

TOWN BOARD
FEBRUARY 24, 1999

A regular meeting of the Town Board of the Town of Bethlehem was held on the above date at the Town Hall, 445 Delaware Avenue, Delmar, NY. The meeting was called to order by the Supervisor at 7:30 p.m.

PRESENT: Sheila Fuller, Supervisor
George Lenhardt, Councilman
Doris M. Davis, Councilman
Robert C. Johnson, Councilman
Susan Burns, Councilman
Kathleen A. Newkirk, Town Clerk
Bernard Kaplowitz, Esq., Town Attorney

SUPERVISOR FULLER: Good evening and welcome to a meeting of the Bethlehem Town Board. We begin our meeting this evening with the pledge of allegiance.

For all the high school students that are here, welcome. I think you are going to be here for a few hours tonight. So, I am glad to see, you will probably get some extra credit. The first item on tonight's agenda is presentation of Engineering Report by O'Brien and Gere and this is on our water supply system in the Town of Bethlehem which I am sure all of you students are familiar with. So, this is just another step in the investigation of what is happening with the water plant, why we are not getting the amount of water that we had been promised. Tonight is just another report on where we are at this point. And, Bob Alessi, who is our Counsel, will set the ground rules for us.

MR. ALESSI: Thank you, Supervisor Fuller, and good evening Members of the Town Board. Tonight as Supervisor Fuller indicated, we have the report which all of you should have and should have had and given its thickness it was to you in advance of time.

O'Brien and
Gere Engineering
report on the
Water Supply
System
Mr. Alessi
addressed
the board

What we want to do here tonight is to keep in mind the principles that we established months ago on this particular project. We continue to be balancing the need to keep the public informed but also recognizing the fact that we are the plaintiff in a 14 million dollar litigation. And, what the considerations are here and competing considerations are. On the one hand we want to provide information and on the other hand we do not want to provide the type of information that will cause us harm in the law suit, provide our defendants with information that the rules say they shouldn't have and good litigation strategy says they shouldn't have.

So, tonight O'Brien and Gere is going to give a summary of the report. They will bring you up-to-date. They will give you a little bit of an indication of where we started with this report because we did start some time ago on it and talk about some of the impediments that came up procedurally which we're all, unfortunately, aware of. And, then after they are done and there is an opportunity for discussion, it is going to be my strong recommendation that we go into executive session to discuss the litigation.

As you all know, we have never gone into executive session. We have tipped the balance decidedly in favor of open discourse all throughout this process. And, anybody who practices in front of any type of governmental body knows that when you have litigation and you've gone through this far in the process and you haven't had executive session, that is extraordinary. It is extraordinary in the sense that this balance is tipped very, very much in favor of doing it out in public, however, we cannot continue to do that for this particular stage of the process and there are some things we need to talk about and the New York State Open Meetings Law expressly provides for that, encourages that and it's going to be my recommendation that we continue to protect the Town's litigation position and fiscal position by going into executive session to discuss litigation.

It will then be my recommendation to the Town Board that we come out of executive session and we come back out into public. And, we can

talk further if it's the Board's pleasure about the test well and the report. So, that is the context in which I would like to present the matter this evening. And, at this point, I would recommend that we have O'Brien and Gere do their summary of the report including the history as to where we started, why we generated this report and where it brings us to today. Thank you.

SUPERVISOR FULLER: Thank you, Bob. After the report is presented there will be questions and discuss from the Town Board and I will open it up to the audience for their questions and comments. And, then we will be taking a motion to go to executive session as Bob Alessi said.

Tony Geiss or Guy Swenson, I am not sure, who is starting.

Discussion of a microphone being used. The Town Clerk indicated it would be the silver public address mike.

COUNCILMAN LENHARDT: The silver one.

MR. ALESSI: Do you want to take a silver microphone.

TOWN CLERK NEWKIRK: The one on this end. I'm not sure how long the cord is.

SUPERVISOR FULLER: What about the one over here?

TOWN CLERK NEWKIRK: That one is harder to get off the stand.

MR. SWENSON: Starting back... well actually it's summer of 1987 when we first did an evaluation of the existing infiltration system we came to a couple of conclusions or a couple recommendations in terms of additional work that needs to be looked at with regards to the additional... with regards to the existing infiltration system and with regards to the fact that there is a lack of water... that the Town needed more water. Two of the studies that we recommended are a dredging test to evaluate whether dredging could effectively help to be operation maintenance tool to maintain higher flows with the existing infiltration system and the second related to looking for additional ground water supplies in the vicinity of the existing infiltration system, basically to the little bit further to the south of Schermerhorn Island. With regards to the dredging tests, folks are probably aware that we were hoping to do the tests last summer but delays in getting the permit from the Army Corps of Engineers did not get the test... allow this test to be started until this winter particularly about the beginning of December. We have done the dredging. We have been doing some sampling and collecting data on the tests. The testing is not through, we still have some additional data to collect before we can evaluate and come to some conclusions. But our intention is that within... hopefully we are going to be finishing the data collection by some point in the spring depending on how run-off goes and so forth in the Hudson River. But, at this point, we are proceeding with that but it has been delayed because of the length of time to get the dredging permit.

The second component that we were looking at is whether the aquifer that the existing infiltration system is in to the south of it really, could provide supplemental water for the Town of Bethlehem. And, we recommended that a test well be installed and some various testing be done on that test well to evaluate the capabilities of that part of the aquifer to provide water. The Town Board approved that step forward and then two other consultants who have been involved in this, Rust and Fraser, came forward and actually performed that work and the Town had O'Brien and Gere oversee that work and put together a report. So what I am going to talk about now is the test well study that was done, the work that was completed and what information we found regarding that.

To start with, the focus of this study was to try to find out whether the aquifer itself, the infiltration system could be a source of additional water for the Town. And, there were some various sub-objectives that were necessary to be answered in order to come to some conclusion. 1. We needed to get some more information on how thick the aquifer was, what kind of material the aquifer was made up

of south of the infiltration system. We had to evaluate some of the aquifer characteristics. The yield that you could get out of the well, the transmissivity which is a technical term for how easily the water moves through the sub-surface. We wanted to look at the ground water quality. One of the issues out there was whether we were going to have high iron, manganese and hardness such that could cause problems in the use of that water. And, last we wanted to evaluate what the interaction was between the Hudson River and the aquifer.

We did a series of different steps in this process. One of the things we did is installed a test well. And, we installed a large diameter test well in order to not only provide an ability to test the aquifer at a higher pumping rate than you might with a small diameter test well but also given that if that test well was effective, one can easily... with relatively low cost, change that into a production well, physically, as opposed to having to re-drill another whole well. The cost difference really suggested... it's usually best to go with a large diameter well in order to get the testing done and to give you the options. We installed some observation points along that... the well. Now, this is a little bit of a diagram we put together, you see over on the left PW-1. This is the test well that we put in. We then put in 2 observation wells, OW-1 and OW-2 at different distances from the test well so that when we tested the well, we could look at how the ground water levels change in these observation points and that allowed us to interpret what the transmitting capacity of the aquifer is. We also installed a river gauge so we could understand what the tidal fluctuations were in the river because the river bounces up and down on the order of 4 feet every day out there and we put in 2 dry points, smaller diameter wells that were out in the river to allow us to look at the water level changes both due to the fluctuation... the tidal fluctuations in the river but also do the pumping in the test well.

We completed what is known as a step test where you go and you pump the test well at varying rates and look at what rate you think you can sustain for a longer period of time, i.e. about 72 hours which is an approximate length of time you might use for a long term pumping test. Basically, it is a process to try to figure out what kind of rate you run your pump at for a longer test. Then we did a constant rate test, that's where you actually select a rate, you turn the pump on and you pump it for a relatively long period of time. And in this case, we were pumping for over 200 hours on the well to allow us to get some understanding of what happens to the ground water levels when we pump a well and what kind of transmitting capacity the aquifer has.

During the test and especially at the end of the test, we collected ground water samples to try to understand what the water quality is. It was recognized that the aquifer has a tendency to have high iron and hardness. We also know that the river, which was very close by, has low iron and low hardness and typically when you pump a well close to a river you are going to get some river flow that any of the aquifer out underneath the river and flows in and eventually comes to your production well. So, we wanted to look and see what the water quality was going to be.

And, then what we did, we conducted an even longer term test. We basically pumped the well at about 300 gallons a minute for over 3 months in order to evaluate whether you are going to continue to see more and more influence of the river on the water quality or whether it becomes somewhat stable.

Based on all this testing and data evaluation, we come into a number of different conclusions that provide information on the aquifer and its capabilities of providing water. 1. The aquifer primarily consists of sand, though at the location that we actually did the test we did find some gravel in the lower 5 feet of the aquifer. Where we did our test, the aquifer was about 40 feet thick. So, from about 35 to 40 feet below the ground surface, we did find some gravel. The rest of it is basically sand. When we interpreted the data, we came up with an actual transmissivity of on the order of about 3.5 feet squared per minute and a hydraulic conductivity of about 0.09 and these numbers are numbers that hydrogeologists will use to calculate yields for wells... long term yields, how much water

is moving through the aquifer and beyond that if you don't do it regularly with those equations it probably doesn't mean a lot to you. But, the numbers are generally similar to what's been found or was found when the... some tests were done for the infiltration system. So, it is very similar material that the aquifer is a little thicker here than up at the infiltration system.

There is a very good connection between the Hudson River and the aquifer. In our test well, when the tides would go up and down, we would see the test well all come down... the river water went down about 4 feet. The test well would go up and down about 3 feet and it would respond within about 7 minutes. So, when you have a flood, the water levels start to go up in the river, about 7 minutes later the water levels in the test well about 30 feet away would start to go up. So, there is a very good connection between the river and the aquifer.

And, then again, we pumped for over 3 months at a rate of about 300 gallons per minute. And, had very steady water levels during that pumping suggesting that the rate at pumping had stabilized the draw down and that was a pretty consistent yield at that time. We did see evidence that we had induced due to the pumping. River water could move down into the aquifer and actually to move into the supply well. We saw reductions in iron and hardness which suggested maybe up to 50 percent of the water we're pumping from the well during the long term test was coming from the river through the aquifer and that's an approximate number. But, the iron and hardness did drop down below what they were when we initially started testing. And, the dry points out in the river that are down below the river bottom actually saw much lower iron and hardness concentrations because they were much more under the influence of the river.

We did do analyses... ground water quality analyses to look at the water quality and how it compares to the standard... the New York State standards for drinking water and, basically, it meets all of the standards for a wide range of parameters that you look at. Iron and manganese are above the standards but those are easily treated by the existing treatment system that treats the water from the infiltration system. We concluded looking at the data and looking at the way the test well performed... the long term test that the aquifer can provide about 275 gallons per minute to this well over a long term period and that is going to be an average. There are going to be fluctuations during the course of the year, tidal cycles result in water levels go up and down. Temperature of the river water can affect things but our interpretation and conclusion is that 275 gallons a minute is a reasonably good estimate for a long term yield from this well.

MR. ALESSI: Guy, can you just... we have been talking about 6 million gallons per day, what we were promised plus the 12, is that number... 175 translatable to make sort of an apples to apples comparison?

MR. SWENSON: About 4200.

MR. KELLEHER: 0.4 million gallons a day.

MR. SWENSON: About 4200 per day.

So, it's no where... it is not close to 6 million by any means...

MR. GEISS: No. The .4 million gallons a day is proportional to the 275 gallons per minute or if you want gallons per minute, 6 million gallons a day is proportional to about 4200 or 4,200 gallons per minute. 700 gallons a minute is about 1 million gallons a day, is the conversion rate.

MR. ALESSI: Good, thank you.

MR. SWENSON: We did also... one other thing that I just want to bring up is that as with pretty much any well that one puts in, one does have to maintain the well. The hardness of the water will tend to over some period of time start to scale up the well screen and so, this well as in most any well that municipalities or towns or

industrial facilities have, does require maintenance in order to prevent it from clogging up and so that you can maintain your high yield.

Finally, we just wanted to address a couple of options that the result of our study provide. One of the things is that the water quality and the volume of water certainly could be added to the existing supply at the town although before that there would be a couple of additional evaluations including the economic evaluation and Tony Geiss will provide a little bit of insight under that and there will also be some need to approach the New York State DEC and DOH regarding the permitting issues associated with that. There also is a fair amount of aquifer from what we have seen to the south of the existing infiltration system and certainly water can be obtained from that but we did not do evaluations at this point in terms of how much water or what kind of design of a system one could do but there is additional water out there in the aquifer to the south of the existing system. Will let Tony briefly touch base on some economic issues associated with this.

MR. GEISS: This is a test well and one of the things we talked about was converting or the possibility of converting to an alternate or a supplemental supply. And, the economic analysis that we did was just basic on what it would cost to do that and looking at the incremental cost of treating water at your facility or your treatment plant, we are looking at about 36 cents per thousand gallons. And, the incremental cost of buying water from the City of Albany is about \$1.97. So, looking at the difference in those production costs and evaluating the capital cost of equipping this well, we're looking at a pay back which is less than 1 year for the cost of converting this well. So, an immediate pay back is what you would have comparing it to the purchase of the City of Albany water which is your supplemental water at this time. I guess Supervisor... you have... wait a minute.

MR. SWENSON: I have for the Board just to hand out... there has been some additional information collected from the well during this long term pumping. Since our report, it has continued to pump, we've got additional water analysis which include some detailed analysis of a variety of parameters and additional water level information. And, I've got... I'll just pass these out to the Board. If you would take one and pass them down.

COUNCILMAN BURNS: Sure.

MR. SWENSON: The first is the lab report and these are just tables that summarize.

SUPERVISOR FULLER: Thank you, Guy.

MR. SWENSON: That's all we have on our report. Do you have any questions?

SUPERVISOR FULLER: Questions from the Board Members first.

COUNCILMAN LENHARDT: Excuse me. Probably my most important question to me, I will ask of Mr. Alessi in executive session because it is legal in nature. However, just a point of clarification... your statement on this test well. This test well given the aquifer that it's in, will produce .4 million gallons of water per day -- is that what I heard you say?

MR. GEISS: Yes.

COUNCILMAN LENHARDT: That's this test well. That doesn't indicate that the aquifer can produce that or more or less.

MR. SWENSON: Well, no, the aquifer can provide .4 million gallons a day to this well.

COUNCILMAN LENHARDT: To this test well.

MR. SWENSON: Yes.

COUNCILMAN LENHARDT: It does not state what the aquifer can supply to our infiltration gallery?

MR. SWENSON: No. And, it doesn't... we also have not looked at what this aquifer could supply to multiple wells.

COUNCILMAN LENHARDT: Okay, thank you. I will hold my other questions for later.

SUPERVISOR FULLER: You don't want to ask your questions?

COUNCILMAN LENHARDT: No, in executive session. I don't imagine they're...

SUPERVISOR FULLER: Susan, go ahead.

COUNCILMAN BURNS: Okay. I guess what you were saying from your presentation that all of this was south of the aquifer. Can you explain why south?

MR. SWENSON: No, this was south of the existing infiltration system...

COUNCILMAN BURNS: Infiltration... right.

MR. SWENSON: Just barely... just a little ways north of the existing system you run into the Vlomankill and also the thickness of the aquifer based on the work that was done in the existing infiltration system the aquifer seems to get thinner as you go north. So, when we looked at it, we said there is not a lot of area there and it is getting thinner, we're better off going south and so we went south and looked at the aquifer south of the existing infiltration system. And, when I say south, I think we're on the order of about 500 feet south of the southern end of the existing infiltration system.

COUNCILMAN BURNS: Okay, thank you. I have some just clarification questions. Are dry points the same as piezometers?

MR. SWENSON: Yes, they are. A piezometer is typically a small diameter well that monitors the aquifer and a dry point is something you drive in as opposed to drill a hole and put the well in. And, so this was a small diameter well that we drove into the... below the river bottom.

COUNCILMAN BURNS: Is there function the same?

MR. SWENSON: Yes, they function the same. What it is is that the dry point you don't actually see a sample of the material that you put it in. It's like you take a rod and just stick the rod down in. You don't know what's down there. But, both of them measure water levels. The monitoring well and the observation well we put in are 2 inch diameter so they are easier to sample from... take water sample from. They are easier to put equipment in to monitor water level. And, they're more of the conventional installation you do on dry land. Out in the river, it's hard to get drill rig out in the river so a dry point becomes much more convenient to drive down below the river bottom.

COUNCILMAN BURNS: Okay. Let's see... you mentioned maintenance of the wells. Now, what exactly... does that just include dredging?

MR. SWENSON: No, it doesn't have anything to do with dredging. Typically wells in most... large number of aquifers either because of hardness or iron or various other components in the ground water, some of that material will slowly start to precipitate out on the well screen... part of the well where the water comes in. And, if you have ever lived in a place with hard water, you know your hot water heater starts to have problems, the water faucets can get a white calcium deposit on it. Wells get the same thing down below the ground and what you have to do periodically is go in, use some acid, use a scrub brush basically and clean that material off the well screen or else it slowly you have a slot an opening in the well that allows the water to come in and that material just slowly closes that up and the end result is you can't get as much water out of the

well. So, what you have to periodically do is do some maintenance and there's a variety of different types of maintenance one can do. But, it's very, very common in the business of water wells that this is done and it can... the industry often will recommend some where in the 3 to 5 year time period to consider that you might need to do some maintenance on your well in order to keep it functioning at the top efficient.

COUNCILMAN BURNS: Okay. Just when you said you had done 2 studies, you said one was the dredging test which was a maintenance tool so I wanted to be clear what you meant by maintenance.

MR. SWENSON: All right.

COUNCILMAN BURNS: That's why I asked that.

MR. SWENSON: The dredging test is separate from this test well. The dredging test... one of the components... one of the objectives was to see if we remove the silt off shore from the infiltration system will that improve the yield of the infiltration system and second, will the silt stay off long enough that if you go out and dredge once or twice a year you might be able to maintain a higher yield or would you have to dredge 20 times a year and it just becomes not cost effective. So, in that respect, we're... one of the components is looking at is can you use dredging to maintain a higher yield for the existing infiltration system. Doesn't have anything to do with the test well. The test well is not going to be as significantly impacted by the infiltration through the river as the infiltration system is.

COUNCILMAN BURNS: So, the maintenance is separate.

MR. SWENSON: They are 2 separate but again, the thought is if there may be a way to maintain higher yield from the infiltration system. The test well... if you have a well you probably have to do maintenance at some point but that is much more of a well known component. Everyone has to deal with those things and it can be... people do them all the time.

COUNCILMAN BURNS: You said iron and manganese can be treated. I was just curious how, through chemicals or how would that be treated.

MR. SWENSON: Well, Bruce could probably answer that best. The existing treatment system treats the... will treat these concentrations that we are finding in the test well. It will go right through and be taken care of so, but Bruce probably would be best to explain the process.

COUNCILMAN BURNS: The treatment would comply with regulations, standards?

MR. GEISS: The treatment would comply with your Health Department regulations. Your treatment ... to manganese... it is in the soluble form as you see it in the ground water. You confer it to a precipitate through oxidation and then it settles out as particles. It is particles that can be removed in the treatment process. This is how it is done in your current treatment plant.

COUNCILMAN DAVIS: I was going to say, isn't that being done now?

MR. GEISS: Yes, it is.

COUNCILMAN DAVIS: That's nothing new, we have heard that...

MR. GEISS: No, that's nothing new.

COUNCILMAN DAVIS: We've heard that for 5 years.

MR. GEISS: Exactly.

MR. ALESSI: And, it is permitted, authorized.

COUNCILMAN DAVIS: Right, it's all been approved.

MR. GEISS: Yes.

MR. SWENSON: So, adding this water to the existing system, there would be no change in the treatment. It would just be treated with the existing water.

COUNCILMAN BURNS: I bring that up because it was on your slide and you brought it up during the presentation and I wanted everybody to be clear on that.

MR. SWENSON: Right, certainly.

COUNCILMAN BURNS: Okay. Could you just explain a little bit about permeability.

MR. SWENSON: Okay. If you... what I'm going to think of is make this project... figure this very simple... sand has particles and it also has gaps between the particles. Those gaps between the particles, the way the ground water moves through the sub-surface and if you think about it, if you have a large gap between particles, you can get a lot more water through it than if you have a little tiny gap. And, the measure of permeability or hydraulic conductivity or even transmissivity really is a measure of how easily the water can move through the particles in the sub-surface. So, the bigger the number you have of transmissivity or hydraulic conductivity of permeability the more easily water can move from... through the aquifer to the well, the more water you can get out of the well. A sandy gravel will have a very high permeability. A clay will have a very low permeability.

COUNCILMAN BURNS: Okay. And, the time frame you said it was for 3 months. When did that start... well you said you are continually testing but...

MR. SWENSON: We did some initial... initial testing was done in the summer and those were shorter tests, the 200 hour tests. Then we looked at the data and we realized we were not seeing much influence yet from the river on the water quality. So, we started about the beginning of November to pump the water... to pump the well for a long period of time. It is still pumping and we have sampled the water during the course of the pumping and looked at the water quality, not a lot of parameters but some of the basic ones such as iron and hardness and manganese. And, what we have seen is, we've seen that the water... concentrations of iron and hardness have declined during the course of that time to a certain level and then leveled off. And, so we are seeing that when you initially start pumping for the first... I think it was... I'll have to look back at the data that was made in couple weeks to a month or so, you still see a relatively high iron concentration. With time, those concentrations came down and then leveled off indicating that you are starting to get some influence from river water coming through the aquifer and to those ... wells. So, you're mixing higher iron aquifer water with low iron river water and getting some intermediate values.

COUNCILMAN BURNS: I know you said the dredging test wasn't completed or the data from that... from the dredging but is there any preliminary figures that you have... data now... I am trying to figure out the time frame... if that was done in early December, then there should be some data as far as levels or some sort of data.

MR. SWENSON: Well, the dredging was taken in early December. We've been collecting data. We have not spent a lot of time interpreting yet but we did see initially higher yields and then we've seen the yields decline. And, we've seen... when they did the dredging we saw reduction in the amount of silt off shore. We went out and measured the silt thicknesses. We've seen silt building up. Beyond that we have not really gotten through reducing that data because we've really been waiting to get this last piece and get the final... the rest of the information on the performance of the system.

COUNCILMAN BURNS: Okay. Was there any consideration to the Vlomankill in this report and its impact on any of this?

MR. SWENSON: The surface coming out or...

COUNCILMAN BURNS: Looking back in my notes...

MR. SWENSON: Surface water coming out of and into the Hudson or I guess I am not sure that...

COUNCILMAN BURNS: I believe so, yes.

COUNCILMAN DAVIS: As I remember, there was quite a bit of discussion about the effect of the Vlomankill and where it comes out into the Hudson and its proximity to the original gallery... the original system and the siltation that could have resulted from that flow. What I think... I think that may be what Susan is referring to.

MR. SWENSON: Is that what you were referring to?

COUNCILMAN BURNS: If that was considered at all... looked at... what the impact of that might have been.

MR. SWENSON: Well, for the test well, we were not looking at the siltation issue for the test well except in factoring the fact that there is going to be some silt on the river bottom and factoring that into what we expect the long term yield from this well to be. The dredging test and siltation study that is going on is looking at the effect of all the surface water input to the river. The river turbidity, etc. in terms of what... how frequently you might expect siltation build up off shore from the infiltration system and what those effects are. We're not necessarily focusing directly on the Vlomankill as much as the overall Hudson as it comes down through this area and impacts the system.

Does that answer your question?

COUNCILMAN BURNS: I think so. I... ummm, I had one more question. Um, as far as, the testing that you did, did you feel that you tested and pumped for an average amount of time or was it, you know, to the max or minimal. Did you stress it?

MR. SWENSON: We stressed the aquifer. We did, I think... I felt that the test went very well. That we accomplished what we wanted with the initial testing with respect to identifying the influence of the river on water levels with respect to what kind of yield we might get out of the system. We then decided that it would be beneficial to do a longer term test to look at the water quality issue a little further. The shorter term test provided some indication but not as much as we would like and because the system... the pump was down there, it wasn't much of an effort to go and do longer term pumping. We did do that. As a scientist I love as much information as we can get but this I think was a... certainly very good successful test and its given us the information we need to know to be able to identify what you can get out of this aquifer and this well to be able to identify that you can use this water and run through the existing system and it will work all right. So, from that point, it is successful. We did do some longer term tests than we do in some other places but the river is something that you don't often have right in your backyard to look at. You are just out miles, miles in a river, you are not worrying about that surface water influence. You are just looking at what the aquifer can do. So, in that situation, we thought that it would be beneficial to get additional information on that test... on the river.

COUNCILMAN BURNS: Actually, I had one more question. I was just wondering where you got the figure of \$1.97.

MR. GEISS: It's actually the combination... excuse me, combination of a, I believe it is \$1.87 actually to Albany and 11 cents for additional energy cost for pumping, is how I came up with that number.

SUPERVISOR FULLER: Albany just had water rate increase, 6 percent.

COUNCILMAN BURNS: Right, I talked to Commissioner Cross and he told me it was going to be \$1.92 but I... maybe he didn't...

MR. GEISS: Okay, well then I actually... the number used here was \$1.87 so the Albany rate would be higher if it was \$1.92 which would lean it more for quicker cost recovery.

SUPERVISOR FULLER: Yes.

MR. GEISS: If you used \$1.92.

COUNCILMAN BURNS: I just wondered if you'd... where you got that figure.

MR. GEISS: Yes, it was a combination of the actual cost of what additional energy for pumping... because there is a slight pumping charge.

COUNCILMAN BURNS: Okay, thank you very much.

SUPERVISOR FULLER: Guy, do we have any... oh, I'm sorry, Doris.

COUNCILMAN DAVIS: No, go ahead.

SUPERVISOR FULLER: Just a quick question, do we have any idea how much water total we have pumped out of this well, test well? And, I know it is an unfair question.

MR. SWENSON: I calculated that a little while ago. I think it is something like 50 million in the 3 to 4 months we've been... I think... 4 months would be about 50 million.

SUPERVISOR FULLER: Roughly is what I was thinking of. Okay.

MR. SWENSON: The Hudson River is a lot higher now.

SUPERVISOR FULLER: Thank you. Go ahead, Doris, I'm sorry.

COUNCILMAN DAVIS: No, finish... if you have any more questions go ahead, Sheila.

SUPERVISOR FULLER: Go ahead.

COUNCILMAN DAVIS: Just to sort of review to make sure that I understand some of the things that you've said in your report and also this evening. Regarding the thickness of the soils and the difference between the soils in the vicinity of the test well and the original project. Am I correct then in saying that you feel that the overall impact is that the yield would be higher further south where the test well is? If... if that test well were used and if additional test wells were... let's just say hypothetically... drilled, that the yield more likely would be higher. Is that an inference that is possible to be drawn or not?

MR. SWENSON: Um, as you increase the thickness of the aquifer you increase the yield. How far... to the north we know that the aquifer does get thinner...

COUNCILMAN DAVIS: Right.

MR. SWENSON: ...as you get up to the northern end of the infiltration system.

COUNCILMAN DAVIS: Right.

MR. SWENSON: I don't remember the thickness at that point. As you go to the south down where we are, we've got a 40 foot thickness. Whether it continues to increase further south it is not known. We're not too far from a wetland area and you have to get around that and then you get a lot more toward Schermerhorn Island down further south, that has not been looked at in detail. We've done some preliminary work that suggested very similar to the area we are in. But, the more thickness you get, assuming the materials stay the same, the more yield you can get. Now, one thing we did find at this location that hasn't been seen at other locations that have been drilled, is we saw a 5 foot gravel layer in the bottom which also provides additional yield above just having sand. Whether... we

don't know if that gravel there extended very far, it doesn't look like it's a prominent layer that might go farther. We have not done an extensive drilling further to the south but we do know given the constraints that we've got, you can get 275 gallons a minute to a well in this area. Does that answer it?

COUNCILMAN DAVIS: Just... I hope so. You said that, just for your information, the bedrock appears to have been encountered at depths ranging from 39 to 42 feet and then bedrock was... that... the original site. And, this area that you drilled, approximately 49 feet.

MR. SWENSON: Right.

COUNCILMAN DAVIS: So, I am assuming you are saying that the yield would be higher or potentially.

MR. SWENSON: Yes, for the same kind of material the yield would be higher, yes.

COUNCILMAN DAVIS: There's a... included in the diagram that you had there that's also in our report, you include a bulk head. And, I remember in the original system there is the barrier wall and I remember you referring to that a number of times in previous reports. Have these new tests that you have done on the new well provided any additional information or provide any insight into that barrier wall? The difference between the barrier wall in the original site and what would happen here.

MR. SWENSON: We haven't compared the two... between the existing infiltration system area and the test well. But, we do know that the test well area, this barrier wall does not seem to be doing very much at all to impede flow.

COUNCILMAN DAVIS: Well, you did believe it was originally.

MR. SWENSON: Well, it certainly can be. Again, we haven't done the same kind of testing at the original site as we have here. In some of the data we've seen from the original study it suggests that it may play a role but it doesn't seem to be a dramatic role. Down here, we don't see much evidence that it's impeding water. There could be some small impedance and the resolution of our tests, this is not that precise. But, we are seeing very rapid response when the tides come up, the water levels come up in the well. When we pumped the wells we saw a fairly uniform change in water levels between out in the river and back on our site. So, that suggests that there is not a big break where if you had a real solid wall the water levels could come along and drop down and then come across. We are seeing much more of a uniform change which suggests that it's not impeding the water. But, yet, some of the data I've seen and we've worked with for the existing system suggests that it could be playing a role but it's not a dramatic role. It's not something that seems to be taking multiple millions of gallons of water away from here.

COUNCILMAN DAVIS: Okay. Getting back to the siltation and dredging that you did. Do you feel that the siltation in this area of the test well would be as thick as it was further north? I mean, there is a difference in several... 5, 6, possibly 700 feet... are you aware of the difference or is that...

MR. SWENSON: There are a lot of different things that affect...

COUNCILMAN DAVIS: A factor?

MR. SWENSON: Yes. There are a lot of things that affect the siltation. Our initial thoughts based on the dredging tests to date are that the siltation probably would not be as bad in this area for the single test well but we did take into consideration that there may be some siltation during natural events.

COUNCILMAN DAVIS: But, that's true all along most of the river.

MR. SWENSON: Yes, exactly but we took into account that there could be some increase in siltation above what we were currently

experiencing with the test well and that's why we pumped it at 300 gallons a minute for 3 or 4 months. We identified 275 as the long term yield because there may be some additional build up at some point. And, so we factored that in a little bit. But, when we get through with the dredging test, I think we will have a better understanding of how the existing system is influenced or maybe influences the siltation.

COUNCILMAN DAVIS: We've heard a lot from some of... particularly one of our critics about ammonia and the significant levels of ammonia in the water that has been tested. Can you comment on that?

MR. SWENSON: With the test well, the levels of ammonia are not that significant and since the adjacent fields are corn fields and apparently from what I understand have liquid fertilizer applied to them, our best judgement is that is the most likely source of the ammonia we are seeing. And, again, the numbers are not unexpected given the nature of the terrain in that area and the use of the farming practices.

COUNCILMAN DAVIS: So, you don't feel that there is a correlation between that and the sewage treatment plant which has allegedly has been given as a reason for the high ammonia levels.

MR. SWENSON: We haven't studied that directly but our judgement is there is no... there is not a correlation that it's related much more locally to the farming practices and the terrain in the area.

COUNCILMAN DAVIS: Again, just hypothetically, if additional wells were to be drilled would you recommend the horizontal which we now have or would you recommend the vertical type of well?

MR. SWENSON: You would have to do a cost analysis to evaluate which is more effective. Both could get water out of the ground. The vertical wells have the advantage of being cheap to put in but you contend to be limited because you can only draw them down so far before you start to have the water impact the screen and the pump. Horizontal well, you don't have to worry about that. You can draw it down a long ways before you impact the screen and the pump but they're very expensive to put in. So, really, you would have to sit down and look at the cost benefits. You'd have to do probably some sort of model, ground water model, to look at how the flow is going to move around the different wells and how close you could... if you space vertical wells what would happen around a horizontal well with respect to the river and infiltration from the river. So, at this point I'd say you really have to do more evaluation of which is better. It typically comes down to which is the most cost effective technology. Both have been used in various places.

COUNCILMAN DAVIS: It's... let's just again say hypothetically, it's determined that it would be better to use not the same kind of well that we're using now, would it be possible to combine the use of 2 or would that not be possible, using the initial system?

MR. ALESSI: If I could, those are excellent questions. What I would recommend is that in terms of the southern part that doesn't relate to the test well, that after executive session we come back and address those questions if necessary but I think for purposes of tonight and the purpose of the report to go to the test well and the results that came out of that would be probably advised at this particular time. Thank you.

COUNCILMAN DAVIS: Thanks. Just one more question, just to sort of summarize in my mind. Would it be safe and correct then to conclude that your results show that there's no problem with the quality of this water, it's a quantity issue that we are still dealing with?

MR. SWENSON: With the water test well?

COUNCILMAN DAVIS: Yes.

MR. SWENSON: The test well has higher iron and hardness than one would want an entire supply of it.

COUNCILMAN DAVIS: Which can be treated.

MR. SWENSON: Well, you can treat a lot of things and my understanding is that if you get too much hardness into the existing system there could be problems in trying to treat and deal with that. So, for this existing well there's no problem adding this volume of water with this water quality into the existing system. If you start doing multiple wells or some other extensive system, you'd need to sit and look at what the impact of that quality are on the system and for that matter what you could do to change that quality based on the influence of the river and stuff. We really focused on taking this water from this well and putting it into the existing system at this point.

COUNCILMAN DAVIS: Thank you.

SUPERVISOR FULLER: Any other questions from the Board? Questions from the audience?

MR. KELLEHER: Bill Kelleher.

Mr. Kelleher
on Water

SUPERVISOR FULLER: Can you hang on one second? We need to take the mike, Guy.

MR. KELLEHER: Bill Kelleher. Are we going to have a chance to make a statement later on or...?

SUPERVISOR FULLER: I would prefer that we take your questions right now while Guy Swenson and Tony Geiss are here. And, then we will be going into executive session.

MR. KELLEHER: Okay. I'll just...

SUPERVISOR FULLER: I would prefer if we just stick with questions right now.

MR. KELLEHER: ...give the questions and that's why I prepared this map. I can give it to a few other people here. You can pass them back.

SUPERVISOR FULLER: Do you have any questions, Mr. Kelleher?

MR. KELLEHER: Pardon?

SUPERVISOR FULLER: Do you have any questions?

MR. KELLEHER: Yes, I do. This map I have prepared is taken from the Corps of Engineers records over in Troy. I spent about 6 hours over there. It clarifies an awful lot of things about where your test well was located. I would like to point this out that this is a map, 1820, before the U.S. put any dikes in or anything else. And, you will notice this is from the east shore of the Hudson River, not from the west. So, pretend you are standing on the east shore of the Hudson River. There is a dam going out there 1700 feet below... where Vlomankill comes in, the obvious intent of that dam was to fill in the Hudson River and that's what happened. Between 1837 and 18... well, the present time as late as 1980, they filled the west branch of the Hudson River completely with material dredged out of the river. Now, your test well... incidentally, the well... the horizontal well is not located on Schermerhorn Island. I don't know if you knew that or not. It's located on Poplar Island. And, Poplar Island is the one with the "P" on it. In 1820 it was a submerged island... at low tide you could just see it, okay. Schermerhorn Island, the much bigger island to your left or south, is a much bigger island than shown here. I've cut it off. But, you notice the river channel between the 2 of them, all right, that is where the test well is located and that is why it's 40 feet deep.

I agree with you, 100 percent, in what you said, I don't think this well... I agree with your analysis on the well by the way, that it's not much better than 275 gallons a minute. And, you have done a good job there. You pointed out that you got a little gravel. You know why you have gravel? I confirmed this with the Corps of Engineers. Wherever you dredge the old river channel what do you run into

first? The sewage sludge, the silt, the sand, and then the gravel on the very bottom. And, the reason we didn't find any gravel in the horizontal well and the reason the bedrock is closer to the surface, you couldn't put it any deeper, is because it was Poplar Island. And, they... when they started to raise the dikes, Poplar Island came out of the water. But, there is still that channel in between... what I am saying is you can't go any further south because you run into Schermerhorn Island. Your well is in the channel. The same as the well you put back in 1978, it was in the old river channel. This whole area has been filled up and I mentioned sewage because there were raw sewage discharges and the worst section of the Hudson River was right at this point. You dredge 2 miles of sewage sludge from about 1890 when we started to get sewers until about 1970 and all of the sewage sludge was buried right here. This is a burial of sewage sludge and that's why you have the ammonia and that's why you have the high iron and that's why you have the high hardness in the water. I've already... I passed out that graph I drew of how the iron and ammonia and hardness are decreasing. So, yes, I have changed my mind. You can explain the ammonia from all the sewage sludge for 70 years from a population of... equivalent of about 50,000 people was buried... primary and secondary sewage sludge basically, that's what the river was when we had no sewage treatment plants. It was all buried here. So, naturally you are going to get ammonia and naturally, it's going to have a lot of carbon dioxide. I know you didn't mention that but the well... the horizontal well had a lot of carbon dioxide in it. Well, naturally, if you bury sewage sludge and you put a well right next to it, you're going to have it but this well is right in the sewage sludge, by the way.

MR. ALESSI: Mr. Kelleher?

MR. KELLEHER: Yes.

MR. ALESSI: Do you have documentation you can reference for the fact that sewage sludge was buried there?

MR. KELLEHER: Yes, absolutely.

MR. ALESSI: Okay. Can you just state what that is... the documentation for that?

MR. KELLEHER: I have looked at the... I have looked at multiple maps over the Corps of Engineers to get a history of how this was filled in, all right. I talked to the Corps of Engineers on how they dredge and let me explain something. The reason I discovered this I was looking at my old text book which contains the ... sag curve from Troy to New York City. Now, as an old sanitary engineer and Sherwood Davies knows this too, the whole foundation of a water program municipal sewage treatment plants, that came from the Professor Vells at Manhattan University and the worst point on that curve was right at Schermerhorn Island.

MR. ALESSI: So, it's a text book that...?

MR. KELLEHER: No, no, no, it's a well known fact that the Albany pool every spring would gasify.. gas bubbles were coming out...

MR. ALESSI: So, there is not a document that shows that? That's your recollection or having talked with someone?

MR. KELLEHER: All my experience in back... yes.

MR. ALESSI: Okay. All right.

MR. KELLEHER: With that sewage sludge laying... what do you thing sewage sludge goes to when we have raw sewage being discharged all those years? It settled in the river and, incidentally, Vells has documented the depletion of oxygen caused by that sewage sludge. And, it's a classical. He should have gotten the Nobel Prize for it, all right.

MR. ALESSI: Thank you.

MR. KELLEHER: Okay. Now, I'm...

SUPERVISOR FULLER: Do you have any questions?

MR. KELLEHER: Well, he asked me questions, so I am just giving it to him. Now, yes, I do.

I just wanted to point out... I... you know, you mentioned the maintenance of that well... I am going to ask you, have you ever seen a... have you read how they clean wells? Obviously you have, with acid.

MR. SWENSON: Yes, we actually get involved in doing rehabilitation of wells, subcontracting, designing what needs to be done and so forth.

MR. KELLEHER: Have you ever cleaned a well with acid when water is moving in and out of it?

MR. SWENSON: You don't. You shut off the pumps when you do the cleaning.

MR. KELLEHER: You're darn right you do.

MR. SWENSON: Yes.

MR. KELLEHER: You take the pump out too.

MR. SWENSON: Yes.

MR. KELLEHER: Yes, and you drop a hose down and you put the acid right where the screen is, right?

MR. SWENSON: Yes.

MR. KELLEHER: You don't put it any other place. Now, you've got 5 foot fluctuation of the tide coming in and out... it can't be done. You can go ahead and try it but you'll have to get a permit from DEC because you are discharging acid and that's why this ridiculous clean... we paid for a lot of plastic piping in this horizontal well, a lot of it. It's completely useless. It would take 100 gallons of acid to clean the horizontal well. I'm... this is all brought out in the past. I'm just giving you an example.

Now, if you want to go ahead... let me back up, do you know where the pump is going to be located? The pump, the actual well pump that you propose putting in there. Where is it going to be located with respect to the screen?

MR. SWENSON: Right now the well pump is just above the top of the screen.

MR. KELLEHER: Yea, but where are you going to... the actual operating pump that you are going to put in there. Where you going to install it?

MR. SWENSON: We haven't done anything to design it.

COUNCILMAN DAVIS: No one has decided if there is anything going to happen, Mr. Kelleher.

SUPERVISOR FULLER: No one decided that.

MR. KELLEHER: Well, you always install a pump above the screen, that's what I am trying to say. You always install it. You've got to put it 4 or 5 feet for the well pump. You've got to have 28 inches above the impeller. Now, are you going to use a shallow well pump or a deep well pump? I mean, how you going to get it up 180 feet?

SUPERVISOR FULLER: Mr. Kelleher, no one has authorized this pump.

MR. KELLEHER: No, no, what I am saying is he came up with the cost though. And, I am asking a question, how can he come in with that cost unless he installed the pump... in his own mind, installed that pump and connected it up and electric lines that have to come down.

All these things come in that cost. So, that's why I am saying, your saying we're not going to pursue that yet but yet he gave you a cost figure.

SUPERVISOR FULLER: He gave us an estimate because we asked for it.

MR. SWENSON: We got...

MR. KELLEHER: Yea, well, I am just asking what kind of a pump are you talking about and you are going... where you going to pump it to.

MR. SWENSON: We have a... we looked at... from the information we have on pumps, we regularly work with them, looking at using a submersible pump, pumping over to the existing line that runs from the infiltration system up to the reservoir and looked at the approximate head that we would have to deal with and the size horsepower motor we'd need and basically worked from information we currently had in house to come up with a rough estimate. And, that's why it is only a preliminary estimate.

MR. KELLEHER: In other words, you're not worried about the draw down in the well with this type of pump? I mean, you are going to design this pump for 180 feet. You are not going to put it in the existing well. That's what I am saying, right? Hey, you don't have much draw down to work with man in this well. I'm... I'm... these are practical things that you know you come up with these statements but I'm telling you right now, it's a very difficult task with this little well. This is not a big diameter well by the way, 18 inch well, come on...

Now, I did have one additional question. In table 3 you show... it goes from minus 12 to minus 23 feet. I mean, how come? What happened there?

MR. SWENSON: Um, this table... table 3 shows the water levels in the pumping well and some of the observation wells during the course of our long term pumping test. And, you will notice that the water levels fluctuate quite significantly during the course of the measurements. The measurements were not made at exactly the same tide period of time during the tidal cycle every time. When you measure the water levels in the test well at low tide, you have a very low water level, minus 23. When you measure the water levels in the test well near close to the high tide, you have a water level that's much higher on the order of minus 12. So, you see fluctuations because we didn't have someone show up at the same point of each tidal cycle during the course of the long term test. But, what you see is that during the course of the test, that you are getting the same lows and about the same highs which suggest that it's a pretty stable level of draw down overall.

MR. KELLEHER: Well, I'd like to be frank with you. That's impossible. He said minus 23 and minus 12, now that's 11 feet and the tide is only 6 feet. All right and you... I say minus 23 feet, where's the top of the screen? The top of the screen is about minus 30 feet.

MR. SWENSON: I believe that is about right.

MR. KELLEHER: Yea, okay. So, you are talking about a 10 foot difference here minus 23 feet versus minus 13 feet... you are talking about a 10 foot. It can't be the tide. Now, if it's minus 23 and the screen is at minus 30, you only got 7 foot of draw down to work with. And, that isn't very much. Anybody would be a fool to put a pump in there, period.

SUPERVISOR FULLER: Thank you, Mr. Kelleher. Are there any other questions?

MR. DAVIES: Good evening. I think Mr. Kelleher... a couple of points, the question was asked by Doris Davis about the ammonia.

SUPERVISOR FULLER: Sherwood, would you identify yourself for the audience, please.

Mr. Davies
Water issue

MR. DAVIES: Pardon?

SUPERVISOR FULLER: Identify yourself.

MR. DAVIES: Sherwood Davies.

SUPERVISOR FULLER: Thank you.

MR. DAVIES: You asked the question about ammonia. And, ammonia is an indicator of pollution. Mr. Secor in prior meetings has indicated it's vegetation, leaves... it could be. Mr. Kelleher has just pointed out that in this area, Schermerhorn Island, the dredged material 5 to 15 feet in depth had been deposited in that... on that island. A lot of that represents bottom sediments that contains industrial waste, contains sludge or fecal material... this is the explanation in my view of why you are getting high ammonia, why you are getting high iron, why you are getting high manganese and I have some questions with regard to the tests that they apparently did or did not perform.

Was there any analysis made of the heavy metals or the synthetic organic chemicals?

MR. SWENSON: Yes.

MR. DAVIES: Is that in your report?

MR. SWENSON: That was information that we just recently obtained and was just passed out to the Board and basically, all the numbers are... all the numbers meet the New York State standards and guidelines for drinking water with the exception of the iron and manganese which, as I indicated, were somewhat elevated but are certainly treatable with the existing system.

MR. DAVIES: Did you run an analysis for pcb's?

MR. SWENSON: Have to look at the data. I don't believe it was done for pcb's. I think we did... it's in this... we did do it then, yes.

MR. DAVIES: All right. Are you familiar with the DEC water quality standards for ground water?

MR. SWENSON: Yes, though I don't have them all in my memory right now.

MR. DAVIES: All right, no. But, would you acknowledge that some of their standards are more stringent than the State Health Department drinking water standards?

MR. SWENSON: There are some differences in the standards.

MR. DAVIES: Is it possible in your view that the DEC ground water standard for pcb's is 5 times more stringent than the drinking water standards by the State Health Department? And, have you looked at that and measured it in terms of that concentration?

MR. SWENSON: I have not looked at the pcb, the Health Department and NYS pcb standards recent enough to know what the differences are. I do know that the testing did not detect stuff.

MR. DAVIES: What was the detection level?

MR. SWENSON: I can get those out. Let's put it this way, the tests were done in accordance to the ... limits that met the requirements of New York State.

MR. DAVIES: Of what? The State Health Department?

MR. SWENSON: I believe that's what that is, yes. I can check but...

MR. DAVIES: Well, this is quite... this is important because 1. this well is within the zone of influence of the Hudson River pcb superfund site; 2. there has been bottom sediment deposited on

Schermerhorn Island right above the aquifer. So, I think you would agree that a very careful study should be made of pcb's.

MR. SWENSON: Pcb's have been looked at for the existing system and for this system and tested in the necessary manner to be evaluated for use of a water supply and they have met the criteria to be used in the water supply.

MR. DAVIES: Well, I would like to question that with you maybe outside this meeting but...

MR. SECOR: Supervisor Fuller, if I could interrupt. Mr. Davies has raised this point on numerous occasions. It has been responded to by the New York State Health Department, by the Department of Environmental Conservation, by the U.S. Environmental Protection Agency in letters directly back to him. I have passed out copies of that to the Board. Mr. Davies continues to repeat the same points which have been responded to on numerous occasions and it's... it just goes on and on. He has another letter which is on my desk right now back to the Health Department on the same issues over and over again. We cannot deal with the differences between DEC and DOH and they have responded to him and I don't know whether that is appropriate here.

MR. DAVIES: Now, just one moment, Mr. Secor, just one moment. I have a letter here written within the last month from DEC that 1. indicates that their standard is 5 times more stringent than the drinking water standard. 2. that if they were to be provided with some data they would investigate. I have provided that to them. I am awaiting a reply. But, the fact is that there is a DEC water quality standard that I think you should look at. I think our engineers should look at and that...

MR. SECOR: We have looked at it. Our engineers have looked at it. This point has been responded to on at least 10 occasions. You have 3 letters in your own file from experts. You have all the laboratory stuff, we have tested this again. Sherwood, this is scare tactics and scare tactics and scare tactics.

MR. DAVIES: You are telling me what I have. I know what I have.

MR. SECOR: And, I am tired of it.

MR. DAVIES: Well, I am too.

SUPERVISOR FULLER: If we can deal with questions only and let's not debate the...

MR. DAVIES: But, let me just... hardness... have you discussed with industry the hardness of the water?

MR. SWENSON: We have looked at hardness in terms of mixing it with the existing supply and it is our understanding in communicating with Mr. Secor that there will not be a problem with the hardness that we have coming out of this well for the supply that's being provided to industry with the system.

MR. DAVIES: There was a quote about 36 cents per thousand gallons to use this water. Could I ask how you arrived at that figure?

MR. GEISS: Yes. In looking at the cost and the unit cost of electricity, amounted to about 11 cents per thousand gallons and looking at the incremental costs of chemicals, amounted to 25 cents per thousand gallons for a total operational cost of 36 cents per thousand gallons.

MR. DAVIES: That's all that goes into your consideration.

Should there not also be an evaluation because we are paying one million dollars a year in bonded indebtedness for this Clapper Road plant. We're paying \$300,000 to \$400,000 for operating costs. According to my calculations, if I add the amount of water produced from the infiltration gallery and that produced from this well, it

will cost about \$2.05 per thousand gallons, not 36 cents. So, you have not factored in other costs here.

MR. GEISS: Okay, you're making a comparison on absolute capital that you are currently spending and assuming I looked at the incremental cost for the cost of treating this water at the treatment plant versus what is the incremental cost that it would cost you to buy the water from the City of Albany. And, I compared the 2 incremental costs is what was compared when I talked about cost.

MR. DAVIES: And, you didn't factor in bonded indebtedness or operation at the plant.

MR. GEISS: Bonded indebtedness is paid for right now regardless of which area you get the water from.

MR. DAVIES: All right. Have you looked at the water demands in this community for the summer months?

MR. GEISS: No, we have not.

MR. DAVIES: You have not. Do you think it should be done?

MR. GEISS: As part of this well investigation?

MR. DAVIES: Well, as part of the need for additional water for our community.

MR. GEISS: I don't think that was..

COUNCILMAN DAVIS: Bob.

SUPERVISOR FULLER: I don't think that's a question that can be answered at this point.

MR. ALESSI: If I could, Supervisor Fuller, excuse me Mr. Davies, if I could. I am not saying those questions aren't relevant in another context or forum. We're here to discuss the test well, to go into executive session and then the Board is going to come back out of executive session. And, so, that's why we're trying to get questions for O'Brien and Gere. You've commented about how much we've paid engineers and we don't want to keep them here any longer because there are necessary.

MR. DAVIES: Are we paying them now?

MR. ALESSI: We are paying them now. That's why the question.

MR. DAVIES: All right. Let me just run through these quick questions then. If we need 6 million gallons a day and the infiltration gallery provides 1.5 million gallons a day, we'd need approximately 11 additional vertical wells to meet that need, is this correct? Would you agree to that figure?

MR. SWENSON: Well, yes, in terms of the simple math, yes. You need something on the order of 10 plus wells to make up to the 6 million.

MR. DAVIES: Okay. Have you looked at the additional land needed to put in those additional wells?

MR. SWENSON: We have not taken a look at the additional land you might need or how you might arrange the wells or what the impact of those wells would be on overall water quality. We have focused on identifying that there is additional water available out there but we have not taken another... next step, we have not been authorized to take another step to look at laying out and designing or scoping out a full system.

MR. DAVIES: Okay. I think you referred in the report to a sample collected by the New York State Department of Health on August 27. I believe that sample was collected by the Albany County Health Department in analyzed in a private laboratory. It's just clarification, that's all.

Um, have you as engineers evaluated the potential for clogging of this vertical well? The frequency that maintenance would have to be provided?

MR. SWENSON: We've looked at that issue. There's not a really cost effective way to evaluate just how fast the well will clog up. I mean, one could go through a long process but you'd probably spend more money trying to figure out when it would clog up than it would take to rehabilitate it. We do know that given the parameters we're seeing that a... somewhere in the 3 to 5 years is a reasonable time frame to expect to have to do some maintenance. It doesn't mean that the well will have clogged up by then, but you're likely to see some noticeable reduction in yield such that maintenance would be recommended in something on a 3 to 5 year time period.

MR. DAVIES: Would you agree that if you produce water from this well at 4/10s of a million gallons a day that you would be pumping and have to remove about 1800 pounds of iron a month? Does that seem reasonable?

MR. SWENSON: We haven't calculated how much iron would need to be removed. The existing system removes iron very effectively.

MR. DAVIES: Have any of the Town officials shared with you the complaint that GE Plastics made after they began using this water about varying concentrations in their discharge of waste? They're not meeting DEC action levels for discharge of their waste.

MR. SWENSON: Our focus has been on evaluating the aquifer and the yield and quality of the aquifer. We have not been asked to look into other issues associated with the distribution and use of the water.

MR. DAVIES: But, some of those because 50 percent of the water in Bethlehem goes to serve GE and Selkirk Cogen, I would think that there should be some communication on hardness and maybe other chemical constituents that may meet the Sanitary Code requirements but may be a problem to industry. That's all I suggest.

May I ask? You go to executive session and then come back for any additional comments?

SUPERVISOR FULLER: I am not sure that there will be additional comments. I can tell you better when I come back.

MR. DAVIES: Well, the point is, would anybody want to wait or not?

SUPERVISOR FULLER: I think so.

MR. DAVIES: Okay.

MRS. CAPONE: Mr. Kelleher talks about... Hey, I am just going to be a minute. Mr. Kelleher talks about his school book, 50 years ago, if you want to learn about the Hudson, there's a book written about it that's called, Albany a Capital City on the Hudson, by Jack McEneny. You would learn a lot.

SUPERVISOR FULLER: Thank you, Marie.

MRS. CAPONE: Bruce, if you didn't get a fruit cake for Christmas, we give you Sherwood.

SUPERVISOR FULLER: Is there any other questions here this evening? No, Mr. Kelleher, not at this point. Are there any other questions?

Supervisor Fuller next continued with the agenda for the benefit of the high school students. Councilman Davis said Supervisor Fuller was being very nice to the students. Councilman Lenhardt said besides learning about government, he thinks the students had a nice Earth Science lesson.

The next item was to authorize the Supervisor to sign the Contract for Emergency Ambulance Service with the Delmar Fire District.

Supervisor authorized to sign contract for Emergency Ambulance Service with Delmar District

The motion was made by Mr. Johnson and seconded by Mrs. Davis to authorize the Supervisor to sign the Contract for Emergency Ambulance Service with the Delmar Fire District for Delmar, Slingerlands and Elsmere. The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson, Ms. Burns.
Noes: None.

The following item was to authorize the Supervisor to sign the Agreement for Advanced Life Support Services between the County of Albany and Town of Bethlehem.

Authorize Supervisor sign agreement Advanced Life Support Services between County of Albany and Town of Bethlehem

The motion was made by Mrs. Davis and seconded by Mr. Lenhardt to authorize the Supervisor to sign the Agreement for Advanced Life Support Services between the County of Albany and the Town of Bethlehem.

Councilman Davis commented that the community has again been very pleased with the service and she feels it was an excellent decision to do this. She further noted it has made a difference in the community. She does not think anyone regrets the monies spent on this service.

The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson, Ms. Burns.
Noes: None.

Supervisor Fuller noted for everyone's benefit, authorizing the signing of the emergency contracts does not mean that we are going to have some major crisis. She said the first one is for the Contract with Delmar Fire District and they provide ambulance service to Elsmere, Delmar, Slingerlands.

Supervisor Fuller noted the second item was for the paramedics from Albany County so that we have a guaranteed paramedic on every call.

The following item was to authorize the Supervisor to sign a Contract with Spectra for the Bethlehem Energy Center. The Supervisor said Bethlehem Energy Center is the present Niagara Mohawk steam plant and noted Spectra is a consulting firm that will be working for the Town of Bethlehem. She said there is money that has been approved for the expenses to hire this consultant to protect the Town's interests as we go through the Bethlehem Energy Center plant including environmental issues. She said these are items that Spectra is far more knowledgeable about than any of the Board Members. She noted the money has been awarded by the judge in this case.

Supervisor to sign a contract with Spectra for Bethlehem Energy Center

The motion was made by Mr. Johnson and seconded by Ms. Burns to authorize the Supervisor to sign the Contract with Spectra for the Bethlehem Energy Center.

Councilman Burns asked if the total amount of money that is reimbursable was \$50,000. She said she knows they are asking for \$69,000 plus. Supervisor Fuller said at this point in time, yes, because they need to see how the testimony goes along. The judge decided that the pre-application testimony should not include the award of money for this at this time. That money will be held for a later date. She said it is just the \$30,000 for Spectra at this time. Councilman Burns asked if the total amount they can request is \$50,000 at this time. Supervisor Fuller said the Town asked for \$69,000. Attorney Kaplowitz noted the Public Service Commission

required Niagara Mohawk to set aside \$150,000. He said he is not very familiar with the public service law but he believes half of this can be spent for municipalities. He said we are the primary municipality and assumes the Town can get up to that \$75,000 of the \$150,000 for reimbursement. He said there are services to be performed. He further noted he did not know if there are any other municipalities involved.

Councilman Burns asked who would pay the difference if there is any. Town Attorney Kaplowitz noted the Town would but he does not anticipate that there will be a difference. Supervisor Fuller said this came about from a meeting early on in this process when Niagara Mohawk presented the plan before the Town Board and the attorneys had suggested that we hire a consultant. She said she asked if Niagara Mohawk would pay for it and they agreed.

The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

Highway Super-
intendent
award bid
rental of
heavy construction
equipment
low bid
of each
item

The next item was a recommendation from Gregg Sagendorph, Highway Superintendent, for award of bid for rental of heavy construction equipment to the lowest bidder of each item.

The motion was made by Mrs. Davis and seconded by Mr. Lenhardt to approve the award of bid for rental of heavy construction equipment as recommended by Mr. Sagendorph, Highway Superintendent, to the low bid companies at the rates quoted in the bid document and listed in his Memorandum dated February 18, 1999. The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

Parks and
Recreation
approval
seasonal
personnel

The next item was a request from David Austin, Administrator, Parks & Recreation Department, for approval of seasonal personnel.

The motion was made by Mr. Johnson and seconded by Ms. Burns to approve the appointment of seasonal personnel as listed on the Memorandum from David Austin, Administrator, Parks and Recreation Department, dated February 24, 1999 at the titles and salaries listed. The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

Approve
Town Board
minutes 2/10/99

The following item was to approve the Town Board minutes of February 10, 1999.

The motion was made by Ms. Burns and seconded by Mr. Lenhardt to approve the Town Board minutes of February 10, 1999 as presented. The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

Supervisor Fuller thanked everyone who attended and were leaving for coming this evening.

The motion was made by Mrs. Davis and seconded by Mr. Lenhardt to meet in Executive Session to discuss litigation at 8:55 p.m. The motion was passed by the following vote:

Executive Session
discuss Litigation
at 8:55 p.m.

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

The Supervisor reconvened the Town Board meeting at 10:45 p.m.

The motion was made by Mrs. Davis and seconded by Mr. Lenhardt to adjourn the executive session at 10:45 p.m. The motion was passed by the following vote:

Reconvened
Town Board at
10:45 P.M.

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

The motion was made by Mr. Lenhardt and seconded by Mrs. Davis to reconvene the regular Town Board meeting at 10:47 p.m. The motion was passed by the following vote:

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

SUPERVISOR FULLER: For tonight and looking at the report that we have received from O'Brien and Gere, there has been a possibility suggested of a test well to be turned into a production well. I think the question that needs to be posed is to go to the Department of Health and Department of Environmental Conservation to see if this is possible. I think we need to send our report from O'Brien and Gere directly to them and just see what would be involved as far as turning the test well into a supply well. Are there any other comments from the Board? Would you like that in the form of a motion?

COUNCILMAN BURNS: I think that... is that a motion are you asking?

SUPERVISOR FULLER: Does someone wish to make the motion to apply to DEC and the Health Department?

The motion was made by Mr. Lenhardt and seconded by Mrs. Davis to seek information as to what process and time period would be involved to apply to the Department of Environmental Conservation and Department of Health for a permit to turn the test well into a supply well.

SUPERVISOR FULLER: Is there any further discussion?

MR. ALESSI: Just have a question for clarification, I know it is, perhaps, not the most proper for me to ask but as the Counsel I will ask anyhow. You phrased it in terms of to apply and I'm wondering whether what you wanted to say was or what you meant was, to have it determined what the process would be to... if the Town Board...

SUPERVISOR FULLER: To obtain a permit.

MR. ALESSI: If the Town Board considered that what would be the process and how long would it take for such a permit.

SUPERVISOR FULLER: That is what I meant. Thought that's what I said.

COUNCILMAN LENHARDT: That's what I moved.

SUPERVISOR FULLER: And, Doris seconded it.

COUNCILMAN DAVIS: Yes.

Motion to
apply to
DEC and the
Health Depart-
ment what the
process would
be to turn a
test well into
a production
well and send
report from
O'Brien and
Gere to see
if this would
be possible

TOWN CLERK NEWKIRK: We just need a vote.

SUPERVISOR FULLER: All those in favor?

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson.

Noes: Ms. Burns.

Absent: None.

- - -

COUNCILMAN BURNS: I would just like to give an explanation. My no vote was because I believe there are other options and further investigation is the option that I would choose.

SUPERVISOR FULLER: Can I inquire as to what the other options might be?

COUNCILMAN BURNS: I'm not an engineer. I don't have the technical expertise to answer that question right now.

SUPERVISOR FULLER: Okay. Or the other investigations?

COUNCILMAN BURNS: But, one option besides the technical investigation would be further cost analysis and negotiation.

SUPERVISOR FULLER: Okay. I think at this point in time, the only thing that we are... that we have approved here 4 to 1 is for Mr. Secor to write a letter to DEC and DOH to see what is involved, time frame for permitting this process, if in fact, we wish to go this route.

This is something that will come back to the Town Board prior to test well going into a supply well.

COUNCILMAN LENHARDT: Obviously at that time, we'll be provided with costs to do this.

SUPERVISOR FULLER: Yes. Okay.

The Supervisor asked if anyone wished to address the Board. Resident Albert Penk, Clapper Road, Selkirk addressed the Board regarding the Selkirk Bypass proposal by New York State Department of Transportation. He raised concerns about the Bypass and the relocation of Exit 22 of the New York State Thruway. He also asked questions regarding the information the Board has received.

Albert Penk
addressed
the board
about
Selkirk
Bypass

Mr. Penk presented information to the Board members. Board Members proposed questions to Mr. Penk with regard to his information. Supervisor Fuller noted there will be a public meeting scheduled by the Department of Transportation in the near future. Mr. Penk requested a meeting be held with residents of the area to discuss this proposal with the Town Board. Supervisor Fuller asked Mr. Penk to arrange a meeting with the residents by choosing 2 or 3 dates and getting back to her. Councilman Davis noted Mr. Penk was in attendance this evening and Supervisor Fuller noted he waited a long time to give this information. Mr. Penk said he was looking for action on this information. Supervisor Fuller suggested the meeting be held separately from the Town Board meeting. She said she would try to get some names for the people who attended the previous meeting. Supervisor Fuller told Mr. Penk she would be in touch in regard to a meeting.

Supervisor Fuller asked if anyone else wished to address the Board.

Mr. Kelleher
Water

MR. KELLEHER: I will be very brief. I don't see where there is any problem in applying to the DEC or State Health Department. I think the only problem would be the wetland issue. This is on the well.

The... who is going to determine the cost by the way?

SUPERVISOR FULLER: We are not getting into that tonight.

MR. KELLEHER: Oh, I see. All right.

SUPERVISOR FULLER: We will start with this step and then we will be back. It will be discussed in the public meeting again.

MR. KELLEHER: So, the only step you are taking tonight...

SUPERVISOR FULLER: Is just to see what the process is... we have to go through for a...

MR. KELLEHER: I'd just like to point out one thing. The Health Department and DEC could care less about the well yield. They didn't care about the well yield... the 6 million gallon per day well. They didn't care a bit about it. All right, Sue, you said there are other options. Here's what should happen at the very end.

You put a pipe line out into the Hudson River, negotiate a contract... a new contract with Cogen and you change the piping up in Selkirk and just make this into a completely cooling water... a treated cooling water and we'll be able to get our revenue back from it.

SUPERVISOR FULLER: Thank you, Bill.

MR. DAVIES: I'll be brief. I just received tonight the lab analysis...

SUPERVISOR FULLER: So did all of us.

MR. DAVIES: Pardon.

SUPERVISOR FULLER: So did all of us.

MR. DAVIES: Yes. I would like to just point out to Mr. Secor and I would urge that you have O'Brien and Gere provide an analysis of these results. I think it is most important. They report 7 pcb's... 7 different pcb's. These really are airochlors. There's some 209 different, so called that total up the total pcb's. There is no... I repeat no total pcb result here. This should be reported. It's in the water quality standards of DEC and of the State Health Department.

Mr. Davies
Water Issue

Let me just indicate on water quantity. I think there are basically 2 questions. How much water does Bethlehem need? That's not been answered. I've heard no discussion. How can we meet these needs? The attempt to meet these need is only a piece-meal approach by going along with this one well. Based upon last summer's use, the maximum use during August of 1998, we used 7.41 million gallons. We will have projecting it this coming year, we'll have a deficiency of about 8/10s of a million gallons. This well apparently if you run it full time for the month will meet about .4 million gallons. So, you are still deficient. My question is, are you going to meet these needs by increasing the purchase from Albany and what is the long term concern with meeting these needs?

I just leave that with you because it has not been discussed at all.

SUPERVISOR FULLER: Thank you, Sherwood. Anyone else who would like to address the Board?

The motion was made by Ms. Burns and seconded by Mr. Johnson to adjourn the regular Town Board meeting at 11:40 p.m. The motion was passed by the following vote:

Adjourn
meeting

Ayes: Mrs. Fuller, Mr. Lenhardt, Mrs. Davis, Mr. Johnson,
Ms. Burns.
Noes: None.

Kathleen A. Newkirk
Town Clerk

STATEMENT SUBMITTED TO THE TOWN BOARD
ON FEBRUARY 24, 1999

by

William J. Kelleher

Operating reports show that the dredging done in December of 1998 failed to improve the well yield. The well yield continues to decline and by the year 2002 the horizontal well will have to be shut down. Therefore the most important remaining questions are the amount of water that can be obtained from conventional wells that might be drilled on the site and how much it will cost. Studies indicate that a series of vertical wells will also fail. Let's start in 1820 to explain why.

An 1820 map made for the Canal Commission shows that where the Vroman Kill emptied into the west branch of the Hudson river there were islands that appeared only at low tide. Further south or downstream was Scammerhaun's Island. Soundings showed that in order for boats to carry heavier cargoes the east branch of the Hudson river would have to be dredged and the west branch filled in.

The first dike was built in 1837 by the US at the same location as the present dike. The dike was lengthened and raised and the spoils dredged from the Hudson river were placed behind the dike. By 1888 the largest submerged island grew out of the water and was given the name Poplar Island. (The 1000 foot horizontal well was built on Poplar Island). The dike was reconstructed and raised again in 1915. The east - west river channel between Poplar and Schermerhorn Islands was not completely filled in until after 1916. The last fill of spoils was in the 1980s. Today the filled in channels of the west branch of the Hudson river and the original islands are all included in the land area called Schermerhorn Island.

Examination of over 30 borings done in 1978, 1991, 1992, 1993 show no evidence of glacial deposits of gravel despite the claim made by Rust and Fraser that it is a sand - gravel aquifer. The four borings for each manhole clearly shows that the horizontal well was built into sand. The only significant amounts of gravel are found in the old river channels at a depth below 40 feet. It is a well graded pea gravel that was deposited by the river and not by the last glacier.

Work done by Rust in 1978 shows that large diameter wells 50 feet deep with a shallow well pump might yield 350 gpm each. This would require 12 wells to get 6 million gallons of water per day. The well field will have to extend over one mile in order to remain in the deepest portion of the filled in river bed where there are deposits of pea gravel. The 1978 and 1991 reports by Rust showed high concentrations of iron and hardness in the water taken from a 50 foot deep well.

If water from drilled wells were to be pumped into the existing well it would cause a precipitate of iron hydrate causing the horizontal well to clog up faster. Therefore even a single vertical well will have to be pumped into a separate underground storage reservoir. Another turbine pump that matches the three deep well turbine pumps in the horizontal well will have to be installed in the reservoir. How can this expensive system be designed and paid for when there is no insurance that a vertical well will not fail in the same fashion as the horizontal well failed?

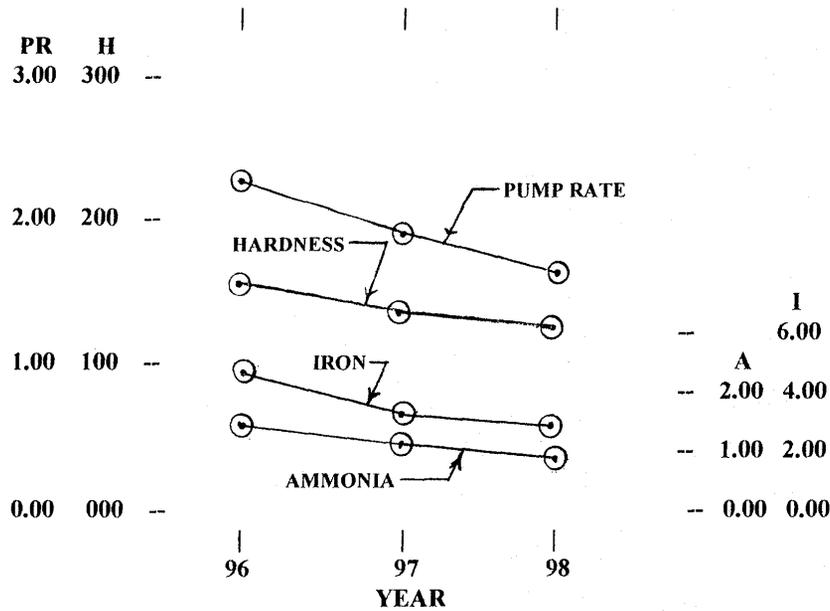
The west branch of the river bed was filled in with spoils that contained iron hydrate, calcium carbonate and sludge from raw sewage discharges. This represents 140 years of burial of sewage sludge from a population equivalent of over 20,000 people. No wonder the ground water on the land side is so much higher in ammonia, iron and hardness than found in the river. The attached graph shows that as the water chemistry gets better the well yield goes down. The ratio of water coming from the land side compared to that coming from the river is obviously going down.

The most likely cause for the decline in well yield is clogging with iron hydrate. The same thing will happen with a vertical well that clogs with carbonate and / or iron deposits. A well on Schermerhorn Island can't be treated to unclog the screen because of the tide.

The company that specializes in the design, construction and maintenance of large diameter wells, that Fraser used as an example to promote his design, would love to do the project. However I can tell you right now, they will never post a long term bond to insure the project because of the water chemistry.

**PUMP RATE, HARDNESS, AMMONIA, IRON
VS.
YEAR**

W.J.K. 02/12/99



- H** - Average hardness for the year in mg / L as calcium carbonate.
- PR** - Average daily pump rate for the year in million gallons per day.
- A** - Average ammonia concentration in mg / L as nitrogen.
- I** - Average iron concentration in mg / L as iron.

Year	96	97	98
Hardness	158	141	133
Pump Rate	2.31	1.90	1.62
Ammonia	1.54	1.19	0.89
Iron	4.87	3.37	2.98