

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

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To: Village of Tuckahoe, Planning Board  
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Prepared on behalf of the Marbledale Road Environmental Coalition

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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. Hotel pilings are to be driven 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 confirm that fill materials extend 56 to 72 feet below ground. There has been no chemical analysis of fill buried at depths below 35 feet. Driving 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 driving pilings will cause substantial vibrations and disturbance of the fill material, causing release of vapors and buoyant liquids (e.g. petroleum products). Pilings may provide a preferred pathway for contaminant liquids and vapors to migrate vertically to the surface.

### **2. Construction methods will create large plumes of contaminated dust, and could easily rupture buried drums and tanks inside the dump site.**

Construction Bid documents have only recently been released to solicit bids from interested contractors. According to the DEC's Project Manager, these documents have not been reviewed by NYSDEC. The bid documents include a geotechnical report for the Marbledale Quarry site by Carlin, Simpson & Associates, dated Dec. 11, 2015. The company performed a geotechnical investigation of the site. 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." The company is advocating the use of "Deep Dynamic Compaction (DDC)" or "partial removal and replacement of the fill and debris and installation of geogrid reinforcement and new compacted fill for subgrade stabilization."

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>)

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, large quantities of dust are created which would be difficult if not impossible 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)

### **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 has asserted that PCDD/PCDF analysis is unnecessary because so-called “precursor” compounds are not present. The paper upon which this assertion is based examined flue gases, not solid residues such as ashes. The relationship between “precursor” compounds and PCDDs and PCDFs in the solid phase is likely to be substantially different than what is observed in the gas phase. The only way to get a good understanding of the risks posed by PCDDs and PCDFs is to actually test for them.

## **SUMMARY**

Overall, the remediation and planned development of the *Former Marble Quarry Landfill Site* follows a flawed 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 create plumes of 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, 109-128 Marbledale Road, Tuckahoe, New York* (July 2016). 399 pp. HydroEnvironmental Solutions, Inc. Somers, NY
- (3) *Remedial Investigation Report, 109-128 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