

Town of Reading, MA
Cemetery Garage Site Selection



Prepared by: Christopher A. Cole, Town of Reading Engineering Division
George J. Zambouras, Town Engineer

May, 2010
Revised: November, 2010

Table of Contents

Introduction.....	page 1
Executive Summary.....	page 2
Site Criteria.....	page 3
Potential Cemetery Garage Locations - Figure 1.....	page 4
Current Cemetery Equipment Stored at Cemetery Garage – Table 1.....	page 5
Minimum Required Areas for Current Equipment – Table 2.....	page 6
Laurel Hill Cemetery	
Site Description.....	page 7
Aerial Imagery Showing Potential (Existing) Site - Figure 2.....	page 8
Potential Site Layout (Ground Level) - Figure 3.....	page 9
Potential Site Layout (Basement Level) – Figure 4.....	page 10
Detailed Aerial Imagery of Site - Figure 5.....	page 11
Forest Glen Cemetery	
Site Description.....	page 12
Aerial Imagery Showing Potential Site - Figure 6.....	page 13
Potential Site Layout - Figure 7.....	page 14
Detailed Aerial Imagery of Site - Figure 8.....	page 15
Charles Lawn Cemetery	
Site Description.....	page 16
Aerial Imagery of Cemetery - Figure 9.....	page 17

Table of Contents (continued)

Wood End Cemetery

Site Description.....page 18

Aerial Imagery Showing Potential Site - Figure 10.....page 19

Potential Site Layout (Ground Level) - Figure 11.....page 20

Potential Site Layout (Basement Level) - Figure 12.....page 21

Detailed Aerial Imagery of Site - Figure 13.....page 22

Pearl Street at Audubon Road

Site Description.....page 23

Aerial Imagery Showing Potential Site - Figure 14.....page 24

Potential Site Layout - Figure 15.....page 25

Detailed Aerial Imagery of Site - Figure 16.....page 26

Public Works Facility

Site Description.....page 27

Aerial Imagery Showing Potential Site - Figure 17.....page 28

Potential Site Layout - Figure 18.....page 29

Detailed Aerial Imagery of Site Option A - Figure 19.....page 30

Detailed Aerial Imagery of Site Option B - Figure 20.....page 31

Garage Facility Site Summary Table.....page 32

Garage Facility Site Selection Ranking Sheet.....page 33

Introduction

The Town of Reading Public Works Department is seeking to replace the cemetery garage currently located at the Laurel Hill cemetery. While a few additions have been constructed over the years, the original section of the building is well over one-hundred years old. Over the past several years, the garage has experienced major storage issues, as well as an overall structural deterioration typically seen in century old buildings.

Presently, the cemetery garage consists of a main floor having about 1,550 square feet of space, a two-bay basement garage having approximately 400 square feet, attic space of about 1,100 square feet, and outside equipment storage utilizing about 275 square feet. The total area currently used is therefore 3,325 square feet. This area can be summarized as follows:

Main Floor

- Garage area for equipment (2 small dump trucks, 1 pickup truck, and 1 backhoe) – 1,100 square feet
- Maintenance Area / Bathroom / Locker Room / Office – 450 square feet

Basement

- Basement garage area (Mowing equipment and turf sweeper) – 400 square feet

Attic

- Attic storage area – 1,100 square feet

Exterior Storage

- 2 equipment trailers currently stored outside – 275 square feet

The overall purpose at this point in the planning stage is not for designing a new building, but rather to understand and outline the particular location requirements for a new garage facility that would meet the Cemetery Division's space needs, and in return would develop information allowing an architect, engineer, or other design professional to scope out the amount of space actually needed.

Executive Summary

The results of this study were based on criteria such as the amount of usable area available at each site; the anticipated additional time to be spent on grounds maintenance resulting from future grave sales; the amount of graves to be displaced to accommodate a new building (if applicable); the impact of any site on residential neighborhoods in the area; the driving distance between each site including the Town Hall, Public Works garage, and compost center; the proximity of utilities to the proposed site; the percentage of time actually spent at each location on grounds maintenance and internments; and the level of development required for either future grave placement or building location.

Based on these criteria listed and the rating system developed for this study, the following locations should be considered for additional analysis as potential sites for the new cemetery garage facility:

- Laurel Hill cemetery (existing site)
- Forest Glen cemetery
- Pearl Street at Audubon Road

Charles Lawn cemetery should not be considered as a potential site location at all as there is currently no useable space available for the placement of a garage facility.

Site Criteria

Potential sites within the Town of Reading to be considered for a new garage, as depicted in Figure 1, include the current location at Laurel Hill cemetery bounded by Lowell Street and Main Street, Forest Glen cemetery at the intersection of Forest Glen Road and Pearl Street, Charles Lawn cemetery on Charles Street, Wood End cemetery on Franklin Street, Town-owned property on Pearl Street at the intersection of Audubon Road, and the Public Works facility on Newcrossing Road. Any proposed site location should be designed to meet the needs of the Cemetery Division for approximately fifty years, with as much flexibility as possible to adequately satisfy the needs of the Division for the lifespan of the building. It should be assumed that, due to a lack of available land, the Town will neither be creating any new cemeteries nor expanding the size of any of the existing cemeteries in the future. The quality of design and construction of any new facility should reflect the historical nature (if any), quality, and scale of the surroundings in which it is to be located. It should be noted, though, that fuel will only be obtained at the Public Works facility on Newcrossing Road where it is currently stored. In addition, regardless of which location might be chosen, meeting coordination amongst other Public Works divisions might be difficult, however, should be manageable, as it is currently, and should not be used as a factor in determining site location. Lastly, while materials are currently stored at the Public Works facility on Newcrossing Road, and storage is so limited at all of the other locations mentioned, storage should not be considered a factor, either in this study, as bulk material storage at any of these sites, aside from the Public Works facility, would produce aesthetic issues not suited for its surroundings.

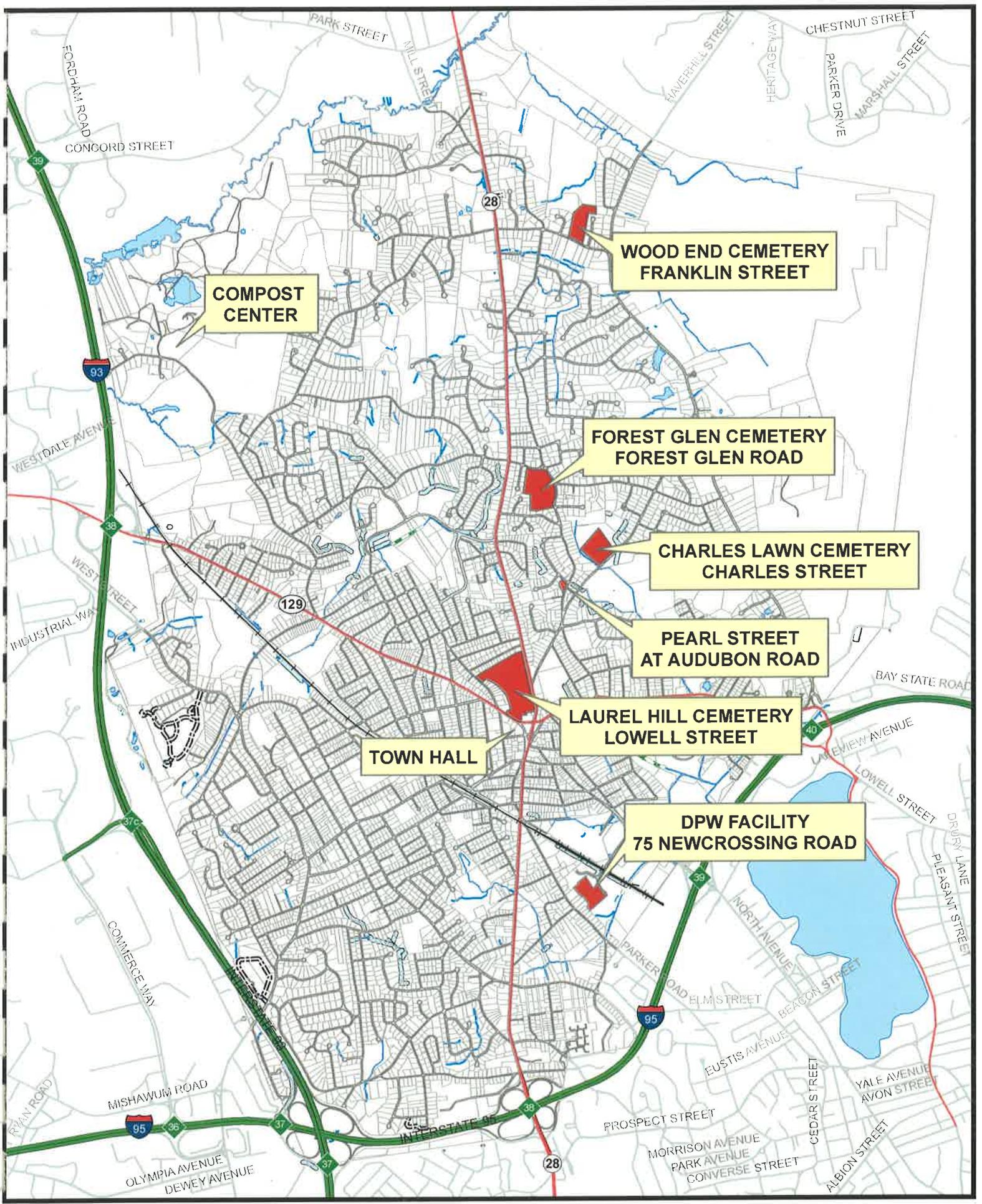
The garage facility should be heated and capable of housing the same equipment being utilized now which includes at a minimum, two small dump trucks, one pick-up truck, one backhoe, five mowers, one turf sweeper, two utility trailers, leaf blowers, weed whackers, miscellaneous hand tools, grave equipment, veteran's markers, seasonal equipment, etc., as well as servicing four (4) full time employees and two seasonal employees. In addition, employees would need space for lockers, showers, and an eating facility, as well as a maintenance area for smaller equipment, which the cemetery division employees perform themselves on-site. The facility would not require, however, any administrative offices, as any records and support staff would best be suited in the Town Hall, on Lowell Street, where they currently reside. Therefore, given the scope of this evaluation and the space limitations on each site, the following assumptions can be made for the footprint area of the structure, based upon potential layouts included within this study:

- 4,300 square feet – single story structure
- 2,400 square feet – single story structure with a full basement underneath
- 2,625 square feet – one and a half story structure with attic storage and no basement

It must be noted that these layouts are not intended to be the required layouts but merely a representation of how the current equipment could fit within a given layout. Regardless of the building configuration, the following minimum areas should be maintained:

- 3,300 square feet – vehicle and equipment maintenance and storage
- 400 square feet – employee facilities such as an office, locker room, bathroom, and shower area

In addition to the required footprint of the building, land must also be allocated for seven parking spaces dedicated to employee parking during the day, as well as space for adequately maneuvering vehicles around the premises.



POTENTIAL CEMETERY LOCATIONS - Figure 1
Page 4



0 300 600 1,200 1,800 2,400
 Feet
 1 inch = 2,500 feet

Cemetery Equipment
Stored at Cemetery Garage – TABLE 1

Vehicles

1 ton – pick up truck
1 ton – dump truck
1.5 ton – dump truck
1 – backhoe

Large Power Equipment

1 – 61” mower
1 – 72” mower
2 – 52” mowers
1 – 36” mower
1 – turf sweeper
2 – 21” walk behind mowers
1 – leaf vacuum

Small Power/Hand Equipment

1 – walk behind leaf blower
1 – water pump
1 – pressure washer
3 – lowering devices
1 – metal detector
1 – jack hammer
4 – weed wackers
2 – bench grinders
2 – backpack leaf blowers
3 – handheld leaf-blowers
1 – motorized pole saw
1 – chain saw
1 – snow blower
Assorted hand tools
- shovels, rakes, crow bars, sledge
hammers, wheel barrows

Utility Equipment

1 – thatcher
1 – aerator
1 – air compressor
1 – roll-away toolbox
2 – trailers
1 – water reel
1 - tow behind spreader
1 - frost bucket

Materials

2000 – flag holders
2000 – flags
3 – sets of greens
1 – casket carriage
2 – tents
18 – mud tracks and assorted plywood
6 - grave boxes
Dunnage (boards for leveling grave site)
Veterans Markers for Memorial Day
Posts for laying out graves

**Minimum Required Areas
For Current Equipment - TABLE 2**

Vehicles	1,300 square feet
Large Power Equipment	600 square feet
Small Power / Hand Equipment	400 square feet
Utility Equipment	600 square feet
Materials	400 square feet
Minimum Total Equipment Area :	3,300 square feet
Minimum Parking Area :	1,150 square feet

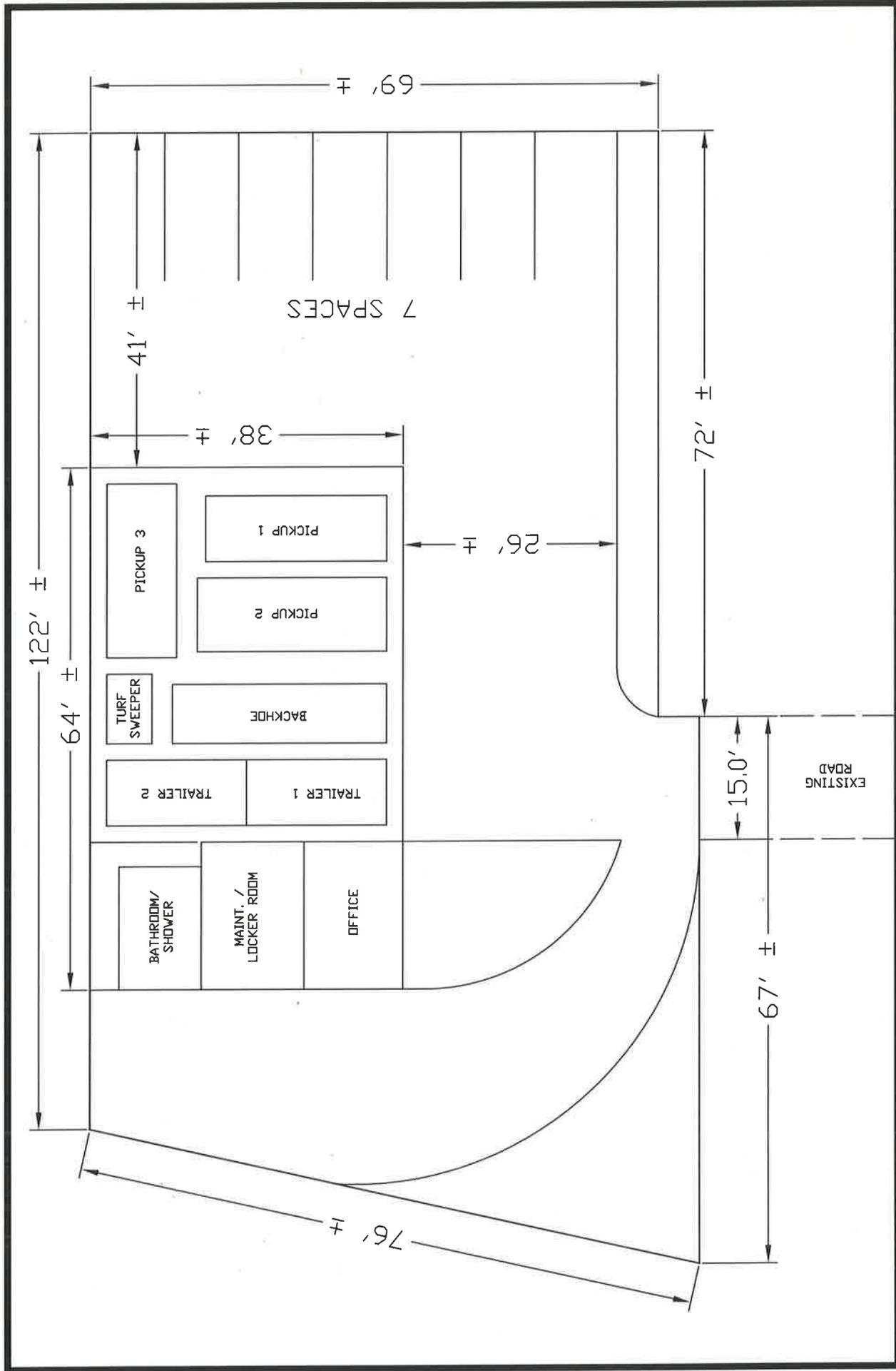
Laurel Hill Cemetery – Lowell Street / Main Street

Laurel Hill is a historic cemetery having housed the cemetery garage facilities for over one hundred years. The cemetery is bounded by Lowell Street and Main Street, across from the Town Hall, where administrative offices and records are currently stored, as illustrated in Figure 2. The cemetery area is listed on the National Register of Historic Places. Effects of this on the replacement of the existing garage with a new facility at the same location still have to be addressed. This site is very beneficial for security purposes, as the cemetery abuts a neighborhood setting. The abutters are also currently accustomed to having facility activities at this location. The current location of the garage is more suited for a facility of this kind anyway, since the area contains potential large amounts of rock ledge that could make for difficult placement of future additional cemetery plots at this location. The current location of the cemetery garage is the only possible location at Laurel Hill, as the cemetery is built out to its maximum limits. On the contrary, though, if this site were selected for the new facility, all of the current equipment and staff would have to relocate during construction, and, based on the fact that the Public Works facility is already limited with the operating space that it has, it could greatly hinder the way the Department would be forced to operate, even just on a temporary basis.

- Cemetery land area – 19.3 acres
- Potential usable (existing) space on site – 10,000 square feet
- Utility availability
 - Water, electric – already on site (The water service will need to be upgraded pending any site improvements in order to satisfy current building code requirements regarding fire suppression, etc.)
 - Gas, sewer – available from Lowell Street (700 feet away)
 - Current method of heat is through a forced hot air oil burner and a wood stove
- Percentage of time spent on grounds maintenance – 36 %
- Percentage of time spent on internments (FY-2009) – 6 %
- Level of site development required for specified site – low
- Level of site development for grave placement at specified site – high

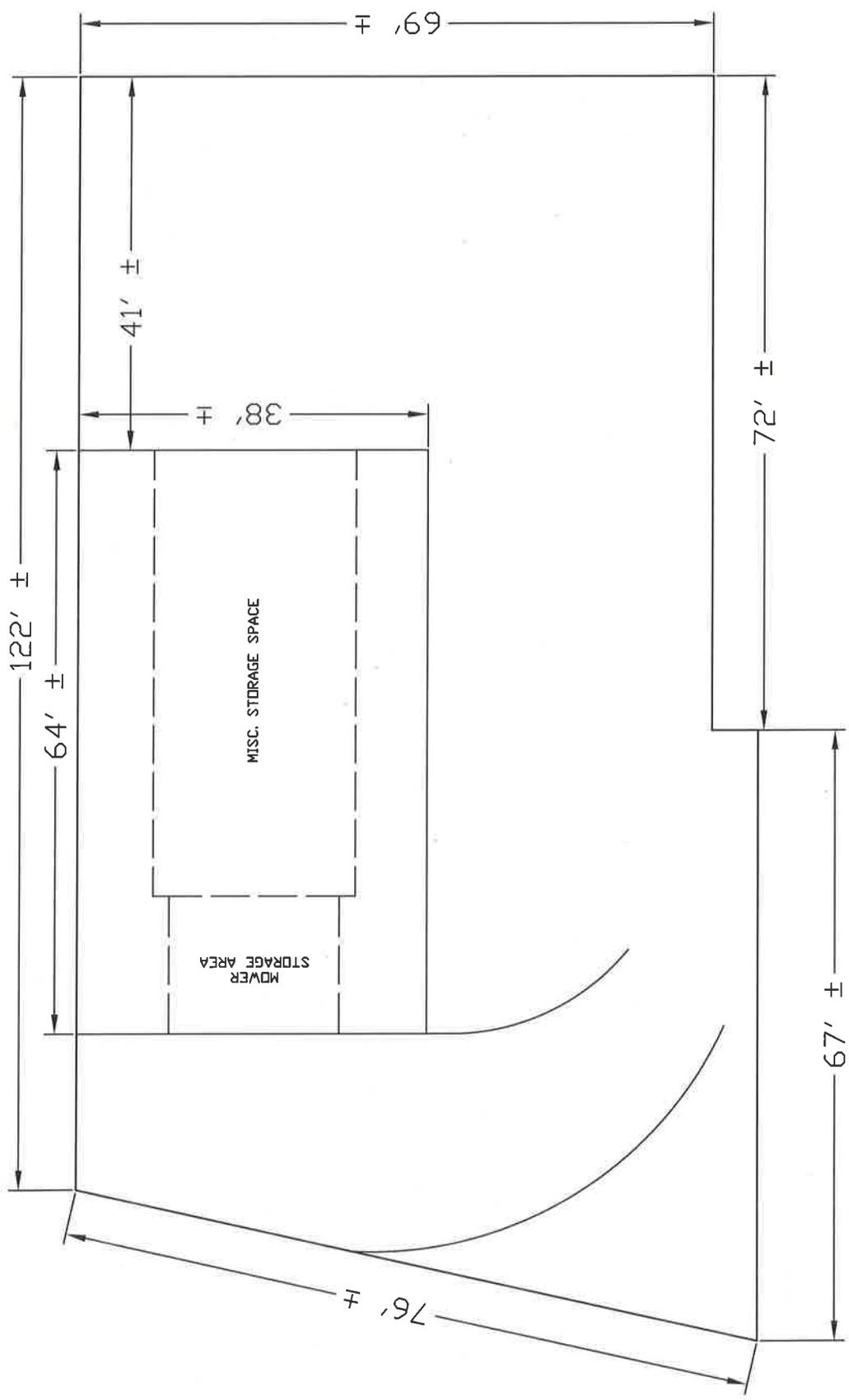


0 25 50 100 150 200
Feet
1 inch = 200 feet



LAUREL HILL CEMETERY - POTENTIAL LAYOUT

GROUND LEVEL - FIGURE 3



LAUREL HILL CEMETERY - POTENTIAL LAYOUT
 BASEMENT LEVEL - FIGURE 4



20'
ZONING SETBACK

15'
ZONING SETBACK



0 3.5 7 14 21 28
Feet
1 inch = 40 feet

Forest Glen Cemetery – Forest Glen Road / Pearl Street

Forest Glen cemetery, as seen in Figure 6, is located approximately 1.3 miles from the Town Hall on Lowell Street. Potential land is available for the cemetery garage facility in the southwesterly corner of the cemetery. The site is beneficial for security purposes, since it would abut a neighborhood setting, however, abutters would not be accustomed to having facility activities at this location. This location contains a wooded area and would require some site development as the terrain presently slopes off on one side of it. Due to these conditions, the site in its current form would not be suitable for future internments, however should indeed be considered very beneficial for a possible garage location.

- Cemetery land area – 10.3 acres
- Potential usable space on site – about 15,700 square feet
- Utility availability
 - Water, sewer, electric, gas – available closest from Pearl Street (400 feet away)
- Percentage of time spent on grounds maintenance – 30 %
- Percentage of time spent on internments (FY-2009) – 36 %
- Level of site development required for specified site
 - medium (heavily wooded, some grading required, retaining wall required)
- Level of site development for grave placement at specified site
 - high (heavily wooded, grading issues)



IRVING STREET

LINNEA LANE

COLONIAL DRIVE

PEARL STREET

WELLS ROAD

FOREST GLEN ROAD

MAIN STREET

DAVIS LANE

WAKEFIELD STREET

READING TERR

BAKER ROAD

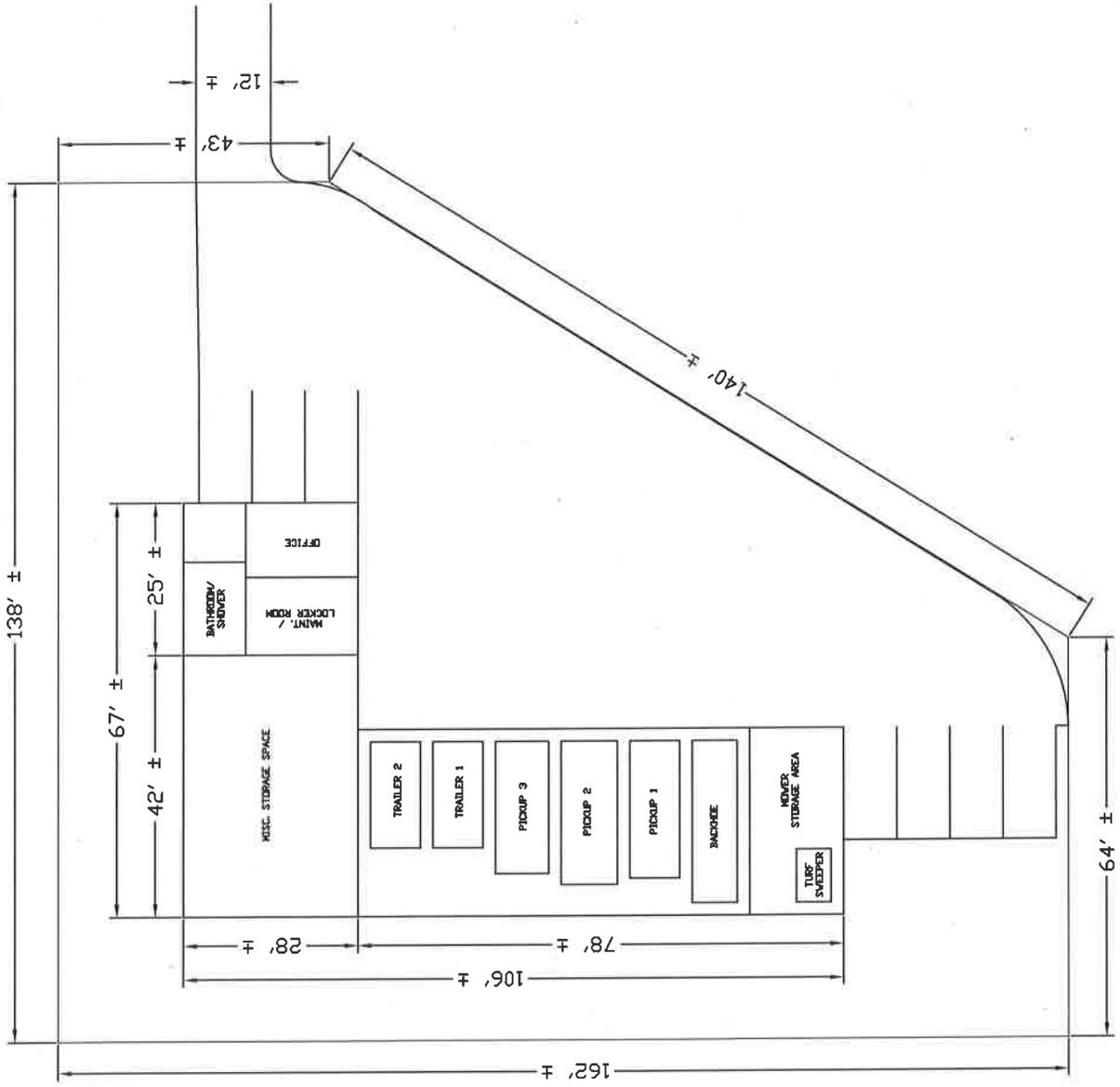
PUTNAM ROAD

CONDOR ROAD



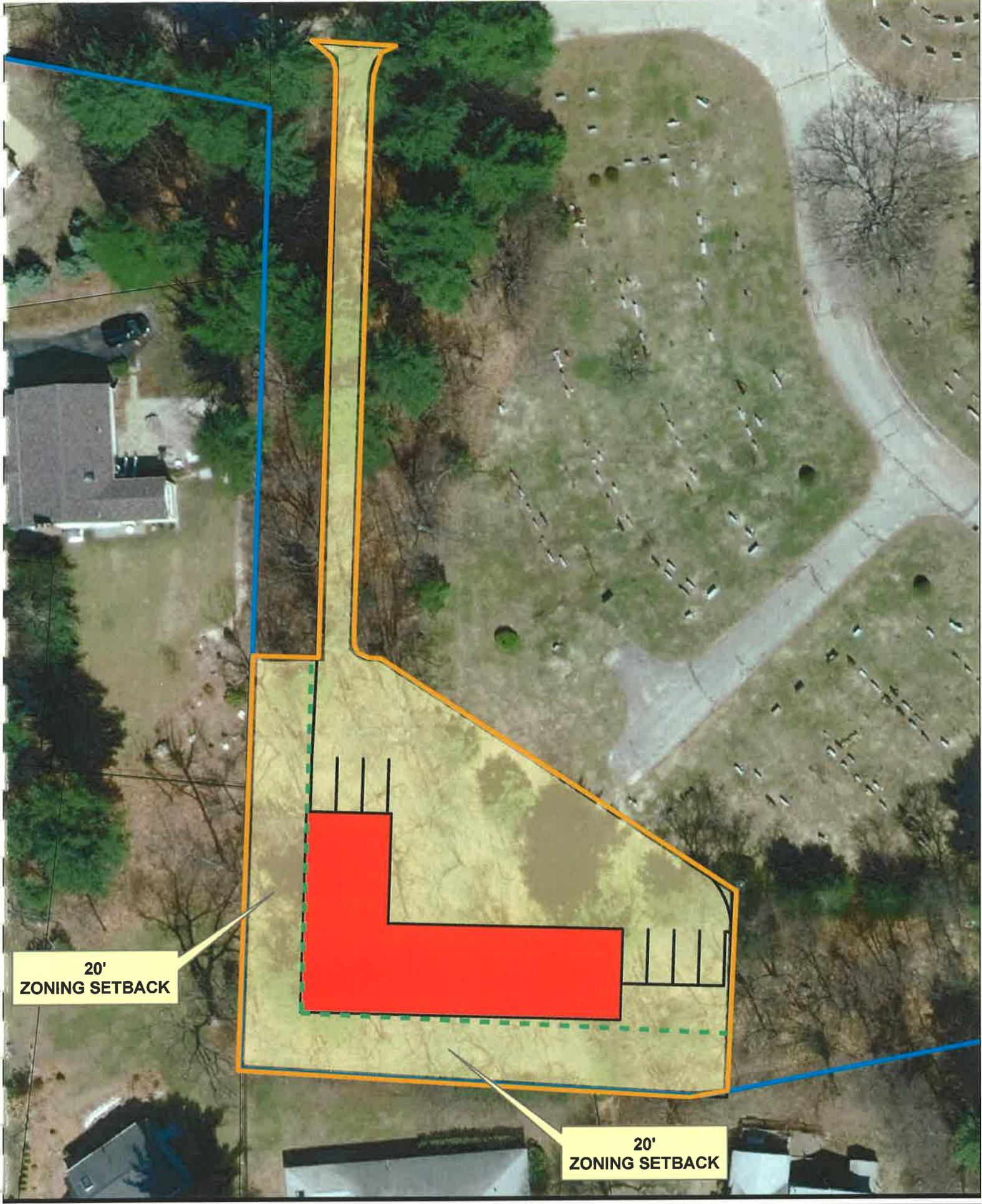
0 20 40 60 80
Feet

1 inch = 200 feet



FOREST GLEN CEMETERY - POTENTIAL LAYOUT

FIGURE 7



**20'
ZONING SETBACK**

**20'
ZONING SETBACK**



0 24 8 12 16
Feet
1 inch = 40 feet

Charles Lawn Cemetery – Charles Street

Charles Lawn cemetery, as seen in Figure 9, is located approximately 1.3 miles from the Town Hall on Lowell Street. While there is land currently available at this site, most areas are either already developed for future plot sales, already sold for future graves, or are pre-existing wooded areas encroaching upon wetlands. While some of the already developed land could potentially be used for a garage facility, valuable land currently intended for future grave sales would have to be abandoned. Therefore, as developable areas within the Town for future internments become a premium due to a lack of available land, every attempt should be made not to disrupt current usable land to occupy a garage facility. It is therefore highly recommended that a garage facility not be placed at this location.

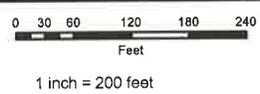
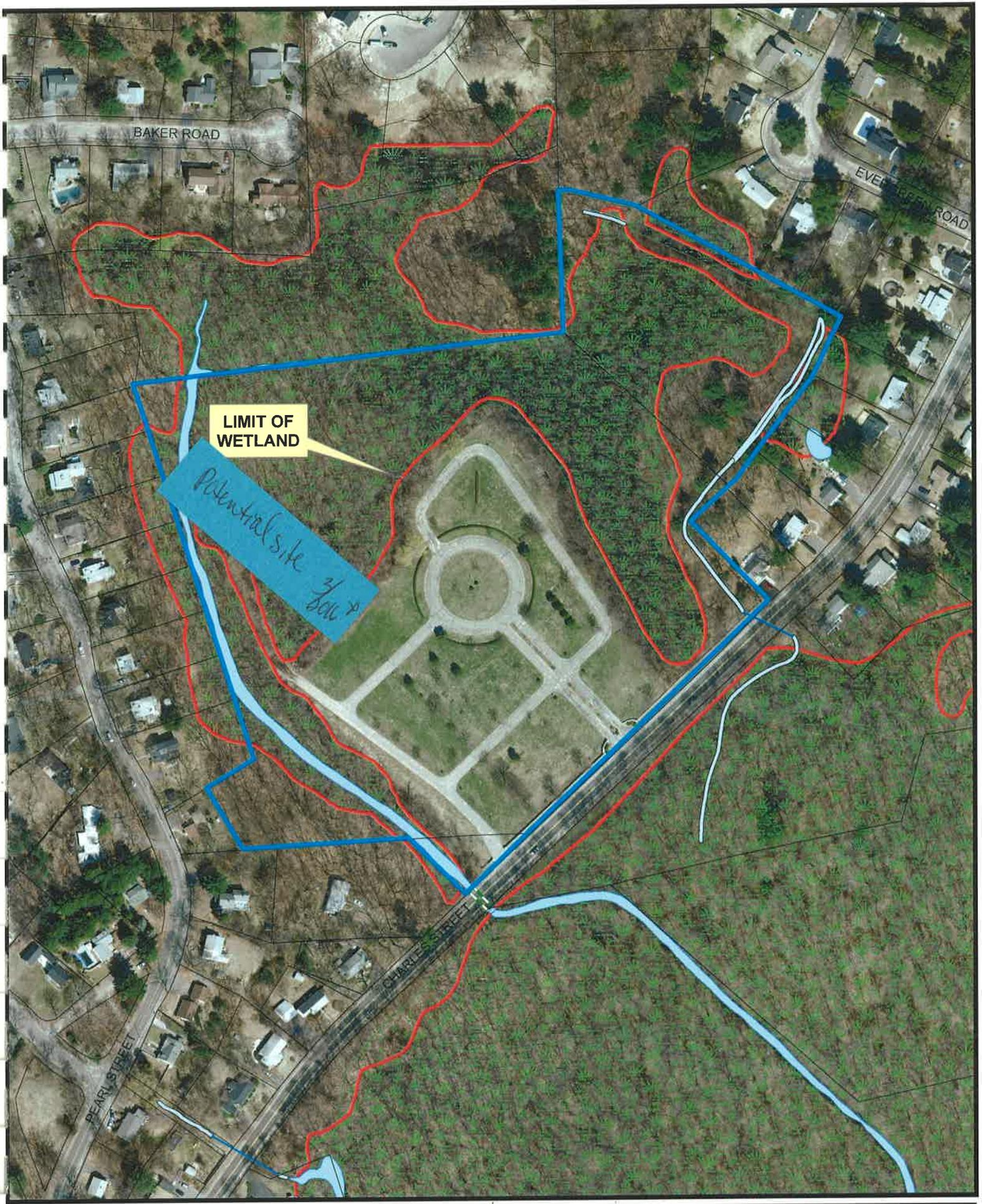
- Cemetery land area – 6.2 acres

- Potential usable space on site currently – none

- Utility availability
 - Water, sewer, electric, gas – available from Charles Street

- Percentage of time spent on grounds maintenance – 17 %

- Percentage of time spent on internments (FY-2009) – 33 %



CHARLES LAWN CEMETERY - Figure 9
Page 17

Wood End Cemetery – Franklin Street

Wood End cemetery, as seen in Figure 10, is located approximately 2.3 miles from the Town Hall on Lowell Street. The cemetery grounds currently abut land owned by the Town of Reading Conservation Commission on the northerly and westerly sidelines. While the cemetery is mostly built out, buildable land, not suitable at all for cemetery plots due to a drastic change in grade along the northernmost sideline, does exist and should be considered as a candidate. The available land at this location would be somewhat secluded from neighboring properties, as well as a moderate distance from Franklin Street. While this may be considered beneficial to many, it also heightens security issues as well for any new facility. Based on the required building footprint for this site, as well as an assumption of approximately 34 square feet per grave, about nine (9) future potential single grave lots would have to be abandoned. However, given the existing layout of the cemetery grounds for future burials, this particular location would create the least amount of impact in regards to grave locations for future sales.

- Cemetery land area – 8.3 acres

- Potential usable space on site – about 8,400 square feet

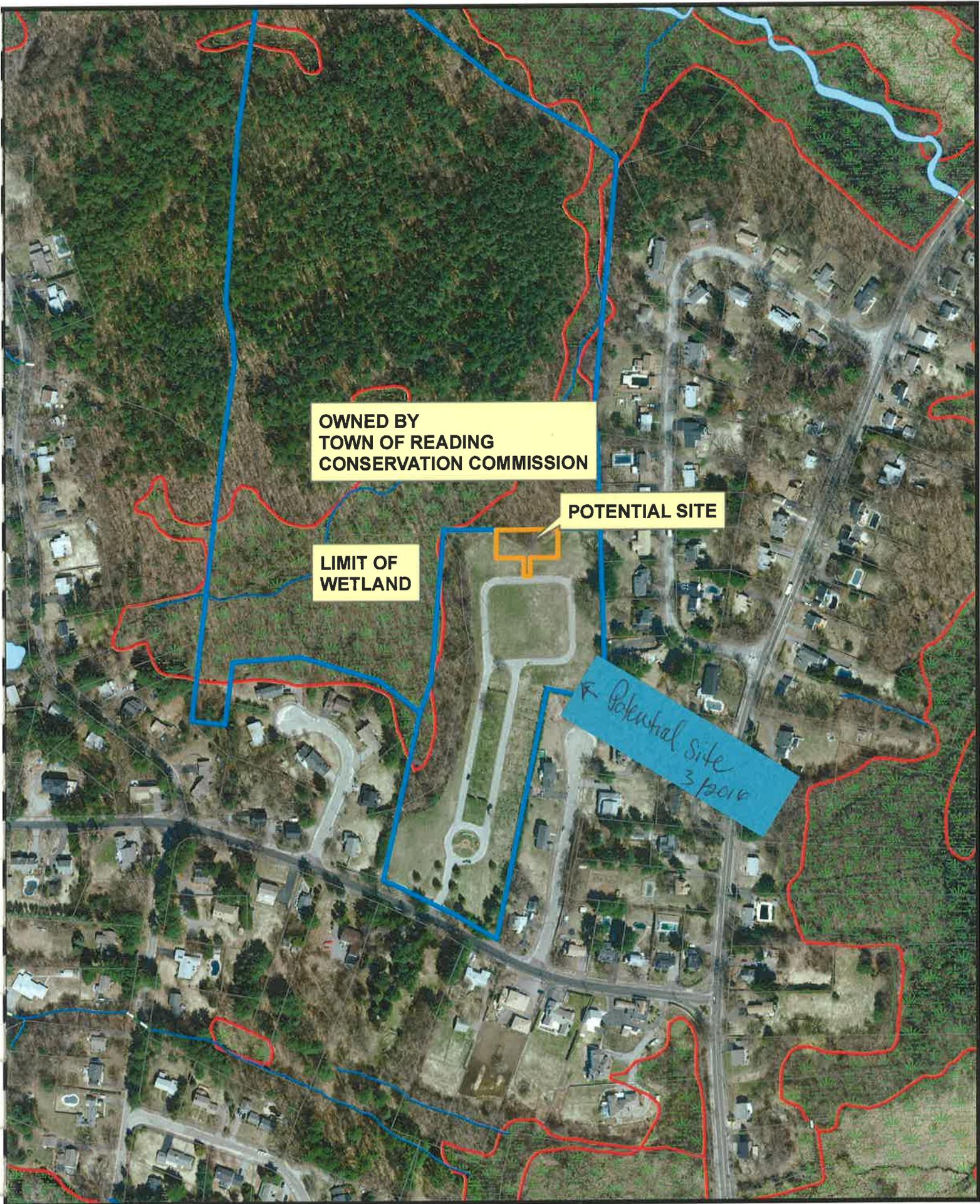
- Utility availability
 - Water, sewer, electric – available from Franklin Street (1,000 feet away)
 - Gas
 - main would need to be extended 800’ from Pearl Street to cemetery entrance
 - approximately 1,000 additional feet from cemetery entrance to site location

- Percentage of time spent on grounds maintenance – 17 %

- Percentage of time spent on internments (FY-2009) – 25 %

- Level of site development required – low

- Level of site development for grave placement at specified site
 - high (extreme change in grade)



OWNED BY
TOWN OF READING
CONSERVATION COMMISSION

POTENTIAL SITE

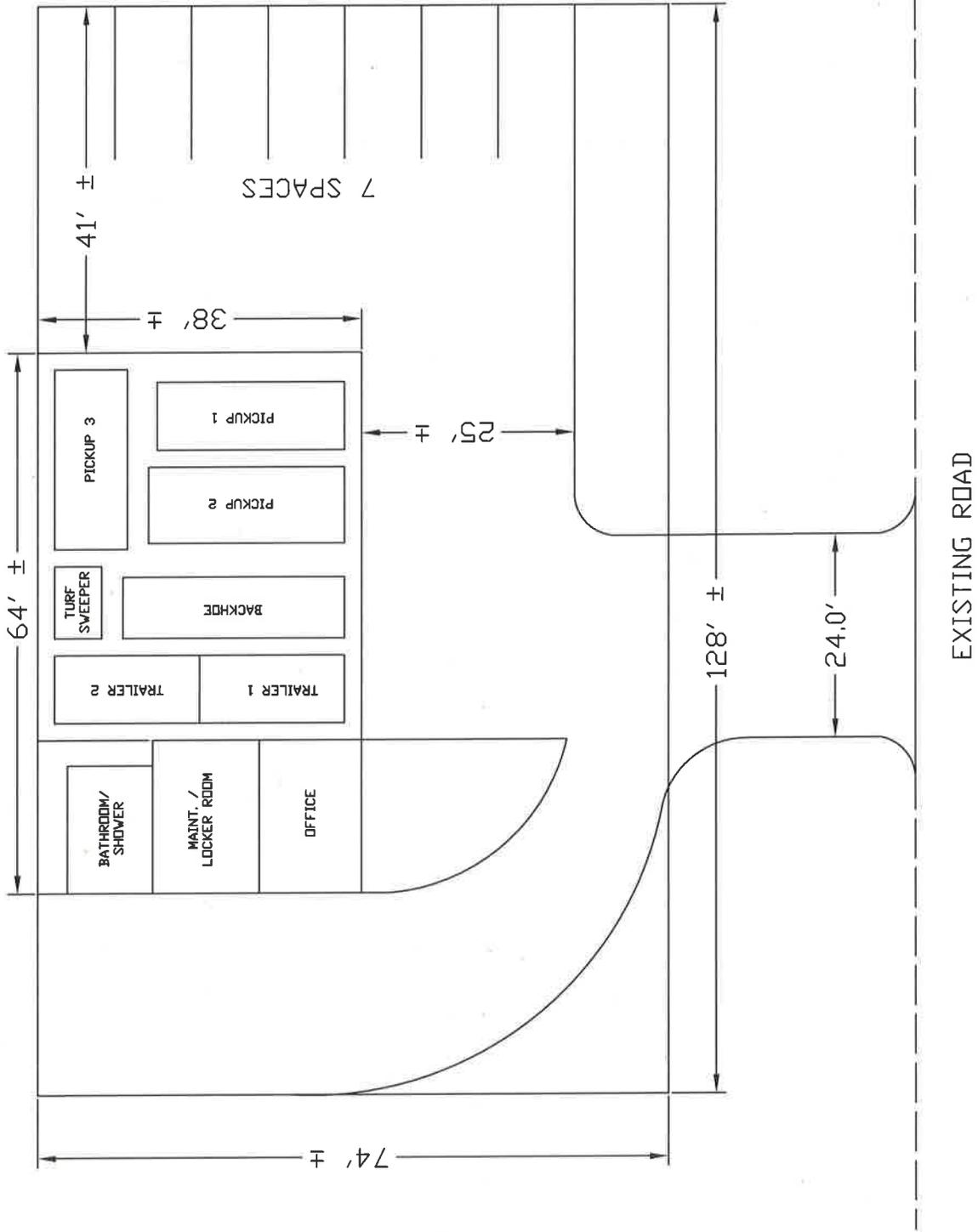
LIMIT OF
WETLAND

← Potential Site
3/12/2010

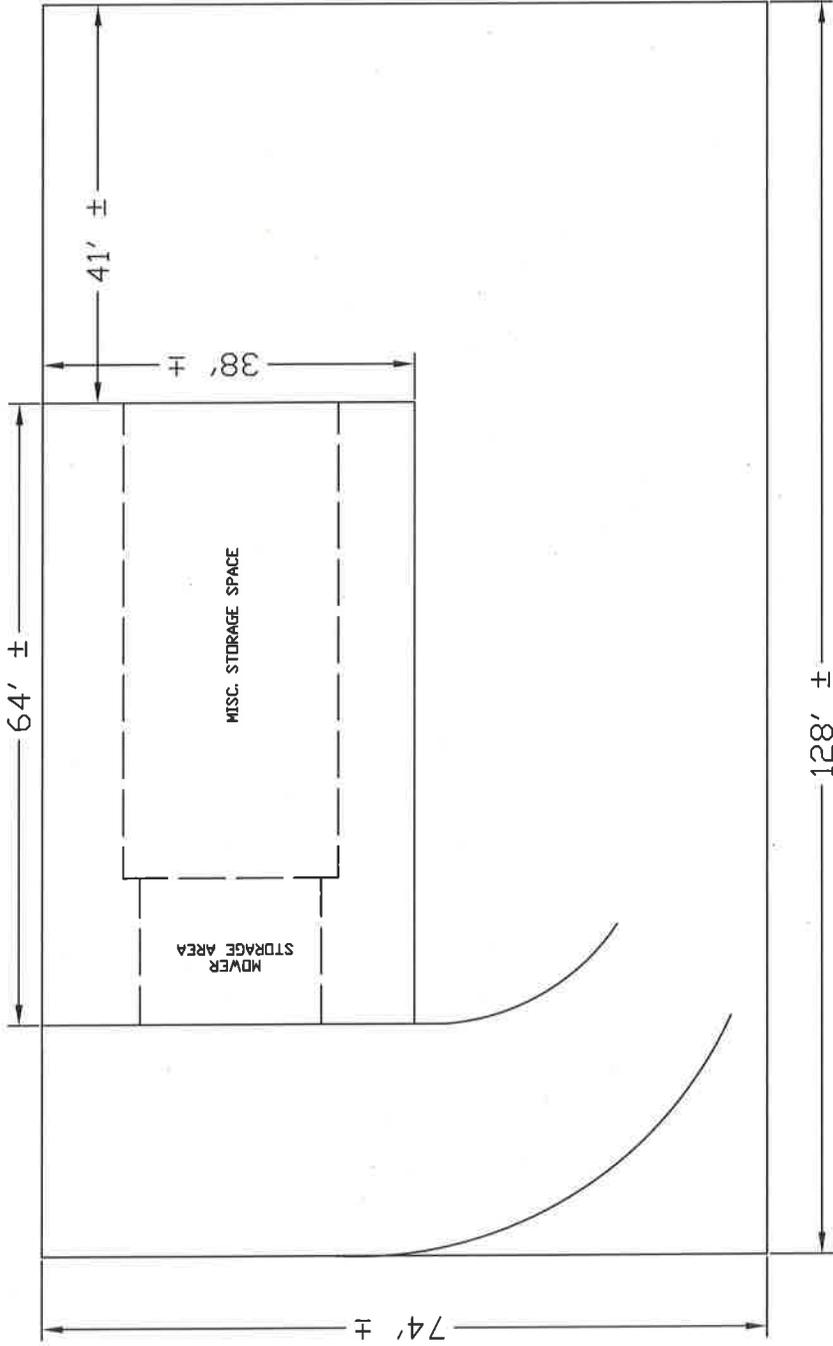


0 40 80 160 240 320
Feet

1 inch = 310.486368 feet

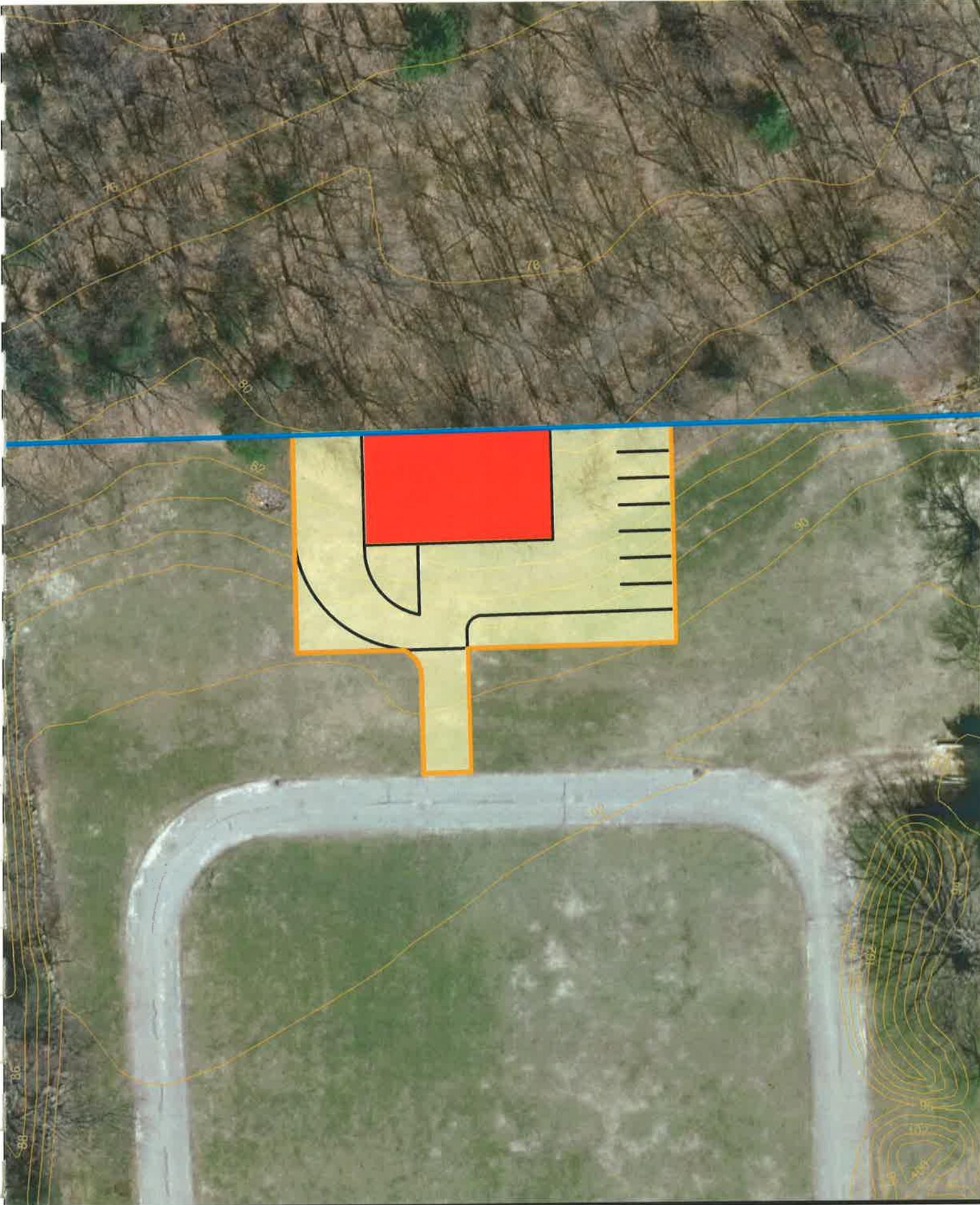


WOOD END CEMETERY - POTENTIAL LAYOUT
GROUND LEVEL - FIGURE 11



WOOD END CEMETERY - POTENTIAL LAYOUT

BASEMENT - FIGURE 12



02 55 10 15 20
Feet

1 inch = 40 feet

WOOD END CEMETERY SITE LOCATION - Figure 13
Page 22

Pearl Street (at Audubon Road)

Located approximately 0.75 miles from Town Hall on Lowell Street, this over 25,000 square foot area, as seen in Figure 14, contains both a parcel of Town owned property as well as land formally occupying a section of Pearl Street prior to the relocation of the roadway by the Town to its current location in a vote of Town Meeting in March, 1945. Prior to any potential selection for this site, it should be noted that the “old Pearl Street” right-of-way would need to be formally abandon by the Town if a garage were to be erected within its limits. Furthermore, due to an abrupt change in grade to the immediate westerly side of the property, some form of a retaining wall ranging in height from two (2) to five (5) feet, whether in the form of an actual retaining wall or simply part of the building foundation, would need to be constructed. Aside from this along with a small amount of tree removal, the lot is relatively level, and would require only minimal site development if chosen. This site location would be beneficial for security purposes as it resides within a residential area, however, being in a residential area might cause concern with neighbors due to daily activities associated with a facility of this type.

- Potential usable space on site – over 25,000 square feet

- Utility availability
 - Water, sewer, gas, electric – available from either Pearl Street or Audubon Road

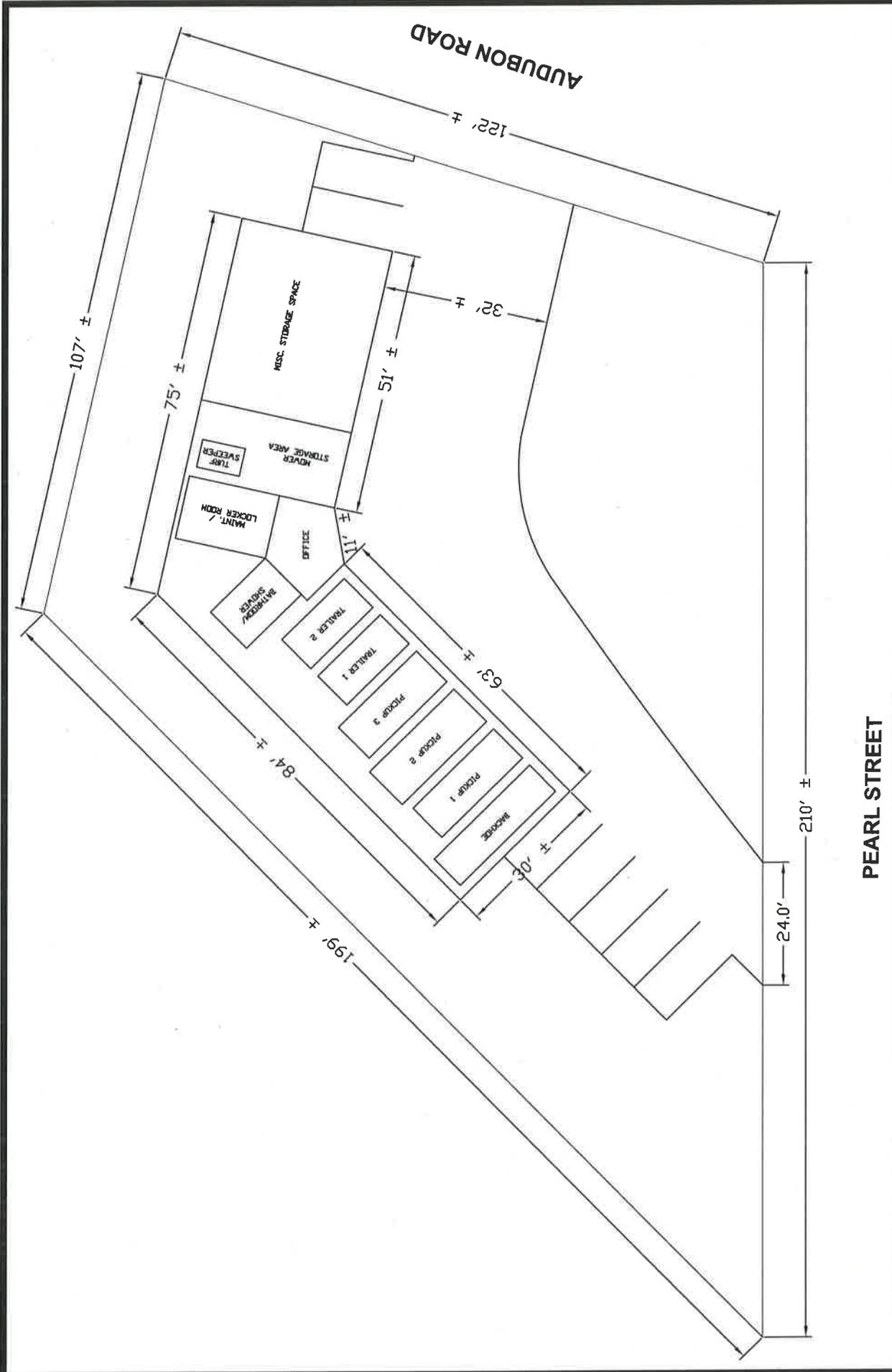
- Percentage of time spent on grounds maintenance – 0 %

- Level of site development required – low



1 inch = 49.093737 feet

PEARL STREET AT AUDUBON ROAD - Figure 14
Page 24



PEARL STREET

PEARL STREET AT AUDUBON ROAD - POTENTIAL LAYOUT

FIGURE 15



0 2.55 10 15 20
Feet

1 inch = 40 feet

PEARL STREET AT AUDUBON ROAD - SITE LOCATION
Figure 16 - Page 26

Public Works Facility – 75 Newcrossing Road

The Public Works facility, as seen in Figure 17, is approximately 1 mile from Town Hall and currently houses several divisions of the Public Works Department. While not the most favorable of locations due to space limitations, two potential sites do exist at the Public Works facility. Option A is located at the edge of the detention pond to the northern side of the parking lot at the Public Works facility. The building would actually be positioned over the edge of the existing detention pond and be supported by large concrete drainage structures that would allow the detention area to function as it currently is now. In addition, due to the placement of and access to the building, a total of thirteen (13) existing parking spaces would have to be relocated, along with six (6) additional spaces for cemetery employee parking, as can be seen in Figure 19.

Option B is located on the southeasterly side of the driveway entrance to the Public Works facility. The building would set back approximately fifteen (15) feet from the edge of the driveway for safety purposes and would be located within the current material storage area for the Public Works Department. In addition, due to the already overcrowded parking situation and the potential addition of cemetery division employees to the garage facility, an additional nineteen (19) parking spaces would be added along the southwesterly side of the material storage area to help alleviate some of the parking problems being faced, as can be seen in Figure 20.

While these two (2) locations would be convenient for fuel accessibility, and material storage, etc, the sites are located on the opposite side of Town from all of the current cemeteries as well as the Town Hall itself, making accessibility difficult at times in accessing these locations. Any new facility would still require its own maintenance area as any more on-site maintenance in the Public Works facility would greatly impact the already overburdened Maintenance Division of the Public Works Department. All vehicles, and maintenance equipment, as well as a small office space would be housed in the new facility. If necessary, due to space limitations, lockers, showers, and an eating facility could possibly be utilized at the Public Works facility along with the other divisions.

- Potential usable space on site – about 14,138 square feet
- Utility availability
 - Water, sewer, electric, gas – already on site.
- Percentage of time spent on grounds maintenance – 0 %
- Level of site development required – high

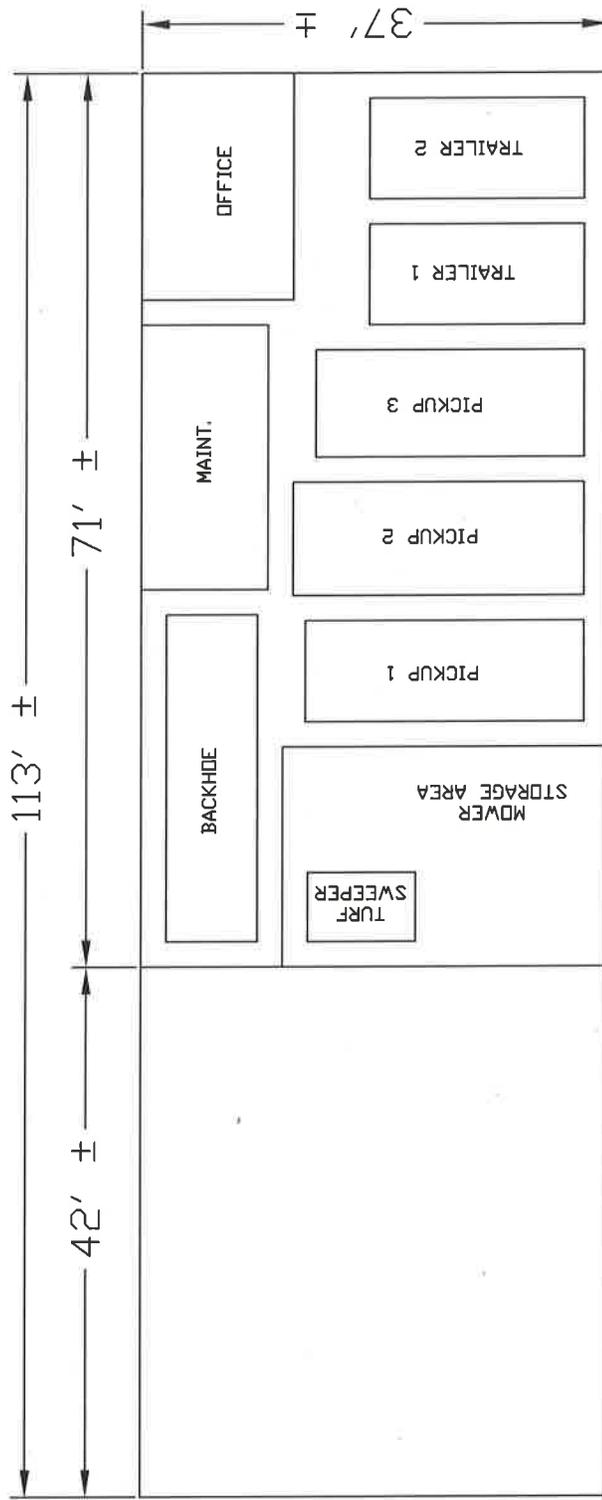


LIMIT OF
DETENTION AREA



0 25 50 100 150 200
Feet

1 inch = 200 feet



EXISTING PARKING LOT
FOR PUBLIC WORKS FACILITY

PUBLIC WORKS FACILITY - POTENTIAL LAYOUT

FIGURE 18



POTENTIAL GARAGE LOCATION

LIMIT OF DETENTION AREA

POTENTIAL ADDITIONAL PARKING (19 SPACES)



0 2.5 5 10 15 20
Feet

1 inch = 40 feet



POTENTIAL
GARAGE LOCATION

LIMIT OF
DETENTION AREA

POTENTIAL
ADDITIONAL PARKING
(19 SPACES)

DPW DRIVEWAY

NEWCROSSING ROAD



0 2.55 10 15 20
Feet

1 inch = 40 feet

	Laurel Hill Cemetery	Forest Glen Cemetery	Charles Lawn Cemetery *	Wood End Cemetery	Pearl St. at Audubon Rd.	Public Works Facility
CRITERIA						
Potential Usable Space on Site (sf)	10,000	15,700	0	8,392	25,100	14,138
Required Site Area (sf)	8,310	12,140	N/A	8,392	10,627	7,259 / 5,166 ¹
Min. Building Footprint Based on Enclosed Layout (sf)	2,420 ²	4,364	N/A	2,420 ²	4,307	2627 ³
Grave Lots Displaced Based on Enclosed Layout (approximate)	0	0	N/A	9	0	0
Site Listed on National Register of Historic Places	Yes	No	No	No	No	No
Conservation Filing Required	No	No	N/A	Yes	No	Yes
Impact on Residential Neighborhoods	Medium	High	N/A	Low	High	Low
Proximity of Utilities (ft)						
- Water	700 ⁴	400	450	1,000	< 75	Onsite
- Sewer	700	400	450	1,000	< 75	Onsite
- Gas	700	400	450	1,800	< 75	Onsite
- Electric	Onsite	400	450	1,000	< 75	Onsite
Required level of site development for graves	High	High	N/A	High	N/A	N/A
Required level of site development for building	Low	Medium	N/A	Low	Low	High
Driving Distance to (miles) :						
- Town Hall	< 0.1	1.3	0.8	2.4	0.6	1.0
- Laurel Hill Cemetery		1.3	0.8	2.4	0.6	1.0
- Forest Glen Cemetery	1.3		0.7	1.2	0.1	2.3
- Charles Lawn Cemetery	0.8	0.7		2.0	0.3	1.7
- Wood End Cemetery	2.4	1.2	2.0		1.7	3.4
- Public Works Facility	1.0	2.3	1.7	3.4	1.5	
- Compost Center	2.4	2.1	3.4	2.4	3.3	3.4
Available single graves remaining in cemetery for future grave sales (approximate)	235	0	1,424	3,130	N/A	N/A
Percentage of time spent for grounds maintenance	36%	30%	17%	17%	0%	0%
Percentage of time spent for internments	6%	36%	33%	25%	0%	0%

* Numbers are for comparison only due to the lack of usable space. Charles Lawn cemetery should not be considered for a potential site.

1. Required building site area and required additional parking area for both options.
2. Utilizes full basement for equipment storage under main level.
3. Utilizes second floor for equipment storage in attic.
4. Existing water service to be upgraded.

	Laurel Hill Cemetery	Forest Glen Cemetery	Charles Lawn Cemetery *	Wood End Cemetery	Pearl St. - at Audubon Rd.	Public Works Facility
SITE CRITERIA						
Potential Usable Space on Site (sf)	A	HA	U	A	A	A
Required Site Area (sf)	U	A	U	U	A	U
Min. Building Footprint Based on Enclosed Layout (sf)	A	A	U	A	A	A
Grave Lots Displaced Based on Enclosed Layout (approximate)	HA	HA	U	U	HA	HA
Conservation Filing Required	A	A	U	U	A	U
Impact on Residential Neighborhoods	A	U	U	HA	U	HA
Proximity of Utilities (ft)						
- Water	HA	A	A	U	HA	HA
- Sewer	A	A	A	U	HA	HA
- Gas	A	A	A	U	HA	HA
- Electric	HA	A	A	U	HA	HA
Required level of site development for graves	U	U	U	U	U	U
Required level of site development for building	HA	A	U	HA	HA	U
Most Frequent Score :	A	A	U	U	HA	HA
SITE PRODUCTIVITY						
Driving Distance to (miles) :						
- Town Hall	HA	A	HA	U	HA	HA
- Laurel Hill Cemetery	HA	A	HA	U	HA	HA
- Forest Glen Cemetery	A	HA	A	HA	HA	U
- Charles Lawn Cemetery	HA	HA	HA	A	HA	A
- Wood End Cemetery	U	A	A	HA	A	U
- Public Works Facility	HA	U	A	U	A	HA
- Compost Center	U	U	U	U	U	U
Anticipated additional time spent on maintenance resulting from future grave sales	U	U	A	HA	U	U
Percentage of time spent for grounds maintenance	HA	HA	A	A	U	U
Percentage of time spent for internments	U	HA	HA	A	U	U
Most Frequent Score :	HA	HA	A	U	A	U
Rankings :	1	1	4*	5	2	3

Note: In cases of a tie, sites with higher productivity rankings were considered to be more beneficial.

* Ratings are for comparison only due to the lack of usable space. Charles Lawn cemetery should not be considered for a potential site.

HA = Highly Advantageous
A = Advantageous
U = Unadvantageous

