
August 17, 2018

Mr. Leonard Norton, P.E.
Director of Public Works & Town Engineer
Town of East Windsor
6 Woolam Road
East Windsor, CT 06088

**Re: Review of Remedial Plans
Former Broad Brook Mill
8 Mill Street, Broad Brook CT
CMG ID 2016-047**

Dear DEP:

CMG Environmental, Inc. (CMG) performed a review of documents submitted to the Connecticut Department of Energy and Environmental Protection (DEEP) regarding planned remediation activities at the Broad Brook Mill site in East Windsor, Connecticut (the 'Site'). We reviewed the following documents:

- May 2010 "Proposed Remedial Action Plan [RAP] for the Broad Brook Mill Site, East Windsor, Connecticut," by Xpert Design and Diagnostics, LLC (XDD) of Stratham, New Hampshire;
- April 2011 "Proposed Soil and Sediment Remedy Work Plan [RWP], Broad Brook Mill Site, East Windsor, Connecticut," by XDD;
- April 26, 2016 [2017] "Broad Brook Building Assessment, Buildings 5, 5A, 11, 17, 17A, 25; Broad Brook, East Windsor, Connecticut," by AECOM Burlington of Burlington, New Jersey; and
- March 19, 2018 "Remedial Approach Optimization [RAO], Hamilton Sundstrand Corporation, Former Broad Brook Mill Site, Broad Brook, Connecticut," by AECOM Environment of Rocky Hill, Connecticut.

CMG believes the building assessment report's cover date (April 26, 2016) is a typographical error since text within indicates AECOM inspected the premises in March 2017. CMG compared the remedial strategies described in the 2010 RAP & 2011 RWP with those listed in the 2018 RAO. We note AECOM performed a significant amount of additional subsurface assessment in the time period between 2011 and March 29, 2018 in order to provide better delineation of known impacts to Site soil, groundwater, and stream sediment. The following provides a summary of our review of the documents listed above.

REMEDIAL ACTION PLAN & REMEDY WORK PLAN

- The RAP & RWP proposed placement of 4' of clean fill material over a large portion of the Site, which, in addition to the conditions of an as-yet undrafted Environmental Land Use Restriction (ELUR), will prevent direct exposure to soil impacts by rendering soil at depths below 4' inaccessible;
- The RAP & RWP did not include an evaluation of the potential impact of the 4' clean fill layer on the base flood elevation of Broad Brook's 100-year flood plain (which it could potentially increase);
- The RAP & RWP proposed removal of a relatively small volume of soil in areas where metals concentrations exceed GA/GAA Pollutant Mobility (GA PM) criteria;
- The RAP & RWP proposed on-Site disposal of excavated soil in what will essentially be a small landfill with an impermeable cover to prevent precipitation contact with and leaching of contaminants present therein;
- The RAP & RWP only discussed the impermeable cover but made no mention of a leachate collection & treatment system, nor any impermeable liner beneath the landfilled materials;
- The RAP & RWP also proposed removal of stream sediment from an area downstream of an on-Site low-head dam across Broad Brook with disposal in the on-Site landfill;
- The RAP proposed air sparging (AS) with soil vapor extraction (SVE) to remove dissolved volatile organic compounds (VOCs) from groundwater and soil gas;
- The RAP also proposed bio-sparging (BS, a lower-pressure variant of AS) to accelerate aerobic degradation of VOCs and less volatile organic contaminants by aerobic microorganisms; and
- The RAP proposed injection of a reducing agent (calcium polysulfide) in areas of in order to reduce hexavalent chromium to less-toxic (and less soluble) trivalent chromium.

CMG notes the RAP & RWP did not evaluate removal of the upper 4' of soil for off-Site disposal and its replacement with clean fill as a potential remedy. While this method would have a high up-front cost, it would allow placement of the approved (i.e., 4' thick) soil cap but would not reduce flood storage volume. We note DEEP considers soil located at a depth greater than 4' below grade "inaccessible" for comparison to Direct Exposure criteria, provided an ELUR is in place to maintain the cover (which appears to be the reason for the planned 4'-layer thickness in the 2010 & 2011 plans).

REMEDIAL APPROACH OPTIMIZATION

AECOM performed substantial additional subsurface assessment of the Site in 2015 and 2016 in order to determine the extent to which natural attenuation processes had degraded Site contamination identified from the 1990s through the 2000s (i.e., prior to 2010). Based on their

results along with concerns about flood elevation changes due to the previously-approved clean fill layer, they proposed a Site-wide reduction in remedial measures. The following summarizes their proposals:

- Reduction of the “clean fill” barrier thickness from 4' to 2' to minimize reductions to flood storage volume and potential flood base elevation increase;
- Elimination of active remediation technologies (AS, SVE & BS) that require substantial ongoing maintenance and monitoring in favor of amending the upper 3' of soil in those areas with oxygen-releasing compounds to passively stimulate enhanced aerobic degradation of organic contaminants;
- Elimination of reducing agents due to concern that these could negatively impact the effectiveness of oxidizing treatments located in hydraulically downgradient locations;
- Limited soil excavation with on-Site placement beneath an impermeable barrier would still take place, with field conditions dictating its extent;
- No change to approved stream bank stabilization or remedial excavation plans beyond addressing EPA comments from 2014 in a future document.

CMG notes the following regarding proposed changes to the approved remedial plan as described in the March 2018 RAO document:

- We did not observe cost figures comparing the proposed remedy to excavation and off-Site disposal of the approximately 1,300 cubic yards of soil planned for disposal in the on-Site consolidation area (i.e., landfill);
- We did not observe calculations quantifying the anticipated changes in floodway volume (or resulting 100-year flood base elevations) that would result from reducing the clean fill layer from 4' to 2' (or from the presence of the original 4' layer);
- AECOM indicated DEEP would have to grant a variance for the reduction of clean fill thickness since it would no longer meet the Remediation Standard Regulations criteria for rendering soil “inaccessible” (i.e., below 4' of clean soil or beneath competent pavement and 2' of clean soil/pavement base) to eliminate the direct exposure pathway;
- AECOM indicated additional paving might be necessary for some areas of the Site, though not throughout the entire “clean fill” area;
- AECOM indicated DEEP had approved clean fill layers of thicknesses less than 4' at other properties to prevent access to “widespread polluted fill” such as that present on-Site;
- AECOM planned amendment of the upper 3' of soil with oxygen-releasing compounds to accelerate aerobic degradation of organic contaminants in soil and groundwater; CMG is uncertain whether or not this layer of amended soil includes the planned 2' clean fill cap (and 1' of existing soil) or the current upper 3' of

existing Site soil that AECOM will then cover with an (unamended) 2'-thick clean fill layer (we believe the latter would be more effective);

- We note that typical subsurface utility work (e.g., water lines, sewer) can extend to depths between 4' and 5' below grade, which would be within impacted areas based upon the proposed 2' soil cap (we presume an ELUR would prohibit subsurface work in the proposed landfill area, and would address engineered controls for utility installation or repair);
- Large shrubs and trees often have root structures that extend below depths of 2', which could result in uptake of contaminants into the above-ground portion of the plant, thus an ELUR should prohibit tree & shrub planting and prescribe a landscape maintenance & monitoring plan;
- CMG is uncertain whether or not a draft ELUR for the Site exists so we cannot provide comment on any planned long-term maintenance and monitoring measures for the Site's planned soil cap (and the impermeable membrane cap for the planned landfill area), measures to address planned vegetation or burrowing animals (e.g., transport of impacted material to the ground surface by a burrowing animal) or establishment of an escrow fund to pay for ongoing maintenance and monitoring;
- As indicated in Section 7.3 of the RAO, a Site ELUR may restrict it to commercial or industrial use, restrict (or prohibit) excavation below the 2' cap (and landfill area), and/or prohibit construction of buildings over the chlorinated VOC groundwater plume without DEEP approval and installation of vapor mitigation measures;
- Given the nature of Site impacts, an ELUR would likely also prohibit use of the property as a school or children's daycare facility, and prohibit growing of produce on-Site for human consumption (especially given the proposed halving of soil cap thickness);
- The RAO indicates that a thinner soil cap could make the Site more attractive for development, but that a thicker soil cap would require less inspection and maintenance;
- None of the documents indicated potential security measures (e.g., fencing) to restrict access to the Site, especially the planned landfill area, to minimize potential damage (e.g., vandalism) to the proposed soil barrier, nor identify and remedy such damage in a timely manner;
- CMG did not identify plans to address repairing the soil cap (or investigating off-Site transport of underlying impacted material) in areas along Broad Brook in the event of scour from heavy flooding;
- CMG did not identify plans for an impermeable liner and leachate collection system at the planned landfill area, which we believe would be prudent to prevent unintentional mobilization of contaminants in the event of a breach in the impermeable cover, heavy runoff (information relayed to CMG indicated past flood events resulted in overland flow from the upstream mill pond down Main

Street and across the Site), or a rise in water table elevation (typical depth to water in MW-21, which is in the approximate landfill area, is between 2.24' and 4.35', per data included in the 2010 RAP).

Please call me at 774-241-0901 if you have questions or if CMG can be of any further assistance to you.

Sincerely,
CMG ENVIRONMENTAL, INC.

Gerald M. Clark
Principal

C. Ryan Goad
Hydrogeologist

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