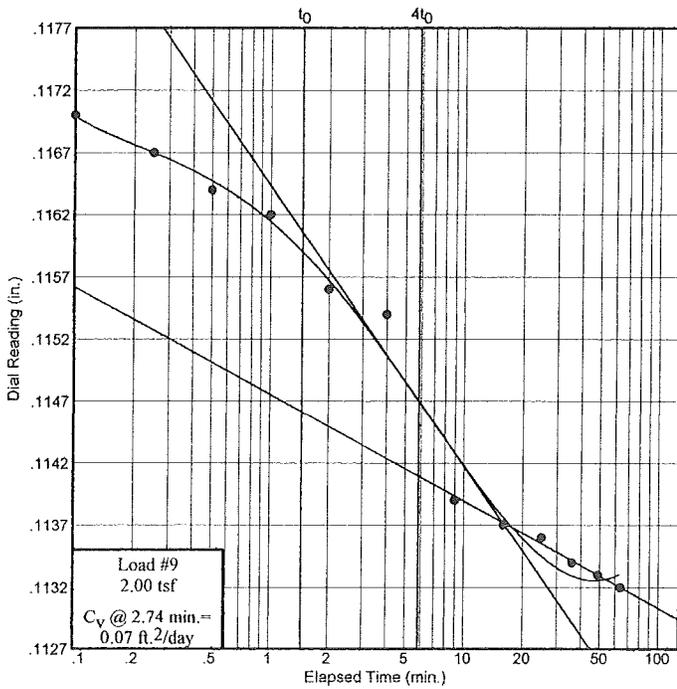
Plate TWO

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-01,T-2,DEPTH 30'-32',ID #22396



Dial Reading vs. Time

PW Laboratories, Inc.

Plate TWO

CONSOLIDATION TEST DATA

Client: GARY L. WOOD
Project: BROOKS ROAD BRIDGE
Project Number: L-07119

Sample Data

Source:
Sample No.: ID #22396
Elev. or Depth: 30'-32' **Sample Length (in./cm.):** 0.75
Location: BORING #07-01, T-2, DEPTH 30'-32', ID #22396
Description: Gray moist clay
Liquid Limit: 40 **Plasticity Index:** 19
USCS: -- **AASHTO:** -- **Figure No.:** TWO
Testing Remarks: CORRECTED FOR SYSTEM DEFLECTION

Test Specimen Data

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 207.66 g.	Consolidometer # = 2	Wet w+t = 282.53 g.
Dry w+t = 174.90 g.		Dry w+t = 256.79 g.
Tare Wt. = 84.87 g.	Spec. Gravity = 2.62	Tare Wt. = 175.97 g.
Height = .75 in.	Height = .75 in.	
Diameter = 2.50 in.	Diameter = 2.50 in.	
Weight = 110.61 g.	Defl. Table = L-07119 RING#2 WHT#3	
Moisture = 36.4 %	Ht. Solids = 0.3848 in.	Moisture = 31.8 %
Wet Den. = 114.2 pcf	Dry Wt. = 81.10 g.*	Dry Wt. = 80.82 g.
Dry Den. = 83.7 pcf	Void Ratio = 0.954	Void Ratio = 0.646
	Saturation = 99.9 %	

* Initial dry weight used in calculations

End-of-Load Summary

Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	C_v (ft. ² /day)	C_α	Void Ratio	% Compression / Swell
start	0.00000				0.954	
0.13	0.00710	0.00130	0.04	0.001	0.939	0.8 Compr.
0.25	0.01020	0.00250	0.25	0.001	0.934	1.0 Compr.
0.50	0.01420	0.00410	0.10	0.000	0.928	1.3 Compr.
1.00	0.02420	0.00650	1.09	0.005	0.908	2.4 Compr.
2.00	0.03980	0.00980	0.10	0.001	0.876	4.0 Compr.
4.00	0.08160	0.01350	0.06	0.000	0.777	9.1 Compr.
8.00	0.13590	0.01740	0.08	0.004	0.646	15.8 Compr.
4.00	0.13070	0.01550	0.31	0.000	0.655	15.3 Compr.
2.00	0.12620	0.01300	0.07		0.660	15.1 Compr.
1.00	0.12300	0.01100	0.18		0.663	14.9 Compr.
0.25	0.12120	0.00250	0.06		0.646	15.8 Compr.

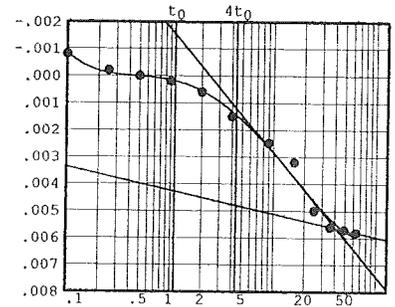
$C_c = 0.44$ $P_c = 2.47$ tsf $C_r = 0.02$

Pressure: 0.13 tsf

TEST READINGS

Load No. 1

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.00000	11	36.00	0.00690
2	0.10	0.00050	12	49.00	0.00700
3	0.25	0.00110	13	64.00	0.00710
4	0.50	0.00130			
5	1.00	0.00150			
6	2.00	0.00190			
7	4.00	0.00280			
8	9.00	0.00380			
9	16.00	0.00450			
10	25.00	0.00630			



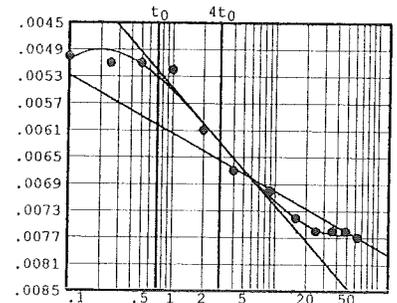
Void Ratio = 0.939 Compression = 0.8 %
 $D_0 = -0.00106$ $D_{50} = 0.00228$ $D_{100} = 0.00563$
 C_v at 7.4 min. = 0.04 ft.²/day $C_\alpha = 0.001$

Pressure: 0.25 tsf

TEST READINGS

Load No. 2

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.00710	11	36.00	0.01010
2	0.10	0.00750	12	49.00	0.01010
3	0.25	0.00760	13	64.00	0.01020
4	0.50	0.00760			
5	1.00	0.00770			
6	2.00	0.00860			
7	4.00	0.00920			
8	9.00	0.00950			
9	16.00	0.00990			
10	25.00	0.01010			



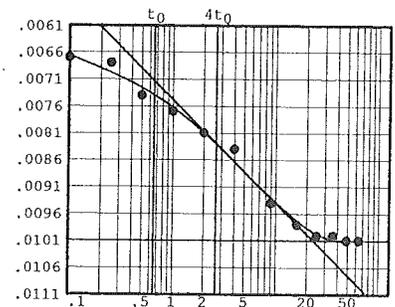
Void Ratio = 0.934 Compression = 1.0 %
 $D_0 = 0.00434$ $D_{50} = 0.00557$ $D_{100} = 0.00680$
 C_v at 1.1 min. = 0.25 ft.²/day $C_\alpha = 0.001$

Pressure: 0.50 tsf

TEST READINGS

Load No. 3

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.01020	11	36.00	0.01410
2	0.10	0.01080	12	49.00	0.01420
3	0.25	0.01090	13	64.00	0.01420
4	0.50	0.01150			
5	1.00	0.01180			
6	2.00	0.01220			
7	4.00	0.01250			
8	9.00	0.01350			
9	16.00	0.01390			
10	25.00	0.01410			



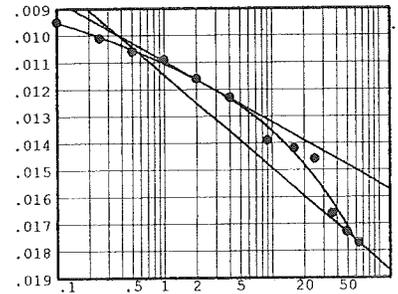
Void Ratio = 0.928 Compression = 1.3 %
 $D_0 = 0.00648$ $D_{50} = 0.00829$ $D_{100} = 0.01010$
 C_v at 2.6 min. = 0.10 ft.²/day $C_\alpha = 0.000$

Pressure: 1.00 tsf

TEST READINGS

Load No. 4

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.01420	11	36.00	0.02310
2	0.10	0.01600	12	49.00	0.02380
3	0.25	0.01660	13	64.00	0.02420
4	0.50	0.01710			
5	1.00	0.01740			
6	2.00	0.01810			
7	4.00	0.01880			
8	9.00	0.02040			
9	16.00	0.02070			
10	25.00	0.02110			



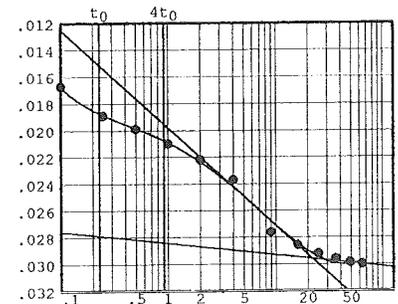
Void Ratio = 0.908 Compression = 2.4 %
 $D_0 = 0.01010$ $D_{50} = 0.01004$ $D_{100} = 0.00998$
 C_v at 0.2 min. = 1.09 ft.²/day $C_\alpha = 0.005$

Pressure: 2.00 tsf

TEST READINGS

Load No. 5

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02420	11	36.00	0.03940
2	0.10	0.02650	12	49.00	0.03970
3	0.25	0.02870	13	64.00	0.03980
4	0.50	0.02970			
5	1.00	0.03080			
6	2.00	0.03200			
7	4.00	0.03350			
8	9.00	0.03740			
9	16.00	0.03840			
10	25.00	0.03900			



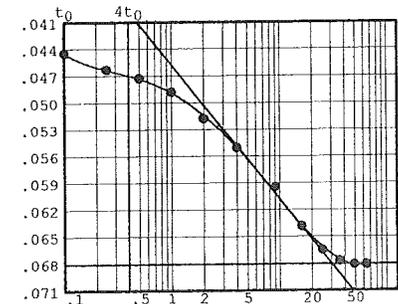
Void Ratio = 0.876 Compression = 4.0 %
 $D_0 = 0.01665$ $D_{50} = 0.02312$ $D_{100} = 0.02960$
 C_v at 2.7 min. = 0.10 ft.²/day $C_\alpha = 0.001$

Pressure: 4.00 tsf

TEST READINGS

Load No. 6

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.03980	11	36.00	0.08120
2	0.10	0.05800	12	49.00	0.08160
3	0.25	0.05980	13	64.00	0.08160
4	0.50	0.06080			
5	1.00	0.06230			
6	2.00	0.06530			
7	4.00	0.06860			
8	9.00	0.07300			
9	16.00	0.07730			
10	25.00	0.08000			



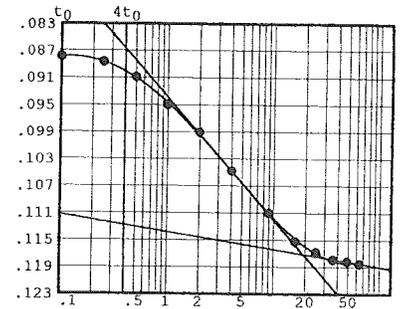
Void Ratio = 0.777 Compression = 9.1 %
 $D_0 = 0.04192$ $D_{50} = 0.05501$ $D_{100} = 0.06810$
 C_v at 4.0 min. = 0.06 ft.²/day $C_\alpha = 0.000$

Pressure: 8.00 tsf

TEST READINGS

Load No. 7

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.08160	11	36.00	0.13530
2	0.10	0.10530	12	49.00	0.13560
3	0.25	0.10610	13	64.00	0.13590
4	0.50	0.10830			
5	1.00	0.11240			
6	2.00	0.11650			
7	4.00	0.12220			
8	9.00	0.12840			
9	16.00	0.13260			
10	25.00	0.13420			



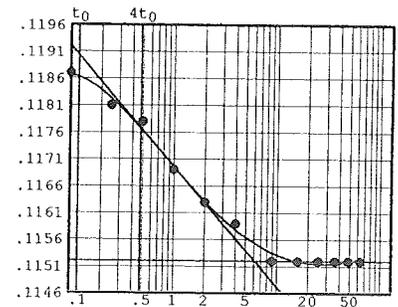
Void Ratio = 0.646 Compression = 15.8 %
 $D_0 = 0.08575$ $D_{50} = 0.10145$ $D_{100} = 0.11715$
 C_v at 2.6 min. = 0.08 ft.²/day $C_\alpha = 0.004$

Pressure: 4.00 tsf

TEST READINGS

Load No. 8

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.13590	11	36.00	0.13070
2	0.10	0.13420	12	49.00	0.13070
3	0.25	0.13360	13	64.00	0.13070
4	0.50	0.13330			
5	1.00	0.13240			
6	2.00	0.13180			
7	4.00	0.13140			
8	9.00	0.13070			
9	16.00	0.13070			
10	25.00	0.13070			



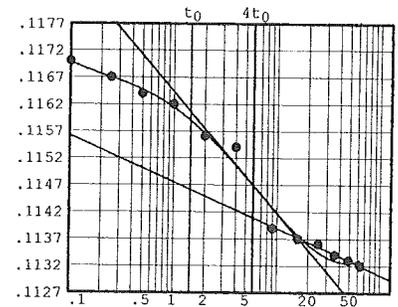
Void Ratio = 0.655 Compression = 15.3 %
 $D_0 = 0.11958$ $D_{50} = 0.11739$ $D_{100} = 0.11520$
 C_v at 0.6 min. = 0.31 ft.²/day $C_\alpha = 0.000$

Pressure: 2.00 tsf

TEST READINGS

Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.13070	11	36.00	0.12640
2	0.10	0.13000	12	49.00	0.12630
3	0.25	0.12970	13	64.00	0.12620
4	0.50	0.12940			
5	1.00	0.12920			
6	2.00	0.12860			
7	4.00	0.12840			
8	9.00	0.12690			
9	16.00	0.12670			
10	25.00	0.12660			



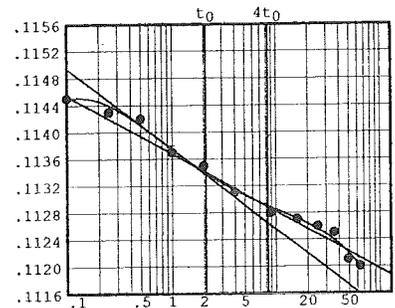
Void Ratio = 0.660 Compression = 15.1 %
 $D_0 = 0.11710$ $D_{50} = 0.11541$ $D_{100} = 0.11372$
 C_v at 2.7 min. = 0.07 ft.²/day

Pressure: 1.00 tsf

TEST READINGS

Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.12620	11	36.00	0.12350
2	0.10	0.12550	12	49.00	0.12310
3	0.25	0.12530	13	64.00	0.12300
4	0.50	0.12520			
5	1.00	0.12470			
6	2.00	0.12450			
7	4.00	0.12410			
8	9.00	0.12380			
9	16.00	0.12370			
10	25.00	0.12360			



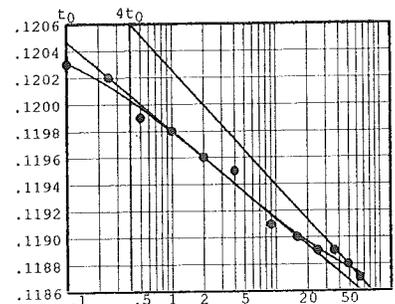
Void Ratio = 0.663 Compression = 14.9 %
 $D_0 = 0.11388$ $D_{50} = 0.11368$ $D_{100} = 0.11349$
 C_v at 1.1 min. = 0.18 ft.²/day

Pressure: 0.25 tsf

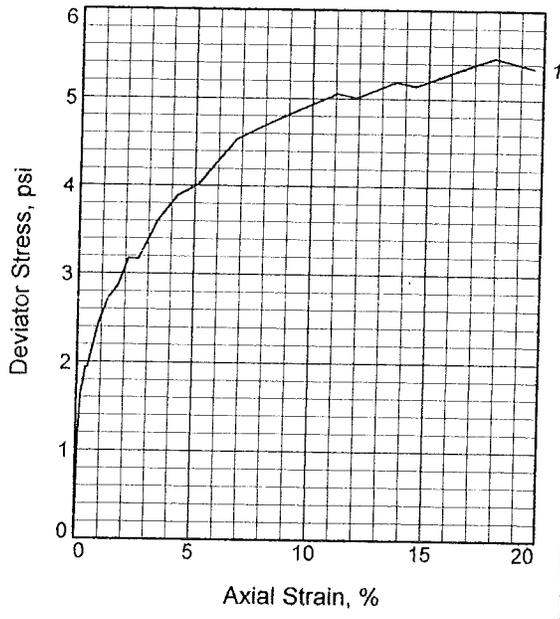
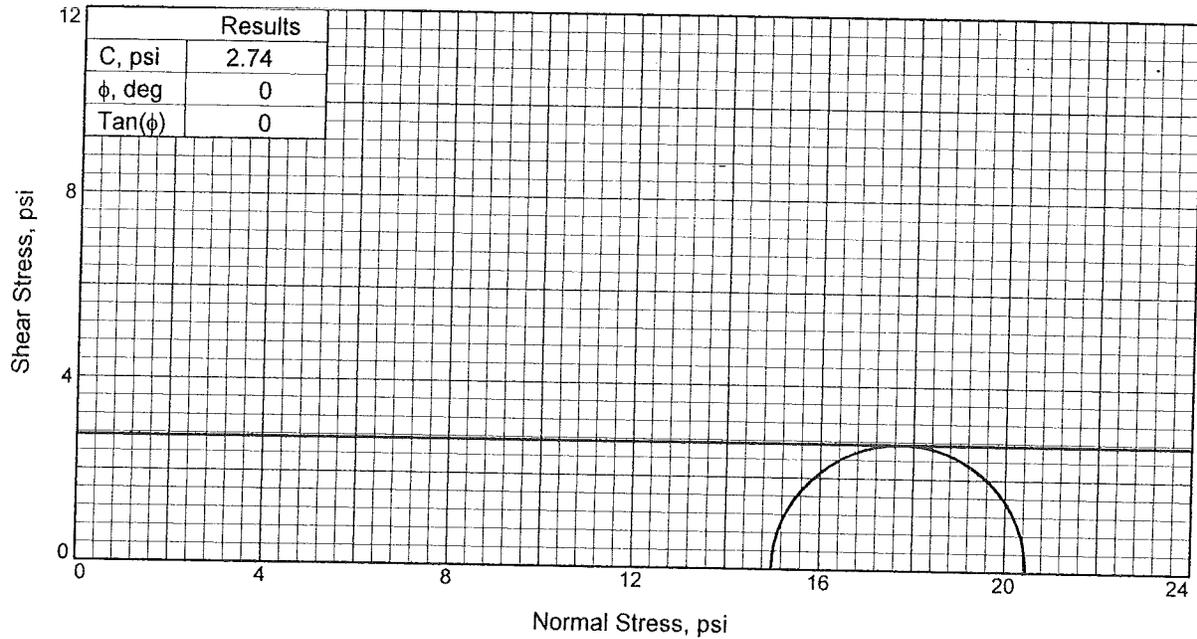
TEST READINGS

Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.12300	11	36.00	0.12140
2	0.10	0.12280	12	49.00	0.12130
3	0.25	0.12270	13	64.00	0.12120
4	0.50	0.12240			
5	1.00	0.12230			
6	2.00	0.12210			
7	4.00	0.12200			
8	9.00	0.12160			
9	16.00	0.12150			
10	25.00	0.12140			



Void Ratio = 0.646 Compression = 15.8 %
 $D_0 = 0.12059$ $D_{50} = 0.11944$ $D_{100} = 0.11829$
 C_v at 3.5 min. = 0.06 ft.²/day



Sample No.		1
Initial	Water Content,	40.5
	Dry Density, pcf	82.3
	Saturation,	107.3
	Void Ratio	0.9874
	Diameter, in.	2.80
At Test	Height, in.	7.06
	Water Content,	39.0
	Dry Density, pcf	82.3
	Saturation,	103.4
	Void Ratio	0.9874
Strain rate, in./min.	Diameter, in.	2.80
	Height, in.	7.06
Back Pressure, psi	0.06	0.0
Cell Pressure, psi	15.0	15.0
Fail. Stress, psi	5.5	5.5
Strain, %	17.8	17.8
Ult. Stress, psi	5.4	5.4
Strain, %		
σ_1 Failure, psi	20.5	20.5
σ_3 Failure, psi	15.0	15.0

Type of Test:
Unconsolidated Undrained

Sample Type: UNDISTURBED

Description: Gray moist clay

LL= 42 PL= 22 PI= 20

Assumed Specific Gravity= 2.62

Remarks:

Client: GARY L. WOOD

Project: BROOKS ROAD BRIDGE

Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395

Sample Number: ID #22395 **Depth:** 14'-16'

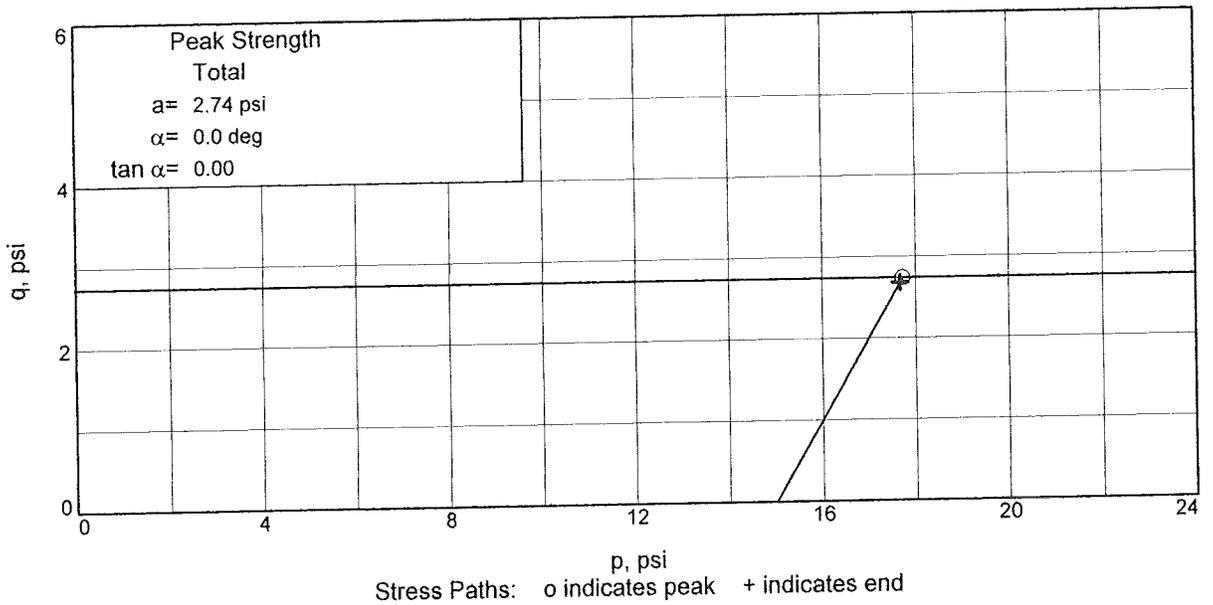
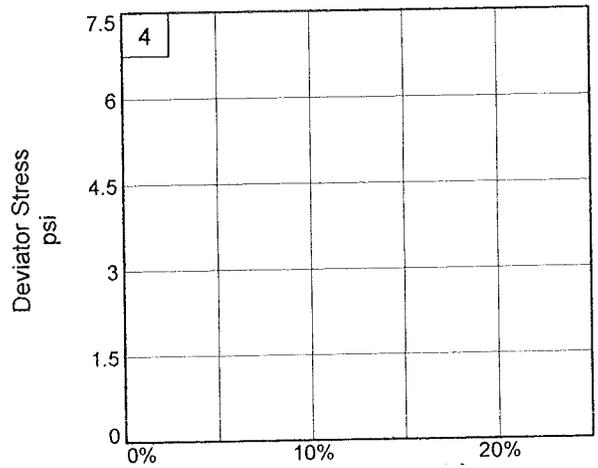
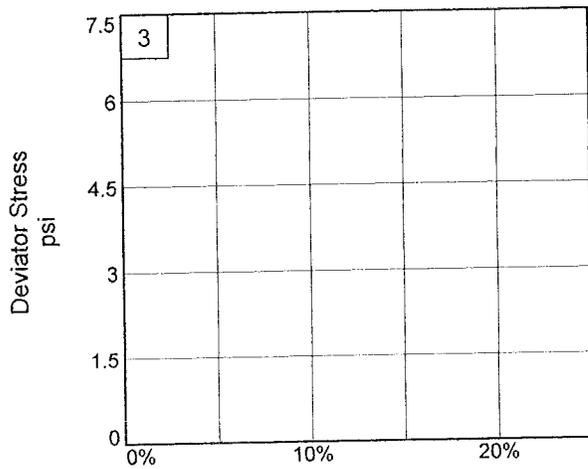
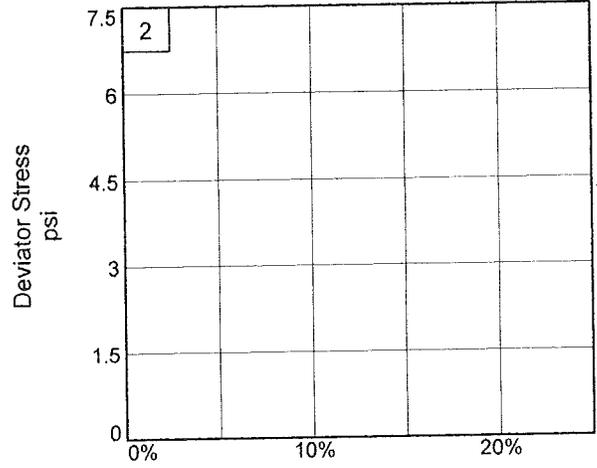
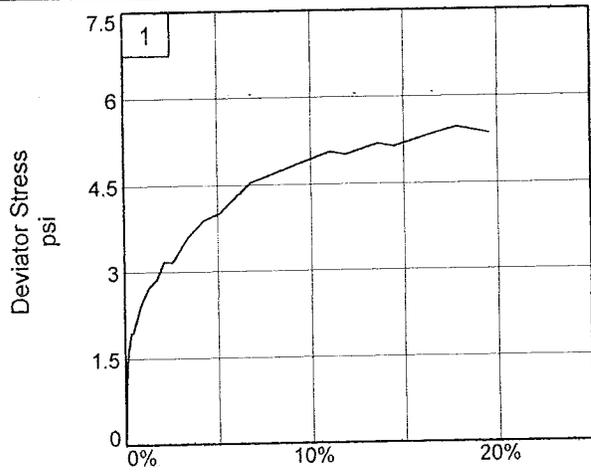
Proj. No.: L-07119 **Date:** RECIEVED JULY 12,2007

TRIAxIAL SHEAR TEST REPORT

PW Laboratories, Inc.

Plate ONE A

Tested By: PE _____ Checked By: DPB _____



Client: GARY L. WOOD

Project: BROOKS ROAD BRIDGE

Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395

Project No.: L-07119

Depth: 14'-16'

Plate ONE B

PW Laboratories, Inc.

Tested By: PE _____

Checked By: DPB _____

TRIAxIAL COMPRESSION TEST

Unconsolidated Undrained

7/26/07
10:54 AM

Date: RECIEVED JULY 12,2007
Client: GARY L. WOOD
Project: BROOKS ROAD BRIDGE
Project No.: L-07119
Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395
Depth: 14'-16' **Sample Number:** ID #22395
Description: Gray moist clay
Remarks:
Type of Sample: UNDISTURBED
Assumed Specific Gravity=2.62 **LL=**42 **PL=**22 **PI=**20
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	223.460	1387.600
Moisture content: Dry soil+tare, gms.	198.170	1022.400
Moisture content: Tare, gms.	135.650	85.300
Moisture, %	40.5	39.0
Moist specimen weight, gms.	1319.0	
Diameter, in.	2.80	
Area, in. ²	6.16	
Height, in.	7.06	
Wet Density, pcf	115.6	
Dry density, pcf	82.3	
Void ratio	0.9874	
Saturation, %	107.3	

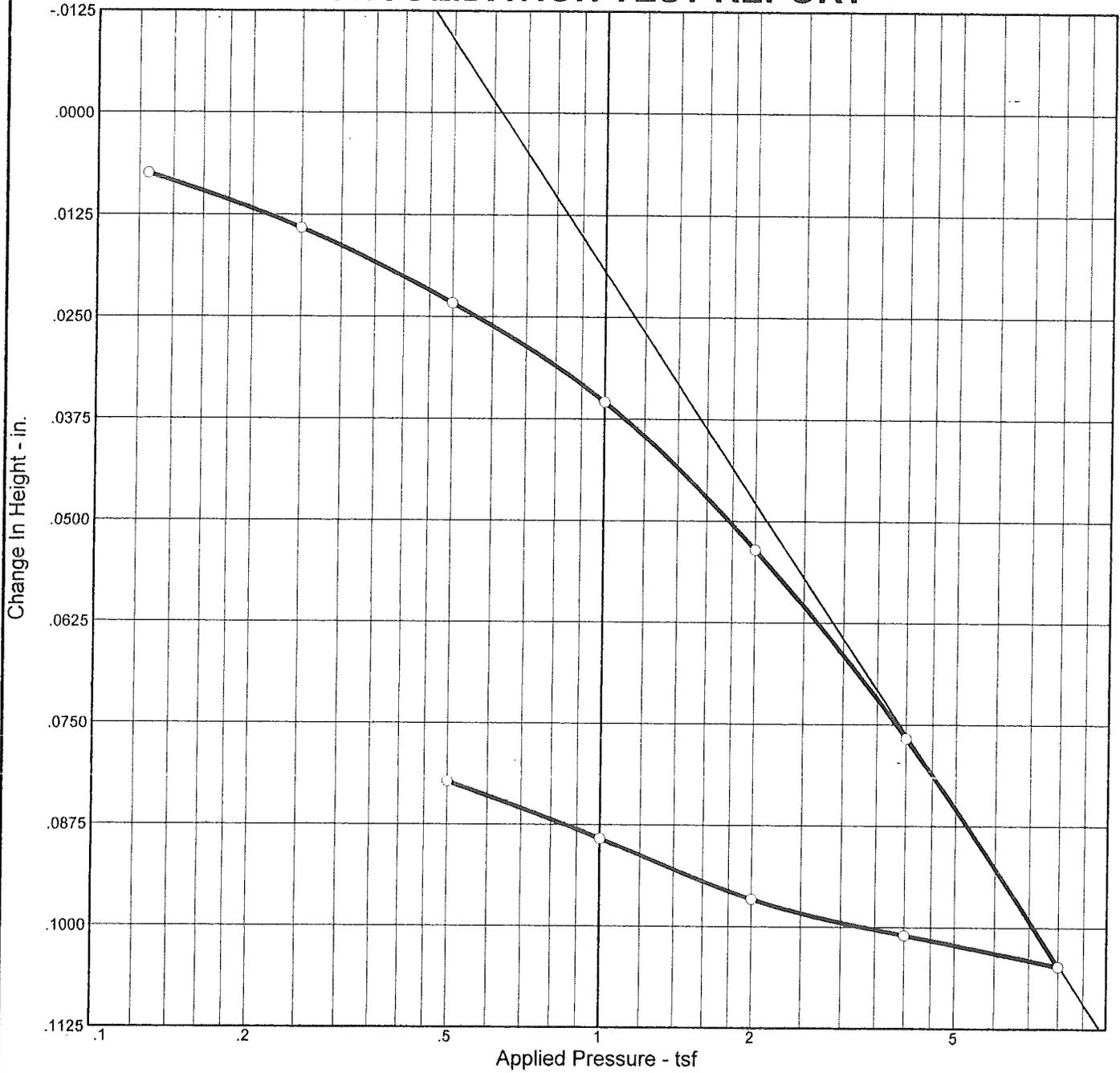
Test Readings for Specimen No. 1

Cell pressure = 15.00 psi
Back pressure = 0.00 psi
Strain rate, in./min. = 0.06
Fail. Stress = 5.47 psi at reading no. 28
Ult. Stress = 5.36 psi at reading no. 30

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress psi	Minor Princ. Stress psi	Major Princ. Stress psi	1:3 Ratio	P psi	Q psi
0	0.0000	5.00	0.0	0.0	0.00	15.00	15.00	1.00	15.00	0.00
1	0.0060	12.00	7.0	0.1	1.14	15.00	16.14	1.08	15.57	0.57
2	0.0120	15.00	10.0	0.2	1.62	15.00	16.62	1.11	15.81	0.81
3	0.0180	16.00	11.0	0.3	1.78	15.00	16.78	1.12	15.89	0.89
4	0.0240	17.00	12.0	0.3	1.94	15.00	16.94	1.13	15.97	0.97
5	0.0300	17.00	12.0	0.4	1.94	15.00	16.94	1.13	15.97	0.97
6	0.0600	20.00	15.0	0.8	2.42	15.00	17.42	1.16	16.21	1.21
7	0.0900	22.00	17.0	1.3	2.73	15.00	17.73	1.18	16.36	1.36
8	0.1200	23.00	18.0	1.7	2.87	15.00	17.87	1.19	16.44	1.44
9	0.1500	25.00	20.0	2.1	3.18	15.00	18.18	1.21	16.59	1.59
10	0.1800	25.00	20.0	2.5	3.17	15.00	18.17	1.21	16.58	1.58
11	0.2400	28.00	23.0	3.4	3.61	15.00	18.61	1.24	16.80	1.80
12	0.3000	30.00	25.0	4.2	3.89	15.00	18.89	1.26	16.94	1.94
13	0.3600	31.00	26.0	5.1	4.01	15.00	19.01	1.27	17.00	2.00
14	0.4200	33.00	28.0	5.9	4.28	15.00	19.28	1.29	17.14	2.14
15	0.4800	35.00	30.0	6.8	4.54	15.00	19.54	1.30	17.27	2.27
16	0.5400	36.00	31.0	7.6	4.65	15.00	19.65	1.31	17.32	2.32
17	0.6000	37.00	32.0	8.5	4.76	15.00	19.76	1.32	17.38	2.38
18	0.6600	38.00	33.0	9.3	4.86	15.00	19.86	1.32	17.43	2.43
19	0.7200	39.00	34.0	10.2	4.96	15.00	19.96	1.33	17.48	2.48
20	0.7800	40.00	35.0	11.0	5.06	15.00	20.06	1.34	17.53	2.53
21	0.8400	40.00	35.0	11.9	5.01	15.00	20.01	1.33	17.50	2.50
22	0.9000	41.00	36.0	12.7	5.10	15.00	20.10	1.34	17.55	2.55
23	0.9600	42.00	37.0	13.6	5.19	15.00	20.19	1.35	17.60	2.60
24	1.0200	42.00	37.0	14.4	5.14	15.00	20.14	1.34	17.57	2.57
25	1.0800	43.00	38.0	15.3	5.23	15.00	20.23	1.35	17.61	2.61
26	1.1400	44.00	39.0	16.1	5.31	15.00	20.31	1.35	17.66	2.66
27	1.2000	45.00	40.0	17.0	5.39	15.00	20.39	1.36	17.70	2.70
28	1.2600	46.00	41.0	17.8	5.47	15.00	20.47	1.36	17.74	2.74
29	1.3200	46.00	41.0	18.7	5.41	15.00	20.41	1.36	17.71	2.71
30	1.3800	46.00	41.0	19.5	5.36	15.00	20.36	1.36	17.68	2.68

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
98.1 %	35.0 %	84.5	42	20	2.62		1.70	0.24	0.05	0.935

MATERIAL DESCRIPTION								USCS	AASHTO
Gray moist clay								--	--

Project No. L-07119 **Client:** GARY L. WOOD
Project: BROOKS ROAD BRIDGE
Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395
 CONSOLIDATION TEST REPORT
PW Laboratories, Inc.

Remarks:
 CORRECTED FOR SYSTEM DEFLECTION

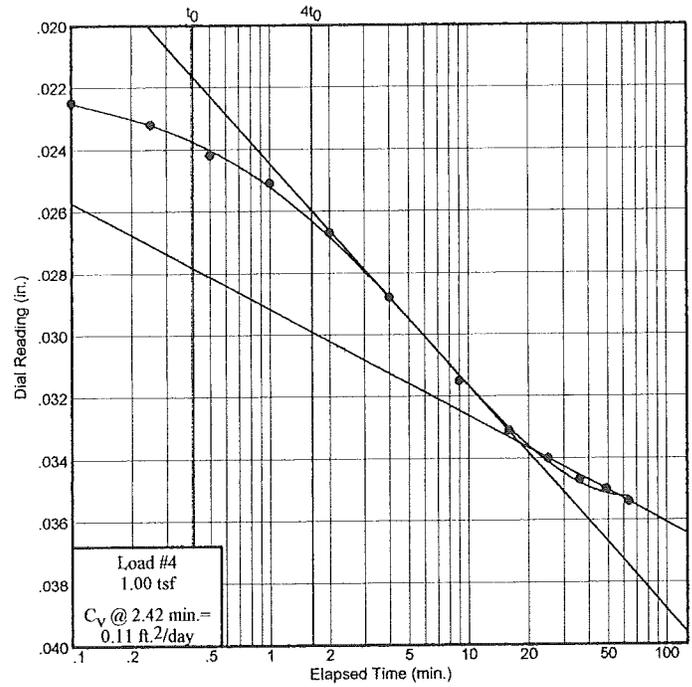
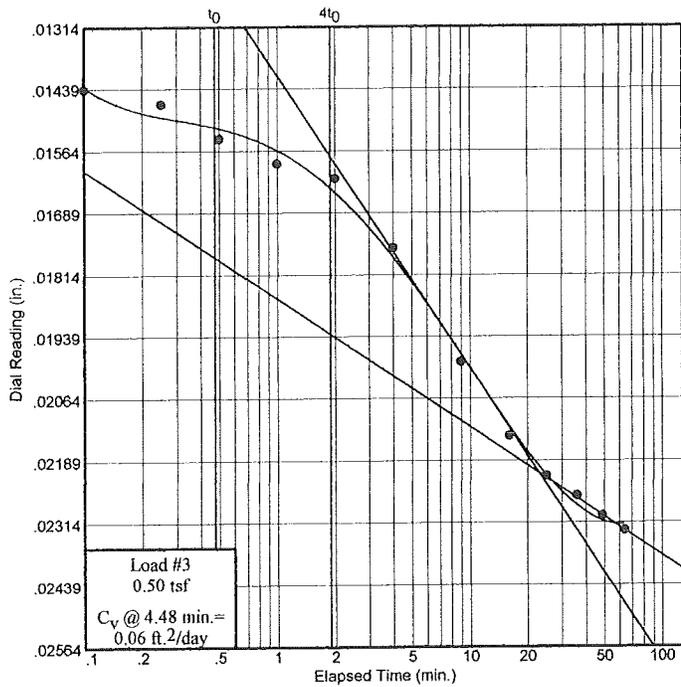
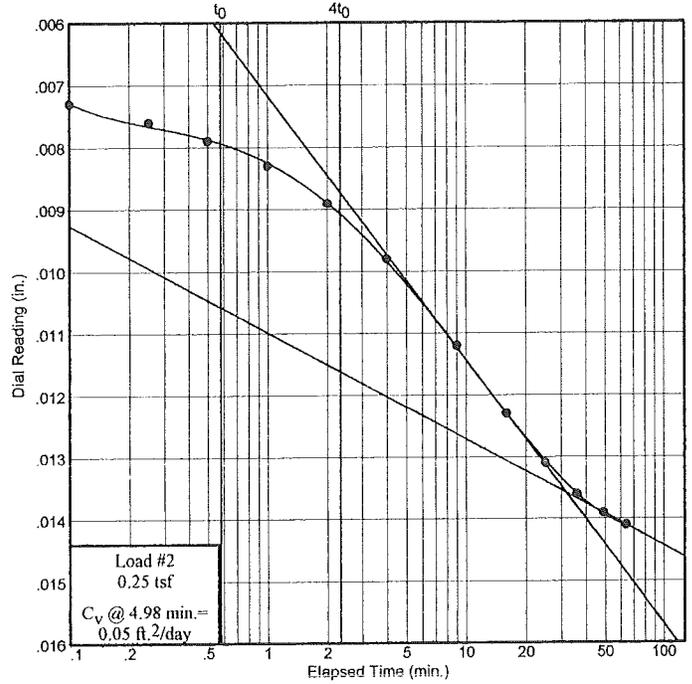
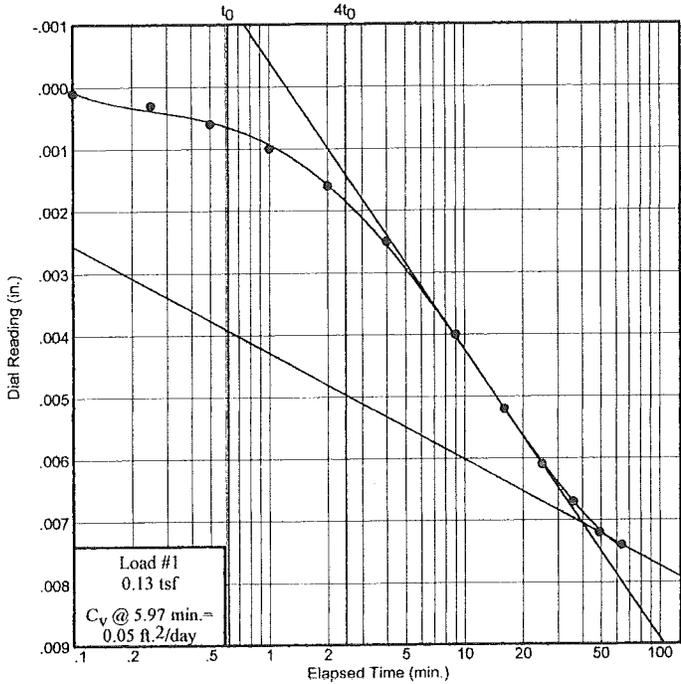
Plate ONE

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395



Dial Reading vs. Time

PW Laboratories, Inc.

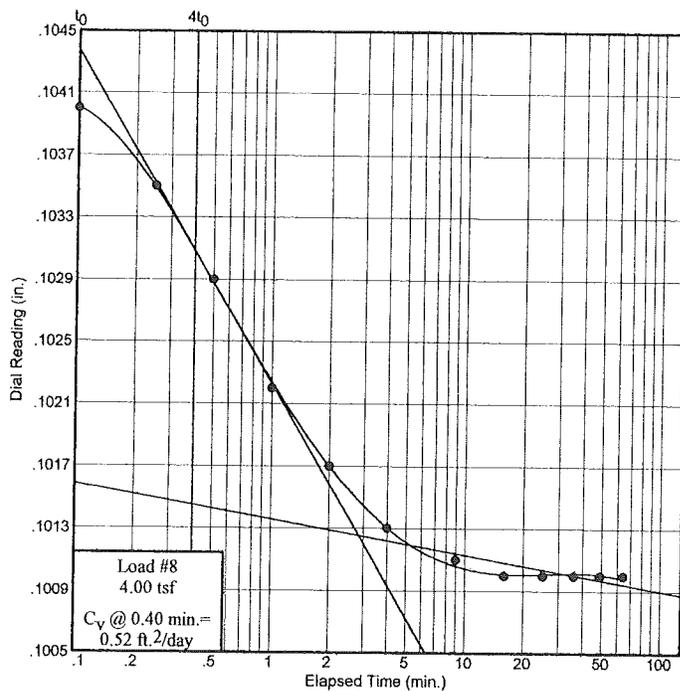
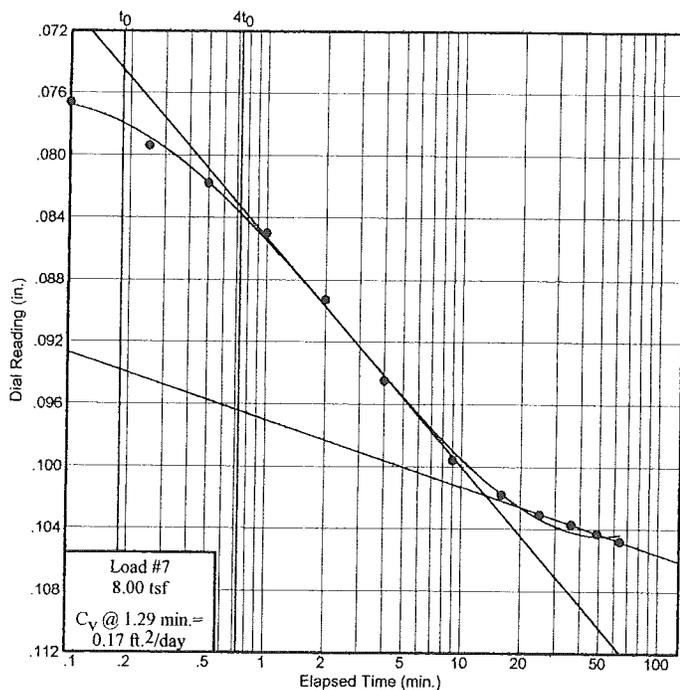
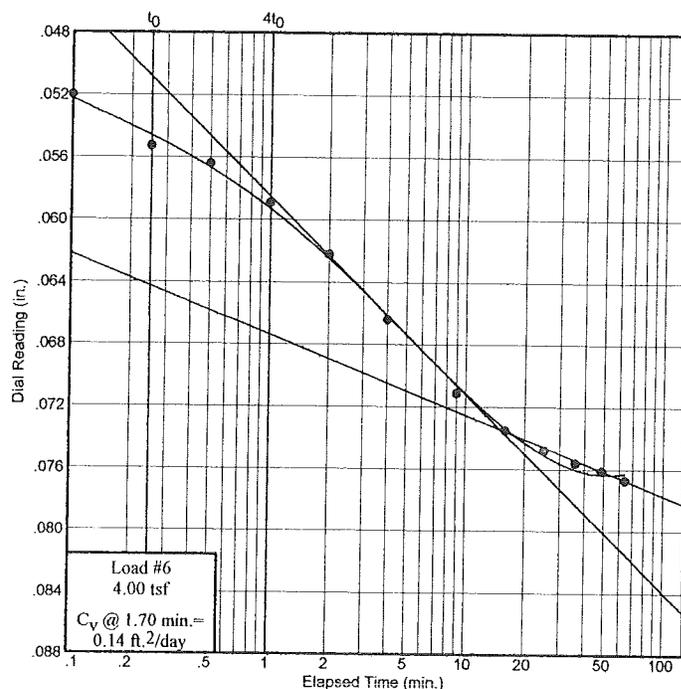
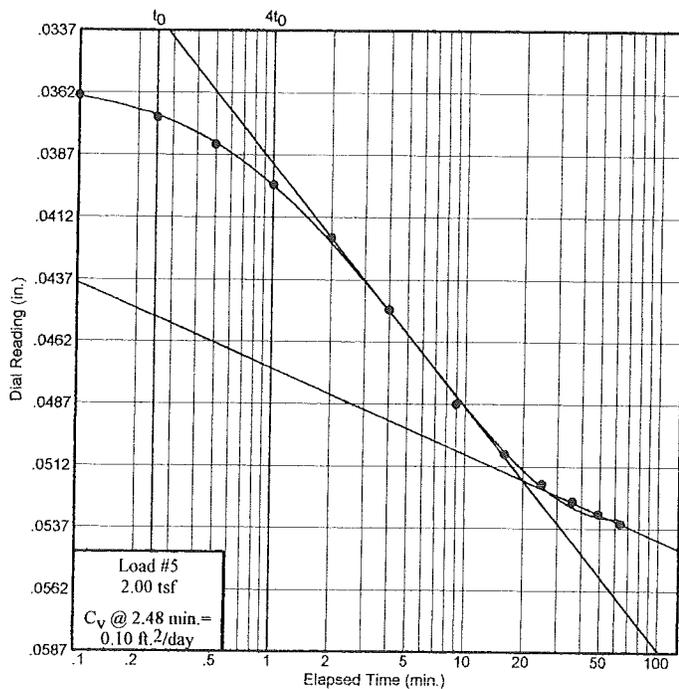
Plate ONE

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-03, T-1, DEPTH 14'-16', ID #22395



Dial Reading vs. Time

PW Laboratories, Inc.

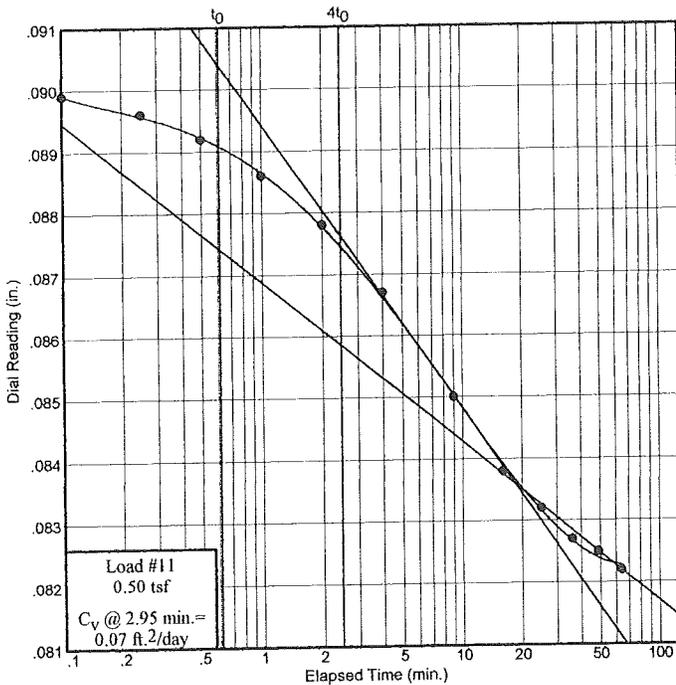
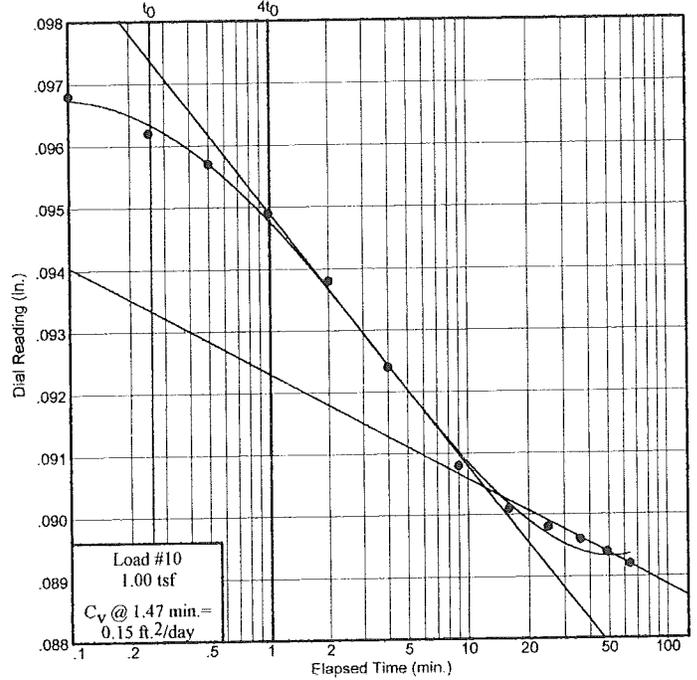
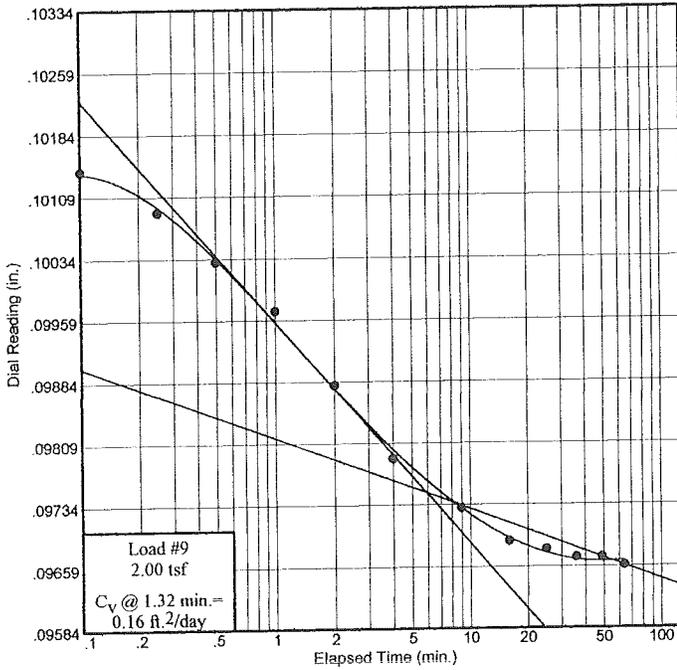
Plate ONE

Dial Reading vs. Time

Project No.: L-07119

Project: BROOKS ROAD BRIDGE

Location: BORING #07-03,T-1,DEPTH 14'-16',ID #22395



Dial Reading vs. Time

PW Laboratories, Inc.

Plate ONE

CONSOLIDATION TEST DATA

Client: GARY L. WOOD
Project: BROOKS ROAD BRIDGE
Project Number: L-07119

Sample Data

Source:
Sample No.: ID #22395
Elev. or Depth: 14'-16' **Sample Length (in./cm.):** 0.75
Location: BORING #07-03, T-1, DEPTH 14'-16', ID #22395
Description: Gray moist clay
Liquid Limit: 42 **Plasticity Index:** 20
USCS: -- **AASHTO:** -- **Figure No.:** ONE
Testing Remarks: CORRECTED FOR SYSTEM DEFLECTION

Test Specimen Data

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 209.25 g.	Consolidometer # = 1	Wet w+t = 279.98 g.
Dry w+t = 181.33 g.		Dry w+t = 255.40 g.
Wet Tare Wt. = 101.60 g.	Spec. Gravity = 2.62	Tare Wt. = 175.66 g.
Height = .75 in.	Height = .75 in.	
Diameter = 2.50 in.	Diameter = 2.50 in.	
Weight = 110.76 g.	Defl. Table = L-07119 RING#1 WHT#3	
Moisture = 35.0 %	Ht. Solids = 0.3886 in.	Moisture = 30.8 %
Wet Den. = 114.1 pcf	Dry Wt. = 82.03 g.*	Dry Wt. = 79.74 g.
Dry Den. = 84.5 pcf	Void Ratio = 0.935	Void Ratio = 0.724
	Saturation = 98.1 %	

Initial dry weight used in calculations

End-of-Load Summary

Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	C_v (ft. ² /day)	C_α	Void Ratio	% Compression / Swell
start	0.00000				0.935	
0.13	0.00820	0.00080	0.05	0.002	0.916	1.0 Compr.
0.25	0.01580	0.00170	0.05	0.002	0.899	1.9 Compr.
0.50	0.02660	0.00330	0.06	0.004	0.875	3.1 Compr.
1.00	0.04160	0.00620	0.11	0.005	0.844	4.7 Compr.
2.00	0.06240	0.00890	0.10	0.005	0.797	7.1 Compr.
4.00	0.08970	0.01300	0.14	0.007	0.738	10.2 Compr.
8.00	0.12160	0.01680	0.17	0.006	0.665	13.9 Compr.
4.00	0.11620	0.01520	0.52		0.675	13.4 Compr.
2.00	0.10960	0.01300	0.16		0.686	12.8 Compr.
1.00	0.10040	0.01120	0.15		0.706	11.9 Compr.
0.50	0.09170	0.00950	0.07		0.724	10.9 Compr.

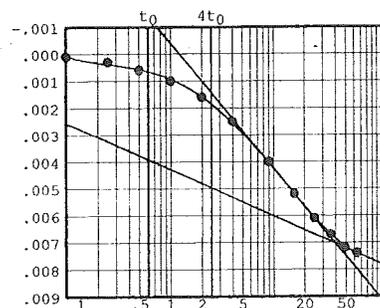
$e_c = 0.24$ $P_c = 1.70$ tsf $C_r = 0.05$

Pressure: 0.13 tsf

TEST READINGS

Load No. 1

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.00000	11	36.00	0.00750
2	0.10	0.00090	12	49.00	0.00800
3	0.25	0.00110	13	64.00	0.00820
4	0.50	0.00140			
5	1.00	0.00180			
6	2.00	0.00240			
7	4.00	0.00330			
8	9.00	0.00480			
9	16.00	0.00600			
10	25.00	0.00690			



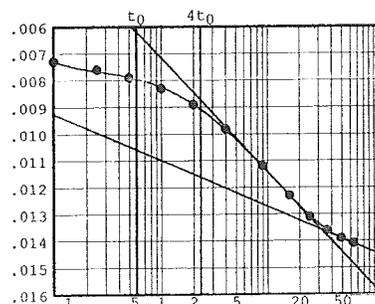
Void Ratio = 0.916 Compression = 1.0 %
 $D_0 = -0.00054$ $D_{50} = 0.00325$ $D_{100} = 0.00705$
 C_v at 6.0 min. = 0.05 ft.²/day $C_\alpha = 0.002$

Pressure: 0.25 tsf

TEST READINGS

Load No. 2

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.00820	11	36.00	0.01530
2	0.10	0.00900	12	49.00	0.01560
3	0.25	0.00930	13	64.00	0.01580
4	0.50	0.00960			
5	1.00	0.01000			
6	2.00	0.01060			
7	4.00	0.01150			
8	9.00	0.01290			
9	16.00	0.01400			
10	25.00	0.01480			



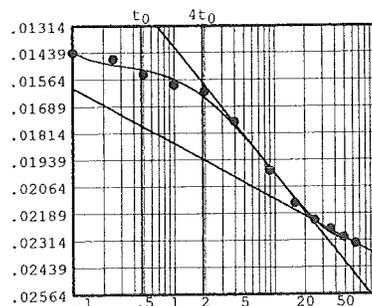
Void Ratio = 0.899 Compression = 1.9 %
 $D_0 = 0.00680$ $D_{50} = 0.01019$ $D_{100} = 0.01358$
 C_v at 5.0 min. = 0.05 ft.²/day $C_\alpha = 0.002$

Pressure: 0.50 tsf

TEST READINGS

Load No. 3

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.01580	11	36.00	0.02590
2	0.10	0.01770	12	49.00	0.02630
3	0.25	0.01800	13	64.00	0.02660
4	0.50	0.01870			
5	1.00	0.01920			
6	2.00	0.01950			
7	4.00	0.02090			
8	9.00	0.02320			
9	16.00	0.02470			
10	25.00	0.02550			



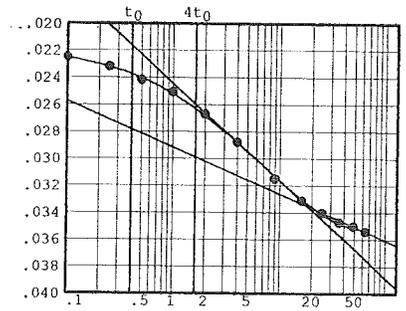
Void Ratio = 0.875 Compression = 3.1 %
 $D_0 = 0.01394$ $D_{50} = 0.01804$ $D_{100} = 0.02215$
 C_v at 4.5 min. = 0.06 ft.²/day $C_\alpha = 0.004$

Pressure: 1.00 tsf

TEST READINGS

Load No. 4

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.02660	11	36.00	0.04090
2	0.10	0.02870	12	49.00	0.04120
3	0.25	0.02940	13	64.00	0.04160
4	0.50	0.03040			
5	1.00	0.03130			
6	2.00	0.03290			
7	4.00	0.03500			
8	9.00	0.03770			
9	16.00	0.03930			
10	25.00	0.04020			



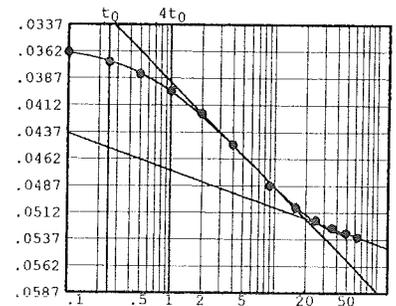
Void Ratio = 0.844 Compression = 4.7 %
 $D_0 = 0.02119$ $D_{50} = 0.02735$ $D_{100} = 0.03351$
 C_v at 2.4 min. = 0.11 ft.²/day $C_\alpha = 0.005$

Pressure: 2.00 tsf

TEST READINGS

Load No. 5

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.04160	11	36.00	0.06150
2	0.10	0.04520	12	49.00	0.06200
3	0.25	0.04610	13	64.00	0.06240
4	0.50	0.04720			
5	1.00	0.04880			
6	2.00	0.05090			
7	4.00	0.05380			
8	9.00	0.05760			
9	16.00	0.05960			
10	25.00	0.06080			



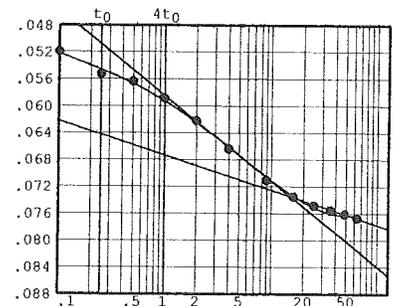
Void Ratio = 0.797 Compression = 7.1 %
 $D_0 = 0.03431$ $D_{50} = 0.04303$ $D_{100} = 0.05176$
 C_v at 2.5 min. = 0.10 ft.²/day $C_\alpha = 0.005$

Pressure: 4.00 tsf

TEST READINGS

Load No. 6

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.06240	11	36.00	0.08860
2	0.10	0.06500	12	49.00	0.08910
3	0.25	0.06830	13	64.00	0.08970
4	0.50	0.06940			
5	1.00	0.07190			
6	2.00	0.07520			
7	4.00	0.07940			
8	9.00	0.08410			
9	16.00	0.08650			
10	25.00	0.08780			



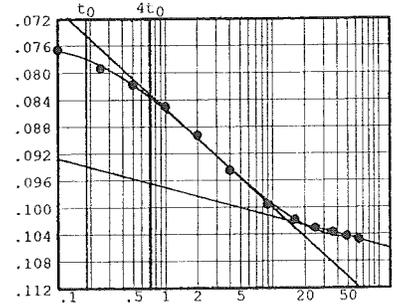
Void Ratio = 0.738 Compression = 10.2 %
 $D_0 = 0.04993$ $D_{50} = 0.06169$ $D_{100} = 0.07345$
 C_v at 1.7 min. = 0.14 ft.²/day $C_\alpha = 0.007$

Pressure: 8.00 tsf

TEST READINGS

Load No. 7

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.08970	11	36.00	0.12050
2	0.10	0.09340	12	49.00	0.12110
3	0.25	0.09620	13	64.00	0.12160
4	0.50	0.09860			
5	1.00	0.10180			
6	2.00	0.10610			
7	4.00	0.11130			
8	9.00	0.11640			
9	16.00	0.11860			
10	25.00	0.11990			



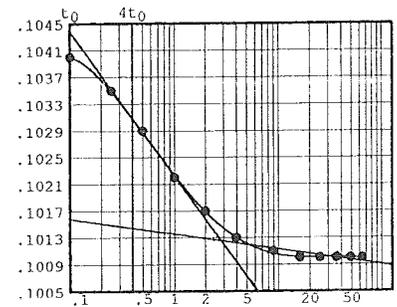
Void Ratio = 0.665 Compression = 13.9 %
 $D_0 = 0.07214$ $D_{50} = 0.08700$ $D_{100} = 0.10187$
 C_v at 1.3 min. = 0.17 ft.²/day $C_\alpha = 0.006$

Pressure: 4.00 tsf

TEST READINGS

Load No. 8

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.12160	11	36.00	0.11620
2	0.10	0.11920	12	49.00	0.11620
3	0.25	0.11870	13	64.00	0.11620
4	0.50	0.11810			
5	1.00	0.11740			
6	2.00	0.11690			
7	4.00	0.11650			
8	9.00	0.11630			
9	16.00	0.11620			
10	25.00	0.11620			



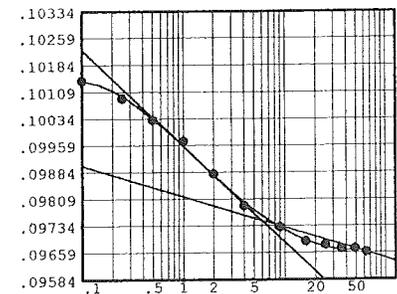
Void Ratio = 0.675 Compression = 13.4 %
 $D_0 = 0.10493$ $D_{50} = 0.10309$ $D_{100} = 0.10125$
 C_v at 0.4 min. = 0.52 ft.²/day

Pressure: 2.00 tsf

TEST READINGS

Load No. 9

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.11620	11	36.00	0.10970
2	0.10	0.11440	12	49.00	0.10970
3	0.25	0.11390	13	64.00	0.10960
4	0.50	0.11330			
5	1.00	0.11270			
6	2.00	0.11180			
7	4.00	0.11090			
8	9.00	0.11030			
9	16.00	0.10990			
10	25.00	0.10980			



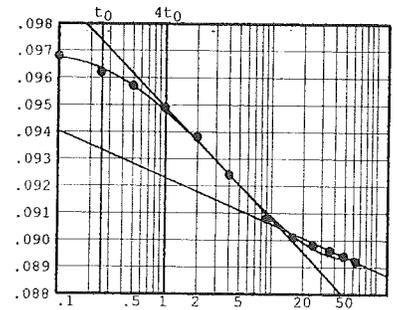
Void Ratio = 0.686 Compression = 12.8 %
 $D_0 = 0.10100$ $D_{50} = 0.09925$ $D_{100} = 0.09749$
 C_v at 1.3 min. = 0.16 ft.²/day

Pressure: 1.00 tsf

TEST READINGS

Load No. 10

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.10960	11	36.00	0.10080
2	0.10	0.10800	12	49.00	0.10060
3	0.25	0.10740	13	64.00	0.10040
4	0.50	0.10690			
5	1.00	0.10610			
6	2.00	0.10500			
7	4.00	0.10360			
8	9.00	0.10200			
9	16.00	0.10130			
10	25.00	0.10100			



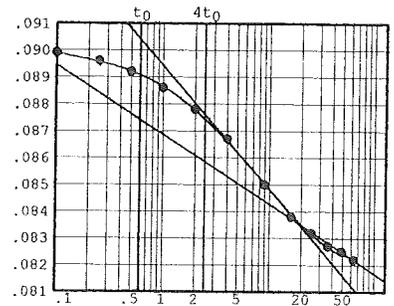
Void Ratio = 0.706 Compression = 11.9 %
 $D_0 = 0.09792$ $D_{50} = 0.09418$ $D_{100} = 0.09044$
 C_v at 1.5 min. = 0.15 ft.²/day

Pressure: 0.50 tsf

TEST READINGS

Load No. 11

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.10040	11	36.00	0.09220
2	0.10	0.09940	12	49.00	0.09200
3	0.25	0.09910	13	64.00	0.09170
4	0.50	0.09870			
5	1.00	0.09810			
6	2.00	0.09730			
7	4.00	0.09620			
8	9.00	0.09450			
9	16.00	0.09330			
10	25.00	0.09270			



Void Ratio = 0.724 Compression = 10.9 %
 $D_0 = 0.09071$ $D_{50} = 0.08715$ $D_{100} = 0.08359$
 C_v at 3.0 min. = 0.07 ft.²/day