

RWSA BOARD OF DIRECTORS
Minutes of Special Board Meeting
Community Meeting on Dredging Feasibility Study
June 30, 2010

A special meeting of the Rivanna Water & Sewer Authority (RWSA) Board of Directors was held on Wednesday, June 30, 2010, at 6:00 p.m. in “City Space” in the Charlottesville Community Design Center, 100 Fifth Street, NE, Charlottesville, Virginia. The purpose of the meeting was to allow members of the Authority’s Board of Directors to attend the second Community Meeting on the Dredging Feasibility Study.

Board Members Present: Mr. Kenneth Boyd, Mr. Michael Gaffney – Presiding, Mr. Maurice Jones, and Mr. Gary O’Connell.

Board Members Absent: Ms. Judith Mueller, Mr. Dave Norris, and Mr. Robert Tucker,

Authority Staff Present: Ms. Tamara Ambler, Mr. Darryl Cooper, Mr. Tom Frederick, Mr. David Golladay, Mr. Chuck Kent, Ms. Jennifer Whitaker, and Dr. Robert Wichser.

Also Present: Mr. Peter Berrini - Manager of Water Resources and Environmental Services with HDR Engineering, Inc.; Mr. Carey W. Burch - Project Manager with HDR Engineering, Inc.; Ms. Becky Clay Christensen – Facilitator with The Clay Christensen Group; Ms. Elizabeth Golden - Recording Secretary; Charlottesville City and Albemarle County Government Officials; Members of the Albemarle County Service Authority Board of Directors; Albemarle County Service Authority, City, and County Staff; members of the public; and media representatives.

Call to Order

The special meeting of the RWSA Board of Directors was called together by Mr. Michael Gaffney on Wednesday, June 30, 2010 at 6:00 p.m., and he noted that a quorum was present. Mr. Gaffney then stated that no Board actions would be taken tonight, but minutes of the meeting would be prepared, submitted to the Board of Directors for approval, and then posted to RWSA’s website.

Mr. Gaffney next invited attendees to sign the register if they had not already done so when they entered the meeting and to also provide their e-mail address if they wanted to receive regular updates on this project.

Mr. Gaffney then noted that the meeting was being taped by Charlottesville Public Access Television and would be aired in the coming days on local government cable television. The schedule of airtimes will be available at www.rivanna.org and www.charlottesville.org.

Background

Mr. Gaffney explained that the dredging feasibility study is being performed by HDR Engineering out of their office in Richmond, stating that HDR is an engineering company practicing in several disciplines including water, natural resources, power and energy, transportation, and waste management. He reported that the company was founded in Omaha, Nebraska in 1917 and today has offices across the United States and in Canada. Mr. Gaffney said that HDR's extensive experience includes dredging, and they were selected last summer by a panel as the most meritorious firm for the dredging feasibility study out of eight consultants who submitted proposals. He indicated that there would be two representatives from HDR present tonight, to be introduced shortly. Mr. Gaffney explained that HDR's work has been divided into two phases, with the first phase completed in February and presented at a public meeting on March 9th – with the focus on the physical characteristics of the South Fork Reservoir and included the results of a bathymetric survey, sediment analysis, wetlands analysis, and a survey of physical obstacles to dredging.

He stated that the second phase would be presented tonight, and this phase will determine how to dredge the reservoir, how to handle the sediment removed from the reservoir, and where to ultimately take that sediment either for beneficial use or disposal. Mr. Gaffney said that HDR would also provide cost estimates for dredging and name specific sites for sediment processing. He emphasized that the landowner names would also be mentioned, adding that permission has been granted by property owners in each case. Mr. Gaffney pointed out that no leasing or other agreement has been negotiated, and HDR did not investigate sites for this study where property owner permission was not granted. He explained that after HDR speaks, Tom Frederick would discuss the June 1st meeting held on the Ragged Mountain Dam, and the outcome of that public meeting. Mr. Gaffney stated that tonight's meeting is being facilitated by Becky Clay Christensen, who has many years of experience facilitating public meetings – including several past meetings of the RWSA and numerous planning and public input processes for the City of Charlottesville. Mr. Gaffney introduced Ms. Christensen.

Introductions of Presentation Speakers

Ms. Christensen thanked audience members for coming, and asked how many had attended the June 1st meeting on Ragged Mountain, and the Phase I meeting in March. She said that the meeting format would be similar to that used in previous meetings, stating that there would be presentations providing an update on the process followed by a brief presentation by Mr. Frederick, followed by questions and then public comments. Ms. Christensen asked speakers to identify themselves.

Presentation

Mr. Burch introduced himself as Project Manager from HDR Engineering, and also introduced Peter Berrini from HDR's office in Springfield, Illinois. Mr. Burch stated that he would summarize Phase II of their efforts, including a dredging alternatives assessment, a dewatering alternatives assessment, and beneficial reuse. He said that when he speaks of various parcels and mentions the landowner it is "with their permission," and where permission was not given to evaluate a certain parcel, landowner names are not mentioned. Mr. Burch added that while some landowners are willing to have their names used, there has been no further commitment to having agreements made. He said that when mentioning permits and what regulatory agencies

may require, the opinion given is HDR's professional opinion – but they do not speak for those regulatory agencies. Mr. Burch added that when the time comes and an application goes before the agencies, “they will render their own judgments.”

He stated that in the reservoir characterization phase, HDR reached several conclusions: the sediment is clean with no environmental contamination found in the samples analyzed; most of the sediment was identified in the upper reaches of the reservoir and in Ivy Creek. Mr. Burch explained that they divided the reservoir into three sections: the upper main stem from Earlysville Road Bridge up to Rhea's Ford Road Bridge; Ivy Creek from the Woodlands Road Bridge up to the point designated on the map; and the lower fork main stem – from Earlysville Road Bridge down to the dam. He reported that they found a high percentage of sand in the sediment, in the upper three segments of the reservoir, with a higher percentage of silt and clay – finer particles – in the lower portion of the upper main stem and Ivy Creek. Mr. Burch reported that a lot of the older sediment deposits have become vegetative; they have become wetlands and are now regulated as such. He added that the only in-water obstacle they identified is the Woodlands Road Bridge, as it is “simply too close to the water to allow a dredge to pass underneath it.” He said that any movement of a dredge from the reservoir main stem into Ivy Creek would require a lift of the boat out of the water and back in, noting that there is limited access to the reservoir itself. Mr. Burch stated that the bathymetric survey identified the amount of sediment that has deposited in the reservoir since its inception – 1.7 million cubic yards of sediment. He emphasized that there are wetlands as mentioned, as well as areas the dredge will not be able to access, so the “no-dredge buffer zones” reduce the dredged volume to about 1.5 million cubic yards. Mr. Burch said that based on where they found the sediment, they did not recommend dredging in the lower main stem. He explained that there was just over 100,000 cubic yards of sediment there, and it is “all down in the dead storage area.” Mr. Burch said that the final Phase I target is 1.4 million cubic yards of material, and that figure was taken forward into HDR's Phase II analysis – which included dredging alternatives, dewatering alternatives, and beneficial reuse alternatives.

Mr. Burch reported that regarding dredging alternatives, HDR looked at reservoir draw-down and excavation, also known as “dry dredging,” and also looked at mechanical wet dredging as well as “hydraulic dredging.” He explained that dry dredging does not work for a water supply such as that at the South Fork, because it requires draining the reservoir, allowing the material to dry out, then excavating the dried material with conventional equipment. Mr. Burch said that the reservoir could be drained, but there would be no water supply during that period – adding that it's very difficult to dry out a reservoir with a river running through it. He stated that HDR looked at mechanical wet dredging, whereby an excavator is put on a barge in the water, where it removes material and puts it into an adjacent barge or scow, which is then taken over to the shoreline where a second excavator removes the material, puts it on a truck to be hauled off. Mr. Burch said that with this method, the material can be handled by conventional earth-moving equipment – but that requires a lot of heavy truck traffic and tends to be “a very expensive method of dredging.” He added that it's not commonly the method chosen for this type of reservoir because of those two negative aspects.

Mr. Burch reported that hydraulic dredging is one of the more common methods of dredging for water supply reservoirs, and can typically be done with equipment such as a floating work

platform with an operator's cabin, a diesel motor, and a cutter at the front with a suction hose attached to it. He stated that the advantage is very little disturbance within the lake itself, but the disadvantage is the material must be dewatered – with the composite suctioned consisting of about 90% water and 10% sediment. Mr. Burch added that a pipeline route for dewatering is also needed, and the typical approach is to build a large containment berm on a relatively level area to form a confined dike, with the sediment slurry pumped into the dike to be dewatered. He explained that with the dredging target of 1.4 million yards, the ideal dewatering area would be about 100 acres with a 15-16 foot high berm around it – with sediment filling it to about 11 feet deep.

Mr. Burch presented two examples of confined dike operations HDR has worked on, including a site in Illinois that has had 3 million cubic yards of material dredged into a 400-acre dike dewatering facility. He presented another dredging example where 500,000 cubic yards were moved into a 40-acre dike dewatering facility.

Mr. Burch explained that another dewatering option is mechanical dewatering with truck-mounted separators, shaker screens, centrifuges, and filter presses to separate the sediment from the water. He said that is usually done for small volumes of material, or when there is some recovery of material anticipated.

Mr. Burch stated that HDR has determined that hydraulic dredging would be the best means for dredging the reservoir, and four elements are required for that operation: mobilization and demobilization, a site to put the dredge in and out of the water, a place to stage the project and dewater the material, and a destination for the material once it is dewatered. He explained that the dredge would come in on a trailer, and a crane would come in and lift the dredge from an access road into to the water. For the staging area, Mr. Burch said, an area adjacent to the reservoir is needed where the pipeline can be assembled, and because South Fork is a long and narrow reservoir, several miles of floating pipeline would be needed. He said that the pipe would need to be assembled in pieces onshore, and pulled into the reservoir as needed. Mr. Burch added that there would also be access needed for workers to get to the dredge via small boats, etc.

He reported that HDR looked at multiple staging and demobilization sites along the reservoir, and identified two that were very practical – with the landowners willing to consider use of their property. Mr. Burch stated that one property is owned by the Virginia Rowing Association, near the Woodlands Bridge in the main stem of the reservoir, and that property has a large area suitable for staging and mobilization. He said that Mr. Spotswood Connelly has a parcel of land just above Rhea's Ford Road bridge that borders the South Fork Rivanna, and that too would be suitable for a staging area and possibly for mobilization of the dredge.

Mr. Burch reported that those findings led HDR to the next stage, which was looking for a site to dewater the material. He said that several alternatives for dewatering were considered, and the confined dike is usually the cheapest option; geo-textile tubes would not be very practical for a project this size due to cost and land requirements – as flat ground is necessary. Mr. Burch noted that land spreading doesn't work, and mechanical dewatering can work but is typically very expensive. He said that HDR's dewatering site search was done in a "step-wise fashion," and

they conducted a desktop analysis first using GIS, aerial photographs, and available data against technical screening criteria; once potential sites were identified, they contacted landowners to pursue their willingness to consider allowing their property to be used. Mr. Burch added that in the case of landowners who responded positively, HDR developed conceptual designs to determine how practical the sites would be.

Mr. Burch explained that their desktop analysis began with parcels larger than 50 acres, with no wetlands or streams that would be of concern to regulatory agencies. He presented a map that showed properties within both one-mile and two-mile radii of the reservoir, and emphasized that there are “not many large parcels.” Mr. Burch stated that when parcels with conservation easements, or those in the floodplain, are ruled out, the options are narrowed down even further. From the desktop analysis, he said, HDR identified four parcels greater than 50 acres as potential dewatering facilities. Mr. Burch said that HDR also included multiple parcels owned by one owner that would add up to a useable parcel. He stated that they also went through public records from prior meetings to identify other names and sites that were mentioned, and two additional landowners were identified – for a total of seven to be contacted, with five of them giving permission for HDR to move forward. Mr. Burch said that from the five landowners, HDR was available to identify four potential dewatering sites.

He reported that one of those sites, Panorama Farms, is on the left bank of the reservoir in the middle of the upper main stem, and HDR identified three possible areas that the landowner was willing to consider allowing for dewatering. Area one, he said, a steeply sloping portion at the bottom of the site has a few intermittent streams that need to be avoided; area two, a much smaller parcel, also has some steeply sloping parts; and area three, with more gentle slopes until it reaches the reservoir face. Mr. Burch reported that Mr. Robert Llewellyn has a 37-acre parcel on the right bank of the reservoir just below Rhea’s Ford Bridge, and again has some steeply sloping portions. He said that HDR took those sites forward to develop conceptual engineering layouts, and the concept behind their designs was to maximize the sediment volume that could be stored on each site. Mr. Burch presented a “crude design,” which was a “10,000-foot level” design using four-foot contours – assuming there is sufficient material on-site to build the berms. He said that there were also specific conditions that the landowners required be met – limited clearing of woodlands, which would also match what the regulatory agencies would be looking for. Mr. Burch stated that the material, once it was dewatered, was to remain onsite to limit any future truck traffic and disturbance of the site.

Mr. Burch stated that HDR developed conceptual layouts, and presented drawings of the areas for dewatering and areas for necessary earthwork and berming. He stated that “none of these sites are ideal” for dewatering because of the topography, which has prevented them from finding “that one single water site where you get a good economy of scale,” so they had to go to multiple sites in a stair step fashion to work with the existing topography. For site one, he said, HDR came up with two different layouts – one that preserves and protects an intermittent stream and the wooded ravine down the center; and the second one that maximizes sediment storage and has a more cost-efficient per unit volume but has a slight impact on the stream there. He said that area two didn’t look as good, as it is narrow and small and would require a lot of earthwork; area three was “the best of the bunch,” requiring less earthwork and providing a good amount of storage. Mr. Burch stated that the Robert Llewellyn land includes some small parcels and a good

one facing the reservoir. He said that HDR came to option four, at the bottom, area “1-B” on Panorama Farms, area “3” on Panorama Farms, and the Llewellyn parcel – in an effort to maximize sediment parcel for the most cost-effective approach. Mr. Burch added that they eliminated area 2 entirely because of high cost of cubic-yard storage.

Mr. Burch reported that HDR also conducted a beneficial reuse assessment to determine what could be done with the sediment, adding that there are “a lot of things” that can be done with it – agriculture, buildings, restoring wetlands. He said that HDR looked at the local market for soil in Charlottesville and Albemarle County, and presented information on the retail cost within a 20 mile radius of Charlottesville. Mr. Burch stated that sand is costly in this area because there are no local sources, and much of what is used here is trucked in from places as far away as Williamsburg – which drives the cost up. He said that the material that comes out of the reservoir could be used for topsoil or fill, and would require additional screening and sifting for certain reuses depending on who the user is and what their specific requirements are. Mr. Burch emphasized that one key item will be the timing of when the material comes out of the reservoir and is available with the timing of the market demand. He noted that the demand is tied into the development market, “which right now isn’t going very far very fast.”

He reported that out of that information, HDR developed a recommended dredging approach for the reservoir – with hydraulic dredging recommended for the upper three segments of the reservoir, staging that portion of the project at Mr. Connelly’s site with a mechanical dewatering process then hauling the material off for beneficial reuse. The upper three segments where most of the sand is, he said, is where the recovery value would be. Mr. Burch stated that part two, the recommended hydraulic dredging for the remainder of the upper main stem of the reservoir and into Ivy Creek, would be staged with the Virginia Rowing Association closer to where the dredge is operating. He said that the dewatering would use the Panorama and Llewellyn sites, and in part two of the dredging there is no reuse of the material. Mr. Burch presented a drawing illustrating the location of each part of the process.

Mr. Burch reported that part one of the operation could remove all of the sediment in the first three segments – about 290,000 cubic yards of material, including 189,000 cubic yards of sand – with the cost of dredging and mechanical dewatering between just under \$8 million to just under \$13 million. He stated that part one does offer the potential for cost offset with reuse, particularly with the sand; the cost for sand after it is further screened and moved to a reuse location, given the current retail price, could allow for recovery of between \$5 million to \$9 million for the sand alone. “This is assuming that the market is there for that volume...less your recovery value for the topsoil and for the fill.” Part two, he said, would remove about 800,000 cubic yards from the remainder of the reservoir at a cost between \$26 million - \$27 million, with the bulk of the cost for the dewatering. Mr. Burch added that because multiple facilities with multiple smaller cells would be used, the cost of dewatering increases.

He explained that permits would be required at every stage of this project, but HDR is confident that each of the projects as laid out would be permitted by the various agencies. The two-part dredging approach, he reiterated, would remove about 1.1 million cubic yards of material at a cost of about \$34 million to \$40 million, not counting any offset that may be gained from the resale of sand or other materials. Mr. Burch added that it would restore all of the useable water

supply in the reservoir, and about 56% of the dead storage volume that has been lost in the upper main stem and in Ivy Creek. “So we got to about 80% of our target 1.4 million cubic yards.”

Mr. Frederick addressed the audience, stating that what was just presented by HDR was the result of their study looking at dredging feasibility of the South Fork Reservoir. He emphasized that dredging feasibility was the limit of HDR’s scope of work, adding that they were not asked to evaluate the water supply plan and make any judgments with respect to it. Mr. Frederick said that there have been questions from the community regarding the cost of dredging compared to the cost of the new Ragged Mountain Dam, and indicated that he would provide a little bit of information in that regard.

Mr. Frederick presented questions that have come from the public, the first one being how much of the proposed added 1,726 million gallons that the new Ragged Mountain Reservoir would provide could be met by the recommendations of the dredging feasibility study. He said that part one of what Mr. Burch presented would recapture about 3% of the new water storage of the Dam - or 59 million gallons; part two would capture 10% - or roughly 169 million gallons of additional storage. Mr. Frederick said that the second question is whether dredging is cheaper, and on the basis of cubic yard or per gallon of added water storage, the cost of dredging is not cheaper. “That doesn’t mean there aren’t reasons in the community to consider dredging.” He said that the third question is whether the market provides a potential opportunity for a small cost-effective dredging project to benefit the community resource of the South Fork Reservoir, and the answer to that is “yes,” based on what HDR has presented tonight.

Mr. Frederick presented a graphic showing that the cost of water provided through part one the dredging alternative at approximately \$8 per cubic yard; for part two dredging is about \$32 per cubic yard because there is no beneficial reuse. He stated that the cost for water when considering the useable storage at the Ragged Mountain Reservoir is approximately \$4 per cubic yard. Mr. Frederick clarified that the cost for part one, the sand recovery dredging, “is not far different from that number” but the Reservoir is significantly lower in cost than Part II dredging. He stated that there have been comments from members of the public that the cost of Ragged Mountain cannot be considered without factoring in the cost of the pipeline, “and we respectfully disagree with that offer because we believe that an element of a reliable long-term future water supply that provides what the City and the County have told us what they need for their future requires replacing the pipeline regardless of how much storage you provide at South Fork, or how much storage you provide at Ragged Mountain.” Mr. Frederick said, “So if you apply the pipeline to one, you should apply the pipeline to both, in our view.” He presented a graphic depicting the numbers he just explained – with the part two dredging project representing “the highest cost by a substantial margin.” Mr. Frederick added that the sand recovery doesn’t provide a substantial amount of volume when compared to what has been identified as the community’s long-term need.

Mr. Frederick said that regarding the benefit of dredging just for the South Fork itself, the RWSA agrees there is a benefit in looking at that – and recommends that as this discussion moves forward, proposals from contractors be considered – particularly from those who have experience in finding sand markets to maximize the return on investment. He stated that the plan

is to reach out and ask these companies to bid, “perhaps even a turnkey proposal,” adding that it has “realistic enough potential that we should pursue the program.”

Ms. Christensen indicated that Mr. Frederick and Mr. Burch would now be available to answer questions for clarity, and asked attendees to save comments for later in the meeting.

Public Questions for Clarity

Question from Dr. Liz Palmer – Albemarle County resident: “We’ve been told in the past that fuel prices affect the cost of dredging. Could you tell us if that’s the case, and how much it really affects it? And also, I guess this is a question for Tom, when you did have up on the screen the statement about benefits for the community with respect to dredging. Could you just say a few things about what those benefits are, if it’s not primarily for water supply or storage? Thank you.”

Response from Mr. Burch: “Does fuel price affect the cost of dredging? Yes it does. The dredges typically operate with diesel motors...fuel is a cost element for them...they’re also having to do some earth-moving equipment. So yes, it will affect the cost of dredging. We believe we have enough of a contingency built in, to our estimate, at least for the next year or two, a couple years, as far as we can proceed, it’s covered.”

Response from Mr. Frederick: “I think some of the benefits when you strictly look at how dredging can benefit the South Fork Reservoir, in the upper reaches particularly that we talked about. Water quality can be benefitted, can be served, by such an operation. Certainly recreational use of the reservoir, passive enjoyment of use. Another idea that’s been talked about in this community before is can you build a forebay. Well this may not be strictly a forebay the way engineers look at it, but if you can dredge out the sand that would head into the reservoir, you may be creating something in the reservoir itself that could capture future sand, [and] that keeps it from moving further downstream.”

Question from Sam Freilich: “I was wondering if Barbara Hutchinson was contacted at the airport, as to either drying out the sediment or using it from the standpoint of fill that’s required for the extension of their runways.

Response from Mr. Burch: “Yes, I met with Ms. Hutchinson and their consultant. We discussed their existing expansion of the runway and the safety zone at the end of that. The material cannot be dewatered at the airport – one, there is not sufficient space available; two, for a hydraulic dredging operation there is a lot of water involved and you can’t have that type of wet impoundment at an airport because of the bird attracting issue. But mainly, they just don’t have space. So even if we did a mechanical dredging and trucked it to the airport there’s still no space there to spread it out and dry it. That said, they do have a need for fill, and we’re estimating about 1.9 million cubic yards of fill, I believe. They have identified an on-site source for that fill, but stated that if outside fill material could be provided at a lesser cost, they would be pleased to take it on provided it meets the FAA standards for compression.

Question from Mr. Freilich: “Mr. Frederick, I’m confused. In the article in *The Daily Progress* that you basically made quotes on, on Thursday, June 17, you indicated two basic areas that would be available for a total of 287 million gallons of water, and tonight you quoted 165 plus 59 is 224 million, and I wondered what the disparity is.”

Response from Mr. Frederick: “I wasn’t aware of a disparity. It may be just simply math or something like that, I don’t know. I can look into it. I don’t have figures in front of me.”
[Editor’s Note: The June 17 article in *The Daily Progress* actually quoted Mr. Frederick as stating “228 million gallons of water” and in his earlier presentation at this meeting he quoted 169 and 59, which add to a total of 228. There was no disparity.]

Question from Mr. Freilich: “Can you tell us, Mr. Burch, when you do as much dredging as you can, how many gallons of water we’d be getting out of this. Is it 224? Is it 287? Or some different number?”

Response from Mr. Burch: “I believe I’ve got that on one of my slides actually...let me see if I can get back to that.

Comment from Ms. Christensen: “Is it OK if we go onto the next question?”

Question from Mr. Freilich: “I have one other question for Mr. Frederick and that’s all.”

Response from Mr. Burch to previous question: “Yeah, we have a million gallons presented here of how much, a million gallons is represented by the dredging quantities. So if we were to remove the 1.5 million, it would be about 311 [thousand], so a little bit less at that level. We’re talking about pulling out 1.1 something in cubic yards, do you have a calculator, multiply that by 202 – 202 gallons to a cubic yard.”

Question from Mr. Freilich: “So it looks like we have maybe 400 million gallons.”

Response from Mr. Burch: “Not quite that much. It would probably be 200 and some.”

Question from Mr. Freilich: “Mr. Frederick, I guess my concern is that I see two things here. I see Mr. Burch here who’s done a very scientific study and can back up everything with absolute numbers that will potentially work. You’re talking about the cost of your project, but I don’t know that you really have a cost to your project. The dam has not been fully calculated, that’s in a phase two; we know that there is unstable rock underneath it; we don’t know what’s really required in order to make this thing work. We have yet to get a number on that. The pipeline is a very major part of all this, and although it’s not required until sometime in the future, it has to be considered in the overall aggregate of the price. We know the pipeline is going to be significantly longer, but what we don’t know really is exactly where it’s going to go, what the cost of that pipeline is, how effective it is, and the massive cost presumably to run it. And also I’m curious too, in these very tough economic times, a number before everything else has been put together is \$142 or \$143 million – but what does that mean to us? What does that obligate each one of us to? And how are we going to pay for this? I mean, these are things that I’m really concerned about.”

Comment from Ms. Christensen: “Could you get to your question? It sounded really like you were stating your concern, which you certainly are welcome to do. We were just trying to clear the questions.”

Question from Mr. Freilich: Well, I guess my succinct question of Mr. Frederick is, again this was pretty substantial, do you have absolute, complete documented prices from engineers, constructors, and others on the pipeline, on the final cost of the dam and so on, to be able to make an apples-to-apples comparison?

Response from Mr. Frederick: “You’re making very exacting statements about the cost. It doesn’t matter what you’re talking about building – you’re initially relying on consultants, who are doing studies and preparing estimates. What you’ve seen from HDR tonight is an estimate, it’s not an exact cost. You don’t know the exact cost of a construction project until you’ve completed 100% of the construction. With respect to the Ragged Mountain Dam, as we qualified tonight, the numbers come from the preliminary design work that’s done by Schnabel Engineering. That has now been completed, and has now addressed the questions that you expressed some concerns about. In the view of how, Schnabel Engineering is very well-qualified to design dams, estimate the cost of the dam, and those are the numbers we are relying on.”

Follow-up question from Mr. Freilich: “And it does include information on the pipeline as to where it is and what it’s going to cost.”

Response from Mr. Frederick: Let’s talk about the pipeline again. If you’re asking the question how much are we going to have to invest in a water system over the next 50 years to take care of all the issues related to a water system, it’s fair to talk about the cost of a pipeline. If you’re simply comparing the storage – which is one component of a 50-year plan – of one project to the storage of another, it’s not fair in my view to add the pipeline to one alternative that provides storage, and not add the pipeline to another alternative that would also provide storage.”

Question from Rebecca Quinn, City resident: “I do have a clarifying question. Just as I think it’s important to always say a ‘dam and pipeline project,’ it seems that there may be more than one pipeline in discussion. And I’d like Mr. Frederick to clarify which pipeline he’s talking about, because when asked a very similar question on the radio about what I think was the pipeline between Rivanna and Ragged Mountain, you talked only about the Sugar Hollow pipeline. So now we know we need to talk about the Ragged Mountain dam, and the Rivanna to Ragged Mountain pipeline...but my question is, well there’s that clarification – which pipeline are you talking about. And then I’d like you to clarify a statement you just made regarding comparing storage, because as I understand it, without the pipeline from the Rivanna to Ragged Mountain, the storage you would create with a new dam at Ragged Mountain would be empty space. Whereas the storage, the water that becomes available if we dredge, is filled with water – and water is what we’re talking about. And one last comment, not asking for clarification, but that is, all references to the previous community water supply plan, let’s remember that’s not the state-required water supply plan and it does not take into account conservation – both active and passive conservation. So we really don’t know how much water this community needs for the future.”

Response from Mr. Frederick: “I’m really not sure how to answer the first question about which pipeline, because it depends on the context of the question and who we’re talking to at the particular time and what the issue is. We’re not always talking about the same pipeline, it’s true.”

Follow-up question from Ms. Quinn: “That’s what I’m saying. You just said that about the pipeline. To compare the costs of a dam project, it needs to be – because the dam without the Rivanna to Ragged Mountain pipeline, the dam will be maybe not entirely empty but it will certainly not be full, right? Do you agree, maybe it’s not a clarifying question, but is that an accurate statement that in order to fill the proposed Ragged Mountain dam, a pipeline from Rivanna to Ragged Mountain is necessary?”

Response from Mr. Frederick: “It’s true that to refill a new Ragged Mountain Reservoir, there needs to be a pipeline.”

Comment from Ms. Quinn: “Therefore...”

Response from Mr. Frederick: “Wait a minute, let me finish answering the question.”

Comment from Ms. Quinn: “You answered it.”

Response from Mr. Frederick: “It is also true that if you retain the existing Ragged Mountain Reservoir, you need a pipeline to fill it. The pipeline that exists today, in our professional opinion, is not a pipeline that you can rely on with no maintenance and no expenditures for the next 50 years. And that’s why we make the argument that we’re going to have to invest in a pipeline regardless of how we choose to design our storage.”

Follow-up question from Ms. Quinn: “And you want us to just accept that those pipeline costs are equivalent, and therefore cancel each other out? ...Let’s be clear when we’re talking about the Ragged Mountain Dam that we have to add the cost of the Rivanna to Ragged Mountain Reservoir pipeline as part of the project, because the dam without a pipeline...now I understand how you’ve conflated the two.”

Response from Mr. Frederick: “I do need to take exception to something that you said...was that without a Rivanna to Ragged Mountain pipeline, the Ragged Mountain Reservoir would sit empty – and that’s not a true statement. There is a pipeline that can fill Ragged Mountain today; if the reservoir is expanded, the fill rate could take a longer period of time – up to three years – that’s the Sugar Hollow pipeline. There’s a couple issues with the Sugar Hollow pipeline – it’s an 18” pipeline. If you’re going to reliably build a system for the future of this community up to 50 years, the pipeline we believe would need to be bigger, and it would need to be replaced. The preferred route that was selected by this community in 2006 is from South Fork, and it has a lot more environmental benefits than going back and replacing a line from Sugar Hollow. We have, depending on the context of the conversation in public, we’ve talked about both pipelines because there are some people in this community who still want to talk about the Sugar Hollow pipeline, and we respect that we sometimes need to talk about that. But the recommended pipeline was from South Fork.”

Question from Dede Smith, City resident: “My question is for Mr. Burch, and it’s about phasing. You’ve got two phases in your report – phase one is very different from phase two, and I’m wondering if phase two...looking at cost and permitting [could] phase two be separated into more phases, particularly as it relates to Ivy Creek. Ivy Creek happens to be the waterway I know best, and it seems distinctly different logistically and in volume...particularly segments 4, 5, 6, in front of Panorama Farms. And I wonder if there would be a benefit from a cost perspective, from a permitting perspective, to making that distinct – or some other part of phase two, distinct phases?”

Response from Mr. Burch: “We identified dredging in two parts. We were thinking of this as a one-time effort, but approaching it from two different sides...phasing is more of a time-sequencing of how you would address those parts. Part one or part two could be carved out as I think separate projects, because they are in definable areas of the reservoir with different techniques, and possibly permitted independent of each other – although regulators would certainly want to know that the projects were being considered in tandem. When you approach part two and start to break that out into pieces, that can certainly be done. You can say alright, we’re going to dredge from the first 4, 5, and 6 segments of the upper main stem and we will only develop area 3 on Panorama farms, and fill that to capacity – and then in a couple years we’ll come back and address some of the others and carve it out into separate parcels that way. Then you’ll incur greater unit costs by going through that permitting process anew each time, each couple of years.”

Follow-up question from Ms. Smith: “Would you need to, if it is spread out over years, if we do in fact go that route, and go maybe a little more slowly, does the permitting need to be re-permitted at some point or would it be more effective to get permitting for the whole thing but then spread it out cost-wise over time?”

Response from Mr. Burch: “When you initially get the permit they typically require you to break ground to initiate the project in some period of time. The Corps permits here are good for five years; the state permits want you to start within two years; I’m not really sure what Albemarle County sets as a timeline on their special use permits, but typically with that type of permit they want you to do something within a two-year timeframe. You can then apply for extensions and the regulatory agencies are generally easy about granting those extensions, but there are some limits to that and you run the risk of if conditions change – either on the ground, or with the landowner, or with the regulations – having to come back and do some of the later elements at a different standard.”

Follow-up question from Ms. Smith: “And permitting, is that to start the project or to finish it? if it were five years, is that to finish it?”

Response from Mr. Burch: “The permit would be to start the project, and you set the schedule within which you’re going to operate. So when you would apply for a permit, you would say we’re going to dredge and we’re going to be in the water, you know, a year prep on the land, we’re going to be in the water for three years, five years, however you lay out the project, and then we’re going to have a two-year reclamation project on the dewatering basin. And they will write that into the permit.”

Follow-up question from Ms. Smith: “So do you think in your opinion of what you know about Ivy Creek versus above the Woodlands Bridge that there would be any benefit to separating out cost-wise, let’s just talk cost-wise, and per useable storage gained – because there’s so many wetlands over there. Is there any benefit to separating that out from the other part of the below the sand, you know – Panorama, that kind of thing?”

Response from Mr. Burch: “I don’t see a huge benefit in separating out Ivy Creek because the volume of material that would come out of Ivy Creek by itself I don’t think is going to match up directly with any of the existing confined dike facilities we’ve identified. The most effective from a cost perspective, is to not have to pump far, so when you dredge Ivy Creek, you want that going into area 1 on Panorama Farms; so as you’re doing your dredging projects, you match the volumes you’re removing with the whatever confined dike facility or facilities you’re offering at that time.”

Question from Mr. Richard Lloyd, County resident: “I’m interested in your comments on small bites – small bites being the continuous dredging over an extended period of time over 20-30 years, which would incorporate future maintenance along with the deferred past maintenance. This would allow us to keep up with the water demands of the potential growth of the County and the City, and at the same time remove the accumulated sediments. The equipment would be smaller and more manageable, easier to move around the bridges and around the wetlands; the cost would be – maybe you lose the economies of scale – the costs would be spread over such a period of time that there’d be maintenance. It would avoid having to come up with the bonding of the project in lieu of continued maintenance on maybe a stepped-up scale of maybe 4 to 5% a year of the total capacity.”

Comment from Ms. Christensen: “What’s your question?”

Follow-up question from Mr. Lloyd: “Well, I wanted comments on that. Well then, dewatering – instead of looking for a hundred-acre site that you looked at, or a 50-acre site, did you look at smaller sites of maybe 5-10 acres, which would be required for the small-bites type of program? The material removed of course, you alluded to, let me comment on this, that the market has to be available and if you’re dredging over a 20-25 year period, then you have the smaller amount of material going to market, which means you don’t saturate the markets and you have the ability – because you’re taking smaller [quantity] out, you don’t have to stockpile it and you can wait for the appropriate time to take it to market – i.e. not in the middle of winter and when the economy is failing. And then I’d like for you to comment on the potential for running this as an in-house project, instead of contracting it out, because it would extend over a period of time when people could be trained. Then of course you could take care of the hydrilla problem first with a small dredge; you could dredge to eliminate the top 18 inches, get rid of the hydrilla, and you could open up rowing lanes, and then continue on from there on a more manageable program. The main thing is that it would be cheaper than going through the bonding capacity and requiring the bonding capacity of Rivanna to be committed to this project, when it could be used as a maintenance project.”

Comment from Ms. Christensen: “This is clearly not a question for clarity, but a set of ideas that you’re offering up...”

Response from Mr. Lloyd: “These have been ideas before...I’m asking for comment...”

Comment from Ms. Christensen [to Mr. Burch]: “Here’s what I want you to do. I want you to take the overall concept that he’s put forward and give some feedback so we can move to the rest of the questions.”

Response from Mr. Burch: “Our scope asked us to look at restoring as much volume in the reservoir as we could in a one-time dredging – so we could not study any long-term phasing out over several years. So my response is going to be somewhat general in nature.”

Follow-up question from Mr. Lloyd: “Let me get clear. You weren’t asked for this alternative? Because it was brought up in public meeting after public meeting.”

Response from Mr. Burch: “No, my scope asked us to look at maximum volume of material possible to get back to the original contours as a one-time dredging to restore the reservoir to original conditions. Now when you start looking at spreading it out in smaller bites over a longer period of time, that doesn’t work well with the upland bank facilities. You get most cost-effective when you build the facility all at once, and that’s where your real cost is with this project.”

Follow-up comment from Mr. Lloyd: “You’ve lost me. You wouldn’t need the upland dike.”

Response from Mr. Burch: “That part of our approach does not lend itself to what you’re asking – multiple long-term dredging – only the part where you do the mechanical dewatering lends itself to that type of approach, where you come in each year, you do it in small bites, and then you haul the material off. The downside that you’re going to see is as you finish out those first couple of segments that have a high volume of sand, when you move down into the rest of the reservoir – where 75% of the material is silt and clay – the cost of dewatering is going to go up, and the volume of sand that you’re getting back, which is your high-dollar cost recovery, is going to go down on a unit-volume basis. So over a long term, your costs are going to shift. Can it be done? Yes. You know, as long as you’ve got the space available, this is one way to approach it.”

Follow-up question from Mr. Lloyd: “So it would avoid the cost of a project and turn it into a maintenance, which you don’t have to bond?”

Response from Mr. Burch: “I would not say that it avoids the cost of the project; it shifts the cost from doing it all at once to that longer-term basis, at a higher price of dredging and incrementally down the road you’re going to see less and less return on a per-unit volume with that approach.”

Question from Mitch King, County resident [representing Blue Ridge Sand]: “My clarifying question relates to the decision to recommend upland dewatering – upland dikes for dewatering in part two, rather than mechanical dewatering. Just wondering what the reason was for that recommendation.”

Response from Mr. Burch: “Again, we were looking at trying to get the maximum volume of material out of the reservoir to restore it to as close to original conditions as we could in sort of a one-time dredging event. And going to the upland dike facilities for the lower part of the reservoir gave us that larger volume of dredging and dewatering; whereas trying to do all of that through mechanical dewatering would, one, extend the life of the project I think quite a bit farther, and two, we would start to see higher unit costs and reduced return as the mechanical dewatering equipment was working with the finer grain materials farther down the reservoir. And quite frankly I don’t think there is a large enough local market for all of the material out of the reservoir; because doing it incrementally like that it would not meet the airport’s needs for fill because it would drag their project out over many years and we did not see that large of a market demand for the rest of the material.”

Question from Ms. Quinn: “Clarifying question for Mr. Frederick. Would you clarify, does your cost estimate of the Ragged Mountain Dam that you used in this comparison, include the cost of whatever work will be required at the I-64 embankment, and would you advise us what is the Virginia DOT and U.S. DOT’s reaction at present to whatever that work might be?”

Response from Mr. Frederick: “There’s an allowance in the estimate, because the study is not yet finished. The allowance for the I-64 embankment is a range of about \$1.5 million and \$2.3 million. There still are conversations and communications with the Virginia Department of Transportation and the Federal Highway Administration; those aren’t complete.”

Question from Hawes Spencer, County resident and local journalist: “I think my question is for Mr. Frederick. It seems like a useful measure of a water system’s capacity is million gallons per day, so can you tell me what the million gallons per day of our current urban water system is, and then could you tell me what it will be after employing a dredging of the maximum amount – such as envisioned by Mr. Burch. And then the third data point I seek is our current million gallons per day average use.”

Response from Mr. Frederick: “To convert storage to millions of gallons per day requires what engineers call a safe-yield analysis – that’s a complex computer analysis, and that was done as a part of the water supply plan development. Gannett Fleming identified somewhere in the 2004 timeframe – that was some time ago now, I don’t remember the exact date – they identified an existing safe-yield capacity at that time based on a 2001 bathymetric survey of South Fork for the entire system; they came up with a figure of 12.8 million gallons per day. And as you probably recall they identified that they felt over time, doing nothing, that would further decline. We haven’t had the computer analysis run to say what it is today based on updated bathymetric surveys. [It’s] a number we could obtain; we’d have to pay a company to run a computer model to give us the answer, but it could be done. But I don’t have the answer at the moment...we can give you the storage that comes straight from HDR to report what additional water storage that would add, but again we have to go back to the safe-yield model to convert that back to a million gallons per day number, and to be frank we haven’t done that. But we can, if that’s important enough to our Board to pay a firm to do that, we can do that.”

Follow-up question from Mr. Spencer: “Well with all due respect, shouldn’t you be calculating that because it looks like you’re only using about nine million gallons per day?”

Because even under the old Gannett Fleming survey if you have a 12.8 million gallons per day capacity now – and I think the bathymetric survey indicated that you actually have more volume than you thought you had – don't you have like a whole lot of wiggle room? I just don't understand why you wouldn't update that."

Response from Mr. Frederick: "How much water we're using depends on what day you ask, because it changes every day. If you look at yesterday's demand, it was 12.04 I believe."

Follow-up comment from Mr. Spencer: "Yeah, but I've got the numbers right here. Calendar 2007, it was 9.998 average; 2008 it was 9.47; and last year was a record low for your system at 9.09; and the first five months of [this] year are running in the low 9s on average. So it looks like you've got declining water use, and I'm wondering if you can clarify why – with declining water use – you seem so reluctant to dredge?"

Comment from Ms. Christensen: "I think we've entered a different question now. Let's just take note of your clarity item and your numbers. That's really a comment, right?"

Response from Mr. Spencer: "Well, I was trying to get the current capacity of the system, and I think I understood Mr. Frederick [to say] that would cost money and he didn't want to do that."

Response from Mr. Frederick: "I didn't say we didn't want to do that. That's really not fair."

Comment from Mr. Spencer: "OK, your Board really didn't want to do that?"

Response from Mr. Frederick: "It hasn't been done. We can ask the question, but it's not fair to say we didn't want to do it because that's putting words in our mouth."

Follow-up question from Mr. Spencer: "But is there a more important question?"

Comment from Ms. Christensen: "And I think that is a statement that you just made. Any more questions for clarity?"

Follow-up question from Mr. Spencer: "No, that's my question. Is there any more important question than what is the capacity of your system and why you need to augment it if you already have such over-capacity?"

Response from Mr. Frederick: "Looking at the safe yield of the system is kind of like watching something slower than a turtle move. It doesn't change from day to day. That's the yield of the system itself. You don't need to pay somebody to run a computer analysis every day. It was run in 2004 and it's 12.8. I doubt it's significantly different from that number today, but we can run it – we might find it's 12.7, 12.75; I'm not sure how that is so significantly important to you but it's in that ballpark."

Comment from Ms. Christensen: "OK, let's finish getting questions for clarity and then we're going to go into comments. Because I feel like we're on that edge – that's really what we're getting – and we should let that come on into the room."

Question from Duane Snow, County resident: “If I heard right, \$28, \$38 million roughly for dredging.”

Response from Mr. Burch: “Our total dredging cost is between \$34 and \$40 million, without considering the potential cost recovery.

Follow-up question from Mr. Snow: “And cost recovery was around \$9 million.”

Response from Mr. Burch: “In the range of...”

Follow-up question from Mr. Snow: “Let’s say we didn’t do anything but repair the Ragged Mountain Dam, the way it is now, just trying to get it so it’s safe. Do we have any ballpark figure on that? That’s all part of the cost.”

Response from Mr. Frederick: “We do not have any current estimates based on today’s bid climate...there was a study done by Gannett Fleming in 2003, and they identified several alternatives – one alternative they identified is the lowest cost alternative; they set a construction cost in 2003 dollars of around \$2.9 million. Construction only – doesn’t include engineering, doesn’t include design or construction administrator or bonding, those sorts of things. They also, in their report, indicated some caveats in their study. One of them, as I recall, they were not sure that that work couldn’t be done without drawing down a portion of the reservoir – and their price tag for that lowest alternative did not assume that. So when you read the report you’re left with the feeling that more investigation might be done to clarify what the cost might be. And I wish I could give you a better answer...”

Follow-up question from Mr. Snow: “So with engineering and everything would you say more like \$4 million? I’m just trying to get to a ballpark.”

Response from Mr. Frederick: “I think you’d have to look at an analysis and come up with a better cost estimate. You’d have to update that information. I’d hesitate to speculate on a number without having that...”

Follow-up question from Mr. Snow: “Alright, I’m going to take the low end. What was the 2003?”

Response from Mr. Frederick: “2003, they said construction-only costs of about \$2.9 million, and then put an asterisk besides that because if you read their report, they had some caveats that need further investigation to confirm.”

Follow-up question from Mr. Snow: “So right now, not counting any pipelines, leave all the pipelines out, we’re at \$50 million for that. Oh no, 38 minus 9 leaves me...”

Response from Mr. Frederick: “Between 28 and 36 million dollars.”

Follow-up question from Mr. Snow: “OK, and how many gallons does that give us through dredging. So the total storage capacity is what? After you dredge, how many total gallons do we have in there?”

Response from Mr. Burch: “If you did the dredging, you would add about 280-some million gallons to what’s already there available.”

Comment from Ms. Quinn: “287, if you just do upper main stem and Ivy Creek.” [Editor’s Note: The calculated volume restored by HDR’s proposed Part I and Part II dredging is 1,126 million cubic yards, which is equivalent to 228 million gallons. It would require a volume of 1.42 million cubic yards to equal 287 million gallons of storage. HDR had set a target of 1.4 million cubic yards in the first phase of its work, but revised the dredging quantity downward to 1,126 million cubic yards in the recommendations from its second phase of work, the further constraint being limited available land with property owner consent for dewatering the sediment.]

Comment from Mr. Burch: “And those numbers are in the report. We have identified the volumes in the report, I just don’t have them committed to memory.”

Follow-up question from Mr. Snow: “Can you just from memory, give me a rough ballpark?”

Response from Ms. Christensen: “Are you looking at estimated dredging volume? Upper main stem you have 241 million gallons, and Ivy Creek 46?”

Comment from Mr. Burch: “So we don’t hold everybody up....I’ve got a copy of the report with me, I can give you those figures.”

Follow-up question from Mr. Snow: “So the price of the new dam, of rebuilding Ragged Mountain altogether, was around \$30 million?”

Response from Mr. Frederick: “The number up there was \$28 to \$36 million range, and that’s total project cost...that includes all the engineering, it includes mitigation, it includes the I-64 embankment.”

Follow-up question from Mr. Snow: And what’s the total capacity of that dam once it’s done.

Response from Mr. Frederick: “The useable volume...the number...was addition of 1,726 million gallons....and it’s somewhere in the 450 some-odd and some change million gallon range today; so you have to add those two numbers together to get your total. And I believe it’s just shy of 2,200 million gallons – or 2.2 billion gallons.”

Question from Keith Rosenfeld, County resident: “Mr. Burch, I think you did a really nice job and thank you very much. One question I have quickly. A bunch of us went and met with DEQ, about 10 of us went down a couple of years ago. We described the fact that many of the wetlands that occurred in the reservoir have come there from basically never being maintained, and from the RWSA not doing certain things. And they told us that under that circumstance that

if applied properly under a permit, they would probably allow that sort of dredging. Did you talk with DEQ, and is that going to be substantial toward this project that they would allow that?"

Response from Mr. Burch: "We did not talk with DEQ specific to that permit question. Yes, I believe that you could go forward with a proposal to dredge much of the existing wetlands. Some wetlands are more valuable than others, and the Corps would have to buy into that as well. They might require mitigation, which would add to the cost. It will add to the cost of dredging, particularly because the dredge itself...the shrub scrub, the forested wetlands have to be cleared first. You'll have to take a backhoe or other equipment out in the scow, pull the woody vegetation off and the stumps, and then get in with the dredge to remove the material. You would gain additional volume, you would gain additional space within the reservoir, but the difficulty becomes you can only dredge to where you can dewater...we weren't able to approach – we got within 80% of our target – if we had found that magical hundred-acre site where we said we could dredge the whole thing, we would have come back before you and said 'you know what we told you about the don't dredge the wetlands, well maybe you can.' But given the situation that we're finding on the ground in terms of dewatering and processing the material, it doesn't make sense to open that door to the regulatory agencies."

Follow-up question from Mr. Rosenfeld: "Mr. Frederick...there was a long discussion of which pipeline we were talking about and in what context, and I think you were referring to the Sugar Hollow pipeline and you said you're not going to get any guarantee that it won't have any maintenance – quote 'no maintenance, no fixes' for 50 years. With the larger pipeline, have you found a contractor who is willing to build it and provide a guarantee of no maintenance and no fixes for 50 years? Is that a fair comparison?"

Response from Mr. Frederick: "No pipeline is maintenance-free, that was my point."

Follow-up question from Mr. Rosenfeld: "OK, because my recollection is you've been spending about \$10,000 a year on maintenance for the Sugar Hollow pipeline. Is that about right?"

Response from Mr. Frederick: "I don't have those figures in front of me."

Follow-up question from Mr. Rosenfeld: "Alright. In looking at dredging and such, it sounds to me like you've had a clearly defined scope of work [and] this may have been outside of it. One of the current discussions here is that the current demand projections overstate our current requirements by about 35%. We are using far less water than what was projected. Now when you take that 35% and you compound it out with the growth for 50 years, you end up with an absolutely large delta between what may be needed and in your work in the dredging at all, have you been asked or done any thinking about the use of this reservoir and it's reality – because we just don't have a useful, factual projection for the future."

Response from Mr. Burch: "Our scope did not ask us to address the water supply demand, safe-yield analysis, or water use. We were focused on attempting to return the reservoir to its original contours or as close as we could practically get it, with what was intended as a one-time dredging event."

Follow-up question from Mr. Rosenfeld: “And finally, Mr. Frederick, you talked about [being] required to pay outsiders to run a safe-yield analysis. In my past work with the AWWA and such, they have an awful lot of software and best practices, which – we don’t seem to be following AWWA, we’re on a different system here I think. But why, if we’re paying for the maintenance of, and the existence of RWSA, can you go to AWWA, buy that software, and run it internally with your own people rather than having to pay an outsider. And also I have been told in the past that you guys don’t really know what that model is being run by the third party, and so the results you get out of it again – bringing up your words – ‘are a context issue.’ Do you have any thoughts on that?”

Response from Mr. Frederick: “You know one of the things when you’re looking at how to make decisions and run operations at the lowest cost, one of the things you ask at any operation is when do you use something often enough that it pays to have your own staff trained and go through all the procedures that it takes to – I mean, you can buy software, but software doesn’t tell you how much volume the Sugar Hollow Reservoir has, how much volume the Ragged Mountain Reservoir has, any of the data about the system. The data has to be populated into the software, and we pay to have that done – it’s paid through a consultant – we don’t use the safe-yield model often, so the question is do you pay to train your own staff to do it, or is it more cost effective if you don’t use it very often to have a consultant do it? Interestingly, often, when it’s something you don’t use very often, you benefit by paying a consultant who does it every day for other clients and is up to speed on the software rather than having to train your own staff to stay up to speed with the technology. Sometimes it benefits to actually contract out to a private company, and this is a case where that’s true.

Question from Collette Hall, City resident: “Mr. Burch, you seem to go quickly over the idea of not needing to dredge what I’m going to call the lower reservoir – that’s the area close to the dam. I’m talking about the South Fork so everybody’s clear. Could you go into just a couple more sentences, because to me that’s the part that holds most of the water I’m guessing – why wouldn’t we dredge that again?”

Response from Mr. Burch: “In the lower part of the reservoir, close into the dam, it is indeed deeper. It holds the largest portion of volume of the reservoir. However, it holds a smaller amount of the useable volume. The water intake is set at a 367-foot elevation, and it can only withdraw water from that level or higher. So the deeper water underneath that is dead storage – it’s unused, unusable. The sediment that we found in that lower portion of the reservoir is largely in that deeper pool, and therefore it is not directly affecting your water supply, or the water supply capacity of the reservoir. So by removing that hundred-thousand some cubic yards of material – which is a fairly small amount compared to a larger target – it reduced the target a little bit without taking away anything from the potential water supply and volume of the reservoir.

Follow-up question from Ms. Hall: “Could that part of the reservoir closest to the dam ever fill up so that the intake is no longer valid?”

Response from Mr. Burch: Given sufficient time and no dredging, it will. But the reservoir has been in operation now 40-some years or so, and a very small part of that dead storage has

become occupied by sediment. There's still a large quantity or large volume of dead storage yet to be filled up.

Follow-up question from Ms. Hall: "The second part is, since you're a dredging expert and this is your field, I understand that the South Fork Reservoir has never been dredged – so it's never had maintenance dredging. In your experience, for most cities or municipalities that have reservoirs in order to maintain their water supply, is maintenance dredging a usual feature or is it like this, just done once every 50 years. What is the normal process that most municipalities would go through?"

Response from Mr. Burch: "I'm not sure I can say this is a normal process, but in my experience and observations maintenance dredging does not occur until a city or municipality has a reservoir and realizes 'we have a sediment problem.' Sediment occurs out of sight, under the water, and it's largely something that people ignore until they have a problem....so then you respond to that problem, and then communities will often come back in with a long-term sediment management plan."

Question from Ms. Hall [to Mr. Frederick]: "I haven't heard you talk much – and I did make a comment about this at the Rivanna Sewer and Water Authority last week – I'm very concerned about I-64 going over the expanded Ragged Mountain Reservoir, if indeed it does become expanded. I mean if the plan is followed through and it does become expanded under I-64. So just a few moments ago you talked about discussing with VDOT and discussing with Federal Highways about the embankment issue. Is there any possibility – and I mean reasonable – is there a reasonable possibility that either VDOT or Federal Highways, one or the other or both, will say no way are we going to allow the dam waters to go under this interstate. Could that be reasonable?"

Response from Mr. Frederick: "What I can relate to you is that in 2004, when we were still looking at Ragged Mountain as an alternative and not the selected alternative, we asked that question to both VDOT and the Federal Highway Administration, and they told us that there 'are no show-stoppers' in implementing that. We're now exploring the weeds, and exploring some of the details of how we're going to do it – and those discussions are still going on and they haven't been concluded yet."

Comment from Ms. Christensen: "We still have questions coming, and that's great. Really great questions, really great information going back and forth. But some of you probably came to make a comment, so I wanted to open up the comment period as well to be a part of this. And so I would like to ask everyone's cooperation in your comments being up to three minutes; if you brought statements that are longer than that, you can certainly turn those in writing. Our question is, 'What is your community response to the feasibility study findings that have been presented tonight?' What do you like, and where do you have concerns....we'll open it up to the comments, except when questions pop up, you'll have to pop up. You're welcome to continue your questions, it's just that some people came to make comments and it's already 7:30 and I don't want folks to leave without being able to have a say."

Question from Bob Fenwick, City resident: “Mr. Burch, what permits will be required for dredging?”

Response from Mr. Burch: “For the in-water activity, for the dredge itself, the project would have to apply for a joint permit from the Virginia Marine Resources Commission and the DEQ, and the Corps of Engineers. This will address impacts to regulated waters and wetlands, and water quality.”

Follow-up question from Mr. Fenwick: “Is that all under the umbrella of the DEQ permit?”

Response from Mr. Burch: “No, that is a single-permit application that goes to multiple agencies, and each of those agencies will issue their own permit.”

Follow-up question from Mr. Fenwick: “If the permit is necessary?”

Response from Mr. Burch: “Yes, and a permit will be necessary for dredging from those three agencies, and they will look at it from a project perspective, and they will look at what’s happening in the water; they will look at the staging areas; they will look at the confined dike facilities, ‘soup to nuts’ of the project. But their focus will be on regulated waters, water quality.” You will also have to get a permit from Albemarle County for the staging site development and disturbed land, construction of those areas, and a special use permit – as well as a permit from Albemarle County for the confined dike facilities. Again, a special use permit for those facilities. Now for the confined dike facilities, you will also have to get a permit from the Virginia Department of Conservation and Recreation for dams.”

Follow-up question from Mr. Fenwick: “You mention about the intakes and the dead space in a reservoir. If you were to lower those intakes, you would increase the capacity of the reservoir. Is that correct?”

Response from Mr. Frederick: “One of the things that was mentioned earlier about standard practices, one of the things that is standard practice in engineers designing a reservoir is they establish a dead space. And in some states, there’s a regulatory requirement that there be a minimum of a certain percent; Virginia gives dam engineers some allowance. Generally within the industry, in a reservoir that’s got forested areas and not a significant amount of sediment, 10% in some cases can be adequate. In reservoir areas located where sediment is a problem, often times engineers recommend higher percentages. The dead space accomplishes several purposes: one it provides a factor of safety; in engineering, that’s an extremely important thing because nothing is absolutely exact. Another thing it provides is even in a deep drought, there’s still space for fish. You’re not killing fish and leaving them on the side of the banks. You’re providing room for that. Some engineers suggest...when you get very low levels of water quality, it deteriorates and it’s much harder to treat the water – so making an allowance for dead space allows for that. As a general practice, the idea of just going underwater and cutting some hole in a pipe and saying we’re going to go lower now can defeat some of the benefits to having a dead space, and it’s generally not recommended in the industry from my experience.”

Follow-up question from Mr. Fenwick: “Well I wasn’t talk about a jack-leg operation to go down to the bottom. So you agree that lowering the intakes would increase the capacity of the reservoir? In a safe engineered manner?”

Response from Mr. Frederick: “The last phrase you put in there causes me some concern. I thought you were asking a theoretical question, but if you add in ‘in a safe engineered manner,’ then I think it’s fair to go to the standards that engineers use in designing reservoirs, and that is they allow for dead storage. They don’t suggest that you...”

Follow-up question from Mr. Fenwick: “You also said that they allowed for a plus or minus...I think I got the answer. The recovery cost is based on, I guess a bucket loader into a dump truck, about \$3 a cubic yard, something like that? If a very smart businessman were to package this in cubic-foot bags like you would buy at Lowe’s, the recovery cost would go up substantially, is that correct?”

Response from Mr. Burch: “Maybe. With respect to your retail cost per unit, but your processing and handling costs now also go up – and the likely volume of material that you’re moving is going to go down, unless you are able to tie it into some larger network outside of the immediate area.”

Follow-up question from Mr. Fenwick: “So if you did that, if a businessman were to find a way to do that, the recovery costs would be much more.”

Response from Mr. Burch: “I really don’t know. We really did not take our analysis that far with it.”

Question from unidentified member of the public [for Tom Frederick]: “Mr. Frederick, my understanding in general terms is that over 50 years, the anticipation for the growth of Albemarle County and the City of Charlottesville is going to be from roughly 150,000 – which is about our current population – to 250,000, basically about 100,000 more people. That increase is 67%. When the gentleman from Schnabel was here, he told us that the new capacity would be 1.7 billion gallons of water – it might be more, but let’s say it’s 1.7 billion – and that’s a 240% increase....why are we at such a huge number? Why are we at 240% rather than 67%?”

Response from Mr. Frederick: “There’s a difference between the amount of storage added and the amount of safe yield added, and that’s really essentially the answer to the question. When Gannett Fleming performed their work in 2004, they calibrated a safe-yield model of the system and then said how much storage do we need to increase the safe yield from 12.8 to 18.7 – and that’s the amount of storage that they came up with. One way I can try to help relate that to you is, when a drought occurs, you’re essentially relying totally on storage – so it’s not a linear relationship between the amount of storage you have to add to be a higher safe yield. They’re not linear. That’s why you need a computer program to answer the question.”

Follow-up question from unidentified member of the public: “Because I understand, I was wondering after the last drought we had, in 2002, that lasted over six months and there was still a 50% capacity – and that’s with the 500 million gallons. So it seems proportionate that an

additional roughly 290 million, which is basically what the dredging would allow, should take care of that – including safety.”

Response from Mr. Frederick: “When we experience a real drought, and we actually experienced one in 2002, we actually hope that even though a model might say – based on the average demand in a community in a given year – we might deplete the storage, we actually hope we don’t. We can’t anticipate the future. We might have a worse drought than we’ve ever modeled for. That’s why in drought management programs, there are restrictive demand for periods of time to try to reduce the amount of demand, and that’s what happened in 2002. But at the same time if you look at standard practices of how water supply plans are developed, this get’s back into engineering standards, you plan for the drought of record to deplete the storage without the change in the amount of water people use. That does give you some factor of safety in case the drought you experience is worse than any ever on record....I think part of the reason there was still 50% left in 2002 was that people really took the drought seriously in this community, and really cut the amount of water they used – and that helped save more water in the reservoir that otherwise wouldn’t have been saved.”

Follow-up comment from unidentified member of the public: “Right. I mean just like today, where basically it was 5% when you did the original demand study and it’s 24% now, as far as conservation. So people are going in that direction. Thank you.”

Question from Kevin Lynch, City resident: “Tom, you mentioned that there’s a proposed 1.7 – or 1,700 million gallons of water storage capacity at Ragged Mountain. Of that 1,700 million, how much of that is to replace an anticipated loss at the South Fork over the next 50 years? In other words, how much of that 1,700 million is what you thought was going to be for replacement?”

Response from Mr. Frederick: “Gannett Fleming had estimated that the South Fork Reservoir over 50 years would reduce from 800 million gallons of useable storage down to 200 – so 600 of that amount is the replacement.”

Follow-up question from Mr. Lynch: “So a little more than one-third of that new storage is to replace storage that you thought you were going to lose in the South Fork, is that right?”

Response from Mr. Frederick: “Yes, to be honest the plan allowed for the possibility that the community could dredge if it wanted to, but it would not have to dredge to meet the safe yield.”

Follow-up question from Mr. Lynch: “On the recommendation for dredging – which I was happy to see that you recommended the Authority develop a request for proposals to allow turnkey proposals to come in – could you expound a little bit more on how that might happen? And I think you mentioned that would be for the upper reservoir, but what if another company similar to what happened I guess it was a couple years ago said ‘we’ve got a turnkey proposal to do the whole reservoir or some larger portion of the reservoir,’ would that be accepted, and how would a company do that? How do you anticipate that would go forward?”

Response from Mr. Frederick: “Well one thing I do agree with is the article that was written by the Editorial Board of *The Daily Progress* recently that it’s not a good idea to use a bidding process for a community to try to get estimated costs – that you should first do a feasibility study, like what HDR is doing, and then budget for what public purpose [is being served]. If you’re serving a public purpose by coming up for a dredging project and put it in your capital improvement program – and you take it seriously, so that bidders who don’t want to spend their time and effort on a speculation are bidding something that they think they have a reasonable chance to get. The recommendation we made tonight was in that same vein; we believe that the case that HDR made, particularly if the market price for sand is maybe better than average...in the current economy that might not happen – there’s enough information in his report on part one to make that a feasible project that we think this community should discuss and debate. Do we want to budget for performing this project, and actually entertain serious proposals? Now you mentioned that if somebody just came out of the blue and said ‘I’d love to do it,’ if somebody did that I guess we should listen to them. But I do not advocate just putting something out on the street just to see how much something costs. I think that’s being disingenuous to bidders.”

Comment from Mr. Lynch: “Well companies have done that in the past. Blue Ridge Sand did that in the past and said they could dredge almost 700,000 cubic yards for – I think it was under \$4 million. If they wanted to repeat that offer, how would that happen? It sounds as if what I’m hearing is, well maybe we’ll do it but we’ll throw a lot of process at it first.”

Response from Mr. Frederick: “Well Blue Ridge Sand has come and talked to us, they were contacted by HDR, they talked to HDR, so their policies certainly were incorporated in the analysis that was done. And we’re certainly aware that they’re interested in a sand-recovery project. The information that we saw in the dredging reports indicates that this has enough potential to take it to a further step for public discussion. I mean, the way things happen, I just described, that typically happen is the community, the public, the Rivanna Board will discuss if it makes sense and if so – a capital improvements budget can be established for the project, and you go through a process of developing the proposal, which is not a simple task. It takes some work. Developing a viable proposal, putting it out for bids, evaluating the proposals to come back, making a decision on tentative awards. In the case of a turnkey proposal it might be written – it could be written in a lot of different ways – but it might be written so that it’s discussed with the bidder as to come up with the design, come up with the land site for processing, come up with the permits; if they can’t do that within a certain amount of time, the owner can opt out. There are proposals written that way...one of the reasons we suggested the idea of going toward turnkey is that the folks who do the process the sand, Blue Ridge Sand is just one example, are the people in the best position to know what the market does – and that seems to be driving the success of the project.”

Comment from Mr. Lynch: “That would make sense, but you’re indicating that it would have to be a Board decision to decide how much to spend first, and that would be based on...? You mentioned that typical practice for dead storage in a reservoir was 10% or so. What’s the percentage in the South Fork Reservoir – both the percentage and in hundreds of millions of gallons?”

Response from Mr. Frederick: “I didn’t say that 10% was typical of any reservoir. I did suggest that for a reservoir that’s going to have a forested area, where there’s not a sediment problem, that many engineers consider that enough. But if there’s a reservoir that has sedimentation issues...it will allow for greater dead storage. I don’t have the exact number for South Fork.”

Follow-up question from Mr. Lynch: “Would you agree that it’s greater than 25%? You know what the total storage is, right? And you know what the dead storage is.”

Response from Mr. Frederick: “We can get the answer for you, Kevin. There’s an answer to the question. I would rather not speculate...”

Comment from Mr. Lynch: “Let me make a comment then. Often, what I hear is a lot of sort of bobbing and weaving to avoid answering the questions directly. I think we could pick up another 250 million gallons and still have a 15% dead storage, but we won’t get that out of you because well, we have to analyze that. Same thing, there was a question ‘what about the difference between existing pipeline that costs us \$10,000 a year to maintain, flows downhill, we have all the easements, versus a brand new pipeline that will have to pump water uphill and you’re implying that they’re somehow equivalent. I think what we’re getting is a lot of non-answers here.”

Response from Mr. Burch: “If I may, from our bathymetric survey that we did in the fall, our calculations showed the original reservoir had a total storage volume of 1,595 million gallons. Current 2009 water volume storage, total, is 1,247 million gallons – so a loss of about 22% total storage. The useable reservoir volume, original useable volume, was 1,034 million gallons, and the current useable water volume is 859 million gallons.”

Comment from Mr. Lynch: “So the dead space is...400 million gallons roughly. I mean, that’s the thing.”

Comment from Tom Olivier, Piedmont Group of the Sierra Club: “For some time the position of the Sierra Club has been that better information was needed on several fronts so that we can conduct a much needed reconsideration of our water plan, and the dredging study we’ve now received provides part of what we need. We now have a detailed analysis by professionals of dredging and its cost and feasibility, and we want to thank HDR for the work they’ve done. It leaves us in a much more informed spot than we were a year ago. We still are waiting though, for example, for the new demand analysis in the community – one that for example considers more fully the possibilities with serious conservation efforts in our community. We think that’s important in terms of finally being able to reach a decision about some of these plans and components. We also suggest that a groundwater analysis done for Advocates of a Sustainable Albemarle Population (ASAP) by Nick Evans and Mike Collins be considered further; the study suggested that millions of gallons might be available per day from groundwater-rich areas of the county, and these could be used in municipal water supply. There’s been a lot of talk both in the handout...and in the slides, about the cost of water storage or creating a new gallon of water storage via dredging versus a new dam. But I want to suggest that the key question is not how cheaply we can create a new gallon of storage, but the question is how can we best obtain the

storage that this community needs in terms of both dollar costs and environmental impact. And if we build a large new dam we don't need, the low cost per gallon of storing water there will be of no benefit. During the early parts of the presentation I was flipping through over and over the handout of slides looking for, in fact, the figure for the safe yield from the reservoir after dredging – and of course I couldn't find it. So I want to second the request by the gentleman who spoke earlier. It seems to me that the safe yield of the reservoir, as dredged as proposed by HDR, is absolutely critical to making some judgments here. So I hope RWSA will go ahead and have that number calculated. And finally, the Piedmont Group of the Sierra Club believes that at this time with so much information not yet in hand surrounding the water plan, it's not in the public interest to sign design or other contracts related to construction of a new dam at Ragged Mountain."

Question from Joe Mooney, City resident: "To go back to cost, site selection obviously is an important factor, and you mentioned and showed the map that ruled out those relatively large areas of land that were subject to conservation easement. And to my mind anyway, dredging is the most environmentally sensitive approach to our water supply plan, would it not be possible to get a waiver to use that conservation easement protected land in the interest of environmental protection?"

Response from Mr. Burch: "I don't know. The way the regulations around the conservation easements are written, they spell out what can and cannot occur on the land under the easement, and clearly prohibit large-scale clearing and earth-moving, and changing of the contours of the land – which these confined dike facilities would clearly do. I did have a conversation with some state representatives that run the state conservation program, and they basically told me that any attempt to set up a dewatering facility on a conservation easement was a 'no-starter.'"

Question from Joe Mooney, City resident: "Secondly, I was surprised by the condition that Mr. Llewellyn, and Panorama Farms – Mr. Murray – put on, that the material would stay on-site. And I wondered about that because Panorama Farms is of course a recycling site; in fact, their business is converting leaves and other material into topsoil and then trucking it off the site. And I was surprised that they would then say, well it has to stay onsite, and I wondered [if that issue] was discussed with the Murrays. And I did talk with Mr. Llewellyn and I didn't get the impression that these were hard and fast 'no, you can't take it off the site.' Did you really push that a little bit and say 'well are there conditions under which you would allow offsite transfer?'"

Response from Mr. Burch: "In talking with the Murrays at Panorama Farms and Mr. Llewellyn, and asking them under what conditions they would consider allowing the project to go forward, both expressed a concern about the impacts to their neighbors, and both – particularly meeting with the Murrays – said absolutely they wanted minimal disturbance and traffic on their site. And we went through the stages...at the end, we talked about the volume of the material that would go onto the site, this is the truck traffic that would be required to haul it off to some other place, and they simply said 'no.' They do not want that additional truck traffic coming to the site...whether that would be negotiable in the future, I do not know."

Comment from Mr. Mooney: "I really do want to thank you for giving a yes or no answer, even though both of them were no and I was hoping they'd be yes. But I think you and your

team have helped us elevate the level of discussion in this community by providing what really is a sensible, objective, assessment that we can trust, and we have very little of that kind of information so far – and I'm looking forward to using the information that you've contributed as part of a comparative analysis of the various alternatives to the water supply plan. We have drowned in muck and mire, and we haven't dredged ourselves out of it yet, but your work is helping us do that. So thank you very much."

Comment from Dede Smith, City resident: "I'd like to thank you too, Mr. Burch, and HDR for an excellent report. Two comments, one piggybacking on what Joe just said. One of the things that was used to scare us about dredging originally were the number of trucks that would be on our roads hauling stuff away, so I personally think it was a really positive feature when we heard that the sediment wouldn't be trucked off. That eliminates a huge impact. I'd just like to note in comparison... 200 acres of mature forest are going to be clear-cut and trucked off the Ragged Mountain Natural Area site, and so one of the things we need to use to compare these two projects is the truck traffic. It's been used against dredging, and the impact will be much greater with the earthen dam. And that's just the trees. That doesn't count other things. Secondly, I think it is piggybacking on what Kevin asked, and Sam Freilich before him about the volume of water that is needed at a new Ragged Mountain expanded reservoir – not only an anticipation of the loss of 600 million gallons of South Fork – but in fact, with a true comparison of dredging it's closer to a billion because what we're looking at in dredging is a total volume of somewhere around 1.1, 1.2 billion gallons going down to, as Mr. Frederick told us, 200 million gallons. So you've got 1,200 million gallons going down to 200 million gallons – is a billion gallons that you need to replace by building the expanding dam; and at 1.7 billion, 1 billion of that is in fact just because we're not going to dredge and we're going to allow South Fork to die. And it might not be a billion, but it's at least 900 million gallons."

Response from Mr. Frederick: "It's 600 million. We clarified that earlier."

Follow-up comment from Ms. Smith: "Excuse me, that is for the loss from this day forward. In the true comparison to alternative dredging, you need to count how much volume you will recover. So we're talking the recovered volume versus the volume – if you're going to compare volumes, you need to be true to apples to apples."

Question from Mr. Fenwick: "Mr. Burch, you mentioned upland dikes. I tried to read your little picture here. Were any sites below the dam considered?"

Response from Mr. Burch: "Yes, in the earlier stages the analysis as we were going through some of that desktop screening, we started out within one mile of the reservoir because it's easier to get to the reservoir in a short area – a pipeline to a facility within a short distance. We moved out to two miles and then we tracked out a little farther on some corridors; we looked at a couple of sites below the dam, but the large open areas were in the floodplain or starting to get too far away to get a pipeline to the middle."

Follow-up question from Mr. Fenwick: "So the nursery down below the dam I guess is included in one of these circles here. I think it's next to the soccer field down there."

Response from Mr. Burch: “I can’t speak specifically to say because I haven’t contacted that landowner...we crossed 29 and went to the east, some distance, looking for sites that were out of the floodplain.”

Follow-up question from Mr. Fenwick: “So no engineering reason why it couldn’t be below the dam. I guess that was my question. As long as it doesn’t go back into the river.”

Response from Mr. Burch: “There’s no inherent reason why you couldn’t dewater below the dam and discharge back to the river; the regulatory agencies strongly prefer that the discharge go back into the reservoir....we did not find an applicable site that would work down river.”

Question from Mr. Fenwick: “The last question is, in a serious drought, how would we fill two reservoirs with one river. If we are filling both the Rivanna and the Ragged Mountain Reservoir, how would that work?”

Response from Mr. Frederick: “You refill the reservoirs after the drought is over. You use the volume in the reservoir during the drought.”

Follow-up question from Mr. Fenwick: “So if we had an extended drought, I’m talking about a serious extended drought?”

Response from Mr. Frederick: “In a serious extended drought, you have available to you the usable storage in all the reservoirs in the system – that includes the South Fork Reservoir, that includes the Ragged Mountain Reservoir, that includes the Sugar Hollow Reservoir. You can use all of that, and then after the drought is over, when it rains again, that’s when you refill the reservoirs. Did that answer your question?”

Response from Mr. Fenwick: “I’m not sure.”

Question from Alan Barker, City resident: “I’m wondering what the long-term costs of abandoning a large reservoir will be if we get all our water from this Ragged Mountain Reservoir project. We’re going to have a redundant reservoir, and it seems to me that reservoir is going to continue to fill up and there are going to be increasing cries from the public – especially in this community, with its aesthetic values and environmental consciousness to do something. So isn’t it inevitable that eventually that reservoir will be, that is the Rivanna Reservoir, will eventually be dredged at least partially. And if that’s so, wouldn’t it make more sense to dredge it now and get more use – maybe two or three more decades of use – out of the Rivanna Reservoir – before we go to this complicated project of pumping, building a pipeline and pumping water up to another reservoir. Doesn’t that make more sense? What are the long-term costs of abandoning a large reservoir when the public is going to be demanding probably that something be done about it?”

Response from Mr. Frederick: “I would say that the Rivanna Water and Sewer Authority has not proposed at any time that I know of, abandoning the reservoir.”

Comment from Mr. Barker: “Yeah, but if we get all our water from this new project at Ragged Mountain, then we’re going to have a redundant reservoir – a large, redundant reservoir.”

Response from Mr. Frederick: “The proposal to build the reservoir was based on the determination that was made in 2004 that was approved by the Board and the community at that time, about how much water we were going to need for our long-term future. Now some are questioning that now, and there’s a study going on to take another look at that. But the requirements that came out of that plan suggested storage that was far more significant than even the South Fork Reservoir in its original condition would hold. There was a long, drawn-out process to select what’s the least environmentally damaging, practical alternative under the Clean Water Act, and that was the answer to that question. But that process left open – and I need to stress this because some people say that Rivanna is just going to let the reservoir silt in; that’s not what we said. The question was left open to allow the community to continue a discussion on dredging, and in fact we’re having that discussion tonight.”

Question from Richard Lloyd, County resident: “First you mention the dead zone, and you have to have it for the fish, and as I understand it the dead zone is pretty stale and deplete of oxygen; I don’t know that fish would live there. [Editor’s Note: Oxygenation of a reservoir occurs from the surface of the water; therefore, as reservoir levels fill during a drought, water will be oxygenated at lower elevations than when the reservoir is full.] The Sugar Hollow to Ragged Mountain pipe, what is the condition of it? What is the cost to replace it? By the way in 2003 it was \$12.8 million in the quote. What is the size of the inlet in your three-pipe comparison, you said it would be 36” pipe, and what is the safe yield of Sugar Hollow and can that actually refill the expanded Ragged Mountain Dam before we have another potential drought? The other is a safe yield; we’re talking about a drought condition, we’re not going to run out of water in normal times. The community should not be in an alarm, this is during a drought. But the safe yield has to do with the environmental releases, which have been truncated under the new permit. So I’m wondering, can you explain what safe yield factors go into the safe yield calculations, just for general public interest. And then the demand, similar to during a drought? What’s the condition of the Sugar Hollow pipe?”

Comment from Ms. Christensen: “OK, let’s tick them off, one by one. The Sugar Hollow pipe.”

Response from Mr. Frederick: “It’s an 18-inch pipeline built in 1927. The technology was cast iron pipe, with lead joints. That technology is very old. It’s a brittle pipe; it’s more prone to breaking. The joint material is more prone to leaking. The easement that the pipeline is on it’s a very general description – but it was typical of the 1920s. So if you were to go in and talk about doing serious rehabilitation or replacement of the pipe, I think there’s a lot of questions that would have to be asked about...and I think the property owners would probably negotiate, but they have a lot of room to control that and have a say in how the easements should be revised before such an undertaking was made.”

Comment from Mr. Lloyd: “The Eifel Tower was built out of puddle cast iron. I don’t think you want to condemn that. Is it brittle? Yes cast iron is more brittle. It’s also a better material. We can go on and on.”

Response from Mr. Frederick: “We can go on and on. I’m saying it’s more brittle than today’s technology. I’m not saying it doesn’t work.”

Comment from Mr. Lloyd: “It’s been described as ‘crumbling, leaky.’”

Response from Mr. Frederick: “I would not describe it as crumbling.”

Question from Mr. Lloyd: “In comparing the three pipelines, just between the Ragged Mountain to South Fork, and the Ragged Mountain to Sugar Hollow pipeline, are they both to be 36-inch?”

Response from Mr. Frederick: “We did a recent paper comparing pipelines. We were asked to try to provide the community with pros and cons without doing any engineering studies. We clarified in the report that we were making the assumption that the three pipes were the same size, in order to, for the sake of [comparison, without which], you could go on with endless scenarios and you could have a thousand-page paper. You’ve got to make some assumptions to nail down the parameters for comparison. What I think needs to be understood – a water system is an entire system. It’s only as good as its weakest link. If you decide you want to compare apples versus oranges, you want to compare a 36-inch versus an 18, all you compare is the pipeline, you’re not telling the full story. Because you’re creating a weakness in the system, then it will have to be overcome somewhere else that you’re not looking at. You’re an engineer, you understand you have to look at the whole picture.”

Comment from Mr. Lloyd: “But the comparison was the current Ragged Mountain Dam, with the current 18-inch pipeline, versus the 36-inch pipeline that would be required for an expanded Ragged Mountain Dam. We were talking about a project of dredging, and a project of expanding the Ragged Mountain Dam. It doesn’t warrant expanding.”

Response from Mr. Frederick: “To compare that, you have to look at the entire system and all the repercussions.”

Question from Mr. Lloyd: “Safe yield, the withdrawal permit that was issued by DEQ, has an ever-decreasing environmental release downstream over the South Fork Dam. If we do nothing, as I understand it, on the permit, we are obligated to have an environmental release of eight million gallons a day. When the capacity is built out, then during a drought, it would be truncated down to 1.3 million gallons per day, which I wonder – is that enough to dilute the wastewater at Moore’s Creek during a drought?”

Response from Mr. Frederick: “We have never looked at releases at South Fork as a way of diluting wastewater; that’s not been in our consideration, ever. They’re two separate issues. Now there have been some people in this community that have suggested that, but it’s not true. That’s not been our consideration.”

Comment from Mr. Lloyd: “I think there’s an environmental requirement to have a permit to release wastewater to dilute it.”

Response from Mr. Frederick: “The wastewater treatment permit – which is off the subject of what we’re talking about tonight – it has quality requirements of what’s released to the river. It doesn’t say anything in the permit about dilution.”

Comment from Mr. Lloyd: “Just for clarity, we’re talking about a drought. It takes a drought, and I think the safe yield we quoted earlier needs to be redone with the current situation, and I think the demand needs to be considered. Not the demand of 12 million gallons today, but you know, the demand in stage two drought.”

Final comments from Ms. Christensen: “You all have done an amazing job of exchanging information. We thank our consultant team, HDR, and Tom for your clarity of questions, and you all for sticking with this conversation. We’re going to bring Mike up to talk about next steps, and close the meeting.”

Closing comments from Mr. Gaffney: “I’d like to thank the elected officials, Board members, staff members, and members of the public for coming tonight. I know we lost a lot of the audience during the last hour, but it was great to see a big crowd. Our staff will review public comments and consider all appropriate suggestions. This meeting represents the final step in the dredging feasibility study, with the exception of the report that HDR will do, which will be complete in July. The final report will not contain new information, except to address changes that are appropriate. Comments we receive tonight we will compile all information into various task reports. All of the task reports are located on the Rivanna website. As you heard tonight, Rivanna is recommending an outcome of the dredging feasibility study that the community considers the development of an RFP for proposals to allow private companies to prepare turnkey dredging for sand recovery. This recommendation and possibly others are likely to be discussed in the upcoming weeks. City Council will be reviewing the results of this dredging feasibility study at its City Council meeting on July 17th, and there’s likely to be a joint meeting of the four Boards – City Council, Board of Supervisors, Albemarle County Service Authority, and the Rivanna Board, sometime later this summer. No date for this meeting has been set. Again, Rivanna will continue to send email notices on the community water supply plan. If you’ve not signed up, please do. Rivanna also has a speaker’s bureau, and just contact Mary Knowles if you are interested in having a speaker come to your organization. There are meeting evaluation handouts in the back...if you get a chance, please fill that out before you leave.....Thank you all for coming. For the Rivanna Water and Sewer Authority Board, the meeting is adjourned.”

Respectfully submitted,

Mr. Robert W. Tucker, Jr.
Secretary-Treasurer