NISQUALLY CHAPTER OF THE
ASSOCIATION OF ENVIRONMENTAL &
ENGINEERING GEOLOGISTS

The Official
AEG Nisqually Chapter Newsletter

Meeting Details

Tuesday, November 2nd

Location: Mercato Ristorante

111 Market St NE

Olympia, WA

6:00 pm Social

7:00 pm Presentation

Dinner: Pizza and Salad

$25 Member or Non-Member

$15 Educators or Job Seekers

$5 Student

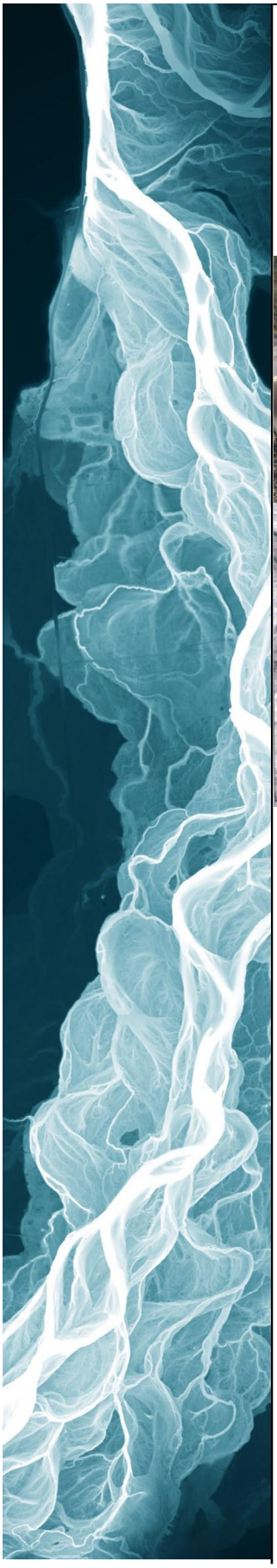
Virtual attendance is free

Upcoming Meetings:

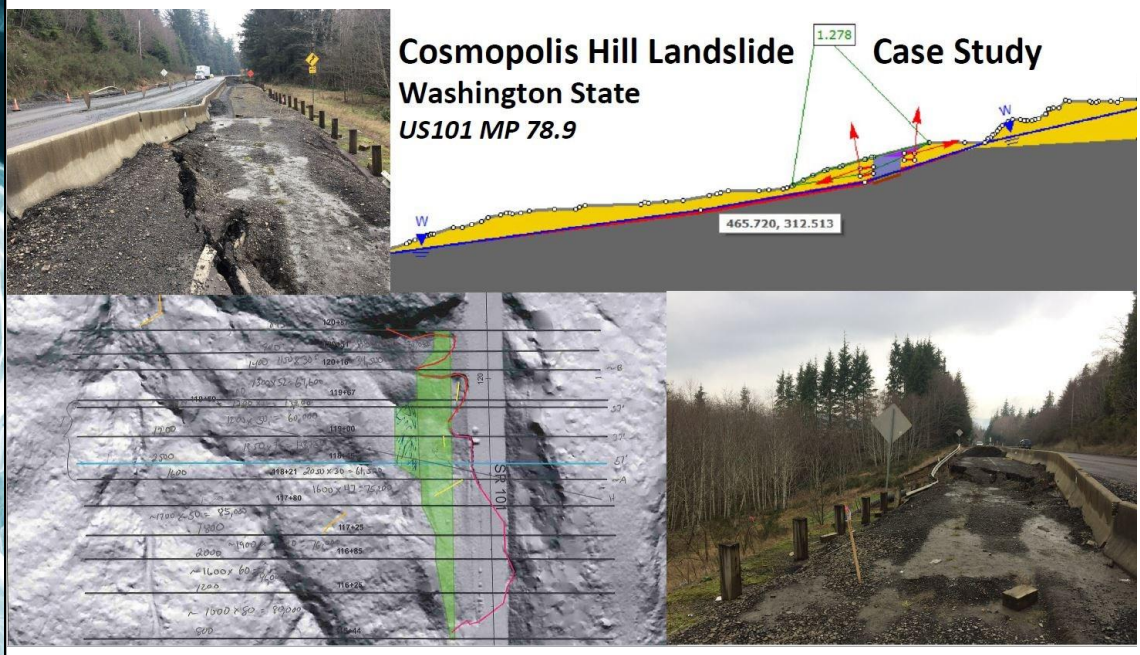
Cosmopolis Hill Landslide Case Study
Washington State
US101 MP 78.9

Cosmopolis Hill is primarily comprised of Miocene aged siltstones and sandstones of the Astoria Formation. In early 1994, the Washington Department of Transportation completed some initial slide mitigation work by placing a 10-foot-wide shear-key buttress, located 37 feet below the existing grade, at the toe of the highway embankment. This buttress temporarily slowed the movement of the landslide. In 1995, additional landslide movement prompted further geotechnical investigations and analysis, which revealed that the landslide is deep seated and is composed of a series of translational block failures extending nearly 750 feet down slope from the highway, and that the actual landslide failure surface is located approximately 30-to 35 feet below the previously constructed shear-key buttress. The same geotechnical investigations found that rainstorm events could also raise groundwater levels by as much as 6 feet in less than 24 hours. In 1998, temporary stabilization measures were constructed to improve the stability of the upper landslide area by constructing deep groundwater drains. These deep groundwater drains included trench drains, a series of drilled vertical shaft drains, and horizontal drains. In May of 2011, a geotechnical site visit revealed that the landslide had reactivated, and the horizontal drains were no longer functioning as designed. In 2013, preliminary engineering towards a programmed mitigation design consisting of new horizontal and trench drains had begun, but well before project advertisement, additional failures occurred that drastically changed the scope of the project. In the spring of 2016, Maintenance could no longer keep up with the landslide movement and sited concrete barrier along the southbound travel lane to permanently abandon the truck-climbing lane and placed gravel over the highway to maintain a passible highway surface.

The new design dilemma became how to stay within our existing unstable slope programming criteria while mitigating an approximately 550-foot-wide deep-seated landslide that is moving between 55 and 115 feet below the existing highway surface. In late 2018, a final design was completed that included maintaining highway traffic through construction, roadway excavation, temporary slopes, a gravel borrow buttress, and a shear-key consisting of quarry-spall-filled drilled shafts socketed into intact bedrock nearly 55 feet below the excavated ground surface. The drilled shaft layout consisted of rows of three to nine shafts that were six feet in diameter with 1-foot radial spacing between the shafts. These shafts resulted in an approximate replacement ratio within the shear-key of about 68%. To fully mitigate the landslide, a gravel borrow buttress was also constructed on top of the drilled shafts with two arrays of



horizontal drains to help maintain lower groundwater elevations throughout the winter months. Construction issues included completing the project before the onset of winter rains and encountering obstructions while the shafts were being drilled. Towards the completion of the project, a near real-time slope monitoring system was deployed to monitor the slope for ongoing movement over the next two winter seasons.



Please RSVP by 4 pm Friday, Oct. 29th if you plan on attending in person. RSVP at:

https://aeg-nisqually.brownpapertickets.com

COVID vaccination required for in-person attendance

Zoom Meeting Info:

https://us02web.zoom.us/j/84167848817?pwd=bzlqdUIxcW9wRkpyTEFET0V4ZS9hZz09

Meeting ID: 841 6784 8817
Passcode: 956589
One tap mobile
+12532158782,,84167848817#,,,,*956589# US (Tacoma)
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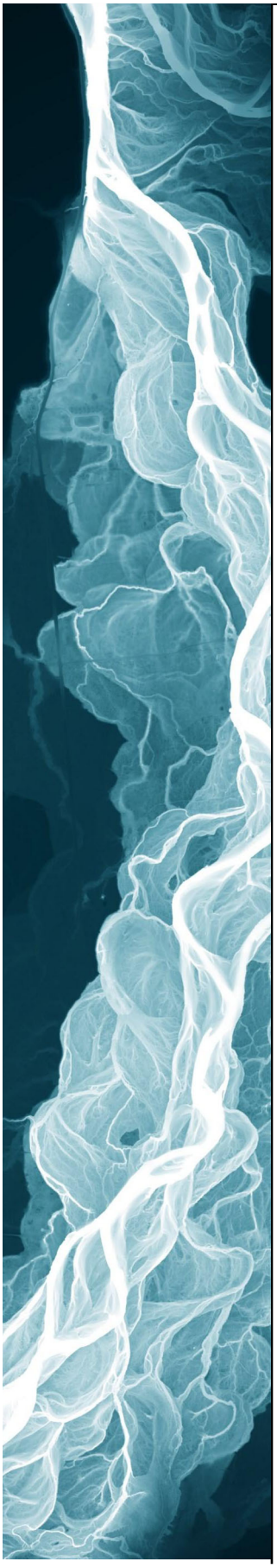
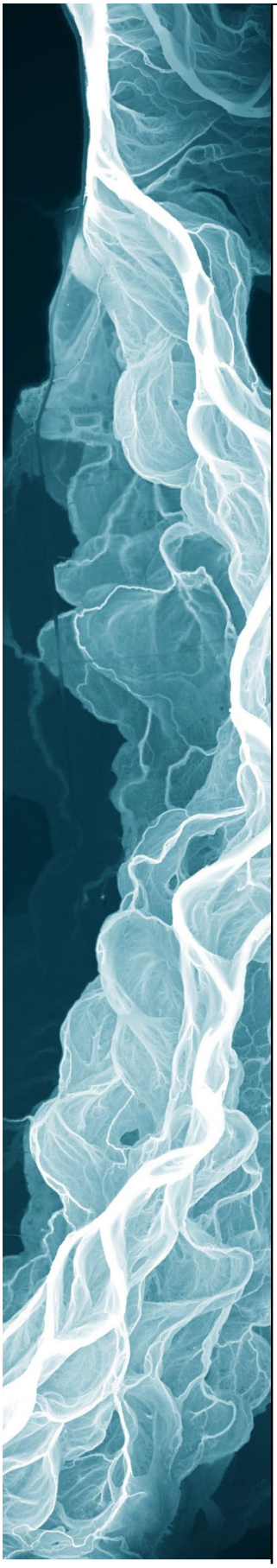


Bio: Marc Fish

Marc is the Washington State Department of Transportation (WSDOT) State Engineering Geologist. He manages a group of highly skilled engineering geologists who are technical specialists in rock slope engineering and stabilization, rockfall control, landslide stabilization, soil cut and embankment design, and unstable slope management. He started his career working as an electron microscopist within the public and private industry. He then turned towards engineering geology while working for the New Hampshire Department of Transportation (NHDOT), where he specialized in rock slope management systems, rock slope stabilization and design, geophysics, and controlled blasting. He is currently a licensed Geologist and Engineering Geologist in Washington State and has previously been licensed in the state of New Hampshire and certified through the American Institute of Professional Geologists (AIPG). He has over 25 years of experience managing risk relating to unstable slopes and developing cost effective remediation designs for rock slopes, landslides, and debris flows along our state highways. Marc earned his bachelor's degree from the University of Colorado and his master's degree from Southern New Hampshire University. He has numerous hobbies and interests, some of which include sailing, skiing, climbing, and pole vaulting.



Message from the Chair

December Meeting, Year in Retrospect:

Last year we hosted the first "Year in Retrospect" AEG Nisqually meeting. Typically the Nisqually AEG Chapter takes December and January off each year for the Holidays, but we are interested in making this a yearly tradition if it serves the chapter members.

We are asking our members who would like to participate to send us a few slides via email that we can share with the group that they would like to talk about at the December meeting. The format is casual, but we would like to look back on projects you have been doing over this last year, or *look forward to projects you would like to do in the next year*.

Geo-Podcast of the Month:

For those times you need something to listen to on your way to the field site.

Ralph Haugerud Interview - Nick Zentener Geology Podcast

This month's recommendation is brought to you by yours truly. If you would like to suggest future podcasts/free applicable geo-media, please let us know in person or via email. Topics can be diverse, but should be geologically focused.

COVID Response/Remote Meetings Update:

Proof of COVID vaccination is required for in-person attendance. COVID waivers for in-person attendance are in development at the AEG national level. Updates to come.

AEG Involvement Opportunities:

We are seeking a "Social Media Czar" to join the board in order to create an AEG Nisqually social media presence. The position is volunteer, with single year terms to be voted on annually. If interested, please let us know at the next meeting, or email us.

Cheers,

Brittany

aegnisqually@gmail.com

Section Officers & Committee Chairs

Chair:

Brittany Dayley

Washington DNR

Brittany.Dayley@dnr.wa.gov

Vice Chair:

Susie Wisehart

Washington DNR

Susie.Wisehart@dnr.wa.gov

Treasurer:

Samantha Denham

Mud Bay Geotechnical

denhamsamm@gmail.com

Secretary:

Stephen Newman

WSDOT

NewmanS@wsdot.wa.gov

Newsletter:

Kate Mickelson

Washington Geological Survey

Kate.Mickelson@dnr.wa.gov

Virtual Meetings Chair:

Kara Jacobacci

Washington Geological Survey

Kara.Jacobacci@dnr.wa.gov

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Vacant

National AEG webpage:
http://aegweb.org

The AEG Nisqually Chapter Newsletter

The Association of Engineering Geologists (AEG) contributes to its members' professional success and the public welfare by providing leadership, advocacy, and applied research in environmental and engineering geology. AEG's values are based on the belief that its members have a responsibility to assume stewardship over their fields of expertise. AEG is the acknowledged international leader in environmental and engineering geology, and is greatly respected for its stewardship of the profession.

AEG NISQUALLY CHAPTER NEWSLETTER is published monthly from September through April. Subscriptions are for members of AEG affiliated with the Nisqually Chapter or other Chapters, and other interested people. E-mail subscriptions are free.

Mailing List sign up link: **http://eepurl.com/c5gyKn**