ISSUES CONFERENCE VOLUME 9

In the Matter of the Applications of

CROSSROADS VENTURES, LLC

for the Belleayre Project at Catskill Park
for permits to construct and operate pursuant to
the Environmental Conservation Law

Margaretville Fire House
Margaretville, New York
June 24, 2004

B E F O R E:

HON. RICHARD WISSLER,
Administrative Law Judge

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(JUNE 24, 2004)
(9:28 A.M.)

P R O C E E D I N G S

ALJ WISSLER: Mr. Gerstman, is everyone here for you?

MR. GERSTMAN: They all left me.

ALJ WISSLER: I want to get appearances for the record, please.

MR. RUZOW: For the Applicant, Dan Ruzow, Terresa Bakner.

MS. KREBS: Department Staff, Carol Krebs and Vincent Altieri.

MS. MELTZER: New York City, Hilary Meltzer and Daniel Greene.

MR. YOUNG: For Delaware County, Coalition of Watershed Towns, Middletown and Shandaken.

MR. GERSTMAN: For the Catskill Preservation Coalition, Marc Gerstman and Eric Goldstein.

ALJ WISSLER: Anything preliminarily we need to buckle up before we begin?

(NO AFFIRMATIVE RESPONSE.)

ALJ WISSLER: I take that as a no.

Ms. Bakner.

MS. BAKNER: Your Honor, what we're going to do first is introduce the exhibits we intend to use. The first Exhibit is a March 20th, 2004 letter from Don Lake to David Carr and Kevin Franke.

ALJ WISSLER: This will be Applicant's 27.

(LETTER DATED 3/20/04 FROM NYS SOIL AND WATER CONSERVATION COMMITTEE RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 27 THIS DATE.)

MS. BAKNER: The next exhibit is the resume of Dean Long from LA Group.

ALJ WISSLER: It will be Applicant's 28.

(RESUME OF DEAN R. LONG RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 28, THIS DATE.)

MS. BAKNER: The next is a resume for David R. Carr from LA Group.

ALJ WISSLER: Applicant's 29.

(RESUME OF DAVID R. CARR RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 29, THIS DATE.)

MS. BAKNER: The next is a resume from

John Andrew Cianci with LA Group.

ALJ WISSLER: Applicant's 30.

(RESUME OF JOHN ANDREW CIANCI RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 30, THIS DATE.)

MS. BAKNER: The next is a resume from

Daniel P. Sheehan from LA Group.

ALJ WISSLER: Applicant's 31.

(RESUME OF DANIEL P. SHEEHAN RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 31, THIS DATE.)

MS. BAKNER: The next is a resume from Roger J. Case from LA Group as well.

ALJ WISSLER: Applicant's 32.

(RESUME OF ROGER J. CASE RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 32, THIS DATE.)

MS. BAKNER: And the last resume is Steven M. Trader, T-R-A-D-E-R, geologist.

ALJ WISSLER: Applicant's 33.

(RESUME OF STEVEN M. TRADER, GEOLOGIST RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 33, THIS DATE.)

MS. BAKNER: The next exhibit is excerpts from a document entitled,

"Controlling Urban Runoff by Thomas R. Schueler, S-C-H-U-E-L-E-R."

ALJ WISSLER: Applicant's 34.

("CONTROLLING URBAN RUNOFF: A PRACTICAL MANUAL FOR PLANNING AND DESIGNING URBAN BMP'S BY THOMAS R. SCHUELER" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 34, THIS DATE.)

MS. BAKNER: The next is an article from Research Management Findings from April 1995 entitled, "Phosphorous Loadings from Wisconsin Watersheds."

ALJ WISSLER: Applicant's 35.

("RESEARCH MANAGEMENT FINDINGS" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 35, THIS DATE.)

MS. BAKNER: The next document is excerpts from an article called, "Runqual, Runoff Quality from Development Sites, Users Manual" dated June 30th, 1993.

ALJ WISSLER: Applicant's 36.

("RUNQUAL RUNOFF QUALITY FROM DEVELOPMENT SITES" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 36, THIS DATE.)

MS. BAKNER: The next is excerpts from

the October 2001 New York State Stormwater Management Design Manual, pages A-1, A-3 and A-7.

ALJ WISSLER: Applicant's 37.

("NYS STORMWATER MANAGEMENT DESIGN MANUAL OCTOBER 2001" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 37, THIS DATE.)

MS. BAKNER: And, I'm sorry, A-8.

The next is a document entitled, "New York City Department of Environmental Protection, Guidance for Phosphorous Offset Pilot Programs" dated March 1997.

ALJ WISSLER: Applicant's 38.

(NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION GUIDANCE FOR PHOSPHORUS OFFSET PILOT PROGRAMS RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 38, THIS

DATE.)

MS. BAKNER: The next is a document entitled, "Monitoring of Tributaries Draining Belleayre Mountain, Crossroads Ventures Development Location." The report is by a division of DEP, and it's dated April 2002.

ALJ WISSLER: Applicant's 39.

("MONITORING OF TRIBUTARIES DRAINING
(STORMWATER ISSUE)

BELLEAYRE MOUNTAIN CROSSROADS VENTURES DEVELOPMENT LOCATION" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 39, THIS DATE.)

MS. BAKNER: The next document is the New York State DEC SPEDES General Permit for Stormwater Discharges from Construction Activity, Permit No. GP-02-01 dated January 8th, 2003. We couldn't remember if this had been entered into the record previously or not, your Honor.

ALJ WISSLER: I don't have it in any of the lists. It's obviously something we'll take notice of, but we'll take it in as Applicant's 40.

("NYS DEC SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY, PERMIT NO. GP-02-01 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 40, THIS DATE.)

MS. BAKNER: The next exhibit is another excerpt from the New York State Stormwater Management Design Manual dated

October 21st, 2001. It includes the table of contents and page 4-1, 4-9, 4-11, 4-13.

ALJ WISSLER: Applicant's 41.

(NYS STORMWATER MANAGEMENT DESIGN MANUAL OCTOBER 2001 (EXCERPTS) RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 41, THIS DATE.)

MS. BAKNER: The next document is an excerpt from a book entitled, "Handbook of Landscape Architectural Construction," and it's published by the Landscape Architecture Foundation.

ALJ WISSLER: Applicant's 42.

("HANDBOOK OF LANDSCAPE ARCHITECTURAL CONSTRUCTION" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 42, THIS DATE.)

MS. BAKNER: The next document is "Urban Hydrology for Small Watersheds," and it's an excerpt including pages, Roman II, Roman numeral III and III-3. It's produced by the United States Department of Agriculture.

ALJ WISSLER: Applicant's 43.

("URBAN HYDROLOGY FOR SMALL WATERSHEDS" RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 43, THIS DATE.)

MS. BAKNER: Today, as we've done in the past during the proceedings, the way in which we'd like to start out in our response

is really to go over the project itself, what we have proposed. Many of the comments we have heard over the course of the past two days would indicate that it would be a good idea to go through all the plans and documents to make sure that, in fact, the comments that have been received reflect the project as it's been designed.

We have an enormous amount of information in our document on stormwater. The reason why we have an enormous amount of information in our document on stormwater is because the Department staff advised us early on in the process that stormwater was an issue in this case, something that had to be carefully addressed in the Environmental Impact Statement process. So in the Draft Environmental Impact Statement, we have a number of records. First we have the LA Group's plans, the large plans which we're going to go through here today in detail, CP-1 through CP-18. We also have the stormwater plans, I believe they're SD plans. Included in the Draft Environmental Impact Statement itself, Volume 1 is an extensive discussion of

stormwater management at Section 2.3, Section 3.2 and Section 5.9 which discusses in detail not only the plan that we're proposing but also an alternative plan that we discussed and worked at length with both as -- with the project sponsor, the golf course architect Paul Cowley, and also representatives from

Clark Companies who were here, I believe it was Tuesday.

In addition to the more accessible information in DEIS Volume 1, we also included all of the technical backup for anything related to stormwater in Volume 5, Appendices 9, 9A, 10, 10A, 11 and 12. And in doing this, we included, to the best of our ability, all of the technical backup information. In addition to this, we included an entire copy of the permit documents which is the Application for a State Pollutant Discharge Elimination System Permit.

One thing I want to draw your attention to particularly is that permit application which is set forth in Appendix 2. In there you'll see an application for an individual permit for both construction

discharges of stormwater and post-construction operation discharges of stormwater for both projects -- for both portions of the project, Big Indian as well as Wildacres.

Additionally, we heard from DEP staff regarding the 1979 Ulster County Soil Survey, and they handed out excerpts of the soil survey. We were instructed early on not to rely upon the old soil survey maps exclusively but instead to undertake a high intensity soil study ourselves of the site. That is discussed in detail at Section 3-5 in Volume 1 of the DEIS, and the results of that high intensity soils mapping effort can be seen on Figures 3-6 and 3-7.

For the record, the person who performed that mapping effort is Roger Case who has had 30 years of experience with soils. He is a soils scientist, and we entered his resume for the record.

I want to talk just briefly about the history of the project to try to put it in context. As you know, your Honor, the scoping took place and the scope was finalized in roughly the year 2000. Immediately after the

scope was presented, we started collecting the information necessary for the Stormwater Pollution Prevention Plan inclusive of the modeling of pollutant loadings. Those runs were done and, Dean Long, if you could help me out on this, what year were they started?

MR. LONG: July 2001.

MS. BAKNER: July 2001. There has been quite a bit of confusion, which I think Mr. Young has gone a long way to clearing up with respect to what draft permits have been issued for this project, and what I'd like to do is go through some of the history, again, of the project; and right now I'm referring to a May 15th, 2002 letter from Alex Ciesluk at the Department of Environmental Conservation to Gary Gales at Crossroads Ventures, LLC. At page 5 of that letter --

ALJ WISSLER: Is this letter in evidence?

MS. BAKNER: It is not. I'm just going to read the relevant portion. It's entitled, "Stormwater Management," and it has a heading. It says, "Individual Permit Requirement. The department believes that an

individual State Pollutant Discharge Elimination System Permit is appropriate for stormwater discharges from the project construction activities, and also for post-construction stormwater discharges. This permit requirement should be identified in the DEIS and a description of the proposed monitoring plan presented."

At that time DEC also advised us, as they say in the letter, that the general permit, the permit dating back to 1993 for stormwater discharges associated with construction was under renewal and that we were to comply with the new general permit -- the requirements, the new general permit and the 2001 Stormwater Design Manual.

So in fact, our project was designed with those technical requirements and standards in mind.

MR. GERSTMAN: Judge, I would ask since Ms. Bakner is referring to that letter, that the Applicant provide copies for the record.

MS. BAKNER: I can provide a copy of

the page. It's clearly part of the record

before DEC, and again, it's the May 15th, 2002 letter.

MR. GERSTMAN: Request the letter, please.

MS. BAKNER: The provision that the Department was referring to --

MS. MELTZER: I'm sorry, she is going to provide the letter or the page?

MS. BAKNER: The page.

MR. GERSTMAN: We'd like the letter.

MS. MELTZER: We would like the letter.

MS. BAKNER: Okay, that's fine. I want to emphasize, your Honor, that's in the public record, and it's been part of the public record in this case since 2002. So we're happy to give them a copy.

ALJ WISSLER: It's not --

MS. BAKNER: It's not in this record today, but certainly it was cc'd to DEP, so they certainly have it.

ALJ WISSLER: It may be among things that were referred to me in the Office of Hearings, but in any event if you could make a copy.

MS. BAKNER: No problem. Referring to the GP-02-01, the SPEDES Discharge Stormwater Permit from Construction Activities, and this was handed out earlier as an exhibit, this provision -- Kevin cited the one from `93 yesterday -- provides on page 5 of 24 --

MR. RUZOW: Exhibit 40.

MS. BAKNER: -- paragraph 7. It just confirms that if you're applying for a number of DEC permits, the Department at its discretion can elect to allow you to proceed under the general permit after the individual permits have been issued.

ALJ WISSLER: What pages are you looking at?

MS. BAKNER: Page 5 of 24 and page 6 of 24. And paragraphs 7 through -- primarily paragraph 7. Basically what it does is it continues the approach that Kevin described from the general permit from 1993, and it basically says the Department has two choices, they can require you to get an individual SPEDES permit for stormwater discharges, or they can issue you the other permits and at that time allow you to proceed subsequently

under the general permit after you follow all the procedural requirements in the SPEDES general permit for stormwater discharges.

Next I'd like to refer you to Office of Hearings Exhibit -- I'm not sure which number it is, your Honor -- it is the Draft SPEDES Permit that were handed out on May 24th, 2004 by the Department.

ALJ WISSLER: That would be Office of

Hearings Exhibit 10.

MS. BAKNER: Looking at the Wildacres Resort Sewer Works Corporation, I would direct your attention to page 20 of 23, and specifically the special conditions for construction phasing. And I just want to direct your attention to the fact that in response to our permit application for an individual permit for both the soil erosion and construction phases, the Department has covered those here in the individual permit. If you look at B, it says: "A stormwater Pollution Protection Plan, or SWPPP, developed in accordance with part 3 of GP-02-01, SPEDES General Permit for Stormwater Discharges, and in substantial conformance with the procedures

and practices described in Appendix 11, August 20, 2003 for Phase 2 of the Big Indian Plateau must be developed for the Wildacres Resort side. The SWPPP shall be developed in phases to coincide with the three construction phases of the project."

C: "Construction of Phase 1 of the Wildacres Resort site shall not commence until submission to the regional water engineer and authorization by the Department of the section of the SWPPP covering that specific phase."

Then it goes on to impose additional requirements: "Submission to the regional water engineer of any portion of the SWPPP, including detail construction drawings for authorization by the Department of any construction phase, must be made at least 60 calendar days before construction of that phase is scheduled to commence."

And in accordance with the testimony, or the argument offered by Kevin Young yesterday, the general permitting plan is a plan and a permit that is keyed towards construction, so that if you are not in a impaired watershed, you merely submit a notice

of intent five days before starting construction which indicates that you have prepared a SWPPP and that it's in accordance with the plan. DEC does not review them. Those documents are, by and large, permits permitted by rule. People just comply with the technical requirements and they, in effect, have the permit.

In the impaired watersheds such as the entire New York City Watershed --

MR. RUZOW: Ashokan.

MS. BAKNER: -- Ashokan, you need to provide it at least 60 days prior to construction. That is the language that is picked up here in D. The Department is asking us to prepare and submit it at least 60 calendar days before.

E: "Construction of any subsequent phase of the project cannot commence until substantive compliance of the previous phase

as determined by the regional water engineer.
Such construction cannot commence until
receipt by the regional water engineer of a
statement from a licensed professional that
the previous construction phase was completed

and stabilized in accordance with the SWPPP.
Then there's a reference to standard permit
conditions and GP-02-01.

Similarly, in the Draft State Pollutant Discharge Elimination System Permit for the Big Indian Plateau Sewage Works Corporation, at the back of that document, page 18 of 21, there are pretty much the same special conditions for construction phasing. And they also go through the plans which we're going to go over in great detail today, plans CP-1 through CP-18 dated August 20th, 2003. Based on my review, I'll refer you to page 19 of 21, Conditions B through F are the same conditions that apply with respect to Wildacres.

So the individual permit covers both projects and covers both stormwater operation and stormwater construction and provides by the nature of its requirements a substantial amount of Department oversight that is completely absent from typical construction jobs which are authorized under the general permit program.

MR. RUZOW: Your Honor, just to point

out another distinction, under the individual permit, the draft permit proposed by the Department, there is an important distinction, additional distinction that may be harder to discern. When you have an obligation in impaired watersheds to submit for 60 days prior to construction, if you don't hear from the Department, you just proceed. It's an opportunity for the Department to choose one way or another to look at it, obviously have an opportunity to review it, and then decide whether or not -- but if you don't hear, you proceed.

In this case, we require authorization from the Department. We have to submit it 60 days in advance. But we need to hear from the Department to actually authorize us and approve us to proceed. That is a fundamental difference in the way in which the program is being -- is ordinarily worked through and in this case.

MS. BAKNER: Previously, your Honor, we submitted a March 23rd, 2004 letter from the United States Environmental Protection Agency to Alex Ciesluk, Jr. I believe it was

one of the exhibits on the first day of the proceeding, the 24th. In the event anybody doesn't have it, we'll provide it.

ALJ WISSLER: What was it?

MR. RUZOW: A letter from Walter

Mugdin to Alec Ciesluk dated --

MS. BAKNER: March 23rd, 2004, EPA's comments on the draft SPEDES permits. On page 2 and 3 of that letter, the Department --

ALJ WISSLER: Do you have that marked as an exhibit?

MR. RUZOW: I don't have it on my list. We were waiting for the official list.

MS. BAKNER: In any event, I'm going to quote a very small portion of it. Let me set the background. The whole general stormwater permit program was initiated by EPA, the United States Environmental Protection Agency, under the federal National Pollutant Discharge Elimination System laws and regulations required the implementation by DEC, as it was delegated to DEC, required the implementation of the Phase 2 general permits.

So EPA's comments on what DEC is proposing to do here, we think, are very

relevant to this proceeding; and I would direct your attention to paragraph 1 on page 2 and paragraph 2 on page 3. It says: "The DEIS states that during construction there will be disturbed areas with bare soil that will be susceptible to erosion. As described in the DEIS, the developer intends to implement a complex construction phasing program to address and mitigate potential water quality and quantity problems associated with erosion. In addition, the developer will employ an erosion control superintendent with a support team who will be independent of and have stop work authority over site contractors and subcontractors."

Let me just say that that is one of the enhanced construction and erosion control measures we have proposed for this project.

We have come up with all these enhanced measures because we understand that the agencies have concerns about stormwater. They note a special condition of the draft SPEDES permit, and they cite it, and they go on to say that: "EPA is very concerned that adequate erosion control be continuously

maintained on the project."

Lastly, I want to direct your attention to paragraph 2, and I'll give you a copy of all this. It says: "EPA recommends that the SPEDES permit include an additional condition stating that no more than 25 acres of unstabilized soils will occur at any given time within either reservoir watershed." You heard repeatedly yesterday sort of -- questions of how anyone could think that opening 25 acres at anytime was going to be anything other than an ecological disaster.

The agency with primary authority for implementing this program throughout the United States obviously doesn't share that degree of concern regarding the five acre "rule."

Before we leave the five acre rule issue, I just want to reiterate that the general permit clearly provides not for a waiver of the five acre rule; it provides that if you are going to exceed five acres of clearing at any one time, that you need to obtain the Department's consent. Typically, obtaining the Department's consent involves a

letter to the regional stormwater engineers proposing enhanced erosion control measures and a letter back from the engineer consenting to clearing more than five acres at a time.

ALJ WISSLER: Ms. Bakner, why don't you show me in Applicant's 40 the section that you're referring to.

MS. BAKNER: It says on page 11 of 24 at 2(A)4: "Consistent with the New York Guidelines for Urban Erosion and Sediment Control, there shall not be more than five acres of disturbed soil at any one time without prior written approval from the Department."

As an attorney working in the stormwater arena on a daily basis, I can only say that the numbers of my clients who have not had to obtain those consents is far smaller than the number of my clients who have had to obtain those consents -- which is to say, if you're building a commercial structure such as a Walmart or a Target or anything that remotely resembles big box construction, you need to obtain that consent from DEC.

Surprisingly, even for residential

subdivisions, your Honor, often involving no more than 30 or 40 houses, because of the road construction limitations, it's very typical for those project sponsors to also obtain consent.

One of the things that we hope to show you today, your Honor, is that the amount of soils that we're disturbing at any one time are the absolute minimum that anyone should disturb and still build a golf course. With all due respect to counsel for CPC and counsel for DEP, it is simply not possible to build a golf course in five-acre increments -- or incredibly one-acre increments. You would take our construction season of essentially two years for the golf courses and blow it out to something approximating ten years, but we'll go over that in great detail.

A lot of the criticisms yesterday were that we had somehow thrown together these plans and hadn't given them the appropriate attention that they deserve. I want to just stress that during the course of the design of the project, we had numerous meetings and letters going back and forth between DEC and

the Applicant. We also had extensive meetings with soil, water and conservation district offices. These included Greene County, Ulster County and Delaware County.

Just to give you a flavor of all the meetings and contacts that we had, on June 19th, 2002, we had an initial meeting with numerous DEC staff, including Mr. Ferracane, to review the original phasing plan that we had put together. After that meeting with Pat, he convinced us we were on the wrong approach, and that we needed, in fact, to rethink what we were proposing to do. We did. And in November of 2002, we had an additional meeting with DEC staff in White Plains to go over the revised documents.

As part of this, your Honor, beginning in March of 2003, we started communicating with DEC staff about the usage of chitosan as a flocculent or an additive to precipitate out sediments.

Then in April of 2003, we continued meeting on stormwater issues with various DEC staff. I don't want to belabor this; but in the course of 2003, we had at least two to

four meetings or phone calls going over additional revisions to the plan -- which Kevin will discuss in greater detail later -- and it wasn't until July of 2003 that we met lastly with DEC staff to go over the revised phasing approach, as well as all of the soil and water conservation guys that we could get in a room. Because what we wanted to do, your Honor, is not to create something that just represented the thought process and the works of our design team or even our construction design team, or even our golf course design team.

We wanted early on to vet the various designs and processes so that we weren't missing something. We were very attuned, at our client's request, to making sure that this issue of stormwater was appropriately addressed. And enormous resources were brought to bear to address these issues far beyond what would typically be expended in a Draft Environmental Impact Statement process.

MR. RUZOW: The issue, as we talked a few days ago, of constructability, not simply design, but the ability on this site to be

able to construct it as it was being planned, and to vet those issues early so we would avoid what Joe Damrath expressed the concern, and maybe inevitable, of unexpected problems developing on-site. There's a certain category of those that any project is going to face, and we fully expect that the best of design and the best of anticipation will, nevertheless, yield things on-site that were unanticipated; however, we wanted to minimize that surprise and opportunity by vetting these out with all the players on the project site, as well as interaction with the Department staff, taking into account their experience on the sites, and reflecting that in our plans and our thought process.

MS. BAKNER: I want to reiterate as well, the extraordinary nature of requiring an individual SPEDES permit for construction discharges of stormwater. Very few projects are required to do that, and we even had difficulty simply filling out the application forms because they're not particularly suited to those types of discharges. So we put a lot of effort into the SPEDES permit applications

themselves to make sure that they would meet DEC's expectations.

I want to move for a second to the issue of calculation of pollutant loadings. Our calculations of pollutant loadings were based on several guidance documents subjected to public review by the Department which are used by the professional engineers, landscape architects and soil pollution/erosion control specialists throughout New York State. One of the reasons why we provided in Exhibit 1, the letter from Don Lake commending our design team on another project --

MR. RUZOW: It's Exhibit 27.

MS. BAKNER: I'm sorry, Exhibit 27, the first thing I passed out today; one of the reasons why we handed that out is because Don

Lake has been an important part of the Department's adoption of new design guidelines, erosion control guidelines, and he has been working with the Department and educating professionals across the state on the new Phase 2 program.

The Department as well, your Honor, has a long history of reaching out to

organizations in other states to develop their design manuals. So we believe, contrary to Dr. Pitt's testimony yesterday, that the pollutant loading credits, if you will, if you design it this way, you will remove approximately this percentage of stuff is, in fact, consistent with those guidelines that were adopted by DEC, and generally consistent with guidelines in the Northeast that we are certainly familiar with. These were developed not only by Department staff but also by outside consulting groups who advised the staff.

Other than that, it's hard for us to address this, and we hope the Department will address this when they make their presentation here today.

We were advised -- advised is probably a namby-pamby lawyer word -- we were directed by DEP as part of their original scoping comments, and I will direct you specifically to the letter I'm referring to. It's a July 12th, 2000 letter. We haven't proposed to submit it into the record because it relates to scoping in an early phase of the

project, but we'd be happy to, and I'm sure DEP certainly has this one, this is page 4 of 5 --

ALJ WISSLER: I really need to have it in the record.

MS. BAKNER: Okay. Page 4 of 5, and I'll just quote: "A more detailed pollutant loading analysis should be conducted for this project such as the Source Loading and a Management Model, or SLAMM." Now, I think Dr. Pitt said yesterday WinSLAMM is SLAMM. It's just been developed or enhanced to run on the Windows operating system. I wanted to make that point. We didn't go out and pick WinSLAMM. We were told to use SLAMM. So in our desire to accommodate the agencies, that's what we attempted to do.

Additionally, there was a lot of discussion yesterday about DEP's, shall we say, deal with the Applicant that they would come out and take baseline water quality monitoring and make that data available to us. One of the things we're going to discuss here today is the amount of time it took us to both request that data and to obtain that data in a

usable form. And that's one of the reasons when we pointed out when we started our modeling efforts, it's very important in relation to when we actually received reliable data from DEP, and what was in the data from DEP at any one moment, and I believe Mr. Dean Long from LA Group will be going over that.

Also I want to draw your attention to a letter also from DEP dated September 22nd, 2000, which we will put in the record, your Honor. It's from Jeffrey D. Graf, program manager, West of Hudson Community Planning, September 22nd, 2000. This letter from Mr. Graf to Arthur Rashab [sic] who was previously associated with Crossroads Ventures. "While DEP is very interested to and will make information gathered in this monitoring program available," and the monitoring program he's referring to is the one Mr. Olson described so thoroughly yesterday, "I want to reiterate comments I made at the meeting with the DEC of August 29th, 2000 in New Paltz.

DEP's monitoring program at Crossroads was not designed to provide information for

the DEIS. At the meeting we discussed the fact that since DEP's monitoring program runs on a separate schedule from the DEIS, Crossroads Ventures should be implementing its own monitoring programs to feed into the DEIS. By doing so, the DEIS will not be dependent on activities beyond Crossroads Ventures control."

So this is the letter indicating to us that the information will be given to us as it was -- it was supposed to be given to us as it was available. It was actually only provided to us as we requested it; however, it also notes that they didn't expect us to use that information in the Draft Environmental Impact Statement due to timing.

The length of the time that it took to get the Draft Environmental Impact Statement in a form acceptable to DEC was, in fact, longer than anyone could have anticipated. And what we were able to do was include the water quality data as it was given to us by DEP in its entirety in the record. Now, we didn't have any bars and whiskers charts or anything really interesting like that. All we

had were the stream data, all of which, your Honor, is set forth in Appendix 18 of the Draft Environmental Impact Statement. In that, it has all the letters transmitting the information, as well as any data we received from DEP we put in here.

The reason why we did that, your Honor, was to have a complete and full record, even though the data was not made available to us in time to, say, use in the early runs or even in the subsequent runs of the WinSLAMM model, and it was often not provided in a form where we could make the calculations necessary, which I will not try to describe but leave to Mr. Long -- we were careful to include it all in the record.

We also reached out to DEP on numerous occasions to try to sit down and discuss with them the WinSLAMM modeling since it was at that time a new form of WinSLAMM and something that was not typically required or do I believe it's required now, for projects west of Hudson. It's not typical to be used in the Capital District Region. I understand it has been used east -- in the east of Hudson area,

Westchester County, counties like that, but it has not typically been used in areas or for projects outside of that area.

In any event, we corresponded as recently as March 1st, 2002 with Mr. Damrath and requested an opportunity to meet with him on the model and the analysis results to talk about the data. Unfortunately, such a meeting never took place. It's been very difficult throughout this process to meet with DEP, and we've been in the position primarily of meeting with DEC as the lead agency and permitting agency, which is typical, but I wanted to share with you that throughout this process what we tried to do was include as many parties as we possibly could to make sure that we had a very wide source of experience and data from which to put together this information.

The first part of any examination of a project and its impact on soils on-site is the Soil Erosion and Sedimentation Control Plan, and what I'd like Kevin Franke of LA Group now to do is take us carefully and slowly through the construction phasing plan so that we're

sure that we all have a common understanding of what the DEIS, in fact, says.

MR. FRANKE: Most of the information that I'll be presenting comes from DEIS Volume 1 and also DEIS Volume 5, so if folks want to have that handy. Some of the graphics are a smaller scale; it may be easier to refer to those in your hard copies. In addition to those graphics, we have copies of LA Group CP drawings, construction phasing drawings.

MS. BAKNER: I'm sorry, your Honor, I forget a critical part of this. Let me interrupt for a second. What I'd like you and Dave and Dean to do is go through your qualifications and describe projects you've worked on that are similar to this.

MR. FRANKE: Kevin Franke with the LA Group, been with the LA Group for 15 years. One of my primary responsibilities is resort, golf course development, permitting, SEQRA work including SWPPP's, and also construction administration. In addition to golf courses in preparation for SWPPP's for their construction, I've also been involved with ski centers and preparing SWPPP's for those, which

is analogous to building golf courses, fairways running downhill, across a hill. Both preparing SWPPP's both under Phase 1, general permit, as well as the new Phase 2 general permits.

MR. LONG: Dean Long from the LA Group, Director of Environmental Planning. I've been at the LA Group since 1986. Prior to that, from 1980 to 1986, I was a research associate at the RPI Freshwater Institute at Bolton Landing. At that position, my primary responsibility was supervision and operation of the Lake George Water Quality Monitoring Program, and I wrote and authored the annual reports from 1982 to 1986.

One of the projects that I completed and also carried over to the LA Group at the Freshwater Institute was the preparation of the Draft Environmental Impact Statements for the use of Fluridone, an aquatic herbicide for the control of milfoil on that particular lake.

Prior to that, in 1978, I received a BA in Zoology from SUNY Oswego; and at SUNY Oswego, I worked primarily on developing a

mercury budget for Cranberry Lake, as well as looking at Mirex transport in the Oswego River systems. At the LA Group, I am the Director of Environmental Planning. I supervise four environmental scientists in the preparation of Draft Environment Impact Statements and various resource studies. Kevin Franke and myself have completed a number of lake studies for Blue Mountain Lake, Saratoga Lake and Pine Lakes in the Adirondacks utilizing the Eutromd Model by Ken Ricktal of Ohio State -- from Ohio State. It's a regional water quality simulation model, lake loading model.

I have also supervised and was the lead manager for restoration and inspections of gas pipeline post-construction and during constructions, as well as power lines, supervised projects involving restoration of 28 wetlands along a gas pipeline, worked on numerous golf courses including Highland Park, which is a 700-acre project in Glens Falls with interconnecting stormwater facilities, prepared draft environmental impact statements on a large number of regional shopping centers throughout New York State.

MR. CARR: Dave Carr with the LA Group. I'm a licensed landscape architect in the State of New York. I have a Bachelor's of Landscape Architecture from SUNY College of Environmental Science in Forestry. I've been at the LA Group for 15 years. I started practicing landscape architecture in 1983. For five years in the late '80s, I was a consultant for the Town of Greenfield, which is a town in upstate New York, reviewing site plans and stormwater management plans for the town. I have completed over 50 stormwater management plans which have been constructed and are operational at this time, including two golf courses: One, the Linx at Unionvale; and a second one, which was the restoration of the Sagamore Golf Club in Bolton Landing, New York, which is a mountainside golf course in the Lake George drainage basin. I also have assisted New York State Soil and Water Conservation Committee at a water quality symposium within the past year.

ALJ WISSLER: I want to take just a couple minutes because I want to get the full-size plans so I can follow along in this

discussion.

(10:40 - 10:50 A.M. - BRIEF RECESS TAKEN.)

MS. BAKNER: Mr. Franke is now going to start with what I interrupted and go through the construction erosion and sedimentation control plans.

MR. FRANKE: I would like to start off by drawing your attention to DEIS Figure 3-15-F, this is the first figure of a series that I'll work through sequentially. As the title states, Project Construction Phasing. This is a schematic that outlines the whole property and how construction will be phased over the number of years.

In particular, focusing on Big Indian Resort Country Club on the left-hand side of this figure, you can see that the construction of this portion of the project has been broken into four phases. Today we'll be focusing on Phase 2, which we prepared detailed sediment and erosion control plans. You can see in Figure 3-15-F, the Phase 2 acreage is the highest of any of the four phases, total of 85.1 acres.

One of the reasons this phase was selected is an example of how plans of this detail will be developed for the entire project in accordance with the conditions of the draft permit.

ALJ WISSLER: Let me understand. When we get to CP-1 through 18, that is only going to deal with Phase 2?

MR. FRANKE: Correct, your Honor. CP-1 shows all of the Big Indian Resort Country Club. What we have highlighted are those areas that will be constructed in Phase 2.

ALJ WISSLER: Does Phase 2, in your opinion, looking at the whole site, does Phase 2 contain topographical features that are found all over the site, number one; and number 2, does it contain the steepest slopes that are found on the site? I'm including both Big Indian and Wildacres.

MR. FRANKE: Yes, your Honor. CP-1, you see we have Holes 1, 2, 3 and 9, which are on the top of the plateau, and that is a relatively flat area. In Phase 2, we have Golf Holes 6 and 7, which represent the most

steep topography on which the golf course will be built. So we have the range of slopes for both golf courses covered in Phase 2 of the Big Indian Resort and Country Club.

I would just like to point out, yesterday it was mentioned that there was some uncertainty as to whether there was going to be overlap between Phase 1 and 2, whether Phase 2 would be beginning while there's road construction. As Ms. Bakner pointed out, the conditions in the draft permit essentially prohibit this, and that Phase 1 has to be completed and certification has to be completed in the proper manner before Phase 2 commences.

MR. RUZOW: Kevin, I think it may be helpful to describe the four phases of construction before we go into this detail.

MS. BAKNER: I think it might be helpful.

MR. FRANKE: For Big Indian Plateau, Phase 1 consists of constructing the access road, installing the infrastructure, utility infrastructure along the access road, creation of the irrigation ponds prior to the

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construction of the golf course and site preparation for the hotel itself.

It's not until Year 2 or Phase 2 that golf course construction commences. And essentially 11 of the golf course holes will be constructed in Year 2 or Phase 2.

Year 3 or Phase 3 is the remainder of the golf course, including the practice range.

Years 4 through 8 is when we anticipate the buildout of the attached lodging units throughout the site.

MR. RUZOW: Kevin, are they in areas -- can you point out for reference point, they are located within areas of what would have been fully developed and completed construction?

MR. FRANKE: Correct. The access road coming up and through the site to the hotel and beyond -- this is golf course holes in Phase 2 and 3. The units themselves are along these roadways and adjacent to the golf holes. So they're not discrete, large areas separate from areas that did not see construction before.

MS. BAKNER: Can you address quickly

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why we picked Phase 2 with the golf course, with consultation with Department Staff as opposed to Phase 1, which is access road? Why did we focus on Phase 2?

MR. FRANKE: As I mentioned before,

it's going to be the largest area total of any of the phases in construction; and as your Honor asked about, it does involve some areas of some steep slopes and fairly long runs down some of these steep slopes.

The next step in the process was to further divide the site within Phase 2 into what we referred to as subphases. And these subphases are illustrated on Sheet CP-2. On CP-2, you can see that Phase 2 has been divided into six subphases which range in size from a low of 1.9 acres to 14 acres. Those numbers are important because the subphase is essentially the unit of construction, if you will.

So when we talk about the 25 acres of disturbance, essentially that's been set as an upper limit. In reality, Phase 2 of Big Indian, we're looking at a range of approximately 12 to 15 acres. Those acreages

are all listed on Figure 3-15-G.

On Figure 3-15-G, it shows how the project site was even further subdivided to each subphase having a number of subcatchments; and we heard discussion of subcatchments earlier this week when talking about, primarily the HydroCAD modeling and how you deal with planning for runoff.

Starting with CP-3 shows the details of construction, including the delineation of each of the subcatchments within the subphase within the phase. On CP-3, we're showing SubPhase 1 and SubPhase 2. I want to take a moment here. Highlighted on CP-3 is the detention basins.

ALJ WISSLER: Let me stop you there. I see the catchment numbers and so forth. Are those the same numbers that Joe Damrath was referring to? If I was to look at the same appendix he was looking at the other day, I would find these same numbers?

MR. FRANKE: No, you wouldn't, your Honor. What Joe was talking about was a separate analysis of the operational phase.

ALJ WISSLER: Separate set of numbers?

MR. FRANKE: So these are unique to the construction phase of the project. I want to take a moment here to discuss the retention basins that were questioned yesterday as to their size and their suitability. Each subcatchment will have its own retention basin sized to capture and hold the ten-year storm as we discussed yesterday. That's a six-inch storm over 24 hours. Regardless of whether this six-inch storm occurs in 24 hours or one hour, these basins are capable of capturing and holding that water.

ALJ WISSLER: What type of storm?

MR. FRANKE: 10-year storm.

MR. RUZOW: 10-year, 24-hour storm.

MR. FRANKE: 10-year, 24-hour storm on

bare soil. We heard discussion previously, you have different rates of runoff from different types of surfaces. Forest, you have a slower runoff. Grass, slightly higher than a forest. Bare soil, even higher than you would expect from grass -- not quite as much as you would expect from an impervious area but, nonetheless, faster than you would expect from a grass area.

ALJ WISSLER: Saturated soil?

MR. FRANKE: The model -- correct me if I'm wrong, Dave. As the hydrograph is developed, is there any conditions --

MR. CARR: The hydrologic soil group assumes saturated soil.

MS. BAKNER: Kevin, if there's one thing you can address now, because I think it's relevant to the 10-year, 24-hour storm, is the sizing of the soil erosion and sedimentation basins.

MR. FRANKE: That's what I'm going to do right now. Using HydroCAD, much as we've done for the operational phase, is to design the size of our basins. We used HydroCAD to design the new basins to capture and hold that ten-year storm, being six inches of rainfall.

ALJ WISSLER: On saturated soils?

MR. FRANKE: Saturated soils.

MR. CARR: The actual definition is not saturated, but it's after prolonged wetting. So, I mean -- so that's the actual definition of a hydrologic soil group.

ALJ WISSLER: I guess what I'm asking is yesterday we had some numbers, 10-year

storm, 24-hour period would be something like six inches of water. What I'm saying is if that water is captured, are these detention ponds designed -- whatever that volume of water is, are these detention ponds designed to capture that amount of water, no more, no less?

MR. FRANKE: It will capture the exact amount of the 10-year storm. A claim was made yesterday that the sizing of the basins don't meet the criteria set forth in what's known as the blue book. That's absolutely correct.

MR. RUZOW: The blue book being the design manual.

MR. FRANKE: New York State Guidelines for Urban Erosion and Sediment Control. Our basins are designed to capture that six inches rain. The blue book currently is for a half inch of runoff.

ALJ WISSLER: First flush?

MR. FRANKE: Yes. So essentially we're 12 times higher than what's currently required by the blue book. Even with a revision, possibly doubling of that amount to 3600 cubic feet per acre, which is an inch,

we're still six times higher than what's required in the blue book.

MR. RUZOW: That's part of the enhanced construction methodology that's being employed here?

MR. FRANKE: Yes. So each of the subcatchments has a basin sized in that manner. What we're doing now is walk through the construction process, pointing out some of the specific sedimentation and erosion details that are on this plan, using a combination of the CP sheets and colored 11-by-17's which are in Section 3 of the EIS.

MR. RUZOW: Can you give us the series you're using in the DEIS?

MR. FRANKE: Yes, Figures 3-15 H, we'll go all the way through 3-15 P, as in Paul, 3.

ALJ WISSLER: Tell me which one you're at when you're at it.

MR. FRANKE: 3-15-H and also CP-3. Construction will start, Subphase 1, CP-3 and following sheets has the list of construction sequencing that will be followed for all of the subphases. Spells out in 19 steps all the

way from construction stakeout to removal of the perimeter erosion control after stabilization.

ALJ WISSLER: We don't go to Phase 2 until Phase 1 is done?

MR. FRANKE: That's correct, with a small exception that I'll get to. This spells out how erosion control practices will be constructed prior to large-scale earth disturbance, and will remain in place until the area is completely stabilized.

ALJ WISSLER: So the total area that will be disturbed, looking at CP-3, the first stage will be 14.2 acres?

MR. FRANKE: That's correct. Working sequentially.

ALJ WISSLER: Is there a phase in any of this where you're going to be disturbing 25 acres?

MR. FRANKE: Over at Wildacres. Again, we haven't gone to this level of detail, we have drawn out the phases. It's possible. I would say we --

ALJ WISSLER: Where, in your view, would that occur?

MR. FRANKE: I think possibly Phase 2 or Phase 3 at Wildacres.

MR. RUZOW: We can look at that in terms of the Wildacres -- the general phasing, but if you could stay with this.

MR. FRANKE: This construction sequencing, as Ms. Bakner stated previously, was as a result of not only our design team with over 50 years' experience, but also including the golf course architect, Clark Companies, as well as input from, obviously, the Department and various soil conservation services. This represents one that's efficient, limits exposure to an area as small as possible, and feasible to construct within a reasonable time frame, and provides a logical consequencing, something that can be built in the manner in which it's designed.

Starting with Subphase 1, approximately 14 acres will be under construction, graded and brought to essentially final grades, and then temporarily stabilized before moving to Subphase 2. The temporary stabilization method that we've identified as a primary means of accomplishing

this is hydroseeded material known as Echoages. It's essentially wood fiber, hemlock fibers. The product has been proven very effective. We visited a golf course under construction in Pennsylvania that utilized this product on some steep terrain.

It's also been used in other areas within a watershed as an effective means of temporary stabilization. So 1 is graded, temporarily stabilized before moving to Subphase 2. That's what this blue represents in these drawings, temporarily stabilized.

ALJ WISSLER: You're looking at 15-I?

MR. FRANKE: Yes.

MS. BAKNER: Kevin, before you leave the first one, what are the soil erosion and sediment control measures that are left in place there?

MR. FRANKE: Everything is left in place at this point. Temporary basins are still in place, perimeter silt fence, which is located downhill providing redundant control is still in place. All the rock swales that feed into these basins remain in place. These all remain in place until the area is finally

stabilized, which is a subsequent step.

So Subphase 1 is temporarily stabilized while Subphase 2 is under construction, Subphase 2 being approximately 15 acres. As soon as grading is complete in Subphase 2, we will begin topsoiling and permanently stabilizing those areas previously disturbed. That's what's represented in this green. (Indicating)

ALJ WISSLER: Figure what?

MR. FRANKE: Figure 3-15-J.

The primarily means of permanent stabilization for the golf course will be sod. You heard before that a total of 100 acres of sod will be used. So what will happen, as soon as grading is done, topsoiling and sodding of Subphase 2 will commence and will continue into Subphase 1 which had been previously stabilized. This is more efficient from a construction standpoint simply because you don't have -- you're bringing people in fewer times to do your topsoiling and sodding. You're not mobilizing, demobilizing

construction people that would be doing this
particular aspect each time for each subphase.

We will have people come in and work their way back staring at Subphase 2 all the way through Subphase 1. With the exception, and this is on Figure 3-15-K -- once the topsoiling and sodding gets to a point where there's less than five acres left to be final stabilized, it's still temporarily stabilized, we'll be allowed to begin clearing on Subphase 3. When there's less than five acres left to be permanently stabilized, we can go in and begin to disturb up to five acres in Subphase 3.

ALJ WISSLER: That's a condition of your stormwater permit?

MR. FRANKE: Yes. These drawings are all referenced in Appendix 11, which is the Draft Stormwater Pollution Prevention Plan, which is in turn referenced in the Draft SPEDES permit. So essentially this sequence of disturbance, some temporary stabilization followed by permanent stabilization is followed through all six of the subphases.

MR. RUZOW: Kevin, how long will it take from Figure 3-15-H through the permanent stabilization?

MR. FRANKE: Beginning here, beginning

construction, essentially this were green, and having this all stabilized, we're estimating approximately two months or a month per subphase. So with the six subphases, roughly six-month construction season. Folks at Clark Company said that's a realistic time frame.

ALJ WISSLER: What is the construction season for this area?

MR. FRANKE: If we're lucky, April through November, but in terms of golf course construction, that's shortened on the tail end somewhat because we need to provide that permanent stabilization in a timely manner. You're not going to want to be too late in the year to establish grass.

MR. RUZOW: Even if it's sod? That gives you additional flexibility in that time but --

ALJ WISSLER: It's still got to take.

MR. RUZOW: Exactly.

MR. FRANKE: So we're looking for our planning purposes, October from a realistic standpoint.

MR. RUZOW: During that period of time, you talked about the construction

basins, stormwater basins. Tell us what happens with the basins over that two to three-month period for that section.

MR. FRANKE: In terms of their use?

MR. RUZOW: Their use.

MR. FRANKE: I was going to get to that but I can do it now. The intent of the basins obviously is to capture that runoff which can contain sediment and potentially run off-site. After a storm event, we have turbid water sitting in our basins.

MR. RUZOW: Kevin, I'm sorry, I don't want you to get into the details of how the basins operate, I was just looking for physically what happens to the basins when you're now in the permanent --

MR. FRANKE: Oh. As part of the permanent stabilization, those basins, many of them will basically be graded to final grade, it will be filled in. Some of these are located in areas where our operational phase stormwater basins will be located. Essentially they'll be regraded to that size and shape as designed for the operational phase.

ALJ WISSLER: Can I tell from looking at, say, CP-3, which is going to be permanent and which is going to be temporary for construction?

MR. FRANKE: No, you can't, I apologize for that, I hoped to have a drawing showing that.

ALJ WISSLER: I forgive you, Kevin.

MR. FRANKE: Thank you, your Honor. The only way to really do it, and it would be cumbersome, would be to have your CP drawings out --

ALJ WISSLER: Are there other drawings I can compare the two against?

MR. FRANKE: Oh, yes. Yes, the SD plans are your site drainage plans for the operational phase. If you have those side by side, you can make that comparison.

Is there anything more that you wanted to discuss about the basins?

MR. RUZOW: No, I'm sorry to interrupt you.

MR. FRANKE: Getting back to the sequence. We outlined Subphase 1, 2, getting into Subphase 3. Essentially this same

process will be followed throughout the six subphases.

We're looking at 3-15-L and that shows all of Subphase 3 under construction. Again with the same enhanced erosion control, such as our oversized retention basins, downhill silt fence.

ALJ WISSLER: What sheet do you have there?

MR. FRANKE: We're over to CP-7. It shows along the top how all sub-phases 1 and 2 have been permanently stabilized and Subphase 3 is under active construction.

Moving on to Figure 3-15-M, again, Subphase 3, it's temporarily stabilized, just as Subphase 1 had. We don't come in and do the permanent stabilization until we have two sub-phases to work on. Subphase 3 is totally stabilized. 4 is under construction.

Subphase 4 is approximately 11.9 -- 12 acres. Again, once final grading is completed on Subphase 4, we immediately come in and topsoil and stabilize, including the sod, 100 acres of sod, Subphase 4, and that is shown on Figure 3-15-N, shows Subphase 4 being

permanently stabilized. Subphase 3 is still temporarily stabilized. We move to the next Figure, 3-15-O, we have begun final stabilization of Subphase 3, less than five acres left to be permanently stabilized -- still temporarily stabilized -- we can start disturbing that up to five acres in Subphase 5, again Figure 3-15-O.

3-15-P shows all of Subphases 3 and 4 permanently stabilized and Subphase 5 under construction.

ALJ WISSLER: Mr. Franke, where the temporary detention ponds are delineated, are these contour lines?

MR. FRANKE: Those are grading lines, grading contours.

ALJ WISSLER: Spaced how far apart?

MR. FRANKE: Five footers.

ALJ WISSLER: What does this tell me looking at Subphase 1, how deep is that pond?

MR. FRANKE: That could be up to 10 feet deep. Continuing the construction sequencing, 3-15-P, Subphase 5 under construction. We're up to about CP-12. Again Subphase 5 after grading is completed, it's temporarily stabilized showing the subsequent Figure 3-15-P-1. Once Subphase 5 is temporarily stabilized, construction begins on 6.

Once grading is completed in Subphase 6, we come in with our permanent stabilization, topsoiling and sodding, complete that and finish up with the permanent stabilization of Subphase 5.

Figure 3-15-P-3 is essentially the end of your construction season with all of Phase 2 permanently stabilized.

Ms. Bakner had mentioned we had an earlier version of this phasing/subphasing plan that we had devised, and actually submitted as part of the earlier version of the EIS. The overall concept was similar in that the area was broken up into phases, subphases and even smaller subcatchments.

The major difference in this first approach, what we did is we tried to limit -- this is from Figure 5-15, and subsequent figures in the alternative section. What we tried to do is we tried to design areas of construction less than five acres in size, and

essentially having these construction areas or work areas, as we call them, located in different drainages. We have an area here in the Lost Clove area, we have one that's in the

Giggle Hollow, one north of Birch Creek. The idea being if there was some type of catastrophic failure, you have a smaller area contributing to any one of the streams.

ALJ WISSLER: Walk me through that again.

MR. FRANKE: We've got one, two, three, four, five areas that are less than five acres in size each located in different drainage basins, if you will.

MS. BAKNER: Really subdrainage basins.

MR. FRANKE: Correct, Lost Clove, Giggle Hollow, they drain in different directions. We ran this by the folks at Clark Companies, and they said, yes, you can do that, you can build it this way; but from a logistic standpoint, it's a nightmare. You're spread out all over the site, you're not constructing in areas adjacent to each other, and that's important from the standpoint that

each one of these areas, the amounts of cut and fill, how much you scrape off or that which you dump on, might not be balanced within this particular area. You might have an excess of cut that you have to have to truck somewhere or stockpile somewhere else until you need it.

In this current plan, we're set up so each subphase is balanced. The amount of cut, you're going to use it within that subphase.

You don't need to move it across the site, temporarily stockpile it somewhere. You move it once, you put it in place, and either temporarily or permanently stabilize it.

This alternative plan required a plethora of haul roads throughout the site in order to be able to move the material between these areas. Again, here we're focused on one particular area. This is also less efficient from a construction monitoring standpoint.

One of the requirements is that you need to do regular inspections to document compliance with your SWPPP or to update the SWPPP as necessary, as Mr. Damrath mentioned, on a weekly basis after rainstorm events.

Again, under this approach --

MR. RUZOW: This being?

MR. FRANKE: The alternative approach.

Again, being able to track construction and effectiveness of your erosion control is made much more difficult simply by the fact that you're located throughout the site. Even though we have, as our condition of our permit, we'll have a certified professional erosion control specialist assigned to the project with a dedicated work crew, and his authority to stop work at any time. The efficiency, and his ability to effectively monitor construction, is decreased under this alternative plan.

Table 5-4 in the DEIS compares the two alternatives of construction phases and includes some of the things that I just mentioned.

Another disadvantage of the alternative plan, the fact that we're building these small disjunct areas as opposed to our proposed plan where we're actually building whole golf courses with the ability to permanently stabilize them right away, every

area within the whole phase would be disturbed and have to be temporarily stabilized because you're dealing in these small areas. You wouldn't go to permanent stabilization because you still haven't completed your construction. You can't install your irrigation on part of a golf hole. They're looped systems that tie in. So you wouldn't have irrigation available needed for your permanent stabilization. Everything has to be temporarily stabilized.

So essentially what we would have -- you would have this, instead of being all green, it would be all blue, and we would have to come back in and permanently stabilize everything.

So in our preferred alternative, approximately half of the area goes right to permanent stabilization. There's no interim step of having to have that temporary stabilization.

The area of actual disturbance during

construction, total area, is actually less under our preferred alternative, ranging from 11 to approximately 19 acres of disturbance at any one time. You'll see in Section 5, in
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discussing the alternatives plan, anywhere from 17 to 25 acres at one time will be disturbed; and that's up to exactly 25.0 acres at one time that wouldn't be disturbed under the alternative plan, albeit in physically disjuncted areas.

ALJ WISSLER: Now, your maximum is 16.4 acres?

MR. FRANKE: Phase 2. It's not to say it couldn't possibly be higher for either Phase 3 or one of the phases in Wildacres. I have to go back and look at those numbers. Certainly not at 25 acres in Phase 2.

MR. RUZOW: But the logic, the approach is not picking a particular number to target for, but the physical area on-site and what, in effect, in an integrated manner, the design folks, the construction folks said would be reasonable. One of the issues that is part of the logic here also is getting to a point at which the project itself can begin to generate revenue; that is, from an operational point of view; and that was a factor involved in one of the balancing factors in terms of -- how long it would take to build. Kevin, do
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you want to address --

MR. FRANKE: Under our proposed alternative, which you have at the end of Year 2, is 11 holes of golf, front nine and two additional holes, and those two additional holes, this area here, that can be used temporarily as a driving range.

So in Year 3 after grow-in, you can begin to play on nine holes and have a temporary practice range.

MR. RUZOW: And the hotel would be constructed by then as well?

MR. FRANKE: Yes, the hotel would be operational. Whereas, under the alternative plan, because of the need to physically separate these different areas, we did not have a sequential nine holes of golf. We had nine holes, but I don't remember exactly--we had Holes 1, 2, 5, 6, 9, 12, 13, 15 and 18. Whereas, under our preferred alternative, like I said previously, we have Holes 1 through 11 constructed, with Holes 10 and 11 serving as a temporary practice range.

MS. BAKNER: Kevin, would you characterize the concerns of Clark and Cowley

as the cut and fill and the double and triple handling of the graded material?

MR. RUZOW: Cowley is --

MR. FRANKE: Paul Cowley is a golf course architect with Love Associates, golf course architect on the project. From a construction standpoint, you're much more inefficient having to move the same pile of dirt two or three times. It costs more money to handle that soil two or three times; and every time you're moving or disturbing soil, you're increasing the potential for erosion.

So with this plan and the balance cuts and fills, it eliminates that need for many more temporary stockpiles, haul roads, et cetera, which you would have needed under this alternative approach.

Unless you have any more questions on --

MR. RUZOW: Kevin, I have one further. With respect to the sequence of where you're starting, you seem to be going downhill in the sequence of construction. What is the logic there?

MR. FRANKE: Essentially to have your

uphill areas stabilized prior to disturbing some of the downsweeps so you don't have runoff from a disturbed area affecting another disturbed area.

It also has to do with the sequencing of the installation of the irrigation, which I said before. You have your irrigation ponds on top, and what's going to happen is you're going to be forming a loop in here; so subsequently in construction, you're also putting in your irrigation to allow you to establish your sod and also those areas that will be seeded.

Anything else on sequencing?

MR. RUZOW: No.

MR. FRANKE: The last thing I want to talk about that has come up previously -- it goes back to our retention basins and how we're dealing with the water that accumulates in them. As Ms. Bakner mentioned, we did do an on-site, high-intensity soil mapping of the project site to identify those soils that were out there.

In addition to that mapping, there's been a lot of testing of the soils themselves.

I turn your attention to Appendix 12 of the DEIS. Appendix 12 includes a number of things, including perc tests, deep-hole test pits, but the one in Appendix 12 I wanted to bring to your attention, your Honor, is approximately halfway through; and it begins with a December 13 letter from Soil and Material Testing, Incorporated.

Following that letter of transmittal, you'll see a number of drafts, and what those represent was an analysis of soil samples taken from the various soils on-site, characterizes them as to how much sand, silt and clay are in the on-site soils, typically called a sieve analysis. Soils run through different size sieves, you can determine the relative amount of the different size soil particles, which is a very common test on soils.

In addition to that sieve analysis, we also had hydrometer testing, and what that is is your soil is put in a column of water, suspended, and they follow the settling time.

Based on our knowledge of the soils and the mapping, these hydrometer tests

confirm what we suspected. You are in the Catskills, you have a fair amount of colloidal clay, which takes a long time to settle out once it's in suspension. Having confirmed our expectations with the laboratory data, the next challenge was: Okay, we have this turbid water in our basins. What do we do with it? It's great that we captured it and didn't let it run off-site, but now we have to do something with it.

That something that we did was to pose using a flocculent. There are many commercial products out there that have claims of various success when used as flocculents. The common one that's been used for years is known as alum. Very early discussions with the Department indicated they really didn't want us to use alum.

There's another class of compounds known as polyacrylamides that can be used as flocculents. There are some polyacrylamides that are on California's list of suspected carcinogens. We didn't think that would be a good idea in the New York City Watershed. After much searching, we identified a firm in

Washington State known as Natural Site Solutions. They have a product known as Stormklear. That's the brand. The active ingredient in that flocculent is chitosan.

Chitosan, as mentioned correctly before, is basically derived from seafood shells. Chitin is the common compound in insect and crustacean shells. We examined that, the toxicity data for the chitosan, we basically learned as much as we could about it.

It's interesting, one of the uses of chitosan, Seaworld actually uses it in their aquariums to keep turbidity out. It had promise. It looked good. So our next step was to say: Okay, guys, you have this product out here. Here is our soil. What is it doing?

Similar to the hydrometer testing, we had soil samples taken from throughout the site, mailed the dirt out to Washington State. Going back to the figures in Section 3 -- I know I jumped back to 5, and I apologize for that -- but Figure 3-15-Q in the DEIS is a simple bar chart of the results of the testing

of chitosan testing on our soils. What the boys out in Washington did is they made up solutions of our soils, various concentrations of suspended sediments, and those are the blue bars you see in 3-15-Q. They made up a solution that has 5,000 turbidity units, 500 turbidity units and 100 turbidity units going left to right.

ALJ WISSLER: NTU is?

MR. FRANKE: Nephelometric turbidity units. Standard measure of turbidity. You can see in Figure 3-15-Q, in the blue is the starting concentration. What you see in purple is what the concentration of the turbidity was an hour after they dosed it with chitosan at the same rate we're proposing to use in our basins. You can see in an hour, the 5,000 NTU sample dropped down to 68 NTU. 500 NTU dropped down to 36 in an hour. 100 NTU dropped down to 28 in one hour. So we were sold.

So what we had to do next is figure out, well, we know this stuff is going to work on the soils, how do we make it work on the construction site? And if you look at Figure

3-15-R, that's basically a schematic of how we're proposing to dewater these basins using the flocculent.

ALJ WISSLER: Mr. Franke, let me ask you this: Going back to the Figure 3-15-Q, I realize that is NTU's per -- what?

MR. LONG: An NTU is a measurement of

turbidity; so what it is, is how much -- how dirty the water appears. So it's not a part per million type concentration or anything.

ALJ WISSLER: Is it a matter of translucence?

MR. LONG: Translucence, correct.

ALJ WISSLER: I'll ask you the question, but I don't know whether I'm asking it right. Can you get from this chart, 15-Q, to a ten-year storm with 5,000 NTU turbidity, that level of density or level of lack of translucence --

MR. FRANKE: That dirty.

ALJ WISSLER: -- that dirty. What does that translate into inches of muck at the bottom of the pond when the flocculent has been applied and settled out?

MR. FRANKE: Since it's not a

concentration like milligrams per liter -- if it was, we would be able to translate that into a mass of solid. The way it's expressed -- can you go from NTU to TSS in milligrams per liter -- we could probably do the math for you, your Honor, and get you that answer.

ALJ WISSLER: My question is then: Going over to 3-15-R, how far down into the pond can your flooding skimmer go before it starts picking up the muck people were concerned about yesterday?

MR. FRANKE: One thing stated in the

SWPPP is that these basins are going to be maintained. Accumulated sediment is going to be removed on a regular basis. The certified professional erosion control specialist, as I mentioned previously, one of his primary duties is going to be overseeing the effectiveness of this whole treatment process, including making sure that sufficient storage volume is maintained in the ponds. So when you see these ponds starting to accumulate the sediment, you can call the general contractor, the earth works subcontractor and say: Okay,

I need one of your guys with a backhoe for the day, we're going to clean out the basins. So it's in the SWPPP, is basically maintain and remove accumulated sediments.

MS. BAKNER: Kevin, can you address how many months are these ponds going to be used primarily; what are we talking about?

MR. FRANKE: These subphases, they're going to be out a month from when you initiate construction to final stabilization.

ALJ WISSLER: And they're filled in at that point?

MR. FRANKE: Yes.

MR. RUZOW: If they're part of the operational -- their opportunity to take sediment is a different --

MR. FRANKE: They're going to be serving a stabilized area, so you won't have a construction area draining to it, everything will be stabilized.

ALJ WISSLER: You wouldn't have any sheet flow of bare soil?

MR. FRANKE: Correct.

MR. RUZOW: You'll have grassed area?

MR. FRANKE: Right.

MS. BAKNER: Your Honor, you will recall the criticism yesterday regarding the quantity of sediments was based on a misunderstanding of how we have impacted the size of the ponds in relation to the requirements in the manual. As Kevin said in the beginning, the ponds are six times larger than they should be --

MR. RUZOW: Twelve times.

MR. FRANKE: Twelve times.

MS. BAKNER: Which is why they don't let me use numbers -- but they're big, much bigger than you would typically size, so that the whole concern regarding the accumulative sediments was misplaced.

MR. FRANKE: Figure 3-15-R is a schematic of how these ponds will be dosed with the chitosan. The withdrawal of water will begin approximately four hours after the chitosan is applied.

As a reminder, the numbers that we saw in Figure 3-15-Q, the bar chart, was one hour after the chitosan was applied. Water will be withdrawn from the top as shown in the

schematic using a floating skimmer. These are commercially available, advised in erosion control magazines, and as part of the pumpout system, you will have attached to the pump a meter to measure turbidity.

ALJ WISSLER: What kind of meter is that?

MR. FRANKE: A turbidity meter.

MS. BAKNER: How does it work; do we know how it works?

MR. LONG: Basically what, you know, we cast a light through it, a very particular wavelength, and as it defracts, it measures the differences.

ALJ WISSLER: The dirtier the water, the less light gets through?

MR. LONG: Yes.

ALJ WISSLER: There's a flowtometer or something on the other side that kind of reads it?

MR. LONG: Correct.

MR. FRANKE: The importance of that meter is we'll be monitoring the effectiveness of our flocculent in the system as we're drawing water out of the pond. We have set it

up so that we have a valve system so that if the water is not sufficiently clean, it's going back in the pond where, if necessary, it would be dosed in order to meet the turbidity requirements.

Before I leave chitosan itself, I wanted to address something that was brought up yesterday in regards to the toxicity of chitosan, and I hope by the end of the week we'll have an exhibit to submit to you, your Honor, that reflects the safety of this project as it relates to aquatic life.

CPC cited a study that gave a value of less than one part per million to be potentially toxic to trout. To put that in perspective, our initial dosing of this pond will be one part per million. That's our starting concentration in our ponds before we dewater or anything else. The whole principle behind the flocculent is this material grabs onto the sediment, for lack of a better word, and settles out with the sediment. That being said, and given the removal rates that we see the concentration -- this was 1. This is what it's going to be by the time we're ready to

pump it out because the flocculent has worked, and it's settled out with the sediment, so it's no longer in the solution. It's not going to be in that water; it's going to be discharged.

Based on the results that we see here, we're seeing a reduction of anywhere from 90 percent to almost 900 percent. So if you start at one part per million that you're dosing, you're bringing that down to .1 part per million, fractions thereof. So that's going -- that's the concentration of the chitosan in the water while it's still in the basin once things have settled out.

As part of this process, this flocculated, clean water is going to be discharged to a series of dispersion pipes, and I'll give a little more information on that in just a second.

Obviously, the intent of the flocculent is we settle out the soil particles, so it binds readily with the soil. It also binds readily with organic matter. The water that's discharged to these dewatering pipes are going to be discharged to

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forest. You have a forest, dirt and you have organic matter. We will have more specific information, hopefully by the end of the week, that will quantify how much removal you can expect immediately adjacent to where this water is being discharged simply by the fact -- that we saw on the site -- you have a very high organic matter surface layer in the forest. The chitosan gets reduced in the basin before it's discharged by an order to 90 or 900 percent, and then at its discharge point, any remaining chitosan, or most of the chitosan is going to bind onto soil or organic matter immediately below the discharge point.

ALJ WISSLER: The pumps will be used, they're be temporary, they'll be just used for the sake of pumping that pond down and then not left on-site?

MR. FRANKE: They'll be left on-site. They'll be there and available because the storms are episodic. These things need to be emptied as soon as feasible, but they'll be portable. They'll be on wagons, so to speak, something that's towable with an ATV. You'll have two wagons. So in the schematic, 3-15-R,

one is your pump system; the other, your bilging system. So if the crew who is in charge of dewatering the basins, an ATV or some other construction vehicle will be able to trailer these things right up to the basin. You'll have a skimmer in each of the basins. You don't need to haul that around.

ALJ WISSLER: But the piping system that will take it to the forested areas and so forth, is that permanently in place so that the same forested areas will be receiving the discharge water?

MR. FRANKE: Yes, they will.

ALJ WISSLER: Are those indicated?

MR. FRANKE: I have shown in red on this plan --

ALJ WISSLER: Take me through that.

MR. FRANKE: Phase 2 --

ALJ WISSLER: What are you looking at?

MR. FRANKE: CP-2.

MS. BAKNER: Kevin, before you get going, I would just like to explain that. We're bringing in plans that show those dispersion pipes on them, and we're going to enter them into the record. We just don't

have them.

ALJ WISSLER: I don't need to go any further, unless you want to explain to me the markings.

MR. FRANKE: In Phase 2 construction, I believe there are 23 temporary basins in total. Of those, only five will have to go to the dewatering hoses, pipes. The rest of the basins will be dewatered directly to the irrigation ponds. There's no discharge off the site for 18 of the 23 basins in Phase 2. It's just those that are located at such a distance and such an elevation difference in the irrigation ponds, it was not really feasible to pump that water from that low point all the way to the irrigation ponds.

It was feasible with a -- I wouldn't say normal but a pump that's not the size of a tractor-trailer -- we would pump it up there, but the elevation difference once you're down in this area, we're talking 2100 feet here, and these are around 2300 -- 300-foot elevation difference in about 500-foot of run -- more than that -- a couple thousand foot of run.

MR. RUZOW: The irrigation ponds are constructed in Phase 1?

MR. FRANKE: Yes, constructed in Phase 1. They're dug ponds. There's no dam. They have a storage capacity of about 7 million gallons.

MS. BAKNER: And they're lined?

MR. FRANKE: They're lined. For those basins, like I say, it was not feasible to pump to the irrigation ditch. What we're pumping to, essentially it's a black, what they call HPDE pipe, flexible pipe, has the holes in it, perforated, potentially long lengths of these pipes shown at these locations, A, B, C and D. There's a detail of the installation shown on, I believe it's CP-17, Detail 9 on the right-hand side.

ALJ WISSLER: Where am I?

MR. FRANKE: CP-17, Detail 9. This shows how these hoses will be staked in place through the duration of construction in the areas they're serving. Six-inch perforated HDPE pipe. This will be wrapped with a woven geotextile sock or equivalent. The intent of the geotextile is not to trap solids. We've

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basically already taken care of that. The intent of wrapping this is to reduce the velocity of the water coming out of the hose. You're pumping water to these things. You could have water actually arcing out of these perforations landing on the ground and possibly causing erosion in the water.

So basically, by wrapping the hoses with fabric, it's going to be -- what we call soaker hose -- basically will be weeping out, pretty much a sheet format rather than having points of water coming out of the little perforations in the pipe.

MS. BAKNER: Kevin, your teams control the rate of discharge; right?

MR. FRANKE: Yes, that is correct.

Another thing that was discussed yesterday was concern for possible downhill erosion of the soils below where we're discharging. This is a valid concern and something that the Department expressed to us early on in the process when we first proposed to use this technology, and in order to address that -- I'm sorry to do this, your Honor, but we have to talk a little more

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HydroCAD.

I would like to point to Appendix 9 in Volume 5. Within Appendix 9, at least my copy, has a purplish divider page in it. Following that is a description of the dewatering process, and following that, some hydrographs which we discussed previously. If I could, I would just like to read into the record one paragraph that I think is important to this topic and also to some things we've heard previously about stormwater management and how you assess impacts. We heard over the past couple of days some very high numbers in terms of what post-construction runoff is going to be.

ALJ WISSLER: You're reading from page 1 after the purple page?

MR. FRANKE: Page 1 after the purple page.

Under Proposed Level Spreader Dewatering Program states: "In order to address concerns regarding level spreader dewatering, additional analysis of existing hydrological conditions were performed and then compared to the proposed hydrological

conditions with the basin dewatering."

This is, I think, the key sentence: "Like other hydrological analysis of stormwater management, the underlying premise behind these analyses is that if post-construction discharges are equal or less than pre-construction discharges, then adverse impacts can be avoided." In other words, if dewatering discharge rates are less than what is currently occurring on the site naturally without adverse effects, then dewatering using level spreaders will also not result in adverse effects.

So the intent was, when we're pumping this water out of our basins, to pump it at a rate that is less than -- or equal to or less than what would occur naturally. I call your attention to the figures that follow the three pages of text. What these figures illustrate in purple or dark blue is the storm hydrograph under existing conditions.

MR. GREENE: What page are you on?

MR. FRANKE: There's three pages of text, an addendum to Appendix 9. Three pages of text followed by a series of figures.

Right now we're looking at Figure 1.

MR. GREENE: Okay. I found it.

ALJ WISSLER: Basin 263, Level Spreader A discharge.

MR. FRANKE: That is correct. What is shown on these figures here is the hydrograph for existing conditions, and that is a dark blue line. As Joe explained effectively before, what the hydrograph does is it shows your discharge rate in cubic feet per second with time. You can see there's a very high peak and a rapid decline and a tail end. Again, this is for the ten-year design storm that we based our sizing on.

What you see on those straight lines underneath are how fast we would be pumping water out of our basins and through these pipes. Obviously, the longer you take to dewater, the slower you can take the water out. Conversely, if you have to get it done quickly, you have to pump it out faster.

So what we've done is we've taken various time intervals -- what we've done is established a pumping rate for various durations, and we've specifically identified

for each one of the basins how long it's going to take to pump them out in order to not exceed the tails of the curve of the existing hydrograph.

ALJ WISSLER: They're close to the same?

MR. FRANKE: There is your peak at 40 cfs from the existing storm. We're going to be one, two, three cfs for that period. Obviously the hydrograph of the storm and our lines are going to be happening at the same time. So it's a little bit misleading.

ALJ WISSLER: So that I understand it. Looking at the red line, if you wanted to pump for 16 hours, you would be pumping at basically two cubic feet per second?

MR. FRANKE: About that.

ALJ WISSLER: If you decided you wanted to pump for 32 hours, you would be basically pumping it at one?

MR. FRANKE: Correct. We have done that for all the dewatering devices and set and established how long these guys have to sit and watch these pumps pump out the basins, again, so as not to exceed the discharge

rates.

ALJ WISSLER: What would be an instance where you would say this event justifies pumping 16 hours, this event justifies pumping over 32 hours?

MR. FRANKE: Again, this is for worst case. This is assuming we get that six-inch rainfall and you have a full basin. And I'm not going to get into the statistics of the likelihood of that happening. Again, it's absolutely worst case, full basin. Say you have a 10-year storm coming again tomorrow.

ALJ WISSLER: How long does it take for the chitosan to work?

MR. FRANKE: The data we're showing up here is one hour. Our schematic here, we're proposing four hours. Again, with the turbidity meter, we can try to pump them out earlier and drop it down. If not, it's going to pump up. If not, it's going back in the basin.

ALJ WISSLER: What level does your turbidity meter need to tell you before you --

MR. FRANKE: I believe it was -- I have to go back in and look, but I believe it

was 25 or 50 NTU.

MR. RUZOW: We can provide you with the statistical probability of two 10-year storms following back to back. We'll do that later.

MS. BAKNER: Do you want to give him

the meter information later?

MR. FRANKE: Oh, yes, yes. I can get that to you. Unless you have any more questions of me, your Honor, I think I'm done -- unless there's something I missed.

MS. BAKNER: Let me ask you one question. It was said yesterday that we're seeking DEC's consent to clear more than five acres, yet we have not fulfilled our obligations to provide enhanced stormwater controls. In your experience, and I'll open this up to Dave and Dean, how enhanced is this?

MR. FRANKE: To point to the one example, the size of the basins. If we go by the blue book, we would have ponds that were six to 12 times smaller; that's enhanced. The fact we're going to have a full-time, certified, professional erosion control

specialist, have a total stop work order. It's totally unusual on these projects.

ALJ WISSLER: Did you give me an exhibit that tells me what the blue book says with respect to sizing this? When you say we're 12 times bigger --

MR. FRANKE: I have it tagged, and I will get it for you.

Using 100 acres of sod.

MS. BAKNER: What about this basin and flocculent situation, how often do you actually try to enhance sediment removal in a storm erosion basin?

MR. FRANKE: Typically, according to the blue book, you provide the basin, and the basin itself provides for the settling. And it has either a weir or some other structure through which water can flow out.

MS. BAKNER: Have you ever had this level of enhanced controls on any of your other jobs?

MR. FRANKE: The last golf course I did in Region 3, someone directed us to use 3600 cubic feet of storage per acre, which is the one inch of runoff.

MR. RUZOW: Which is the new proposed design?

MR. FRANKE: Golf course construction is a little different in terms of topography and soils but not terribly different. Those function effectively on that particular site -- so again, this being six to 12 times higher is certainly enhanced.

MS. BAKNER: We're ready to move on to Mr. Carr, unless you want to take a break, your Honor.

ALJ WISSLER: How long are you going to be?

MR. CARR: About an hour.

ALJ WISSLER: Let's take a lunch break now.

(12:11 - 1:15 P.M. - LUNCHEON RECESS

TAKEN.)

MS. BAKNER: Here is the next exhibit.

("DRAWING CP-2 FOR BIG INDIAN PLATEAU - PHASE 2 SUBPHASING PLAN THAT SHOWS THE LEVEL SPREADER DISPERSION PIPES RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 44, THIS DATE.)

ALJ WISSLER: Are we ready to go?

MS. BAKNER: Mr. Carr is going to

address water quantity primarily.

ALJ WISSLER: The record should reflect that Applicant's 44 has been received, being CP-2, "Big Indian and Level Spreader Dispersion Pipes."

MR. RUZOW: On CP-2, the drawing with -- now marked with the level spreader.

MR. CARR: Thank you, your Honor. As Ms. Bakner stated, I'm going to be discussing operational stormwater quantity, which is Appendix 9A of Volume 5, it's basically located in 9A. As you know and as you've heard over the past few days, we are modeling stormwater quantity using the HydroCAD stormwater modeling system which is based on the USDA Soil Conservation Service Technical Release, No. 20. We are also utilizing the New York State Stormwater Management Design Manual dated October 2001 as the parameters of our design, and we basically use that manual for three things.

First, the manual sets the design storms we need to study, and it gives us selection criteria within the manual as to which best management practices would work

best for this type of development on this type of site, and it also gives us performance criteria for the stormwater management practices.

I'd like you to turn to Exhibit A-41 that you were given this morning. Basically it looks like this. It's the cover of the Stormwater Management Design Manual, October 2001. If you turn to page 4-1, the title at the top of the page is, "Unified Stormwater Sizing Criteria." This is basically the sizing criteria we utilize to design our best management practices for post development stormwater control throughout the site.

As you can see in Table 4.1, there are four actual sizing criteria we utilize, the first one being water quality volume, which is the amount of water that we must treat in a stormwater pond. It's 90 percent of the average rainfall in this area basically; and in this area, it's 1.3 inches in 24 hours. That is actually -- is not included in the HydroCAD model.

If you read along in Appendix 9A, those calculations basically have to be done

by hand, and they're based on mainly impervious cover is the main ingredient and watershed area are the two.

ALJ WISSLER: Average rainfall is 1.3 inches?

MR. CARR: Ninety percent of the average rainfall is 1.3 inches, or less. The next is the channel protection volume which is a one-year design storm. As you can see here, basically the criteria is to hold that storm for at least a 24-hour period. The third storm is the 10-year design storm, and the fourth storm is the 100-year design storm. We also analyzed the 25-year design storm in Appendix 9A, which is a requirement of the Town of Shandaken and the Town of Middletown. Those were local requirements on stormwater, which is not unusual for towns to have their own requirements beyond DEC requirements.

If you turn to the next page, which is actually page 4-9, you'll see a map of New York State -- actually the next three pages -- 4-9, 4-11 and 4-13, and these are these isopleth maps that we've been talking about for the last few days. Basically what you do

is you find the area of the state you are in, and it gives you the rainfall amount you should be using for each design storm. If you are between two numbers, interpolation takes place.

Basically if you look through these three maps, we are basically located in the highest rainfall area of the state. In the one-year design storm, we're pretty much the bull's eye with 3.5 around it. What this is telling you, that in this area of the state, a one-year design storm includes 3.5 inches of rain over a 24-hour period.

The next map is the 10-year design storm which is six inches of rain over a 24-hour period. The 100-year design storm is eight inches over a 24-hour period. Just for informational purposes, I didn't include it, but the 25-year storm, which is not part of DEC's requirement, is 6.3 inches. So you basically go an additional .3 inches from a 10-year design storm, from a six-inch to 6.3-inch design standard.

Once we have our design storm set that we need to analyze, we go on to -- I'm looking

at the existing conditions of the site basically. What we look at are soils, vegetation, existing drainage features and slopes. Those are the four major criteria we look at when we're looking at existing conditions or pre-development runoff. What I mean by pre-development runoff, what we're really analyzing is the impact of development on the existing condition, and HydroCAD basically looks at peak runoff, which as Mr. Damrath showed on Tuesday, was the peak of that bell curve, and the volume of runoff, so we are charged with --

ALJ WISSLER: Can I ask you a question with respect to the hydrograph? The highest peak, is that peak a function of the frontal system that's moving through? In other words, it is the highest peak, the height of a storm?

MR. CARR: Normally in most conditions, and it will show on your hydrograph, it's pretty close to the middle of the storm. You'll see numbers, and I don't know -- basically it will give you a time of the peak. Here it is right here. What I'm pointing to is basically what I did.

MR. RUZOW: David, where is that from?

MR. CARR: This is from Appendix 9A. It's basically a sample of a subcatchment, Page 18, Big Indian Plateau proposed.

The only difference here, the copy I pulled off my computer, the 6-inch rainfall storm, and what you have in your book is the 6.3-inch.

ALJ WISSLER: We have a 25-year storm?

MR. CARR: That's correct. Basically if you look at your model, what you'll see is a peak of 98.37 -- yours will actually be a little more because it's 6.3 inch -- at 11.94 hours. 12 hours, obviously, is the middle part of a storm. If you go from zero hours to 24 hours, so in this column --

ALJ WISSLER: I'm not looking at the same page.

MR. CARR: I copied a table you don't

have in your book. This is more of a sample. If you look at the second line, the second line will give you the peak runoff, the volume.

MR. GERSTMAN: What page are we referring to?

MR. CARR: Page 18, Big Indian proposed. If you look at the second item at 11.94 hours, that time is the peak of that bell curve. So a 24-hour storm goes from zero to 24, 11.94 is basically six one-hundredths of an hour before 12. So it's basically right in the middle. And the peak value is the peak runoff at that time.

So at the top of that curve, that's your runoff. So that's what you're analyzing in HydroCAD, what's the worse case, and the volume is everything under the curve. So what our requirement is, is to attenuate any post-development flows to meet those pre-development levels.

So if you have 10 acre-feet leaving your site, when you're done, you have to have 10 acre-feet or less. That's basically the requirement.

As stated earlier, we did a high-intensity soils mapping on the site which is important because one of the major components of creating your hydrograph -- again I'll point to this Subcatchment 31 -- is basically what you do is -- one of the

components is you have to come up with a hydrologic soils number or runoff curve number for each cover type, cover type being one of the four major factors. What we found through our soils mapping is that soils on this site fall into Hydrologic Soil Group C. That is set by the Soil Conservation Service.

As Kevin's discussion earlier, the hydrologic soils group is determined on a soils condition in an extremely wetted condition. Basically it's a function of infiltration and runoff. And I believe Joe spoke about this on Tuesday; the higher the curve number, the more runoff, the less infiltration. So roads, parking, driveways would have a curve number of 98. Forest, for a C soil, has a 70; and grass has 74; 70 meaning there's a little more infiltration in forest than grass.

ALJ WISSLER: So the peak of a hydrograph off of a parking lot would be higher than the peak of a hydrograph off of a forest?

MR. CARR: That's correct. Absolutely. And volume, because there's no

infiltration.

The other things we look at are existing drainage features, slopes -- in vegetation, cover types. Another function of the weighted curve number is cover type. As I just stated, grass and forest have a different curve number because they have a different rate of roughness on the ground. The rougher the condition on the ground, the more likely you are to have infiltration.

So grass, closely mowed grass has a higher rate of runoff than a dense forest which, in a golf course condition -- our biggest change from pre-development and post-development on this site is really the transition from forest to turf because we have very little impervious area.

What's the percent across the site?

MR. FRANKE: Less than 10.

MR. CARR: So it's really the change of cover type is really our biggest impact here on this site. So we basically come up --

ALJ WISSLER: Let me stop you real quick. Is there a number in the DEIS for the percentage of impervious cover?

MR. FRANKE: Yes, there is, your Honor. There's a table -- Tables 2-3 and 2-4, your Honor. Table 2-3 gives the actual acreages, and 2-4 relates it as a percentage of the site.

ALJ WISSLER: The Big Indian where it says 52.4 impervious acres proposed, Wildacres, they're proposing 32.76 acres?

MR. FRANKE: Right, 4.2 percent and

4.6 percent.

ALJ WISSLER: Of the total?

MR. FRANKE: Yep.

MR. CARR: The next thing to do, once we've delineated our soils, our cover types and our vegetation, we map any drainage features which may be involved in the site. We basically do that from aerial photography, walking the site. In this case, our topography is -- was flown topography at five-foot contours to determine if there are any existing drainage features that need to be addressed in the design.

Then the final thing is slopes. That's the contour map we're looking at here. Those are the four functions that go into the

development of the subcatchment, and I'll do that in a minute.

The next thing we do is we choose our design points, which a design point is a key location of an area of confluence of stormwater nearest -- that's an important point -- nearest to the development that's impacting the site. In other words, you want to pick a point that's closest to the developed area as possible not to dilute your numbers. If you include more area than you need, things like percent impervious rapidly change, and I'll discuss that in a minute.

There was some discussion from DEP specifically on Design Point 4 along Lost

Clove Road and Design Point 3 along Woodchuck Hollow Road that they felt that our model was incorrect because we didn't include the entire watershed. My experience has been from doing this, as I said, 20 years, what we're trying -- as I stated, what we're trying to do is we're trying to assess the impact of development on the existing condition.

Let's take Design Point 4, for instance. Say Subcatchment 30 is 100 acres

just for example, and say to the south side of Lost Clove Road is also 100 acres.

ALJ WISSLER: What are you referring to?

MR. CARR: SD-5. The area to the south of Lost Clove Road is consistent between the pre- and post-development condition. So the only impact that is realized is at Design Point 4 is the impact from Subcatchment 30. So say in Subcatchment 30, you have 10 acres of impervious area in a 100-acre subcatchment. That represents 10 percent impervious. If you include the other 100 acres, now it's only 5 percent.

ALJ WISSLER: Dilute the effect?

MR. CARR: It dilutes the effect. Now, that's not to say that this area does not have an impact on Design Point 4. It does. It absolutely does. But the point is, is that if your charge is to reduce the impact of the

flow peak in volume from this area to the
design point and you do that, then what's
happening on the south side will remain the
same.
So including areas such as the south

side of Lost Clove Road and the west side of Woodchuck Hollow Road, in my experience only dilutes the final product. And beyond that -- and I'll get to time of concentration in a minute -- the other problem you can have, which I have seen, is that time of concentration is measured from the furthest point in a watershed to the point of confluence. If, say in this watershed, you included this entire area and that furthest point happened to be on the south side of Lost Clove Road, then your time of concentration, no matter what your impact is on the north side, would the same. Because it's still your farthest distance.

As I stated in the beginning of our discussion about design points, the reason why this point was chosen, because I believe Hole No. 4 ends at this point right here on the ridge. So any runoff going to the north or south emanates from that point. And as Mr. Damrath showed on Tuesday, he made a very good point of showing how you figure out a watershed going perpendicular to the contour. Those lines go perpendicular to the contour to the nearest point of confluence.

MR. RUZOW: David, that was Hole 3.

MR. CARR: Hole 3 which runs across the top of the ridge. There wasn't a lot of discussion about Design Point 2. Design Point 1, there was a lot of discussion. Design Point 1 is a location along the railroad tracks, which I know, your Honor, you walked, I've walked several times. There was a lot of discussion about existing culverts along the railroad tracks and flow going to those culverts. In my opinion from walking those culverts -- it's kind of a two-headed opinion here. The first opinion is that my feeling is that those culverts, because of their size, were located to deal with groundwater seeps to pass those under the railroad tracks.

The second issue, which is even a bigger issue, and it's a limitation of HydroCAD, and I think this is very important, is that -- one of the limitations of HydroCAD is these culverts -- and Mr. Damrath stated this yesterday, there's a lot of flow going down those railroad tracks. Basically what

HydroCAD does is if you come to a culvert and the culvert is undersized, it does not allow you to take the excess flow and pass it down the line. What it does is it holds it, and it basically gives you a default message that says you need to construct a pond here. If you have a 12- or 14-inch culvert that will only carry, say, 3cfs at the peak, and you actually have 300 running to it -- the 300 just evaporates in HydroCAD. It doesn't get carried down the line.

So my feeling was it was more important to assess that total peak along the railroad tracks because the numbers would be artificially reduced every time you passed one of those culverts.

The next thing is time of concentration. That's the next item that goes into your pre-development model. Basically what time of concentration is, is you're calculating the time it takes for basically a drop of water to move from the farthest point in a watershed to the point of confluence. Doesn't have to be the design point. It could be a point of confluence within the

subcatchment as long as there's another subcatchment in front of it that it can tie to. So it's the farthest point.

So say Subcatchment 5, SD-5, the furthest point is here. What you have to do is draw a line perpendicular to the contour all the way to the end of your subcatchment. You have to input the slope, cover type, and that will give you a time.

There was a lot of discussion on Tuesday about a couple things. One of the things that DEP stated was that sheet flow should always be a component of time of concentration, the first thing, you always have the sheet flow, sheet flow turns to shallow concentrated flow, and shallow concentrated flow changes to channel flow. Basically what sheet flow -- if you were to take the same values and put them in sheet flow and shallow concentrated upland flow, the sheet flow would actually give you a longer time of concentration. It's a little slower because it's not concentrated.

When I walked this site, including on the ridge, I did not feel comfortable applying

sheet flow because sheet flow -- and I'll go to, I believe this is 43 which is called Urban Hydrology for Smaller Watersheds, this is TR-55 manual. There's a description of sheet flow on page 3-3. Basically the first sentence is that sheet flow is flow over plain surfaces which I consider to be consistent, not necessarily flat, but consistent, and I didn't feel, through my experience up on that site, that that existed.

There's always a fear, and as a reviewer in the past, one thing I always looked at was slowing down the time of concentration. Adding sheet flow would slow down the time of concentration. So in my opinion, not including sheet flow is less conservative because we also didn't include it in the post-development scenario, which is obviously more likely to happen. Because at post-development scenario at Big Indian, especially on the top of this ridge, are golf holes. So they're obviously going to be finally graded. The water is, obviously, going to sheet flow, but my feeling and my opinion was that if I didn't use it in the

pre-development condition but used it in the post-development condition, then a reviewer would come back and say: You artificially slowed down your time of concentration in your post-development condition to help you out to make your pond smaller.

So basically what I did, I used it consistently between the pre-development condition and post-development condition. I think that's important.

MS. BAKNER: Dave, so I'm sure I understand: Does that mean if you did it your way as opposed to Joe's way, your ponds are bigger?

MR. CARR: No. What I mean -- if I did it Joe's way, you would do it in the pre-development condition and the post-development condition. I believe what would happen is the peak flows would be reduced in both scenarios. So in my opinion, your ponds would basically be the same because what your ponds are basically designed for is to attenuate the increases in flows. If you start with 10, you want to end up with 10. But if it's 15 -- you know, if it's 10

existing and 13 proposed, then you will have to deal with the three. If it's 15 existing and 18 proposed, you still have to deal with the three, so you're attenuating to those preexisting conditions.

ALJ WISSLER: Let me be clear. You did not use -- you did not take sheet flow into account?

MR. CARR: In either scenario.

ALJ WISSLER: Which, in your view, would lead to more conservative numbers?

MR. CARR: I think the numbers would be the same. It's more conservative in the pre-development scenario, correct; but as I stated, I didn't feel comfortable using it because I didn't see it in the field. I didn't see that consistent flow in the beginning of the time of concentration run. Basically what happens is you take that time of concentration and what you do is that you -- for every change of cover type and every major change in slope, you create a new segment.

ALJ WISSLER: How much is a major change of slope?

MR. CARR: It's hard to put a number

on it. You have to look at the topography and see where there's breaks in the consistency. If you have a 50 percent slope and it goes to 45, in my opinion, that wouldn't be enough to change because really what HydroCAD does is if you put in a thousand length section at 50 percent and 200 at 60, 200 at 40, 200 at 60, 200 at 40, those times of concentration are going to end up being the same.

ALJ WISSLER: As 50?

MR. CARR: Right, because it basically totals them up. Basically what I look for when I go out in the field is not undulations that you would walk out with GPS equipment, and say, oh, there's a big ridge here, let's include that, and it flattens out. You're looking for long tendencies in changes in grade is what I look for.

ALJ WISSLER: Long means how long?

MR. CARR: In a site like this, I would say at least 2-, 300 feet, especially on slopes where the grades tend to be pretty consistent. You've walked the site. Yes, there are breaks. But if there's a 20-foot

break where it flattens out and it goes back to the same slope, I wouldn't model that.

So you take those two -- those two items and you create your pre-development map, which is basically what this is, and it's subcatchments. Basically this is a sample of a subcatchment. You're talking your different cover types with their acreages, and what you get is a weighted curve number.

So for Subcatchment 31, it gives you a weighted curve number of 75 which means, as you can see by the acreages, the largest portion is grass. So the curve number is very close to grass. It's basically averaging it out. Then you're inputting your time of concentration segments, and it's giving you a time, so it's the area and the time.

ALJ WISSLER: Curve number is a constant derived from what?

MR. CARR: From the hydrologic soils group and the cover type.

MR. FRANKE: Do you have the table?

MR. CARR: Actually I do, the TR-55 manual.

ALJ WISSLER: It's determined from

those various covers, from the literature and then made applicable to this site? It's not determined uniquely for this site?

MR. CARR: No, it's not unique, because basically -- and we can submit these to you.

ALJ WISSLER: I don't need that.

MR. CARR: So you basically get a volume and a time of concentration for each subcatchment, and the subcatchments are then linked together in some cases, or in some cases you may have one pre-development subcatchment going to one design point, and that gives you your value that you have to hit in your post-development scenario.

Your next step, or our next step is that you take your site plan, your design, and you overlay it -- basically what it is would be your master plan -- over your existing conditions. At this point you have some decisions to make in that you have to, obviously, start grading your site to make it work. At this point, you have to make a decision on what best management practices to use.

As I stated in the beginning of the discussion, and I'm going to need to make copies of this because I did not, but in the beginning of the discussion, I mentioned the Stormwater Management Design Manual gives you selection matrices in there, and we'll make copies of it and give it to you, as to what are the best management practices to use for land uses, for example.

Basically -- I'll read this right out of here: "Using the stormwater management practices selection matrices contained in Chapter 7 of the New York State Design Manual, it was determined stormwater ponds were the most suitable practice to be implemented for the Belleayre Resort project. More specifically, the micropool extended detention ponds, or P-1, was selected as the practice to be implemented. The P-1 practice was selected based on the following factors: One, the project density makes it a rural project," and this is in Table 7.1, and again, we'll submit these to you. "Soils. Groundwater and drainage area sizes mostly over 10 acres are suitable for micropool extended detention; 3,

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the presence of local sensitive cold water trout streams." This can be found in Table 7.3A. "The need for sediment and phosphorous removal for trout water and New York City water supply reservoir protection, Table 7.3B. Other pollutant controls -- other pollutant controls need channel protection and flood control in this region with flashy storm hydrology." Flashy means quick hitting storms of intense variety. And last one is ease of maintenance.

So this project basically fell into all those categories for the use of micropool extended detention. So that was the practice we utilized.

Basically, what we did next was as you are grading your design, you start to locate these throughout the site in areas that make sense, where you have proposed areas of confluence. You have existing areas of confluence, you have proposed areas of confluence, and it's basically -- in the beginning it's a guesstimate, you're guessing at spots. And as you're building your model, it starts to make sense where these things

need to be located.

What I have here, and this is on page 1 of the Big Indian Plateau Proposed, is a post-development model. Basically, what this model is, it's a series of subcatchments, as you see at the bottom, which are the hexagons, reaches and ponds. We do not have any links in this project. Basically what a subcatchment is is basically what we looked at in the beginning. It's basically a subwatershed, that's the makeup of the areas and the times of concentration.

The reaches, which I have an example on the next page, are basically -- they can be pipes; they can be swales. They're basically conveyance. They have a function of conveyance. So basically it's how you get, more likely than not, from a subcatchment to a pond.

Then the ponds themselves. Basically what we did when we had a very good level of comfort onto where these ponds should be located, we went back to the site after we did the first level soils test to do our high-intensity soils mapping, and we did a

deep hole test pit and percolation test at every storm pond location that we could physically get a machine to, which was probably about 95 percent of them.

So you can see when you look through the HydroCAD run at a pond description, it will say at the top, "Storm pond, blue beech," which is the soil type, 2.2 inches per hour, which was the percolation rate, to a depth of 2.5 feet. Basically, what that's saying is we only had infiltration in that area to 2.5 feet.

Basically, we did a test pit and percolation test at every location to determine that, first of all, it was physically possible to locate that pond there because, as Mr. Damrath mentioned, we do have thin soils in some locations, and whether there was a possibility of infiltration or not. So this was done at every pond location.

Then I will turn to Sheet SG-9 which is a site grading plan. Basically what SG-9 shows, and this is a portion of the Big Indian Plateau, Hole 9, Hole 2, Hole 3, it gives you your pond and your reach locations which

correspond to the model underneath here, and to the SD drawings, or the storm drainage drawings, which -- this is SD-7.

So what we did was at every pond location, we added the information of test pit number, which the test pits are all located in the DEIS, the soils, the depth of soils, the percolation rate, the bottom elevation of the proposed pond, the existing field grade, the outlet structure, and then the required water quality volumes at each pond. So that's located on the site grading plan.

MR. RUZOW: You mentioned these ponds have outlets as compared to what we heard this morning with the construction ponds being pumped?

MR. CARR: Yes. Each pond has an outlet, whether it be an outlet structure, which could be a catch basin with elevations where each storm can pass through, or in some cases it's a weir, and each pond has a drain so they can manually be drained for maintenance purposes.

ALJ WISSLER: Just as an aside, the values, when you did the subcatchment data and

so forth with respect to the number of acres of road and driveway and all that kind of stuff, is that just pulled off the plans for each of those --

MR. CARR: Pulled off the survey and the plans.

ALJ WISSLER: Is that what it is?

MR. CARR: You manually do a takeoff.

ALJ WISSLER: You take a subcatchment area, and you measure it out, and it looks like we have .28 acres of impervious pavement here?

MR. CARR: That's correct. You actually measure it mechanically.

ALJ WISSLER: But you're pulling it off the drawing?

MR. CARR: Yes, absolutely. That's standard practice. At this point, you go back to your model, and basically you determine at your post-development design points, which have to be the same locations as the pre-development design points, if your flows and your volumes have been attenuated, and if they have not, you have to go back and either add ponds, outlet structures, change routing.

There's many things you can do, but basically that's the end product you want to get to. And those tables can be found in Appendix 9A for each area and each storm what the pre- and post-development runoff and volume are at each location.

One thing I want to mention, there was a comment, one of the EA letters that was appended to DEP's comments was there was some confusion as to whether the actual models corresponded to the plans, and I did go back, and I reviewed --

ALJ WISSLER: I was the one who was confused.

MR. CARR: I can understand how you would be confused. It's a very large project. I mean, as far as -- it's intricate in its design, and it has to be because of its location and because of the amount of control that we want to have. So that was one of the reasons.

The other thing I do want to bring up that I believe we submitted as an exhibit was this Handbook of Landscape Architectural Construction. Basically what I want to point

out here --

ALJ WISSLER: Applicant's 42?

MR. RUZOW: Yes.

MR. CARR: -- the last page, there was also a comment that -- there was a question about end values which are coefficients of friction that are utilized in pipes and swales.

Basically, we wanted to enter this because this basically gives the criteria that I use to choose the coefficients of friction for the stone-lined channels and turf-lined channels. It's important because if you artificially increase that number, you're obviously going to slow your peak down. So I think that was the concern. Slowing the peak down gives you a smaller pond.

MS. BAKNER: Okay, have a seat, Dave.

Now we have some questions, and the purpose of these questions are just to make sure that we, in fact, respond to the issues that have been raised, and I'm directing these to all of you, but I believe the HydroCAD questions are mostly for Dave. In using HydroCAD, do you input rainfall data from any

weather station?
MR. CARR: No, you only use, as I stated in my presentation, the New York State Stormwater Management Design Manual dated October 2001, and that's the data you utilize.
MS. BAKNER: That's not a variable?
MR. CARR: The only variable that changes is the area around the state.
MS. BAKNER: Dean, this question is to you. Why did you choose to use Tannersville data, rainfall data from the Tannersville station in the development of the WinSLAMM model?
MR. LONG: Back at the point where we started preparing the WinSLAMM data, we review the various available NOAA collection sites in the Catskills, and near the project area. As people have commented, there's a fair number of different sites out there. The critical thing with WinSLAMM is that you need hourly precipitation data in order to initialize and have the model operate. So that certainly cut down on the number of sites that were available to us for use in the WinSLAMM model.
MR. RUZOW: You just can't have

24-hour numbers that are recorded; you must have hourly within the 24?
MR. LONG: Correct. What Dan is saying, most rainfall collection sites have

one number for the entire June 12th date of two-tenths of an inch. To make WinSLAMM run, you have to have 24 hours of rainfall data that adds up to that two-tenths of an inch. So every hour, at some of the very old stations, somebody goes out and looks at the gauge and actually physically makes the measurement of how much rain has fallen, and of course many of these have now been converted to electronic gauges that measure hourly precipitations.

So of the ten stations mentioned in the prior letters, Slide Mountain and Prattsville and Claryville have hourly precipitation data. Slide Mountain was eliminated because its hourly precipitation data was mostly complete for only the years of 1953 to 1967. When we started setting up the WinSLAMM model, we were very interested in having 1963 data because 1963 data was the year that DEP had identified, utilized in the

total maximum daily load calculations for a Phase 1 total maximum daily load.

MS. BAKNER: Say the date, again. It didn't come out right.

ALJ WISSLER: `63.

MR. LONG: `93. 1993. So we were focused in. We wanted to have hourly rainfall from that particular year. So going back to Slide Mountain, its data set was available for `53 to `67, obviously not part of `93.

Prattsville has hourly data for 1949 to 2001, but most of the years have full months of missing data or months with at least several days of missing data.

So again, that fell into the right year class. It had `93, but it had, in our view, a lot of missing data. The hourly precipitation records for Claryville were also missing data for many of the days or even entire months during periods since 1990. Tannersville has the most complete record for hourly precipitation data among those stations. Also when yearly precipitation maps of New York State was consulted, precipitation for Belleayre area, approximately 45 inches,

was found to be about the same, or slightly lower, than the amount of Tannersville. By comparison, precipitation data collected by the New York State DEC at the Belleayre Ski Area ski center indicated annual precipitation rates of approximately 42.5. On the other hand, the average yearly precipitation for Tannersville is 40 inches, about five inches less than in the Belleayre area.

At Claryville, the annual precipitation was nearly 53 inches, or about 8 inches greater. So we felt that using Tannersville, because it had the superior record and it was representative based on the limited amount of daily record that was available at Belleayre Ski Center, it was an entirely appropriate data source to initialize the WinSLAMM model.

ALJ WISSLER: WinSLAMM can only be run on hourly data?

MR. LONG: Yes, it has to have hourly data. And that's what Dr. Pitt spoke about yesterday is essentially this same process. He said use statistics and everything else, but we were able to, just by visually

inspecting the data, see there was missing blocks of data, we were missing data for a year that we were particularly interested in.

So we did much of the same process that Dr. Pitt spoke about yesterday.

MS. BAKNER: Dean, I'm drawing your attention to New York City's Exhibit 20. This is the runoff observed, calculation of runoff observed for five monitoring stations. At the bottom, what does that say?

MR. LONG: "Precipitation data were obtained from New York DEC gauging station on Belleayre Mountain."

MS. BAKNER: Can you explain to me, Dean -- Mr. Long, can you explain to me why the Belleayre Mountain Ski Center precipitation data was viewed as a less valuable data set?

MR. LONG: The Belleayre Mountain data set was originally started for one of the acid rain monitoring efforts in New York State.

It's not a NOAA, National Oceanographic
Atmospheric Administration, designated and
quality controlled site.
ALJ WISSLER: NOAA.

MR. LONG: NOAA. So based on that,
and again, as Dr. Pitt said yesterday, NOAA
sites are preferred because of the data
quality control they use.
ALJ WISSLER: Is that Belleayre data
hourly data?
MR. LONG: No, and it's also not
hourly data.
ALJ WISSLER: How long has that data
been collected; do you know?
MS. BAKNER: Ten years, your Honor.
I want to put a mental marker at this
place. There's a lot of comments floating
around regarding rainfall data and how we used
it, and I just want to assure your Honor that
we'll be addressing that in the groundwater\
surface water section; but for now, we're
merely focusing on the WinSLAMM and how we
developed the data for that.
MR. RUZOW: Also, just for
clarification, some of the number of inches --
people are using a period of year versus the
whole year for comparisons, and you have to be
careful that when you're mentally remembering
an inch total, make sure that it's worth a

whole year versus a six-month period of time. It's a lot of confusion in the comments that we have had -- comments in the DEIS, and we want to make sure that's clear for your Honor.

MS. BAKNER: Mr. Long, why did the LA Group use the WinSLAMM model?

MR. LONG: Again, at the beginning of the process, DEP directed for the Applicant to use a more sophisticated model in order to determine water quality post-development, and they directed the Applicant to use WinSLAMM.

MS. BAKNER: I'm leaving this open to Mr. Long and Mr. Carr, but specifically I'd like you to describe the interaction between WinSLAMM and HydroCAD.

MR. CARR: I'll start because basically the HydroCAD model came first, and I designed all micropool extended detention ponds and the associated controls with them and I basically thought I was done. Then I turned it over to Dean's group who did the quality side of the picture, and he can take it from there.

MR. LONG: One of the considerations about WinSLAMM or in the WinSLAMM manual, it

clearly says that it's to be utilized in consort, and can be utilized in consort with other models. As David said, we used HydroCAD to develop our water quantity management strategy and plan.

MR. CARR: Can I break in. I want to

also state, in the HydroCAD model, we did meet the New York State DEC requirement for water quality volume in the pond design, which is different than WinSLAMM. I guess what I'm trying to say is the HydroCAD model didn't just address quantity, it addressed quantity and quality as required by New York State Stormwater Management Design Manual.

MS. BAKNER: Let me interject here a little bit, because this is an important point in light of what Dr. Pitt said the other day. The design of the micropool detention basins according to the Storm Water Management Design Manual, what classification of control devices are they? Is there a specific one, micropool detention, or are they referred to generally as wet ponds in the manual?

MR. FRANKE: Collectively they're referred to as ponds, come under the category

of ponds.

MS. BAKNER: In terms of classified as ponds, based on the guidance in the manual, what removal rates are you allowed as design professionals to assume that they meet?

MR. LONG: For wet ponds which includes --

MR. RUZOW: Which Exhibit?

MR. LONG: Exhibit 58, CPC 58. For wet ponds, the suggested removal rate for total phosphorous is 50 percent; and for total suspended solids, it's 80 percent.

MS. BAKNER: And the stormwater quality volume in the pond is what? Is the requirement you have to meet -- Dave or Dean, can you explain that a little more?

MR. CARR: Yes. Under the manual, the requirement is that you have to have at least -- I believe it's 10 percent in the micropool, and the rest in the permanent pool; and that's been met over the discharge point. We're actually -- we actually over-designed our ponds, and we're treating up to actually -- we're treating up to the one-year storm.

MR. RUZOW: Your Honor, this is also found in Applicant's 37. The same chart is found there with the series of the pages.

MS. BAKNER: I'm sorry, Dean, to have interrupted. You were going to explain how you took Dave's HydroCAD information and used it in the development of the WinSLAMM model.

MR. LONG: As Dave said, once he completed the design of the site for water quantity management in the volume of runoff --

ALJ WISSLER: Using HydroCAD?

MR. LONG: Using HydroCAD. So he had his work done--

ALJ WISSLER: Which doesn't require an hourly data?

MR. LONG: Correct. So he had his work done as far as managing the quantity of water. Then what we did is we set up the WinSLAMM model, again, using the hourly precipitation data and using all the subcatchments looking at any of the drawings, but SG-7 is over there. We had to go back in in WinSLAMM and put in many of the same type of data to redescribe that subcatchment as far as its impervious surfaces and all its

surfaces, into WinSLAMM to build the mathematical model that describes subcatchment.

Once we did that, then we started a running WinSLAMM, and we found that we weren't meeting the necessary water quality objectives to manage phosphorous discharges as well as total suspended solids.

At that point, Dave would have to redesign a subcatchment in general to change the grades but primarily go back in and redesign the extended micropool detention areas in order to enlarge them. One of the controlling factors in WinSLAMM, and the reason it's a controlling factor in WinSLAMM, it's simply dealing with the physical properties and pollution removal properties of stormwater ponds, is that it doesn't recognize ponds unless they're three feet or deeper. In the first reiterations of designs, we may have had some shallower ponds that Dave had to go back in, redesign, recalibrate his model, see

if he still had quantity control, and then we
would go back in and remodel on the WinSLAMM
to see if we had quality control. In general,

that took about two or three reiterations of
design effort in order to meet the applicable
criteria.

MR. CARR: I don't believe there was any other way to do it. They're two entirely separate models.

ALJ WISSLER: HydroCAD, if I understand it, will tell you about volumes of flows?

MR. LONG: Correct.

ALJ WISSLER: But WinSLAMM tells you about the quality that you get from that flow?

MR. RUZOW: Right, but HydroCAD also, according to the design manual, gives you ranges of removal; does it not? Once you have designed the --

MS. BAKNER: The stormwater quality volume.

MR. CARR: No, the model doesn't give you the ranges of removal, the model tells you what ranges of removal you should expect.

MR. LONG: The HydroCAD does give us the pond stages which helps us get the water quality volume estimates for the various ponds.

MR. RUZOW: Does the design manual require that the ponds have a minimum of three feet of depth?

MR. CARR: No. I believe the micropool and the extended detention pond needs to be at least five or six feet, I believe, so there is a depth requirement on the micropool.

MS. BAKNER: Dave, you have explained to us where your HydroCAD design points are.

MR. CARR: Yes.

MS. BAKNER: Yesterday or the day before, it was suggested that the design points should be located up slope as opposed to at the bottom of the slope where you located them. Can you explain for the Judge why they're located in that --

MR. CARR: As a clarification, I don't believe that was mentioned. That was in a comment -- EA comment letter, and the comment was made that -- the commenter felt that the spatial relationship between the pre-development and post-development subcatchments should be the same.

I'm pointing to SD-5 and SD-7.

Subcatchment 5, if that's 100 acres, then in the post-development condition, you should also have 100 acres draining to that point, or vice versa. If you have a 10-acre area draining to Pond 9 up in here, which is up in this area of our site, then you should really have a pre-development subcatchment coming to that same area; but the problem is that if there isn't a point of confluence there, then there's no way of measuring flow to that point.

So the idea is to have the same amount of total of land basically drained to the same design point, but spatially the more controls you add in the post-development condition, the more subcatchments you are going to add because every time you add a pond, it basically becomes a control point.

MS. BAKNER: Dave, you discussed how you chose the design point, Design Point 1, I believe it is on the Big Indian, relative to the railroad right-of-way. What assumptions did you make or plans do we have with respect to that swale?

MR. CARR: We have not fully designed

that swale yet. That would be part of Phase 1; and as Kevin mentioned in his presentation, detailwise we focused on Phase 2.

ALJ WISSLER: You would agree with Mr. Damrath's assessment the other day that when you get to Point 1, the flows have nowhere to go at this point because you need to design something?

MR. CARR: Yes, the design along the railroad track needs to be completed. Yes, I do agree.

ALJ WISSLER: At present, that flow

that we have in front of us, that flow doesn't go anywhere?

MR. CARR: Oh, it does go somewhere; but the point is that the actual design of the channel has not been completed.

MR. RUZOW: I think the Judge was asking you: At Design Point 1, what happens to the flow? And if we haven't looked at it beyond that, why is that important or unimportant?

MR. CARR: It's unimportant in the requirement of designing the stormwater system

because you're basically charged with attenuating the flows at the design point. So the assumption is made, is that if you have 100 cfs going to a design point now and when your project's done, you have 100, the impact downstream is going to be the same. You're having no impact on that. So what we're assessing is the impact, and all those impacts have to be assessed up to that design point.

MS. BAKNER: Is that why you look at the different year storms at the design point as well, so you can be sure it will function in basically the same way?

MR. CARR: That's one of the reasons.

ALJ WISSLER: But at some point the water has to go someplace beyond Design Point 1; right?

MR. CARR: Correct. It moves as it

does today. We're not changing any of that. Because what you would end up doing is what I stated as far as the discussion of -- say Design Point 4. Quite possibly, your design point, instead of being here, which is the nearest point to your development, may be down to the actual stream where it enters -- all of

a sudden, you are now entering in a lot of watershed area that your development has no impact on.

MS. BAKNER: I guess the question was asked previously: Is the design point the point at which the water leaves the site?

MR. CARR: Not necessarily. It's the point that has been chosen where you can best assess the impact of development on the existing condition. So it really doesn't have any correlation to project boundaries, it has to do with existing topography and drainage features.

MR. RUZOW: So your selection of Design Point 1 was at that location because you had -- I think you described before -- Hole 3 was the furthest point east that drained to it?

MR. CARR: Yes.

MS. BAKNER: Is there anything in HydroCAD that sort of grabs you and says: Dave, you have to put the design points here?

MR. CARR: No.

MS. BAKNER: So another professional

engineer, another landscape architect could

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choose different design points?

MR. CARR: Correct.

MS. BAKNER: Is there any demonstrably right answer?

MR. CARR: Demonstrably -- I believe my answer is right. On a project this size, you do have other design professionals review your work, and there are two -- I'll bring up a couple comments that were made. One of the comments that was made was I did have the other side of Lost Clove Road in the design, and their assessment was you should take it out, and the other one which --

ALJ WISSLER: Can I ask why you put it in originally?

MR. CARR: Because it was the watershed. And the argument was made to me, well, this is going to dilute your numbers, just like you did over on Woodchuck Hollow Road, you should take that out. To be consistent, I agreed with that.

ALJ WISSLER: Because in your view it gives you environmentally safer numbers by taking it out?

MR. CARR: Correct.

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ALJ WISSLER: And therefore getting a higher percentage --

MR. CARR: Of change. The other

change was Giggle Hollow. I basically split Giggle Hollow in two because -- and I'm pointing to SD-5 -- Giggle Hollow I basically split in two and had, say, Subcatchment 3A, Subcatchment 3B, because 3A is in the Belleayre Highlands section, and 3B was in the Big Indian Plateau section; but you know, the reviewer came back and said: Well, you have impacts on both sides of your watershed, which is different than Lost Clove Road because in that one -- you should be assessing the whole thing together. You shouldn't be separating it by project. It has to do with land.

MS. BAKNER: This process of QA/QC, when you talked with other design professionals who do this work, what purpose does that serve?

MR. CARR: Level of comfort for me. I'm a landscape architect, and it's basically the way we work. We work in teams and not individually, so as far as any design, more heads are better than one basically. So we,

more times than not, share ideas about design and practice.

MS. BAKNER: There was a comment, I believe it was DEP or one of their consultants suggested that the same subcatchments must be used pre- and post-development.

MR. CARR: That's what we just discussed.

MS. BAKNER: I believe you've already

covered the sheet flow, why you didn't use
sheet flow?

MR. CARR: Right.

MS. BAKNER: Is there anything you
want to add to that?

MR. CARR: No.

MS. BAKNER: There was some questions in the EA work, in particular in Appendix C-1 at page 4, No. 4, and there was an argument that the HydroCAD model and the stormwater routing were inaccurate. It wasn't very specific, but I just wondered if you could go over the Giggle Hollow water -- subcatchment basin and show what the misperception was, if you could.

MR. CARR: That goes back to the

discussion I just made about Giggle Hollow, and I believe the commenter specifically mentioned Subcatchment 19, Subcatchment 20 and Subcatchment 15.

ALJ WISSLER: Can you take me to where you are?

MR. CARR: Yes, Belleayre Highlands proposed.

The issue with respect to -- had to do with Subcatchment 20 here, 19 which is here, and 15 which is here. Basically they were looking at SD-7. When you put 6 and 7 together -- the subcatchments from the one page go with the other model, and that was basically the confusion. The question was whether they were included or not, so this basically shows that they were included. It goes back to that Giggle Hollow break. There are a couple subcatchments on the other side of Giggle Hollow that flow to Giggle Hollow and don't flow to the Big Indian Plateau. And those are 15, 19 and 20. (Indicating)

ALJ WISSLER: But as between SD-6 and SD-7, the only 15, 19 and 20 that exist on these drawings are right here?

MR. CARR: There may be a 15, 19 and 20 on the other model because each model has their own numbers.

ALJ WISSLER: But it's a different 15, 19 and 20?

MR. CARR: That's correct.

MS. BAKNER: Dave, can you verify that you designed the drainage swales to the ponds to appropriate standards?

MR. CARR: Yes, that was one of the exhibits we handed in with the end values.

MS. BAKNER: The Manning values?

MR. CARR: The Manning values. That goes back to the question about the coefficient of friction which is this Handbook of Landscape Architectural Construction.

MR. RUZOW: Exhibit 42.

MS. BAKNER: Can you please discuss how you calculated the rate at which the stormwater leaves the stormwater treatment pond?

MR. CARR: That's actually done by HydroCAD. HydroCAD gives you the value at the outlet.

MS. BAKNER: All right. There was

some criticism that you didn't show the time of concentration calculation and values on the drawings. Can you just explain why you produced those separately?

MR. CARR: The commenter -- that was also in one of the EA letters -- stated that he felt or she felt that the times of concentration that I calculated should have been placed on the drawing; in other words, the line that I used -- and that's something I've never done, and it's not a requirement. Would it make it easier for someone to review the drawings? Yeah, it would; but it's something I have never done.

MS. BAKNER: But the information involved --

MR. CARR: The information is in the HydroCAD model, correct.

MS. BAKNER: Can you please confirm for the record that the post-development discharge of stormwater is lower in quantity and rate of flow than the pre-development discharge?

MR. CARR: Yes, and that can be found in Appendix 9A in the tables. And I did go back and check that.

MS. BAKNER: The next question I wanted to ask you, Dave, is: Where do you set forth the maintenance requirements for the stormwater management system?

MR. LONG: That's in that Appendix 11.

MS. BAKNER: What happens to stormwater ponds that aren't maintained?

MR. CARR: Stormwater ponds -- these ponds that aren't maintained will continue to function, but they will lose their effectiveness over time. They are -- included in the design are pond drains which they can be manually drained to be mowed or to be cleaned out of sediment, and they will continue to function, but over time they will degrade.

Most of the designs in the SWPPP's that I've worked on over the years, common maintenance practice for a pond that has total infiltration -- and if it is functioning -- is to actually clean it out a minimum of every ten years. Actually go in and actually excavate the top six inches or so of material and re-seed. If that is not done, the

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infiltration benefits and the pollutant removal benefits will degrade over time.

MS. BAKNER: There's been discussion of how the analysis that you did is impaired because it doesn't account for allegedly all site drainage?

MR. CARR: Yes.

MS. BAKNER: I guess my question is: Is the topography that's shown on those drawings at that scale, in your opinion, sufficient to pick up any drainage areas on the site?

MR. CARR: Yes.

MS. BAKNER: I'd like to come back to that issue later, your Honor, because Kevin had to step out.

Let's see, Dave, has the stormwater pollution prevention plan been prepared to ensure that the stormwater treatment methods will not intercept clean water being conveyed in any drainage features?

MR. CARR: There's one point that we discovered where a pond is going to have to be moved. I believe it's Pond 11 on SD-7 that will have to be moved slightly to the east,

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but that will not change the function of the design. Those types of changes will readily happen as these plans are developed. I view this as actually a starting point.

Normally this is the first time I have ever gone into this much detail on a stormwater management plan at this time, because plans change. So I discussed the borings we did at each location. If ponds move, we have to go out and do additional borings -- which isn't a problem, but it's not something you normally do normally at this stage. So I do foresee more changes relative to that.

MS. BAKNER: Thank you very much, Dave.

Picking back up with Kevin. There's been a statement that two drainage features -- that we did not explicitly show as drainage features beyond the topography and the topographic changes on the two sites are somehow streams that were missed that were part of the USGS quadrangle maps. Could you show us the quadrangle maps in relation to the features?

MR. FRANKE: I have copies of the Shandaken USGS quadrangle from the year 1960, also the 1997 update of the Shandaken quadrangle.

ALJ WISSLER: Are you putting these in?

MS. BAKNER: Yes, we'll get you copies later.

ALJ WISSLER: Could I have counsel at the table here.

MR. FRANKE: Just for orientation purposes, Lost Clove Road, red line is 28, here is the stream of Giggle Hollow, day use area, Birch Creek running down to Lasher Road. You can see on here, there are no blue lines indicating a perennial or intermittent stream anywhere along the railroad tracks between Giggle Hollow and Lasher Road. (Indicating)

MS. BAKNER: Just for the record, Kevin, does a blue line mean something on a USGS map? I just want to make that clear for the record. If it's blue, what does it mean?

MR. FRANKE: It's a mapped water course. If it's solid blue line, it's a perennial stream. If it's a series of dashes

and dots, then it's mapped as an intermittent stream. Here is the 1960 version of the same map, showing the same condition. Between Giggle Hollow and Lasher Road, there are no mapped streams along the railroad track.

ALJ WISSLER: Is that exhaustive? I mean, if it isn't on those maps, it doesn't exist?

MR. FRANKE: DEC -- if I can speak for them -- only because when I was employed with DEC, their watershed maps where they indicate regulated streams, use the USGS maps as their base. So streams are identified and classified.

ALJ WISSLER: And they're based on that and that's it; or if field investigation indicates that there may be other intermittent streams, are they then augmented?

MR. FRANKE: That I can't speak to.

ALJ WISSLER: That's my question.

MS. BAKNER: The question I was

asking, your Honor, was not are all drainage features shown on the USGS map. I was trying to get to the point that if it's blue, that that means --

ALJ WISSLER: It's either a perennial or intermittent stream.

MS. BAKNER: Yes. Now, there is more than one way to refer to drainage features. You can show drainage features on maps through topography. You can show drainage features through symbols on the map. We also discussed the drainage features that were pointed out; and I believe, Dean, you have the page numbers, or Kevin, you have the page numbers for that?

MR. FRANKE: There is discussion of the -- in particular, the two drainage areas that we walked on our site visits, and they are identified and described.

MS. BAKNER: 3-14 and 3-15.

MR. RUZOW: Those are pages in the DEIS?

MS. BAKNER: That's correct.

MR. FRANKE: Underneath the heading, Unmapped Drainage Areas, if I'm not mistaken.

MS. BAKNER: At this time I'd like to ask Steve Trader -- we handed out his statement of qualifications earlier, and what I would like him to do is kind of address

specifically as the geologist working with

Dr. Sam Gowan, a hydrogeologist, on looking at these drainage features. If you would like to bring up your --

ALJ WISSLER: How long will he be?

MS. BAKNER: Just two minutes. We're introducing these two sheets as exhibits. We have Observations of Drainage Features on June 4th, 2004, and then a second one also entitled, Observations of Drainage Features on June 4th, 2004. One is for Big Indian; one is for Wildacres.

ALJ WISSLER: Big Indian is Applicant's 45.

(BIG INDIAN OBSERVATIONS OF DRAINAGE FEATURES ON JUNE 4, 2004 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 45, THIS DATE.)

ALJ WISSLER: Wildacres is Applicant's 46.

(WILD ACRES OBSERVATIONS OF DRAINAGE FEATURES ON JUNE 4, 2004 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 46, THIS DATE.)

MS. BAKNER: Mr. Trader, in terms of the Exhibit 45 here, you have taken a look at this drainage feature to try to determine if

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in your professional judgment really what kind of a feature it represents, and I'd like you just to address, if you will, for both of these, what kind of drainage feature you feel it is.

MR. TRADER: On Exhibit 45, the Big

Indian site, that seems to be a feature that has drainage occurring during and after storm events. We walked that on our field --

ALJ WISSLER: Which feature are you talking about?

MR. TRADER: You can kind of see -- that's a wetland, I believe that's mapped. If you follow the wetland, that's mapped from the Mid Road Well and Mid Road Spring area down to where you see "stone wall," and then down to the railroad. That is the feature that we walked. I think that was the last field visit that we all went on, and that's the one I'm saying is only going to be flowing during or after storm events. There are some seeps that come out during those times as well and shortly after storm events, but when we visited, it was not flowing down the course the entire way, only a portion.

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MS. BAKNER: With respect to Applicant's Exhibit 46 and looking at -- it's sort of upside down in terms of the topography -- but looking at Design Point 1, then the words "box culvert" and essentially where it has 56, 26, 30, right through there.

MR. TRADER: Start towards the three blue dots down at the bottom which are Wildacres Springs, Wildacres 1, 2 and 3. They eventually drain to the ditch that goes along the access road to -- I guess the Marlowe Mansion area. They go through a culvert that's mapped there with a green symbol. That indicates that water was flowing when we were there on June 4th. That flow continued down and disappeared at the red dot, the first red dot downhill from there just above the number 2. That was on our visit on June 4th. The flow had disappeared further downslope when we were there with all the people here -- we were all doing the site visit -- it was further downhill, but it did disappear nonetheless. That flow disappeared into the ground, and there was kind of an alluvial fan situation there, and you started to get an anastomosing

system of channels that were dry.

Those were dry channels, and those would only be flowing during or shortly after storm events for a day or two. It was dry the rest of the way down to the Gunnison Road where there is a couple places where the anastomosing channels come out alongside the roadside ditch there in a couple places.

That flow, when it's flowing, would proceed to a culvert there marked 30 inches. And it was also dry when we did our site visit. Flow would have continued down during the storm event, and there's a stone wall just uphill from the railroad tracks. The railroad tracks are located -- I can see the number 56. There's a line right along there. Right along the property boundary is the railroad tracks.

There's a stone wall just uphill from there which is creating an impoundment for sediment during the wash events. That was all dry. That's basically an alluvial fan that's forming now behind -- uphill from the stone wall. (Indicating)

Some of that flow when it is occurring is directed off to the right towards the

26-inch culvert, and a portion of it is directed -- there's a red solid dot to the left of the 26-inch culvert. That's about 300 feet away. So this alluvial fan is about 300 feet wide. And when you have water, during a storm event, would be flowing to those locations, either through the 26-inch culvert or along the tracks and through a culvert that is just to the west, or to the left, of that red solid dot. (Indicating)

That culvert was blocked when we were there, and the reason for that blockage was sediment, branches, twigs, leaves. There was a large storm event -- I'm not sure of the exact date -- but sometime in the few weeks prior to our site visit which was most likely the cause of that plugged culvert. Because of that, the water had to find somewhere to go, and it washed out the railroad tracks in a couple spots. Those are located by the "V" symbols along the tracks. Water continues on down the slope, around and down to the right of the Fleischmanns reservoir. It comes down

to the green symbol that you see towards the
top of the page. That is actually along

Route 28. It's not shown along the map. The
topo coverage didn't go that far.
(Indicating)
That flow comes out there and flows
westward into another culvert. It goes
underneath Route 28 and is discharged into the
Emory Brook tributary. (Indicating)
MS. BAKNER: Given the feature you
have just described, in your opinion, would
you consider that to be either an intermittent
or perennial stream?
MR. TRADER: No.
MS. BAKNER: I'm going to read you a
definition. This is, I believe, something you
can take judicial notice of, your Honor. It's
the final DEP regulations, and it is their
definition of a water course: "A water course
means a visible path through which surface
water travels on a regular basis, including an
intermittent stream which is tributary to the
water supply. A drainage ditch, swale or
surface feature that contains water only
during and immediately after a rainstorm or a
snowmelt shall not be considered to be a water
course."

In your professional opinion, do these
drainage features meet the definition I have

just read?

MR. TRADER: No, they don't.

ALJ WISSLER: Can you give me the section?

MR. RUZOW: Section 18-16, subparagraph 113 of the New York City Watershed Regulations.

MS. BAKNER: Again, your Honor, I just want to say that we'll go into this information a little more deeply in terms of springs and things when we talk about groundwater and surface water; but now I want to get back to Kevin and Dave here, and the question I have for you is: One of the points that DEP has made is that we're proposing to use level spreaders inappropriately based on the DEC 2001 Stormwater Manual and/or the Soil Erosion and Sedimentation Control blue book; I was just wondering if you could address that for us.

MR. CARR: The level spreader that's shown on the drawing, I believe it's CP-18, is on a typical detail that we pulled out of the

New York State Stormwater Management Design Manual. The actual level spreader that's shown on that drawing -- it's CP-18 -- is actually not shown anywhere on the plans in particular. It was more meant as a typical detail, and further there are other alternatives listed in the manual that could be used in place of that detail.

And looking at it further, we're probably more likely to use something such as a rock check dam in those locations, but basically it was a typical detail that we included in the drawings -- that for some locations would not be appropriate, and they are not placed anywhere on the plans.

MR. FRANKE: From a construction standpoint, your Honor, those dispersion pipes that I spoke of this morning, for the basin dewatering, we probably used a poor choice of terms when we defined the words as level spreaders, because if you go to the design manual and their detail of a level spreader, and you go to the blue book and their design with level spreaders, obviously those hoses aren't the same as what is depicted as a level

spreader.

MS. BAKNER: So I guess, the point we wanted to make for the record is we have mislabeled those on the drawings. They should be called dispersion pipes, they should not be called level spreaders.

One of the points that DEP, and I believe representatives of CPC, have made is that the plans that we have submitted, the soil erosion sedimentation control plans for Phase 2 of Big Indian should, in fact, at this point be submitted for the entire project. In your professional judgment, would that be typical or wise given the cost involved in developing such plans?

MR. FRANKE: No, it would not be typical. We've already discussed the level of detail in these drawings, that I presented this morning, are not typical in terms of a SEQRA review, and investment of time and money to design the entire project with that level of detail would be significant, and in my opinion could potentially very easily be inefficient use of time and money because eventually those plans may change as a result

of either something in the SEQRA process or as a result of local site plan review.

MR. CARR: Just to add to that, I believe there was testimony yesterday, testimony from Mr. Garabed who reviewed the stormwater pollution prevention plan drawings. A few of the statements he made, in my opinion, listening to his statements, he was asking for a level of detail that even goes beyond permit drawings. He was discussing things like amount of silt fence, linear footage of this. In my opinion and in my experience, he was talking more of construction level drawings, which would be the very last step in a design process when you're ready to build something. He was looking for that amount of detail, which would be very unusual for this point. He was almost looking for the amount of detail that someone would need to put a price on the project to actually bid it, which would be very unusual.

MS. BAKNER: Dean, turning to you for the moment, we have heard quite a bit from the author of WinSLAMM yesterday, Dr. Pitt. The criticism that Dr. Pitt made of the use of the

WinSLAMM was that it was essentially not meant to be used to model forested areas such as that that occur on the site. I just wanted to ask you, as a professional who uses models on a regular basis, did you find that the model or the manual or the computer disk or anything else was drafted such that it would alert you to that problem?

MR. LONG: The manual was not specific as expressing a prohibition from using the model for a large forested watershed. The manual does discuss and has default values, as we have been calling them, for things such as undeveloped land. It discusses golf courses and large turf areas, and it -- the manual also provides examples that included a 90-acre forest as part of the pre-development condition. Based on that information and based on reading the manual, as we started using WinSLAMM, it was our belief that it was within the general parameters of the model to be able to accommodate this type of development process.

MS. BAKNER: Dean, let me ask you: I

know that you've sent members of your staff to

WinSLAMM seminars or courses on how to use WinSLAMM, and we put two of those gentlemen's names in the record, their curriculum vitae or resume are in there, John Cianci and Dan Sheehan. Unfortunately Dan was going to be here today to be with us, but unfortunately he broke some ribs and was unable to come down.

So, Dean, I wanted to ask you, based on your discussions with them, was there anything during the course that they attended that would lead them to believe that you couldn't use the model in the way in which you used it?

MR. LONG: Dan Sheehan most recently attended seminars this past winter. He came out of the seminar, and we discussed specifically whether or not there was explicit prohibitions against using WinSLAMM for a heavily forested site as a pre-development condition; and he said, no, that that topic did not come up.

And again, because the manual is the book that they use in these seminars, they did review the other -- they did review and utilize the examples that I previously have

spoken of that had a 90-acre forest in it.

MS. BAKNER: Were there communications between your staff and Mr. Voorhees, who works with Dr. Pitt on the model, as part of your use of the model?

MR. LONG: The model has a lot of attributes; and the model is, as Dr. Pitt says, is always being revised. As we loaded the data, we had to contact Mr. Voorhees on a number of occasions to clarify data input parameters, clarify reasons why we were getting spurious end results that did not seem to logically fit.

So we were in communication throughout the process with John Voorhees, who is the co-developer or the current software writer with Dr. Pitt at this time, and these communications went throughout the process, including up over the last couple of weeks as we had looked at the model -- to begin to understand better what would be a calibration process.

MS. BAKNER: Mr. Long, when Dr. Pitt said unequivocally yesterday that your use of the model to model pre-development forested

conditions was not really an appropriate use of the model, what was your reaction to that?

MR. LONG: My reaction to Dr. Pitt's written criticisms of our use of the model were basically coming in the category of shocking. It's being marketed and it's being advertised relatively heavily as a model for pretty widespread use, and obviously it -- with his testimony yesterday as well as his written documentation, it's got some pretty severe limitations for rural New York State.

MR. RUZOW: He also told us yesterday that it was basically an urban design model; is that fair? And perhaps its use east of Hudson and Westchester County might make sense, but does that translate into the area, the subject of this project?

MR. LONG: It doesn't translate into the Big Indian Resort or Wildacres. It certainly would be applicable in urbanized settings. When you go back through, after reading Dr. Pitt's criticism of it and looking at it, you see that it is an urban model that's really best -- and this is what Shohrah said from the DEC on Tuesday -- is that it's

really best at fine tuning and refining stormwater devices within an urbanized setting.

MS. BAKNER: When DEP suggested or requested or demanded that we use WinSLAMM in the beginning, did they ever in writing or orally advise you that it should not be used to model pre-development conditions such as those that are present on the site?

MR. LONG: No, they didn't.

MS. BAKNER: Can you tell me, Mr. Long, in your opinion, how useful is a model that can be used to predict post-development loading but not pre-development loading?

MR. LONG: Again, you would end up -- well, you would end up in a situation that is infeasible because you would end up having two different models for pre- and post-development.

So you would have two different tools trying to work to come to a single conclusion. Absent being able to use it solely in an urbanized setting, solely for conceptual planning, it doesn't have much utility for a

forested or rural watershed applications.

MS. BAKNER: Dean, going from my memory of Dr. Pitt's testimony, in addition to saying or testifying that it wasn't useful for a forested landscape such as this, did he express some reservations about the use of the model in modeling golf courses as well as part of this?

MR. LONG: Specifically yesterday Dr. Pitt expressed some reservations by using it for golf courses. The model does discuss golf as a sub-text of -- as a subcatchment or as a watershed feature. It does discuss large turf areas as a watershed feature. In his testimony yesterday, he wasn't certain whether or not those descriptions that he has utilized in the past would be applicable to a full-scale, 18-hole golf course is what I took from his comments.

MS. BAKNER: Moving right along, in

light of the fact that the creator of the model has basically advised us after we bought and used the model, at the direction of the regulatory agencies, that it's an inappropriate model, before Dr. Pitt created

WinSLAMM, how did we calculate the rate of runoff and loadings of pollutants such as phosphorus?

MR. LONG: Basically since the interest in phosphorus has always been driven by lake management, lake and reservoir management situations, the most common methodology has always been used, what's called a mass loading, what I call a direct calculation or a coefficient base calculation where you simply take a land use, find an appropriate runoff value for that land use, you fully apply the land use times that value times an annual rainfall rate, with some level of correction for whether or not you actually are getting rainfall from that particular -- from the entire year or from that particular event.

As part of the preparation of Appendix 10 and 10A, we discussed briefly the other models available to us as far as looking at nutrient loadings; and other commenters during the process of the development of the DEIS had asked why we had not used the simple method of four for watershed loadings, and

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Shohrah spoke briefly on Tuesday about the simple method.

MS. BAKNER: Before you get into that, I'd like to just hand out this presentation so that people can follow along with the numbers as you're discussing them.

This would be Applicant Exhibit 47.

("TOTAL PHOSPHORUS LOADING CALCULATIONS BETWEEN WINSLAMM AND OTHER STORMWATER QUALITY METHODS DATED JUNE 2004 RECEIVED AND MARKED AS APPLICANT'S EXHIBIT NO. 47, THIS DATE.)

MS. BAKNER: Looking at Table 1 here, Dean, the comparison of WinSLAMM data and literature estimate, can you explain the values that are set forth there in Table 1?

MR. LONG: In Table 1, what there is is a comparison of total phosphorus concentrations as predicted by WinSLAMM for Big Indian and Wildacres, both as a concentration, which is a milligram per liter or a part per million, or as a load in pounds per acre. This data was directly from the DEIS from Appendix 10A. What follows underneath it are concentrations or loads from

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various other data sources that we've collected during the process of developing the Draft Environmental Impact Statement. In the other exhibits that we handed out this morning are either the pages -- are the pages from these various data sources.

So Haith, which is 1993 is Exhibit 36; Schueler `87 is 34; NYCDEP 1997 is 38; Pensca and Lively, [sic] 1995, which is the Wisconsin document, is 35.

MS. BAKNER: Exhibit 35.

MR. LONG: In any case, these are some comparative values that we found in the literature. And further, as far as this goes, some of these values were utilized in an earlier direct calculation and coefficient calculation that's found in Appendix A at the back of this document where we created very early on in the process a rough estimate of what kind of nutrient loads we were expecting off of the Big Indian property, off of the Big Indian Resort.

MS. BAKNER: Let me just ask you: You did that double-checking method; you were essentially trying to double-check the model?

MR. LONG: Correct.

MS. BAKNER: I notice you have a location here of Giggle Hollow. Can you explain how you derived that concentration?

MR. LONG: Giggle Hollow location is of course on the property site, and the concentration there is derived on the following page and as a result -- not on the following page but on page 3 of 35 -- page 5 of 35 of the document. Essentially that concentration we derived by two methods which are described on page 5 of 35.

MS. BAKNER: Just to clarify, the raw data you used to make this calculation, where did it come from?

MR. LONG: From DEP as part of their efforts to collect preexisting condition water quality data in and around the Belleayre Resort.

MS. BAKNER: For the record, all that water quality data which DEP gave to us was included as Appendix 18 in the Draft Environmental Impact Statement?

MR. LONG: That's correct. Briefly, I'll just go through --

ALJ WISSLER: Don't be brief.

MR. LONG: To derive the estimated concentration on a year-round value, which is 20.05 micrograms per liter or parts per billion, we approached it in two methodologies. The first one was to, as it shows in the table on page 5 of 35, was to create an event mean for each of the rainfall events in 2004. That magical process is the simple creation of the average. All the relevant numbers there are shown in that table -- except for the actual raw data is shown in that table. That resulted in a value of 20.05 micrograms per liter. That number was added to the 15.47 base flow monitoring data from the April 2002 DEP report -- sorry.

The estimate of stormwater flow is immediately above it, which is 24.46 micrograms per liter.

MS. BAKNER: You mean 24.63.

MR. LONG: 24.63. Glad I'm not a pilot. That number was added to the 15.47. The 24.63 is the number I derived by creating an average from the 2002 event rainfall data collected by DEP. Those two numbers added

together and divided by two became the 20.05. The reason I did that is I wanted to make sure I was giving adequate weight to the dry weather conditions.

MS. BAKNER: Can you just go over that just a little bit more. They took monitoring during storm events -- excuse me, they monitored during storm events, and they also monitored during non-storm events, which you're referring to, I believe, as baseline?

MR. LONG: Right, base flow. In the progression of setting up all the rain stations in 2000 and 2001, the automated stations that are necessary or extremely convenient to collect event rainfall were not operating. That's why in 2001 and published in 2002, they were able to create the 15.47. So that's where that number comes from is base flow, non-event flow.

They were able to fully automate their stations, and then they were able to collect event data on timed intervals during rainfalls of the actual stream flow changes, and that's what the table that's labeled, "Giggle Hollow 2002 NYC DEP sample data." They provided us

with the raw data; and from that raw data, I created the sums which is event sums, TP, micrograms per liter, total phosphorus; and there was -- the first line of data, there was 25 samples in that particular event, so you merely take the 281, which is the sum, divide it by 25 to create that average. And I repeated that for each of the storms in 2002.

The odd thing I did do here in this -- again, it was simply to give extra weight to the low flow conditions, the non-event conditions, was to add that average of 15.47 to the event average that I created above of 24.63, creating a year-round average by mixing years, of 20.05.

Then I also approached it a second way which is described in the next paragraph. Essentially what I did is that I took the whole data set for 2002 and created an average out of that data set. In 2002, the difference is that you have all the event data but because they have -- they had already set a database of dry flow, they had fewer collections of dry flow, non-event of water quality data from the stream.

By utilizing that method, the average

became 21.6 micrograms per liter, and that's based on 161 measurements, full data record for 2002. So having, basically, two numbers that are essentially around 20 to 21, and because we were interested in this particular analysis of having a minimal value for our forested condition in the subsequent, in the rest of this booklet here, I utilized the 20.05.

MS. BAKNER: Just to clarify for us laypeople, you picked 20.05 instead of 21 point -- because 20.05 is less than 21.6, and you wanted to pick the minimal value to represent the runoff from the existing pre-development condition?

MR. LONG: Right.

MS. BAKNER: Let me interrupt with one question, Mr. Long. The Draft Environmental Impact Statement was submitted preliminarily, I believe, in the beginning of 2002?

MR. RUZOW: January of 2002.

MS. BAKNER: Was this data available to you then, the event-based data?

MR. LONG: The final report is

April 2002.

MS. BAKNER: So it was not available to you?

MR. LONG: The final with full quality control was not available.

MS. BAKNER: And that was the baseline data?

MR. LONG: Correct.

MS. BAKNER: The next time we submitted our Draft EIS for review was, I believe, in January of 2003. In January of 2003, was the event-based data available to you?

MR. LONG: Not a complete data set with all the flow data.

MS. BAKNER: Why is the flow data important?

MR. LONG: The flow data was important because we wanted to make sure we had an understanding of the runoff characteristics and the differences in quality caused by rainfall, as well as be able to fully convert it to actual loading rates.

MS. BAKNER: Going back to Table 1, the concentration of .02 milligrams per liter

is the value you just described how you derived; correct?

MR. LONG: The Giggle Hollow concentration at the bottom chart, yes.

MS. BAKNER: Can you walk us through how you used these various concentrations or loadings to come up with predicted pollutant loadings?

MR. LONG: On page 2 of 35, I set out some of the assumptions and the beginnings of some of the data sources. The most important one here is that in these analyses that follow in this book, we utilized the fertilizer loading rates that we have attained in the GLEAMS modeling for this site, which is the .99 pounds per acre. The other data sources are the two different loading rates that are commonly found in the literature for impervious surfaces of .15 milligrams per liter or .26 milligrams per liter.

MS. BAKNER: Just to refresh our recollection, the .15 milligrams per liter comes from who?

MR. LONG: They are both found in the Schueler document, and I believe they're both

found in the DEC 2001 document.

MS. BAKNER: So impervious surfaces can be considered of having a runoff coefficient of either of those two numbers.

MR. LONG: A runoff concentration of either of those two numbers. And the other assumption we're taking in the following charts is that on our project site we have about 100 acres of intensively managed turf for each of the golf courses. In addition, there's another 100, 120 acres, and it's specified in the following charts, of other landscaped areas.

MS. BAKNER: This would be like lawns, ornamental --

MR. LONG: Lawns, ornamental areas around the hotels, planting beds, any of the roadside areas or any of these areas. We're making the assumption in this set of loading calculations that those areas will receive the same cultural practices, meaning the same fertilizing regime that the golf course will. In actual fact, that will not occur because the golf course receives slightly higher rates of fertilization because of the demands that

are placed on the turf; whereas in the landscape areas, there tends to be lower amounts of fertilization because people aren't walking on the turf, and it has a much less level of disturbance.

MR. RUZOW: So it's a conservative approach?

MR. LONG: It's a very conservative approach. The next page, page 3 of 35, I go through and identify conversion factors that are utilized in this document as well as the other data values that we have selected. I have already discussed many of these factors -- many of these factors as far as some of the selection as it relates to the golf course, but I'll run through all the values so we understand where we're coming from.

The other values chart, page 3 of 35, first one is annual rainfall, 50.4 inches. That's taken directly from the DEP 1997 document which is Exhibit 38. The impervious total phosphorus, TP concentrations, two values are available. One is .26 milligrams per liter for older urban areas, and .15

milligrams per liter for parking lot areas. Golf turf concentrations, the DEP manual in `97 recommended .227 kilograms per acre per year. Our GLEAMS model is showing .449 kilograms per acre per year, and in all the subsequent calculations, we are using the .449.

Landscaping TP concentrations recommended in the `97 manual is .26 milligrams per liter. Pre-development base flow concentrations from the DEP manual is .15 milligrams per liter, and event monitoring concentrations utilized in this document, and always identified as Giggle Hollow, is .02005 milligrams per liter, and because it's an average, I'm carrying some extra digits on that particular value.

All the subsequent equations in this document are what I prefer to call direct calculations, what are frequently called coefficient calculations, both in the manuals and in the DEP manual.

The problem with that is that you end up with too many -- you have runoff coefficients, you have loading coefficients,

you have coefficient methods, and it ends up in a lot of confusion.

So in this document, I've chosen to

call it a direct calculation wherever I'm speaking towards the methodology utilized to create an annual load. That's the purpose of this document is to create a comparison of various annual loadings in order to compare it to what we were able to predict in relation -- what we were able to predict using the WinSLAMM model.

The generalized equation is to take a total phosphorus concentration or a total phosphorus load, depending on which number happens to be available, multiply it times an area, times the annual rainfall with a correction factor of .9 in there to correct for incidents when the rainfall doesn't result in runoff, and that becomes the total phosphorus concentrations for the particular sites.

MS. BAKNER: The correction for the rainfall factor, is that something you made up?

MR. LONG: No. I utilized that same

factor that's utilized in the DEC October 2001 manual.

The next page, 4-35, identifies the simple method. The simple method is a part of the DEP 1997 methodology; and so therefore, I've identified that equation there as given and as utilized in this document. Page 5 of 35, we've already discussed, and that's the page in which I derived the average base flow, Giggle Hollow -- no, the average year-round Giggle Hollow discharge concentration of the 20.05 micrograms per liter. That's on page 5 of 35.

The next successive pages, what's identified are the various calculations. The thing you have to do when you look at each of these pages is read across the top. The top line above the header line identifies what kind of -- what the calculation is attempting to -- what the calculation is deriving or the value that you will end up with and the project site.

So page 6 of 35 is TP calculations, pre-development Big Indian. This is the WinSLAMM pre-development value which, again,

just comes straight out of the model. So on the table where it shows forest, impervious, landscape, golf course and composite for golf course and landscape loading, each of those are NA because I did not try to go back into the model and root out each of the values out of the -- compiled data that summarizes for each of the subcatchments.

MS. BAKNER: Dean, for the record we're talking pre-development?

MR. LONG: Right.

MS. BAKNER: And we assume it's just forest?

MR. LONG: Right.

MS. BAKNER: That's why we have forest, 171.30; and the total, 171.30?

MR. LONG: Page 7 of 35, TP calculations, pre-development Big Indian. Calculation method here is direct calculation, Giggle Hollow. So in this calculation, what we're utilizing is the Giggle Hollow data and creating the total load for the Big Indian site, according to the equation on this page.

Basically we take a concentration, multiply it times the acreage of the Big

Indian site, which is 1,242, and then multiply it times the rainfall/runoff estimate of 1.27 meters times .9. And the pre-development load using the Giggle Hollow data becomes 115.19 kilograms per year.

Next page, 8 of 35. Again, we're still on Big Indian, this is TP calculation, pre-development. The calculation method is direct calculation EPA. The change here is going to be the loading rate is different utilizing the EPA data sources that are identified on page 3 of 35. So that's going to be the only substitution here.

Again, so you have a concentration times your land area, times the rainfall. And because this concentration is much, much lower, it ends up with a total load of 57.45 kilograms.

Page 9 of 35 is a modified simple

method which is the method that was described in the NYC DEP 1997 manual. In the modified simple method in the `97 manual, what they instruct you to do is because the simple method doesn't work well for areas with less than five percent of impervious surfaces,

which is one of the expressed limitations in the Schueler document which was -- Schueler is 34 in the submittal we made this morning -- when the expressed limitations in the simple method is that you should always be cautious when utilizing it for areas that are less than five percent impervious.

So in the 1997 DEP manual, they instructed users to simply do what I call a direct calculation method and what they call a coefficient method in order to establish the value. So here I used the coefficients suggested in the `97 manual, and that's identified in the chart there. And it ends up coming up at 86.17 kilograms, which is below the Giggle -- using the on-site data, which was the Giggle Hollow data, which for Big Indian came up with 115 kilograms.

Now we're moving into a next segment of calculations, because what I wanted to be able to do here was to have available the various runoff -- runoff loadings for the project site. So all the previous couple, three, four pages is pre-development as a forested site. The next series is going to be post-development/pre-treatment. Post-development, again, reading across the top, page 10 of 35, TP calculations, post-development/pre-treatment, Big Indian -- this is the WinSLAMM chart, and this, again, is directly out of the WinSLAMM data set found in Appendix 10A of the DEIS, and the value is 252.3 kilograms per liter.

The next page, TP calculations, post-development/pre-treatment, Big Indian, page 11 of 35. This is a direct calculation using Giggle Hollow data. As you can see here is that more data begins to appear in the various columns. Giggle Hollow data is being used for the forest load, so that's how I derived the 84.49, which is the last calculation in the -- last calculation in the summary below.

The other data here, we're using the high rate for impervious surfaces, .26 milligrams per liter, or converting it over into kilograms per liter as we're doing here to get all the numbers into the right units of .00026 kilograms per cubic meter.

The golf course, again, we're

utilizing the higher loading rate that we've estimated off the GLEAMS model of the .49. In the end here, for the post-development prior to treatment, the loading rate becomes 272.6

kilograms per year.

The next table on page 12 of 35, again at Big Indian yet, post-development/pre-treatment direct calculation using EPA. As you can see here, the forest number drops down a little bit from the prior table, and again, because the loading rate is lower. The impervious concentrations, we leave the same at the high rate, as we do, again, for the landscape features. And the results become 230.25 kilograms per year.

We're on 13 of 35. TP calculations, post-development/pre-treatment, Big Indian. This is a modified simple method. At this point, the modified simple method, you can go in and use the simple method which relates stormwater quality to impervious surfaces.

So that's why the data here for impervious and landscape, the number is sort of whacked right into the center there because

that number there, that 44.37 is derived based on the simple method. All the other numbers are derived as previously derived so that the loading rate becomes 173.76 kilograms per year.

Now we're at post-development/post-treatment. Page 14 of 35 -- and the other information that I'm including on this particular chart is the wastewater treatment effluent discharge from the Big Indian Resort of 60 kilograms. So what this chart shows is the total loading from the Big Indian Resort post-development/post-treatment of 257 kilograms per year.

Again, this is -- that's straight out of the Appendix 10A of the DEIS.

TP calculations post-development/post-treatment, the method is direct calculation using Giggle Hollow data for the base loads which is in the forest category here. This is page 15 of 35.

Again, we leave the impervious calculation as far as its concentration -- runoff concentration at the high value, then

we divide that runoff value by 2 to represent the treatment, the results of our stormwater management.

MS. BAKNER: Dean, just to stop a second here. The 50 percent is the value you get from the 2001 DEC stormwater manual for phosphorus removal?

MR. LONG: Correct.

MS. BAKNER: You get that if you design your ponds the way it says to?

MR. LONG: Correct.

MS. BAKNER: Okay.

MR. LONG: So anyhow -- so that becomes 31.43 kilograms per year. The same is done for the golf courses since the stormwater and the stormwater from the landscaped areas are also being routed to stormwater facilities. So then of course, the remaining forested wood lots that aren't disturbed but below the site are also represented on the chart as 84.49 kilograms per year. So the total load becomes 178.47 kilograms per year.

To that, again, we add the wastewater treatment facility effluent, 60 for the total post-treatment discharges from Big Indian,

using the direct calculation of the Giggle Hollow data of 238.47.

The next page, 16 of 35, is a direct calculation using the EPA method. Again, because the EPA loading rates for forest are lower but all the other values essentially stay the same as far as the loading rates from impervious surfaces and the golf courses are the same, the same treatment assumption is again made here; so the total post-treatment value becomes 136.11 kilograms; and again, we add the wastewater treatment effluent, so the total post-treatment discharges using the EPA-based method becomes 196.11 kilograms per year.

Next page, 17 of 35, using the modified simple method which allows us to calculate the impervious and landscape area as a unified value, but because it is a modified simple method, we handle the golf course separately as shown in the -- as shown in the data boxes since the golf course data is there as shown in the equation in the middle of the page.

All the values we have previously

discussed where they came from as far as the loading rates, the post-treatment -- post-development/post-treatment value is 128.21. So this is with the treatment, with the wastewater treatment facility effluent of 60 kilograms per year, it becomes 189.12 kilograms per year utilizing this method.

Now we're going to move on to Wildacres site. Repeating the whole series again.

MS. BAKNER: Can I ask you a question, Mr. Long? Not that I don't enjoy this, but is there some way that we could go over the numbers generally with respect to Wildacres since the calculations and the values are all the same -- the calculations are all the same?

MR. LONG: I'll stop at one or two where, again, the values come in slightly differently so nobody gets lost as far as where numbers are being derived from here.

WinSLAMM, of course that's very straightforward, that comes from 10A. We'll move on to page 19 of 35. This is the direct calculation. Just for simplicity's sake, we're reutilizing the Giggle Hollow data which was derived on the Big Indian site; and because Giggle Hollow is a forested watershed, it is transferable, it should be representative of the forest over at Wildacres, but I'm mixing some data sources here. But nonetheless, they're only a few miles apart anyhow.

So direct calculation, Giggle Hollow, pre-development becomes 66.59 kilograms per year.

Page 20 of 35, TP calculations pre-development using the EPA method, the results is 33.21 kilograms per year. Again showing you the effect of the lower loading rate that was recommended by the US EPA in their older literature.

Page 21 of 35 here is the modified simple method utilizing the values recognized by DEP. Same equations are all identified, becomes 49.81 kilograms per year. Moving into the post-development/pre-treatment, WinSLAMM is 217.6, directly from 10A. Direct calculation in utilizing Giggle Hollow. I've discussed all the variabilities in this particular equation earlier. The result is

177.49 kilograms per year. This is post-development/pre-treatment. Post-development/pre-treatment, direct calculation using EPA, result is 155.35 kilograms per year. That's page 24 of 35.

Moving to 25 of 35, modified simple

method, the result is 117.98 kilograms per year. Remember again, we're using the higher loading rates that were determined in our DEIS for the golf course, and here landscape and impervious is calculated under the simple method.

Page 26 of 35 is post-development/post-treatment Wildacres using WinSLAMM. Post-development/post-treatment is 146 kilograms per year, wastewater effluent of 78, total post-treatment discharges is 224 kilograms.

Post-development/post-treatment, 27 -- page 27 of 35, Wildacres. Stormwater or the non-point source loading here is 110 -- 110.76 kilograms per year, wastewater treatment effluent of 78, for a total of 188.76.

Post-development/post-treatment

Wildacres, page 28 of 35, direct EPA calculation, total phosphorus load of 88.63. Again here, we're using a convention of the 50 percent removal for estimating the treatment levels. Wastewater treatment effluent of 78, for a total of 166.63.

Modified simple, page 28, 29 of 35 for Wildacres, post-development/post-treatment. Non-point source, 181.10. Wastewater treatment facility, 78; post-treatment discharges, 159.10.

Page 30 of 35 describes the tables and the figures to follow. Table 1, Big Indian, it's going to correspond to Figure 1, which is the figure immediately behind.

MR. RUZOW: Table 2 you meant?

MR. LONG: Yes, it is Table 2, the big table.

MR. RUZOW: Page 31 of 35.

MR. LONG: Yes, 31 of 35 corresponds to Figure 2, which is immediately behind. The additional bit of data that's on here is to show the values of runoff quality that you get if you substitute in .26, which is what all the prior equations have been utilizing, if

you substitute in the lower concentration of .15. The reason I did this is to show the differences in the impervious surface loadings that occur on the site when you change the concentration value.

So the first thing to look at on this table is to look at the impervious surface differences between the top of the table that says: "Post-development/pre-treatment .15 milligram per liter." You can see there that, based on the direct calculation of Giggle Hollow methods and/or direct calculation EPA, the impervious surface loading is 36.

If you increase the concentration coming off of the impervious surfaces to .26, it jumps up to 63. And this was done just to test the sensitivity and determine just to demonstrate what's happening with the relatively small amounts of impervious surfaces that we have on the properties.

The bottom part of the table summarizes and re-gathers all the data from the prior 30-some-odd pages of information here. Again, what I've discussed and what's

shown in all the calculations is shown in the bottom of the page under the .26 milligram per liter because that was all the prior calculations of -- utilized throughout the other pages of the document.

So in the end here, what you end up with is you look at the total post-treatment discharges, and you see -- you have Giggle Hollow at 239 kilograms per year, direct EPA at 196, and the modified simple at 206.

On the following bar chart, Figure 1, Big Indian TP discharge calculations, comparisons for various methods of pre- and post-development, what I've done is shown you the data for the pre-development for each of the various same methods and the post-development -- post-development concentrations with both point and non-point sources for the project site.

The first thing that's readily apparent from this is the relatively minor amount of variations that we have with all the various methods here. You can see WinSLAMM is up -- has the higher values; whereas, the modified simple and the direct calculation at

Giggle Hollow have values that are relatively close together -- relatively close together as far as their prediction.

MR. RUZOW: In terms of the differential?

MR. LONG: Differentials between the two methodologies.

The other thing to look at here is the differences between the pre and post; the pre being the green bars, the yellow ones for the EPA modified simple, and direct calculations being the illustration of the concentrations for the various annual loadings for the project site. So that's for Big Indian. I'll return to these in just a moment.

We'll look at Wildacres which is Table 3. I've already explained all the values. The yellow box, which will correspond to the yellow on the following chart, is post -- total post-treatment discharges. Again, we have the same relationships here where -- where all the direct calculation methods come out with very, very close values. The values in the differentials between the direct calculations and the WinSLAMM values

are not too great in either case. And we have the pre-development levels also shown on the graph.

So in the end, what the graphs tell us and what the charts tell us is that all the methods essentially come in around the same broad spectrum of values.

MS. BAKNER: In terms of the charts, the bar charts that you have there, we're looking at pre-development rates of runoff of phosphorus and post-development rates of runoff and their pollutant loading for the year. Explain, if you can, why we went to this comparative methodology rather than trying to rerun Dr. Pitt's model.

MR. LONG: Dr. Pitt's testimony yesterday was enlightening and helpful for me to understand what he meant by calibration. Frequently and -- what we have been looking at over the last couple weeks is the feasibility of calibrating the WinSLAMM model to make it work better for the forested watershed. In our initial examination of that, we said, obviously we need to change the loading value from the loading rate that -- from the default

values that are contained in WinSLAMM -- that are contained in WinSLAMM to -- let's say, the Giggle Hollow value that I just used throughout this document.

Dr. Pitt yesterday pointed out a number of things, and if you go to Appendix 10A and go to page 9 -- on pages 9 and 10, in that text and write-up, we identified all the data files that are necessary in order to make -- in order to make WinSLAMM operate. The rainfall data files and the project description data files, we have already built. That was a whole process we described earlier where Dave would design it, we would import it, you would have to redesign it, we would have to change WinSLAMM as he changed HydroCAD.

So that work is all done. But the next five items are all areas that would have to be calibrated in the model. So it's not the mere process of inputting a single new loading value. We would have to go in and change the runoff coefficient data set, as well as possibly change or arrange some way of having the runoff curve data sets that are intrinsic,

that are imbedded into the model modified in order to work for this forest.

We would have to do the same thing for street delivery. So we would have to tinker with the very internal guts of the model in order to make it calibrate.

We would have to do the same thing again for particulate solid concentration data and the pollutant probability data files and the particulate residue delivery data files. In a quick -- so calibration is certainly not going to be a simple matter. It is certainly not going to be something that's generally within the realm of possibility for engineers practicing in this area to tinker with all the internal workings of the model.

Essentially, you know, instead of -- it essentially gets down to what I call a pretty extensive rewrite of the code in order to make it work -- in order to make it work. So there's one huge time challenge there.

There's a second equally large time challenge and process challenge here is to get consensus and agreement on what are the appropriate tinkerings with all this stuff.

Earlier today I read the information concerning rainfall data. We have had three or four sets of comments on rainfall data. Rainfall data is pretty straightforward. So we would expect to have to go through endless discussions in order to make all these modifications.

So it's not an easy task, and it's not a task that could be readily accomplished as far as calibrating the model. That's why we went out and went back to a more simple, straightforward, easily followed methodology of doing the direct calculations of the loadings; and what it shows is, one, it's highly reproducible based on a wide variety of loading rates; and the other thing, whether it's good or bad, it sort of shows the value of WinSLAMM in that WinSLAMM tends to be high but not absolutely totally out of the realm as far as in the post-development phase.

MS. BAKNER: Mr. Long, do you think the highness of WinSLAMM could perhaps be the fact they don't grant the same credit to the ponds for treatment that DEC does?

MR. LONG: I think it's probably

caused by -- yes, partially due to the pond treatment. It's also partially due to the sediment loading files, which is what Dr. Pitt spoke about yesterday.

So my belief, after hearing him yesterday, was that the particulate delivery files is probably one of the problem files when you're dealing with a forest -- that causes the pre-development WinSLAMM values to be high for a forested setting.

MS. BAKNER: So it's your advice to your client, which is Crossroads Ventures, that for this project, it simply doesn't make sense to use WinSLAMM?

MR. LONG: Correct.

MS. BAKNER: Based on what you know now?

MR. LONG: Based on what I know now, it would be a very long effort to calibrate the model, even with all the existing data and get consensus on all the data.

MS. BAKNER: Assuming consensus is achievable. Let me ask you one last question. You said a couple of times that the comparison of these different methods of calculating

discharge renders relatively -- we'll use Shohrah's term from yesterday -- ballpark results. Are you ever going to be able to say the discharge of phosphorus on any given day or over the course of a given year is "X"?

MR. RUZOW: A precise number.

MR. LONG: As far as being able to predict it, you're not going to be able to predict it for a particular day given that you never have an absolutely analogous watershed in order to base your prediction on, so you're not going to be able to achieve that for the future.

MS. BAKNER: All right. Your Honor, we can break now.

ALJ WISSLER: If not WinSLAMM, if the world was perfect and you had the choice in the first instance, what method would you have chosen?

MR. LONG: Probably one of the methods to be looked at would be -- and we discussed this in 10A -- would be to determine whether or not you could actually utilize a lake or reservoir loading model to predict the values here. The problem we have of this site is

that it's far removed from -- the problems we have with this site is it's far removed from either respective reservoirs, being the

Ashokan or the Pepacton.

DEP had a very sophisticated model that it's developed for the Pepacton and is currently working with it for the other reservoirs. Now, whether it's sensitive enough to predict water quality or water quality changes with projects of only four percent impervious surfaces, it's doubtful given our distance.

MR. RUZOW: We're how many miles from Pepacton?

MR. LONG: 14. So even a very well-calibrated, sophisticated model is going to have a difficult time dealing with this. The closest you're going to really come is probably using careful uses of coefficients or this direct calculation method for the pre-development and for the post-development. Because as everybody is observing, there's more and more data out there on stormwater effectiveness and stormwater treatment.

MR. RUZOW: So you agree with

Shohrah's comment yesterday about staying with the same model for comparison?

MR. LONG: You absolutely have to stay with the same model beginning for your pre and post, and you have to search for the best possible values. And what this is showing is that with the direct calculations, you can come up with something that's reproducible, that's very trackable, so that the values should be very representative of what will actually happen.

ALJ WISSLER: You quoted some sections of the WinSLAMM user's manual. I think some of that was -- did you give me the pages he referred to?

MS. MELTZER: No, we gave you pages about calculation.

ALJ WISSLER: Did you give me any pages on that?

MR. GERSTMAN: No, but we can provide them.

ALJ WISSLER: I would like to have the pages that you made reference to.

MS. BAKNER: It was the values for undeveloped land and forested land.

ALJ WISSLER: That's from the WinSLAMM manual. I'd like to get those pages.

Let's take five minutes. It's 4:12, five minutes, and really five minutes, and then we will take pesticides.

(4:12 - 4:22 P.M. - BRIEF RECESS TAKEN.)

ALJ WISSLER: Pesticides.

MR. GOLDSTEIN: Good afternoon, your Honor, Eric Goldstein and Dr. Robin Marks will be presenting the next witness on behalf of the CPC, the Catskill Preservation Coalition.

Our next witness is Dr. Walter Knisel. Dr. Knisel, welcome. Can you please give us a quick summary of your professional background and educational experience.

DR. KNISEL: I have a Bachelor's and Master's Degree in Agricultural Engineering, soil and water option, and Ph.D. in Civil Engineering, hydrology option. I've worked for over 50 years, mainly in research and development, research in hydrology and erosion and sedimentation and water quality. And the last 25 years has been in the development of mathematical models, computer models to be

used as aids in decision-making for management practices.

MR. GOLDSTEIN: Have you also had some teaching experience?

DR. KNISEL: I have very little.

MR. GOLDSTEIN: Would you care to share that with us?

DR. KNISEL: That was an offshoot -- I was not in the soil and water field actually.

MR. GOLDSTEIN: Did you receive any official recognition for your work with the US Department of Agriculture in connection with the model development application and implementation?

DR. KNISEL: Yes, our group that started this work received some awards for outstanding developments in the Department of Agriculture, Agricultural Research Service. It was recognized as being a significant contribution to the program of the Soil

Conservation Service, now the Natural Resource Conservation Service.

MR. GOLDSTEIN: I note for the record, your CV indicates four awards from the USDA for superior service in connection with model

implementation and development.

Finally, Doctor, can you briefly describe for us the nature of the consulting work you have done since you left government service?

DR. KNISEL: Well, part of the time during that service -- and I had the privilege of working with water quality specialists in all the 50 states and several foreign countries. This has enhanced the development and implementation and application of GLEAMS, what is called the GLEAMS model; GLEAMS being an acronym for Groundwater Loading Effects of Agricultural Management Systems.

MR. GOLDSTEIN: What is the GLEAMS model?

DR. KNISEL: It is an assembly of mathematical statements for the computer and decision-making process, some 5- to 6,000 lines of computer code to simulate the interactions of climate, soils and management systems; management systems referring to land cover, fertilizer practices, pesticide applications.

MR. GOLDSTEIN: If you had to describe

it in a sentence or two, what would you say is the purpose of the GLEAMS model?

DR. KNISEL: The reason that it was developed was to provide a tool to action agencies such as the Soil Conservation Service to compare or to assess non-point source pollution from existing management and look at alternative management practices, or different cropping practices or different tillage practices, different pesticide practices to alleviate the non-point source pollution that exists.

MR. GOLDSTEIN: Who uses the GLEAMS model today, and how widely is it utilized?

DR. KNISEL: It is used currently by the NRCS --

MR. GOLDSTEIN: What is the NRCS?

DR. KNISEL: National Resource Conservation Service.

MR. GOLDSTEIN: That's the federal agency that replaced the Soil Conservation Service?

DR. KNISEL: Soil Conservation, renamed. It has been used by chemical companies to look at environmental impact of

some of their chemical compounds, pesticides, for which they are applying for registration. It is used by state agencies in evaluating the environmental impact for registration of pesticides on a state basis, and it is used in several foreign countries in similar kinds of activities.

MR. GOLDSTEIN: What is your official connection to the GLEAMS model?

DR. KNISEL: GLEAMS is an outgrowth of a former model. The former model called CREAMS, I was the coordinator of the project team of scientists that developed that model in the early `80's. Then I began extending that to the present GLEAMS model and was a principal developer over the last 25 years.

MR. GOLDSTEIN: You were the principal developer of the GLEAMS model?

DR. KNISEL: That's correct.

MR. GOLDSTEIN: Can you tell us in general terms how the GLEAMS model works? Just take it through step-by-step, if you would.

DR. KNISEL: GLEAMS is a daily simulation model that takes precipitation,

temperature, radiation, crop factors and operates on a daily time step to distribute the water in the hydrology component -- to distribute or partition the precipitation, rainfall, snow, between infiltration into the soil and direct or surface runoff. The partitioning of that water then, that portion that goes into the soil, the GLEAMS model simulates crop uptake of water as well as evaporation of that soil water from the soil, and uses that information from the hydrologic component.

The runoff is used to determine the amount of erosion and sediment transport. These are the carriers, the water and the sediment are the carriers of pesticides and fertilizers. This operates on a daily time step.

We recognized that climate varies from year to year. That's the reason the Catskills may get 20 inches of snowfall one year and 40 inches another year, and these differences are significant in what happens as a result of our management practices.

We talk about worst cases, worst-case

scenarios. The worst case or the highest rainfall amount may not be the worst case as far as the amount of runoff or the worst case as far as the amount of sediment or pesticide leaching or pesticide runoff. So we developed a model to run over a period of up to 50 years, so that we could look at long-term occurrences.

We were haunted with the what-if questions. What if when the soil was bare and we had just planted a crop and we got a big thunderstorm, what would happen from that; if that was the day that pesticides was applied or fertilizers was applied? And there's no way of predicting what might happen in the future, but if we use this for a long-term climatic record, then we can determine what effects management practices has on the output system.

MR. GOLDSTEIN: Can you tell us now, what would be the five- or six-step process if you were applying the GLEAMS model to a project like the one described in the DEIS?

DR. KNISEL: I'll back up just a fraction here. GLEAMS operates for small,

relatively homogeneous areas, homogeneous soil where we can consider that precipitation is uniform over that area. It is developed for a single cover, or lack thereof, at any one time. The cover can change, as in a crop rotation, from year to year; but to examine existing conditions, we would have to make a simulation run with a climatic record of the forest cover to determine what results from the existing forest cover --

MR. GOLDSTEIN: So your first step would be to determine the existing conditions?

DR. KNISEL: That's right.

MR. GOLDSTEIN: How would you do that?

DR. KNISEL: Taking the precipitation data, using our best estimate of soil characteristics as input to the model, and the best estimate of our cover that affects the distribution of the water, and run it through GLEAMS for whatever period of record we want to use.

MR. GOLDSTEIN: What would be your next step?

DR. KNISEL: My next step is to change the management, change it from forest to golf

course. This is a management practice; this is a management change. We can't do them both in the same run. Even if we don't change the soil in any way, we change the cover. We change the management of that golf course, so in order to determine the impact or the effects of changing from a forest cover to a golf course, we have to make two simulations using the same climatic records.

MR. GOLDSTEIN: Then what?

DR. KNISEL: Then compare the results to see the runoff, the percolation, the bottom of the soil profile, the sediment transport, the plant nutrient matters in the fertilizer in this case -- we don't consider other fertilizer elements -- and pesticides; see what change there is between the two management systems.

MR. GOLDSTEIN: So at the end of the line, what would you have then?

DR. KNISEL: You would have tabulated results over a period of years, and we do summarize and say this is the impact of the change or this changed management system.

MR. GOLDSTEIN: Can you tell us,

Doctor, in the world of modeling, what is a default file?

DR. KNISEL: When we developed the CREAMS model initially --

MR. GOLDSTEIN: The CREAMS model was the model that was the predecessor model to the GLEAMS model?

DR. KNISEL: Yes. It was primarily a surface response model only. It did not consider chemicals moving into, within and through the original. When we developed the model, when we developed CREAMS and started working with the Soil Conservation Service, we asked them to get a team of people at the workshops, hydrologists, sedimentationists, soil scientists, crop scientists, pesticide scientists, and their response was: "We need a whole team?" Our response was: "Yes."

CREAMS was not -- GLEAMS is not a simple model. There are approximately 200 parameters, different parameters in all of the files. Not all parameters are used in every simulation run. Some are used more than once. There's a total of about 200 different parameter names input to the model in addition

to precipitation.

MR. GOLDSTEIN: Where does the default file fit into that?

DR. KNISEL: The Soil Conservation Service said: Well, we can't always have this team of experts. Can you give us help? Can you give us some average values?

Our first response was: We can't make the model foolproof. If we do, every fool will want to run it.

MR. GOLDSTEIN: What does that mean you can't make the model foolproof?

DR. KNISEL: We can't just make it where it is totally self-contained and not have to have any input, punch a button and in 30 seconds we have the exact answer that we want. That doesn't happen.

MR. GOLDSTEIN: Why is that?

DR. KNISEL: That doesn't happen. You have to put in averages. But we were asked to give them help. Can you give us some information on soils? Can you give us some information on pesticides? Can you give us some information on resistance to flow of water-carrying sediment? So we agreed to help

them out. We agreed to build help tables or tables of averages.

We put in soils characteristics that included the porosity of the soil, water retention characteristics of the soil by soil texture. Those values and these help tables are averages of all of the soils within that texture of classification that have been analyzed 20 or 30 years ago.

MR. GOLDSTEIN: Around the country?

DR. KNISEL: Around the country.

MR. GOLDSTEIN: So is it safe to say

that the default file is essentially a national average?

DR. KNISEL: Basically that's true. This is also true in pesticides. An herbicide, for example, has a given half life -- we call a shelf half life, but the real world half life, how long it exists in the soil is different in Florida than it is in New York. We don't know as developers what these values are for a given soil for a different climatic region, for a given management system where the model might be applied; but by providing this information, it

gave them some help.

MR. GOLDSTEIN: I think I know what you're saying, but just to be clear, can you tell us what -- what is the problem or disadvantage of using the default files in running your GLEAMS model?

DR. KNISEL: We have always recommended to model users that they use site-specific data, data for the specific soil, data for the specific location, climatic region for pesticide characteristics. Water solubility is water solubility of a pesticide, but the half life is not, how long it stays around in the environment.

MR. GOLDSTEIN: That depends on local conditions?

DR. KNISEL: That depends on local

conditions, climate and soil conditions. Our recommendation is to use site-specific data. If we do not have site-specific data and take data from our default tables that are built into parameter editors, then we just have an average over the entire United States.

MR. GOLDSTEIN: Is it always preferred that you use local or site-specific data

rather than default files while applying the GLEAMS model?

DR. KNISEL: Absolutely. To get the most accurate results.

We heard the speaker earlier talk about calibration of a model. This is not simple. You can't -- regardless whose model it is -- I don't know offhand of one that you can plug in some data and automatically calibrate all of the variables. In the user manual for the GLEAMS model, there is a discussion of every parameter value, and in each of the four components, the hydrology, the erosion, the plant nutrient and the pesticide component, we tell the user which are the most sensitive parameters. Those are the ones that they need to give the most concern to.

It doesn't mean that the others are not important, but they are not sensitive. You can change one of those quite a little bit, and it wouldn't make much of a change in the output; but those sensitive parameters, as we say, we can fine tune or tweak the knobs if we have measured runoff, measured percolation,

measured soil characteristics. We can turn the knobs, make a few simulation runs.

GLEAMS model runs in a matter of seconds for several years of simulation on a desktop calculator. So it doesn't take long to run the model and change one parameter at the time, and say: What if I miss that by five percent; and rerun it and see what the effects were.

MR. GOLDSTEIN: For the project discussed here in the Draft Environmental Impact Statement, are the hydrology data an important component in the use of the GLEAMS model?

DR. KNISEL: Absolutely. The partitioning of the water between the runoff and the percolation phase, and that partitions what goes into the plant, what goes off, what goes through the soil that carries soluble chemicals.

MR. GOLDSTEIN: So the hydrology data then would be one of the most important pieces you would want to plug in individual local data with?

DR. KNISEL: That is the driver.

MR. GOLDSTEIN: In your review of the DEIS, did the project applicant use the default files for hydrology rather than inserting site-specific data?

DR. KNISEL: It appeared they did. There were two soil horizons, and in the GLEAMS model --

MR. GOLDSTEIN: Excuse me, Doctor, let me stop you for a second. What is a soil horizon?

DR. KNISEL: This is a genetic layer that has developed due to the weathering of rock or some parent material, and with depth it changes. And the characteristics of those horizons change. We allow the user to input data for up to five soil horizons. You don't have to put in but one.

MR. GOLDSTEIN: Again, when you say a soil horizon, you essentially mean a different layer -- a layman would say it's a different layer of soil, it has different characteristics -- soil has different characteristics?

DR. KNISEL: That's right.

MR. GOLDSTEIN: A little further down,

different characteristics from top soil?

DR. KNISEL: That's right.

MR. GOLDSTEIN: Please continue. You said -- you indicated in your written comment, and just now, that the project applicants identified two soil horizons?

DR. KNISEL: They identified two soil horizons, but the only change they made in their input parameters was in the organic layer content.

MR. GOLDSTEIN: In other words, they used --

DR. KNISEL: They used the same porosity in both horizons. They used the same water retention in both horizons, the field capacity. They used the same saturated conductivity in the two horizons.

MR. GOLDSTEIN: Let's take a moment to see if we understand this. You said that they used the same porosity for both horizons. What do you mean when you say porosity?

DR. KNISEL: It is kind of the flip side of density. The more dense the soil, the lower the porosity. And the porosity being the pore space in the soil mass. If for no

other reason than the weight of the soil above that second layer most generally has a lower porosity.

MR. GOLDSTEIN: When you say saturated conductivity, what do you mean by that?

DR. KNISEL: The transmission rate internally of the water under saturated condition.

MR. GOLDSTEIN: The water flowing through the soil?

DR. KNISEL: Moving into and through the soil.

MR. GOLDSTEIN: Again, when you say

porosity, what do you mean by that?

DR. KNISEL: The total pore space in a given unit volume of soil. The fraction that is not filled by the soil particles.

MR. GOLDSTEIN: So for all three of those indicators, the project applicant used the same number in both of the soil horizons?

DR. KNISEL: Soil horizons.

MR. GOLDSTEIN: Is that unusual?

DR. KNISEL: Yes.

MR. GOLDSTEIN: Why?

DR. KNISEL: Most applications I have

ever seen, there is some difference, decreased transmissivity of water or saturated conductivity, decreased porosity or higher density of soil in a lower horizon. Generally different water retention characteristics in both horizons.

A good example of the existing soils under the existing condition, existing cover, if you go out and take a sample, the first few inches of the soil probably will have very little soil granules in it. It will be mostly organic matter. Then there will be a layer of fairly high organic matter that has mineral soils in it, and the difference in the water transmission, the difference in the water-holding capabilities, the difference in the porosity between that layer of organic matter will certainly be different than it is in the mineral soil.

MR. GOLDSTEIN: So what conclusion do you draw from the project applicant's use of the same values in each of the soil horizons here?

DR. KNISEL: When I looked at the parameter file and I saw that they had the

same value in both horizons, I checked our help table and found that for the same texture soil that they gave for both horizons, that they used the exact values out of our help tables. So this tells me that they did not have site-specific data.

MR. GOLDSTEIN: What you're saying is for these key indicators, they did not use site-specific data, they used the default files?

DR. KNISEL: That's what it appeared to me.

ALJ WISSLER: Mr. Goldstein, is this a particular reference to an appendix of the DEIS?

MR. GOLDSTEIN: Yes, it's an appendix in the DEIS that we're looking at. We'll get that for you, your Honor.

We're talking about generally Appendix 15. The very hard to obtain parameter files were not, as far as I know, publicly distributed, but we were able to get a hold of them.

ALJ WISSLER: And it was from these

parameter files that you ascertained that they

used default values rather than site-specific values?

DR. KNISEL: That was what I used to look at to come to the conclusion that they were using default files.

ALJ WISSLER: Is that parameter file going to go into the record?

MR. GOLDSTEIN: If it hasn't, we'd be very happy to put it in.

ALJ WISSLER: Okay.

MR. GOLDSTEIN: Moving on to the climate data. Another concern you expressed in your written report is that the project applicant ran the model for climate for only one year. Can you explain in simple terms what the project applicant did here and why, in your view, there is a problem with the approach that they followed?

DR. KNISEL: Well, in the Draft Environmental Impact Statement, they said that they used the one-year, the highest rainfall. That in itself is not a problem. They said that this was the worst-case situation. That may or may not be true. The experience that I have had over quite a lot of the US has been

that maybe one storm, one rainfall event in a five- or ten-year period accounts for 90 to 95 percent of the sediment transport from an area.

I was doing some work in southwest Texas where we had what the Weather Bureau or NOAA would classify as 100-year rainfall event. We had approximately four inches of rainfall in a one-hour period. So this is a 100-year event. This is a worst-case scenario, a design storm.

ALJ WISSLER: Four inches of rain in a how long a period of time?

DR. KNISEL: One hour. The only catch was we didn't get any runoff from it. It was a deep soil that was extremely dry. No runoff. We didn't get any sediment. We could have applied every pesticide in the world. We could have applied 10 tons of fertilizer to the acre. Nothing would have happened, except that it infiltrated into the soil.

So 100-year storm in that case was not a worst case that day. The point I'm trying to make is it is hard to tell what the worst case might be for a specific situation. This

is why we designed the model to consider a long-term climate.

MR. GOLDSTEIN: What do you mean by that, a long-term climate?

DR. KNISEL: Up to 50 years of precipitation temperature.

MR. GOLDSTEIN: So the model was designed to take as much as a 50-year data input?

DR. KNISEL: That's right, so we can look at the year-to-year differences.

MR. GOLDSTEIN: What's the advantage of doing that?

DR. KNISEL: We can see when those worst cases occurred. We can look at the maximum concentration or maximum concentrations of a pesticide or fertilizer element in the runoff by the concentrations of pesticides going out of the bottom of the root zone to groundwater.

We'll consider pesticides for just a moment. There are so-called lethal concentrations for different species of fish, for example. There's a different concentration for every different pesticide.

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If we run 50 years of climate and we say: Okay, we know that this is not going to happen, they're not going to apply a particular herbicide on the golf course on the same day every year for 50 years, we know that's not going to happen; but if, in fact, we wanted to see what these interactions are, what effects it has, then we can look at that 50-year record, and we exceeded the LC-50, which is the lethal concentration for a certain species of fish, such as trout, in the stream here.

MR. GOLDSTEIN: So am I correct in summarizing your concerns here that in the DEIS, the project applicant picked the wettest year and said that one year represents the worst case, and what you're saying is if you want to identify the worst case, you should do ideally 50 years of data?

DR. KNISEL: Certainly several years. I'm not saying that it has to be 50 years, but certainly several years to look at exceedances.

MR. GOLDSTEIN: And your model handles up to 50?

DR. KNISEL: Up to 50.

MR. GOLDSTEIN: In a project of this size and complexity, what would you think would be a reasonable number of years to look at?

DR. KNISEL: Like I said, it only takes seconds to run the model. It depends on whether the precipitation data are input manually by an individual, or if data are purchased from NOAA and can be reformatted for the GLEAMS format. Doesn't take that long to do that either. Then you can assemble 50 years of data rather quickly. Certainly I would think 10 years would probably be reasonable.

MR. GOLDSTEIN: Okay. Turning for a moment to nutrients, you also expressed some concern about the impacts of grass clippings on nutrient loadings from stormwater runoff. Can you describe to us what this issue is about, what your concern is here?

DR. KNISEL: The GLEAMS model has a plant growth, crop growth component. The model applicator used default leaf area data, which is fine. Again, these are averages. I

don't quarrel with that. Not for leaf area. That is not a sensitive parameter. However, when we get into plant nutrients, also into pesticides, we calculate the amount of water on a daily basis that is taken up by the plant, and this is the carrier of the solution part, watered phase of fertilizer and pesticides.

When a crop is harvested and the crop is removed, then the content of nitrogen and fertilizer and pesticides, if any are left, in the harvested portion of the crop is transported out of the system.

We can be an artist, if you will, and we can draw that leaf area curve to represent growth in a harvest such as clipping or mowing of the fairway. Then we can regenerate the next growth period and another clipping. If we take that material out, we're transporting off of that golf fairway to be deposited somewhere, but we're taking it out of that fairway where we're fertilizing. If we don't take it out, we get a buildup of thatch, of grass clippings that contains nitrogen and phosphorus, and that in turn recycles,

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mineralizes and becomes part of the pool of nitrogen, if you will, and the pool of phosphorus that the next growth has to draw on. If it is not exported and we keep adding to it every year, there is a total buildup, and one year of simulation is not going to show that.

MR. GOLDSTEIN: Again, when you say exporting or taking out the grass clippings, do you mean taking them off the golf course or taking them out of the sub-basin or basins?

DR. KNISEL: As far as GLEAMS is concerned, it is taking it off the golf course. As far as the total system is concerned, it's exporting out of the basin. Because if we stockpile the clippings over at the edge of the golf course, as I've seen done in a lot of places, that continues to mineralize there in time. So now we have transferred it from a non-point source to a point source over here, and the leaching from that point source can ultimately get into the streams and the reservoirs.

MR. GOLDSTEIN: Your Honor, at the risk of distressing you again, I will point

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out it is after 5. I'd say we have about 15 minutes to go.

ALJ WISSLER: Well, I'm glad you told me.

MR. GOLDSTEIN: Turning to the erosion

component, Dr. Knisel, did you also review the erosion component of the GLEAMS model in the project applicant's DEIS submission?

DR. KNISEL: I reviewed the parameter file again that was input, and I found some things there that led me to believe that they didn't exactly know what they were doing.

MR. GOLDSTEIN: Tell us what you mean by that.

DR. KNISEL: For example, there are certain things input into the model that is a function of plant growth. The density -- the total cover, for example, the protection of the soil from raindrop impact. We cannot express that as a continuous curve; so we, in the development of GLEAMS, we choose to put in discrete times or dates at which we would update. We didn't want those changes to be in the order of magnitude or two or three times the original value, but change them frequently

enough to represent that growth curve, that covered factor.

There were three parameters that we used. They chose, and apparently they chose only an overland flow, direct runoff, no channel, no impoundments for that 18th fairway. That's no problem. That was a valid application. There are three parameters that can be updated as many as ten times during a year. They had eight updates on consecutive days, and we specified that if none of the parameters changed in a period of time, we don't need to update it.

MR. GOLDSTEIN: I'm sorry. Tell us again, tell us what an update is.

DR. KNISEL: Changing the resistance to flow, changing the canopy, changing the pattern of runoff or the practice factor, as we call it, of the erosion component. There were three factors there, three parameters. Their updates were on Day 1, an initial value, they have to have that or the model will holler "tilt," it's trying to divide by zero. They had an update on Day 2, Day 3, Day 4, Day 5, Day 6, Day 7, Day 8, but they did not

change the value.

MR. GOLDSTEIN: Is that unusual?

DR. KNISEL: Absolutely. They accomplished the same thing with only input on Day 1. There's no need to change anything. If there's no need to change anything, then there's no need having updates.

MR. GOLDSTEIN: Should they have had updates spread out over a longer period of time?

DR. KNISEL: They could have; but if they weren't going to change any parameter values, there was no need to have any additional updates. The strange thing was, there is a parameter that relates to practice factor. This goes back to an earlier model years ago -- for any agriculturalists here, the old erosion prediction equation -- and this factor relates to whether or not there is anything to change or to divert the flow of water directly down the slope.

That factor is, one, if you have runoff directly down the slope. This is what they had intended apparently as they represented the profile of that 18th fairway.

But for some reason, they had a practice factor of .4. They reduced the erosion, the sediment transport in the area by a factor of 60 percent by doing that.

ALJ WISSLER: Why in your view?

DR. KNISEL: I have no idea why they did that. So this, again, leads me to believe they are not sure of what they're doing with the erosion.

MR. GOLDSTEIN: One other aspect of the erosion component: In the files as used by the project applicant, did they make use of a contouring factor?

DR. KNISEL: Yes, contouring factor.

MR. GOLDSTEIN: Is that what you're saying, practice factor? Explain to us what that means.

DR. KNISEL: Well, it's analogous to running row crops, running the rows of the row crop at some degree with the contour, either directly on the contour or in some degree off the contour. It is a contouring factor that

channels the water off to the side. This is
an effective practice in reducing the sediment
transport from an area, but this cannot be

done unless they have designed the fairway
such that there are small rivulets, if you
will, that diverts the water off to the side,
and I don't believe that is intended.

MR. GOLDSTEIN: What would be other
examples of how they could contour the golf
course? Kind of like we learned in high
school of contour planting, terrace planting?

DR. KNISEL: This is a sod crop, a
bunch grass, and it is not in rows. It is
broadcast. So I have never seen an
application anyway in which grass was on the
contour. Unless they have, by tillage,
created that -- and there would be no tillage
here on the golf course to do it.

MR. GOLDSTEIN: Is what you're saying,
they ran the model and sort of took a credit,
in very simple terms, for contouring but you
didn't see in DEIS actual design of the golf
course in contoured fashion; is that
essentially your point?

DR. KNISEL: That's right.

MR. GOLDSTEIN: From what you have
read in the DEIS about the bringing in of fill
and topsoil, again according to the DEIS on

page 3-6, there will be at least one million cubic yards of soil and rock. Were those soils included in the GLEAMS modeling?

DR. KNISEL: It's hard to tell.

MR. GOLDSTEIN: Let me ask the question in another way. Did you find in your review of the project that the Applicant performed the GLEAMS modeling both with the existing soils, and again, with the new top soils and fills they planned to bring in?

DR. KNISEL: No, they only made one application that I could tell and that application was described in the title as being the vly -- or vlay -- I'm not sure how it's pronounced -- silt loam soil, and I assume that that is the existing soil, but they did not run the existing forest cover.

MR. GOLDSTEIN: Should they have run the GLEAMS model both with the existing soil and the new soil?

DR. KNISEL: To me, if we want to determine the impact of changing land use, changing management from forest to a golf course or whatever treatment -- be it agriculture -- to determine the true impact,

we need to run the "as is" before condition and the after condition with changes in soils, reconstituted soil, different drainage systems other than soil, and then to be able to say that --

ALJ WISSLER: Where soils change within a particular area, it needs to be re-run for particular areas?

DR. KNISEL: If the soil is changed in the construction of the golf course, then that reconstitution soil is a separate computer run.

ALJ WISSLER: In other words, if you have a soil map that indicates in various areas of the site there are different soils, then you're saying you need a run for each area of the site?

DR. KNISEL: It should be run. And there are several soils, as indicated by the soil map, but they're all developed on glacial till, and I wouldn't necessarily say that they needed to run every different soil, although to be sure that we don't get surprises, that might be -- and this particular vly soil, vly silt loam may not occur on other fairways.

This particular fairway that they choose to represent -- and I think probably the main reason for choosing that was that it was a long fairway that had several steep slopes on it -- so in essence, this would be a worst-case topography that they were trying to represent.

Now, if soil is brought in, if sand is brought in and mixed with the silt loam soil that is there, then it will have different characteristics than the original vly silt loam, and that needs to be represented for the after -- change after construction.

ALJ WISSLER: What if that soil was predominantly sand?

DR. KNISEL: What if it was predominantly sand? In the present condition --

ALJ WISSLER: Both.

DR. KNISEL: -- or change to sand after?

ALJ WISSLER: Yes.

DR. KNISEL: Different characteristics, different water transmission and different water retention.

MR. GOLDSTEIN: So even if the -- even if the topsoil is essentially the same characteristics as the existing topsoil, if you're bringing in sand to be part of the mix, you'd want to run it again because the sand characteristics could change the whole horizon?

DR. KNISEL: When we talked earlier about the hydrology parameter file in that we have to specify the fraction of clay and the fraction of silt in a unit volume of soil, then by difference, the other or the remaining percent is sand. If they mix sand with some of that soil, then it would have less total of clay, less total of silt, and would have different water retention/transmission characteristics and different porosity.

MR. GOLDSTEIN: Doctor, thank you.

Will the runoff from a golf course, especially a golf course or two golf courses like on this which are built on mountain ridge terrain, be greater or less than runoff from forested conditions in the same area?

DR. KNISEL: Runoff will be greater.

MR. GOLDSTEIN: Why is that?

DR. KNISEL: You don't have the receptiveness of the soil that you have under a forest canopy. Some foresters have said that you never have direct or surface runoff in a forest, but I can prove them wrong because I've seen where littered leaf, organic matter has floated in concentrated water flows or streams. But in general, runoff will be higher for -- and I'll say agricultural crops -- than for the forest cover.

MR. GOLDSTEIN: Would the runoff be greater for a golf course even if the golf course were to apply the best management practices as opposed to the runoff you get from forested terrain under forested conditions?

DR. KNISEL: Yes.

MR. GOLDSTEIN: Again, the reason for that?

DR. KNISEL: You have changed the water regime, you've changed the cover, and with traffic, human traffic, golf cart traffic over a golf fairway, you're going to get

compaction, and with compaction of that
surface, and particularly with grass clippings

that are left, you get thatch buildup, there is lower infiltration into the soil than the forest cover.

So in general, you will have more runoff from a golf course with any kind of management than you would forest.

MR. GOLDSTEIN: If you remove approximately 86,000 trees and 189,000 saplings, what effect is that likely to have on the local ecology and runoff problems?

DR. KNISEL: It's going to have a tremendous impact on the area as the golf course and the impervious areas are developed, but I cannot say what the impact would be in the overall water delivery to a reservoir.

MR. GOLDSTEIN: You can't say what it would be to the water delivery to a reservoir, but you can say what it would be in the local environment and local stream environment, and what would that be?

DR. KNISEL: When you take the trees up, the soil temperature will go up. When you get a rainfall event that produces runoff, the water temperature will go up. This has an effect on trout streams.

When you take the trees off, you change the fetch for the wind. This could be a problem for a side-by-side operation. I'm not a meteorologist, and I can't say specifically. I know what the overall implication is. You will change the snow drift pattern. And if you have a ski slope area, you may change the amount of snow accumulation on that ski slope when you take off all the trees on this area.

ALJ WISSLER: This project.

DR. KNISEL: I'm not a meteorologist, I can't state for sure.

MR. GOLDSTEIN: Summing up, Dr. Knisel, from your review of the DEIS, can you determine whether the impacts of fertilizers and pesticides that would be applied in the new project as envisioned in the DEIS would be significant?

DR. KNISEL: On fertilizers, no, you cannot tell because they did not run an existing condition. I don't know -- I'm not familiar, I have never developed an environmental impact statement; but to me, if we determine the impact of a change, we have

to know what the existing condition is. EPA may not require it, I don't know, but if we don't run the before condition -- we have nitrogen in rainfall. The soil has some inherent phosphorus content. It may be low in this area, having never been in agriculture, but we don't know what the transport from that 18th fairway would be under a forest condition.

So to me -- to me, we cannot tell if the change to the golf course has had a detrimental impact on the delivery of fertilizer or plant nutrients to the water bodies or not. Not until the existing condition has been run.

MR. GOLDSTEIN: So in other words, this basic question of whether fertilizers or pesticides will increase, you're saying the DEIS doesn't answer now because they haven't run both the present case and compared it to a fair run using local data of what the future case will be after build-out?

DR. KNISEL: We know very seldom are pesticides applied in forest areas, although I was surprised to see the extensive -- what

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looked like die of trees here and learned that it was an inspect pest, and they lay newts and spray -- I believe he said that this happens, on an average, about once every 30 years. We know pesticides will be used on a golf course. There is nothing that we can say other than the fact that conversion to a golf course will increase pesticide runoff and pesticide leaching.

MR. GOLDSTEIN: Finally, Doctor, you mentioned to us on the way here this morning that the application of a model is no stronger than its weakest link. Can you tell us what you meant by that?

DR. KNISEL: In the computer circles, you probably heard GIGO: Garbage in, garbage out. So the results of a model -- I don't care how good the model is -- it's no better than the course of information that is put into it.

And unfortunately, and I'm not saying this is the case here at all -- I certainly don't want it to be implied that way -- I don't think that anyone is intentionally using information that would be detrimental in any

way to the decision, but the point is that we need to use the best available information. If it means going out and taking soil samples, taking them into the laboratory and analyzing them. I will compliment the model users on their application of the plant nutrient component. They seemed to really do a good job in that they had -- they did not use the default table formulas for averages for the nitrogen and phosphorus content of the soil.

This is one place where a lot of applicators are weak. They say: Oh, I don't know what that is. I'll just go with the average values. Then they wonder why their results didn't compare well with observed results. And I've seen this happen too.

MR. GOLDSTEIN: But where they did use the default values, tell us again your concluding thoughts on that.

DR. KNISEL: The default values, primarily in the hydrology component, is where I had the difficulty. And of course the hydrology is the driving part. It's the carrier of the pesticides. It's the carrier of the fertilizer.

MR. GOLDSTEIN: Thank you, Dr. Knisel.

Judge, that completes our questioning unless you have any.

ALJ WISSLER: Nope. Thanks very much.

MR. GERSTMAN: As with other of our experts, your Honor, we request the right to submit written responses prior to closing briefs once the Applicant and others have their rebuttal.

ALJ WISSLER: Not a problem.

Do I need you with respect to pesticides, or could I go back to water?

MS. KREBS: I don't think we have time. I think going back to the order will be fine. Thank you.

ALJ WISSLER: Let's go off the record.

(5:31 - 5:41 P.M. - BRIEF RECESS TAKEN.)

ALJ WISSLER: If we could reconvene, please.

MS. BAKNER: Mr. Long, in your opinion, is the estimate of phosphorus loading an exact science?

MR. LONG: No, it's not.

MS. BAKNER: In your opinion, is it

possible to show or prove with any reasonable or scientific degree of certainty that the post-development loadings of phosphorus will be less than or equal to pre-development loadings?

MR. LONG: Well --

MS. BAKNER: Do you want me to ask it again?

MR. LONG: Yes.

MS. BAKNER: In your opinion, is it possible to prove within a reasonable or scientific degree of certainty that the post-development loadings of phosphorus to the site will be less than or equal to the pre-development loadings of phosphorus from the site?

MR. LONG: Yes, it should be -- you should be able to determine the pre- and post-loading differences at a site.

MS. BAKNER: Would those differences be expressed in a range, or would they be expressed as an absolute number?

MR. LONG: Given the variability or the wide selection of different loading values, a range may be the best means of

expressing the differences in the pre- and post-development.

MS. BAKNER: Given the various ranges of phosphorus that you have -- that have been estimated to be produced in runoff post-development from the site, you know, looking at the bar chart, in your opinion, is the amount of phosphorus being discharged significant in any respect when you look at the loadings watershed-wise?

MR. RUZOW: And in particular in the receiving reservoirs?

MR. LONG: No, none of the values predicted would have a measurable impact in the reservoirs or are significant in relationship to the load available for allocations.

MS. BAKNER: Yesterday -- I'm just going to open this up to the three of you -- we were advised by DEP that it's impossible to build the road up the mountain; that if one were to try, it would cause an ecological disaster. In your opinion, is it possible or feasible to build a road up the mountain?

MR. FRANKE: Certainly.

MR. LONG: Even with the very preliminary phasing plan that was described for Phase 1, we have already anticipated constructing the road from the top down in order to be able to have constant control both of grade as well as quality of the construction, and to be able to manage the water in the adjacent undisturbed forest. As part of the road construction, the upper site, starting at the top of the hill, will get stabilized gravel and all the sub-base materials as well as all the drainage systems will be constructed which will aid -- which will aid greatly in the management of stormwater during the successive portions of the construction process.

MS. BAKNER: In your experience in building roads on steep slopes such as these, is it possible to successfully contain and treat sedimentation during the construction process?

MR. LONG: Yes.

MS. BAKNER: Another criticism that we heard yesterday was that we had somehow inappropriately focused in our pond design

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choices on avoiding potential temperature impacts to the trout streams and that we had favored concern over temperature impacts to the point that we were somehow compromising the pollutant-loading capacity of the pond. If you or Dave or Dean could answer that question.

MR. LONG: I believe Dave ran the selection criteria this morning. It was about the fourth item down in the list of the considerations as far as DEC's guidance, and that basically indicates and shows that it was a consideration, it has to be a consideration because we are in an area with trout waters. It was not the predominant consideration for the selection of the stormwater treatment methodology.

MR. CARR: That's in Table 7.3A of the New York State Stormwater Management and Design Manual which we will submit, as I stated earlier.

MS. BAKNER: Dave, there were a lot of discussions about refining and ground-truthing the data that you put into HydroCAD. In terms of going back to the site and looking at

conditions on the site and sort of what I would characterize as an extreme emphasis on that, as a design professional, are you satisfied that your HydroCAD model accounted for the existing site and the proposed site changes?

MR. CARR: Absolutely. The way HydroCAD is modeled, as I stated earlier, just because there is a drainage feature within a subcatchment that you are modeling, I think the emphasis was made that the drainage would necessarily flow to that feature and then become channelized.

As I stated earlier, the key about time of concentration is to find the longest flow path, and if that drainage feature is not within the most hydrologically long flow path, that it would not be included in the model.

MR. LONG: I think the other thing to make clear for everybody is, as we've said numerous times before, this project has a high-intensity soil map, and a high-intensity soil map can only be based on two- and five-foot contours of the property. The high-intensity soils map is attempting to

achieve accuracy between a half and one acre per soil unit.

So we have a lot more highly specific data about all our soil types on the property, which feeds logically into the stormwater management plan.

MS. BAKNER: Yesterday, Dave, there was a description of a distance -- a time of concentration on Sheet SD-5. It was page 9 of Appendix 9A. And there was a description of various distances. In that description by Mr. Damrath, did he include all of the reaches?

MR. CARR: I think the inaccuracy that was made was that -- I don't totally recall the comment -- but I believe he was looking at Subcatchment 5. This is SD-5 here. And if you look at the model, SD-5 doesn't flow in and of itself to the design point. There's also a reach that flows through which is Reach 2, so that distance needs to be added into that time of concentration which is in the model, which makes the distance about 1100 feet, I believe.

MS. BAKNER: Yesterday, Kevin --

MR. RUZOW: It was 11,000 feet?
MR. CARR: It was 11,000 feet, yes.
MS. BAKNER: Kevin, yesterday we heard from a witness, I forget who it was, that the forest-to-grass ratio of runoff -- that for grass, the ratio of runoff -- maybe this is a question for Dean -- was supposedly three times more runoff than turf grass. In your experience, is that accurate?
MR. FRANKE: No, it is not, and I believe it was Dr. Mankowitz who made that comment. One of the simplest ways to illustrate that is go back to the curve numbers that Dave was discussing this morning. These are a measure of the amount of runoff that you can expect from various land covers; and if Dave will pull that out, the curve numbers for forest versus turf were --
MR. CARR: Turf is a curve number of 74, and forest is a curve number of 70.
MR. FRANKE: So certainly nowhere in the neighborhood of three times, but much, much less, matter of percentage points.
MR. RUZOW: Yesterday, Mr. Damrath had indicated, brought our attention to a number

of the tables in the HydroCAD model by drawing attention to various catchments and reaches in which he was emphasizing the velocity in post-development levels. Can you comment on the relevance of that?
MR. CARR: I think it was a rate

consideration. If you go to SD-7, I believe one of the ponds he was speaking of was Pond 25 and the discharge of Pond 25. That happens to be one where the flow path leaving Pond 25 is at pretty much the same location as one of the pre-development subcatchment lines which can be found on SD-5. And if you look at the post-development flow for the 100-year storm, which was 147 cfs, the pre-development flow for the same storm in the same location is 336 cfs.

A lot of that -- there are a few reasons for that, but one of the major reasons, and I discussed that earlier, is that, as Mr. Damrath mentioned, there are about ten subcatchments going to Pond 25 that are being routed around the site to Pond 25, and their total area is about 65 acres. That's associated with that 147 cfs in the

post-development. In the pre-development in that Subcatchment 5, there's 200 acres, so there's a lot more acreage, so you would assume there would be a lot more flow. But what's happening here is that the flow is being redirected around the site to those roadside swales and controlled in the swales.

So, yes, there is a discharge there; and, yes, it is lower in the post-development than it is the pre-development, and it is also associated with a smaller area.

MR. FRANKE: If I could just follow up. If you recall, your Honor, Pond 25 is one of those areas that we visited on our hike, and Mr. Trader pointed out at that time, made the observation that the slopes below where the pond was located were not carved out, there were not drain channels cut out under existing conditions. Mr. Carr just said the discharge will actually be less.

MR. RUZOW: We heard today and we heard yesterday in some respect, concerns again about the velocity and the changes between grassed areas, turfed areas and forested areas in terms of runoff. What

factor in your mind does the fact that we are changing the topography in terms of the -- in effect the benches for the golf fairways have on the runoff characteristics, either velocity or time of concentration post-development compared to simply a mountainous forest cover?

MR. FRANKE: Certainly by grading the fairways and providing playable surfaces for golfers, lessening the slopes suitable for golfers to play on is going to promote infiltration rather than runoff, so a change in topography has to be considered as well as the change in land in assessing the amount of runoff. Yes, lessening those slopes certainly will promote infiltration as opposed to runoff.

MR. RUZOW: It's not simply a question

of simply putting -- as we've described -- the sod on top of the existing topography?

MR. FRANKE: Correct.

MR. RUZOW: So that the suggestion that that is the analysis and comparison that that's what's going on, you're simply substituting the turf, is missing a major component of the change in the dynamics for

runoff characteristics?

MR. FRANKE: Right.

MR. RUZOW: Your Honor, we would like to reserve for the first thing tomorrow morning in the event we --

ALJ WISSLER: Think of something you left out?

MR. RUZOW: In light of the break-ups. Breaking up is hard to do.

MS. BAKNER: Is there anything else you guys would like to add?

MR. FRANKE: No.

MR. LONG: No.

ALJ WISSLER: Folks, that's a wrap. See you tomorrow morning.

(5:57 P.M. - WHEREUPON, THE ABOVE PROCEEDINGS ADJOURNED FOR THE DAY.)

(PESTICIDES ISSUE)

C E R T I F I C A T I O N

I, THERESA C. VINING, hereby certify and say that I am a Shorthand Reporter and a Notary Public within and for the State of New York; that I acted as the reporter at the Issues Conference proceedings herein, and that the transcript to which this certification is annexed is a true, accurate and complete record of the minutes of the proceedings to the best of my knowledge and belief.

THERESA C. VINING

DATED: August 17, 2004.