



BERRIEN COUNTY HEALTH DEPARTMENT

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BERRIEN COUNTY SEWAGE APPEALS BOARD

Berrien County Board Room & Via Zoom

9/1/21 Approved Minutes

Present: Peg Kohring (Berrien County Board of Health), Dr. Gleiber (Great Lakes Scientific), Brian Murphy (EH Supervisor), Chris Nagy (Registered Sanitarian, EH), Laird Willard (Registered Sanitarian, EH), Dervin Witmer (Dig-it Excavating), Pattie Kobe (homeowner)

Via Zoom: Ezra Scott (Berrien County Commissioner; via Zoom in New Buffalo Twp.), Justin Sorenson (Engineer; via Zoom in Charlevoix county)

10:37 Meeting called to order by Peg Kohring

Approval of Agenda: Dr. Gleiber made a motion to approve the agenda, a second was made by Ezra Scott, motion passed and approved.

Approval of 4/7/2021 & 6/2/2021 Minutes: Dr. Gleiber made a motion to approve the minutes, a second was made by Ezra Scott, motion passed and approved.

Introductions (1): Peg Kohring (Berrien County Board of Health), Dr. Gleiber (Great Lakes Scientific), Brian Murphy (EH Supervisor), Chris Nagy (Registered Sanitarian, EH), Laird Willard (Registered Sanitarian, EH), Ezra Scott (Berrien County Commissioner, Via Zoom in New Buffalo Twp.), Dervin Witmer (Dig-it Excavating), Pattie Kobe (homeowner), Justin Sorenson (Engineer; via Zoom in Charlevoix county)

Owner/Installer Presentation: Dervin Witmer (Dig-it Excavating), Pattie Kobe (homeowner), Justin Sorenson (Engineer; via Zoom in Charlevoix county for Coveney Rd., 9.9 acres split from parent parcel Tax ID # 11-06-0005-0010-06-9, Buchanan Twp., Section #5

Pattie: Purchased 10 acre parcel, track 5. Looking to build a small 2 bedroom home on it and looking for variance to be able to do septic.

Dervin: Particularly looking to have a Sledge Hammer Treatment System installed. It's a secondary treatment process in which you have sewage coming into a septic tank, this aerator unit is placed in the first tank and is constantly providing stream of oxygen, which speeds up the process of aerobic bacteria. Basically taking away the length of time needed to process the sewage, basically turning the septic tank into aerobic (not sure if that's the proper term for it) - to clean the effluent into an extremely pure level. DOD and TSS those levels are brought below NSF40 standards. So you have it going into a secondary tank and then from there a dosing tank, affluent filter on secondary tank and dosing tank additional screening as it goes into a field. There are two designs Justin submitted, one is typical mound with 4ft of height, dosed into pipe and stone. The second is drip irrigation system which is significantly lower mound due to the fact of drip irrigation process, the GeoFlow material we are using and the travel of liquid out of the humidors. So instead of most of the water coming into the pipe and draining down into the stone and sand, it's actually spread out in a one foot diameter both up and down as it travels across the granules of sand. So we reduce the need of all the extra sand underneath to process the sewage because we spread of the liquid going in all the directions. That technical process can be explained by Justin. What I know is that I would like you to consider the drip irrigation system over the pump and dump system due to a couple things. We have a harder time getting aggregate in this area, so we will save a lot in trucking, sand and stone. Because of the process of the drip irrigation eliminating the need for so much aggregate being brought in. I do have a system printed out for you to see the layout. People think its new technology but it's not really, we have installed these systems all over and they have been working beautifully by lakes and in other hard situations like these soil types and is environmentally beneficial. We are actually putting effluent into the ground that is extremely better treated than the pump and dump. So the combination of all of that, I would like for this county to consider this technology. We are in the process of offering "new" technology, not the it is new and hasn't been used for a long time, but that it hasn't been considered by certain Health Departments and it's in your (BCHD) best interest to check out these technologies and it's in our best interest to provide the homeowner with the best solution. What was the technology for septic 30 years ago, pump and dump. Our cell phones were big old box you carry like a suitcase. If we as environmental stewards don't look at these newer technologies, we aren't offering the best treatment of sewage that we could. We want you to consider the drip irrigation plans over the pump and dump

system, we know you will be happy with the results and we will provide testing and data for the effluent being put into the ground, we can show you the site multiple times through the years so you can see how the stuff works. The example I provided was with a house on Lake Cora in Van Buren, we installed this system within 16 feet of a lake, 3 feet from crawl space, 2 feet from water table and 2 feet from property line.

Justin: this system is giving us the ability to install on very challenging sites, data starting to come back over the last year. Data is robust, very clean numbers are very supportive, we can provide that information as well. Pump and dump vs drip: spherical capillary action affect, where we are dosing the soil in a 2-3 drips per second, looking to dampen the soil but not saturate it. We're speeding the biologically active zone of the soil, so we get good uptake by the plants and bugs in the soil. Dosing can be done by volume or time (ie: every 30 minutes).

Laird: Did you go through EGLE for this system?

Justin: No, we were able to go through the local Health Departments for single family homes. We have a project in Grand Traverse County, 20,000 gallons/day and we did go through EGLE for that community development project.

Laird: how much do we dose every 30 minutes in this system proposed for the Kobe home? 100 gallons?

Justin: Two separate ideas with the plan, when I spoke with Nick he said to offer a low pressure dosing system and we could move forward. But with the subsurface drip, that dose is 2-4 gallon per dose range.

Chris: we're here to appeal the original denial, but which plan are we looking at? We have 4 plans in front of us. I'm hearing subsurface, drip, mound, which is the one we need to look at?

Dervin: I'm here to suggest that we approve the subsurface drip because I believe it is their best option. Even though Nick preferred the pump and dump version, but I am proposing to bring this new system into Berrien County. I was hoping Nick would be here to discuss this, but I guess the real question is who makes the decision? The Board, or Nick?

Peg: Let me clarify, as you can see on the agenda there is owner presentation and then the health department presentation and the board makes the decision.

Justin: Subsurface drip is our first desire, I did design the pump and dump for Nick's comfort level but I agree with Dervin that we prefer the drip system.

Gleiber: Both of you have mentioned "data coming in", what does that mean? Is that to see how the system is working?

Justin: part of our permitting process in northern counties is we have to pull samples quarterly the first year and twice a year there after or remain quarterly if we aren't meeting the numbers. So what that means is that we are sampling for B.O.D., T.S.S., nitrogen, nitrite, pneumonia, T.I.N, sometimes if within 500 feet of a waterbody we have to test phosphorus as well. That's only in one county.

Gleiber: what if the levels are too high? Do we replace the system?

Justin: we do an inspection to see what is going on. Sometimes the pump will stop working so you aren't getting aeration and your levels are all goofed, so we would replace a pump. If we have customers that are on chemo, it's detrimental to the bacteria levels so we have to adjust the bacteria we add to the system (supplemental). All of that information is in the literature given. Generally we identify the problem, fix it, return in 30-45 days and resample to ensure everything is working properly. We have data from other systems already that prove it is working well.

Dervin: we watch the progress of each system, we may have to replace the bacteria packs, make sure the pumps are working properly. We are saying these are the results we are ensuring are happening.

Justin: we have our own benchmark standard and our levels are well below county standards. We keep maintenance programs and agreements. I know there is difficulty in your county code to enforce this, in northern counties these maintenance agreements are recorded with the deed, so we keep tabs on each system.

Dervin: I know one grievance Nick's commented to me was that we don't have the mechanics in place to require these maintenance agreements but you do, you can fail a system simply by not having a maintenance contract. Van Buren County has it recorded on the deed and has a maintenance plan required and that has to be transferred with the deed to a new owner. The language they put in, if there is no maintenance program in place the county will consider this system failed and you can no longer live in that house, that is in your power to say and enforce. The definition of a working system has to follow the definition of the manufacturer, so if sledgehammer says you have

to have a maintenance contract on this. The health code doesn't specifically have to say those words, you either have a system that works or you have a failure. The system only works with a maintenance agreement, that's the only teeth you need to have to make this work.

Gleiber: sledgehammer says NSF certified, is that the equipment function or the process?

Justin: that means that Dr. Wickham went through the testing protocols to achieve the industry standard NSF certification for an aerobic bacterial generator. Rigorous process, using city effluent in Chelsea Michigan. They created protocols to test the bacterial generators with typical residential effluent and showed over the course of time that we could remediate a clogged leach field and the levels of BOD and TSS.

Chris: is there data for her type soils and the system you are wanting to put in at her site?

Justin: I have to get with Dr. Wickham to pull data for you, when it comes to soils it is really about application rate than it is whether it works. We have clay soils we can only use so much water, whereas sand is easier so we can increase or decrease application rate. Bacteria will operate as intended in any soil conditions but hydrologically soil can only handle so much water.

Chris: so the drip irrigation is what you want, how much sand or vertical isolation are you guys doing between the water table and the drip system? Because I was looking at the mound system the last couple days.

Dervin: seasonal high water table is at 12"

Chris: 0-12" if I recall

Dervin: 12" of sand, so we would be 2 feet above the water table

Chris: typically we put more sand base because it will sink/ settle and then you don't have that full two feet anymore between the water table.

Dervin: I've never hear of sand settling before but ok. You take out top layer, put in sand, shows on the map here

Chris: Even if the water is treated, and you're making this drip irrigation system smaller- which footprint is bigger? The mound or the drip irrigation?

Dervin: the footprint is the same, were just talking about not needing the 3 feet of sand and foot of stone

Chris: so the mound is 30 x 60 and the drip irrigation is the same thing, but you had more sand under the mound. So we are doing pretreatment and reducing the mound because the drip irrigation system. For the application rate, if you're still putting in the same amount of water into both systems it looks like the mound would have a bigger area to disperse that water throughout rather than the drip irrigation system.

Justin: Maybe I can clarify; the actual soils that are present dictate the size of the application rate or the mound area it has to be, so it's the parent material that's determining how much square footage you need. Same size field, the difference is with drip irrigation we don't need all the aggregate. With the pump and dump you need all that aggregate, there is a lot of pressure there so we need that stone to deal with that spray. Whereas with the drip irrigation we do the slow drip so we don't use aggregate, we want to use sand on top of the parent material and then we want top soil or something suitable for growing grass on top. In other climates we try to have 10 inches on top.

Chris: are your laterals designed to handle the 100 gallon dose goes out and fills up the entire area and then drips or what?

Justin: for drip irrigation we dose out to the system 2-3 gallons at a time, the 100 gallon dose is for the mound system

Chris: ok so I was looking at and discussing the mound system prior to this meeting, we didn't get to look over this drip irrigation that well, my apologies.

Justin: I'm sorry for the confusion; that's the objective is that you are not putting out as much water per dose but more doses, so the mound height doesn't need to be as high we can do 3/1 or 4/1 slope and we end up with a smaller top area.

Chris: generally we ask for a 7/21 slope for mound systems.

Dervin: the pass through of this system is shown here (on attachment), adjusted through valves so there is enough pressure on each emitter that they are dripping the proper dose per second. When the dose turns off everything is sloped so everything runs back into dosing tank and into septic system.

Peg: Dr. Gleiber has a question, but we do need to move onto the Health Department's presentation, so please go ahead with your question.

Gleiber: in this photo you have provided for us the system is located very close to the house, is that what you are proposing for this system we are discussing?

Dervin: no, we are just showing that in that particular system with minimal room the variances allowed by Van Buren County and the homeowner, this is what we were able to design to fit those specific parameters.

Gleiber: so on the system we are looking at approving, what are the distances?

Justin: we have plenty of room, we aren't encroaching on anything. The example Dervin is showing was just one of the most insanely cool examples of drip irrigation systems and what we can do for these difficult lots. So in this current situation we have quite a bit of space.

Gleiber: Is there an alarm?

Dervin: there is a high water alarm on it so in the event that the affluent side where the filter is, the filter needs to be cleaned we will get a high water alarm because the levels are getting to high in the tank.

Peg: so this is the most confusing presentations ive ever heard, I want you to start from the beginning, sayin what youre suggesting and keep it simple, explain the size of the tanks, mound. Tell me what you are proposing so we can hear from the Berrien County side and get to a decision. Don't slam the other types, simply tell me what you are proposing.

Ezra: I do have questions to ask about this system before we hear from the Health Department, so however you want to handle that.

Peg: I would like to get a simple description of the system first and then we would welcome your questions.

Dervin: a new 1500 gallon tank, with double chamber and a S46 sledgehammer in the second chamber along with an effluent filter, a 500 gallon pump train, with a pump in it that would dose the field. What we are proposing is 12 inch sand mound installed with the subsurface drip irrigation technology.

Peg: you have additional questions Commissioner Scott?

Ezra: Yes I do. To give you an idea I was a general building contractor since 1979. Firstly, we are talking about a subsurface drip- one statement I have to

make is Why did Nick not like this system, and the Health Department can answer that when they present. Secondly, what household materials will kill or diminish the bacteria that you say is in the system and gets flushed out into the drip system in order to keep working? Because there is no such thing as a super bug, all those bugs all have a life expectancy and they have termination expectancy. I feel it is very important in this type of a system where you say you have a maintenance agreement, whether it goes on the deed or not those are all legal questions that have nothing to do with this meeting, in which we approve or disapprove. How will you know when a certain percentage of bugs are diminished and the system is not working as planned, who monitors that?

Justin: to answer your question about that, in a regular system you shouldn't be pouring paint down there or antifreeze, you shouldn't be flushing non flushable items. One thing, the bacteria nothing is eternal superbug however these patented blend of bacteria are pretty incredible. One thing we have to remember is that they are not completely perfect, like if you have a customer that is on chemo or large doses of antibiotics for chronic health things, it's important for us to know that because we have supplemental bacteria pods that we have fabricated that can be flushed once a week throughout the month. That is a rare thing, but it affects a regular system as well. One thing we look for when we go out to inspect during these maintenance agreements is pulling samples and such, is the color of the effluent in the system is not our regular clearish gray and we should only have minimal odor. We shouldn't be blown away by the smell like you would in a typical septic tank because of the amount of sludge, and if you do experience that with one of our systems then something isn't right and needs to be adjusted. That is why we are massive fans of maintenance plans, and keeping tabs on these systems. These systems are biologically complex but physically simple systems. We are just using aeration and cylindrical columns and days of time to allow these bacteria to propagate. But with any system you have to make sure it's working and needs to be inspected, which is why we always propose these maintenance agreements.

Ezra: the other question I have is that you (Justin) are here and your purpose today is to get this board to approve this system for this particular piece of property, but what I am hearing is that once we potentially approve the system our Health Department has absolutely nothing more to do with this system, you're putting your system to the homeowners to monitor and if the homeowner doesn't monitor it or there is some breakdown in the maintenance agreement, then the Health Department has issued a permit for possible contamination. So what I am saying is that there are too many

variables and that is of concern to me. Think of basic systems or mound systems we have put in before, were not in such a problematic area of having this system requiring a maintenance agreement in order to monitor that it is putting out the effluent it is supposed to be putting out and if it's not monitored properly then we are basically giving the authority to damage environment. I'm not saying the system is bad, I just don't know enough about it and it just throws a bit of fear into me on to what we are actually getting into here with this very system.

Justin: that is fair and I presume you would feel that same way about any other advanced technology. What you're saying is that your county has little recourse as to enforce this kind of thing? I think that this just offers another tool to a homeowner to fix it. Your concerns are valid. We are conservationists and we love these areas we are trying to protect and serve these customers in these difficult areas.

Dervin: as far as the maintenance plans, the kind of customer that doesn't want a maintenance plan is not the type of customer we work with. In a particular site where someone wants to be environmentally responsible and they want to have a system that works they are usually willing to pay for the proper services. I'll go back to this: a failed system or a working system, on the permit that is issued we have a definition of a working system and we have that recorded in their deed that's all we need to have the teeth to maintaining this maintenance contract. So to me that helps to identify his concern. Our definition of failed is that there is no maintenance contract.

Peg: just a point of clarification, in this county our attorney does not support deed restrictions. We have run that gauntlet a couple times before, so you weren't aware of that and I should have stopped you before to explain. We are at an hour of your presentation, and I would like to move on to the Berrien County presentation if that is acceptable to all.

Berrien County Health Department Presentation:

Chris: Laird did the soil boring in an area that was picked out, the soils were found to be unacceptable, high water table and clay. So it was discussed that if that homeowner wanted to pursue it we would do backhoe cuts and I stepped in and met the homeowner and excavator out there and we did a couple holes and we found the same thing, high water table. I said from 0-12 inches because just below top soil, since it is hard to see the mottling in it I

say 0-12 inches it is 0-12. We did two spots, we were limited where we could go, and we could only go 9 feet or so.

Brian: we met Patti out there August 19th, 2021 with myself, Nick Margaritis and Brandon Reith tried a couple more spots with the same excavator but we were able to go a little deeper. We went from the northwest corner of the property 154 feet east, and it was same clay and water table. We went 165 feet from northwest corner, east of the property line and we went down to 14 feet and never broke through clay. We hit saturated water at 5 feet and I believe Chris hit it at 6 feet with his cuts. We hit that blue clay and that's the point in which we stopped and that is what prompted this appeals.

Peg: What would you recommend for this site?

Brian: Nick's reservations were just about the same as Ezra's, there are just too many variables with this type of system. That is why Nick was communicating with Justin about a week ago, about switching to the low pressure mound system that we are more comfortable and know more about.

Peg: can you take it from the top and let us know what you are recommending, the size tanks, dosing chambers, everything?

Chris: I feel comfortable with everything for the drain bed, the filter, sledgehammer, pretreatment is all fantastic. I think what we were looking at with the slope of the mound, generally like 7/1 slope for mounds. But the 7/1 slope based on height may push that out into the waterway or into the isolation distances to the ponds and streams, so we don't even know if it will fit. We generally doing more sand, with Nick, we feel more comfortable with the mound where we do 4 feet of sand base so finished 6 feet.

Peg: Would you do 4/1 slope?

Chris: Brian and I had that discussion, we would do a minimum of 4/1. The sand might be able to do 3 foot sand base so 5 feet finished grade. So we have a greater separation between the water table but that is generally without pretreatment. With pretreatment we're not expecting that mound to do as much work, but we are still dealing with the same amount of water no matter if it has been pretreated or not, there is still the same amount going out to the drain bed. So specifically if you remove the foot of topsoil and brought in the 4 feet of sand, so 3 feet above grade and a 2 foot system, so we have 5 foot finished mound height. Slope at 7/1 if it would fit but minimum of 4/1. Normally 1000 gallon tank with filter and raisers to grade, then 500 gallon dosing tank with pump chamber and visual alarm, then into the 5 foot

mound. That is what we are comfortable doing and it doesn't involve maintenance agreements, if the alarm goes on you need to replace your pump it's pretty simple. All isolation distances being met, 50 feet to the well, 50 feet to the any surface water, 10 feet to lot lines, 15 feet away from basement if it is planned (it is not for this home), but I am still not sure all of that will even fit because of the shape of this lot.

Dervin: if we are having these constraints, do you ever do an experimental site where we could show you the results over the next five years so we can help you guys get familiar to the technology? We aren't trying to ram any technology through, we just want to help out in situations that the site is challenging with wells and water tables. We are here not to change your code or minds necessarily but just show you here is another option.

Chris: our code definitely says for new technologies, I just don't know enough about it yet. It's like saying try this new tire on your car, but I don't know enough about it or what it's made of to try it yet.

Dervin: I would love to have- every 3 month -visits with you guys to monitor this thing over the next 5 years to get you the data so we can help you get to that point of comfort.

Laird: I'm going to add one more thing too, we have used in replacement systems things like the waterloo system or similar systems, but it's always been on replacements not on initial construction projects.

Dervin: the area of restraints is where we feel these type of systems would be beneficial in getting systems in and keeping those isolation, and we are happy to provide you with data. If it becomes a problem where it is no longer satisfactory, even at our cost, remove that system and build the mound you prefer.

Chris: I believe possibly one of Nick's reservations was who was going to monitor these systems because we don't have the staff to be calling her every month to ask if she's been checking her system levels and such, we don't have that. So would she then have to contact us every 6 months to let us know what the results are, and let's say there is nothing wrong and then we find out 3 years later there is a massive sewage issue. I don't know what the board would say that would be ok if a mound system that we would like would fit if that system were to go bad, I don't know if there is enough room for that based on the size and shape of the lot.

Appeals Board Discussion:

Ezra: what about alarm system, filter system with the tanks. Are we talking about 1500 double chamber tank or are we not discussing that anymore?

Peg: at this time I cannot do a drip system without more information, we have too many questions. Trial Resolution: two bedroom home, no garbage grinder, 1000 gallon tank with filter and riser to grade, 500 gallon dosing tank with visual alarm, 5 foot mound preferably 7/1 slope but if it doesn't fit 4/1 mound with all isolation distances met including well and property lines with the opportunity for the Health Department to visit when the mound is being sized (preconstruction meeting). Dr. Gleiber 2nd support.

Dervin: One comment about the tank, the sledgehammer will work more optimally if it is a two chamber tank

Chris: I was going to suggest a 1500 gallon, two chamber tank. My whole concern was with the mound height.

Peg: so we have an option of a two compartment 1500 gallon tank with sledgehammer with alarm, so that is my resolution

Appeal Board Decision:

Peg: Proposed: two bedroom home, no garbage grinder, two compartment 1500 gallon tank with sledgehammer, filter and riser to grade, 500 gallon dosing tank with visual alarm, 5 foot mound preferably 7/1 slope but if it doesn't fit 4/1 mound with all isolation distances met with the opportunity for the Health Department to visit when the mound is being sized (preconstruction meeting). All in favor, motion Approved.

Additional Comments After Appeals Decision:

Dervin: my only question is if we can't get the isolation distances then what?

Chris: then it's back to the Appeals Board

Ezra: I would like to thank you for your presentation, and I would hope and highly suggest to you and to Justin to get some more hard real data to our health department people because if new technology is coming out we need to be on the forefront of it and decisions cannot be made without all of the

information. I think it is very important the Health Department Team gets over familiar with this type of system that you were proposing for future.

Peg: I appreciate how you did the map, everything looked very professional and a step above what we normally see so we thank you for that. We are not anti-technology.

Ezra: I appreciated all that documentation provided and I think more needs to be studied by our Health Department officials so we can be advised, we are just the recommendation board but we also need to be brought up to speed on any new technologies that are coming.

Brian: how many years have you been installing these systems?

Dervin: a few years but Justin has been installing these for 4 years, and Dr. Wickam has been doing them for 20 years, largely out in states where water is precious.

Chris: we do have a lot of tough spots, we size these drain beds for 300 square feet per bedroom, in good sand. By using the sledgehammer, what can we go down to in order to reduce these mound systems in size? For her (Pattie Kobe) situation, soil type and water level, is there data using the sledgehammer that can show us a better target point that we can use to help reduce the size of the mound?

Justin: the short answer is yes we do have some case studies that we can provide for you to go over that relate to reducing the size of the mound systems similar to this one. Treatment is still occurring in the mound but our objective is to reduce the size at least 25% if possible.

Laird: say we do this system and the maintenance agreement, can you test B.O.D.'s and suspended solids through the sand after it has been treated? How do you test it once it goes through soil? If we are reducing mound size?

Justin: we are doing an install now similar to what you're asking and part of the deal is all about the phosphorus, we can test for nitrogen and other things as well but this particular county wants the phosphorus data for the lake nearby. The solution is groundwater monitoring wells directly downstream of the field. I proposed putting one (groundwater monitoring well) in right next to the field and another one 30 feet away, and Dr. Wickham suggested this in order to prove how well it works through this and how the water changes within the distances between these wells. Also taking samples from the tank

to compare and monitoring nutrients in that way can help us get a real idea of how well the systems are working.

Chris: you mentioned capillary action before, and that is why we typically do more sand because of the capillary action because we know that the water will come up into it, and if I am calling the water table 0-12 inches and we have water at grade and it gets pulled up into that sand and I don't know how much data there is to prove if it gets pulled up 4 inches or a foot and that is why we may go overboard and put in more sand because of the settling and the capillary action.

Justin: that makes total sense to me and especially when you have a water table that great. We are also developing a special bacteria blend to use in bodies of water to combat algae bloom, we are permitted through DEQ to do this. So keep an eye out for that technology as well.

Dervin: if we did that standard isolation distance, would you consider the drip instead of pipe and stone at that isolation distance because it would bring us down a foot so then maybe we would get the 7/1 slope you want.

Chris: I think we could consider that but I also would like Nick to be here since he had some reservations. We did approve a system for you today so let's move forward with that and discuss more later on.

Peg: it is a really tight site here and we do appreciate your technology and look forward to possibly using it in the future.

11:57am Meeting Adjourned

Minutes Submitted by S. Bowie 9/14/2021