Tracks Retaining Wall Meeting Minutes- Meeting 1 (TA) CENE 486

Meeting Time: 09/13/19, 10:00 am-11:00am
Meeting Location: EGR 114
Meeting Type: Technical Advisor Meeting
Meeting Purpose: Discuss the steps that need to be taken and advice for collecting samples. This will determine the amount and way that soil is collected.

People in Attendance:

- Chris Cook
- Hunter Schnoebelen
- Josh Endersby
- Tommy Nelson

Agenda Items

Start of Meeting:

Time (Start)	Time (End)	Description of Agenda Item
10:00am	10:15am	• Catch up from previous semester, and reintroduce the project and the team. • Discuss the agenda items and current over all issues thus far. • Discuss the meeting with Bero about how to sample and sampling plan
10:15am	10:30am	• Determine how sampling in engineering companies collect soil in flagstaff. • Discuss the restrictions and changes in the way that sampling may need to happen.
10:30am	11:00am	• Develop a plan to presented and discussed with Bero and Stephen to ensure that soil is collected correctly. • Determine next time we should meet to talk about soil testing.

End of Meeting:

Summary / Recap:

- Duplicate samples are not needed, however, yes duplicate samples should be taken if possible. 3 samples per location will work as Bulk sampling. This will be combined into the same sample along the wall to create a homogenous group of samples along the wall.
- Can shift sampling if need be up slope to get better data. (For actual design values)
- Can stop if hits significant size rock, however, need to ensure that it is immovable prior. This means that rock is bigger than a foot both ways.
- Clay soils testing, if present, will need to be done in the field. Tommy supplied 2 tests to use. Penetrometer test and the shear vane test were proposed, but other tests also suppled will give readings on friction angle and settlement.

- Record samples and collect samples consistently, and use trash bags to keep moisture content consistent. Samples that are most like collecting from the field that day are best prior to drying them out.

Future Items:

Due Date	Item	Estimated Time to Completion	Team Member
09/13/2019	Collect and store soil samples	1-2 days	ALL
	Field Sampling Plan	2 hours	Josh
	Field Safety Plan	2 hours	Josh

Comments/ Concerns:

- Need to start testing as soon as soil is collected.
- Collect soil by the end of the week (09/19/2019)

Other Information:

- September 24,2019 report and presentation is due.
- Talk wyatt about chemical testing for toxic soil.

Future Topics and Assignments:

- Beginning Hydrology (09/12/2019)
- Client meeting Tuesday at 4:00pm (09/17/2019)
    - Collect Survey and Possible estimated line work for structure as well as topo for hydrology and hydraulics.

Tracks Retaining Wall Meeting Minutes- Meeting 2 (TA)
CENE 486

Meeting Time: 10/15/19, 1:00 pm-2:00pm
Meeting Location: EGR 114
Meeting Type: Technical Advisor Meeting
Meeting Purpose: Discuss the results of the testing and the type of soil as classification. This is to fix the issues in the soil determination and the proceeding extra testing that is needed.

People in Attendance:

- Chris Cook
- Hunter Schnoebelen
- Josh Endersby
- Tommy Nelson

Agenda Items

Start of Meeting:

Time (Start)	Time (End)	Description of Agenda Item
1:00pm	1:15pm	• Discuss how sampling and testing has been going. • Discuss the presentation and how it went.
1:15pm	1:30pm	• Determine the issues with consolidation and triaxial as well as the outlier in the soil sampling. • Discuss proceeding steps in determining the results accurate.
1:30pm	2:00pm	• Discuss the accuracy of results and the calculations being used. • Determine if SWI's soil samples are needed through actual geotech report for project.

End of Meeting:

Summary / Recap:

- Discussion of the soil and the issues that we have had. This was determined to be the settlement from consolidation and the friction angle from triaxial. Both tests came with odd results and the determination is more testing.
- Determination that more testing will need to be done using the direct shear test and consolidation on the soil as homogenous sample. This will replace the previous consolidation test and the triaxial tests that have been completed.
- Talked about the issue with the triaxial test as the bearing capacity that was collected was wrong and will need to use the direct shear.
- Determined the soil is most likely not native to the site as the soil that was collected was a fill and will be used for future development. Soil is somewhat similar to the soil that is native in the geotech report that tommy has. The Soil classification is slightly tweaked as the testing may have provided some insufficient results.

- Determined that further testing is needed to determine if the soil analysis should be used to design walls. (Discuss with Bero)

Future Items:

Due Date	Item	Estimated Time to Completion	Team Member
10/15/2019	Testing for better results	2 weeks	All
	Determine preliminary wall designs for 60%	3 days	All
	Field Safety Plan	2 hours	Josh

Comments/ Concerns:

- Need to begin wall designs to show client to choose the best option
- Need to determine if soil that was collected is accurate enough to use for wall design.

Other Information:

- 60% is due with presentation the week of October 22, 2019.
- Complete soil chemical testing for the 60% with wyatt

Future Topics and Assignments:

- Hydrology was determined that it could be ignored based on future development and infrastructure. However, weep holes or a perforated pipe near the wall are needed to divert water that may be in contact with the wall.
- Hunter talks to the client to determine if hydrology is needed for the wall.

Tracks Retaining Wall Meeting Minutes- Meeting 3 (TA)
CENE 486

Meeting Time: 11/19/19, 10:00 am-11:00am
Meeting Location: EGR 114
Meeting Type: Technical Advisor Meeting
Meeting Purpose: Discuss the results of the testing and the type of soil as classification. This is to fix the issues in the soil determination and the proceeding extra testing that is needed.

People in Attendance:

- Chris Cook
- Josh Endersby
- Tommy Nelson

Agenda Items

Start of Meeting:

Time (Start)	Time (End)	Description of Agenda Item
10:00am	11:00am	• Discuss CMU wall calculation

End of Meeting:

Summary / Recap:

- Discussion of the CMU wall included clarifying that the sliding, overturning, and bearing capacity checks are the same calculations as a concrete cantilever retaining wall except the unit weight of the masonry is different. Also talked about reinforcement and the team concluded that a steel dowl will be needed in the concrete footing sized to handle the applied moment at the footing and imbedded 9” into the footing.

Future Items:

Due Date	Item	Estimated Time to Completion	Team Member
10/22/2019	Concrete Cantilever retaining wall calculations and plan/profile	2 days	All
	CMU retaining wall calculations and plan/profile	3 days	All
	MSE retaining wall calculations and plan/profile	2 days	All

Tracks Retaining Wall Meeting Minutes- Meeting 4 (TA)
CENE 486

Meeting Time: 11/25/19, 10:00 am-11:00am
Meeting Location: EGR 114
Meeting Type: Technical Advisor Meeting
Meeting Purpose: Discuss the results of the testing and the type of soil as classification. This is to fix the issues in the soil determination and the proceeding extra testing that is needed.

People in Attendance:

- Chris Cook
- Hunter Schnoebelen
- Tommy Nelson

Summary / Recap:

- TBD
- Will happen in the following week as wall design is almost completed.

Tracks Retaining Wall Meeting Minutes- TA Emails
CENE 486

Purpose: Discuss the issues with the projects and how to proceed as there is time difference. Meetings are often for large amounts of questions and determining steps to complete needed tasks on the project.

People in Email:

- Chris Cook
- Hunter Schnoebelen
- Josh Endersby
- Tommy Nelson

Summary / Recap:

- Emails are primary use of communication to determine and fix small issues in the project. Below is a list of all emails sent and responses.

Hi Tommy,

Hope you had a great summer, and we are looking forward to this semester in capstone. The first thing that we need to cover is the TA agreement, which needs to be signed again and is attached to this email. If you could sign it and send it back to one of us, that would be great. Also the first major question has come up which is the number of boring holes that are required for a sufficient geotechnical test for a retaining wall (approx 1500 feet long). We are also wondering what an acceptable location for the boring holes might be. The team discussed that optimally the boring holes might follow the wall alignment, but if that is not possible for some reason, what the acceptable tolerance might be. Lastly, given that we will be boring using a hand auger, we were wondering what depth might be necessary to bore to. The team believes that the wall will not exceed a depth of 5 feet below grade, so we are hoping that this might be an acceptable depth. Any other specific information you might think of would also be appreciated. Lastly, we have attached our final proposal from last semester if you would like to look over it to get more up to date with our project

If you need more information let us know.

Thanks,

The Trax Team
Chris Cook,
Josh Endersby,
Hunter Schnoebelen

From: Josh Endersby <jje55@nau.edu>
Sent: Monday, November 11, 2019 6:57 PM
To: thomas@siriusstructures.com
Cc: Boren Cook <bcc88@nau.edu>; Hunter <has233@nau.edu>
Subject: Tracks Consolidation

Hey Tommy,

We (painfully) completed the consolidation testing. Due to time constraints, We only tested one sample because it took 4 days to reach an adequate load (2099 lbs). But we are a little confused on what we should actually be looking for in terms of variables or extractable information. Are we looking for the Recompression index or trying to get an idea of normal/pre/overly consolidation properties of the soil, or just a stress strain curve? I have attached the excel data and would greatly appreciate your input.

Thank you,

Tracks Team

(Josh Endersby, Chris Chris Cook, and Hunter Schnoebelen)

On Tue, Nov 12, 2019 at 8:17 AM Thomas Nelson <thomas@siriusstructures.com> wrote:

Hi All,

Since your sample was disturbed you won't be able to get any information about the consolidation ratio. The key reason behind for performing this test is to get the soil properties you need to estimate settlement below your wall under whatever design bearing pressure you select. Typically settlement is limited to ~1/2". You can use that to work backwards to determine an allowable bearing pressure. You can also see from the stress strain curve where your soil moves from "elastic" to "plastic", so you also can tell what you do not want your allowable bearing pressure to exceed. As a side note, typically a factor of safety of ~3-5 is used when reducing ultimate values to allowable values.

I hope this helps! Let me know if you have any more questions.

Tommy

Thank you, that is very helpful. Another question we have is about designing a CMU retaining wall. None of us have designed one before but it seems like it would be designed the same way a concrete cantilever wall with the sliding, overturning, and bearing checks. Is it the same process and equations for a CMU wall or are there differences we should look out for?

Thank you,

Trax Team