BEDMINSTER TOWNSHIP
LAND USE BOARD

IN THE MATTER OF: : TRANSCRIPT
:
CASE: LUB# 12-015 (BOA) :
KDC Solar SA55 LLC : OF
Solar Project :
Country Club Road :
Block 71.02, Lot 1 : PROCEEDINGS
Block 62, Lot 10 :
Block 69, Lot 4 :
_____X

Thursday, February 12, 2015
Municipal Building
One Miller Lane
Bedminster, New Jersey
Commencing at 7:01 p.m.

BOARD MEMBERS PRESENT:

LANCE BOXER, Chairman
NICK STRAKHOV
CAROL GUTTSCHALL
LOUIS DiGIOVINE
DORN STEWART
GEORGE RODELIUS

ALSO PRESENT:

JANINE DeLEONE, Board Secretary
FRANK BANISCH, Board Planner
PAUL W. FERRIERO, Board Engineer

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RICHARD M. SASSO, ESQ.
Attorney for the Objectors - Steve and Sabina Forbes

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I N D E X

E X H I B I T S

IN EVD.	DESCRIPTION	PAGE
OF-3	Report dated 1/8/2015	6
A-21	Test Pit location map	40
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AUDIENCE MEMBERS SWORN.

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(Roll call is taken.)

CHAIRMAN BOXER: Good evening. And tonight we have one applicant which has been part of the plan, KDC. We'll go through public comments first. Anybody in the audience that would like to come up and address the committee that's not related to KDC so this is the time you can come up and make a statement or ask questions about anything that's not on the agenda this week. (No response.)

Okay. Seeing none. We'll just go right to, let's see, pending applications. So we have one, Mr. Ferriero, Land Use Board 14-015.

(The Board discusses other matters.)

CHAIRMAN BOXER: All right. So we'll get right to it. Continuing on hearing LUB 12-015, which is KDC. Nice to see you, Mr. Hall.

MR. HALL: Good evening. Gary Hall for the applicant, KDC Solar SA55. We have our geotech engineer to testify tonight.

CHAIRMAN BOXER: Okay.

MR. SASSO: Mr. Chairman, if I could I would like to address the Board.

CHAIRMAN BOXER: Sure, Mr. Sasso.

MR. SASSO: Mr. Chairman, this application has obviously a lengthy history, but the things I

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wanted to note tonight before we take on this testimony is basically a notation that what was agreed to by the applicant in this case has not been followed. There was a request by Mr. Hall that I spend money and have Mr. Forbes pay for the engineer to have a meeting with Mr. Ferriero, as well as the applicant's engineer. I have the testimony or the comments in a record of Mr. Hall saying this is better. This will eliminate all these questions, hopefully, if the engineers can reach an agreement.

So in the spirit of cooperation I do something that's unusual for an objector. All right, we'll pay for the engineer to go and see if we can have a meeting of the minds in terms of incomplete data. That was done. There was a request at the same time that I even produce a written report before the meeting and provide it to everyone, namely, Mr. Ferriero in advance. I promised that I would do what the applicant hasn't done in this case and share it directly with the applicant's attorney, which I did, and I did what I said I was going to do.

We then come up with, after spending a substantial sum of money, the report that was filed with the Board dated January 8, 2015. I just ask that that be marked for Identification.

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MR. COLLINS: We'll make that Identification number O -- I don't have a number.

(Exhibit OF-3, report dated 1/8/2015, was received and marked.)

MR. SASSO: So OF-3 is the lengthy report that I provided to everyone, and then we had the meeting. And after the meeting Mr. Hall noted at one of our last meetings, look, the engineers all got together, and they did. And as usual Najarian Associates went to the meeting fully prepared to agree upon the testing that was to be done. We have Mr. Ciliberto who's also here, who's been at most of the meetings, as well as Vajira Gunawardana, the chief engineer.

They then reach an agreement with the applicant in front of Mr. Ferriero to what data we all needed before we again went into this area of stormwater management, so that we wouldn't continue to go in circles. They reached that agreement, and time goes by until this hearing. As the Board knows there was a prior hearing that was adjourned, et cetera, due to the weather so we got this new date. I kept checking and checking with the Board secretary, where are the new submissions? Where is the new data? Where is the new -- I don't have anything. I don't have

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anything. I don't have anything.

I have no idea who's going to be produced here tonight, and I find out yesterday that we have a geotechnical specialist and the applicant's engineer is going into stormwater management. And I wonder how this happened? In other words, my objection, none of the new data that was agreed to by this applicant has been provided. None of the testing that everyone on the Board said, well, we really need high water table, et cetera, my engineer says you can't design a stormwater management without knowing what the high water table is. And we don't have that to this day, but here I am tonight after spending a lot of money and I have no additional data, and yet we're going forward with these witnesses. To say that I was shocked yesterday would be an understatement. I'm just making these statements for the record because that's what your record bears out. And I did what I said I was going to do, and I spent a lot of money. We identified the testing and it was never done. Here I am supposed to cross-examine someone without the data. Thank you.

CHAIRMAN BOXER: Mr. Sasso, I appreciate it.

Mr. Hall, do you have a comment? And I'd like an explanation.

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MR. HALL: Yeah, well, I disagree with what he said. There was a meeting, and I know they've met with -- our engineers have met with Mr. Ferriero. The geotech information was filed in a report in September, and then in December it's not that we were surprising you with information that the reports went to Mr. Ferriero. I assume Mr. Sasso got a copy. It was available. And my understanding from the engineer is that it reached a point where let's just move ahead. We know Najarian will never be happy with everything. It was considered.

And I'll defer to Mr. Ferriero, he's the engineer. I mean, if he wants us to do more we'll do more, but our understanding was that we had addressed the questions and it was time to move ahead. I mean, there was no intentional misrepresentation, no sleight of hand. I mean, I wasn't involved. The engineers have been dealing with Mr. Ferriero, et cetera, and this has gone on for a number of months now.

CHAIRMAN BOXER: Right.

MR. HALL: And certainly if there are any issues we'll address that, but I think we've provided a lot of information and a lot of discussion, and I don't see a problem.

CHAIRMAN BOXER: Ms. Donato just got here,

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and I'm sure they'll have something to say as well, Mr. Sasso as well. Look, a couple of comments and maybe Mr. Sasso and Ms. Donato if you have anything further to say you can come up again.

There are four issues here, right, and there will be probably more as this night goes on. You know, I've had conservations with Mr. Collins and Mr. Ferriero about the completeness of the application, specifically stormwater. And I believe, and we'll have Mr. Ferriero confirm it, but he does believe that it's adequate and that it should proceed. It doesn't mean it's perfect, but it is adequate in our professional's mind, which leads me to believe that we have to give the applicant, whether it's right or wrong, or whether we like the way case progresses, the applicant has the right to present this case in an order that they seem fit. It would be nice if it was orderly and if it was agreed to in advance. I'm not sure whether we can ever get to that point, but I do think that with the township engineer agreeing that certainly at the most minimal level if the report is adequate to proceed then we have a right and we have an obligation to let the applicant proceed.

The truth is that the Najarian report, which was introduced tonight, it hasn't been presented,

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and I'm sure it will be by the Objectors at some point, and at that point that report will go on the record and they will have a chance to present it and give -- the applicant will certainly have a chance to cross-examine. And at some point we'll have to determine where the truth lies and whether we can get our professionals to render some opinions on the accuracy of both reports.

I'm not sure what else we can do with this stage. I know that in a perfect world this application would be complete in everybody's mind, but at the moment it's certainly the prerogative of the applicant to present in any form or sequence that they want and certainly with the professionals agreeing that it does meet minimum standards. It's just not something -- we don't have the discretion to not allow the case to continue.

So, I just want to make that comment, and allow Ms. Donato and Mr. Sasso then to come back up and certainly for any other comments or statements we would appreciate you at this point, whatever, Ms. Donato. I know you came in late and I just want to make sure we give you the opportunity to speak.

MS. DONATO: Thank you very much, Mr. Boxer. I come from a far distance, and I had snow the

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entire way up. Usually I'm Mario Andretti, but it's when it's like snow I have a considerable degree of trepidation

CHAIRMAN BOXER: I understand. I'm glad you're here safely.

MS. DONATO: Thank you. I hope I can get home safely because it's snowing heavily.

There is no question as one searches back to the various correspondences that were exchanged toward the November and December of 2014, including those from the applicant's attorney, that they recognize the need to provide additional information in order to have what is really a fundamental element of any compliant stormwater management plan, and that is, where is the seasonal high.

This Board has tried. You've given enough warning. Certainly we've given enough warning. And if the applicant wants to proceed with the information that it has then we, you know, will certainly, you know, understand that, and don't agree with it, but because it's really been delaying everything. In the long run you made the right decision back in June that this is only causing us to go around and around. And it's particularly bothersome because it was very much understood that there was going to be some response.

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There was an agreement that they were going to have more tests done and that there was going to be a response after the, you know, the summer of additional tests that were done. And not having that response received I was really, really surprised today to learn that this application was moving forward on stormwater management. I, you know, we all had to scramble and if nothing it's -- it's probably not in consideration, it's probably a deliberate strategic move to try to get us off our persistence that this is an important issue, but we won't forget, so, thank you.

CHAIRMAN BOXER: Look, I understand, again, this process will allow you and Mr. Sasso and anybody else who chooses to question witnesses or cross-examine evidence to take your best shot at that. And this applicant, again, has the right to present in their own form and sequence. So as much as we'd like perfection it may not happen and we have to give the applicant some latitude to present in a way that they feel is correct.

If the Najarian report in this case is completely -- is in conflict with their report you guys are going to have plenty of opportunity, as Mr. Hall will, to look at it, submit it, and cross-examine it. And hopefully the process will bear out on what is, in

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fact, the truth and what we can look at as a Board to make a decision.

So, Mr. Ferriero, I just want to confirm with you, do you agree with my statement? Do you have any other comments to make?

MR. FERRIERO: I think the most significant thing that I can say is that there is a very big difference between a complete application and one that is fully technically sufficient and meets all the standards. The information has been submitted. There is certainly some discussion and debate as to the validity of that information and whether or not it complies with all the standards. I've read everything that's been submitted. Frankly, I think there's more testimony that at least I need to hear to make any judgment on this. And, you know, as you said it's the applicant's case to make. And if they feel that they've submitted enough information to address the issue then I suppose that what they do is they submit the testimony to say why it does. And if it does or it doesn't that's ultimately for the Board to determine.

CHAIRMAN BOXER: Thank you, Mr. Ferriero. Mr. Collins, any comments?

MR. COLLINS: No, Mr. Chairman. I think we should do as you indicated you will do, which is

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proceed with the next witness.

CHAIRMAN BOXER: Thank you. Mr. Hall?

MR. HALL: If we can have the witness sworn.

MR. COLLINS: I don't think he was sworn. Sir, please raise your right hand. Do you swear or affirm to tell the truth, the whole truth, and nothing but the truth so help you God.

MR. LOH: I do.

MR. COLLINS: Please state your name and your business address for the record.

CHAIRMAN BOXER: Sir, you'll have to speak into the microphone.

MR. LOH: My name is Dennis C. Loh, L-o-h. My business address is 14-B Worlds Fair Drive, Somerset, New Jersey.

D E N N I S C. L O H, having been duly sworn, testifies as follows:

MR. COLLINS: Thank you, sir.

DIRECT EXAMINATION BY MR. HALL:

Q. Mr. Loh, can you tell the Board your professional background and experience and qualifications?

A. Certainly. I received my bachelor of science in civil engineering from the University of

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Maryland in 1983. At that time upon graduation I was employed by Melick-Tully and Associates, a geotechnical engineering firm in New Jersey, and I worked with Melick-Tully until January of 2003 when I was employed by Geo-Technology Associates, Inc.

I am currently vice president and principal in charge of GTA's Somerset, New Jersey office. I am a professional engineer licensed in New Jersey, New York, and Connecticut.

Q. And as a professional engineer is there an area in which you particularly practice?

A. Yes. Since graduation I've been practicing geotechnical engineering on a full-time basis.

Q. Can you just briefly tell us what geotechnical engineering is?

A. Geotechnical engineering is, as the name applies, 'geo' having to do with soil, but it's really the structural properties of soil, evaluating the structural properties of soil and how they interact with structures. So it's related to foundation design, retaining wall design, floor design, and other components of construction.

It also has to do with what we're testifying here tonight about, is soil and groundwork conditions, bedrock conditions and such.

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Q. And have you testified as an expert on such matters before Land Use Boards such as this one?

A. I have.

Q. Have you ever been before this Board, by the way?

A. I have not.

Q. And have you been accepted as an expert witness?

A. Every time.

MR. HALL: Okay. I would offer Mr. Loh as an expert witness as a geotechnical engineer.

CHAIRMAN BOXER: Okay.

MR. COLLINS: Mr. Chairman, we should open to the attorneys for questions just on voir dire on the witness' qualifications.

CHAIRMAN BOXER: Thank you. Mr. Sasso?

MR. SASSO: I do not have any questions, Mr. Chairman.

MS. DONATO: I don't either.

UNIDENTIFIED PUBLIC MEMBER: We can't hear.

CHAIRMAN BOXER: You guys can't hear? We'll make sure that Mr. Loh speaks into the microphone. Thanks.

MR. COLLINS: So, Mr. Chairman, I recommend that the Board find that Mr. Loh is qualified as a

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professional engineer and as an expert in geotechnical engineering.

CHAIRMAN BOXER: Thank you very much, and we'll accept the witness.

MR. HALL: Thank you.

BY MR. HALL:

Q. Mr. Loh, can you start off by telling the Board your relationship to the project that's before the Board?

A. Certainly. I think it might be helpful to all to understand when and how GTA became involved with this project. To do that I think I need to speak a little bit about soil classification. The U.S. Department of Agriculture has maps in near surface soils throughout the state based on the soil mineralogy, gradation, and drainage properties. The mapping units are called soil series. And there's about 200 different soil series throughout New Jersey. There are four different soil series at this site; namely, Penn shaley silt loam, Penn silt loam, Norton loam, and Klinesville shaley loam.

The various soil series, the 200 of them, are further categorized into four different hydrologic soil groups A through D. Group A is the most permeable type of soil, and Group D is the least permeable soil.

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Three of the soil series at this site are identified as Group C, and one of them is identified as Group D on the USDA mapping. Prior explorations performed by Birdsall --

CHAIRMAN BOXER: Mr. Loh, can I ask a question, please? When you say three of "C" and one of "D," what about proportionately against the size of the property? In other words, does the one soil in Group D make up a larger portion of the property?

THE WITNESS: No, sir. Group D is generally through the center of the property, maybe a little bit towards the east. I don't know an exact percentage of the area of the site. I would guess that it's about 20 percent would be a rough ballpark.

CHAIRMAN BOXER: All right. 20 percent, approximately. Thank you very much.

THE WITNESS: So prior explorations were performed by Birdsall and Gladstone Design. And all of those explorations indicated clay or silty soils below the topsoil, and the clay and silty soils were underlain by shale. Because of this it was considered likely that the soils throughout the site could have the characteristics of Group D, as opposed to Group C, which was the predominant soil type according to the mapping.

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So the New Jersey Department of Environmental Protection provides a way to test the soil to evaluate if the mapping unit may be incorrect and maybe should be revised. So KDC retained GTA to perform an exhaustive study to determine if the soils throughout the site are Group D. And we started that work in August of 2014.

When we started to do that work, which included some infiltration testing, some of the infiltration tests came back with rates that were slightly higher than the rates that are identified as Group D soils. So early on in the process we advised KDC that it's probably not realistic that we're going to be able to revise the soil mapping to Group C -- rather, to Group D throughout the site. So we shifted gears at that point.

Since Group "C" soil conditions were present at some locations --

CHAIRMAN BOXER: Mr. Loh, can I ask a question?

THE WITNESS: Yes.

CHAIRMAN BOXER: Can you just explain what's the relevance of shifting gears? What would -- if you were able to align more with Group D what would that have done for the application or not?

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THE WITNESS: Group D soils are considered impermeable. And so many of the stormwater regulation requirements such as infiltrating water into the ground would have been waived by DEP.

CHAIRMAN BOXER: Interesting. Okay.

THE WITNESS: So we perform some test pits in the area that appear favorable in the initial testing. We perform infiltration in some of those areas. And Gladstone performed a preliminary stormwater management design based on that initial round of testing. Then we went back to the site and performed additional testing in the infiltration basin areas for Gladstone's final design.

So to summarize the subsurface conditions encountered in GTA's test pits we performed 43 test pits in August and September of 2014. Test pits range from about one-and-a-half- to 9-feet deep. The general subsurface profile was about 4 to 12 inches of topsoil at the surface. The topsoil was underlain by silty and clay soils. They're residual soils that extended to depths of about one-and-a-half- to 9-feet deep where we hit weathered shale rock.

We encountered slight seepage in two of the test pits at depths of two and a half feet, and four and a half feet below the ground surface. Mottling,

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soil mottling was observed in eight of the test pits at relatively shallow depths. The materials below the mottled soils were not mottled. So GTA --

BOARD MEMBER STRAKHOV: Could we get an explanation of mottled? I'm not sure I know what the relevance of that is.

THE WITNESS: Sure. The groundwater level typically fluctuates seasonally anywhere on any site. Soil mottling is the result of a color change of some of the soil particles, typically iron, due to prolonged saturation causing an anaerobic condition. They're starved of air.

So, through a long and arduous process that involves lots of stuff, generally the colors tend to pale, to become more pale over time in that condition. When the groundwater level rises it causes saturated soil particles to pale and become -- and that's the term called 'mottling.' Some of the soil particles were pale, some weren't. So it appears as a marbling effect.

So when the groundwater level rises and causes soil mottling that is an indication of a seasonal high groundwater level. But it's not always -- soil mottling is not always an indication of the seasonal high groundwater level. Water that -- rain

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water that infiltrates, seeps through the topsoil, seeps through the underlying soils, can get held up or perched on top of relatively impermeable soil layers. So those soil layers, those soils are saturated, not as a result of a rising groundwater level, but rather as a result of water seeping through and becoming trapped on top of that impervious layer. So those soils can become mottled, but that mottling is not an indication of a seasonably high groundwater level.

CHAIRMAN BOXER: Mr. Loh, I apologize, because I know you're on a pace here and I don't want to get you too distracted, but there's a great deal of debate in this room for many months over the materiality of doing the testing during high water times. Can you comment on, you know, in your professional opinion doing the tests whether I think you said 43 in the August/September time frame, would there be a difference in your testing if you did it during the high water season?

THE WITNESS: The difference would be, in the high water season you may see a groundwater level that wasn't seen before at the deeper levels. The groundwater level will fluctuate maybe a few feet in -- on a site like this maybe a few feet over the course of the year. It may go up and down 2 or 3 feet on that

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order of magnitude, not 10 or 20 certainly.

So when soil becomes saturated it becomes mottled, most soils do, not all, most soils do. The soils at this site do. So in the dry season, the season -- I'll say it the other way, there is a wet season identified as defined by DEP. That's the time of the year from January 1st to April 1st. That is called the wet season. During the wet season a determination of the seasonal high groundwater level can be made simply and only by looking at the observed groundwater level. But outside of the wet season soil mottling can be used, is allowed to be used, according to DEP, as an indicator of what the seasonally high groundwater level is. I hope that answered your question.

CHAIRMAN BOXER: It was. Thank you. I appreciate that.

THE WITNESS: So we observed mottling in eight of our 43 test pits at relatively shallow depths, generally within the clay and silty soils underlying the bedrock. And as I said the material below the mottled soils was not mottled, which is a very good indication that the mottling was caused by a perched groundwater condition, rather than a rising groundwater condition.

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So for that reason GTA provided an opinion that the soil mottling at this site, at least in the areas where we observed it in those test pits, is not indicative of the seasonally high groundwater level.

So then we performed infiltration testing. We did infiltration tests at 28 locations, not across the site -- well, across the site. Most of them were done within the areas proposed for infiltration, stormwater infiltration. They were all done at relatively shallow depths within the silty and clay soils.

Infiltration testing was not performed by GTA within the rock. Five infiltration tests were done by Gladstone prior to GTAs involvement with the site, and all of those tests indicated the rock was not permeable. So it was previously determined that the rock could not be relied on for stormwater infiltration, which is why we limited our infiltration testing to the shallow soils overlying the rock.

We obtained zero infiltration, zero inches per hour in 11 of our test areas. And some infiltration was measured at 17 of the test locations. So the general results of the infiltration testing confirmed that the soils throughout the site, or at least in the areas tested, should be categorized as

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Group D soils as the mapping suggests.

And so based on all of that GTA provided an opinion that the soils in the areas proposed for infiltration are suitable for infiltration provided those rates are incorporated in the design. And with that I'll take a question.

CHAIRMAN BOXER: Are you complete with this witness, Mr. Hall?

MR. HALL: Let me just ask a couple just to close the loop.

BY MR. HALL:

Q. The seasonal high groundwater how is that significant for someone preparing a stormwater management plan?

A. Thank you for asking that. DEP requires that the level of infiltration be maintained at least 2 feet above the seasonal high groundwater level, or observed seepage, whichever is higher.

Q. So in designing the basin you have to be 2 feet above?

A. Above the seasonal high groundwater level, yes.

Q. And the infiltration that's a requirement or goal in stormwater at infiltration; is that correct?

A. I'm sorry?

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Q. Where you have infiltration versus where you don't have infiltration how is that significant or relevant?

A. It's certainly possible, and in fact it did occur in some areas within the same infiltration basin where we got some readings of zero, and yet we're proposing infiltration for those areas. DEP also allows for soil replacement in that circumstance. You can remove the impermeable soils for a depth of 2 feet, or shallow if you have permeable soils below, and replace those impermeable soils with granular materials that will allow infiltration and soil seepage.

Q. But you don't design stormwater, you did the testing and provide the results to another engineer; correct?

A. Correct.

CHAIRMAN BOXER: I do have one follow-up question, Mr. Loh. You said that eight of the -- eight of the 43 test pits you observed mottling?

THE WITNESS: Yes.

CHAIRMAN BOXER: Is there a threshold in which mottling will be considered negative? If you were to observe mottling in 40 of the 43 test pits, is that a problem? In your professional opinion is that a problem if you see mottling in a large majority of test

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pits?

THE WITNESS: It would enter my thought process about evaluating whether or not the mottling was indicative of the seasonal high groundwater level. And it's a good point, Chairman, that only eight of the test locations had a mottling at all.

CHAIRMAN BOXER: I agree. And just one question, Mr. Loh. If you were to do the testing during the high water season is it possible that you would discover mottling in more of the pits?

THE WITNESS: No. No. Once soil becomes mottled it stays mottled.

CHAIRMAN BOXER: I see. Okay. Thanks. That was helpful. Let me turn over --

MR. FERRIERO: Mr. Chairman, if I could just ask a couple of questions maybe?

CHAIRMAN BOXER: Absolutely.

MR. FERRIERO: You talked a little bit about, in fact, that it's your opinion that the mottling was indicative of a perched condition. I'm assuming that anything you've talked about really is the testing protocol from N.J.A.C. 7:9A, which is the septic regulations that outlines how all this testing is done. In 9A how do you demonstrate a perched water condition?

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THE WITNESS: I'm reading from 9A. 9A, it's 7:9A-5.8(b). "The upper limit of the zone of saturation, which is the seasonally high groundwater -- high water table, shall be determined by one of the following means: Where mottling is observed, at any season of the year, the seasonally high water table shall be taken as the highest level at which mottling is observed, except when the water table is observed at a level higher than the level of the mottling.

"Where mottling is not observed the seasonally high water table shall be determined based upon either of the following methods: The first one is during the months of January through April. The second one is during other times of the year the depth to the seasonally high water table may be obtained from the Soil Conservation Service report based on soil morphology, including mottling."

MR. FERRIERO: Okay. But I asked how do you determine that mottling is related to a perched water condition and not a seasonally high water condition?

THE WITNESS: Well, Mr. Ferriero, as I explained before, I looked at soil mottling with respect to seasonally high groundwater determination from the viewpoint of did -- was the soil mottling

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caused by a rising groundwater table? And if so then the mottling is indeed indicative of the seasonally high groundwater table. But when the soils including the shale below it are not mottled at all that suggests to me that the soils became mottling from above, not from below.

MR. FERRIERO: In the -- in the septic code it talks about separations between hydraulically restrictive Horizons, which basically are the clay soils that don't have permeability and the mottling. In the testing that you did was there a separation between the hydraulically restricted Horizons and the mottling? Was all the mottling in the clay non-permeable material?

THE WITNESS: I believe all the mottling was in the clay material.

MR. FERRIERO: Is it possible that the mottling could have been the result of an Artesian groundwater condition?

THE WITNESS: I don't believe so. An Artesian groundwater condition requires a head of water. It requires a relatively significant, typically, variation in topography where water is traveling through the soil from uphill into downhill where it's trapped at an underlying depth from a

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hydraulically restrictive layer. And when you remove that hydraulically restrictive layer the groundwater level rises because it's under pressure. I don't believe we have that condition at this site.

MR. FERRIERO: Is there a way to demonstrate whether or not that exists?

THE WITNESS: Absolutely. One can drill borings and put in groundwater monitoring wells, and screen off the restrictive layer and see if the groundwater level rises over time with the new material underneath it.

MR. FERRIERO: In the case of the soil logs here, I think in virtually all of the ones that you did, once you got to the bottom you hit backhoe refusal. You basically were hitting the rock below?

THE WITNESS: Correct.

MR. FERRIERO: How does that relate to finding the seasonally high groundwater table in the absence of mottling?

THE WITNESS: I'm not sure that I understand the question completely. Although I will say that the shale bedrock will mottle as well when it's saturated over a prolonged period. Does that answer your question?

MR. FERRIERO: Well, it does, but it

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doesn't. I mean, if you -- you said you found the mottling at relatively shallow depths, 2 feet plus or minus?

THE WITNESS: Roughly.

MR. FERRIERO: And the soil logs went down to about 9 feet in some cases?

THE WITNESS: Correct.

MR. FERRIERO: If you went down 9 feet and you found no mottle what would your conclusion be relative to the seasonally high group water table?

THE WITNESS: If I found no mottling and no groundwater seepage was observed my conclusion is that the seasonally high groundwater level is below the bottom of the test pit below the extent of the test pit.

MR. FERRIERO: Even if that bottom of that test pit was not permeable?

THE WITNESS: Sure. Yeah.

MR. FERRIERO: Okay. That's all, Mr. Chairman.

CHAIRMAN BOXER: Let me just check with my Board here. Any questions? Comments?

BOARD MEMBER RODELIUS: I have a couple. You mentioned there was about 200 soil types on the maps, is that what you said?

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THE WITNESS: Throughout New Jersey.

BOARD MEMBER RODELIUS: Right. And you said that the four in this location are all able to be -- they can get mottling. That's what you just said, right?

THE WITNESS: That's correct.

BOARD MEMBER RODELIUS: So which ones can't get mottling? I'm just trying to get a feel for --

THE WITNESS: There are soils in South Jersey called Gluck und Nicht soils that have a certain mineral in them that is used to be resistive to mottling. Generally, as I said, mottling typically is as a result of observation of iron particles in the soil. So any soil that has iron, an iron particle component would become mottled.

BOARD MEMBER RODELIUS: And did you test for iron in this soil?

THE WITNESS: No.

BOARD MEMBER RODELIUS: Do you have any pictures that you can show us of the mottling?

THE WITNESS: Not with me.

BOARD MEMBER RODELIUS: Okay. Do you have them someplace else?

THE WITNESS: Sure. I can provide them to you, if you'd like.

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BOARD MEMBER RODELIUS: If you wanted to determine the high water, seasonal high water, would you prefer to do it through the mottling or through the January to April 1st window that DEP recommends?

THE WITNESS: I would prefer to do it during the January to April window. It creates less confusion. I will say that several of the test pits that Gladstone Design performed were performed within that wet season. They performed eight test pits on January 8, 2014, where they had slight seepage between eleven and a half and 14.2 feet in three of those eight test pits. They also performed 13 test pits on March 26th and 27th, 2014. And observed seepage, slight seepage at depths between 5 feet to seven and a half feet in eight of those 13 test pits.

BOARD MEMBER RODELIUS: Okay. But you didn't do that; right?

THE WITNESS: We did not do that, no.

BOARD MEMBER RODELIUS: Thank you.

CHAIRMAN BOXER: All right. Thank you, Mr. Loh.

Mr. Sasso, Ms. Donato, I'd like to turn it over to you and see if there are any questions.

MS. DONATO: Thank you, Mr. Boxer.

CHAIRMAN BOXER: Mr. Loh, you're still

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going to have to talk into the mic. So between you and Ms. Donato, she's probably going to have to talk into the mic, but if you want to turn around and maybe sit the other way --

MR. HALL: The reporter probably needs to see.

CHAIRMAN BOXER: All right. A lot to figure out. That will be fine. That will be perfect, actually. Thank you, Mr. Loh.

CROSS-EXAMINATION BY MS. DONATO:

Q. Good evening, Mr. Loh. My name is Michelle Donato, and I'm the attorney for Stop Somerset Hills Power Plant, which is a group of citizens that are opposing this application.

Now, I'd like to just verify, when were you first retained?

A. It was in, I believe, July. I don't know if I have a date, the exact date.

Q. Okay. July of 2014?

A. Of 2014, yes.

Q. And the test pits that were then -- or the test -- soil tests that were performed during the summer of 2014 they were prepared under your direction?

A. Yes.

Q. And have you received any information from

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the Planning Board engineer, Mr. Ferriero, with his comments regarding the issues that he has raised concerns about with respect to the stormwater management plan?

A. At that time?

Q. Yes?

A. No.

Q. And when did you first receive any information about what concerns had been expressed here with regard to the soils and stormwater management?

A. I don't recall, Ms. Donato, that there was ever an indication made to me specifically about the Board's or anyone's concerns about certain issues. It was really only relayed to me that there was -- there were exhaustive test pits done prior that there was a feeling that the soil group mapping could potentially be revised. And that's the premise that my company was retained.

Q. And are you then not aware of the fact that this Board directed the applicant to go out and get comprehensive set of data so that a meaningful stormwater management plan could be --

MR. HALL: I object to the form. I'm sorry.

MS. DONATO: You object to the form of the

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question?

MR. HALL: Right. Because I don't agree with the factual predicate that the Board directed anything. There were concerns about -- questions about can he get more information.

BY MS. DONATO:

Q. Okay. Are you aware of the fact or were you told that this Board wanted more information about stormwater management?

A. No.

Q. And did anyone tell you that this Board had expressed, or the Board engineer, any concern about trying to remap soils to see if they were all Class "D," rather than "C"?

A. I was never told that that directive came from the Board.

Q. Were you told that there were any issues with respect to the soil testing of permeability that had been arrived at by some of the previous testing that had been performed by KDC?

A. Only that Gladstone had performed five infiltration tests, basic flood tests in the shale, and that those tests indicated the shale was not suitable for infiltration.

Q. So you were really -- I think you said in

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the beginning you were really hired to try to change the soil types to a "D" so that you wouldn't have to have, or the applicant would not have to have infiltration?

A. Yes. Let me expand slightly.

Q. There's no question pending. Your attorney can ask you on redirect.

A. All right.

Q. Okay. So you reviewed all of the previously conducted test pits, am I right?

A. Which ones?

Q. All of the previously conducted test pits, those done by Birdsall and those done by Gladstone?

A. I reviewed those boring logs.

Q. And did you at any time tend to correlate the location of those soils tests with respect to the location of the detention basins that were proposed?

A. To some degree, yes.

Q. Okay. And you are -- I see you reference the stormwater management regulation. So you're aware of the requirement of the New Jersey Stormwater Management Regulation?

A. I am.

Q. You don't design the sites, though, you just do the soil work; right?

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A. Correct.

Q. So, did you look at the plan to see if the requisite soil testing was done in each of the basins based on the type of basin that was proposed?

A. After the first round of testing that indicated some areas were potentially favorable for infiltration a preliminary stormwater design was performed by Gladstone. Then we went back out to those areas and performed additional testing keeping in mind the stormwater regs.

Q. Do you know when that additional testing was performed?

A. The additional round of testing?

Q. Yes?

A. The second round of testing by GTA was performed in September of '14.

Q. So you didn't perform any testing, or you weren't asked to perform any testing during the wet season?

A. Correct.

Q. Now, you mentioned -- let me just get my notes in this -- now, you mentioned that there were some tests that were performed during the wet season. You said there was some test performed in January, and some in March?

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A. Yes, by Birdsall.
Q. By Birdsall?
A. I'm sorry, I'm sorry, by Gladstone.
Q. By Gladstone. Okay. So do you know whether or not those January tests, these were tests for infiltration; right?
A. No.
Q. For permeability?
A. No.
Q. They were not?
A. No.
Q. So what were these tests for, the January and March tests, they were just straight out soil testing, not permeable?
A. They were test pits to observe the subsurface conditions.
Q. Okay. And did you know the location of those January tests?
A. Yes.
Q. Okay. Were any of those tests performed in the basins?
Do you want to pull up your materials?
A. I think that's a good idea.
Q. I think so, too.
A. Ms. Donato, I don't know if I can

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specifically answer your question.

MR. HALL: I think we're going to need a microphone.

CHAIRMAN BOXER: Mr. Loh, you're going to have to use a mic, because we're going to have to get there for the stenographer.

THE WITNESS: I don't know if I can specifically answer your question about which test pits on the plan would perform during the wet season. What I can do, though, is show you all of the test pits that were done at the site.

MR. HALL: I think we need to mark that.

BY MS. DONATO:

Q. Because I just want to know what was the location? You mentioned that there were tests that were performed in the wet season?

MR. COLLINS: Let's -- let's mark this, because it is being observed, and it's apparently going to be used. So this will be an "A" Exhibit, and there is an "A" Exhibit number.

(Exhibit A-21, Test Pit location map, was received and marked.)

MR. COLLINS: A-21. And can you just identify what it is, Mr. Loh?

THE WITNESS: A-21 is titled "Test Pit

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Location Exhibit."

BY MS. DONATO:

Q. So, can you please go to your notes so that you can -- because you may need to refresh your recollection in this, is whether those January tests were performed in any of the proposed basins?

All right. If the witness is going to be coached -- I think the witness should be able to testify on his own. Mr. Moschello will have an opportunity to testify.

A. I'm looking at Gladstone Design soil logs dated January 8th, and it will just take me some time to --

Q. What year is that?

A. 2014.

CHAIRMAN BOXER: Do you want to just take a couple of minutes, Mr. Loh? Would that be helpful to you?

THE WITNESS: That will be helpful.

CHAIRMAN BOXER: Why don't we take a five- or 10-minute break, let the stenographer take a little rest and then it will give you a chance to look at the plans. So maybe 8:10 promptly. Thank you.

(A recess is taken at 7:59 p.m.)

(Back on the record at 8:11 p.m.)

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CHAIRMAN BOXER: Ladies and gentlemen, if we can get started I would appreciate it. We have a lot to cover tonight.

All right. We have a quorum up here. Everybody's settling down. So why don't we go back on the record and we'll have Mr. Loh and Ms. Donato was up here with some questions. So if you could proceed, Ms. Donato.

MS. DONATO: Yes.

BY MS. DONATO:

Q. Yes. Mr. Loh, during the break you had an opportunity to confer with Mr. Moschello from Gladstone?

A. He helped me locate the test pits on the plan, because there's so many of them.

Q. Well, you mentioned that there were test pits that were performed in the wet season. So why did you say that?

A. I said that as a matter of clarity regarding the whole discussion of should test pits be done during wet season or not.

Q. Well, where are test pits supposed to be performed to determine seasonal high water with respect to stormwater management?

A. Any time of the year.

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Q. Where?

A. Where? I'm sorry. They're supposed to be performed within the stormwater management basins.

Q. And also underneath any hazmat or practices like infiltration swales, too, is that right?

A. If it's designed for infiltration then there needs to be a test document.

Q. Okay. So, now my question to you had been, where were those January test pits performed?

A. Well, there were test pits performed in January, as well as in March.

Q. Okay. Let's stick to January for the moment.

A. So, first let me discuss this plan since it's only been put up here for the first time.

Q. And this is a plan that's marked as A-21 and was prepared by Gladstone Engineering; right?

A. Correct.

Q. And it shows all of the test pits from Birdsall, from Gladstone, and then there's your company?

A. Correct.

MR. COLLINS: What is the date on that plan?

THE WITNESS: February 12, 2015.

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MR. COLLINS: Fresh off the presses, so to speak.

THE WITNESS: So the test performed in January, are these tests that start SL, whatever, 123456 and so on - 10/8/14 is the date?

BY MS. DONATO:

Q. Okay. So you have --

A. So, here, here, here, here, mostly this front.

Q. Okay. Are any of those test pits underneath a proposed stormwater basin?

A. None of those are.

Q. So, if you want to measure the seasonal high of a basin those January tests don't help at all, do they?

A. By virtue that they're not located within the basin.

Q. So they just show you you shouldn't have one there, you should not have a basin where those January -- or wherever you show seasonal high you should not have a basin, right?

A. No.

Q. If you can't get the separation -- well, if you don't have the 2-foot separation I'll clarify.

A. If you don't have 2 feet of separation then

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that would be a problem.

Q. Right. So you want to know whether you can meet that requisite distance, that's part of the regulations; is it not?

A. Yes.

Q. So are any of those January tests performed in a basin?

A. No.

Q. Okay. And are there any -- how many of the tests in March of 2014 are under a basin?

A. One.

Q. One?

A. There's one within basin one, and then there's another one a little bit beyond basin 2D.

Q. And it's not under the basin and in the location that the regulations would require?

A. That's right.

Q. All right. So, of all of the tests that were performed during the wet season that you refer to there's only one of them that was under a basin?

A. Correct.

Q. And do you know how many -- there's different number of test pits that are required based on the size of the basin; right?

A. That's right.

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Q. Is there a minimal number of tests that the DEP requires under a basin?

A. Two.

Q. Now, do you know when this application was filed?

A. No.

Q. Would you be surprised to know it was filed in December of 2012?

A. Okay.

Q. Can you explain why 2013, 2014, and this year we don't have tests performed in the wet season to avoid confusion, as you stated?

A. No. Certainly matters to me to determine when my firm gets involved in the project.

Q. Well, you're not here to testify as to whether or not this plan meets the requirements of the stormwater management regulations; am I right?

A. I believe so, yes.

Q. What do you believe so, that you are not here to say that this plan is compliant with the stormwater management regulations?

A. I'm not here to state that this design, this plan is compliant with the stormwater management regulations.

Q. And are you here to testify that the

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testing that has been done to date Birdsall, Gladstone, and your own, are sufficient to satisfy the requirements of the stormwater management regulations?

A. I believe the testing performed meets the general criteria, the flavor of the Appendix "E" of the stormwater management regulations.

Q. Maybe I'm getting a little confused, but didn't you just agree that the stormwater management regulations require a minimum of two tests in every basin and maybe more depending on the size of the basin?

A. That's correct.

Q. So how do you meet the flavor of the regulations if you don't really have one test that's in a basin --

A. No, that's not true.

Q. -- test for 'in the wet season'?

A. Okay. But the tests don't have to be performed in the wet season.

Q. All right. But let me just -- I want to just go back over this. I'm asking you a question about the wet season right now, because you did raise the fact that they did all these tests in the wet season, didn't you?

A. I was just stating for the record the

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previous tests that were done.

Q. Okay. So, of all of these tests that you're referring to one of them --

MR. HALL: I object. This has all been asked and answered. We're wasting time.

MR. COLLINS: The objection should be over ruled, but the questions should focus on the word "test pit" or phrase "test pit" not the word "test." I have a problem with the way it's being asked.

MS. DONATO: We're talking about soil, so I just took an abbreviation.

MR. COLLINS: I think we have a problem with using the word "test pit," or the phrase "test pit," so --

MS. DONATO: I'll use the word "test pit" from now on.

MR. COLLINS: Well, use both because it might matter which, I think.

BY MS. DONATO:

Q. I'm asking for his permeability tests. I understand. So you're saying that the tests for the -- during the wet season, you said, did you not, that tests during the wet season avoid a lot of confusion?

A. To some.

Q. Well, you said that, you didn't say "to

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some"?

A. Well, now I'm saying "to some." Apparently some people here are confused.

Q. Well, that's because you rely on mottling, right, is that it? Is that what you're saying?

A. Mottling is an accepted method of evaluating seasonal high water.

Q. I want to just back up a second. I want to make sure that I understand. When you prepared your report what test pits did you rely on?

A. Primarily our own. To some degree we looked at the results of other test pits that were done within the basin locations.

Q. Did you look at the test pits that were performed by Birdsall Engineering?

A. Yes.

Q. Okay. And did you find those test pits to be reliable?

A. Sure.

Q. Do you realize that those test pits are not signed?

A. No.

Q. Is there a requirement that the test pits be signed?

A. I don't believe so.

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Q. So it just gets some anonymous person putting some test pit information and there's no, like, check to see that the test pits are signed?

A. You know, I think that the Birdsall information was given to me as a matter of information. This is, as I think I said before, this is used as a guidance to understand what the soil conditions at the site are. Birdsall was a reputable engineering company when they were in business. And to me as a geotechnical engineer I think that I can look at those soil logs or test pits and have a relatively good level of comfort that the subsurface conditions shown on those test pits are true and factual.

Q. Even though they're not signed?

A. Yes.

Q. All right. And did you also happen to notice that there were many test pits that were performed by Birdsall where they mention that there was bucket refusal, where they stopped attempting to determine where the water was?

A. Well, bucket refusal, yes, I notice that there was bucket refusal in test pit logs, yes.

Q. And those test pits were used to show that there was no seasonal high water that would be problematic. In fact, if you look at the area where

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the January test pits were performed by Gladstone isn't it true that there was a previous stormwater management basin right in that location?

A. I don't know that.

Q. Oh, okay. Okay. Now, you also indicated that you had eight test pits that revealed mottling; is that correct?

A. Yes.

Q. All right. Now, I'm trying to dispel a considerable degree of confusion on my part about mottling. Okay. So you'll need to correct me because I may have misunderstood what you stated. Okay. Did you say that when mottling occurs that the colors become pale?

A. Yes.

Q. So you're saying that where the staining from the water level is that that area shows pale?

A. Yes. Some of the soil particles become pale in color.

Q. Oh, some of them do?

A. Yes.

Q. Do some of them turn another color?

A. Typically, no. It's the soil -- the original soil color is typically retained in the mottling, in the mottled zone.

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Q. So you've never heard of the mottling showing up as a red stain from the iron?

A. That can sometimes happen.

Q. Oh, it can sometimes happen. That's not always just pale?

A. That can happen in some instances that I can't explain right now, but it's typically linear when that happens.

Q. What does that mean, "linear"?

A. It's horizontal to the -- it's relatively a horizontal plain. It's a -- it looks more like a line as opposed to a zone of mottling.

Q. Okay. And you have to use a Munsell color chart, right, to analyze the soil when you're trying to determine whether or not -- if you're trying to determine seasonal high water by mottling rather than by observance of actual water; right?

A. You don't have to use a Munsell soil color chart to observe mottling.

Q. Don't you need to use the Munsell chart to determine the difference in the coloration of the soil?

A. The Munsell color chart defines the color of the soil.

Q. Right. And isn't it the different color that the mottling would reveal that is critical in

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terms of accurately determining where the mottling begins?

A. No. I think you're mixing up what the purpose of the soil -- of the Munsell color chart is. It's just to define the color, but it doesn't mean that you can't observe that soil as mottled.

Q. Isn't part of the determination of the mottling the ability to determine the differentiation between the underlying soil color, which is the soil color, and where the mottling exists?

A. The Munsell color chart defines the color of the mottles, and the other soil particles for that matter, yes.

Q. All right. That's why I asked you about it. Then, yes, you use the Munsell color chart to see the distinctions and that helps you to define the mottle, am I right?

A. Yeah, but you don't need a Munsell color chart to see that soil is mottled.

Q. I understand that. You can see it when you look at it.

May I have this marked for Identification? It's a photograph.

(Exhibit O-1, photograph, was received and marked for Identification.)

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BY MS. DONATO:

Q. Okay. I'm going to show you this photograph which is marked O-1. Okay. And you see this, it's a photograph of soil, right?

A. It looks like it.

Q. And you see the reddish coloration?

A. In the middle?

Q. Yes.

A. Yes.

Q. So can you identify what you think this is?

A. In terms of what?

Q. In terms of the discussion of mottling, do you think this shows mottling?

A. It appears that that soil is -- was previously saturated judging from the pale grays.

Q. So what do you think the mottling is in this picture, the red or the white?

A. It's hard. I can't tell you that without seeing the rest of the soil pit.

Q. Okay. And you wouldn't -- this comes from like a treatise about how to identify mottling?

A. Okay.

Q. So you don't think that that red stuff is mottling?

A. I didn't say that.

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Q. You didn't say that?

A. I said I think that I would need to look at the rest of the soil pit to evaluate which color is the mottled.

Q. Well, you wouldn't honestly think that the white is the mottle, because there's white below the red, isn't there, wouldn't that be very strange?

A. The picture that you're handing me is a clump of soil on the ground surface.

Q. Yes, with a red coloration?

A. Yeah.

Q. And below the red coloration is white; is it not?

A. Above it and to the sides of it and below.

Q. Yes. So why would you think that the mottling is the white rather than the red?

A. It typically is the whiter pale color, typically.

Q. And on this photograph do you think that the white is the mottled?

MR. HALL: I would object. It's too far afield from his testimony.

MS. DONATO: No, it isn't. We're talking about the observed mottling.

MR. HALL: He didn't say he looked at

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pictures to observe mottling, he looked at soil.

MR. COLLINS: She can continue. It's an appropriate area on cross-examination.

BY MS. DONATO:

Q. So you see that there's white below the red?

A. I see that there's white surrounding the red.

Q. Surrounding the red. So how could you have the white being the mottling and the red being the soil?

A. If the white part of that soil clump had iron-type material in it, minerals in it, then that would become the mottled part of it, but I would have to see the whole soil pit --

CHAIRMAN BOXER: Ms. Donato, can we just --

THE WITNESS: -- to see which color is mottled.

CHAIRMAN BOXER: Just pass it around.

BY MS. DONATO:

Q. So what color is shale, the shale that's on this property?

A. It's red/brown.

Q. So if the mottling was red, as Exhibit O-1 for Identification, would you be able to observe it in

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the shale?

A. When shale models the models are white, typically.

Q. Typically, again, we have this typically, do you know what exists here?

A. At this site?

Q. Yes.

A. Yes, you would see typically gray mottle.

Q. I didn't ask you "would." Did you see mottling in any of the shale?

Did you try to look at mottling in any of the shale on this property?

I'm not asking you typically, I'm not asking you --

A. I'd have to look at our test pit logs to see if any of them had mottling in the shale. And furthermore, I would be relying on my soil scientist who logged the rolls. I didn't log the rolls personally.

Q. Okay. So that's interesting. Okay.

Now, you said that of the test pits that your firm performed eight of those test pits showed mottling; am I correct?

A. Yes.

Q. Okay. Can you tell me how many of those

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eight test pits showing mottling are under stormwater basins?

A. I don't believe any of them are, but let me check the map. (The witness reviews exhibit.)

None of those soil logs, none of those test pits that show mottling are within the basin infiltration areas.

Q. So what is needed in order to have a compliant stormwater management plan for an infiltration basin based on the New Jersey Department of Environmental Protection stormwater management regulations?

A. Well, in terms of number of test pits within the basins?

Q. Yes.

A. The stormwater regs require two test pits for the first 10,000 square feet of basin infiltration area, and then one additional test pit for each additional 10,000 square feet of basin infiltration area.

Q. Did you also perform any of the -- the permeability tests that are required for infiltration basins?

A. We did.

Q. You did perform those? So you got a

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certain rate that -- so let's go over -- I'd like to do that first.

Now, because this is a little bit disjointed, but I just want to make it clear. You did not design the system, so you're not talking about the design of the system and how it's put together, you're only talking about the soils and how they relate to the basins?

A. Correct.

Q. Now, I have to grab the other report. Just be patient for just a moment.

Now, you are advising the applicant whether or not the test pits in totality will be able to be used to design a compliant stormwater management plan; right?

A. Right.

Q. Okay. Are you confident that all of these test pits are taken to the requisite depths in order to assure the location of the seasonal high water table?

A. Appendix "E" says that the test pits should extend to a depth of 8 feet below the depth of infiltration, or twice the depth of water that's in the basin below the depth of infiltration, whichever is greater.

So, in this case these shallow basins, the

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8-foot below the depth of infiltration would be the standard. Now, you are incorrect in saying that the reason for that depth requirement is for seasonal high ground water evaluation.

Q. Well, I didn't say that was the sole reason. It also relates to permeability, does it not, if you're going to have recharge?

A. Yes.

Q. Is that what I was incorrect about?

A. Yes.

Q. I was breaking the question down. I was trying to do the seasonal high first and then the infiltration, because obviously if you have a high water table you can't put the basin there, you need a 2-foot separation, and the water wouldn't infiltrate anyway, because there's two much water, right? You'd have a pond, a permanent pond?

A. Correct.

Q. And the DEP doesn't want a permanent pond; right?

A. Correct.

Q. Why?

A. I don't know.

Q. So, is it one of the primary purposes of the basin to make sure that water is recharging back

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down to the ground?

A. Yes.

Q. And is it another difficulty that occurs with infiltration that if the basin doesn't drain that you end up having mosquitos and other undesirable insects that will prevail in a basin that doesn't drain?

A. Sure.

Q. And isn't it also true that it would be rather unattractive to have a lot of mud holes that aren't draining on the property?

A. I suppose.

Q. You do know what zone this property is located in?

A. Why don't you enlighten me.

Q. So you're unaware of the fact that this township engaged in extensive litigation to get one of the leading cases --

MR. HALL: I object. That's totally irrelevant to his testimony.

MS. DONATO: Well, he's saying these basins are okay. And if he's saying they will be testing to be okay then that would mean that the basins are okay, and if the basins are okay but we don't know where the water table is then we have a mud hole. He's already

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agreed to that.

MR. HALL: That's nothing to do with zoning, though.

BY MS. DONATO:

Q. Well, won't you think that having a mud hole in the middle of this conservation, agricultural conservation zone that this township I don't know how many hundreds of thousands of dollars have been spent to litigate the leading case --

MR. HALL: I object. She's testifying.

MS. DONATO: -- don't you think that helps?

MR. HALL: He's testifying about soil testing and you're talking about zoning. That has nothing to do with it.

BY MS. DONATO:

Q. Okay. So the idea that these basins would be a potentially unsightly and unhealthy condition was not something that you took into consideration?

A. Correct.

Q. Okay. Thank you. Now, with respect to mottling, okay, I want to go back to that subject. Have you ever heard a soil engineer take the position that mottling shows up primarily as a reddish stain on the soil?

A. It can happen.

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Q. Okay. And it could happen with shale, too, couldn't it?

A. Typically it doesn't.

Q. But it could?

A. I haven't seen that.

Q. You haven't seen it -- I'm talking about this piece of property, though, did you happen to ever have any -- did you look at anything or see anything that would indicate whether there was a red stain on this shale? The stain is from iron, is it not?

A. The stain is from oxidation of iron, leaching.

Q. And in anaerobic condition. So if you had a red stain of this shale would you be able to notice it, because the shale was red?

A. The shale does not mottle red, shale mottles gray.

Q. You said typically shale mottle gray?

A. Yes.

Q. You don't how shale mottles?

A. Well, I did see a few test pits and none of the test pits that I witnessed myself personally had mottling in the shale.

Q. How many did you witness?

A. I don't know. Maybe six or eight.

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Q. And where were they located?
A. Within the infiltration basin locations.
Q. Okay. Were -- all right.
Now, in your doing that, okay, you completed -- I want to refer you -- this is detention basin number one. Detention basin number one there is one test pit by Gladstone that showed groundwater at 68 inches, am I right?
A. Yes.
Q. Now, that was the one test pit that was performed in March, right?
A. Correct.
Q. And in all the others observed groundwater there is none, right, none observed?
A. In all of the other --
Q. Test pits?
A. Test pits?
Q. For that detention basin number one?
A. For that basin, yes.
Q. Okay. And in that particular test pit they actually observed seepage at that time of year; right?
A. Correct.
Q. Now, can you tell me why the first test pit, SL-47313 where it says "observed groundwater" it says "none provided"?

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A. That would be an indication that groundwater was not observed.

Q. Okay. And what's the difference between "none provided" or the language with the test pits that you have, or the geo test pits that say "none encountered" is there a difference?

A. I don't believe so.

Q. Okay. I'm kind of confused about the test pit from Gladstone SL-132614. That test pit, can you tell me what -- that one is the one that has the 68 inches observed groundwater; right?

A. Yes.

Q. Okay. There's no infiltration rate on either of those two, is there?

A. No, they did not perform an infiltration test.

Q. Of the test pits that we have in detention basin one, other than TP-209 can you tell me how deep the pits were?

A. I'll have to take a moment to review my logs. (Witness reviews his notes.)

Those test pits performed by GTA in basin one extended to depths ranging from about 2 to 5 -- I'm sorry, to 6 feet -- 2 to 6 feet below the existing grades.

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Q. Okay. And I don't want to ask you a question twice for fear of objection, but did I understand you correctly to say that you had to go down 8 feet with the NJDEP?

A. That's what the Appendix "E" suggests, yes.

Q. So you didn't do what Appendix "E" suggests?

A. We encountered refusal with our excavator at shallow depth.

Q. What size of a piece of equipment did you have?

A. It was a small-track hoe. Some of them are performed with a Caterpillar 313B excavator, and some of them were performed with a Kobelco 135 KRX.

Q. Okay. And once that you had bucket refusal what was the equipment you used with that --

A. Both of those machines.

Q. Are they large machines, are they able to, you know, get a larger machine to deal with the bucket refusal?

A. Are there larger machines than those, is that the question?

Q. Yes.

A. Yes, there are larger machines.

Q. So if you encounter bucket refusal do you

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kind of say, well, I encountered bucket refusal, I don't look any further?

A. We encountered bucket refusal in relatively hard shale. The geology of the area is that the shale continues.

Q. Continuous underlying this entire site; right?

A. Yeah, for, you know, being down thousands of feet.

Q. So you didn't go down the requisite depth. And in every instance that you didn't it was because of bucket refusal?

A. That's correct.

Q. And does the DEP allow you to just say, oh, I can't go any further so I don't know why I didn't go any further?

A. The DEP does provide latitude in my experience on other sites where there is bucket refusal on shallow depths on rock, because rock is also considered a hydraulic and restrictive layer, and you need to stay 2 feet above it.

Q. Is that in the regulation, Mr. Loh?

A. No.

Q. It is not. And if you said that you didn't observe mottling in the shale; right?

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A. Correct.

Q. How far -- did you have a problem with not being able to penetrate the shale in those locations?

A. Well, I just told you I had bucket refusal.

Q. So if you had bucket refusal and you couldn't observe the shale then how do you know if there's mottling in the shale?

A. The mottling could be in the shale at deeper depths.

Q. At deeper depths, the requisite depth that the DEP would require by its regulations to have those test pits?

A. The DEP requires the 2-foot separation between seasonal high groundwater level, as identified by mottling, and the seepage level. These tests meet that requirement.

Q. The DEP requires that you go down 8 feet, does it not?

A. Yes.

Q. And you did not, is that correct?

A. Yes.

Q. Thank you. Now, I'd like to direct your attention to your -- I'm still on basin one. And I'm referring to the infiltration rates for the basin. So you show that the rates range from zero to 1.4 inches

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per hour; is that correct?

A. Yes.

Q. Okay. Now, are you aware of the fact that the DEP requires a design to incorporate a margin of safety that you have to increase that figure?

A. I am aware of that.

Q. So does that infiltrate -- that infiltration test, does it meet the design standard that the DEP will apply?

A. I believe the DEP suggests that a minimum infiltration rate of 1 inch per hour is advisable, and then to apply a factor of safety of two on top of that.

Q. Okay. And does it meet that?

A. It would meet that.

Q. It would?

A. The one rate they decided would. The ones that are below one inch per hour would not.

Q. And how many did you get that do not meet the infiltration requirement?

A. I believe six.

Q. What are you going to do with those basins? You're just giving the information and let somebody else draw the conclusions, is that it?

A. Yes.

Q. And how many tests pits would be required

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in this basin? How big is basin number one, by the way?

A. I don't know the area of the infiltration off the top of my head.

Q. All right. I'm going to next direct your attention to detention basin 2D. That's a recharge basin, right?

A. Yes.

Q. What's the size of that basin?

A. I don't know off the top of my head.

Q. So you don't know how many tests would be required?

A. Well, I did know that at one point and we did the minimum required number of test pits for that.

Q. Isn't the basin 34,000 square feet?

A. I don't know.

Q. So how could you say that you did the required amount if you don't know the --

MR. HALL: Objection. He said he knew it before, he doesn't know it now. He also answered your question.

BY MS. DONATO:

Q. He also stated, did you not, that you did the requisite number of tests?

A. That's right. Remember the area of

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infiltration in that basin.

Q. I knew that.

MR. COLLINS: I don't find it very helpful to hear an answer that says I don't know off the top of my head, because it implies that you know it from some document. So rather than have to go back over this later, could you just look at whatever document would help you figure out how much infiltration area there is in that basin?

CHAIRMAN BOXER: Mr. Loh, do you need a few minutes to get that up?

THE WITNESS: We may have it right here.

MR. FERRIERO: Mr. Chairman, if I could while the witness is looking that up, I would like to try to give the Board some information maybe to help clarify some of this issue on mottling, because mottling is a complicated issue. I've dealt with it for many, many years. I've actually spent more than my appropriate time in court dealing with the issue, but what I would like to do is read the definition of mottling from 7:9A. It says, "Mottling means a color pattern observed in soil consisting of blotches or spots of contrasting color. The term 'mottle' refers to an individual blotch or spot. Mottling is an indication of seasonal, or periodic, and recurrent

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saturation."

Most important part of that in the context of the testimony, I think, in the question that you've heard is blotches or spots of contrasting color, because I think Ms. Donato is trying to get -- trying to make a point that there might be red mottling in red shale. The fact of the matter is by definition it is not mottling. Mottling has to be a contrasting color.

MS. DONATO: And I would beg to differ with you on that because of the fact that you may have -- you could have water rise in shale. Shale is red; mottling is red. It might not meet the textbook definition, but it doesn't mean that it's not with seasonal high. It might not be mottling, but it doesn't mean that the seasonal high hasn't reached to that level.

MR. FERRIERO: I'm not arguing that point. The point I'm making is that mottling is not the same color as the native soil.

MS. DONATO: And I am trying to address that as well, because I understood it's a contrast, but I appreciate that. Thank you.

CHAIRMAN BOXER: Mr. Loh, do you have that material?

THE WITNESS: Not yet.

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CHAIRMAN BOXER: All right. Why don't we just take five minutes while Mr. Loh finds this.

Let's just take five-minutes and we'll try to get right back.

(A recess is taken at 8:58 p.m.)

(Back on the record at 9:04 p.m.)

CHAIRMAN BOXER: Okay. Ms. Donato, are you ready to go? Why don't we continue with Ms. Donato's cross-examination?

THE WITNESS: Ms. Donato, you asked me if the number of test pits that we performed in each of those infiltration areas met the requirement --

Q. Well, the number, yes, that's correct.

A. The answer is, yes.

Q. Well, what's the size of the basin?

A. The size of the sand infiltration area for basin one is 15,000 square feet. So according to Appendix "E" you would need two test pits for the first 10,000, and one test pit for each additional 10,000.

Q. I didn't ask you one. I asked you about 2D. "D" as in David?

A. 2D?

Q. Yes.

A. The sand infiltration area is 23,000 square feet. So according to Appendix "E" you should do four.

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Q. Okay. Can you tell me who provided you with the sand infiltration area, who provided you with that number?

A. Gladstone Design.

Q. Is it something that's indicated on a plan in any location so that someone could double-check that information?

A. I don't know that.

Q. So somebody told you that tonight?

A. Yes.

Q. So if the Board engineer wanted to check this would he be able to do so?

A. Well, the area is indicated on the plan by the dotted line, so he could go in and figure out what that area is by looking at the plan.

Q. As a high standing mathematician, it's a irregular shape; right?

A. Yes.

Q. So it's not easy to calculate; correct?

A. It's doable.

Q. But you would have to have pretty good mathematical skills?

A. It's doable.

Q. But is there anything on the plan anyplace along -- and now I'm up to two big brief indications,

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anywhere that indicates that's the size of the sand infiltration pit?

A. It's not indicated as a number on the plan, but you can figure it out easily enough.

Q. Okay. So now there were four tests that were performed on 2D. Okay. TP-201 performed by your firm?

A. Yes.

Q. Does that meet the required infiltration rate?

A. I will point out one other thing.

Q. No, could you answer my question, please?

A. I will point out one other thing.

Q. Could you please answer my question?

MR. HALL: I think he can answer your question how he chooses to.

MS. DONATO: No. I think he answers my question and not another one.

A. But you misuse the word "required."

Q. Didn't you -- wouldn't you agree that the DEP regulation requires certain number of test pits, two minimum, plus additional numbers based on the size of the basin?

A. Right. What I'd like to point out is that Appendix "E" is a guidance document, it's not a

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regulation.

Q. I know that some contend Appendix "E" is not a regulation. On the other hand if you want to get something through the DEP have you ever tried to do it without complying with Appendix "E"?

A. Yes.

Q. Oh, okay. Good, so we're not going to comply with Appendix "E". Okay. Thank you.

MR. HALL: He didn't say that.

BY MS. DONATO:

Q. So assuming that you don't need to comply with Appendix "E," let's look nevertheless at TP-201. Are you saying that the one inch per hour required infiltration rate is not required?

A. I'm saying -- all I said was it's not a regulation, it's a guidance document. That's all I said.

Q. So the DEP you're telling me has no requirement for the one inch per hour permeability that is used by engineers throughout the state of New Jersey?

A. I don't know that that's a requirement by law.

Q. You don't know?

A. That's what I said.

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Q. Okay. So who gave you that idea?
A. I don't know his name.
Q. So let me just make sure I understand something, because I feel that I'm getting deeper into the muck.
Let's just do the following. When you are asked to do soil testing do you use Appendix "E" in order to do so?
A. Absolutely.
Q. And is Appendix "E" where the one inch per hour is contained?
A. That's right.
Q. And if you didn't have one inch per hour permeability, okay, and water was placed in the basin, would the basin drain?
A. If you didn't have the required infiltration rate that the basin was designed for then you could loosen the soils, remove them and replace them. There's some things that you can do besides not building a basin.
Q. That was not my -- I'm asking you a question. Will you design a basin that has less than the one inch per hour, which you don't think is required by Appendix "E"? If you designed a basin, you said you could get away with that at the DEP. You've

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gotten away with it. So you design a basin and it's not one inch per hour permeability, what happens?

A. What happens is you loosen the soils and --

Q. No, I didn't ask you what you could do to rectify the condition. You're saying the one inch per hour is guidance and it's not required. My question to you is the following: If you don't have one inch per hour minimum permeability and you build the basin with that information, you don't change the soil, you don't put a sand bed, you don't do anything else, what happens to that basin?

A. Assuming all the other test pits and infiltration tests were also -- were at one inch per hour at the maximum?

Q. Let's assume you have all -- let's just say you needed two permeability tests and both permeability tests was less than one inch per hour?

A. And if the basin --

Q. You don't do any mitigating, you don't put in a sand bag, you don't do anything because it's not required and you've got the DEP look the other way?

A. And if the basin was designed based on a higher infiltration rate then it would retain water.

Q. And it would retain water, it wouldn't drain, right?

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A. It would retain water longer than the design expects.

Q. So would that be good engineering practice to ignore the one inch per hour minimum based on somebody's advice that it's not required?

A. What's good engineering practice is to fix issues when they arise.

Q. So you're saying that you would let the basin be built with less than one inch per hour, water would be accumulating, it would be a mud hole. It's after the two-year maintenance guarantee or something from the town, what is the town, maybe it's during the performance guarantee, so the town's going to go against the surety to collect to get this basin fixed?

A. No, not at all. What you do is during construction you do additional testing to evaluate if the materials at the basin infiltration level are in accordance with the design, and if they're not then you deal with it.

Q. All right. You're not answering the questions that I ask, and I'm trying to understand your answer regarding Appendix "E". Okay.

Did you or did you not say that you don't think that Appendix "E" is required?

A. I said that Appendix "E" is a guidance

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document.

Q. Okay. So that -- and the next correlarity is that the -- that the provision, I won't say requirement, in Appendix "E" of a minimum permeability rate of one inch per hour is not required. So would you design a basin that had, let's say it needed two tests, two permeability tests for that basin and they'd all meet the one inch per hour, would you design a basin like that without mitigating factors, without changing the underlying soils, without putting in the sand and doing all of those things?

A. I don't design basins. I test the soil.

Q. Okay. So you're going to go to someone who asks you to do soil work and one of your test pits has an infiltration of 0.2, as TP-201 does, and you're not going to say to them, gee, you've got a test pit here that doesn't meet the correct required infiltration rate? Are you going to tell them what they want?

A. No, of course I'd point it out to them, as well as point out that the other two infiltration rates of six and seven and a half.

Q. Well, don't -- so what are you going to do, average numbers on something, is that it?

A. No, you don't average them, but perhaps we can go out and do another test at some point in time

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like during construction.

Q. Okay. So you don't say here's the information and do what you want, you don't do that? You don't say it's not required, Appendix "E" really doesn't require it, so we'll just let it go at this?

A. The designer is also well familiar with the Appendix "E".

Q. So. All right. But right now, as I understand it, this is the stormwater data that this applicant is presenting to this Board and asking for approval. And on this particular basin we know we have one test pit that's significantly lower than the minimum required; am I right?

A. That's right.

Q. So are they going to get more test pits, or are we going to be here, that's it, they're just going to leave it at that, is that it?

A. That's not up to me.

Q. Thank you. Is there anything unusual to you as a soil scientist to find that you would have these four rates with significant differences in permeability?

A. They're really not that significant when you think about it. It's not even an order of magnitude.

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Q. Well, one is .2 at the lowest, which doesn't meet the requirement, or as you would say, the guidance. And the highest is 7.5. That doesn't make a difference to you?

A. It's not something that I would raise my eyebrows at and say, wow, that's really weird. As I started off in my testimony tonight I said that the soils throughout the site are only moderately permeable. They're not very good for infiltration, but some areas are good enough, and we identified those areas, I think. And if additional tests need to be done or deemed to be needed I'm sure that the applicant will do that. And in my opinion that testing can happen during construction --

Q. There's no question pending.

A. I was finishing my answer.

Q. You understand that the requirements of stormwater management regs require that this Board when they are addressing something make certain that the regulations are satisfied?

A. Of course.

Q. So you don't wait until they get an approval and then start digging and find that there's not enough infiltration, do you, is that what you're suggesting?

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A. What I'm suggesting is that additional testing can be done. It should be done during construction.

Q. And if the testing that's before the Board when the Board is being asked to evaluate the stormwater management system doesn't show compliance with this recommended infiltration rate, as you described it, then you're saying the Board should approve it and let you go to the construction stage and then design the basin?

A. They can certainly always excavate and replace. That's always an option and it will always work.

Q. Do you know anything about bonding, performance bonds under the Municipal Land Use Law?

A. No.

Q. So you don't know that performance bonds are the plans that design basins, not something that you're trying to after the fact retrofit?

A. I don't know.

Q. Okay. And you wouldn't think that a town would want to approve an infiltration basin if the infiltration rates aren't satisfied knowing that they might end up having a mud hole?

A. I think the design engineer can answer to

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that.

Q. Now, I want to direct your attention to detention basin number two. Do you know what the sand area of detention basin number two is?

A. No.

Q. And Mr. Chairman --

A. Two, that's not an infiltration basin, is it?

Q. Well, I'm sorry. I stand corrected. It's just attenuation. But don't you still need to know the bottom of the basin still has to be a certain distance from the seasonal high water level; is that right?

A. I don't believe that's true.

Q. No one foot requirement on an attenuation?

A. Perhaps there could be a foot requirement.

Q. It's not two, it's one; is that correct?

A. That's correct.

Q. Do you know whether this basin will be an excavated basin?

A. Basin two?

Q. Yes.

A. I'm sure the design engineer can answer that question.

Q. Okay. Now, let me just double-check to see if I've got all of the -- do you know whether -- I'm

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going to direct your attention to detention basin number three. Do you know whether that's an excavated basin?

A. It looks like the northeastern portion of the basin might be excavated a foot or two.

Q. All right. Do you know how big that basin is?

A. No, I don't.

Q. I'm loath, Mr. Chairman, to keep taking breaks and the witness has to consult -- I mean, you've been very, very patient, so --

A. That's not an infiltration basin either, I believe.

Q. I'm sorry. It's an attenuation basin.

MS. DONATO: I think I'm just going to defer to our witness' testimony when the time comes. I just find it to be very difficult because it seems that the witness has a very narrow focus and --

BY MS. DONATO:

Q. You're not testifying that all of the tests that the DEP would require to determine seasonal high water table and infiltration have been completed for these basins, are you?

A. The number of tests?

Q. Yes.

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A. I am.

Q. Okay. So you're saying, you're saying that the number of tests comply. I'm a little confused if you don't know the size of the basin. Then I have to ask him the question.

A. When we were evaluating how many test pits should be done in each basin we did know that number and we did comply with that number.

Q. Do you agree that seasonal high water table is very essential to the design of a stormwater management system?

A. Yes.

Q. Without having at least -- the test pits going down a minimum of 8 feet how can you assure anyone that you have an accurate reflection of seasonal high?

A. Because mottling is not present at depths of at least 2 feet below the level of infiltration.

Q. But you couldn't penetrate, you had bucket refusal. So how could you have observed mottling if you didn't get into the shale?

A. The test pits extended it to a depth of at least 2 feet below the level of infiltration.

Q. That's not the point. 8 feet is required, is it not?

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A. That's right.

Q. That was my question. You're saying that you didn't see mottling?

A. The purpose of --

Q. You -- did you go into the shale?

A. I'm sorry?

Q. Did you go into the shale in these locations?

A. Yes.

Q. You went into the shale. You didn't have bucket refusal?

A. We had bucket refusal in the sale.

Q. So how did you get -- as you went into the shale a certain depth and then encountered bucket refusal?

A. Correct.

Q. But you didn't -- still didn't go down the 8 feet?

A. Correct.

Q. When someone relies on mottling is that as accurate as observed seasonal high, or water seepage?

A. I wouldn't say it's as accurate or not as accurate. For instance, what if there is a particularly dry winter and the groundwater level does not rise to levels that it has risen before?

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Q. Okay. There's a provision in the regulations for that, though, isn't there, where there are climactic conditions that might alter what would be the ordinarily apparent seasonal high?

A. That's not taken into consideration when observing groundwater levels in the winter.

Q. You've never seen that provision in the regulations?

A. I have not.

Q. Oh, okay. I'll send it to you.

A. I appreciate it.

Q. So, mottling is -- here you're saying mottling is pale, and some other people say mottling is red stained. And the photograph I showed you shows a red stain and you didn't want to commit to what it was. So mottling has an element of a judgment call to it, doesn't it?

A. No. Mottling does not have an element of judgment. Evaluation of seasonal high groundwater has an element of judgment.

Q. Well, have you ever seen engineers who have failed to see mottling that other people have seen? You've never seen a debate among engineers as to whether soil contains mottling?

A. Are you asking me if engineers debate

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whether or not soil is mottled? I don't understand the question.

Q. Have you ever heard engineers have a difference of opinion on a particular observation of soil, same exact soil as to where the mottling is, where it begins?

A. Yes.

Q. You've seen a difference of opinion? You've seen a difference of opinion on the seepage as well?

A. No, seepage is observed. It is where it is. You measure it with a ruler.

Q. So, I really did misunderstand your statement before. So let me just make sure.

So seepage is accurate, you see it, but you could debate mottling?

A. Yes.

Q. Thank you. I have no further questions.

CHAIRMAN BOXER: Mr. Sasso?

CROSS-EXAMINATION BY MR. SASSO:

Q. Mr. Loh, I apologize in advance if I go over something.

There's no question that when you were first retained in this particular case your job was to determine if all the property was basically in the "D"

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Classification; correct?

A. That's right.

Q. And then if it was in the "D" Classification the benefit to the applicant would have been then infiltration is not an issue?

A. I suppose so, yes.

Q. I mean, that's what would happen?

A. Yes.

Q. But you weren't able to do that because that wasn't accurate based on your observation?

A. Correct.

Q. And you did use the Birdsall test results as part of your report; correct?

A. They were attached to the report.

Q. And they were attached for a reason. You utilized them in part in coming up with your report; is that fair to say?

A. That's not fair to say in terms of the design of the stormwater management basin, the infiltration basins.

Q. No, sir. Please. I'm not limiting myself to that. Just listen to the question.

If you don't understand it tell me. Is it fair to say the reason why you attached it to your report is because in part you relied upon the test

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results?

A. Yes. To give me a general indication of subsurface conditions that were not explored.

Q. Right. You told us already that Birdsall was a great organization and you had no reason to doubt any of the test results; correct?

A. Correct.

Q. But you didn't know that you came here to testify tonight that some of those logs aren't even -- and test reports aren't even signed, that's what you told us?

A. Right.

Q. Let's talk about what you call guidance. When push came to shove with Ms. Donato you were saying Appendix "E" was just guidance; is that right?

A. I just simply stated that fact that I have been told by somebody from DEP.

Q. Okay. So let's go to your report, okay, if you don't mind. I'd like to go to page four where you talk about infiltration testing, because this is really what we're talking about, right? This is what matters in terms of a geotechnologist because you're not designing the system. The question is the soil samples and the ability for these basins or the berms that are designed, right, it's not just the basins, to take the

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water and recharge it; correct?

A. Correct.

Q. All right. So, you told us in answer to a question a minute ago about accuracy of finding the seasonal high water table that if it was a dry winter then direct observation perhaps would not be the more accurate method, that was your answer a minute ago?

A. I said that it wouldn't be the indication of the seasonal high water level necessarily.

Q. But you agree that in terms of the Appendix and 9A the regulation that the reason why DEP specifies a time period for the tests between January and April, and based on an observation by the testing person of the high water table, that that's more accurate, is it not? And that's why it's in the regulation?

A. No.

Q. Why is it then, sir, that the DEP would take the time to specify a specific time period between January and April and put that in as the direct observation as the high water table meeting the regulation?

A. Absent soil mottling the only way to evaluate seasonal high groundwater level is during the wet season.

Q. Well, let's talk about this case. I'm glad

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you said that.

In this case in terms of the basin when you were asked before the test pits didn't show mottling; correct?

A. Correct.

Q. So you just told us then that there's no way because there's no mottling to determine where the high water table would be in the area that's been designed by Gladstone as a detention basin, would you agree with me?

A. The high water table is below the depths of the test pit.

Q. But you don't know that, do you?

A. Yes, I do.

Q. First of all, we need to talk about that time period of January to April, which is specifically set forth in the regulations. She started asking you earlier about the time period that has gone on for this particular application. Now, the DEP time period is January through April; correct?

A. Yes.

Q. And that's the season for direct observation of the high seasonal water table; correct?

A. Yes.

Q. And she asked you, the application which

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the Chairman can verify, was signed on December of 2012. Now, if I wanted to give this Board the direct observation information about the high groundwater, seasonal high water table, I could have done it if I was going to use that method in 2012/2013; correct?

A. Well, sir, I'm not going to --

Q. I'm asking you a factual question, sir. I know you don't like answering the question.

A. I'm not going to answer something that should my client have done something without knowing any of the time tables or any of the project or anything else.

Q. I'm not asking you whether you should have or not, I'm asking you based on what you reviewed as the expert here today. Did you see any direct observation information for that time period?

A. In GTA's test pits?

Q. No, sir. Please. Come on, please.

A. I'm asking you, I'm sorry.

Q. Let's face it, I can summarize it for you. You relied on Birdsall. You relied on some pits that Gladstone Design did, and you relied on your own?

A. Yes, that's right.

Q. And in coming up with a decision on whether or not the soils were proper you were given information

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or not given information; correct?

A. We obtained information as well.

Q. So let's go back to my very simple question. Were you given any information about the results of direct observation of the seasonal high table for the period of January of 2013 through April?

A. No.

Q. How about the following year, which would be -- then we're talking January of 2013 through April, again, the DEP said period of time --

MR. HALL: I think you meant '14.

BY MR. SASSO:

Q. '14. Were you given any information from that period of time?

A. Yes.

Q. In terms of direct observation, do you remember the question?

A. Direct observation during the wet season?

Q. During the wet season?

A. Yes.

Q. And are you talking about the Gladstone Design test pit?

A. Yes.

Q. Some of which the date that was given in January are somewhere in the front field, not where the

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basin is located; is that correct?

A. Yes.

Q. Let's go to page four again of your report. -- let me go back a second. None of the January tests are in any basin area; correct?

A. Correct.

Q. Now, you just testified before that these regulations, they're just guidance. They're not really a regulation, right, is that what you're telling us?

A. Yes.

Q. Let's go to your report. Infiltration testing is the section, do you see it?

A. Yes, I do.

Q. Okay. Now, if it was just guidance would you agree with me that you would never have said that you "must" do something? For instance, you must dig 8 feet down, because you certainly didn't in this case, would you agree? That you may dig down to 8 feet below, but not "must," would you agree with me?

A. I would agree that that's a poor choice of words, yes.

Q. No, let's talk about your report. You got paid to do the report; right?

A. Yes.

Q. And that's the report you gave all of us;

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right?

A. That's right.

Q. Well, read the second sentence.

A. "According to Appendix "B" of the New Jersey Stormwater BMP Manual --"

MR. SASSO: You're going too fast. She's got to take it down. Loud and go slow.

THE WITNESS: "According to Appendix "E" of the New Jersey Stormwater BMP Manual test pits and infiltration tests must be performed within each SWM basin location."

BY MR. SASSO:

Q. You signed that report, right, at the end?

A. I did.

Q. Let's face it, as an engineer you're before us here, you understand that really Appendix "E" are really standards, aren't they, for DEP? Otherwise, you can do one test pit for a 60,000-square foot basin; right? They give you some level of minimum standards that you have to follow?

A. That is what the BMP is, and it's the standard of the industry, I'll admit, but however --

Q. There's no "however," sir. In this case, in this report you admit that you did not comply with the standards, right in your report; correct?

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A. Yes.

Q. All right. As you go further down the page, and you can help me because I was very good in PolySci, I wasn't too good in the sciences like you. The chart that we have, it says "Summary of infiltration test results." Does that chart reflect the depth of the test?

A. Yes.

Q. And in those minimum standards that the DEP has in Appendix "E" they talk about 8 feet below what?

A. The depth of infiltration.

Q. Let's go through the depths. Give us the test pit location and tell us the furthest down you went from that particular test?

A. Test pit TP-2.

Q. Again, nice and slow for her, okay. You can read off mine, if you need to.

A. That doesn't contain the information as far as how deep the test pit went.

Q. Well, I'm asking you about this chart?

A. The depth that's in the chart is the depth of the infiltration test, not the depth of the test pit.

Q. That's why I'm asking you the question.

A. I thought you said what was the depth of

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the test pit.

Q. Is that number different than what we have in the chart?

A. Yes.

Q. Okay. Where do you have the list of the total depth for the test pit?

A. They're on the test pit logs.

Q. So, let's go through, for instance, TP-2 and tell us the furthest you went down?

A. Test Pit 2 went to a depth of 3 feet below the existing ground surface.

Q. Not close to 8 feet; right?

A. It's 5 feet off.

Q. Well, not only 5 feet off, because that's not really accurate, because we know that in terms of 8 feet you told us already it's 8 feet from where the basin is tied in?

A. I stand corrected. The 8 feet below the level of infiltration, yes.

Q. Yes. So let's talk about this. So go ahead, what's the next one?

A. Test pit 8.

Q. Go ahead.

A. Test pit 8 extended to a depth of 6 feet below the existing ground surface.

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Q. That one doesn't comply; right?
A. Right.
Q. Okay. Next one. Go through them.
A. Test pit 9 extended to a depth of six and a half feet below the ground surface.
Q. That didn't comply; correct?
A. Correct. Test pit 18 extended to a depth of five and a half feet below the ground surface.
Q. That didn't comply, correct, is that right sir? Is that right, sir?
A. I'm sorry?
Q. That did not comply?
A. That did not extend to 8 feet below the level of infiltration.
Q. Next one. Same thing for all of them. I don't want to hold the Board up. Let's just go through the -- if you know what I'm asking, tell us.
A. I'm searching for it. Test Pit 18 extended to a depth of five and a half feet below the ground surface.
Q. Not in compliance?
A. Test Pit 28 --
Q. Correct, sir, not in compliance? At the end of you telling us the level tell us whether or not it complied or --

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MR. HALL: I object. We all know the difference between five and eight. He doesn't have to say that every time.

MR. SASSO: I have to say that, too. Go ahead.

THE WITNESS: Test Pit 28 extended to a depth of five and a half feet below the ground surface.

Test Pit 30 extended to a depth of 1 and a half feet below the ground surface.

Test Pit 32 extended to a depth of 4 and a half feet below the ground surface.

Test Pit 39 extended to a depth of 2 and a half feet below the ground surface.

Test Pit 101 extended to a depth of eight and a half feet below the existing ground surface.

BY MR. SASSO:

Q. And that's one so far right?

A. Yes.

Q. And that's ground surface, not what you told us which was it had to be from the bottom of the basin, you're saying from the ground surface. From the ground surface is not the correct description of the regulation. The basin is lower and you have to be 8 feet below the detention basin; correct?

A. Yes, eight.

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Q. Okay. Go ahead. Next pit?

A. Test Pit 103 extended to a depth of 6 feet below the ground surface.

Test Pit 104 extended to a depth of 5 and a half feet below the ground surface. Test pit 105 extended to a depth of 6 feet below the ground surface.

Test Pit 106 extended to a depth of 5 feet, I'm sorry, below the ground surface.

Test Pit 107 extended to depth of 4 feet below the ground surface.

Test pit 110 extended to a depth of three and a half feet below the ground surface.

Test pit 113 extended to a depth of two and a half feet below the ground surface.

Q. Can I just stop you there? And I want to get back to this, but I'm a little confused because you just told me earlier that in the graph that you have, not the graph, but the columns that you have here that it doesn't show the depth and then you're reading to me all the depths right in the same chart --

A. I stand corrected.

Q. -- that I have?

A. I stand corrected yet again.

Q. All right.

MS. DONATO: Pretty good for a guy that

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doesn't know science.

BY MR. SASSO:

Q. Go ahead.

A. Test Pit 116 extended to a depth of 5 feet below the ground surface.

Test Pit 118 extended to a depth of two and a half feet below the ground surface.

Test Pit 119 extended to a depth of four and a half feet below the ground surface.

Test Pit 120 extended to a depth of five and a half feet below the ground surface.

Test Pit 121, 3 feet below the ground surface.

201, two and a half feet below the ground surface.

203, 3 feet below the ground surface.

205, three feet below the ground surface.

206, 2 and a half feet below the ground surface.

207, two and a half feet below the ground surface.

208, two and a half feet below the ground surface.

And Test Pit 209, 2 feet below the ground surface.

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Q. Okay. Good. Now, looking at my chart, I mean, I have one, only one out of all those tests that are 8.5 feet from the surface of the ground, not the surface of the basin, would you agree with me?

A. Yes.

Q. Okay. I want you to go to, again, to that page four again that I have. That's the infiltration testing on the report that you signed. Just read for the Board the balance of the paragraph after 8 feet of the basin, bottom level in the middle of the paragraph. Just tell us what the report -- what you wrote down for the balance of the paragraph?

A. "Therefore, the test pits must extend at least 8 feet below the planned level of infiltration. The test pits performed by GTA did not extend at least 8 feet below the planned level of infiltration as bucket refusal with a relatively small backhoe and excavator used for the study on weather chilling and confidentiality of depths. However, several test pits previously performed by others were able to be extended to at least 8 feet below the planned level infiltration. A summary of infiltration test results included in the following table: Details of the infiltration testing are included in Appendix "E".

Q. Okay. And, again, those are the numbers,

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the depths that we just went through in the chart that follows that; right?

A. Yes.

Q. Well, you tell us in the report that there was a reason why you couldn't get through that shale; right?

A. Yes.

Q. But you also told us before that it matters to look for mottling in the shale to determine where the seasonal high is located; correct?

A. What I said is that it matters if the seasonal high groundwater table is within 2 feet of the level of infiltration.

Q. And if you hit shale at 2 feet and stop there and there's mottling below that you would have no way of knowing as you stand here tonight; correct?

A. Correct. Although the level of infiltration is above that depth, most likely.

Q. True. Let's talk about the small equipment you had there. I assume from what you're saying that these were units that you hired as part of your package of getting paid by KDC; correct?

A. That's right.

Q. I mean, we even know who you rented them from, Heritage Construction; right?

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A. Right.

Q. And Heritage Construction has equipment bigger than the two units that you have noted in your report, don't they?

A. They probably do.

Q. And I mean, when Ron Kennedy did the test results we had pictures of his huge trackhoe of a Japanese name, or maybe it was Volvo, I stand corrected. It was Volvo. Did you ever, after you experienced the inability to break through the shale ever go back to this site with bigger equipment since the equipment that you brought was small, a small backhoe and excavator? Did you ever bring bigger equipment back to break through the shale so that you could see what existed below the shale?

A. No, because you can't break through shale. It's just more shale.

Q. And that's why you made a notation that you couldn't do the test because the equipment was small. It really didn't matter if it was small or if it was gigantic, that's what you're telling us?

A. Right.

Q. A small backhoe and a large, large trackhoe have the same power, that's what you're telling us here today?

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A. That's not at all what I said.

MR. SASSO: Okay. That's all I have.

CHAIRMAN BOXER: Thank you, Mr. Sasso. Let's see. It's ten to ten, but I think it might be worthy of maybe just opening up a couple of questions in the audience if there are anybody -- we'll have to just see what time is like, but I'm thinking maybe 10, 15 minutes. So if there's anybody in the audience that would like to cross-examine this witness I would urge you to come up now.

MR. YINGLING: Good evening. Jeff Yingling, previously sworn in as well. A few questions for you, Mr. Loh.

J E F F Y I N G L I N G, having been previously sworn, testified as follows:

MR. YINGLING: How many samples did you use to determine the soil types on the site.

THE WITNESS: I'm sorry?

MR. YINGLING: How many samples were taken to determine the soil types on the site?

THE WITNESS: Well, GTA performed 43 test pits, and Birdsall performed also 43 test pits. I think Gladstone Design performed, am I answering your question?

MR. YINGLING: I'm looking specifically for

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soil types.

THE WITNESS: Then I don't understand your question.

MR. YINGLING: You indicated that there were four soil types out of the 200 found in the state of New Jersey?

THE WITNESS: Oh, I'm sorry.

MR. YINGLING: How many tests were dug on the site to determine what soil types were on this property?

THE WITNESS: We didn't determine the soil type in terms of whether it's Penn shaley silt, for instance, and others. That's a USDA soil series classification. It's not an engineering classification. So I did not do testing, USDA soil testing to determine if it was Penn shaley silt loam than the others.

MR. YINGLING: So what methods did you use to make those determinations?

THE WITNESS: Well, the hydrologic soil Groups A through D have to do with --

MR. YINGLING: And the specific types, the actual names of the soils that you indicated?

THE WITNESS: That I looked up on the soil survey.

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MR. YINGLING: So geologic soil survey?

THE WITNESS: On the Somerset County soil survey.

MR. YINGLING: So no specific core samples were actually dug on the site to determine that?

THE WITNESS: No testing was done to determine whether the material categorized as Penn silt loam. What I was saying was that those four soil types that are shown in the county soil survey for this site fall under two hydrologic soil groups "C" and "D".

Now, those soil groups "C" and "D", "E" have engineering properties.

MR. YINGLING: Essentially what I'm trying to find out is, did you yourself or your firm do tests on the site to determine those classifications or did you rely on the information provided by others to indicate what's on that site?

A. No, we did that testing, the infiltration testing.

MR. YINGLING: Not infiltration. The specific soil types -- you indicated that there were four soil types on the site out of 200 towns in state of New Jersey. What method did you use to make that determination?

THE WITNESS: I looked it up on the soils

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map.

MR. YINGLING: So there are no bore samples or tests done to indicate the soils by your firm or Birdsall?

THE WITNESS: Right.

MR. YINGLING: Right. How many samples were done to determine the water levels on the property, how many were --

THE WITNESS: GTAs 43, plus Birdsall's 43, plus Gladstone's 20.

MR. YINGLING: So roughly a hundred tests on a 120-plus acre site?

THE WITNESS: Pardon me. Gladstone had 29 test pits, sorry.

MR. YINGLING: So less than 80 then on a hundred-plus acre site?

THE WITNESS: Right.

MR. YINGLING: Okay. Were you --

THE WITNESS: No, no. Forty-three and 43, and 29.

MR. YINGLING: Forty-three, 43, and 29.

Were you physically present when those samples were taken?

THE WITNESS: Just on six or eight of the test pits.

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MR. YINGLING: So out of the 43 you only visibly saw 6 to 8 that were done?

THE WITNESS: Personally.

MR. YINGLING: So you're relying on the information provided by others to make this determination?

THE WITNESS: By my soils engineer for the test pits that we did.

MR. YINGLING: Just curious, because there seems to be a lot of questions that you weren't able to answer directly. And it didn't seem like you were involved with the actual tests that were done on the site. It looks like you were relying on information from others to make this determination.

THE WITNESS: No. Engineering personnel from my company, my employees, were at the site logging our test pits, doing in-filling, and making groundwater observations and so on.

MR. YINGLING: But it didn't seem like you had accurate knowledge of test location. You had to refer back to notes and refer back to locations to the size --

THE WITNESS: Well, that was for test pits done by others.

MR. YINGLING: Well, that was always done

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by your firm. Questions about the size of the basin you didn't have those answers. You referred back to information provided by the scientists within your firm?

THE WITNESS: Well, the size of the basin have come from Gladstone Design, and that information was provided to us early on in the process to figure out how many test pits we need to be doing within each of those basin areas, and I just didn't have that number at the top of my head.

MR. YINGLING: You indicated that the test met the flavor of the criteria required by the DEP in the state. Would that be a bland flavor, spicy flavor? How would you indicate those results?

THE WITNESS: I'm sorry. Say that again.

MR. YINGLING: Are they bland in there? Are the basins absolute minimum's required, or are they spicier where they meet the requirements?

MR. COLLINS: Try to make it less sarcastic, sir.

THE WITNESS: I really don't understand your question.

MR. YINGLING: That's okay. We can skip that one.

Question: The applicant indicated that in

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the left-hand portion of the property there's approximately, I'm guesstimating 20 to 30 acres of area of tree, forest area that are going to be removed under the proposal. How will that affect the water table on the property in your calculations that were determined by yourself or Birdsall or Gladstone?

THE WITNESS: Calculations were not to determine water level. Those determinations were made by observation within each test pit.

MR. YINGLING: Within those test pits if you removed 20 to 30 acres wooded area that is currently -- groundwater that's on the property, would that not then increase the water tables on the property so that your observation would be more visible as opposed to test pits that are coming up empty?

THE WITNESS: I think it's probably fair to say that tree roots, big tree roots absorb more water than grass roots.

MR. YINGLING: Correct. So would your calculations then change, and the determination of the location of particular basins or suggested areas of basins also change?

THE WITNESS: No. Well, there's no calculations, again, for determining the seasonal high water or observing the groundwater level. It is what

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it is right now. And there's no way that you can calculate what that potential possible rise in groundwater level would be.

MR. YINGLING: Wouldn't there be some type of standard or calculation used to determine how much water is at a particular tree based on the caliber of that tree?

THE WITNESS: I'm not aware of that.

MR. YINGLING: Okay. Thank you.

CHAIRMAN BOXER: So it is 10 o'clock. I think it's been a long night for this witness and I think we at least owe him a little bit of rest over the next meeting. I'm not sure we're done with you yet. I think the citizens may have some additional questioning, but we'll have to see how that goes.

Just maybe by a show of hands of the people that are here, is there anybody else that may want to question this witness? Okay. Just you, sir?

UNIDENTIFIED VOICE: I just have one question.

CHAIRMAN BOXER: If you have one question we'll let you come up.

UNIDENTIFIED VOICE: It's a quick one. I promise. Collin Hickey, and I've been sworn in previously.

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C O L L I N H I C K E Y, having been previously sworn, testifies as follows:

MR. HICKEY: Just a quick question.

Mottling would appear to be a subjective measure, as opposed to direct observation which would be an objective measure, would that be correct? When you're determining the high groundwater or the high level of groundwater?

THE WITNESS: Evaluating the high ground water is based on mottling can be subjective.

MR. HICKEY: So how often is there a discrepancy between the observation of mottling, which I would say is a subjective measure, and sticking a ruler in a hole and observing the actual?

The reason I ask that is because you mention before there's a degree of confusion based on observation of mottle, because somebody could believe that it's mottle, somebody else would say it's not. Would that be correct?

THE WITNESS: I think that mottling is mottling. It's something that everybody here could see soil that's mottling and say ah, that's mottled soil. The subjectiveness of it comes from evaluating whether or not that soil mottling is indicative of a seasonal high groundwater level.

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MR. HICKEY: Okay. How often then is there a discrepancy between observation of mottling and actually doing the objective measure of measuring with a stick as you described before, the ruler, and actually observing directly that seasonal high water?

Meaning, it sounded to me that the latter was the gold standard, and lacking that I could observe mottling as a pretty good measure, but the gold standard was actually direct observation. Would that be correct?

THE WITNESS: Direct observation doesn't always tell you what the seasonal high groundwater level is, though. There still is a level of subjectivity, whether or not the seasonal high water level is above that level of the seepage level, the groundwater level. All right.

MR. HICKEY: I guess I'm still going back to how often do the two measures disagree, or are they always in agreement? I'm just trying to get a degree of accuracy.

THE WITNESS: Yes. Again, even in the wet season you could go and see where the seasonal high -- you could see where the seepage is coming from and you could measure that depth below the ground surface, but then in the same pit if you see mottling extending up

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above that seepage then that's probably a pretty good indicator that that mottling was caused by a rising groundwater level.

MR. HICKEY: And how often would I not see the mottling -- I'm flipping in reverse now where I see mottling to a certain level, but I don't get mottling even though the groundwater has exceeded that level of mottling, does that happen?

THE WITNESS: Some soils are not very prone to mottling.

MR. HICKEY: Would these soils be prone to mottling?

THE WITNESS: Absolutely these soils are prone to mottling.

MR. HICKEY: I just want to go to my original question. Is there a discrepancy between the direct observation or the mottling, or are they always in agreement?

THE WITNESS: Well, again, if you see water seeping out of the test pit, right, and you determine that that water is groundwater, it's because it continues seeping all the way down to the bottom of the test pit. Sometimes there's perched water. That water is seeping out of a test pit at a higher level, and then below that isolated seepage the rest of the test

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pit is dry. So that is not a groundwater level, that's perched water, and that perched water can cause mottling, because it's not caused -- because the water is just hung up on that impervious layer, right. So the soils below it are not mottled and then you keep digging and perhaps you see seepage at some much deeper depth. In that case you can't correlate, you shouldn't correlate, in my opinion, the mottling with that deeper groundwater level, if that answers your question.

MR. HICKEY: That answered my question. Thank you.

CHAIRMAN BOXER: All right. So thank you very much, Mr. Loh. I appreciate it. Mr. Loh, we appreciate your patience and hanging in there for a very long discussion.

When do we have the scheduled next --

MR. FERRIERO: We don't, Mr. Chairman. March 5th is booked. The next one will be March 12th.

MR. HALL: Excuse me. It doesn't sound like I had a choice. I was hoping to get back to first Thursdays, but if the 5th is booked then --

CHAIRMAN BOXER: March 12th it is.

MR. HALL: Hopefully for April you can clear the first Thursday.

MR. FERRIERO: I'll be out of town

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April 2nd, so the Board will have to determine what they do.

MR. HALL: Just looking ahead.

CHAIRMAN BOXER: All right. Thank you very much. Okay.

MR. COLLINS: This case, KDC's application will be carried without additional notices to March 12th at 7 p.m., same place.

CHAIRMAN BOXER: Thank you you very much. Appreciate it, everyone. Motion to adjourn?

BOARD MEMBER RODELIUS: So moved.

(The Board adjourns at 10:05 p.m.)

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C E R T I F I C A T E

I, IRIS LA ROSA, a Notary Public and Certified Shorthand Reporter of the State of New Jersey, do hereby certify that the foregoing is a true and accurate transcript of the testimony as taken stenographically by and before me at the time, place, and on the date hereinbefore set forth.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

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