Message from our President

Mark Rohrbach, PE  
Geotechnical Group President  
Lachel Felice & Associates

Welcome to the 2006 version of the Seattle Geotechnical Group’s annual publication of the Groundhog. This issue brings news of recently completed group activities, ongoing activities, active committees, and planned future events including upcoming dinner meetings, the upcoming sheet piling short course and the 23rd annual spring seminar “Soft Ground Engineering”, which will be held on May 20, 2006.

The strategic planning process initiated by Keith Ward and finalized by Doug Lindquist has resulted in an expanded officer corps and a clear understanding of the group mission and vision as stated on the following page. This year is the first year under the new officer structure and our current officers are making progress towards accomplishing the group mission and making the group vision a reality.

This year is off to a strong start due in large part to this year’s outstanding officer corps including President Elect Mike Harney (Shannon & Wilson) who will be coordinating this year’s spring seminar “Soft Ground Engineering”, Secretary Jeff Fowler, PE (City of Seattle) who is the primary editor for this year’s Groundhog, Treasurer Dave Pischer, PE (Landau Associates) who is overseeing group financial transactions, Membership Chair Alan Macnab, P. Eng. (Condon-Johnson) who has increased our membership roster to about 500 individuals and improved our relationship with many other professional organizations, Public Relations Chair Eric Heller (GeoEngineers) who has coordinated the group’s presence at the Puyallup Fair and is working to educate young people about Geotechnical Engineering, and Education Chair Joe Schrank, PE (Golder Associates) who is responsible for over-

Helping Iraqi Children Smile

Mike Harney  
Geotechnical Group President Elect  
Shannon & Wilson

Recently, the board of the Geotechnical Group was contacted by one of its members, Bret Martin (Major, United States Army Corps of Engineers), currently stationed in Diyalah, Iraq, where he is leading the Corps of Engineers’ reconstruction effort for that region. Major Martin noted that many Iraqi children congregate around the construction sites he visits on a daily basis. He has been trying to reach out to these kids by handing out small, inexpensive items and toys but he’d reached a limit as to what he could do on his own. With Bret’s approval and assistance, the board of the Geotechnical Group volunteered to organize a small effort to

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JOIN NOW

If you are not a member of ASCE or are not current, we encourage you to join and help support the Seattle Section and the Geotechnical Group. In addition to joining ASCE, we encourage you to join the Geo-Institute (at no additional cost) and you will receive a free Geo-Strata publication. The Geo-Institute is a full-service discipline-oriented and semi-autonomous institute within ASCE. It strives to be the premier organization for a wide range of geo-professionals. For more information on how to become an ASCE member, please refer to:
www.asce.org/membership.

2006 Schedule of Events

- **ASCE Seattle Section Geotechnical Group**
  - Feb. 8 February Dinner Meeting (Joint with Section)
  - Feb. 9 Short Course “Design and Construction of Steel Sheet Pile Structures”
  - Mar. 23 March Dinner Meeting
  - Apr. 1 “Geology of Seattle” Field Trip
  - Apr. 27 April Dinner Meeting
  - May 20 2006 Spring Seminar
  - June 1 May/June Dinner Meeting

- **ASCE Oregon Section Geotechnical Group**
  www.asceor.org/geotech

- **Association of Engineering Geologists (AEG) Washington Section**
  www.aeg-wa.org

- **Structural Engineers Association of Washington (SEAW)**
  www.seaw.org

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Career Opportunities with:

- LACHEL FELICE & Associates 20
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“Soft Ground Engineering”

The 23rd Annual Seattle Geotechnical Group Spring Seminar

Sponsored by:

American Society of Civil Engineers
Seattle Section Geotechnical Group
And
University of Washington
Department of Civil and Environmental Engineering

The Geotechnical Group of ASCE’s Seattle Section is pleased to announce the 23rd Annual Spring Seminar on “Soft Ground Engineering.” The keynote speaker, Dr. Don DeGroot (Professor of Engineering at the University of Massachusetts-Amherst) will be joined by Dr. Demetrious Koutsoftas (the 2004 Ralph Peck Lecturer) and other local and international soft ground experts. The seminar will include topics of interest to both experienced and novice professionals, including characterization, staged construction, instrumentation, and options for improvement. Detailed case studies will be presented to illustrate these concepts, including a history of the failures of the Great Salt Lake Causeway.

When: Saturday, May 20, 2006. 8:00 am to 5:00 pm. Social hour in the exhibitors area until 6:00 pm.

Where: On the campus of the University of Washington, in Seattle.

Who: Typically more than 300 attendees from the Pacific Northwest and across the United States, including professionals practicing in many disciplines in the earth sciences and engineering, representing consultants, contractors and public agencies.

Program: Dr. Stan Boyle, Shannon & Wilson Inc., on “Soft Ground in the Pacific Northwest”
Mr. Armin Stuedlein, Hart Crowser Inc., on “Options for Soft Ground—Improvement vs. Non-Improvement”
Professor Don DeGroot, University of Massachusetts, on “Engineering Characterization of Soft Ground”
Ms. Carol Ravano and Mr. Frank Pita, Milbor-Pita & Associates, on “Case History of Failures on Soft Ground: The Great Salt Lake Causeway”
Dr. Demetrious Koutsoftas (2004 Ralph Peck Lecturer), ARUP, on “Staged Construction for Soft Ground”
Mr. Erik Mikkelsen, on “Instrumentation for Soft Ground Projects”
Professor Jie Han, University of Kansas, on “Column-supported Embankments”
Dr. Conrad Felice, LACHEL FELICE & Associates, on “Numerical Techniques in Soft Ground Engineering”
Dr. Mustapha Zergoun, Trow Associates, on “Case Study of Site Development on Soft Ground”
Dr. Barry Christopher, on “Woodrow Wilson Bridge Approach Embankments”

Contact: Michael Harney, Seminar Chair, at (206) 979-5709 or at harney@u.washington.edu
Joint DPD/ASCE Geotechnical Group Committee

Jon Siu
Group Chair
DPD

Last year, Jon Siu (Principal Engineer/Building Official for the City of Seattle, Department of Planning and Development) approached the Geotechnical Group President Doug Lindquist with the idea of forming a joint committee to look at a “standard of care” for documents being submitted to DPD for permitting review. This year, under the guidance of Jon Siu and the current Geotechnical Group President Mark Rohrbach, a committee consisting of geotechnical engineers in private practice and DPD staff have started meeting to discuss the issues. As we meet, the scope of the committee is evolving, but the following list is a representative sample of the issues to be discussed:

- Level of necessary study
- When does the geotechnical engineer’s engineering judgment prevail (when has the DPD fulfilled its review obligations)?
- What’s the process for dealing with field changes?
- Different design basis/submittal standard for different types of structures (should a single family residence be held to the same standard as a commercial building?)
- How long is “temporary” for shoring?
- What is an appropriate factor of safety?

The intent is to produce one or more guideline documents that are useful to both DPD and private-practice geotechnical engineers as to what DPD will require. Once the committee has agreed on the guidelines, the draft guidelines will be posted to the Geotechnical Group web site and comments from the general membership will be requested. Based on the comments, the committee will then refine the guidelines, and DPD can turn them into operating policies.

The committee understands some of these topics are very complex, somewhat overlapping, and that care must be taken when developing the guidelines.

If you have thoughts on the issues, or issues you’d like to see addressed, please contact Mark Rohrbach (mrohrbach@lachel.com) or Jon Siu (jon.siu@seattle.gov).

Committee Members:
John Bingham (Hart Crowser)
William Bou (DPD)
Matt Malgesini (Golder)
Glenn Mann (Creative Engineering Options)
Bo McFadden (GeoEngineers)
Matt Miller (Associated Earth Sciences)
John Peterson (Aspect)
Jon Siu (DPD)
Mark Rohrbach (LACHEL FELICE & Associates)
Public Relations Committee Summary

Eric Heller
Geotechnical Group Public Relations Chair
GeoEngineers

National Conference of State Legislators

Seattle played host to the state lawmakers’ annual National Conference of State Legislators (NCSL) August 16-20. Several volunteers from the ASCE Seattle Section Geotechnical Group operated an exhibit as representatives of the Geo-Institute of ASCE (G-I). The goal of the booth was to get the word out to state legislators about the role geo-professionals play in the world. G-I also publicized the fact that its Technical Committees make it the leader in disseminating technical information and research. In addition, G-I showed that the Seattle Geotechnical Group is an active part of the community. This was an excellent opportunity to interact with the people who make the laws, not only here in Washington, but across the nation as well.

One of the hottest topics discussed was the increase in critical areas ordinances and the implications for all parties involved. Legislators were concerned about over-legislating. Home owners were concerned about the ever increasing investments required for new construction. Although the conversations were generally short, our guests left knowing that the geotechnical profession exists to help protect public safety as economically as possible.

Other associations participating in the NCSL exhibit this year included: Association of American State Geologists, American Institute of Professional Geologists, American Association of Petroleum Geologists, Association of Engineering Geologists, and American Geologic Institute. The estimated attendance of this event was nearly 8,000 legislators, aides, business professionals and other interest groups. Overall, the event was a success. We would love to have it in Seattle again next year!

Puyallup Fair

This summer the ASCE Seattle Section Geotechnical Group teamed up with ASCE-Tacoma Section and the Mt. Tacoma Post of SAME (Society of American Military Engineers) to host a booth at the Puyallup Fair, September 9-13. The Tacoma Section provided computers with Sim-City and the West Point Bridge Competition. We provided a hands-on liquefaction display. This was a good opportunity to engage the community and tell them what geotechnical engineers do. All three organizations provided volunteers for this event providing an opportunity to interact with other members of the civil engineering community.

The event was considered a success by all parties involved. Kids of all ages were attracted to the video games. The goal was to show that civil engineers affect our daily lives from planning city layouts and construction of almost everything within a city. From a slightly biased position, it looked like the liquefaction display was the most popular. Adults and children were fascinated to see how
Public Relations Committee Summary (continued)

liquefaction occurs and of course to see the building fall over. We were able to have some in depth discussions with passers-by and hopefully inspire a few people in the process. We plan on teaming up again next year. We will keep you posted.

Membership Committee Summary

Alan Macnab, P. Eng.
Geotechnical Group Membership Chair
Condon-Johnson & Associates

Currently the membership committee of the ASCE Geotechnical Group maintains contact with its membership – some 490 geotechnical engineering professionals. The membership committee is committed to retaining the existing membership base and exploring avenues to increase the rolls. By maintaining contact with our members, the Geotechnical Group is able to provide access to the products of our efforts. Included are monthly dinner meetings with technical presentations, short courses, job site tours, newsletters, and our Spring Seminar.

Anyone who wishes to be included on the distribution list for information on any of the above mentioned events should provide their email address to the chair of the membership committee.

Alan Macnab, P.Eng.
Condon-Johnson & associates Inc.
206-575-8248
amacnab@condon-johnson.com

If you value the receipt of these notifications, please be sure to inform us if you have any changes to your email address occasioned either by job change, or address change.

The membership committee would welcome suggestions for new members or groups of members. Simply provide the names to the chairman and we will do the rest.

Education Committee Summary

Joe Schrank, PE
Geotechnical Group Education Chair
Golder & Associates

The Education Committee has been very busy this year, organizing not only the eight monthly dinner meetings, but also three one day short courses and three field trips. Four dinner meetings, two short courses, and one field trip have already been offered, and the other events are on their way. Details of these events are given below. If you are interested in participating in the planning, coordination, or organization of any of these events, please contact our Education Chair, Joe Schrank, PE at jschrank@golder.com.

Dinner meetings

Laureen McKenna, PE of Shannon & Wilson is the current Dinner Meeting Coordinator, and is responsible for arranging and coordinating the eight dinner meetings for this season. The first four dinner presentations were:

Education Committee Summary (continued)

Ph.D., PE, and Laureen McKenna, PE of Shannon & Wilson. Topic: Beartooth Highway Project in Montana;

The speakers for the remaining four dinner meetings are:

1. Feb. 8, 2006 (joint with ASCE Seattle Section): Steve Kramer, Ph.D. of UW. Topic: Recent liquefaction research;
3. April 27, 2006: Del Fredlund, O.C., P. Eng. of Golder Associates in Saskatoon, Saskatchewan. Terzaghi Lecturer; and;

ASFE Professional Practice 101

The first short course offered by the Geotechnical Group this year was Professional Practice 101: The Essentials of Risk Management and Profitability for Project Managers, presented by John Bachner of ASFE on September 19, 2005. This seminar focused on professional liability loss prevention basics. It is a “backyard seminar” offered by the ASFE. The attendance for this course was 38 people and the course was well received.

Estimation of Soil Properties for Foundation Design

Estimation of Soil Properties for Foundation Design was presented by Dr. Fred Kulhawy of Cornell University on November 11, 2005. Dr. Kulhawy was the 2005 Wilson Lecturer and agreed to present this course while he was in Seattle. The course sold out its 60 spots and had a waitlist of at least five people. The course was very well received.

Design and Construction of Steel Sheet Piling Structures

Design and Construction of Steel Sheet Piling Structures will be presented by Richard Hartman, Ph.D., P.E., of Hartman Engineering of Clarence, New York on February 9, 2006. Dr. Hartman is a leading international expert in the design and construction of steel sheet pile structures and has been involved in the design of new sheet pile sections incorporating transverse stress characteristics. He has been awarded patents for several new sheet pile sections.

This one day seminar, co-sponsored by The Joint Committee for Education and Training (a combination of the L.B. Foster Company and Hartman Engineering), will present concepts for the design and construction of steel sheet pile structures. Topics range from practical field problems to recent research in the field and product advancements in steel sheet pile manufacture and design. Upon completion the participant will be able to:

a) Demonstrate proper use of the terminology related to steel sheet piling structures.
b) Identify design parameters and site factors used to design steel sheet piling structures.
c) Identify sheet piling characteristics used to select U-shape and Z-shape sections.
d) Explain why new design methods are required.
e) Apply the procedures and methods for the new design criteria.
f) Evaluate computerized design methods for steel sheet piling structures.
**Education Committee Summary (continued)**

**SAF Field Trip: Skyscrapers of Seattle**

*Concrete, Glass, Steel, and Egos – Skyscrapers*, a tour offered by the Seattle Architecture Foundation (SAF), was organized as a field trip on the afternoon of December 16, 2005. The purpose of this field trip, sponsored by the Geotechnical Group in conjunction with the SAF, was to demonstrate some of the elements of style and architecture that influences the design since as geotechnical engineers, we are often involved in the planning, design, and construction of buildings, including skyscrapers and other landmarks. The tour was led by a volunteer from the SAF with geotechnical input from Tom Gurtowski, PE of Shannon & Wilson, who has worked on many buildings in downtown Seattle. The field trip was attended by eight people, and was well received by those who braved the rain to participate.

**Future Field Trips**

The Education Committee is organizing two more field trips for this season:

- **Geology of Seattle** - a daylong field trip scheduled for April 1, 2006 and led by Kathy Troost, Ph.D. of UW and the Pacific Northwest Center for Geologic Mapping Studies (GeoMapNW) and Bill Laprade, L.E.G of Shannon and Wilson; and,
- The annual spring field trip to a construction site. This year, the site will be the C755 project, which is a very large project with a mix of soft soils, rock, and other unique geology, and includes, among other elements, retaining walls and deep foundations.

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**Message from our President (continued from Page 1)**

seeing all short courses and dinner meetings. Laureen McKenna, PE (Shannon & Wilson), the Dinner Meeting Coordinator, has done an outstanding job planning our dinner meetings including booking Del Fredlund (Terzaghi lecture on unsaturated soils) for April 27, 2006.

In response to the December 26, 2004 tsunami, the Geotechnical Group donated $1,000 to The Center for Earthquake Resistant Houses. In May of last year our group pledged a donation of $5,000 in support of pin-pile research. The research was performed by David Maloney, a graduate student at the University of Washington, and the preliminary results of this research are summarized in the article “University of Washington Pin Pile Research Project” on page 10.

More recently our group has joined with ASCE (Tacoma) and SAME to sponsor an engineering booth at the Puyallup Fair; coordinated a humanitarian effort to donate toys and educational materials to Iraqi children; partnered with the Geo-institute, ASCE (national) and other Geo-Professionals at the National Conference of State Legislators (NCSL); sponsored two short courses (Professional Practice 101 and Estimation of Soil Properties for Foundation Design); donated $2500 and coordinated a donation of $10,000 from ASCE (national) to the “Keep Washington Rolling” campaign in opposition of Initiative I-912; began participating in the Architects & Engineers Legislative Council (AELC) legislative task force; began participating in a joint Geotechnical Group/City of Seattle DPD Committee to address geotechnical submittals; held four dinner meetings; ran one field trip; and strengthened our relationship with DFI, the Geo-Institute, AEG, and other similar geotechnical groups across the country.

Our group has had a busy six months and we are looking forward to an equally productive 2006. Next time you see one of the geotechnical group officers be sure to thank them for all of their hard work.

If you are interested in becoming more involved in the Pacific Northwest geotechnical community, contact any group officer and ask for more information. I look forward to seeing you at one of our upcoming group activities and thank you for your continued support.
University of Washington
Pin-Pile Research Project

David Maloney
Graduate Student
University of Washington

Abstract

The focus of this study was to increase our understanding of the testing and performance of small diameter steel pipe piles, or pin piles. Pin piles are a cost-effective and efficient foundation solution for transferring light structural loads to shallow bearing strata. The economic value of pin piles means engineers are more inclined to rely on local standards of practice instead of using load tests; this often leads to overly conservative foundation designs. This study involved testing of three 2-inch pin piles, each driven to a specific driving criterion of 1, 4, and 8 inches of penetration per minute of driving with a 90-lb pneumatic jackhammer. Static load tests were conducted until a plunging failure was reached. The results were then analyzed by both the Tangent-Line and Davisson method. Dynamic load tests were also performed using a homemade 370-lb drop hammer and a Pile Dynamic Analyzer (PDA) which collected the data. The data however, is still currently being analyzed with the Case Pile Wave Analysis Program (CAPWAP). Although the dynamic analysis is incomplete, results from the static load tests indicate an ultimate bearing capacity in the range of 10-14 kips, which is an increase of 2-6 kips compared to local standards of practice.

Introduction

In the late 1970’s, Shannon & Wilson, Inc. learned of a method being used in Sweden in which small diameter steel rods were driven into soft soils and used to transfer structural loads to shallow bearing strata. Shannon & Wilson, Inc. adapted this method and introduced the concept of pin piles to the Seattle area. Through a series of load tests, Shannon & Wilson, Inc. invented a driving criterion which correlated penetration resistance with bearing capacity. They found that a pin pile could be designed for a working capacity of 4 kips if a nominal 2 inch steel pipe was driven to a resistance of equal to or less than 1 inch of penetration per minute of driving, when using a 90 pound jackhammer. Shannon & Wilson, Inc. compiled their findings and in 1980 presented their paper at the ASCE Convention and Exposition in Portland, Oregon. The objective of this study was simply to improve our understanding of the performance and testing of pin piles.

Pin Pile Study

Three 2-in pin piles were driven at a test site on the west bank of the Duwamish River, located near the West Seattle Bridge. The test site primarily consisted of soft to medium stiff, low plasticity sandy silt, increasing significantly to a very stiff sandy silt at about 20 feet below the ground surface. For performance evaluation purposes, the pin piles were driven to 1, 4, and 8 inches of penetration per minute of driving using a 90-lb pneumatic jackhammer. This provided a basis for quantifying the relationship between driving criteria and bearing capacity. All three pin piles reached their desired driving criteria at an elevation of about 19-21 feet below the ground surface. Steel reaction beams were constructed over the pin piles using drilled and grouted micropiles as anchors, from which static load tests were performed to failure. Failure consisted of plunging the piles anywhere from 3-6 inches. The static load tests were conducted using a calibrated, 220 kip load cell which monitored the loading conditions. Four Linear Variable Displacement Transducers (LVDTs) were placed on top of the pin pile cap and used to monitor dis-
placements up to 1/1000 of an inch. All of these measurements were then received and amplified by a signal conditioner and then digitized by an HP Data Logger, all of which were displayed real-time through a laptop. Telltales such as dial gauges and laser levels were also used to monitor the LVDT recordings and anchor pile movements, ensuring that everything was working properly. Table 1 outlines the results of the static load tests and demonstrates the range of bearing capacity values, given the various driving criteria.

**Table 1: Static Load Test Results**

<table>
<thead>
<tr>
<th>Pin Pile #</th>
<th>Penetration Resistance in/min</th>
<th>Ultimate Bearing Capacity (kips)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tangent-Line Method</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>13.8</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>10.5</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>10.5</td>
</tr>
</tbody>
</table>

* Unable to interpret value

Although highly effective, static load tests are often too expensive and labor intensive for use in everyday pin pile projects, which prompted this study to explore other testing methods. Dynamic testing seemed appropriate due to its widespread acceptance and popularity with larger piles. Each pin pile was tested using the Pile Dynamic Analyzer (PDA) program. The dynamic tests were performed by striking the top of each pile with a homemade 370-lb hammer which fell 30-40 inches. To raise the hammer above the pile, our study used a three part block and tackle system. A major concern was that the drop height would not be sufficient enough to overcome the friction between the pulley and rope, resulting in an insufficient hammer drop. A stand alone radar unit was positioned directly over the hammer to measure its velocity, which in turn was used to quantify efficiency. After ensuring that the hammer was in fact sufficient, the induced stress wave was then measured using strain gauges and accelerometers linked to the PDA software. Testing was successful and all initial indications of the data are good, but the data is still being analyzed with the Case Pile Wave Analysis Program (CAPWAP).

**Conclusion**

The goals of this project were relatively simple in that we wanted to better understand the testing and performance of pin piles. Even though the dynamic analysis is currently incomplete, the results of the static load tests, and previous graduate work findings on this topic, seem to indicate two main points. The first is that static load tests are only as good as the equipment used, especially when it comes to measuring the loading conditions. A recently calibrated load cell should always be used as the main measuring device. The second point is that our current understanding of the bearing capacity of pin piles is conservative. Without a load test and given the current accepted driving criterion, a design bearing capacity of 6 kips seems to be appropriate for use with nominal 2 inch, schedule 80 pin piles.

**Acknowledgements**

This study would not have been possible without the help and guidance of Dr. Bob Holtz and Mr. Glen Mann, the field support of Terra-Firma Drilling, CemRock/Jolly Miller Construction, Davies Drilling, and Robert Miner Dynamic Testing, Inc., and the financial support of our local ASCE Geotechnical Group: thanks to you all. We also greatly appreciate all of the previous work done by H. H. Druebert, G. Yamane, K. K. Haggard and H. G. Vestberg.
Yearly Summary of Other Professional Organizations, Local Universities and Government Organizations

AEG Yearly Update

The AEG Washington Section board members for 2005-2006 are Fred Becker of The Riley Corp. (Secretary), Jay Lucas of GeoEngineers (Treasurer), Kathy Troost of the University of Washington (Vice-Chair), Darrell Sofield of GeoEngineers (hair), and Mark Molinari of URS (Past-Chair). Anyone interested in joining or obtaining info on AEG or the WA section can contact Darrel Sofield at dsofield@geoengineers.com, visit the section web site http://www.aeg-wa.org, or the National AEG web site www.aegweb.org. In addition to their Section duties, Darrell is on the AEG Finance Committee and Mark was elected to the AEG Executive Council and is currently Secretary.

Many members of the WA section attended the AEG National Meeting in Las Vegas, Nevada in September 2005. Several members presented or co-authored talks including Jeff Laird of Shannon & Wilson, Tom Badger of WSDOT, Michael King of The Hydrodynamics Group, Aaron Fox of Golder, William Gates of Kleinfelder, Bill Haneberg, and Mark Molinari. The 2006 Annual Meeting is in Boston, Massachusetts from October 30 to November 3.

Section meetings were held on a monthly basis from January-May and September-November, typically on the third Thursday of each month. Meetings are mostly in Seattle with one a year usually held in Tacoma. For 2006, the February meeting will be Bill Perkins from Shannon & Wilson who will present a companion talk to the ACSE talk on the Beartooth Highway in Montana. The April meeting will feature the AEG/GSA Jahns Distinguished Lecture by Dr. Jerry Higgins of Colorado School of Mines. He will also likely be giving one of the three different Jahns lectures at one or more colleges or universities in Washington. AEG President, Darrell Schmitz of Mississippi State University will be the speaker in Mat and will be giving a talk on Hurricane Katrina. The topic of the March meeting is TBD.

We are in the planning stages for a field trip in late May on the Geologic and Geotechnical Solutions of Coal fields, Mines, and Hydropower Plants in Pierce County, Washington. Let us know if you want to assist or attend!!!

Future AEG Washington Meetings and Field Trip:

February 16, 2006 – Bill Perkins, Shannon & Wilson

March 16, 2006 - TBD


May 18, 2006 – Dr. Darrel Schmitz, Mississippi State University, on Hurricane Katrina

Field Trip – late May 2006, Geologic and Geotechnical Solutions of Coal fields, Mines, and Hydropower Plants in Pierce County, Washington
University of Washington Graduate Studies

Mike Harney
Advisor Dr. Bob Holtz

Mike Harney is completing his Ph.D. research focused on the plane strain deformational behavior of cohesionless soils. Practical quantitative guidance has been lacking for parameters describing shear stress-shear strain, pore pressure development and volumetric strain behavior for soils loading in plane strain conditions. This is in spite of the use of such parameters in modern computational tools and the fact that many common civil works present plane strain geotechnical conditions. The main goal of this work is to provide such guidance on parameter estimation, for a wide range of soil properties, accounting for particle morphology and soil particle size distribution. As part of the work, an 18-parameter 2-bounding surface constitutive model has been calibrated for six distinct, controlled-property test soils, utilizing a series of more than 100 true triaxial tests in the world’s largest cubic triaxial device. Other recent side projects include a forensic study of the failure of a turbidity curtain to control contaminated sediment migration during a dredging operation, and the evaluation of the durability and degradation of a geotextile base reinforcement exhumed after 30 years of service in a pile-supported embankment in Sweden.

Sarah Upsall
Advisor Dr. Steve Kramer

Sarah Upsall is nearing completion of Ph.D. research directed toward development of a damage-related instrumental intensity scale for earthquake shaking. As strong motion networks have expanded, many earthquakes now produce many recordings of ground surface motions, and the characteristics of those motions have been used to compute instrumental intensities on which ShakeMaps and other products useful for emergency response and planning are based. Current instrumental intensity scales are based on relatively simple parameters such as peak acceleration and peak velocity to which earthquake damage is related, but often only loosely. Sarah has identified a series of alternative ground motion parameters to which various types of damage are much more closely related; the use of such parameters in a new instrumental intensity scale produces intensities that are more reliable indicators of potential damage. Individual scales for structural damage, landslide damage, liquefaction damage, and life-line damage are being developed in addition to a composite scale that combines all of the preceding scales.

Roy Mayfield
Advisor Dr. Steve Kramer

Roy Mayfield has developed a procedure for performance-based evaluation of liquefaction potential as part of his Ph.D. research. Instead of basing liquefaction potential on a single scenario (i.e., the peak acceleration and magnitude associated with a particular return period), the performance-based approach considers all ground motion (return period) levels and all of the different distributions of magnitude that contribute to those ground motion levels. The result is a procedure that combines the results of a probabilistic seismic hazard analysis with a probabilistic liquefaction analysis to compute a true probability of liquefaction. Roy has used this procedure to show that consistent application of conventional procedures for evaluation of liquefaction potential produce inconsistent actual probabilities of liquefaction. He has also developed an easy-to-use procedure for performing performance-based evaluations in Washington State; the results of the detailed probabilistic, performance-based calculations are encapsulated in a single number for which he has developed contours on a map of the state. By taking the value at the location of interest from the map and following a simple site-specific adjustment procedure, the benefits of the performance-based approach (i.e. of ensuring a known and consistent probability of liquefaction) can be realized with no more effort than used in conventional analyses. Roy is currently developing a liquefaction model based on a new ground motion parameter that could reduce some of the uncertainty that contributes to high liquefaction potential.

Yi-Min Huang
Advisor Dr. Steve Kramer

Yi-Min Huang is in the early stages of Ph.D. research on performance-based liquefaction hazard evaluation. Yi-
University of Washington Graduate Studies (continued)

Min will extend the liquefaction potential work of Roy Mayfield to performance-based evaluations of the effects of liquefaction, such as flow failure, lateral spreading, and settlement. Yi-Min’s work will eventually allow evaluation of, for example, the return period (or, alternatively, the annual probability of exceedance) of some level of post-liquefaction settlement. These procedures will allow more uniform and consistent evaluation of liquefaction hazards in different seismic environments.

Kevin Franke
Advisor Dr. Steve Kramer

Prior to joining Kleinfelder in Boise, Kevin Franke recently completed a Masters thesis on the estimation of lateral spreading displacements. Kevin evaluated a number of existing lateral spreading models and implemented them into Windows-based computer programs. Kevin also developed a procedure in which the loading (i.e. magnitude- and distance-related) terms in an empirical lateral spreading model can be cast in the form of an attenuation relationship and then used in a probabilistic seismic hazard analysis to develop a seismic hazard curve for that loading parameter. Using that loading parameter with Dave Baska’s probabilistic lateral spreading model, Kevin was able to compute return periods for lateral spreading displacements.

Jed Stoken
Advisor Dr. Steve Kramer

Jed Stoken is completing Masters research that involves alternative characterization of ground motions for liquefaction hazard evaluation. Jed is performing a pilot study of the effects of liquefaction on ground surface response spectra and how those effects evolve with time at different frequencies. He has also modified a cyclic triaxial testing apparatus to apply transient earthquake loading and has used it to investigate pore pressure generation in clean sands.

City of Seattle Materials Laboratory

The SPU Materials Laboratory Geotechnical Group includes Al Rice, Manager, Henry Haselton, Supervisor, Jeff Fowler, Senior (ASCE Geotechnical Group Secretary), Nils Lindwall, Senior, and Taryn Sass, Associate. We also get part-time assistance from student interns from surrounding universities. The Group is responsible for completing geotechnical studies to support design and construction of City capital improvement projects, and for providing support for in-house construction and maintenance projects. We also perform special studies and technical consultation for various City activities. The Group provides geotechnical services mainly to SPU, Seattle City Light, Seattle Department of Parks and Recreation, and Seattle Department of Transportation.

Our more interesting current projects include the replacement of four open, in-town reservoirs, with massive buried tanks. Beacon, Myrtle, West Seattle and Maple Leaf reservoirs will be replaced. The Group is working on the geotechnical aspects and are working with MWH Global as the main designer. Other SPU projects of note include the Rock Creek Fish Passage project near Landsburg, working with Tetra Tech to replace deteriorated culverts beneath the Cedar River pipelines. We are also working on several SPU drainage improvement projects, water transmission upgrades and landslide mitigation projects throughout the City. The Madison Valley drainage project could involve the microtunneled installation of an oversize storage pipe and access shafts in soft ground, along with up to two large storm water storage tanks. We continue to work with the Parks department on South Lake Union Park, a site with numerous soft ground challenges and plans for a new bridge and micropile-supported waterfront bulkhead. Other Parks projects include Magnolia Playfield, Jefferson Driving Range, Loyal Heights Playfield and Fremont Peak Park, which all present various challenges. Current City Light projects include a power transmission tower replacement using deep, large diameter drilled shaft foundations near the confluence of Corkindale Creek and the Skagit River. We are also
City of Seattle Materials Laboratory (continued)

helping City Light with a drilled-shaft-supported distribution tower replacement on the Duwamish River. Finally, we completed two studies to assist SDOT with design of two bike paths, Burke Gilman 60th to Golden Gardens and the Ship Canal Trail.

We are happy to be challenged by increasingly interesting projects for the City. We actively seek continuing education opportunities, and appreciate the efforts of the local ASCE section in providing us with accessible professional lectures and seminars.

Helping Iraqi Children Smile (continued from Page 1)

provide him with some inexpensive toys that he could distribute daily to the children he meets.

In Bret’s words: “What I’m trying to do here with giving the kids stuff is purely altruistic. When I go out and see how little they have and how much we have, I just want to help out a little bit. Everybody here does.” Specifically, Bret requested inexpensive toys, soccer balls, crayons, coloring books, and other small items that would help make a small difference in a child’s life. Individual members as well as member firms of the Geotechnical Group have stepped up by contributing more than $1500 in the form of monetary and material donations. The Society of American Military Engineers, Tacoma Section has joined in the effort by committing an additional $500 from their organization. In order to expedite Major Martin’s receipt of the donation, contributions were accepted until August 19. The Geotechnical Group then had a “purchasing and packing party” to speed the gift on its way. In all, seven large boxes of toys and other items were sent to Major Martin. Bret and his Soldiers have since been handing out the gifts to the many children he meets on his project sites. The reaction has been tremendous and heart-warming, such as the photo shown of a young Iraqi boy who is very ill in a children’s hospital that Bret visited (page 1). Major Martin has asked that his sincere and heartfelt thanks be passed along to all who contributed to the effort on behalf of these children.
Cornerstone Geotechnical

Cornerstone Geotechnical has enjoyed significant growth in the past year and welcomes several new staff to help handle the workload for the upcoming year, our sixth. Stephen Bond, Olga Popova, Mark Schumacher, and Robin Weldy have joined our Woodinville office as staff geologists. We have doubled our office space to give us some room to breathe. In addition, Thor Christensen has been promoted to partner, Jeff Laub recently passed the PG exam, and Jeff Wale has been promoted to project engineer. Both Rick Powell and Chuck Couvrette continue to provide cost-effective solutions to their long-term clients.

Jacobs Associates

Jacobs Associates, a consulting engineering firm that specializes in tunnels and underground construction, continues to provide the northwest with design, construction management (CM), and claims services from our Seattle office. As we celebrate our third year in Seattle, we also prepare to toast our fiftieth anniversary as a company.

Our Design Department (Bill Edgerton, Dan Adams, Isabelle Lamb, Jeremy Johnson, Ben Constable, John Giaudrone, Gregg Davidson, Mark Havekost, Andrew McGlenn, and Ben Piermattei), in joint venture with MWH, continues work on King County’s Brightwater Conveyance System. The 2.7-mile East Tunnel Contract, opened bids in October 2005, with construction expected to commence in early 2006. Final design approaches completion on the 3.8-mile Central Tunnel and four-mile West Tunnel Contracts.

Jacobs Associates (Gregg Davidson, Mark Havekost, Mark Tilley, and Ben Piermattei), in association with two Canadian firms, advances the conceptual design of the 3,300-foot long, 13-foot diameter Second Narrows Water Tunnel across the Burrard Inlet, Vancouver. Additionally, our Melbourne, Australia outpost, managed from Seattle, leads the tunnel and shaft design on the Northern Sewerage Project, Stages 1 and 2. We work as part of the Sinclair Knight Merz design team.

The Portland* CM Department (Greg Colzani, Craig Kolell, Mike Kowalski, and Sue Bednarz), has begun shifting focus toward the East Side Willamette River CSO, as the West Side CSO wraps up. Jacobs Associates provides specialty supplemental CM services to

Yearly Summary of Local Firms
Jacobs Associates (continued)

the City of Portland on both jobs, involving approximately 11 miles of pipeline, multiple shafts, and a new pump station. The West Side effort employed shielded slurry TBMs, a historic first use in the US.

Major wins in 2005, in the northwest, include: design for Portland’s Portsmouth Main Force; design for Vancouver’s Port Mann Water Supply Tunnel; on-call engineering specialty services for WSDOT; and shaft design for the Columbia River’s Chief Joseph Dam. In addition, we recently concluded: design for Port of Tacoma’s Blair Waterway Crossing, executed by horizontal directional drilling; investigation and design for Port of Seattle’s Fisherman’s Terminal drainage rehabilitation; and value engineering and peer review of preliminary design for Sound Transit’s North Link.

Our Claims Department, headed by Carl LaFraugh and supported by Mark Tilley and Monica Stary, made two hires this summer. Senior Engineer KC Carmichael focuses on dispute resolution assignments, while Consultant Kyle Braget specializes in presentations and graphics.

* Jacobs Associates’ Portland office has moved: 101 SW Main Street, Suite 320, Portland, Oregon 97204, (503) 227-1800.

Hatch Mott MacDonald

The end of 2005 culminated another banner year in underground engineering for HMM. In the Northwest we continued our successful role on the Beacon Hill Tunnel and deep station project for Sound Transit, with Mike Murray and David Hammett providing design and project controls support during construction. HMM provides support to Sound Transit’s Resident Engineer with responses to Contractor RFI’s, submittals review, change orders etc., as well as providing line management support to the RE, coordinating responses to ST’s other Beacon Hill consultants, supporting various redesign work required, and providing construction observation required for the critical SEM construction activities of the Contractor.

Above ground for Sound Transit, we were pleased to be asked by Link Management to amend our Section 755 Boeing Access Rd to S. 154th St Station contract, to provide the further design of Section 770, the “Airport Link” project. This section will provide a direct Link connection to SeaTac, and it is the third major Link project accomplished for Sound Transit by HMM.

Other projects in the NW region:

HMM’s Ed Kennedy and John Hawley worked with WSDOT in 2005 on a study to expand the capacity of and provide improvements to the alignment of I-90 east of Snoqualmie Pass with possible alternatives included tunneling through the hillside immediately north of the
Hatch Mott MacDonald (continued)

existing alignment of SR-90 along the lake. HMM assisted WSDOT with tunneling concepts, cross section and approximate costs, and identified required safety features for a possible tunnel facility.

HMM is currently working with our sister company Hatch-Acres on the Cabinet Gorge Bypass Tunnel Project, for Avista Corporation, in Clark Fork, ID. Project Manager David Jurich leads the design and construction engineering effort for HMM. The team will determine if the two original diversion tunnels can be returned to service as bypass tunnels. The objective is to improve water quality and avoid air-water mixing during flood conditions to satisfy a license condition for Avista's hydroelectric project. The bypass will include 1,000 feet of concrete lined tunnel, two gate valve shafts, and an outlet portal structure. The project site has difficult access and construction must not adversely impact operation of the nearby Clark Fork Hydroelectric Station.

Rapid Excavation and Tunneling Conference (RETC) June Meeting in Seattle
HMM had an exceptionally successful showing at the RETC June meeting in Seattle, with over 20 HMM tunnel and geotechnical professionals attending. The group presented 17 technical papers and participated in the proceedings with discussions on a wide variety of subjects including:

- Geotechnical Baseline Reports (Randy Essex)
- Design and Risk Management Strategy for the Beacon Hill Tunnel (Don Phelps, Chris Tattersall)
- Design Considerations as applied to the Vancouver B.C. Seymour Capilano Twin Tunnels Project (Dean Brox, Don Phelps, Peter Proctor, Jeff Pringle)
- Tunnel Lining and Support (Tomas Gregor, Brian Garrod)
- Lessons learned using NATM on recent projects in the U.S. (David Field, John Hawley, Don Phelps)

Recent Northwest staff additions.
HMM continues to add staff both locally and nationally. Among those joining HMM this year in the Northwest are: Yogi Beri, Steve Boesel, Joel Caldwell, David Coombs, Yarek Hosek, Cliff Mansfield, Dan McKillop, Andrea Molina, Roy Pratt, Margaret Simmons Cross, and Anthony Smith.

Condon Johnson & Associates, Inc.

The Seattle office of Condon-Johnson & Associates Inc. (CJA) has just completed its 15th year of operation with its largest volume ever. Significant projects completed in 2005 included Canyon Creek Bridge – IDOT’s first Micropile project, Drilled Shafts on Hwy 18 at Maple Valley, Shoring and Underpinning for the Alaska Baggage Handling Facility at SeaTac, and Drilled Shafts for the Tieton Irrigation District. We also completed our first project in Vancouver, BC installing jet grouting.

On going projects include a $ 7 M contract for the City of Des Moines building a bridge and creek training structure. We also are shoring and dewatering at the Cronyn Block, shoring at the Pearl Block, and shoring, micropiles, and stone columns at Block 34, all in Portland. CJA is installing Secant Piles at the Juanita Pump Station, soil nails at Broadway and Pine and is involved in a $ 20 M project in Joint Venture with Soletanche Inc. to install Anchored Slurry Diaphragm Walls, limited headroom Cut and Cover Shoring, Secant walls, Soil Nailing, Micropiles and Jet Grouting at the Beacon Hill project for Sound Transit where we hosted the ASCE Geotechnical group for a job visit in June/05.

New projects for 2006 include Stone Columns and Compaction Grouting at the Sauvie Island Bridge and another Jet grouting project in Vancouver BC.

During 2005 CJA created a permanent joint venture with Soletanche, Inc to pursue stone column projects in the Western USA.
Condon Johnson & Associates, Inc. (continued)

In 2002 CJA-Seattle completed a Design Build Drilled Shaft project at the El Camino Powerhouse for Sacramento Municipal District (SMUD). During the project, CJA encountered a Differing Site Condition (DSC) and sought protection under a state statute mandated DSC clause contained in the contract. SMUD maintained that such clauses do not apply to design build work. After a thirteen (13) day jury trial in the summer of 2005, the California Superior Court strongly confirmed a contractor’s right to the protection of DSC clauses on all public works projects in California including Design Build work.

Condon Johnson & Associates Seattle office is managed by Eric Dybvik. Project managers include Ray McCorkle, Leo Stapleton, and Rolly Stow. All five offices of CJA (San Diego, Los Angeles, Las Vegas, Oakland, and Seattle) are serviced by Geotechnical Manager Dominic Parmantier and Business Development Officer Alan Macnab. Both reside in the Seattle office.

Visit us at our new website www.Condon-Johnson.com

Golder Associates

Golder Associates Inc. had a productive 2005 and we are looking forward to an incredibly busy 2006. Golder added several new staff members to our Redmond office, including: Katy Chandler and Sarah West, Engineers; Alison Denison, Staff Geologist; Shawn Clayton, Field Technician; and Grant Bailey, Senior Consultant specializing in permitting. In addition, Hank Swift, Senior Geotechnical Engineer, transferred to our Coeur d’Alene office. Staff was also added to our geophysics and environmental groups.

Golder was honored with several awards this year, including: Best Large Company to Work For in Washington by Washington CEO magazine; 9th place in Top CE Firms to Work for in the United States by CE News magazine; ACEC of Washington Silver Award for using LiDAR technology to assess geologic conditions and hazards on I-405; and ACEC of Washington Bronze Award and ASCE Seattle Chapter Honors for shotcrete retaining walls that mimic natural rock at the Talus development. In addition, Andreas Kammereck received the ASCE Collingwood Prize for his article “Changing Course” in the June 2004 Civil Engineering magazine. Matt Malgesini gave the October ASCE Seattle Section Geotechnical Group dinner meeting presentation on the design and construction of the Le Reve Mountain at the new Wynn Las Vegas Resort and Casino.

Golder is pleased to announce the following promotions: Alex McKenzie-Johnson and Ted Sager, promoted to Project Geologist; Josh Hanson, promoted to Project Engineer; Sara Marxen, promoted to Senior Project Engineer; Andreas Kammereck and Travis McGrath became Associates; and Tim Martin in Coeur d’Alene became a Principal. Congratulations to Josh Hanson, Matt Malgesini and Scott Zajac who became registered Professional Engineers, and to Aaron Fox and Alex McKenzie-Johnson who became registered Professional Geologists.

Golder worked on a variety of challenging projects this year, including: geotechnical investigations and construction support for the Washington Square 22-story residential towers in downtown Bellevue and the 4th and Virginia residential tower in downtown Seattle; engineering support for FEMA in disaster areas; flood hazard assessment and erosion protection design at the Dead Sea in Israel; continued engineering support for the HDDs and stream crossings for the Capacity Replacement Project for Williams - NWP; design for the cleanup of the White King/Lucky Lass Superfund site in Lakeview, Oregon; pipeline protection designs for flood erosion and scour in St. George, Utah; field support for the 2010 Olympic Games in Whistler, BC; geotechnical investigations at the Lawson Hills development in Black Diamond; and many CEVP projects for our risk analysis group. Golder has also won on call contracts with WSDOT and FHWA, and looks forward to working on them in the coming year.
Geopier Foundation Company Northwest

Geopier Foundation Company Northwest worked closely with local geotechnical engineers on commercial, industrial, housing, medical, and school projects throughout western Washington. Geopier soil reinforcement was used to support “The Mercer” development (Geotech Consultants), a large mixed-use project on Mercer Island, Merrill Gardens (Geo Group Northwest), an assisted living facility, and Bush School (Zipper Zeman Associates) in Seattle. In eastern Washington, Geopier elements were used to reinforce soils for support of the 6-story SEL Corporate Headquarters Building at Washington State University. Over 900 Geopier elements were used to support the new Glacier High School in Kalispell, Montana.

Geopier Foundation Company introduced the new “Impact Pier” technology which is a “displacement” process and does not require a drilled hole. A mandrel with a beveled lead section is rammed into the ground, displacing the soil laterally. The mandrel is then raised 3- or 4-feet to introduce a lift of crushed stone into the hole. The mandrel is subsequently forced downward using “vertical ramming” energy to compact the stone into a 1-foot lift. The Impact Pier is subsequently constructed to the ground surface. The process enables us to construct piers to greater depths, and in sands and high groundwater.

The Impact Pier process was used to mitigate liquefaction on a soft site in Longview for the Pacific Surgical Institute project (GeoEngineers). About 900, 24-inch diameter piers were installed at a spacing of about 6-feet on-centers to reinforce the soft silts and loose sands.

LACHEL FELICE & Associates

LACHEL FELICE & Associates (LF&A) celebrates 30 years of continued business! LF&A is an underground engineering and geotechnical design firm specializing in tunnel design and engineering, deep foundations, numerical modeling, construction engineering, soil structure interaction and other advanced structural and geotechnical designs. LF&A is headquartered in Golden, CO, with offices in Kirkland, WA; Atlanta, GA; Morris- town, NJ; Columbus, OH; Las Vegas, NV; Dunn Loring, VA; and Pittsburgh, PA.

LF&A’s current projects include the Big Walnut Augmentation Rickenbacker Interceptor (BWARI) Tunnel Project and the Big Walnut Outfall Augmentation Sewer Part II in Columbus, OH; Interstate 635 (LBJ Freeway) West Section – Managed HOV/Toll Lanes in Dallas, TX; Sound Transit Central Link Light Rail C755 in Tukwila, WA; and numerous Cross-hole Conic Logging testing projects for state transportation departments; as well as Expert Witness Testimony for construction claims.

LF&A welcomes Larry Eckert, P.E. as the National Director for Tunnels & Underground Construction. Larry comes to LF&A from URS Corporation and brings more than 30 years of experience in heavy civil underground construction. His project involvement ranges in size from the design of more than 2,500 railroad and highway undercrossings to major projects such as the Red Hook and Port Richmond Tunnels for the NYCDEP; Super Collider, TX; Chicago’s Deep Tunnel System; and more than 30 contract sections of the Washington Metro WMATA system.

LF&A also welcomes Gordon Elliott, Ph.D., P.E. who has joined LF&A’s newest office in Pittsburgh, PA. Dr. Elliott presents more than 20 years of technical and management experience on projects as diverse as the geologic
LACHEL FELICE & Associates (continued)

disposal of high-level radioactive waste, analysis of the stability of mine waste piles, software development, rock slope stability analysis, tieback wall and soil-nail wall design, rockfall hazard and risk evaluation, foundation analysis, hard rock tunnel design and rehabilitation, hydrogeologic investigations, landfill design and permitting, health risk evaluation, and other risk assessment studies.

LF&A had a very productive 2005. Looking forward 2006 promises to be even busier as we continue to serve our clients, pursue new work, and experience steady growth. Please visit www.lachel.com for a firm overview and current employment opportunities.

LACHEL FELICE & Associates
Geotechnics, Foundations, Underground Structures

LACHEL FELICE & Associates, Inc. (LF&A) is seeking candidates to fill the following positions:

National Director - Geotechnical Design Services (no specific geographic location) Masters Degree in civil engineering or technically related area and MBA or advanced development education in business management, proven leadership, business development/marketing, client services, and project management skills

National Director - Federal Programs (position located in Washington DC) Masters Degree in civil engineering or technically related area and MBA or advanced development education in business management, proven leadership, business development and marketing, client services, and project management skills.

Geotechnical Engineer or Engineering Geologist 2-6 years of experience, master’s degree and/or a modest background in structural foundations (footings and walls), excellent communication and organizational skills, ability to work independently and as part of a project team, some travel.

For more information on these positions, please visit www.lachel.com.

LACHEL FELICE & Associates, Inc. is an equal opportunity employer.

Email/Fax-Mail Resume and Cover Letter

Attn: Grace Weaver
LACHEL FELICE & Associates, Inc.
11411 NE 124th Street
Kirkland, WA 98034
Tel. (425) 820-0800
Fax (425) 820-9892
Email: gweaver@lachel.com
Web: www.lachel.com
DBM Contractors, Inc.

2005 proved to be another busy year for DBM with projects spanning from Washington, to Alaska, to Hawaii, to California, and Nevada. [...] Hood Canal Bridge Retrofit and East Half Replacement, Poulsbo, WA- DBM and joint venture partner Case Foundation of Chicago, IL, worked with Kiewit/General Joint Venture to complete the drilled shaft foundations for the new east half bridge replacement. Foundations diameters ranged from 6.5 ft. to 10 ft. and extended to depths in excess of 100 ft. Construction was completed from a temporary work trestle over the waters of Hood Canal. 

US 26: Cornell Rd.-OR 217 Section Sunset Highway, Beaverton, OR- As part of Mowat Construction’s team, DBM provided design/build services to Oregon Department of Transportation for a permanent retaining wall adjacent to US 26. The proposed cylinder pile wall was valued engineered by DBM into a non-reticulated micropile wall. The wall spanned 617 linear feet, reached heights to 20 ft. and included a permanent shotcrete fascia.

Northwest Cascade Inc.

Northwest Cascade’s, Inc. (NWC) geotechnical division continued to see growth and experienced many challenges with great success in 2005. We continue to be involved with many difficult, high profile projects throughout the West Coast. Recent projects include micropiles, soldier pile-tieback walls, soil nail walls, permeation grouting, compaction grouting and barrel vault grouting. Specific projects include: The Palms Casino in Las Vegas, NV which was successfully underpinned by NWC and Crux Subsurface, Inc. with the installation of 130 EA high capacity, low overhead micropiles. NWC is currently performing the remediation of existing subsurface geological conditions to depths of 400 feet at the Navajo Generation Station Project, in Page, AZ. The subsurface remediation is being accomplished using permeation and void fill grouting techniques.

Spark Johnston P.E., geotechnical division manager, continues to show the way for the division by contributing his services and 25+ years of experience to the industry. In addition, Doug Watt and Paul Rodriguez continue to provide project management for the division. NWC is also pleased to announce the acquisition of an assistant project manager, Jess Carkner, a Cal Poly at San Luis Obispo graduate.

NWC is looking forward to another year of growth and success.
Hayward Baker, Inc.

In 2006, HBI celebrates 60 years of ground improvement construction innovation and 20 years of work in the Northwest, beginning with a vibro-replacement stone column project in 1986 or liquefaction mitigation for a pipeline segment on the Renton/Duwamish Effluent Line. Mark Koelling established the Seattle Area Office in 1987 and has since remained involved with all project work in the Northwest and Canada. In 2005, Joe Rosinski has joined the office as Area Manager, previously coming from roles in project management with Granite, Walsh, Dillingham, and RCI. Rick Hanke, a 5 year HBI employee, also joined the office as a project manager in 2004.

HBI continues to provide ground improvement construction services (to include foundation concepts, budgets, schedules, and method specifications), to the local geotechnical, structural, and architectural communities. This work addresses: 1) both static and seismic loads and settlement limitations for new construction; 2) retrofits to existing structures for load increase, seismic upgrade, and underpinning; 3) groundwater control; and 4) slope stability and unique excavation support.

As an extension of stone column construction, HBI has focused, over the past few years, to install Vibro Piers, or “short stone columns”, on several projects to accommodate increased bearing capacity and static settlement reduction in the upper 10’-20’ of soil profiles. Our methodology of Vibro Pier design, construction, and load testing allows for efficient foundation installation delivery for soil profiles both above and below the water table. And HBI continues to enjoy its relationships with the individuals and firms involved in foundation design and construction in the Northwest.
HWA GeoSciences Inc.

HWA GeoSciences wishes you healthy and prosperous New Year! This is an exciting time at HWA. Our Lynnwood office grew to 30 staff in 2005, and we anticipate continued growth in 2006.

HWA’s Geotechnical Group remains busy with three US Embassy design-build projects in Africa; State Route 518 Widening project; Mercer Island Lake Line; and the Mount Si Bridge Replacement, to mention a few. Erik Andersen and Steve Greene were promoted to Geotechnical Group Lead, and Engineering Geology Group Lead, respectively. We added JoLyn Gillie and Tewodros (Teddy) Taddese to our professional staff. JoLyn just completed her Master’s degree at Washington State University with an emphasis on geotechnical earthquake engineering. Teddy has a PhD in engineering geology, with expertise in landslides, and is widely published abroad. We enjoyed having David Maloney intern with us this past summer, and look forward to his return from a post-graduate appointment at the Norwegian Geotechnical Institute!

Our Pavement Technology Group, including George Minassian and Bryan Hawkins, has been busy with pavement projects. HWA has assisted many local agencies adapt to WSDOT’s new Superpave classification system for hot mix asphalt. HWA continues as the only private geotechnical firm in the area that owns and operates a falling weight deflectometer for pavement and subgrade evaluation.

Our GeoEnvironmental Group continues to be productive, with services ranging from environmental site assessments, water resource assessments, solid waste permitting, and construction dewatering consultation. Pete Pearson was recently licensed as a geologist by the state. In January of this year we welcomed Vance Atkins as Senior Hydrogeologist. Vance has over 13 years of experience in geoenvironmental consulting services.

John Schwartz joined us in mid-2005 as Laboratory Manager, bringing 20 years of local experience. Our A2LA-certified geotechnical and materials laboratory remains busy with in-house projects as well as work for other geotechnical firms in the area.

We are elated that Michele Percussi joined us as Director of Client Relations. She has worked in the local engineering/architectural community since 1989 and will help us expand our work for existing and new clients. Assisting Michele are Erin Scott, Business Development Coordinator, and Carol Micek, Marketing Assistant.

AMEC Geotechnical Group

The AMEC Geotechnical Group had a very successful 2005 with a variety of new and ongoing projects including Sound Transit (the Tukwila segment and Airport Link), community colleges and K-12 schools, and transportation and infrastructure projects. We look forward to another busy year in 2006.

Jess Abed led our geotechnical group for another successful year, focusing on business management and marketing. Principal Jim Dransfield continues to manage Sound Transit and other projects, juggling staffing for pile and shaft construction, confirmation borings, and exploratory borings. Jim even spent a day logging on the drill rig when we were short-handed. Deb Ladd has kept busy marketing and managing a variety of geotechnical and environmental projects ranging from a community college system in California to helping the Edmonds School District purchase and develop a new property in Lynnwood. Deb helped to bring the geotechnical on-call WSDOT contract to AMEC and will be working hard to get work out of the contract. Bill Lockard played a key role supporting drilling planning and logistics for Sound Transit and wrapped up activities at the Roosevelt High School. Steve Siebert kept busy on several private projects, community colleges, and a variety of transportation projects. Carolyn Anderson continued her management of design and construction activities at Issaquah Highlands and prepared multiple critical areas reports for development in the area. Carolyn was supported at the Highlands by Kristin Addis and Cody.
Shaping the Future
Worldwide. Responsibly. For the long term.

AMEC’s vision, values, and objectives are founded on a commitment to sustainability at all levels of our organization—including supporting sustainable growth of the communities in which we do business. Established in Seattle since 1974, we are proud of the role we have played in many major projects in the Pacific Northwest.

Services:
- Geotechnical Engineering
- Environmental, Natural Resources & Planning
- Materials Testing & Special Inspection

AMEC is currently looking for engineers and scientists to help fulfill our vision.

Please contact us at (425) 820-4669.

AMEC Geotechnical Group (continued)

Sherrard, newcomers to the group in 2005. Konrad Moller also joined the group in 2006, providing key expertise at Issaquah Highlands. Jerry Ladd has been spending the last few months conducting full-time monitoring of the Sound Transit shafts that are supporting the elevated guideway you can see near SR 518 / I-405. Jerry also has the distinction of being our first geologist to get his Washington license “the hard way” – by passing the exam! Todd Wentworth has been busy with Sound Transit design of at-grade improvements and several new schools including a new middle school in Steilacoom. Henry Brenniman continues to be our pile driving expert, providing observation the long piles / BIG hammer at Sound Transit’s crossing of the Duwamish. Henry continues to find geologic variability wherever the piles go – he hopes to be able train the engineers to take over for him someday ….. Brad Hupy, Greg Rollins, and Minsoo Kim in our Portland office keep busy in Oregon and southern Washington supporting private development and geotechnical components of environmental projects.
Krazan & Associates, Inc.

Krazan & Associates, Inc. appears poised to have another very busy year in 2006. We have seen growth during 2005 in all of our divisions including geotechnical, environmental, construction materials testing and forensic evaluation. The volume of work in all of these departments at the conclusion of 2005 indicates that there are no signs of slowing.

We have added an office to our northwest region. In November of 2005, Krazan & Associates, Inc. merged with STI-Northwest in Spokane. The Spokane office will be under the joint name STI-Krazan during a transitional period. As part of this merger, Ken Sahi, P.E. has joined our team as the Pacific Northwest Regional Manager. Ken was formerly with AMEC in the Puget Sound region and was the owner of STI-Northwest prior to the merger.

Our environmental division has seen significant additions during the past year. Carlotta Celucci joined Krazan in the late summer. She is a senior geologist with 18 years of experience. Carlotta was previously with Tetra Tech and brings with her a strong environmental background and great marketing skills. Steve Nuegebauer joined Krazan approximately one month ago. He will be the manager of the environmental division for the northwest region. Steve is a senior geologist with 24 years of diverse experience. Steve has worked in many areas around the country, as well as internationally.

The geotechnical division for the Pacific Northwest continues under the management of Sean Caraway, P.E. This division has grown to a group of eight. The volume of projects has approximately doubled for our geotechnical division in the past year as compared to 2004.

Our testing and inspection divisions are under the management of Jeff Mercer in Woodinville, Jeff Bowers in Poulsbo, Frank Adams in Auburn and Alan Bain in Spokane. We have seen continued growth in the construction inspection and testing division in each of these locations in the past year.

Our forensic evaluation group continues under the leadership of Mark Liebman. Mark specializes in historic structure restoration. The forensic evaluation group has grown to three people and appears to be on course for continued expansion.

Mibor Pita & Associates

Mibor-Pita & Associates is beginning their 11th year of business and continues to work on a variety of geotechnical, tunnel and railroad projects around the western United States and the Dominican Republic. We are doing design and construction management for double-stack railroad tunnel clearance projects, new railroad bridge foundation construction, and landslide rehabilitation projects. We recently completed the construction management of the seismic retrofit of four brick-lined tunnels in San Francisco for Caltrain. We continue to monitor the stability of the Great Salt Lake Causeway in Utah. MPA will do a presentation on the Causeway at the ASCE Geotechnical Group Spring Seminar on Soft Soil Engineering.

Partner/owner Gerry Millar was recently honored in Santo Domingo, Dominican Republic, as one of the three founding members of the Dominican Geological Society. He is consulting on two tunnel projects in the D.R. Frank Pita, partner/owner, continues to be active in ASFE, is managing the ever-expanding Woodinville office, and performing engineering design on numerous projects. Carol Ravano is celebrating her 4th year with MPA as a project engineer and loves the variety of projects that the company has. Maureen Kwolek consults for MPA on hydrology and site drainage issues.

MPA recently hired Margaret Stoffel, a senior geotechnical engineer with over 25 years experience, to work as a design and resident engineer. Margaret comes to us from the Washington Group, where she was the lead geotechnical engineer on a canal liner repair project.
Landau Associates

Last year was very busy and involved exciting projects and pursuits, challenging work, and growth at Landau Associates. We welcomed Jonathan Brown, Staff Geotechnical Engineer, and Reda Mikhail, P.E., Associate. Promotions included Ed Heavey, P.E., to Senior Associate; Michelle Ramos, P.E., to Senior Engineer and Edmonds geotechnical group manager; Steve Wright, P.E., to Associate; James Wilson, P.E., to Project Engineer; and Brian Bennetts to Senior Staff Engineer. Congratulations go out to Dana Olcott, P.E., Senior Staff Engineer for obtaining his P.E. license and to Paul Ford, P.E., for his 19 years of service with Landau Associates. After 40 years in this esteemed industry, Paul Ford is retiring from active practice, but will remain available as a Senior Consultant with Landau Associates.

Ed Heavey was kept busy with projects for the City of Tacoma, the Cleveland High School Renovation, Interurban Avenue Improvements in the City of Tukwila, and the RW Johnson Blvd Improvements and Percival Creek Pump Station for the City of Olympia. Steve Wright continues to manage a variety of projects including final design for the Granite Falls Alternate Route, challenging waterfront redevelopment and improvements for the Port of Everett; a new mixed use development in the University District; and a marina expansion for the Port of Townsend. Reda Mikhail has contributed technical expertise on many of our projects and is managing our work for the WSDOT Pontoon Construction site. Michelle Ramos has been working on the City of Edmonds Critical Areas Mapping using Lidar, NE 116th Street Roadway Widening in Redmond, and managing the North Creek Interceptor Pipeline project. Dave Pischer, P.E., recently started work on the New Whatcom Redevelopment project and continues to provide services to the Port of Bellingham’s Gate 2 Boatyard and the Port of Seattle’s North Bay redevelopment projects. Dennis Stettler, P.E., is program manager for our WSDOT on-call geotechnical contracts with projects at the I-5/ Salmon Creek Interchange near Vancouver and the Pontoon Construction Site; and he has been managing projects at Richmond Beach Saltwater Park; and slope stability studies for the WPA landslide drainage program for Seattle Public Utilities (SPU). Paul Ford has led our work for SPU’s Cedar Moraine Safety Studies.

Looking ahead, we continue to work on challenging projects and seek to add outstanding staff. We encourage you to contact us in our Edmonds, Tacoma, Spokane, or Portland offices and visit our website at www.landauinc.com.

Geotechnical Engineers

Landau Associates, a leading regional environmental, geotechnical engineering, and natural resource consulting company, is recruiting for geotechnical engineers for our offices in Edmonds and Tacoma, Washington. We are interested in qualified applicants who value client service, employee satisfaction, and profitable growth. For company information, position qualifications, and responsibilities, please see our web site at www.landauinc.com. Please email your resume to HR@landauinc.com, or Fax: 425.778.6409. ET-GE-0106-DAP. EOE.
**URS Corporation**

In 2005 URS helped with the Katrina hurricane disaster response, and sent Charles Masala, Vichai Vitsupakhorn, Chuck Vita and Ken Yang to Louisiana to provide assistance. They investigated damage to the New Orleans levee system, evaluated failure mechanisms and possible mitigation, and provided general disaster response support. Mining projects continued to demand geotechnical attention. Cecil Urlich directed the activities of a several teams including Sri Rajah, Carlos Chaparro, Dick Clark, Dan Hawk, Chris Castro and Arturo Ortiz, who provided continuing exploration, design and construction monitoring services for a tailings dam raise in Alaska, and prepared closure plans for two mines in Canada. Todd Parkington, Bill Kuck, Erich Lenz, Kevin Tice and Kranti Maturi supported mine expansion efforts at the Centralia Coal Mine in Washington. Rik Langendoen was involved in activities related to evaluation of the proposed Buckhorn Mine and closure of Holden Mine in Washington. New engineer Ray Gu’s attention was on investigations and construction monitoring at refineries in the Anacortes area. Becca Loveday assisted with the design of a proposed water treatment plant near Port Angeles. Bob Burk, Marty McCabe and Balin Strickler were heavily involved in a large field exploration effort and evaluation of 10 miles of new Highway US 20 in central Oregon. Mark Molinari searched trenches for signs of the Southern Whidbey Island Fault at a site near Picnic Point, while CB Crouse and Juan Crlos Ramirez evaluated the seismicity at the site of two hospitals in southern California. URS is proud that its geotechnical-led multi-disciplinary services during the emergency pipeline repair at Snohomish River and Ebey Slough for the City of Everett earned an honor award in the Outstanding Civil Engineering Awards program by the Seattle Section of ASCE. We look forward to 2006 with two new geotechnical Masters graduates, Suredan Balendra and Tung Vu.

**Shannon & Wilson**

Shannon & Wilson had a very busy and successful 2005. Our continued growth led to the opening of our Jacksonville, Florida office and new hires in our Portland and Seattle offices. Jacksonville branch manager Mark Popovich expands our East Coast operations. Gary Peterson joined our Portland office as branch manager. Gary has 28 years of geotechnical experience in the transportation, water/wastewater, and site development markets. Also joining our Portland office are Jerry Jacksha and Risheng (Park) Piao. Jerry has 30 years of geotechnical engineering experience focused on water/wastewater and deep foundation projects. Park has 16 years experience with geotechnical designs for transportation and site development projects. Additional 2005 geotechnical hires: Sherri Lott, Matt Thomas, Chad McMullen, and Jeremy Butkovich.

The following staff were promoted in 2005: Chris Robertson, Stan Boyle, and Scott Gaulke to Vice President and Ted Hopkins, Associate. Laureen McKenna and Claire Roggero received their Professional Engineering License last year.

Two of our projects won Silver and Bronze awards respectively in the 2005 ACEC Washington Engineering Excellence Awards competition: Boundary Dam Instrumentation System and Tacoma Narrows Ravine Repair. Our geotechnical involvement on the Marysville Wastewater Treatment Plant Upgrade received a project of the year honorable mention from Trenchless Technology.

Notable projects from the past year:

- We completed fast-track geotechnical design and analyses for emergency repairs to the Beartooth Highway in Montana.
- We won the USACE Seattle Geotechnical IDIQ and are currently working on instrumentation for the Howard Hanson Fish Passage Facility and pedestrian bridge design at Union Slough in Everett.
- Our work for Sound Transit at Beacon Hill continues
Shannon & Wilson (continued)

as we install and monitor instrumentation during construction for this project which is the first and deepest sequential excavation method (SEM) done in soil in the United States.

- We are providing geotechnical and environmental services for the Harborview Bond Program that includes an excavation shoring design that is top-down soil nail walls to 60 feet depth and the permanent walls are shotcreted as the excavation deepens.

- We are continuing our geotechnical and environmental work on the Alaskan Way Viaduct and seawall replacement.

Over 100 attended the 2005 Wilson Lecture cosponsored by the University of Washington’s Civil Engineering Department. Dr. Fred Kulhawy of Cornell University presented his lecture “The Time Factor in Deep Foundations” which focused on how time influences the entire deep foundation evaluation process.

Zipper Zeman Associates, Inc.

ZZA was founded in 1998, and has experienced 7 years of expansion. We currently have a staff of 28, including 17 licensed professional engineers and geologists. ZZA wrapped up 2005 with an exciting event: we merged with Terracon in late December.

Terracon is 100% employee-owned, provides excellent opportunities for professional growth for the ZZA team, and is a technically strong, well-managed company. All of us at ZZA look forward to expanded horizons with our new company, where we will operate as the Northwest division of Terracon. John Zipper will remain as President of ZZA, and Jim Thompson, Tom Jones and Sean Donnan will serve as Department Managers within the Lynnwood office. Al Zeman continues to provide on-call consulting from his home in cave Creek, Arizona.

The ZZA team is proud of a number of accomplishments this year. Our merger with Terracon was certainly the highlight. Another was a renewal of our geotechnical laboratory’s AASHTO accreditation. We also expanded our staff by welcoming a mix of seasoned professionals and recent graduates. Finally, our staff stayed busy with a wide variety of projects, including the Swedish Hospital Orthopedic building, the 500 Mercer project, Northgate and Capitol mall expansions, retail sites all across the Northwest, roadways, bridges, pipelines and tunnels. We provided on call services to a number of agencies, and enjoyed the relationships with our clients and peers that were developed through those projects. We celebrated the holidays with a party at the Lynnwood Convention Center, one of our highlight projects from years past, and we had a great golf tournament in August.

Our Seattle office, managed by Dave Baska, was pleased to welcome Jim Brisbine on board during summer 2005. Jim is staying busy and provides a strong addition to our local experience base. Gil Pepin, staff geologist, was new this year to our Tacoma office, managed by Tim Roberts. Another 2005 accomplishment in Tacoma was celebrated when Jason Washburn obtained his PE license.

In Lynnwood, ZZA welcomed several new staff in 2005. Rob Sargent, staff engineer, completed his Masters Degree at UW in 2005, and returned to ZZA upon graduation. Ryan Murphy and Mike August joined ZZA as staff geologists. ZZA also recognizes the accomplishment of Kris Hauck in obtaining his PE license this year.

We look forward to continued growth in 2006 and beyond.

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John E. Zipper, P.E.
President
The Geotechnical group at CH2M HILL wishes everyone a prosperous New Year! Mike Reimbold continues his service as Group Leader and we would like to welcome Roch Player and Ha Pham to our Seattle area team. Roch recently transferred to Washington from our Anchorage, Alaska, office. Ha recently graduated from Iowa State University with his PhD.

Our team continues to enjoy working on a wide variety of challenging projects for a broad range of clients. Design/build opportunities continue to dominate much of our workload. This past year we opened a project office in Everett to support the reconstruction of I-5 through Everett. This fast-paced, challenging project consists of an extensive field investigation and testing program; nearly two-dozen bridge widenings, replacements, and new bridges; dozens of temporary and permanent retaining structures including CIP, soil-nail, soldier-pile and lagging, and MSE walls; and extensive drainage and water-retention structure construction. Large-diameter drilled shafts, piles, and spread footings are being designed to support the structures. Strict environmental considerations, close neighbors, and variable geology all serve to make this project professionally edifying.

The Design/Build delivery system provides a fantastic opportunity to pull the owner (WSDOT) and the Constructor (Atkinson-CH2M HILL Joint Venture) together in a teaming relationship that has fostered innovation and improved design to provide a project that will significantly improve the flow of traffic along I-5. A team of five full-time CH2M HILL geotechnical engineers (King Sampaco, Joel Theodore, Michel Bouchided, Roch Player, and Ha Pham) plus field staff are co-located with WSDOT and the rest of the JV team in a project office in Everett. Substantial completion of the project is expected in late 2007.
Hart Crowser

Hart Crowser has undergone a number of positive changes in 2005. The most significant change was that the company transitioned majority ownership into an Employee Stock Ownership Plan (ESOP) that allows all current and future employees to be owners of the company and share in those benefits.

We continue to be involved with a number of high-profile projects throughout the Puget Sound area. Recent projects include deep excavations, high-rise buildings, hospitals, waterfront structures, embankments, roads, bridges, dams, seismic studies, peer review, expert witness, and mine closures.

Jeff Wagner, the geotechnical division manager, has also taken on the role of Seattle Operations Manager. Doug Lindquist completed his duties as the President of the Geotechnical Group in the summer and assisting Jeff with some of the division manager duties. Jeff and Doug continue their roles as project managers as well. John Bingham is coordinating the geotechnical construction for the Seattle Art Museum’s Sculpture Park and is participating on the ASCE Geotechnical Group/DPD standard of practice committee. Doug and John were both promoted to Associates. Matt Gibson earned his PE license in California and Washington and was recently promoted to Project Engineer. Alison Armstrong has been instrumental to a number of mine reclamation projects and was also promoted to Project Engineer. Ben Upsall and Armin Stuedlein have both been promoted to Senior Staff Engineer and provide much of the analytical horsepower to the group.

Garry Horvitz continues to secure and manage a variety of interesting projects with private developers, local ports, and the military. Barry Chen has been managing a number of projects for Hart Crowser including a large design-build I-405 project. Mike Bailey is heavily involved in a number of multidisciplinary projects and continues to lead our Third Runway construction support team. Speaking of the Third Runway ... Hart Crowser added to their design role by performing instrumentation monitoring of the largest mechanically stabilized earth wall (155 feet tall including a 20-foot-high slope at the top) ever constructed in North America. Hart Crowser and the Reinforced Earth Company designed this wall. Mike is the ASCE Geotechnical Group’s legislative representative.

We have a strong group of 10 geotechnical engineers in Seattle and are actively looking to grow in 2006. See advertisement on following page.
At Hart Crowser, we provide innovative and creative solutions to serve our clients. We currently have opportunities for **Geotechnical Engineers** (MS preferred) to join our Seattle and Portland offices.

The candidate we are seeking for our **Senior Geotechnical Engineer** will be an OR and/or WA P.E., with 10+ years experience providing geotechnical design and construction recommendations for a variety of development, industry and port/harbor clients within the Pacific Northwest. As the Senior Geotechnical Engineer in the Portland office, this individual will be responsible for business development, project management and mentoring of junior staff.

Candidates for our **Project level Geotechnical Engineer**, also for our Oregon office, will have a MS, with 4~7 years of geotechnical consulting experience, and be an OR or WA PE, or be PE eligible. Experience with environmental projects is highly desirable.

We also have an opportunity for a **Staff level Geotechnical Engineer** to join our Seattle team. The successful candidate will possess a MS in Geotechnical Engineering with 0-2 years experience in performing field explorations, sample collection, and interpretation of subsurface data, engineering analyses, calculations and construction monitoring. Experience and/or interest in environmental projects is a plus. This position will involve fieldwork.

Each of these positions require strong writing, communication and interpersonal skills, to be able to clearly convey technical information to what may/may not be a technical audience.

We offer challenging opportunities and a comprehensive compensation package, including an ESOP. To learn about other employment opportunities with Hart Crowser in the areas of **Environmental Engineering, Water Resources, Hydrogeology, and Wetlands Ecology**, please visit our website: [www.hartcrowser.com](http://www.hartcrowser.com). Interested candidates are encouraged to forward their confidential resume to [staffing@hartcrowser.com](mailto:staffing@hartcrowser.com).

**HART CROWSER, INC.**

An Affirmative Action/Equal Opportunity Employer
GeoEngineers

It’s an exciting time at GeoEngineers, Inc. as we continue to grow, diversify and expand into new services and markets across the nation! We offer our staff incredible opportunities to take their careers to the next level as our projects take us all around the globe and challenge us to find innovative solutions for complex project issues.

Our new geotechnical employees are contributing to our growing success. They include: **Byoungjae Mun**, Redmond, Staff 1; **Lindsay Baynes Flangas**, Redmond, Staff 1; **Seungcheol Shin**, Redmond, staff 1; **D. Craig Royer**, Tacoma, Intern; **Adam Alderman**, Seattle, Senior 1 (civil); **Zachary Newell**, Redmond, Staff 1; **Lyle Stone**, Tacoma, Staff 2; **Jian Hu**, Redmond, Staff 1.

GeoEngineers is pleased to announce the following geotechnical employee promotions: **Mark Miller**, to Project 1, Redmond; **Kimball Olsen**, to Project 1, Redmond; **D.J. Thompson**, to Senior 1, Tacoma; **Shaun Stauffer**, to Associate, Redmond; **Eric Heller**, to Staff 3, Tacoma; **Aaron McCain**, to Project 2, Bellingham; **Garry Squires**, to Principal, Tacoma; **Tim Bailey**, to Staff 3, Redmond; **Byoungjae Mun**, to Staff 2, Redmond.

Congratulations to our newly registered engineer: **Kimball Olsen**, Redmond.

We are proud to provide geotechnical engineering services for major clients in Puget Sound including U.S. Navy, U.S. Air Force, Army Corps of Engineers, U.S. Coast Guard, WSDOT, BNSF Railway Company, Puget Sound Energy, State of Washington Department of Fish and Wildlife, and local cities, counties and ports. GeoEngineers’ staff wishes you a happy and prosperous 2006.

See our career opportunity on the following page.
Are you looking for meaningful work? Exciting and diverse projects? Career growth and advancement opportunities?

GeoEngineers, Inc., a leading environmental and engineering consulting services provider, is seeking talented, qualified candidates for career opportunities available in the Pacific Northwest and beyond. We offer a highly competitive salary and outstanding benefits, including medical/dental/vision/life, 401(k) with matching contribution, profit sharing and merit-based bonus plans, relocation assistance and professional development.

This is a great opportunity to work in a challenging and dynamic environment for a growing company! For a complete listing of current openings, please visit our website at www.geoengineers.com and select “Careers”. For immediate consideration, please apply directly online.

GeoEngineers is an Equal Opportunity Employer.
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**SEATTLE SECTION**
GEOTECHNICAL GROUP

**AMERICAN SOCIETY OF CIVIL ENGINEERS**

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