



**DECOMMISSIONING PLAN
CLEAN HARBORS DEER TRAIL, LLC.**

PREPARED BY

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TABLE OF CONTENTS

1.0 Introduction.....	1
2.0 Facility History	1
3.0 Approach to Decommissioning	2
3.1 Facility Radiation Protection Design Features	2
3.2 Survey Methods	2
3.3 Quantities and Types of Decontamination and Decommissioning Wastes	3
3.4 Facility Decontamination, Sampling, and Closure Methods	5
3.4.1 Process and Operations Area/Roads	5
3.4.1.1 Background Sampling and Testing.....	6
3.4.1.2 Concrete Paved Areas	6
3.4.1.3 Gravel Roads.....	7
3.4.1.4 Decontamination	7
3.4.1.5.Sampling	7
3.4.2 Treatment Building - Primary and Secondary Containment.....	8
3.4.2.1 Decontamination	8
3.4.2.2 Closure Sampling Program.....	8
3.4.2.3 Final Closure.....	9
3.4.3 Equipment and Structures	9
3.4.4 Container Management Building.....	10
3.4.5 Tanks.....	10
3.4.6 Collection Sumps	10
3.4.7 Treatment Building	11
3.4.8 Heavy Equipment.....	11
3.4.9 Disposal Volumes	12
3.4.10 Measured Residual Contamination	12
3.4.11 Disposal of Decontamination Wastes	12
4.0 Site Radiological Characterization Following Closure (MARSSIM)	13
5.0 Records	13
6.0 Decommissioning Cost Estimates	13
7.0 Technical References and Guidance.....	16
8.0 Cost Estimate Resources.....	16

Figures

Figure 1 – Facility Overview and MARSSIM Classifications

Figure 2 – Laboratory and MARSSIM Classification

Figure 3 – Treatment Building and MARSSIM Classification

1.0 Introduction

This facility-decommissioning plan with associated cost estimates are written to satisfy condition 45.A of the facilities Radioactive Materials License. It is important to note that the mobilization of third party contractors, technicians and other professionals to perform tasks associated with decontaminating and/or dismantling of equipment and structures that may be required in the decommissioning effort is already addressed in the RCRA Permit Closure Plan (CP) therefore; the RCRA Part B permit Closure Plan and Closure Cost Estimate are incorporated by reference into this Decommissioning Plan (DP) closure document. One significant difference between the two plans would be in inclusion of a Final Status Survey has outlined in Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Clean Harbors Deer Trail, LLC (CHDT) is committed to following the guidelines for final site survey as outlined in NURREG 1575 (MARSSIM).

2.0 Facility History

The CHDT facility has been in operation since July 23, 1991. It owns and operates Resource Conservation and Recovery Act (RCRA) permitted hazardous waste treatment, storage, and disposal facility. CHDT owns 5,760 acres in southeast Adams County, approximately 70 miles east of Denver, Colorado. Waste handling and associated activities occur on the RCRA permitted portion of the property, comprised of 325 acres. The facility sets on over 4,000 feet of unweathered Pierre shale with no aquifer underlying the permitted area. The surrounding ground of the facility is primarily used for agricultural purpose. The population is less than 250 people within a ten-mile radius. The annual average rainfall at Deer Trail is 14 inches and the evaporation rate is 58 inches per year.

The facility receives and treats bulk, drummed, and small-container waste for treatment followed by either placement in secure landfill cells or by shipment off site for disposal. The facility is designed and constructed to serve the core business for hazardous waste treatment, storage, and disposal.

The Radioactive Materials License allows for transfer of a specific and limited type of licensed radioactive material to the CHDT facility for disposal. The license applies only to radioactive material consistent with the radionuclides found in NORM and TENORM waste with concentrations have a total activity of less than 2,000 picocuries per gram (pCi/g; natural uranium and thorium decay chain products only), with a maximum 226Ra concentration less than 400 pCi/g. These materials will have external dose rates that are generally less than 100 microroentgens per hour ($\mu\text{R/hr}$), exclusive of background. The license does not include radioactive waste in the broader definition of low-level radioactive waste, including other licensed forms of manmade radioactive materials.

The CHDT facility is permitted for seven secure disposal cells. The approximate volume of each cell is:

Cell 1: 173,000 cubic yards

Cell 2: 220,600 cubic yards

Cell 3: 480,240 cubic yards
Cell 4: 491,840 cubic yards
Cell 5: 472,120 cubic yards
Cell 6: 433,840 cubic yards
Cell 7: 466,320 cubic yards

The total maximum permitted capacity is 2,737,960 cubic yards. Cell 1 is closed and capped. Because past operations of Cells 1 and 2 did not permit disposal of NORM/TENORM waste, the total maximum capacity (assuming that all waste received is NORM/TENORM) to fill Cells 3 through 7 is about 2,344,360 cubic yards.

3.0 Approach to Decommissioning

The Deer Trail RCRA Permit provides a detailed site Closure Plan, which identifies the overall methodology Clean Harbor Deer Trail will follow in the closure of disposal Cells 1 through 7 as well as the facility infrastructure and equipment. CHDT will apply this methodology to hazardous and Naturally Occurring Radioactive Material (NORM) and Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) waste in the facility.

Decontamination and decommissioning activities will begin as Disposal Cell 7 nears capacity. These activities are discussed in detail in the Deer Trail facility Closure Plan. Cells 1 through 6 will have been closed. The following sections summarize elements of the Closure Plan with a focus on radiation protection issues associated with NORM/TENORM waste.

3.1 Facility Radiation Protection Design Features

It is the policy of CHDT management to maintain personnel exposure to levels that are as low as reasonably achievable (ALARA), consistent with efficient disposal site operations and fully compliant with 10 CFR 20, Standards for Protection Against Radiation, and 10 CFR 19, Notices and Instructions to Workers. The CHDT facilities Radiation Protection Plan states that workers will be considered members of the public and radiation exposures will be limited to 100 millirem per year (mrem/yr), plus ALARA (as low as reasonably achievable), with a goal of 25 mrem/yr or less. If worker dosimetry results determine that selected worker doses could exceed 25 mrem/yr, an assessment of the potential for other manmade exposures for these workers will occur to ensure that maximum individual doses from manmade sources will not exceed 100 mrem/yr. Other members of the public will be limited to an annual dose of 25 mrem/yr, consistent with the Performance Objectives outlined in 6 CCR 1007-1, Radiation Control, Part 14: Licensing Requirements for Land Disposal of Low-Level Radioactive Waste.

3.2 Survey Methods

The Radiation Protection Plan and supporting Standard Operating Procedures (SOPs) have been approved by the CHDT Corporate Staff and facility General Manager. Although the

RCRA permit requires numerous SOPs, those pertaining specifically to various types of radiation surveys or monitoring systems for NORM/ TENORM waste include:

- Standard Operating Procedure on Individual and Area Dosimetry
- Standard Operating Procedure on Airborne Monitoring
- Standard Operating Procedure on Radiation Surveys
- Standard Operating Procedure on Use of the Gate Monitoring System

Radiation surveys at Deer Trail will verify waste concentrations, limit the exposure of Deer Trail workers, and ensure that radiation doses to Deer Trail workers are maintained at levels less than 100 millirem per year (mrem/yr). These survey methods will be applied during decontamination and decommissioning of the facility. Because minimal waste handling and treatment is anticipated for most NORM/TENORM waste, and because operational procedures will ensure contamination control for areas outside the disposal cells, small decontamination efforts are anticipated. Where equipment or building surfaces are to be released for unrestricted use, the relevant surface contamination levels in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.86 or alternative levels approved by the State of Colorado will be applied (NRC 1974). Where soil contamination is found, residual levels will be derived for an unrestricted release limit of 25 mrem/yr using the methodology defined in *Residual Radioactive Contamination from Decommissioning: Volume 1 – Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent (Kennedy and Strenge 1992) or other methods approved by the State of Colorado.*

3.3 Quantities and Types of Decontamination and Decommissioning Wastes

- The currently permitted site occupies approximately 325 acres. The Deer Trail facility, at the time of closure, will include:
 - Six closed, capped, graded, and vegetated disposal cells occupying approximately 90 acres;
 - One open, active disposal cell occupying approximately 10.3 acres of surface area, with approximately 12,500 cubic yards (yd³) of capacity available (Cell 7);
 - Two Contaminated Water Storage Tanks with a capacity of approximately 250,000 gallons each;
 - One Treatment Building with 15,000 ft² of Treatment Area. The Treatment Area includes four steel-lined treatment mixing basins (each 20 ft wide × 80 ft long × 10 ft deep with a 2,400-yd³ capacity). The Treatment Building is underlain with a clay, synthetic, and concrete lining system that occupies approximately 89,000 ft²;

- One 2,760-ft² Offsite Truck Wash building, including a 3,300-gallon washwater recycling system with lined collection sump (17,000-gallon capacity) and lift pump to the Contaminated Water Storage Tanks;
- An Onsite Truck Wash bay with a 4,000-gallon underground sump collection tank;
- A 4,000-gallon Operations Building/Laboratory/Sampling Station underground collection tank;
- Two packed column air scrubber systems, each with 2,500-gallon liquid capacity;
- Three dust conveyer systems from the Treatment Building baghouses;
- One decontamination room attached to the south side of the Containment Building with a 500-gallon-capacity sump;
- One Container Management Area in the Treatment Building, including a Class I and II drum storage area (11,000-gallon capacity), Class III drum storage area (22,000-gallon capacity), drum shredder, and conveyor system; and
- Two Container Storage Areas totaling 65,400 ft² of concrete paving plus curbing.

The Closure Plan assumes that the listed waste storage units will be filled to capacity when the closure period begins. The actual volume of hazardous wastes on the site when the closure period begins probably will be less. The following list summarizes estimated liquid, sludge, and solid wastes at the time of closure that could be contaminated with hazardous and NORM/ TENORM waste.

- Liquids - 563,800 gallons as follows:
 - 11,000 gallons (200 drums) of oils and solvents in the Class I and II Drum Storage Area;
 - 500,000 gallons of contaminated water in the Contaminated Water Storage Tanks;
 - 28,800 gallons of contaminated water in the following locations:
 - 3,300 gallons in the Offsite Truck Wash recycle tanks
 - 17,000 gallons in the Offsite Truck Wash sump

- 4,000 gallons in the Maintenance Building sump collection tank
- 4,000 gallons in the Operations Building/Sampling Station sump collection tank
- 500 gallons in the Treatment Building decontamination room sump
- The water in the Contaminated Water Storage Tanks will be treated on the site with the available wastewater treatment system. The treated water will be discharged in accordance with the Deer Trail Permit.
- Sludges - 2,509 yd³ of untreated waste as follows:
 - 109 yd³ (22,000 gallons) of untreated containerized waste (assumed to be sludge) in the Class III Drum Storage Area; and
 - 2,400 yd³ of untreated waste in the treatment mixing basins.
- Solids - 1,994 yd³ as follows:
 - 14 yd³ of untreated solids in the floor drains, collection tanks, and the Truck Wash recycle unit; and
 - 1,980 yd³ of untreated containerized waste in the Container Storage Area.

3.4 Facility Decontamination, Sampling, and Closure Methods

General facility decontamination methods have been developed with a focus on hazardous materials. Because of the low concentrations of NORM/TENORM waste, and because of operational contamination control methods, the following methods will be more than adequate for any residual NORM/TENORM waste at the Deer Trail facility.

3.4.1 Process and Operations Area/Roads

The process area and site roads that could require decontamination consist of:

- The concrete paved entrance road from U.S. Highway 36 to the bermed processing area in the facility (approximately 413,400 ft²)
- The concrete paving in the active waste management area including the Cell 7 haul road (approximately 371,300 ft²)
- The concrete paving in the Container Storage Area (approximately 65,400 ft²)
- The gravel roadways around the disposal cell area (approximately 150,000 ft²)

All roadways in the Deer Trail facility are designated for on and offsite vehicle use. Offsite vehicles will travel only on the paved site entrance road and the roadways in the process and operations area or on designated gravel roads for construction support or facility monitoring. Because vehicles leaving the active waste management area must be washed in either the on or offsite truck wash, contamination of the paved and unpaved roadways outside the active waste management area is not anticipated. All roads (including the access road) will be inspected for areas of obvious contamination and the facility operating record will be consulted to determine locations of past spills or contamination. The active waste management area is expected to consist of the concrete paved process area north of the Maintenance Building and the concrete paved access road to the active Secure Disposal Cell.

The following sections describe background sampling and testing, decontamination, and closure procedures for the roadways listed above.

3.4.1.1 Background Sampling and Testing

A background soil sampling and testing program was conducted in the process and operations areas and access roads after initial construction and prior to acceptance of hazardous wastes at the Deer Trail facility. This program included determination of background dose rates for calibrating the gate radiation monitor. These levels will be used for comparison against derived soil contamination limits, based on 25 mrem/yr to an individual, for making decisions on soil that might be contaminated with NORM/TENORM waste.

3.4.1.2 Concrete Paved Areas

As discussed above, the Closure Plan assumes that only the concrete paved areas, including the Container Storage Area in the active waste management area, will require decontamination (approximately 436,700 ft²). Decontamination of the active waste management area will employ the onsite high-pressure-water cleaning unit. The concrete surfaces will be hydroblasted with an appropriate industrial-strength detergent solution. Washwater will drain to adjacent Segregated Storm Water Drainage Ditches and the Segregated Storm Water Retention Basin (SSRB), or temporary storage containers. Representative rinsate samples will be collected from the ditches, SSRB, or temporary storage containers. The paved areas will be considered decontaminated on the removal of all visible residues and when a final rinsate volume of 300 gallons or less, at 400-foot intervals, produces a total organic content level of less than 50 parts per million and pH between 6 and 9. For NORM/TENORM waste, subsequent surface contamination surveys must meet established unrestricted surface contamination levels. Test methods will be those specified in the Waste Analysis Plan. The contaminated rinse water will be collected for onsite treatment in the wastewater treatment facility or for disposal at an interim status or permitted hazardous waste disposal facility.

3.4.1.3 Gravel Roads

The facility Closure Plan assumes that no gravel roads will require decontamination. If decontamination is necessary, the decontamination of all gravel roads used to transport waste material will employ the procedures described in the following sections:

3.4.1.4 Decontamination

Samples will be taken in the areas described above and analyzed for soil pH, 6 CCR 1007-3 §261 - Appendix VIII constituents, and NORM/TENORM waste disposed of in the cell being closed. If contamination is found, its extent must be determined in a horizontal and vertical direction. Contaminated soils must be removed until a 6-inch horizontal and vertical stratum of soil in the contaminated area meets the requirements specified below for decontamination as determined by representative soil samples in the contamination zone. Soils will be considered decontaminated when analysis of soil pH, 6 CCR 1007-3 §261 - Appendix VIII constituents, and NORM/ TENORM waste results indicate that background levels have been met. Test methods and procedures will be those specified in the Waste Analysis Plan. Contaminated soils will be transferred to the active disposal cell or an offsite permitted hazardous waste disposal facility.

3.4.1.5.Sampling

A sampling program will be initiated to determine the existence and extent of any contamination (hazardous and NORM/TENORM waste) that might be present on the gravel roadways utilized by equipment going into or out of a disposal cell.

The gravel and soil sampling program will utilize a grid system as defined under RCRA. Samples will be obtained in any areas of obvious contamination in the grid system. Samples will be taken at a depth of 0 to 6 inches. Composites could be prepared from these samples at a ratio of 5:1 and analyzed. The dimensions of the grids will be 400 ft by 50 ft with the long axis parallel to the centerline of the access roads. Five sampling locations in each grid will be selected randomly. However, in each grid, if an area(s) of potential contamination is noted (i.e., soil discoloration and/or odor), one of the sampling locations will be in that area. At each sampling location, the sample will be obtained by advancing a bucket or hand auger to a depth of 0 to 6 inches. Each sample will be visually characterized, noted in a field logbook, and placed in pre-cleaned glassware with Teflon-lined caps. Each sample container will be labeled as to sample location and depth interval, and the chain of custody will be initiated for shipment to an approved analytical laboratory. During the sampling activity, the bucket-type hand auger and auxiliary sampling equipment will be cleaned using detergent, distilled water, and acetone. The sampling equipment will be rinsed using distilled water to avoid cross-contamination. A minimum of five samples will be taken for every 400 ft of gravel roadway in the landfill area.

3.4.2 Treatment Building - Primary and Secondary Containment

Treatment Building closure will include the Treatment Building primary and secondary liner systems. Prior to placement of the Treatment Building liner systems, a background soil sampling program was conducted in the area of each impoundment. These preoperational data were used to establish background parameters and to specify the extent of closure activities.

Ten representative soil samples were taken at a depth of 0 to 6 inches for each unit impoundment and analyzed for soil pH, heavy metals, priority pollutants, and the first 10 major peaks that are quantifiable above 25% of the internal standard of 10 parts per billion, as identified by gas chromatograph/mass spectrometer analysis. Background levels for inorganics (except pH) were established at the mean value plus 2 standard deviations; for organics, background was established at the practical quantification limit.

3.4.2.1 Decontamination

The soil sampling program will generate at least 20 representative samples (that might be combined into 4 samples) taken at a depth of 0 to 6 inches. Samples will be taken in areas of obvious contamination. If contamination is found, its extent must be determined in a horizontal and vertical direction. Contaminated soil must be removed until a 6-inch horizontal and vertical stratum of soil in the contaminated area meets the decontamination criteria specified below, as determined by five representative soil samples or a composite of these five samples in the contamination zone. Soil will be considered decontaminated when analysis of soil pH, 6 CCR 1007-3 §261 - Appendix VIII constituents, and NORM/TENORM residual concentration results indicate that background or unrestricted release levels have been achieved. Test methods and procedures will be those specified in the Waste Analysis Plan. Sampling methods, procedures, recordkeeping protocol, and soil sampling equipment will be those specified above. Contaminated soils will be transferred to Disposal Cell 7 or to a permitted hazardous waste disposal facility.

3.4.2.2 Closure Sampling Program

For closure, it is assumed that the closure sampling program will not be required. If a leak is detected during the active life of the facility, the Leak Detection System of the Treatment Building, the Closure Plan, and Closure Cost Estimate must be modified. The Department must be notified within 15 days of the determination and the Modification Request must be submitted within 30 days of the determination. If required, the sampling program for the excavated area will utilize a grid system. Samples will be obtained in the grid system from a depth of 0 to 6 inches. Composites will be prepared from these samples at a ratio of 5:1 (five samples might be combined into one) and analyzed. The dimensions of the grids will be 100 ft by 100 ft. Five sampling locations in each grid will be selected randomly. At each sampling location, samples will be obtained by advancing a bucket-type hand auger

to a depth of 0 to 6 inches. The samples will be visually characterized, noted in a field logbook, and placed in pre-cleaned glassware with Teflon-lined caps. Each sample container will be labeled as to sample location and depth interval, and the chain of custody will be initiated for shipment to an approved analytical laboratory. During the sampling activity, the hand auger and auxiliary sampling equipment will be cleaned with detergent, distilled water, and acetone. The sampling equipment will be rinsed using distilled water to avoid cross-contamination.

3.4.2.3 Final Closure

If required, following decontamination and testing of the Waste Treatment and Container Storage Building, the excavation will be backfilled and a final cover will be placed over the backfill. For closure, the estimated amount of solids generated during closure that might require disposal is 8,973 yd³. This is based on the assumption that 25% of the Waste Treatment and Container Storage Building containment system will require disposal. If a leak is detected in the building's Leak Detection System during the active life of the facility, the Closure Plan and Closure Cost Estimate must be modified to include the entire containment system. The Department must be notified within 15 days of the determination and the Modification Request must be submitted within 30 days of the determination.

3.4.3 Equipment and Structures

Potentially contaminated equipment and structures will be decontaminated, disposed of in Disposal Cell 7, or transferred to an interim status or permitted facility for disposal. The Closure Plan assumes the use of decontamination procedures. Potentially contaminated equipment and structures will be decontaminated by hydroblasting with an appropriate industrial-strength detergent solution or another appropriate 40 CFR 268.45 procedure, or transferred to an industrial or hazardous waste service.

Hydroblasting is assumed for closure cost estimate purposes. The hydroblasting will occur in the on- or offsite truck wash areas, where practical, or in situ when necessary. The washwater in the truck wash areas will drain to the sump before being transferred for onsite treatment or off the site for disposal. The washwater generated from in situ cleaning will be collected by a pump or vacuum truck or similar equipment before being treated or shipped off the site. All contaminated facility equipment, structures, and protective clothing that will not be decontaminated will be disposed of in Cell 7 or shipped to a permitted or interim status hazardous waste disposal facility. The volume of wastewater generated during the decontamination of the equipment and structures at the facility includes washwater from the decontamination of the associated concrete systems and concrete pads.

The decontamination activities will generate an estimated 250,000 gallons of wastewater with an amount of sediment equal to 5% of the wastewater created by

mass, and an estimated 12,500 gallons (62 yd³) of sediment will be disposed of in Disposal Cell 7 after decontamination.

The decontamination criteria and specific procedures for the Container Management Building, tanks, sumps, Treatment Building, and heavy equipment are as follows: equipment, tanks, and structures will be considered decontaminated on the removal of all visible residuals and when a final rinsate volume of 300 gallons or less from 10% of like equipment produces analytical results that indicate that 6 CCR 1007-3 §261 - Appendix VIII constituent concentrations are no greater than maximum contaminant levels for drinking water and the pH is between 6 and 9.

Test methods will be those specified in the Waste Analysis Plan. Rinsate that does not meet the above specifications will be collected for onsite treatment or disposal at an interim status or permitted waste disposal facility. In addition, the residual NORM/TENORM surface activity levels shall not exceed the appropriate criteria (NRC 1974).

3.4.4 Container Management Building

Equipment in the Container Management Building (including the drum shredder and drum conveying system) will be disassembled and decontaminated in the on or offsite truck wash areas or disposed of by an approved method. It might be transferred to another permitted hazardous waste facility to be used in hazardous waste service without decontamination or to an industrial application after removal of gross contamination by visual inspection. Decontamination is assumed for closure cost estimate proposes. Representative rinsate samples will be collected at the drain of the truck wash area. The Container Management Building floor, berms, and any remaining structures will be decontaminated in place. Representative samples will be collected at the Container Management Building sumps.

3.4.5 Tanks

The Contaminated Water Storage Tanks and the offsite truck wash recycling system surge tanks will be emptied during closure. The contents will be treated on the site or transferred to a permitted facility. The empty tanks, foundations, structural supports, piping, and containment systems will be decontaminated, disposed of, or transferred to a hazardous waste or industrial waste service without being decontaminated as described above. Representative samples will be collected from each tank's containment area sump.

3.4.6 Collection Sumps

The Maintenance Building underground sump collection tank, the Operations Building/ Sampling Station underground sump collection tank, and the in-floor sump of the offsite truck wash will be emptied during closure. The contents will be treated on the site or transferred to an appropriately permitted facility. If leaks have not been

detected in the leak detection system throughout the life of the tank, the tank and all associated piping will be decontaminated and closed in place. If leaks have been detected, the double-walled fiberglass tank piping and associated structures will be removed. A soil sampling program will be implemented in the excavation pit created by removal of the tank and associated materials.

The soil sampling program will include a minimum of 10 samples taken at a depth of 0 to 6 inches and additional samples will be taken in areas of obvious contamination. (These samples will be collected as follows: two samples will be taken from the floor of each excavation pit, one sample will be taken from the wall of each excavation pit, and four samples will be taken from the pipeline excavations). The extent of contamination found will be determined in a horizontal and vertical direction. Contaminated solids will be removed until a 6-inch horizontal and vertical stratum of soil in the excavation pit no longer contains hazardous constituents as determined by 10 representative soil samples in the contamination zone.

Soil will be considered decontaminated when analysis of soil pH and 6 CCR 1007-3 §261 - Appendix VIII results indicate values within the mean plus 2 standard deviations background soil sampling values for inorganics, and values below the practical quantification limits for organics have been achieved. In addition, the derived unrestricted release criteria for NORM/ TENORM waste in soil must be met. Test methods and procedures will be those specified in the Waste Analysis Plan. Sampling methods, procedures, recordkeeping protocol, and soil sampling equipment will be those specified for the closure of surface impoundments. Contaminated soils will be disposed of in Cell 7 or at an interim status or permitted hazardous waste disposal facility. All equipment and associated piping removed from the collection sump area will be decontaminated in the on or offsite truck wash.

3.4.7 Treatment Building

Prior to dismantling (removing walls and roof) the Treatment Building, its walls and roof, process equipment, and treatment mixing basins will be decontaminated. The building will be considered decontaminated on the removal of all visible residues and when two representative rinse water samples (from two different locations along the face) collected from each face of the building meet the decontamination criteria specified in the Closure Plan, and when the NORM/ TENORM unrestricted release criteria are met.

3.4.8 Heavy Equipment

All equipment and heavy machinery remaining at final closure will be decontaminated in the on or offsite truck wash and will meet the sampling standard for unrestricted use, or will be transferred to another industrial user standard or to another hazardous waste use standard.

3.4.9 Disposal Volumes

During closure, the concrete floor, high-density polyethylene (HDPE) liners, clay liners, and all associated components including the leak detection systems, riser pipes, and geotextile will be removed. These removed materials will be transferred to Disposal Cell 7 or to an appropriately permitted waste disposal facility. If monitoring of the leak detection system indicated a failure of the primary containment system during the life of the building, a soil sampling program will be conducted in the excavated area. If required, this program will occur following removal of the liners. The following table lists estimated volumes of materials of the Waste Treatment and Container Storage Building's primary and secondary containment systems:

Treatment Building Primary and Secondary Containment Systems

Backfill Between Building and Liner	14,600 yd ³
Clay Liner	17,000 yd ³
Concrete	3,822 yd ³
Steel Plate Liner	150 yd ³
HDPE/Geonet	318 yd ³
Total	35,890 yd ³

3.4.10 Measured Residual Contamination

Radiation surveys at Deer Trail will verify compliance with unrestricted release criteria for NORM/TENORM waste on equipment or building surfaces. The relevant surface contamination levels in NRC Regulatory Guide 1.86, or alternative levels approved by the State of Colorado, will be applied (NRC 1974). If soil contamination is found, residual levels will be derived for an unrestricted release limit of 25 mrem/yr using the methodology defined in Residual Radioactive Contamination from Decommissioning: *Volume 1 – Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent (Kennedy and Strenge 1992), or other methods approved by the State of Colorado.*

3.4.11 Disposal of Decontamination Wastes

All material that meets the release criteria specified in the Closure Plan (CHDT 2004a – see Volume 5 of this application) and in Regulatory Guide 1.86 will be removed from the facility. All decontamination waste produced during decommissioning activities will be disposed of in Cell 7. The types of waste generated during decommissioning activities will include radiological sampling materials. The facility operating philosophy is to minimize contamination generated during operations and, if contamination occurs, to decontaminate the area at that time. If soil contamination is found, residual levels will be derived for an unrestricted release limit of 25 mrem/yr using the methodology defined in Residual Radioactive Contamination

from Decommissioning: Volume 1 – Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent (Kennedy and Strenge 1992), or other methods approved by the State of Colorado.

4.0 Site Radiological Characterization Following Closure (MARSSIM)

Final radiological characterization of the facility following closure under RCRA will be in accordance with the recommendations in the Multiagency Radiation Survey and Site Investigation Manual (MARSSIM) (NRC 1997). A formal site characterization plan will be developed, reviewed, and approved; the plan will include characterization of external radiation dose rates and residual soil concentrations of NORM/TENORM waste. During operations, the facility will be under continuous radiological characterization and monitoring. The result of the operational monitoring will not only provide an extensive history of radiological conditions at the site, but also serve as screening information on which to develop the characterization plan.

5.0 Records

As part of the MARSSIM process, a review of facility operating records will occur prior to decommissioning to ensure that any areas potentially affected during operations receive the appropriate level of attention during decommissioning activities. This information will be evaluated during preparation of the final characterization plan. All records generated during decontamination and decommissioning activities will be retained in the facility records.

The Deer Trail Standard Operating Procedures, including the routine survey program for operations and buildings, will be largely effective in maintaining contamination control to levels below the established Screening Levels or DCGLs. The planning assumption is that the majority of the buildings and land will be Class 3 areas (little potential for radioactive contamination). Building areas, such as the surface impoundments located in the treatment building or the space set aside in the laboratory (see attached figures), although potentially a Class 2 or 1 area will be dismantled and disposed in the landfill. Therefore it is assumed that the final survey will be of land areas and buildings, which can be treated as Class 3 Survey Units.

6.0 Decommissioning Cost Estimates

Given that the decommissioning plan and the closure plan share many of the same tasks the cost estimate for decommissioning will be an extension of the closure cost estimate prepared for the RCRA Permit. The approved RCRA Permit Closure Cost Estimate can be found in Attachment Two. The total cost for closure under the RCRA Permit is \$2,712,596.

It is estimated that an additional \$225,000 will be added to the RCRA closure cost estimate to place the total cost estimate for decommissioning at \$2,937,596. The \$225,000 is estimated as follows:

Survey plan preparation, field surveys and report as follows:

	Certified Radiation Safety Professionals	Health Physicists	Technical Services	Administrative Support	Cost
	\$180	\$96	\$72	\$56	
Final Status Survey Plan	40			10	\$7,760
Field Surveys (80 hrs)	16	80	320	20	\$34,720
Report	40			10	\$7,760
Travel Expenses					\$8,000
Sub total					\$58,240
10% contingency					\$5,824.0
Total					\$64,064

Rental of additional survey equipment including but not limited to Ludlum model 239-1F floor monitor with scaler ratemeter model 2224, Ludlum model 43-68 GP detector with scaler ratemeter model 2224, pressurized ion chambers, and others to conduct contamination and dose rate measurements. **Total estimated cost \$10,936.**

\$150,000 for additional laboratory analysis as follows:

Group A

Gross A/B	\$45
RA 226/228	\$140
Gamma	\$65
U (ICP/MS)	\$25
Th (ICP/MS)	\$25
Total	\$300

Group B

Gross A/B by GFPC	\$45
Tritium (Distilled)	\$55
SR_90 by GFPC	\$105
RA 226/228	\$140
Gamma CS-137 & Hits	\$65
Iso Uranium	\$87
Iso Thorium	\$87
Iso Plutonium	\$152
AM241 (Long CT)	\$95
Plutonium 241 Liq Sci	\$88
PB 210 Liq Ssi	\$88
Carbon 14 by EERF	\$68
Total	\$1,075

In summary:

Survey plan preparation, field surveys and report	\$64,064
Rental of additional survey equipment	\$10,936
Additional laboratory analysis	\$150,000
Total	\$225,000

7.0 Technical References and Guidance

NRC NUREG-1575 Rev 1, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), September 2000.

Kennedy, W. E., Jr., and D. L. Strenge. 1992. *Residual Radioactive Contamination From Decommissioning: Volume 1, Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent*. NUREG/CR-5512. Prepared for the U.S. Nuclear Regulatory Commission by Pacific Northwest National Laboratory, Richland, Washington.

Clean Harbors Deer Trail (CHDT). 2004a. *Permit Renewal Report for Incorporation of a Geosynthetic Clay Liner (GCL) in the Liner Section for Secure Cells 3 Through 7 and in the Cover Section for Secure Cells 1 Through 7*.

Clean Harbors Deer Trail (CHDT). 2004b. *Waste Filling Plan and Drawings for Secure Cell Number 2, Revision 1*.

Clean Harbors Deer Trail (CHDT). RCRA Permit.

8.0 Cost Estimate Resources

Radiation Safety Academy, 481 N. Frederick Ave, Ste. 302, Gaithersburg, MD 20877
Phone: 301-990-6006 Fax: 301-990-9878

Severn Trent Laboratory, 13715 Rider Trail North, Earth City, MO 63045
Phone: 314-298-8566 or 800-333-3305 Fax: 314-298-8757

Environmental Restoration Group, Inc., 8809 Washington St. NE • Suite 150, Albuquerque, NM 87113 Tel: (505) 298-4224 Fax: (505) 797-1404

FIGURES

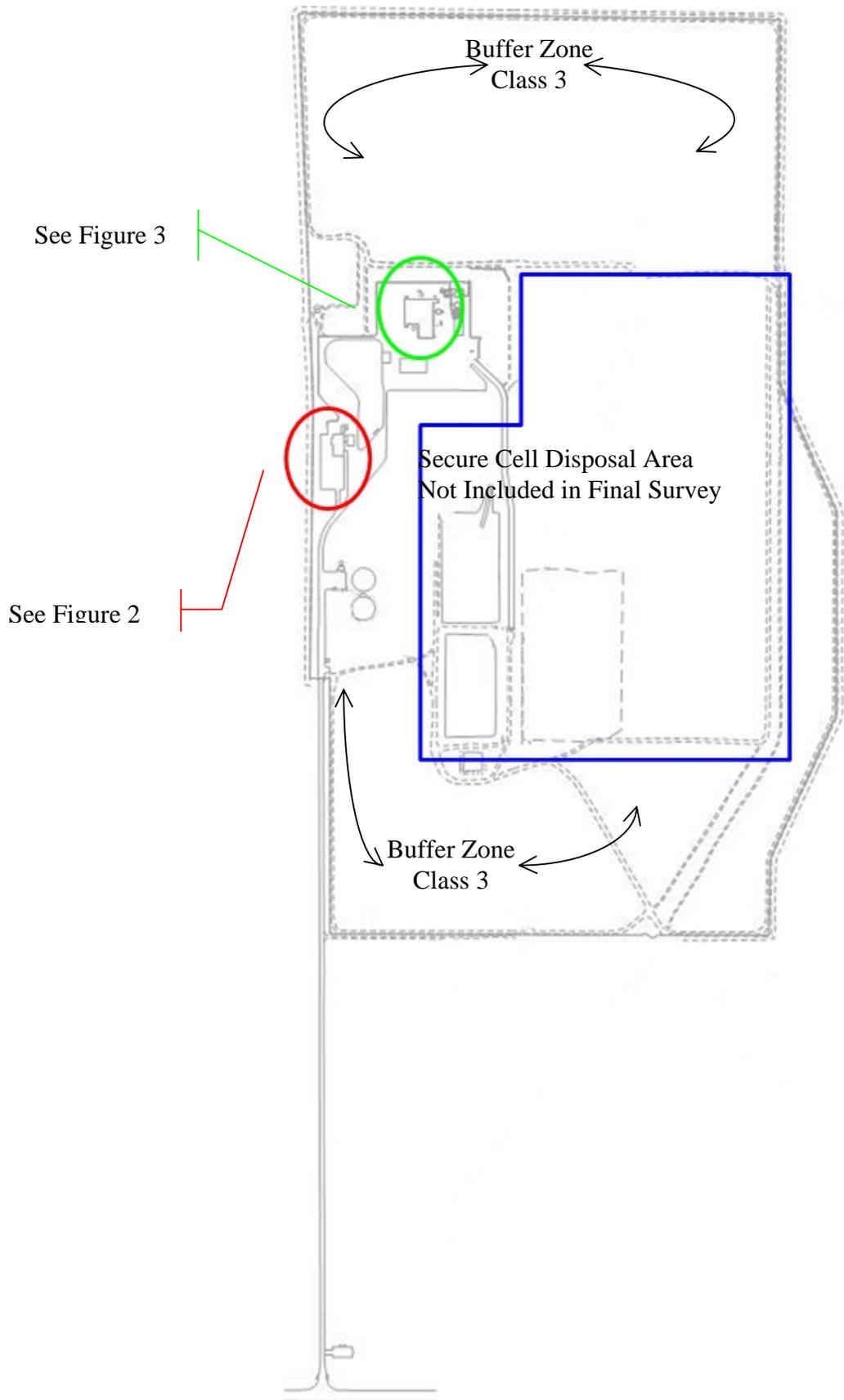


Figure 1 – Facility Overview and MARSSIM Classifications

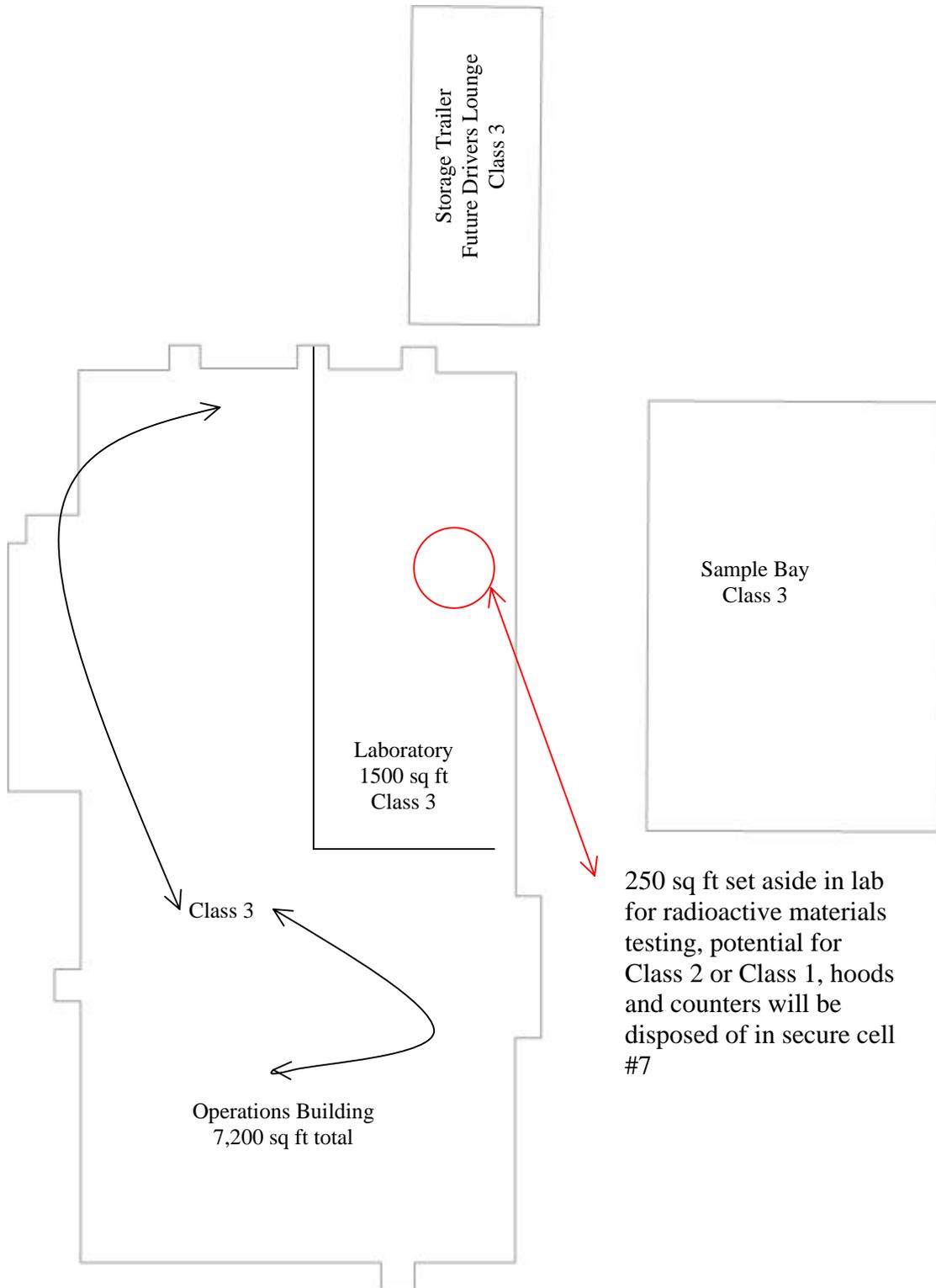


Figure 2 – Laboratory and MARSSIM Classification

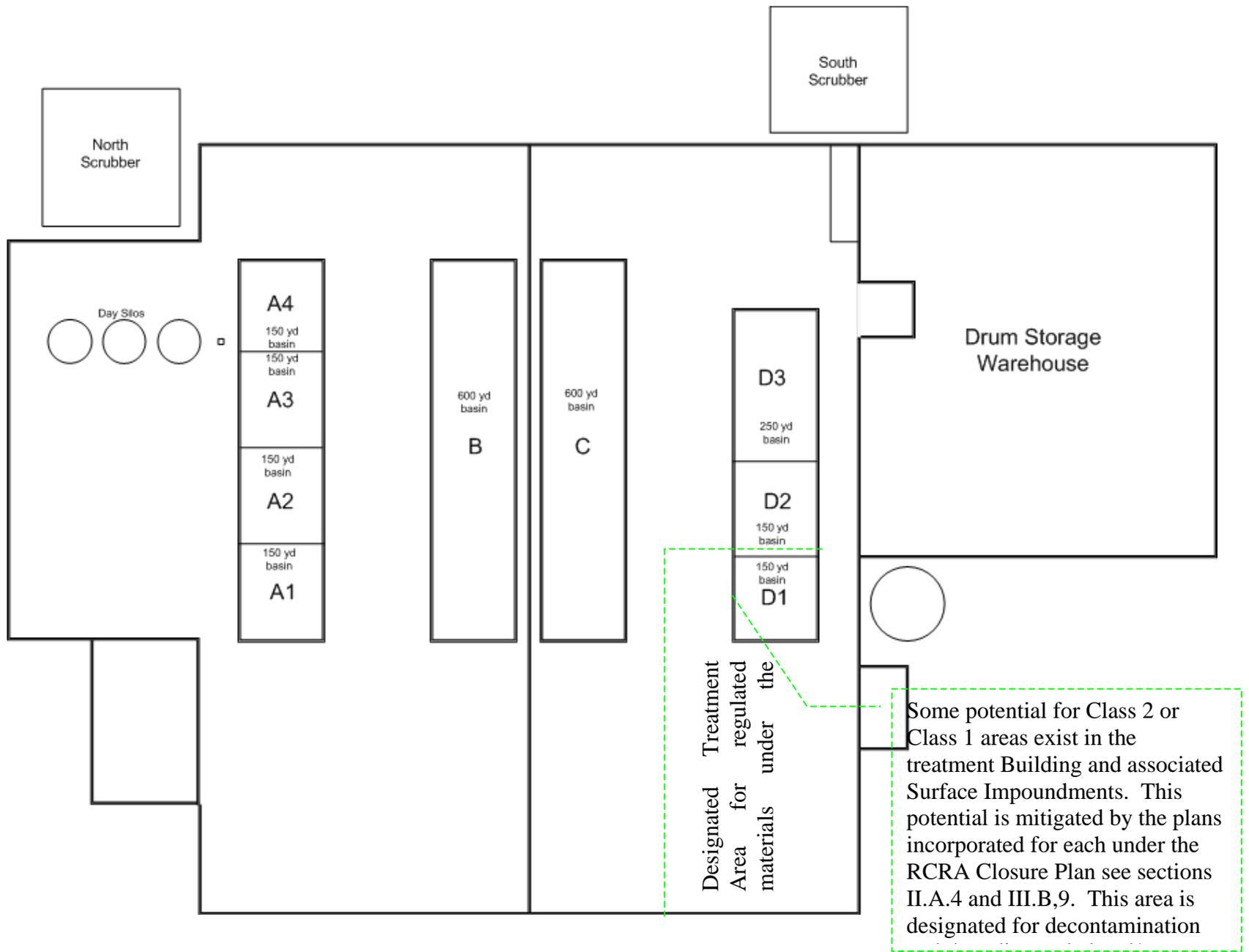


Figure 3 – Treatment Building and MARSSIM Classification