

Preliminary Wastewater Management Study for Ivoryton Village

**Town of Essex Water Pollution
Control Authority**
Essex, CT

November 8, 2011



146 Hartford Rd.
Manchester, CT 06040

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Preliminary Wastewater Management Study for Ivoryton Village Town of Essex Water Pollution Control Authority

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1 Introduction 1

At the present time, Subsurface Sewage Disposal Systems (SSDS) in Ivoryton Village are reportedly not experiencing visible failures. However, because these systems are generally not in compliance with the current CT Public Health Code, improvements to or replacement of the systems will be necessary if landowners wish to expand their buildings and/or change the building's uses.

Generally, the individual properties within the Village do not have the adequate space or environmental setting to allow SSDS improvement or replacement. For these reasons, the Town of Essex WPCA engaged Fuss & O'Neill to conduct a preliminary evaluation of certain properties outside the Village that could potentially be used to for a community treatment and disposal system. Specifically, the objective of the evaluation was to determine the approximate subsurface sewage disposal leaching capacity of parcels selected by the WPCA. A location map that depicts the location of the selected parcels is presented as *Figure 1*. We conducted this evaluation during the spring of 2011, with the assistance of the WPCA and the Town's planning and engineering staff. Our findings are presented herein.

2 Initial Evaluation

2.1 Description

At the outset of this project, we made an initial evaluation of six parcels the commission identified as potential locations for community wastewater systems. The six sites included:

- Parcel ID 57 017, 114 Main Street, owner Carl Echtman
- Parcel ID 63 020 01, Baldwin Lane, owner Murwin A. Johnson
- Parcel ID 64 001 01, 85 Mares Hill Road, owner Jere J. LaPlatney
- Parcel ID 62 002, Park Road, owner Town of Essex
- Parcel ID 58 033, 13 Cheney Street, owner Robert E. Lee
- Parcel ID 40 10, Main Street, owner Town of Essex

The six parcels, including property line, soil types (SCS, now the Natural Resources Conservation Service or NRCS) Survey for Middlesex County¹ and USGS topography are depicted in *Figures 2 through 7*. The initial evaluation included a field review of the sites with two WPCA members and Rick Canavan from CME on April 15, 2011. We walked each site, made shallow soil borings with a hand auger and reviewed published soil information. We prepared a memorandum of our Preliminary Findings, which evaluated for each site:

- Brief description of the soils present
- A brief summary of pertinent historic data that the WPCA and CME were able to provide
- Published SCS/NRCS soil types and their general suitability for subsurface disposal
- Description of soil core samples we collected during our site visit

¹ Soil Survey of Middlesex County, Connecticut. US Department of Agriculture, Soil Conservation Service, 1979.

- Prepared preliminary leaching capacity calculations
- Presented a discussion regarding each site's suitability for a community SSDS
- Brief comment on the suitability of the site for subsurface disposal
- Recommendations regarding further investigation

2.2 Findings

2.2.1 Parcel ID 57 017, 114 Main Street, owner Carl Echtman

This parcel is located across Main Street from the Ivoryton Playhouse, and is primarily used for parking cars. Soils are primarily fills, and samples could not be obtained by hand auger. The area is highly compacted and is not suitable for subsurface sewage disposal. The WPCA directed us not to investigate this parcel further.

As we discussed with the WPCA during our field visit, the best use for 114 Main Street may be as a centralized location for septic tanks, equalization tanks and perhaps a pump station to serve Ivoryton Village. Following primary settling and equalization, wastewater could be conveyed to the parcel(s) chosen for subsurface sewage disposal. Based on our site investigation we do not recommend this parcel be investigated further.

2.2.2 Parcel ID 63 020 01, Baldwin Lane, owner Murwin A. Johnson

Our field visit indicated that the higher areas on the property would be good candidates for field soil investigation and possible SSDS. Mr. Johnson was present during our site visit, and he indicated that in holes he has dug in the western field, he encountered compact soils between 24 and 30 inches. A neighbor we met that day confirmed that depth to compact soil is generally found in that area. Mr. Johnson has not dug holes in the easterly field, but soils information described in the SCS Survey indicates the same soil types are present.

A sample collected by hand auger indicated fine sandy loam soil with stones. The SCS survey indicates these are Paxton soils that are well drained and stony. Potentially large areas on this property could be suitable for SSDS.

Our initial conclusion was that this parcel could potentially support a community SSDS, and that the site should be investigated further.

The Town of Essex Land Trust retains the development rights to this parcel, and whether it could be used to support a community SSDS would need further review.

2.2.3 Parcel ID 64 001 01, 85 Mares Hill Road, owner Jere J. LaPlatney

This parcel is just east of the Johnson property. Published soils information and our field observations indicate similar conditions and suitability for a community SSDS. The SCS survey indicates the presence of Paxton soils, and the owner had dug test pits for a possible house location in the upper field, where a community SSDS would likely be placed. He indicated that the test hole results were good, although these results are not available for review.

Similar to the Johnson property, our initial conclusion was that this parcel could potentially support a community SSDS, and that the site should be investigated further.

2.2.4 Parcel ID 62 002, Park Road, owner Town of Essex

Comstock Field is an area in which the SCS had mapped Agawam Fine Sandy Loam, but the soil is very shallow or was removed to construct the playing fields. Information provided by CME regarding Test pits conducted in the area indicate that subsoils are compact silty loam.

Comstock Field is surrounded on 3 sides by very shallow ground water and surface waters. We estimate that seasonal high ground water is at the surface or within 1 to 2 feet of the ground surface.

To accommodate the necessary vertical separation from seasonal high ground water, and to accommodate effluent mounding beneath an SSDS, the portions of the field that are used for SSDS could need to be raised up to 6 feet, depending on which regulatory authority has jurisdiction².

Because our site investigation concluded that Comstock Field is in close proximity to groundwater, that a large amount of select fill would be required and that the cost of a community SSDS would be significant, the WPCA has decided not to consider this parcel further.

2.2.5 Parcel ID 58 033, 13 Cheney Street, owner Robert E. Lee

The SCS Soil Survey indicates the presence of Agawam Fine Sandy Loam on this parcel. Soil samples obtained with a hand auger confirmed the presence of sandy loam with little silt. Test pit data for the area that was made available by CME indicate medium to coarse sand (11 Cheney Street, Parcel ID 58 32), medium to coarse gravelly sand (testing conducted for Bisecky, Parcel ID 58 34 1), and clean gravelly sand (Pond Meadow Road, Parcel ID 62 1 2).

This parcel contains upland areas as well as areas that appear to be characterized by wetlands or more poorly drained soils. Upland areas that appear to be suitable for SSDS include a 60 foot wide by 200 foot long area.

Our initial conclusion was that this parcel could potentially support a community SSDS, and that the site should be investigated further.

2.2.6 Parcel ID 40 10, Main Street, owner Town of Essex

Use of the Town park property on Main Street for subsurface sewage disposal is limited because of the historic stone channel that conveys stormwater and/or ground water through the site. Setback distances for SSDS required by the Health Code preclude the use of a significant portion of the park for wastewater disposal, and the presence of compact, disturbed

² SSDS with flow rates over 5,000 gallons per day are within the CTDEP's jurisdiction. The CTDEP requires that leaching systems have 3 feet of vertical separation from seasonal high ground water to facilitate virus die-off in the unsaturated soil zone.

soils we encountered with a hand auger significantly limit the site's value for that purpose. Based on our investigation we do not recommend this parcel be investigated further.

3 Evaluation of Selected Parcels

Our initial evaluation indicated that the following three of the original six parcels are potentially good candidates for subsurface sewage disposal systems:

- Parcel ID 58 033, 13 Cheney Street, owner Robert E. Lee
- Parcel ID 63 020 01, Baldwin Lane, owner Murwin A. Johnson
- Parcel ID 64 001 01, 85 Mares Hill Road, owner Jere J. LaPlatney

For the three selected parcels, we calculated the approximate leaching capacity of soils that would receive effluent from SSDS. To do so, we prepared base mapping from the Town of Essex GIS database. Based on field observations and discussions with the land owners we developed preliminary layouts for subsurface sewage disposal systems. The preliminary layouts are presented in the attached figures:

- Figure 8 – Parcel ID 58 033, 13 Cheney Street, owner Robert E. Lee
- Figure 9 – Parcel ID 63 020 01, Baldwin Lane, owner Murwin A. Johnson
- Figure 10 – Parcel ID 64 001 01, 85 Mares Hill Road, owner Jere J. LaPlatney

Using soil types and engineering properties described in the Soil Conservation Service Soil Survey for Middlesex County, we performed preliminary leaching capacity calculations for the layouts which are presented in *Appendix A*. To summarize the results of the calculations, the 3 parcels analyzed have the following leaching capacities:

Table 1
Leaching Capacity of Selected Parcels

Parcel ID	Approximate Leaching Capacity (gallons per day)
58 033, 13 Cheney Street, owner Robert E. Lee	17,000
63 020 01, Baldwin Lane, owner Murwin A. Johnson	11,500
64 001 01, 85 Mares Hill Road, owner Jere J. LaPlatney	12,500

4 Recommended Next Steps

If permission for access to the three selected parcels could be obtained, the next steps in the process of determining which property(s) are best suited for a community SSDS could include:

- For Parcel 58 033 a limited property boundary review or survey to confirm property limits. A limited inland wetland delineation at the toe of the slope beneath the potential

leaching area should be conducted, and the flags should be located by field survey and mapped.

- Review of the flexibility the Town has regarding the purchased development rights on Parcel 63 02 01.
- A topographic survey in areas that might be used for SSDS on all 3 parcels.
- Soil testing on each parcel, including excavation of test pits with a backhoe, collection of undisturbed soil samples for hydraulic conductivity testing and collection of bulk soil samples for grain size analysis.

Data obtained from soil testing would allow a more accurate and meaningful evaluation of the parcels for wastewater disposal potential. The data collected would be useful and required in subsequent project steps for the preferred site alternative, including design and permitting.

Once the leaching capacities of the selected parcel(s) are determined, the daily flow rate could be used to determine a service area for the Ivoryton Village community septic system. Determination of the service area would include the analysis of existing and water consumption data and possible future expansions or changes in land use.

Figures

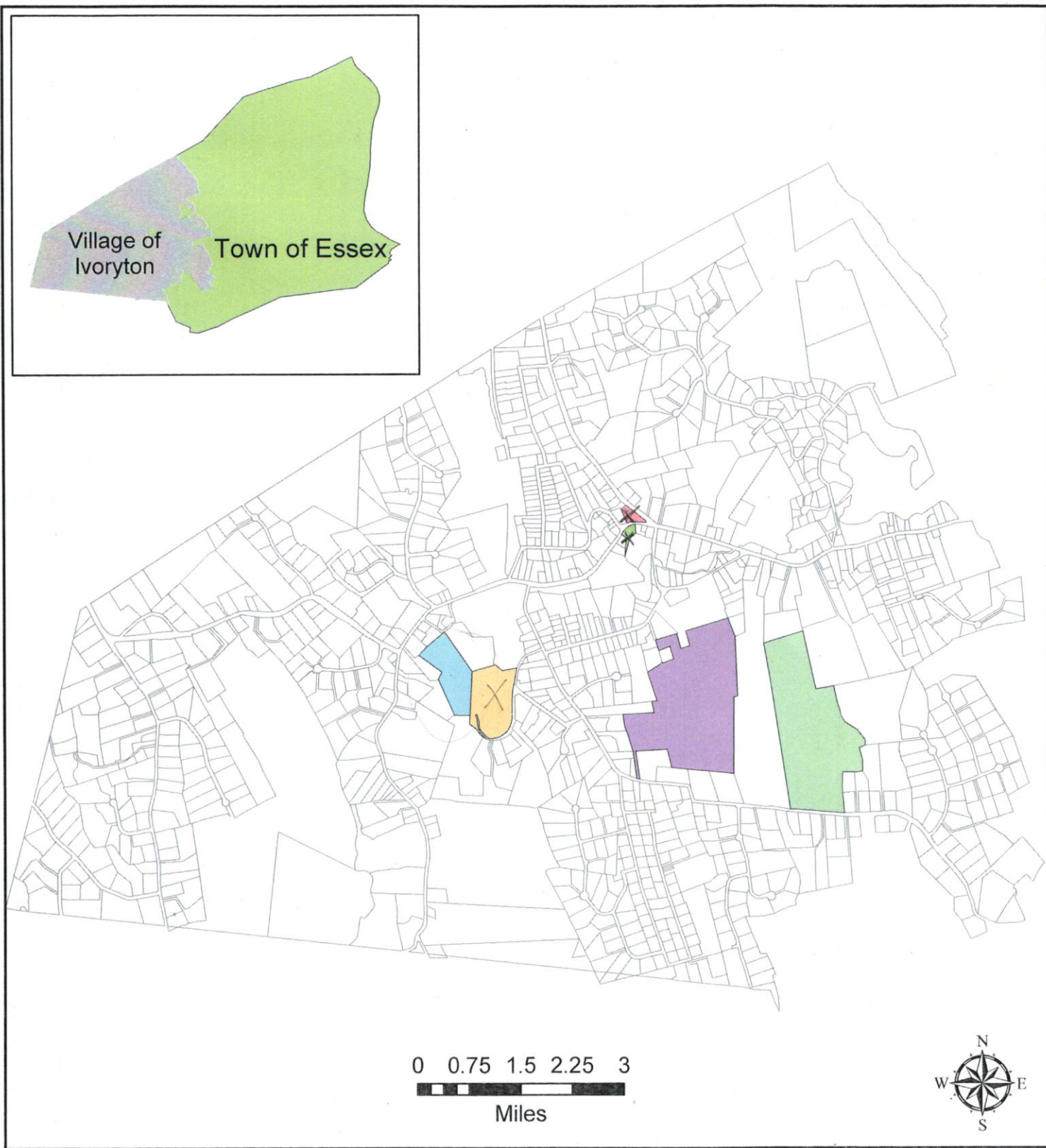









FIGURE 1 November 2011

Legend

-  Parcel ID # 40 10, Main St., owner Town of Essex
-  Parcel ID # 57 017, 114 Main St, owner Carl Echtman
-  Parcel ID # 58 033, 13 Cheney St, owner Robert E. Lee ✓
-  Parcel ID # 62 002, Park Road, owner Town of Essex
-  Parcel ID # 63 020 01, Baldwin La, owner Murwin A. Johnson ✓
-  Parcel ID # 64 001 01, 85 Mares Hill Rd, owner Jere J. LaPlatney ✓
-  Ivoryton Village

Path: K:\GIS\CUSTOMERS\TownOfEssex\Ivoryton\MXD\Ivoryton.mxd

Location Map
Project: Ivoryton Wastewater



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Parcel ID 40 10, 10 Main Street

Essex, Connecticut

FIGURE 2

N

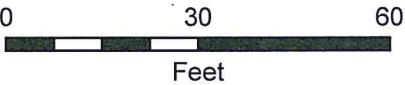


Legend

- Selected Parcel
- 10 Foot Contours

Soils

- 29B; Agawam fine sandy loam, 3 to 8 percent slopes
- 73E; Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky



1 inch = 30 feet

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Parcel ID # 57 017, 114 Main Street
Essex, Connecticut

FIGURE 3



Legend

-  Selected Parcel
-  10 Foot Contours
-  29B; Agawam fine sandy loam, 3 to 8 percent slopes

0 25 50
Feet

1 inch = 40 feet

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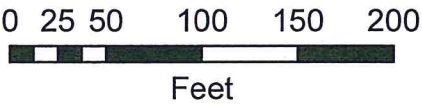
Parcel ID # 58 033, 13 Cheney Street
Essex, Connecticut

FIGURE 4



Legend

- Selected Parcel
- 10 Foot Contours
- 103; Rippowam fine sandy loam
- 17; Timakwa and Natchaug soils
- 29A; Agawam fine sandy loam, 0 to 3 percent slopes
- 29B; Agawam fine sandy loam, 3 to 8 percent slopes
- 307; Urban land
- 73C; Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky
- 73E; Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky



1 inch = 100 feet

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










Ivoryton Village Preliminary Wastewater Management Study

Parcel ID # 62 002, Park Road
Essex, Connecticut

FIGURE 5



Legend

-  Selected Parcel
-  10 Foot Contours
- MUSYM, MUNAME**
-  103; Rippowam fine sandy loam
-  13; Walpole sandy loam
-  17; Timakwa and Natchaug soils
-  29A; Agawam fine sandy loam, 0 to 3 percent slopes
-  29B; Agawam fine sandy loam, 3 to 8 percent slopes
-  307; Urban land
-  61C; Canton and Charlton soils, 8 to 15 percent slopes, very stony
-  62D; Canton and Charlton soils, 15 to 35 percent slopes, extremely stony
-  73C; Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky
-  73E; Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky
-  85C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony
-  86D; Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony

0 25 50 100 150 200



Feet

1 inch = 100 feet

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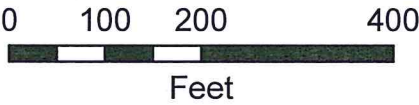
Ivoryton Village Preliminary
Wastewater Management Study

Parcel ID # 63 020 01, Baldwin Lane
Essex, Connecticut

FIGURE 6



- Legend
- 10 Foot Contours
 - Selected Parcel
 - 3; Ridgebury, Leicester, and Whitman soils, extremely stony
 - 45B; Woodbridge fine sandy loam, 3 to 8 percent slopes
 - 47C; Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony
 - 84C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes
 - 85B; Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony
 - 85C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony
 - 86C; Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony
 - 86D; Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony



1 inch = 200 feet

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Parcel ID # 64 001 01,85 Mares Hill Road
Essex, Connecticut

FIGURE 7



Legend

- 3; Ridgebury, Leicester, and Whitman soils, extremely stony
- 46B; Woodbridge fine sandy loam, 2 to 8 percent slopes, very stony
- 47C; Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony
- 61C; Canton and Charlton soils, 8 to 15 percent slopes, very stony
- 62C; Canton and Charlton soils, 3 to 15 percent slopes, extremely stony
- 62D; Canton and Charlton soils, 15 to 35 percent slopes, extremely stony
- 73C; Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky
- 85B; Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony
- 85C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony
- 86C; Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony
- 86D; Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony

0 100 200 400
Feet

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Ivoryton Village Preliminary Wastewater Management Study

Schematic Leaching Area Layout

Parcel ID # 58 033, 13 Cheney Street
Essex, Connecticut

FIGURE 8



Legend

- Selected Parcel
- 10 Foot Contours
- 103; Rippowam fine sandy loam
- 17; Timakwa and Natchaug soils
- 29A; Agawam fine sandy loam, 0 to 3 percent slopes
- 29B; Agawam fine sandy loam, 3 to 8 percent slopes
- 307; Urban land
- 73C; Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky
- 73E; Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

0 25 50 100 150 200
Feet

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Ivoryton Village Preliminary
Wastewater Management Study

Schematic Leaching Area Layout

Parcel ID # 63 020 01, Baldwin Lane
Essex, Connecticut

FIGURE 9



- Legend
- 10 Foot Contours
 - Selected Parcel
 - 3; Ridgebury, Leicester, and Whitman soils, extremely stony
 - 45B; Woodbridge fine sandy loam, 3 to 8 percent slopes
 - 47C; Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony
 - 84C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes
 - 85B; Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony
 - 85C; Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony
 - 86C; Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony
 - 86D; Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony



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Ivoryton Village Preliminary
Wastewater Management Study
Schematic Leaching Area Layout

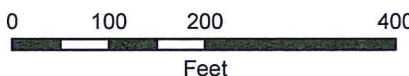
Parcel ID # 64 001 01,85 Mares Hill Road
Essex, Connecticut

FIGURE 10



Legend

- 3; Ridgebury, Leicester, and Whitman soils, extremely stony
- 46B; Woodbridge fine sandy loam, 2 to 8 percent slopes, very stony
- 47C; Woodbridge fine sandy loam, 2 to 15 percent slopes, extremely stony
- 61C; Canton and Charlton soils, 8 to 15 percent slopes, very stony
- 62C; Canton and Charlton soils, 3 to 15 percent slopes, extremely stony
- 62D; Canton and Charlton soils, 15 to 35 percent slopes, extremely stony
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- 86C; Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony
- 86D; Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony



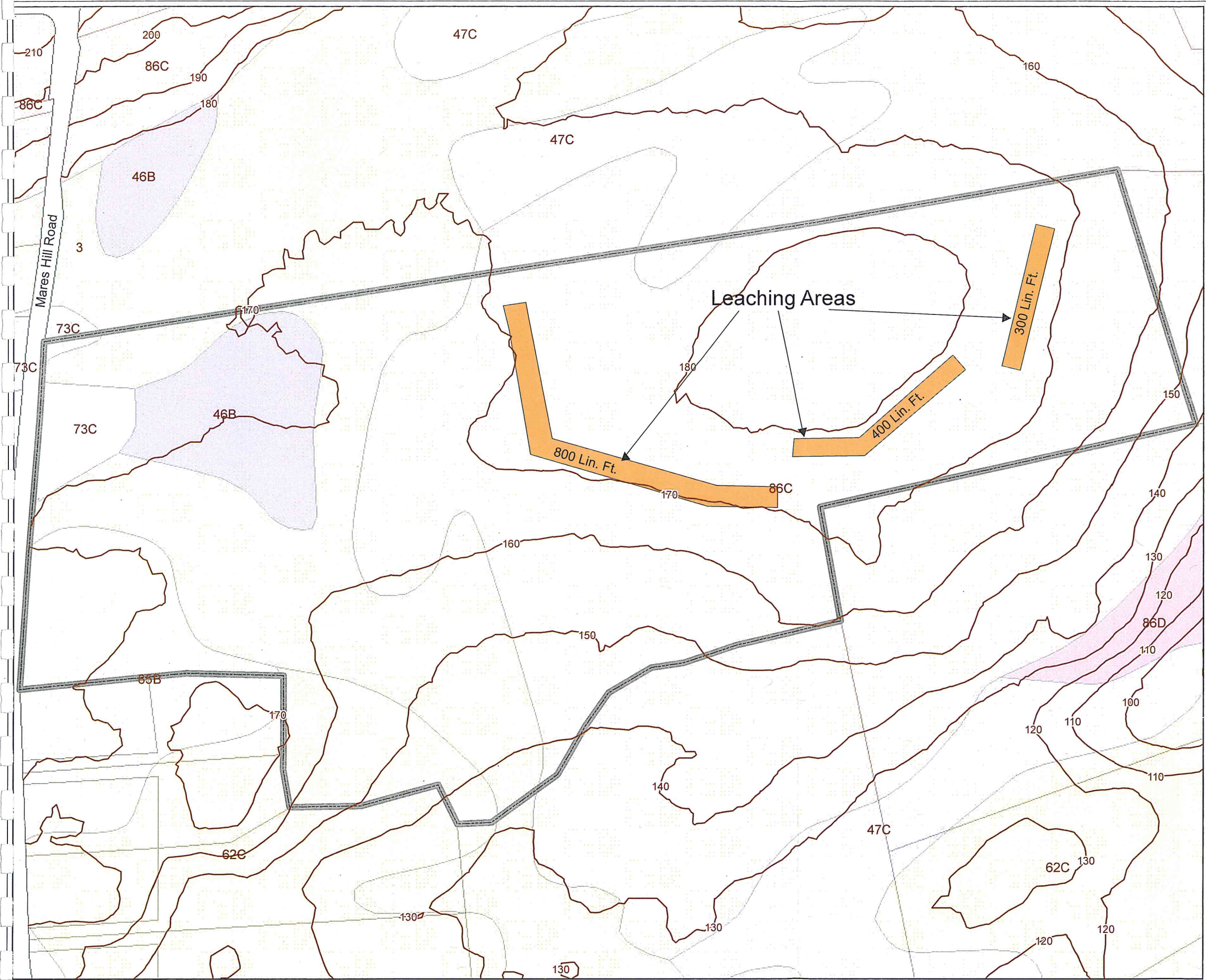
1 inch = 200 feet

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November 2011



Appendix A

Leaching Capacity Calculations



Ivoryton Village Preliminary Wastewater Management Study
July 11, 2011

Property ID: 58 033
Street Address: 13 Cheney Street
Owner name: Robert Lee

Published Soil Data (Soil Survey of Middlesex County, CT. SCS 1979)

NRCS soil designation in leaching system area: AfB
Soil description: Agawam fine sandy loam
Published hydraulic conductivity (feet/day):
 High end of range: 40
 Low end of range: 4
 Calculated average for use in analysis: 22
Depth to seasonal high groundwater (feet): 2.9 (Source: test pits taken at 11 Cheney Street, data provided by Town of Essex)

Leaching Area Characteristics (from field observations and USGS mapping)

Width of leaching system (in feet, from Schematic Layout): 700
Hydraulic gradient (in feet/foot, from USGS mapping): 0.05

Leaching capacity estimate

$Q = \text{leaching capacity (gallons/day)} = K \times i \times A \times 7.48$, where:
 $K = \text{hydraulic conductivity (feet/day)} = 22$
 $i = \text{hydraulic gradient of site (feet/foot)} = 0.05$
 $A = \text{subsurface flow area (square feet)} = \text{ht} \times \text{width}$, where:
 $\text{ht} = \text{depth from ground surface to seasonal high groundwater (feet)} = 2.9$
 $\text{width} = \text{width of leaching system (feet)} = 700$
 7.48 = conversion factor from cu ft /day to gallons/day

$Q = 16,799 \text{ gallons / day}$



Ivoryton Village Preliminary Wastewater Management Study
July 11, 2011

Property ID: 63 020-1
Street Address: Baldwin Lane
Owner name: Murwin Johnson

Published Soil Data (Soil Survey of Middlesex County, CT. SCS 1979)

NRCS soil designation in leaching system area: PeC
Soil description: Paxton Stony Fine Sandy Loam
Published hydraulic conductivity (feet/day):
 High end of range: 12
 Low end of range: 1.2
 Calculated average for use in analysis: 6.6
Depth to seasonal high groundwater (feet): 2.25 (average reported by Mr. Johnson during April 15, 2011 site visit)

Leaching Area Characteristics (from field observations and USGS mapping)

Width of leaching system (in feet, from Schematic Layout): 1,150
Hydraulic gradient (in feet/foot, from USGS mapping): 0.09

Leaching capacity estimate

$Q = \text{leaching capacity (gallons/day)} = K \times i \times A \times 7.48$, where:
 $K = \text{hydraulic conductivity (feet/day)} = 6.6$
 $i = \text{hydraulic gradient of site (feet/foot)} = 0.09$
 $A = \text{subsurface flow area (square feet)} = \text{ht} \times \text{width}$, where:
 $\text{ht} = \text{depth from ground surface to seasonal high groundwater (feet)} = 2.25$
 $\text{width} = \text{width of leaching system (feet)} = 1150$
7.48 = conversion factor from cu ft /day to gallons/day

$Q = 11,497 \text{ gallons / day}$



Ivoryton Village Preliminary Wastewater Management Study
July 11, 2011

Property ID: 64 001-1
Street Address: 85 Mares Hill Road
Owner name: Jere J. LaPlatney

Published Soil Data (Soil Survey of Middlesex County, CT. SCS 1979)

NRCS soil designation in leaching system area: PeC
Soil description: Paxton Stony Fine Sandy Loam
Published hydraulic conductivity (feet/day):
 High end of range: 12
 Low end of range: 1.2
 Calculated average for use in analysis: 6.6
Depth to seasonal high groundwater (feet): 2.25 (no data available, assume same as Baldwin Lane-Mares Hill Road soils)

Leaching Area Characteristics (from field observations and USGS mapping)

Width of leaching system (in feet, from Schematic Layout): 1,500
Hydraulic gradient (in feet/foot, from USGS mapping): 0.075

Leaching capacity estimate

$Q = \text{leaching capacity (gallons/day)} = K \times i \times A \times 7.48$, where:
 $K = \text{hydraulic conductivity (feet/day)} = 6.6$
 $i = \text{hydraulic gradient of site (feet/foot)} = 0.075$
 $A = \text{subsurface flow area (square feet)} = \text{ht} \times \text{width}$, where:
 $\text{ht} = \text{depth from ground surface to seasonal high groundwater (feet)} = 2.25$
 $\text{width} = \text{width of leaching system (feet)} = 1500$
 7.48 = conversion factor from cu ft /day to gallons/day

$Q = 12,496 \text{ gallons / day}$

Ivoryton Village Preliminary Wastewater Management Study
July 11, 2011

Property ID:
Street Address:
Owner name:

Published Soil Data (Soil Survey of Middlesex County, CT. SCS 1979)

NRCS soil designation in leaching system area:
Soil description:
Published hydraulic conductivity (feet/day):
 High end of range:
 Low end of range:
 Calculated average for use in analysis: 0
Depth to seasonal high groundwater (feet):

Leaching Area Characteristics (from field observations and USGS mapping)

Width of leaching system (in feet, from Schematic Layout):
Hydraulic gradient (in feet/foot, from USGS mapping):

Leaching capacity estimate

Q = leaching capacity (gallons/day) = $K \times i \times A \times 7.48$, where:
 K = hydraulic conductivity (feet/day) = 0
 i = hydraulic gradient of site (feet/foot) = 0
 A = subsurface flow area (square feet) = $ht \times \text{width}$, where:
 ht = depth from ground surface to seasonal high groundwater (feet) = 0
 width = width of leaching system (feet) = 0
 7.48 = conversion factor from cu ft /day to gallons/day

$Q =$	0	gallons / day
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