10.0 UTILITIES COMMENTS AND RESPONSES

Comment 10-1 (Mr. Peter Bliss, Public Hearing, June 11, 2008): I saw there was no sewerage treatment plant. That in the '90s and going to the rezoning in the year 2000, it was a given in the planning that if there was multi-family housing over 50 units, there would be sewerage treatment. It could be put subsurface once it was treated, but the plant would be there. In reading the EIS, I only saw one sentence that even addressed treatment, and that was a filter it looked like it might have been put in at the end, to monitor nitrate levels. I really don't think that's sufficient. The whole principal of septic tanks and fields is you have small areas scattered about. They don't have a big impact. Here you have the effluent from 65 units going all into one place. It's three-and-a-quarter acres with the expansion a hundred percent expansion, makes it six-and-a-half acres. It's all in one place. It's not scattered about. I'm very concerned about that. I think the impacts or potential impacts could be severe. One thing, and I don't know whether it's been looked at, if there is a stream that's downhill right next to this, will it have any impact on that? I have no idea, but I think it needs to be looked at.

Response 10-1: *The proposed project has been revised and now includes a Wastewater Treatment Plant (WWTP) that will treat effluent prior to its being discharged to the subsurface sewage disposal system (SSDS). This redundant system will meet all regulatory requirements, including those of the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), Westchester County Department of Health (WCDOH), and the New York City Department of Environmental Protection (NYCDEP). It is also noted that extensive soil testing was performed on the site and a mounding analysis was prepared by the project's hydrogeologist to provide a more thorough hydrogeological analysis of the proposed SSDS's feasibility.*

The WWTP and redesigned SSDS are described in the Preliminary Wastewater System Report (Appendix G). Wastewater treatment will utilize the Biologically-Engineered Single-Sludge Treatment (BESST) system, manufactured by Purestream ES, LLC. The treatment process is expected to produce treatment effluent with less than 10 mg/l (ppm) biochemical oxygen demand (BOD_5), 10 mg/l total suspended solids (TSS) and 10 mg/l total nitrogen (TN). The treatment system will also remove phosphorus by chemical precipitation. The WWTP will collect and entirely treat the sanitary flow from the development, and no treatment of the discharge will be required by the soil, as with a traditional subsurface treatment system. The discharge from the plant will be treated to a level that it could be discharged to a surface water body or stream.

The entire wastewater treatment system will be located in a 55 foot by 35 foot building located south of the project entry road in the same area where the DEIS Plan had the septic tanks (which are no longer necessary) and other equipment. The building will have an odor control system as well as an emergency power generator capable of automatic startup, should power be lost.

Treated wastewater from the plant will be discharged to the redesigned SSDS field located in the east-central portion of the site. Again, the SSDS field is designed to discharge fully treated wastewater and no treatment is proposed in the SSDS system. Based upon recent discussions with the WCDOH, their policy is not to allow reductions in SSDS size or expansion area when a WWTP is utilized for wastewater treatment. Therefore, the SSDS was designed and sized based upon the estimated project flow

rates. The SSDS was conservatively designed with several factors of safety, as described in the Preliminary Wastewater Treatment Report (Appendix G, page 3). The length of the absorption trenches is twice that required by NYSDEC and NYCDEP regulatory minimums.

The proposed WWTP, although not required by any regulatory agency, has been provided to discharge fully treated wastewater into the subsurface. Providing twice the length of absorption trench, compared to regulatory minimums, will ensure the long term functioning of the SSDS.

Comment 10-2 (Mr. Peter Bliss, Public Hearing, June 11, 2008): If they are going to do subsurface with no treatment or just the nitrate treatment, I think they should be made to look at similar places, perhaps within the State of New York, that do it and have done it for a number of years and give the results of, does it work. And if it doesn't work, why doesn't it work. And then if it doesn't, corrections should be made prior to having it done.

Response 10-2: *Refer to Response 10-1. In addition, the proposed recirculating textile filter system has been well tested and documented to provide enhanced wastewater treatment to reduce not only nitrates, but biological oxygen demand (BOD) and Total Suspended Solids. Refer to the Preliminary Wastewater System Report for more detail.*

The following is a list of similar community septic systems in the immediate surrounding area and their approximate age. Based on discussions with the local Health Departments and the NYCDEP, these community septic systems function adequately.

Table 10-1
Local Community Septic Systems

Project	*Location*	*Design Flow (GPD)*	*Year Constructed (Approximate)*	*Type*
Pepsico	*Somers*	*34,800*	*unknown*	*WWTP with SSDS*
North Salem High School	*North Salem*	*10,000±*	*1961*	*Absorption Trench SSTS*
Somers Central School District – Primrose School	*Somers*	*7,000 ±*	*1970's*	*SSTS*
Terravest	*Southeast*	*30,000 ±*	*2007*	*WWTP with SSDS*
Meadowbrook Farms	*Patterson*	*8,100*	*1989*	*Absorption Trench SSTS*
Plaza at Clover Lake	*Patterson*	*18,000*	*1988*	*Galley SSTS*

Source Insite Engineering 2009

Comment 10-3 (Mr. John White, Public Hearing, June 11, 2008): The school, when they went to dig the new well, went to redo their water tank and the health department reneged on what they previously said, and required that the capacity be increased and the tank, which now doesn't fit in the school, so whatever you've been told by the health department, that 66 units

can be put on your treatment process, whatever your calling it here, it's certainly not I think you may find it will be revisited because they seem to be getting stricter every day.

> ***Response 10-3:*** *Comment noted. The project team is very aware of the current regulations and will meet all aspects of the current regulations that apply to the proposed project.*

Comment 10-4 (Ms. Suzannah Glidden, Public Hearing, June 11, 2008): And one other thought about the school impact, impact fees aren't illegal here in New York State, but other than the recreation fees, they haven't been. And it would be interesting to consider school impact fees that a developer would have to pay, as well as maintaining stormwater devices, and again, instead of sticking the residents of a town with these fancier and more expensive devices to maintain in the future, why shouldn't the developer why can't we consider a developer paying for the future maintenance of the storm water devices. Ideas. We'll be commenting too. Thank you.

> ***Response 10-4:*** *Comment noted. The NYSDEC, NYCDEP and the Town of North Salem, have each adopted stormwater regulations with which the Salem Hunt Homeowners Association must comply. Included in those regulations are requirements for maintenance of erosion and sediment controls implemented during construction and the post construction management of stormwater facilities. The Applicant would be solely responsible for ensuring the proper implementation and maintenance of the erosion and sediment controls during construction, and for the construction of the permanent stormwater management facilities.*
>
> *The Homeowners Association would be solely responsible for the long term maintenance of the post construction stormwater management facilities. Refer to Section 5 of the Stormwater Pollution Prevention Plan (Appendix F) for detailed descriptions of the maintenance requirements during and following construction. The Homeowners Association maintenance responsibilities are summarized in Section 1.3 Summary of Proposed Action.*

Comment 10-5 (Mr. Irvin Raboy, Public Hearing, June 11, 2008): I also don't think that a number of fire department groups, and that's probably going to be a problem too, not for me, but a lot of close houses. And whether or not, if you are going to suck out water or if you are going to have a basin, will you guys also use tanks to store your water in. And just, you know, save up gray water, save up anything else. If you can't use the basins because you end up, you know, making (indiscernible) wetlands as a result, maybe you could do something with that.

> ***Response 10-5:*** *Two (2) 25,000-gallon fire protection tanks are proposed in the vicinity of the proposed recreation building. The size of the tanks are based on an April 9, 2008 meeting between the applicant and the Fire Department. The location of the tanks were also discussed with the Fire Department at this meeting. It was agreed that two (2) tanks with a single draft point at the first intersection on the access drive would provide a suitable staging area for fire fighting within the proposed project. The tanks would initially be filled by the applicant after which the Homeowners Association would be responsible for conducting an annual inspection of the tanks. A low level alarm is proposed within the adjacent recreation building to provide an alarm should the level drop. Typically these tanks do not require make up water unless there is usage. Should*

make up water be needed or the tanks require refilling after usage, the water would be provided by a tanker truck.

Comment 10-6A (Letter #3 Ms. Marilyn Shanahan, NYCDEP, July 9, 2008): The Hydrogeology Investigation Report (Appendix J) in the DEIS indicates that the proposed action will result in a build-up of groundwater (i.e., a "mound") under the SSTS absorption area that will result in septic tank effluent and groundwater being elevated to or above the existing ground surface. This is an indication that the proposed action is exceeding the capacity of the site to absorb and disperse the design sewage flow rate without significant engineering. The hydrogeologic model, which is based on actual site data, shows that a sewage design flow rate greater than 16,000 gallons per day will result in surface breakout of sewage effluent onto the surface of the ground. The DEIS proposes to maintain the required vertical regulatory separation distance from groundwater water to the bottom of the SSTS absorption trenches by utilizing fill material. The results of the hydrogeologic investigation are alarming and should warrant consideration of additional alternatives. One such alternative could include a reduced sewage design flow rate that will minimize the risk of surface breakout of sewage effluent, which could be achieved through a reduction in the number of proposed units. A wastewater treatment plant should be considered as an additional alternative to the conventional SSTS.

Comment 10-6B (Letter #20 Edward & Ervin Raboy, E&Y Operating Corp., July 31, 2008): The Plan seems to call for a very standard septic system consisting of septic tanks and leeching fields. We are not knowledgeable enough to make specific suggestions for improving the septic system, but ask the board to consider whether the wastewater generated by a concentration of 65 two bedroom units shouldn't have some additional mechanical, chemical, or biological treatments within the system. The fact is that all this waste is going into the ground in one small area — an area very close to an important tributary stream of the Croton reservoir system. We urge the board to require full independent analysis of this issue.

Response 10-6A-B: *Refer to Response 10-1. A WWTP is now proposed to treat effluent prior to its discharge to the conventional SSTS. NYCDEP Watershed Regulations prohibit the construction of WWTP's with surface discharges in New York City's drinking water supply watershed.*

Unfortunately the groundwater mounding controls with subsurface disposal of WWTP effluent are the same as those for subsurface treatment, therefore the opportunity to reduce the square footage or hydraulic loading to the SSDS absorption trenches is not present. Although the now proposed WWTP will not reduce the square footage or hydraulic loading to the SSDS, the effluent will now be fully treated prior to subsurface discharge.

Comment 10-7 (Letter #3 Ms. Marilyn Shanahan, NYCDEP, July 9, 2008): The Hydrogeology Investigation Report indicates that four to five feet of fill will be required to both prevent sewage effluent from day-lighting on the ground surface, and to maintain a regulatory-compliant and functioning absorption area. Considering design features such as appropriate tapering of the fill section and an impervious berm, it is unclear from the information provided whether or not an absorption area with 4 to 5 feet of fill will fit in the area shown on the plans and still meet all required regulatory setbacks, Note that the site plan included with the DEIS, dated 11/28/06 and last revised 4/18/06, shows fill with a depth of 2-4 feet and the actual layout of trenches is not provided.

Response 10-7: *The reference indicating four to five feet of fill will be required over the SSTS was associated with a 17,000 gallon per day scenario, a scenario that will not be pursued. The trench layout and site grading for the SSDS has been revised, based upon consultation with regulatory agencies and additional testing data. Fill, with a maximum depth of 2 to 3 feet will be placed in the southern portion of the SSDS area. The trench layout and grading are shown in Figure SSDS-1, included in the revised Preliminary Wastewater System Report prepared for the project. (refer to Appendix G).*

Comment 10-8 (Letter #3 Ms. Marilyn Shanahan, NYCDEP, July 9, 2008): The presence of steep slopes in the proposed SSTS area is a concern. The slope disturbance map, Figure 7-5, shows the proposed dwelling units, but not the layout of the SSTS area. The SSTS layout should be superimposed on a topographic drawing.

Response 10-8: *The revised SSDS layout has been shown superimposed on the site topography in the Preliminary Wastewater System Report. (refer to Appendix G).*

Comment 10-9 (Letter #3 Ms. Marilyn Shanahan, NYCDEP, July 9, 2008): As a recirculating filter treatment system is proposed as mitigation for some SSTS impacts, the specifications for this system should be provided during DEIS review. Although the reader is referred to Section 6.3 for additional information on this system, no information was found under this heading.

Response 10-9: *The recirculating textile filter has been replaced by a wastewater treatment plant which is described in the revised Preliminary Wastewater System Report. (refer to Appendix G).*

Comment 10-10 (Letter #7 Russell Urban-Mead, The Chazen Companies, July 24, 2008): The Applicant is proposing use of a recirculating textile filter treatment system to release a cleaner effluent to the subsurface wastewater disposal fields than would be released by use of a septic tank alone. Under a scenario assuming that all discharged wastewater returns to the local aquifer system, the Applicant should calculate whether this additional treatment is sufficient to ensure that average ground water quality under the site will not exceed groundwater standards for nitrate once diluted into the average site-wide aquifer recharge described in DEIS Appendix H Table 1.

Response 10-10: *Based on concerns of the Town, the Town's Consultants, regulatory agencies and the General Public, the project has been revised to include a Wastewater Treatment Plant (WWTP). According to the plant manufacturer, nitrate levels would be reduced to 10 mg/l, prior to discharge to the subsurface. The plant is described in Response 10-1 and in the revised Preliminary Wastewater System Report (Appendix G).*

Comment 10-11 (Letter #7 Russell Urban-Mead, The Chazen Companies, July 24, 2008): The Chazen Companies have not reviewed the engineering design and mounding analysis for this proposed wastewater system. Review of the mounding analysis should be completed before closing SEQRA but it may be wise to wait until we learn if the Applicant will revise their mounding analysis to respond to comments from NYCDEP.

Response 10-11: *The mounding analysis has been revised based upon the revised SSDS design. The results are provided in the Supplemental Hydrogeology Investigation*

(Appendix K). The responses to the NYCDEP comments have been included in the FEIS.

Comment 10-12 (Letter #8 Mr. Frank Annunziata, Hahn Engineering, July 25, 2008): The estimated water supply demand contained in the "Preliminary Engineer's Report for Supply for the Proposed Salem Hunt Project, Town of North Salem, New York, August 4, 2006, Revised November 13, 2006", prepared by Insite Engineering is appropriate, however, all future plans and approvals should specify that lawn irrigation will be prohibited. Likewise, Section 10.6 - Mitigation Measures Water Supply should specify that lawn irrigation systems will be prohibited.

Response 10-12: *Section 10.6 - Mitigation Measures Water Supply and the Site Plans have been revised to specify that lawn irrigation systems would be prohibited except during initial grow in.*

Comment 10-13 (Letter #8 Mr. Frank Annunziata, Hahn Engineering, July 25, 2008): The location of proposed utilities to be brought into the site (i.e. gas, electric, telephone, cable TV) should be shown on the plans. Site utilities are to be installed underground. This should be noted on the plan.

Response 10-13: *The locations of the proposed utilities to be brought into the site will be determined by the utility suppliers. The utility suppliers will provide these locations upon determination of a final layout. A note has been added to the plan indicating that all site utilities are to be installed underground.*

The underground utilities are anticipated to be installed commencing along the northern edge (right side) of the Road "A" entrance at June Road and follow the right side of both Road "A" and Road "B": The installation of the underground utilities will not impact wetlands. The improvements will fall partially in wetland control area for Wetland D, which will be disturbed for the construction of the site entrance. Utility installation will require no additional wetland buffer impact.

Comment 10-14 (Letter #19 Phil Bein & Charles Silver, Watershed Inspector General, July 30, 2008): As discussed in the Technical Appendix A (p. 11), the Salem Hunt DEIS does not provide information or analysis concerning the proposed wastewater treatment system that would treat sanitary wastes generated by residents at the development. Additional environmental review should be performed to address this issue especially given the importance of ensuring that sewage is properly treated and that discharges of pathogens, phosphorus, and other pollutants into the Muscoot Reservoir drainage basin do not occur.

The additional environmental review should take the form of a Supplemental DEIS so that members of the public and interested public agencies can comment on wastewater treatment issues and such comments can be addressed in the FEIS. See Save Eastern Environment v. Marsh, 234 A.D.2d 616 (3d Dep't 1996); Friends of Smith Farm v. Town Board for the Town of Clarkstown, 45 A.D.3d 765 (2d Dep't 2007).

Response 10-14: *The applicant has met with the regulatory agencies responsible for approving the wastewater system, including the Town, NYSDEC, NYCDEP, WCDOH, as well as the comment writers, to discuss the project wastewater treatment. Those meetings and discussions resulted in the applicant's decision to provide a WWTP. A Supplemental DEIS is not required since the Preliminary Wastewater System Report*

has been substantially revised to describe the WWTP and the revised SSDS. (refer to Appendix G).

Comment 10-15 (Letter #19b Richard Claytor, Horsley Witten Group, Inc, July 29, 2008): Information on the wastewater system has not been included. We recommend the wastewater system is provided for review. We note the soil logs provided in Appendix I show adequate material for effluent disposal.

Response 10-15: *The Preliminary Wastewater System Report has been revised to provide detailed calculations for the sizing of the SSTS. An absorption trench layout has also been provided.*

Comment 10-16 (Letter #20 Edward & Ervin Raboy, E&Y Operating Corp., July 31, 2008): The only mention of anything extra is a filter for nitrates. We're not professionals at this, but according to their analysis there are nitrate levels on the property with no septic or fertilizers currently being used. In addition to this we know that Putnam County Soil and Water is concerned with the high nitrate levels entering the reservoirs downstream. The Salem Hunt data suggests that the effluent is rated at 40 mg/L, four times that of what the EPA considers safe (10mg/L). In order to lower its concentrations, they wish to use a mechanical filter, which they give a brochure for in the Appendix K. The brochure itself states that the filter eliminates 66-70% of the nitrates in the sewage going through it. That leaves effluent with 12mg/L nitrate (not safe). The effluent will then infiltrate the soil via the leaching fields and enter the ground water supply, while hopefully losing some nitrate levels along the way. This doesn't work out. There is already a problem with nitrate levels and allowing more to seep into the ground is not a satisfactory way of improving the environment. A chemical filtration system that completely filters out nitrates/nitrites/ammonia is going to have to be required for this site. The numbers they are using, 16,000 gpd of sewage, are not even met with the system they propose now and 16,000 gpd is only an estimate. If there's even more sewage, there will be an even higher flow rate or concentration. The inadequate computer modeling that they are using should not replace common sense. You are putting 135+ people on less than 40 acres in the middle of a watershed. There is going to be contamination without extreme interventions. There should be virtually no more nitrates leaving their property after the installation of a septic then there were before one was installed.

Response 10-16: *Refer to Responses 10-1 and 10-10.*

Comment 10-17 (Letter #21 James L Simpson & William Wegner, Riverkeeper, July 30, 2008): The applicant proposes to site the 6.5-acre primary and secondary disposal field of a subsurface sewage treatment system (SSTS) in Charlton loam (ChB) soils east of the residential development. The DEIS correctly characterizes ChB soils on slopes from 2 - 8% as deep and well drained. However, DEIS Figures 9-6, Proposed Site Plan, and 7-3, Soils Map, indicate that the 6.5-acre SSTS disposal area is proposed to be sited on Charlton loam (ChD) soils with slopes ranging from 15-25% and Sutton loam (SuB) soils in addition to ChB soils. Development limitations on ChD soils are severe due to slope, and on SuB soils are severe due to wetness.

Appendix 75-A.4 of the New York State Septic System Design Regulations prohibits siting of SSTS on slopes greater than 15%. Because the DEIS soil map proposes siting a portion of the SSTS on ChD soils, which are characterized by a *minimum* of 15% slopes, the applicant should

be required either to demonstrate that all the ChD soils in the proposed absorption area are limited to 15%, or to reconfigure the site plan to comply with State law.

> ***Response 10-17:*** *The proposed SSTS was not designed on slopes greater than twenty percent. The revised FEIS plan has none of the septic system components installed in grades that exceed 15 percent (see Figure SSDS-1 SSDS Schematic, Preliminary Wastewater Report, Appendix G.).*

Comment 10-18 (Letter #21 James L Simpson & William Wegner, Riverkeeper, July 30, 2008): In addition, the applicant's project engineer completed 31 deep test holes and percolation tests in August 2007, the driest month of the year. Percolation and depth to groundwater of SuB soils, having severe development limitations due to wetness, cannot be assessed accurately unless seasonal variations in rainfall are included in the analysis. To ensure that the proposed SSTS will not fail due to groundwater mounding and surface soil saturation, the applicant must be required to conduct soil percolation tests during the wettest time of year.

> ***Response 10-18:*** *Thirty-one deep test holes and 31 percolation test holes were performed and witnessed by the Westchester County Department of Health (WCDOH) and NYCDEP for the proposed SSDS. Standard WCDOH testing protocol includes a presoak of the percolation test holes prior to witnessing the actual percolation test. The percolation test hole presoak consists of completely filling the percolation test hole with water one day before the actual percolation test hole witnessing. All 31 percolation test holes were presoaked in accordance with the WCDOH requirements. The presoak ensures that the witnessed stabilized percolation rate is representative of saturated soil.*

Comment 10-19 (Letter #21 James L Simpson & William Wegner, Riverkeeper, July 30, 2008): These issues are particularly salient when considering the fact that the applicant has proposed siting a 6.5-acre sewage disposal field on soils some of which have severe development limitations due to steep slopes and wetness. The Town Planning Board should require the applicant to identify and discuss an alternative that reduces the number of proposed residential units to a quantity that can be serviced by an SSTS that is properly designed and sited on appropriate soil types existing on the project site.

> ***Response 10-19:*** *Refer to Response 10-18.*

Comment 10-20 (Letter #9 Edward Gordon, Resident, July 26, 2008): Perhaps the project could tie in to the nearby planned Peach Lake Sewage District by expansion, or to a sewage district in bordering Southeast. At any rate, the number of planned units crammed in to the buildable part of the lot therefore seems excessive. The buildable section is not 40 acres; it appears closer to 25.

> ***Response 10-20:*** *The proposed Peach Lake WWTP is provided to improve local conditions by removing failed SSTS's within close proximity to Peach Lake. The NYCDEP will not allow new development to be connected to the proposed Peach Lake WWTP. The number of residential units proposed meets the requirements of the Town Zoning Code and the project has been designed to minimize impacts.*

Comment 10-21 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): The written description of the treatment system does not match

what is being shown in the plans. For example, Section 4.0 of the Preliminary Wastewater System Report references two locations for septic tanks, however, only one location is shown on the plans. Section 5 of the Report references alternate dosing of the trenches, while based on the plans it appears gravity distribution is proposed.

Response 10-21: *Site Plans have been revised to reflect the discussion in the text and the Preliminary Wastewater System Report (See Drawings SP-3.1 and 3.2 Grading and Utilities Plan). Alternate dosing of the two groups of absorption trenches by a duplex pump station is proposed.*

Comment 10-22 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): Additional information regarding the subsurface sewage treatment system (SSTS) is required to adequately review the proposed design. The plan should show the location of each leaching trench, along with calculations for sizing the field, including the proposed loading rates.

Response 10-22: *Additional information regarding the design is provided in the Supplemental Hydrogeology Report (see Appendix K).*

Comment 10-23 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): The proposed AdvanTex AX100 wastewater treatment system is generally considered a reliably system to provide adequate pollutant removal from biochemical oxygen demand (BOD), total nitrogen, and total suspended solids to meet the discharge limits but has limited capability to remove phosphorus. The expected total phosphorus concentration in the treated effluent is likely to be approximately 5 milligram per liter (mg/L), which is equivalent to about 0.67 pounds per day with a design flow of 16,000 gallons per day. This will increase the phosphorus loading into an existing phosphorus stressed watershed. Other phosphorus removal technologies, such as biological and chemical processes should be considered in order to reduce the total phosphorus concentration to less than 1 mg/L in the treated effluent.

Response 10-23: *Phosphorous in wastewater is typically not a major issue of concern since phosphorus is reduced under natural chemical and biological systems in soils. Nitrates are not as effectively reduced in soils and therefore treatment is proposed. The proposed waste water treatment system is designed to effectively reduce concentrations of phosphorus in the effluent.*

Comment 10-24 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): Necessary information to adequately review the calculations is missing, including:

- A better graphic showing actual locations of the proposed effluent leaching facility relative to borings, test pits, the stream, property boundaries, and existing topography;
- Color copies of diagrams and mapping to make the groundwater model documentation legible;
- Better documentation of rationale for model boundary conditions and aquifer properties.

Response 10-24: *New mapping has been prepared by Insite to show the locations of the sewage treatment components (see Appendix G Revised Preliminary Wastewater*

Treatment Report). Color copies of these maps have been provided under separate cover. Further, Insite has provided detailed site topography mapping which includes each of the wetlands/streams that were represented as constant head boundaries in the model under separate cover. With respect to the aquifer properties comment, please refer to Sections 3.30 and 6.20 of the GeoDesign report and related appendices (Tables 4.1; Falling head test data; Table 5.1, Table 5.2) for details and basis for selecting properties.

Comment 10-25 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): Model input factors do not appear to be based on a conservative methodology which tends to underestimate mounding results, including:

- Existing natural groundwater recharge rounded down from 16.7 inches per year calculated to 16 inches per year used;
- Constant head boundaries in model nearly surround the proposed leaching area and are too close to the area of interest. The influence of those constant head boundaries tends to reduce estimated mound heights at the leaching area as the model attempts to maintain those constant head elevations in close proximity to leaching area;
- The model includes the top 10 feet of bedrock as aquifer which is inappropriate. The model should only use overburden material and the bedrock surface should be modeled as an impermeable boundary. Artificial thickening of the aquifer decreases predicted mound heights;
- The computed hydraulic conductivity values in model are artificially increased by 10% to account for predicted increases in aquifer transmissivity as water levels rise under the influence of mounding. This is inappropriate as the model accounts for changing transmissivity as water level change and artificial alterations of conductivity are not required. If the applicant's choice of confined aquifer conditions for the model drove this decision, the aquifer type should be changed to unconfined or variable.

Response 10-25: *The use of 16.7 inches/year versus 16.0 inches/year is not a meaningful difference as compared to the variability of other parameters used in the study, including variability in precipitation and measured groundwater levels. Thus, this is an insignificant rounding difference.*

The model's constant head boundaries reflect field conditions and are appropriate (details of the elevations used to model the constant cells at the stream/wetland to the east of the SSTS have been provided to Horsley Witten Group [HWG] under separate cover).

Please refer to the Supplemental Hydrogeology Investigation dated December 18, 2008 for a discussion of the inclusion of the upper ten feet of bedrock as part of the aquifer and the selection of the assumed impervious boundary (see Appendix K). The report has been revised and supplemented in a letter dated April 21, 2009 (see Appendix K).

The model was run using the confined option. Based on GeoDesign's experience, this method yields reliable results while facilitating computations and model calculations convergence. Additionally, it is a common and accepted procedure. Thus, the increase in the hydraulic conductivity under the flow (mounded) condition is not artificial. This methodology is used to reflect the predicted mounded condition since a "confined"

condition has been modeled, e.g. the calibrated (pre-flow) model runs approximate to the pre-development condition with a thinner aquifer, while the predicted (post-flow) condition runs approximate to the increased aquifer thickness (due to the mounding) by increasing the hydraulic conductivities. This is appropriate since the mounding increases transmissivity (T), where T = kH; k = hydraulic conductivity; and H = aquifer thickness. It is much easier to modify a calibrated model by increasing hydraulic conductivity (k) than by increasing aquifer thickness (H), thus the reason for selecting this method, but the resulting increase in transmissivity is the same as if aquifer thickness (H) had been increased instead of hydraulic conductivity (k).

Comment 10-26 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): Mounding results are reported independently for each of the three leaching bed rotations simulated. In reality, the mounding resulting from bed use configuration 2 will be superimposed on the remaining mound from bed use configuration 1, and so on. The total mound height is therefore under predicted. The total mounding should be estimated by either using a transient model capable of accounting fro the bed use changes, or by a mathematical superposition of the three independent mounding evaluations.

Response 10-26: *Mathematical superposition of three independent mounds is technically invalid since the three areas (A, B and C) will never be operated (recharged simultaneously). In choosing to model each of the three flow rotation cases (A + B, B + C, and C + A) independently it is conservatively assumed that a steady state is reached at the end of each case. When each subsequent case begins, the mound in the area which was just shut down will begin to recede as the mound in the area of the newly started area will begin to increase, i.e. as one increases, the other decreases. While the detail effect of this transient condition has not been modeled, it is believed that the steady state assumption is sufficiently conservative and therefore does not under predict the mound height. For these reasons, the applicant and Geodesign believe that running a transient model is unnecessary.*

Comment 10-27 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): The model output is generated for target boring locations and it is unclear how these relate to the actual leaching areas. Is there potentially higher mounding away from these target boring locations?

Response 10-27: *The model can only be calibrated to targets (locations where actual groundwater levels are known). However, the predicted mounding levels are calculated at each model cell and checked by reviewing the contoured predicted groundwater levels. This is how the location and extent of the areas requiring filling to provide added separation above the predicted mound where determined.*

Comment 10-28 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): Even with the non-conservative issues raised above, the model predicts mound heights that will require infilling to maintain groundwater separation. There is little room for error in this situation and any errors in the applicant's calculations may result in violation of the groundwater separation requirements. This is particularly relevant as the model output is reported to be accurate to only within approximately 1 to 2 feet.

Response 10-28: *Refer to Responses 10-25, 10-26, and 10-27 in regards to being conservative in calculations and rationale. As explained in Section 7.20 of the*

GeoDesign report, the model's calibration "match" is in part limited by the fluctuations in observed groundwater levels. For this reason, the upper range of observed groundwater levels was used for the calibration. This is a conservative approach that tends to over predict mound height and under predict vertical separation distance. It should be noted that in Section 7.5 "accuracy" is referred to, when in fact, what really should be "precision". The issue of providing increased and conservative vertical separation is addressed by using a conservative existing ground surface elevation and by using a larger fill area. The ground surface elevations used in each cell of the model are generally based on the highest ground surface in each cell, e.g. If a cell represents sloping ground, the higher elevation within the area of the cell was generally used in the model (not the average elevation). Similarly, the higher elevation of the stream/wetlands was generally used in representing the constant head boundary cells (as previously transmitted to HWG under separate cover). The design fill height and areas were selected by conservatively applying the design fill thickness to the entirety of the cells where insufficient vertical separation was predicted.

Comment 10-29 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): As a quick check on the applicant's mounding calculations, we ran an analytical mounding estimate using Hantush's 1967 method. We used a 100,000 square foot infiltration area representing two of the proposed infiltration basins, a loading rate of 16,000 gallons per day under steady state conditions, the applicant's reported average hydraulic conductivity value of 0.6 feet per day, and an initial saturated aquifer thickness of 5 feet based upon the boring logs for B-5, B-13, and B-14 (assumed to be closest to the leaching area). The estimated maximum mound height below the center of the leaching area from this analysis was calculated to be approximately 28 feet; significantly higher than any of the values reported by the applicant. It is unclear how a 28-foot mounded related to existing topography in terms of groundwater separation requirements.

Response 10-29: *The applicant and GeoDesign have requested, but have not yet been provided all input parameters to HWG's Hantush model. Without the input parameters, the above described results cannot be evaluated nor can a response be provided to the technical specifics of the comment.*

Comment 10-30 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): The applicant's mounding analysis was conducted using natural aquifer recharge conditions from a slightly wetter than average year. What would occur under extremely wet conditions, as may occur more frequently due to climate change considerations? This is particularly relevant since the applicant's calculations show sufficient mounding to require infilling, and that there are real concerns about whether the applicant's mounding calculations are an under estimation.

Response 10-30: *Tables 5-3 though 5-7, in Appendix 5 of the Hydrogeology Investigation (GeoDesign, February, 2007), found in Appendix J of the DEIS, explain in detail the basis for establishing the design pre and post-construction groundwater recharge parameters. In the applicant's opinion, it is not reasonable to attempt to predict what will happen if extreme precipitation events occur outside historic climatic conditions. The recharge parameters were established using long period records for both precipitation (110 year record at KPOU) and base flow (46-year record in USGS Bulletin GROUNDWATER-37 as referenced in Table 5-4). A link to this USGS Bulletin has been provided to HWG under separate cover.*

Comment 10-31 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): There is not enough information to adequately review the applicant's nitrogen loading calculations. As a check on the veracity of the MT3D contaminant transport model used, it would seem reasonable to provide a delineation of the groundwater flow area from the leaching facility to the stream, and a mass balance analysis completed.

Response 10-31: *The applicant is uncertain what is meant by "delineation" and if this refers to ground contour mapping under the nitrate scenario. This mapping was not presented because flow direction has a similar pattern as that depicted in Fig 6-8 for the conditions modeled for the mounding model.*

Comment 10-32 (Letter #24 Richard Claytor, Neal Price & Tom Lee, Horsley Witten Group, September 2, 2008): There is no discussion of phosphorous loading despite the fact that the project is located within a phosphorous restricted watershed. While phosphorous does tend to bind to subsurface soil particles, subsurface adsorption sites gradually become filled and soluble phosphorous migrates incrementally further with time. The leaching facility is reported to be located approximately 170 feet from the adjacent stream. Given the shallow depth to groundwater under proposed conditions, the total horizontal and vertical wastewater travel distance will be much lower than the 300 feet commonly used as a general rule of thumb guideline for a desirable distance from a surface water body. In addition, the concerns about groundwater mounding discussed above raise an additional concern that surficial breakout of effluent might allow for the rapid transport of phosphorous to the stream via overland flow.

Response 10-32: *Phosphorous loading evaluation was beyond the scope of the mounding analysis, as required by the Scoping Document. The assumptions made are that predicting nitrate concentrations (Figure 6-10 and Section 7.80) and travel time (Section 7.70) are adequate to evaluate potential impact to surface water bodies. The applicant believes that relying on a site-specific groundwater model is more valid that using general rules of thumb [guidelines] as suggested by HWG.*

Comment 10-33 (Letter #9 Edward Gordon, Resident, July 26, 2008): The lot includes and is bordered by wetlands. Sewage disposal therefore raises a significant question. What is planned is "SSTS" (Subsurface Sewage Treatment System). As in all such developments, the amount of sewage runoff is of great concern. The local runoff feeds directly into the local stream, and thence into the NYC reservoirs.

Response 10-33: *See Response 10-1, 10-6 and 10-10.*