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September 15, 2016

Village of Tuckahoe Planning Board
65 Main St.
Tuckahoe, NY 10707

Attn: Chairperson Ann Marie Ciaramella

RE: Marriott Springhill Suites Development at 109 Marbledale Road

Dear Chair Ciaramella and Planning Board members:

I am writing to provide comments on the subject development on Marbledale Road, on behalf of the Marbledale Road Environmental Coalition. As you know, the proposed development is situated on a brownfield site called the *Former Marble Quarry Landfill Site*. This site is being addressed under the Brownfield Cleanup Program by the New York State Department of Environmental Conservation (NYSDEC). Investigation of the BCP site shows a wide variety of contaminants in soils, soil vapors, and in site groundwater.

However the BCP site occupies about half of the entire former quarry dump. The remainder of the quarry dump is now proposed for inclusion in the state's Inactive Hazardous Waste Site program, known also as the State Superfund. Historical eyewitness accounts detail the disposal of a wide variety of materials over a 20- to 30-year period beginning in the early 1950s. First the northern quarry hole was filled, then the southern hole. Historical aerial photography confirms this. Waste materials included incinerator ash, demolition debris, asphalt and other debris from road construction, chemical laboratory wastes, pharmaceutical products, automotive parts, refrigeration and/or air-conditioning equipment, electrical transformers, and petroleum products. It is alleged that drums of waste materials were disposed of in the former quarry landfill.

Investigations of the site by HydroEnvironmental Solutions over the past three years, augmented by geotechnical tests in 2015 by Carlin, Simpson & Associates, confirms large quantities of ash at the site, mixed with cinders, debris (concrete, wood, asphalt, etc.), auto parts, and other fill material. Chemical testing confirms the presence of petroleum, chemical solvents, PCBs from transformers, and Freon gases from refrigeration or AC equipment. There are many additional contaminants whose origins can only be guessed at.

The question before the Planning Board now is whether to approve permits needed to allow the construction of the proposed 5-story hotel and stand-alone restaurant on this site. On the basis

of what is known about the site today, and the methods being proposed to build on the site, I strongly recommend that permits *not be issued at this time*. Rather, action should be deferred until much needed information is gathered. In particular, I recommend that the Planning Board requires—at a minimum—the following be completed before a proper decision can be rendered concerning development at this site:

- Complete review of new soil and groundwater data that is to be gathered as part of the remedial action currently approved by NYSDEC;
- Thorough and complete investigation of contamination of fill material in the deep parts of the quarry pits. This is required by NYSDEC's own guidelines.
- Thorough and complete investigation of groundwater upstream, downstream, and along the edges of the *entire* quarry site.
- The use of geophysical surveys, such as ground-penetrating radar and magnetometer, to map out buried drums, tanks, and other potentially hazardous debris.
- A more complete investigation of soil vapors along Marbledale Road, and in residences along Verdi Ave.

Moreover, I urge the Planning Board not to allow the use of dynamic soil compaction at this site, as this will almost certainly cause buried tanks and drums that are close to the surface to rupture.

I have attached more detailed comments concerning this site.

Respectfully,

Donald J. Hughes, P.E., Ph.D.

cc Steve Ecklund, Mayor of Tuckahoe
David Burke, Tuckahoe Village Administrator

REVISED Comments on the planned remediation and development of the *Former Marble Quarry Landfill Site*

September 14, 2016

To: Village of Tuckahoe, Planning Board
Village Hall, 65 Main St., Tuckahoe, NY 10707

From: Hughes Environmental Consulting Services
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Prepared on behalf of the Marbledale Road Environmental Coalition

The Remedial Action Work Plan (RAWP), released in early August 2016, describes the remediation and development of the *Former Marble Quarry Landfill Site* administered under the Brownfield Cleanup Program by the New York State Department of Environmental Conservation (NYSDEC). The RAWP is based on environmental information gathered during the Remedial Investigation conducted in 2015. Unfortunately, the RI does not conform to the requirements spelled out by the NYSDEC in its guidance document *DER-10 / Technical Guidance for Site Investigation and Remediation*, May 2010.

The RAWP describes a three-step process:

1. Additional environmental data will be collected at the site, including 49 soil borings, six monitoring wells, and a soil vapor pilot test.
2. Remedial activities, including removal of more heavily contaminated soils, and
3. Construction of a hotel, restaurant and associated parking areas, walkways, and landscaping.

Overall, the remediation and planned development of the *Former Marble Quarry Landfill Site* follows a process which is problematic, to put it mildly. The NYSDEC has corrected many initial flaws, for example:

- Designating parts of the former quarry outside the BCP site as a potential state Superfund site;
- Requiring additional testing of site soils
- Requiring installation of additional monitoring wells.

However, many flaws remain, including:

- The RAWP dismisses concerns of the public about the toxicity of the landfill contents.
- The site could be remediated more safely and less expensively without building a hotel & restaurant. This option is not discussed.
- The geotechnical consultant for the project is recommending use of a technology which will create large plumes of contaminated dust, and which could easily rupture buried drums and tanks inside the dump site.
- The Remedial Investigation does not meet NYSDEC standards.

These and other flaws are specifically addressed in the comments below.

Remedial Action Work Plan

1. The Quarry site contains significant amounts of toxic substances.

According to the Remedial Action Work Plan (RAWP, p.29) “There are a number of members in the community who have a personal history with the landfill and believe it is more toxic than actual sampling has shown it to be.” In fact, the sampling data indicate that the site has a wide variety of contaminants, which corroborates the testimony of several community members who have witnessed dumping of all manner of commercial, industrial, and residential waste materials. Groundwater has been shown to exceed New York State ambient standards for heavy metals, pesticides, PCBs, chlorinated solvents, and many other compounds. Soil vapors are known to contain hazardous levels of many volatile organic compounds, including perchloroethylene, trichloroethylene, and very high levels of Freon gases. While no drums or tanks have been uncovered during the site investigations to date, the NYSDEC acknowledges that drums and tanks are probably buried at the site.

2. The RAWP does not consider any alternative that does not involve construction of a hotel and restaurant.

Every alternative evaluated in the RAWP, including “No Action” (Alternative A), includes construction of a hotel and restaurant. It is *not necessary* to build a hotel and restaurant to address the most pressing public health risks, which are exposure to soils vapors and exposure to surface contamination. A logical approach for reducing exposure of the public to these risks is to install a Composite Cover System and Soil Vapor Controls *only—that is, without construction of any buildings*. This would cause minimal disturbance of the site soil, thereby minimizing exposure to site contaminants during construction.

3. The containment of groundwater contamination is not explicitly addressed.

The RAWP requires that six new monitoring wells be installed “to ascertain if contaminated groundwater is migrating from the Site and to monitor the impact of ongoing construction ... The BCP remedy must prevent migration of contaminants from the Site.”

DER-10, Section 4.1 (d) states, under “Groundwater protection and control measures” that “a volunteer in the Brownfield or Voluntary Cleanup programs is only required to *evaluate the feasibility of containing the plume on-site*.” (emphasis added) The RAWP goes into tremendous detail about controlling storm water at the site, but provides **no evaluation of how groundwater contamination will be controlled**. The groundwater monitoring conducted to date indicates mobile (dissolved) contaminants such as perchloroethylene and trichloroethylene, among many others. Thus, off-site migration of contaminants is highly likely. The RAWP should evaluate the installation of groundwater collection and treatment systems, barrier walls, and the like.

Construction Methods

1. Approximately 180 pilings are to be drilled into unknown contamination

The proposed hotel is to be constructed directly above the southern quarry hole, which is known to be 85-feet deep in its center. Three additional borings indicate that fill materials extend 56 to 72 feet below ground. There has been no chemical analysis of fill buried at depths below 35 feet. Installing pilings into a deep waste pit without doing any additional sub-surface investigation seems foolhardy. Pilings may puncture drums, or run into pockets of highly contaminated materials. The process of drilling large holes deep into the soil will cause vibrations and disturbance of the fill material, causing release of vapors and buoyant liquids (e.g. petroleum products). All of the pilings will extend below the water table, which is approximately 20 feet below the surface, and will penetrate into the bedrock, which has consistently characterized as “highly fractured.” The process of installing 180 pilings is likely to release additional contaminants into the groundwater. They may provide a preferred pathway for contaminant liquids and vapors to migrate vertically to the surface.

2. Construction methods will eject contaminated dust into the air, and could easily rupture buried drums and tanks inside the dump site.

Construction Bid documents have only recently (August 2016) been released to solicit bids from interested contractors. According to the DEC’s Project Manager, these documents were not provided to the NYSDEC. The bid documents include a geotechnical report for the Marbledale Quarry site by Carlin, Simpson & Associates, dated Dec. 11, 2015.¹ The company performed a geotechnical investigation of the site: four test borings were collected at the site, along with various geotechnical analyses of the material collected. Based on that investigation, CS&A found that sidewalks, pavement, retaining walls, and utilities will settle if the site soils and fill material are not compacted or replaced. The amount of settlement “could range from several inches to more than two feet.”

CS&A essentially gave two options for making the site suitable for construction:

- 1) deep dynamic compaction (DDC)
- 2) removal of fill material and replacement with more suitable soil.

(specifically "partially over-excavating the fill and debris from select areas and then installing geogrid reinforcement for stabilization along with new compacted fill.")

DDC is the preferred option. A sketch of DDC is shown in Figure 1 (Ref. 5).

¹ I provided a copy of this report to the DEC, as well as other consultants involved with this project.

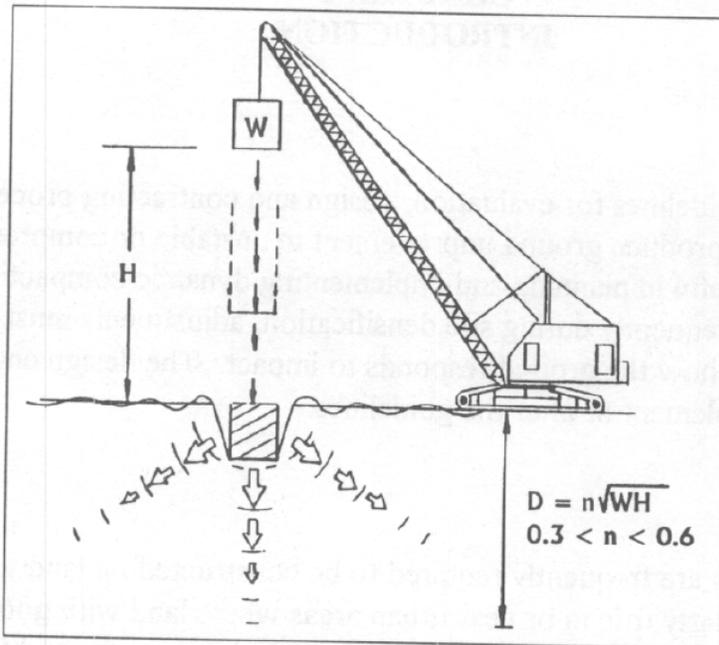


Figure 1. Dynamic compaction.

Both of these options are a significant departure from what the developer, the Village, and, to some extent, the DEC, has been saying to the community. The RAWP says **nothing** about deep dynamic compaction. Moreover, the RAWP selects an alternative which specifies a limited amount of soil removal ("Some soil excavation of shallow source material areas...") followed by re-grading of the site.

The RAWP says: "A total of 5,500 yds³ are proposed to be cut and reused, and 6,500 yds³ are proposed to be filled on-Site, thus, the need to import approximately 1,000 yds³ of fill material."

If deep dynamic compaction is used, or if fill is removed, the developer will need to import far greater quantities of fill to level the site.

As described by CS&A, "Deep Dynamic Compaction uses a large, heavy weight dropped from a crane to compact the soil. Repeated drops are used in a grid pattern to assure uniform densification of the soil layers. Multiple passes would be required across the site."

(A video of DDC in action is posted at <https://www.youtube.com/watch?v=LLNP6tN0aNw>)

Typical weights used in this process range from 6 tons to over 20 tons. Drop heights are typically 40 feet or more. (Ref. 5)

The use of this technology creates tremendous risks that make it unsuitable for use a hazardous waste site like the *Former Marble Quarry Landfill Site*. These risks include:

1. Each time the weight is dropped on the ground, significant amounts of dust are created which would be difficult to control since it is explosively ejected into the air. Dust particles at this site will include fine ash which tends to have the highest concentrations of heavy metals, polycyclic hydrocarbons, and very possibly dioxins. These particles pose the greatest risks to children and the elderly in the community.

2. DDC generates strong vibrations which could easily disrupt buried drums and tanks at the site. We already know that buried equipment and/or tanks are leaking Freon vapors. DDC could be disastrous at the site, turning slowly leaking containers into major leaks, or even small explosions as corroded tanks suddenly fail.

Moreover, the DDC method generates significant low-frequency vibrations. According to CS&A, “Based on our experience and the site conditions, we expect that the DDC program can be designed in a manner that will not detrimentally affect the nearby structures. However, vibrations will be felt in the area surrounding the site. Because of the ground vibrations generated during DDC, the process must be closely monitored by a seismologist using a seismograph to ensure that...nearby structures are not adversely affected.” Use of DDC over the 3.5-acre site in a densely populated area is sure to generate a lot of complaints from local residents.

The alternative to DDC is "partial removal and replacement of the fill and debris." This implies considerable excavation at the site, which again has major implications in terms of site remediation. This will cause more disturbance of the sub-surface, with ensuing emissions of vapors and potentially dust. Excavated fill would have to be removed from the site and replaced with new compacted fill. So an unspecified quantity of fill would be excavated and removed, and replaced with new material brought in from off-site. As noted by the developer’s consultant, the large-scale removal of waste materials from the quarry site has “negative impacts to the community ... due to odors, truck traffic and decreased property values.” (RAWP, p.19)

In summary, what is recommended by Carlin-Simpson requires a construction plan that is vastly different from what is portrayed in the RAWP. Recent verbal communications confirm that the Applicant is proposing to use DDC.

Remedial Investigation

Brownfield Cleanup Program (BCP) sites are to be investigated and remediated according to guidance issued by the Department of Environmental Conservation’s (DEC) Division of Environmental Remediation (DER). The investigations carried out under the Remedial Investigation by the applicant fail to meet this guidance. (1) Specifically:

1. The investigation of the groundwater is incomplete.

DER-10 Section 3.7.2 (a) states that one of the basic purposes of the RI is to: “determine whether the contaminant plume is expanding, contracting or stable.” The Remedial Investigation provides no conclusions whatsoever as to whether the contaminant plume is expanding, contracting or stable.

Section 3.7.2 (b) of DER-10 states that the RI should:

“Delineate the vertical and areal extent of groundwater contamination and the sources of such groundwater contamination, without regard to property boundaries.”

The data collected from the nine monitoring wells on the site show contamination of groundwater by metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pesticides, and volatile organic compounds—which are above groundwater standards in the overburden aquifer, and/or the bedrock aquifer. But the vertical and horizontal extent of such contamination has yet to be determined. The investigation has been hamstrung by the lack of monitoring wells outside the property boundaries.

More fundamentally, the movement of groundwater through the bedrock and the overburden aquifers is not understood. The consultant for the Applicant has admitted that groundwater elevations at the site cannot be reasonably contoured. The relationship between the overburden aquifer and the bedrock aquifer is unclear

The RI Report, as defined in DER-10 Section 3.14 (a), should “define hydrogeological factors as needed, to include: grain size analysis, soil permeability, nature of any bedrock, depth to saturated zone, hydraulic gradients, depth to bedrock, bedrock permeability, proximity to a drinking water aquifer, surface water, floodplains and wetlands;”

The RI lacks several of these important parameters, including:

- grain size analysis,
- soil permeability,
- bedrock permeability

In addition, the depth to bedrock appears to be lacking for many wells, since six of the nine wells were completed in the fill/overburden material.

2. The investigation of historic fill material at the site is far from complete.

The FMQL site contains tens of thousands of cubic yards historic fill material, abbreviated as “HFM” in DER-10. DER-10, Section 3.11 (b), states that the Remedial Investigation “is intended to identify the location and extent of the historic fill on and around the site, as well as to characterize the nature of the fill material, including a determination of the presence of any contaminated non-HFM.” This Section goes on to require three items:

“The investigation should include:

- i. the logging and mapping of all contaminated fill material encountered, including both historic and non-historic fill;
- ii. at least four borings or test pits per acre of HFM [historic fill material]with a minimum of four borings or test pits. ***The location of the borings or test pits should be representative of the areal extent of the fill and should be advanced through the fill material to native soil, meadow mat or bedrock so that the vertical limit of the fill material is established;*** and

iii. if the contaminated fill material extends below the water table, ***borings or test pits should extend below the water table as necessary to establish the vertical limit of the fill material;***
(emphasis added)

The RI has not quite met the requirement of four soil borings per acre: 13 borings collected on a 3.45-acre site equates to 3.8 borings per acre.

More significantly, many of the borings were not advanced through the fill material to bedrock so that the vertical limit of the fill material may be established. A single boring in the southern quarry hole—TB-6—extends to the native bedrock. No boring was advanced to bedrock in the northern quarry hole. Moreover, none of the soil borings collected during prior investigations within the limits of the former quarry holes extend to the native bedrock.

This shortcoming will not be remedied by the collection of additional soil boring as described in the RAWP. While these borings will provide much-needed delineation of the ***areal extent*** of the fill, these borings will do nothing to address the lack of information regarding the ***vertical limit*** of the fill material. In short, after the completion of the additional sampling specified in the RAWP, the vertical limit of fill in the southern quarry hole will still be approximated by a single soil boring. And the vertical limit of fill in the northern quarry hole will still be completely undefined.

3. Analysis of historic fill material is incomplete.

DER-10, Section 3.11 (b)(3) recommends that the fill material be characterized by “collecting and analyzing contaminant characterization samples from each type of historic fill present (e.g. ash and demolition debris are considered to be different types of fill material) to determine the site-specific contaminant levels.”

Over 300 samples were collected from soil borings during Phase II Environmental Site Assessment (2013) and the Remedial Investigation. Fill at the site has been characterized as containing a wide variety of materials, including cinders, ash, sand, concrete, plastics (e.g. foam), brick, wood, metal (car parts), etc. Despite the heterogeneous nature of the fill material, the frequency of chemical analysis has not been increased to address this.

Moreover, DER-10 Section 3.11 (b)(3)(iii) requires that:

“Analysis of rubble, ash, cinders and dredge spoils should be conducted for:

(A) ***total petroleum hydrocarbons;***

(B) ***priority pollutant metals in all samples;***

(C) carcinogenic and noncarcinogenic polycyclic aromatic hydrocarbons (per EPA Priority Pollutant List); and

(D) PCBs on 25 percent of the samples, biased to samples having the highest total petroleum hydrocarbon levels;

(2) field screening for VOCs should be conducted during the installation of all

exploratory borings and test pits with *volatile organic laboratory analysis performed on all samples with elevated field instrument measurements* (greater than five times background); (emphasis added)

No samples at the FMQL site have been tested for total petroleum hydrocarbons. Priority pollutant metals have been analyzed only in a small subset of samples collected from borings. And finally, field screening for VOCs was conducted using photoionization detector (PID). This found numerous occurrences of elevated field instrument measurements. In most instances, such samples were not analyzed for volatile organic compounds.

4. The site has not been investigated for polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)

Two families of compounds known as polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) have received great scrutiny in environmental investigations due to their high toxicity, persistence, and tendency to biomagnify in food chains. There are seven PCDDs and ten PCDFs which are considered toxic; the most toxic member being 2,3,7,8-tetrachloro-*p*-dibenzodioxin. These will collectively be referred to as “dioxins.” The history of the FMQL site indicates there are two primary sources of these compounds:

1. Incinerator ash
2. Fires which took place at the FMQL site.

A literature review conducted by Hughes Environmental Consulting demonstrates that these highly toxic compounds are likely to be present at levels far above guidance values set by USEPA (10-25 pg TEQ/g soil) and the Agency for Toxic Substances and disease Registry (ATSDR) (50 pg TEQ/g soil). Scientific studies predict that dioxin concentrations in ash could range from 10 to 500,000 pg TEQ/g solids. The presence of heavy metals and chlorinated compounds (PCBs, PCE, TCE, methylene chloride, etc.) at the disposal site probably contributed to formation of dioxins when waste materials were burned at the site in the 1950s-1970s. Dioxins persist in soils for many decades, so dioxin concentrations in site soils could easily exceed 5000 pg TEQ/g solids. Small diameter particles such as those found in fly ash are likely to contain the highest concentrations of dioxins. Unfortunately, these are the materials that are most likely to become airborne when the site is disturbed.

The NYSDEC is currently considering analysis for PCDDs and PCDFs.

SUMMARY

Overall, the remediation and planned development of the *Former Marble Quarry Landfill Site* has followed an unsatisfactory process. The NYSDEC has corrected many initial flaws; however, many flaws remain, including:

- The RAWP dismisses concerns of the public about the toxicity of the landfill contents.

- The site could be remediated more safely and less expensively without building a hotel & restaurant. This option is not discussed.
- The geotechnical consultant for the project is recommending use of Deep Dynamic Compaction (DDC) which will likely release contaminated airborne dust, and which could easily rupture buried drums and tanks inside the dump site.
- The alternative to DDC is to excavate significant quantities of waste materials from the site, and replace that with imported clean, structurally sound fill. This will result in significant truck traffic, and potential exposure to contaminants.
- The Remedial Investigation does not meet many of the requirements of DER-10. Groundwater contamination plumes have not been defined, and the vertical extent of the fill material has not been defined. Analysis of the fill material should be expanded to gain a better understanding of the contamination therein.

References

- (1) New York State Department of Environmental Conservation. *DER-10 / Technical Guidance for Site Investigation and Remediation*, May 2010.
- (2) *Remedial Action Work Plan, 109-125 Marbledale Road, Tuckahoe, New York* (July 2016). 399 pp. HydroEnvironmental Solutions, Inc. Somers, NY
- (3) *Remedial Investigation Report, 109-125 Marbledale Road, Tuckahoe, New York* (March 2016). 1054 pp. HydroEnvironmental Solutions, Inc. Somers, NY
- (4) *Letter-report, dated 11 December 2015, to Warshauer Mellusi Warshauer Architects P.C.* 29 pp. CARLIN, SIMPSON & ASSOCIATES, Consulting Geotechnical and Environmental Engineers. Sayreville, New Jersey
- (5) U.S Department of Transportation. (Oct. 1995) *Geotechnical Circular No.1: Dynamic Compaction. Office of Engineering, Technology Applications.* Washington, D.C.