SECTION 3
ENVIRONMENTAL SETTING, IMPACTS & MITIGATION

3.1 TOPOGRAPHY, GEOLOGY & SOILS

3.1.1 EXISTING CONDITIONS

3.1.1.1 Topography

The natural landscape within the project vicinity is comprised of rolling sand dunes, supporting a unique ecological community known as the Albany Pine Bush. This landscape once occupied a much larger area than what is present today. The Albany Rapp Road landfill lies adjacent to the Pine Bush Preserve and is the highest land feature in the area, rising to an elevation of 406 feet above mean sea level (AMSL). Within the existing active portion of the landfill, the elevations will continue to rise to 460 feet AMSL, as approved under the current Part 360 permit.

The majority of the proposed expansion area is comprised of relatively flat and/or low to moderate-relief areas. According to recent topographic mapping, the elevation across the expansion area varies from approximately 300 to 332 ft. AMSL. The most significant topographic feature is a remnant dune located in the southern portion of the expansion area, adjacent to the landfill.

3.1.1.2 Geology

The following sections provide a summary of the regional and site specific geology for the Rapp Road Landfill facility, inclusive of the proposed eastern expansion area. The information is based on a review of historical investigation reports and published geological information, as well as site specific subsurface data collected as part of the recently completed hydrogeologic investigations. In addition to the information presented herein, a Hydrogeologic Report has been prepared and included in the Part 360 Permit Application (under separate cover) for the proposed Eastern Expansion. The Hydrogeologic Report was prepared to meet the requirements of the 6 NYCRR Part 360 regulations.

Regional and Site Specific Surficial Geology

The site lies within the Hudson-Champlain Lowland physiographic province of New York State, which was once occupied by the Hudson Lobe of the Laurentide ice sheet during the Woodfordian State of the Wisconsin Glaciation (Dineen 1982). This last major episode of glaciation occurred during the Pleistocene Age. This most recent ice age is responsible for much of the current surficial geologic features in the Albany area.

As advancing glaciers scoured the preglacial land surface, sediments and debris were entrained in the glacial ice sheet, transported for some distance, and eventually deposited as unconsolidated materials overlying the bedrock surface. Some of these materials were deposited directly by the ice sheet (ice-contact deposits) and some were sorted and deposited in layers by meltwater streams and lakes. As the glaciers retreated and deposited sediment loads into moraines that blocked surface water flow, a series of proglacial lakes were formed, one of which was glacial Lake Albany (C.T. Male 1999).

Eventually, glacial Lake Albany drained completely and the wind action created a dune field on the former lake floor between Schenectady and Albany north to Glens Falls. The dunes were built from drifting sands derived from the deltas and the lake floor. The dune fields that were located within the western arm of the former glacial Lake Albany plain is known as the Pine Bush Dune Field (Isachsen and others, 1991). The surficial deposits within the Pine Bush dune field consist primarily of dune sand or Lake Albany sand deposits. The dune sand deposits are characterized as cross-bedded loose, light yellow to brown sand. The Lake Albany surficial sand deposits on the other hand are characterized as laminated, and compact yellow sands. The project site is located within the Pine Bush Dune field and the near surface deposits consist primarily of either dune sands and/or Lake Albany sands.

Based on the subsurface stratigraphic data obtained from the recent investigations conducted as part of the hydrogeologic investigation for the proposed expansion area, five primary stratigraphic units (layers) were identified. These primary units are listed below in order of descending depth:

i. Shallow, Brown/Gray Sand Unit (Shallow Sand Unit);
ii. Silty Sand/Sand and Silt Unit (Intermediate Unit);
iii. Silty Clay/Silt and Sand Unit (Deep Unit);
iv. Deep Clay Unit; and
v. Till Unit.

In general, the surficial geology beneath the proposed expansion area is quite similar to the geology at the entire Rapp Road facility. Both current and historical borehole and well installation data were also employed to provide graphic depictions of the subsurface data. Two cross-sections were prepared to illustrate the stratigraphic setting for the Rapp Road facility, including the proposed expansion area. The locations of the cross-sections are illustrated by Figure 3.1-1. Representative cross-sections A-A' and B-B' are included as Figures 3.1-2 and 3.1-3, respectively. A more detailed comparison of the surficial geology for the expansion area including a comparison with previously collected subsurface data for the Rapp Road facility is provided in the Hydrogeologic Report.

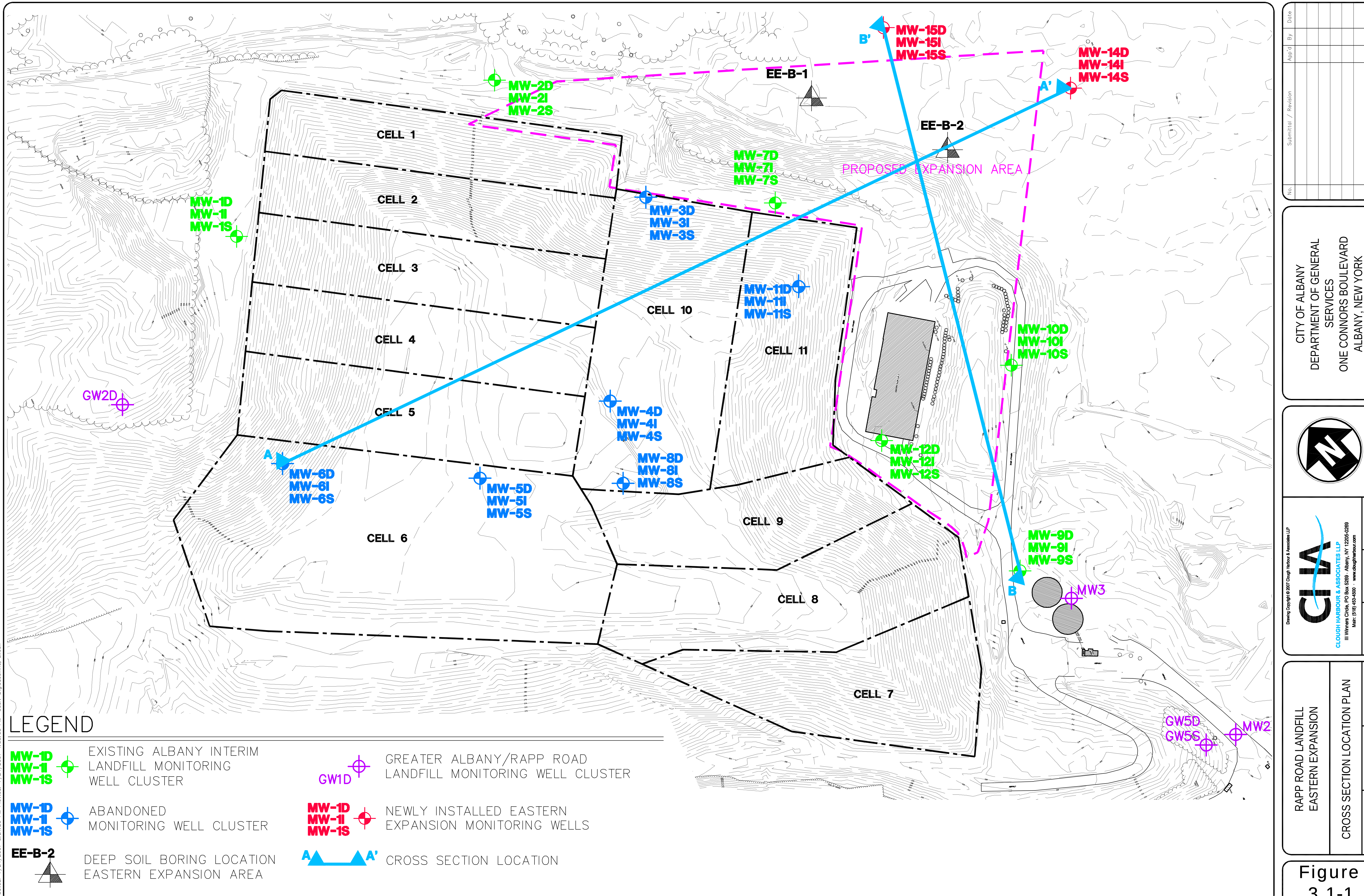
Bedrock Geology

According to the *Generalized Bedrock Geology of Albany County, New York* (Fickies, 1982), the bedrock located beneath the project site consists of the Snake Hill Shale. The Snake Hill Shale is described as medium to dark-gray, silty, micaceous, pyretic shales with occasional thin interbeds of siltstones, fine-grained calcareous mudstone, and fine-grained sandstones, intensely folded and well cleaved. Based on the report entitled *Bedrock Topography and Glacial Geology of the Colonie Channel Between Saratoga Lake and Coeymans, New York;* (Dineen & Hanson, 1983), the depth to bedrock is expected to exceed 125 feet below ground surface in the vicinity of the proposed expansion area. The maximum depth of the deep soil borings installed as part of this investigation was 104 feet below ground surface. Bedrock was not encountered in any of the recently completed soil borings for the proposed expansion area.

3.1.1.3 Soils

Based on review of the Albany County Soil Survey (SCS 1992), the project area, including the restoration areas, are comprised of Colonie loamy fine sand, Elnora loamy fine sand, Granby loamy fine sand, Pits, Gravel, Stafford loamy fine sand, Udipsamments, and Adrian muck. These soils series are generally described by deep, excessively drained loamy fine sand to sand, with variations between horizons stemming from small gradations in texture and/or organic matter content. The following is a list and brief description of the soils that occur within the project area.

Symbol	Name
Ad	Adrian muck
CoA	Colonie loamy fine sand, 0 to 3 percent slopes
CoB	Colonie loamy fine sand, 3 to 8 percent slopes
CoC	Colonie loamy fine sand, rolling
CoD	Colonie loamy fine sand, hilly
EnA	Elnora loamy fine sand, 0 to 3 percent slopes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MW-11D
MW-11I
MW-11S
MW-12D
MW-12I
MW-12S
MW-14D
MW-14I
MW-14S
MW-15D
MW-15I
MW-15S
EE-B-1
EE-B-2
PROPOSED EXPANSION AREA
GW2D
MW3
MW2
GW5D
GW5S
A
A'
B
B'
LEGEND
EXISTING ALBANY INTERIM LANDFILL MONITORING WELL CLUSTER
ABANDONED MONITORING WELL CLUSTER
DEEP SOIL BORING LOCATION EASTERN EXPANSION AREA
GW1D
GREATER ALBANY/RAPP ROAD LANDFILL MONITORING WELL CLUSTER
NEWLY INSTALLED EASTERN EXPANSION MONITORING WELLS
CROSS SECTION LOCATION
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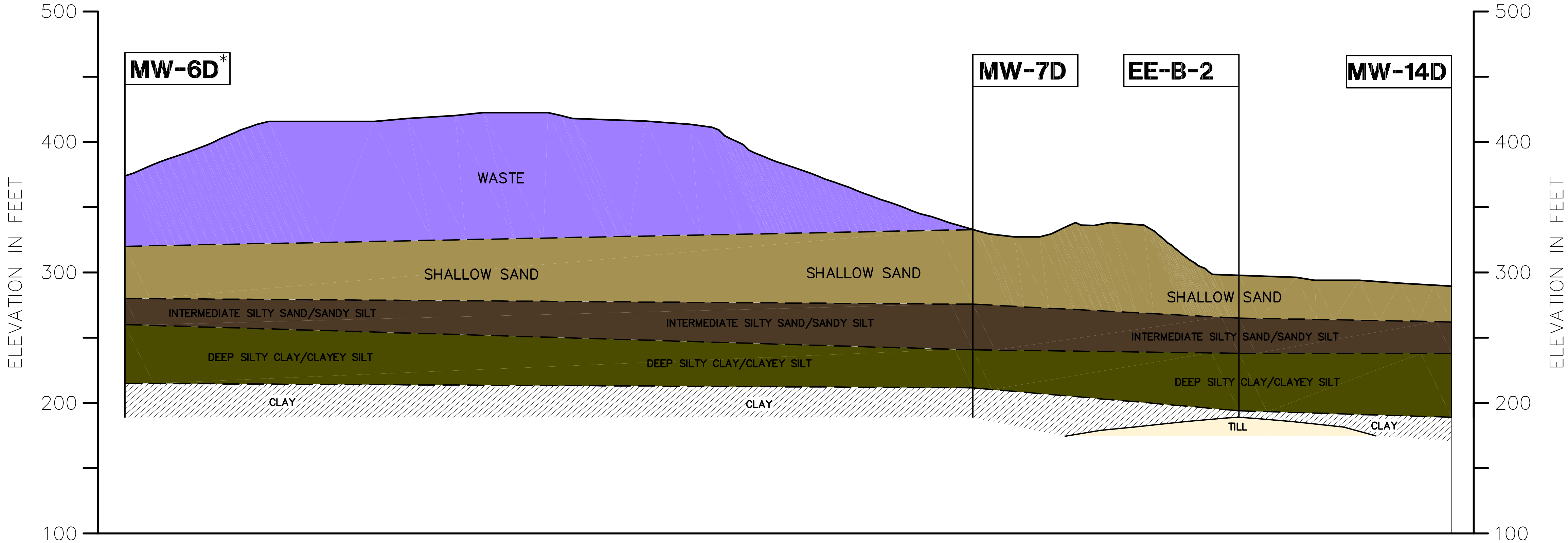
RAPP ROAD LANDFILL
EASTERN EXPANSION
CROSS SECTION LOCATION PLAN
Project No.: 12206
Issue Date: 05/07
Scale: 1" = 200'

Figure 3.1-1



SECTION A–A'

* ORIGINAL SURFACE ELEVATION FOR "6D"
ESTIMATED BY CLOSEST ORIGINAL
TOPOLOGICAL FEATURE

HORIZTONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 100'

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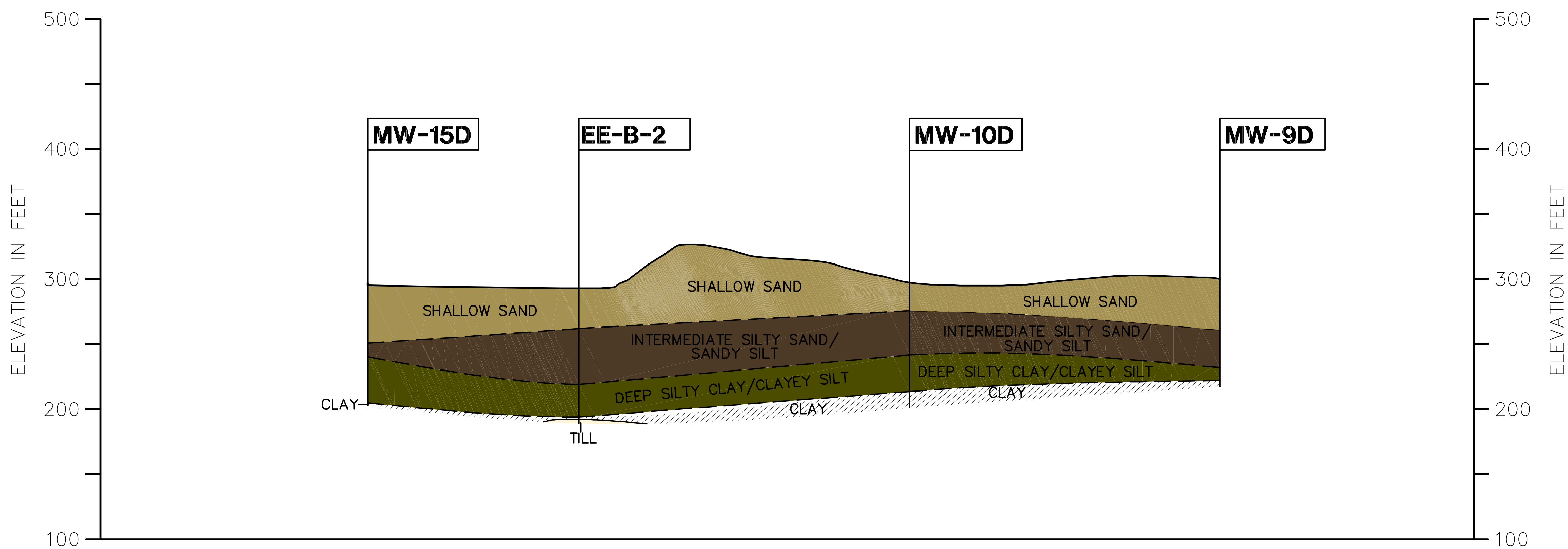
Designed: XXX Drawn: XXX Checked: XXX

RAPP ROAD LANDFILL
EASTERN EXPANSION

GEOLOGIC SECTION A-A'

Issue Date: 05/07 Project No.: 12206 Scale: AS SHOWN

Figure
3.1-2



SECTION B–B'

HORIZTONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 100'

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EASTERN EXPANSION

GEOLOGIC SECTION B-B'

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Figure 3.1-3

Gr	Granby loamy fine sand
Pm	Pits, Gravel
St	Stafford loamy fine sand
Ud	Udipsamments, smoothed
Uf	Udipsamments-Urban land complex

- Adrian muck (Ad). This Hyric soil is a very deep, very poorly drained soil that occurs in bogs, depressions, on uplands and in concave basins on lowland plains.

- Colonie loamy fine sand, 0-3% slope (CoA) is a very deep, nearly level, well drained to somewhat excessively drained soil, on plains and deltas. Included in this soil are small areas of moderately well drained Elnora soils, somewhat poorly drained Stafford soils, and poorly drained and very poorly drained Granby soils in depressions and low areas. Soil properties include:

- Colonie loamy fine sand, 3 to 8 percent slopes (CoB). These soils are very deep and well drained to somewhat excessively drained. The seasonal high water table occurs at depths of greater than 6 feet but in some years the water table may fluctuate to within 3.5 feet of the soil surface for brief periods in early spring.

- Colonie loamy fine sand, rolling (CoC). These soils are very deep and well drained to somewhat excessively drained. The seasonal high water table occurs at depths of greater than 6 feet but in some years the water table may fluctuate to within 3.5 feet of the soil surface for brief periods in early spring.

- Colonie loamy fine sand, hilly (CoD). This soil is very deep and well drained to somewhat excessively drained. The seasonal high water table occurs at depths of greater than 6 feet but in some years the water table may fluctuate to within 40 inches of the soil surface for brief periods in early spring.

- Elnora loamy fine sand, 0 to 3 percent slopes (EnA). This soil is very deep and moderately well drained. It occurs on deltas and glacial lake plains. The seasonal high water table is at a depth of 1.5 to 2 feet from the soil surface from February to May.

- Granby loamy fine sand (Gr). This soil is very deep and poorly drained to very poorly drained. Areas of this soil occur in flat and slightly depressional areas of glacial lake plains or deltas. The seasonal high water table occurs at a depth of 1 foot from the soil surface from November to June.

- Pits, Gravel (Pm). These areas consist of areas where sand and gravel material has been excavated for use in construction. The pits can be 3 to 50 feet deep and have steep sides. The pits may be filled with salvaged topsoil and permeability is site dependent but typically is rapid.

- Stafford loamy fine sand (St). This soil is very deep and somewhat poorly drained. The seasonal high water table is 0.5 to 1.5 feet below the soil surface from January to May.

- Udipsamments, smoothed (Ud). These moderately well drained to somewhat excessively well drained soils are nearly level to very steep areas of disturbed sandy soils. The depth of the seasonal high water table is normally at a depth of greater than 6 feet but occasionally occurs within 4 feet of the soil surface.

- Udipsamments-Urban land complex (Uf). These soils are nearly level to gently sloping, very deep and well drained to somewhat excessively drained. The depth of the seasonal high water table is normally at a depth of greater than 6 feet but occasionally occurs within 4 feet of the soil surface.

The soil horizons are deep, typically much greater than 60 inches and are generally described in the following sequence:

0 to 12 inches (± 3 inches):	loamy fine sand
12 to 25 inches (± 5 inches):	fine sand to loamy fine sand
25 to 60+ inches:	sand to fine sand

Colonie loamy fine sand is the dominant soil series comprising much of the Albany Pine Bush. However, within the project area there are muck soils associated with wetlands as well as fill soils that comprise the Albany Landfill and disturbed/excavated sands within the mobile home park.

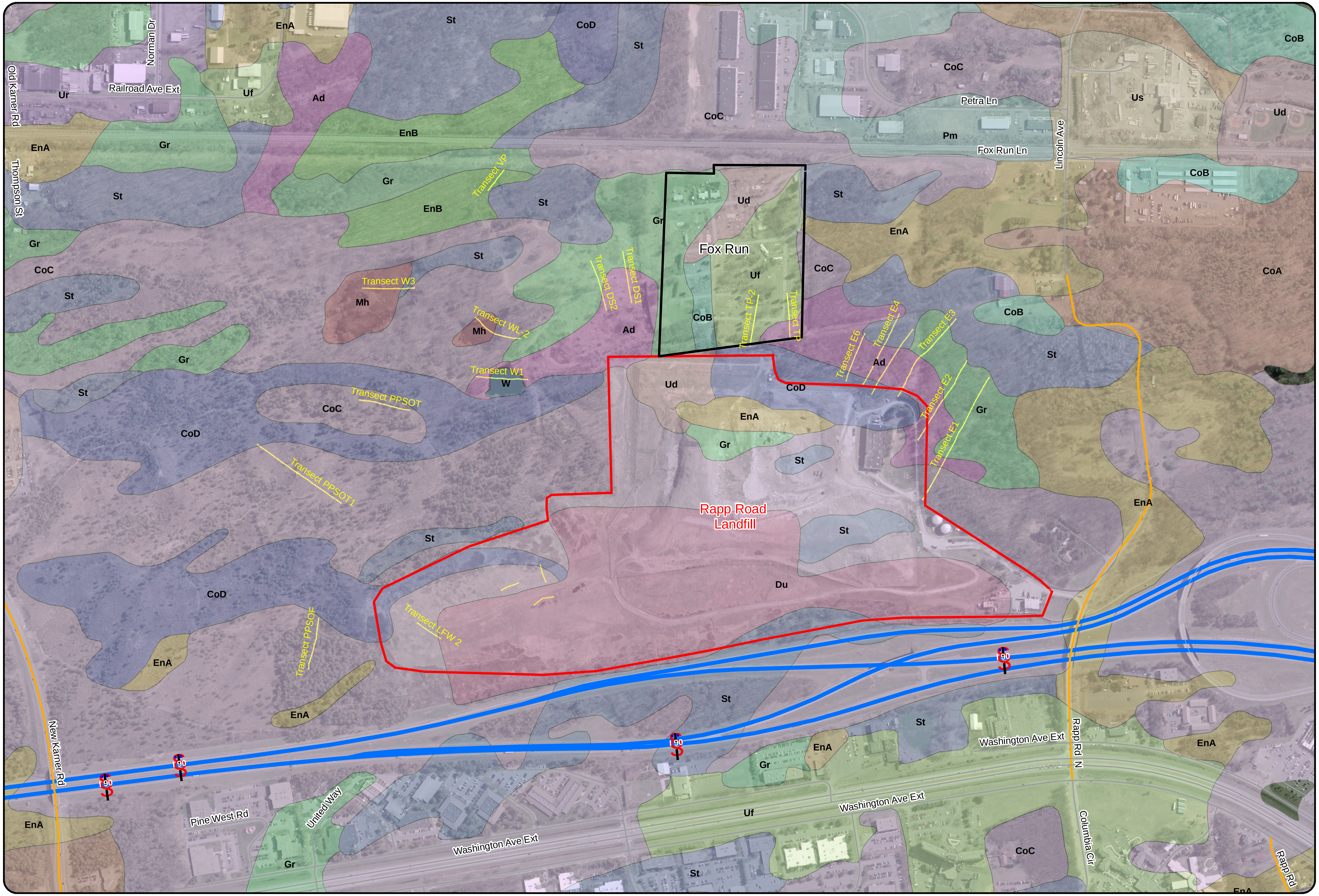
In support of the Habitat Plan discussed in SDEIS Section 2.8, soil samples were collected throughout the project area and in ecological reference areas (examples of high quality ecological communities proposed to be replicated within the project area). A report on the findings is provided in Appendix E. A summary is provided below.

<u>On-site Investigations</u>

Soils were examined in the area of the proposed landfill expansion east and southeast of the current operations, and in reference areas both north and west of the landfill in the Pine Bush. Soil cores were extracted along transects (Transects E-1 through E – 6, and in the former trailer court) established in the expansion area using a 33-inch long soil probe. The soil probe collects a core in an approximate 15-inch open-side barrel. Cores were collected in approximately 15-inch intervals and extracted for evaluation. Photographs (digital) of each core from the 0 to 15-inch depth were recorded, soil profile characteristics were documented on data sheets (Appendix E), and soil samples collected for analysis of target constituents (calcium, magnesium, phosphorous, potassium, percent organic matter, cation exchange capacity, and pH). Soils were examined along transects established in the areas of the expected landfill expansion north of the current landfill; in the proposed habitat restoration areas, including Fox Run Estates; and from individual locations selected as representative of the varied vegetative communities in the Pine Bush (reference areas for the Habitat Plan). Transects are illustrated on Figure 3.1-4. Forty one sites were sampled including lowland and upland locations.

Because the soils examined formed in a common parent material, typical profile characteristics are similar across the entirety of the Albany Pine Bush. A soil profile consists of layers of soil material referred to as horizons. From the surface down, the horizons are lettered "O", "A", "B", and "C." The "O" horizon consists of partially decomposed organic matter as might be observed on a forest floor. The "O" is not always present, depending on how quickly organic material is decomposed. The "A" horizon is often referred to as top soil and generally ranges from a few inches in depth to 12 or more inches. With the exception of organic soils, the "A" horizon is characteristically dark in color, a result of a higher organic content (decomposed material from the "O" horizon). The "A" horizon is very important since it contains many of the essential nutrients for plants.

Next is the "B" horizon. This layer generally consists of mineral soils (very little organic matter). Many species of woody and herbaceous plants extend their roots into this layer to obtain water, especially in dryer soils. In general, these two layers constitute the root zone for most plants and are therefore important in this analysis to better understand the characteristics that give rise to the various vegetative species comprising the study area.



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Rapp Road Landfill Eastern Expansion

Soils Map

Issue Date: 04/07
Project Number: 12260
Scale: 1" equals 550'

Figure 3.1-4

The "C" horizon is the first generation of soil from the parent material. As noted in the discussion of surficial geology for the study area, the parent material is sand.

The primary differences in soil characteristics lay in their relational aspect: Lowland including fens, bogs, and ponds; and uplands on hilltops and side slopes. This summary describes the results of the soil characterization completed in September related to their relational aspect, with comparison of soil profiles in the expansion area to reference sites.

Lowland - The lowlands mapped include soils found in wetlands, typically where water flows and collects, or where the topographical aspect is low and intercepts the water table, creating perennially wet conditions. Because these areas receive runoff from upland areas, they collect increased amounts of organic detritus in addition to that which grows and collects there. The abundance of organic material contributes to the water-holding capacity of the soil, maintaining poorly-drained conditions. Organic material in these areas is slow to decay, and therefore builds, creating its own horizon, and leaching into lower soil horizons. Organic acids slowly break down the mineral sands into finer sands, silts, and clay that, with silts and clays transported to these low areas, result in higher water holding capacity.

Lowland soils in the area of the landfill expansion typically fit the following description:

- A/O Horizon: The A horizon of the wetland/lowland soils in the expansion area average about 20.5 inches in depth (range from 6 to 38 inches), typically consisting of muck intermixed with very fine sand and loamy fine sand. Occasionally, increased silt and clay content was noted, representative of the accumulation of organic materials and fine mineral matter. The A horizon in nearly all of the sampled locations consisted dominantly of organic muck (largely 80 to 100 percent organic material) in an 'O' or organic horizon with an A horizon with increased mineral content (typically fine sand). At all locations, the organic material was always wet to saturated, and loosely-consolidated, sometimes with substantial void spaces.

- B Horizon: The B horizon of the wetland/lowland soils in the expansion area is differentiated from the A or O horizons by increased amounts of mineral matter, typically fine sand. The B horizon soil tends to be dark, typically with high amounts of organic material that has leached into the sands. The B horizon was exemplified by thicknesses of 0 to 40 inches, and greater extending to depths beyond 60 inches below the surface. The B horizon was always wet or saturated.

The specific characteristics of the soils sampled in the lowland areas are discussed in the soil report provided in Appendix E.

Lowland soils at reference areas were examined in or very near to ponds, bogs, and fens. Soils were sampled both on wet or saturated ground, an in inundated pond/bog beds. Typically, the soil underlying the inundated areas of ponds and bogs was found to consist of muck to depths greater than 40 inches. The soils examined within a sedge meadow, fens, or adjacent to ponds typically consisted of an organic layer (muck or detritus) from 0 to 4 inches thick, underlain by high organic, very fine sand to loamy fine sand to depth of approximately 14 to 24 inches below the ground surface.

The B horizon of soils at the lowland reference sites were found to be composed of very fine sand and loamy fine sand. In some locations, the B horizon had relatively low organic matter content, but in all locations the B horizon was wet to saturated.

Comparing the lowland soil profiles to reference areas indicates that similar conditions exist in nearly all of the areas, with lowlands typically consisting of thick A and AO horizons underlain by thick B horizons consisting of dark and saturated soils. All of the locations are in receiving areas from upland drainage, or intersect water tables close to the soil surface.

<u>Uplands</u> - The typical upland soils in the Albany Pine Bush were found on ridge tops and side slopes. Generally, the upland soils had well-developed A horizons and thick B horizons, all consisting of fine sand and sand. In some upland profiles, mottling was noted in the upper reaches of the B horizons indicating periodic inundation or saturation, followed by periods of good aeration. These soils are well-drained, although moderate drainage was found in lower areas close to wet conditions.

Upland soils have the following general profile characteristics:

- A Horizon: The A horizon of the upland soils is typically from 0 to 7 inches (ranges from 4 to 15 inches thick) with relatively high organic matter content notable from the dark brown to black coloration (typical is 10YR 2/2 or 10YR 3/4). The A horizon, being modified by high organic matter, consists generally of very fine sand and fine sand with massive, friable structure. With higher organic matter content, the A horizon soil has a seemingly finer texture.

- The B horizon was found to extend from immediately below the A horizon to depths greater than 36 inches (usual limit of sampling). In many locations, the there is a sharp, distinct boundary between the A and B horizons, represented by sharply contrasting soil matrix colors. Other locations show a less distinct boundary between horizons, but differentiation in texture and the presence of mottles was more of a discerning factor.

The B horizon of the upland soils had few hydric characteristics, generally found as faint to distinct – but few – mottles in the 4 to 10 inch depths below the ground surface (although as deep as 15 inches in one profile). The mottles were high chroma, indicating short periods of saturation/inundation, followed by largely well-aerated conditions. Occasionally, gleyed mottles were noted in the shallow B profile.

The specific characteristics of the soils sampled in the upland areas are discussed in the soil report provided in Appendix E.

Reference soils in upland areas, including the scrub oak thicket (PBPP-SOT), pine woodland (PBPP-SOF1), and restored prairie (PBKBH1), had relatively shallow, thin A horizons, generally very dark brown (10YR 2/2 or 3/3) or very dark grayish brown (10YR 3/2) soil with fibrous organic matter with fine sand. The A horizons were well drained with massive, friable structure. The B horizons of the reference soils were found to be brown (7.5YR 5/8) to yellowish brown (10YR 4/6 or 5/6) fine sand, typically well-oxidized with occasional leach stains from organic material. No mottling was found in the reference upland soil locations. Soil structure in the B horizons as massive and friable.

Comparison between the reference upland locations and the upland soils in the expansion area show that the soils in the expansion area appear to be more mature with stronger horizon development and indications of more pronounced hydrologic interaction, evidenced by presence of mottles in the shallow B horizons.

Laboratory Analytical Results

Soil samples were collected for laboratory analyses of the following parameters: texture (percent sand, silt, and clay), pH, percent organic matter, phosphorous, potassium, calcium, magnesium, percent organic matter, and cation exchange capacity. The results of the analysis are provided in Appendix D.

The laboratory data shows that soil conditions within the project study area and reference sites have some variation, which may be the result of the parent material varying from dune sands to lake sands. Soil conditions range from sand to loamy texture, with an overall, average textural classification of sandy loam. Soil pH is typically in the area of 5.2 to 5.5 standard units, with a range from pH 3.9 to pH 7.6. The lowland, wet areas tend to have higher organic matter and lower pH than the upland sample locations, as would be expected. Concentrations of phosphorus (P) and calcium (Ca) appear to be higher than would be expected in most soils, particularly in eastern woodlands and in sandy soil, and potassium (K) concentrations were generally low. Descriptions of soil characteristics based on laboratory analysis for lowland areas and upland areas are provided Appendix E.

The general understanding of the soils within pine barren communities is that they are typically nutrient poor, hence limiting the types of species able to colonize these soils and resulting in open barrens supported by periodic fires. However, the laboratory analysis shows that the soils are generally nutrient rich. This being the case, one would expect to find different and more diverse community types than what are present.

The primary plant nutrients are N, P, K and Ca. Laboratory analysis revealed that total N compared to organic matter content results in a carbon-nitrogen ratio of 15 or greater in all soils sampled. With a C-N ratio greater than 15, N becomes bound to the organic matter and unavailable for plant uptake. In addition, P content was found to be high to excessive in many soils but the very high iron content of the soils renders this nutrient largely unavailable. Therefore, through chemical processes, the availability of important plant nutrients is limited.

Understanding the soils within the study area and reference areas is critical to the success of the Habitat Plan (Section 2.8). The unique characteristics of the soils suggest that the best sources of soil will be from the Pine Bush itself.

3.1.2 POTENTIAL IMPACTS & MITIGATION

The landfill is a large, man-made feature of the Albany Pine Bush landscape and currently represents one of several barriers between Pine Bush Preserve ecology to the west and east due to the intensity of the land use. The proposed expansion will convert a primarily low area into the side slopes of a new landfill cell that will partially overtop the existing landfill. The impact to the natural topography of the area is small in comparison to the overall landfill footprint but unavoidable. It will always remain an unusual feature but there is significant potential to remove the ecological barrier separating west from east through implementation of the Habitat Plan, discussed in SDEIS Section 2.8.

The proposed eastern expansion of the landfill will have no significant impact on the surficial or bedrock geology of the project area. The new landfill cell must maintain a 5-foot separation between the cell liner and the groundwater table. Recent groundwater investigations revealed that the water table is approximately 2 feet below ground surface. Fill will be needed to provide the separation. As noted, bedrock is in excess of 100 feet beneath the surface and will not be encountered during construction of the expansion.

Soils within the expansion area will be disturbed and the associated ecological communities will be eliminated. To the extent practicable, the native soils within the expansion area will be removed and stockpiled for the habitat restoration project. In order to maintain the required separation between groundwater and the landfill liner, fill soils will be imported rather than using the native soils. A large amount of native soils will be required to complete all the components of the Habitat Plan. Since the plan will be phased over a number of years (through the life of the proposed expansion), it is intended to obtain soils through other development activities within the Albany Pine Bush Preserve Study Area and beyond, including the sand plains in Saratoga County. This is envisioned as a long-term cooperative effort between the City and APBPC to reclaim soils for reuse that would otherwise be used as fill material.

3.2 WATER RESOURCES

3.2.1 EXISTING CONDITIONS

3.2.1.1 Groundwater

The surficial geologic/stratigraphic units (below the soils) discussed in Section 3.1.1.2 can also be classified based on their hydrogeologic properties as hydrostratigraphic units (water-bearing units). Generally, water-bearing units consist of geologic formations that are able to transmit water (e.g. fractured bedrock and permeable overburden units). Confining units consist of geologic media such as silt, clay and till, which are not able to transmit appreciable amounts of water.

Groundwater in the uppermost shallow Sand Unit occurs under unconfined conditions. The surficial groundwater table within the shallow sand unit (beneath the proposed expansion area) is approximately two (2) feet below ground surface. Surficial groundwater elevations are currently monitored on a routine basis to evaluate seasonal changes in groundwater elevations.

Groundwater within the shallow Sand Unit, as well as the intermediate Silty Sand Unit and the Deep Silty Clay/Silt and Sand Unit are monitored by a series of groundwater monitoring well clusters at the existing AIL facility and within the proposed expansion area. Each monitoring well cluster includes a shallow, intermediate, and deep monitoring well, which correspond directly to the stratigraphic sections. These monitored stratigraphic units make up the critical stratigraphic section, which is defined by the 6 NYCRR Part 360 regulations as:

> *…all stratigraphic units, both unconsolidated deposits and bedrock, including, but not limited to the unsaturated zone, uppermost aquifer and first water bearing unit into which facility derived contaminants that escape from a solid waste management facility might reasonably be expected to enter and cause contamination during the active life or within 30 years following closure of the facility.*

Based on information presented in historic investigation reports, the deep clay unit at the base of the monitored stratigraphic section is considered a confining layer (C.T. Male 1999). This deep Clay Unit is continuous across the site, and due to its relatively low conductivity/permeability, is expected to provide hydraulic separation between the underlying hydrogeologic units that will serve as a hydraulic barrier to downward migration of potential site contaminants.

Groundwater recharge occurs primarily through precipitation and infiltration within the shallow Sand Unit. Recharge to the deeper units, such as the intermediate Silty Sand and the deep Silty Clay/Silt and Sand Unit occurs from infiltration through the upper units. Locally, groundwater often emanates as surface water within small streams and surface water bodies such as the tributary to Rensselaer Lake, which is located on the east side of the AIL.

A summary of the potential current and future groundwater usage, groundwater flow regimes, and the existing water quality for the proposed eastern expansion area is provided in the following sections of this document. Additional information relative to the groundwater regime at the site is presented in the Hydrogeologic Report that was prepared as part of the 6 NYCRR Part 360 permit application for the proposed expansion.

Current and Future Groundwater Usage

The Pine Bush Formation is an unconsolidated (i.e., surficial) sand deposit located within the City of Albany, the Town of Guilderland, and the Town of Colonie. The unconsolidated surficial sand unit located beneath the Rapp Road facility is considered to be a part of the Pine Bush formation.

The Pine Bush formation is located within a 40 square mile urban area between Albany and Schenectady, New York that has been developed for primarily residential and commercial land uses. The Pine Bush is part of an extensive sand dune field and swamp area that extends from South Glens Falls to Delmar. This extensive dune field developed on top of a series of interconnected glacial lake sediments that occupied the Hudson River Valley from approximately Glens Falls to Newburgh. The glacial lakes developed in front of the ablating continental ice sheet during and after the Late Wisconsinan deglaciation. The Pine Bush is covered by sand dunes of light yellow-brown to light gray very fine to medium grained sand deposits that are reported to range in thickness from 5 to 150 feet. The thickest sand deposit is located in the northwestern and central parts of the Pine Bush. In some areas, streams have eroded completely through the sand formation and into the underlying clay (C.T. Male, 1999).

Due to its historically perceived water bearing properties, the Pine Bush Formation is currently classified as a New York State principal aquifer. The Pine Bush Formation was first listed as a principal aquifer by NYSDEC's division of Water in the Draft Upstate New York Groundwater Management Program in January, 1985, which was later published as final in May 1987. The 6 NYCRR Part 360 Regulations define a principal aquifer as follows:

> *a formation or formations known to be highly productive or whose geology suggests abundant potential water supply, but which is not intensively used as a source of water supplies by major municipal systems at the present time. Some water supply development has taken place in some of these areas, but it is not generally as intensive as in the primary aquifer areas.*

The classification of the Pine Bush Formation as a principal aquifer was based upon general, state wide geologic mapping. Many of the mapped principal aquifers were believed to represent locations underlain by deposits of sand and gravel, which suggested the potential for an abundance of available groundwater supply. However, little or no consideration was given to actual site specific hydrogeologic condition of these mapped areas.

Although the Pine Bush Formation in the vicinity of the Rapp Road facility is classified as a principal aquifer, a January 1999 Pine Bush Formation Declassification Study completed by C.T. Male Associated P.C. demonstrates that the Pine Bush Formation: (1.) does not have the distinguishing characteristics of a principal aquifer, (2.) does not represent a viable public water supply source for the future, and (3.) that the development of a potential public water supply source would have an adverse impact to the Pine Bush habitat by lowering of the water table (C.T. Male, 1999).

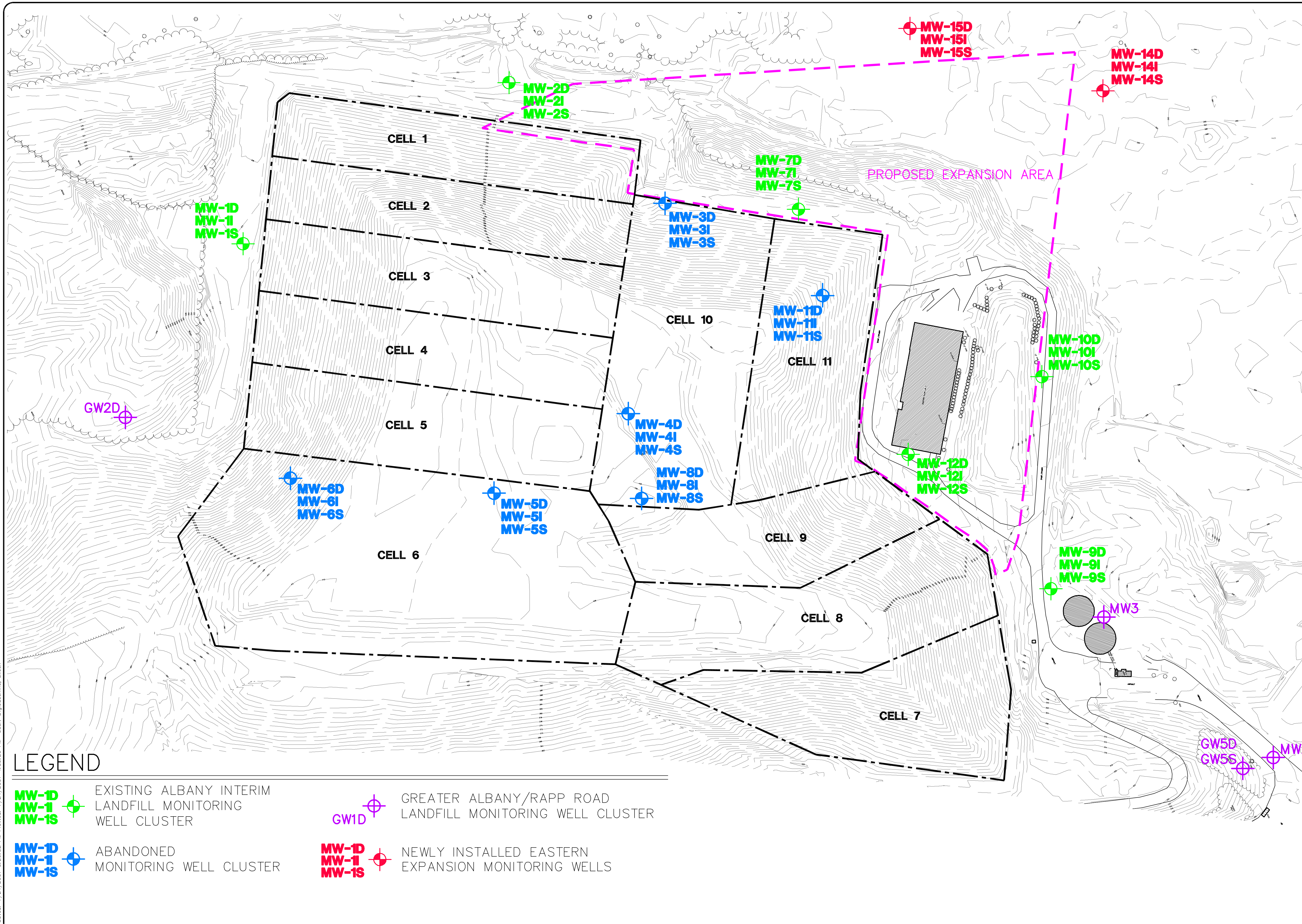
Due to the fact that the 6 NYCRR Part 360 regulations restrict siting a landfill over a New York State Principal Aquifer, the Permit Application includes an Aquifer Variance Report that specifically requests for a variance from the provisions of 6 NYCRR 360-2.12(c)(1), which prohibits siting a landfill over a primary water supply aquifer or principal aquifer. The aquifer variance report further demonstrates that the Pine Bush Formation is not presently, and most likely will never be, used as a public water supply. Also, the Pine Bush Formation is not intensively utilized as a source of private water supply. Based on CHA's conversations with the water district that services the area in the vicinity of the Rapp Road facility, with limited exception, the area within one mile of the landfill is all serviced by municipal water from either the City of Albany, the Town of Guilderland, or the Town/Village of Colonie (Latham Water), water districts. Two private wells were identified by the Albany County Department of Health (ACDOH). They are located on Pine Lane in the Town of Guilderland. Pine Lane is located approximately 0.75 miles in a cross-gradient direction of groundwater flow relative to the Rapp Road facility. These wells are reportedly used for individual domestic water supplies for private residences, which are not currently connected to a municipal system. Due to the relatively low yield and limited area of influence associated with domestic residential wells and their distance from the Rapp Road facility, it is unlikely that potential impacts from the landfill would impact these wells.

Groundwater Flow Regime

Groundwater elevation data for the existing Albany Interim Landfill (AIL) facility has been collected on a quarterly basis since the early 1990's as part of the on-going operational groundwater monitoring program. Quarterly Groundwater Potentiometric Surface Contour Maps are also prepared and submitted to NYSDEC with each quarterly monitoring report to evaluate groundwater flow direction and potential changes over time. Recently collected groundwater elevation data for the proposed expansion area, as well as data from the existing AIL monitoring well network was used to prepare groundwater potentiometric surface contours for each of the monitored stratigraphic units at the site. The monitoring well network is illustrated by Figure 3.2-1. The water table/potentiometric surface contours for the Shallow, Intermediate, and Deep stratigraphic units for the February and March/April 2007 monitoring events are included as Figures 3.2-2, 3.2-3, and 3.2-4, respectively.

In general, groundwater within each stratigraphic flow regime flows to the southeast towards nearby Rensselaer Lake. The component of groundwater flow within the proposed expansion area (based on elevation data from new monitoring well clusters MW-14 and MW-15) is consistent with the historical monitoring data and the expected direction of groundwater flow at the site.

Based on the groundwater surface contours for each flow regime generated from the February 2007 monitoring event, a hydraulic gradient of 0.0062, 0.0060, and 0.0057 was calculated for the shallow, intermediate, and deep monitored stratigraphic units, respectively. This is generally consistent with historical data, which indicates that the average hydraulic gradients for the three units ranged from 0.0060 to 0.0071 (C.T. Male 1999) for the existing AIL facility. The slightly lower gradient for the February 2007 water level monitoring event is likely a result of seasonal variability.



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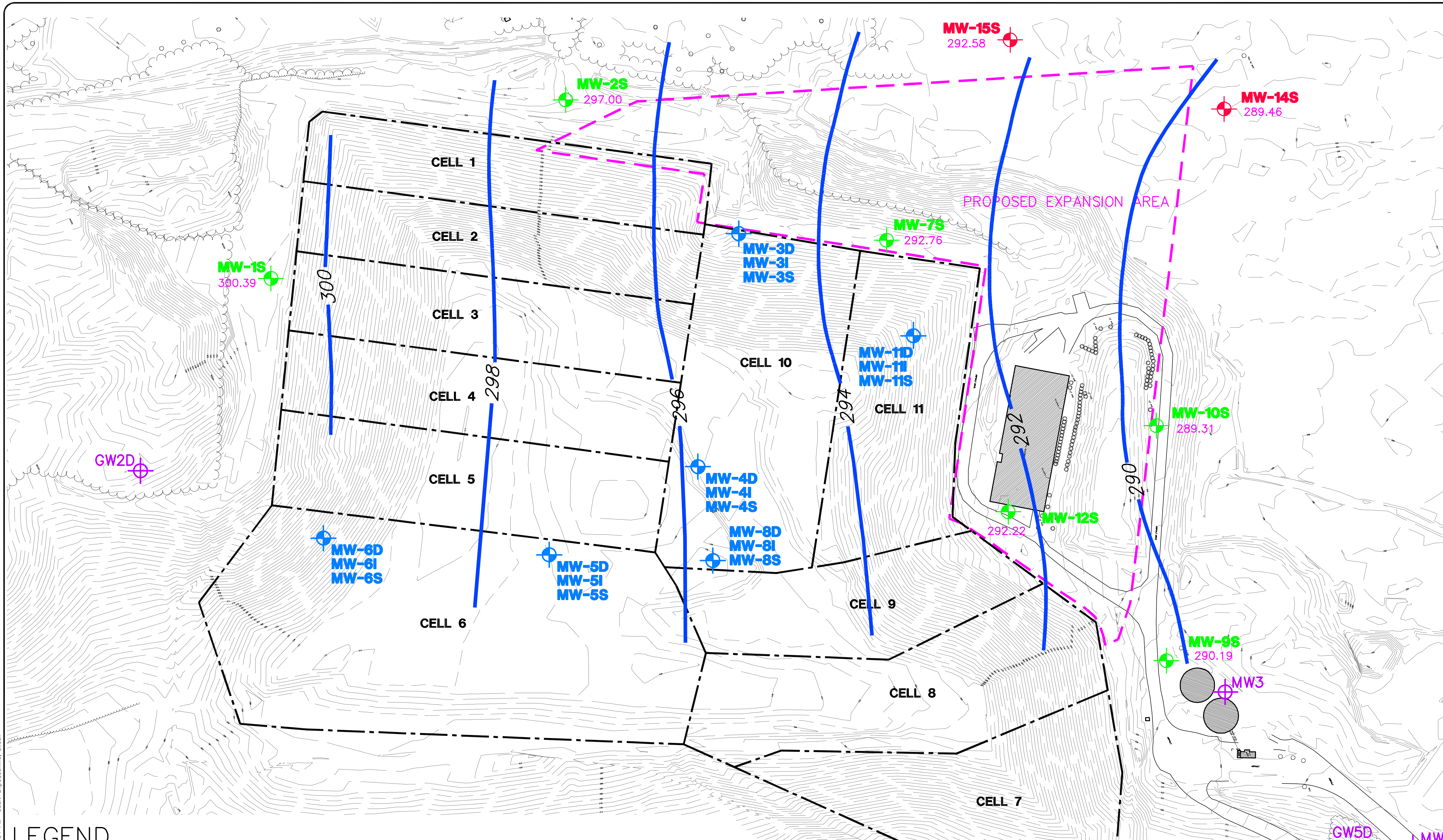
RAPP ROAD LANDFILL
EASTERN EXPANSION

EXISTING MONITORING WELL
LOCATION MAP

Issue Date: 05/07 Project No.: 12206 Scale: 1" = 200'

Figure
3.2-1



LEGEND

MW-1D MW-1I MW-1S	EXISTING ALBANY INTERIM LANDFILL MONITORING WELL CLUSTER
GW1D	GREATER ALBANY/RAPP ROAD LANDFILL MONITORING WELL CLUSTER
MW-1D MW-1I MW-1S	ABANDONED MONITORING WELL CLUSTER
MW-15S	NEWLY INSTALLED EASTERN EXPANSION MONITORING WELLS
300.39	WELL WATER LEVEL MEASURED ON FEBRUARY 2, 2007
290	GROUNDWATER CONTOUR/ ELEVATION

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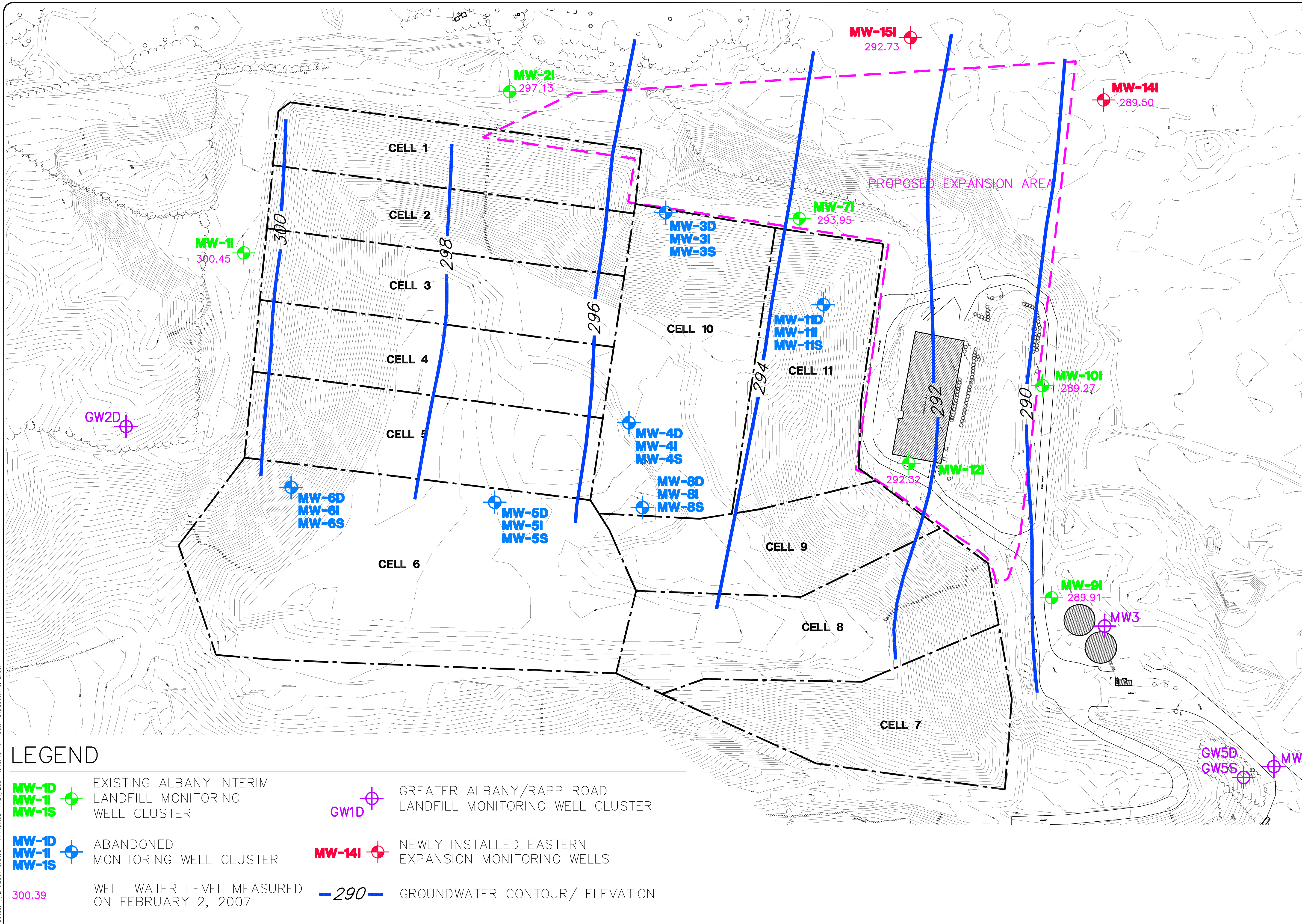
RAPP ROAD LANDFILL
EASTERN EXPANSION

SHALLOW GROUNDWATER
PIEZOMETRIC MAP

Figure
3.2-2



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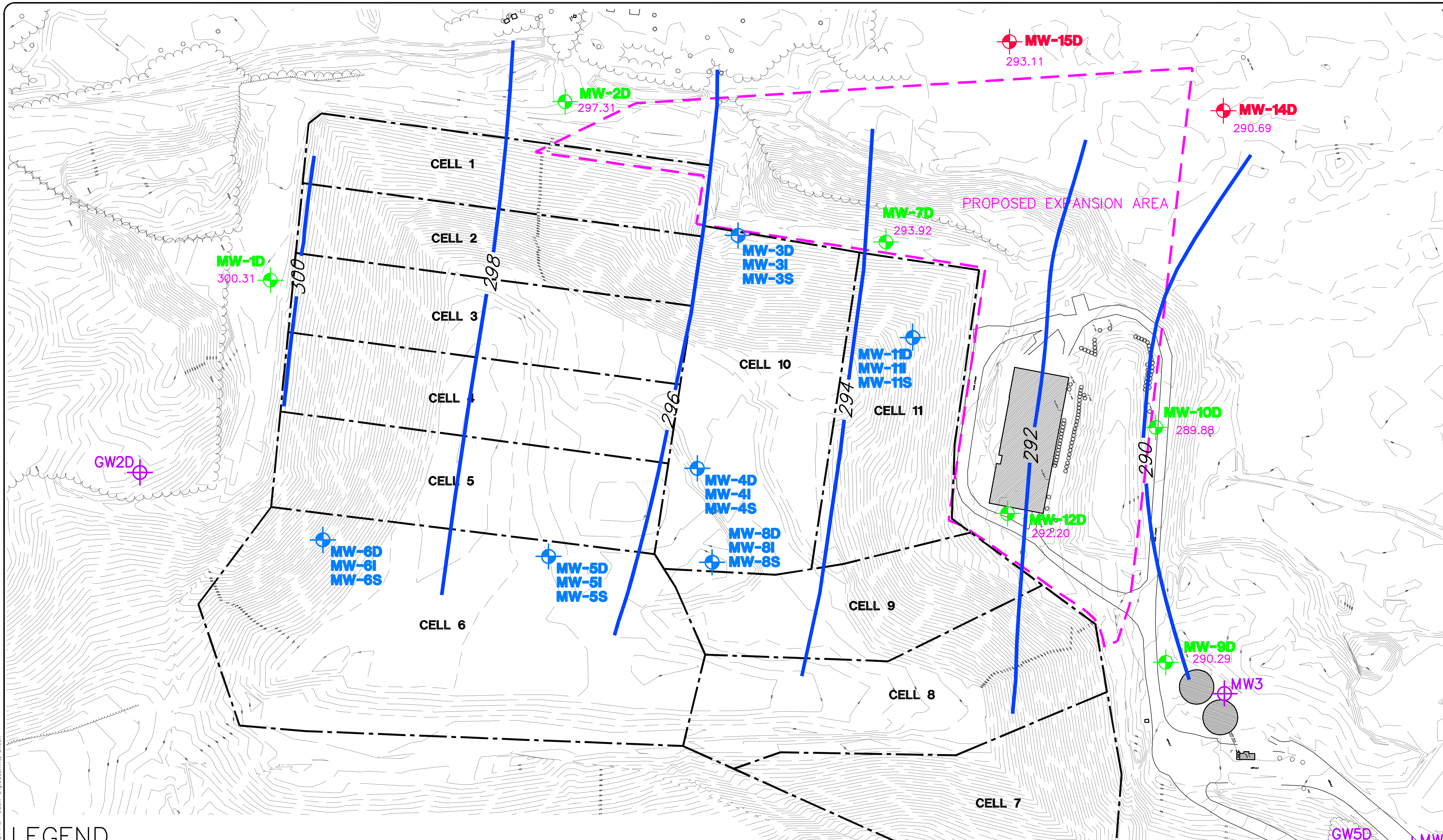
RAPP ROAD LANDFILL
EASTERN EXPANSION

INTERMEDIATE GROUNDWATER
PIEZOMETRIC MAP

Issue Date: 05/07 Project No.: 12206 Scale: 1" = 200'

Figure
3.2-3



LEGEND

MW-1D MW-1I MW-1S	EXISTING ALBANY INTERIM LANDFILL MONITORING WELL CLUSTER	GW1D	GREATER ALBANY/RAPP ROAD LANDFILL MONITORING WELL CLUSTER
MW-1D MW-1I MW-1S	ABANDONED MONITORING WELL CLUSTER	MW-14I	NEWLY INSTALLED EASTERN EXPANSION MONITORING WELLS
300.39	WELL WATER LEVEL MEASURED ON FEBRUARY 2, 2007	290	GROUNDWATER CONTOUR/ ELEVATION

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ONE CONNORS BOULEVARD
ALBANY, NEW YORK

CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, PO Box 5269 · Albany, NY 12205-5269
Main: (518) 453-4500 · www.cloughharbour.com

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RAPP ROAD LANDFILL
EASTERN EXPANSION

DEEP GROUNDWATER PIEZOMETRIC MAP

Issue Date: 05/07 | Project No.: 12206 | Scale: 1" = 200'

Figure
3.2-4

Water Quality

Groundwater monitoring for the AIL has been and continues to be conducted on a quarterly basis in accordance with the initial October 1995 Part 360 permit to operate the AIL, as well conditions outlined in subsequent permit modifications for the various expansions. As the landfill has expanded, various monitoring wells have been abandoned and others installed to accommodate the various landfill expansions in accordance with the NYSDEC approved revisions to the site's Environmental Monitoring Plan (EMP).

The current operational water quality monitoring program consists of the collection and analysis of groundwater samples from 18 monitoring wells located around the perimeter of the AIL. The monitoring well locations are illustrated by Figure 3.2-1. The monitoring wells are located within six well clusters, each of which includes a shallow, intermediate, and deep monitoring well. These monitoring well clusters include the following:

- MW-1S, MW-1I, MW-1D
- MW-2S, MW-2I, MW-2D
- MW-7S, MW-7I, MW-7D
- MW-9S, MW-9I, MW-9D
- MW-10S, MW-10I, MW-10D
- MW-12S, MW-12I, MW-12D

As previously noted, the shallow ("S" wells), intermediate ("I" wells), and the deep ("D" wells), correspond with the shallow Sand Unit, the intermediate Silty Sand/Sandy Silt Unit, and the deep Silty Clay/Clayey Silt Unit, respectively. Monitoring well cluster MW-1 is located upgradient of the AIL, and clusters MW-2 and MW-7 are considered cross-gradient well clusters. The remaining monitoring wells are located downgradient of the AIL.

Operational groundwater quality for the AIL is evaluated by comparing the quarterly monitoring data with Existing Water Quality Values (EWQVs) that were established in the original 1994 EMP for the AIL, as well as subsequent revisions to the EMP for the various expansion projects. In addition, trends in individual parameter concentrations and a comparison with New York State Ambient Groundwater Quality Standards is also used to evaluate the operation water quality for the AIL facility.

In accordance with Part 360-2.11(c), the EWQV is the mean of the pre-operational analytical results for each well. The analytical monitoring results obtained during each quarterly monitoring event are compared to the EWQVs and regulatory guidance values (groundwater standard) as a basis to determine if a statistically significant increase has occurred. Specifically, a significant increase is defined by Part 360 regulations as a parameter concentration which exceeds the EWQV by three standard deviations or exceeds both the EWQV and regulatory guidance value for that parameter. Regulatory guidance values (GVs) for the protection of groundwater are called maximum contaminant levels (MCLs) and are established by the Safe Drinking Water Act under 40 CFR Part 141 or guidance values as established pursuant to 6 NYCRR Parts 701, 702, 703, and Division of Water Technical and Operational Guidance Series 1.1.1., June 1998. Again, this evaluation is currently conducted on a quarterly basis.

Based on the quarterly monitoring data collected to date, significant increases have been identified for a number of parameters in each of the down-gradient monitoring wells. However, these significant increases are not attributed to impacts from the AIL, but rather a number of factors that include the following:

(1) impacts from the unlined, closed GAL;
(2) potential errors due to matrix interference affects or variability in the laboratory analysis;
(3) natural variation;
(4) the size of the sample population for statistical analysis of the existing water quality value database;
(5) construction/expansion of the landfill cells; with impervious composite liner systems, which reduce recharge; and
(6) impacts from road salt.

As a result of the above factors, it is not uncommon that significant increases are often identified. However, trends in parameter concentrations are also evaluated during each quarterly monitoring event to determine if these potentially statistically significant increases are in fact an indication of significant changes in water quality.

Given the close proximity to the adjacent, unlined GAL, historical water quality monitoring data has indicated that leachate from the GAL has impacted groundwater quality in down-gradient AIL well clusters MW-9 and MW-12, and to a lesser extent MW-10 and MW-7. Up-gradient monitoring well cluster MW-1 and cross-gradient cluster MW-2 have exhibited little to no impact from the GAL. In general, the degree of impact increases with closer proximity to the GAL.

Impacts from the GAL has resulted in elevated levels of common leachate indicator parameters, including ammonia, iron, manganese, sodium, chloride, total dissolved solids, and total hardness, which have been identified in one or more of the shallow, intermediate, and deep monitoring wells. The elevated levels of these parameters are attributed to the GAL rather than the operational AIL. This is supported by the fact that there have been no considerable increasing trends in key leachate indicator concentrations since the AIL operations were initiated.

One exception has been a recent increasing trend in the levels of total dissolved solids (TDS), sodium, and chloride in several shallow monitoring wells. However, these increasing trends are considered to be a result of the road salt impacts. The effected wells specifically include monitoring wells MW-7S, MW-9S, MW-10S, and to a lesser extent MW-2S. These wells would be particularly susceptible to road salt impacts due to its shallow nature and close proximity to the primary site access road. The road salt impacts are further supported by the monitoring data from well cluster MW-12. There have been no recent increasing trends in the concentration of these parameters in well MW-12S, which is located much closer to the AIL waste mass than well clusters MW-9 and MW-10. This suggests that the sodium and chloride contamination is not landfill derived.

In addition to the above road salt impacts, calcium, magnesium, hardness, alkalinity, and sulfate have also exhibited moderate variability since 2003 in a number of wells adjacent to the site access roads. Similar to the elevated sodium and chloride concentrations, the variability in the concentration of these parameters can be attributable to a number of factors including road salt mixtures and the tracking of synthetic cover material on the site access roads. The road salt utilized by the City can include a mixture of calcium chloride and trace levels of magnesium salts. The presence of both calcium and magnesium ions will directly influence both hardness and alkalinity. In addition to de-icing salt use, the City also applies a synthetic cover to the waste known as Posi-Shell®. Posi-Shell® is an aqueous alkaline slurry/cement mortar coating that is spray applied as a daily cover. The major constituent of the Posi-Shell® is a mineral binder that contains varying proportions of mineral compounds including, but not limited to calcium carbonate, and potassium and sodium sulfates. Due to the nature of the landfill operations, this material may be tracked onto and/or over-sprayed on the site access roads during application. Run-off from the roads is generally directed towards the nearby monitoring well clusters. Run-off from the Posi-Shell® could have similar impacts to the effects of de-icing salts, however, the Posi-Shell® would also result in an increase in alkalinity levels and sulfate concentrations.

Based on the overall monitoring database, there is no indication of leachate breakouts or are impacts from AIL leachate. There are no increasing trends in concentration for other typical early leachate indicator parameters including iron, manganese, BOD, and ammonia in any of the AIL monitoring wells. In fact, rather significant decreasing trends are noted for a number of key leachate indicator parameters in downgradient/cross-gradient well clusters MW-7, MW-9, MW-10, and MW-12. With the exception of an anomalous increase in ammonia concentration during the second quarter of 2005 monitoring event, ammonia levels in downgradient well MW-9S have decreased significantly to the point at which ammonia levels are now consistently below laboratory method detection limits. Other common leachate indicators have also remained at levels consistent with the historical database or at levels below method detection limits in well MW-12S and the remaining downgradient well network. With the exception of the deicing salt impacts, these decreasing trends actually suggest an improvement in many water quality parameters over time in these well clusters since the inception of the monitoring program for the AIL.

The decreasing trend in parameter concentrations in many of the down-gradient and cross-gradient wells can be attributable to a number of factors including natural improvement in water quality beneath the unlined GAL and the various expansion phases of the AIL. As new landfill cells are constructed, especially those that have been installed immediately adjacent to or "piggy-backed" on top of the GAL, the nature of the new double composite liner system reduces the groundwater recharge at the GAL and potentially the localized component of groundwater flow beneath the facility. This reduction in recharge can often result in both increases and decreases in parameter concentrations.

Similar to landfill closure and capping, new landfill construction reduces the amount of infiltration of precipitation at the site. In some instances, the decreased infiltration can reduce the dilution of the leachate within the unlined portion of the landfill, which can increase individual parameter concentrations in groundwater. However, over time the decrease in infiltration will also inhibit the additional generation of landfill leachate and parameter concentrations will generally stabilize and subsequently decrease over time. As stated above, there are a number of decreasing trends in key leachate indicator parameters. The construction of the new cells can also influence the natural variation of water quality parameters over time due to changes in recharge areas and changes in localized groundwater flows. These factors could contribute to the variability in observed in parameters such as alkalinity, sulfate, calcium, magnesium, and sodium and chloride. With the absence of the former recharge areas (currently occupied by landfill cells), groundwater recharge is concentrated along the remaining pervious surfaces, which is concentrated along the site access roads. Similarly, there may also be localized changes in groundwater flow beneath the new cells and the former GAL.

Eastern Expansion Area Water Quality

A preliminary evaluation of the groundwater quality within the proposed eastern expansion area has been conducted based on the results of water samples collected from newly installed monitoring well clusters MW-14 and MW-15 (Figure 3.2-1). Similar to the AIL monitoring well network, the newly installed well clusters within the expansion area each consist of a shallow, intermediate, and deep monitoring well that correlate with the critical water bearing stratigraphic units. Samples were collected from these monitoring wells during two separate monitoring events. The first monitoring event was conducted in January 2007 and the second in April 2007.

In general, water quality within the proposed expansion area is most similar to water quality up-gradient of the AIL. The distance of the newly installed wells from the closed, unlined GAL is sufficient in that impacts from the GAL are not observed. Based on a review of the water quality data collected from the newly installed wells, a number of parameters were detected at levels above the New York State Ambient Water Quality Standards in one or more wells. These parameters include turbidity, total phenols, ammonia, total dissolved solids (TDS), color, aluminum, arsenic, cobalt, iron, lead, manganese, nickel, sodium, thallium, and vanadium.

The elevated levels of most of these parameters is a result of both naturally elevated background concentrations and elevated turbidity levels at the time of sample collection. During the second monitoring event, CHA modified the well sampling activities to include a modified low-flow purging technique to minimize turbidity levels. Samples containing elevated turbidity levels can influence the concentration of metals parameters, as metallic ions are often sorbed to the particulates in the sample. During the second monitoring event, the wells were purged using a peristaltic pump rather than a Watterra inertia pump, which significantly reduced the turbidity levels. With the exception of monitoring well MW-15D, the turbidity level in all monitoring wells was below 50 nepholometric turbidity units (NTUs). In well MW-15D, the turbidity level after purging was measured at 142 NTUs, and therefore, a portion of the sample from well MW-15D was filtered in the field using a 0.45 micron filter and analyzed for both total and dissolved metals. In general, the lower turbidity levels results in fewer parameters in excess of NYSDEC groundwater standards. More specifically, only the parameters turbidity, color, TDS, aluminum, iron, manganese, sodium, thallium, and ammonia were detected at levels above groundwater standards during the second monitoring event. Based on the dissolved metals analysis, the only metal compound in excess of groundwater standards in the sample collected from well MW-15D was thallium. With the exception of ammonia, the elevated level of these compounds is a result of naturally elevated background concentrations.

Although the source of the elevated ammonia level has not been identified, CHA believes that the elevated level of ammonia is likely attributable to failing or improperly constructed septic systems within the mobile home park located immediately to the north-west of the newly installed wells. The elevated ammonia levels were detected only in the shallow monitoring wells (MW-14S and MW-15S). During both monitoring events, the ammonia level was observed to decrease with increasing distance from the mobile home park. At well location MW-15S, the level of ammonia was detected at a maximum level of 2.15 milligrams per liter (mg/l), which is only slightly above the groundwater standard of 2.0 mg.l. At well location MW-14S, the level of ammonia decreased to a maximum detected concentration of 0.751 mg/l. In some instances, the elevated ammonia level was also accompanied by the presence of slightly elevated levels of total kjeldahl nitrogen (TKN), and/or biochemical oxygen demand (BOD), which also suggest potential impacts from the septic system. Elevated levels of ammonia have not been detected in AIL shallow perimeter monitoring wells MW-7S or MW-10S during any recent monitoring events. These wells are in the closest proximity to the expansion area and the data from these wells suggests that the ammonia levels are not landfill derived.

The elevated levels of ammonia will continue to be monitored on a quarterly basis to further evaluate potential trends in the ammonia levels. The continued quarterly monitoring data will also be used to develop pre-operational, existing water quality values (EWQVs) for evaluation of statistically significant increases in parameter concentration during the operation period. Additional discussion relative to the monitoring well installation activities, the groundwater sampling activities, and the existing water quality for the expansion area is provided in the Hydrogeologic Report, which was prepared and submitted as part of the 6 NYCRR Part 360 permit application.

3.2.1.2 Surface Waters

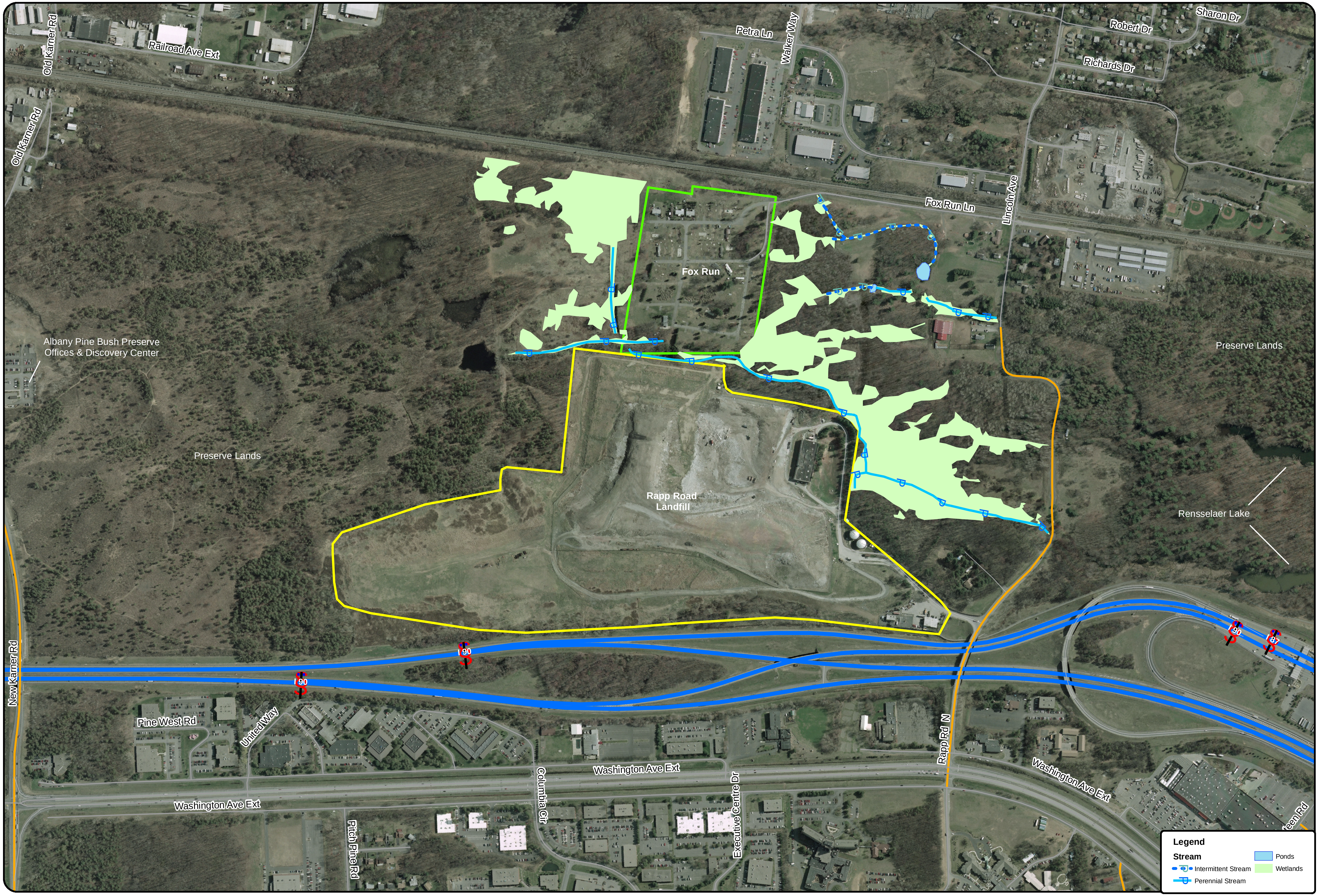
Existing Surface Water Features

Surface water features in the study area includes channelized streams and ditches, two small farm ponds, and a mitigation pond. Figure 3.2-5 identifies the streams/ditches and water bodies within the study area. Each of these features, with the exception of the mitigation pond, has been survey located as part of the wetland delineation for the project.

As shown in Figure 3.2-5, it is evident that surface water features have been manipulated over the years. The primary ditched stream channel flowing through the study area is located along the northern side of the landfill, beginning at the mitigation pond. Water flows easterly towards the southwestern corner of the mobile home park where another ditch enters from the north, draining the lands on the western side of the mobile home park. From here, the stream/ditch continues to flow easterly, through the proposed expansion area, turning south and flowing into the State lands located east of the landfill. At this point, the stream is joined by a very small ditch picking up drainage from the south and together conveying flows easterly through the State land, beneath Rapp Road and on to Lake Rensselaer (southern finger of the lake).

Historically, there was a northern drainage course that conveyed flows through the land now occupied by the mobile home park and on to the northern finger of Lake Rensselaer. Soil mining, development of the mobile home park, and farming have significantly manipulated this drainage course within the study area. Drainage west of the mobile home park is now conveyed southward, as previously noted. East of the mobile home park, drainage generally flows east and is captured in two small farm ponds. Eventually it is conveyed to the remnant channel (since ditched) that conveys flows beneath Rapp Road and on to Lake Rensselaer.

The manipulation of this drainage, especially ditching and associated discharge from tile drains within the wetland located on the State land, has resulted in some water quality impacts prompting the proposal to change some of these drainage tactics as discussed in the Habitat Plan (Section 2.8). Briefly, the ditching and draining efforts within the wetland on State land have resulted in the release of nutrients from decaying peat from the wetland and minerals from the intersection of groundwater through deep ditching. The visual evidence of this is the high degree of eutrophication (siltation and heavy aquatic weed growth) in the southern finger of Lake Rensselaer vs. the northern finger. High nutrient content in the water accelerates vegetation growth.



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City of Albany
Department
of General Services
One Connors Boulevard
Albany, New York

CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, P.O. Box 5269 • Albany, NY 12205-0269
Main: (518)453-4500 • www.cloughharbour.com

Rapp Road Landfill Eastern Expansion

Water Features

Issue Date: 04/07 Project Number: 12260 Scale: 1" equals 600'

Figure 3.2-5

Classification and Regulations

Surface water features in New York are designated with a water quality classification for the purposes of regulating discharges into these water bodies in accordance with the State Pollutant Discharge Elimination System (SPDES). These classifications refer to the suitability of a given water feature (lake, pond, river, stream) for human use; the higher the classification (i.e. A), the better the water quality. For example, Class A water is suitable for “primary contact” (swimming) and for a drinking water supply.

Classifications include water supply designations (AA-S, A-S, AA) and normal designations ranging from A (suitable for most uses) to D (unsuitable for primary contact). Each water quality classification carries with it a set of discharge limitations (standards) designed to protect or improve the water quality. A "T" modifier is used for those streams that have a breeding trout population. Streams with a classification of C(T) or higher are regulated pursuant to Article 15 of the NYS Environmental Conservation Law (“Protection of Waters”) and its implementing regulations (6 NYCRR 608).

A review of 6NYCRR 863 stream classifications revealed that the stream/ditch referred to herein as the northern tributary to Lake Rensselaer is identified as H-226-P336-2 or tributary 2 of Lake Rensselaer. This stream is assigned a classification and standard of C. The southern tributary within the study area is not mapped. However, the southern finger of Lake Rensselaer is treated as a tributary of the lake and identified as H-226-P336-1 and also assigned a classification and standard of C. In either case, it would appear that the streams are not specifically regulated by NYSDEC under Article 15 such that a Protection of Waters Permit would be required. However, all streams must be protected against the discharge of sediment or turbid water where it creates a substantial visible contrast.

However, the U.S. Army Corps of Engineers (USACE) regulates all “waters of the U.S.,” therefore, almost any water body (streams, ponds, and lakes) falls under federal jurisdiction. The exception to this are those water bodies that are determined (by USACE on a case by case basis) to be isolated as required by a January 2001 Supreme Court decision (see Section 3.3 for more information regarding isolated waters).

The extent of regulatory involvement depends on many factors. In general, Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into all waters of the U.S. Within the study area, all of the streams identified on Figure 3.2-5 are likely to be considered jurisdictional.

The need for and the extent of permitting under Section 404 would depend on the type and extent of impact. Impacts to streams must be less than 300 feet in length to be authorized under a Nationwide Permit; otherwise, an individual Section 404 permit is required.

Section 401 of the Clean Water Act regulates water quality impacts from Section 404 discharges. The intent is to ensure states have the opportunity to review and determine if a project will meet state water quality standards. This federal regulation, referred to as Water Quality Certification (WQC), has been delegated to NYSDEC for implementation. Water Quality Certification is typically required from NYSDEC in conjunction with Section 404 permits.

Non-point sources of water pollution, particularly urban runoff, are regulated by the U.S. Environmental Protection Agency (USEPA) and the NYSDEC. Under the National Pollutant Discharge Elimination System (NPDES), projects involving an acre or more of disturbance are required to provide water quality treatment for runoff in accordance with established guidelines. States are offered the opportunity to administer this program, provided the regulations they promulgate are the same as, or more stringent than, the federal regulations. New York has adopted this program and requires that all projects disturbing 1 or more acres of land comply with the State Pollutant Discharge Elimination System (SPDES) General Construction Permit (GP-02-01). The two primary elements of the SPDES regulations are stormwater management and water quality. To comply with SPDES, projects must address both the volume and quality of runoff.

Existing Watershed Characteristics

The extent of hydrologic analysis was limited to those areas impacted by or tributary to the City of Albany Rapp Road Landfill and its discharge points along Rapp Road. Based on this evaluation, the contributing watershed consists of approximately 266 acres, of which 72± acres are landfill. Existing land use beyond the limits of the landfill includes forest, wetlands, successional fields, and impervious areas (consisting of an existing mobile home park and roadway corridors).

The topography of the watershed generally conveys runoff from the northwest to the southeast. Slopes within the watershed range from 1% to 25% in the landfill and from 1% to 5% in the surrounding areas. Elevations range from 403 feet (NAVD88) on the landfill to 272 feet (NAVD88) along the west side of Rapp Road. Runoff from the majority of the watershed is initially conveyed overland as sheet and shallow concentrated flow, before entering one of several drainage channels that convey water under Rapp Road and eventually into Lake Rensselaer.

Based on review of the Albany County Soil Survey (SCS 1992), the contributing watershed is primarily composed of loamy sands. A summary of the soil composition and related hydrologic soil groups is shown in Table 3.2-1 and surficial mapping is included in Figure 3.1-4 – Soils Map.

Table 3.2-1
Soil Analysis Summary

Soil Name[1]	Hydrologic Soil Group
Ad – Adrian Muck	A/D (Modeled as D)
CoA – Colonie loamy sand	A
CoB – Colonie loamy sand	A
CoC – Colonie loamy sand, rolling	A
CoD – Colonie loamy sand, hilly	A
EnA – Elnora loamy sand	B
Gr – Granby loamy sand	A/D (Modeled as D)
St – Stafford loamy fine sand	C
Ud – Udipsamments, smoothed	C
Uf – Udipsamments-Urban Land Complex	C

[1] For detailed soil descriptions see Section 3.1

The USDA Natural Resource Conservation Service (NRCS), as part of their soil classification system, assigns each soil series to a hydrologic soil group (HSG). The HSG is a four-letter index (A-D) that is intended to show the relative potential for a soil to generate runoff. In hydrologic soil group (HSG) A are soils that have a low runoff potential and high infiltration rates. They consist mainly of deep, well to excessively drained sands or gravels and have a moderate rate of water transmission. Approximately 20% of the contributing watershed consists of HSG A soils. In HSG B are soils having a moderate infiltration rate when thoroughly wet and having a low to moderate potential for runoff. They are mainly deep, moderately well to well drained, and generally consist of loams and sandy loams. Approximately 18% of the contributing watershed consists of HSG B soils. In HSG C are soils having a low infiltration rate when thoroughly wet and having a low potential for runoff. They are soils with moderately fine to fine textures. Approximately 44% of the contributing watershed consists of HSG C soils. In HSG D are soils having a very low infiltration rate when thoroughly wet and having a high potential for runoff. They are soils with moderately fine to fine textures. Approximately 18% of the contributing watershed consists of HSG D soils.

Stormwater Management Design Criteria

The following design criteria have been established for the project, in accordance with the New York State Stormwater Management Design Manual, the SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-06-002). CHA proposes to utilize the unified approach for sizing stormwater management practices to meet removal goals, reduce channel erosion, prevent overbank flooding, and help control extreme floods.

- The Water Quality Volume (WQ_v) shall be designed to improve water quality sizing to capture and treat 90% of the annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at the site. Impervious cover is defined as all impermeable surfaces and includes: paved and gravel road surfaces, paved and gravel parking lots, building structures, paved sidewalks, and other miscellaneous impermeable surfaces.

- As a result of the total impervious area reduction associated with the restoration of the landfill and surrounding watershed, the requirements for Stream Protection Volume (Cp_v), Overbank Flood Control (Q_p), and Extreme Flood Control (Q_f) are not relevant.
- In accordance with the general conveyance guidelines presented in the New York State Stormwater Management Design Manual, the targeted storm frequencies for conveyance are the 2-year and 10-year events. The 2-year event will be used to ensure non-erosive flows through roadside swales, overflow channels, pond pilot channels, and over berms within stormwater management practices. The 10-year event will be used for sizing of outfalls, and as a safe conveyance criterion for open channel practices, closed storm sewer elements, culverts, and overflow channels.

Hydrologic Evaluation

Methodology

In order to evaluate the potential impacts associated with the proposed development, existing condition and post-development hydrographs were generated for the site, using a type II rainfall distribution. Rainfall amounts for northeastern Albany County were referenced from Chapter 4 of the New York State Stormwater Design Manual, August 2003. The 24-hour rainfall totals for the 1-, 10-, 25- and 100-year design storms are 2.4", 4.3", 5.0" and 6.0", respectively.

The runoff curve numbers and times of concentration were computed using NRCS TR-55 methodology. Peak stormwater flows and hydrographs for the existing and post development conditions were computed using the Haestad Method's Pondpack Hydrology Program (Version 10.0).

The required WQ_v for the areas with new impervious area were computed using the Runoff Frequency Spectrum (RFS) Method outlined in the New York State Stormwater Design Manual, and presented below.

$$WQ_v = \{(P)(R_v)(A)\} / 12$$

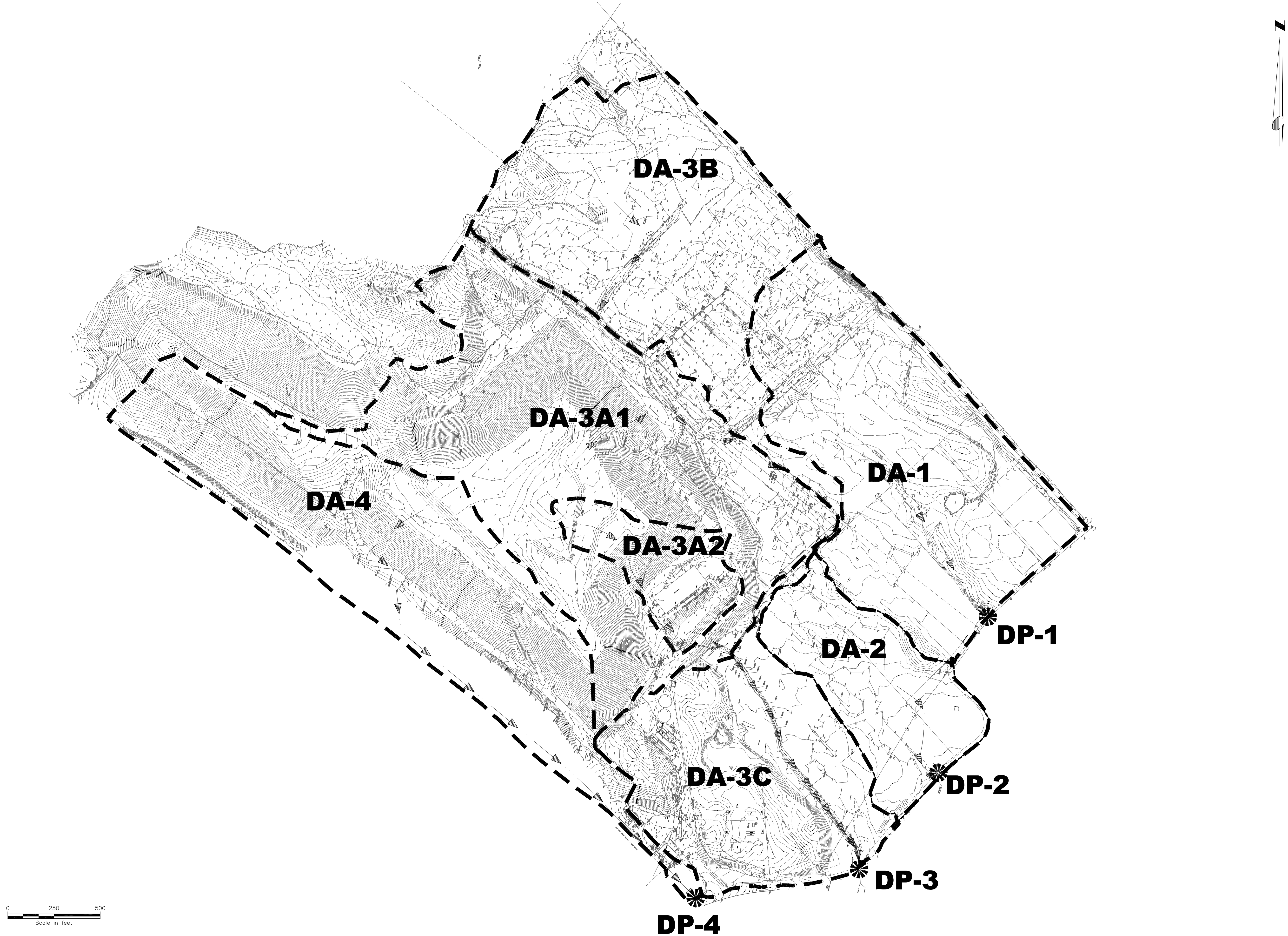
Where:

WQ_v = water quality volume (acre-feet)
P = 90% rainfall event (inches)
R_v = 0.05 + 0.009 (I), where I is percent impervious cover (R_v = 0.2 at minimum)
A = disturbance area (acres)

For Albany County, 90% of the annual runoff is generated by storms of 1.0 inch of rainfall or less. Therefore, the required water quality volume is determined by multiplying the runoff coefficient (R_v) by the 1.0 inch rainfall.

Existing Condition Hydrology

For the purposes of the existing condition analysis, four design points (DP-1, 2, 3, 4) were defined to characterize the current drainage patterns of the site (See Figure 3.2-6 - Existing Condition Watershed Map). The design points were selected to assess the hydrology at several culvert crossings along Rapp Road and proceed from north to south along the roadway. In order



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III Winners Circle, PO Box 5269 · Albany, NY 12205-0269
Main: (518) 453-4500 · www.cloughharbour.com

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RAPP ROAD LANDFILL
EASTERN EXPANSION

EXISTING CONDITION
WATERSHED MAP

Issue Date: 05/2007 | Project No.: 12206 | Scale: AS SHOWN

FIGURE 3.2-6

to maintain consistency with the hydrologic assessment, the existing condition analysis was based on the P-4 landfill expansion (in the capped condition).

- DP-1 is located at the inlet of a 36-inch culvert, and contains one subarea (DA-1). DA-1 is located northeast of the landfill, and contains a mix of forested, open space and developed area (mobile home park).

- DP-2 is located at the inlet of a 12-inch culvert, and contains one subarea (DA-2). DA-2 is located east of the landfill and south of DA-1, and contains a mix of wetlands and forested area.

- DP-3 is located at the inlet of two (2) 18-inch culverts, and contains three subareas (DA-3A, 3B, 3C). DA-3A represents the majority of the landfill area, and is further divided into DA-3A1 and DA-3A2. DA-3A1 has been modeled as open space in good condition on HSG C (capped landfill) for this analysis. DA-3A2 consists mainly of capped landfill and surrounding impervious area. The runoff from DA-3A1 is released undetained, while the runoff from DA-3A2 is routed through an existing detention basin. DA-3B is located north of DA-3A1, and contains a mix of wetlands, forested area, and residential development. DA-3C is located east of DA-3A, and contains mostly wetlands, forested area, and a limited amount of residential development.

- DP-4 is located at the inlet of a 36-inch culvert, and contains one subarea (DA-4). DA-4 contains a previously capped portion of the landfill that drains southeast along the NYS Thruway.

The results of the existing condition analysis are shown in Table 3.2-2.

Table 3.2-2
Existing Condition Analysis Summary

Design Point	Watershed	Area (acres)	Tc (hours)	Curve Number	Peak Flow Rate (cfs)		
					1-yr	10-yr	100-yr
DP-1	DA-1	46.9	0.4	57	1	25	65
DP-2	DA-2	17.9	0.8	71	4	18	33
DP-3	DA-3A1	63.6	0.6	68	10	59	118
	DA-3A2	9.4	0.4	79	2	3	4
	DA-3B	45.4	0.9	71	8	38	71
	DA-3C	33.5	0.5	57	1	16	41
	Total	151.9	-	-	20	111	224
DP-4	DA-4	49.1	0.4	66	8	53	108

Floodplain

Floodplain areas, as defined by the Federal Emergency Management Agency (FEMA) and depicted on the Flood Insurance Rate Maps (FIRM) do not occur within the study area. However, most natural stream corridors have floodplains associated with them. This is certainly the case for the streams within the Expansion and Restoration areas. An interesting characteristic of the remnants of natural stream corridors is that they are almost entire broad floodplains. Due to the generally flat topography and well drained sandy soils within the Pine Bush, streams with small drainage areas are intermittent. The existing stream that flows through the Expansion Area and the wetland on State lands to the east has modified hydrology, carrying flow that at one time was separated into two channels and two watersheds. This stream has been ditched and now intercepts the groundwater table. As a result, the stream is perennial. This unnatural condition is partly the cause of water quality issues and the dewatering of adjacent floodplain wetlands.

3.2.2 POTENTIAL IMPACTS & MITIGATION

3.2.2.1 Groundwater

The modern design of the proposed eastern landfill expansion minimizes potential impacts to groundwater. As outlined in Section 2.4, the proposed eastern expansion facility will be constructed with a double composite liner system that includes a redundant impermeable geomembrane liner system as well as a primary and secondary leachate collection system. The secondary leachate collection system also serves as a leak detection layer for the system.

As a result of the double composite liner system and the secondary containment that it will provide for the proposed expansion area, no significant impacts to groundwater are expected as part of this project. The double liner system has proven to be effective for the existing AIL facility as no existing impacts to groundwater at the site are considered to be attributed to the AIL facility. The performance of composite liner systems has also been documented in the EPA publication entitled *Assessment and Recommendations for Improving the Performance of Waste Containment Systems* (EPA; December 2002).

Groundwater monitoring continues to be conducted on a quarterly basis for both the AIL and GAL facility, which provides a mechanism for detecting potential contamination resulting from the AIL and also aids in evaluating trends in contaminant concentrations from the unlined GAL. Following construction of the eastern expansion, groundwater will continue to be monitored in accordance with the revised Environmental Monitoring Plan (EMP) for the site. The revised EMP has been submitted with the Part 360 permit application for NYSDEC approval.

The historical water quality monitoring database that has been developed for both the AIL and GAL since the early 1990's enhances the overall monitoring of the proposed Eastern Expansion. Due to the size of the existing sample data set, the effects of seasonal variability and the water quality trends associated impacts from the GAL are well defined and understood. Potential impacts from either the existing AIL facility or the proposed expansion area are expected to be readily identified as part of the current and proposed monitoring programs put forth by the EMP.

In addition to outlining the monitoring network and the quarterly monitoring program for the Eastern Expansion project, the revised EMP also provides the basis for evaluating groundwater quality within the proposed expansion area during the landfill operational and post-closure periods. Similar to the methods for evaluating water quality for the existing AIL facility, EWQVs will be established for the expansion area monitoring well network based on pre-operational groundwater quality data. Pursuant to the 6 NYCRR Part 360 regulations, the EWQVs and current NYSDEC ambient water quality standards will be utilized to determine if statistically significant increases in parameter concentrations have occurred during each quarterly monitoring event. Specifically, a significant increase is defined by Part 360 regulations as a parameter concentration which exceeds the EWQV by three standard deviations or exceeds both the EWQV and regulatory guidance value for that parameter. In the event that statistically significant increases are identified during the future monitoring events, the EMP also specifies the necessary contingency monitoring that will be required to further evaluate the significant increases and characterize potential impacts. The proposed monitoring program is discussed in detail in the EMP.

As noted in Section 3.2.1.1, groundwater quality in the vicinity of the Rapp Road facility has been impacted as a result of the historical operations associated with the unlined GAL. The groundwater impacts have been characterized and continue to be monitored on a quarterly basis to evaluate overall water quality as well as trends in groundwater contaminant levels over time. In addition to the groundwater quality monitoring for the GAL, in 2002, C.T. Male completed a Feasibility Study to evaluate the feasibility of implementing a remediation program that would remediate all or part of the groundwater contaminant plume associated with the GAL.

The Feasibility Study specifically evaluated the implementation of several remedial alternatives aimed at improving groundwater quality and creating a shallow groundwater flow barrier directly downgradient of the GAL. The remedial alternatives that were assessed as part of the Feasibility Study included the following:

- No Action Alternative;
- Groundwater Pumping – Well Point System
- Groundwater Pumping – Conventional Well System
- Groundwater Pumping – Shallow Interceptor Trench

The Feasibility Study included a series on site investigations that were conducted to evaluate the applicability of each of the above remedial alternatives including test well installations, representative pump testing and aquifer testing, exposure assessment, and implementation cost analysis. The Feasibility Study was designed to evaluate the potential effectiveness, overall human health protection, potential for compliance with groundwater standards, and costs associated with each alternative.

The Feasibility Study concluded that the no further action alternative, which generally consists of natural attenuation and continued groundwater monitoring is the preferred remedial alternative for the GAL. This conclusion is based on the fact that the three groundwater removal alternatives are no more protective of human health than the no further action alternative. Groundwater downgradient of the GAL is not used for human consumption and there are existing municipal systems that service the entire area downgradient of the landfill. In addition, the Pine Bush Formation, which lies beneath the area of the Rapp Road facility, as well as downgradient of the facility can not realistically be used for a municipal source of water supply (C.T. Male, 1999). Potential human health exposures are limited to contact with potential groundwater discharges to surface water bodies such as the drainage channels located just east of the landfill. However, surface water monitoring data has indicated that the contaminant levels are generally low, and largely absent at a very short distance from the landfill facility.

Although the three groundwater pumping alternatives could result in an improvement of water quality downgradient of the site, none of the pumping systems would result in an improvement of groundwater quality beneath the GAL. Leachate from the GAL would continue to impact groundwater quality beneath the facility.

Due to the nature of the fine sediments associated with the shallow Sand Unit, each of the pumping systems would require significant routine maintenance to keep the systems from clogging due to the fine sediments and maintain their efficiency. As a result, both the construction and maintenance costs for the pumping systems were estimated by C.T. Male to be on the order of $12,879,000 to $24,315,000. As a result, none of the pumping alternatives were considered to be cost effective given the fact that these alternatives were not considered to be any more protective of human health than the no action alternative.

Based on the Feasibility Study, the no action alternative, coupled with the continued post-closure quarterly monitoring program was recommended for the GAL. As a result, mitigation of existing water quality impacts associated with the GAL will be remediated via natural attenuation.

3.2.2.2 Surface Waters

During construction, operation and closure of the landfill, clearing and grading activities could expose soils to erosion. If the soils erode, the sediment-laden stormwater eventually would decrease in velocity and deposit the material (sedimentation) in surface waters. As with any construction activity, sedimentation can occur downstream within the floodplain, wetlands, and other portions of the stream corridor. This could impact the aquatic environment and may also change the physical characteristics of the stream. This will be of particular concern since the stream/ditch that currently flows through the expansion area will need to be relocated.

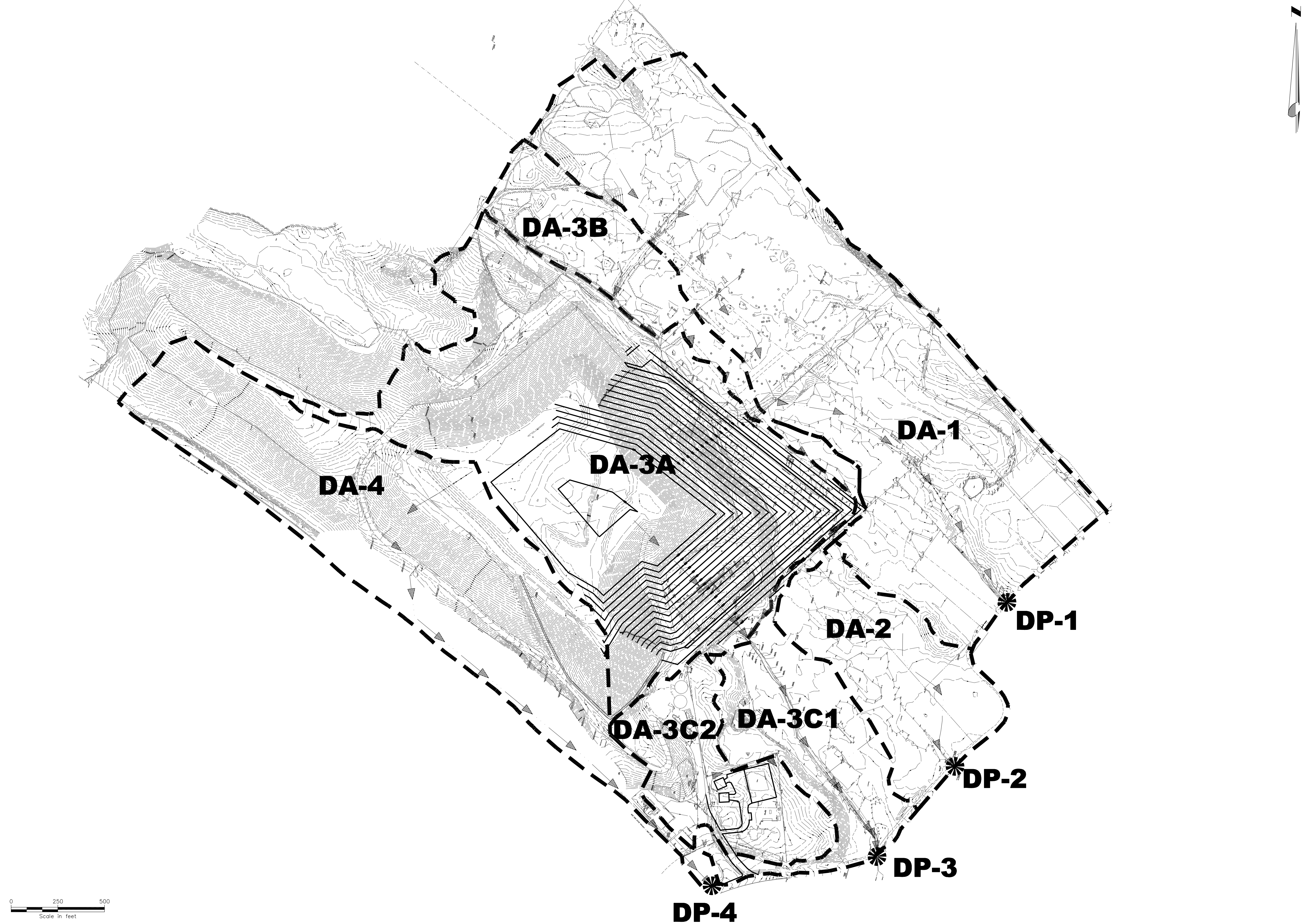
Stormwater discharges from construction activities disturbing one acre or more of land are regulated under the landfill's SPDES Multi-sector General Permit GP-0-06-02. The discharges authorized under this general permit must neither cause nor contribute to a violation of the water quality standards contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York. To obtain coverage for a new construction activity under this general permit, the owner or operator must prepare a Stormwater Pollution Prevention Plan (SWPPP) before any disturbance is initiated. This plan must be prepared in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (August 2005), and the New York State Stormwater Design Manual. If alternative erosion and sedimentation controls or stormwater management practices are proposed, the owner or operator must demonstrate equivalence to these technical standards..

Proposed Condition Watershed Analysis

Although the proposed project will include major site grading within the landfill expansion area, the design points (DP-1, 2, 3, 4) established for the existing condition analysis remain unchanged (See Figure 3.2-7 - Proposed Watershed Map). The expansion of the landfill will result in a net reduction of impervious area in the contributing watershed, due to the conversion of an existing mobile home park to open space and wetlands as part of the Habitat Plan. In addition, as part of the restoration of the surrounding watershed, a stream will be constructed north of the landfill, which will divert runoff from DP-3 to DP-1. A summary of the changes associated with the proposed landfill expansion is outlined by design point and presented in the bulleted items below.

- DP-1 contains subarea DA-1. The watershed contributing to DP-1 was increased through the addition of a restored stream corridor through DA-1 and DA-3B. DA-1 contains mostly open space, wetlands and forested areas, as a result of the removal of an existing mobile home park.

- DP-2 contains subarea DA-2 and remains unchanged from the existing to the proposed condition.



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CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, PO Box 5269 · Albany, NY 12205-0269
Main: (518) 453-4500 · www.cloughharbour.com

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RAPP ROAD LANDFILL
EASTERN EXPANSION

PROPOSED CONDITION
WATERSHED MAP

Issue Date: 05/2007 | Project No.: 12206 | Scale: AS SHOWN

FIGURE 3.2-7

- DP-3 contains three subareas DA-3A, DA-3B, and DA-3C. DA-3A represents the majority of the existing landfill, as well as the proposed eastern expansion area. The expansion of the landfill (DA-3A) was modeled as open space in good condition (HSG C) and reflects the conversion of existing impervious area (formerly DA-3A2 - the existing facilities were removed to accommodate the expansion) to vegetated land. DA-3B was reduced in size by approximately 65% due to the construction of the stream corridor which diverts flow to DP-1. DA-3C was further subdivided into DA-3C1 and DA-3C2, in order to analyze the impacts of the addition of new facilities (formerly located in DA-3A2) within DA-3C. In DA-3C2, 2.6± acres of forest and meadow were converted to impervious area.

- DP-4 contains subarea DA-4, and remains unchanged from the existing to the proposed condition.

The results of the proposed condition analysis are shown in Table 3.2-3 below.

Table 3.2-3
Proposed Condition Analysis Summary

Design Point	**Watershed**	**Area (acres)**	**Tc (hours)**	**Curve Number**	**Peak Flow Rate (cfs)**		
					1-yr	**10-yr**	**100-yr**
DP-1	DA-1	77.2	0.8	62	4	40	92
DP-2	DA-2	17.9	0.8	71	4	18	33
DP-3	DA-3A	73.3	0.4	72	28	118	217
	DA-3B	14.8	0.9	72	3	14	25
	DA-3C1	18.6	0.5	60	1	11	27
	DA-3C2	14.9	0.3	59	1	12	29
	Total	121.6	-	-	30	148	284
DP-4	DA-4	49.1	0.4	66	8	53	108

Proposed Mitigated Condition Watershed Analysis

As a result of the restoration of the surrounding watershed, wetlands and vegetation will be added to DA-1. The addition of wetland areas will increase the available storage volume within the watershed and will be quantified through an adjustment of the Initial Abstraction (I_a). The I_a is a parameter in the TR-55 analysis that represents the amount of losses which occur before runoff begins. It includes rainfall that is retained in surface depressions, intercepted by vegetation, evaporated into the atmosphere or infiltrated into the soil. In order to account for the increase in surface storage provided by the restoration of the watershed, an additional ponding depth of one (1) foot was assumed to occur in the proposed wetland areas. The composite runoff curve number for DA-1 was modified using the following procedure.

- Utilizing the computed curve number (CN) for the unmitigated proposed condition subarea, the respective I_a value was determined using Table 4-1 as presented in TR-55, Chapter 4. This value was then multiplied by the contributing drainage area in order to compute the volume of precipitation which is "naturally" abstracted prior to runoff.

- The estimated volume of storage provided by the proposed wetlands was computed for DA-1. This volume was then added to the "natural" abstraction provided throughout the subarea to determine the "total" volume of rainfall being abstracted.

- The "total" volume of abstraction was then converted back to inches, by dividing the volume by the drainage area, to determine the modified value of the I_a. Table 4-1 in the TR-55 manual was then referenced, this time to determine the modified CN value.

The results of the mitigated analysis for DP-1 are shown in Table 3.2-4 below.

Table 3.2-4
DP-1 Mitigated Analysis Summary

Design Point	Watershed	Area (acres)	Tc (hours)	Curve Number	Peak Flow Rate (cfs)		
					1-yr	10-yr	100-yr
DP-1	DA-1	77.2	0.8	53	<1	16	53

The project will also include the reestablishment of native soils and vegetation within the landfill area. For the purpose of the existing and proposed condition analyses, the existing landfill and proposed expansion area were considered to be capped, and were modeled as open space in good condition (HSG C). Due to the overfill of sand (two (2) to four (4) feet) proposed to cover the landfill as part of the Habitat Plan, the drainage areas within DP-3 were modeled as open space in good condition on HSG B in the proposed mitigated condition. The results of the analysis at DP-3 are shown in Table 3.2-5. In addition, flows to DP-2 and DP-4 are constant from the existing to the proposed condition, and as such are not presented in the following table.

Table 3.2-5
DP-3 Mitigated Analysis Summary

Design Point	Watershed	Area (acres)	Tc (hours)	Curve Number	Peak Flow Rate (cfs)		
					1-yr	10-yr	100-yr
DP-3	DA-3A	73.3	0.4	61	4	60	138
	DA-3B	14.8	0.9	72	3	14	25
	DA-3C1	18.6	0.5	60	1	11	27
	DA-3C2	14.9	0.3	56	<1	9	24
	Totals	121.6	-	-	7	88	204

Stormwater Management Practices

Water Quality

Water quality treatment will be designed to capture and treat 90 % of the annual stormwater runoff volume, or the full water quality volume (WQ_v). Treatment practices need to be capable of 80 % Total Suspended Solids (TSS) removal and 40 % Total Phosphorous (TP) removal, have an accepted longevity in the field and have a pretreatment mechanism. Throughout the site, stormwater management efforts will be focused on improving water quality using natural systems, a process referred to as a Stormwater Treatment Train (STT). These practices will meet the water quality requirements set forth in the New York State Stormwater Design Manual, if constructed in accordance with the performance criteria and properly maintained. The water quality volume computations for the landfill expansion are summarized in Table 3.2-6.

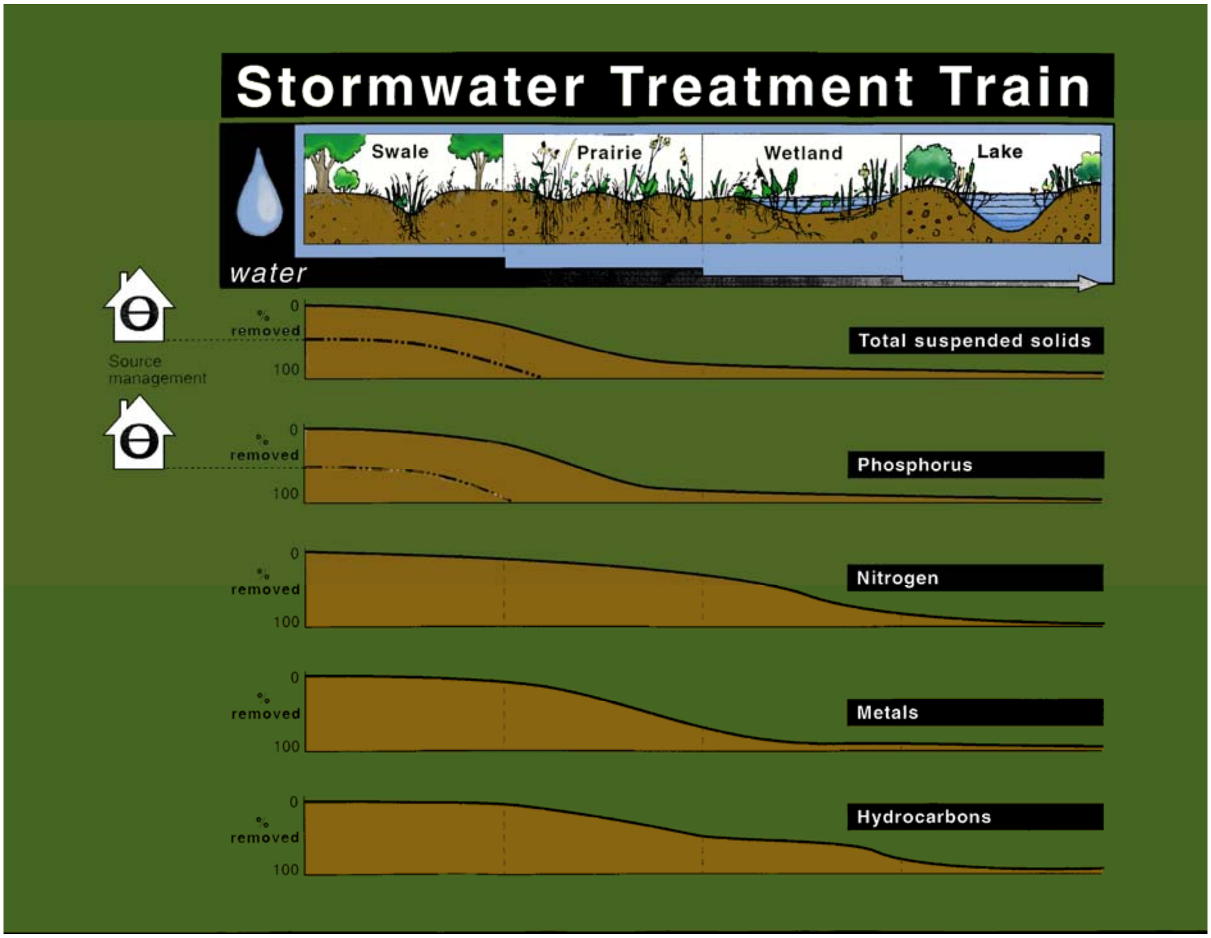
Table 3.2-6
Summary of Required Water Quality Volumes

Design Point	Watershed	Area (acres)	Impervious Area (acres)	Percent Impervious	WQ_v (acre-feet)	Treatment Practice
DP-3	DA-3A	15.0	0.0	0.0	0.24	Wetland Biofilter
DP-3	DA-3C2	14.9	3.9	26.0	0.24	Infiltration

While the project does not result in an increase in impervious area in DA-3A, water quality treatment will be sought and achieved through a combination of a pretreatment stone channel and wetland biofilter, components of the STT. Since there is so little impervious area, a minimum R_v value of 0.2 was used to compute water quality volume for the approximately 15 acres of landfill expansion. The water quality volume for DA-3A results in about 10,350 cubic feet (0.24 ac-ft). DA-3C2 included the conversion of 2.6± acres of meadow and forest to impervious area. The water quality volume for DA-3C2 is 10,280 cubic feet (0.24 ac-ft). An infiltration garden with a vegetated conveyance swale, located just north of the new impervious areas, will provide runoff treatment within subarea DA-3C2.

The Stormwater Treatment Train

Stormwater will be managed in the restored landscapes associated with the Habitat Plan. Localizing restored forests, swales, pine barrens and wetlands and routing water through these creates a STT where each ecological zone provides specific function for management of the stormwater. Appendix F provides a publication that defines the benefits of the STT approach for stormwater management.



<u>Water Quality Benefits of STT</u>

The contaminants that the STT system is designed to treat include nitrogen, phosphorous, BOD, suspended solids, and some heavy metals. However, it is important to note that runoff from the capped landfill, filtered through the vegetation and sands proposed for the Habitat Plan will result in clean water in and of itself. There will be no imperious surfaces or human activities that would introduce pollutants to the runoff. Nevertheless, STT provides the assurances to meet regulatory requirements and provides "polishing" of runoff that will only benefit the watershed.

One pollutant of concern during the initial establishment of the landfill cap and restoration elements is suspended solids. Suspended solid removal is accomplished with a sedimentation process. Effective sedimentation systems provide lengthy travel paths for sediments to settle out of the stormwater runoff. The most efficient basin operates under plug flow (rather than perfect mix) conditions and move runoff through the system with very slow velocities to prevent mixing. Sediment settling velocities are a function of particle mass, shape and surface area ratios. Larger sediment materials including gravels and sands are easily settled due to higher mass/surface area ratios. These larger materials account for much of the suspended material in stormwater runoff. Silts and clays require extended times for settlement and are most effectively settled in shallower depth basins (with less time required for the sediment particle to reach the basin bottom) such as shallow wetlands with extensive vegetation.

Water Quantity

The project will result in an overall decrease in the rates and volumes of runoff at DP-1 and DP-3 due to a reduction in impervious area, combined with the addition of created wetlands. Based on the results of the proposed mitigated analysis, the requirements for Stream Protection Volume (Cp_v), Overbank Flood Control (Q_p), and Extreme Flood Control (Q_f) will not be required for the expansion of the landfill.

In summary, the stormwater management plan for the Rapp Road Landfill Eastern Expansion will include a number of Water Quality Practices and Erosion and Sediment Control Measures that will treat runoff from the proposed expansion. These practices will include water quality treatment, and temporary and permanent erosion and sediment control measures. Stormwater quantity control is not required due to the decrease in the volume and rate of runoff from the landfill and the surrounding watershed. As such, the proposed mitigation systems will be designed in accordance with the regulations established by the New York State Department of Environmental Conservation.

3.3 ECOLOGY

3.3.1 EXISTING CONDITIONS

Inventories of the immediate Eastern Expansion area and the larger ecological context (all within the Study Area) were undertaken to understand existing ecological conditions, determine the ecological health of the plant and animal systems in place, and to understand restoration and land management needs that could improve site ecology and the general health and viability of the Pine Bush and progress efforts to meet the goals of the Albany Pine Bush Preserve Commission. The Study Area includes the Eastern Expansion Area (Expansion Area); the Habitat Restoration, Mitigation and Enhancement Area (Restoration Area), the Future Landfill Facilities Area (the Facilities Area) and reference communities in the Albany Pine Bush Preserve.

To inventory the current conditions and ecological communities of the Study Area, detailed quantitative vegetation investigations were undertaken along study transects that bisected the primary representative areas and significant targeted communities of the Study Area. Several reference communities were identified with the help of the Albany Pine Bush Preserve Commission (APBPC) technical staff. These communities are examples of high quality vegetative community types/habitat from which the restoration projects will be modeled. They serve two purposes: first to provide baseline data to build the restoration parameters and second to compare/evaluate the progress of the restoration efforts.

The Expansion Area and Restoration Area encompass approximately 164.28 acres of terrestrial (upland), palustrine (wetland), lacustrine (ponded) and riverine (ditched stream channel) community types. The Facilities Area encompasses approximately 3 acres of terrestrial community types. The following sections document the findings from the ecological inventories, wetland delineations, soils and detailed vegetation studies of the entire Study Area. Figure 3.3-1 illustrates the vegetative communities of the Study Area and is provided to aid the reader in understanding the ecological context of the Study Area.

3.3.1.1 Vegetation

Twenty two vegetative community types, as described by Edinger (2002)[1], were identified and mapped in the Study Area. Wetlands were identified and described according to Edinger (2002) and Cowardin (1979).[2] These communities are described below and in greater detail in Appendix G - Ecological Data. All of the communities are illustrated on Figure 3.3-1, Vegetative Communities Map.

Terrestrial Communities of the Study Area

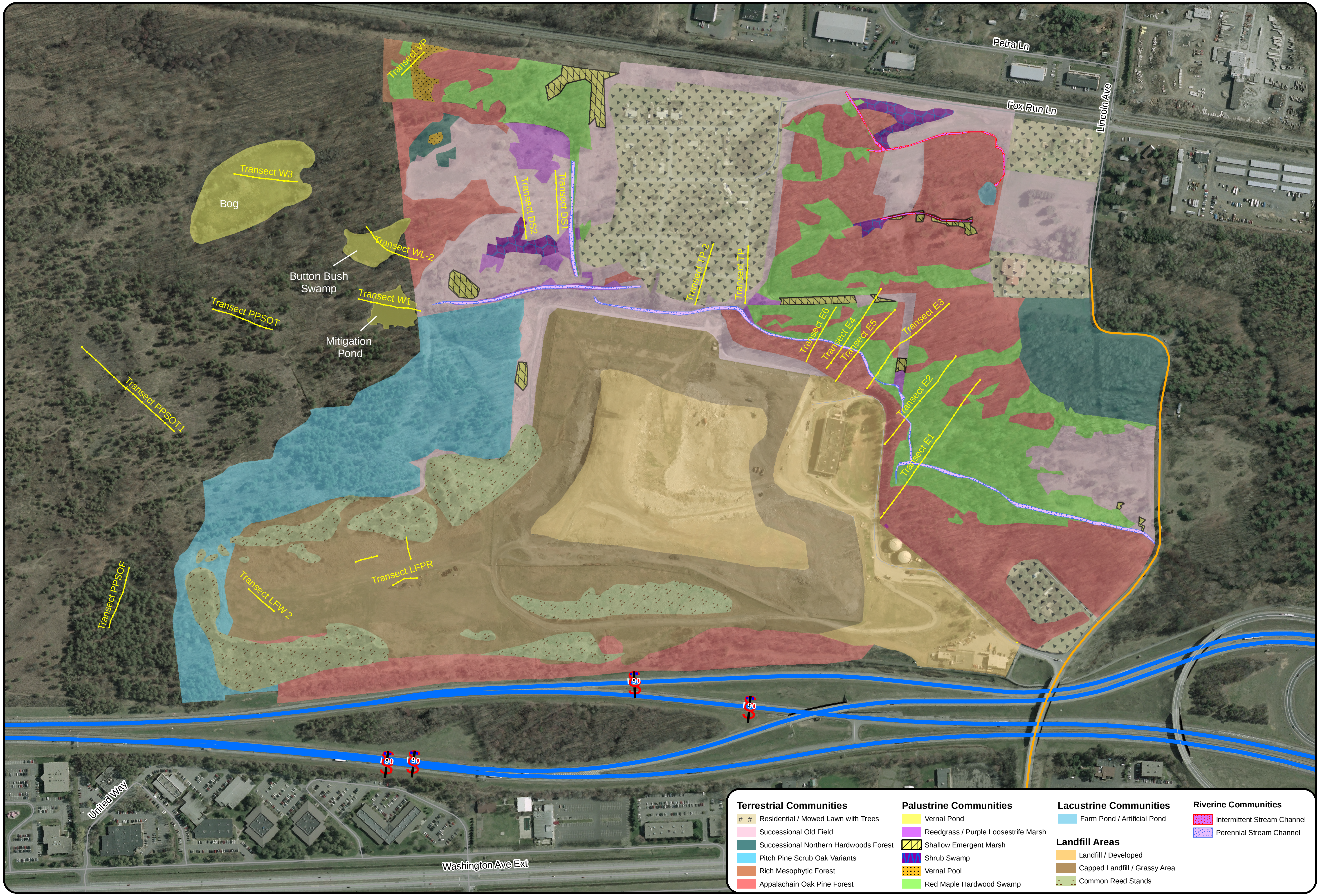
Terrestrial vegetative communities are the upland habitats of the Study Area. These communities, as they occur in the Study Area, are described below and are illustrated on the Figure 3.3-1. Terrestrial communities of the Study Area include:

- Landfill
- Mowed lawn with trees
- Successional old field
- Successional northern hardwoods
- Appalachian oak-pine forest
- Rich mesophytic forest

Landfill area: This area is the existing landfill and its vegetated and developed/disturbed lands. Developed/disturbed lands contain buildings, roads and other landfill operation facilities. Grassy or mowed areas occur on capped portions of the landfill, on landfill side slopes and adjacent to the developed areas. Vegetation is mostly limited to grasses and weeds common to disturbed areas. Species most frequently encountered in transects include switchgrass (*Panicum virgatum*), Kentucky bluegrass (*Poa pratensis*), tall fescue (*Festuca elatior*) and crown vetch (*Coronilla varia*).

Mowed lawn with trees: this is the major community type within the Fox Run mobile home park area and is easily identified by its landscaped and maintained appearance. This community is

[1] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors), 2002. *Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State.* (*Draft for review*). New York Natural Heritage Program, New York State Department of Environmental Conservation. Albany, NY.
[2] Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe, 1979. *Classification of wetlands and deepwater habitats of the United States*. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.



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Department
of General Services
One Connors Boulevard
Albany, New York

CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, P.O. Box 5269 • Albany, NY 12205-0269
Main: (518)453-4500 • www.cloughharbour.com

Rapp Road Landfill
Eastern Expansion

Vegitative Communities Map

Issue Date: 04/07
Project Number: 12260
Scale: 1" equals 450'

Figure 3.3-1

dominated by various grasses with dandelion (*Taraxacum officinale*), birdsfoot trefoil (*Lotus corniculatus*), gill-over-the-ground (*Glechoma bederacea*), northern bedstraw (*Galium boreale*), clover (*Trifolium pratense* and *T. repens*) and other common forbs occurring scattered throughout these regularly mowed and maintained grassy areas.

Trees and shrubs occur randomly. Commonly encountered trees include cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sugar maple (*Acer saccharum*), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), Norway spruce (*Picea abies*) and blue spruce (*Picea pungens*). Some shrubs, mostly planted ornamentals but some native, also occur scattered throughout this community. Honeysuckle (*Lonicera spp.*) and gray dogwood (*Cornus foemina*) were most commonly observed.

Successional old field: This upland community occurs on land that is or has been maintained or mowed to maintain a field-like appearance. Trees and shrubs constitute less than 50 percent cover in any given area. This community is one of the dominant upland community types in the Restoration Area.

Herbaceous species commonly encountered include Queen-Anne's lace (*Daucus carota*), false baby's breath (*Galium mollugo*), aster (*Symphytotrichum sp.*), Virginia strawberry (*Fragaria virginiana*), timothy (*Phleum pratense*), dandelion, steeplebush (*Spiraea tomentosa*), Canada goldenrod (*Solidago canadensis*), narrow leaf goldenrod (*Solidago graminifolia*), little bluestem (*Schizachyrium scoparium*), orchard grass (*Dactylis glomerata*), spotted knapweed (*Centaurea biebersteinii*), fox grape (*Vitis labrusca*), oriental bittersweet (*Celastrus orbiculatus*), black-eyed Susan (*Rudbeckia serotina*), cinquefoil (*Potentilla sp.*), birdsfoot trefoil, common milkweed (*Asclepias syriaca*), crown vetch (*Coronilla varia*), common reed (*Phragmites australis*), ragweed (*Ambrosia artemisifolia*), New England aster (*Aster novae-angliae*), clover and Alleghany blackberry (*Rubus allegheniensis*).

Shrubs and saplings occur scattered throughout this community. Common shrub species include multiflora rose (*Rosa multiflora*), gray dogwood, common blackberry (*Rubus allegheniensis*), staghorn sumac (*Rhus typhina*) and buckthorn (*Rhamnus cathartica*). Red maple (*Acer rubrum*), cottonwood and quaking aspen (*Populus tremuloides*) trees, saplings and shrubs occur in low numbers.

Successional northern hardwoods: this community occurs as a transitional forested community on the edges of the older forested areas, along the ditch/artificial intermittent stream communities and in other areas of past disturbance.

Dominant tree species include quaking aspen, black cherry (*Prunus serotina*), cottonwood, red maple, white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), sassafras (*Sassafras albidum*), American elm (*Ulmus americana*) and sugar maple. Saplings of the tree species dominate the sub canopy.

The shrub layer ranges from sparse to moderately dense with species such as gray dogwood, honeysuckle, multiflora rose, European buckthorns and blackberry.

The herbaceous layer is moderately dense and depends on the density of the canopy. Species frequently observed include goldenrod (*Solidago sp.*), aster, sensitive fern, Virginia creeper (*Parthenocissus quinquefolia*), mayapple (*Podophyllum peltatum*), Virginia strawberry, poison ivy (*Toxicodendron radicans*), jumpseed (*Polygonum virginianum*), wild sarsaparilla (*Aralia nudicaulis*), baneberry (*Actaea sp.*) and young sprouts of the shrubs and trees present. Garlic mustard (*Allaria periolata*) has widely invaded this community type.

Appalachian oak-pine forest: This is a forested community in the Expansion Area. Red oak (*Quercus rubra*), black cherry and red maple dominate the canopy with white pine (*Pinus strobus*) and black locust (*Robinia pseudoacacia*) occurring scattered throughout and somewhat common in some areas. Pitch pine (*Pinus rigida*), green ash and other trees occur in low numbers scattered throughout this community.

The shrub layer is sparse to moderately dense and dominated by species such as black cherry, choke cherry (*Prunus virginiana*) and Alleghany blackberry. Saplings of the trees present also occur throughout the shrub layer.

Dominant herbaceous species include garlic mustard (*Alliaria petiolata*), oriental bittersweet (*Celastrus orbiculatus*), black cherry and green ash.

Rich mesophytic forest: This hardwood or mixed forest community is typified by a wide variety of tree species and a large number of codominant canopy species with lush shrub and herbaceous layers. This community occurs mostly surrounding Wetland C.

Common canopy trees include red oak, white oak, black cherry, sugar maple and red maple with an understory dominated by saplings of the trees present as well as quaking aspen, green ash, white ash and hickory (*Carya spp.*). Shrubs observed include young growth of most of the trees present as well as arrowwood (*Viburnum dentatum*), rose and honeysuckle. Dominant herbs include young growth of the trees and shrubs and interrupted fern (*Osmunda claytoniana*), star flower (*Trientalis borealis*), painted trillium (*Trillium undulatum*), poison ivy, purple crane's-bill (*Geranium maculatum*), garlic mustard (*Alliaria petiolata*), lady fern (*Athyrium filix-femina*), and common blue violet (*Viola papilionacea*).

Rare, Declining and Vulnerable Vegetative Communities and Vegetative Species

No rare, declining or vulnerable vegetative species were observed in the Study Area while conducting the detailed quantitative vegetation investigations. A pine barren vernal pond is located in the Restoration Area, not in the expansion area.

Table 3.3-1 presents a list of rare, declining and vulnerable vegetative communities and vegetative species that are known to occur in the adjacent Pine Bush Preserve. This list is based on information provided in the Albany Pine Bush Management Plan (2002)[3], *Significant Habitats and Habitat Complexes of the New York Bight Watershed* (1997)[4] and a list of species identified by the New York State Department of Environmental Conservation (NYSDEC) in their Comprehensive Wildlife Conservation Strategy (CWCS) as "Species of Greatest Conservation Need (SGCN)" in New York State[5]. The habitats of the Study Area were then compared to each community and the habitats of each species to determine the potential for each habitat or species to occur in the Study Area.

[3] Environmental Design & Research, P.C., M. Batcher, and Behan Planning Associates. 2002. *Albany Pine Bush Management Plan and Final Environmental Impact Statement*. Prepared for the Albany Pine Bush Commission, Latham, NY.
[4] *Significant Habitats and Habitat Complexes of the New York Bight Watershed* – US Fish and Wildlife Service, November 1997.
[5] *New York State Comprehensive Wildlife Conservation Strategy (CWCS)* - New York State Department of Environmental Conservation (NYSDEC), September 2005.

Table 3.3-1

Rare, Declining or Vulnerable Vegetative Communities & Vegetative Species Known to Occur or that May Occur within the Albany Pine Bush Preserve

<table>
<tr><th colspan="4">Rare, Declining or Vulnerable Community</th></tr>
<tr><th colspan="2">Community</th><th>NY Status</th><th>Federal Status</th></tr>
<tr><td colspan="2">Pitch pine-oak forest</td><td>Unlisted</td><td>Unlisted</td></tr>
<tr><td colspan="2">Pitch pine-scrub oak barrens</td><td>Unlisted</td><td>Unlisted</td></tr>
<tr><td colspan="2">Pine barrens vernal pond</td><td>Unlisted</td><td>Unlisted</td></tr>
<tr><th colspan="4">Rare, Declining or Vulnerable Species & their Associated Habitats</th></tr>
<tr><th>Habitat</th><th>Species</th><th>NY Status</th><th>Federal Status</th></tr>
<tr><td rowspan="10">Pitch pine-scrub oak variants:
Pitch pine-scrub oak barrens,
Pitch pine-scrub oak thicket,
Pitch pine-scrub oak forest and
Pine barrens vernal pond</td><td>Woodland Agrimony (Agrimonia rostellata)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Nuttall's Tick-trefoil (Desmodium nuttallii)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Little-leaf Tick-trefoil (Desmodium ciliare)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Bayard’s Adder’s-mouth Orchid (Malaxis bayardii)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Whip Nutrush (Scleria triglomerata)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Yellow giant-hyssop (Agastache nepetoides)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Side-oats grama (Bouteloua curtipendula)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Clustered Sedge (Carex cumulata)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Virginia False Gromwell (Onosmodium virginianum)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Husk-tomato (Physalis pubescens var. integrifolia)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Forests:
Appalachian oak-pine forest
Pine-northern hardwood forest</td><td>Hooker’s Orchid (Platanthera hookerii)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td rowspan="6">Wetlands:
Pine barrens vernal pond,
Red maple hardwood swamp
and
Shallow emergent marsh</td><td>Blunt-lobe Grape Fern (Botrychium oneidense)</td><td>Endangered</td><td>Unlisted</td></tr>
<tr><td>Clustered Sedge (Carex cumulata)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Carey’s smartweed (Polygonum careyi)</td><td>Threatened</td><td>Unlisted</td></tr>
<tr><td>Slender marsh bluegrass (Poa paludigena)</td><td>Endangered</td><td>Special Concern</td></tr>
<tr><td>Schweinitz’s Flatsedge (Cyperus schweinitzii)</td><td>Rare</td><td>Unlisted</td></tr>
<tr><td>Hooker’s Orchid (Platanthera hookerii)</td><td>Endangered</td><td>Unlisted</td></tr>
</table>

Based on this evaluation it was determined that the Restoration Area contains:

- pine barren vernal pond – Mitigation pond for P-4

This community is a mitigation site that is being monitored and managed and is establishing as a pine barrens vernal pond. The pond and adjacent sedge meadow will be preserved as part of the Habitat Plan. Restoration of the areas surrounding them will help to enhance their overall functions and values. It has also been noted that there are wild lupine (*Lupinus perennis*) patches located approximately 80 yards southwest of the mitigation pond at the western extent of the restoration area. The site is on a sand dune and is partially fenced in to protect the planted lupine from deer browse. It can be best classified as pitch pine scrub oak barrens containing numerous wild lupine plants growing both inside and outside of the fenced enclosure on the slope of the dune.

The Expansion Area contains:

- no rare vegetative species or communities

The Expansion Area does not contain important Pine Bush communities. It does not harbor the host plants (e.g. blue lupine in pitch pine-scrub oak barrens) found in rare community types known in the Pine Bush Preserve. Additionally, none of the rare plant species were found in the Expansion Area during the detailed surveys. Many invasive species occur in the overstory, transgressive, and ground story vegetation layers. The presence of European and glossy buckthorns and Tartarian honeysuckle in the shrub and sapling layers and dense garlic mustard and invasive bittersweet (*Celasturus orbiculatus*) among others in the vine and ground story are indicative of past disturbances and representative of the degraded conditions present. The dense growths of black locust in some areas further suggests the range and tenure of the disturbances, dating 30+ years, based on the age of the oldest locust trees that were incremented cored to determine age.

The Facilities Area contains:

- no rare vegetative species or communities

This area is predominantly residential (mowed lawn with trees) and also contains some Appalachian oak-pine forest and mowed roadside. The communities within the Facilities Area will be permanently converted to support landfill operations facilities.

3.3.1.2 Wetlands & Aquatic Resources

Palustrine Communities

Palustrine communities are the wetland habitats of the Study Area. These communities, as they occur in the Study Area, are described below and illustrated on the Vegetative Communities Map (Figure 3.3-1).

The delineation of wetland boundaries was conducted in accordance with the procedures provided in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (1987). The "Routine Wetland Determination" method was used based on the characteristics of the Study Area.

Based on this methodology, twelve wetland areas (Wetlands A, B, C, D, F, G, H, I, AA, DD, EE and VP) totaling 36.79 acres were identified and delineated within the Study Area. The boundaries of reference wetland communities in the Pine Bush Preserve were not delineated since they will not be impacted by the proposed project. Instead, they were studied to develop detailed structural and composition data on the plant communities which have been used in restoration planning.

In addition to the delineation of wetland boundaries, an initial determination was made regarding the federal jurisdiction of the wetlands. Following the 2001 Supreme Court decision regarding Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC) and the 2005 decision regarding Rapanos v. United States and Carabell v. United States (Rapanos), the criteria for federal jurisdiction changed significantly. Wetlands and other surface waters that are physically isolated from traditional waters of the U.S. are no longer considered jurisdictional. Furthermore, streams, swales, ditches, and other erosion features with flows that are intermittent or ephemeral may also be non-jurisdictional depending on actual flow characteristics and both hydrologic and ecologic factors that create a significant nexus to traditional navigable waters.

Therefore, a wetland is federally jurisdictional if it has a direct surface water connection to federally navigable waters (defined in legislation and in this area generally limited to the Hudson River below the Troy dam and the NYS Canal system) and may be jurisdictional if it has an indirect connection via tributaries of navigable waters. Ultimately, this determination is made by USACE.

Seven of the wetlands (Wetlands A, AA, B, C, D, F and I) totaling 36.43 acres appear to be jurisdictional due to an indirect hydrologic connection to navigable waters, in this case the Hudson River via Rensselaer Lake and Patroons Creek. The streams/ditches within the project area flow for most of the year, primarily due to ditching below the groundwater table, and appear to meet the criteria for federal jurisdiction. Wetlands G, H, DD, EE and VP (totaling 0.36 acres) appear to be hydrologically isolated from Waters of the U.S. The following table provides wetland acreages.

The NYSDEC Freshwater Wetlands map (Appendix G) indicates three state-regulated wetlands A-11, A-32 and A-33 immediately northwest of the Study Area. These wetlands are indirectly connected to most of the wetlands of the Study Area and form the headwaters of Lake Rensselaer, which is located southeast of the landfill. The NYSDEC classifies wetlands A-11, A-32 and A-33 as Class 1 wetlands. These wetlands are the bog (A-11), buttonbush swamp (A-32) and mitigation pond (A-33) reference wetlands that are described later in this section.

With the exception of the Expansion Area, all of the wetlands within the Study Area are located on Preserve or State lands and are therefore protected by the very designation of the land. In addition, Wetland AA (23.66 acres) exceeds the State size threshold of 5 hectare (12.4 acres). By letter dated November 19, 2007, NYSDEC informed the City that it is believed that several unmapped wetlands within the project area qualified as State wetlands under Article 24 of the Environmental Conservation Law (Freshwater Wetlands Act). Solely for the purposes of expediting its application and without waiving any arguments it may have, the City agrees with NYSDEC that the wetlands qualify for jurisdiction as Class II wetlands.

The following table identifies the jurisdiction and acreage of each wetland.

Table 3.3-2
Wetland Area Calculations

Wetland	Presumed Federal Jurisdictional (sq.ft./acres)	Isolated (sq.ft./acres)	State Jurisdiction & Classification
A	0.35 ac	-------	No
B	8.56 ac.	-------	Yes/ Class II
C	1.23 ac.	-------	Yes/ Class II
D	0.15 ac.	-------	No
F	0.68 ac.	-------	No

Wetland	Presumed Federal Jurisdictional (sq.ft./acres)	Isolated (sq.ft./acres)	State Jurisdiction & Classification
G	-------	0.17 ac.	No
H	-------	0.03 ac.	No
I	1.8 ac.	-------	No
AA	23.66 ac.	-------	Yes/ Class II
DD	-------	0.007 ac.	No
EE	-------	0.06 ac.	Yes/ Class II
VP	-------	0.10 ac.	Yes/ Class II
Total	**36.43 ac.**	**0.36 ac.**	

Palustrine (wetland) communities identified within the Study Area include:

- red maple-hardwood swamp
- Pine barrens vernal pond
  - bog
  - button bush swamp
  - mitigation pond
- vernal pool
- vernal pool red maple-hardwood swamp
- shrub swamp
- shallow emergent marsh
- reedgrass/purple loosestrife marsh
- common reed stands
- pine bush sedge meadow
- pine bush hanging fen

Red maple-hardwood swamp: these forested wetlands are dominated by red maple, cottonwood, green ash and American elm trees. The shrub layer ranges from sparse to dense and is dominated by saplings of the dominant tree species along with shrubs such as gray dogwood, highbush blueberry and spicebush (*Lindera benzoin*). A variety of herbaceous species including skunk cabbage (*Symplocarpus foetidus*), sedges and rushes, poison ivy, moss, sensitive fern, cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), jewelweed (*Impatiens capensis*), dewberry (*Rubus hispidus*) and false nettle (*Boehmeria cylindrica*) may be present.

Pine barrens vernal pond: according to Edinger, these are a seasonally fluctuating, groundwater fed ponds and associated wetlands that typically occur in pine barrens. The water is intermittent, seasonally ponded, and circumneutral. The substrate is coarse sand and development of a shallow peat layer is common. The bog, the button bush swamp and the ponded wetland of the Study Area were placed into this category because of their geomorphological characteristics. Each wetland is described below.

> *Bog:* according to Edinger a bog is an ombrotrophic peatland (dominated by stunted vegetation, *Sphagnaceae* and *Ericaceae*) that is fed primarily by direct rainfall, with little or no groundwater influence. The herbaceous layer of the bog in the Study Area is dominated by Sphagnum moss, threeway sedge (*Dulichium arundinaceum*) and tussock sedge. Highbush blueberry is the only species in the shrub layer and red maple and gray birch dominate the canopy.
>
> *Button bush swamp:* this wetland is almost completely dominated by buttonbush (*Cephalanthus occidentalis*). The wetland occurs in a topographic depression and the relative cover of the herbaceous layer is dominated by lesser duckweed (*Lemna minor*), tussock sedge (*Carex stricta*) and American water horehound (*Lycopus americanus*).
>
> *Mitigation pond:* The water levels of this wetland are controlled by an adjustable outflow box. This wetland is permanently ponded and fish have become established. Fringe wetland occurs along the periphery. Submerged aquatic plants occur in the deeper portions of the ponded area and the fringe wetlands along the periphery are primarily forested and dominated by cottonwood and red maple trees, speckled alder (*Alnus rugosa*) and highbush blueberry shrubs, interrupted fern and tussock sedge. Common reed is becoming established along the east banks of the wetland.

Vernal pool: these temporarily flooded wetlands occur in depressions, typically within larger communities such as an upland forest. According to Edinger, vernal pools are typically flooded in spring or after heavy rainfall, but are usually dry during summer. Many are flooded again in autumn. The substrate is typically a dense leaf litter over hydric soils.

The vernal pools of the Study Area fit this description. Vegetation observed within the vernal pool communities of the Study Area includes tussock sedge (*Carex stricta*), sensitive fern, royal fern and skunk cabbage with red maple and gray birch (*Betula populifolia*) trees and saplings as well as highbush blueberry and arrowwood shrubs typically along the edges of the pools.

Vernal pool red maple-hardwood swamp: these are vernal pool areas that occur within a larger red maple hardwood swamp. The pools are seasonally inundated with a few inches of water and the soils are saturated all year.

Shrub swamp: this is a shrub-dominated wetland with greater than 50 percent cover by shrubs and less than 50 percent cover by trees. In the Study Area this community type typically occurs as a transitional area along forested edges and in small patches intermixed with the other wetland communities.

Shrubs typically present include silky dogwood (*Cornus amomum*), gray dogwood, spicebush, rose, blackberry, white willow (*Salix alba*), arrowwood, steeplebush (*Spiraea tomentosa*) and elderberry (*Sambucus canadensis*). Herbaceous species density varies and is highly dependant on percent cover by shrubs. Areas with a dense shrub cover typically have a sparse herbaceous layer and areas with a sparse shrub cover typically have a lush herbaceous layer. Herbaceous species commonly found include sensitive fern, steeplebush, narrow leaf goldenrod, spotted touch-me-not and false baby's breath.

Shallow emergent marsh: these wetlands are field or meadow-like communities with less than 50 percent cover by shrubs and trees. In the Study Area they are typically located in cleared areas along the edges of the red maple-hardwood swamp communities and along the ditch/artificial intermittent streams.

Herbaceous species commonly observed include purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), narrow leaf goldenrod, soft rush (*Juncus effusus*), green bulrush (*Scirpus atrovirens*), fox sedge (*Carex vulpinoidea*), tussock sedge (*Carex stricta*), steeplebush, skunk cabbage, reed canary grass (*Phalaris arundinacea*), jewelweed and horsetail (*Equisetum fluviatile*).

Shrubs and saplings occur throughout this community but in low numbers. Species observed include gray dogwood, buckthorn, elderberry, white willow, black willow (*Salix nigra*), green ash, red maple and silver maple.

Reed grass/purple loosestrife marsh: these field-like wetlands occur in previously disturbed areas and are dominated by the exotic and highly invasive common reed and/or purple loosestrife. Few other herbaceous species occur throughout this community because they are quickly out-competed and shaded by the more aggressive exotic loosestrife and common reed.

In the Study Area, native herbaceous species were typically found growing along the edges of this community. Native species observed include sensitive fern, reed canary grass (*Phalaris arundinacea*) and the species listed as occurring in the successional old field and shallow emergent marsh communities of the Project Area.

Common reed stands: these areas are dominated by the exotic and invasive common reed and occur on disturbed portions of the Study Area. These areas were not investigated to determine if they are wetland or upland but it is assumed that they mostly occur as wetland areas because common reed is most frequently found in wetland areas. These areas are mostly found on the side slopes of the capped landfill and its adjacent areas that have been disturbed by landfill activities. In these areas common reed forms relatively monotypic stands with few other species able to occur because of the aggressiveness of common reed and its tendency to shade out most other species.

Pine Bush sedge meadow: this wetland closely resembles the "sedge meadow" community as described by Edinger. It is a meadow-like wetland dominated by herbaceous species with little cover by shrubs. No trees are present. Tussock sedge and dewberry account for over 56% of the relative cover. Meadowsweet (*Spiraea alba*) is the dominant shrub and dwarf chinkapin oak (*Quercus prinoides*) was observed to occur along the wetland periphery.

Fen: According to Edinger a fen is a minerotrophic peatland fed by groundwater that contains minerals obtained during passage through or over mineral soils or aquifers. The Pine Bush fen is located within a powerline right-of-way off Kings Road. Five species, woolly sedge (*Carex pellita*), little bluestem, tussock sedge, Alleghany blackberry and royal fern account for almost 60% of the relative cover in this community. This is the only community where steeplebush (*Spirea tomentosa*) and meadowsweet (*S. alba*) occurred. It is located on a built slope associated with the railroad. According to APBPC staff, along this slope there is seepage, resulting in the minerotrophic fen. Percent shrub cover is low (18%) but artificially so due to periodic maintenance along the powerline.

Table 3.3-3
Albany Pine Bush Reference Wetland Communities and Species Compositions

Wetland Type	Dominant Vegetation
Pine Bush Sedge Meadow	Tussock sedge, dewberry, meadowsweet (*Spiraea alba*), dwarf chinkapin oak (*Quercus prinoides*), blueberry (*Vaccinium sp.*)
Fen	Woolly sedge (*Carex pellita*), little bluestem (*Andropogon scoparius*), tussock sedge, Allegheny blackberry, royal fern, meadowsweet, grayleaf red raspberry (*Rubus idaeus strigosus*)
Vernal Pool	Aralia sp., Rubus sp., highbush blueberry, dwarf chinkapin oak (*Quercus prinoides*), red maple
Vernal Pool Red Maple Swamp	Rubus sp., royal fern, highbush blueberry, red maple, cottonwood
Pond	Interrupted fern (*Osmunda claytoniana*), highbush blueberry, Queen Anne's lace (*Daucus carota*), tussock sedge, speckled alder (*Alnus rugosa*), red maple, cottonwood, black willow (*Salix nigra*)
Button Bush Swamp	Lesser duckweed (*Lemna minor*), American water horehound (*Lycopus americanus*), tussock sedge, common buttonbush (*Cephalanthus occidentalis*)
Bog	Sphagnum moss, threeway sedge (*Dulichium arundinaceum*), tussock sedge, highbush blueberry, red maple, gray birch

Wetland VP and portions of Wetland C are vernal pool communities. The bog, button bush swamp and mitigation pond are all vernal pond communities. These temporarily inundated wetlands provide critical habitat for certain wildlife and invertebrate species. Some rare species, such as the eastern spadefoot toad (*Scaphiopus holbrookii*), Jefferson salamander (*Ambystoma jeffersonianum*) and wood frog (*Rana sylvatica*) are considered obligate vernal pool breeders that depend on vernal pools for their survival. Species such as spring peeper (*Pseudacris c. crucifer*), Fowler's toad (*Bufo fowlerii*), American toad (*Bufo americanus*) and spotted turtle (*Clemmys guttata*) are considered facultative vernal pool species that can be found using vernal pools but they can reproduce elsewhere so they do not depend solely on vernal pools for their survival. A key feature of vernal pools is that they do not support fish populations that would eat the amphibian eggs and invertebrate larvae.

Lacustrine (ponded) Communities

A small farm pond/artificial pond (Edinger, 2002) is located near the farm in the eastern portion of the Study Area. This pond appears to be man-made and is shallow with murky water. The pond has a culverted outfall which diverts water underground then to an intermittent stream channel running along the fence line of the farm. This pond appears to be jurisdictional due to a direct hydrologic connection to Waters of the U.S., in this case the Hudson River via Rensselaer Lake and Patroons Creek.

Riverine (stream) Communities

Multiple ditch/artificial intermittent stream channels (Edinger, 2002), totaling 5,726 linear feet, are present within the Expansion and Restoration Areas of the Study Area. These ditches show obvious characteristics of human influence/alteration. One stream channel is shown on the USGS Topographic map in the vicinity of the mobile home park but occurs outside of the site. All ditches have associated side-cast dredge spoil piles that have become invaded by native and invasive plant materials.

Portions of these ditches are vegetated with herbaceous species. Areas with standing water have little to no vegetation but saturated areas and areas along the banks generally consist of jewelweed, common reed and sensitive fern. Willow, cottonwood, quaking aspen, green ash, elderberry and red maple trees, saplings and shrubs occur along the edges of the ditches.

The FEMA Flood Zones map (Refer to Appendix G - Wetland Delineation Report) indicates the presence of 100 year flood zones southeast but outside of the Study Area. These flood zones are associated with Rensselaer Lake and its immediate vicinity.

The ditch/artificial intermittent streams of the Study Area were studied and found to be representative of depleted waterways, in sand bottom drainageways with little to no in-stream habitat structure (Appendix G). Because the sand continuously washes away no stable habitat conditions are present to support diverse plants or conditions for fishes or invertebrates.

3.3.1.3 Wildlife

The inventory of wildlife occurring or potentially occurring in the Study Area involved direct observations of wildlife while conducting fieldwork as well as drawing species associations based on the habitats present. Species identified by sight, tracks, call and other distinguishable features were documented.

The habitats of the Preserve and a list of rare, declining or vulnerable species known to occur within those habitats were obtained from the Albany Pine Bush Management Plan, 2002. Additional information on rare species known to occur in the Preserve was obtained from the NYSDEC NHP list of "Species and Community Status in the Albany Pine Bush: 2006." A list of "Species of Greatest Conservation Need" consolidated from the NYSDEC Comprehensive Wildlife Conservation Strategy for New York State[6] was used to identify Species of Greatest Conservation Need that are known to occur in the Preserve. Additionally, the New York State Breeding Bird Atlas[7] and the New York State Amphibian and Reptile Atlas Project[8] were referenced for a list of species known to occur in the general vicinity of the Study Area. The habitats of the Study Area were then compared to the habitats of each species to determine the potential for each species to occur in the Study Area.

The lists of species compiled from these resources are provided in Appendix G and the results of the analysis are presented below.

Species documented in the Study Area during field surveys by sight, call or tracks include:

<u>Mammals</u>
Virginia opossum (*Didelphis virginiana*), white-tailed deer (*Odocoileus virginiana*), raccoon (*Procyon lotor*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail rabbit (*Sylvilagus floridanus*), eastern chipmunk (*Tamias striatus*), coyote (*Canis latrans*)(tracks), meadow vole (Microtus sp) and white footed mouse (Peryomyscus sp), and various bats.

<u>Reptiles and Amphibians</u>
American toad, spadefoot toad (located east of the mobile home park in a vernal pool in moderate to high quality woodland), gray treefrog (*Hyla versicolor*), northern spring peeper, pickerel frog (*Rana palustris*), wood frog, bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans melanota*), northern leopard frog (*Rana pipiens*), spotted turtle, painted turtle (*Chrysemys picta*), common garter snake (*Thamnophis sirtalis*), eastern ribbon snake (*Thamnophis sauritus*), ring necked snake (*Diadophis punctatus*) and an unidentified terrestrial salamander (probably Plethodontinae) egg mass in an upland area

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6 Comprehensive Wildlife Conservation Strategy for New York State. 2006. New York State Department of Environmental Conservation, Albany, NY.
7 *New York State Breeding Bird Atlas 2000-2005.* New York State Department of Environmental Conservation.
8 *New York State Amphibian and Reptile Atlas Project 1990-1999.* New York State Department of Environmental Conservation.

Birds

American goldfinch (*Carduelis tristis*), American robin (*Turdus migratorius*), red-breasted nuthatch (*Sitta canadensis*), white-breasted nuthatch (*Sitta carolinensis*), brown thrasher (*Toxostoma rufum*), yellow warbler (*Dendroica petechia*), golden-crowned kinglet (*Regulus satrapa*), white-throated sparrow (*Zonotrichia albicollis*), black-capped chickadee (*Parus atricapillus*), American tree sparrow (*Spizella arborea*), field sparrow (*Spizella pusilla*) Indigo bunting (*Passerina cyanea*), eastern towhee (*Pipilo erythrophthalmus*), tufted titmouse (*Parus bicolor*), northern cardinal (*Cardinalis cardinalis*), blue jay (*Cyanocitta cristata*), mourning dove (*Zenaida macroura*), tree swallow (*Tachycineta bicolor*), red-winged blackbird (*Agelaius phoeniceus*), oriole (*Icterus galbula*), belted kingfisher (*Ceryle alcyon*), red-bellied woodpecker (*Melanerpes carolinus*), northern flicker (*Colaptes auratus*), European starling (*Sturnus vulgaris*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), wild turkey (*Meleagris gallopavo*), American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), Coopers hawk (*Accipiter* cooperii), and turkey vulture (*Cathartes aura*).

Invertebrates

An underwing moth, inland barrens buckmoth (*Hemileuca maia spp. 3*) (in the Preserve), eastern tailed blue (*Everes comyntas*), American copper (*Lycaena phlaeas*), monarch (*Danaus plexippus*), Mourning cloak (*Nymphalis antiopa*), cabbage white (*Pieris rapae*), numerous butterflies, dragonflies and damselflies, water strider (*Aquarius remigis*), giant leopard moth caterpillar, wolf spider.

Dominant invertebrates in the ditch/artificial intermittent streams include cranefly larvae of the family Ptychopteridae, Crustaceans (*Isopoda* and *Amphipoda*), Gastropods and Pelecypods included a few individuals of snails and clams of the following genera: *Helisoma* sp., *Physa* sp., *Physella sp.*, *Musculium* sp., *Sphaerium* sp.

Fish

No fish were found in the studied streams. Fish may be present in the mitigation pond but it was not surveyed to determine species present.

Rare, Threatened and Endangered Wildlife and Species of Greatest Conservation Need

Based on review of the general habitat requirements of each species, rare, declining or vulnerable species and species of greatest conservation need that could potentially occur in the Study Area are listed in Appendix G. The following provides a more detailed assessment based on the extensive field work conducted with the proposed Expansion and Restoration areas:

<u>Rare Species Potentially Occurring in the Expansion Area</u>
Baseline investigations and quantitative vegetation analyses and mapping (Appendix D) have concluded that all of the habitats present in the Expansion Area are overgrown and degraded environments. In fact, what is present is ubiquitous and highly altered forest cover typical of many nearby disturbed landscapes. In addition, the wetlands that are present exhibit the highly altered vegetation characteristics of dewatered organic substrates and all potential expansion areas had a very high prevalence of invasive plants species, such as European buckthorn, glossy buckthorn, Tartarian honeysuckle (Lonicera tartarica) and garlic mustard. European bittersweet plants covered the ground in many locations, as did dense growths of tartarian honeysuckle, and other invasive plants.

The Expansion Area does not represent regional habitat of concern and is not similar to other rare communities known to provide habitat for rare plants and animals found in the Pine Bush Preserve. The following provides an overview of key rare species and addresses the likelihood of their utilizing the potential landfill expansion area.

Invertebrates

- Barrens Dagger Moth (oak woods)
- Karner Blue Butterfly (open dry prairie and oak barrens with lupine and other host plants)
- Brook snaketail (clear, sandy bottomed streams with rapids, flowing through dense woodlands)
- Common sanddragon (shallow streams with sandy substrate)
- Forcipate emerald (small forested streams)
- Mocha emerald (small streams in forested areas with sandy to gravel substrate)
- Tiger spiketail (small cold streams in forested areas)

There are no documented host plants for such insects as the Karner blue butterfly (e.g. Lupine, or scrub oak community), and no scrub oak such as known in the adjacent expansion or study area to harbor the dagger moth. While the site contains a forested sandy bottomed former agricultural ditched stream, no odonates were found during the macroinvertebrate investigation of the stream. The macroinvertebrate survey showed the stream habitat to be degraded and could explain the absence of these non-tolerant odonate species. These species may return once the stream has been restored and exhibits better water quality.

Reptiles and Amphibians

- Eastern hognose snake (sandy soils in areas with toads)
- Worm snake (loose damp soil in wooded areas or on edges, under surface cover or in rotten logs)
- Eastern spadefoot toad (sandy soils near vernal pools and vernal-like inundated areas)
- Fowler's Toad (sandy soils/open woodlands, meadows)
- Jefferson salamander (vernal pools, vernal-like inundated portions of wetlands & upland forests)

There are no exposed open sandy areas known to harbor toads in the Expansion Area that would foster hognose snakes. Furthermore, there are no vernal pools or moist areas present in the Expansion Area. This area has been highly dewatered with ditching and downcutting of the ditched stream. Thus spadefoot toads and Jefferson salamanders are not likely to utilize this area and have not been observed here.

Such toads as the Fowlers toad would also be unlikely and have not been observed in the expansion areas in the dense and overgrown wood vegetated areas. No records of worm snake have been found in the expansion area, under leaf litter and logs that are present.

Based on the many hundreds of hours invested in on-site quantitative investigations and many hundreds of additional person-hours spent in qualitative inventorying the expansion area, we have concluded that none of these species have been observed and no historic records that we are aware of exist. Both this and the inappropriateness of the habitats present for these species leads us to conclude that these species are not likely to be present in the Expansion Area.

Birds

Based on the list of rare or vulnerable birds of provided in Appendix G, we have broken the list into categories of potential use of the Expansion Area as follows: A) No record but potentially present during migration and nesting season, B) No record and no potential of being present during nesting season.

A. Potentially Present During migration or nesting season:

Hawks, such as Cooper's and sharp-shinned, have been documented to nest in tree canopies of pine and larger stature deciduous trees (Apfelbaum and Seelbach 1983) and would also be very likely to forage or pass through the types of degraded forest communities found in the Expansion Area. However, because of the adjacent, much higher quality habitats present in the preserve, the small and disturbed forested areas in the expansion area would be very marginal habitat for these species, with the exception of occasional use for foraging and passage.

The dewatered nature of the wetlands and dense woody vegetation at the ground story, coupled with the absence of open shrubby wetlands would also suggest that the Expansion Area to be of marginal use for the woodcock and wood thrush.

While none of these species were observed or heard specifically in the Expansion Area, the Cooper's hawk, woodcock and wood thrush were observed and heard in adjacent higher quality forested areas during fall migration season in 2006.

B. No potential for use during nesting season:

The expansion area does not provide known suitable habitat for any of the following species for nesting.

- Blue-winged warbler (power line corridors/successional forested edges)
- Golden-winged warbler (power line corridors/damp, heavily-vegetated fields with clumps of shrubs)
- Black-throated blue warbler (mature deciduous and mixed woodlands with thick understory)
- Whip-poor-will (deciduous and mixed forest adjacent to large clearings)
- Yellow-breasted chat (dense second-growth, riparian thickets, and brush)
- Rufous-sided towhee (old fields and forest edges, often in dry environments and open ground)
- Indigo bunting (power line corridors/brushy and weedy areas/open deciduous woods)

While migratory birds of these and other species may occasionally use degraded forests, none of these species have been recorded using the Expansion Area. Indigo buntings were observed and heard in powerline areas and in forest-edge margins within the Pine Bush Preserve just west of the mobile home park property.

Rare Species Potentially Occurring in the Restoration Area

Numerous wildlife species have been observed in portions of the Restoration Area. The sandy soils of the “disturbed sands” area located west of the mobile home park provide suitable conditions for the host plants and rare community types known in the Preserve.

Occasional isolated scrub oaks can be found scattered throughout the open fields of this area. The scrub oaks provide habitat for inland barrens buckmoth and other rare species.

There is a known population of frosted elfin’s (*Callophrys irus*) approximately 80 yards southwest of the mitigation pond. The occupied site is on a sand dune and is partially fenced in to protect the planted lupine from deer browse. It can be best classified as pitch pine scrub oak barrens containing numerous wild lupine plants both inside and outside of the fenced enclosure on the slope of the dune. A variety of Karner blue butterfly nectar species have been observed as scattered and isolated plants in this area. Species such as cinquefoil, round-headed bush clover, and especially the invasive spotted knapweed and others are present in the open disturbed fields that are not overgrown by common reed, buckthorn, Tartarian honeysuckle, and Hungarian brome grass (Bromus inermis), and other aggressive non-native plants.

The upland vegetative communities on sandy soils that are near vernal pools or vernal-like inundated areas could support eastern spadefoot toad populations. Any of the sandy areas could support eastern hognose snake. However, none have been reported in this area nor were any of these species identified during the field analysis.

Rare Species Potentially Occurring in the Facilities Area

No rare species have been observed in the Facilities Area during the site visits.

The natural habitats present in the Facilities Area include Appalachian oak-pine forest and mowed grass. The Appalachian oak-pine forests of this area are likely to support the same species listed as possibly occurring in the Appalachian oak-pine forests of the Expansion Area. The Facilities Area does not represent regional habitat of concern and is not similar to rare habitats found in the Pine Bush Preserve.

3.3.2 POTENTIAL IMPACTS & MITIGATION

The habitat assessment performed for the project Study Area revealed that the Expansion Area and all the areas proposed for restoration are degraded ecological communities, having been modified by past land uses such as farming, mining, and development (Fox Run). All of these activities have impacted drainage, soils, and native vegetative communities. Therefore, conversion of the Expansion Area to landfill and the work necessary to restore, mitigate and enhance natural communities in the Restoration Area will have no significant impact on any rare, threatened or endangered species.

3.3.2.1 Expansion & Facilities Areas

Expansion of the landfill will impact approximately 13 acres of degraded forested upland and wetland communities. The term degraded is defined by extensive on-site data collection and evaluation. Some of the wetlands within the expansion area have been identified as red maple forest, but the data does not support recognition of the expansion area as high quality and even brings into question whether the wetland community is even representative of red maple forests. The data shows that this location does not meet the quality condition or even the tree compositional and canopy dominance associated with a moderate quality red maple forest. The measurements of the extant vegetation in this area further suggest only a relatively small area actually would even meet the state natural area description/definition of red maple forest. Areas of oak, black locust, scattered pines, and other trees dominate larger areas of this expansion area. The red maple was found localized along the dredged ditch through the expansion area.

Further, the reference to degraded condition is based on the presence of many invasive species in the overstory, transgressive, and ground story vegetation layers. The presence of European and glossy buckthorns and Tartarian honeysuckle in the shrub and sapling layers and dense garlic mustard and invasive bittersweet (*Celasturus orbiculatus*) among others in the vine and ground story are indicative of serious past disturbances and representative of the degraded conditions present. The dense growths of black locust in some areas further suggests the range and tenure of the disturbances, dating 30+ years, based on the age of the oldest locust trees that were incremented cored to determine age. The near absence of native ground story vegetation, as found in other locations where higher quality red maple forests grow, is also strongly supportive of the pervasiveness of the degradation that this expansion area has incurred.

Detailed vegetative and habitat assessment in this area revealed no rare or vulnerable species or communities. Therefore, the implications of this loss will be to common wildlife species and degraded and invasive plant communities.

Relocation of the landfill operations facilities to the existing residential parcels to the east will impact approximately 1.5 acres of Appalachian oak-pine forests, much of which is dominated by black locust. The remaining land is lawn, buildings, and driveways. Given the disturbed nature of this area, no significant impact to wildlife or important vegetative communities is anticipated.

The loss of approximately 5.05 acres of primarily forested wetland will require regulatory approvals from the U.S. Army Corps of Engineers (USACE) to impact waters of the U.S. and from NYSDEC for the impact to State regulated wetland. For the State process, the impacts to the 100-foot Adjacent Area (buffer) must also be considered. As a result, the project will impact approximately 6.5 acres of Adjacent Area. Approximately 1,490 linear feet of ditched stream will be filled and relocated outside of the expansion area. Another 190 linear feet of ditch that was dug to divert drainage from the north to the existing, relocated southern drainage channel on the west side of the mobile home park will be eliminated as part of the process of restoring the northern drainage channel across the mobile home park. Wetland impacts are illustrated on SDEIS Figure 3.3-2.

The required permits for these activities will include an Individual Section 404 permit from USACE and Section 401 Water Quality Certification from NYSDEC. In addition, the City has agreed to apply for an Article 24 Freshwater Wetlands Permit.

In order to obtain wetlands permits from both NYSDEC and USACE, it is necessary to meet the standards for permit issuance. For the State, these standards are set forth in 6NYCRR 663 Freshwater Wetlands Permit Requirements. The first step in evaluating these standards is to identify whether or not the project is compatible with the accepted uses in Freshwater Wetlands and their 100 foot Adjacent Areas. The regulations indicate that the filling of Freshwater Wetlands is not considered a compatible use thus requiring an evaluation of “weighing standards” identified in 6 NYCRR 663.5(e). For Class II wetlands there are two standards that must be met:

- The proposed activity must be compatible with the public health and welfare, be the only practicable alternative that could accomplish the applicant's objectives and have no practicable alternative on a site that is not a freshwater wetland or adjacent area.

NOTES:

1. BASE MAP PREPARED BY CLOUGH HARBOUR & ASSOCIATES LLP FROM A MAY AND JUNE 2005 AND MARCH 2006 FIELD SURVEY.

2. NORTH ORIENTATION IS BASED ON EXISTING LANDFILL CONTROL.

3. CONTOURS AND ELEVATIONS BASED ON EXISTING LANDFILL DATUM.

4. SUBJECT TO ANY STATEMENT OF FACT AN UP–TO–DATE ABSTRACT OF TITLE WOULD DISCLOSE.

5. SUBJECT TO ALL RIGHTS, EASEMENTS, COVENANTS OR RESTRICTIONS OF RECORD.

6. UNDERGROUND UTILITIES ARE SHOWN BASED ON THE FIELD LOCATION OF SURFACE FEATURES COMBINED WITH INFORMATION FROM RECORD PLANS. THE ACTUAL LOCATION OF UNDERGROUND UTILITIES MAY DIFFER SOMEWHAT FROM WHAT IS SHOWN AND OTHERS MAY EXIST.

MAP REFERENCES:

1. MAP ENTILTLED "BOUNDARY SURVEY, PORTION OF LANDS NOW OR FORMERLY OF THE CITY OF ALBANY FORMERLY KNOWN AS FOXRUN MOBILE HOME PARK" AS PREPARED BY C.T. MALE ASSOCIATES, P.C., DATED JULY 17, 2001 AND LAST REVISED 8/16/01.

WETLAND	SIZE (sq.ft./acres)	FEDERAL JURISDICTIONAL	ISOLATED	STATE JURISDICTIONAL	ADJACENT AREA IMPACTS
A	15487.81 sq.ft./0.35 ac.	15487.81 sq.ft./0.35 ac.	NO	YES	
B	372937.45 sq.ft./8.56 ac.	372937.45 sq.ft./8.56 ac.	NO	YES	
C	53525.99 sq.ft./1.23 ac.	53525.99 sq.ft./1.23 ac.	NO		
D	6593.70 sq.ft./0.15 ac.	6593.70 sq.ft./0.15 ac.	NO		
F	29677.68 sq.ft./0.68 ac.	29677.68 sq.ft./0.68 ac.	NO		
G	7410.38 sq.ft./0.17 ac.	NO	7410.38 sq ft./0.17± ac.		
H	1163.70 sq.ft./0.03 ac.	NO	1163.70 sq.ft./0.03 ac.		
I	78203.07 sq. ft./1.80 ac.	78203.07 sq. ft./1.80 ac.	NO		
J	29303.39 sq. ft./0.67 ac.	29303.39 sq. ft/0.67 ac.	NO		
AA	1030472.84 sq.ft./23.66 ac.	1030472.84 sq.ft./23.66 ac.	NO	YES	6.5 ac.
DD	343.38 sq.ft./0.007 ac.	NO	343.38 sq.ft./0.007 ac.		
EE	2463.66 sq.ft./0.06 ac.	NO	2463.66 sq.ft./0.06 ac.	YES	
VP	4261.84 sq.ft./0.10 ac.	NO	4261.84 sq.ft./0.10 ac.	YES	
TOTAL	163184.89 sq.ft./ 37.46 acres	1616201.93 sq.ft./ 37.10 acres	15642.96 sq.ft./ 0.36 acres		

No. 1 WETLAND REVISIONS JWG 2/28/07

CITY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
ONE CONNORS BOULEVARD
ALBANY, NEW YORK

CHA
CLOUGH HARBOUR & ASSOCIATES LLP

Designed: 04/06 Drawn: CAP Checked: JG 02/28/07

ALBANY LANDFILL EASTERN EXPANSION

WETLAND IMPACT MAP

Issue Date: 02/28/07 Project No.: 12206 Scale: 1"=120'

Fig. 3.3-2

- The proposed activity must minimize degradation to, or loss of, any part of the wetland or its adjacent area and must minimize any adverse impacts on the functions and benefits that the wetland provides.

In addition, as specified in 6 NYCRR 663.5(e) for Class II wetlands, "A permit shall be issued only if it is determined that the proposed activity satisfies a pressing economic or social need that clearly outweighs the loss of or detriment to the benefit(s) of the Class II wetland."

These standards contain several parts that are addressed separately as follows:

<u>Public health and welfare</u> - This SDEIS fully demonstrates the public need and benefits of the Eastern Expansion. The wetland impacts will not pose any public health, safety and welfare risks. Although located adjacent to public lands, the expansion area is not adjacent to any public trails. Expansion of the landfill is essential to maintain solid waste disposal to the City of Albany and ANSWERS communities and provide sufficient time to identify and implement an alternative waste disposal option for the future that will not involve landfilling of wastes at the Rapp Road facility. The primary issue of public concern with the landfill and proposed expansion is the potential for odors. The odor problem has been addressed through several measures as discussed in SDEIS Section 3.8 and there have been significant, measureable improvements. With the technology in place to capture and destroy the methane from the existing landfill and the proposed expansion coupled with other measures to eliminate significant sources of odor causing materials, no significant odor impacts are anticipated from the proposed expansion.

<u>Only practicable alternative to accomplish applicant's objectives</u> – The alternatives analysis provided in SDEIS Section 5.0 along with the discussion of public need provided in Section 2.0 clearly shows that the Eastern Expansion is the only practicable alternative that will provide the capacity and lifetime sufficient to allow the City to evaluate and implement other solid waste disposal alternatives. There are other larger alternatives that would provide the City with more time to address their solid waste management needs. They included the northern and western expansions. However, the City recognizes that these alternatives are contrary to the Albany Pine Bush Preserve Commission goals for the Preserve and could possibly impact some significant habitat.

<u>No other practicable alternatives that do not involve impact to Freshwater Wetlands or their Adjacent Areas</u> – As discussed in SDEIS Section 5.0 and Appendix L, the only alternatives that

avoid wetland impacts and do not impact other important ecological resources are the overfill portion of the Eastern Expansion, referred to as the Wetland Avoidance Scenario, and the GAL Overfill (vertical expansion). The latter alternative is not technically feasible. Although it could be engineered, the existing steep side slopes prevent the provision of any significant landfill capacity (only about 1.2 years) without a lateral expansion and present a high potential for settlement and subsequent failure of both the liner and leachate collection systems. The Wetland Avoidance Scenario provides very little capacity (2.8 years) with a significant cost associated with moving existing infrastructure. Combination of the two scenarios is not feasible, as previously discussed for the GAL overfill.

Minimization of Impacts to Wetlands – The City has gone to great lengths to avoid impacts to wetlands and other important ecological communities. The proposed Eastern Expansion will partly involve an expansion on upland areas that are currently developed with landfill infrastructure and buildings. In order to accommodate this expansion, infrastructure will be relocated and new buildings constructed on adjacent private lands that will be purchased at a significant cost to the City. The remaining expansion has been limited to City land that has not been dedicated to the Preserve. This area has been fully investigated through wetland delineation and detailed assessment of vegetation, soils, hydrology, and habitat characteristics. The analysis shows past degradation to this area which is documented in the SDEIS Section 3.3 and Appendix D. As originally planned, the Eastern Expansion would result in grading to all property limits, resulting in approximately 5.60 acres of impact. The habitat assessments for the surrounding area suggest that the habitat to the east of the expansion area is of higher quality and should be protected. The result is the proposed layout that pulls the slopes in on the east side, protecting the habitat to the east and reducing the wetland impacts to 5.05 acre. Concern was also raised by NYSDEC regarding the grading activity along the eastern side of the landfill to the south of the expansion area. This area is adjacent to NYSDEC lands and a large wetland occurs at the toe of slope which could be impacted by grading and sedimentation. The grading in this area involves slope stabilization. The slope is existing and the grades will not change significantly. However, in recognition of NYSDEC concerns, this area will be treated as part of the habitat restoration work and will be stabilized with plantings shortly after the landfill grading is complete. Additionally, the wetland at the toe of slope will be protected from sedimentation with silt fence and an orange snow fence construction barrier will be erected to prevent any unintentional incursions.

Economic or Social Need - Currently, the operation of the landfill provides approximately $13 million in revenues. This money is used to pay for the City's solid waste and recyclables collection services ($3,069,000) and annual debt service for bonds issued for solid waste related projects ($2,376,100), for a total of $5,445,100. The remaining revenue is paid into the general fund to reduce the total tax burden on the residents of the City of Albany, paying for many City services. In the event the Eastern Expansion were not approved, the City would not only have to find an alternative source of revenues for these costs, including the costs associated with various other City services, it would incur an additional $4,705,000 per year in transfer and hauling costs and the operation of a transfer station (see SDEIS Section 5.5.7 - p. 5-32) since transport to an off-site regional landfill would be required.

Other beneficiaries would also suffer. The portion of the tipping fee that currently goes to the Albany Pine Bush Preserve would be eliminated and funding would not be available for the Habitat Plan discussed in SDEIS Section 2.8. The other ANSWERS communities would also likely be faced with higher costs. The Albany landfill provides a consistent, reasonably priced solution for solid waste management. Although it is understood that the long term alternative may well be a long haul transport of solid waste to a regional landfill, the time provided by the Eastern Expansion provides the communities with ample time to plan for the fiscal implications and participate in the process of selecting an appropriate solution.

Other expansion alternatives that avoid wetland impact (SDEIS Section 5.2) are either not feasible or result in too little time to properly plan for and implement a long term solution.

Based on the detailed field assessment of the wetlands within the expansion area, it has been determined that the wetlands are disturbed (see p. 3-61 for a definition of “disturbed”) and in their current state do no provide significant functions and benefits. One of the major elements of the Habitat Plan (Section 3.3.2.2) is to restore the historic drainage patterns across the mobile home park and eliminate the ditching and drain tiles that have dewatered the wetlands and promoted the degradation of these communities. These efforts are designed to improve water quality and enhance existing and proposed wetland communities.

The elimination of the wetlands in the expansion area will allow for the expansion of the landfill to address current needs for the ANSWERS communities and help them prepare for a long term solution for solid waste management. The economic and social needs for the expansion significantly outweigh the costs for the loss of these wetlands. Furthermore, the expansion provides the means to implement a comprehensive habitat plan that will address both mitigation, restoration and re-establishment of Pine Bush communities through a critical east-west link, and enhance existing upland and wetland ecology.

The federal standards are provided in the Section 404(b)(1) guidelines found in 40 CFR Part 230. Like the above State standards, the federal standards focus on the least damaging practicable alternatives and require that projects evaluate alternatives that avoid and minimize the impacts to aquatic resources. The guidelines also recognize that the alternatives should not result in other non-aquatic impacts that would be damaging to the environment. The avoidance and minimization of impacts to sensitive ecological communities, including wetlands, have been a key component throughout the process of siting and designing the proposed expansion and have been thoroughly explored in SDEIS Sections 2.0, 5.1 and Appendix K (Alternative Sites Analysis). A comprehensive alternatives analysis report is also provided in SDEIS Appendix L to facilitate review.

To summarize, the western expansion alternatives would impact less wetland but would likely result in significant impacts to State and federally listed threatened and endangered species. The northern expansion alternative would impact approximately 2.5 acres of wetland and would be contrary to the intent of the mobile home park to be restored to pine barrens and provide an east-west linkage.

Design alternatives included two wetland avoidance scenarios and a full build-out scenario that was initially proposed as the preferred alternative. The latter was rejected in favor of a more habitat-sensitive layout that is the current preferred alternative. All of the design alternatives are discussed in detail in SDEIS Section 5.2. The two wetland avoidance scenarios are not cost effective due to the limited life of the facility. Relocation of existing site infrastructure for the wetland avoidance scenario will cost approximately $4 million on top of the costs to construct the new landfill cell and is not feasible since it would significantly limit capacity and reduce landfill life to about 2.8 years. This will not provide sufficient time to address long term solid waste management plans nor would it be cost effective due to the need for relocation of significant infrastructure.

The modified layout, also referred to as the habitat protection scenario (SDEIS Section 5.2.3), would reduce wetland impacts from 5.6 acres down to 5.05 acres. The benefit is potentially less impact to more sensitive wetlands and other habitat to the east by avoiding stream relocation through these areas. There would be a reduction of landfill capacity resulting in a decrease in landfill life from approximately 6.6 years down to 6.5 years. The City has agreed to evaluate the habitat protection scenario as the preferred alternative.

Based on the exhaustive analysis of alternatives that has occurred over a period of several years documented in SDEIS Section 5.0 and Appendix L coupled with the detailed analysis of site conditions documented throughout this SDEIS and specifically in Section 3.3 and Appendix D for ecological resources, there are no other practicable alternatives that meet the City's needs to continue uninterrupted solid waste management services until a suitable alternative is identified and implemented through the new SWMP. Other alternatives with sufficient capacity that would result in less wetland impact were evaluated and presented in this SDEIS, however they would potentially result in significant impact to high quality and unique ecological communities (western expansion) or would create barriers that would significantly limit the Pine Bush Preserve Commission's goal to link habitat (Preserve lands) from east to west.

Since the expansion is occurring adjacent to the existing landfill operations, it will not cause significant fragmentation of wetlands and other ecological systems. The expansion area contains no habitat for rare, threatened and endangered species and no rare communities. It has not been identified by the Pine Bush Management plan as containing any significant Pine Bush characteristics. There are no cultural resources within this area and the land is not dedicated to the Preserve.

Mitigation for both the wetland and ditched stream impacts is addressed in the Habitat Plan presented in Section 2.8. Figure 2-5 illustrates the various wetland mitigation areas and communities proposed as part of the plan. The primary mitigation for wetland loss will be the creation of riparian wetland corridors associated with the relocated and restored streams. Unlike the existing wetlands, the new stream work will result in broad riparian corridors, restoration of floodplain forests, and improved water quality and habitat. In addition, there are opportunities to create a bog, sedge meadow, and red maple hardwood forest. And, unlike many mitigation plans that do not have the opportunity to connect to other significant areas of protected habitat, the 25 acres of wetland creation will be part of a 250 acre restoration and enhancement project that will further connect to hundreds of acres of preserved lands.

Key to the success of restoring Pine Bush terrestrial and aquatic communities is the study of high quality reference areas within the Preserve. Detailed vegetation, soils and hydrology data have been collected and analyzed from the reference areas and compared to records in an extensive literature search. Additional hydrology monitoring, critical for the success of the wetland communities, is ongoing and includes groundwater elevations, vernal pool/pond surface water elevations, and stream flow and water quality. Surface and groundwater monitoring methodology is discussed in Appendix D.

Acceptable mitigation for the loss of wetland is the replacement of the lost wetland functions and values. The Habitat Plan provides the opportunity to replace and improve upon the lost functions and to provide much higher quality habitat over the existing conditions. The following wetland communities are proposed:

- Riparian Forested Wetland (in restored drainage channels) – 19.57 acres
- Bog – 1.04 acre
- Sedge Meadow – 0.76 acre
- Biofilter Wetland – 0.69
- Forested Wetland Enhancement (repair hydrology & remove invasives) – 25-30 acres
- Restored and enhanced stream channel – Approximately 3,500 linear feet

The above proposed acreages for the various aquatic ecological communities exceed the typical regulatory compensation ratios of 2:1 for forested wetland, with stream channel loss replaced in kind and enhanced. It is also important to note that all of the mitigation efforts have a purpose in the overall restoration of Pine Bush habitat. All of the existing communities and in particular the wetland communities have been modified. The Habitat Plan was not created with regulatory mitigation requirements as the primary focus. Rather, the intent of the proposed aquatic communities within the proposed pine barrens and enhanced forested habitats was to improve water quality, restore the health of existing wetlands and former stream channels, diversify habitat, and reintroduce lost communities (bog). And by conducting detailed field analysis at the beginning of the concept stage, all this work will be done with the utmost sensitivity to the important existing rare communities associated with the Pine Bush.

No significant secondary impacts to waters of the U.S. have been identified for the project. Existing wetland corridors to the north of the proposed Expansion Area will maintain hydrology through their use as the re-established drainage corridors, as identified in the Habitat Plan. The existing power line easement will be relocated onto the proposed landfill Expansion Area (toe of the landfill) and will not be relocated onto undeveloped lands. Therefore, no trees and other vegetation will be cut for this relocation.

3.3.2.2 Restoration Area

The entire Restoration Area includes primarily degraded communities. Within highly disturbed areas such as the mobile home park and adjacent disturbed sands area to the west, full restoration is proposed. Disturbance of the existing highly degraded communities within these areas will be necessary to create the desired Pine Bush habitat. As previously noted, such disturbance will not impact any rare or vulnerable species of plant or animal. To the east of the mobile home park are forested lands and some open lands that are conducive to both enhancement and restoration. Within existing forested communities, the intent is to enhance the community by eliminating invasive species that can dominate the community. These areas are referred to on Figure 2-5 as Upland Forest Buffer Enhancement (Appalachian oak pine forest).

Past agricultural ditching and draining of the wetland located to the east of the proposed expansion (State land) has allowed for the introduction of invasive species and degraded water quality. Modifications to this system (enhancement) will improve/restore the hydrology of this wetland and eliminate the invasives in favor of native wetland species and improved habitat. This work is not intended to significantly change the hydrology to the extent that the community type changes from forested to meadow, for example. Careful manipulation of the hydrology based on data collected in the field will assure the forested wetland remains forested.

The western extent of the restoration area, in the vicinity of the mitigation pond, contains some rare species and habitats such as the vernal pond and known areas of wild lupine. The frosted elfin is also known to occur in this area. The purpose of the Habitat Plan is to restore the rare Pine Bush communities that once occurred throughout this area. This work will be done with the utmost care and respect for existing rare communities and species. Actual work areas will be evaluated and delineated to prevent any unintended impacts. All work will be monitored by experienced ecologists. More information is provided in the detailed plans for restoration provided in SDEIS Appendix D. Based on these plans, the following ecological communities will be affected:

- Approximately 4.40 acres of ditches and disturbed or degraded wetlands will be enhanced in support of a total of approximately 53 acres of restored and enhanced wetland communities.
- Approximately 0.38 acre of degraded wetland will be graded and filled to accommodate the biofilters and stream corridors.
- Approximately 1,100 linear feet of ditches will be converted to wetland and stream. Overall, approximately 3,500 linear feet of stream corridor will be created.
- Creation and restoration of approximately 200 acres of disturbed lands (mobile home park, adjacent disturbed sands area, landfill, and degraded upland communities) to pine barrens and pitch pine/oak forest.

3.4 ALBANY PINE BUSH PRESERVE

3.4.1 EXISTING CONDITIONS

The Albany Pine Bush is identified as an inland pine barrens ecosystem; a globally rare community and one of only 20 such ecosystems in the world. It is generally characterized as a pitch pine-scrub oak community (see Section 3.3 for an in-depth discussion of the ecological communities) that has adapted to the dry conditions (glacial sand deposits) and periodic fires, once common to the area. The ecosystem formerly occupied a 40 square mile area between Albany and Schenectady and is a remnant of a glacial lake that extended from Glens Falls to Newburgh.

Early in the development history of the Capital District, it was considered a wasteland and generally avoided, although the remnants of historic uses such as roads and homes attest to some rural uses of this area. However, development gradually increased over time and today most of the original Albany Pine Bush lies beneath roads, businesses and homes. Currently, there are approximately 2,615 fire manageable acres of the Albany Pine Bush left that supports existing pine barrens communities or could be restored to pine barrens. Of this total, approximately 1,850 acres are protected within the Albany Pine Bush Preserve.

In an effort to preserve the ecosystem, NYSDEC purchased 450 acres in 1973. Additional land was acquired by the City of Albany, the NYS Office of Parks, Recreation and Historic Preservation (OPRHP), the Towns of Colonie and Guilderland, and The Nature Conservancy (Environmental Design & Research, P.C. 1993).

Land within the Pine Bush was characterized by the NYS Natural Heritage Program in 1984 as pitch pine-scrub oak barrens and pine barrens vernal ponds. Boundaries were established around high quality areas (Primary), fire suppressed areas providing important buffers (Secondary), and protected lands. In the mid-1980's, several Environmental Impact Statements were prepared for developments in the area. One of the studies indicated that approximately 2,000 acres of fire-manageable Pine Bush must be protected in order to preserve the ecosystem (Environmental Design & Research, P.C. 1993, 2002). This remains a goal of the Albany Pine Bush Preserve Commission.

In 1988, the NYS Legislature established the Albany Pine Bush Preserve Commission (APBPC), comprised of representatives from NYSDEC, OPRHP, The Nature Conservancy (TNC), Albany County, City of Albany, Town of Colonie, and the Town of Guilderland. The APBPC is charged with managing the newly established Pine Bush Preserve (consisting of previously protected lands), and the preparation of a Management Plan.

The preserve lands are tied together through the APBP study area boundary, also known as the Project Review Area.

Prepared in 1993 and last updated in 2002, the Management Plan identifies several problems facing the Pine Bush ecosystem due to development. Suppression of naturally occurring fires has allowed the invasion of more aggressive plant species and has required the use of controlled burns that require significant resources. This has led to a shrinking of the Karner blue butterfly (*Lycaeides melissa samuelis*) habitat, which requires open areas (pine barrens) and the wild lupine to survive. Deer populations have increased due to limited hunting opportunity. Also, since the preserve is not well defined, uncontrolled access and illegal dumping are concerns.

The 2002 Management Plan builds upon the vision and goals for the Preserve initially expressed in the 1993 Management Plan and its supplement, the "Albany Pine Bush Preserve: Protection and Project Review Implementation Guidelines and Final Environmental Impact Statement" (Albany Pine Bush Preserve Commission 1996). The 2002 management goals include the following:

- Protect and manage a viable pitch pine-scrub oak barrens community with the objectives of 1) achieving 2,000 acres of pitch pine-scrub oak barrens that can be managed by fire and 2) continuing and expanding ecological management programs to re-establish the plant and animal species native to pitch pine-scrub oak barrens.
- Protect and manage linkages to reduce or eliminate habitat fragmentation within the Preserve, provide dispersal opportunities for species, infill lands to create connections, and establish Karner blue butterfly subpopulations within linkages to achieve recovery goals for the species. - These include lands that do not necessarily contain significant habitat but provide connection between significant areas. This is particularly important for Karner blue butterfly habitat to allow linkage between existing and potential habitat.

- Protect and manage buffers by acquiring lands or easements adjacent to Preserve lands to buffer the preserve from development and other uses inconsistent with the use and management of the Preserve; by maintaining existing open space parcels through agreements with the owners of these parcels; by encouraging farmland protection; and by developing smoke easements with adjacent landowners.

- Protect and manage significant cultural and environmental resources by protecting lands containing the remaining isolated Karner blue butterfly subpopulations; by monitoring and managing the Preserve's fish and wildlife resources to be consistent with existing habitat; by protecting and managing wetlands, streams, ravines, and pine barrens vernal ponds; and by protecting historic and prehistoric cultural resources.

- Maintain and enhance public access to the Preserve by maintaining trails for various recreational uses; by planning for trails on newly acquired parcels; by providing opportunities for public observation and use of ecological/wildlife resources (eg, hunting); by segregating and restricting incompatible uses in sensitive areas; and by monitoring uses and enforcing restrictions.

- Enhance and expand education and outreach efforts by creating greater public awareness of Pine Bush ecology and by increasing the visibility of the Preserve and developing a sense of public stewardship.

If full protection goals are met, approximately 4,610 acres of land within Town of Colonie, Town of Guilderland, Village of Colonie and City of Albany, could be included as preserve lands or otherwise protected through easements, dedications, or other voluntary preservation. Of this total, approximately 2,615 acres of existing and restorable pitch pine-scrub oak barrens would be preserved and fire managed. Today, protected lands within the Preserve include approximately 3,010 acres.

3.4.2 POTENTIAL IMPACTS & MITIGATION

The 2002 Management Plan identifies full and partial protection lands and other open spaces that are desired to meet the vision and goals of the Plan (Figure 17, Environmental Design & Research, P.C. 2002). The proposed Eastern Expansion includes approximately 13 acres of City-owned lands that have been identified in the Plan as recommended for full protection (Figure 17, parcel 15b, Environmental Design & Research, P.C. 2002). The parcel is primarily comprised of forested wetland with some forested upland areas. It does not contain pine barrens habitat. The ecology of this parcel is discussed in SDEIS Section 3.3.

Although the APBPC staff have expressed their belief that a portion of this land is restorable to pine barrens, the predominance of sizeable oaks on the upland islands, the proximity of upland directly adjacent to existing landfill operations, and the significant wetland component suggests the intent for this land is as a buffer and habitat linkage. This assumption is supported by the 2002 Management Plan that ranks the parcel high for both linkage and buffer and very low for establishment as pine barrens, Karner blue butterfly habitat, and water resources (Environmental Design & Research, P.C. 2002, Table 11, p. 65 and Figures 12-17).

The Rapp Road landfill itself is recommended in the Plan to be preserved as open space (Figure 17, parcel 23, Environmental Design & Research, P.C. 2002).

Construction of the Eastern Expansion would convert approximately 13 acres of land proposed by the APBPC for full protection from wetland and forested upland (non-pine barrens) to landfill. Although the project would eliminate the existing natural communities within this area, the Habitat Plan (Section 2.8) calls for the re-establishment of pine barrens across the closed and capped landfill. Therefore, unlike some other forms of development, the impact to the Management Plan goals will not be compromised. The expansion area and a large portion of the remaining landfill will be converted to pine barrens. Since the landfill was not conceived as a full protection area, let alone potential pine barrens habitat, there will be a net benefit of approximately 100 acres of pine barrens.

The 2002 Management Plan indicates that between 1996 and 2002, approximately 130 acres of land designated as full protection in the 1996 addendum to the 1993 Management Plan have been lost to development. Conversations with APBPC staff indicate that additional full protection lands have been lost since 2002 but the numbers are yet to be compiled. The Habitat Plan would reclaim approximately 100 acres of pine barrens lost to development elsewhere through restoration of the landfill cap. Additionally, the Habitat Plan re-establishes an important linkage between existing Preserve/pine barrens west of the landfill to the Preserve lands to the east. Thus, there is an overall net benefit to the Preserve with the proposed Eastern Expansion.

3.5 LAND USE & COMMUNITY CHARACTER

3.5.1 EXISTING CONDITIONS

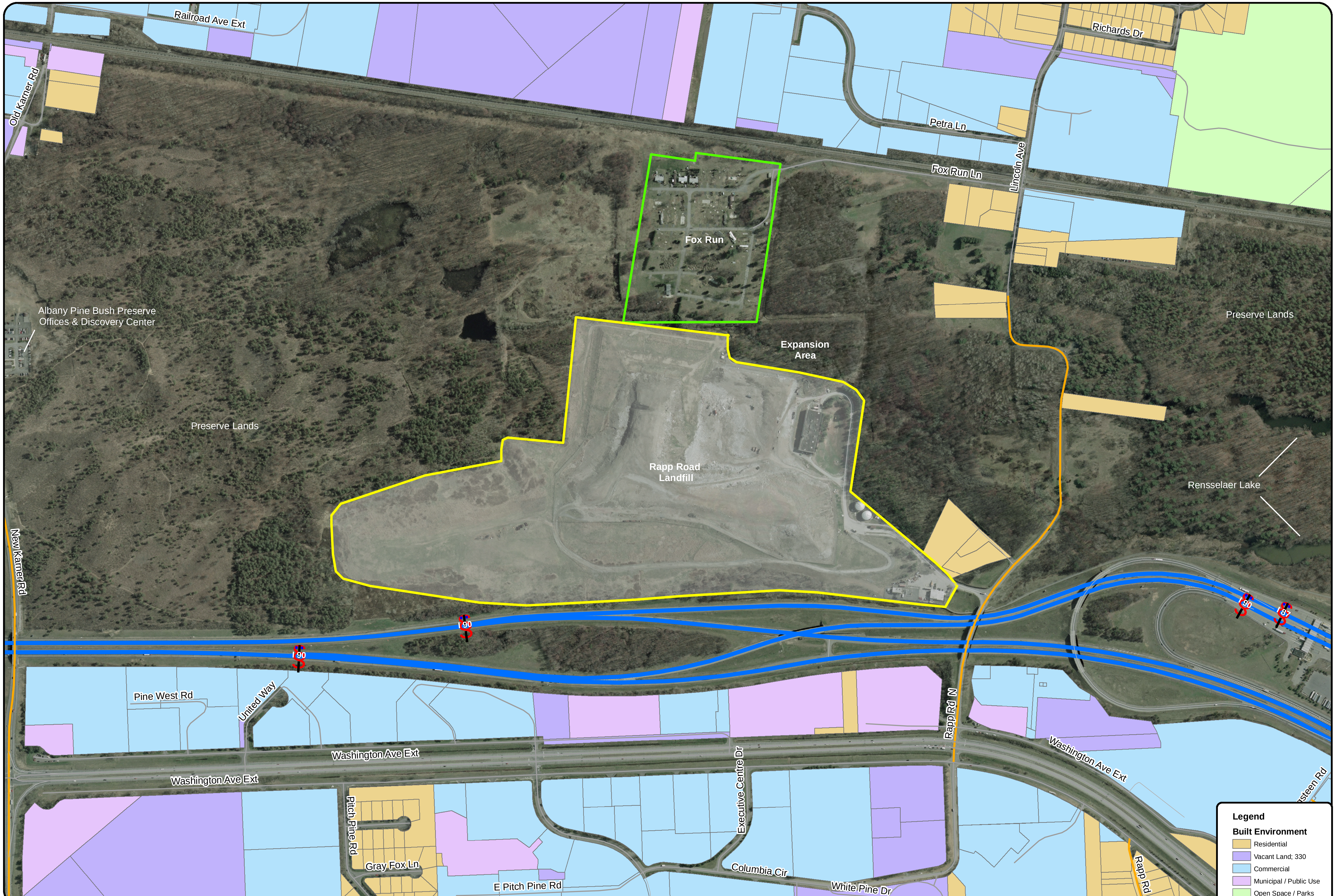
The project area is located north of the New York State Thruway (I-90), west of Rapp Road, and south of Fox Run mobile home park and the railroad tracks, within the City of Albany. The Eastern Expansion is proposed to extend onto approximately 15 acres of developed land and natural areas owned by the City of Albany. Within this area, three municipalities border each other. The northern boundary of the Expansion Area is the City of Albany-Town of Guilderland municipal boundary. The Town of Guilderland occupies an approximately 400 foot wide swath of land between the City of Albany and the Village of Colonie.

Existing land uses within the vicinity of the proposed expansion are illustrated on Figure 3.5-1. Immediately north of the expansion area and the existing landfill is the former Fox Run mobile home park. This land was purchased by the City and dedicated to the Albany Pine Bush Preserve. Some residents still occupy the property but it is anticipated to eventually be available for the implementation of the Habitat Plan. Albany Pine Bush Preserve lands are located to the east and west of the landfill. Also immediately east of the landfill is a parcel of State-owned land that is managed by the Albany Pine Bush Preserve Commission (APBPC) but not yet dedicated to the Preserve.

Residential uses in the project vicinity include single-family homes along Rapp Road, along Lincoln Avenue and other side streets north of the railroad in the Village of Colonie, and south of Washington Avenue Extension. Also on the south side of Washington Avenue Extension are senior housing, including Avila and the Teresian House.

Commercial uses including light industrial occur to the north of the railroad in the Village of Colonie. Commercial office and retail are the predominant land use type along Washington Avenue Extension.

Zoning within the project vicinity is illustrated on Figure 3.5-2. In comparison with Figure 3.5-1, the existing land uses are generally consistent with the zoning. The landfill is currently zoned Industrial, including the expansion area.



No.	Submittal / Revision	App'd	By	Date

City of Albany
Department of General Services
One Connors Boulevard
Albany, New York

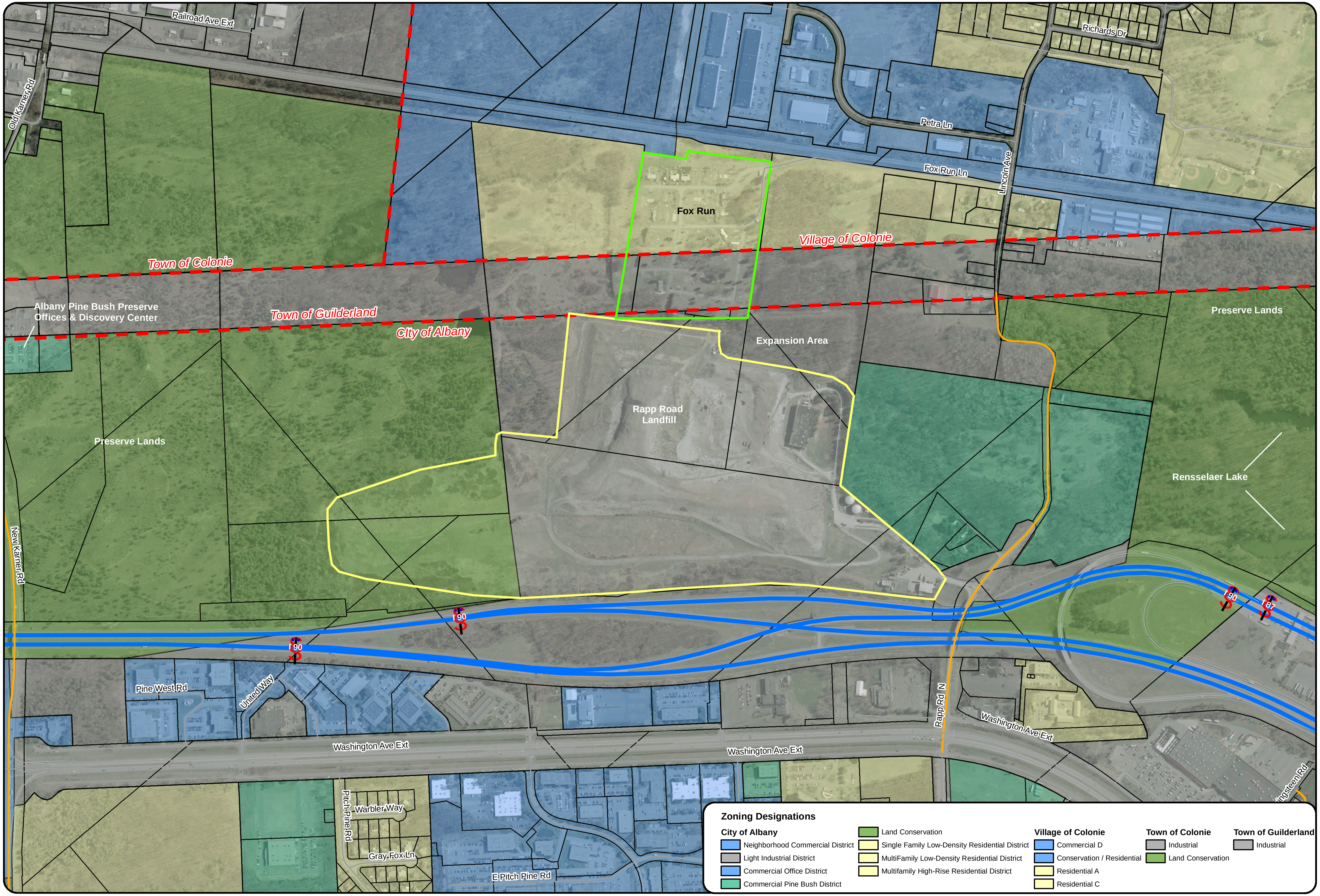
CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, P.O. Box 5269 • Albany, NY 12205-0269
Main: (518)453-4500 • www.cloughharbour.com

Rapp Road Landfill Eastern Expansion

Existing Land Use Map

Issue Date: 04/07 Project Number: 12260 Scale: 1" equals 600'

Figure 3.5 - 1



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City of Albany
Department
of General Services
One Connors Boulevard
Albany, New York

CHA

CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, P.O. Box 5269 • Albany, NY 12205-0269
Main: (518)453-4500 • www.cloughharbour.com

Rapp Road Landfill Eastern Expansion

Zoning Map

Issue Date: 04/07 Project Number: 12260 Scale: 1" equals 600'

Figure 3.5 - 2

3.5.2 POTENTIAL IMPACTS & MITIGATION

Landfill operations are an intensive use and generally not compatible with residential and other low intensity uses. As shown on figure 3.5-1, residential neighborhoods are buffered from the landfill by commercial uses. The exceptions to this are the residences along Rapp Road and those mobile homes that remain in Fox Run. The uses along Rapp Road are buffered from the landfill by dense forested lands that are permanently protected. The properties located near the landfill entrance will be used to relocate the landfill offices and other facilities. The remaining residents of the mobile home park will eventually move out to allow for implementation of the Habitat Plan.

The Eastern Expansion of the landfill would place the active landfill area closer to the residences on the northern portion of Rapp Road. The potential impacts of landfill operations include odor, noise, and safety hazards. The active portion of the landfill will be fenced off and not accessible to the public, thus significantly limiting safety hazards to the general public. Odor and noise impacts are addressed in Sections 3.8 and 3.9, respectively.

In general, landfill operations may affect the use and enjoyment of the trails within the Albany Pine Bush Preserve located in the immediate vicinity of the landfill. However, these impacts are not expected to be any more significant than current conditions. The existing active portion of the landfill is in an area where there are no immediately adjacent trails. The proposed expansion would move the working face further to the northeast where no formal trails exist.

The Eastern Expansion will provide the means to implement the Habitat Plan. As envisioned, the Plan will convert the mobile home park to the north of the landfill to Pine Bush ecological communities and, upon closure, will convert the landfill to pine barrens. These efforts will integrate the landfill and the mobile home park into the ecology of the Pine Bush and will open up some new opportunities for public access to newly created habitat and provide Preserve linkages east and west that currently do not exist. Therefore, the landfill and mobile home park will no longer present barriers or incompatible uses but will become part of the Preserve system, which will be a very significant public benefit.

3.6 VISUAL RESOURCES

3.6.1 EXISTING CONDITIONS

Rapp Road Landfill is currently permitted for a maximum height of 460 feet above mean sea level (AMSL) which is known as the approved P4 height in the photosimulations (photosims). Following the proposed landfill expansion, the landfill will have a final height of approximately 470 feet AMSL. Views of the landfill from surrounding lands are somewhat limited by the presence of forest and other vegetation. Since the project site already contains a landfill, pre-existing visual impacts linked to current operations must be recognized while evaluating the aesthetic implications of landfill expansion.

Mixed deciduous and evergreen vegetation surrounds the landfill site and provides visual buffering that varies seasonally with annual leaf on/leaf off periods. Vegetation in key locations will continue to mature into the future and visual buffering will be progressively enhanced.

Aesthetic resources existing in the area directly surrounding Rapp Road Landfill include the Albany Pine Bush Preserve and Rapp Road Historic District. Viewer groups, or sensitive receptors, are identified for the purposes of visual impact assessment and include motorists, property owners, and visitors to the Pine Bush Preserve. Six locations have been identified as Key Views within the study area and nine locations were identified as Key Views within the Pine Bush Preserve. Clough Harbour & Associates LLP (CHA) has addressed the potential impacts that would be experienced at these key viewpoint locations and by sensitive receptors. The complete Visual Impact Assessment conducted by CHA is attached as Appendix H.

Figure 1 presents an aerial view of the existing landfill, as well as surrounding land uses, which include preserved lands and other open space, residential and commercial structures, rail lines, local roads, and highways.

3.6.2 POTENTIAL IMPACTS & MITIGATION

In order to assess the visual/aesthetic concerns of a landfill expansion, CHA prepared a Visual Impact Assessment consistent with NYSDEC Policy DEP-00-2.

Visual concerns within a one-mile radius were addressed as part of the Visual Impact Assessment. This radius was deemed appropriate because the study area has relatively flat topography and is largely covered by dense vegetation. More importantly, the appearance of the expansion will be consistent with the visual characteristics of existing landfill components.

Each of the four alternative expansion scenarios described in Section 2.2 were evaluated in the visual impact assessment for the six key views within the study area. Alternative 5 is not included in this analysis since it is not a technically feasible alternative. Figure 2-3 in Section 2.2 illustrates the footprint of each alternative scenario. Alternative 3 is the proposed Eastern Expansion and preferred alternative therefore the key views within the Pine Bush Preserve were evaluated using only this alternative. Under Alternative 3, approximately 25 acres on the existing landfill operations, including areas containing roads, buildings and other infrastructure, would be converted to landfill space by overfilling. An additional 13-acres would be part of a lateral expansion onto adjacent City-owned property to the northeast of the existing landfill that includes primarily natural areas.

The Final Viewshed Maps document areas for each of the alternatives where there is a potential for visibility by using a blue cross-hatch pattern. The orange cross-hatching marks areas where views of the proposed expansion are obstructed by topography only. Vegetative and structural features are not considered, thus depicting a "worst-case scenario". Balloon tests were performed to identify locations from which the landfill expansion would be visible at its maximum height. The green lines on the roads indicate that during the field visit the balloon representing the proposed expansion was not visible. The red lines on the roads indicate areas where the balloon could be seen. It is important to note that only public areas such as right-of-ways, parks or schools were visited during the field evaluations. It is assumed that if the balloon is not visible from the street right-of-way the landfill expansion will not be visible from the adjacent residential properties or conversely, if the balloon is visible from the street the landfill expansion would be visible from the adjacent residences.

3.6.2.1 Viewer Groups

CHA identifies two viewer groups that would potentially be affected by the visual impacts associated with landfill expansion.

Motorists – The greatest impacts to motorists' views would occur from I-90 (NYS Thruway) while traveling east or west, NYS Route 155 at its bridge over I-90, portions of

South Frontage Road, and portions of Washington Avenue Extension. Depending on a motorist's speed and location, the landfill expansion may be visible for approximately 1 to 39 seconds. Washington Avenue and South Frontage Road motorists will see portions of the expansion for the most prolonged periods of time. However, intervening vegetation and other variable factors will tend to limit visual impacts from along these roadways.

Property Owners / Visitors to the Pine Bush Preserve – Based on the Final Viewshed Maps and field observations, there are no residential units which would have views of the landfill expansion. The project would have the greatest impact to the businesses off of South Frontage Road. Views of the site would be mitigated by the continued growth of existing vegetation in the foreground and midground.

Those using the trails in Blueberry Hill East and the Karner Barrens at the Albany Pine Bush Preserve will have both filtered and direct views of the landfill as they presently do. Future trails associated with the proposed Habitat Plan could be located in the vicinity of Alternative 3 (preferred alternative).

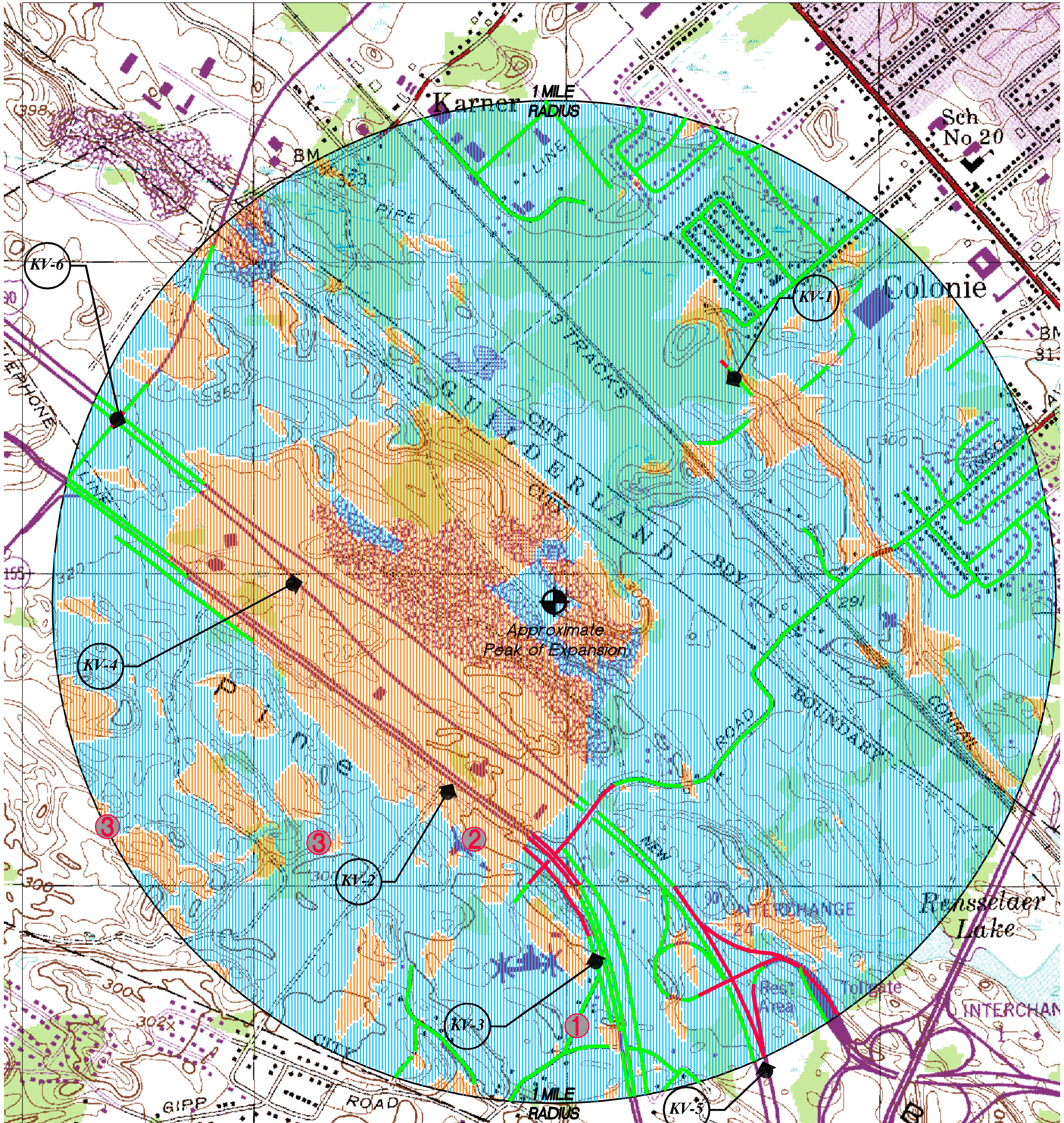
3.6.2.2 Aesthetic Resources

Primary sensitive receptor locations within the one-mile landfill radius were identified. Two of these receptors would potentially be affected by landfill expansion visibility: Albany Pine Bush Preserve and the Rapp Road Historic District. These aesthetic resources are marked on the Final Viewshed Map for Alternative 3, Figure 3.6-1viewshed maps for the other three alternatives are in the VIA, Appendix H). VIA Figure 3.6-2 represents key view areas within the Pine Bush Preserve exclusively. Field tests were performed to determine actual visibility.

The Rapp Road Historic District was discounted as a potential viewer group because landfill views are obstructed. There is visibility from some trails within the Albany Pine Bush Preserve currently and it should be noted that the landfill is located adjacent to dedicated Preserve lands that can be accessed via existing and potential future trails.

3.6.2.3 Key Viewpoints

There are six Key Viewpoint locations from which the landfill expansion will be visible within the study area and five within the Pine Bush Preserve. The Key Viewpoints are representative of



LEGEND

APPROXIMATE CENTER OF PROPOSED LANDFILL EXPANSION

KEY VIEW PHOTOGRAPH & SECTION LOCATION

EXPANSION POTENTIALLY VISIBLE BASED SOLELY ON TOPOGRAPHY ABSENT VEGETATION

PORTIONS OF EXPANSION VISIBLE (WITHIN PUBLIC RIGHT-OF-WAYS)

EXPANSION NOT VISIBLE DUE TO VEGETATION AND/OR BUILDINGS (SEE NOTE BELOW)

EXPANSION NOT VISIBLE DUE TO TOPOGRAPHY (INTERPOLATED FROM USGS MAPPING)

POTENTIAL RESOURCES

0 1200 2400

Scale in feet

N

AESTHETIC RESOURCES:

1. RAPP ROAD HISTORIC DISTRICT
2. TERESIAN HOUSE
3. PINE BUSH PRESERVE

NOTE:

AREAS ON THIS VIEWSHED MAP DEPICTING LOCATIONS OF LANDFILL VISIBILITY WERE DETERMINED FROM FIELD VERIFICATION DURING BALLOON TEST. AREAS ON THIS MAP THAT ARE DEPICTING LOCATIONS SCREENED BY TOPOGRAPHY WERE INTERPOLATED FROM EXISTING USGS MAPPING. THIS MAP IS NOT INTENDED TO BE UTILIZED FOR PRECISE VIEWSHED DETERMINATIONS ON PRIVATELY OWNED PROPERTY OR LANDS NOT ACCESSIBLE VIA PUBLIC RIGHT-OF-WAYS. VIEWSHED INFORMATION SHOWN ON PRIVATELY OWNED LANDS ON THIS MAP WAS INTERPOLATED FROM EXISTING VEGETATION MAPPING AND WAS NOT FIELD VERIFIED.

No.	Submittal / Revision	Appr'd	By	Date

city of ALBANY

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CHA
CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, PO Box 5269 · Albany, NY 12205-5269
Main: (518) 453-4500 www.cloughharbour.com

Designed: JEC | Drawn: JEC | Checked: NJS

CITY OF ALBANY DGS
RAPP ROAD LANDFILL EXPANSION

ALTERNATIVE 3
VIEWSHED MAP

Issue Date: Jan. 2007 | Project No.: 12206 | Scale: 1" = 1200'

FIG 3.6-1

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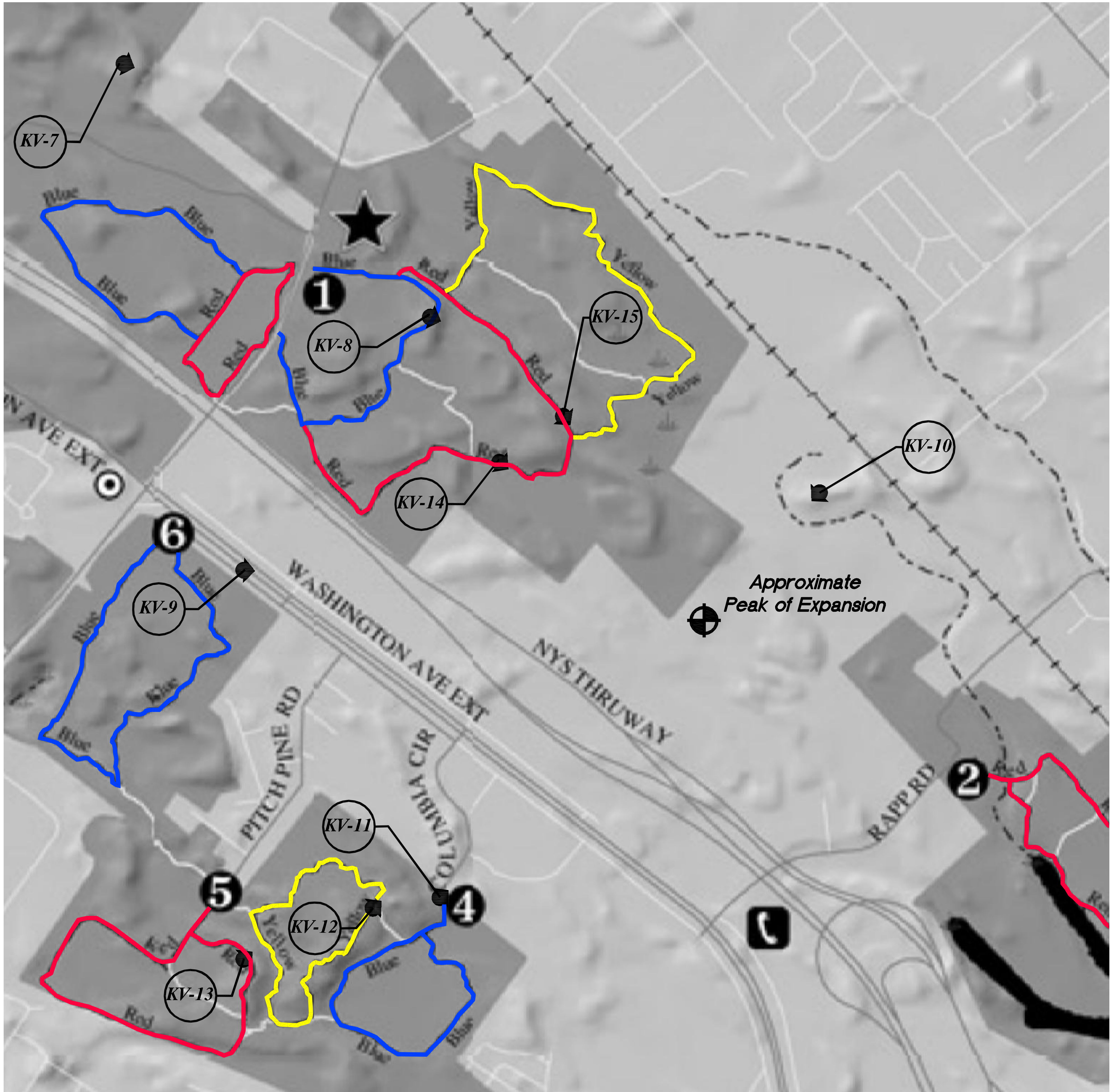

Legend

Albany Pine Bush Preserve

PHOTO LOCATIONS:

KV–7 VIEW FROM TRAIL OFF OLD STATE ROAD.
SITE POTENTIALLY VISIBLE

KV–8 VIEW FROM OVERLOOK DUNES
SITE VISIBLE

KV–9 VIEW FROM WESTERN FRONTAGE ROAD
FILTERED VIEWS TOWARD SITE

KV–10 VIEW FROM HILL AT FOX RUN TRAILER PARK
SITE VISIBLE

KV–11 VIEW FROM BLUEBERRY HILL EAST TRAIL HEAD
FILTERED VIEWS TOWARD SITE

KV–12 VIEW FROM BLUEBERRY HILL EAST BLUE TRAIL
SITE NOT VISIBLE

KV–13 VIEW FROM BLUEBERRY HILL EAST RED TRAIL
SITE NOT VISIBLE

KV–14 VIEW FROM RED TRAIL
SITE NOT VISIBLE

KV–15 VIEW FROM RED TRAIL NEAR BASE OF EXISTING LANDFILL
SITE NOT VISIBLE

0 1000 2000
Scale in feet

N

NOTE:

BASE MAP WAS CREATED USING THE ALBANY PINE BUSH TRAILS MAP FROM THE ALBANY PINE BUSH PRESERVE WEBPAGE.

city of ALBANY

CLOUGH HARBOUR & ASSOCIATES LLP

Designed: JEC | Drawn: JEC | Checked: NJS

CITY OF ALBANY DGS
RAPP ROAD LANDFILL EXPANSION

VIEWS FROM THE
ALBANY PINE BUSH PRESERVE

Issue Date: Mar. 2008 | Project No.: 12206 | Scale: 1" = 1200'

FIG 3.6-2

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the relationship the major viewer groups have with the project site locations that best represent the visual character of the area, and the locations that most clearly demonstrate the project's visual impact on the environment. The pictures include the existing views from that key view location with leaf on and leaf off, a photosim of the approved P4 height with leaf on and leaf off and a photosim of Alternative 3, the preferred alternative, with leaf on and leaf off. The other three alternatives are included in the completed VIA, Appendix H. Descriptions of each Key Viewpoint and its potential impacts are as follows:

> *Key View 1* is from the end of Petra Lane, approximately 0.6 miles northeast of the proposed expansion. The visual impact of the landfill expansion on the viewers from the end of Petra Lane would not be significant from what has previously been approved. Views toward the landfill would appear as an elongation of the existing landfill with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have no greater visual impact than the other alternatives. The proposed landfill expansion would generally be indistinguishable from the existing permitted P4 landfill height.
>
> *Key View 2* is from South Frontage Road, approximately 0.4 miles west of the proposed expansion. The visual impact of the landfill on the viewers on South Frontage Road would not be significant from what has previously been approved. Views toward the landfill would appear as an elongation of the existing landfill with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have no greater visual impact than the other alternatives. The proposed landfill expansion height of 10' would be visually indistinguishable from the existing permitted P4 landfill height.
>
> *Key View 3* is from South Frontage Road, approximately 0.8 miles southwest of the proposed expansion. Although it will be visible, the visual impact of the landfill on the viewers on South Frontage Road would not be significant from what has previously been approved. Views toward the landfill would appear as an elongation of the existing landfill with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have no greater visual impact than the other alternatives. The proposed landfill expansion height of 10' would be visually indistinguishable from the existing permitted P4 landfill height at this location.

Figure 3.6-3
Key View 1 - Existing Condition - Leaf Off

Figure 3.6-4
Key View 1 - Existing Condition - Leaf On

Figure 3.6-5
Key View 1 - Approved P4 Height - Leaf Off

Figure 3.6-6
Key View 1 - Approved P4 Height - Leaf On

Figure 3.6-7
Key View 1 - Proposed Alternative 1

Figure 3.6-8
Key View 1 - Proposed Alternative 2

Figure 3.6-9
Key View 1 - Proposed Alternative 3 - Leaf Off

Figure 3.6-10
Key View 1 - Proposed Alternative 3

Figure 3.6-11
Key View 1 - Proposed Alternative 4

Figure 3.6-12
Key View 2 - Existing Condition - Leaf Off

Figure 3.6-13
Key View 2 - Existing Condition - Leaf On

Figure 3.6-14
Key View 2 - Approved P4 Height - Leaf Off

Figure 3.6-15
Key View 2 - Approved P4 Height - Leaf On

Figure 3.6-16
Key View 2 - Proposed Alternative 1 - Not Visible

Figure 3.6-17
Key View 2 - Proposed Alternative 2

Figure 3.6-18
Key View 2 - Proposed Alternative 3 - Leaf Off

Figure 3.6-19
Key View 2 - Proposed Alternative 3

Figure 3.6-20
Key View 2 - Proposed Alternative 4

Figure 3.6-21
Key View 3 - Existing Condition - Leaf Off

Figure 3.6-22
Key View 3 - Existing Condition - Leaf On

Figure 3.6-24
Key View 3 - Approved P4 Height - Leaf Off

Figure 3.6-25
Key View 3 - Approved P4 Height - Leaf On

Figure 3.6-26
Key View 3 - Proposed Alternative 1 - Not Visible

Figure 3.6-27
Key View 3 - Proposed Alternative 2

Figure 3.6-28
Key View 3 - Proposed Alternative 3 - Leaf Off

Figure 3.6-29
Key View 3 - Proposed Alternative 3

Figure 3.6-30
Key View 3 - Proposed Alternative 4

Key View 4 is from the NYS Thruway southbound, approximately 0.4 miles west of the proposed expansion. The visual impact of the landfill on the viewers on the Thruway southbound would not be significant since the tree line along the right-of-way focuses the motorists' attention straight ahead and not at the facility. Views toward the landfill would appear as an elongation of the existing landfill with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have less visual impact than the other alternatives. The proposed landfill expansion height of 10' would be visually indistinguishable from the existing permitted P4 landfill height at this location.

Key View 5 is from the NYS Thruway westbound, approximately one mile south of the proposed expansion. The visual impact of the landfill on the viewers on the Thruway westbound would be noticeable however motorists at Exit 24 should be focused on the surrounding traffic volumes in this area. Views toward the landfill would appear as an elongation of the existing landfill with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have no greater visual impact than the other alternatives. The proposed landfill expansion height of 10' would be visually indistinguishable from the approved P-4 height but would be an elongation of the P-4 development scenario.

Key View 6 is from NYS Route 155 at the I-90 overpass, approximately 0.8 miles northwest of the proposed expansion. The visual impact of the landfill on the viewers on Route 155 at the I-90 overpass for Alternatives 1 and 3 would not be significant from what has previously been approved. Views toward the landfill would appear behind the existing vegetative buffer with no distant views or background elements affected. The foreground and midground would remain unchanged in all alternatives. Alternative 3, the preferred alternative, would have less visual impact than alternatives 2 and 4 and be similar to the already approved P4 development scenario.

Based on the analysis of the 6 key views, Alternative 1 would have the least impact. It is not visible from several key views and from others it would be filtered. However, in general it is not anticipated that any of the expansion alternatives would have a significant visual impact. Alternative 3, Eastern Expansion, would be visible from Key Views 1-3, and 5. These views are generally limited/filtered by existing vegetation during the summer months. However, this alternative will be most visible from Key View 5, relative to the other alternatives, due to its

Figure 3.6-31
Key View 4 - Existing Condition - Leaf Off

Figure 3.6-32
Key View 4 - Existing Condition - Leaf On

Figure 3.6-33
Key View 4 - Approved P4 Height - Leaf Off

Figure 3.6-34
Key View 4 - Approved P4 Height - Leaf On

Figure 3.6-35
Key View 4 - Proposed Alternative 1 - Not Visible

Figure 3.6-36
Key View 4 - Proposed Alternative 2

Figure 3.6-37
Key View 4 - Proposed Alternative 3 - Leaf Off

Figure 3.6-38
Key View 4 - Proposed Alternative 3

Figure 3.6-39
Key View 4 - Proposed Alternative 4

Figure 3.6-40
Key View 5 - Existing Condition - Leaf Off

Figure 3.6-41
Key View 5 - Existing Condition - Leaf On

Figure 3.6-42
Key View 5 - Approved P4 Height - Leaf Off

Figure 3.6-43
Key View 5 - Approved P4 Height - Leaf On

Figure 3.6-44
Key View 5 - Approved Alternative 1 - Not Visible

Figure 3.6-45
Key View 5 - Proposed Alternative 2

Figure 3.6-46
Key View 5 - Proposed Alternative 3 - Leaf Off

Figure 3.6-47
Key View 5 - Proposed Alternative 3

Figure 3.6-48
Key View 5 - Proposed Alternative 4

Figure 3.6-49
Key View 6 - Existing Condition - Leaf Off

Figure 3.6-50
Key View 6 - Existing Condition - Leaf On

Figure 3.6-51
Key View 6 - Approved P4 Height - Leaf Off

Figure 3.6-52
Key View 6 - Approved P4 Height - Leaf On

Figure 3.6-53
Key View 6 - Proposed Alternative 1 - Not Visible

Figure 3.6-54
Key View 6 - Proposed Alternative 2

Figure 3.6-55
Key View 6 - Proposed Alternative 3 - Leaf Off

Figure 3.6-55
Key View 6 - Proposed Alternative 3

Figure 3.6-56
Key View 6 - Proposed Alternative 4

presence across the entire view. Where the expansion is visible it would appear as an elongation of the approved P4 development scenario but the height difference would not be readily distinguishable from the approved P4 height.

As noted previously, the key views within the Pine Bush Preserve contemplate the potential visual impacts for Alternative 3, the preferred alternative. The pictures include the existing condition from that key view location, a photosim of the approved P4 height and a photosim of Alternative 3.

Key View 7 is from the trail off of Old State Road and views toward the landfill would appear behind the existing vegetative buffer with no distant views or background elements affected. The proposed expansion height of 10’ would be visually indistinguishable from the existing permitted landfill height.

Key View 8 is from the Overlook Dunes and the visual impact of the landfill on the viewers using the trail would be consistent with what has previously been approved and permitted.

Key View 9 is from the end of the western frontage road and views toward the landfill would appear behind the existing vegetative buffer with no distant views or background elements affected. The visual impact would be consistent with what has previously been approved.

Key View 10 is from the hill at Fox Run trailer park and the visual impact of the landfill on the trail users would be consistent with what has previously been approved however the expansion would be an elongation of the approved P4 development scenario. The visual impact of the landfill on the trail users would be consistent with what has previously been approved P4 development scenario. Views toward the landfill would appear behind the existing vegetative buffer. The foreground and midground would remain unchanged in all alternatives. The proposed landfill expansion height of 10’ would be visually indistinguishable from the permitted P-4 landfill height at this location.

Key View 11 is from Blueberry Hill east trail head and the landfill is not readily visible in the distance due to the existing office building and evergreen vegetation in the midground. The proposed expansion height of 10’ would be visually indistinguishable from the existing permitted landfill height.

Figure 3.6-57
Key View 7 - Existing Condition

Figure 3.6-58
Key View 7 - Approved P4 Height

Figure 3.6-59
Key View 7 - Proposed Alternative 3

Figure 3.6-60
Key View 8 - Existing Condition

Figure 3.6-61
Key View 8 - Approved P4 Height

Figure 3.6-62
Key View 8 - Proposed Alternative 3

Figure 3.6-63
Key View 9 - Existing Condition

Figure 3.6-64
Key View 9 - Approved P4 Height

Figure 3.6-65
Key View 9 - Proposed Alternative 3

Figure 3.6-66
Key View 10 - Existing Condition

Figure 3.6-67
Key View 10 - Approved P4 Height

Figure 3.6-68
Key View 10 - Proposed Alternative 3

Figure 3.6-69
Key View 11 - Existing Condition

Figure 3.6-70
Key View 11 - Approved P4 Height

Figure 3.6-71
Key View 11 - Proposed Alternative 3

Key Views 12 -15 are included because it was thought that the expansion would be visible from these locations however, during the field work and balloon testing, the landfill was not visible. The picture represents the existing and future view.

> *Key View 12* is from the Blueberry Hill east blue trail and the expansion will not be visible from this location.
> *Key View 13* is from the Blueberry Hill east red trail and the expansion will not be visible from this location.
> *Key View 14* is from the red trail and the expansion will not be visible from this location.
> *Key View 15* is from the red trail near the base of the existing landfill and the expansion will not be visible from this location.

Viable measures to eliminate or mitigate views of the expansion are very limited. State Policy DEP-00-2 provides 4 types of mitigation to consider: relocation, camouflage, low profile, downsizing, and screening. Relocation was considered through the 4 alternative expansion locations. Other alternatives, including off-site opportunities, are discussed in Section 5.0. Downsizing and maintaining a low profile are also difficult to achieve since the intent of the expansion is to provide sufficient capacity in the landfill to provide the time necessary to seek an appropriate long-term option for waste disposal.

Camouflage and screening are the proposed mitigation measures for the expansion of the landfill. Since the site is adjacent to the Albany Pine Bush Preserve the mitigation would be in the form of recreating a pine barrens habitat utilizing plant materials that would invite indigenous wildlife species to the area. The Conceptual Restoration plan calls for the cap of the landfill to be a dry prairie restoration. The side abutting the Thruway would be a dense pitch pine forest along the right-of-way and pitch pine/scrub oak forest restoration farther upslope near the cap and on the remaining sides of the landfill. Although the final landfill would be higher that it's surroundings it will visually blend into its surroundings as much as possible. During construction of the expansion, the exposed areas will be maintained using the same means and methods presently used at the landfill to mitigate disturbed areas. The solid waste at the working face within the landfill will be covered on a daily basis with several different types of materials, including petroleum contaminated soils and alternative daily cover materials such as Posi-Shell. Posi-Shell is currently used at the Rapp Road Landfill and consists of a spray-on material that dries and hardens into a shell over the waste. This is a commercially generated product that is used at a wide range of landfill facilities. Aesthetically, the Posi-Shell creates a dark gray coating. When

Figure 3.6-72
Key View 12 - Not Visible

Figure 3.6-73
Key View 13 - Not Visible

Figure 3.6-74
Key View 14 - Not Visible

Figure 3.6-75
Key View 15 - Not Visible

PCS or other soils are used as daily cover, the working face will resemble bare ground at the end of each day.

It is not anticipated the Rapp Road Landfill Expansion would have a significant visual impact on any of the referenced user groups. The expansion would not affect the areas aesthetic quality or create an aesthetic impact that varies substantially from what presently exists and has previously been approved.

The largest potential impact would be to the motorists using Washington Avenue Extension and the businesses located off of South Frontage Road. The landfill would be most visible from I-90 at the Exit 24 area however the views would be limited due to existing vegetation, the speed at which the user group is traveling and the motorists' cone of vision. Users of several trails in the Albany Pine Bush Preserve would also have views of the landfill from the Fox Run trailer park and the Overlook Dunes which would be mitigated by leaf on season. In many cases, the expansion height will be visually insignificant from the previously approved P4 height however the expansion will appear as an elongation of the P4 development scenario.

The proposed landfill expansion, Alternative 3, is to be sited on the north side of the existing landfill which would make the proposed expansion appear as an elongation of the existing landfill with no distant views or background elements affected. The existing vegetation which would remain and the surrounding land uses adjacent to the site would reduce the number of viewers and the viewers' ability to gauge the increase in the landfill size. Photosims were completed for four different expansion scenarios and Alternative 3 has been shown to have no greater visual impact than the other scenarios proposed. The overall height would not differ substantially from what has previously been approved and the habitat management plan proposed upon completion of the expansion will serve to mitigate visual impacts by installing indigenous plantings to blend into the surrounding pine bush.

3.7 TRAFFIC

3.7.1 EXISTING CONDITIONS

The Rapp Road landfill is located off of Rapp Road, approximately 0.25 miles north of Washington Avenue Extension. Entrance to the site is by an existing two lane paved road. All truck traffic must access the site via Washington Avenue Extension to Rapp Road. No truck traffic related to the landfill is permitted on Rapp Road north of the landfill entrance.

Washington Avenue Extension is a four-lane, divided highway with a posted speed limit of 55 miles per hour (mph). Washington Avenue Extension approaches are well suited to handle large truck traffic as they contain two through lanes and separate left and right turn lanes. The signal system provides for protected left turn phases to facilitate movement through the intersection. The right turn lane allows large trucks to decelerate and queue up prior to entering Rapp Road. Rapp Road is a two-lane road both north and south of the landfill entrance, with a posted speed limit of 30 mph.

Traffic generated by landfill personnel consists of 26 employees working 3 shifts during normal operating hours (M-F 7:00 am to 3:30 pm) and two backshift employees. Other activities at the site such as maintenance of heavy vehicles not related to operations and the NEO gas to energy facility will continue under current conditions.

The current range of truck traffic volumes at the site is 125 to 150 vehicles per day based on traffic records from the Rapp Road Landfill. Traffic volumes to the complex depend on the tonnage of municipal solid waste entering the facility. The approved capacity of the Landfill is currently 1,050 tons/day (based on a rolling 30 day average), and no change or increase to this existing rate is proposed under the expansion application.

3.7.2 POTENTIAL IMPACTS & MITIGATION

No increase in traffic volumes are anticipated as a result of the proposed Eastern Expansion. The purpose of the project is to continue to provide landfill capacity within the Rapp Road complex to maintain the current rate of solid waste disposal to serve the ANSWERS communities for the life of the expansion. As a result, traffic volumes will be similar to what they are now. There exists sufficient roadway capacity to continue to handle the anticipated traffic. Therefore, the levels of service along Washington Avenue Extension and the intersection with Rapp Road will not be impacted by this project.

The proposed expansion will not create additional employment thus will not increase traffic volumes due to employees at the site.

Many communities are beginning to consider the implications of the services they provide on global warming issues and energy consumption. Relative to truck traffic and the City's solid waste collection service, the City utilizes the most efficient routes. The compact land pattern of a city, particularly a small city, provides a much more optimum and efficient means to provide services, such as waste collection.

The same would be true for the private haulers whose profits are impacted by fuel prices. The communities within ANSWERS send wastes to the Albany landfill from their transfer stations because it provides them with the most cost effective solution for the disposal of their wastes. In large part this is due to the close proximity of the landfill.

New technologies and a significant reduction in waste production may play an important role in the future of waste collection. The City's fleet of garbage trucks is getting older and as trucks are decommissioned, the City will evaluate opportunities for new, more fuel efficient and greener alternatives. For example, several municipalities in the U.S. have converted their fleets to compressed or liquefied natural gas vehicles, providing a significant reduction in pollutants. The New York City Department of Sanitation was the first to used natural gas garbage trucks in their fleet back in 1989. Recently, Peterbuilt unveiled a hydraulic hybrid garbage truck. These opportunities will be explored further in the SWMP Update.

The City replaces its garbage trucks and construction equipment every 5 years. The newer equipment is likely to be slightly more fuel efficient, even without the new technologies or natural gas vehicles. It is difficult to predict what the effect will be on energy savings and carbon footprint but it is reasonable to assume that the City will use less fuel and that there will be an incremental benefit to the carbon footprint.

3.8 AIR QUALITY & ODOR CONTROL

3.8.1 EXISTING CONDITIONS

3.8.1.1 Air Quality

Regulatory Program

The Clean Air Act (CAA) authorized the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered to be harmful to public health and the environment. The NAAQS were established by the EPA for air contaminants that specify permissible levels of a given pollutant in the air. Six principal pollutants are regulated by the NAAQS, including carbon monoxide, nitrogen dioxide, ozone, lead, particulates, and sulfur dioxide.

The EPA designates certain areas of the country as non-attainment areas for air quality and classifies them according to severity. A non-attainment area is an area that does not meet, or contributes to the air quality in a nearby area that does not meet, the NAAQS for a given pollutant. Non-attainment areas are classified in increasing severity as marginal, moderate, serious, severe or extreme. These classifications are based on the number of times per year the NAAQS are exceeded, and on average pollutant design values obtained from monitoring data in various regions.

Ambient air quality is monitored by the NYSDEC via a series of monitoring stations located throughout New York State. The monitoring stations monitor and record air quality throughout the year for the six principal pollutants. The results of the monitoring are published in regular reports by the NYSDEC entitled *Ambient Air Quality Report.*

Similar to the EPA NAAQS, New York State Ambient Air Quality Standards (NYSAAQS) have also been established. The NYSAAQS include additional criteria pollutants (beryllium, fluoride and hydrogen sulfide). Guidelines for non-criteria pollutants have been established in New York State *Air Guide-1*. Both short term (SGC) and annual (AGC) guideline concentrations have been established for a large number of toxic air pollutants.

Air emission sources are regulated through a number of state and federal programs including the Title V Permit Program, Non-attainment New Source Review and Prevention of Significant

Deterioration (NNSR/PSD) regulations, New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs). Each of these programs sets specific applicability criteria which must be evaluated for new and modified sources.

In New York State, the Title V Permit Program is regulated under 6NYCRR Part 201. The level of permitting required is based on the quantity of emissions generated at a facility. Facilities which exceed the major source thresholds listed in Table 3.8-1 must obtain a Title V permit. As part of the permit application process, compliance with applicable state and federal air regulations must be evaluated and compliance must be certified.

Table 3.8-1
Emission Thresholds to Identify Major Sources of Pollution

Emission Threshold	**Pollutants**
100 tons per year	Nitrogen Oxides Sulfur Dioxides Carbon Monoxide Particulates
50 tons per year	Volatile Organic Compounds
25 tons per year	Combined Hazardous Air Pollutants (HAP)
10 tons per year	Any single HAP

<u>Site Conditions</u>

The Albany Landfill and proposed expansion area are located in Albany County. Albany County is an Attainment Area for sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter (PM_{10}). All of New York State, including Albany County, is part of the Northeast Ozone Transport Region. This region is designated a Moderate Non-Attainment Area for nitrogen oxides (NO_x) and volatile organic compounds (VOC). Background air quality is established by the NYSDEC ambient air monitoring stations. Background concentrations for criteria pollutants at the stations nearest the Albany Landfill and proposed Expansion Area are shown in Table 3.8-2.

Table 3.8-2
Maximum Monitored Background Concentrations

Pollutant	Averaging Time	2003 Concentration	2004 Concentration	2005 Concentration	Monitoring Site
Carbon Monoxide (CO)	8-hr 1-hr	1.7 ppm 4.3 ppm	1.3 ppm 1.9 ppm	1.4 ppm 2.1 ppm	Loudonville Loudonville
Sulfur Dioxide (SO_2)	Annual 24-hr 3-hr	0.004 ppm 0.024 ppm 0.037 ppm	0.004 ppm 0.031 ppm 0.060 ppm	0.005 ppm 0.023 ppm 0.027 ppm	Loudonville Loudonville Loudonville
Particulates ($PM_{2.5}$)	Annual	12.2 ug/m^3	11.2 ug/m^3	12.4 ug/m^3	Albany County HD
Ozone (O_3)	1-hr	0.076 ppm	0.072 ppm	0.103 ppm	Loudonville, NY

The area surrounding the existing landfill and proposed Expansion Area is comprised of residential and commercial areas generally to the north and south. Major sections of the Albany Pine Bush Preserve are located to the west and east of the landfill, with other Preserve parcels located to the north of the Expansion Area. Additionally, the mobile home park located to the west of the Expansion Area has been dedicated to the Preserve. Vehicle exhaust is generated from NYS Thruway Interstate 90 and Interstate 87 which are located to the south and east of the site.

Construction and operation of the proposed landfill Expansion Area has the potential to impact local air quality due to landfill gas emissions, landfill gas combustion, and dust and odors. This section of the SDEIS explores the significance of the potential impacts and the appropriate mitigation measures to address the issues.

Title V Permit & Collection and Control System

Emissions from the existing Albany Landfill exceed the major source thresholds noted in Table 3.8-1 for nitrogen oxides, sulfur dioxide, carbon monoxide and volatile organic compounds and as a result, the facility currently holds a Title V air permit (ID 4-0101-00171/00013). The permit includes applicable requirements from the New Source Performance Standards (NSPS) in 40 CFR 60, Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills. A Collection and Control System Design Plan was submitted to DEC/EPA in March 2006 as required by Subpart WWW. The plan describes the landfill gas collection and control system for the existing landfill and the methods to be used to meet the operational standards, monitoring requirements, and recordkeeping and reporting provisions of Subpart WWW. Both the Title V permit and the Collection and Control System Design Plan will be modified as necessary to incorporate the proposed expansion area.

The current Title V permit includes four landfill gas engines (two existing and two not yet installed) and three flares, which would have sufficient capacity to handle the additional gas generated by the expanded landfill. At a future date, upgrade of the existing three flares and/or installation of additional flares may occur, but at this time, there is no plan to change the landfill gas combustion sources as currently permitted. However, the landfill itself is an emissions unit and NYSDEC has indicated that expansion of the landfill will require modification of the Title V permit through a preconstruction permit authorization.

The existing landfill utilizes a landfill gas collection and control system that includes a horizontal collection system, a well field, flare and blower systems, and a gas to energy facility. The collection and control system is an active system to remove landfill gas under vacuum. Gas is collected from each area of the facility in which waste has been placed. As new cells are constructed, the active collection system is expanded to include additional vertical gas collection wells and horizontal collection trenches. Two gas engines and two flares are currently used to burn the collected landfill gas. The proposed expansion area will also be designed to include a collection and control system. The City of Albany is a leader in the collection and elimination of methane, a major greenhouse gas component. This is accomplished through the gas to energy facility and the flares that destroy the methane.

Typical landfill gas collection system efficiencies can range from a low of 65% to 75% for uncapped landfills, to a high of 85% to 90% for landfills with an impermeable cap. The Albany Landfill includes a combination of uncapped areas (~19 acres), areas with a soil cap (~51 acres) and areas with an impermeable cap (~23 acres). For use in emission calculations and dispersion modeling, a conservative collection system efficiency of 80% was assumed for the overall landfill.

3.8.1.2 Odor

6 NYCRR 211.2 prohibits odors which ‘unreasonably interfere with the comfortable enjoyment of life or property’. 6 NYCRR 360-1.14(m) requires that odors be controlled so that they are not

a nuisance. Odors are frequently associated with air emissions from municipal solid waste landfills. Methane and carbon dioxide, the two main components in landfill gas, are odorless. Landfill gas does, however, typically have distinctive odors due to other trace components present in the gas. The odorous compounds in landfill gas are either formed during the refuse decomposition process, or are included in the waste deposited in the landfill. Odors escape along with landfill gas from surface cracks and disturbances of soil layers as waste is added to the landfill. The odor associated with freshly placed municipal waste is due to aerobic decomposition of the waste. Over longer time scales, anaerobic decomposition within the waste body generates landfill gas which may contain trace components that are odorous.

The EPA has identified a variety of odor causing compounds which are potential components of landfill emissions (EPA-450/3-90-011a). The major contributors to odor can be divided into two groups. The first group is dominated by esters of volatile fatty acids and organo-sulfurs, but also includes certain solvents that may be deposited with the waste. These compounds are not widespread and are variable in their concentrations. The second group is more widespread and includes alkyl benzenes and other hydrocarbons and sulfur compounds that are more typically responsible for the background smell associated with a landfill. One of the more commonly measured sulfur compounds is hydrogen sulfide.

The rate at which odors are emitted from a landfill is dependent on a number of factors including:

- the rate of filling
- the size of the working face
- the type and the efficiency of the landfill gas collection system
- daily cover applied
- shredding of waste prior to filling
- meteorological conditions

The two factors that will typically have the greatest influence on total landfill odor are the odors associated with uncollected landfill gas and the exposed working face. Generally, odors from the working face of a landfill are likely to be noticeable in the immediate vicinity of the working face (100-200 meters). Odors, in general, are typical short-term occurrences that have no specific standards. The guidelines that facilities must meet are commonly treated under nuisance criteria that are based on judgments and relate to quality-of-life issues.

3.8.2 POTENTIAL IMPACTS & MITIGATION

3.8.2.1 Air Quality Evaluation

Landfill Gas Emission Estimates

EPA's *Landfill Gas Emissions Model* (*LandGEM)* was used to estimate the landfill gas generation rate for both the existing permitted landfill area and the proposed expansion area. In order to obtain a conservative estimate of the landfill gas generation rate, the Clean Air Act (CAA) defaults for the methane generation rate constant ($k = 0.05\ yr^{-1}$) and the potential methane generation capacity ($Lo = 170\ m^3/Mg$)) were used in the *LandGEM* model. The *LandGEM* reports for the existing landfill and the expansion area are located in Appendix I. The *LandGEM* reports indicate that the year of maximum gas generation will be 2010 for the existing permitted landfill area and 2017 for the proposed expansion area.

In addition to estimating landfill gas generation rates, *LandGEM* was also used to estimate emission rates for 46 individual pollutants identified by EPA as typical constituents of landfill gas. These estimates can be made using EPA AP-42 default concentrations or user input concentrations. The estimates for the existing landfill and the expansion area were made using average concentrations developed by the Waste Industry Air Coalition (WIAC). The AP-42 default values were derived from a database of analyses that included data accumulated from the early 1980's through 1991. VOC emissions from municipal solid waste (MSW) landfills have declined by 80% since 1990, due primarily to regulations that resulted in the reduction of hazardous wastes in MSW.

The AP-42 defaults tend to significantly overestimate emissions from MSW landfills because data from the early 1980's is included. The WIAC average concentrations utilize results from up to 46 landfills in the US; however, the average concentrations are calculated after removal of older data (early 1980's) from the database. The WIAC concentrations are believed to be more representative of the concentrations to be expected in the most active gas generating regions of the existing landfill and in the proposed expansion area. The 2017 *LandGEM* pollutant inventories for the existing landfill and the expansion area are located in Appendix I.

Combustion Source Emission Estimates

The existing landfill gas collection and control system includes two landfill gas engines (10 MMBtu/hr each) and two flares (2000 cfm and 3300 cfm). The facility is currently permitted for two additional landfill gas engines (10 MMBtu/hr each). The expansion area will include an additional flare (5000 – 6000 cfm). The maximum gas generation rate will occur after the expansion area reaches maximum capacity. Combustion source emissions for the maximum gas generation rate were made assuming 80% of the generated gas will be directed to the control system, with a split of 30% to the engines and 70% to the flares. This split was assumed based on projections from current operations. Combustion source emissions were estimated based on AP-42 emission factors, where available, and can be found in Appendix I.

Modeling Analysis & Results

Screening level air dispersion modeling was performed to evaluate the potential for off-site impacts from both landfill emissions and combustion source emissions. EPA's *Screen3* is the recommended tool to calculate screening level impact estimates for stationary sources. The *Screen3* model is conservative and assumes worst case conditions of wind/weather. *Screen3* outputs are 1-hr average concentrations in units of micrograms per cubic meter (ug/m^3).

The landfill was modeled as two separate area sources (one for the existing area and one for the proposed expansion area) using *Screen3*. The *Screen3* model was run with an area source emission rate of 1 g/s/m^2. The *Screen3* results were then multiplied by the calculated emission rates (from *LandGEM*) for the 46 individual pollutants identified by EPA as typical constituents of landfill gas. The maximum emissions rates, which will occur the year after the expansion area reaches maximum capacity, were used. (It was assumed that 80% of the generated landfill gas will be collected and directed to the engines/flares, and the remaining 20% will be dispersed from the landfill surface.)

The combustion sources were modeled as two separate sources (one point source for the engines and one flare source for the flares) using Screen3. The *Screen3* model was run with a source emission rate of 1 g/s. The *Screen3* results were then multiplied by the calculated engine and flare emission rates. The maximum emissions rates, which will occur the year after the expansion area reaches maximum capacity, were again used. Thirty percent of the collected gas was assumed to be directed to the engines and 70% was assumed to be directed to the flares. Background concentrations for criteria pollutants were estimated using NYSDEC ambient air monitoring station results noted in Table 3.8-2. The 1-hr concentrations were converted to the appropriate averaging period of each contaminant. The combined maximum engine and flare source results were added to the background concentrations.

Screen3 model outputs for both the landfill and the combustion sources are located in Appendix I.

Landfill Gas Emissions – Impact on Air Quality

The maximum gas generation rate will occur in 2017 for the proposed expansion area. Emissions were calculated for both the existing and expansion areas for 2017. The screening analysis indicates that the maximum impact from the existing landfill occurs at a distance of 1051 meters (3448 feet) from the center of the landfill, which may extend beyond the property line in certain directions. The maximum impact from the expansion area will occur at a distance of 549 meters (1801 feet) from the center of the landfill. The screening results for the existing landfill and the expansion area were combined at both 1051 meters and 549 meters for the maximum gas generation year. The results are shown in Tables 3.8-3 and 3.8-4. The affected areas are noted in Figure 3-___ that indicates the distances to maximum impacts (maximum concentrations at these distances are listed in that tables). As indicated in the tables, the maximum screening result concentrations are below the SGCs and AGCs for all pollutants at both distances. The potential off-site impact from landfill gas emissions is, therefore, not considered significant.

Table 3.8-3
Screening Results - Albany Landfill Existing Area and Expansion Combined - 2017

@ 1051 m	Existing Area		Expansion Area		Combined Result			
	80% Control 1-hr Max Conc. (ug/m^3)	80% Control Annual Max Conc (ug/m^3)	80% Control 1-hr MaxConc (ug/m^3)	80% Control Annual MaxConc (ug/m^3)	80% Control 1-hr MaxConc (ug/m^3)	80% Control Annual MaxConc (ug/m^3)	SGC (ug/m^3)	AGC (ug/m^3)
1,1,1-Trichloroethane	0.0040	0.0003	0.0035	0.0003	0.0075	0.0006		
1,1,2,2-Tetrachloroethane	0.0021	0.0002	0.0018	0.0001	0.0039	0.0003	---	0.017
1,1-Dichloroethane	0.0130	0.0010	0.0115	0.0009	0.0245	0.0019	---	0.63
1,1-Dichloroethene	0.0016	0.0001	0.0014	0.0001	0.0030	0.0002		
1,2-Dichloroethane	0.0021	0.0002	0.0019	0.0001	0.0040	0.0003	---	0.038
1,2-Dichloropropane	0.0005	0.0000	0.0004	0.0000	0.0009	0.0000		
2-Propanol	0.0844	0.0068	0.0745	0.0060	0.1589	0.0128	61000	1200
Acetone	0.0632	0.0051	0.0558	0.0045	0.1190	0.0096	180000	28000
Acrylonitrile	0.0003	0.0000	0.0003	0.0000	0.0006	0.0000	---	0.015
Benzene	0.0135	0.0011	0.0119	0.0010	0.0254	0.0021	1300	0.13
Bromodichloromethane	0.0090	0.0007	0.0080	0.0006	0.0170	0.0013		
Butane	0.0516	0.0041	0.0456	0.0036	0.0972	0.0077	---	45000
Carbon Disulfide	0.0043	0.0003	0.0038	0.0003	0.0081	0.0006	6200	700
Carbon Monoxide	0.6964	0.0557	0.6147	0.0492	1.3111	0.1049	14000	---
Carbon Tetrachloride	0.0002	0.0000	0.0002	0.0000	0.0004	0.0000	1900	0.067
Carbonyl Sulfide	0.0020	0.0002	0.0017	0.0001	0.0037	0.0003	250	28
Chlorobenzene	0.0045	0.0004	0.0040	0.0003	0.0085	0.0007		

Chlorodifluoromethane	0.0055	0.0004	0.0048	0.0004	0.0103	0.0008	---	50000
Chloroethane	0.0027	0.0002	0.0024	0.0002	0.0051	0.0004		
Chloroform	0.0045	0.0004	0.0004	0.0000	0.0049	0.0004	150	0.043
Chloromethane	0.0022	0.0002	0.0020	0.0002	0.0042	0.0004	22000	90
Dichlorobenzene	0.0420	0.0034	0.0370	0.0030	0.0790	0.0064	30000	360
Dichlorodifluoromethane	0.0376	0.0030	0.0332	0.0027	0.0708	0.0057	---	12000
Dichlorofluoromethane	0.0475	0.0038	0.0420	0.0034	0.0895	0.0072	---	100
Dichloromethane	0.0512	0.0041	0.0452	0.0036	0.0964	0.0077	14000	2.1
Dimethyl Sulfide	0.0751	0.0060	0.0663	0.0053	0.1414	0.0113		
Ethane	0.0424	0.0034	0.0374	0.0030	0.0798	0.0064		
Ethanol	0.9705	0.0776	0.8568	0.0685	1.8273	0.1461	---	45000
Ethylbenzene	0.0867	0.0069	0.0766	0.0061	0.1633	0.0130	54000	1000
Ethyl Mercaptan	0.0150	0.0012	0.0132	0.0011	0.0282	0.0023	---	3.1
Ethylene Dibromide	0.0015	0.0001	0.0018	0.0001	0.0033	0.0002		
Fluorotrichloromethane	0.0080	0.0006	0.0070	0.0006	0.0150	0.0012		
Hexane	0.0356	0.0028	0.0314	0.0025	0.0670	0.0053	---	200
Hydrogen Sulfide	0.1427	0.0114	0.1260	0.0101	0.2687	0.0215	14	2
Mercury	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8	0.3
Methyl Ethyl Ketone	0.1352	0.0108	0.1193	0.0095	0.2545	0.0203	59000	5000
Methyl Isobutyl Ketone	0.0133	0.0011	0.0118	0.0009	0.0251	0.0020		
Methyl Mercaptan	0.0110	0.0009	0.0097	0.0008	0.0207	0.0017	14	2.3
Pentane	0.0423	0.0034	0.0373	0.0030	0.0796	0.0064	---	4200
Perchloroethylene	0.0351	0.0028	0.0310	0.0025	0.0661	0.0053		
Propane	0.1155	0.0092	0.1020	0.0082	0.2175	0.0174	---	110000
Toluene	0.0482	0.0039	0.3669	0.0294	0.4151	0.0333	37000	400
Trichloroethene	0.0159	0.0013	0.0140	0.0011	0.0299	0.0024		
t-1,2-Dichloroethene	0.0482	0.0039	0.0426	0.0034	0.0908	0.0073		
Vinyl Chloride	0.0120	0.0010	0.0106	0.0008	0.0226	0.0018	180000	0.11
Xylene	0.3126	0.0250	0.2760	0.0221	0.5886	0.0471	4300	100

Note: These concentrations are based on the conservative assumption that 80% of the generated landfill gas is collected and controlled and the remaining 20% is dispersed form the landfill surface.

Table 3.8-4
Screening Results - Albany Landfill Existing Area and Expansion Combined - 2017

@ 549 m	Existing Area		Expansion Area		Combined Result			
	80% Control 1-hr MaxConc (ug/m^3)	80% Control Annual Max Conc (ug/m^3)	80% Control 1-hr MaxConc (ug/m^3)	80% Control Annual MaxConc (ug/m^3)	80% Control 1-hr MaxConc (ug/m^3)	80% Control Annual MaxConc (ug/m^3)	SGC (ug/m^3)	AGC (ug/m^3)
1,1,1-Trichloroethane	0.0033	0.0003	0.0040	0.0003	0.0073	0.0006		
1,1,2,2-Tetrachloroethane	0.0017	0.0001	0.0021	0.0002	0.0038	0.0003	---	0.017
1,1-Dichloroethane	0.0108	0.0009	0.0130	0.0010	0.0238	0.0019	---	0.63
1,1-Dichloroethene	0.0013	0.0001	0.0016	0.0001	0.0029	0.0002		
1,2-Dichloroethane	0.0017	0.0001	0.0021	0.0002	0.0038	0.0003	---	0.038
1,2-Dichloropropane	0.0004	0.0000	0.0005	0.0000	0.0009	0.0000		
2-Propanol	0.0699	0.0056	0.0842	0.0067	0.1541	0.0123	61000	1200
Acetone	0.0523	0.0042	0.0631	0.0050	0.1154	0.0092	180000	28000
Acrylonitrile	0.0003	0.0000	0.0003	0.0000	0.0006	0.0000	---	0.015
Benzene	0.0112	0.0009	0.0135	0.0011	0.0247	0.0020	1300	0.13
Bromodichloromethane	0.0074	0.0006	0.0090	0.0007	0.0164	0.0013		
Butane	0.0427	0.0034	0.0515	0.0041	0.0942	0.0075	---	45000
Carbon Disulfide	0.0036	0.0003	0.0043	0.0003	0.0079	0.0006	6200	700
Carbon Monoxide	0.5764	0.0461	0.6950	0.0556	1.2714	0.1017	14000	---
Carbon Tetrachloride	0.0002	0.0000	0.0002	0.0000	0.0004	0.0000	1900	0.067
Carbonyl Sulfide	0.0016	0.0001	0.0019	0.0002	0.0035	0.0003	250	28
Chlorobenzene	0.0038	0.0003	0.0045	0.0004	0.0083	0.0007		
Chlorodifluoromethane	0.0045	0.0004	0.0054	0.0004	0.0099	0.0008	---	50000
Chloroethane	0.0023	0.0002	0.0027	0.0002	0.0050	0.0004		
Chloroform	0.0037	0.0003	0.0004	0.0000	0.0041	0.0003	150	0.043
Chloromethane	0.0018	0.0001	0.0022	0.0002	0.0040	0.0003	22000	90
Dichlorobenzene	0.0347	0.0028	0.0419	0.0033	0.0766	0.0061	30000	360
Dichlorodifluoromethane	0.0311	0.0025	0.0375	0.0030	0.0686	0.0055	---	12000
Dichlorofluoromethane	0.0393	0.0031	0.0474	0.0038	0.0867	0.0069	---	100
Dichloromethane	0.0424	0.0034	0.0511	0.0041	0.0935	0.0075	14000	2.1
Dimethyl Sulfide	0.0622	0.0050	0.0750	0.0060	0.1372	0.0110		
Ethane	0.0351	0.0028	0.0423	0.0034	0.0774	0.0062		
Ethanol	0.8033	0.0643	0.9687	0.0775	1.7720	0.1418	---	45000
Ethylbenzene	0.0718	0.0057	0.0866	0.0069	0.1584	0.0126	54000	1000
Ethyl Mercaptan	0.0124	0.0010	0.0149	0.0012	0.0273	0.0022	---	3.1
Ethylene Dibromide	0.0013	0.0001	0.0021	0.0002	0.0034	0.0003		
Fluorotrichloromethane	0.0066	0.0005	0.0080	0.0006	0.0146	0.0011		
Hexane	0.0294	0.0024	0.0355	0.0028	0.0649	0.0052	---	200
Hydrogen Sulfide	0.1181	0.0094	0.1424	0.0114	0.2605	0.0208	14	2
Mercury	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8	0.3
Methyl Ethyl Ketone	0.1119	0.0089	0.1349	0.0108	0.2468	0.0197	59000	5000
Methyl Isobutyl Ketone	0.0110	0.0009	0.0133	0.0011	0.0243	0.0020		
Methyl Mercaptan	0.0091	0.0007	0.0110	0.0009	0.0201	0.0016	14	2.3
Pentane	0.0350	0.0028	0.0422	0.0034	0.0772	0.0062	---	4200

Perchloroethylene	0.0291	0.0023	0.0351	0.0028	0.0642	0.0051		
Propane	0.0956	0.0076	0.1153	0.0092	0.2109	0.0168	---	110000
Toluene	0.0399	0.0032	0.4148	0.0332	0.4547	0.0364	37000	400
Trichloroethene	0.0132	0.0011	0.0159	0.0013	0.0291	0.0024		
t-1,2-Dichloroethene	0.0399	0.0032	0.0481	0.0038	0.0880	0.0070		
Vinyl Chloride	0.0099	0.0008	0.0119	0.0010	0.0218	0.0018	180000	0.11
Xylene	0.2587	0.0207	0.3120	0.0250	0.5707	0.0457	4300	100

Note: These concentrations are based on the conservative assumption that 80% of the generated landfill gas is collected and controlled and the remaining 20% is dispersed form the landfill surface.

Combustion Source Emissions – Impact on Air Quality

The screening analysis indicates that the maximum impact for the engines occurs at a distance of 142 meters and the maximum impact for the flares occurs at a distance of 876 meters. The background concentrations were added to the combined maximum combustion source impacts, and the results were compared to the NAAQS. The individual engine and flare results are located in Appendix I, and the combined results are summarized in Table 3.8-5. As indicated in the table, maximum sulfur dioxide (SO_2), nitrogen oxide (NO_x), carbon monoxide (CO), non-methane organic compound (NMOC) and particulate matter (PM) concentrations will all remain below the NAAQS. This analysis was completed using a number of conservative assumptions. It was assumed that the maximum impact of both the flares and the engines will occur at the same location, which is unlikely due to the fact that the sources are not located contiguously. The screening level concentrations were also based on AP-42 emission factors which are conservative, and on worst case weather conditions assumed in the screening software. Using these conservative assumptions, the results indicate that there will be no significant impact on air quality due to combustion source emissions.

Table 3.8-5
SCREEN3 Combined Results for Engines and Flares

Contaminant	Averaging Period	Max Result (ug/m^3)	Max Result (ppm)	Background (ppm)	Total (ppm)	NAAQS (ppm)
SO_2	1 hour	133.24	0.051		0.0506	na
SO_2	3 hour	119.916	0.046	0.0600	0.1056	0.5
SO_2	24 hour	53.296	0.020	0.0310	0.0513	0.14
SO_2	annual	10.6592	0.004	0.0050	0.0091	0.03
NO_x	1 hour	73.78	0.039	0.0340	0.0731	na
NO_x	annual	5.9024	0.003	0.0027	0.0058	0.053
CO	1 hour	157.16	0.138	0.3800	0.5178	35
CO	8 hour	110.012	0.096	0.2660	0.3625	9
NMOC	1 hour	1.03	0.002	0.0340	0.0355	na
NMOC	3 hour	0.927	0.001	0.0306	0.0320	0.24
PM	1 hour	14.50	14.500	20.200	34.70	na
PM	24 hour	5.80	5.800	8.0800	13.88	150
PM	Annual	1.16	1.160	1.6160	2.78	50

Air Sampling Program

Since the landfill expansion area is proposed, no air quality monitoring data is available for the expansion. A series of four ambient air quality sampling events have, however, been conducted at the Albany Landfill on a calendar quarterly basis over the course of a year. Air quality impacts associated with the existing landfill are expected to be representative of air quality impacts associated with the future expansion area. The first air quality sampling occurred on May 3, 2007 and the fourth and final test was conducted on January 31, 2008. The purpose of testing on a quarterly schedule was to identify the existence of any seasonal variations. All monitoring events were scheduled when odor and air quality impacts from the Albany Landfill were expected to be maximized based on meteorology, which included a persistent wind direction with light to moderate wind speeds and falling atmospheric pressure over the course of the test.

In addition, staggering tests over an annual period allowed for testing during different stages of typical landfill operations. Landfill operations included, routine maintenance of landfill gas capture and control equipment, installation of landfill gas collection wells, management of leachate, waste placement and movement, capping and closure of landfill sections, etc. Testing was also performed during different times of the day including during normal business hours and when the landfill complex was closed. This was necessary to determine if air quality levels differed based on time of day/night, as well as, to determine if diurnal meteorological conditions impacted local odor and air quality levels.

The air quality investigation utilized several different sampling methods including SUMMA canister sampling, Tedlar bag sampling and sorbent tube sampling. The investigation included the sampling and analysis of volatile organic compounds (VOCs), volatile organic acids (VOAs), sulfur containing compounds, aldehydes, ketones and compounds associated with natural gas including methane, ethane, propane, butane and pentane (common components of landfill gas). Sample locations are provided Appendix I.

VOC levels are also measured at several New York State Department of Environmental Conservation (NYSDEC) monitoring sites. VOC data measured during the air quality investigation can be qualitatively compared with the VOC levels measured at locations throughout New York State. This comparison is provided in Table 3.8-6. NYSDEC Annual Guideline Concentrations (AGC) are also provided in the table.

Table 3.8-6
Comparison of State-Wide Ambient Air VOC Concentrations (μg/m^3)

	NYSDEC Monitoring Locations[1]				Albany Landfill Average Upwind VOST Results[2]	Albany Landfill Average Downwind VOST Results[3]	
Compound	**Troy, NY Uncle Sam Atrium**	**Lakawanna Simon St., Erie County**	**Whiteface Mt. Base Essex County**	**LaTorrette Golf Course Richmond County**			**NYSDEC AGC**
Chloromethane	1.47	1.21	1.20	1.19	0.10	0.13	90
Dichlorodifluoromethane (Freon 12)	3.56	3.14	3.33	3.08	1.80	3.13	12000
Trichloromonofluoromethane (Freon 11)	2.02	1.86	1.89	1.83	0.65	0.97	1000
Trichlorotrifluoroethane (Freon 113)	0.80	0.82	0.76	0.62	0.10	0.27	180,000
Methylene Chloride	0.32	0.33	0.48	0.59	0.10	0.50	2.1
Chloroform	**0.192**	**0.181**	**0.180**	**0.173**	0.042	**0.167**	**0.043**
1,1,1-trichloroethane	0.30	0.41	0.27	0.25		0.35	1000
Benzene	**1.68**	**2.32**	**0.55**	**1.31**	**0.60**	**0.83**	**0.13**
Carbon Tetrachloride	**0.790**	**0.812**	**0.788**	**0.740**	**0.402**	**0.600**	**0.067**
1,2-Dichloroethane	**0.074**	**0.092**	**0.057**	**0.059**	**0.040**	**0.040**	**0.038**
Toluene	4.26	3.22	0.89	3.25	0.80	1.70	5000
Tetrachloroethene	0.27	0.31	0.11	0.47	0.13	0.30	1.00
Ethylbenzene	0.72	0.52	0.18	0.55	0.15	0.47	1000
Xylene (m,p)	2.15	1.65	0.50	1.68	0.40	1.47	100
Xylene (o)	0.62	0.50	0.15	0.42	0.15	0.53	100
1,4-dichlorobenzene	**0.46**	**0.20**	**0.14**	**0.17**		**0.15**	0.09
1,3,5-trimethylbenzene	0.57	0.41	0.20	0.46		0.30	290
1,2,4-trimethylbenzene	0.95	0.51	0.18	0.75	0.07	0.60	290

Notes:
[1] Concentrations represent the annual average of NYSDEC monitoring data from 2001 to 2003, except for LaTorrette Golf Course which includes data from 2002 and 2003 only.

[2] Upwind average results at the landfill represent two samples; one from the third test and one from the fourth test. Due to limited samples, average results do not necessarily represent annual average concentrations.

[3] Downwind average results from the Albany Landfill represent three downwind VOST samples; one sample was taken during test events 2, 3 & 4. Due to limited samples, average results do not necessarily represent annual average concentrations.

- Shaded concentration is above the level of the NYSDEC Annual Guideline Concentration value, however does not signify an exceedance of the guideline value.

- Blank values indicate levels below analytical minimum detection limits. Minimum detection limits can be found in Appendix C.

- NYSDEC monitoring site characteristics as follows:
  Troy - Urban
  Lakawanna - Industrial
  Whiteface Mt. - Rural
  LaTorrette GC - Suburban

Several conclusions can be drawn from the air quality sample results from data collected during the four (4) test events. An abbreviated list of general conclusions has been provided below. Please refer to Appendix I for the detailed report of RTP's ambient air quality and odor assessment.

General Conclusions

- The monitoring program results indicate that the landfill's air quality impacts on the surrounding community were minimal based on the data obtained from each test. Further, downwind impacts are expected to decrease with distance increasing from the landfill property due to atmospheric diffusion.
- Air quality levels were slightly higher immediately downwind of the landfill (on-site) when compared to levels at locations upwind of the landfill. However, air quality levels downwind of the landfill are, in general, lower than other locations in New York State monitored by the New York State Department of Environmental Conservation (NYSDEC) based on data from four sample sets collected during the air investigation at the Albany Landfill.
- Maximum air quality levels were observed during the second test event (August 1, 2007). Reasons for the high concentrations may be attributed to one or more of the following; landfill operations, meteorology and nighttime testing.

- Based on a comparison of landfill gas and ambient air sample results, it appears the majority of the VOC ambient air quality impacts are related to uncontrolled landfill gas emissions.
- Measured air quality levels associated with the landfill decreased over the course of the testing program. This was primarily due to several operational and management corrective actions taken by the City of Albany and its consultants over the course of the program.

The data from the sampling events supports the landfill gas emission calculations and modeling results previously discussed, which show no significant impact.

Landfill Gas Collection and Control System - Mitigation

A comprehensive landfill gas collection and control system is currently in place at the Albany Landfill. The system will be progressively expanded on the site as landfilling occurs in areas that are currently permitted, and in the proposed Expansion Area. The system will be subject to the operational standards of NSPS Subpart WWW as outlined in the Title V permit. These standards have been developed to ensure that the efficiency of the collection and control system is maximized and that emissions to the environment are minimized. To demonstrate that the required design criteria for the collection and control system are being met, the system will be monitored for compliance with the following operational standards:

- A negative pressure must be maintained at each wellhead. Pressure will be monitored monthly and reports will be submitted to DEC on a semiannual basis.
- Temperature of the collected landfill gas must remain below 55 ^{o}C. Temperature will be monitored monthly and reports will be submitted on a semiannual basis.
- Nitrogen concentration in the collected landfill gas must be maintained below 20%, or oxygen concentration below 5%. Nitrogen/oxygen concentration will be monitored on a monthly basis and reports will be submitted on monthly.
- In order to demonstrate that the off-site migration of gas is minimized, methane concentration must remain below 500 ppm above background at the surface of the landfill. Surface testing is conducted at 30 meter intervals on a quarterly basis. Reports will be submitted on a semiannual basis.

Corrective actions will be taken as soon as possible if any monitoring result indicates that the system is not operating as required. These actions could include:

- Should it be determined that a negative well pressure is not maintained at a well head, an investigation will be performed to determine why vacuum has been lost within 12 hours. The investigation will include, but is not limited to; exercising the wellhead valve to ensure it is open and operational and performing a vacuum profile along the collection header that is connected to the well to determine where vacuum is lost. If required maintenance will be performed on the well head or the collection header will be uncovered and repaired within 48 hours.
- Should the temperature of the well exceed 55˚C, the wellhead will be adjusted to reduce vacuum. Another reading will be performed within 5 days of the initial adjustment to determine if the temperature is reduced, should the well temperature not change, additional adjustments will be performed and the rechecked. Should the temperature not change due to wellhead adjustment, a gas sample will be collected to determine carbon monoxide content and determine if a fire may existing in the waste mass.
- Wellhead adjustments will be performed to adjust the nitrogen and oxygen content of the landfill gas collected to the required levels.
- Should the surface scan readings indicate that the methane concentration is above 500 ppm, within 5 days adjustments to the collection system will be performed and/ or additional cover soils will be placed. The area will be rechecked and should readings indicate levels above 500 ppm, an evaluation of the collection system will be performed to determine if additional collection points are required.

Control devices must be operated at all times when landfill gas is routed to the device. In the event the engines shut down, the gas is automatically diverted to a flare for combustion. In the event a flare shuts down, the system vacuum will reduce, and only enough landfill gas required to operate the engines will be recovered. If a control device becomes inoperable, the gas mover system will be shut down within one hour.

3.8.2.2 Odor Evaluation

<u>Landfill Emissions – Evaluation of Odor Impact</u>

An evaluation of the potential odor impact from the proposed expansion area has been completed for six landfill gas components that have been identified by EPA as typical landfill gas constituents and potential odor causing compounds. The combined screening level concentrations for the existing landfill and the expansion area, at both 1051 meters and 549 meters, were compared to odor thresholds. Screening level concentrations were based on the most conservative assumptions for landfill gas generation and worst case weather conditions. The results are found in Tables 3.8-7 and 3.8-8. As indicated in these tables, the maximum concentrations of all six compounds are predicted to remain below detection thresholds at both distances. Since the concentrations of these compounds are below the detection thresholds, they should not contribute to nuisance odors and will comply with the requirements of 6 NYCRR 211.2 and 6 NYCRR 360-1.14(m). Methane concentrations at the landfill surface are monitored using a portable analyzer that meets the instrumentation specifications in Section 3 of Method 21 of 40 CFR 60 Appendix A, as noted in 40 CFR 60.755(d).

Table 3.8-7
Screening Model Maximum Results – 2017 @ 1051 m

Odorant	80% Control 1-hr Max.Conc. (ug/m^3)	80% Control Annual Max. Conc. (ug/m^3)	Detection Threshold * (ug/m^3)
Dimethyl Sulfide	0.141	0.011	10.000
Ethyl Mercaptan	0.028	0.002	2.580
Hydrogen Sulfide	0.269	0.022	0.650
Methyl Mercaptan	0.021	0.002	0.040
Ethyl Benzene	0.163	0.013	200
Xylene	0.589	0.047	400

Table 3.8-8
Screening Model Maximum Results – 2017 @ 549 m

Odorant	80% Control 1-hr Max.Conc. (ug/m^3)	80% Control Annual Max. Conc. (ug/m^3)	Detection Threshold * (ug/m^3)
Dimethyl Sulfide	0.137	0.011	10.000
Ethyl Mercaptan	0.027	0.002	2.580
Hydrogen Sulfide	0.261	0.021	0.650
Methyl Mercaptan	0.020	0.002	0.040
Ethyl Benzene	0.158	0.013	200
Xylene	0.571	0.046	400

* Taken from Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines Table 3-10 (EPA-450/3-90-011a)

Combustion Source Emissions – Evaluation of Odor Impact

SO_2 has a high odor threshold compared to typical landfill gas sulfur compounds such as hydrogen sulfide. Odors derived from SO_2 have been detected at concentrations within the range of 0.33 ppm and 1.0 ppm. As indicated in the discussion of the air quality impact from combustion sources (Table 3.8-5), maximum 1-hr SO_2, concentrations may reach 0.05 ppm, which is below the lowest end of the odor detection range. No odor impact due to combustion sources is anticipated.

Odor Sampling Program

Since the landfill expansion area is proposed, no odor monitoring data is available for the expansion. However, a series of four ambient tests for odor have been scheduled for the existing Albany Landfill. Odors associated with the existing landfill may be representative of odors associated with the future expansion area since the waste acceptance rate will remain the same. The first odor sampling occurred on May 3, 2007 and the fourth and final test was conducted on January 31, 2008.

The purpose of testing on a quarterly schedule was to identify the existence of any seasonal variations. All monitoring events were scheduled when odor and air quality impacts from the Albany Landfill were expected to be maximized based on meteorology, which included a persistent wind direction with light to moderate wind speeds and falling atmospheric pressure over the course of the test. In addition, staggering tests over an annual period allowed for testing during different stages of typical landfill operations. Landfill operations included, routine maintenance of landfill gas capture and control equipment, installation of landfill gas collection wells, management of leachate, waste placement and movement, capping and closure of landfill sections, etc. Testing was also performed during different times of the day including during normal business hours and when the landfill complex was closed. This was necessary to determine if odor levels differed based on time of day/night, as well as, to determine if diurnal meteorological conditions impacted local odor levels.

Sampling involved the collection of whole air samples in preconditioned 12-liter Tedlar bags. Odorous air samples were evaluated by Odor Science & Engineering’s professional odor panel. The panel consisted of eight prescreened and trained individuals. Odor concentration and odor intensity were measured and the character of the perceived odor was recorded. Odor concentration is measured by dynamic dilution forced-choice olfactometry using a state-of-the-art dynamic olfactometer.

Descriptions of the odor sample locations and the odor sample results are located in Appendix I. The odor panel results were then combined with local meteorological data and plant operations to define the general impacts being experienced by the community. Odor concentration is determined by the number of volumes of odor-free air required to dilute one volume of odorous air to the median detection threshold. The resulting value is a dimensionless ratio of the number of dilutions, abbreviated as D/T.

Several conclusions can be drawn from the odor sample results from data collected during the four (4) test events. An abbreviated list of general conclusions has been provided below. Please refer to Appendix I for the detailed report of RTP's ambient air quality and odor assessment.

General Conclusions

- The monitoring program results indicate that the landfill's odor impacts on the surrounding community were minimal based on the data obtained from each test. Further, downwind impacts are expected to decrease with distance increasing from the landfill property due to atmospheric diffusion.
- Maximum odor levels were observed during the second test event (August 1, 2007). Reasons for the high concentrations may be attributed to one or more of the following; landfill operations, meteorology and nighttime testing.
- Measured odor levels associated with the landfill decreased over the course of the testing program. This was primarily due to several operational and management corrective actions taken by the City of Albany and its consultants over the course of the program.

Odor Control – Mitigation

Several practices/policies have been instituted at the Albany Landfill in order to minimize impacts due to odor. These include placement of daily cover and placing impermeable capping on filled/closed areas. The landfill has also established an odor hotline for use in reporting any odor complaints. These complaints will be investigated and logged to provide insight into causes of specific odors and methods to better address them. As noted above, the City's efforts have resulted in a decrease in odor levels over the course of the air sampling period. There has also been a marked decrease in the number of reported odor complaints.

In addition to the above mentioned practices/policies, the City no longer accepts processed construction and demolition (C&D) debris and will not do so again in the future as long as the material continues to contain gypsum-based drywall. Processed C&D typically includes such materials as ground wood, brick, asphalt, concrete, roofing materials, and drywall, which has been approved by NYSDEC as ADC. Gypsum based drywall can generate hydrogen sulfide gas as it decomposes, resulting in potential odors to the surrounding area.

The decomposition process for processed C&D containing drywall will vary depending on a variety of conditions present at the actual location of the material. In general, it will take approximately 2 years for the material to decompose during which time the hydrogen sulfide gas can be produced. The City's recently enacted program of placing temporary capping material over approximately 17 acres of un-capped landfill area has significantly reduced the potential for the release of landfill gas containing hydrogen sulfide from the landfill surface. Evidence of the success of this practice is shown in the significant reduction in the number of calls received concerning off-site odor impacts.

Further air testing may be appropriate if odor again becomes a problem, despite the measures taken above. The scope of future odor tests, frequency of testing and duration would be based on the odors being observed and potential sources. The objective of the testing would be to identify the odor source and determine the level of control necessary to mitigate the off-site odor issue. This information would then be provided to the City and its consultants to design a solution for the problem.

3.8.2.3 Greenhouse Gases

A carbon footprint is a "measure of the impact human activities have on the environment in terms of the amount of greenhouse gases (GHG's) produced, measured in units of carbon dioxide" It is meant to be useful for individuals and organizations to conceptualize their personal (or organizational) impact in contributing to global warming[9].

In order to identify the carbon footprint of the existing Rapp Road landfill the various aspects of the landfill and its operations that produce GHG's were identified. They include:

- Fuel (gasoline and diesel fuel) consumed by the operations vehicles

[9] Wikepedia, the Free Encyclopedia. http://en.wikipedia.org/wiki/Carbon_footprint

- Fuel (oil) and electricity consumption (kWh) to heat, cool and provide power to the operations buildings and other amenities
- Gasses produced and released by the landfill and related facilities (gas to energy facility and flares)

Because of the many assumptions and variable efficiencies of landfill operations relative to the collection and combustion of methane the carbon footprint is best used as a comparative tool. There are no adopted standards for GHG emissions but rather national and international goals for which future standards may be developed, possibly similar to NAAQS.

There are several carbon footprint models available for use. *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organizations*[10] was chosen based on its applicability to the project and past experience using the model.

Methodology

The first consideration in developing the carbon footprint is to determine what aspect of the landfill operations to evaluate. Due to the amount of commercial hauling involved to serve the ANSWERS communities and the difficulty in getting data on routes and mileage, the evaluation is limited to the operations at the landfill site and not the collection of solid wastes.

Electricity Consumption

The buildings and other operational amenities consume electricity for heating, cooling, lighting, etc. This energy is provided by National Grid and is created by numerous renewable and non-renewable processes/sources such as wind, hydro, nuclear, coal, oil, etc. The processes that are considered renewable are generally considered to have little to no GHG's produced to create that energy so a percentage of the energy consumed by landfill operations that was produced by renewables is considered relatively carbon neutral. Each non-renewable energy source has a carbon footprint associated with each kilowatt-hour (kWh) produced so total yearly kWh consumption can be converted to carbon dioxide emitted. This information was obtained from data provided on National Grid billing for the landfill.

[10] Thomas, Charles, Tessa Tennant and Jon Rolls. 2000. United Nations Environment Programme,

Burning Fossil Fuels

GHG's are produced by the burning of fossil fuels, which is required to operate vehicles such as the pick up trucks, bulldozers and shredders and to provide heat to the buildings. Each fuel type emits a certain amount of carbon dioxide for each gallon of fuel burned. Therefore, the amount of each fuel type burned on a yearly basis for landfill operations was identified and multiplied by the amount of carbon dioxide emitted per gallon burned.

Landfill Gas Emissions and Energy Production

The decomposition of organic matter within the landfill creates various gasses, the most prevalent of which are methane and CO_2. In years past these gases would be allowed to escape into the atmosphere (fugitive gas). However, the landfill has a landfill gas recovery system that collects the gas and diverts a portion to be converted into energy and the rest to be flared off (burned). When the gas is flared off the byproduct is carbon dioxide and no energy is produced and put to use. Methane sent to the gas to energy facility on-site is burned in engines that power turbines to produce electricity. Although both processes produce carbon dioxide, methane is a much more potent GHG and the environment benefits from its destruction. Furthermore, energy produced by the destruction of methane off-sets production elsewhere.

The efficiency of the landfill gas recovery system (captured vs. fugitive gas) is variable but generally ranges between 65 and 85 percent. The amount of GHG released from the landfill, either directly or from the flares and engines, is measured and data collected is used to identify yearly emissions. The two primary components of these emissions are methane and carbon dioxide.

<u>Comparison of Existing & Proposed Conditions</u>

Table 3.8-9 identifies the GHG emissions from the existing landfill based on 2007 data. The two GHG's of concern are methane and CO_2. Based on a conservative estimate of 70 percent gas collection efficiency, approximately 7,172 tons of methane was released to the atmosphere in 2007. Total CO_2 emissions were 101,984 tons. Both the methane and CO_2 were released from the landfill as fugitive gases and as emissions from the flares and the gas to energy facility engines. In addition, CO_2 was emitted from landfill equipment. The table shows that the largest source of GHG emissions is by far the landfill itself.

The proposed landfill expansion will require the same vehicles and other heavy equipment used at the existing landfill. Additionally, the hours of operation and days worked per year will

Table 3.8-9
Existing Condition Carbon Footprint

Existing Rapp Road Landfill[1]																		
	Heating, Cooling and Electricity						Landfill Operations Vehicles						Landfill Gas Creation					
Rapp Road Landfill	Yearly Electric Consumption (kWh)[2]		Yearly CO_2 Emissions from Electric (tons)[3]	Yearly Heating Oil Consumption (gallons)	Yearly CO_2 Emissions from Heating Oil (tons)[4]	Total Yearly CO_2 Emissions from Heating, Cooling & Electricity (tons)	Yearly Gasoline Consumed by Pickup Trucks (gallons)	Yearly CO_2 Emissions from Gasoline (tons)[5]	Yearly Diesel Fuel Consumed by Pickup Trucks & Heavy Equipment (gallons)[6]	Yearly CO_2 Emissions from Diesel Fuel Pickup Trucks & Heavy Equipment Vehicles (tons)[7]	Total Yearly CO_2 Emissions from Landfill Operations Vehicles (tons)	Yearly Fugitive Methane (tons)	Yearly Methane Combusted 70% efficient (tons)	Yearly Methane Emitted from Engines & Flares (tons)	Yearly CO_2 Emitted from Engines & Flares (tons)[8]	Yearly Fugitive CO_2 Emissions (tons)	Total Yearly Methane Emissions (tons)	Total Yearly CO_2 Emissions (tons)
	Shop	Guard Bldg.																
2007	10,775	776,640	58.2	10,000	125.7	183.9	3794	36.8	208,000	2329.6	2366.4	6,507	15,183	665	81,581	17,853	7,172	99,434
2007 Footprint	Year 2007 CO_2 Emissions: 101,984 tons (tn) Year 2007 Methane Emissions: 7,172 tons (tn)																	

[1] *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organizations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000 was used to identify most aspects of the carbon footprint analysis

[2] January 1, 2007 through December 31, 2007 data used.

[3] Used "Fuel Sources & Air Emissions to Generate Electricity for National Grid" chart on the National Grid bill to identify how the energy was created. Fuel source GHG emissions were derived from *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organizations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000.

[4] Based on 0.00300 tCO2/litre (so I converted gallons to liters (1 gal = 3.8 liter)).

[5] # of gallons of gas multiplied by 19.4 pounds of CO2 emitted into atmosphere per gallon of gas.

[6] 800 gallons of diesel fuel each day multiplied by 260 working days/year.

[7] # of gallons of diesel fuel multiplied by 22.4 pounds of CO2 (0.010145 tCO2/gallon) emitted into atmosphere per gallon. Based on 0.00268 tCO2/litre.

[8] Per EPA AP-42, Section 2.4-7, assuming complete combustion, the mass of CO_2 emitted from combustion of landfill gas = 2.75 x the mass of the methane. One ton of methane combusted produces 2.75 tons of CO_2

remain the same so the assumed carbon footprint of these features of the proposed landfill expansion will be similar to the 2007 numbers associated with the existing landfill. Further in this section is a discussion of the potential reductions in the carbon footprint that might be expected due to the use of more efficient equipment as older equipment is replaced. These savings are likely to be very small in comparison to the landfill emissions and are therefore insignificant for comparison purposes.

The landfill area will increase and as a result the amount of GHG's produced increases. A worst case scenario was identified by projecting emissions out to the anticipated peak GHG production period, estimated to occur in 2017. Improvements to the efficiency of the gas collection system have occurred over the past year, with the reduction of odor complaints serving as evidence. Although 70 percent efficiency was used for the existing conditions analysis, it can be argued that 2007 was a year of increasing efficiency due to various modifications to the gas collection system and the placement of a temporary cap. Higher efficiencies of 80-85 percent have been achieved in 2008 and can be expected for the 2017 proposed conditions. Therefore, the calculations of methane and CO_2 emissions presented in Table 3.8-10 reflect the higher efficiency, resulting in 6,560 tons of methane and 137,827 tons of CO_2 released to the atmosphere. Using the 70 percent efficiency (Table 3.8-11) results in 9,229 tons of methane and 130,524 tons of CO_2 released to the atmosphere.

The comparison of existing conditions with proposed indicate that methane emissions will decrease under the proposed condition due to better efficiency for gas collection. An increase in the amount of methane burned translates into an increase in the amount of CO_2 emitted due to the fact that 1 ton of methane combusted emits 2.75 tons of CO_2. However, methane is about 20 times more effective in trapping heat in the atmosphere than CO_2 and therefore the destruction of methane greatly benefits the environment despite the increase in CO_2 produced. Therefore, the proposed conditions will presumably have less adverse impact on global warming factors than current (2007) conditions. In comparison with Table 3.8-11, fugitive methane would increase by 2,000 tons. This scenario is unlikely again due to the high degree of confidence in higher gas collection efficiency.

For Albany and at least some of the ANSWERS communities, a denial of the Eastern Expansion would require the long haul of solid waste to a regional landfill such as Seneca Meadows. The amount of waste that generates GHG remains the same but adding the long haul would result in another source of GHG emissions from trucking. Each truck could carry approximately 25 tons of solid waste. Therefore, approximately 42 trucks would be required to haul the solid waste

Table 3.8-10
Proposed Condition Carbon Footprint (80% Efficiency)

Proposed Rapp Road Landfill Eastern Expansion[1]																		
	Heating, Cooling and Electricity						Landfill Operations Vehicles					Landfill Gas Creation						
Rapp Road Landfill	Yearly Electric Consumption (kWh)		Yearly CO_2 Emissions from Electric (tons)[2]	Yearly Heating Oil Consumption (gallons)	Yearly CO_2 Emissions from Heating Oil (tons)[3]	Total Yearly CO_2 Emissions from Heating, Cooling & Electricity (tons)	Yearly Gasoline Consumed by Pickup Trucks (gallons)	Yearly CO_2 Emissions from Gasoline (tons)[4]	Yearly Diesel Fuel Consumed by Pickup Trucks & Heavy Equipment (gallons)[5]	Yearly CO_2 Emissions from Diesel Fuel Pickup Trucks & Heavy Equipment Vehicles (tons)[6]	Total Yearly CO_2 Emissions from Landfill Operations Vehicles (tons)	Yearly Fugitive Methane (tons)	Yearly Methane Combusted 80% Efficient (tons)	Yearly Methane Emitted from Engines & Flares (tons)	Yearly CO_2 Emitted from Engines & Flares (tons)[7]	Yearly Fugitive CO_2 Emissions (tons)	Total Yearly Methane Emissions (tons)	Total Yearly CO2 Emissions (tons)
	Shop	Guard Bldg.																
2017	10,775	776,640	58.2	10,000	125.7	183.9	3794	36.8	208,000	2329.6	2366.4	5,582	22,328	978	119,992	15,320	6,560	135,313
Totals:																		
2017 Footprint	Anticipated Year 2017 CO2 Emissions: 137,863 tons Anticipated Year 2017 Methane Emissions: 6,560 tons																	

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[1] *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000 was used to identify most aspects of the carbon footprint analysis.
[2] Used "Fuel Sources & Air Emissions to Generate Electricity for National Grid" chart on the National Grid billing to identify how the energy was created. Fuel source GHG emissions were derived from *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000.
[3] Based on 0.00300 tCO2/litre.
[4] # of gallons of gas multiplied by 19.4 pounds of CO2 emitted into atmosphere per gallon of gas.
[5] 800 gallons of diesel fuel per day multiplied by 260 working days/year.
[6] # of gallons of diesel fuel multiplied by 22.4 pounds of CO2 (0.010145 tCO2/gallon) emitted into atmosphere per gallon. Based on 0.00268 tCO2/litre.
[7] Per EPA AP-42, Section 2.4-7, assuming complete combustion, the mass of CO_2 emitted from combustion of methane = 2.75 x the mass of the methane. One ton of methane combusted produces 2.75 tons of CO_2

Table 3.8-11
Proposed Condition Carbon Footprint (70% Efficiency)

Proposed Rapp Road Landfill Eastern Expansion[1]																	
	Heating, Cooling and Electricity							Landfill Operations Vehicles					Landfill Gas Creation (Capped and Expansion Landfill Areas Combined)				
Rapp Road Landfill	Yearly Electric Consumption (kWh)		Yearly CO_2 Emissions from Electric (tons)[2]	Yearly Heating Oil Consumption (gallons)	Yearly CO_2 Emissions from Heating Oil (tons)[3]	Total Yearly CO_2 Emissions from Heating, Cooling & Electricity (tons)	Yearly Gasoline Consumed by Pickup Trucks (gallons)	Yearly CO_2 Emissions from Gasoline (tons)[4]	Yearly Diesel Fuel Consumed by Pickup Trucks & Heavy Equipment (gallons)[5]	Yearly CO_2 Emissions from Diesel Fuel Pickup Trucks & Heavy Equipment Vehicles (tons)[6]	Total Yearly CO_2 Emissions from Landfill Operations Vehicles (tons)	Yearly Fugitive Methane (tons)	Yearly Methane Combusted 70% Efficient (tons)	Yearly Methane Emitted from Engines & Flares (tons)	Yearly CO_2 Emitted from Engines & Flares (tons)[7]	Yearly Fugitive CO_2 Emissions (tons)	Total Yearly Methane Emissions (tons)	Total Yearly CO2 Emissions (tons)
	Shop	Guard Bldg.																
2017	10,775	776,640	58.2	10,000	125.7	183.9	3794	36.8	208,000	2329.6	2366.4	8,373	19,537	856	104,994	22,980	9,229	127,974
Totals:																		
2017 Footprint	Anticipated Year 2017 CO2 Emissions: 130,524 tons (tn) Anticipated Year 2017 Methane Emissions: 9,229 tons (tn)																	

[1] *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000 was used to identify most aspects of the carbon footprint analysis.

[2] Used "Fuel Sources & Air Emissions to Generate Electricity for National Grid" chart on the National Grid billing to identify how the energy was created. Fuel source GHG emissions were derived from *The GHG Indicator: UNEP Guidelines for Calculating Greenhouse Gas Emissions for Businesses and Non-Commercial Organisations*. By Charles Thomas, Tessa Tennant and Jon Rolls. United Nations Environment Programme, 2000.

[3] Based on 0.00300 tCO2/litre.

[4] # of gallons of gas multiplied by 19.4 pounds of CO2 emitted into atmosphere per gallon of gas.

[5] 800 gallons of diesel fuel per day multiplied by 260 working days/year.

[6] # of gallons of diesel fuel multiplied by 22.4 pounds of CO2 (0.010145 tCO2/gallon) emitted into atmosphere per gallon. Based on 0.00268 tCO2/litre.

[7] Per EPA AP-42, Section 2.4-7, assuming complete combustion, the mass of CO_2 emitted from combustion of methane = 2.75 x the mass of the methane. One ton of methane combusted produces 2.75 tons of CO_2

produced each day from the City and region (based on 1050 tons per day). Using an average of 6 MPG for a diesel tractor trailer, approximately 7,338 tons per year of CO_2 would be generated. This is in addition to the CO_2 and methane produced by the solid waste that is placed in the regional landfill.

Reducing GHG Emissions & Offsets

The existing landfill operations include measures to reduce the carbon footprint through offsets. These offsets do not have a direct effect on the emissions of GHG's from the landfill but indirectly reduce global emissions. First, the on-site gas to energy facility operates off of landfill methane, generating electricity that is provided directly into the grid. This offsets the need to produce this electricity elsewhere, using higher polluting methods such as oil or coal. The amount of offset is determined by the percentage of electricity generated from non-renewable resources. In the case of the electricity provided to the landfill by National Grid, 25 percent is generated by non-renewables. Currently, the gas to energy facility provides approximately 12,802,332 kWh that translates into 945 tons per year of CO_2 emissions offset.

Under the proposed 2017 conditions, it is assumed that a new gas to energy facility will be in place (City is currently negotiating with a successful bidder) with an average output of 7.65 mW. and that of the total methane collected, 100 percent would be diverted to the gas to energy facility. As a result, total yearly output is expected to be 60,300,000 kWh, assuming 10 percent downtime. Based on this future output, approximately of 4,457 tons per year of CO_2 emissions would be offset in the year 2017. Since this is peak production, the offset may be lower leading up to and following 2017.

Second, the recycling program diverts wastes from the landfill. This does not decrease the landfill footprint since these diversion rates have been included in the calculation of the landfill space necessary to serve ANSWERS. The benefit is the energy saved in extracting resources necessary to create these materials in the first place. Based on the current diversion rate for recyclables, the offset could be as high as 44,000 tons of CO_2 per year.

The proposed buildings for the landfill expansion will be designed with more energy efficient equipment (such as compact fluorescent light bulbs, reflective insulation and Energy Star appliances) to help lower electricity consumption and the associated carbon footprint. Incorporating energy efficient products and practices will help lower energy consumption and associated costs.

As previously discussed, the current means of solid waste collection within the City is relatively efficient due to the high density land use pattern. Fuel prices largely dictate efficiency outside the City where primarily private waste haulers determine the best location to take their daily loads. Efforts to reduce solid waste production may provide the most significant benefits in reducing the carbon footprint of the landfill and its operations in the future. This issue, among others, will be addressed as part of the Solid Waste Management Plan Update.

Overall, energy reduction can be expected through normal replacement of the equipment and vehicles. The City replaces its garbage trucks and construction vehicles on a 5 year basis. The energy savings will be small and incremental since not all the vehicles come due at the same time. New technologies may also play a large role and the cost of fuel will provide incentive to consider alternative technologies. Currently, some manufacturers such as John Deere claim a 10-30% more efficient vehicle without hybrid technologies. Their efficiency is related to reductions in the weight of the vehicle and its mobility. Assuming a 10% increase in efficiency at the end of 15-20 years, CO_2 emissions from construction vehicles could be reduced by approximately 233 tons per year. Whether or not these vehicles would work for the landfill operations at Rapp Road is unknown at this time but it is reasonable to assume reductions will occur through the normal decommissioning of older equipment and purchase of new, more fuel efficient equipment.

3.9 NOISE

3.9.1 EXISTING CONDITIONS

Three specific attributes are significant in the study of the amount and the nature of noise:

- The frequency distribution of the noise
- The intensity of the noise
- The time varying pattern of the noise

The overall sound we hear is composed of a summation of separate sound waves, each with a different frequency. Human hearing is more sensitive to sound in the higher frequencies than to sounds in the lower frequencies. An electronic adjustment called the "A-scale weighting network" has been devised to measure noise in a way that closely resembles human hearing. Through the A-scale network, a noise level meter electronically adjusts some of the higher, middle, and lower frequencies when noise is measured, placing a greater emphasis on the middle to high frequencies. This overall sound, or frequency distribution, is what is measured in noise analyses.

The second property of sound or noise levels is the intensity; a measure of the magnitude of the sound pressure level (SPL) expressed in units called decibels (dB). When noise is measured with A-scale weighting, the magnitude of the sound is expressed as dBA. Changes in noise levels of 3 dBA or less are not perceptible by human hearing. Common indoor and outdoor noise levels are shown in Table 3.9-1.

Noise levels vary over time at any location. For example, along a road, noise levels will change throughout the day based on the volume, types, and speeds of the vehicles operating on the road. The third property of noise is the time varying pattern with regards to the intensity of the noise. The equivalent sound level, L_{eq}, has been developed to quantify the time varying pattern of noise. The L_{eq} descriptor is used to quantify the average energy content of sounds over a selected period of time, with the most common time period being one hour for noise studies, into one representative noise level. The L_{eq} descriptor was used to quantify the noise levels used in this analysis.

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ONE CONNORS BOULEVARD
ALBANY, NEW YORK

CHA
CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, PO Box 5269 · Albany, NY 12205-0269
Main: (518) 453-4500 · www.cloughharbour.com

Designed: Drawn: Checked:

RAPP ROAD LANDFILL
EASTERN EXPANSION

NOISE MEASUREMENT LOCATIONS

Issue Date: 05/07 Project No.: 12206 Scale: 1" : 500'

FIGURE
3.9-1

Table 3.9-1
Common Noise Levels

Common Outdoor Noise Levels	Noise Level (dBA)			Common Indoor Noise Levels
	---	110	---	Rock Band
Jet Fly over at 1000 Ft.				
	---	100	---	
				Inside Subway Train (New York)
Gas Lawn Mower at 3 Ft.				
	---	90	---	Food Blender at 3 Ft.
Diesel Truck at 50 Ft.				
				Garbage Disposal at 3 Ft.
Noisy Urban (Daytime)	---	80	---	Shouting at 3 Ft.
				Vacuum Cleaner at 10 Ft.
Gas Lawn mower at 100 ft.	---	70	---	
Commercial Area				Normal Speech at 3 Ft.
Heavy Traffic at 300 ft.	---	60	---	Large Business Office
				Dishwasher Next Room
Quiet Urban (Daytime)	---	50	---	
				Small Theatre (Background)
Quiet Urban (Nighttime)	---	40	---	Library
Quiet Suburban (Nighttime)				
	---	30	---	Bedroom at Night
				Concert Hall (Background)
Quiet Rural (Nighttime)				
	---	20	---	Broadcast and Recording Studio
	---	10	---	
				Threshold of Hearing
	---	0	---	

3.9.1.1 Noise Regulations

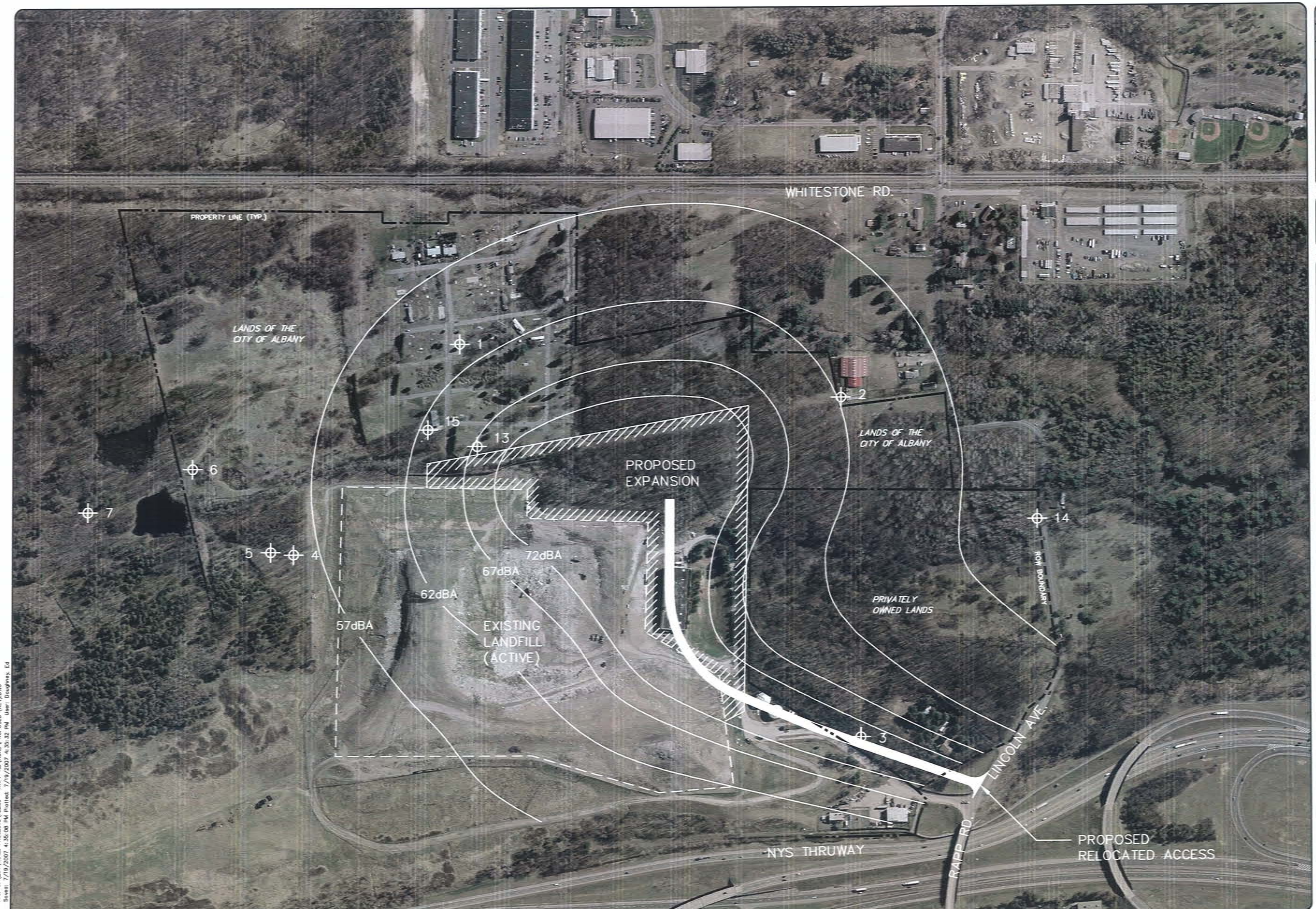
Under title 6 of the Codes, Rules, and Regulations of the State of New York (6 NYCRR) Part 360, the New York State Department of Environmental Conservation (NYSDEC) regulates solid waste management facilities throughout the state. Subpart 360-1.14 of the regulations specifies operational requirements for solid waste management facilities. In reference to noise, the regulations state that the noise from equipment or operations at the facility must be controlled to prevent transmission above certain threshold levels beyond the property line at locations zoned or otherwise authorized for residential purposes. Table 3.9-2 lists the noise level thresholds.

Table 3.9-2
Part 360 Noise Level Thresholds

Character of Community	L_{eq} Noise Levels (dBA)	
	7 a.m. – 10 p.m.	10 p.m. – 7 a.m.
Rural	57	47
Suburban	62	52
Urban	67	57

The existing landfill site and surrounding areas can be considered as “suburban”. As such, the NYSDEC will not allow noise from the landfill expansion to exceed an L_{eq} of 62 dBA beyond the property line at locations zoned, or otherwise authorized, for residential purposes. An exception to this rule exists for locations that currently experience levels greater than an L_{eq} of 62 dBA. The regulation states that “if the background residual sound level (excluding any contributions from the solid waste facility) exceeds the limits in Table 2, the facility must not produce an L_{eq} exceeding that background level”.

The landfill expansion is also subject to the SEQRA process. The NYSDEC employs a program policy for staff to evaluate the sound levels and characteristics from facilities in close proximity to other land uses (Program Policy DEP-00-1, *Assessing and Mitigating Noise Impacts,* issued October 6, 2000, revised February 2, 2001). The guidelines serve as a means to assess noise impacts, identify avoidances, and identify mitigation approaches to reduce or eliminate noise impacts in the agency’s facility permit approval process under SEQRA. The guidelines include



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RAPP ROAD LANDFILL
EASTERN EXPANSION

PROJECTED NOISE CONTOURS

Issue Date: 05/07 | Project No: 12206 | Scale: 1":400'

FIGURE
3.9-2

descriptions of anticipated human reactions to noise level increases above current background noise levels. The guidelines are used to define potential acceptability and practical limits on noise level increases from developments. NYSDEC may use the guidelines to impose appropriate noise mitigation practices associated with permit approval.

The program policy states:

"The goal for any permitted operation should be to minimize increases in sound pressure level above ambient levels at the chosen point of sound reception. Increases ranging from 0 to 3 dB should have no appreciable effect on receptors. Increases ranging from 3 to 6 dB may have potential for adverse noise impact only in cases where the most sensitive of receptors are present. Sound pressure [level] increases of more than 6 dB may require a closer analysis of impact potential depending on existing [sound pressure levels] and the character of surrounding land use and receptors. [Sound level] increases approaching 10 dB result in a perceived doubling of [sound level]. An increase of 10 dBA deserves consideration of avoidance and mitigation in most cases. The above thresholds as indicators of impact potential should be viewed as guidelines subject to adjustment as appropriate for the specific circumstances one encounters."

3.9.1.2 Noise Analysis Methodology

The following methods were used to determine existing noise levels, predict future noise levels, and assess impacts upon the project's noise environment.

- Existing land uses were established for the project area.
- Existing noise levels were determined by obtaining noise measurements at sites in the vicinity of the proposed project, typically in the vicinity of sensitive receptors or adjacent site property boundaries.
- All potential sources of noise were determined. Sources that contribute negligibly towards the overall noise levels in the area, or those that do not affect sensitive receptors, were eliminated from the analysis.
- Noise levels at various receptors were determined by adding together the noise contribution from each noise source.

- Predicted noise levels were compared to the existing noise levels to determine the extent of the noise impact (if any) caused by each alternative. Predicted noise levels were compared to noise regulations presented in 6 NYCRR Part 360 regulations to determine the extent of the noise impact (if any) caused by each alternative.

- Noise contours were generated for predicted noise levels.

- Where an impact is expected to occur, noise abatement measures were examined and evaluated.

The proposed project will consist of an expansion to the existing landfill. A noise analysis will be performed for the expansion to evaluate the worst case scenario at the adjacent property lines. If there are no noise impacts found during analysis of the worst case noise levels noise abatement measures will not be required.

3.9.1.3 Land Use

Existing activities or land uses which may be affected by noise from the proposed expansion project were identified and are shown on Figures 3.5-1 and 3.5-2 in Section 3.5. Land use is categorized as suburban. There are no schools, churches, hospitals or other sensitive receptors found within the immediate project area. The residential areas are considered to be the only receptors sensitive to noise from the proposed expansion of the landfill. These residential areas are located along Rapp Road at the entrance to the landfill, along Lincoln Avenue, and within the Fox Run mobile home park.

3.9.1.4 Noise Measurements

Existing noise level measurements were conducted during the summer and winter of 2006 at the fourteen noise measurement locations shown on Figure 3.9-1 Noise Measurement Locations. These sites represent noise sensitive land uses around the proposed expansion site.

Field measurements were obtained using a Metrosonics Metrologger model dB3080 (ANSI Type II) noise level meter. The meter is a battery-powered instrument that was field-tested for proper calibration before each measurement. During the field measurements, the noise meter was positioned approximately 5 feet above the ground at sensitive receptor locations.

The weather varied during the field measurements from cloudy to clear with temperatures between 50 – 60 degrees Fahrenheit. The wind speeds varied between 4 – 8 mph, with humidity levels between 20 and 37 percent. These meteorological conditions are within the parameters for accurate operation, as recommended by the manufacturer of the noise level meter.

To accurately measure the sound levels representative of each site, measurements of at least 15 minutes were taken during the hours of landfill operations. Noise levels were recorded for both the maximum noise level (L_{max}) and the L_{eq}. The measured L_{eq} noise levels; time of day the measurement was taken; the date of the measurement; and the measurement location in reference to the landfill are shown in Table 3.9-3. Figure 3.9-1 graphically depicts the receptor locations with regards to the landfill.

Table 3.9-3
Measured Existing Noise Levels
L_{eq} (h) (dBA)

Measurement Site	Description	Time	Date	L_{eq} (dBA) Without Shredder
1	600 feet North of existing landfill, within Fox Run Estates	12:15 p.m.	7/05/06	51
2	1000 feet East of landfill at residence/horse farm	1:05 p.m.	7/05/06	51
3	At residence located along access road to landfill	1:30 p.m.	7/05/06	58
4	200 feet Northwest of landfill along trail within the Pine Bush	11:35 p.m.	7/07/06	43
5	400 feet North of landfill along trail within the Pine Bush	10:45 a.m.	7/06/06	43
6	700 feet West of the landfill along trail within the Pine Bush	11:05 a.m.	7/06/06	44
7	1100 feet North of the landfill along trail within the Pine Bush	12:05 p.m.	7/06/06	43
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	12:25 p.m.	7/07/06	46
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	1:05 p.m.	7/07/06	46
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	1:25 p.m.	7/07/06	50
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	1:45 p.m.	7/07/06	41
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	2:10 p.m.	7/07/06	40
13	200 feet North of the landfill at property line of Fox Run Estates	2:25 p.m.	12/14/06	53
14	1400 feet Southeast of the landfill at residence along Rapp Road	3:05 p.m.	12/14/06	64

During the period of obtaining existing noise measurements, it was determined that the shredder was not in operation at the landfill. In order to accurately depict existing noise levels at each of the measurement sites, when all equipment is operating at the landfill, the shredder was modeled alone, and then combined with the measured noise levels at each one of the measurement sites. These combined noise levels produce an overall existing noise level (See Table 3.9-4). These noise levels were used to generate existing noise contours that are depicted on Figure 3.9-2 Existing /Projected Noise Contours.

Table 3.9-4
Existing Daytime Noise Levels
L_{eq} (h) (dBA)

Measurement Site	Description	L_{eq} (dBA) Without Shredder	L_{eq} (dBA) Shredder Only	Combined Existing Noise Levels L_{eq} (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	51	49	53
2	1000 feet East of landfill at residence/horse farm	51	43	52
3	At residence located along access road to landfill	58	40	58
4	200 feet Northwest of landfill along trail within the Pine Bush	43	44	47
5	400 feet North of landfill along trail within the Pine Bush	43	43	46
6	700 feet West of the landfill along trail within the Pine Bush	44	41	46
7	1100 feet North of the landfill along trail within the Pine Bush	43	38	44
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	31	46
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	31	46
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	35	50
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	33	42
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	40	34	41
13	200 feet North of the landfill at property line of Fox Run Estates	53	56	58
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	38	64

3.9.1.5 Noise Sources

The sources of noise from the proposed expansion project were identified for use in the analysis. The major sources of noise will be landfill equipment used for daily operations and development of the proposed expansion of the landfill and the construction equipment that will be used to construct the expansion. The machinery that will contribute to the increased noise levels for operations include compactors, backhoe excavators, bulldozer, and a waste shredder for development of the proposed expansion and movement of waste and fill that is brought to the proposed site.

In order to accurately depict the sound levels of the proposed expansion each piece of equipment to be used was measured and noise levels were recorded for both the maximum noise level (L_{max}) and the L_{eq}. Measurements were conducted on Saturday, June 16th, 2007 during a period in which the existing landfill was not in operation. Measurements of at least 15 minutes were taken while the machine was isolated and operating at a distance of 50 feet from the noise meter. The measured noise levels for each piece of construction equipment are shown in Table 3.9-5.

Table 3.9-5
Measured Operational Equipment Noise Levels
L_{eq} (h) (dBA)

Equipment Type	Machine Make / Model	L_{max} (dBA)	L_{eq} (dBA)
Compactor	Caterpillar 836H	85	82
Bulldozer	Caterpillar D6R	83	80
Excavator	Caterpillar 330C	78	73
Waste Shredder	Diamond Z SWG 1600	82	82

Another source of noise to be considered in the noise analysis includes the noise from truck traffic used to deliver waste and fill to the proposed site. The majority of the traffic will occur during the hours of landfill operations typically 7:00 a.m. to 3:00 p.m. The truck traffic is anticipated to deliver waste from Washington Avenue extension to Rapp Road that connects to the existing landfill site. Other minor traffic will be generated throughout the day; however, the noise from this traffic is considered negligible compared to the noise from the trucks delivering waste.

3.9.2 POTENTIAL IMPACTS & MITIGATION

3.9.2.1 Predicted Noise Levels (Operations)

Predicted noise levels of landfill operations were determined for the worst case L_{eq} at the sensitive receptors surrounding the landfill. The method used to determine the contributions at a given receptor took into account the operational machinery noise sources working in and around the landfill, as well as the truck traffic noise sources used to deliver the trash to the site. All noise contributions associated with these operations were determined using the Federal Highway Administration (FHWA) construction noise model indicated within their noise regulation titled "Procedures for Analysis and Abatement of Highway Traffic Noise and Construction Noise," commonly referred to as FHPM 7-7-3. Actual noise levels from the machinery operating at the landfill, as identified in Table 3.9-4, were used in the model to provide more accurate results.

The FHWA construction noise model has been developed into a package of two computer programs called HINPUT and HICNOM. HINPUT is an interactive program that requests input data from the user, makes initial acoustical and geometrical calculation, and prepares a data file that is used by HICNOM for the detailed acoustical calculations. HICNOM then produces a report file that contains the results of these calculations.

In utilizing the FHWA construction noise modeling programs the input data consisted of two separate applications for operations: the delivery of the waste by heavy trucks (garbage trucks) to the project site; and the act of manipulation (shredding) and placement (distributing and compacting) of the waste delivered to the site. In order to model the landfill operations accordingly, the area of work and applicable equipment uses within that area of work was clearly defined. It was determined that for the landfill operations anticipated, the area of work would be contained at any one time within a relatively small area of the landfill's working face. Multiple noise models were completed throughout the landfill site to fully evaluate the 'worst case' noise impact scenarios along all property lines adjacent to the proposed landfill expansion. Locations analyzed included all residential properties, the Fox Run Estates and the Albany Pine Bush Preserve. Based on additional information obtained from the landfill operators, the following equipment is considered the maximum pieces of machinery that can be anticipated for use within the proposed work area at any one time:

1 Shredder - used to break the waste apart
2 Compactors (Bulldozer) – used to distribute and compact the waste
1 Excavator – used to feed waste into the shredder
1 Bulldozer – used to place fill over the waste
14 Heavy Trucks (Garbage Trucks per hour) – used to deliver waste and fill to the site

Models were generated for two separate work areas in order to determine the worst case noise levels outside of the project site. Both the northwest and northeast quadrants of the proposed landfill footprint were used for the proposed modeling. The modeling was limited to these quadrants because south of the proposed landfill is the NYS Thruway, with no residential properties to be affected above of what currently may exist due to this facility. For additional information regarding the land uses adjacent to the landfill refer to Figures 3.5-1 and 3.5-2.

The predicted noise levels from the two models generated, both the northwest and northeast quadrant models, were then transposed into one worst-case representation for each of the receptors modeled. From this compilation of data noise contours were generated depicting the anticipated worst-case noise levels anticipated as a result of the proposed landfill expansion. These contours are depicted in Figure 3.9-2, Existing/Projected Noise Contours. To more accurately depict the anticipated noise levels resulting at the sensitive receptors previously measured; Table 3.9-6 shows a breakdown of the noise levels generated from the models. The results show that the Part 360 threshold for a suburban area will not be exceeded by any of the receptors except the residence on Rapp Road adjacent to the landfill entrance that will be acquired for the project and the mobile home park in which all but one residence can be moved.

Table 3.9-6
Projected Landfill Operation Noise Levels
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Part 360 Level Threshold for Suburban Area	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	62	59	6
2	1000 feet East of landfill at residence/horse farm	52	62	60	8
3	At residence located along access road to landfill	58	62	72(1)	14
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	62	55	8
5	400 feet North of landfill along a trail within the Pine Bush	46	62	54	8
6	700 feet West of the landfill along a trail within the Pine Bush	46	62	52	6
7	1100 feet North of the landfill along a trail within the Pine Bush	44	62	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	46	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	46	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	62	49	-1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	62	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	62	46	5
13	200 feet North of the landfill at property line of Fox Run Estates	58	62	65	7
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	62	55	-9
15[2]	At property line of a resident located within Fox Run Estates		-	60	

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.
2. Modeled to determine the proposed noise levels within the resident's area of use.

3.9.2.2 Predicted Noise Levels (Construction)

The proposed landfill expansion will be constructed in three phases (See Section 3.9.2.1.A). The phases consists of (1) demolition of existing recycling building and construction of a new recycling building, (2) cell excavation, construction of containment berm and installation of leachate pipe and pump stations, and (3) landfill liner construction within the expansion area. Once these phases are complete for the expansion area, landfill operations will commence.

Predicted noise levels for the construction of the landfill expansion were determined for the worst case L_{eq} at the sensitive receptors surrounding the landfill for each phase of construction. The FHWA construction noise modeling program (HICNOM) was used to determine the noise contributions from the construction machinery. Noise levels due to operations at the existing landfill were also included to determine the overall noise levels at the receptors.

In order to determine noise levels during each phase of construction, separate models were generated for each construction phase. The models included all of the separate work areas in order to determine the worst case noise levels at the receptors. The following equipment was used in the models developed for each construction phase:

Phase 1 (Demolition and Construction of Recycling Facility)

- 1 Dozer - used for grading
- 2 Loaders – used to fill trucks with building debris
- 2 Excavators – used for excavation and demolition
- 1 Crane – used for construction and demolition
- 1 Vibratory Roller – used for compaction
- 5 Heavy Trucks (10 Wheel Dump Trucks) – used to remove debris

Phase 2 (Construction of Containment Berm, Cell Excavation and Leachate Pipe and Pump Stations)

- 2 Dozers - used for grading
- 1 Loader – used to move fill material
- 2 Excavators – used for excavation
- 1 Vibratory Roller – used for compaction
- 5 Heavy Trucks (10 Wheel Dump Trucks) – used to move and truck in fill

Phase 3 (Landfill Liner Construction)

- 2 Dozers - used for grading
- 2 Vibratory Roller – used for compaction
- 2 Generators
- 1 Crane – used for moving liner
- 5 Heavy Trucks (10 Wheel Dump Trucks) – used to truck in fill

Tables 3.9-7A through 3.9-7C show a breakdown of the noise levels for each construction phase.

Table 3.9-7A
Projected Landfill Construction Noise Levels
Phase 1
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Part 360 Level Threshold for Suburban Area	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	62	55	2
2	1000 feet East of landfill at residence/horse farm	52	62	56	4
3	At residence located along access road to landfill	58	62	85(1)	27
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	62	51	4
5	400 feet North of landfill along a trail within the Pine Bush	46	62	50	4
6	700 feet West of the landfill along a trail within the Pine Bush	46	62	49	3
7	1100 feet North of the landfill along a trail within the Pine Bush	44	62	47	3
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	62	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	62	44	2
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	62	44	3
13	200 feet North of the landfill at property line of Fox Run Estates	58	62	59	1
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	62	64	0

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.

Table 3.9-7B
Projected Landfill Construction Noise Levels
Phase 2
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Part 360 Level Threshold for Suburban Area	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	62	59	6
2	1000 feet East of landfill at residence/horse farm	52	62	61	9
3	At residence located along access road to landfill	58	62	63(1)	5
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	62	54	7
5	400 feet North of landfill along a trail within the Pine Bush	46	62	53	7
6	700 feet West of the landfill along a trail within the Pine Bush	46	62	51	5
7	1100 feet North of the landfill along a trail within the Pine Bush	44	62	49	6
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	62	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	62	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	62	45	4
13	200 feet North of the landfill at property line of Fox Run Estates	58	62	72	14
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	62	64	0

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.

Table 3.9-7C
Projected Landfill Construction Noise Levels
Phase 3
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Part 360 Level Threshold for Suburban Area	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	62	59	6
2	1000 feet East of landfill at residence/horse farm	52	62	59	7
3	At residence located along access road to landfill	58	62	63[(1)]	5
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	62	54	7
5	400 feet North of landfill along a trail within the Pine Bush	46	62	53	7
6	700 feet West of the landfill along a trail within the Pine Bush	46	62	51	5
7	1100 feet North of the landfill along a trail within the Pine Bush	44	62	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	62	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	62	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	62	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	62	45	4
13	200 feet North of the landfill at property line of Fox Run Estates	58	62	68	10
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	62	64	0

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.

3.9.2.3 Noise Impacts (Operations)

Based on the ‘worst case’ noise models generated for operations and as identified in Table 3.9-5, transmission of projected sound levels exceeding the NYSDEC Part 360 regulations will occur outside of the current landfill property lines at Fox Run Estates (mobile home park) and at the residence located near the intersection of the landfill access road and Rapp Road. Table 3.9-8 depicts the receptors that exceed the Part 360 regulations from the proposed landfill expansion.

Table 3.9-8
Impacted Receptor Locations (Operations) According to Part 360
L_{eq} (h) (dBA)

Measurement Site	Description	Modeled L_{eq} (dBA)	Amount Over Threshold (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	59	0
2	1000 feet East of landfill at residence/horse farm	60	0
3	At residence located along access road to landfill	72(1)	10
4	200 feet Northwest of landfill along trail within the Pine Bush	55	0
5	400 feet North of landfill along trail within the Pine Bush	54	0
6	700 feet West of the landfill along trail within the Pine Bush	52	0
7	1100 feet North of the landfill along trail within the Pine Bush	49	0
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	49	0
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	45	0
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	46	0
13	200 feet North of the landfill at property line of Fox Run Estates	65	3
14	1400 feet Southeast of the landfill at residence along Rapp Road	55	0
15	At property line of a resident located within Fox Run Estates	60	0

The projected sound levels from operations are expected to exceed the Part 360 regulations at measurement Sites 3 and 13. The residential parcel represented by Site 3 is proposed to be acquired and used for landfill operations. Therefore, this site will no longer be used for residential purposes. Site 13 is located in the mobile home park north of the landfill. As part of this project the mobile home park has been dedicated to the Albany Pine Bush Preserve. The existing mobile homes on the site are gradually relocating and those that remain can be relocated within the park but outside of the noise impact contour, with the exception of one parcel on which there is a life estate. The predicted worst case noise level at the property line for this mobile home is 60 dBA, which is below the Part 360 threshold.

The noise levels due to landfill operations shown in Table 3.9-4 represent worst case noise levels, but actual noise levels will typically be lower than those shown. As shown in the noise measurements, the machinery at the landfill is typically not all operating at the same time, which means that noise levels will typically be lower than the worst case predicted noise levels, which were determined with all equipment in operation. Furthermore, as the landfill in the expansion area increases in height, the landfill operations will move away from the area located closest to the receptors, resulting in lower noise levels. As the landfill is filled with waste, the side slopes will be constructed at a slope of 3 horizontal to one vertical. Consequently, a typical layer of waste, which is approximately 10 feet in height, will begin 30 feet further into the landfill than the layer below. In this way, the landfill equipment will be continually stepping back from the outer boundary of the landfill. This will results in the equipment being located further from receptors, which will result in lower noise levels as the landfill height increases.

As stated in the NYSDEC Program Policy DEP-00-1, the goal for any permitted operation should be to minimize increases in sound pressure level above ambient levels at the chosen point of sound reception. Table 3.9-9 shows the projected change in noise levels from operations compared to existing.

Table 3.9-9
Impacted Receptor Locations (Operations) According to DEP-00-1
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	59	6
2	1000 feet East of landfill at residence/horse farm	52	60	8
3	At residence located along access road to landfill	58	72(1)	14
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	55	8
5	400 feet North of landfill along a trail within the Pine Bush	46	54	8
6	700 feet West of the landfill along a trail within the Pine Bush	46	52	6
7	1100 feet North of the landfill along a trail within the Pine Bush	44	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	46	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	46	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	49	-1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	46	5
13	200 feet North of the landfill at property line of Fox Run Estates	58	65	7
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	55	-11
15(2)	At property line of a resident located within Fox Run Estates	58(3)	60	2

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.
2. Modeled to determine the proposed noise levels within the resident's area of use.
3. Although no measurement was conducted at site 15, the noise level can be assumed to be the same as site 13.

The noise levels due to the expansion operations were compared to the existing noise levels to determine the effects anticipated from the proposed landfill expansion. Based on the NYSDEC Program Policy DEP-00-1 guidance, a noise level increase of 0 to 3 decibels should have no appreciable effect on receptors. An increase of 3 to 6 decibels may have potential for adverse noise impact only in cases where the most sensitive of receptors are present. An increase of more than 6 decibels may require more analysis, and an increase of 10 decibels deserves consideration of avoidance and mitigation measures in most cases. The guidance also includes a table, Table B, that gauges human reaction to increases in sound pressure level. This table indicates that increases of less than 5 decibels are unnoticed to tolerable, increases of 5 to 10 decibels are intrusive, and increases of 10 to 15 decibels are very noticeable.

A comparison of the noise levels in Table 3.9-7 to the DEC guidance provides an indication as to the level of noise impact due to the operation of the landfill. This comparison shows that the increase will be 0 to 3 decibels, having no appreciable effect on receptors, at sites 8, 9, 10, 11, 14, and 15. The increase will be 3 to 6 decibels at sites 1, 6, 7, and 12. The noise level increase at these sites is within the range to have potential for adverse noise impact only in cases where the most sensitive of receptors are present. These sites represent locations within Fox Run Estates and trails within the Albany Pine Bush. These sites are not considered the most sensitive of receptors, which would normally include amphitheaters or other uses that require quiet conditions for activity. Therefore, no impact is associated at measurement sites 1, 6, 7, and 12.

The noise level increase at sites 2, 4, 5, and 13 is in the range of 6 to 10 decibels. According to the DEC guidance, these increases require closer analysis of impact potential depending on the existing noise levels and character of the surrounding land uses. According to Table B of the DEC guidance, increases in this range are also considered intrusive to humans. Site 2 is located at an existing residence/horse farm with an existing noise level of 52 decibels. Sites 4 and 5 are located within the Albany Pine Bush Preserve with existing noise levels of 46 and 47 decibels, respectively. Site 13 is at the Fox Run Estates property line and has an existing noise level of 58 decibels. Site 2 would have the most noticeable noise impact since the land use is a residence with frequent outdoor activity. However, the resulting noise level of 60 decibels is not at a level that it would interfere with speech. Impacts at sites 4 and 5 would be less noticeable since there is much less frequent activity, and the chances of activity occurring during operations that would produce the worst case noise levels is much less. No impact would be perceived at site 13 since it is located at the Fox Run Estates property line where no activity occurs. The noise increase at the closest remaining residence in Fox Run Estates, where human activity will occur more regularly, is only 2 decibels.

As stated previously, the modeled noise levels presented in Table 3.9-7 represent the worst case noise levels. Actual noise levels will typically be below these noise levels since all of the equipment is typically not operating at the same time and the equipment will move further from these receptors as the landfill height increases.

An increase of greater than 10 decibels deserves consideration of avoidance and mitigation in most cases. The noise level at measurement site 3 represents a 14 decibel increase over existing. However, this land will be acquired as part of the project and will not be a concern as a sensitive receptor.

3.9.2.4 Noise Impacts (Construction)

Based on the 'worst case' noise models generated for construction of the proposed expansion and as identified in Table 3.9-7A through 3.9-7C, transmission of projected sound levels exceeding the NYSDEC Part 360 regulations will occur outside of the current landfill property lines. Table 3.9-10A through 3.9-10C depicts the receptors that exceed the Part 360 regulations, for each phase of construction for the proposed landfill expansion.

Table 3.9-10A
Impacted Receptor Locations (Construction) According to Part 360
Phase 1
L_{eq} (h) (dBA)

Measurement Site	Description	Modeled L_{eq} (dBA)	Amount Over Part 360 Threshold (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	55	0
2	1000 feet East of landfill at residence/horse farm	56	0
3	At residence located along access road to landfill	85	23
4	200 feet Northwest of landfill along trail within the Pine Bush	51	0
5	400 feet North of landfill along trail within the Pine Bush	50	0
6	700 feet West of the landfill along trail within the Pine Bush	49	0
7	1100 feet North of the landfill along trail within the Pine Bush	47	0
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	51	0
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	44	0
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	44	0
13	200 feet North of the landfill at property line of Fox Run Estates	59	0
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	2

Table 3.9-10B
Impacted Receptor Locations (Construction) According to Part 360
Phase 2
L_{eq} (h) (dBA)

Measurement Site	Description	Modeled L_{eq} (dBA)	Amount Over Part 360 Threshold (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	59	0
2	1000 feet East of landfill at residence/horse farm	61	0
3	At residence located along access road to landfill	63	1
4	200 feet Northwest of landfill along trail within the Pine Bush	54	0
5	400 feet North of landfill along trail within the Pine Bush	53	0
6	700 feet West of the landfill along trail within the Pine Bush	51	0
7	1100 feet North of the landfill along trail within the Pine Bush	49	0
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	51	0
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	45	0
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	45	0
13	200 feet North of the landfill at property line of Fox Run Estates	72	10
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	2

Table 3.9-10C
Impacted Receptor Locations (Construction) According to Part 360
Phase 3
L_{eq} (h) (dBA)

Measurement Site	Description	Modeled L_{eq} (dBA)	Amount Over Part 360 Threshold (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	59	0
2	1000 feet East of landfill at residence/horse farm	59	0
3	At residence located along access road to landfill	63	1
4	200 feet Northwest of landfill along trail within the Pine Bush	54	0
5	400 feet North of landfill along trail within the Pine Bush	53	0
6	700 feet West of the landfill along trail within the Pine Bush	51	0
7	1100 feet North of the landfill along trail within the Pine Bush	49	0
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	47	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	51	0
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	45	0
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	45	0
13	200 feet North of the landfill at property line of Fox Run Estates	68	6
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	2

The projected sound levels for the three phases of construction are expected to exceed the Part 360 regulations at measurement Sites 3 and 13 for Phase 1 and Sites 3, 13 and 14 for Phases 2 3. The residential parcel represented by Site 3 is proposed to be acquired and used for landfill operations. Site 13 is located at the property line of the mobile home park north of the landfill, which has been dedicated to the Albany Pine Bush Preserve. The existing mobile homes on the site are gradually relocating and those that remain can be relocated within the park but outside of the noise impact contour, with the exception of one parcel on which there is a life estate. The predicted worst case noise level at the property line of the mobile home park is 72 dBA (10 dBA over the threshold) for Phase 2 construction and 68 dBA (6 dBA over the threshold) for Phase 3 construction. Although this noise level exceeds the noise level found in the Part 360 regulations, this noise level represents the worst case noise level only when construction is in closest proximity to this site. The machinery used for construction will typically not all be operating at the same time, nor in the same location, which means that noise levels will typically be lower than the worst case predicted noise levels. Site 14 is located approximately 1400 feet southeast of the landfill. The predicted worst case noise level in proximity to this residence is 64 dBA (2 dBA over the threshold) for Phase 1, 2 and 3 construction. Although this noise level exceeds the noise level found in the Part 360 regulations, this noise level represents the worst case noise level only when construction is in closest proximity to this site. The machinery used for construction will typically not all be operating at the same time, which means that noise levels will typically be lower than the worst case predicted noise levels.

Table 3.9-11A through 3.9-11C show the projected change in noise levels, compared to existing, for the three phases of construction.

Table 3.9-11A
Impacted Receptor Locations (Construction) According to DEP-00-1
Phase 1
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	55	5
2	1000 feet East of landfill at residence/horse farm	52	56	4
3	At residence located along access road to landfill	58	85	27
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	51	4
5	400 feet North of landfill along a trail within the Pine Bush	46	50	4
6	700 feet West of the landfill along a trail within the Pine Bush	46	49	3
7	1100 feet North of the landfill along a trail within the Pine Bush	44	47	3
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	2
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	44	2
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	44	3
13	200 feet North of the landfill at property line of Fox Run Estates	58	59	1
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	64	0

Table 3.9-11B
Impacted Receptor Locations (Construction) According to DEP-00-1
Phase 2
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	59	6
2	1000 feet East of landfill at residence/horse farm	52	61	9
3	At residence located along access road to landfill	58	63	5
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	54	7
5	400 feet North of landfill along a trail within the Pine Bush	46	53	7
6	700 feet West of the landfill along a trail within the Pine Bush	46	51	5
7	1100 feet North of the landfill along a trail within the Pine Bush	44	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	1
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	45	4
13	200 feet North of the landfill at property line of Fox Run Estates	58	72	14
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	64	0

Table 3.9-11C
Impacted Receptor Locations (Construction) According to DEP-00-1
Phase 3
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Modeled L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	59	6
2	1000 feet East of landfill at residence/horse farm	52	59	7
3	At residence located along access road to landfill	58	63	5
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	54	7
5	400 feet North of landfill along a trail within the Pine Bush	46	53	7
6	700 feet West of the landfill along a trail within the Pine Bush	46	51	5
7	1100 feet North of the landfill along a trail within the Pine Bush	44	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	1
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	47	1
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	51	1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	45	3
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	45	4
13	200 feet North of the landfill at property line of Fox Run Estates	58	68	10
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	64	0

Based on the previous discussion in regard to landfill operation impacts in accordance NYSDEC Program Policy DEP-00-1 guidance, and given the fact that construction noise is considered temporary, an construction noise level increase of up to 6 decibels results in minimal or no impact. Therefore, for Phase 1 construction, no site will encounter an impact (although site 3 exceeds 6 decibels, the property will be acquired as part of the landfill project). Similarly, no impact will be encountered at sites 1, 3, 6, 7, 8, 9, 10, 11, 12 and 14 for Phases 2 and 3 construction.

The noise levels at sites 2, 4, and 5 are within the range of 6-10 decibels for construction Phases 2 and 3. Site 2 would have the most noticeable noise impact during construction since the land use is a residence with frequent outdoor activity. However, the resulting noise level of 61 decibels for Phase 2 and 59 decibels for Phase 3 are not at levels that would interfere with speech. Impacts at sites 4 and 5 would be less noticeable since there is much less frequent activity, and the chances of activity occurring during construction operations that would produce the worst case noise levels is much less.

Noise levels at site 13 for construction Phases 2 and 3 represents a 14 decibel and 10 decibel increase, respectively, over existing noise levels. Increases of greater than 10 decibels deserve consideration of avoidance and mitigation in most cases. However, site 13 represents the property line of Fox Run Estates, which will be dedicated to the Pine Bush Preserve. As such, no activity is anticipated in the area represented by site 13 during construction.

As stated previously, the modeled noise levels presented in Table 3.9-7 represent the worst case construction noise levels. Actual noise levels will typically be below these noise levels since all of the construction equipment is typically not operating at the same time or in the same location. Furthermore, the entire construction of the proposed landfill expansion will be a temporary activity that will only last for a year. Each Phase of the construction will only last a few weeks to a couple of months.

3.9.2.5 Tonal Noise Considerations and Backup Alarms

Tonal noise and high frequency noise, such as from backup alarms, have the potential to result in annoyance even when the decibel level is not such that it creates a noise impact at a receptor. Tonal noise is a prominent discrete tone, rather than typical noise occurring over several frequencies, which is typical for construction equipment. The backup alarms on construction equipment, however, do have the capability of producing tonal noise.

A separate analysis was completed to determine the possible effects of the backup alarms on equipment operating within the expansion. The analysis consisted of measuring existing backup alarms and noise levels produced by these alarms at existing receptors, and then modeling the noise due to these backup alarms for operation within the proposed expansion. See Appendix M for the complete analysis.

The results of the analysis show that the backup alarm for the compactor, although unlikely could result in noise impacts due to an increase in noise levels compared to existing for the higher frequency noise. The results also predict prominent discrete tone conditions during operation of the compactor backup alarm within the proposed expansion. These impacts can be mitigated by equipping the compactor with a Preco Model 1028 self-adjusting alarm, which automatically adjusts the alarm sound level to 5dBA above ambient levels. As shown in the analysis, the Model 270 currently installed on the water truck, will produce noise levels slightly above existing. Based on product information the Model 1028 sound output is 10dBA lower than the Preco 270. It can therefore be assumed the resulting alarm sound level from the Preco 1028 will be slightly above existing if not lower. Prominent discrete tone conditions will also be prevented at the nearby receptor sites due to the sound level reduction and audible frequency achieved by the Model 1028.

3.9.2.6 Mitigation Measures

Based on the results of the noise modeling for the proposed expansion of the landfill, minor and temporary impacts are anticipated according to the Part 360 regulations and NYSDEC Program Policy DEP-00-1 guidance. As previously stated, these impacts are expected to be short in duration and experienced during the construction phases and the preliminary operational phases only. The anticipated duration of each construction phase is approximately 12 weeks, with typical working hours from 7:00 A.M. to 5:00 P.M. Based on the analysis, impacts due to construction activities are projected to occur during Phases 2 and 3, but only when equipment is operating closest to sensitive receptors. Since these impacts are occasional and temporary, no mitigation measures are proposed for construction.

There is a range of mitigation measures that were considered for proposed landfill operations to reduce the noise levels at the receptors. The first consideration involved relocating the proposed landfill operations away from the eastern project limit. However, moving the operations further from the eastern property line is not feasible since the objective of the project is an eastern expansion of the existing landfill footprint. The second mitigation measure considered the use of a noise barrier in the form of a wall or earthen berm along the eastern property line to shield residences to the east of the landfill from noise due to proposed operations. The implementation of a barrier would provide shielding effects to receptors during the initial stages of landfill activities. Yet as operations progress and gain elevation the barrier would no longer block the line of sight between operations and receptors, and would provide no appreciable mitigating effect. Therefore, this mitigation alternative is considered not feasible due to the mobility of proposed landfill operations.

In addition to quieter back-up alarms as previously discussed, equipment noise emissions can be further reduced by installing engine exhaust sound-suppression packages (SSP). Engine exhaust SSP's are devices designed to provide a higher degree of noise attenuation than that of standard mufflers. An analysis was performed to determine the noise decrease achieved by this mitigation measure during normal operations within the area of the proposed expansion. Noise levels will be reduced by 2 dBA for the compactor and bulldozer and remain the same for the excavator with the addition of the most effective SSP available for the equipment (refer to the Epsilon Associates, Inc. September 22, 2008 letter in Appendix M). Table 3.9-12 shows the equipment sound levels with and without the sound-suppression package installed.

Table 3.9-12
Equipment Noise Levels With & Without SSP
L_{eq} (h) (dBA)

Equipment Type	Machine Make / Model	Without SSP L_{eq} (dBA)	With SSP L_{eq} (dBA)
Compactor	Caterpillar 836H	82	80
Bulldozer	Caterpillar D6R	80	78
Excavator	Caterpillar 330C	73	73

In order to determine the effect sound-suppression packages have on overall noise levels at receptor sites, a model was generated for the proposed expansion operations using equipment noise levels with sound-suppression packages installed. Table 3.9-13 shows the projected noise levels for the proposed operations using equipment with and without sound-suppression packages.

Table 3.9-13
Projected Landfill Operation Noise Levels with Equipment with and without Sound-Suppression
L_{eq} (h) (dBA)

Measurement Site	Description	Existing Noise Level	Modeled w/ out SSP L_{eq} (dBA)	Noise Increase Over Existing (dBA)	Modeled w/ SSP L_{eq} (dBA)	Noise Increase Over Existing (dBA)
1	600 feet North of existing landfill, within Fox Run Estates	53	59	6	58	5
2	1000 feet East of landfill at residence/horse farm	52	60	8	59	7
3	At residence located along access road to landfill	58	72(1)	14	72(1)	14
4	200 feet Northwest of landfill along a trail within the Pine Bush	47	55	8	54	7
5	400 feet North of landfill along a trail within the Pine Bush	46	54	8	53	7
6	700 feet West of the landfill along a trail within the Pine Bush	46	52	6	51	5
7	1100 feet North of the landfill along a trail within the Pine Bush	44	49	5	49	5
8	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	46	0	46	0
9	2500 feet Northwest of the landfill along a trail within the Pine Bush	46	46	0	46	0
10	1200 feet Northwest of the landfill along a trail within the Pine Bush	50	49	-1	49	-1
11	1500 feet Northwest of the landfill along a trail within the Pine Bush	42	45	3	44	2
12	1500 feet Northwest of the landfill along a trail within the Pine Bush	41	46	5	46	5
13	200 feet North of the landfill at property line of Fox Run Estates	58	65	7	64	6
14	1400 feet Southeast of the landfill at residence along Rapp Road	64	55	-11	55	-9
15(2)	At property line of a resident located within Fox Run Estates	58(3)	60	2	59	1

1. Property is being acquired as part of this project, therefore, an impact at this location will not exist.
2. Modeled to determine the proposed noise levels within the resident's area of use.
3. Although no measurement was conducted at site 15, the noise level can be assumed to be the same as site 13.

Based on the analysis, most of the receptors will experience a 1 dBA reduction in noise levels during operations utilizing equipment with sound-suppression packages compared to operations without the SSP's. Measurement sites 2, 3, 4 and 5 will experience sound level increases more than 6 dBA over existing conditions. As stated previously, site 3 is being acquired as part of the project and therefore will not experience an impact. Sites 2, 4 and 5 would experience a noise increase of 7 dBA for operations with the sound suppression package on landfill equipment. However, the projected noise levels are considered worst case and will occur only when operations occur in areas closest to the receptor sites and all equipment is operating. Landfill activities in these areas will only occur during the initial stages of the expansion. As the landfill is gradually filled in, operations will move further away from the receptors, resulting in lower noise levels.

Based on the analysis of available mitigation measures, the following best practice mitigation strategies will be included in the landfill expansion:

Source Control:

1. Restrict operations of the Landfill facility to daylight hours. Currently the hours of operation are 7:00 a.m. to 4:00 p.m. (3:00 p.m. waste acceptance ceases).
2. Utilize Preco Model 1028 self-adjusting backup alarms on all equipment to reduce impacts due to high frequency noise and prominent discrete tones.
3. Utilize engine exhaust sound-suppression packages on the compactors and bulldozers to reduce overall equipment noise emissions.
4. Use of properly designed and well-maintained mufflers and engine enclosures on all internal combustion engines.
5. Regular equipment maintenance or the use of new equipment which is subject to new product noise emission standards. Currently the facility performs weekly maintenance on all equipment. Immediate maintenance takes place on any pieces of equipment that becomes damaged or break due to operation activities (this includes muffler failure).

Site Control:

1. Placement of stationary equipment as far away as possible from particularly sensitive receptors. For example: shredder should be placed at the farthest point away from these receptors or in a shielded position during operation.
2. Phasing of operations to preserve natural or manmade barriers as long as possible.
3. Elimination of "tail gate banging."

Community Awareness:

1. Expand existing community feedback mechanisms to accept potential future concerns by residents over noise issues. This should include a quick response

component, such as that used for the odor hotline, to investigate and verify noise issues and determine if construction or operation modifications can be made to reduce the impact.

3.10 CULTURAL RESOURCES

3.10.1 EXISTING CONDITIONS

Cultural resources include historic and pre-historic sites, structures and artifacts. Historic resources originate from the period when European settlers arrived till the present (after c. AD 1610). Precontact resources are generally defined as artifacts originating from the period when humans first entered the Hudson Valley about 11,000 years ago to the early 1600's when European settlers arrived (before c. AD 1610).

To assess potential impacts related to these resources, a Phase 1 Cultural Resources Assessment was prepared for each of the proposed landfill expansion areas by Hartgen Archeological Associates, Inc. (HAA, Inc.) between 2005 and 2007 (refer to Appendix J). Although alternatives are discussed in SDEIS Section 5.0, their discussion here is relevant since much of the land investigated through the Phase 1 assessment may be part of the Habitat Plan.

The Phase 1 assessment includes two parts (Phase 1A and 1B). The Phase IA Literature Review and Final Cultural Resources Sensitivity Assessment Report included an assessment of the environmental setting, review of documentary information of known archeological sites, historic properties, and archeological surveys, archaeological field investigations and a report of findings with recommendations.

The initial studies provided an inventory of known cultural resources within one mile of each of the proposed expansion areas and a preliminary archeological assessment based on the proximity of known resources. Archeological site files of the New York State Museum (NYSM) and the Office of Parks, Recreation and Historic Preservation (OPRHP) were reviewed for reported sites within one mile of each of the proposed landfill expansion areas. Historical maps were reviewed to identify any 19th- or early 20th-century Map Documented Structures (MDS) within one mile of each of the proposed landfill expansion areas. Additionally, a preliminary review of any previous cultural resource reports conducted in, or within one mile of each of the sites was completed.

The Phase 1A assessment is primarily a review of the available literature including agency file data on known sites, historic maps, and local information as applicable. This information combined with a visual inspection of the project area and available documentation on previous disturbance allows the archaeologist to render an opinion on the sensitivity of the area for producing cultural resources and to make recommendations for further work. Should this analysis lead to a recommendation for field survey, a Phase 1B assessment is conducted. This involves subsurface field investigations performed in accordance with State and national guidelines. Should cultural resources be found, additional analysis in the form of a Phase 2 assessment is typically performed to determine the significance of the find and the extent of the resource. The results of the Phase 1 assessment of the alternative expansion areas, including the preferred site are discussed in the sections to follow.

Phase IB Field Reconnaissance field work conducted at each of the four proposed expansion areas consisted of hand excavated screen shovel tests. Test pits were approximately 16 inches in diameter and were set at an interval of 50 or 100 feet apart. The goal of the shovel testing was to reach undisturbed subsoils in order to uncover precontact and historic materials if present. Recovered artifacts were analyzed and inventoried at the HAA, Inc. laboratory facility.

Two historic sites were discovered during the Phase 1B Field Reconnaissance field work within one of the proposed landfill expansion areas. Based on these findings, a Phase II Site Evaluation was completed within this area.

The Phase II Site Evaluation included reviews of additional historic maps and field work. Field work included additional hand excavated shovel test pits and test units. Test units were hand excavated in areas of high artifact density, or adjacent to shovel test pits with abnormal subsoil. Test units ranged in size from 1.5 x 3 feet to 3 x 6 feet.

The results of the field work were used to evaluate areas of high and moderate artifact density, determine the limits of the site, and to determine if subsurface or stratified cultural resources were present within the site. These results were ultimately used to evaluate the site's eligibility for inclusion in the National Register of Historic Places.

General site descriptions, results of the Phase 1A, 1B and Phase II studies, and recommendations are included below for each of the four proposed landfill expansion study areas. Complete information including data and maps is provided in Appendix J.

3.10.1.1 Alternative 1 - Fox Run Estates

The majority of this area has been previously disturbed by grading, filling, sand mining and the construction of residential lots and associated buried utilities. Large soil stock piles are located adjacent to the borders of the project area. Wooded areas are located along the northern and southern project limits and within the western portion of the study area.

Phase 1A Archeological Survey

Wooded areas adjacent to the northern and southern project limits were determined to have a moderate sensitivity for the potential for precontact sites. The remaining areas were considered very low for sensitivity to the presence of precontact cultural resources. In general, this site is considered to have a moderate to very low precontact sensitivity and a moderate to low historic sensitivity.

Based on files of the OPRHP and NYSM, eight archeological sites are reported within one mile of this alternative. These sites include two historic sites, four pre-historic sites and two sites assumed to be precontact based on NYSM files. A review of historical maps indicates the presence of a 19^{th} century or early 20^{th} century structure within the project area. This structure was identified in the field as a half-buried modern pump house located along the southern project limit.

According to a review of the OPRHP files, there are no properties listed on the State or National Register of Historic Places located within or adjacent to the study area.

Based on the results of Phase 1A, the Phase 1B field reconnaissance study was focused on the open and wooded spaces within the northern portion of the study area. Limited field work was recommended within the southern portion of the site. Intact cultural resources predating the 1950's are not likely located within the central portion of the site due to disturbance; therefore no field testing was recommended within this area.

Phase 1B Field Reconnaissance

Phase 1B testing was completed between November 21st and 23rd, 2005. The study area was divided into four testing areas, labeled Area 1 to Area 4. Area 1 was the closest test area to a recorded precontact site. This area was located adjacent to the northwest property limit. No artifacts were recovered within this area.

Area 2 was located within the southwest edge of the property adjacent to the existing landfill sound wall. Soils within this testing location have been previously disturbed as a result of the construction and installation of trailer lots and related utilities. No cultural materials were recovered within this area.

A historic structure was map documented within Test Area 3. A modern, half-buried pump station is currently within the location of this structure. Cultural resources, including a fragment of hand blown glass, a small fragment of whiteware, and a fragment of buff bodied earthenware were recovered within this area.

Area 4 was located south of the project entrance. No artifacts were recovered from this test location.

Since no significant cultural materials were recovered during the Phase 1B field reconnaissance, no additional investigation was recommended within this area.

3.10.1.2 Alternatives 2 & 4 Western Expansion

The area of Alternatives 2 & 4 overlap. Alternative 2 involved a 24 acre expansion whereas Alternative 4 reduced the expansion to 10 acres. Alternative 2 was dismissed prior to being investigated for cultural resources. The Alternative 4 expansion area is located adjacent to the northwest boundary of the existing Albany Landfill. The total project area is approximately 37 acres but includes overfilling of approximately 27 acres of the existing landfill. The remaining 10 acres of undisturbed land within the Pine Bush Preserve was the focus of the Phase 1A and 1B investigations.

Phase 1A Background

The Phase 1A was completed in December of 2004. No previously recorded archeological sites were identified within the study area. A review of historical maps indicated a 19th century road may have bisected the project area. The exact location of this road and relative distance to the project area is difficult to pinpoint due to inconsistent map scales. No structures were depicted within the vicinity of the project area on the reviewed historical maps.

Phase 1B Field Reconnaissance

The Phase 1B fieldwork was completed in March of 2006, between the 22nd and the 24th. The majority of the testing was conducted within the central portion of the study area, with an additional five tests located on the eastern edge of the site. Three areas of previous disturbance were observed adjacent to two well monitoring locations and an area of previous mining adjacent to a steep slope within the northeast portion of the site. No precontact materials were recovered during the field work. Two historic sites were identified adjacent to a dirt trail. The two historic sites are described below and have been identified as Albany Landfill Historic Site A and Albany Landfill Historic Site B.

The dirt trail that bisects the central portion of the site is documented as Centre House Road. This 19th century trail historically connected Kings Highway and extended north to Albany-Schenectady Turnpike (Route 5). Today, what is left of this road is being used as a hiking trail through the Pine Bush Preserve.

Modern trash, loose plastic, slag, charcoal, ash and modern glass were commonly noted within the test pits. Historic artifacts were recovered in 21 of the test pits. Recovered artifacts included nail fragments, salt-glazed stoneware with Albany slip, pieces of whiteware, yellowware and redware fragments, brick and porcelain fragments, glass, clam and oyster shells, ceramic drainage tile, lead-handled iron hardware, burned bones, and one glass button.

<u>Albany Landfill Historic Site A</u> - Albany Landfill Historic Site A is approximately 42,500 square feet, and is a possible structure site which encompasses the trail. No structural remains were identified on the surface. The most common artifacts recovered on the eastern side of the trail include gray and buff-bodied stoneware with Albany slip and machine cut nails. Blue decorated whiteware, glass, a tobacco pipe bowl fragment and a four-hole metal button were also recovered in this area. Glass and nail fragments, whiteware, redware and a lead-handled iron tool were recovered adjacent to the western side of the trail. Based on the decorations on the recovered artifacts, this site seems to date from the mid-1800's. This site is potentially National Register eligible.

<u>Albany Landfill Historic Site B</u> - Albany Landfill Historic Site B is a possible structure site located 50-feet west of the trail, adjacent to the northern study area limit. This site is approximately 12,500 square feet. No structural remains were observed on the surface within this area. Recovered cultural resources included a burned pit containing nail fragments, stoneware, machine-cut nails and nail fragments, burned bone, glass, and a glass button. Albany Landfill Historic Site B appears to date from the mid-1800's. This site may be eligible for inclusion on the National Register of Historic Places.

Phase II Site Evaluation

Based on the results of the Phase 1B Field Reconnaissance, a Phase II Field Reconnaissance was conducted for the historic sites to determine the sites' eligibility for inclusion on the National Register of Historic Places.

Phase II studies include additional background research and field work. Additional background research included historical map and deed reviews and census and directory research. Field work included shovel tests and units, used to determine the vertical and horizontal limits of the historic site and evaluate areas with high density of artifacts within the site.

The Beers' 1866 *Map of Albany County* shows the first development along Centre House Road, the remnants of which bisects the central portion of the site. The structure, owned by John Vant, is located within the limits of the expansion area. Albany Landfill Historic Sites A and B are now considered one site with two loci, known as the J. Vant Historic Site- Loci A and B.

The Phase II field work was completed in February 2007, and included 244 shovel test pits, and 31 unit tests. Shovel test pits were dug at five meter intervals to identify the site boundaries. In areas determined to be highly sensitive, shovel tests were placed at closer intervals. Test units were hand excavated in high-density artifact areas, and ranged from 1.5 x 3-feet to 3 x 6-feet.

<u>J. Vant Historic Site- Loci A (Albany Landfill Historic Site A)</u> - Locus A is approximately 115 feet by 130 feet (1,500 square feet), located within the southeast portion of the J. Vant Historic Site. The site contains a small, previously undocumented domestic structure associated with John Vant, an associated midden, and several deposits throughout the site. Artifacts from this site are documented in the attached archeological report (Appendix J).

Precontact artifacts recovered from this portion of the site included two trim flakes. No precontact feature or site was discovered within Locus A.

Cultural resources recovered from Locus A provide information on living conditions, commerce and travel within the Albany Pine Bush in the mid to late 1800's; therefore this site is National Register eligible. This site also has historical significance based on its location within the Pine Bush. This site is located centrally within the 10 acre portion of Alternative 4, and would be directly impacted as a result of the expansion of the landfill.

<u>J. Vant Historic Site- Locus B (Albany Landfill Historic Site B)</u> - The J. Vant Historic Site- Locus B consists of a large outbuilding, such as a stable or barn, which is associated with the J. Vant structure within Locus A. This area is located on the west side of the hiking trail which is the remnants of the Centre House Road from the 19th century. Based on the 16 foot interval test pits, Locus B extends 82 by 131 feet, and includes approximately 10,742 square feet.

A majority of the test pits that contained cultural resources were located adjacent to the western edge of the site. Approximately 700 artifacts were recovered from Locus B, including domestic and building materials. The highest concentration of artifacts were recovered within the northwest portion of the Locus B area, with a density of approximately 52 to 70 artifacts recovered per square meter.

An interior structure surface was discovered within this high density area, and was approximately 25 by 50 feet. The high density area continues north beyond the project area, with a mid-level concentration of artifacts encompassing this region associated with an outdoor work area surrounding the structure and a burn pit.

Domestic artifacts recovered from this site were similar to Locus A and are documented in Appendix J. One precontact artifact, a Normanskill projectile point, was recovered from a test pit adjacent to the western site boundary. No precontact structure or site was identified within Locus B.

As with Locus A, cultural resources recovered from Locus B provide information on living conditions, commerce and travel within the Albany Pine Bush in the mid to late 1800's; therefore this site is National Register eligible. This site also has historical significance based on its location within the Pine Bush. This site is located centrally within the 10 acre portion of Alternative 4, and could be directly impacted as a result of the expansion of the landfill.

3.10.1.3 Alternative 3 – Eastern Expansion

Alternative 3 is the preferred alternative and the subject of this SDEIS. The archeological investigation covered an approximately 53 acre study area, 32 acres of which are previously disturbed and filled lands. The northern limit of the study area is defined by the City of Albany's northern boundary. The northwestern portion of the property includes the sound barrier between the Fox Run property and the existing landfill. The western and southern boundaries follow the contours of the eastern portion of the landfill and the access road to Rapp Road. The eastern boundary follows an access road to Rapp Road.

Additional areas within the northern portion of the site were avoided due to standing water and wetland areas related to an adjacent stream.

Phase 1A Background

The Phase 1A was completed in December of 2004. No previously recorded archeological sites were identified within the study area. A review of historical maps indicated that a historic settlement was located east of the study area adjacent to Rapp Road, and extending north to Central Avenue. No structures were depicted within the vicinity of the project area.

Phase 1B Field Reconnaissance

The Phase 1B fieldwork was completed between September 18th and 21st, 2006. Test pits were dug within a 16 acre portion of undisturbed, forested land located within the northeast corner of the study area. A stream crosses through this portion of the site, and restricted the location of test pits in areas which contained standing water.

No significant historic or precontact materials were recovered within the Alternative 3 study area. Modern trash was commonly encountered, but not recovered. Historic artifacts, including a piece of whiteware and one iron-alloy metal punch were recovered from two test pits. The recovery of these artifacts does not indicate the presence of a historic deposit.

3.10.1.4 Alternative 3 Addendum- Private Parcels

The southeastern portion section of Alternative 3 contains two private parcels that total 5 acres. The southern property boundary follows the right-of-way of Rapp Road, the northern boundary is delineated by an old split-rail fence, and the eastern and western boundaries are marked by chain link and wire fencing. These parcels collectively contain a house, two mobile homes, two garages and a swimming pool. The majority of the property is comprised of landscape and garden areas, with some wooded areas.

Phase 1A Background

The Phase 1A was completed in December of 2004. No previously recorded archeological sites were identified within this study area. A review of historical maps indicated that a historic settlement was located east of the study area adjacent to Rapp Road, and extended north to Central Avenue. No structures were depicted within the vicinity of the project area.

Phase 1B Field Reconnaissance

The Phase 1B fieldwork was completed between December 21 and 22, 2006. Precontact material, consisting of one trim flake and a shard of pottery were recovered within two of the initial test pits within the northern portion of the study area. Four confirmation test pits were dug within the area of the recovered artifacts. The confirmation pits were negative for cultural material. This deposit is considered a stray find.

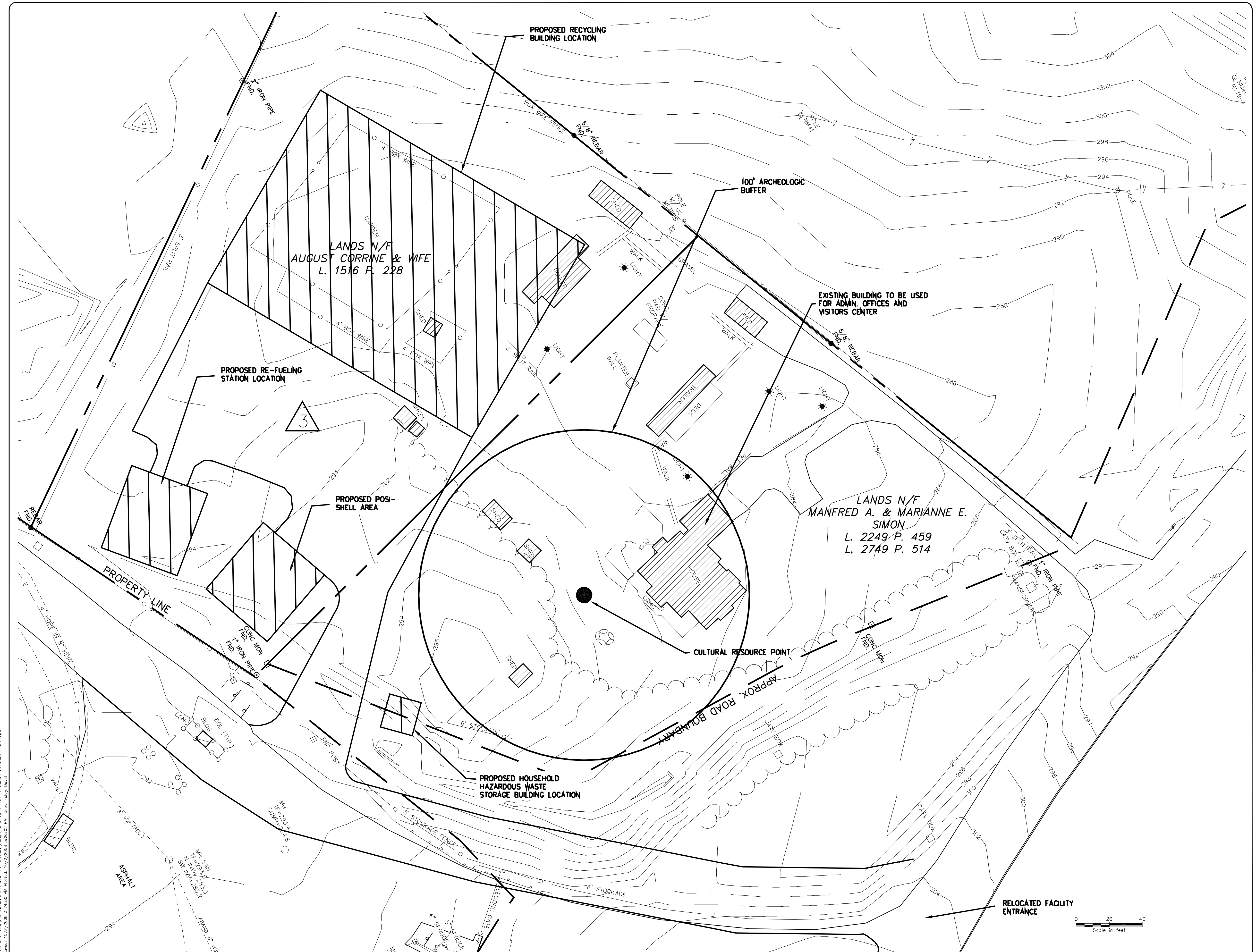
Precontact material was discovered within an approximately 64 square meter (689 sq ft) area located adjacent to an existing house. Recovered material included thinning and trim flakes, a scraper, and one piece of thin, undecorated precontact-period pottery. This site appears to date to the Late Woodland period (1000-1600 AD) based on the style of pottery discovered. One historic artifact, a nail fragment, was recovered from the study area. This group of test pits has been identified as the Alternative 3 Precontact Site.

No block flakes, charcoal deposits, fire-cracked rock or shatter was encountered within this area; therefore this area is anticipated to have been used for refining, finishing and sharpening tools.

3.10.2 POTENTIAL IMPACTS AND MITIGATION

The results of the cultural resources investigation revealed that a western expansion of the landfill would likely impact a historic site referred to as the J. Vant site. Due to the characteristics of the site and the ability to advance knowledge of the time period, it is likely that the site would be identified as a Register Eligible site. For this alternative to proceed, the site would have to be mitigated through a Phase III data recovery plan.

An eastern expansion of the landfill would have no impact on cultural resources. The relocation of the landfill operations onto adjacent private parcels can occur without impact to the small pre-contact site (pre-historic resource) located there. SDEIS Figure 3.10-1 illustrates the site layout and provides a 100 foot buffer around the pre-contact site to ensure protection. An initial layout providing a 50 foot buffer was submitted to OPRHP for their review. They responded by letter dated September 23, 2008 (Appendix J) indicating that they recommend a 100-foot buffer with the potential to reduce the buffer to 50-foot if additional testing is performed. The City can move forward with a 100-foot buffer and may conduct the additional work to see if a reduction in the buffer is acceptable to OPRHP. However, in either case, the City will avoid impacts to this site. The site concept with a 100-foot buffer has been submitted to OPRHP for their review and they have issued a letter (dated October 2, 2008 – SDEIS Appendix B) indicating No Adverse Effect.



No.	Submittal / Revision	App'd	By	Date
1	REMOVED SMALL, OBSCURED TEXT	WAH	CAP	2/22/08
2	ADDED MONITORING WELL LABELS	WAH	CAP	2/22/08
3	ADDED FACILITIES TO BE RELOCATED	WAH	CAP	2/22/08

CITY OF ALBANY
DEPARTMENT OF GENERAL SERVICES
ONE CONNERS BOULEVARD
ALBANY, NEW YORK 12204

STATE OF NEW YORK · WARREN A. HARRIS, IV · No. 077420 · LICENSED PROFESSIONAL ENGINEER

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CHA
CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle, PO Box 5269 · Albany, NY 12205-0269
Main: (518) 453-4500 · www.cloughharbour.com

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RAPP ROAD LANDFILL
EASTERN EXPANSION

CULTURAL RESOURCES SITE AVOIDANCE

Issue Date: 7/07 | Project No.: 12206 | Scale: AS SHOWN

3.10-1