

4.20 TICONDEROGA RANGE (OLD) MRS (NYHQ-021-R-01) AND TICONDEROGA RANGE (OLD) SDZ (NYHQ-021-R-02)

4.20.1 Site Description

During the HRR/WP the Ticonderoga Range (old) MRS was split into Ticonderoga Range (old), small arms range, and Ticonderoga Range (old) SDZ, range fan, which are located in Ticonderoga, Essex County, New York. The MRS was operational between 1950 and 1973.

As documented in the approved HRR/WP the MRS was divided approximately 100 yards behind (east) of the target berm. Ticonderoga Range (old) MRS includes the suspected firing point location, the target berm, part of the natural backstop and 100 yards behind the berm. The Ticonderoga Range (old) MRS is approximately 15.5 acres. Ticonderoga Range (old) SDZ MRS includes the remainder of the land east of the target berm and is approximately 394 acres. Currently, the MRSs include undeveloped forested land. One residential property is located on Ticonderoga Range (old). The MRS location is shown in Figure 4.20-1.

At the small arms range, the direction of fire was to the east with seven targets and a natural backstop was located east of the targets. The range was approximately 250 feet wide by 900 feet long. Potential munitions used were small arms (.22, .30 .38, .45 and .50 caliber, and 5.56mm and 7.62mm).

As documented in the approved HRR/WP, no SI approach was proposed for the Ticonderoga Range (old) MRS and Ticonderoga Range (old) SDZ MRS due to ROE refusal. See Section 4.20.2.

4.20.2 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ – ROE Issues

Table 4.20-1 lists the three properties, or “parcels” for which site access was requested by USACE in order to complete the SI for both the Ticonderoga Range (old) MRS and the Ticonderoga Range (old) SDZ MRS. The parcels are shown on Figure 4.20-2. Access to the parcels was required in order for fieldwork to be completed. ROEs were not obtained for any of the three parcels; therefore, fieldwork could not be completed as planned at the MRS.



Figure 4.20-1
Ticonderoga Range (old) (Aerial)
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



- Legend**
- MRS Boundary
 - - - SDZ Boundary
 - Berm
 - Firing Line

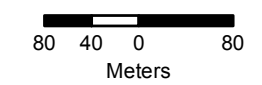


Image: 2009 Orthophoto
 Projection: UTM Zone 18,
 WGS84, Meters

PROJECT NUMBER:
 747648.13000
 April 2012

Table 4.20-1

Rights-of-Entry Site Access Summary for Ticonderoga Range (old) and Ticonderoga Range (old) SDZ

MMRP MRS Name	Primary or Secondary¹	ROE Status As of October 31, 2011	Parcel Number
Ticonderoga Range (old)	Primary	Refused	138.2-1-21.000; 138.2-2-4.110; 138.2-2-5.000
Ticonderoga Range (old) SDZ	None	None	None

¹ Primary refers to those parcels deemed critical to the field work and the SI and may include firing points and/or berms. The inability to obtain ROEs for these parcels may impact the contractor's ability to complete the SI, especially if all range features are located within all of the parcels refused. Secondary parcels would be used to support field work; however, if ROE refusals occurred, the absence of related field work would not impact the contractor's ability to complete the SI.

The ROE for parcels 138.2-1-21.000, 138.2-2-4.110 and 138.2-2-5.000 were refused prior to the Final HRR/WP approval and negotiations with the landowner were unsuccessful; therefore, no fieldwork was proposed for this site.

4.20.3 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ – Visual Survey Results

Field activities were not proposed at the Ticonderoga Range (old) MRS due to the absence of primary ROEs. Field activities were not proposed at Ticonderoga Range (old) SDZ since contamination from range use was not expected in the MRS.

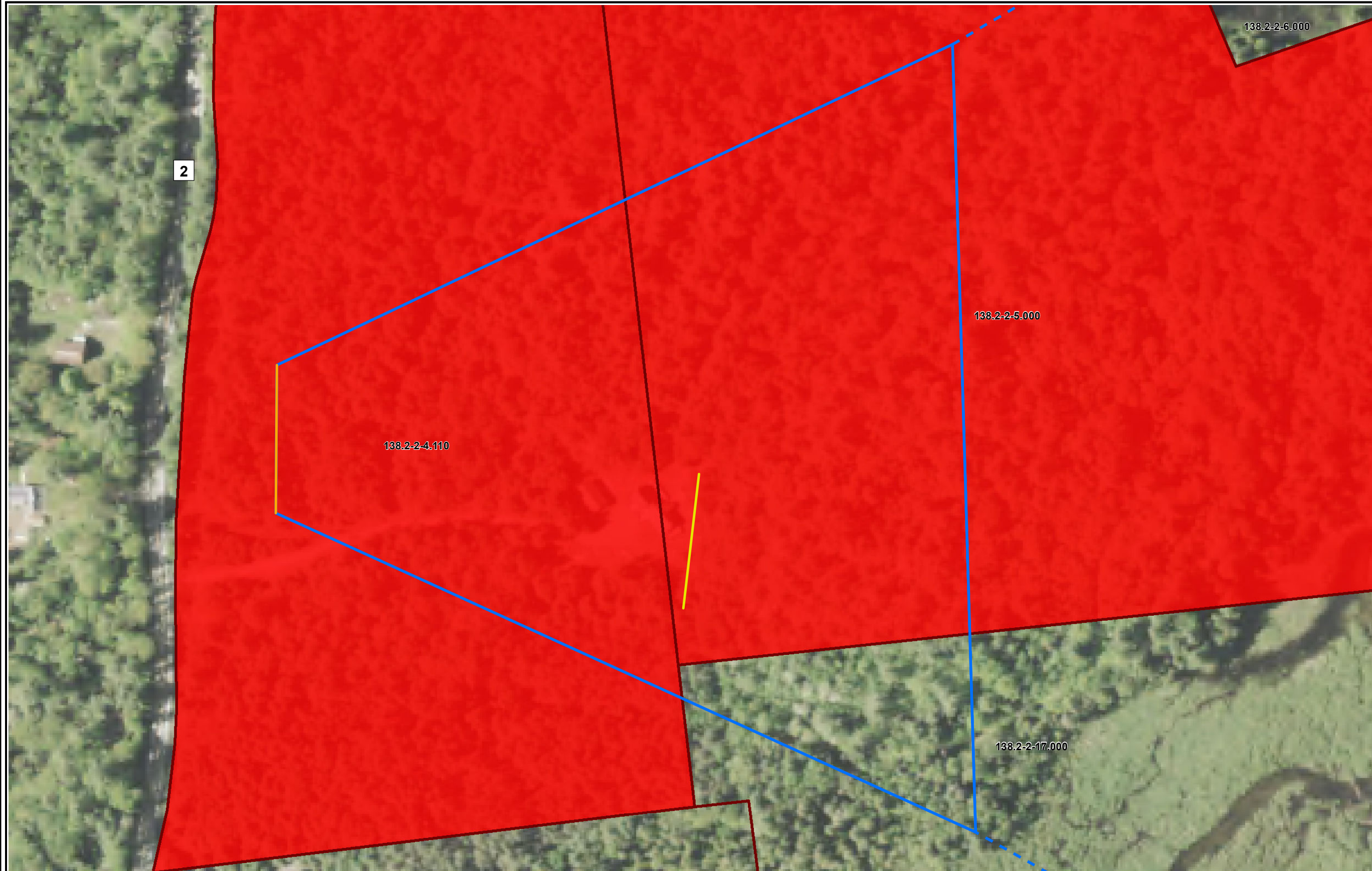
4.20.4 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ – Munitions Constituents Sampling and Analytical Results

Field activities were not proposed at the MRS due to the absence of primary ROEs.



Figure 4.20-2
Ticonderoga Range (old) – ROE Refusal
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



Legend

- MRS Boundary
- - - SDZ Boundary
- Berm
- Firing Line
- Parcel Boundary
- ROE Refused

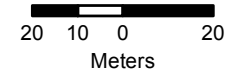


Image: 2009 Orthophoto
 Projection: UTM Zone 18,
 WGS84, Meters

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4.20.5 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ – Conceptual Site Model

The CSM for these MRSs (Table 4.20-2) describes the physical profile, including geology, topography, soil classification and climate, potential release mechanisms, and land use and ecological exposure profiles together with the current understanding of the site. Figure 4.20-3a and b present the CSMs for the Ticonderoga Range (old) MRS and the Ticonderoga Range (old) SDZ MRS, respectively, current and potential future receptors in graphical form pursuant to EM 1110-1-1200 (USACE, 2003).

Table 4.20-2
Conceptual Site Model for Ticonderoga Range (old) and Ticonderoga Range (old) SDZ MRSs

Profile Type	MRS Characterization
Facility Profile	<p><u>Location and Area:</u> Ticonderoga, Essex County, in eastern part of New York, couple of miles west of the Vermont Border.</p> <hr/> <p><u>Structures:</u> There are less than five residential structures located in the MRS.</p> <hr/> <p><u>Security:</u> There are no barriers preventing access to any part of the MRS.</p>
Physical Profile	<p><u>Climate:</u> Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.9° F. The coldest month of the year is January, with an average minimum temperature of 17.6° F. The annual average precipitation is 51.77 inches with rainfall evenly distributed throughout the year (IDcide, 2011u).</p> <hr/> <p><u>Geology:</u> The Ticonderoga Range (old) MRS is within the Adirondack physiographic province west of Lake Champlain. Based on a USGS bedrock geology map, the Ticonderoga Range (old) MRS is on the faulted eastern margin of the Adirondack province (Thompson et al., 1990). Precambrian granitic gneiss and metamorphosed sedimentary rocks are exposed at the surface or subcrop glacial deposits in the vicinity of the MRS.</p> <p>The Precambrian metamorphic and igneous rocks exposed in the Adirondack Mountains were deformed and uplifted in a regional mountain building event over 1 billion years ago. By earliest Cambrian time (542 million years ago) these basement rocks were exposed at the surface and shedding sediments into surrounding shallow seas. Discontinuous sandstones of the Potsdam Formation on the northern and western fringe of the Adirondack Mountains grade into sandy carbonate facies. Cambrian and Ordovician sedimentary rocks, primarily limestones, dolomites, sandstones, and shales, surround the Adirondack Mountains and dip gently southward into the Appalachian Basin. Silurian and Devonian carbonates and shales cover the older Paleozoic rocks in south central and southwestern New York (Olcott, 1995). Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Amsterdam Range MRS.</p> <p>Continental-scale glaciers covered most of Canada and the northern United States episodically over the last 1.8 million years. New York has been covered by ice multiple times including the last advance approximately 22,000 years ago. Glaciers scoured and removed soil and soft weathered surface rocks as they moved, and polished the hard bedrock surface below the ice. A variety of landforms were left behind when the glaciers eventually receded approximately 10,000 years ago (Skehan, 2008). As the ice melted, the sediment load was dropped in place as unsorted till or was redistributed as outwash by the vast amounts of meltwater released by the glacier.</p>

Profile Type	MRS Characterization
	<p>Till is a mixture of silt, gravel, and boulders of various sizes in a clay matrix. The glacial outwash sediments, deposited by streams and rivers of meltwater in front of the receding glaciers (glaciofluvial deposits), tend to be graded from coarse to fine with increasing distance from the glacier. Meltwater could also be impounded in lakes that were dammed either by the ice or by glacial sediments. Lake plains, terraces and beaches were left in place when the dammed water found a lower outlet (Olcott, 1995).</p>
	<p><u>Topography:</u> The Ticonderoga Range (old) MRS is on a stream terrace within the lowland containing Putnam Creek to the east and Penfield Pond to the north. The MRS includes a small rocky hill at its eastern boundary (Figure 4.20-4). The elevation on the terrace portion of the MRS is approximately 950 to 960 feet above sea level. The hill on the eastern border of the MRS rises to approximately 1040 feet above sea level (USGS, 1973).</p>
	<p><u>Soil:</u> The soil within the Ticonderoga Range (old) MRS is predominantly Champlain loamy sand in a stream terrace landform. The material is derived from sandy glacial lake deposits. A typical soil profile is loamy sand from 0 to 10 inches; sand from 10 to 16 inches; fine sand from 16 to 50 inches; and sand from 50 to 72 inches. The soil on the hill at the eastern border of the MRS is Lyman-Knob Lock complex on a steep, very rocky surface. The material is derived from glacial till. The soil profiles for the components of this soil complex include decomposed plant material at the surface, a relatively thin layer of gravelly sandy loam or fine sandy loam on shallow unweathered bedrock. (NRCS, 2011).</p>
	<p><u>Hydrogeology:</u> USGS well data in the vicinity of the Ticonderoga Range (old) MRS indicate aquifers are found primarily in rocks of the basement complex (USGS, 2011). The basement complex consists of crystalline igneous and metamorphic rocks, primarily granitic gneiss and metamorphosed sedimentary rocks (Thompson et al., 1990). The intergranular porosity of crystalline rocks is insignificant and pore spaces are not interconnected. Therefore, movement of water through crystalline rock aquifers is dependent on fractures and jointing within the rock. The fracture permeability in crystalline rocks is a result of cooling of igneous rocks, deformation of metamorphic rocks, faulting and weathering. Such openings may follow the original fabric of the rock but are generally very heterogeneous in size, orientation, and degree of interconnectivity. Fracture permeability tends to decrease with increasing depth. Water in these aquifers is generally unconfined. Well yields commonly range from 2 to 10 gpm (Olcott, 1995).</p> <p>There are no groundwater wells within the Ticonderoga Range (old) MRS as shown in Figure 4.20-5. Domestic well number EX1128 is approximately 0.4-mile northwest of the MRS. The well depth is reported as 725 feet below land surface and the water depth is reported at 716 feet.</p>
	<p><u>Hydrology:</u> There is no surface water within the Ticonderoga Range MRS (Google Earth, 2011; USGS, 1973). There are ponds located within the Ticonderoga Range SDZ.</p>
	<p><u>Vegetation:</u> The MRS is very densely forested.</p>
	<p><u>Cultural, Archeological, and Historical Resources:</u> There are no historic or cultural resources at Ticonderoga Range (old). There are six National Historic Landmarks located in Essex County, NY; however, none occur within the MRS (National Park Service, 2011a, b).</p>
	<p><u>Wetlands:</u> Wetlands are not delineated within the MRS (USFW 2011c).</p>

Profile Type	MRS Characterization
	<p><u>Demographics</u>: The total population of Ticonderoga is 4,931 based on the 2000 to 2009 State and County QuickFacts estimate from the U.S. Census Bureau. The 2010 population density of Ticonderoga is not available. The 2010 population density of Essex County is 21.9 persons per square mile (U.S. Census Bureau, 2012).</p>
Ecological Profile	<p><u>Habitat Type</u>: The MRS is undeveloped forested land. No critical habitats are present.</p> <p><u>Ecological Receptors</u>: Forested areas, which may provide habitat for ecological receptors, are present within the MRS. There is one federally-listed T&E species that occurs in Essex County, Indiana bat (<i>Myotis sodalis</i>); however, no T&E species are listed to occur at Ticonderoga Range (old) MRS (USFWS, 2011b).</p> <p><u>Degree of Disturbance</u>: Medium to low disturbance level is present at the MRS. Majority of the MRS is undeveloped land, low level of disturbance. There is a residence on the area where a portion of the range was located, medium level of disturbance.</p>
Land Use and Exposure Profile	<p><u>Current Land Use</u>: Undeveloped land with a residential property. Ticonderoga Range (old) SDZ: Undeveloped land.</p> <p><u>Current Potential Receptors</u>: Current receptors include residents, site visitors/recreational users, commercial/industrial workers, and ecological receptors. Ticonderoga Range (old) SDZ: Current receptors include site visitors/recreational users and ecological receptors.</p> <p><u>Potential Future Land Use</u>: Same as current land use.</p> <p><u>Potential Future Receptors</u>: Same as current receptors.</p>
Munitions/Release Profile	<p><u>Munitions Type(s)</u>: Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and 5.56mm cartridge, and 7.62mm cartridge (Table 3-4). Ticonderoga Range (old): None</p> <p><u>Release Mechanisms</u>: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings. Ticonderoga Range (old) SDZ: No release mechanism since no source.</p> <p><u>Maximum Probable Penetration Depth</u>: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).</p> <p><u>MEC Density</u>: Small arms ammunition is not classified as MEC; therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.</p> <p><u>Munitions Debris</u>: Associated with the small arms listed above. Ticonderoga Range (old) SDZ: No MD anticipated</p> <p><u>Associated Munitions Constituents</u>: MC of interest includes antimony, copper, and lead (Table 3-4). Ticonderoga Range (old) SDZ: No MC of interest</p>
	<p><u>Transport Mechanisms/Migration Routes</u>: MC metals and some explosives can adsorb to or form complexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or</p>

Profile Type	MRS Characterization
	<p>chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. No surface water/sediment present within the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated dust is not expected to migrate off-site.</p> <p>Ticonderoga Range (old) SDZ: None, no source present.</p>
	<p><u>Pathway Analysis:</u> While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. All pathways noted that are potentially complete were not quantitatively assessed given the ROE refusals at this MRS. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates).</p> <p>There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening activities; however, these pathways are considered to be potentially complete but not quantitatively assessed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities.</p> <p>There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete but not quantitatively assessed for all receptors within the MRS. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion.</p> <p>MEC is not anticipated at the MRS since only small arms ammunition was used.</p> <p>Ticonderoga Range (old) SDZ: None of the exposure pathways are potentially complete for all receptors within the MRS since no source is present.</p>

FIGURE 4.20-3A CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Ticonderoga Range (old) (NYHQ-021-R-01)

Completed By: PARSONS

Date Completed: April 11, 2012

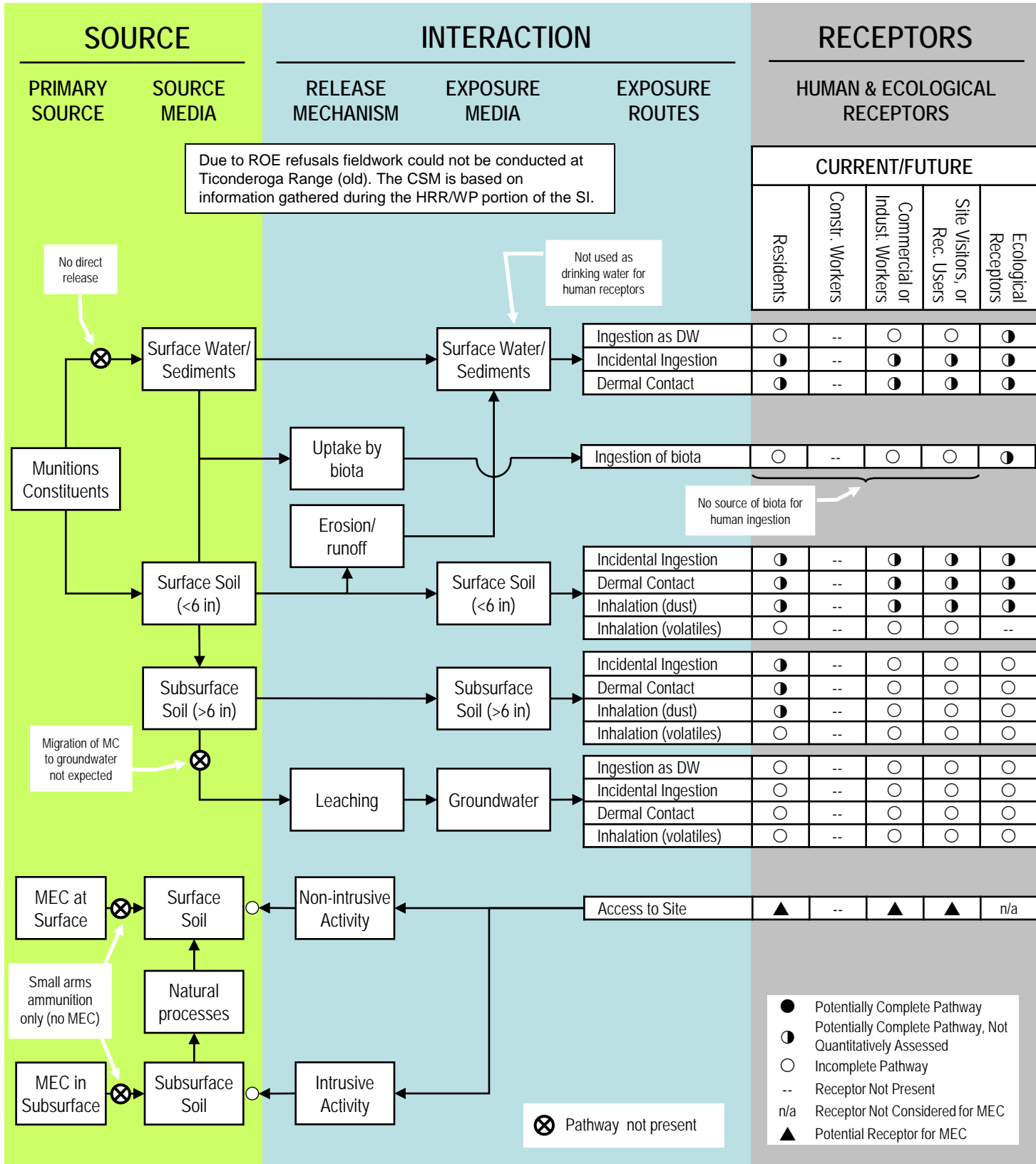


FIGURE 4.20-3B CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Ticonderoga Range (old) (SDZ) (NYHQ-021-R-02)

Completed By: PARSONS

Date Completed: April 11, 2012

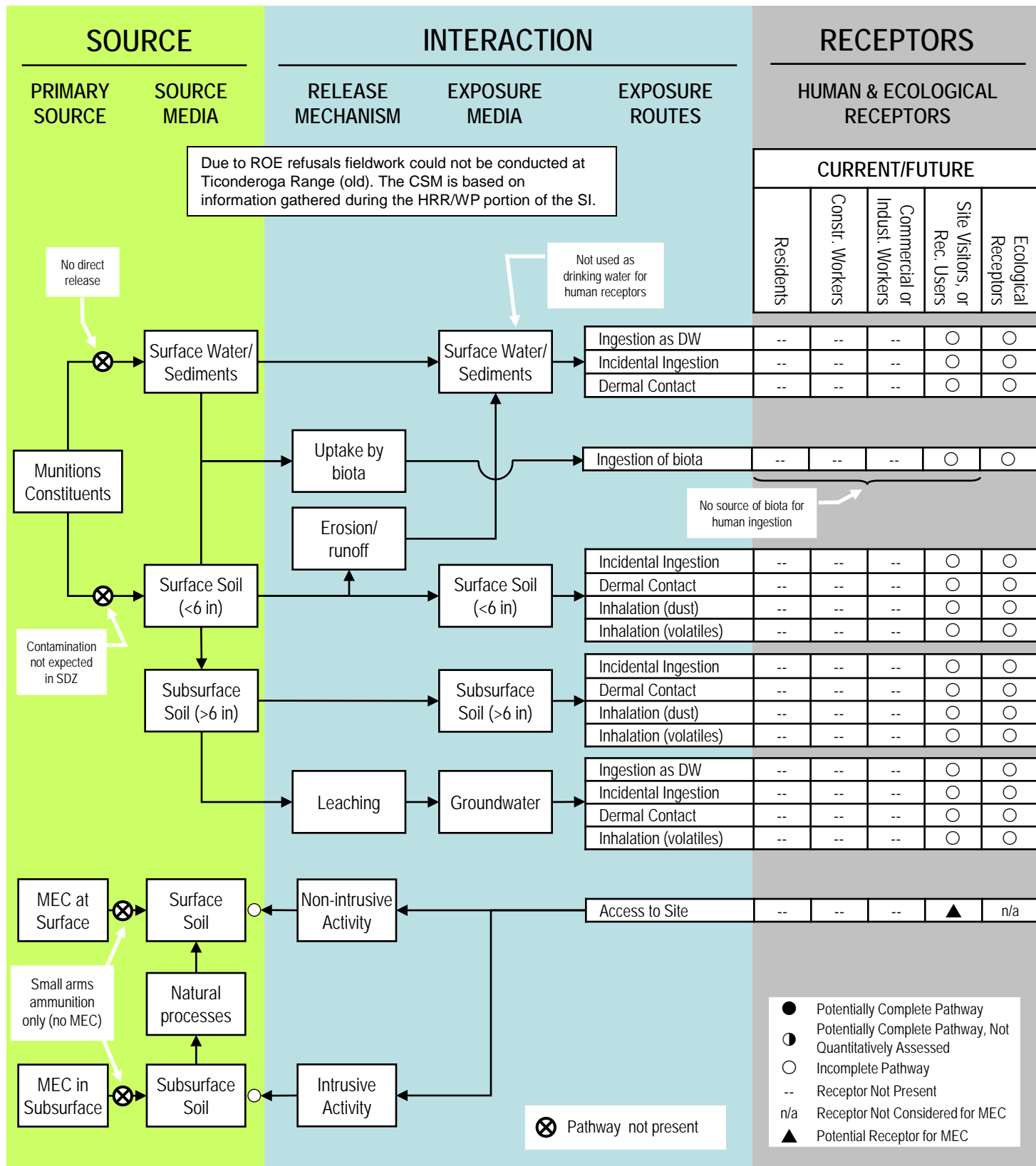
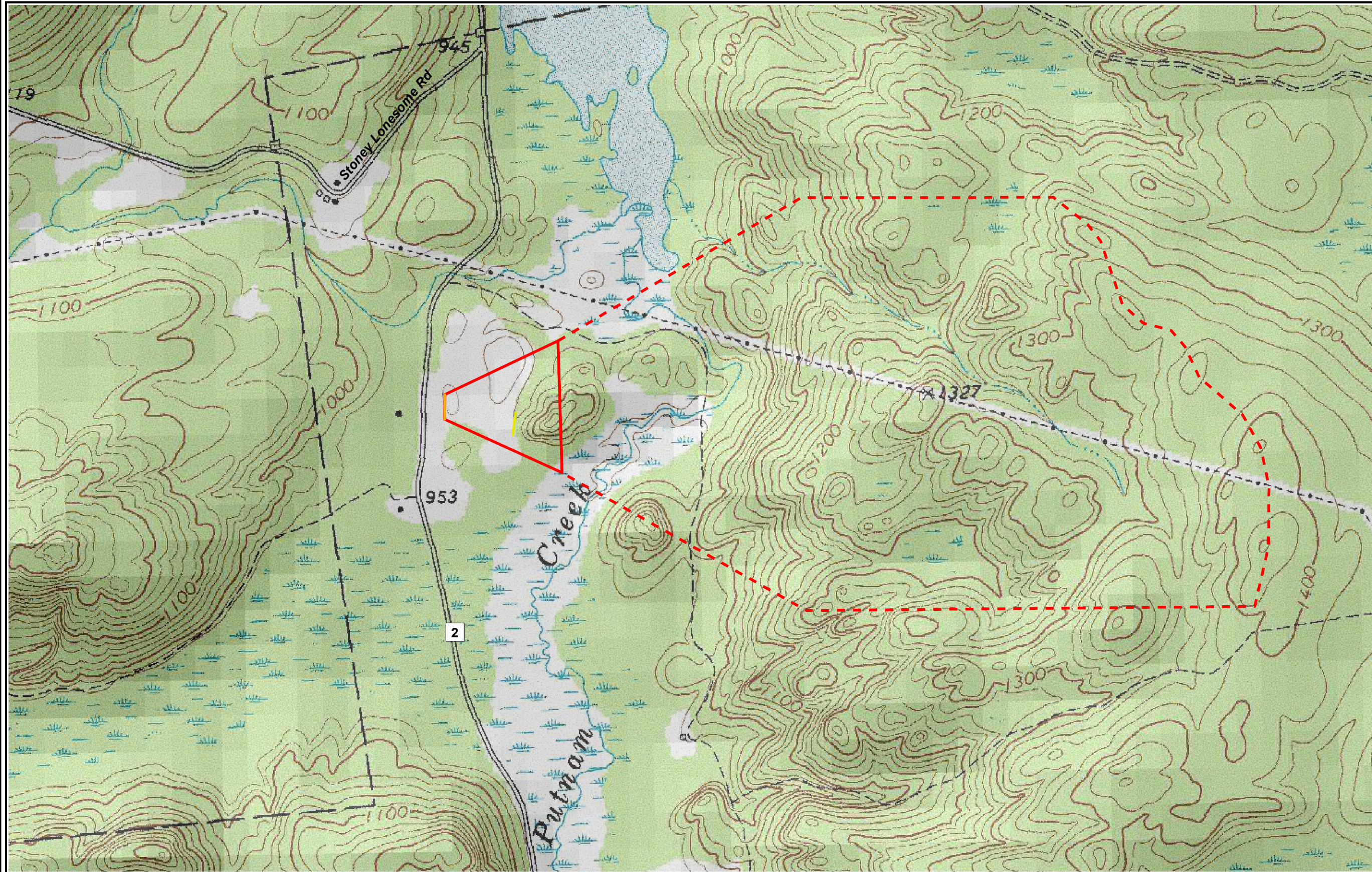


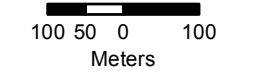


Figure 4.20-4
Ticonderoga Range (old) (Topographic)
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



- Legend**
- MRS Boundary
 - - - SDZ Boundary
 - Berm
 - Firing Line



Contour Interval 20 Feet



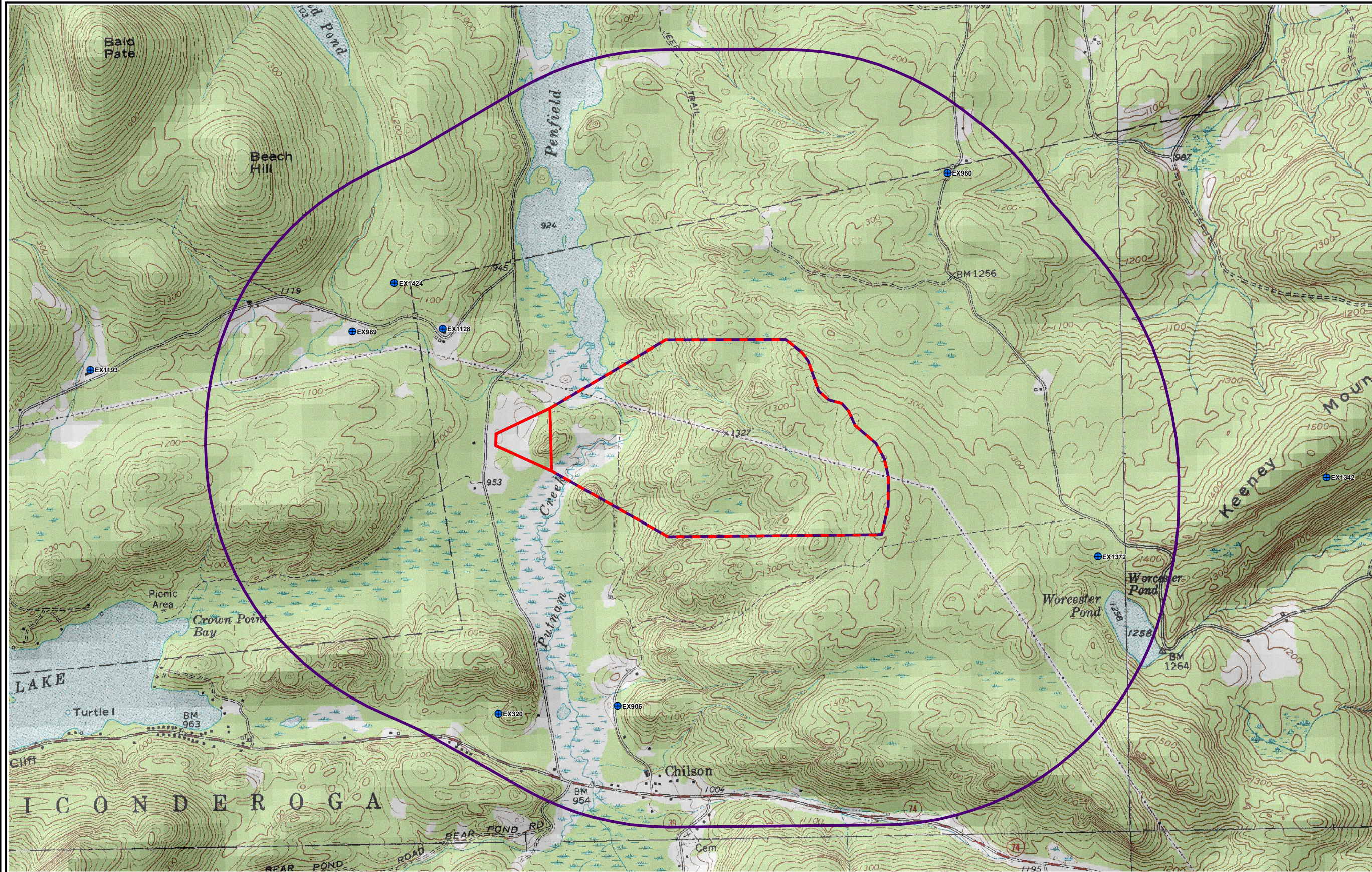
Image: USGS 7.5'
 Topo Quadrangles,
 Date 1973
 Projection: UTM Zone 18,
 WGS84, Meters

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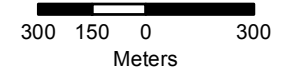
Figure 4.20-5
Ticonderoga Range (old) - Water Wells Within 1-Mile Buffer
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



Legend

- MRS Boundary
- SDZ Boundary
- Domestic Water Well
- Buffer (1 Mile)



Contour Interval 20 Feet



Image: USGS 7.5'
 Topo Quadrangles,
 Date NW & SW 1973
 and NE & SE 1950
 Projection: UTM Zone 18,
 WGS84, Meters

PROJECT NUMBER:
 747648.13000
 January 2012

4.20.6 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ - Summary and Conclusions

Field activities were not planned due to the absence of executed ROEs. Based on the PAs and the SI HRR, the one MRS is a confirmed small arms range where only small arms munitions were fired and the other is an SDZ, which served as a range fan. Small arms munitions are not considered to be MEC, as they do not contain fuzes or explosives that might present a residual hazard. No unanticipated MEC has been reported. No explosive hazards are expected at either MRS. Therefore, no explosive safety risk is considered to be present at the MRS.

4.20.7 Ticonderoga Range (old) and Ticonderoga Range (old) SDZ - Recommendations

Field activities were not planned at the Ticonderoga Range (old) or Ticonderoga Range (old) SDZ during the SI as the necessary ROEs could not be obtained. Due to landowner ROE refusal, field work could not be conducted and the Army cannot take any additional action without landowner coordination. This MRS will be placed on a 5-year review cycle by the ARNG. In five years, the landowner will be contacted to obtain access so that an SI can be completed. Therefore, Ticonderoga Range (old) is recommended for **Site Inspection with 5-Year Review**. Ticonderoga Range (old) SDZ is recommended for **No Further Action** since the MRS was a range fan and is not expected to be contaminated with MC and MD are not expected to be present.