Attachment 2

Response to
NRC RAIs

Response to NRC Request for Additional Information
Dated July 7, 2010

CE Windsor Site
Windsor, Connecticut

NRC License Number 06-00217-06
Docket Number 030-03754

August 6, 2010

Request for Additional Information Question 1:
Please provide the characterization information for radium and thorium that shows the location and depths of the contamination.

Response:
At the Windsor Site, thorium and radium were originally found in the burning grounds area. Additional characterization found some regions of thorium and radium in the woods area and an isolated pocket in the drum burial pit area. These areas are adjacent to each other and were associated with historical waste operations. Characterization has only identified elevated thorium and radium in surface soils (up to one foot in depth). Figure 1-1 provides thorium surface soil characterization and Figure 1-2 provides radium surface soil characterization information.

Request for Additional Information Question 2:
In Chapter 14 of the Decommissioning Plan, Rev. 2, Ra-226 and Th-232 are not listed as radionuclides of concern. Please provide a commitment that these radionuclides will be measured.

Response:
Thorium and radium will be included as radionuclides of concern. Changes have been made to Chapter 14 of the Decommissioning Plan, Rev. 2 which is included as part of this submittal.

Request for Additional Information Question 3:
No area factors appear to have been calculated for Ra-226 and Th-232. Please calculate area factors and document them in the plan.

Response:
Area factors have been calculated and are included as Table 14-2 of the Decommissioning Plan, Rev. 2 included as part of this submittal.

Request for Additional Information Question 4:
Please provide the geology information that was used to derive the thickness of the unsaturated zone (UZ) layers used in the RESRAD calculations.

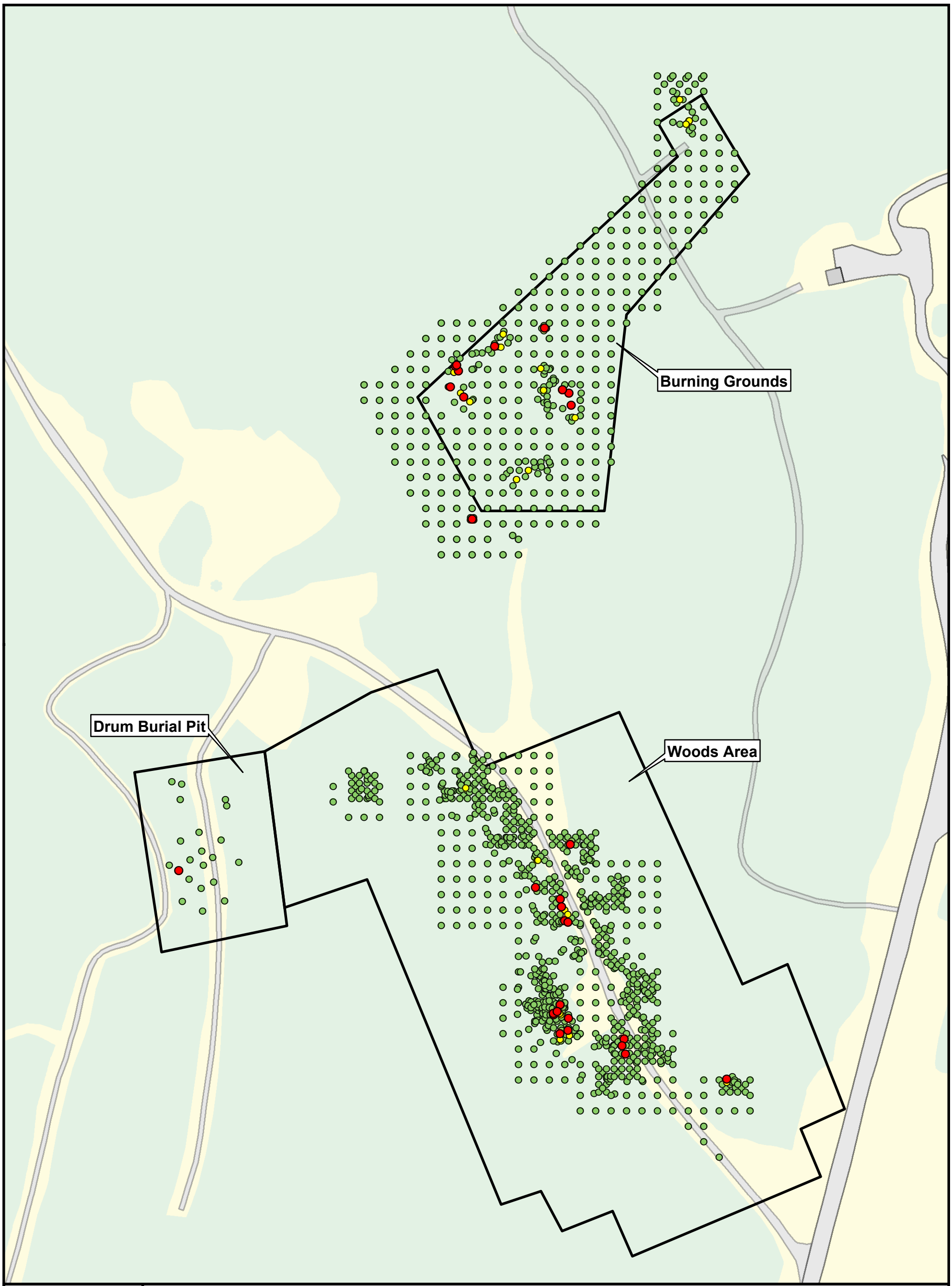
Response:
The thickness of the unsaturated zone layers used in RESRAD was based upon the Windsor Site geology of the overburden. The overburden consists of quaternary deposits. The most pronounced local geologic feature on the Site is a dense till ridge, or drumlin, that trends north-south and is located in the middle of the Site. West of the ridge, the overburden consists of stratified sands and silts. These deposits become finer with depth and have been investigated to depths of approximately 37 meters bgs without encountering till or bedrock. East of the ridge, the overburden consists of fine sands in silts to approximately 12 to 18 meters bgs. These deposits are underlain by ablation till that flanks the drumlin and pinches out to the east. In several borings, a coarse sand and gravel water-bearing zone was encountered at approximately 27 to 32 meters bgs. These coarse sands have been encountered within a soil unit that trends north-south and is located beneath Small Pond. This unit is not continuous to the east and west.

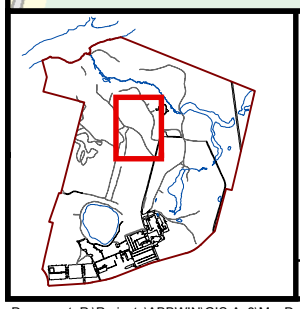
The total unsaturated zone thickness at the Site varies from 4.5 to 6 meters in the southern portion of the Site to approximately 17 meters in central and northern portions of the Site. Sensitivity analysis showed that the drinking water pathway was most sensitive to unsaturated zone thickness, but was insensitive over the range of groundwater depths reported.

The unsaturated zone is subdivided into two strata to enable the use of two different uranium Kd values in the unsaturated layer. The upper stratum (designated Unsaturated Layer #1) is associated with soils immediately underlying the surface soil layer in which residual radioactivity might be present down to a nominal depth of approximately 2 meters bgs. The lower stratum (designated Unsaturated Layer #2) is associated with soils beneath layer #1 down to the depth at which ground water is encountered (the top of the saturated layer). Unsaturated layer #2 has a nominal thickness of approximately 4 meters. The thickness of Unsaturated Layer #1, H(1), is represented with a bounded lognormal-N distribution (the RESRAD default) with a central tendency value of 2 meters and lower and upper bounds of 1 and 4 meters respectively. The thickness of Unsaturated Layer #2, H(2), is also represented with a bounded lognormal-N distribution (the RESRAD default) with a central tendency value of 4 meters and lower and upper bounds of 2 and 17 meters respectively.

Request for Additional Information Question 5:
It appears that the way Ra-226 was modeled by not including the Pb-210 that has ingrown may not be appropriate. Please change the modeling for Ra-226 to include the dose from the Pb-210 that has ingrown from Ra-226.

Response:
The initial concentration of Pb-210 has been changed to be equal to Ra-226 in the RESRAD model and reanalyzed. The Derivation of the Site-Specific Soil DCGLs Addendum has been changed to reflect this and is included as part of this submittal.





Legend

Th-232 - pCi/g

- Th-232 < 2.0
- Th-232 >= 2.0 and < 4.0
- Th-232 >= 4.0

N

0 60 120 Feet

Prepared/Date: BRP 08/02/10 | Checked/Date: HTD 08/02/10

Figure 1-1
Surface Soil
Thorium Concentration Locations

CE Windsor Site
Windsor, Connecticut

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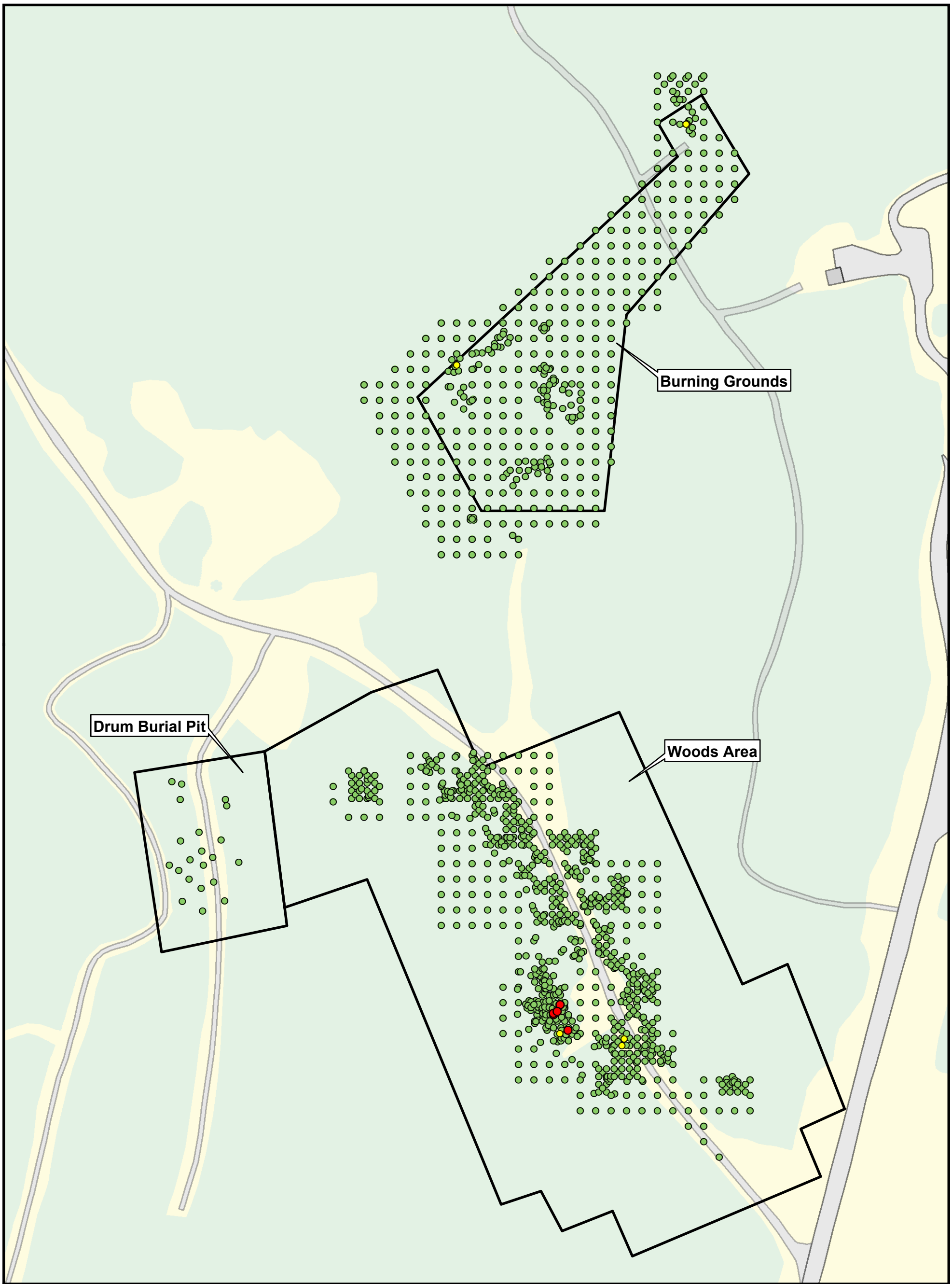

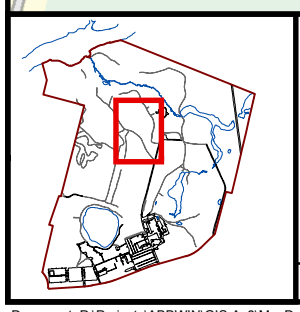

Legend

Ra-226 - pCi/g

- Ra-226 < 2.0
- Ra-226 >= 2.0 and < 4.5
- Ra-226 >= 4.5

N

0 60 120 Feet

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Figure 1-2
Surface Soil
Radium Concentration Locations

CE Windsor Site
Windsor, Connecticut

MACTEC

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