Revised 05-15-12

TOWN OF MANSFIELD

SPECIAL TOWN COUNCIL MEETING

Thursday, May 17, 2012
7:00 p.m.
Council Chambers
Audrey P. Beck Municipal Building

AGENDA

Call to Order

Opportunity for the Public to Address the Council

Old Business

1. School Building Project (Item #1, 03/07/12 Agenda)
    a. School siting considerations
    b. Review timeline
    c. Council deliberations
    d. Next steps

Executive Session

2. Sale or purchase of real property, in accordance with CGS §1-200(6)(D)

Adjournment

SEPTIC SUITABILITY REPORT

FOR THE

GOODWIN ELEMENTARY SCHOOL SITE
321 HUNTING LODGE ROAD
MANSFIELD, CT

PREPARED FOR

TOWN OF MANSFIELD
FACILITIES MANAGEMENT DEPARTMENT

APRIL 19, 2012

STATE OF CONNECTICUT
BRANDON J. HANDFIELD
No. 24564
LICENSED
PROFESSIONAL ENGINEER

4/24/12

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EXECUTIVE SUMMARY

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into two (2) buildings, one of which will be constructed on the Goodwin Elementary School Site located at 321 Hunting Lodge Road. This consolidated school will accommodate up to 375 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. was retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis was performed through data collection, field testing and preliminary subsurface sewage disposal system (SSDS) calculations.

Preliminary soil testing was performed to determine whether the existing soils have sufficient capacity to carry the septic tank effluent into subsurface soils. The results of this preliminary testing along with estimates of the proposed sewage flow were utilized to evaluate the suitability of a subsurface sewage disposal system on this site. The following parameters indicate that the site has adequate hydraulic capacity to accommodate the SSDS.

- Percolation Rate = 5.1 to 10.0 min./in.
- Depth to Restrictive Layer = 64 inches
- School Discharge (Q) = 4,125 gpd (375 Students)
- Effective Leaching Area (ELA) = 3,406.25 sq ft

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths and etc., it appears that the site can adequately accept the wastewater flows of a 375 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated in the following report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDPH.

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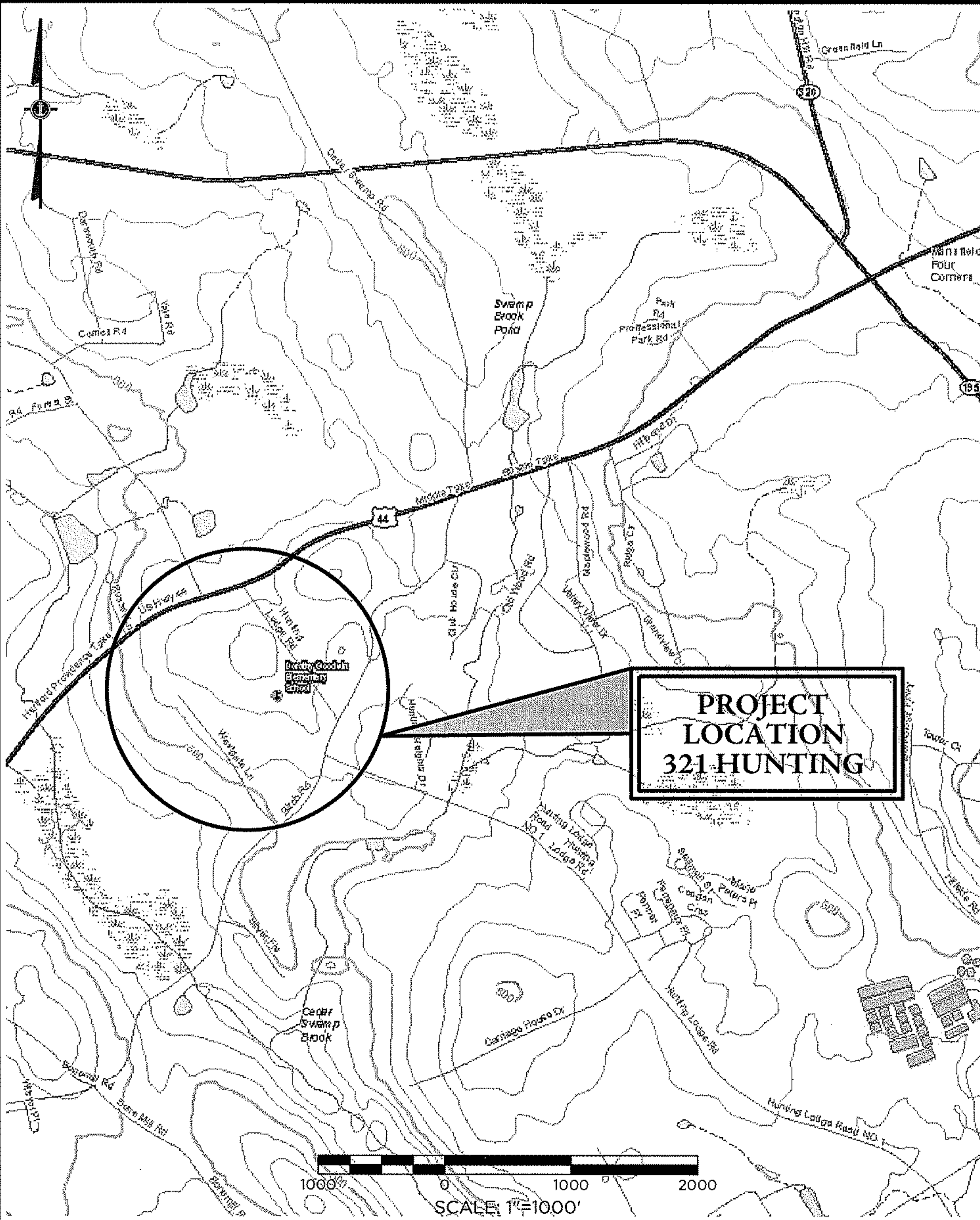
SITE LOCATION MAP

GOODWIN ELEMENTARY SCHOOL
321 HUNTING LODGE ROAD

FIGURE 1	
PROJECT	DATE
486-05	4/18/12



INTRODUCTION

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into two (2) buildings, one of which will be constructed on the Goodwin Elementary School Site located at 321 Hunting Lodge Road. This consolidated school will accommodate up to 375 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. has been retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis generally consists of the following:

1. Data collection
2. Soil testing
3. Sewage flow estimates for an 375 student elementary school
4. Evaluation of septic suitability

The following report has been prepared to summarize the work completed and provides an opinion of the septic suitability of the site based upon the information compiled to date.

DATA COLLECTION

Anchor Engineering collected data on the subject parcel through the compilation of available public information and field investigations.

COMPILATION OF EXISTING INFORMATION

The following information was obtained from public sources listed below:

- Connecticut Department of Energy & Environmental Protection (GIS data)
    - Natural Diversity Database
- USDA Natural Resource Conservation Service
    - Major Soil Types
    - Engineering Properties of Identified Soils
- Eastern Highlands Health District, Mansfield Office
    - 1989 result analysis summary of existing subsurface sewage disposal systems
- Town of Mansfield
    - Additions and Alterations of the Mansfield Public Schools 2/8/90.
    - Mansfield Schools Well Location Schematics 6/6/05
    - Well Pump House Additions, Site Plan ,Goodwin School 2/8/06
    - Dorothy Goodwin Elem. School Schematics, The Lawrence Associates 2/9/11

Based upon a review of the information obtained from the above mentioned sources, it was determined that additional field investigations were necessary to determine the septic suitability of the site. The testing methods described below were selected to allow for classification of existing soils and the determination of groundwater, mottling, ledge and/or other restrictive depths.

SOIL TESTING

DEEP TEST PITS

Six (6) deep hole observation test pits were excavated throughout the site by Town Of Mansfield Public Works Department and witnessed by Anchor Engineering, CTDPH, Eastern Highlands Health District and Town of Mansfield Facility Maintenance staff. The test pits were performed to examine the soil at close range and identify characteristics such as color, firmness, particle size and moisture content and to record the presence of restrictive layers.

The test pits ranged in depth from 90" to 138". Five of the six test pits had no apparent restrictive layers, such as ledge, hardpan or seasonally high groundwater. Mottling (high seasonal groundwater) was observed in one of the test pits. In general, the observed soils consisted of tan/gray fine to medium sand with some gravel and cobles and overlain by topsoil and loam or topsoil and fill depending on the location of the pit within the athletic fields or woods. These observed soil types are consistent with NRCS published soil mapping, which indicates the presence of Sutton Fine Sandy Loam or Canton and Charlton Soils in the vicinity of the site. The deep test pit data logs can be found in Appendix B.

Canton and Charlton soils generally consist of coarse-loamy over sandy gravelly melt-out till derived from granite and/or schist and/or gneiss and are well drained, with a hydraulic conductivity ranging from 4.0 to 11.9 feet/day within the underlying soil strata. Observations made in the field during deep hole observation pit testing generally confirm the presence of soils consistent with the Canton and Charlton Series.

Sutton soils generally consist of coarse-loamy melt-out derived from granite and/or schist and/or gneiss and are moderately well drained, with a hydraulic conductivity ranging from 1.1 to 11.9 feet/day within the underlying soil strata. Observations made in the field during deep hole observation pit testing generally confirm the presence of soils consistent with the Sutton Series.

PERCOLATION TEST DATA

Two in-situ percolation tests were performed at the site by Anchor Engineering on April 2, 2012. A summary of results is provided below. Refer to Appendix B expanded data information.

	Test P-102G	**Test P-104G**
Percolation Rate	5.1 to 10.0 Min./In.	5.1 to 10.0 Min./In.

Table No. 1 – Percolation Test Result

FALLING HEAD TEST DATA

Soil samples obtained from deep hole observation test pits were analyzed by Anchor Engineering to determine soil permeability. An in-situ 1½" diam. by 6" long core sample was obtained at a depth of 38" and a falling head permeability test was conducted. Results of the falling head permeability tests are provided in the table below:

	Test Hole 101G
Coefficient of Permeability	10.4 Ft/Day

Table No. 2 – Permeability Test Result

The in-situ core sample obtained from the site was delivered intact therefore the sample was not re-compacted as is often done. Therefore a re-compaction correction factor was not applied to the results. The permiability of **10.4 ft/day** falls within the tange for the Canton and Charlton Series (4.0 to 11.9 ft/day) published by the NRCS.

GROUNDWATER STANDPIPE INSTALLATION & MONITORING

Two (2) shallow groundwater monitoring wells were installed by Mansfield DPW and witnessed by Anchor staff. The wells consisted of the installation of 10 foot lengths of 4" diameter PVC pipes in the deep test pits prior to backfilling. A brief summary of the well data is provided below.

Monitoring Well	Observed GW Depth	Total Well Depth
MW-104G	N/A	96"
MW-105G	N/A	103"

Groundwater depths within the monitoring wells were measured on 4/02/12 and 4/17/12. Results on both days revealed no measurable groundwater, indicating that the actual ground water elevation during this time period is beyond the reaches of installed wells.

SEWAGE FLOW ESTIMATES

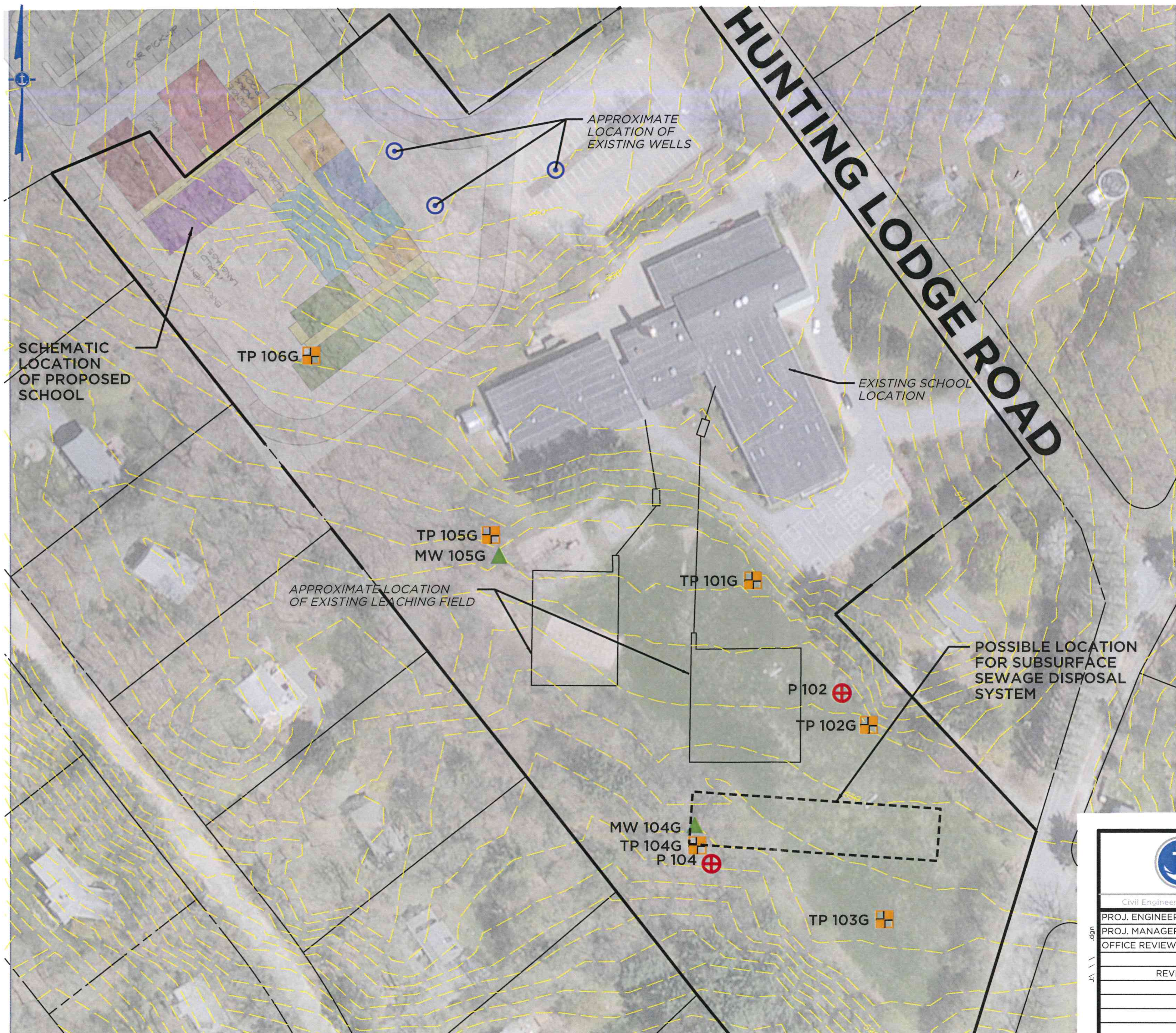
SEWAGE FLOW ESTIMATES

The Town of Mansfield has stipulated that the Subsurface Sewage Disposal System (SSDS) required for the proposed school will need to be designed to accommodate up to 375 elementary school students.

Sewage design flows for an elementary school, as provided in Table No. 4 of the Connecticut Public Health Code, Regulations and Technical Standards for Subsurface Sewage Disposal Systems, is 8.0 gallons per day/per pupil (gpd/pp). Additional design flows to be considered include those resulting from kitchen facilities (+3.0 gpd/pp) and/or shower facilities (+3.0 gpd/pp).

As a conservative measure, a total sewage design flow of 11.0 gpd/pp was used in consideration of the base flow and the likely presen0ce of full kitchen facilities in the new school. Shower facilities were not considered in the study as they are not typical for an elementary school. The projected daily sewage flow for the proposed school is **4,125 gpd**.

Prior to final design, it is recommended that water usage data for the three (3) existing Mansfield elementary schools be compiled to confirm or adjust the conservative design flow utilized in this preliminary study.



LEGEND

- ANCHOR STANDPIPE LOCATION
- ANCHOR DEEP TEST PIT
- ANCHOR PERCOLATION TEST
- EXISTING DOMESTIC WATER WELL

100 0 100 200

SCALE: 1"= 100'

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PROJ. ENGINEER	ECP
PROJ. MANAGER	BJH
OFFICE REVIEW	BJH
REVISIONS	
SCALE:	1"=100'

GOODWIN ELEMENTARY SCHOOL

PREPARED FOR
TOWN OF MANSFIELD

SOIL TEST LOCATION PLAN

321 HUNTING LODGE ROAD — MANSFIELD, CT

PROJECT	DATE	FIGURE
486-05	4/19/12	2

EVALUATION OF SEPTIC SUITABILITY

The SSDS required for the proposed school will be designed to accommodate up to 375 elementary school students in accordance with the CT Public Health Code. The following preliminary calculations and determinations were performed to determine the septic suitability of the site.

DESIGN DATA

The following summary of data was collected during on the site investigation performed on April 2, 2012. Refer to Appendix B expanded data information.

Depth to Mottling:	64" (TP-105G)
Depth to Ledge:	N/A
Depth to Groundwater:	N/A
Percolation Rate:	5.1 to 10.0 Min./In.

EFFECTIVE LEACHING AREA (ELA)

The effective leaching surface area (ELA) of a SSDS is the interface area between the soil and the facilities used for applying the pretreated wastewater to the soil (the leaching system). For the purposes of this study a range of anticipated effective leaching area values was calculated.

Daily Design Flow = 4,125 gal/day
ELA = Design Flow/Application Rate
Use App. Rate of 1.5 for Base Student Flow (Table 8, CT Public Health Code)
Use App. Rate of 0.8 for Kitchen Flow (Table 7, CT Public Health Code)
ELA = 3,000 gpd/1.5 + 1,125 gpd/0.8 = **3,406.25 Sq Ft**

Based upon available site area for construction of the SSDS it appears that the site can accommodate a system with an effective area of 3,406.25 square feet.

MINIMUM LEACHING SYSTEM SPREAD (MLSS)

The minimum leaching system spread (MLSS) of a SSDS is the required minimum length of leaching system for effective effluent application to the receiving soils based on hydraulic gradient and percolation rates of the receiving soils as well as flow factors of the design building. MLSS is not applicable on sites having a receiving soil depth that exceeds 60 inches.

Minimum depth to a restrictive layer encountered on this site is 64" (TP105G) therefore MLSS is not applicable for this system.

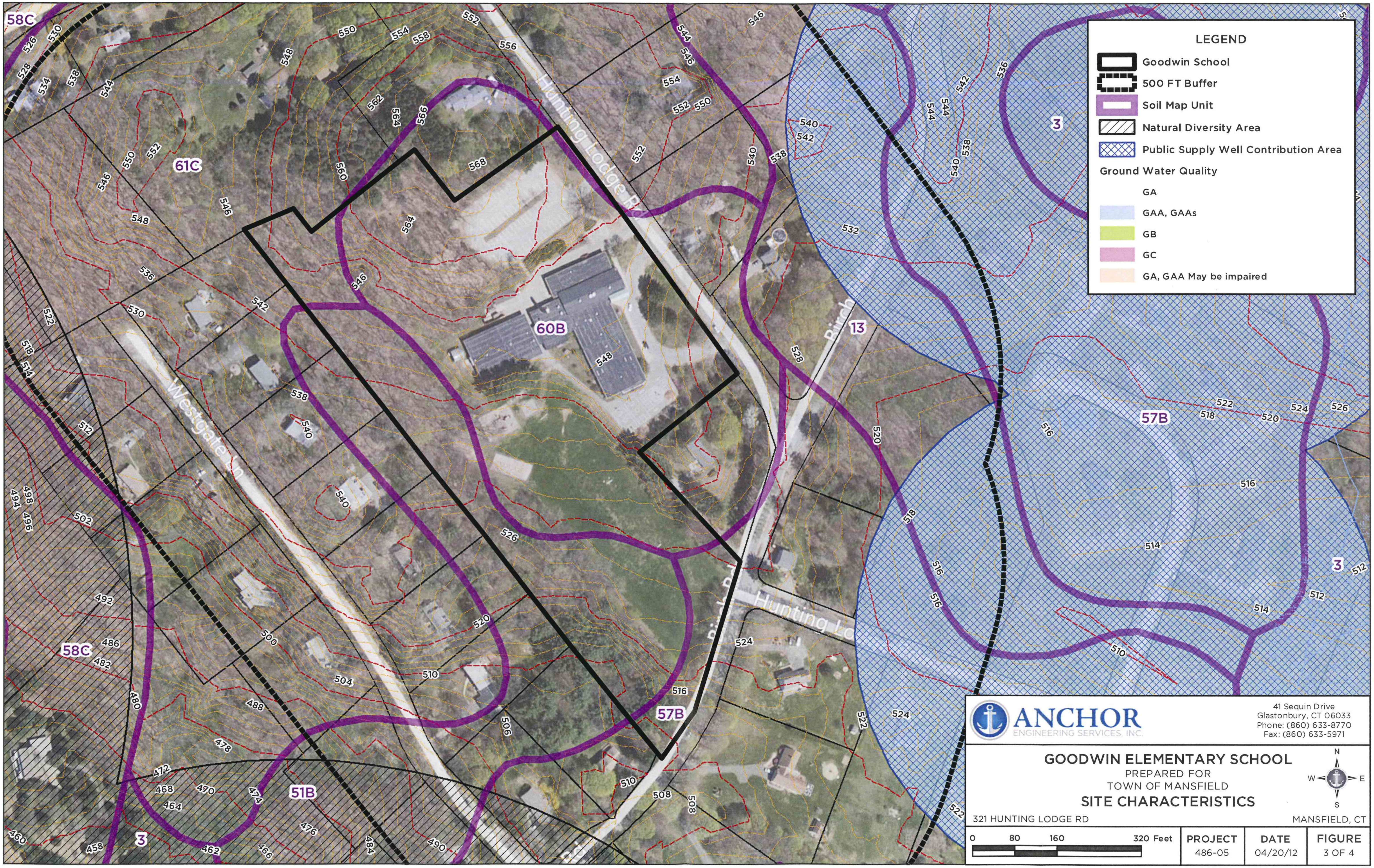
PRELIMINARY OPINION OF SITE SEPTIC SUITABILITY

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths, and etc., it appears that the site can adequately accept the wastewater flows of a 375 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated throughout this report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDPH.

Appendix A1

Data Collection

Connecticut Department of Energy & Environmental Protection


LEGEND
Goodwin School
500 FT Buffer
Soil Map Unit
Natural Diversity Area
Public Supply Well Contribution Area
Ground Water Quality
GA
GAA, GAAs
GB
GC
GA, GAA May be impaired
58C
61C
60B
57B
51B
3
13
Hunting Lodge Rd
Westgate Ln
Birch Rd
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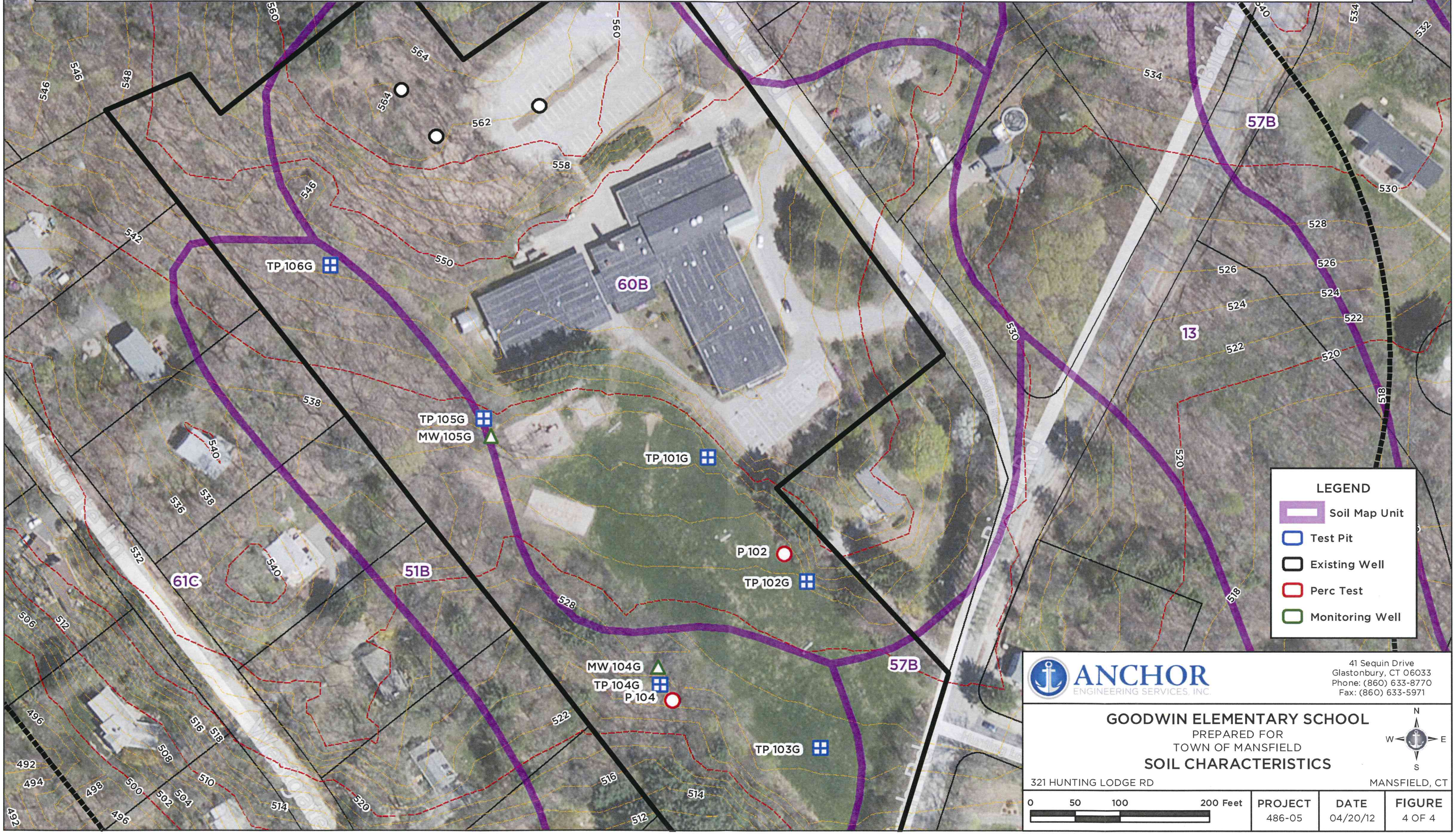
GOODWIN ELEMENTARY SCHOOL
PREPARED FOR
TOWN OF MANSFIELD
SITE CHARACTERISTICS
321 HUNTING LODGE RD
MANSFIELD, CT
0 80 160 320 Feet
PROJECT
486-05
DATE
04/20/12
FIGURE
3 OF 4
N
S
E
W

Map Unit	Map Unit	Inland Wetland	Hydric S	Potential SSSD	Soil Parent Material	SRM Dry Basins	SRM Infiltration	SRM Pervious Paving	SRM Wet Basins	Drainage Class	Flooding Class
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	Other	Other	High Potential	Melt-out Till	Least Suitable	Least Suitable	Least Suitable	Least Suitable	Well drained	Other
60B	Canton and Charlton soils, 3 to 8 percent slopes	Other	Other	High Potential	Melt-out Till	Least Suitable	Somewhat Suitable	Somewhat Suitable	Least Suitable	Well drained	Other
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	Other	Other	Low Potential	Melt-out Till	Somewhat Suitable	Least Suitable	Least Suitable	Least Suitable	Moderately well drained	Other
57B	Gloucester gravelly sandy loam, 3 to 8 percent slopes	Other	Other	High Potential	Melt-out Till	Least Suitable	Somewhat Suitable	Somewhat Suitable	Least Suitable	Somewhat excessively drained	Other



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GOODWIN ELEMENTARY SCHOOL
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SOIL CHARACTERISTICS

321 HUNTING LODGE RD — MANSFIELD, CT

PROJECT	DATE	FIGURE
486-05	04/20/12	4 OF 4

Appendix A2

Data Collection

USDA Natural Resource Conservation Service

State of Connecticut

60B—Canton and Charlton soils, 3 to 8 percent slopes

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Canton and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent

Description of Canton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 3 inches: Gravelly fine sandy loam
3 to 15 inches: Gravelly loam
15 to 24 inches: Gravelly loam
24 to 30 inches: Gravelly loam
30 to 60 inches: Very gravelly loamy sand

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 4 inches: Fine sandy loam
4 to 7 inches: Fine sandy loam
7 to 19 inches: Fine sandy loam
19 to 27 inches: Gravelly fine sandy loam
27 to 65 inches: Gravelly fine sandy loam

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Chatfield

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear

Hollis

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed, silt loam surface

Percent of map unit: 2 percent

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

State of Connecticut

61C—Canton and Charlton soils, 8 to 15 percent slopes, very stony

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Canton and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent

Description of Canton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 3 inches: Gravelly fine sandy loam
3 to 15 inches: Gravelly loam
15 to 24 inches: Gravelly loam
24 to 30 inches: Gravelly loam
30 to 60 inches: Very gravelly loamy sand

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/ or schist and/or gneiss

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 4 inches: Fine sandy loam
4 to 7 inches: Fine sandy loam
7 to 19 inches: Fine sandy loam
19 to 27 inches: Gravelly fine sandy loam
27 to 65 inches: Gravelly fine sandy loam

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Chatfield

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear

Hollis

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

State of Connecticut

51B—Sutton fine sandy loam, 2 to 8 percent slopes, very stony

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Sutton and similar soils: 80 percent
Minor components: 20 percent

Description of Sutton

Setting

Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 6 inches: Fine sandy loam
6 to 12 inches: Fine sandy loam
12 to 24 inches: Fine sandy loam
24 to 28 inches: Fine sandy loam
28 to 36 inches: Gravelly fine sandy loam
36 to 65 inches: Gravelly sandy loam

Minor Components

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Canton

Percent of map unit: 4 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex

Paxton

Percent of map unit: 3 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex

Leicester

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Woodbridge

Percent of map unit: 2 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear

Rainbow

Percent of map unit: 2 percent
Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Concave

Narragansett

Percent of map unit: 1 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Sewage Disposal

This table shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Sewage Disposal

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Sewage Disposal– State of Connecticut					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
51B—Sutton fine sandy loam, 2 to 8 percent slopes, very stony					
Sutton	80	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
				Slope	0.68
57B—Gloucester gravelly sandy loam, 3 to 8 percent slopes					
Gloucester	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Slope	0.92

Sewage Disposal– State of Connecticut						
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons		
		Rating class and limiting features	Value	Rating class and limiting features	Value
58C—Gloucester gravelly sandy loam, 8 to 15 percent slopes, very stony					
Gloucester	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Filtering capacity	1.00	Seepage	1.00
		Slope	0.63		
60B—Canton and Charlton soils, 3 to 8 percent slopes					
Canton	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
Charlton	35	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
61C—Canton and Charlton soils, 8 to 15 percent slopes, very stony					
Canton	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Charlton	35	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Appendix A3

Data Collection

Eastern Highlands Health District, Mansfield Office

ed lally and associates

CIVIL ENGINEER • 111 PROSPECT HILL ROAD • WINDSOR, CONN. 06095 • (203) 688-2

March 17, 1989

Robert Mocarsky
Schoenhardt Architects
One Massaco Place
Simsbury, CT 06070

Re: Northwest, Southeast, and Annie Vinton
Elementary Schools
Mansfield, CT

Dear Mr. Mocarsky:

The following summarizes the results of analysis of existing subsurface sewage disposal systems at the above referenced schools. The analysis was based upon Public Health Code Criteria, review of original design plans, discussion with Dr. Rein Laak of Mansfield, one of the original design engineers, and projected population data supplied by your office.

Northwest School

Two existing 4000 gallon septic tanks have adequate capacity for the proposed increase in flow.

The existing leaching area is slightly short of that required by design calculations. The additional area required (44 sq ft) is so small, however, and because the design calculation is conservative, the existing systems can be considered adequate for the proposed addition.

Annie Vinton School

Existing septic tank volume of about 6500 gallons is more than adequate to accommodate the proposed increase.

The existing leaching field is also adequate to handle the proposed increase.

Southeast School

The existing septic tank is marginally adequate for the proposed increase. Design plans indicate an existing 4042 gallon tank. A minimum of 4200 gallons is required. If the maximum projected population is realized, an additional 1000 gallon tank should be installed.

The existing leaching area appears to be undersized for the proposed increase. Assuming the existing system functions properly, an additional required leaching area of 2200 sq. ft. is estimated. Soil testing and site engineering would be required to prepare a design.

Calculations are attached. Please call should you have questions or comments.

Very truly yours,

Michael J Garbolski

Michael J. Garbolski, P.E.

Att.

ED LALLY & ASSOCIATES
111 Prospect Hill Road
WINDSOR, CONNECTICUT 06095
(203) 688-2413

CALCULATED BY MJG DATE 3-17-89
CHECKED BY ______ DATE ______
SCALE ______

MANSFIELD ELEMENTARY SCHOOLS

Evaluation of Existing Septic Systems

Assumptions:

1) Max. school population from Architect
2) Wastewater generation = 15 gpcpd
3) Existing systems scaled or estimated from previous plans.
4) Soil data taken from previous plans or SCS Soil Survey.
5) Existing systems may be utilized for expansion.
6) No additional kitchen facilities are proposed.

Northwest School

Proposed pop. = 320 students + 22 staff
= 342 p

Design flow Q_d = 342 p x 15 gpcpd
= 5130 gpd

Septic Tank $V_{req'd}$ = 5130 gal. → 6000 gal.

Existing Tanks = 2 - 4000 gal. = 8000 > 6000 O.K.

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(203) 688-2413

Leaching System

Perc. Rate from existing plan = 15 min./in.

Application rate = 1.1 gpd/S.F

Area req'd = 5130/1.1 = 4664 S.F.

Existing Area

original 10 trenches x 70' l x 3' w = 2100 s.F.

1965 add. 10 trenches x 75' l x 3' w = 2250 s.F.

Connected ends = 2 x 5 x 9' x 3' = 270 s.F.

4620 S.F.

Deficiency = 4664 - 4620 ≅ 44 S.F.

44 SF ≅ 15' of 3' wide trench.

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JOB S-0025 I
SHEET NO. 3 OF 4
CALCULATED BY MJG DATE 3-17-89
CHECKED BY ______ DATE ______
SCALE ______

Annie Vinton School

Proposed pop. = 320 students + 22 staff = 342

Q_d = 342 p × 15 gpcpd = 5130 gpd

Septic Tank $V_{req'd}$ = 5130 gal → 6000 gal.

Existing tank V = 6550 gal. > 6000 O.K.

Leaching System 1970 Plan

18 trenches × 60' l × 3' w = 3240 S.F.

8 trenches × 65' l × 3' w = 1560 S.F.

11 trenches × 50' l = 550 S.F.

Σ 5350 S.F.

Perc. Rate = 15 min/in.

Application rate = 1.1 gpd/SF

Area req'd = 5130/1.1 = 4664 < 5350 O.K.

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WINDSOR, CONNECTICUT 06095
(203) 688-2413

Southeast School

Proposed pop. = 260 students + 20 staff = 280

Q_d = 280 p × 15 gpcpd = 4200 gpd

Septic Tank V req'd = 4200 gal

Existing tank = 4042 gal < 4200 gal.

∴ Add 1000 gal. tank

Leaching system

Assume application rate = 1.1 gpd/SF

Area req'd = 4200/1.1 = 3818 SF

Existing Area

8 trenches × 70' l × 3' w = 1680 SF

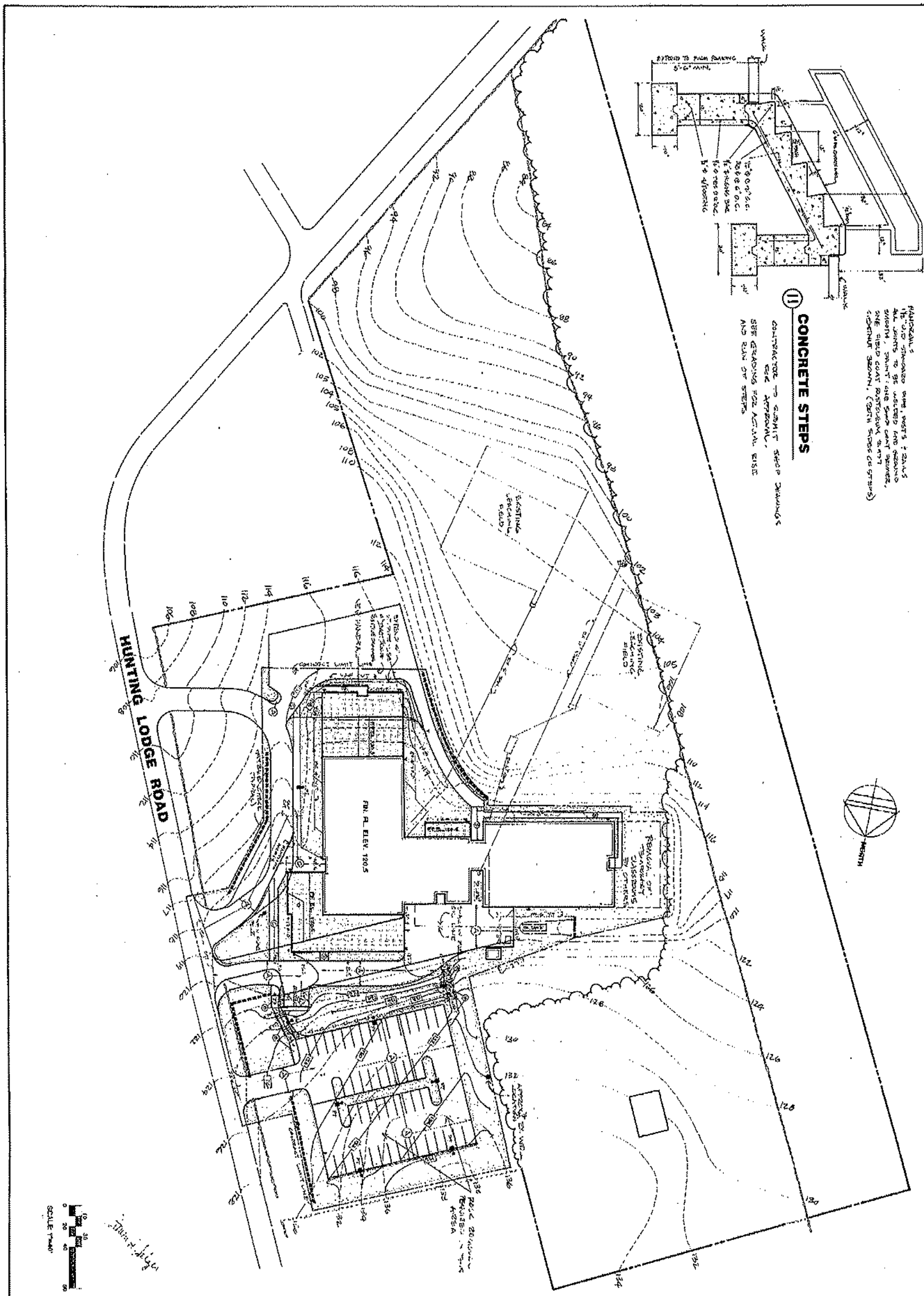
Add. area req'd = 3818 − 1680 = 2138 S.F.

$\frac{2138}{3(75)} = 9.5$ (9½ trenches 75' l × 3' w)

∴ Perform soil testing and design additional leaching area

Appendix A4

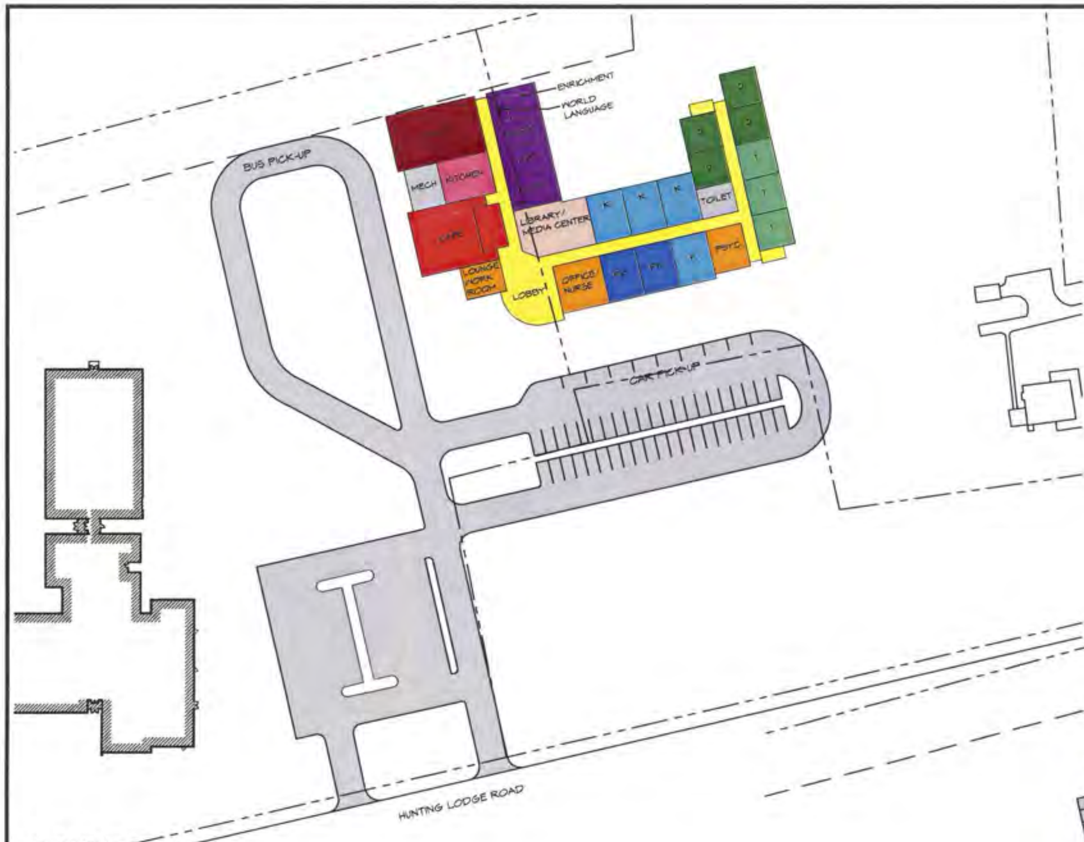
Data Collection
Town of Mansfield



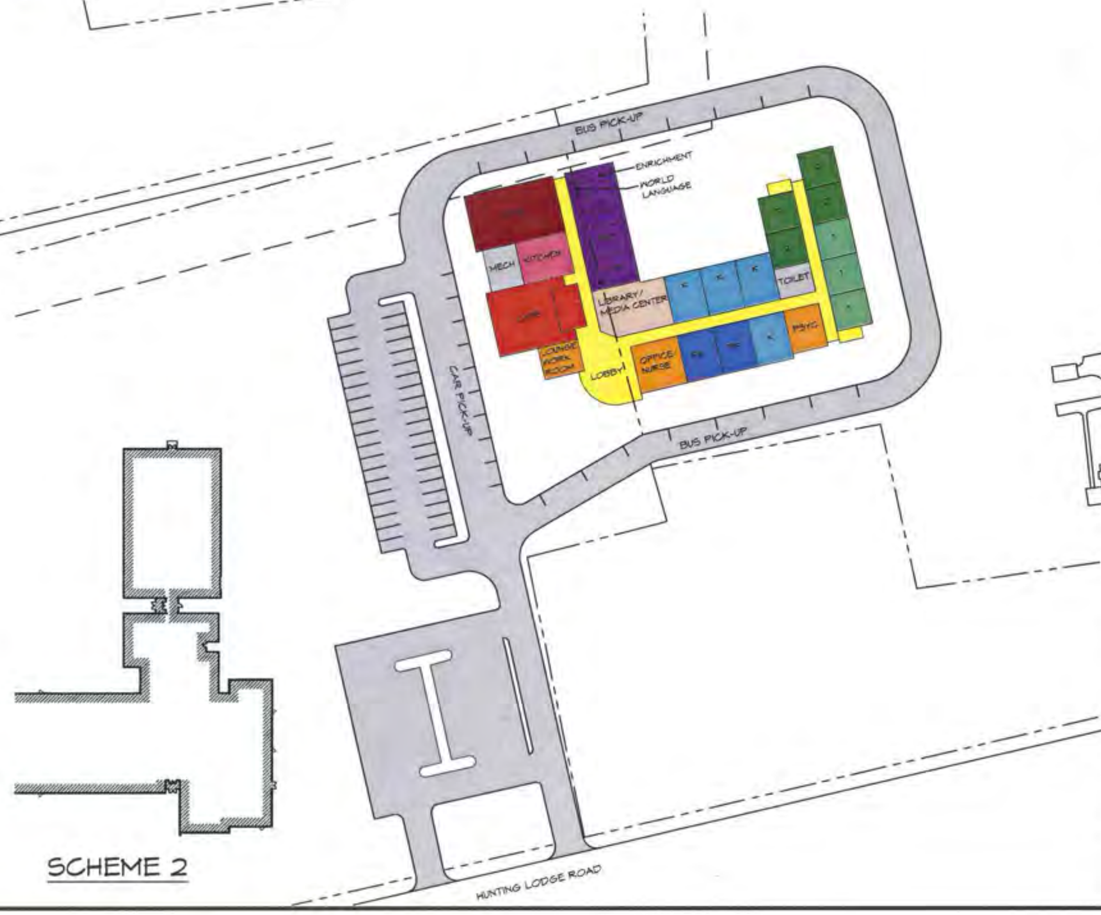
GRADING, DRAINAGE & EROSION CONTROL PLAN

DOE PROJECT #'S
078-88-045 EC/E 078-88-042 CV 078-88-051 SP 078-87-035 RR

SCHOENHARDT ARCHITECTS INC.	L-6	LANDSCAPE ARCHITECTURAL DESIGN ASSOCIATES, P.C. SITE PLANNERS/LANDSCAPE ARCHITECTS SIMSBURY, CONNECTICUT	ADDITIONS AND ALTERATIONS TO THE MANSFIELD PUBLIC SCHOOLS MANSFIELD, CONNECTICUT NORTHWEST ELEMENTARY SCHOOL HUNTING LODGE ROAD STORRS, CONNECTICUT



SCHEME 1



SCHEME 2

THE LAWRENCE ASSOCIATES

08-0067

DOROTHY GOODWIN ELEM. SCHOOL

321 HUNTING LODGE ROAD
MANSFIELD, CT

N

SCHEME 3

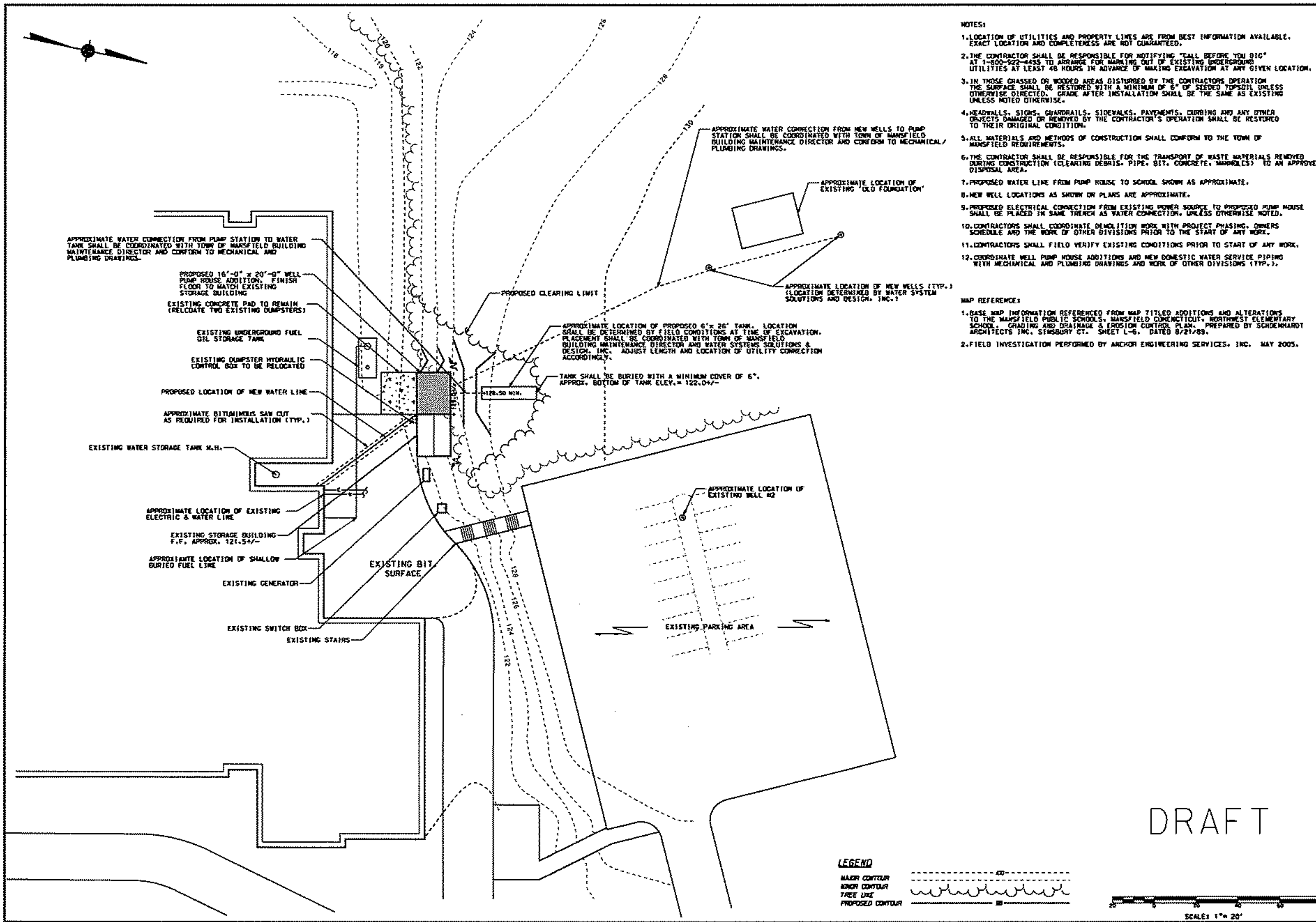
THE LAWRENCE ASSOCIATES

06-0067

DOROTHY GOODWIN ELEM. SCHOOL

321 HUNTING LODGE ROAD
MANSFIELD, CT

N



NOTES:

1. LOCATION OF UTILITIES AND PROPERTY LINES ARE FROM BEST INFORMATION AVAILABLE. EXACT LOCATION AND COMPLETENESS ARE NOT GUARANTEED.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO ARRANGE FOR MARKING OUT OF EXISTING UNDERGROUND UTILITIES AT LEAST 48 HOURS IN ADVANCE OF MAKING EXCAVATION AT ANY GIVEN LOCATION.

3. IN THOSE GRASSED OR WOODED AREAS DISTURBED BY THE CONTRACTORS OPERATION THE SURFACE SHALL BE RESTORED WITH A MINIMUM OF 6" OF SEEDED TOPSOIL UNLESS OTHERWISE DIRECTED. GRADE AFTER INSTALLATION SHALL BE THE SAME AS EXISTING UNLESS NOTED OTHERWISE.

4. HEADWALLS, SIGNS, GUARDRAILS, SIDEWALKS, PAVEMENTS, CURBING AND ANY OTHER OBJECTS DAMAGED OR REMOVED BY THE CONTRACTOR'S OPERATION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

5. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE TOWN OF MANSFIELD REQUIREMENTS.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORT OF WASTE MATERIALS REMOVED DURING CONSTRUCTION (CLEARING DEBRIS, PIPE, BIT, CONCRETE, MANHOLES) TO AN APPROVED DISPOSAL AREA.

7. PROPOSED WATER LINE FROM PUMP HOUSE TO SCHOOL SHOWN AS APPROXIMATE.

8. NEW WELL LOCATIONS AS SHOWN ON PLANS ARE APPROXIMATE.

9. PROPOSED ELECTRICAL CONNECTION FROM EXISTING POWER SOURCE TO PROPOSED PUMP HOUSE SHALL BE PLACED IN SAME TRENCH AS WATER CONNECTION, UNLESS OTHERWISE NOTED.

10. CONTRACTORS SHALL COORDINATE DEMOLITION WORK WITH PROJECT PHASING, OWNERS SCHEDULE AND THE WORK OF OTHER DIVISIONS PRIOR TO THE START OF ANY WORK.

11. CONTRACTORS SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO START OF ANY WORK.

12. COORDINATE WELL PUMP HOUSE ADDITIONS AND NEW DOMESTIC WATER SERVICE PIPING WITH MECHANICAL AND PLUMBING DRAWINGS AND WORK OF OTHER DIVISIONS (TYP.).

MAP REFERENCE:

1. BASE MAP INFORMATION REFERENCED FROM MAP TITLED ADDITIONS AND ALTERATIONS TO THE MANSFIELD PUBLIC SCHOOLS, MANSFIELD CONNECTICUT, NORTHWEST ELEMENTARY SCHOOL. GRADING AND DRAINAGE & EROSION CONTROL PLAN. PREPARED BY SCHOENHARDT ARCHITECTS INC. SIMSBURY CT. SHEET L-6. DATED 8/21/89.

2. FIELD INVESTIGATION PERFORMED BY ANCHOR ENGINEERING SERVICES, INC. MAY 2005.

OWNERSHIP OF DOCUMENTS

REVISIONS

NO.	DATE	DESCRIPTION

Anchor Engineering Services, Inc.
75 Nutmeg Lane Glastonbury, CT 06033
TEL (860) 633-8770 FAX (860) 633-5971

THE LAWRENCE ASSOCIATES

PROJECT NUMBER	STATE PROJECT NO.
05-0008	078-0084 CV

PROJECT TITLE:

WELL PUMP HOUSE ADDITIONS

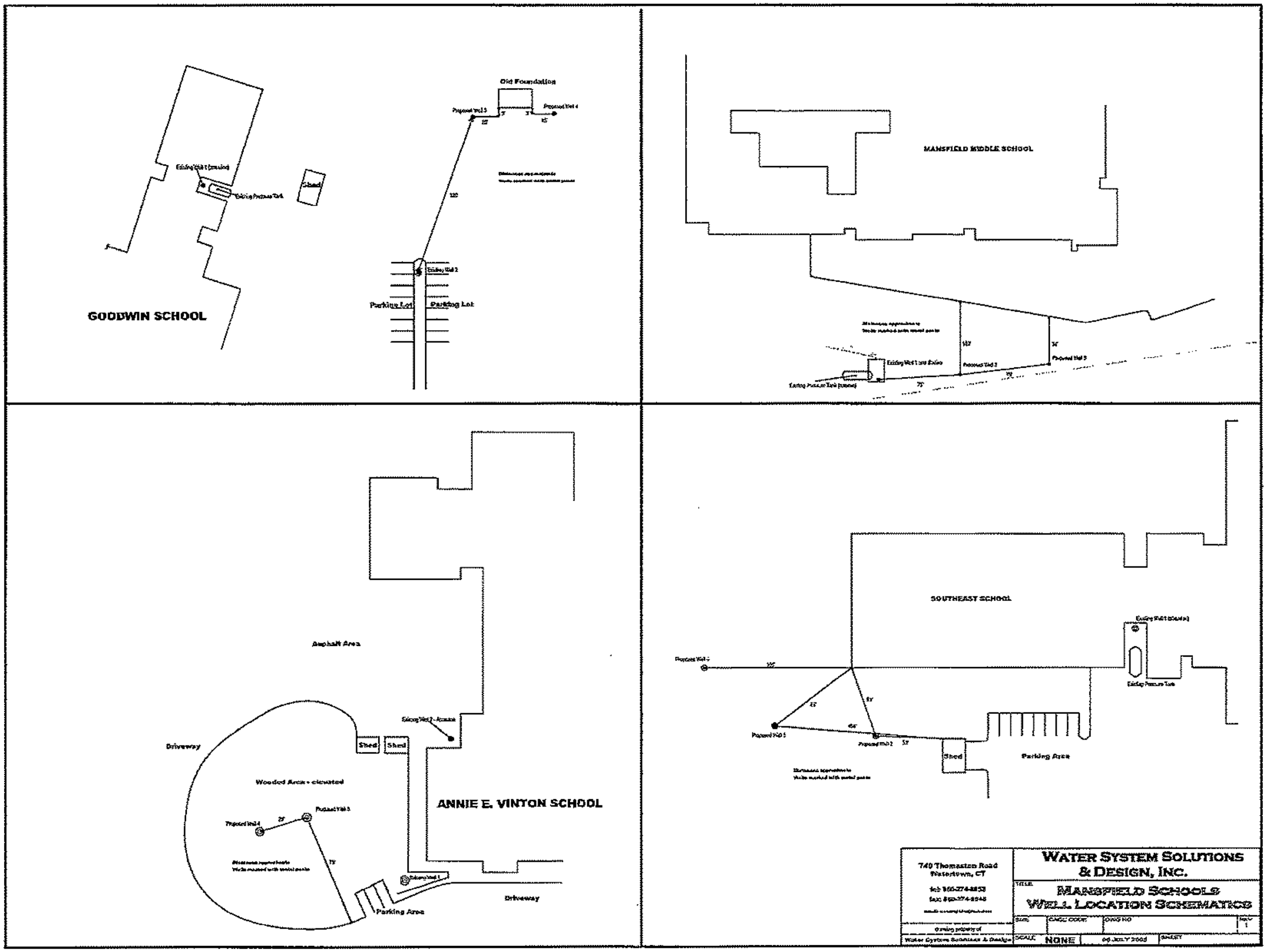
MANSFIELD PUBLIC SCHOOLS
GOODWIN SCHOOL
MANSFIELD, CONNECTICUT

DRAWING TITLE:

SITE PLAN

SCALE	DATE
1" = 20'	02/08/06

DRAWING L3 OF


Old Foundation
Shed
GOODWIN SCHOOL
Parking Lot
Parking Lot
MANSFIELD MIDDLE SCHOOL
Asphalt Area
Driveway
Shed
Shed
Wooded Area - elevated
ANNIE E. VINTON SCHOOL
Parking Area
Driveway
SOUTHEAST SCHOOL
Shed
Parking Area
740 Thomaston Road
Watertown, CT
WATER SYSTEM SOLUTIONS
& DESIGN, INC.
TITLE
MANSFIELD SCHOOLS
WELL LOCATION SCHEMATICS
SCALE
NONE
SHEET

Appendix B

Soil Test Results

ANCHOR
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Glastonbury, CT 06033
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Fax: (860) 633-5971
www.anchorengr.com
Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

SOIL DEEP TEST PIT RESULTS

GOODWIN ELMENTARY SCHOOL
321 HUNTING LODGE ROAD, MANSFIELD, CT

FIGURE A

PROJECT 486-05
DATE 4/13/12

TEST PIT #: TP 101G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 94"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 7"	TOPSOIL
7" - 18"	LIGHT BR. FINE SANDY LOAM
18" - 94"	TAN FINE/MED SAND W/ GRAVEL & COBBLES

TEST PIT #: TP 102G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 90"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 6"	TOPSOIL
6" - 13"	LIGHT BR. FINE SANDY LOAM
13" - 44"	TAN FINE SAND W/ GRAVEL FRIABLE
44" - 90"	TAN FINE SAND W/ COBBLES PLATEY

TEST PIT #: TP 103G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 138"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 6"	TOPSOIL
6" - S3"	FILL MATERIAL
S3" - 138"	MED. SAND STRATIFIED W/ GRAVEL & COBBLES

TEST PIT #: TP 104G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 96"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: 42"
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 13"	TOPSOIL
13" - 43"	RED/BR. FINE SANDY LOAM
43" - 96"	TAN FINE/MED. SAND FRIABLE

TEST PIT #: TP 105G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 103"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: 46"
MOTTLING OBSERVED AT: 64"

SOILS DESCRIPTION

0" - 9"	TOPSOIL
9" - 50"	LIGHT BR. FINE SANDY LOAM
50" - 103"	ORANGE/GRAY FINE/MED. SAND

TEST PIT #: TP 106G
DATE PERFORMED: 4/02/12
DEPTH OF TEST PIT: 110"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: 43"
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 3"	TOPSOIL
3" - 21"	RED/BR. FINE SANDY LOAM, LOOSE
21" - 46"	GRAY/TAN FINE SANDY LOAM
46" - 110"	TAN FINE SAND W/SOME GRAVEL

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SOIL PERCOLATION RATES

GOODWIN ELEMENTARY SCHOOL
321 HUNTING LODGE ROAD, MANSFIELD, CT

FIGURE B

PROJECT 486-05 | DATE 4/13/12

PERC TEST RESULTS

PERCOLATION TEST (PT 102G)
PERFORMED 04/02/12
TOTAL DEPTH = 48"
PRESOAK @ 10:29 AM & 1:15 PM
PERC TEST STARTED @1:54 PM
PRESOAK WATER COLUMN= 20"

TIME	READING	RATE
0	9.25	-
5	11.75	2.00
10	13.25	3.33
15	14.875	3.07
20	16.25	3.63
25	17.25	5.00
30	18.125	5.71
35	19.00	5.71
40	19.875	5.71

PERC RATE 5.1-10.0 MIN./IN.

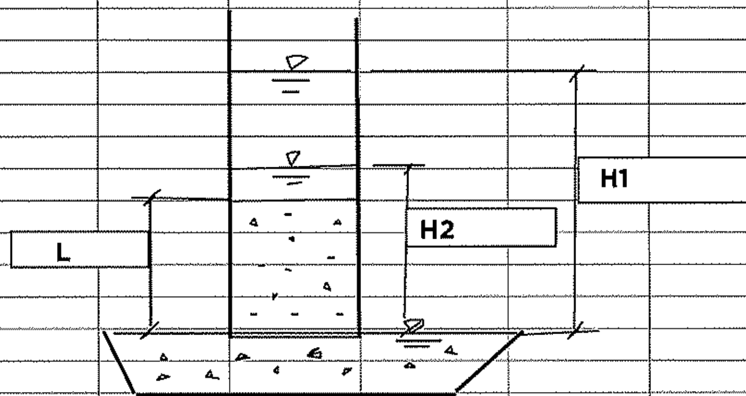
PERCOLATION TEST (PT 104G)
PERFORMED 04/02/12
TOTAL DEPTH = 55"
PRESOAK @ 12:10 PM & 1:18 PM
PERC TEST STARTED @1:56 PM
PRESOAK WATER COLUMN= 20"

TIME	READING	RATE
0	10.00	-
5	11.50	3.33
10	13.125	3.07
15	14.75	3.07
20	15.875	4.44
25	17.25	4.44
30	18.25	5.00
35	19.125	5.71
40	20.00	5.71
45	20.75	6.67

PERC RATE 5.1-10.0 MIN./IN.

FALLING HEAD
PERMEABILITY TEST

PROJECT:	Goodwin Elementary School	**PROJECT #486-05**	**BY:**	ECP
	Hunting Lodge Rd, Mansfield, CT	**DATE: 04/08/12**		
TEST PIT #	**TP-101G**			
SAMPLE DEPTH:	**38"**	**SAMPLE LENGTH:**	**6.00**	**in.**
SAMPLE #1				



$$K = \frac{(H1 - H2) \times L}{t \times (H1 + H2)/2}$$

Time (min.)	H1 (in.)	H2 (in.)	H1 - H2	H1 + H2/2	K (in/min.)	K (in/hr)
0	9.50					
5.00	9.50	9.125	0.375	9.313	0.048	2.90
10.00	9.50	7.875	1.625	8.688	0.112	6.73
15.00	9.50	7.375	2.125	8.438	0.101	6.04
20.00	9.50	7.125	2.375	8.313	0.086	5.14
25.00	9.50	6.625	2.875	8.063	0.086	5.13
					Average=	**5.19**

30 Minute Pre-Soak

Appendix C

Septic Suitability Calculations

ANCHOR ENGINEERING SERVICES, INC.

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Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

Project No. 486-05
Date Apr. 2012

SSDS Design Calculations

Solve for: Sewage flow Estimate

Given: • Town of Mansfield proposes a 375 student Elementary School

- Table #4 of the CT Public Health Code
  - 8 gpd/pupil
  - Additional 3 gpd/pupil for kitchen
  - Additional 3 gpd/pupil for showers
- Showers are not typical for Elementary Schools therefore the 3 gpd/pupil will not be included
- A conservative calculation of 11 gpd/pupil shall be applied

Conclusion:

375 students × 11 gpd/pupil = **4,125 gal per day**

Proposed Daily Sewage Flow for The Proposed School shall be =

4,125 gal per day

Prepared By: E.C.P.   Checked By: [signature]

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Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

SSDS Design Calculations

Solve For: Effective Leaching Area (ELA)

Given:
- Daily Design flow = 4,125 gpd (3,000 student + 1,125 kitchen)
- Application Rate
  - Use application rate of 1.5 for base student flow (Table #8)
  - Use application rate of 0.8 for kitchen flow (Table #7)
- Percolation Rate = 5.1 to 10.0 min./in.

Conclusion:

$$ELA = \frac{\text{Daily Design Flow}}{\text{Application Rate}}$$

$$= \frac{3000 \text{ gpd}}{1.5} + \frac{1{,}125 \text{ gpd}}{0.8}$$

$$= 2000 \text{ Sq Ft} + 1.406.25 \text{ Sq Ft}$$

$$= 3{,}406.25 \text{ Sq. Ft.}$$

Required Effective Leaching Area = **3,4,06.25 Sq. Ft**

Prepared By: E.C.P　　Checked By: BOF

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ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

SSDS Design Calculations

Solve for: Minimum Leaching System Spread (MLSS)

Given: • Depth to restrictive layer = 64" in TP-105G

Conclusion:

- MLSS is not applicable on sites that have a receiving soil depth exceeding 60 inches.

Prepared By: E.C.P. Checked By: BM

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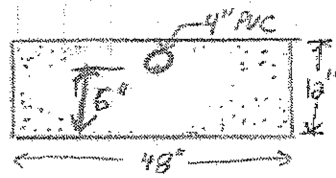
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

SSDS Design

Solve For: Possible system size

Given:
- ELA = 3,406.25 SF
- MLSS = N/A
- Stone Leaching Trench 12" x 48"

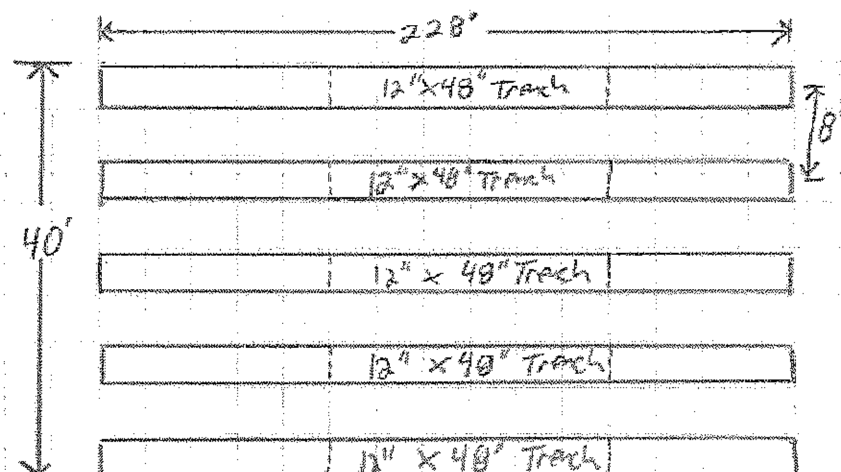


- Effective Leaching Area = 3.0 SF/LF (section VIII.B)
- Center to Center spacing = 8.0 Ft (section VIII.B)

Conclusion:

- $\text{Length of trench} = \frac{ELA}{3.0\ SF/LF} = \frac{3406.25\ SF}{3.0\ SF/LF} = \boxed{1{,}135.5\ LF}$

- USE 5 rows at 228 LF Each of trench



Prepared By: E.C.P.   Checked By: [signature]

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ENGINEERING SERVICES, INC.

41 Sequin Drive
Glastonbury, CT 06033
T: 860.633.8770
F: 860.633.5971

SEPTIC SUITABILITY REPORT

FOR THE

SOUTHEAST ELEMENTARY SCHOOL SITE
134 WARRENVILLE ROAD
MANSFIELD, CT

PREPARED FOR

TOWN OF MANSFIELD
FACILITIES MANAGEMENT DEPARTMENT

JANUARY 26, 2010

STATE OF CONNECTICUT
BRANDON J. HANDFIELD
No. 24564
LICENSED
PROFESSIONAL ENGINEER

1/26/10

ANCHOR
ENGINEERING SERVICES, INC.

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EXECUTIVE SUMMARY

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into one (1) building to be constructed on the Southeast Elementary School Site located at 134 Warrenville Road. This consolidated school will accommodate up to 800 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. was retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis was performed through data collection, field and laboratory testing, topographic surveying and preliminary subsurface waster absorbtion system (SWAS) calculations.

A preliminary hydraulic capacity analysis was performed to determine whether the existing soil deposit has sufficient capacity to carry the septic tank effluent below the ground surface for a sufficient period of time and distance to bring the pretreated wastewater into compliance with required groundwater quality standards before it reaches a point of concern. The results of this preliminary analysis, utilizing the following conservative parameters, indicate that the site has adequate hydraulic capacity to accommodate the SWAS at a minimum system length of approximately 230 linear feet.

- Hydraulic Conductivity (K) = 12 ft/day
- Hydraulic Gradient (I) = 0.015 ft/ft
- School Discharge (Q) = 8,800 gpd = 1,176 ft^3/day
- Maximum Unsaturated Soil Depth (D) = 32'

A preliminary analysis was also performed to determine SWAS design parameters to provide further confirmation of the site septic suitability. These parameters include determination of the long term acceptance rate (LTAR), Effective Leaching Area (ELA), Nutrient Reduction and Pollution Renovation requirements required for a proposed 800 student school.

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths, and etc., it appears that the site can adequately accept the wastewater flows of an 800 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated in the following report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDEP.

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SEPTIC SUITABILITY ANALYSIS

PREPARED FOR

TOWN OF MANSFIELD

USGS TOPO QUAD #41 SPRING HILL, CT	N W E S	0 500 1,000 2,000 3,000 Feet	FIGURE 1: SITE LOCATION	
			PROJECT 486-04	DATE NOV 2009

INTRODUCTION

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into one (1) building to be constructed on the Southeast Elementary School Site located at 134 Warrenville Road. This consolidated school will accommodate up to 800 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. has been retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis generally consists of the following:

1. Data collection
2. Groundwater well installation & monitoring
3. Deep observation pit soil testing
4. Topographic field survey & mapping
5. Sewage flow estimates for an 800 student elementary school
6. Site hydraulic capacity analysis
7. Preparation of a feasibility report

The following report has been prepared to summarize the work completed and provides an opinion of the septic suitability of the site based upon the information compiled to date.

DATA COLLECTION

Anchor Engineering collected data on the subject parcel through the compilation of available public information and field investigations.

COMPILATION OF EXISTING INFORMATION

The following information was obtained from public sources listed below:

- Connecticut Department of Environmental Protection (GIS data)
    - Natural Diversity Database
    - Aquifer Protection Mapping
- USDA Natural Resource Conservation Service
    - Major Soil Types
    - Engineering Properties of Identified Soils
- United States Geologic Survey (USGS)
    - Historic Data for Site Number 414548072114501–CT–MW 19
- Eastern Highlands Health District, Mansfield Office
    - Soil Testing Data for Concession Stand Improvements
- Town of Mansfield
    - On Site Improvement Locations for Athletic Complex, Electrical Services.

Based upon a review of the information obtained from the above mentioned sources, it was determined that additional field investigations were necessary to determine the septic suitability of the site. The testing methods described below were selected to allow for classification of existing soils, estimate hydraulic conductivity, the determination of groundwater depths and approximate hydraulic grade.

GROUNDWATER WELL INSTALLATION & MONITORING

Four (4) groundwater monitoring wells were installed by Columbia Environmental Drilling, Inc. and witnessed by Anchor staff. The wells consisted of the installation of 2" diameter PVC well casing and 4" diameter steel well casing tops with locking caps. A brief summary of the well installation data is provided below.

Monitoring Well	Observed GW Depth	Total Well Depth
MW-101	50'	57'
MW-102	45'	52'
MW-103	58'	65'
MW-104	53'	60'

Prior to commencement of a groundwater depth monitoring program, each well was developed to remove sediments and fines within the well resulting from drilling activities. The process involved purging water from and introducing water into each well to ensure flow in all directions through the well screen and sand filter. Groundwater depths within the monitoring wells and surface water elevations of Mansfield Hollow Reservoir have been measured on a weekly basis for a period of eleven (11) weeks after developing the wells.

OBSERVATION PIT SOIL TESTING

Nine (9) deep hole observation test pits were excavated throughout the site by Krukoff Paving & Excavation and witnessed by Anchor Engineering, CTDEP, Eastern Highlands Health District and Town of Mansfield staff. The test pits were performed to examine the soil at close range and identify characteristics such as color, firmness, particle size and moisture content and to record the presence of restrictive layers.

The test pits ranged in depth from 88" to 132" and no apparent restrictive layers, such as ledge, hardpan or seasonally high groundwater were observed. In general, the observed soils consisted of olive/brown coarse sand with some gravels and coarse fines overlain by topsoil, fill or processed aggregate depending on the location of the pit within the driveway, parking areas, athletic fields or woods. These observed soil types are consistent with NRCS published soil mapping, which indicates the presence of Merrimac Sandy Loam or Hinckley Gravelly Sandy Loam in the vicinity of the site.

Four (4) additional shallow hole observation test pits were excavated by Anchor Engineering and witnessed by a field inspector from Independent Materials Testing Laboratory (IMTL). These test pits were performed to obtain field densities of existing soils at a depth ranging from 36" to 48" below grade through in-situ nuclear density testing methods. The in-situ densities ranged from 79% to 94% percent compaction with an average 85% compaction.

TOPOGRAPHIC FIELD SURVEY & MAPPING

A detailed boundary and topographic survey map was completed for the site to provide accurate base information for the preparation of the septic suitability study. The topographic survey is

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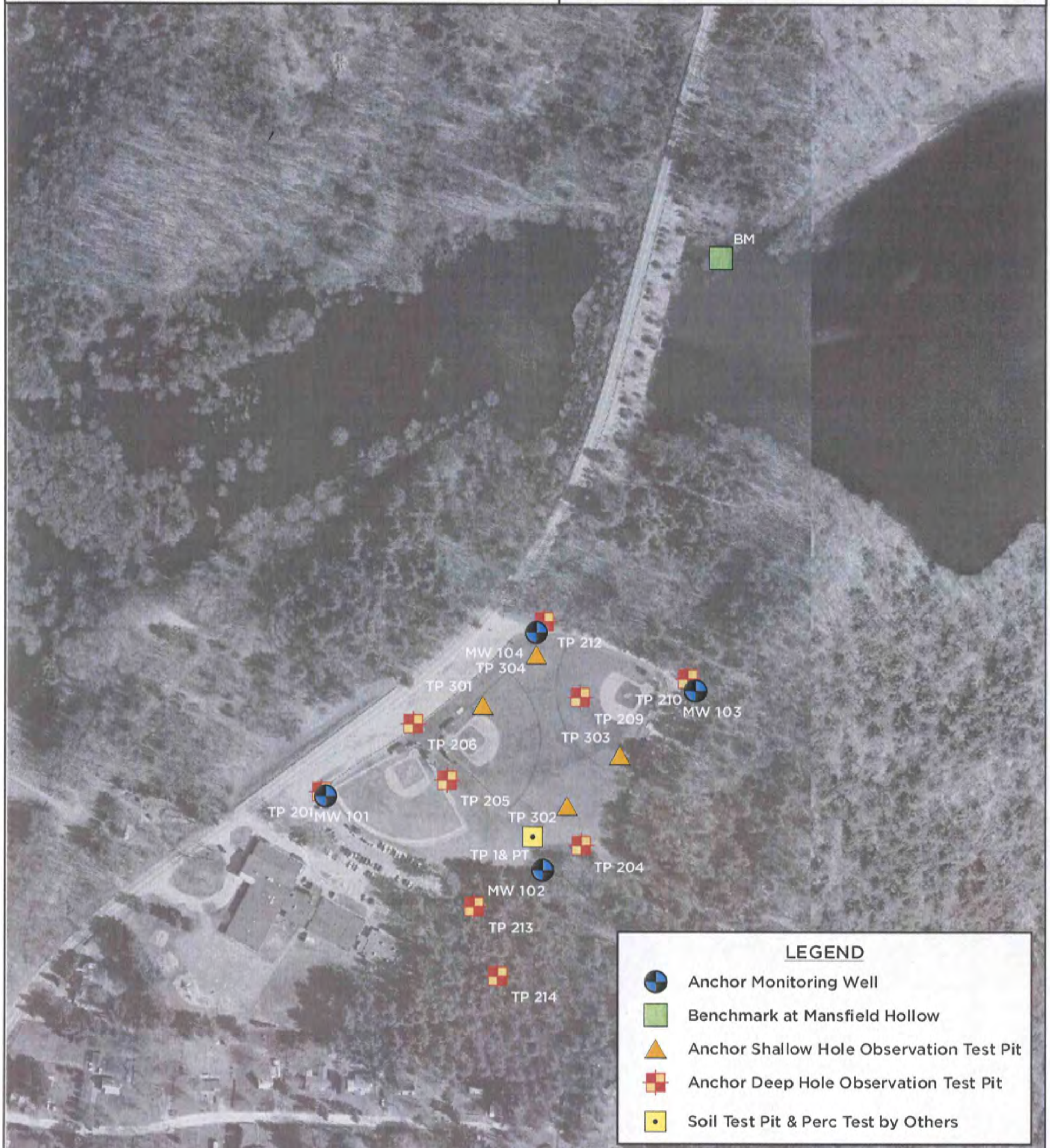

CONNDOT 2004
AERIAL IMAGERY
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N W E S

0 150 300 600 900 Feet

FIGURE
2: SITE MONITORING

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SEPTIC SUITABILITY ANALYSIS

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SITE MONITORING DATA

Location ID	Casing Elevation (FT)	Well Depth (FT)
MW 101	274.19	57
MW 102	272.44	52
MW 103	278.02	65
MW 104	274.14	60
CT MS-19	260.00	21.3
Benchmark Elevation: 221.30 FT		

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N W E S

0 500 1,000 2,000 3,000 Feet

FIGURE
3: WELL LOCATIONS

PROJECT	DATE
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based upon NGVD 29 vertical datum to allow for direct comparison of the elevation data to published USGS information.

In order to assist in the conceptual layout process of the potential school building site, Anchor Engineering performed additional topographic and boundary survey. The detailed mapping was provided to the Town of Mansfield and consultant architect.

SITE HYDRAULIC CAPACITY ANALYSIS.

In order to determine the site's ability to accept and renovate wastewaters discharged from the subsurface wastewater absorption system (SWAS), a preliminary hydraulic capacity analysis was performed. The hydraulic capacity of this site depends on the projected sewage flow estimates, hydraulic conductivity of existing soils, the hydraulic gradient and depth of groundwater and the position of any impermeable boundaries beneath the site.

Based upon the preliminary data and using a conservative approach, it was determined that the site has an adequate hydraulic capacity to accommodate an 800 student elementary school.

SEWAGE FLOW ESTIMATES

The Town of Mansfield has stipulated that the SWAS required for the proposed school will need to be designed to accommodate up to 800 elementary school students, faculty and staff.

Sewage design flows for an elementary school, as provided in Table No. 4 of the Connecticut Public Health Code, Regulations and Technical Standards for Subsurface Sewage Disposal Systems, is 8.0 gallons per day/per pupil (gpd/pp). Additional design flows to be considered include those resulting from kitchen facilities (+3.0 gpd/pp) and/or shower facilities (+3.0 gpd/pp).

As a conservative measure, a total sewage design flow of 11.0 gpd/pp was used in consideration of the base flow and the likely presence of full kitchen facilities in the new school. Shower facilities were not considered in the study as they are typical of schools with full athletic programs, which is likely not the case for an elementary school. The projected daily sewage flow for the proposed school is **8,800 gpd.**

Prior to final design, it is recommended that water usage data for the four (4) existing Mansfield elementary schools be compiled to confirm or adjust the conservative design flow utilized in this preliminary study.

DETERMINATION OF HYDRAULIC CONDUCTIVITY

A critical component of the hydraulic capacity analysis is the determination of hydraulic conductivity (K), which is a measure of the soils ability to transmit water. A range of hydraulic conductivities was estimated for the site based upon analysis and characterization of the existing site soils and completion of numerous tests, observations and measurements performed in the field and laboratory. Based upon the results of the methods described below and for the purposes of determining the suitability of the site, a range of **12 to 90 ft/day** was estimated.

SOIL CHARACTERIZATION

Soil mapping published by the NRCS indicates that soils types on site are representative of the Merrimac Sandy Loam or Hinckley Gravelly Sandy Loam Series. The Merrimac Series generally encompasses the cleared portions of the school property, including the school building, parking and adjacent athletic fields. The Hinckley Series are generally located to the rear of the parcel within the wooded areas. Based upon the projected location of the SWAS, it appears that it will be constructed within Merrimac Series soils.

Merrimac soils generally consist of sandy and gravelly deposits and are somewhat excessively drained, with a hydraulic conductivity ranging from 12 to 200 feet/day within the underlying soil strata. Observations made in the field during deep hole observation pit testing generally confirm the presence of soils consistent with the Merrimac Series. In addition, laboratory testing, including gradation and grain size distribution was performed, provided further confirmation of presence of soils consistent with the Series. Therefore, hydraulic conductivities ranging from 12 to 200 ft/day are anticipated.

FIELD HYDRAULIC CONDUCTIVITY TESTS

Utilizing the four (4) groundwater depth monitoring wells installed as part of the data collection phase of the project, Anchor performed numerous field tests to determine the hydraulic conductivity of the undisturbed site soils. These tests included well pumping, well bailing and slug methods. Due to the excessive depths to groundwater at the site (35' to 45' below grade) and the high rate of groundwater recovery for the granular soils, the field tests did not produce usable results.

For the purposes of this study, additional field testing was not performed. Prior to final design of the SWAS, it is recommended that additional field testing be performed. These field tests may include continuing to monitor groundwater depths and rainfall levels, tracer testing or installation of a larger diameter well for the performance of well drawdown tests.

In response to the limitations encountered during the field testing process, soils samples were delivered to Independent Materials Testing Laboratoty (IMTL) for additional testing.

LABORATORY TESTING

Soil samples obtained from deep hole observation test pits were analyzed by IMTL to determine hydraulic conductivity. The disturbed samples were re-compacted into a tube to the approximate field density and a falling head permeability test was conducted. Results of the falling head permeability tests are provided in the table provided below

	Tube 24B	Tube 24A	Tube 17A
Percent Compaction	90.5%	95.2%	98.3%
Coefficient of Permeability	25.6 Ft/Day	3.5 Ft/Day	1.2 Ft/Day

Table No. 1 – TP210 Permeability Test Results

	Tube 42B	Tube 80B	Tube 23B
Percent Compaction	93.4%	94.3%	96.7%
Coefficient of Permeability	26.6 Ft/Day	23.5 Ft/Day	17.8 Ft/Day

Table No. 2 – TP213 Permeability Test Results

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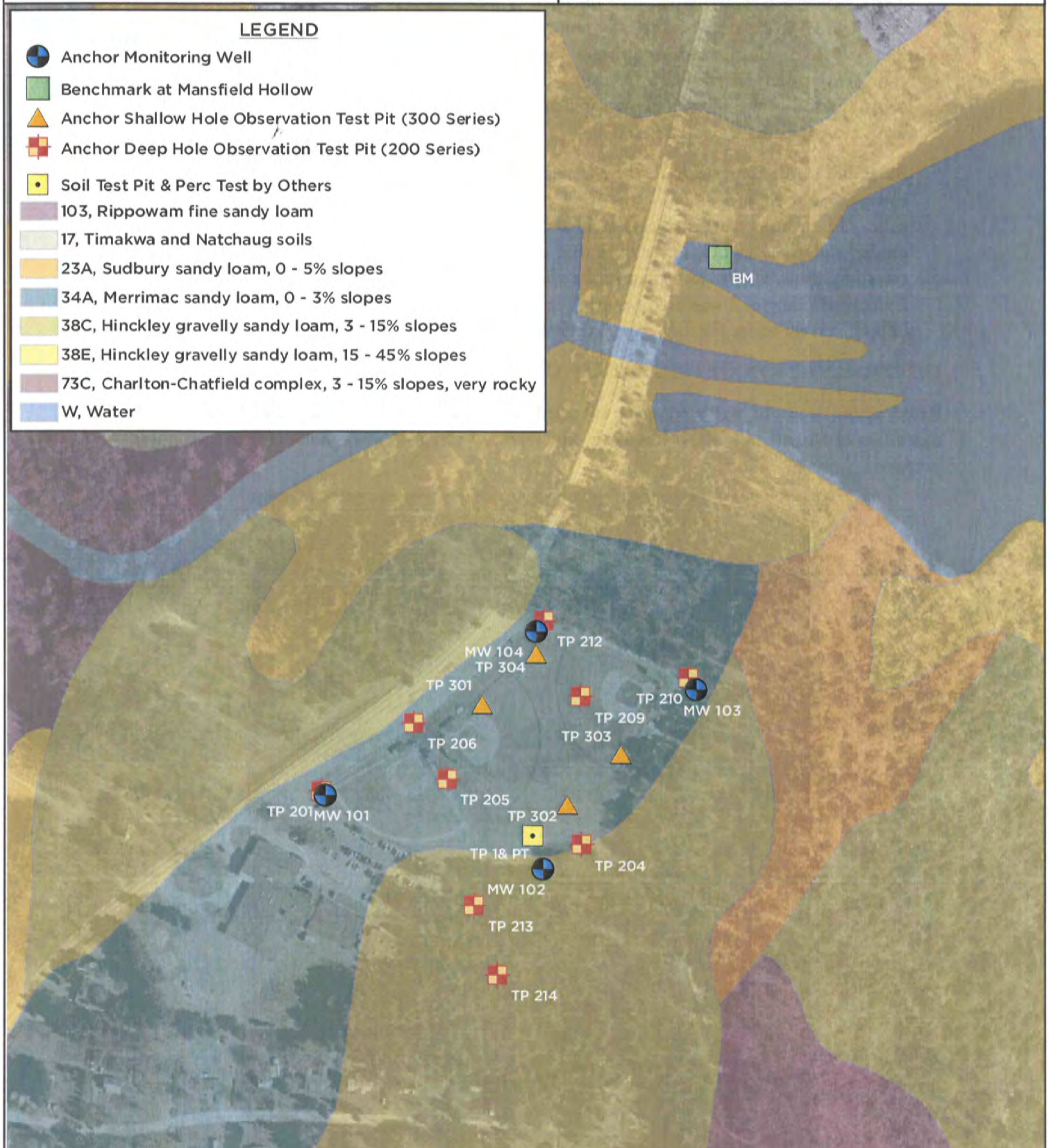


CONNDOT 2004 AERIAL IMAGERY 0410720412_4 & 7 0410720413_6 & 9	N / W / E / S — 0, 150, 300, 600, 900 Feet	FIGURE 4: SOIL TYPES
		PROJECT 486-04 — DATE NOV 2009

Tests performed in the laboratory on re-compacted soil samples often do not reflect the effect of soil structure and generally will give a lower hydraulic conductivity than exists in the field. In clean sand or gravel a re-compacted sample may indicate a hydraulic conductivity that is within a factor of 2 or 3 of the field hydraulic conductivity. In consideration of this factor, the anticipated hydraulic conductivity for these soils in the field would range from 60 to 90 ft/day.

As stated in the Observation Pit Soil Testing section of the report, to confirm the percent compaction used in the lab, in-situ nuclear density testing was performed on the subsurface soils. The results of this testing yielded an average density of approximately 85%. This density, which is slightly lower than that used in the lab, would likely yield slightly higher rates of permeability than shown in the above tables. Therefore, as a conservative measure, a factor of safety of 3 was used resulting in a hydraulic conductivity of **90 ft/day**. This rate falls within the range for the Merrimac Series published by the NRCS.

DETERMINATION OF HYDRAULIC GRADE

Based upon depth to water readings obtained from the monitoring wells and surface water elevations of Mansfield Hollow Reservoir on a weekly basis, groundwater contour mapping was prepared.

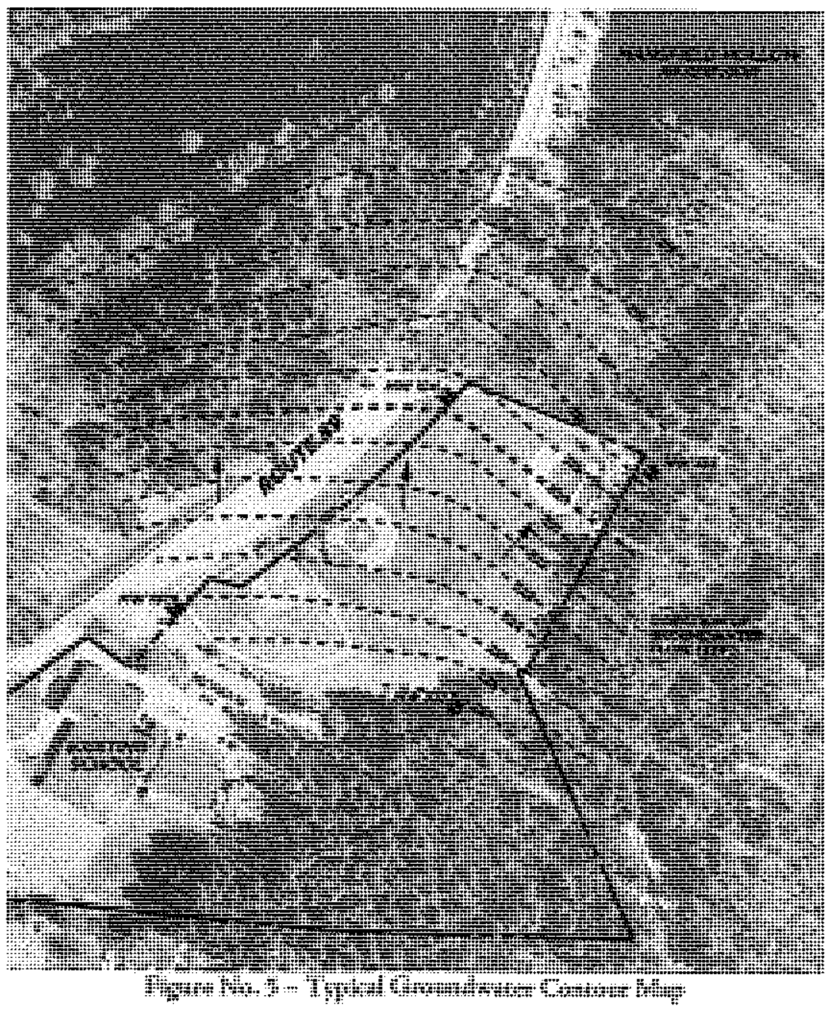


Figure No. 3 – Typical Groundwater Contour Map

The hydraulic gradient of groundwater flow beneath the site ranges from 1.2% to 1.6% with an average of approximately 1.5% (0.015 ft/ft). The groundwater contour mapping reflects a direction of groundwater flow in a general south to north direction, surface water body of Mansfield Hollow Reservoir. A hydraulic gradient of **0.015 ft/ft** was used for the purposes of this study.

DETERMINATION OF SEASONALLY HIGH GROUNDWATER TABLE

Groundwater depths were recorded at the site for a period of 11 weeks from September to November in order to calculate the hydraulic gradient of the groundwater flow and determine the seasonally high groundwater table (SHGT). However, the time of year during which this monitoring was conducted is not likely within the designated "wet season", when groundwater elevations are typically at the annual peak elevation. Therefore, for the purposes of this preliminary study, information from USGS monitoring well CT-MS 19 was used to estimate the SHGT.

CT-MS 19 is located to the northeast of the intersection of Cemetery Road and Route 195, which is approximately ¾ miles from the subject site. Per conversations with USGS staff, groundwater elevations are recorded in this well during the last week of every month and subsequently published. These published values were compared to the recorded elevations at the site..

In general, the groundwater elevations at the subject site are 20' to 22' lower than the published groundwater elevations at CT-MS 19. Based upon 60 years of published data, the highest recorded groundwater level occurred on April 26, 1983, with a measured depth of 7.85' and an elevation of 252.15. By interpolation, the estimated groundwater elevation at the subject site that same day would be 232.15, or approximately 40' below the ground surface.

As a conservative measure, the SHGT was estimated to be 36' below grade at the site. Prior to final design, it is recommended that the groundwater depths be monitored on a weekly basis for the duration of the designated "wet season", which typically occurs during the late winter and spring months.

DEPTH OF UNSATURATED SOIL

The depth of unsaturated soil is determined to be the difference in elevation from the bottom of the proposed SWAS to the highest elevation of groundwater recorded on site. As stated above, the estimated SHGT is 36' below grade at the site. Assuming a maximum SWAS depth of 4' into grade, a depth of unsaturated flow of approximately 32' was used in this study.

HYDRAULIC CAPACITY CALCULATIONS (PRELIMINARY)

Preliminary calculations were performed to determine whether the existing soil deposit has sufficient capacity to carry the septic tank effluent below the ground surface for a sufficient period of time and distance to bring the pretreated wastewater into compliance with required groundwater quality standards before it reaches a point of concern. Results must show that water flows away underground faster than it enters the SWAS. The following parameters were considered in the preliminary calculations to estimate a system spread.

Hydraulic Conductivity (K) = 12 ft/day
Hydraulic Gradient (I) = 0.015 ft/ft
School Discharge = 8,800 gpd = 1,176 ft^3/day
Rain Inflow = 0.01 ft/day x 15,000 sf (system area) = 150 ft^3/day
Total Discharge = 1,176 + 150 = 1,326 ft^3/day
Maximum Unsaturated Soil Depth (D) = 32'

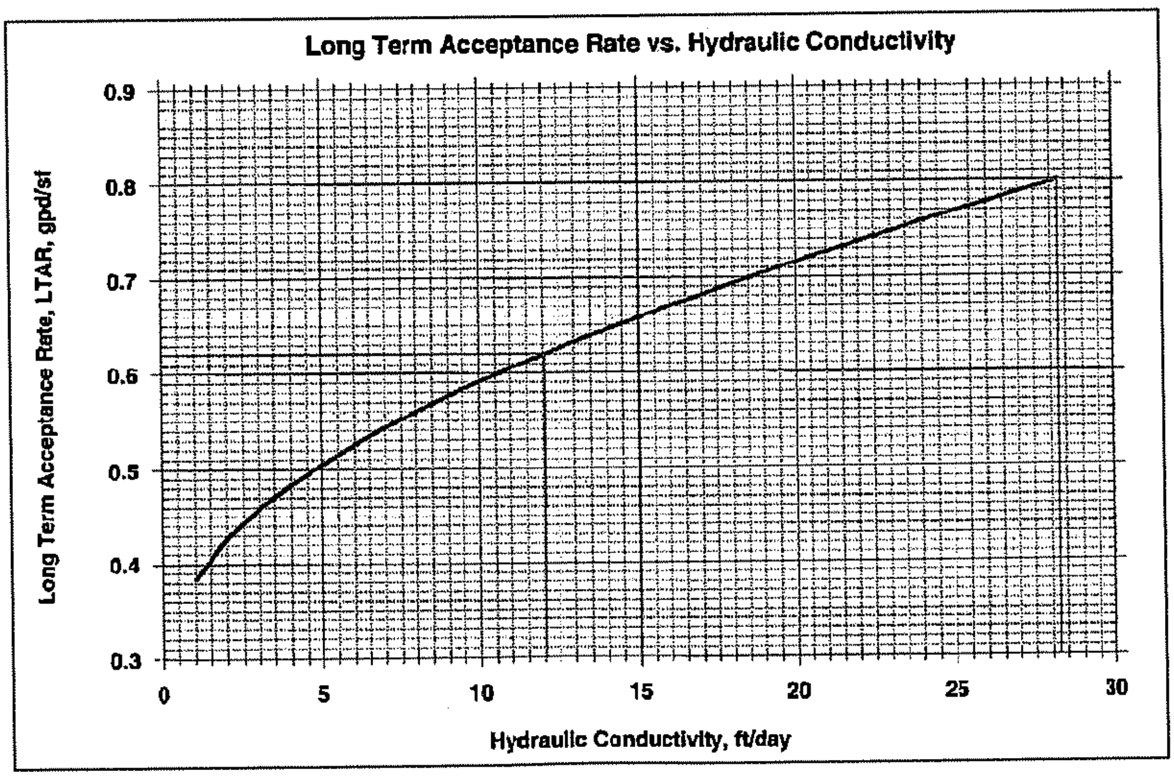
Based upon the above parameters, the minimum system spread was calculated to be 230 linear feet. Although the parameters used in the above preliminary calculations are conservative, it appears that the existing site can accommodate a system of this size.

SWAS DESIGN (PRELIMINARY)

The SWAS required for the proposed school will be designed to accommodate up to 800 elementary school students, faculty and staff and renovate the wastewater as required to protect the public health and the environment. The following preliminary calculations and determinations were performed to determine the septic suitability of the site.

LONG TERM ACCEPTANCE RATE (LTAR)

The LTAR is defined as the infiltrative surface loading rate at which a SWAS will continuously accept effluent for a long period of time. As shown in the chart below, as hydraulic conductivity rates increase the LTAR subsequently increases. The maximum stable LTAR value for wastewater flows where additional pretreatment is not provided is 0.80 gpd/lf. This maximum LTAR value applies for K values in excess of 28 ft/day. As a conservative measure, an LTAR value of 0.62 was also considered, which corresponds to a K value of 12 ft/day.



EFFECTIVE LEACHING AREA (ELA)

The effective leaching (infiltrative) surface area (ELA) of a SWAS is the interface area between the soil and the facilities used for applying the pretreated wastewater to the soil (the leaching system). For the purposes of this study a range of anticipated effective leaching area values was calculated based upon an estimated design flow rate of 8,800 gpd, a minimum LTAR of 0.62 and a maximum LTAR of 0.80. The calculated range of ELA is 11,000 square feet minimum to 14,200 square feet maximum.

Based upon available site area for construction of the SWAS and the use of conservative values within the preliminary calculations, it appears that the site can accommodate a system with a length of 230' and an effective area of 14,200 square feet.

NUTRIENT REDUCTION

Domestic wastewater discharged to a SWAS receives pretreatment and nutrient reduction within a septic tank or other pretreatment structures prior to reaching the SWAS. However, the reduction may not be adequate to meet current State standards and additional measures may be required.

NITROGEN

Nitrogen is one of the two most prominent nutrients in pretreated wastewater discharged to the ground water, its fate and transport is of considerable concern when designing a SWAS. It is estimated that nitrogen levels within the wastewater will be reduced approximately 40% by the pretreatment system and within the biomat. Further reduction will be necessary to meet current State standards if effluent is of typical Nitrogen concentrations.

Reduction of nitrogen may be achieved by introducing precipitation and stormwater infiltration into the system to effectively dilute the nitrogen content. Based upon a review of the existing site, the area where precipitation will likely infiltrate and provide dilution and the projected school development, it is anticipated that adequate dilution methods can be incorporated into the SWAS design.

Prior to final design, the anticipated nitrogen concentration for the school should be determined through an analysis of effluent from the existing schools in comparison to current estimates.

PHOSPHORUS

The CTDEP estimates that approximately 30% of the phosphorus within the wastewater is removed in the pretreatment system and biomat. Depending on the phosphorus concentrations within the effluent, additional treatment may be necessary. It is our understanding that the Town of Mansfield has implemented a "green" program to limit the amount of phosphorus within chemicals used in public facilities. A reduction in phosphorus concentrations in the wastewater as a result of this program, in combination with the significant depth of unsaturated soils beneath the projected SWAS installation area, will likely result in adequate treatment without additional methods.

Prior to final design, additional testing should be performed to determine the phosphorus sorption capacity of the existing soils and allow for detailed calculations to be performed.

POLLUTION RENOVATION

Pollutants are removed from wastewater through a combination of physical, biodegradation, sorption, biological and physiological processes. The pretreatment system and biomat that forms at the infiltrative surface of the soil provides some level of removal. However, additional consideration needs to be given to the transport of bacteria and viruses and proximity to surrounding points of concern and sensitive receptors.

Sensitive receptors include the following:

- The outer limit of the cone of depression of a public drinking water supply well
- A surface water body used as a source of public drinking water supply
- A private drinking water supply well serving an individual residence
- An impoundment used for aquaculture

As depicted on Figure 7, of the above listed sensitive receptors, public drinking water supply wells, a surface water body used as a source of public drinking water and private drinking water supply wells exist in the vicinity of this site. A minimum groundwater travel time of 56 days is required to these sensitive receptors, with a minimum travel time of 21 days required to points of concern, such as the property line.

VERTICAL SEPARATION

Recent studies cited in the CTDEP Guidance Document suggests that a 99.9% removal/inactivation of viruses can be obtained when domestic wastewater has been pretreated in a septic tank and discharged to a properly designed SWAS, percolated through the biomat that forms at the SWAS/soil interface and has moved slowly down through at least three feet of suitable aerobic unsaturated soil.

We anticipate that all of the above parameters will be met, which includes the presence of 32' of unsaturated soil beneath the projected SWAS area that meets CTDEP specifications for septic fill. Therefore, vertical separation appears to be adequate.

HORIZONTAL SEPARATION (TRAVEL TIME)

As stated above, based on an inactivation rate of 0.036 log10 per day, a travel time of 56 days is required between a SWAS and existing and potential sensitive receptors. The minimum required travel time to all points of concern (property line) should not be less than 21 days.

Although the hydraulic gradient has been established on the site, which flows in generally south to north at a slope of 0.015 ft/ft, radial flow from SWAS was assumed in the analysis as a conservative measure.

Based upon the estimated range of K values, the highest estimated rate of 90 ft/day was used in the preliminary calculations. Utilizing this rate, a porosity of 0.30, which is typical for granular soils, and a hydraulic gradient of 0.015 ft/ft, the velocity of groundwater was calculated to be 4.5 ft/day.

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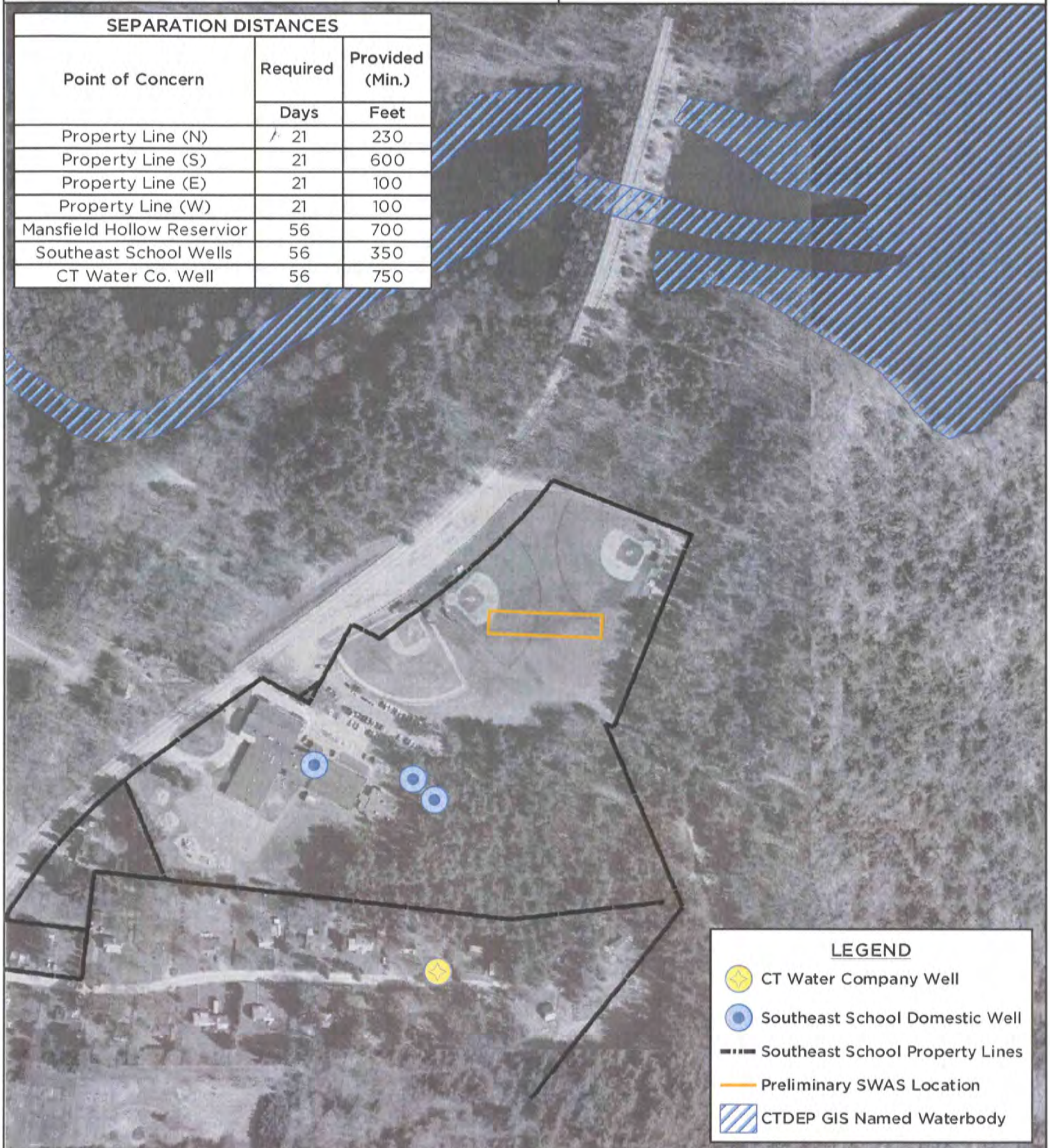
SEPARATION DISTANCES		
Point of Concern	Required	Provided (Min.)
	Days	Feet
Property Line (N)	21	230
Property Line (S)	21	600
Property Line (E)	21	100
Property Line (W)	21	100
Mansfield Hollow Reservior	56	700
Southeast School Wells	56	350
CT Water Co. Well	56	750



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N W E S

0 150 300 600 900 Feet

FIGURE
7: POINTS OF CONCERN

PROJECT	DATE
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Utilizing this calculated velocity, the system will need to be constructed a minimum of 95' from a point of concern, such as the surrounding property line, to meet the 21 day travel time requirement. It appears that this separating distance is feasible given the area where the SWAS will likely be constructed.

Further, a minimum separating distance of 252' will have to be maintained between the SWAS and a sensitive receptor. As shown on Figure 7, it appears that this distance can be maintained to meet the minimum travel time of 56 days.

It should be noted that additional work will be required prior to final design to confirm the calculated velocity and travel times. These values are based upon the hydraulic conductivity determined in this preliminary study. In addition, the cone of depression for the nearby public drinking water wells has not been studied. Additional work will be required to confirm actual separating distances.

PRELIMINARY OPINION OF SITE SEPTIC SUITABILITY

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths, and etc., it appears that the site can adequately accept the wastewater flows of an 800 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated throughout this report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDEP.

Appendix A1

Data Collection:
Connecticut Department of Environmental Protection

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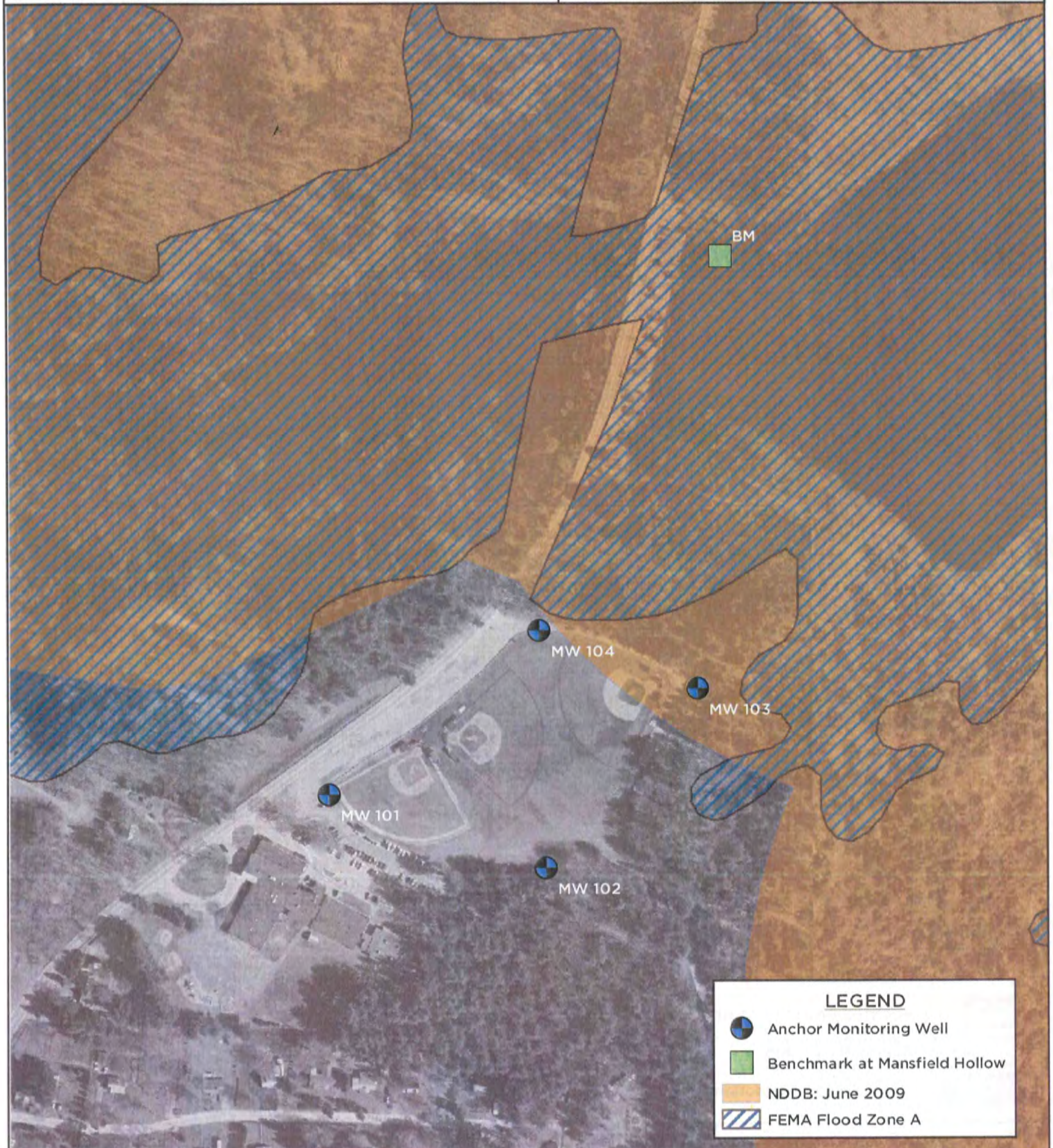

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FIGURE
ADDITIONAL DATA

PROJECT	DATE
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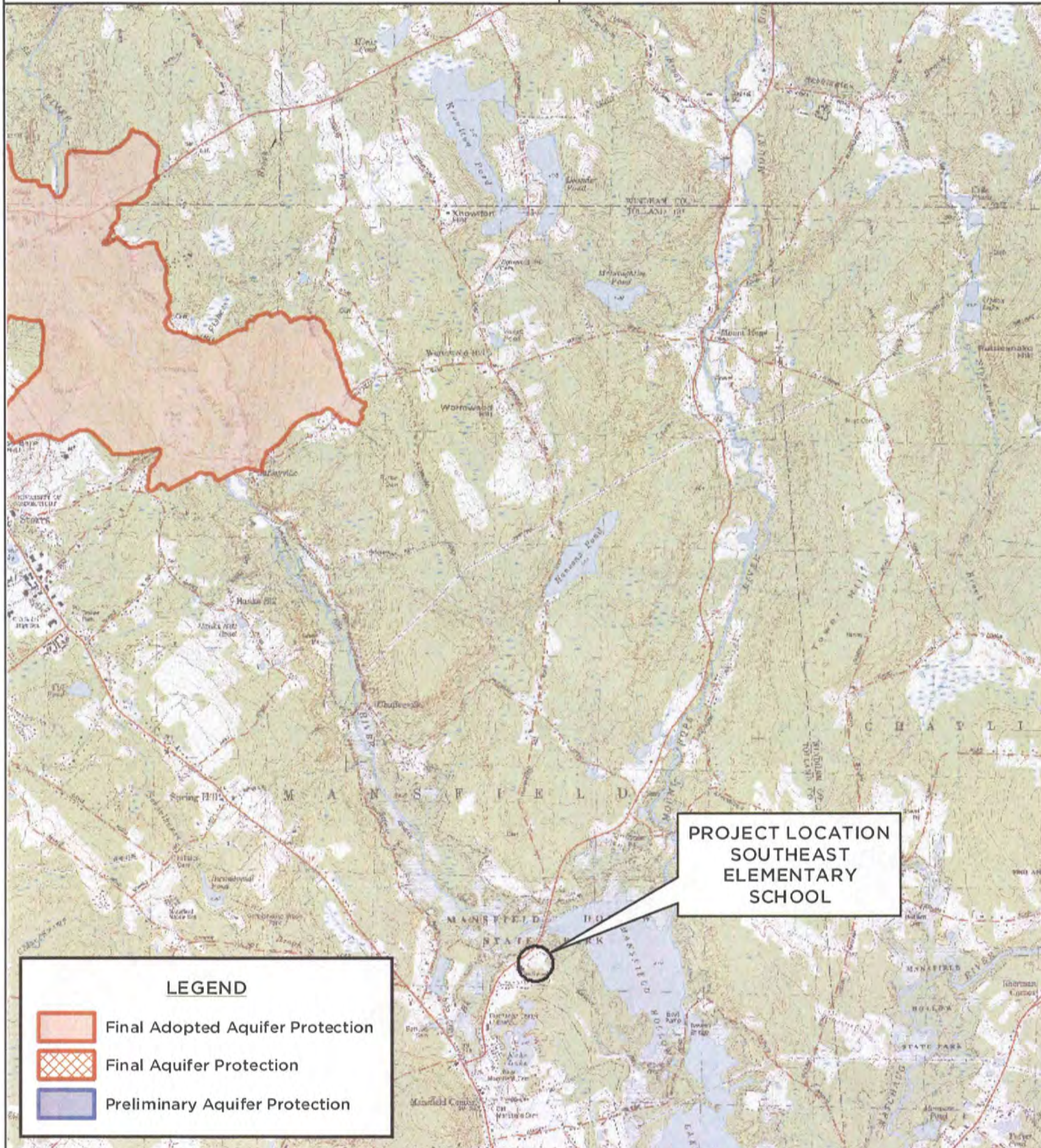


USGS TOPO QUAD #41 SPRING HILL, CT	N W E S	0 2,000 4,000 8,000 12,000 Feet	FIGURE APA 2009	
			PROJECT 486-04	DATE NOV 2009

Appendix A2

Data Collection:

USDA Natural Resource Conservation Service

Engineering Properties

State of Connecticut

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
34A:												
Merrimac	0-9	Sandy loam	ML, SM	A-2, A-4	0	0	90-100	70-90	45-85	25-60	0-20	NP
	9-16	Fine sandy loam, Sandy loam	SM	A-2, A-4	0	0	90-100	75-90	45-90	25-50	0-25	NP
	16-24	Gravelly sandy loam, Sandy loam	SM	A-2, A-4	0	0	80-100	55-90	35-70	15-50	0-25	NP
	24-60	Stratified very gravelly coarse sand to gravelly sand	SP, SP-SM	A-1	0	10-20	65-85	35-60	35-60	1-15	0-25	NP
38C:												
Hinckley	0-8	Gravelly sandy loam	SM	A-2, A-4	0-5	1-15	65-85	60-75	45-70	25-50	0-20	NP
	8-20	Gravelly loamy sand, Very gravelly loamy coarse sand, Very gravelly loamy sand, Loamy fine sand	GM, SM	A-1, A-2	0-10	1-15	50-100	40-90	25-90	15-25	0-20	NP
	20-27	Gravelly sand, Very gravelly sand	GM, SM	A-1	1-10	5-20	50-90	40-80	25-50	5-15	0-20	NP
	27-42	Stratified cobbly coarse sand to extremely gravelly sand	GM, GP-GM, SM, SP-SM	A-1	1-10	15-35	30-95	20-85	15-50	5-15	0-15	NP
	42-60	Stratified cobbly coarse sand to extremely gravelly sand	GM, GP-GM, SM, SP-SM	A-1	1-10	15-35	30-95	20-85	15-50	5-15	0-15	NP

Physical Soil Properties

State of Connecticut

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
34A:														
Merrimac	0-9	45-70	27-48	3-7	1.10-1.20	14.00-42.00	0.10-0.12	0.0-2.9	1.0-5.0	.24	.28	3	3	86
	9-16	48-69	30-48	1-4	1.20-1.40	14.00-42.00	0.10-0.14	0.0-2.9	0.5-1.0	.28	.37			
	16-24	48-69	30-48	1-4	1.20-1.40	14.00-42.00	0.07-0.12	0.0-2.9	0.5-1.0	.24	.32			
	24-60	88-100	0-9	0-3	1.30-1.50	42.00-703.00	0.02-0.05	0.0-2.9	0.0-0.5	.10	.15			
38C:														
Hinckley	0-8	54-69	27-38	4-8	0.90-1.10	42.00-141.00	0.07-0.11	0.0-2.9	2.0-7.0	.15	.28	2	5	56
	8-20	75-83	12-24	1-5	1.20-1.40	42.00-141.00	0.03-0.10	0.0-2.9	0.5-1.5	.10	.17			
	20-27	87-93	2-12	1-5	1.20-1.40	42.00-141.00	0.02-0.05	0.0-2.9	0.0-0.5	.05	.15			
	27-42	88-93	4-12	0-3	1.30-1.50	141.00-703.00	0.01-0.04	0.0-2.9	0.0-0.5	.10	.28			
	42-60	88-93	4-12	0-3	1.30-1.50	141.00-703.00	0.01-0.04	0.0-2.9	0.0-0.5	.10	.28			

Sewage Disposal

State of Connecticut

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
34A:					
Merrimac	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
38C:					
Hinckley	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	1.00
		Filtering capacity	1.00		
		Slope	0.04		

Appendix A3

Data Collection:
United States Geological Survey

USGS Home
Contact USGS
Search USGS

Groundwater Watch

Site Number: 414548072114501 - CT-MS 19

Groundwater Watch Help Page

DESCRIPTION:

Latitude 41°45'48", Longitude 72°11'45" NAD27
Tolland County, Connecticut, Hydrologic Unit 01100002
Land surface altitude: 260.00 feet above sea level NGVD29.
Well completed in "Sand and gravel aquifers (glaciated regions)" (N100GLCIAL) national aquifer.
Well completed in "DRIFT,STRATIFIED" (112DFSF) local aquifer

AVAILABLE DATA FROM NWISWeb:

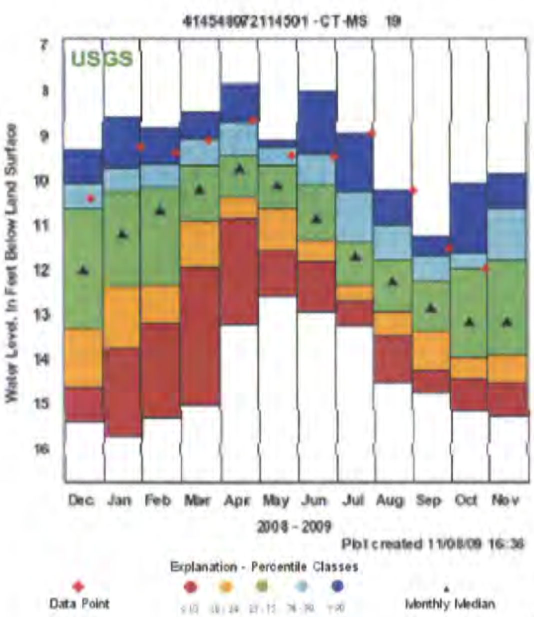
Field ground-water-level measurements

Additional Data Sources		Begin Date	End Date	Count
Annual Water-Data Report (pdf)	**offsite**	2006	2006	1

OPERATION:

Record for this site is maintained by the USGS Connecticut Water Science Center
Email questions about this site to Connecticut Water Science Center Water-Data Inquiries

Site Statistics



Most recent data value: 11.98 on 10/28/2009
Period of Record Monthly Statistics for 414548072114501
Depth to water level, feet below land surface
All Approved Continuous & Periodic Data Used In Analysis
Note: Bold values in the table indicate closest statistic to the most recent data value.

Month	Lowest Level	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile	Highest Level	Number of Years
Jan	15.72	13.76	12.39	11.21	10.27	9.71	8.59	50
Feb	15.27	13.19	12.34	10.69	10.17	9.62	8.83	49
Mar	15.04	11.95	10.90	10.21	9.66	9.07	8.48	49
Apr	13.23	10.84	10.38	9.76	9.44	8.70	7.85	50
May	12.60	11.57	10.64	10.12	9.65	9.27	9.10	49
Jun	12.94	11.83	11.34	10.87	10.10	9.41	8.02	52
Jul	13.25	12.70	12.36	11.73	11.37	10.26	8.95	48
Aug	14.54	13.48	12.94	12.28	11.79	10.99	10.22	51
Sep	14.75	14.24	13.39	12.87	12.25	11.70	11.24	52
Oct	15.12	14.45	13.98	13.18	**11.98**	11.62	10.08	51
Nov	15.24	14.53	13.91	13.18	11.80	10.63	9.86	50
Dec	15.39	14.62	13.33	12.04	10.62	10.08	9.33	50

Statistics Options

View month/year statistics

Periodic Groundwater Data

Summary Statistics for Period of Record Periodic Water Levels

Depth to water level, feet below land surface

Approved Periodic Water Level Values

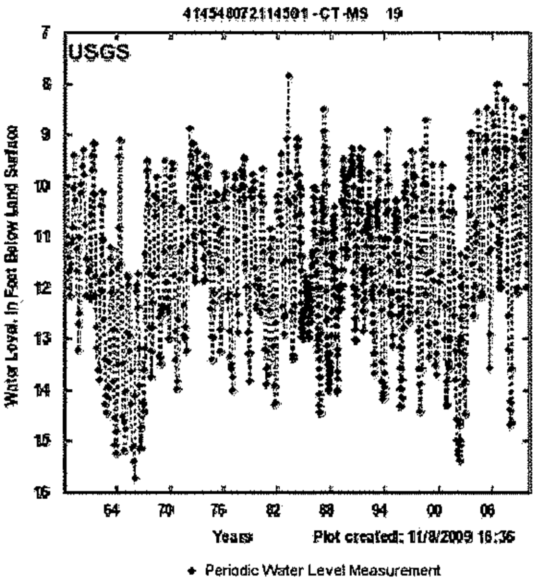
Begin Date	End Date	Number of Values
05/27/58	10/28/09	890

Highest WL	Date of Highest WL	Lowest WL	Date of Lowest WL
7.85	04/26/83	15.72	01/26/66

Groundwater Levels Options

View NWISWeb Groundwater levels page

View annual monthly statistics for all data types



Download Groundwater levels in text format

Groundwater Watch

```
# ---------------------------------------------------------
# U.S. Department of the Interior
# U.S. Geological Survey
# Retrieved: 11/10/2009 2:12:54 PM
#
# ----------------------- WARNING -----------------------
# Some of the data you have obtained from this automated
# U.S. Geological Survey database have not received
# Director's approval and as such are provisional
# and subject to revision. The data are released
# on the condition that neither the USGS nor the
# United States Government may be held liable for
# any damages resulting from its use.
#
# This file consists of space delimited columns of data,
# which include the following fields:
#
# column            column definition
# ------------      -----------------------------------------
# 1. agency_cd      Agency collecting or maintaining the site
# 2. site_no        USGS site identification number
# 3. parm_code      Parameter code
# 4. lev_dt         Date
# 5. lev_va         Depth to water level, feet below land surface (Missing value indicated by '-----')
# 6. sl_lev_va      Altitude of Water Level, in Feet Above Sea Level (Missing value indicated by '-----')
# 7. lev_status_cd Water level status code, defined at: http://waterdata.usgs.gov/nwis/gwlevels/?help#
#
# Note: '*' in the status field indicates a partial date.
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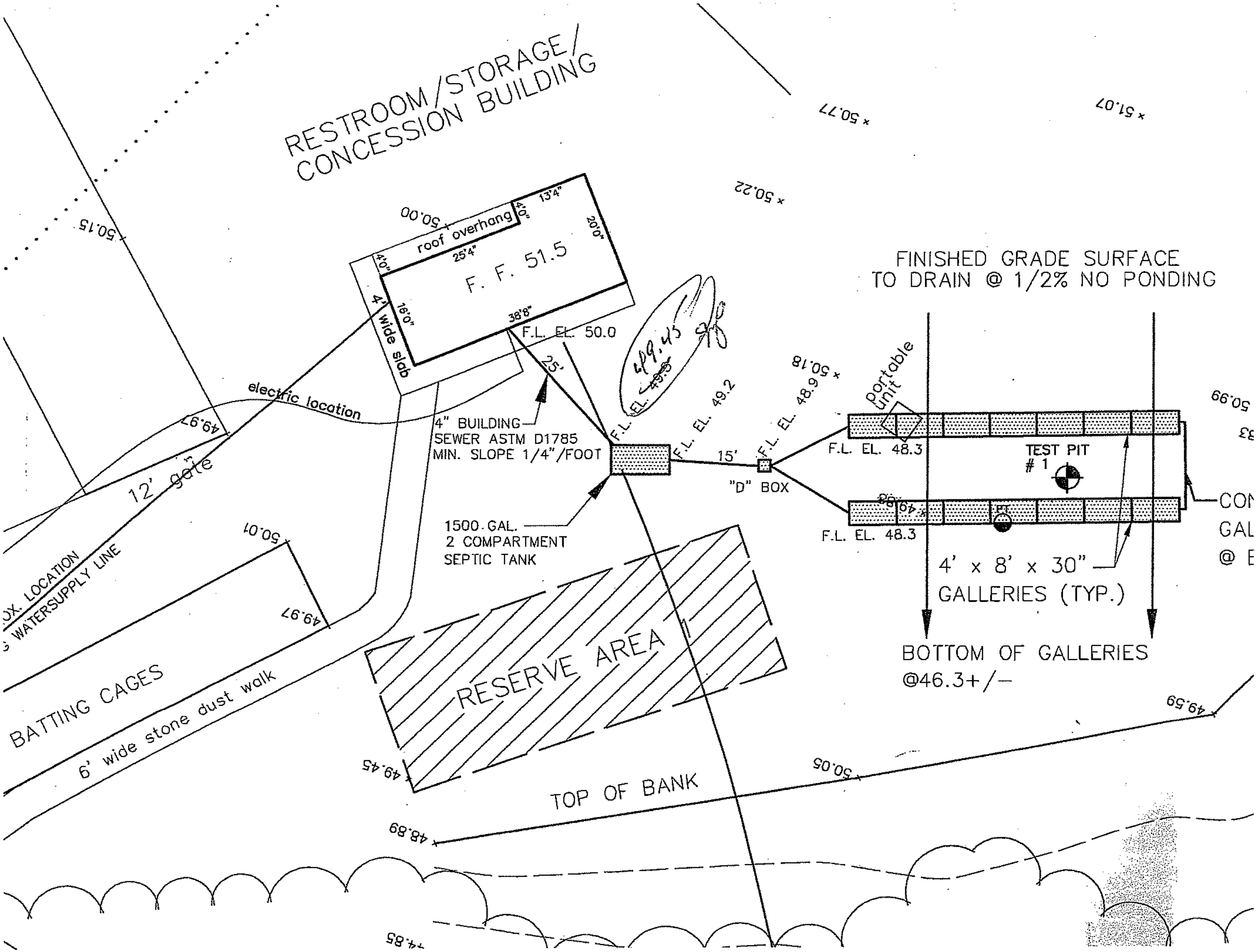
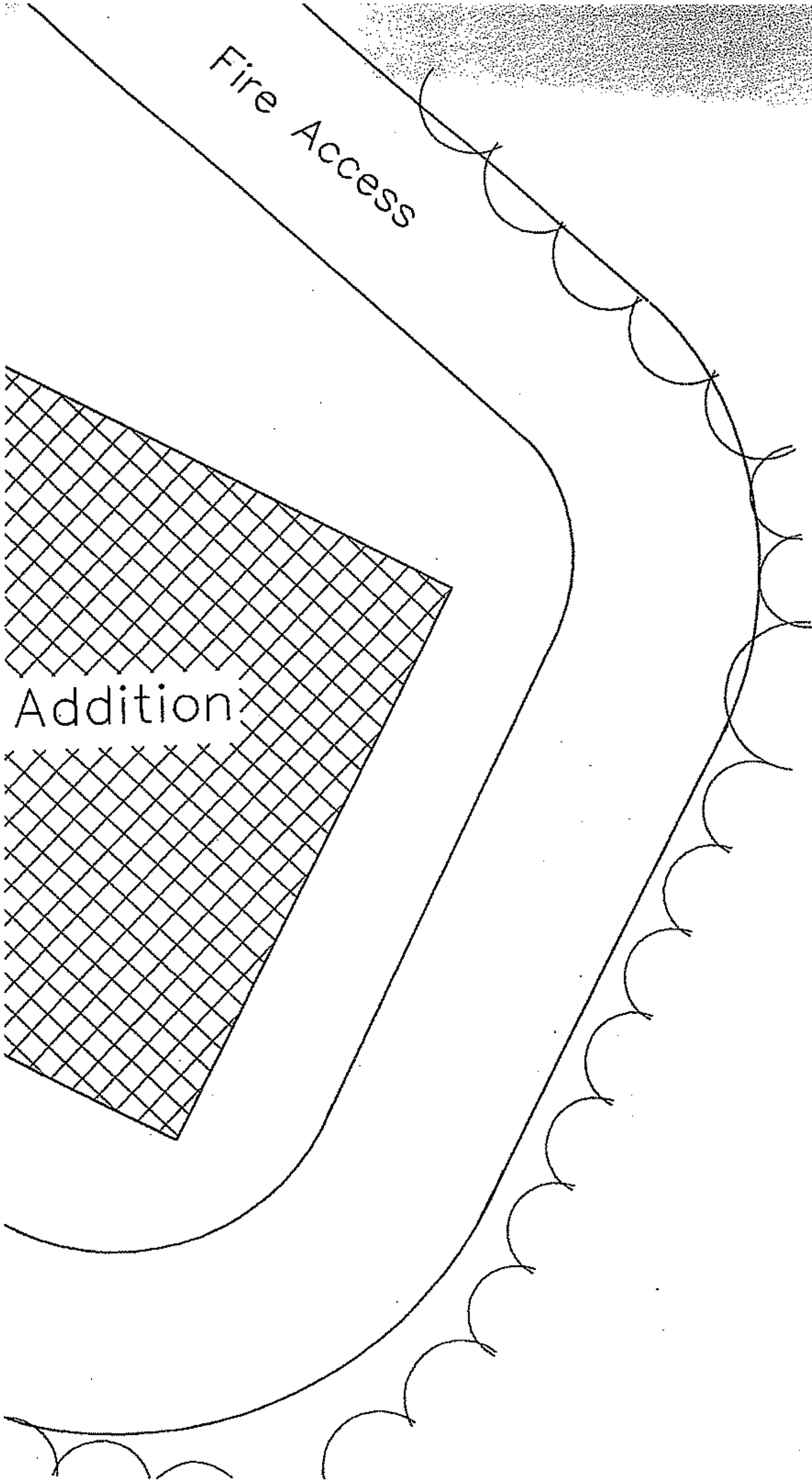
Appendix A4

Data Collection:

Eastern Highlands Health District, Mansfield Office


RESTROOM/STORAGE/
CONCESSION BUILDING
roof overhang
F. F. 51.5
4' wide slab
F.L. EL. 50.0
25'
4" BUILDING
SEWER ASTM D1785
MIN. SLOPE 1/4"/FOOT
electric location
F.L. EL. 49.2
15'
F.L. EL. 48.9
"D" BOX
1500 GAL.
2 COMPARTMENT
SEPTIC TANK
portable unit
FINISHED GRADE SURFACE
TO DRAIN @ 1/2% NO PONDING
F.L. EL. 48.3
TEST PIT
1
F.L. EL. 48.3
4' x 8' x 30"
GALLERIES (TYP.)
BOTTOM OF GALLERIES
@46.3+/-
12' gate
WATERSUPPLY LINE
BATTING CAGES
6' wide stone dust walk
RESERVE AREA
TOP OF BANK



TEST PIT LOGS (7/27/05)

#1

0"–10" TOPSOIL

10"–32" SAND & GRAVEL, COBBLES

BROWN BONY – 6" COBBLES

32"–84" BONY GRAVEL

NO LEDGE, NO EVIDENCE OF GROUNDWATER

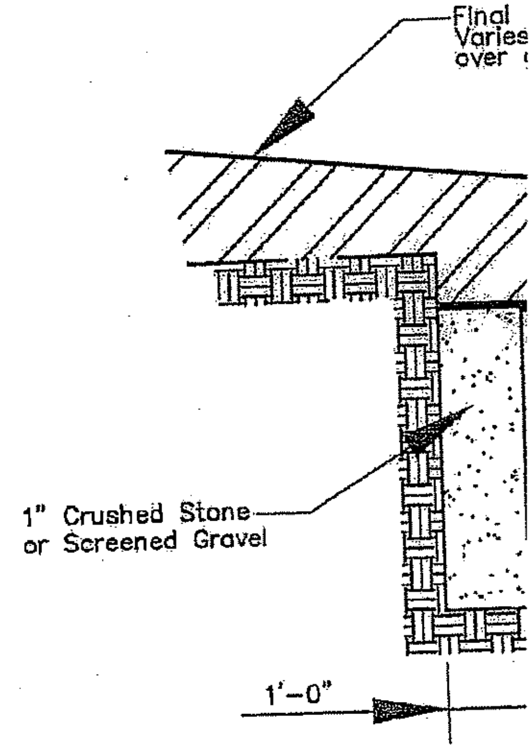
PERC TEST (7/27/05)

CONDUCTED BY EHHD

30" TOP OF HOLE TO GRADE

19" HOLE DEPTH

LESS THAN 3 MIN./INCH



GALLERY FL = 48.3

GROUND ELEV. = 50.4+/

FL TO GALLERY BOTTOM

ELEV. OF GALLERY BOTT

TEST PIT BOTTOM ELEV.

DIST. GALLERY BOTTOM

BORING/WELL LOG

COLUMBIA ENVIRONMENTAL DRILLING, INC.
136 Route 66
Columbia, CT 06237
Phone (860)228-0052 Fax (860)228-8115
Email: columbiadrilling@gmail.com

Client: Anchor Environmental
Project: 134 Warrenville Road
Location: Mansfield, CT

P.O. Number: 486-04
Inspector: Brandon Handfield

Sheet 1 of
Boring Number: MW-103

CED Driller: Chris McKinney

Date Start: 8/19/2009
Date Finish: 8/20/2009

SAMPLE	Depth Range	Blows per 6" on Sampler 0-6	6-12	12-18	18-24	Recovery	Strata Change	Field Classification And Remarks (Color, Grain Size, Moisture, Etc.)
								MW-103
								Augered to 10.0'.
S-1	10.0-12.0'	17	15	25	20	7"	sand gravel	Tan, medium-coarse sand; some medium-coarse gravel.
S-2	20.0-22.0'	15	19	25	39	2"	sand gravel	Tan, medium-coarse sand; some medium-coarse gravel.
S-3	30.0-32.0'	14	17	16	14	7"	sand	Tan-orange, fine sand; some layering, twice mottling.
S-4	40.0-42.0'	10	28	39	48	15"	sand gravel	Tan-orange, fine sand; some medium-coarse gravel.
S-5	50.0-52.0'	11	26	38	36	15"	sand gravel	13" Tan, fine sand; little mottling; 2" Tan-orange, medium-coarse sand & medium-coarse gravel.
S-6	60.0-62.0'	13	29	32	30	16"	sand silt	Tan, fine-coarse sand; fine-medium sand; trace silt, wet at 58'.

End of exploration 65.0'.

Installed 2" PVC monitoring well at 65.0' using 10.0' of slotted screen and 57.0' of solid riser with sand pack, Bentonite seal, lockable top & lock, stand pipe, and cement apron.

Groundwater at 58.0'.

PENETRATION RESISTANCE
140lb. Weight Falling 30" on 2" O.D. SAMPLER

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Mod. Dense	5-8	Mod. Stiff
30-49	Dense	9-15	Stiff
50+	Very Dense	16-30	Very Stiff
		31+	Hard

PROPORTIONS USED

Trace	0 TO 10%
Little	10 TO 20%
Some	20 TO 35%
And	36 TO 60%

Equipment Used: H.S.A. Drilling Rig
Casing: H.S.A. 4¼" I.D.
Sampler: Split-Spoon 1½" I.D.
Hammer Weight: 140# Hammer Fall: 30"

BORING/WELL LOG

COLUMBIA ENVIRONMENTAL DRILLING, INC.
136 Route 66
Columbia, CT 06237
Phone (860)228-0052 Fax (860)228-8115
Email: columbiadrilling@gmail.com

Client: Anchor Environmental
Project: 134 Warrenville Road
Location: Mansfield, CT

P.O. Number: 486-04
Inspector: Brandon Handfield

Boring Number: MW-102

CED Driller: Chris McKinney

Date Start: 8/19/2009
Date Finish: 8/20/2009

SAMPLE	Depth Range	Blows per 6" on Sampler 0-6	6-12	12-18	18-24	Recovery	Strata Change	Field Classification And Remarks (Color, Grain Size, Moisture, Etc.)
								MW-102
								Augered to 9.0'.
S-1	9.0-11.0'	13	49	28	26	5"	sand gravel	Tan, medium-coarse sand; medium-coarse gravel; some crushed cobbles.
S-2	19.0-21.0'	13	23	26	26	10"	sand gravel	Tan, medium-coarse sand; fine-coarse gravel.
S-3	29.0-31.0'	27	50	100/3"	ref	8"	cobbles gravel sand	Pulverized cobbles & medium-coarse gravel; some fine-medium sand.
S-4	39.0-41.0'	28	34	28	29	0	sand gravel	No Recovery.
S-5	49.0-51.0'	7	9	38	54	23"		Tan-brown, fine sand; little medium-coarse gravel, wet at 45.0.

End of exploration 52.0'.

Installed 2" PVC monitoring well at 52.0' using 10.0' of slotted screen and 44.0' of solid riser with sand pack, Bentonite seal, lockable top & lock, stand pipe, and cement apron.

Groundwater at 45.0'.

PENETRATION RESISTANCE
140lb. Weight Falling 30" on 2" O.D. SAMPLER

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Mod. Dense	5-8	Mod. Stiff
30-49	Dense	9-15	Stiff
50+	Very Dense	16-30	Very Stiff
		31+	Hard

PROPORTIONS USED

Trace	0 TO 10%
Little	10 TO 20%
Some	20 TO 35%
And	36 TO 60%

Equipment Used: H.S.A. Drilling Rig
Casing: H.S.A. 4¼" I.D.
Sampler: Split-Spoon 1½" I.D.
Hammer Weight: 140# Hammer Fall: 30"

BORING/WELL LOG

COLUMBIA ENVIRONMENTAL DRILLING, INC.
136 Route 66
Columbia, CT 06237
Phone (860)228-0052 Fax (860)228-8115
Email: columbiadrilling@gmail.com

Client: Anchor Environmental
Project: 134 Warrenville Road
Location: Mansfield, CT

P.O. Number: 486-04
Inspector: Brandon Handfield

Boring Number: MW-104

CED Driller: Chris McKinney
Date Start: 8/19/2009
Date Finish: 8/20/2009

SAMPLE	Depth Range	Blows per 6" on Sampler 0-6	6-12	12-18	18-24	Recovery	Strata Change	Field Classification And Remarks (Color, Grain Size, Moisture, Etc.)
								MW-104
								Augered to 10.0'.
S-1	10.0-12.0'	20	13	12	16	6"	sand silt sand gravel	4" Dark-brown, fine sand & silt with little organics; 2" tan, fine-medium sand; little coarse sand; some fine-medium gravel, dry.
S-2	20.0-22.0'	11	12	27	100/1"	4"	sand cobbles	Tan, medium-coarse sand; few cobbles.
S-3	30.0-32.0'	3	11	16	18	15"	sand	Tan-orange, fine sand; some layering at 41"; little mottling.
S-4	40.0-42.0'	10	24	38	26	20"		
S-5	50.0-52.0'	5	10	10	8	18"		Tan fine sand, very moist at 51.0', wet at 52.0'.

End of exploration 60.0'.

Installed 2" PVC monitoring well at 60.0' using 10.0' of slotted screen and 52.0' of solid riser with sand pack, Bentonite seal, lockable top & lock, stand pipe, and cement apron.

Groundwater at 53.0'.

PENETRATION RESISTANCE
140lb. Weight Falling 30" on 2" O.D. SAMPLER

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Mod. Dense	5-8	Mod. Stiff
30-49	Dense	9-15	Stiff
50+	Very Dense	16-30	Very Stiff
		31+	Hard

PROPORTIONS USED

Trace	0 TO 10%
Little	10 TO 20%
Some	20 TO 35%
And	36 TO 60%

Equipment Used: H.S.A. Drilling Rig
Casing: H.S.A. 4¼" I.D.
Sampler: Split-Spoon 1½" I.D.
Hammer Weight: 140# Hammer Fall: 30"

BORING/WELL LOG

COLUMBIA ENVIRONMENTAL DRILLING, INC.
136 Route 66
Columbia, CT 06237
Phone (860)228-0052 Fax (860)228-8115
Email: columbiadrilling@gmail.com

Client: Anchor Environmental
Project: 134 Warrenville Road
Location: Mansfield, CT

P.O. Number: 486-04
Inspector: Brandon Handfield

Boring Number: ~~MW-104~~ MW-10

CED Driller: Chris McKinney
Date Start: 8/19/2009
Date Finish: 8/20/2009

SAMPLE	Depth Range	Blows per 6" on Sampler 0-6	6-12	12-18	18-24	Recovery	Strata Change	Field Classification And Remarks (Color, Grain Size, Moisture, Etc.)
								MW-101 ~~MW-104~~
								Augered to 10.0'.
S-1	10.0-12.0'	100/2"	ref	ref	ref	1"	pulverized rock	Pulverized rock in tip.
S-2	20.0-22.0'	25	7	11	14	11"	sand gravel	Tan-orange, medium-coarse sand; little medium-coarse sand.
S-3	30.0-32.0'	46	11	14	16	15"	sand	Orange-tan, fine sand.
S-4	40.0-42.0'	14	23	28	36	13"	sand	Orange-tan, fine sand; some layering; trace silt.
S-5	50.0-52.0'	8	14	19	20	18"	sand gravel	Tan-brown-orange; 10" fine-coarse sand; coarse gravel, 8" fine sand; little silt, wet at 50.0'.

End of exploration 57.0'.

Installed 2" PVC monitoring well at 57.0' using 10.0' of slotted screen and 47.0' of solid riser with sand pack, Bentonite seal, lockable top & lock, stand pipe, and cement apron.

Groundwater at 50.0'.

PENETRATION RESISTANCE
140lb. Weight Falling 30" on 2" O.D. SAMPLER

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Mod. Dense	5-8	Mod. Stiff
30-49	Dense	9-15	Stiff
50+	Very Dense	16-30	Very Stiff
		31+	Hard

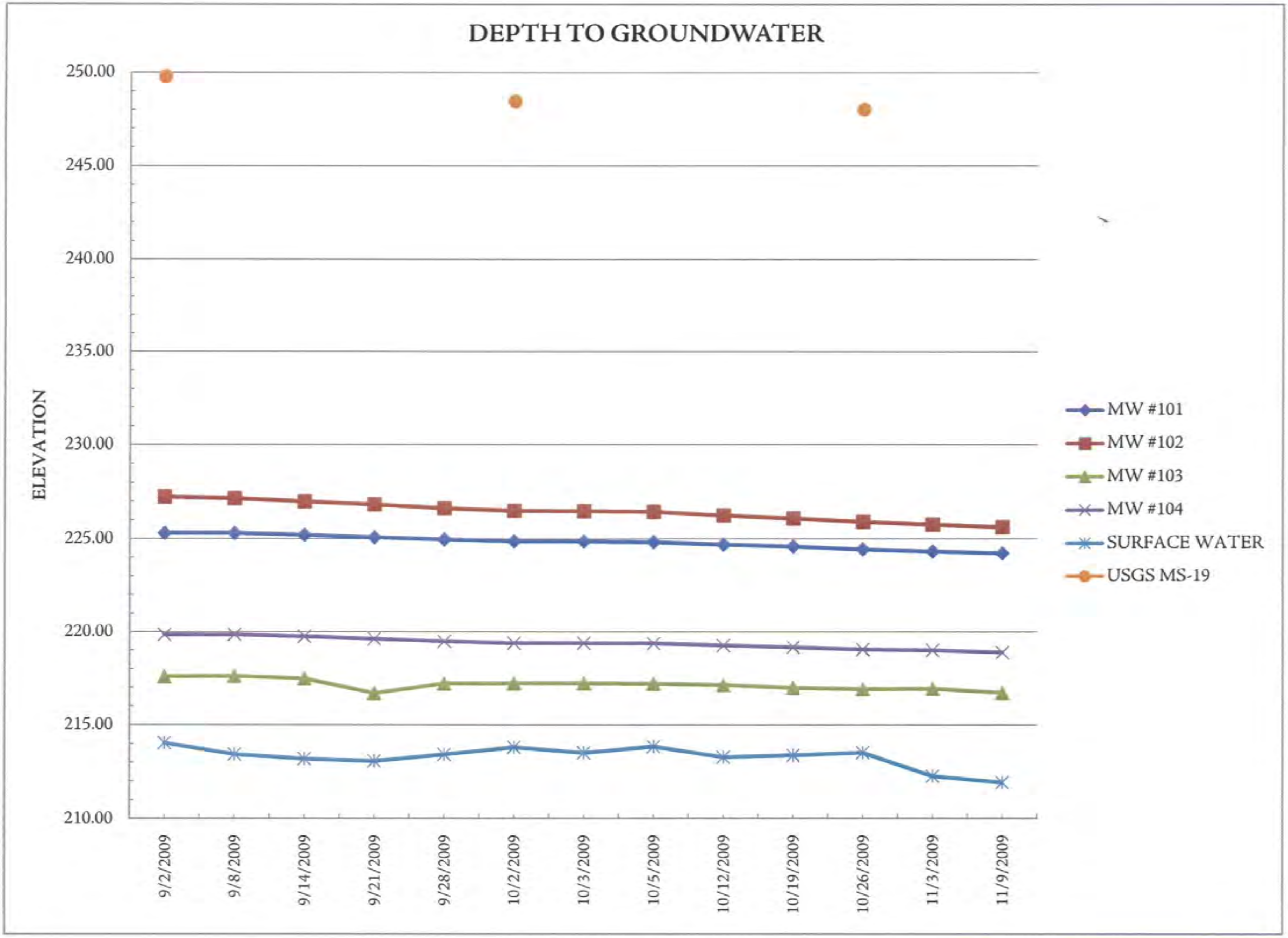
PROPORTIONS USED

Trace	0 TO 10%
Little	10 TO 20%
Some	20 TO 35%
And	36 TO 60%

Equipment Used: H.S.A. Drilling Rig
Casing: H.S.A. 4¼" I.D.
Sampler: Split-Spoon 1½" I.D.
Hammer Weight: 140# Hammer Fall: 30"

	MONITORING WELL #101							MONITORING WELL #102						
DATE	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV. (FT)	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.
9/2/2009	101	274.19	0.23	273.96	48.65	**225.31**		102	272.44	0.39	272.05	44.80	**227.25**	
9/8/2009	101	274.19	0.23	273.96	48.65	**225.31**	0.00	102	272.44	0.39	272.05	44.88	**227.17**	-0.08
9/14/2009	101	274.19	0.23	273.96	48.75	**225.21**	-0.10	102	272.44	0.39	272.05	45.05	**227.00**	-0.17
9/21/2009	101	274.19	0.23	273.96	48.88	**225.08**	-0.13	102	272.44	0.39	272.05	45.21	**226.84**	-0.16
9/28/2009	101	274.19	0.23	273.96	48.99	**224.97**	-0.11	102	272.44	0.39	272.05	45.42	**226.63**	-0.21
10/2/2009		274.19	0.23	273.96	49.09	**224.87**	-0.10	102	272.44	0.39	272.05	45.55	**226.50**	-0.13
10/3/2009	101	274.19	0.23	273.96	49.10	**224.86**	-0.01	102	272.44	0.39	272.05	45.57	**226.48**	-0.02
10/5/2009	101	274.19	0.23	273.96	49.13	**224.83**	-0.03	102	272.44	0.39	272.05	45.61	**226.44**	-0.04
10/12/2009	101	274.19	0.23	273.96	49.27	**224.69**	-0.14	102	272.44	0.39	272.05	45.80	**226.25**	-0.19
10/19/2009	101	274.19	0.23	273.96	49.37	**224.59**	-0.10	102	272.44	0.39	272.05	45.96	**226.09**	-0.16
10/26/2009	101	274.19	0.23	273.96	49.52	**224.44**	-0.15	102	272.44	0.39	272.05	46.14	**225.91**	-0.18
11/3/2009	101	274.19	0.23	273.96	49.63	**224.33**	-0.11	102	272.44	0.39	272.05	46.29	**225.76**	-0.15
11/9/2009	101	274.19	0.23	273.96	49.73	**224.23**	-0.10	102	272.44	0.39	272.05	46.42	**225.63**	-0.13

	MONITORING WELL #103							MONITORING WELL #104							SURFACE WATERBODY				
DATE	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.	WELL NO.	CASING ELEV.	MEASURE DOWN	CASING ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.	BRIDGE ELEV.	BRIDGE TO WATER SURFACE		GW ELEV.	CHANGE IN ELEV.
9/2/2009	103	278.02	0.68	277.34	59.75	**217.59**		104	274.14	0.58	273.56	53.72	**219.84**		221.30	87.13 in.	7.26 ft.	**214.04**	
9/8/2009	103	278.02	0.68	277.34	59.72	**217.62**	0.03	104	274.14	0.58	273.56	53.71	**219.85**	0.01	221.30	94.38 in.	7.86 ft.	**213.44**	-0.60
9/14/2009	103	278.02	0.68	277.34	59.85	**217.49**	-0.13	104	274.14	0.58	273.56	53.81	**219.75**	-0.10	221.30	97.25 in.	8.10 ft.	**213.20**	-0.24
9/21/2009	103	278.02	0.68	277.34	60.64	**216.70**	-0.79	104	274.14	0.58	273.56	53.94	**219.62**	-0.13	221.30	98.75 in.	8.23 ft.	**213.07**	-0.13
9/28/2009	103	278.02	0.68	277.34	60.12	**217.22**	0.52	104	274.14	0.58	273.56	54.08	**219.48**	-0.14	221.30	94.50 in.	7.88 ft.	**213.43**	0.35
10/2/2009	104	278.02	0.68	277.34	60.11	**217.23**	0.01	105	274.14	0.58	273.56	54.17	**219.39**	-0.09	221.30	89.88 in.	7.49 ft.	**213.81**	0.39
10/3/2009	103	278.02	0.68	277.34	60.11	**217.23**	0.00	104	274.14	0.58	273.56	54.17	**219.39**	0.00	221.30	93.50 in.	7.79 ft.	**213.51**	-0.30
10/5/2009	103	278.02	0.68	277.34	60.13	**217.21**	-0.02	104	274.14	0.58	273.56	54.19	**219.37**	-0.02	221.30	89.50 in.	7.46 ft.	**213.84**	0.33
10/12/2009	103	278.02	0.68	277.34	60.20	**217.14**	-0.07	104	274.14	0.58	273.56	54.29	**219.27**	-0.10	221.30	96.25 in.	8.02 ft.	**213.28**	-0.56
10/19/2009	103	278.02	0.68	277.34	60.35	**216.99**	-0.15	104	274.14	0.58	273.56	54.39	**219.17**	-0.10	221.30	95.00 in.	7.92 ft.	**213.38**	0.10
10/26/2009	103	278.02	0.68	277.34	60.42	**216.92**	-0.07	104	274.14	0.58	273.56	54.51	**219.05**	-0.12	221.30	93.38 in.	7.78 ft.	**213.52**	0.14
11/3/2009	103	278.02	0.68	277.34	60.40	**216.94**	0.02	104	274.14	0.58	273.56	54.56	**219.00**	-0.05	221.30	108.50 in.	9.04 ft.	**212.26**	-1.26
11/9/2009	103	278.02	0.68	277.34	60.62	**216.72**	-0.22	104	274.14	0.58	273.56	54.67	**218.89**	-0.11	221.30	112.50 in.	9.38 ft.	**211.93**	-0.33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240.00
235.00
230.00
225.00
220.00
215.00
210.00
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9/8/2009
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9/21/2009
9/28/2009
10/2/2009
10/3/2009
10/5/2009
10/12/2009
10/19/2009
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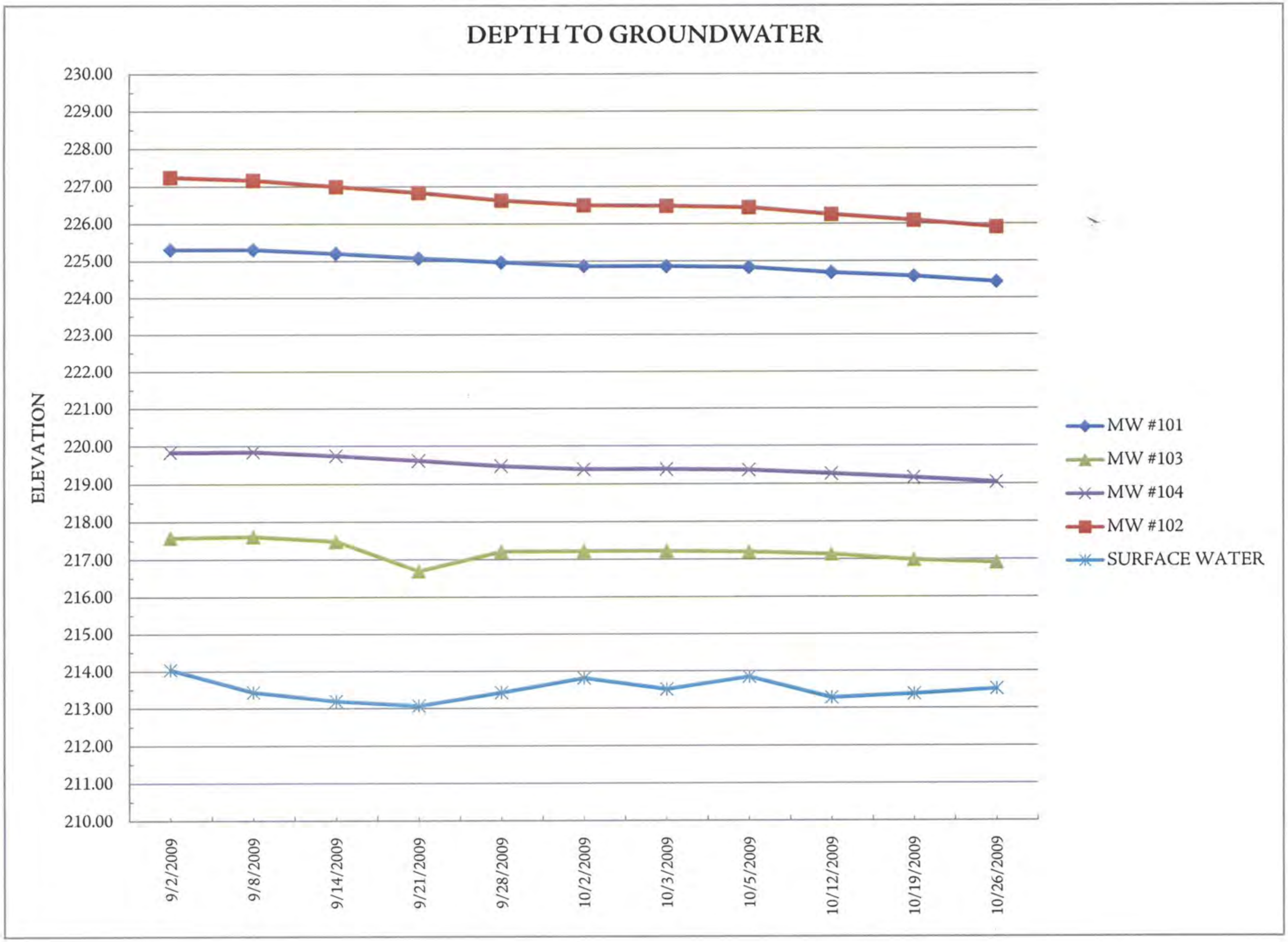
MW #101
MW #102
MW #103
MW #104
SURFACE WATER
USGS MS-19



DEPTH TO GROUNDWATER
ELEVATION
230.00
229.00
228.00
227.00
226.00
225.00
224.00
223.00
222.00
221.00
220.00
219.00
218.00
217.00
216.00
215.00
214.00
213.00
212.00
211.00
210.00
9/2/2009
9/8/2009
9/14/2009
9/21/2009
9/28/2009
10/2/2009
10/3/2009
10/5/2009
10/12/2009
10/19/2009
10/26/2009
MW #101
MW #103
MW #104
MW #102
SURFACE WATER

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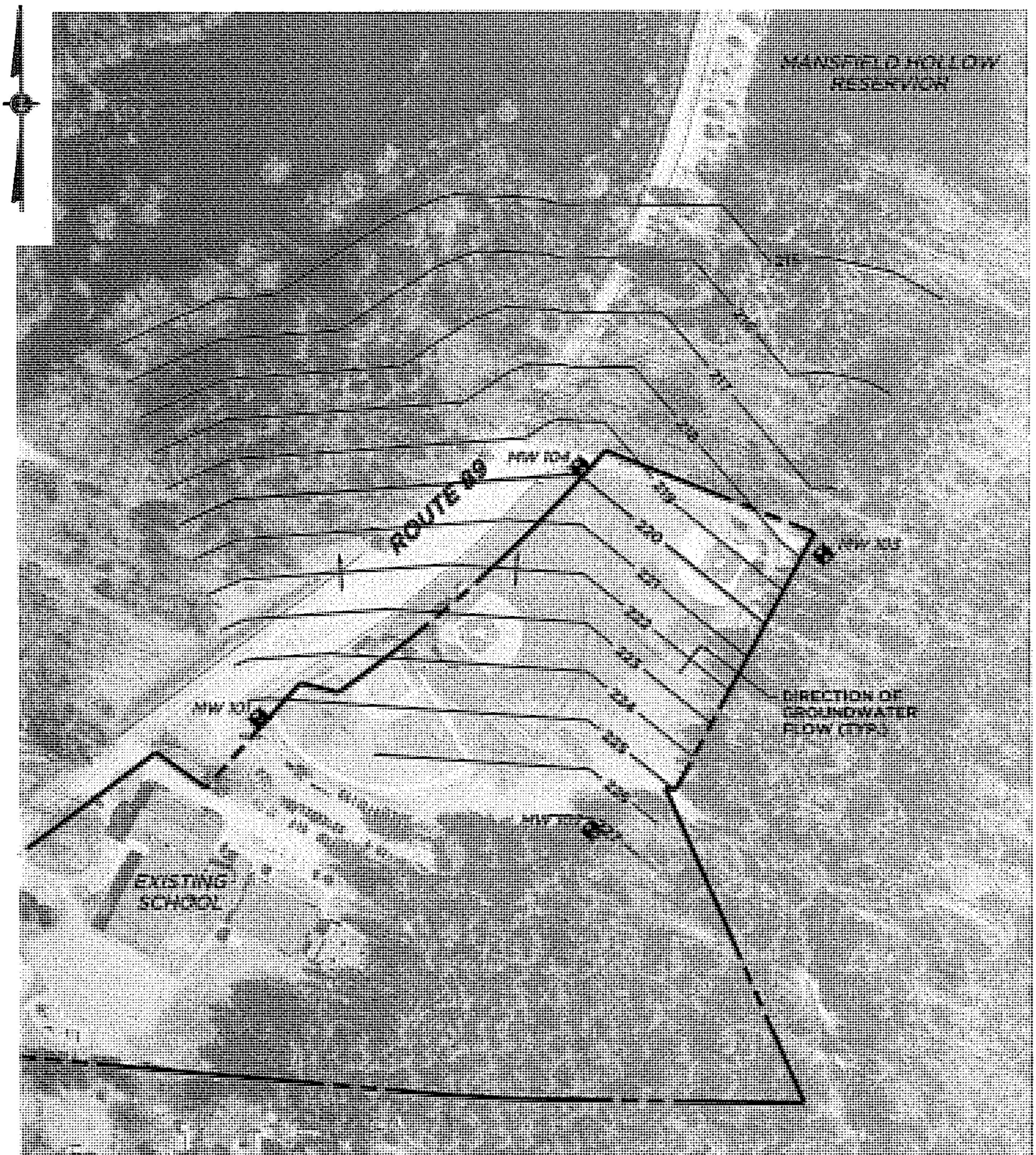
GROUNDWATER CONTOURS

PREPARED FOR 09/02/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



200 0 200 400

SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	225.31
MW #102	227.25
MW #103	217.59
MW #104	219.84
SURFACE WATER	214.04

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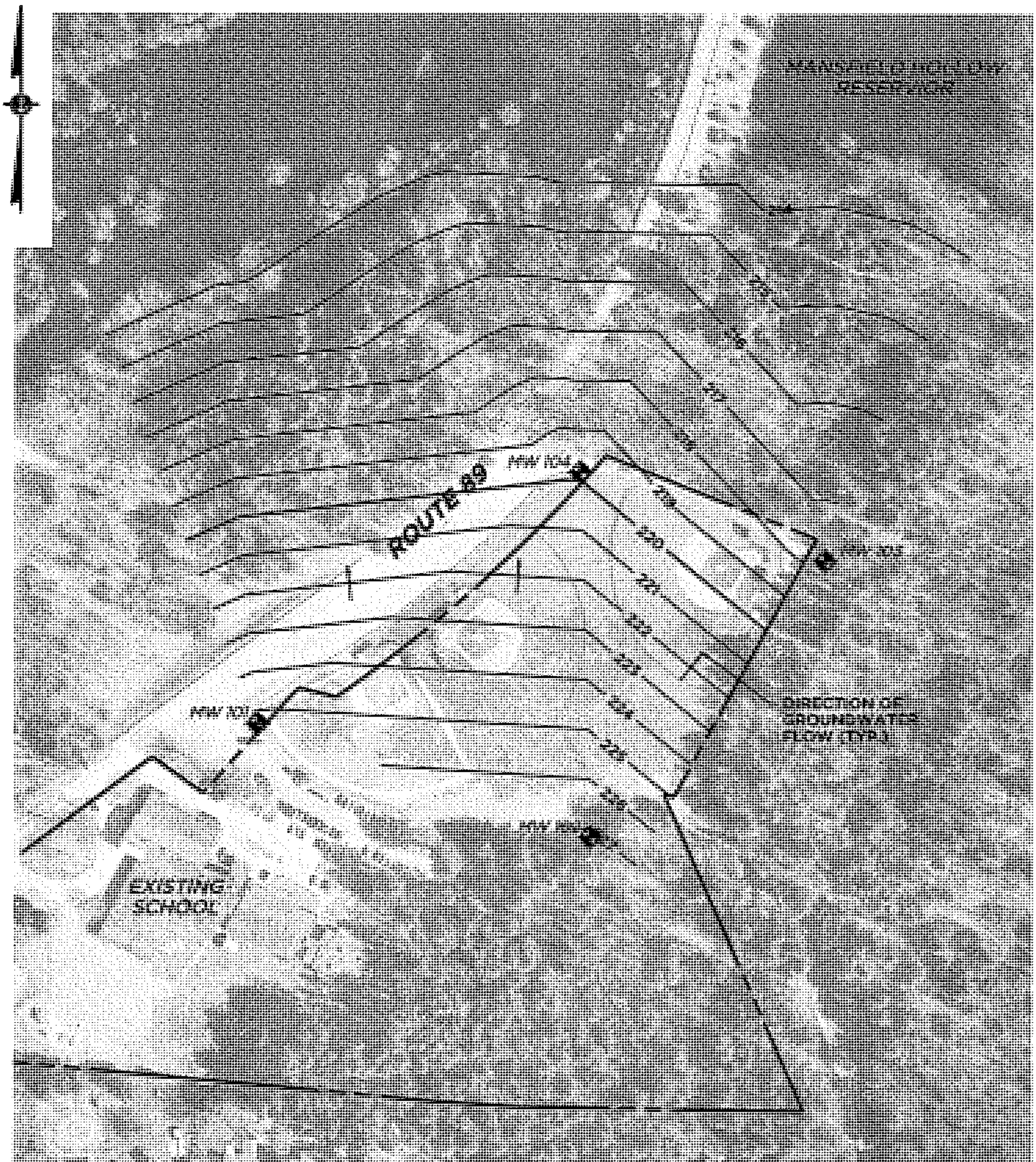
GROUNDWATER CONTOURS

PREPARED FOR 09/08/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



200 0 200 400

SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	225.31
MW #102	227.17
MW #103	217.62
MW #104	219.85
SURFACE WATER	213.44

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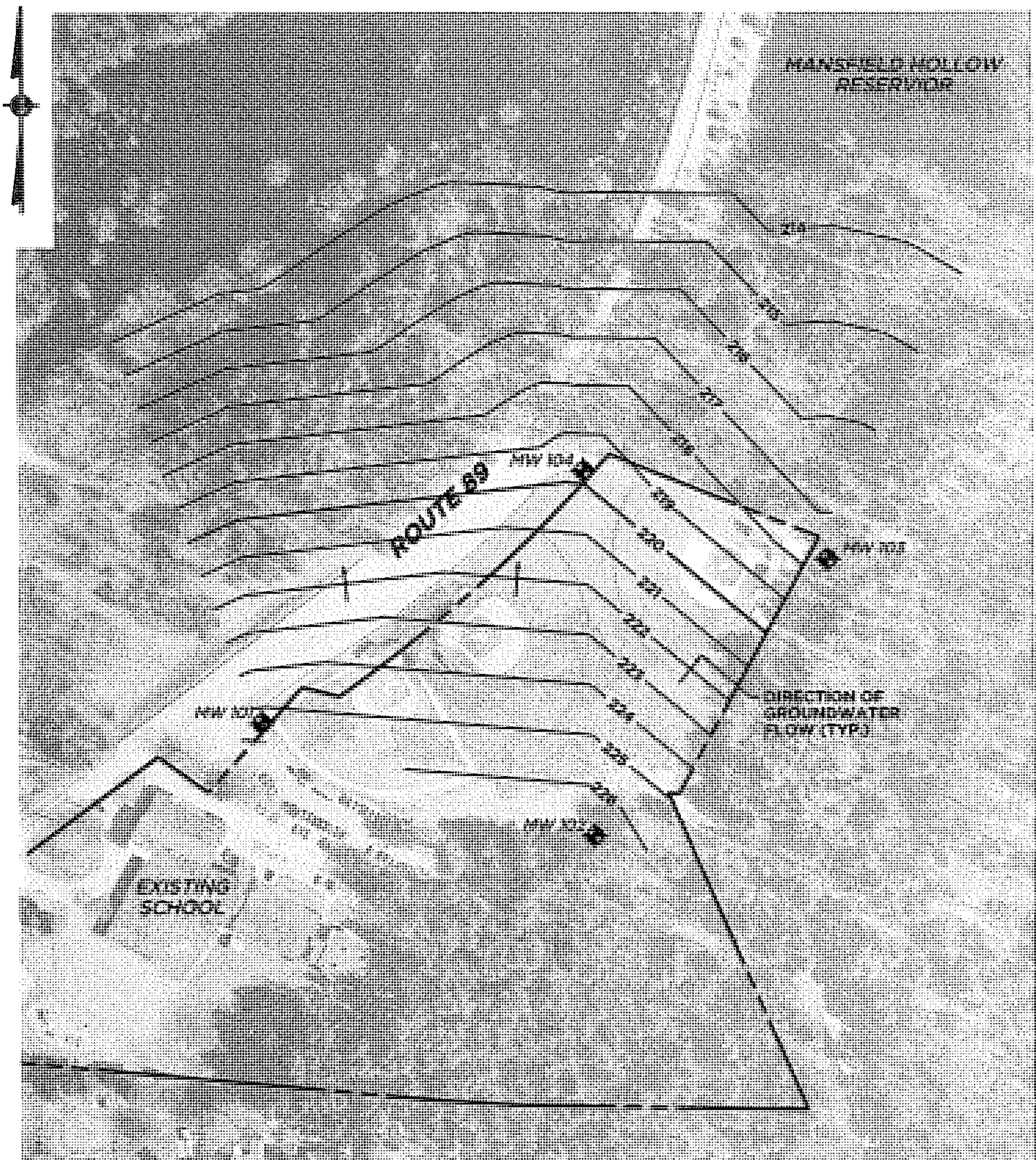
GROUNDWATER CONTOURS

PREPARED FOR 09/14/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



WATER ELEVATIONS	
MW #101	225.21
MW #102	227.00
MW #103	217.49
MW #104	219.75
SURFACE WATER	213.20

200 0 200 400

SCALE: 1"= 200'

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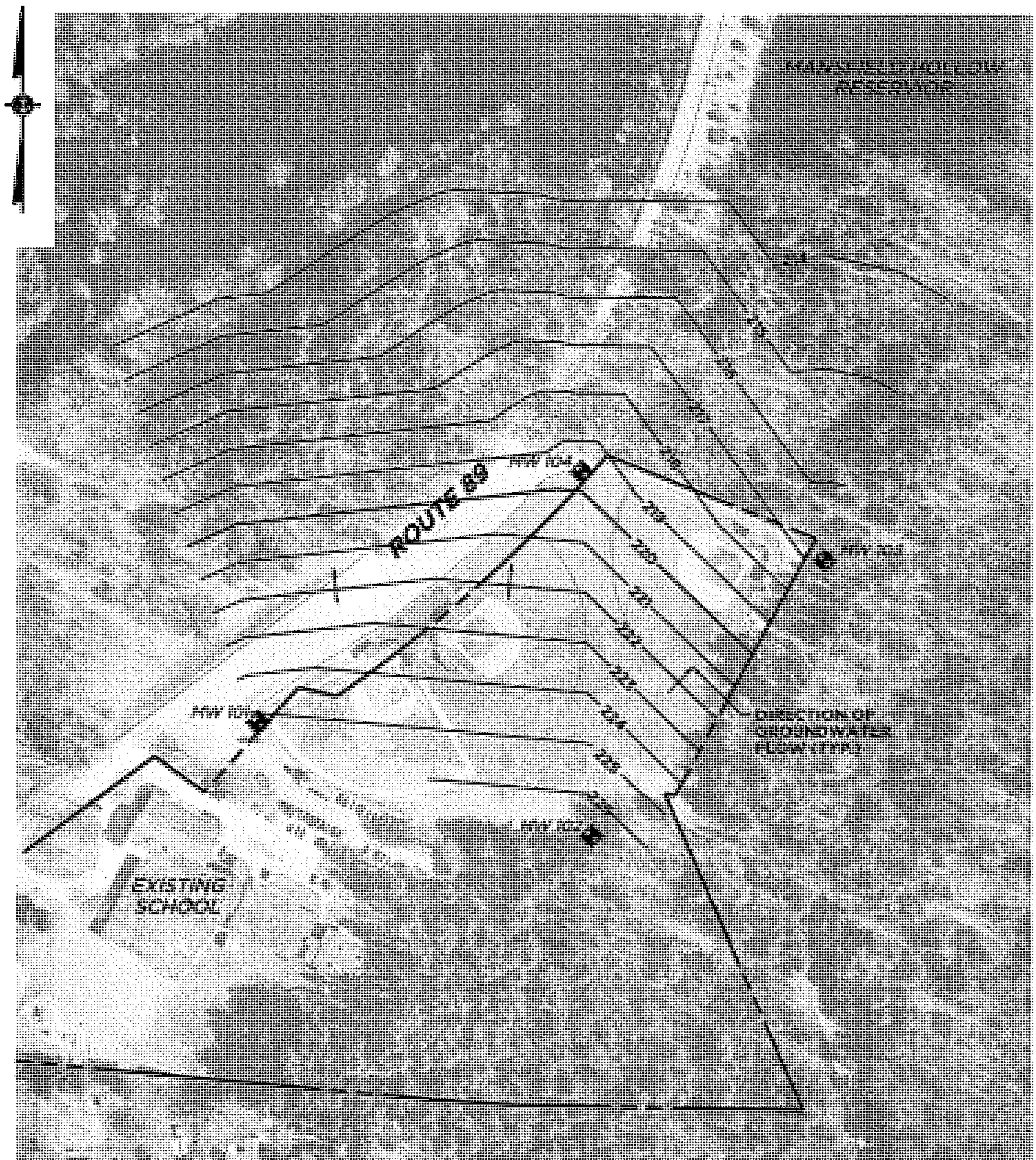
GROUNDWATER CONTOURS

PREPARED FOR 09/21/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE OCT. 09



200 0 200 400
SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	225.08
MW #102	226.84
MW #103	216.70
MW #104	219.62
SURFACE WATER	213.07

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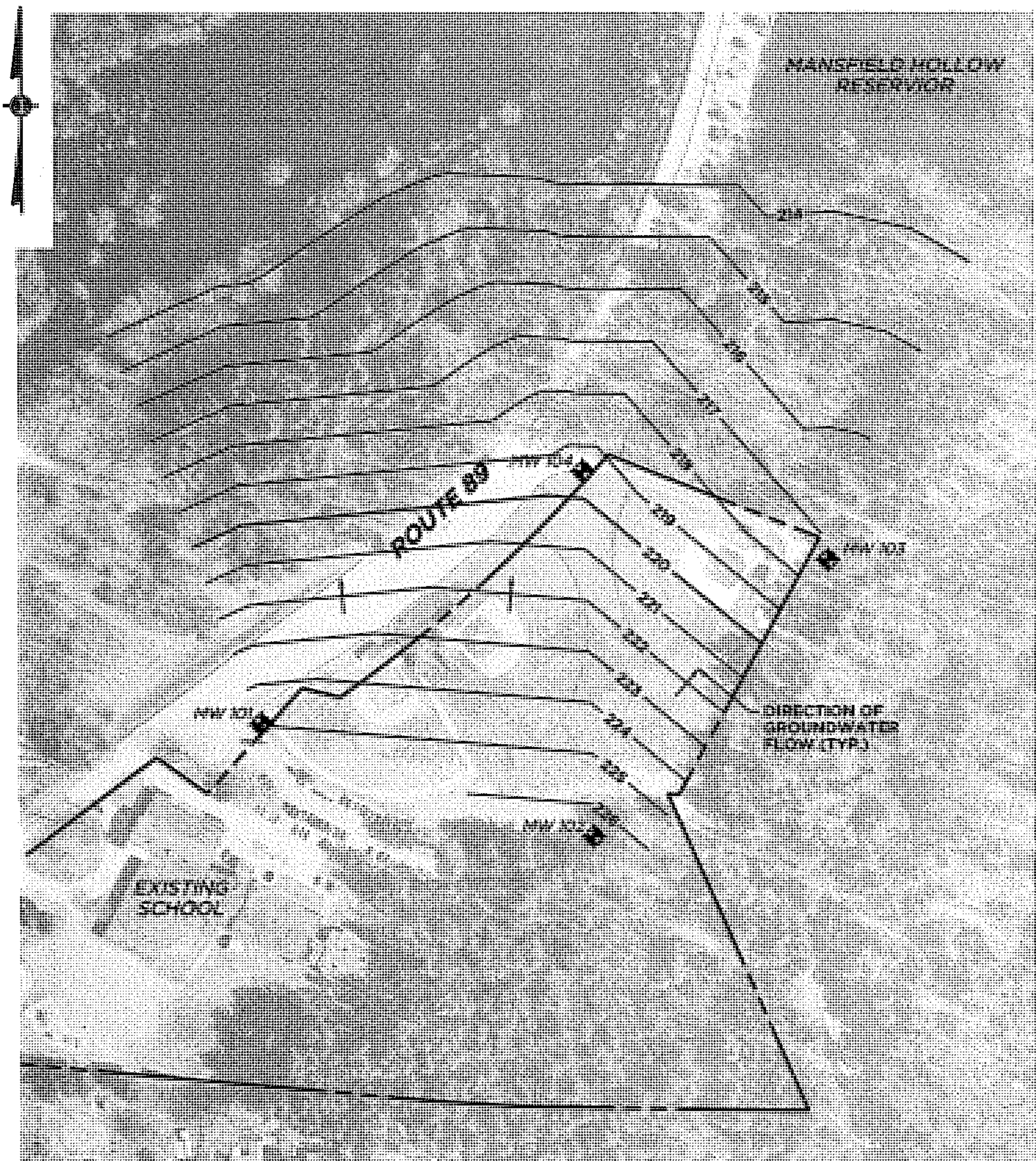
GROUNDWATER CONTOURS

PREPARED FOR 09/28/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



200 0 200 400
SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	224.97
MW #102	226.63
MW #103	217.22
MW #104	219.48
SURFACE WATER	213.43

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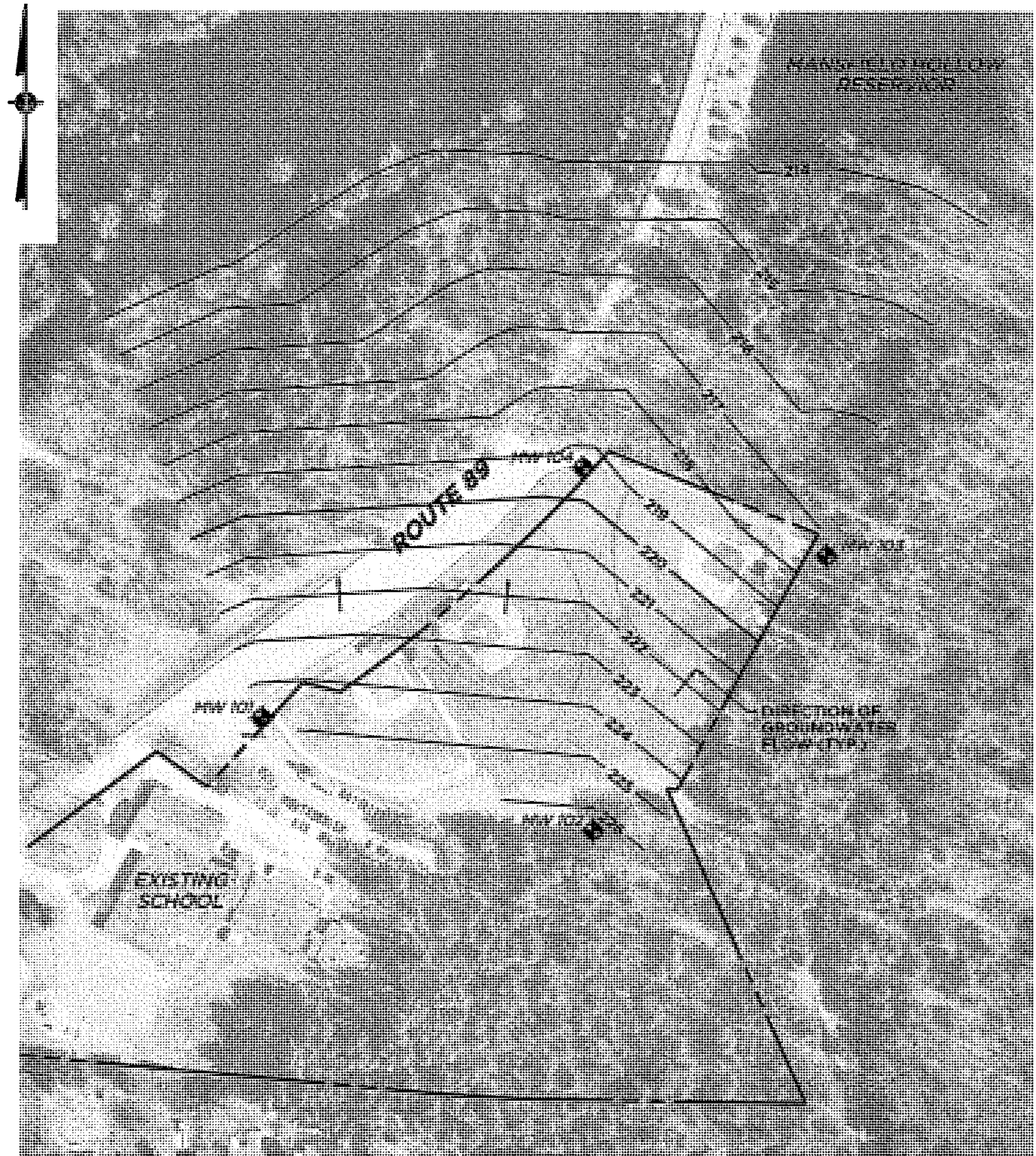
GROUNDWATER CONTOURS

PREPARED FOR 10/05/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



200 0 200 400
SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	224.83
MW #102	226.44
MW #103	217.21
MW #104	219.37
SURFACE WATER	213.84

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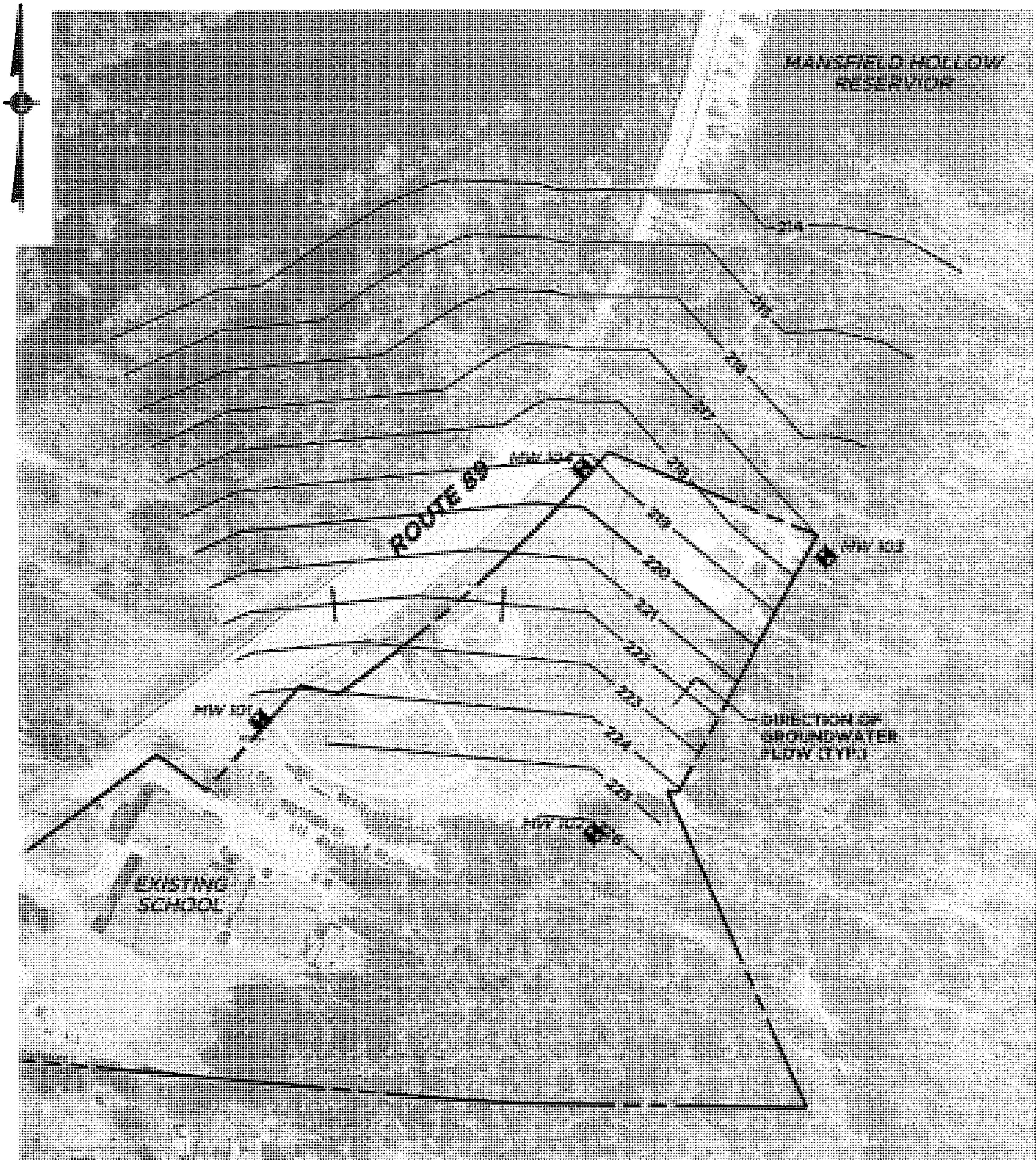
GROUNDWATER CONTOURS

PREPARED FOR 10/12/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	OCT. 09



200 0 200 400
SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	224.69
MW #102	226.25
MW #103	217.14
MW #104	219.27
SURFACE WATER	213.28

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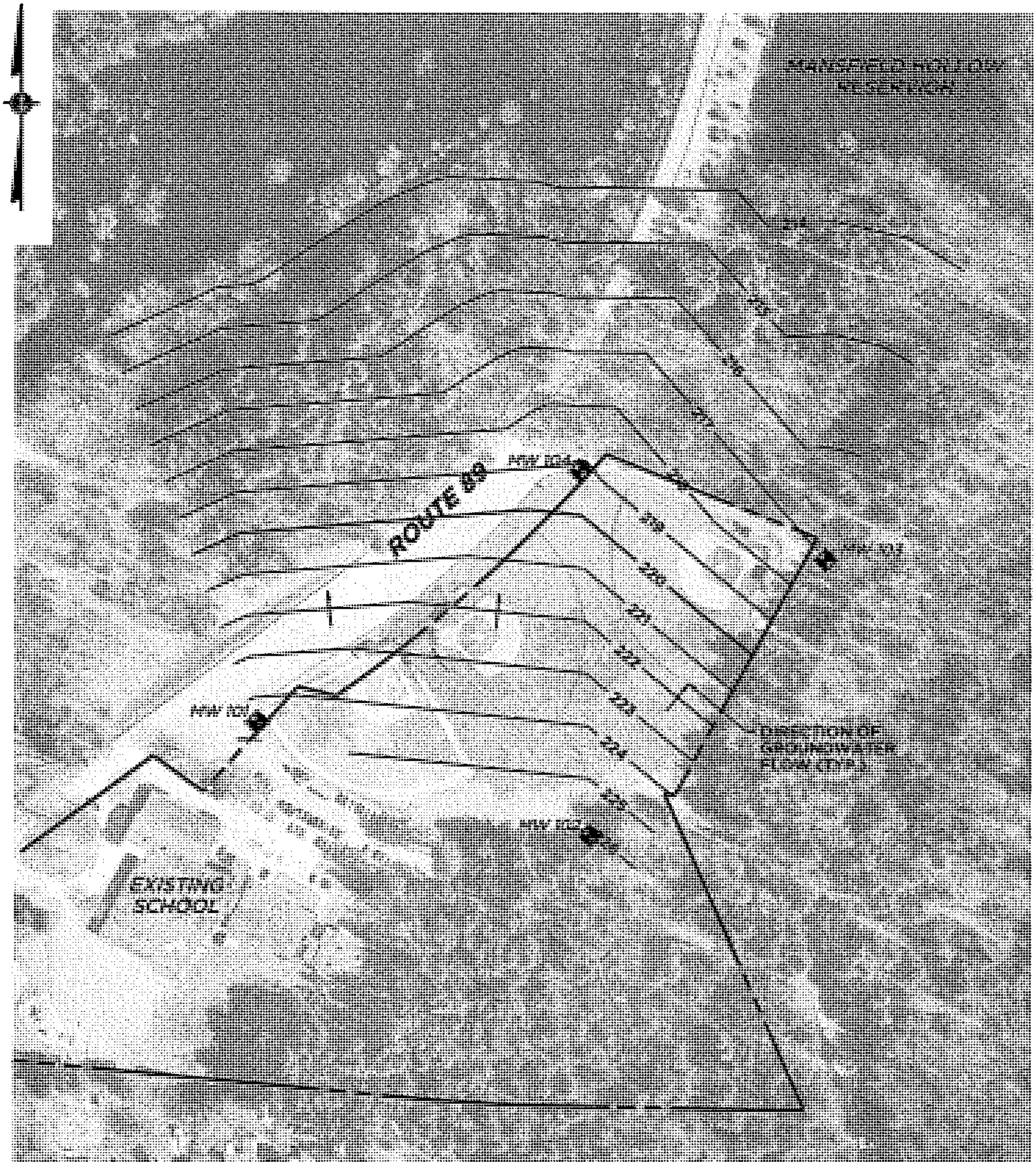
GROUNDWATER CONTOURS

PREPARED FOR 10/19/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE OCT. 09



200 0 200 400
SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	224.59
MW #102	226.09
MW #103	216.99
MW #104	219.17
SURFACE WATER	213.38

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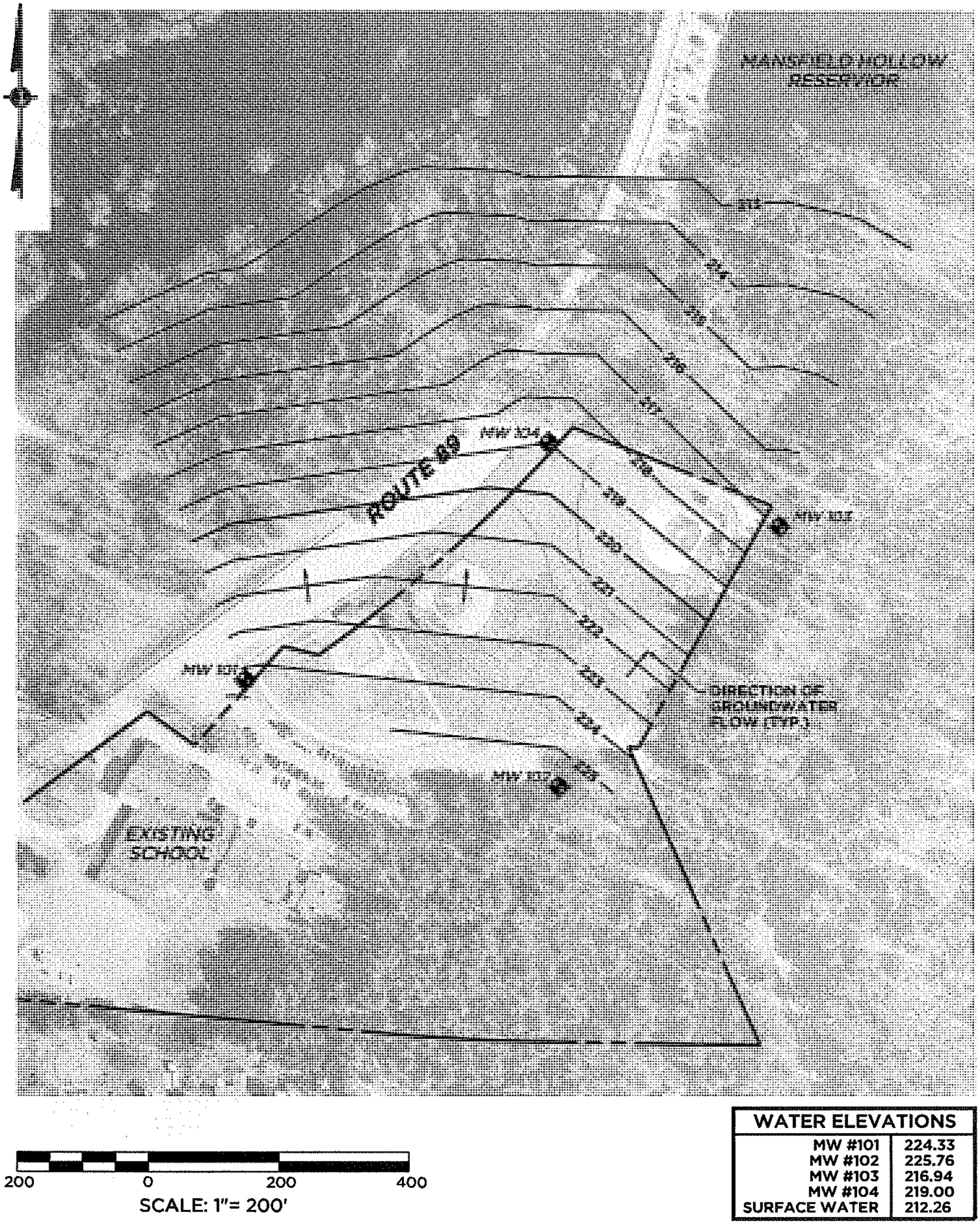
GROUNDWATER CONTOURS

PREPARED FOR 11/03/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	NOV. 09



WATER ELEVATIONS	
MW #101	224.33
MW #102	225.76
MW #103	216.94
MW #104	219.00
SURFACE WATER	212.26

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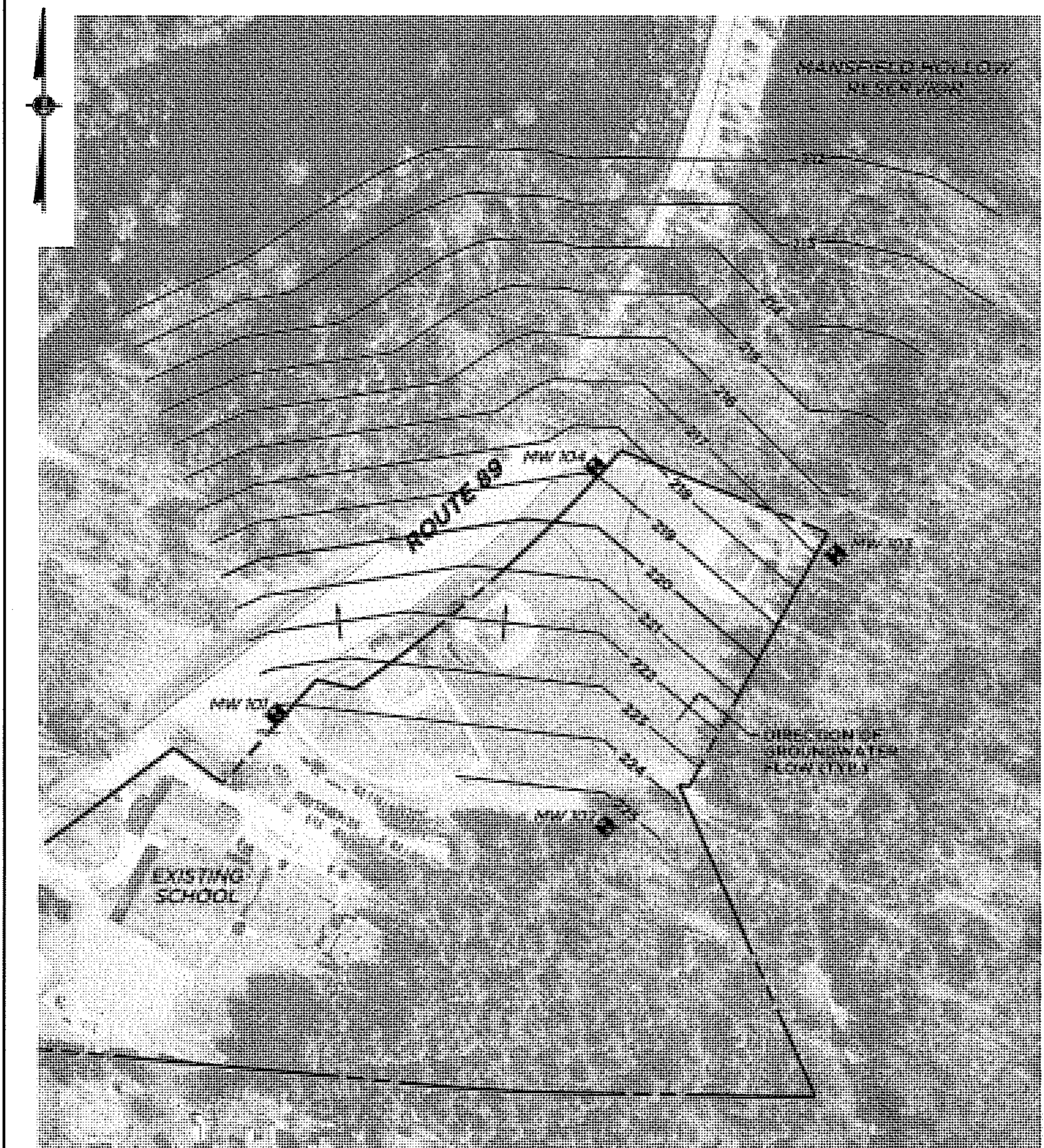
GROUNDWATER CONTOURS

PREPARED FOR 11/09/09 GROUNDWATER MONITORING
SOUTHEAST ELEMENTARY SCHOOL, MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE NOV. 09



200 0 200 400

SCALE: 1"= 200'

WATER ELEVATIONS	
MW #101	224.23
MW #102	225.63
MW #103	216.72
MW #104	218.89
SURFACE WATER	211.93

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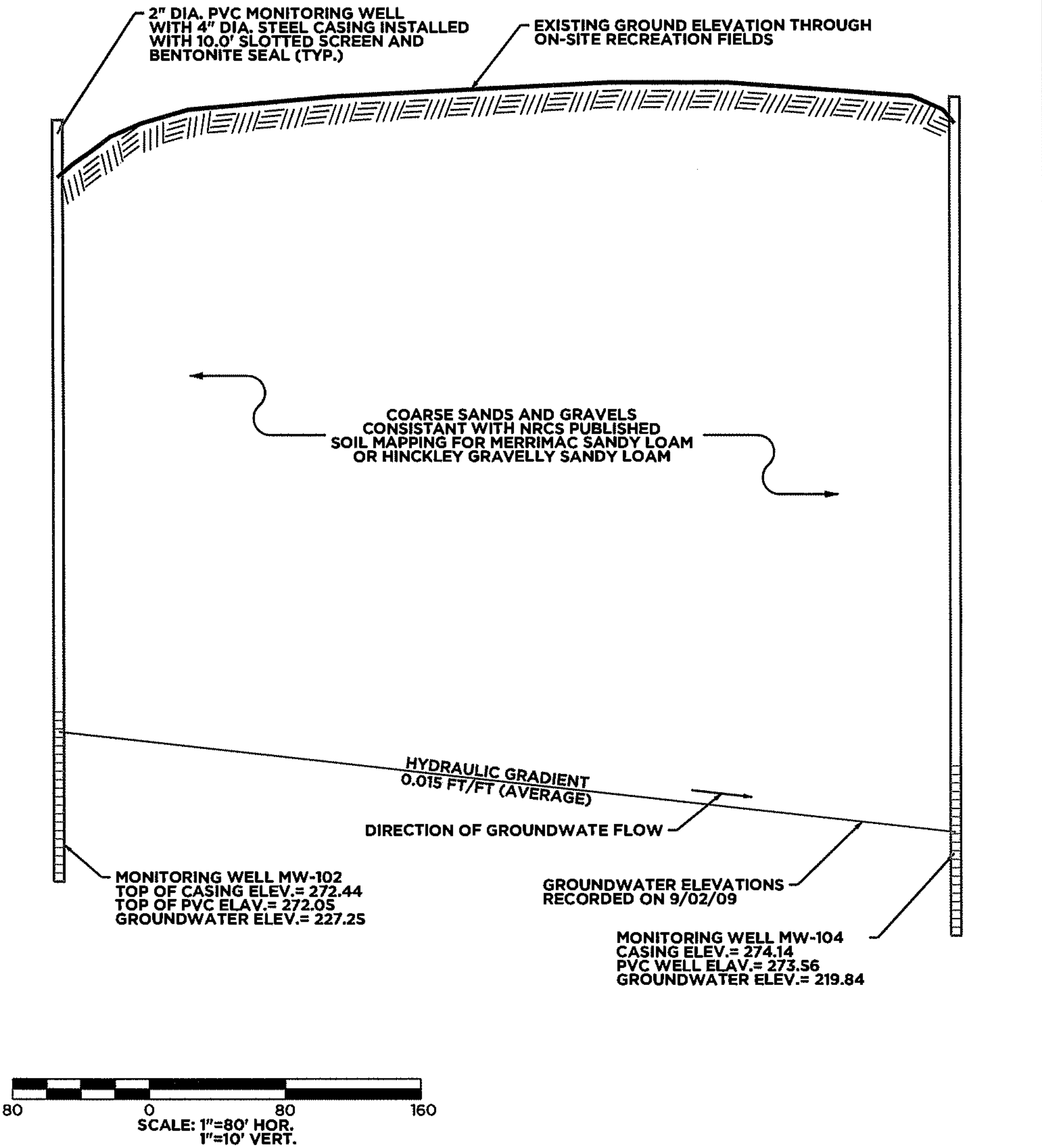
HYDRAULIC GRADE SECTION

PREPARED FOR TOWN OF MANSFIELD
SOUTHEAST ELEMENTARY SCHOOL MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE NOV. 09



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SOIL TEST RESULTS

SOUTHEAST ELEMENTARY SCHOOL SITE
134 WARRENVILLE ROAD, MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	NOV. 09

TEST PIT #: TP 201
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 104"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 90" FILL MATERIAL
90" - 104" COARSE SAND & GRAVEL W/ SOME SILTS, COBBLES

TEST PIT #: TP 204
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 101"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 44" TOPSOIL & FILL MATERIAL
44" - 90" BR. FINE SANDY LOAM
90" - 101" COARSE SAND & GRAVEL W/ COBBLES

TEST PIT #: TP 205
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 95"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 40" FILL MATERIAL
40" - 95" COARSE SAND & GRAVEL W/ COBBLES

TEST PIT #: TP 206
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 102"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 12" PROCESS AGGREGATE
12" - 54" FINE SILTY SAND & GRAVEL W/ COBBLES
54" - 102" MED. COARSE SANDS

TEST PIT #: TP 209
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 96"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 12" TOPSOIL
12" - 36" FINE MED. SAND & GRAVEL
36" - 45" TAN/OR. MED. SAND
45" - 80" COARSE SAND & GRAVEL W/ COBBLES
80" - 96" FINE./MED. TAN SANDS

TEST PIT #: TP 210
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 132"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 10" TOPSOIL
10" - 132" MED. COARSE SAND W/ COBBLES

TEST PIT #: TP 212
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 125"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 110" FILL MATERIAL
110" - 125" MED. COARSE SAND & GRAVEL W/ COBBLES

TEST PIT #: TP 213
DATE PERFORMED: 8/24/09
DEPTH OF TEST PIT: 88"
SEEPAGE OBSERVED AT: N/A
LEDGE OBSERVED AT: N/A
ROOTS OBSERVED AT: N/A
MOTTLING OBSERVED AT: N/A

SOILS DESCRIPTION

0" - 10" TOPSOIL
10" - 24" BR. FINE SANDY LOAM
24" - 36" COARSE TAN SANDS
36" - 72" COARSE SAND & GRAVEL W/ COBBLES
72" - 88" COARSE SAND

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SOIL TEST RESULTS

SOUTHEAST ELEMENTARY SCHOOL SITE
134 WARRENVILLE ROAD, MANSFIELD, CT

FIGURE

PROJECT	DATE
486-04	NOV. 09

TEST PIT #:	TP 214
DATE PERFORMED:	8/24/09
DEPTH OF TEST PIT:	100"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	N/A
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 12"	TOPSOIL
12" - 26"	BR. FINE SANDY LOAM
26" - 66"	OR./TAN C. SAND W/ COBBLES
66" - 92"	OR./TAN C. SAND & GRAVEL W/ COBBLES, COMPACT
92" - 100"	TAN COARSE SAND & GRAVEL

DEEP HOLE OBSERVATION TEST PIT & PERCOLATION RATE TEST PERFORMED FOR CONCESSION STAND BUILDING ADDITION ON (7/27/05)

TEST PIT #:	TP 1
DATE PERFORMED:	7/27/05
DEPTH OF TEST PIT:	84"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	N/A
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 10"	TOPSOIL
10" - 32"	SAND AND GRAVEL, COBBLES BROWN, BONY - 6" COBBLES
32" - 84"	BONY GRAVEL

PERCOLATION TEST PERFORMED BY EASTERN HIGHLANDS HEALTH DISTRICT

30" TOP OF HOLE TO GRADE
19" HOLE DEPTH

LESS THAN 3 MIN./INCH

Soil Gradation Report

IMTL
Accurate information you can rely on.

GRADATION ASTM D-422; WET WASH ASTM D-1140

PROJECT:	SOUTHEAST ELEMENTARY SCHOOL-MANSFIELD	PROJECT NO.:	9300
CLIENT:	ANCHOR ENGINEERING	REPORT NO.:	001
LAB NO.:	26326	DATE:	10/13/09
USE:	SEPTIC	SAMPLED BY:	CLIENT
SPEC A:	CT D.O.P.H.	SOURCE:	ON-SITE TEST PIT
SAMPLE ID:	TP 210		

GRADATION RESULTS

SIEVE #		% PASS	SPEC. A
75 mm	(3")	100.0	100
4.75 mm	(#4)	100.0*	100*
2.0 mm	(#10)	79.4*	70-100*
425 µm	(#40)	15.4*	10-50*
150 µm	(#100)	3.9*	0-20*
75 µm	(#200)	2.4*	0-5*

COMPLIED WITH: SPEC A: YES

. . .AS PER GRADATION ABOVE

SOIL DESCRIPTION: OLIVE/YELLOW SAND; SOME GRAVEL; TRACE FINES;

*PERCENTAGE OF SAMPLE LESS GRAVEL.

REMARKS: PERCENTAGE GRAVEL (+#4) = 33.3%

STATE OF CONNECTICUT RICHARD ... No. 10036 LICENSED PROFESSIONAL ENGINEER 10-13-09

REVIEWED BY: [signature] 10-13-09

pc: Kevin Grindle, Anchor Engineering

kb

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Soil Gradation Report

IMTL
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GRADATION ASTM D-422; WET WASH ASTM D-1140

PROJECT:	SOUTHEAST ELEMENTARY SCHOOL-MANSFIELD	PROJECT NO.:	9300
CLIENT:	ANCHOR ENGINEERING	REPORT NO.:	002
LAB NO.:	26327	DATE:	10/13/09
USE:	SEPTIC	SAMPLED BY:	CLIENT
SPEC A:	CT D.O.P.H.	SOURCE:	ON-SITE TEST PIT
SAMPLE ID:	TI 213		

GRADATION RESULTS

SIEVE #		% PASS	SPEC. A
75 mm	(3")	100.0	100
4.75 mm	(#4)	100.0*	100*
2.0 mm	(#10)	72.0*	70-100*
425 µm	(#40)	11.3*	10-50*
150 µm	(#100)	1.7*	0-20*
75 µm	(#200)	0.9*	0-5*
COMPLIED WITH:			SPEC A: YES
. . .AS PER GRADATION ABOVE			

SOIL DESCRIPTION: YELLOW/BROWN SAND AND GRAVEL; TRACE FINES

*PERCENTAGE OF SAMPLE LESS GRAVEL.

REMARKS: PERCENTAGE GRAVEL (+#4) = 48.9%

STATE OF CONNECTICUT RICHARD W... No. 10030 LICENSED PROFESSIONAL ENGINEER 10-13-09

REVIEWED BY: [signature] 10-13-09
pc: Kevin Grindle, Anchor Engineering
kb

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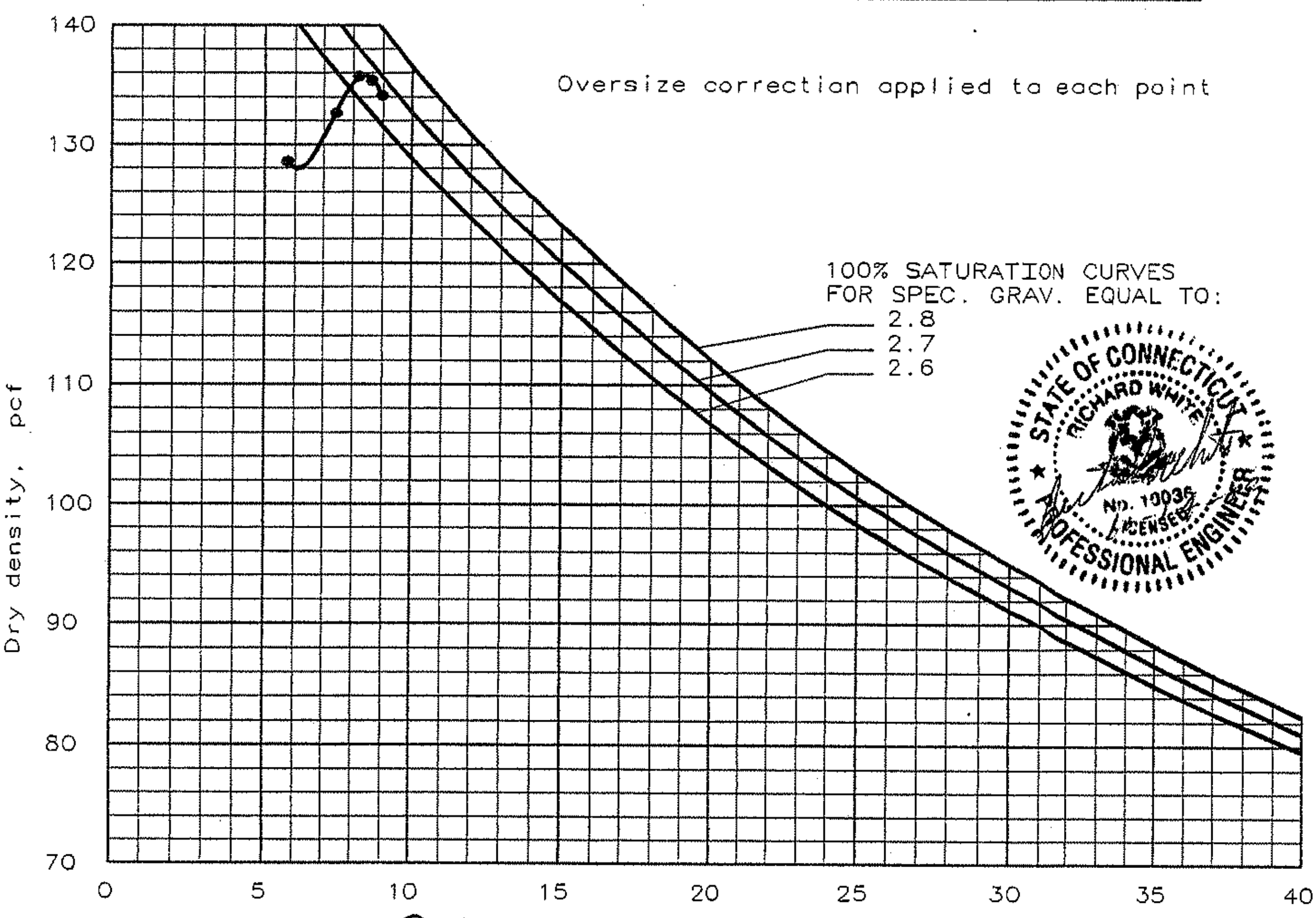
PROCTOR TEST REPORT

PROJECT: SOUTHEAST ELEMENTARY SCHOOL- MANSFIELD
CLIENT: ANCHOR ENGINEERING
LAB NO.: 26327
SOURCE: ON-SITE TEST PIT TI-213
USE: SEPTIC
REMARKS:

REPORT NO.: 003
PROJECT NO.: 9300
DATE: 10/14/09
SAMPLED BY: CLIENT
GRADATION ASSOCIATED WITH THIS SAMPLE: Yes

TEST METHODS: Test specification: ASTM D 1557 Procedure C, Modified
MATERIAL DESCRIPTION: YELLOW/BRW SAND & GRAVEL; TRACE FINES
%> 3/4 in = 19.9%
TESTED BY: RR/KB

TEST RESULTS
Maximum dry density = 135.8 pcf
Optimum moisture = 8.4 %



STATE OF CONNECTICUT RICHARD WHITE No. 10036 LICENSED PROFESSIONAL ENGINEER

REVIEWED BY: [signature] 10-14-09

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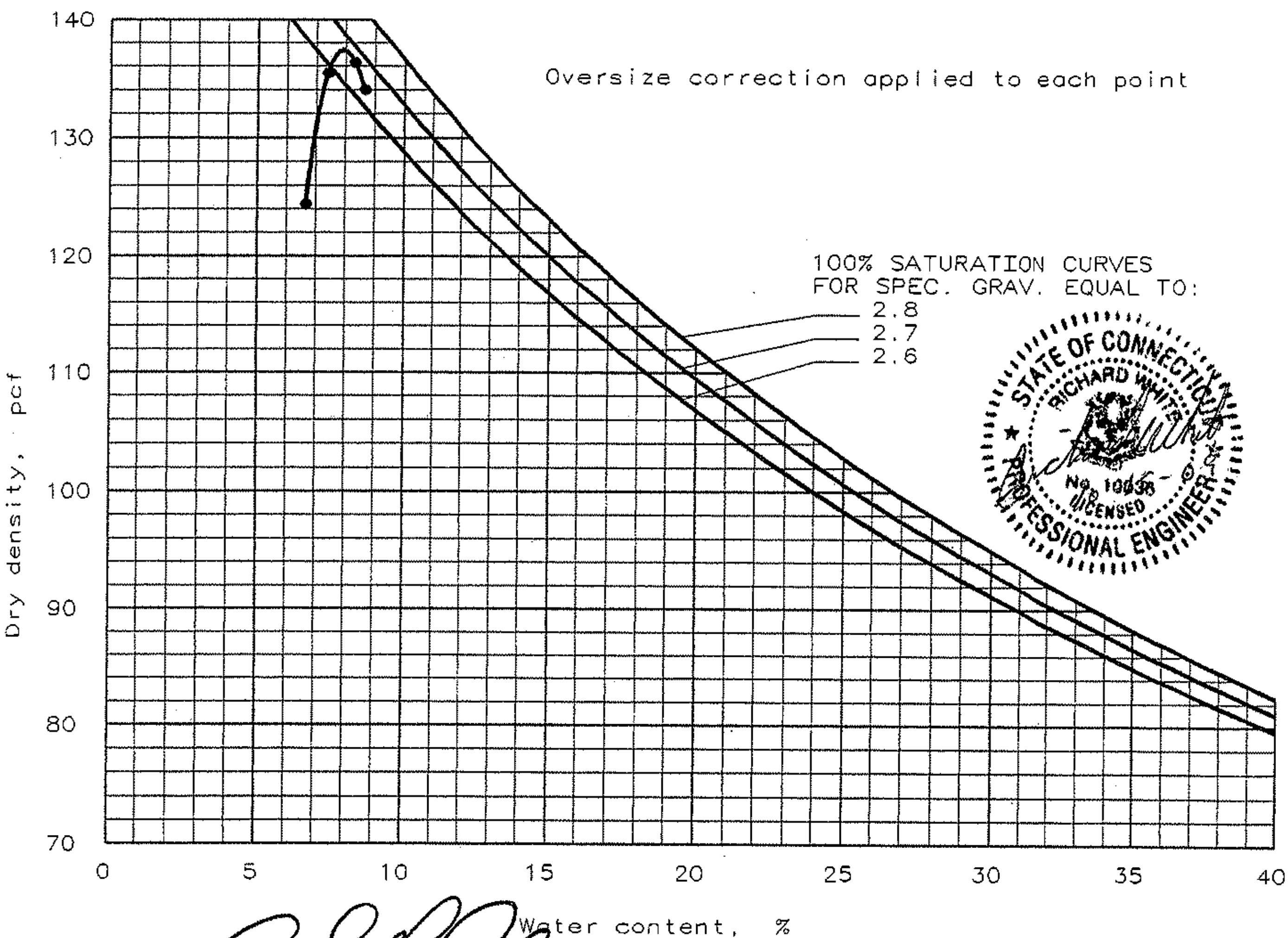
PROCTOR TEST REPORT

PROJECT: SOUTHEAST ELEMENTARY SCHOOL- MANSFIELD
CLIENT: ANCHOR ENGINEERING
LAB NO.: 26326
SOURCE: ON-SITE TEST PIT TP-210
USE: SEPTIC
REMARKS:

REPORT NO.: 004
PROJECT NO.: 9300
DATE: 10/14/09
SAMPLED BY: CLIENT
GRADATION ASSOCIATED WITH THIS SAMPLE: Yes

TEST METHODS: Test specification: ASTM D 1557 Procedure C, Modified
MATERIAL DESCRIPTION: OLIVE/YLW SAND; SOME GRVL; TRACE FINES
%> 3/4 in = 16.0%
TESTED BY: RR/KB

TEST RESULTS
Maximum dry density = 137.4 pcf
Optimum moisture = 7.9 %



REVIEWED BY: 10-15-09

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CT DEP/DPH Falling Head Permeability

Client:	Anchor Engineering	Project No.:	9300
Project:	Southeast Elementary School – Mansfield	Report No.:	005
Technician:	Richard Cashman	Date:	10/19/09
Test Method:	CT DEP/DPH Falling Head Permeability		

STATE OF CONNECTICUT RICHARD WHITE NO. 16036 REGISTERED PROFESSIONAL ENGINEER 10-19-09

Source: On-Site Top Pit 213
Material Description: Yellow/Brown Sand & Gravel; Trace Fines
Lab No.: 26327

Sample ID: Tube 42B
Percent Compaction: 93.4%
Coefficient of Permeability: 26.6 Ft/Day

Sample ID: Tube 80B
Percent Compaction: 94.3%
Coefficient of Permeability: 23.5 Ft/Day

Sample ID: Tube 23B
Percent Compaction: 96.7%
Coefficient of Permeability: 17.8 Ft/Day

pc: Kevin Grindle, Anchor Engineering
bh

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CT DEP/DPH Falling Head Permeability

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Client:	Anchor Engineering	Project No.:	9300
Project:	Southeast Elementary School – Mansfield	Report No.:	006
Technician:	Richard Cashman	Date:	10/20/09
		Revised:	*11/05/09

Test Method: CT DEP/DPH Falling Head Permeability

Source: On-Site Top Pit 210
Material Description: Olive/Yellow Sand; Some Gravel; Trace Fines
Lab No.: 26326

Sample ID: Tube 24B
Percent Compaction: 90.5%
Coefficient of Permeability: 25.6 Ft/Day

Sample ID: Tube 24A
Percent Compaction: 95.2%
Coefficient of Permeability: 3.5 Ft/Day

Sample ID: Tube 17A
Percent Compaction: 98.3%
Coefficient of Permeability: 1.2 Ft/Day

STATE OF CONNECTICUT
JOHN M. WALER
No. 17
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*Sample size is insufficient to run the recommended procedure (ASTM D2434).

Report Revision: *Remark added.

pc: Kevin Grindle, Anchor Engineering
kb

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Soil Compaction Report

Client:	Anchor Engineering	Project No.:	9300
Project:	Southeast Elementary School-Mansfield	Report No.:	007
Subject:	Field Density Determinations ASTM D2922 & D3017	Date:	10/26/09
		Page:	1 of 1
Inspector:	Eric Pittman	Equipment:	MC-3
Material Description:	Olive/Yellow Sand; Some Gravel, Trace Fines	Standard Count:	XiD 0.98
			XiM 1.03
Area Represented:	Adjacent Football Field Corners, Excavation Nos. 304, 303, 301 and 302	Test Mode/Depth:	MD/2"-8"
		Proctor Value:	137.4

Test No.	Location	Elevation	% Moist.	Wet Unit Wt.	Dry Unit Wt.	% Comp.
1	Excavation No. 303	41" Below Existing Grade	4.2	126.3	120.2	87.5
2	Excavation No. 303	41" Below Existing Grade	5.1	123.7	117.7	85.7
3	Excavation No. 304	36" Below Existing Grade	4.4	134.2	128.5	93.5
4	Excavation No. 301	36" Below Existing Grade	4.3	120.8	115.8	84.3
5	Excavation No. 301	36" Below Existing Grade	4.8	122.1	116.5	84.8
6	Excavation No. 302	48" Below Existing Grade	5.1	114.5	109.0	79.3
7	Excavation No. 302	48" Below Existing Grade	4.3	116.8	112.0	81.3

Density tests were done pursuant Anchor Engineering's assessment of site for a septic system. Excavation was freshly dug in the morning. Material at this elevation appeared to be a natural fluvial deposit.

STATE OF CONNECTICUT PROFESSIONAL ENGINEER LICENSED No. 10036

pc: Kevin Grindle, Anchor Engineering
ag

Independent Materials Testing Laboratories, Inc. T 860.747.1000 mail@imtlct.com
57 N. Washington St., P.O. Box 745, Plainville, CT 06062 F 860.747.6455 www.imtlct.com

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Hydraulic Capacity Analysis

Solve for: Sewage flow estimates

Given: • Town of Mansfield proposes a 800 student school

- Table #4 of the CT DPH Tech. Standards
  8 gpd / per pupil
- Additional 3 gpd/pp for full kitchen facilities
- Additional 3 gpd/pp for shower facilities

Town officials indicate proposed school will have kitchen, will not have showers.

A conservative calculation of 11 gpd/pp shall be applied

Conclusion:

800 students x 11 gpd/pp = 8,800 gpd

Projected daily sewage flow for the proposed school shall be = 8,800 gal. per day

Prepared By: KRG

Checked By:

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Hydraulic Capacity Analysis

Solve for: Hydraulic Conductivity

Given:
- Soil mapping published by NRCS represent Merrimac soils encompassing cleared portion of site
- Merrimac soils consist of sands & gravel, excessively drained with hydraulic conductivity from 12-200 FT/DAY
- Field samples provided to IMTL for lab testing ranged in hydraulic conductivity from 1.2-26.6 FT/DAY @ 90-98% compaction
- In place density testing yielded 85% compaction
- Laboratory tests generally yield lower results by a factor of 2 to 3

Conclusion:

Apply factor of safety = 3 to lab samples

26.6 FT/DAY x 3 = 79.8 FT/DAY

Say 90 FT/DAY

Prepared By: KRG

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Hydraulic Capacity Analysis

Solve for: Hydraulic Grade

Given: 11 weeks of groundwater monitoring yielded slopes of 1.2% - 1.6% w/ average of 1.5%

Conclusion: Hydraulic Grade shall be 1.5% (0.015 FT/FT)

Solve for: Seasonally High Groundwater (SHGT)

Given: USGS monitoring well 3/4 miles from site has 60 years of data to review (CT-MS-19)

- highest water elevation recorded in USGS well 7.85' (or 252.15)
- readings on our site at that time would have been (approx. 40' below surface elevation) ^232.15

Conclusion: Conservatively assume SHGT is 36' below grade

Solve for Depth of Unsaturated Soil

Given: Assume SWAS is 4' deep into grade

SHGT = 36' below grade

Conclusion 36' - 4' = 32' Say 32' unsaturated soil

Prepared By: KRG Checked By:

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Hydraulic Capacity Analysis

Solve for: Hydraulic Capacity

Given: Hydraulic Conductivity (K) = 12 FT/DAY

Hydraulic Gradient (I) = 0.015 FT/FT

School Discharge = 8,800 gpd = 1,176 FT^3/DAY

Conclusions:

Rainwater Inflow - Assume 0.01 FT/DAY

15,000 SF (System Area)

0.01 FT/DAY X 15,000 SF = 150 FT^3/DAY

Total Discharge

1,176 FT^3/DAY + 150 FT^3/DAY = 1326 FT^3/DAY

Maximum Unsaturated Soil depth = 32'

$$\frac{1326\ FT^3/DAY}{12\ FT/DAY \times 0.015\ FT/FT \times 230} = 32'$$

Therefore Minimum Leaching System Spread = 230' LF

Prepared By: KRG

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SWAS DESIGN

Solve for: Long term Acceptance Rate (LTAR)

Given: LTAR = 5K - [1.2/(Log10 K)]

K = FT/MIN

12 FT/DAY = 0.0083 FT/MIN

MAX LTAR per DEP = 0.8 = 28 FT/DAY

Conclusions:

LTAR @ 12 FT/DAY

5 X 0.0083 - [1.2/(Log10 .0083)] = 0.62 gpd/LF

LTAR Range from 0.62 to 0.80 gpd/LF

Solve for: Effective Loading Area (ELA)

Given: Design flow 8,800 gpd

MIN LTAR of 0.62 - MAX LTAR 0.80

Conclusions: 8,800 ÷ 0.62 = 14,194 SF MIN

8,800 ÷ 0.80 = 11,000 SF MIN

ELA Range from 11,000 to 14,200

Prepared By: KRB

Checked By:

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SWAS Design

Effective Leaching Area (ELA)

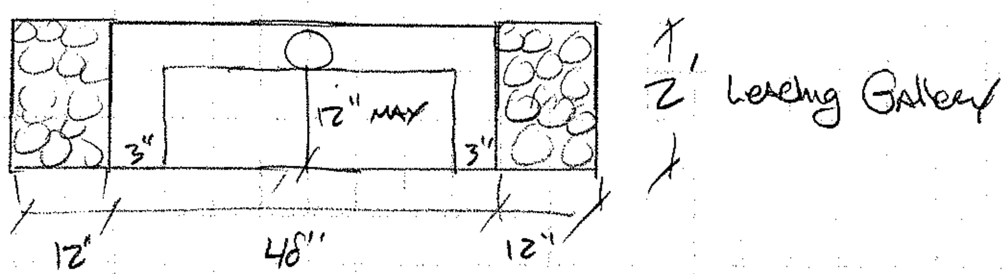
GIVEN: EFFECTIVE Sidewall height = Leaching Bottom to inlet invert
not more than 1'-0"

Stone masked sidewall = 2 times sidewall height = 2X1 = 2'

Stone masked bottom = Contact Bottom Area of stone = 2'

Unmasked bottom = INSIDE Clear Area

ELA/LF = 1.5X unmasked bottom + 1X stone masked bottom + 1X effective stone masked sidewalls



ELA/LF = (1.5X3.5)+(1X2)+(1X2) = 9.25 SF/LF

Prepared By: KRG

Checked By:

SEPTIC SUITABILITY REPORT

FOR THE

VINTON ELEMENTARY SCHOOL SITE
306 STAFFORD ROAD
MANSFIELD, CT

PREPARED FOR

TOWN OF MANSFIELD
FACILITIES MANAGEMENT DEPARTMENT

APRIL 19, 2012

STATE OF CONNECTICUT
BRANDON J. HANDFIELD
No. 24564
LICENSED
PROFESSIONAL ENGINEER

4/24/12

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EXECUTIVE SUMMARY

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into two (2) buildings, one of which will be constructed on the Vinton Elementary School Site located at 306 Stafford Road. This consolidated school will accommodate up to 375 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. was retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis was performed through data collection, field testing and preliminary subsurface sewage disposal system (SSDS) calculations.

Preliminary soil testing was performed to determine whether the existing soils have sufficient capacity to carry the septic tank effluent into subsurface soils. The results of this preliminary testing along with estimates of the proposed sewage flow were utilized to evaluate the suitability of a subsurface sewage disposal system on this site. The following parameters indicate that the site has adequate hydraulic capacity to accommodate the SSDS.

- Percolation Rate = 5.1 to 10.0 min./in.
- Depth to Restrictive Layer = 65+ inches
- School Discharge (Q) = 4,125 gpd (375 Students)
- Effective Leaching Area (ELA) = 3,406.25 sq ft

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths and etc., it appears that the site can adequately accept the wastewater flows of a 375 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated in the following report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDPH.

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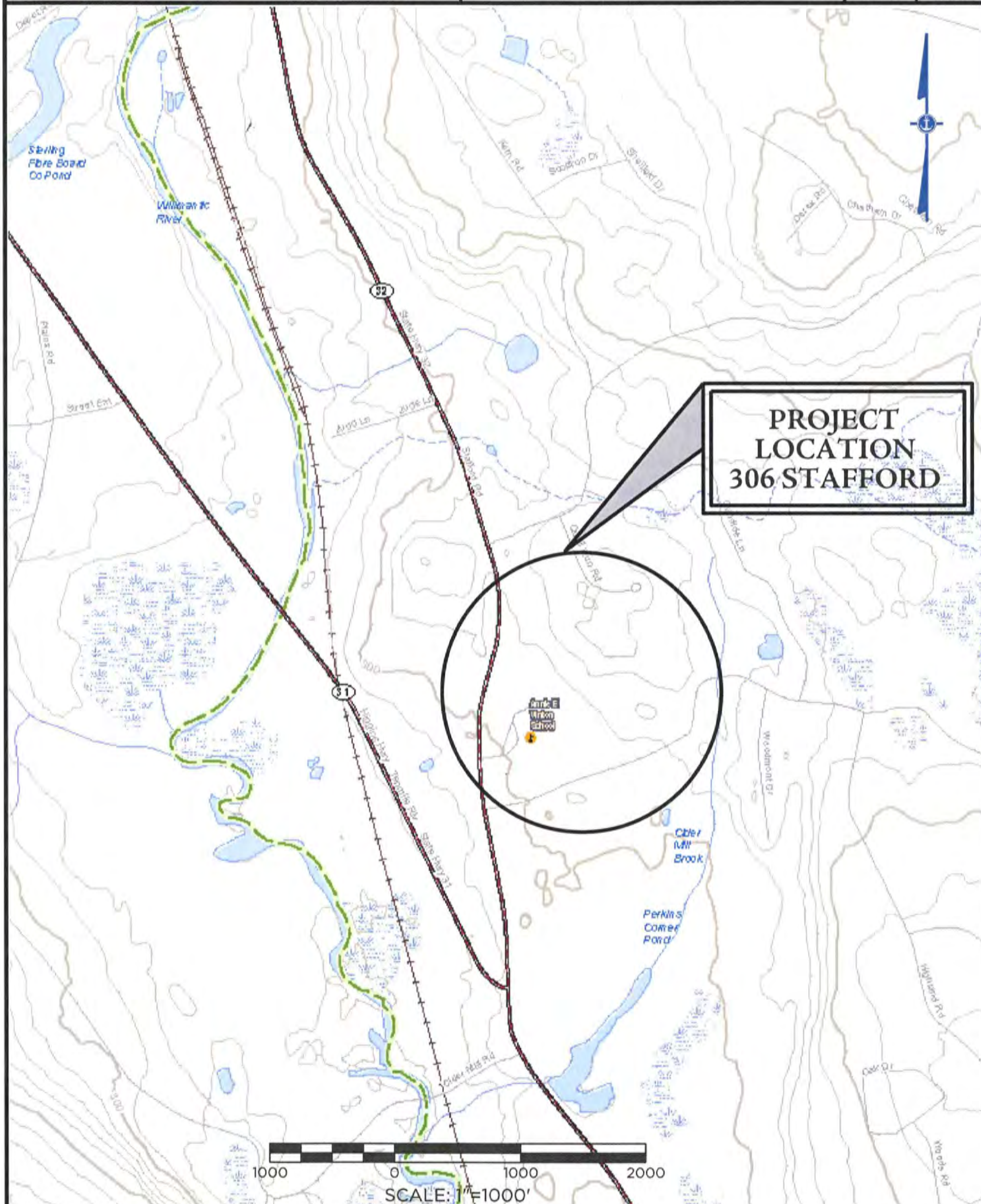
SITE LOCATION MAP

VINTON ELEMENTARY SCHOOL
306 STAFFORD ROAD

FIGURE 1	
PROJECT	DATE
486-06	4/18/12



INTRODUCTION

The Town of Mansfield is exploring the feasibility of consolidating the separate elementary schools in Town into two (2) buildings, one of which will be constructed on the Vinton Elementary School Site located at 306 Stafford Road. This consolidated school will accommodate up to 375 elementary school students, faculty and staff.

Anchor Engineering Services, Inc. has been retained by the Town of Mansfield Facilities Management Department to analyze the septic suitability of the subject site. This analysis generally consists of the following:

1. Data collection
2. Soil testing
3. Sewage flow estimates for an 375 student elementary school
4. Evaluation of septic suitability

The following report has been prepared to summarize the work completed and provides an opinion of the septic suitability of the site based upon the information compiled to date.

DATA COLLECTION

Anchor Engineering collected data on the subject parcel through the compilation of available public information and field investigations.

COMPILATION OF EXISTING INFORMATION

The following information was obtained from public sources listed below:

- Connecticut Department of Energy & Environmental Protection (GIS data)
    - Natural Diversity Database
- USDA Natural Resource Conservation Service
    - Major Soil Types
    - Engineering Properties of Identified Soils
- Eastern Highlands Health District, Mansfield Office
    - 1970 Annie Vinton Elementary Waste Water Disposal System design
    - 1989 result analysis summary of existing subsurface sewage disposal systems
    - 1990 Vinton School Soil Testing
- Town of Mansfield
    - Additions and Alterations of the Mansfield Public Schools 2/8/90.
    - Mansfield Schools Well Location Schematics 6/6/05
    - Well Pump House Additions, Site Plan ,Goodwin School 2/8/06
    - Annie Vinton Elem. School Schematics, The Lawrence Associates 2/9/11

Based upon a review of the information obtained from the above mentioned sources, it was determined that additional field investigations were necessary to determine the septic suitability of the site. The testing methods described below were selected to allow for classification of existing soils and the determination of groundwater, mottling, ledge and/or other restrictive depths.

SOIL TESTING

DEEP TEST PITS

Seven (7) deep hole observation test pits were excavated throughout the site by Town Of Mansfield Public Works Department and witnessed by Anchor Engineering, Eastern Highlands Health District and Town of Mansfield Facility Maintenance staff. The test pits were performed to examine the soil at close range and identify characteristics such as color, firmness, particle size and moisture content and to record the presence of restrictive layers.

The test pits ranged in depth from 37" to 110". Six of the seven test pits had no apparent restrictive layers, such as ledge, hardpan or seasonally high groundwater. Ledge was observed in one of the test pits (TP-106V). In general, the observed soils consisted of a gray medium to coarse sand with cobbles and some gravel and overlain by topsoil and loam or topsoil. These observed soil types are consistent with NRCS published soil mapping, which indicates the presence of Sutton Fine Sandy Loam or Canton and Charlton Soils in the vicinity of the site. The deep test pit data logs can be found in Appendix B.

Canton and Charlton soils generally consist of coarse-loamy over sandy gravelly melt-out till derived from granite and/or schist and/or gneiss and are well drained, with a hydraulic conductivity ranging from 4.0 to 11.9 feet/day within the underlying soil strata. Observations made in the field during deep hole observation pit testing generally confirm the presence of soils consistent with the Canton and Charlton Series.

Sutton soils generally consist of coarse-loamy melt-out derived from granite and/or schist and/or gneiss and are moderately well drained, with a hydraulic conductivity ranging from 1.1 to 11.9 feet/day within the underlying soil strata. Observations made in the field during deep hole observation pit testing generally confirm the presence of soils consistent with the Sutton Series.

PERCOLATION TEST DATA

Three in-situ percolation tests were performed at the site by Anchor Engineering on April 3, 2012. A summary of results is as follows. Refer to Appendix B expanded data information.

	Test P-101V	Test P-102V	Test P-104V
Percolation Rate	5.1 to 10.0 Min./In.	1.1 to 5.0 Min./In.	5.1 to 10.0 Min./In.

Table No. 1 – Percolation Test Result

FALLING HEAD TEST DATA

Soil samples obtained from deep hole observation test pits were analyzed by Anchor Engineering to determine perrmiability. Two in-situ 1½" diam. by 6" long core samples were obtained at a depth of 56" and 68" and a falling head permeability test was conducted. Results of the falling head permeability tests are provided in the table below:

	Test Hole 103V	Test Hole 107V
Coefficient of Permeability	35.8 Ft/Day	9.3 Ft/Day

Table No. 2 – Permeability Test Result

The in-situ core sample obtained from the site was delivered intact therefore the sample was not re-compacted as is often done. Therefore a re-compaction correction factor was not applied to the results. The permeability of **9.3 ft/day** falls within the range for the Canton and Charlton Series (4.0 to 11.9 ft/day) published by the NRCS while 35.8 ft/day is slightly higher than published data.

GROUNDWATER STANDPIPE INSTALLATION & MONITORING

Two (2) shallow groundwater monitoring wells were installed by Mansfield DPW and witnessed by Anchor staff. The wells consisted of the installation of 10 foot lengths of 4" diameter PVC pipes in the deep test pits prior to backfilling. A brief summary of the well data is provided below.

Monitoring Well	Observed GW Depth	Total Well Depth
MW-101V	N/A	60"
MW-104V	N/A	110"

Groundwater depths within the monitoring wells were measured on 4/03/12 and 4/17/12. Results on both days revealed no measurable groundwater, indicating that the actual ground water elevation during this time period is beyond the reaches of installed wells.

SEWAGE FLOW ESTIMATES

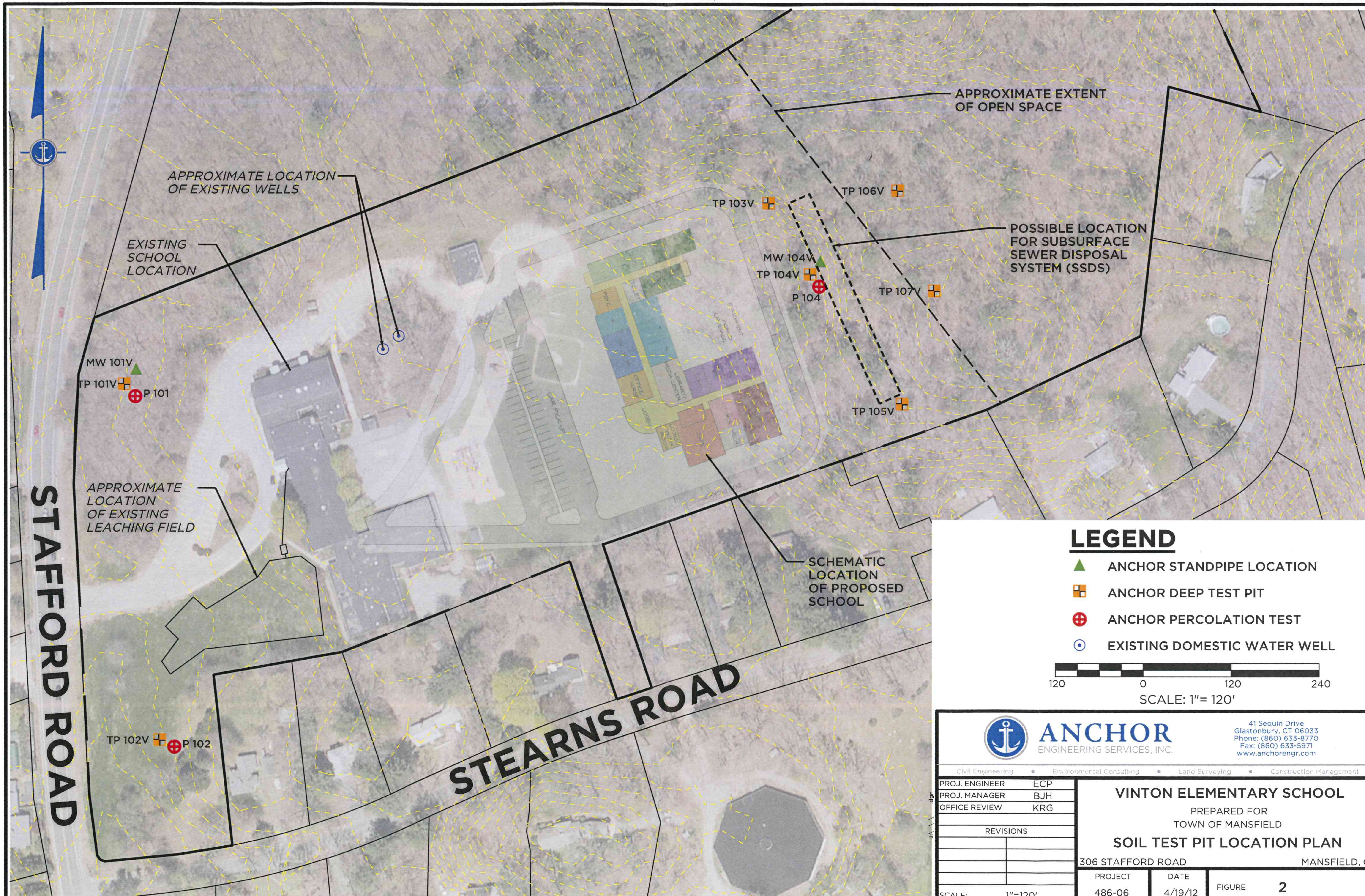
SEWAGE FLOW ESTIMATES

The Town of Mansfield has stipulated that the Subsurface Sewage Disposal System (SSDS) required for the proposed school will need to be designed to accommodate up to 375 elementary school students.

Sewage design flows for an elementary school, as provided in Table No. 4 of the Connecticut Public Health Code, Regulations and Technical Standards for Subsurface Sewage Disposal Systems, is 8.0 gallons per day/per pupil (gpd/pp). Additional design flows to be considered include those resulting from kitchen facilities (+3.0 gpd/pp) and/or shower facilities (+3.0 gpd/pp).

As a conservative measure, a total sewage design flow of 11.0 gpd/pp was used in consideration of the base flow and the likely presence of full kitchen facilities in the new school. Shower facilities were not considered in the study as they are not typical for an elementary school. The projected daily sewage flow for the proposed school is **4,125 gpd**.

Prior to final design, it is recommended that water usage data for the three (3) existing Mansfield elementary schools be compiled to confirm or adjust the conservative design flow utilized in this preliminary study.



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PROJ. ENGINEER	ECP
PROJ. MANAGER	BJH
OFFICE REVIEW	KRG

REVISIONS

SCALE: 1"=120'

VINTON ELEMENTARY SCHOOL

PREPARED FOR
TOWN OF MANSFIELD

SOIL TEST PIT LOCATION PLAN

306 STAFFORD ROAD — MANSFIELD, CT

PROJECT	DATE	FIGURE
486-06	4/19/12	2

EVALUATION OF SEPTIC SUITABILITY

The SSDS required for the proposed school will be designed to accommodate up to 375 elementary school students in accordance with the CT Public Health Code. The following preliminary calculations and determinations were performed to determine the septic suitability of the site.

DESIGN DATA

The following summary of data was collected during on the site investigation performed on April 3, 2012. Refer to Appendix B expanded data information.

Depth to Mottling:	N/A
Depth to Ledge:	N/A (System will not be located in the vicinity of TP-106V)
Depth to Groundwater:	N/A
Percolation Rate:	5.1 to 10.0 Min./In.

EFFECTIVE LEACHING AREA (ELA)

The effective leaching surface area (ELA) of a SSDS is the interface area between the soil and the facilities used for applying the pretreated wastewater to the soil (the leaching system). For the purposes of this study a range of anticipated effective leaching area values was calculated.

Daily Design Flow = 4,125 gal/day
ELA = Design Flow/Application Rate
Use App. Rate of 1.5 for Base Student Flow (Table 8, CT Public Health Code)
Use App. Rate of 0.8 for Kitchen Flow (Table 7, CT Public Health Code)
ELA = 3,000 gpd/1.5 + 1,125 gpd/0.8 = **3,406.25 Sq Ft**

Based upon available site area for construction of the SSDS it appears that the site can accommodate a system with an effective area of 3,406.25 square feet.

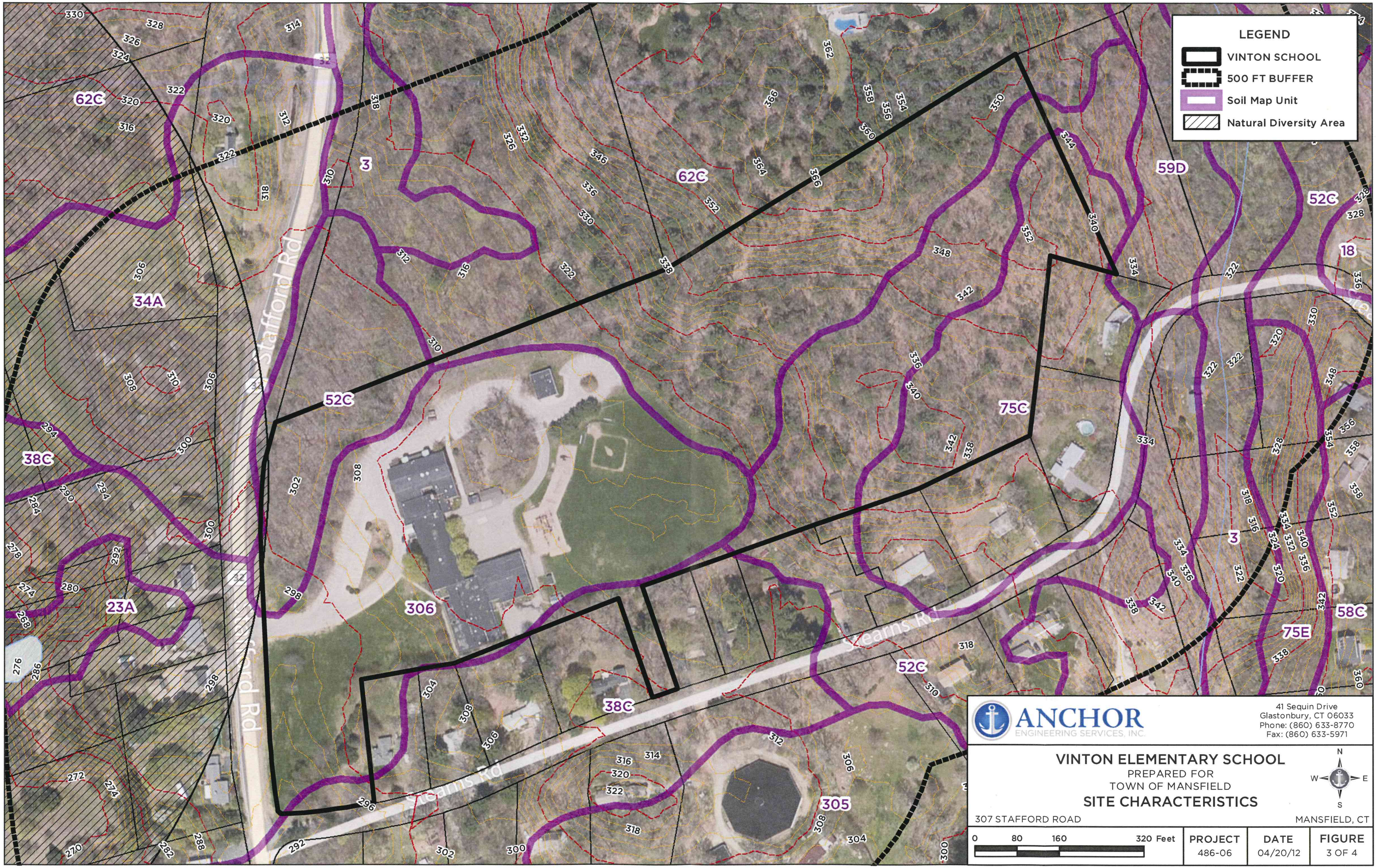
MINIMUM LEACHING SYSTEM SPREAD (MLSS)

The minimum leaching system spread (MLSS) of a SSDS is the required minimum length of leaching system for effective effluent application to the receiving soils based on hydraulic gradient and percolation rates of the receiving soils as well as flow factors of the design building. MLSS is not applicable on sites having a receiving soil depth that exceeds 60 inches.

Minimum depth to a restrictive layer encountered on this site is 37" (TP-106V). Since there are much more suitable areas on site the SSDS, the vicinity adjacent to TP-106V can be avoided, therefore MLSS is not applicable for this system.

PRELIMINARY OPINION OF SITE SEPTIC SUITABILITY

Based on our observations of the site and the surrounding area, including topography, soils, groundwater depths, and etc., it appears that the site can adequately accept the wastewater flows of a 375 student elementary school. This opinion is based upon the data obtained and preliminary calculations performed as part of this feasibility study. As stated throughout this report, additional investigations and calculations will be necessary as part of the final design in order to fully satisfy the requirements of the CTDPH.


LEGEND
VINTON SCHOOL
500 FT BUFFER
Soil Map Unit
Natural Diversity Area
Stafford Rd
Stearns Rd
62C
3
34A
38C
23A
52C
306
75C
59D
18
58C
75E
305
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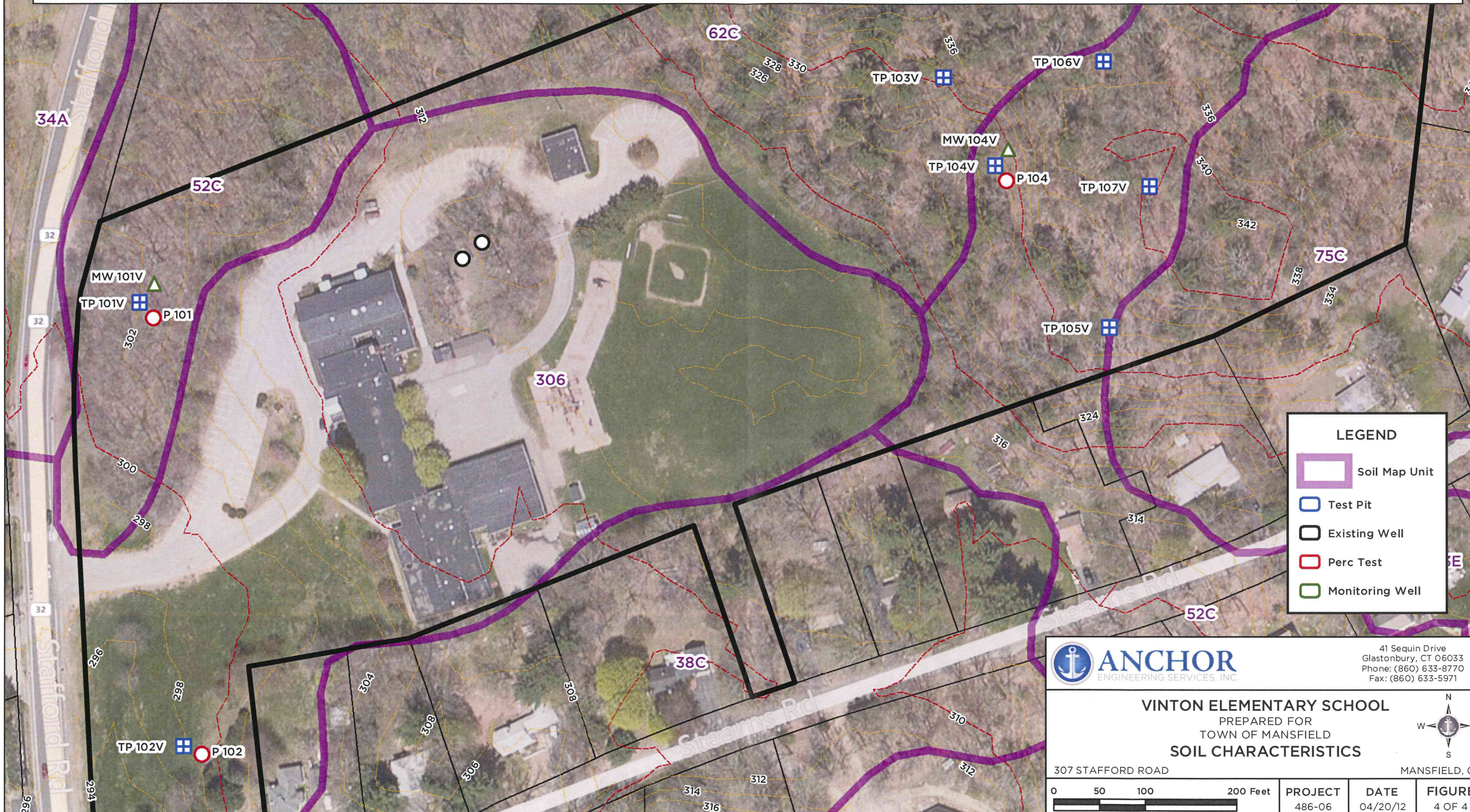
SITE CHARACTERISTICS
307 STAFFORD ROAD
MANSFIELD, CT
0 80 160 320 Feet
PROJECT 486-06
DATE 04/20/12
FIGURE 3 OF 4

Map Unit	Map Unit	Inland Wetland	Hydric	Potential SSSD	Soil Parent Material	SRM Dry Basins	SRM Infiltration	SRM Pervious Paving	SRM Wet Basins	Drainage Class	Flooding Class
62C	Canton and Charlton soils, 3 to 15 percent slopes, extremely stony	Other	Other	High Potential	Melt-out Till	Least Suitable	Least Suitable	Somewhat Suitable	Least Suitable	Well drained	Other
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	Other	Other	Low Potential	Melt-out Till	Somewhat Suitable	Least Suitable	Least Suitable	Least Suitable	Moderately well drained	Other
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	Other	Other	Very Low Potential	Melt-out Till - Shallow to Bedrock	Least Suitable	Least Suitable	Least Suitable	Least Suitable	Well drained	Other
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	Other	Other	Low Potential	Melt-out Till	Somewhat Suitable	Least Suitable	Least Suitable	Least Suitable	Moderately well drained	Other
306	Udorthents-Urban land complex	Other	Other	Not Rated	Urban Influenced	Not Rated	Not Rated	Not Rated	Not Rated	Well drained	Other
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes	Other	Other	Low Potential	Glaciofluvial	Least Suitable	Least Suitable	Somewhat Suitable	Least Suitable	Excessively drained	Other



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VINTON ELEMENTARY SCHOOL
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SOIL CHARACTERISTICS

307 STAFFORD ROAD | MANSFIELD, CT

PROJECT	DATE	FIGURE
486-06	04/20/12	4 OF 4

Appendix A1

Data Collection

Connecticut Department of Energy & Environmental Protection

Appendix A2

Data Collection

USDA Natural Resource Conservation Service

State of Connecticut

60B—Canton and Charlton soils, 3 to 8 percent slopes

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Canton and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent

Description of Canton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 3 inches: Gravelly fine sandy loam
3 to 15 inches: Gravelly loam
15 to 24 inches: Gravelly loam
24 to 30 inches: Gravelly loam
30 to 60 inches: Very gravelly loamy sand

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 4 inches: Fine sandy loam
4 to 7 inches: Fine sandy loam
7 to 19 inches: Fine sandy loam
19 to 27 inches: Gravelly fine sandy loam
27 to 65 inches: Gravelly fine sandy loam

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Chatfield

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear

Hollis

Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed, silt loam surface

Percent of map unit: 2 percent

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

State of Connecticut

61C—Canton and Charlton soils, 8 to 15 percent slopes, very stony

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Canton and similar soils: 45 percent
Charlton and similar soils: 35 percent
Minor components: 20 percent

Description of Canton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy and gravelly melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 3 inches: Gravelly fine sandy loam
3 to 15 inches: Gravelly loam
15 to 24 inches: Gravelly loam
24 to 30 inches: Gravelly loam
30 to 60 inches: Very gravelly loamy sand

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 4 inches: Fine sandy loam
4 to 7 inches: Fine sandy loam
7 to 19 inches: Fine sandy loam
19 to 27 inches: Gravelly fine sandy loam
27 to 65 inches: Gravelly fine sandy loam

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Chatfield

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear

Hollis

Percent of map unit: 5 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

State of Connecticut

51B—Sutton fine sandy loam, 2 to 8 percent slopes, very stony

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Sutton and similar soils: 80 percent
Minor components: 20 percent

Description of Sutton

Setting

Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 6 inches: Fine sandy loam
6 to 12 inches: Fine sandy loam
12 to 24 inches: Fine sandy loam
24 to 28 inches: Fine sandy loam
28 to 36 inches: Gravelly fine sandy loam
36 to 65 inches: Gravelly sandy loam

Minor Components

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Canton

Percent of map unit: 4 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex

Paxton

Percent of map unit: 3 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex

Leicester

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Woodbridge

Percent of map unit: 2 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear

Rainbow

Percent of map unit: 2 percent
Landform: Drumlins, hills
Down-slope shape: Linear
Across-slope shape: Concave

Narragansett

Percent of map unit: 1 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Sewage Disposal

This table shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Sewage Disposal

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Sewage Disposal– State of Connecticut					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
51B—Sutton fine sandy loam, 2 to 8 percent slopes, very stony					
Sutton	80	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
				Slope	0.68
57B—Gloucester gravelly sandy loam, 3 to 8 percent slopes					
Gloucester	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Slope	0.92

Sewage Disposal– State of Connecticut					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
58C—Gloucester gravelly sandy loam, 8 to 15 percent slopes, very stony					
Gloucester	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Filtering capacity	1.00	Seepage	1.00
		Slope	0.63		
60B—Canton and Charlton soils, 3 to 8 percent slopes					
Canton	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
Charlton	35	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
61C—Canton and Charlton soils, 8 to 15 percent slopes, very stony					
Canton	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Charlton	35	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Appendix A3

Data Collection

Eastern Highlands Health District, Mansfield Office

EASTERN HIGHLANDS HEALTH DISTRICT

X	Mansfield	4 South Eagleville Road, Mansfield, CT 06268	Tel: (860)429-3325
	Coventry	1712 Main Street, Coventry, CT 06238	Tel: (860)742-4064
	Bolton	222 Bolton Center Road, Bolton, CT 06043	Tel: (860)649-8066

INVESTIGATION FOR SEWAGE DISPOSAL SYSTEM

Owner: Mansfield

Date: 3/11/99

Location: Vinton School

PERCOLATION TESTS:

Hole # ___ Pit # ___	Hole # ___ Pit # ___
Presoak ___ hrs.	Presoak ___ hrs.
Depth ___ Mark ___	Depth ___ Mark ___
Rate ___ min/in	Rate ___ min/in

SOIL TESTS OBSERVED BY: R.L. Miller

Test Pit: A Depth: 84
Ledge: NONE Seepage: 32
Mottling: 48 (Very faint) Roots: 46

Depth	Observation
0-4	Topsoil
4-48	brown silt loam, friable
48-84	gray loamy sand firm Till

Test pit D No ledge, seepage or mottling

Depth	Observation
0-4	Topsoil
4-26	brown silt loam friable
24-84	gray loamy sand firm Till

Test Pit: B Depth: 84
Ledge: NONE Seepage: NONE
Mottling: NONE Roots: 36

Depth	Observation
0-4	Topsoil
4-28	brown silt loam friable
28-84	gray loamy sand firm Till
	20% cobbles

Test Pit: C Depth: 84
Ledge: NONE Seepage: NONE
Mottling: NONE Roots: 40

Depth	Observation
0-4	Topsoil
4-40	brown silty loam friable
40-84	gray loamy sand firm Till
	40% large cobbles


Town of Mansfield, CT - 306 Stafford Rd
A
B
D
C
306
31.81.1
Sleeper Road
Location: 306 STAFFORD RD ID: 31.81.1

ed lally and associates

CIVIL ENGINEER • 111 PROSPECT HILL ROAD • WINDSOR, CONN. 06095 • (203) 688-24

March 17, 1989

Robert Mocarsky
Schoenhardt Architects
One Massaco Place
Simsbury, CT 06070

Re: Northwest, Southeast, and Annie Vinton
Elementary Schools
Mansfield, CT

Dear Mr. Mocarsky:

The following summarizes the results of analysis of existing subsurface sewage disposal systems at the above referenced schools. The analysis was based upon Public Health Code Criteria, review of original design plans, discussion with Dr. Rein Laak of Mansfield, one of the original design engineers, and projected population data supplied by your office.

Northwest School

Two existing 4000 gallon septic tanks have adequate capacity for the proposed increase in flow.

The existing leaching area is slightly short of that required by design calculations. The additional area required (44 sq ft) is so small, however, and because the design calculation is conservative, the existing systems can be considered adequate for the proposed addition.

Annie Vinton School

Existing septic tank volume of about 6500 gallons is more than adequate to accommodate the proposed increase.

The existing leaching field is also adequate to handle the proposed increase.

Southeast School

The existing septic tank is marginally adequate for the proposed increase. Design plans indicate an existing 4042 gallon tank. A minimum of 4200 gallons is required. If the maximum projected population is realized, an additional 1000 gallon tank should be installed.

The existing leaching area appears to be undersized for the proposed increase. Assuming the existing system functions properly, an additional required leaching area of 2200 sq. ft. is estimated. Soil testing and site engineering would be required to prepare a design.

Calculations are attached. Please call should you have questions or comments.

Very truly yours,

Michael J Garbolski

Michael J. Garbolski, P.E.

Att.

ED LALLY & ASSOCIATES
111 Prospect Hill Road
WINDSOR, CONNECTICUT 06095
(203) 688-2413

JOB SCHOENHARDT 80025I
SHEET NO. 1 OF 4
CALCULATED BY MJG DATE 3-17-89
CHECKED BY DATE
SCALE

MANSFIELD ELEMENTARY SCHOOLS

Evaluation of Existing Septic Systems

Assumptions:

1) Max. school population from Architect
2) Wastewater generation = 15 gpcpd
3) Existing systems scaled or estimated from previous plans.
4) Soil data taken from previous plans or SCS Soil Survey.
5) Existing systems may be utilized for expansion.
6) No additional kitchen facilities are proposed.

Northwest School

Proposed pop. = 320 students + 22 staff
= 342 p

Design flow Q_d = 342 p × 15 gpcpd
= 5130 gpd

Septic Tank $V_{req'd}$ = 5130 gal. → 6000 gal.

Existing Tanks = 2 - 4000 gal. = 8000 > 6000 O.K.

PRODUCT 205-1 NEBS Inc., Groton, Mass. 01471. To Order PHONE TOLL FREE 1-800-225-6380

ED LALLY & ASSOCIATES
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(203) 688-2413

Leaching System

Perc. Rate from existing plan = 15 min./in.

Application rate = 1.1 gpd/S.F.

Area req'd = 5130/1.1 = 4664 S.F.

Existing Area

original 10 trenches x 70' l x 3' w = 2100 s.F.

1965 add. 10 trenches x 75' l x 3' w = 2250 s.F.

Connected ends = 2 x 5 x 9' x 3' = 270 s.F.

4620 S.F.

Deficiency = 4664 - 4620 ≅ 44 S.F.

44 SF ≅ 15' of 3' wide trench.

ED LALLY & ASSOCIATES
111 Prospect Hill Road
WINDSOR, CONNECTICUT 06095
(203) 688-2413

JOB S-0025 I
SHEET NO. 3 OF 4
CALCULATED BY MJG DATE 3-17-89
CHECKED BY ______ DATE ______
SCALE ______

Annie Vinton School

Proposed pop. = 320 students + 22 staff = 342

Q_d = 342 p × 15 gpcpd = 5130 gpd

Septic Tank $V_{req'd}$ = 5130 gal → 6000 gal.

Existing tank V = 6550 gal. > 6000 O.K.

Leaching System 1970 Plan

18 trenches × 60' l × 3' w = 3240 S.F.

8 trenches × 65' l × 3' w = 1560 S.F.

11 trenches × 50' l = 550 S.F.

Σ 5350 S.F.

Perc. Rate = 15 min/in.

Application rate = 1.1 gpd/SF

Area req'd = 5130/1.1 = 4664 < 5350 O.K.

ED LALLY & ASSOCIATES
111 Prospect Hill Road
WINDSOR, CONNECTICUT 06095
(203) 688-2413

Southeast School

Proposed pop. = 260 students + 20 staff = 280

Q_d = 280 p × 15 gpcpd = 4200 gpd

Septic Tank V req'd = 4200 gal

Existing tank = 4042 gal < 4200 gal.

∴ Add 1000 gal. tank

Leaching system

Assume application rate = 1.1 gpd/SF

Area req'd = 4200/1.1 = 3818 SF

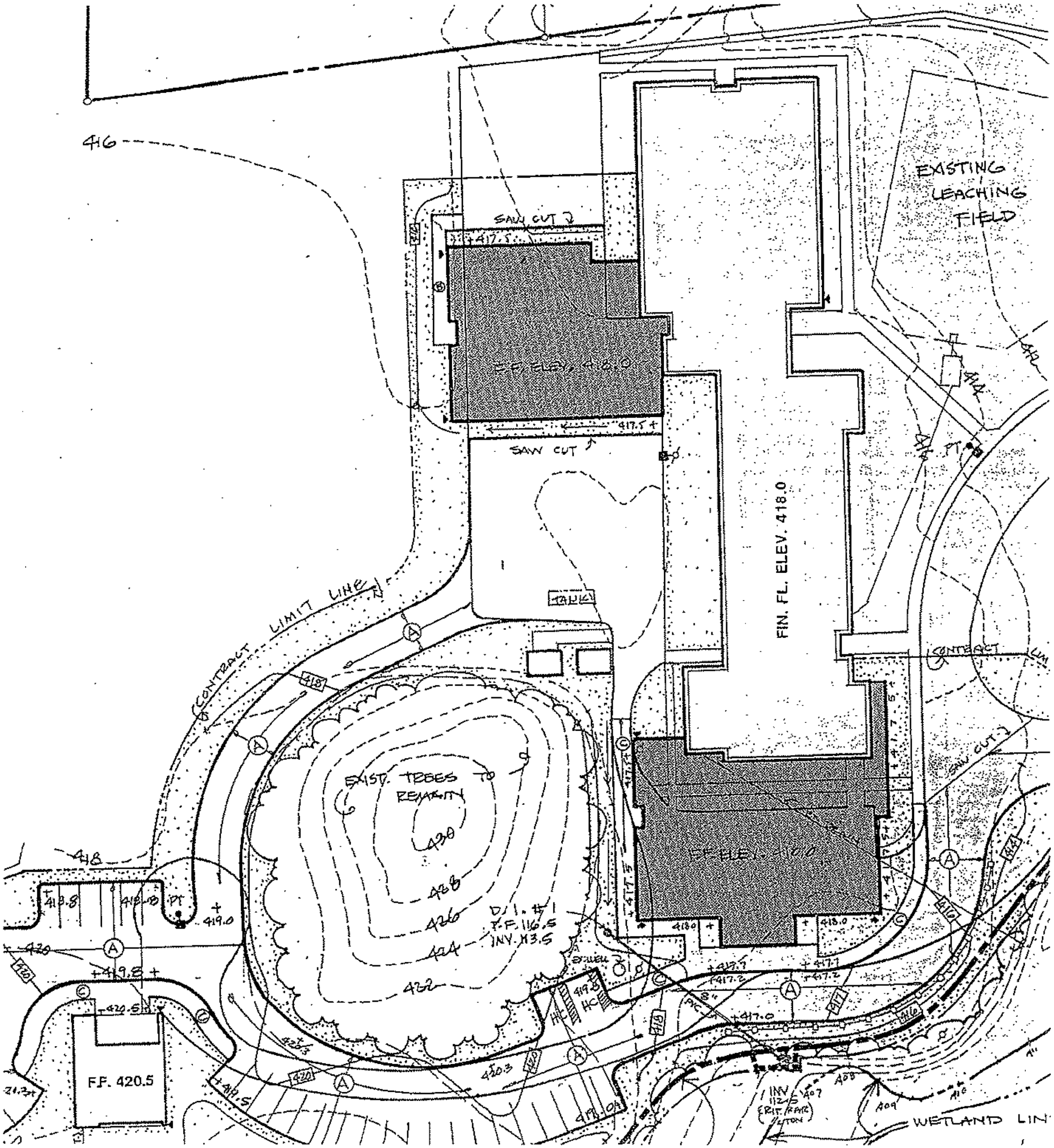
Existing Area

8 Trenches × 70' l × 3' w = 1680 SF

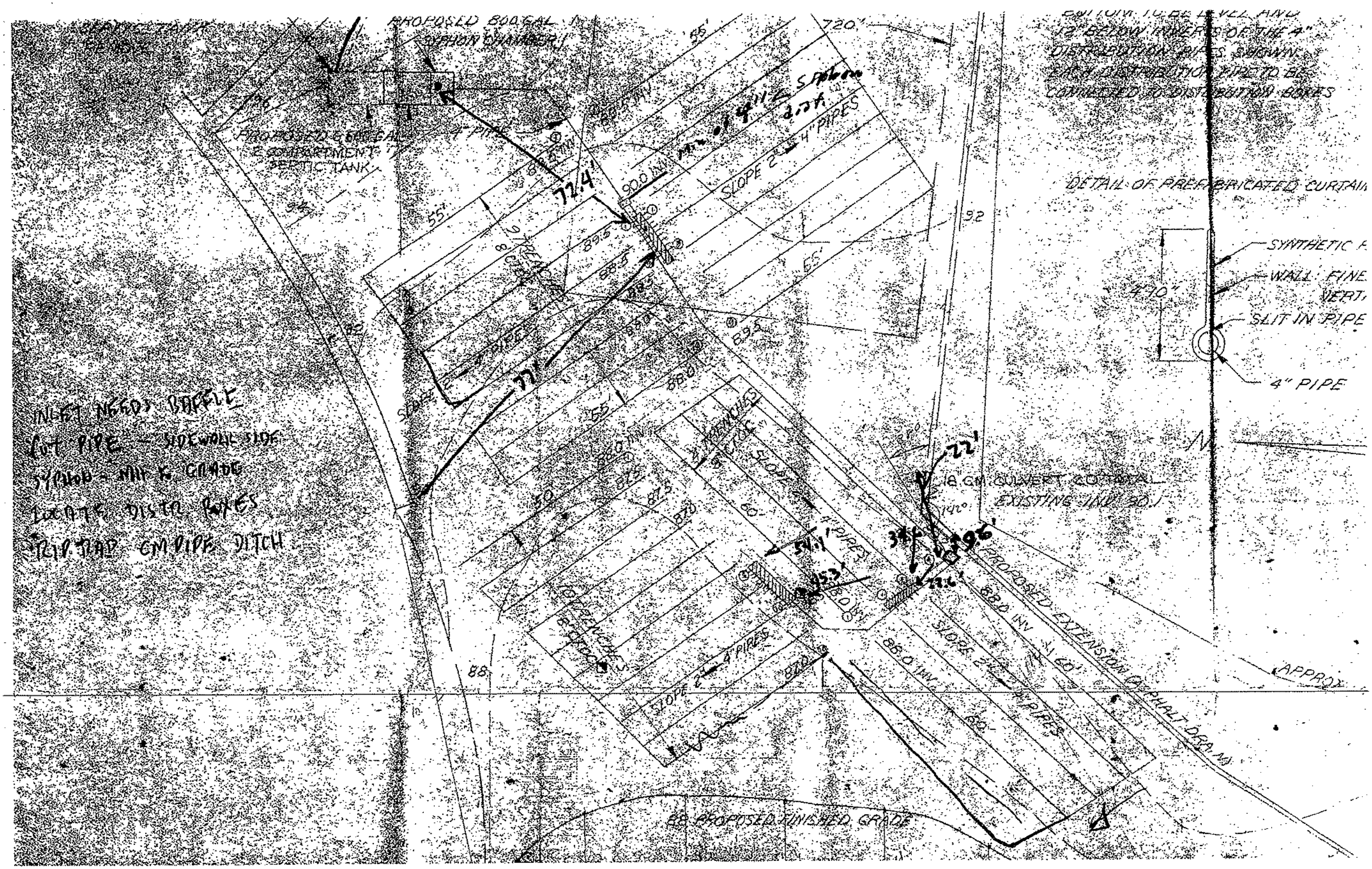
Add. area req'd = 3818 − 1680 = 2138 S.F.

$\frac{2138}{3(75)}$ = 9.5 (9½ trenches 75' l × 3' w)

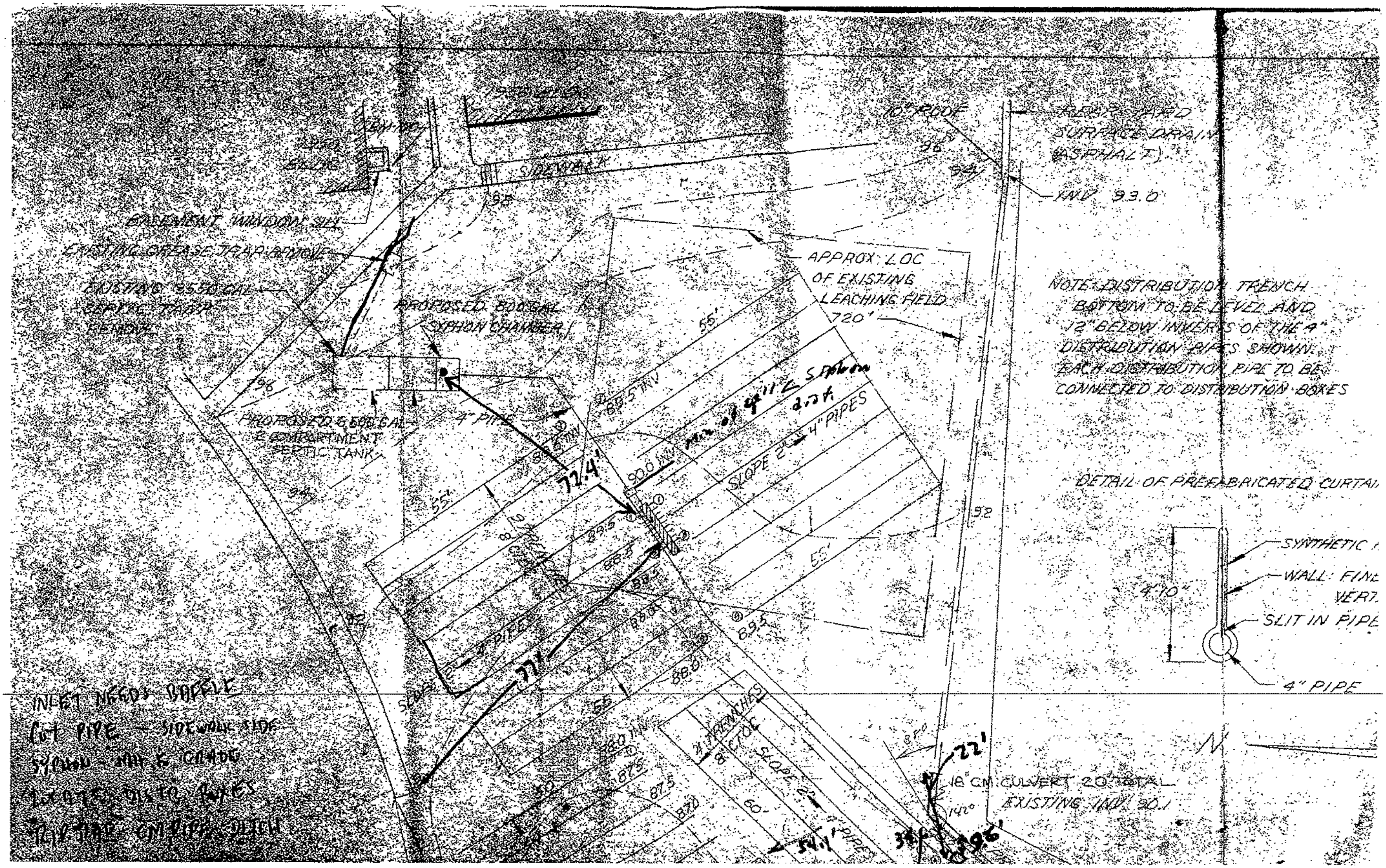
∴ Perform soil testing and design additional leaching area



VINTON SCHOOL



PROPOSED 800 GAL. SYPHON CHAMBER
PROPOSED 2 COMPARTMENT SEPTIC TANK
4" PIPE
SLOPE 2" 4" PIPES
BOTTOM TO BE LEVEL AND 12" BELOW INVERTS OF THE 4" DISTRIBUTION PIPES SHOWN. EACH DISTRIBUTION PIPE TO BE CONNECTED TO DISTRIBUTION BOXES
DETAIL OF PREFABRICATED CURTAIN
SYNTHETIC F
SLIT IN PIPE
4" PIPE
INLET NEEDS BAFFLE
SLIT PIPE - SIDEWALL SIDE
LOCATE DISTR BOXES
EXISTING INV. 90.1
PROPOSED EXTENSION ASPHALT DRA.
88 PROPOSED FINISHED GRADE
APPROX


10" ROOF
SIDEWALK
SURFACE DRAIN
(ASPHALT)
INV. 93.0
EXISTING GREASE TRAP REMOVE
APPROX. LOC. OF EXISTING LEACHING FIELD
720'
PROPOSED 800 GAL. SYPHON CHAMBER
PROPOSED 6,500 GAL. 2 COMPARTMENT SEPTIC TANK
4" PIPE
89.5 INV.
90.0 INV.
SLOPE 2" 4" PIPES
72.4'
77'
55'
60'
88.5
88.0
87.5
87.0
4 TRENCHES 8' C TO C
18" CM CULVERT 20' TOTAL
EXISTING INV. 90.1
22'
34'
NOTE: DISTRIBUTION TRENCH BOTTOM TO BE LEVEL AND 12" BELOW INVERTS OF THE 4" DISTRIBUTION PIPES SHOWN. EACH DISTRIBUTION PIPE TO BE CONNECTED TO DISTRIBUTION BOXES
DETAIL OF PREFABRICATED CURTAI
SYNTHETIC
WALL FINE
VERT.
SLIT IN PIPE
4'-0"
4" PIPE
N
INLET NEEDS BAFFLE
CUT PIPE - SIDEWALK SIDE
SYPHON - MH & GRADE

RECEIVED
MANSFIELD BOARD OF ED

1987 APR -9 AM 10:22

ANNIE E. VINTON ELEMENTARY SCHOOL

MANSFIELD, CONNECTICUT

DESIGN CRITERIA

WASTEWATER DISPOSAL SYSTEM

May, 1970

Revised June, 1970

R. Lank, P.E.
Lic. No 7618.

EXISTING SYSTEM

435 STUDENTS @ 15 GAL/D/S
(incl. staff)

R. Lank
April /87

HISTORY

In 1950 a 3,547 gallon septic tank and 720 feet of 36" trench field was designed by Carl J. Halmfeldt, Architect. It is assumed that the disposal system as shown on Drawing 1, Sept. 28, 1950 was installed. In 1956 and 1960 the school was expanded but the sewage disposal system was not. According to Mr. Bramhall, Assistant Superintendent Mansfield Schools, the school building now serves about 225 pupils and about 10 teachers. The Kindergarten, a separate building with 50 pupils was reported to be connected to a separate septic tank disposal system. A letter of April, 1970, addressed to the Mansfield School, based on the authority granted by the State Health Code, asked that the sewage disposal system be rectified. It appeared that the disposal system has had drainfield leakage problems during the last three years.

INVESTIGATION

Mr. Bramhall requested professional engineering services to investigate the status of the existing disposal system and if necessary design a new disposal system. It was agreed that if a new disposal system was to be built future school expansions should be considered.

a) Maintenance

According to the Vinton School Custodian, the existing septic tank had been pumped out for the first time two years ago.

The grease trap had presumably been cleaned at the same time. The grease trap, which needs cleaning up to once a months, appears to serve no useful purpose.

The school, however, had taken steps to repair drainfield leaks. Fill has been spread over the field where needed.

b) Status of the Wastewater Disposal System

On April 12, 1970 a topographic survey of the S.W. corner of the school property was made. The leaching bed was found to be under water pressure and one of the trenches contained sludge slurry, indicating that the drainfield had failed.

It was found that the sewage level in the septic tank was 2 feet and 9" below the top of the tank, indicating a probable defect in the baffling system.

c) Soil Conditions

The leaching field area is in Hickley gravelly sand loam. Two 7-7.5 feet test pits (shown on plans) were dug on June 11, 1970. On June 13 and June 15, 1970 the holes were dry. It appears that the curtain drain is necessary to intercept the water that infiltrates from the open ditch in the spring.

The soil profile was in test pits as follows:

0 - 2" sod and top soil

2"-6" top soil

at 30" depth an 8" red sandy layer (iron deposits)

at 36" depth in the northern hole boulders were found.

To 7-7.5' depth gravelly sandy loam.

d) Recommendations

A new drainfield is required. The present grease trap should be removed. The existing tank should be removed and a two chamber tank with syphon installed. Before construction, the existing septic tank should be pumped and the existing seepage bed should be drained and allowed to dry for a period of 1 - 2 weeks.

e) Plan A - a system to accomodate 200 additional students, no showers in school:

Estimated sewage flow (235 + 200)15=6,525 gallons. Number of square feet of effective leaching area required (based on original design) $\frac{6,525}{1.6}$= 4,100 square feet.

Number of feet of 24" wide trench required = $\frac{4,100}{2}$ = 2,050 ft. Size of syphon chamber required 0.4x2,050= 800 gallons.

Plan B - to rectify the present system without any capacity for expansion:

Estimated sewage flow 235 x 15 = 3,525 gallons. Number of square feet of effective leaching area required = $\frac{3,525}{1.6}$ = 2,200 sq ft.

Number of feet of 24" wide trench required = $\frac{2,200}{2}$ = 1,100 ft. Size of syphon chamber required = 0.4 x 1,100 = 440 gallons.

COMMENTS

Plan A would be better for future economy. It assures more successful drainfield operation, it provides one system, whereas if it was decided to select Plan B, a separate or an expansion will be needed.

The prepared plans and suggested specifications were drawn for Plan A which included the future school expansion.

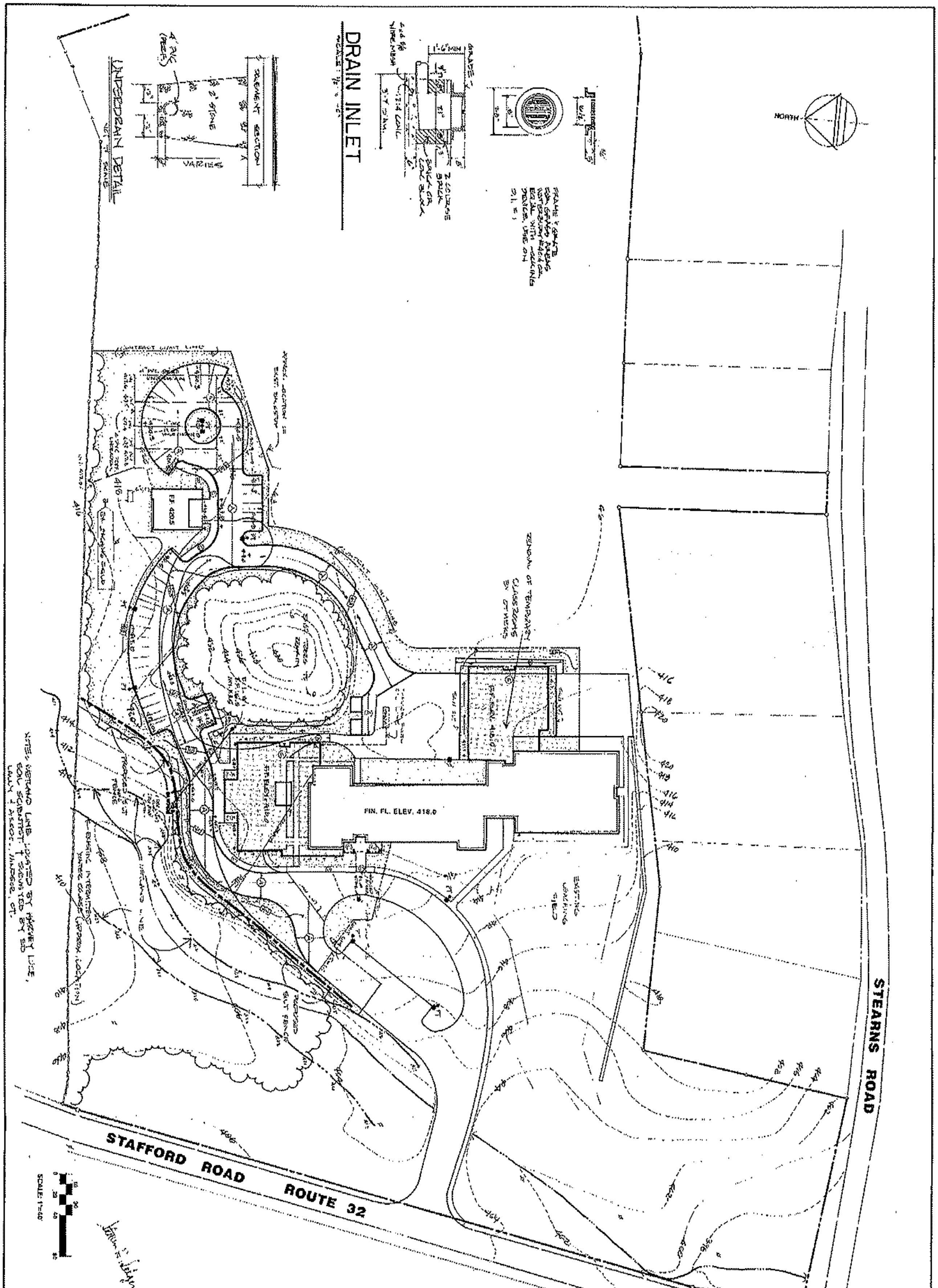
The Mansfield Schools should initiate a regular maintenance program, i.e. clean all the septic tanks annually and repair immediately leaky plumbing fixtures in order to protect and give longevity to the seepage beds. These measures will minimize future major expenditures and avoid troublesome and serious sewage disposal problems.

Rein Laak

STATE OF CONNECTICUT
REIN LAAK
NO. 7618
REGISTERED PROFESSIONAL ENGINEER

Appendix A4

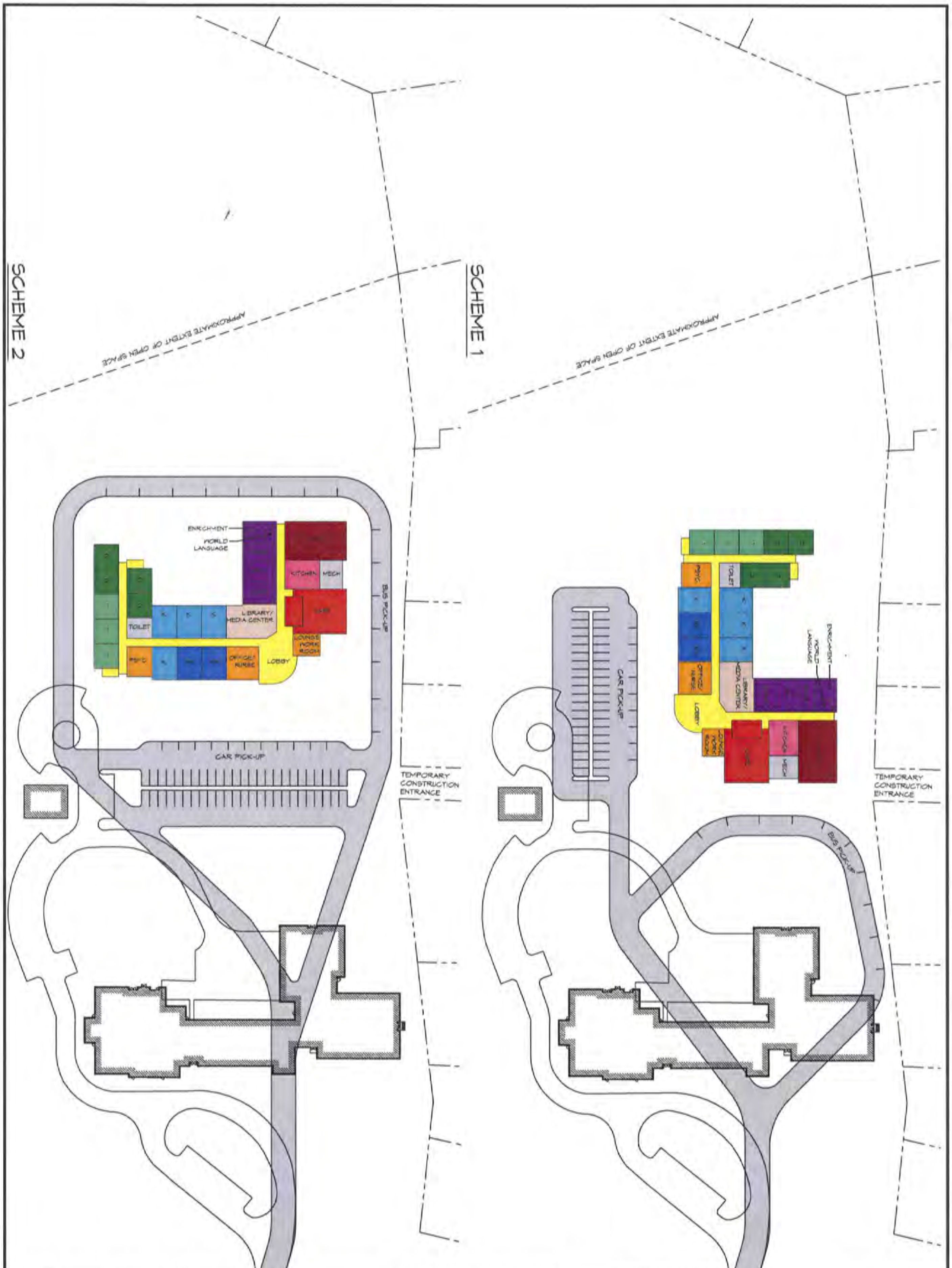
Data Collection
Town of Mansfield



GRADING, DRAINAGE & EROSION CONTROL PLAN

DOE PROJECT #'S
078-88-048 EC/C 078-88-043 CV 078-88-050 SP

SCHOENHARDT ARCHITECTS	L-3	LANDSCAPE ARCHITECTURAL DESIGN ASSOCIATES, P.C. SITE PLANNERS/LANDSCAPE ARCHITECTS SIMSBURY, CONNECTICUT	ADDITIONS AND ALTERATIONS TO THE MANSFIELD PUBLIC SCHOOLS MANSFIELD, CONNECTICUT	ANNIE VINTON ELEMENTARY SCHOOL 306 STAFFORD ROAD MANSFIELD CENTER, CONNECTICUT



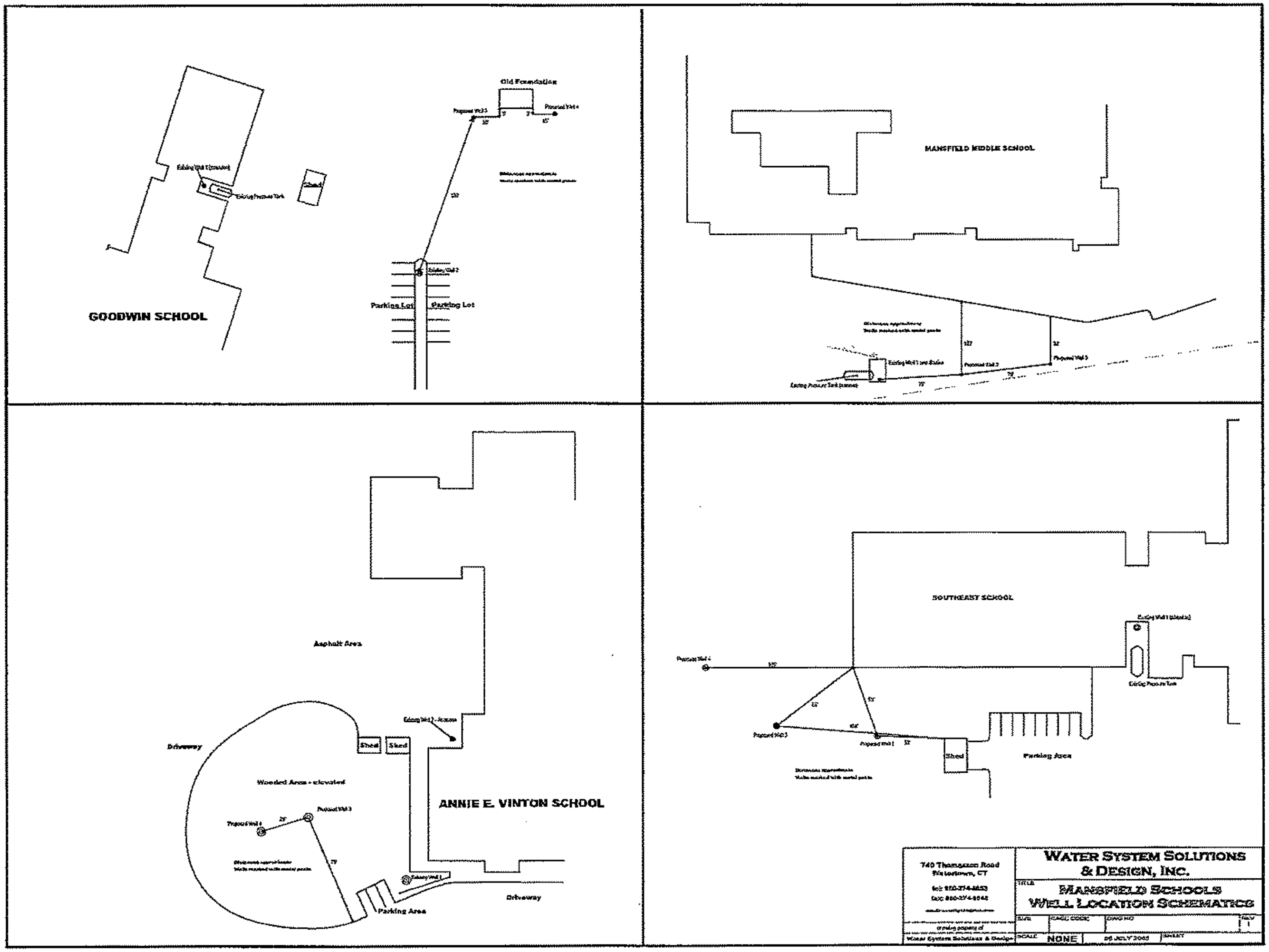
N

ANNIE VINTON ELEMENTARY SCHOOL

306 STAFFORD ROAD
MANSFIELD, CT

THE LAWRENCE ASSOCIATES

08-0057



Old Foundation
GOODWIN SCHOOL
Shed
Parking Lot
Parking Lot
MANSFIELD MIDDLE SCHOOL
Asphalt Area
Driveway
Shed
Shed
Wooded Area - elevated
ANNIE E. VINTON SCHOOL
Parking Area
Driveway
SOUTHEAST SCHOOL
Shed
Parking Area
740 Thomaston Road
Watertown, CT
WATER SYSTEM SOLUTIONS
& DESIGN, INC.
TITLE
MANSFIELD SCHOOLS
WELL LOCATION SCHEMATICS
SIZE
CAGE CODE
DWG NO
REV
1
SCALE
NONE
SHEET

Appendix B

Soil Test Results

ANCHOR
ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971
www.anchorengr.com
Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

SOIL DEEP TEST PIT RESULTS

VINTON ELMENTARY SCHOOL
306 STAFFORD ROAD, MANSFIELD, CT

FIGURE A

PROJECT	DATE
486-06	4/13/12

TEST PIT #:	TP 101V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	60"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	N/A
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 7"	TOPSOIL
7" - 25"	FINE SANDY LOAM W/ COBBLES
25" - 38"	MED/COARSE SAND W/ COBBLES
38" - 44"	GRAY FINE SAND W/ COBBLES
44" - 60"	COARSE SAND W/ COBBLES

TEST PIT #:	TP 102V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	72"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	N/A
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 6"	TOPSOIL
6" - 26"	LIGHT BR. FINE SANDY LOAM
26" - 72"	TAN MED. SAND W/GRAVEL & COBBLES

TEST PIT #:	TP 103V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	103"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	55"
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 6"	TOPSOIL
6" - 34"	RED/BR. FINE SANDY LOAM
34" - 103"	GRAY MED./COARSE SAND W/COBBELS

TEST PIT #:	TP 104V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	110"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	51"
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 3"	TOPSOIL
3" - 34"	RED/BR. FINE SANDY LOAM
34" - 110"	FRAY MED/COARSE SAND

TEST PIT #:	TP 105V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	65"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	50"
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 9"	TOPSOIL
9" - 32"	RED/BR. SILTY FINE SANDY LOAM
32" - 65"	GRAY MED/COARSE SAND W/ COBBLES & BOLDERS

TEST PIT #:	TP 106V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	37"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	37"
ROOTS OBSERVED AT:	N/A
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 3"	TOPSOIL
3" - 36"	BR. SILTY LOAM W/ LOTS OF COBBLES & BOLDERS
36" - 37"	LIGHT BR. SILTY LOAM

TEST PIT #:	TP 107V
DATE PERFORMED:	4/03/12
DEPTH OF TEST PIT:	78"
SEEPAGE OBSERVED AT:	N/A
LEDGE OBSERVED AT:	N/A
ROOTS OBSERVED AT:	23"
MOTTLING OBSERVED AT:	N/A

SOILS DESCRIPTION

0" - 2"	TOPSOIL
2" - 23"	RED/BR. FINE SANDY LOAM
23" - 78"	GRAY MED/COARSE SAND W/ COBBLES

ANCHOR
ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971
www.anchorengr.com
Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

SOIL PERCOLATION RATES

VINTON ELEMENTARY SCHOOL
306 STAFFORD ROAD, MANSFIELD, CT

FIGURE B

PROJECT 486-06

DATE 4/13/12

PERC TEST RESULTS

PERCOLATION TEST (PT 101V)
PERFORMED 04/03/12
TOTAL DEPTH = 22"
PRESOAK @ 11:40 AM
PERC TEST STARTED @2:00 PM
PRESOAK WATER COLUMN= 16"

TIME	READING	RATE
0	8.00	-
5	12.50	1.11
10	14.25	2.85
15	15.50	4.00
20	17.00	3.33
25	18.50	1.33
30	19.50	5.00
35	20.25	6.66
40	21.25	5.00

PERC RATE 5.1-10.0 MIN./IN.

PERCOLATION TEST (PT 102V)
PERFORMED 04/03/12
TOTAL DEPTH = 28"
PRESOAK @ 11:45 AM
PERC TEST STARTED @2:02 PM
PRESOAK WATER COLUMN= 18"

TIME	READING	RATE
0	6.00	-
5	12.25	0.80
10	-	-
15	18.50	-
20	20.125	3.07
25	21.75	3.07
30	23.25	3.33
35	24.50	4.00
40	25.50	5.00
45	26.50	5.00

PERC RATE 1.1-5.0 MIN./IN.

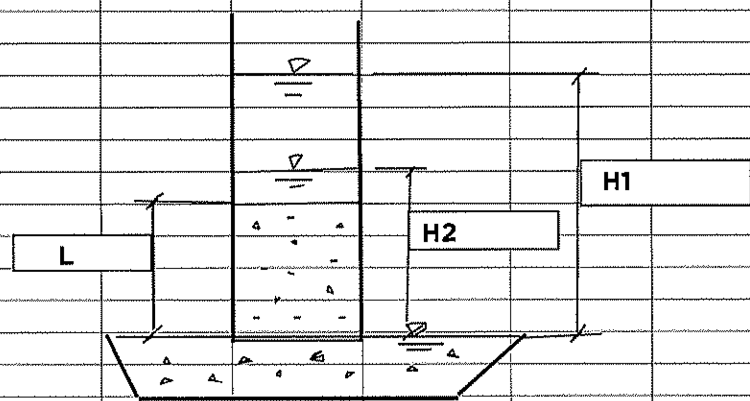
PERCOLATION TEST (PT 104V)
PERFORMED 04/03/12
TOTAL DEPTH = 52"
PRESOAK @ 12:15 PM
PERC TEST STARTED @12:55 PM
PRESOAK WATER COLUMN= 20"

TIME	READING	RATE
0	3.50	-
5	5.75	2.22
10	7.50	2.85
15	8.875	3.63
20	10.00	4.44
25	11.125	4.44
30	12.125	5.00
35	13.125	5.00
40	14.00	5.71
45	14.875	5.71
50	15.75	5.71

PERC RATE 5.1-10.0 MIN./IN.

FALLING HEAD
PERMEABILITY TEST

PROJECT:	Vinton Elementary School	**PROJECT #486-06**		**BY:**	ECP
	Stafford Rd, Mansfield, CT	**DATE: 04/08/12**			
TEST PIT #	**TP-103V**				
SAMPLE DEPTH:	**68"**	**SAMPLE LENGTH:**	**4.25**	**in.**	
SAMPLE #1					



$$K = \frac{(H1 - H2) \times L}{t \times (H1 + H2)/2}$$

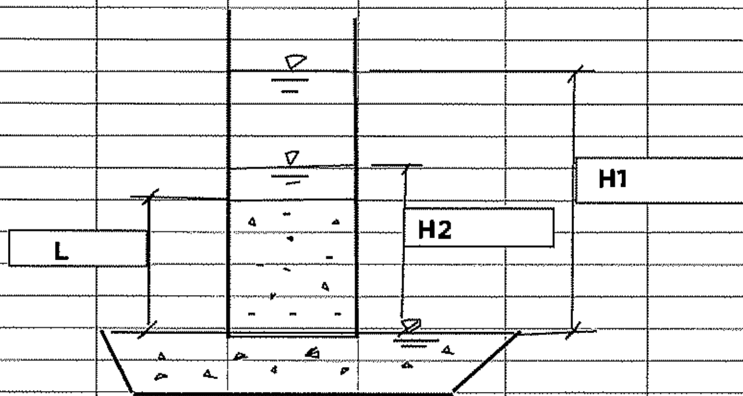
Time (min.)	H1 (in.)	H2 (in.)	H1 - H2	H1 + H2/2	K (in/min.)	K (in/hr)
0	5.75					
5.00	5.75	4.125	1.625	4.938	0.280	16.78
4.00	5.75	4.000	1.750	4.875	0.381	22.88
5.00	5.75	4.125	1.625	4.938	0.280	16.78
5.00	5.75	4.250	1.500	5.000	0.255	15.30
					Average=	**17.94**

30 Minute Pre-Soak

* Refilled tube after each reading

FALLING HEAD
PERMEABILITY TEST

PROJECT:	Vinton Elementary School		**PROJECT #486-06**		**BY:**	ECP
	Stafford Rd, Mansfield, CT		**DATE: 04/08/12**			
TEST PIT #		**TP-107V**				
SAMPLE DEPTH:		**56"**	**SAMPLE LENGTH:**	**4.00**	**in.**	
SAMPLE #1						



$$K = \frac{(H1 - H2) \times L}{t \times (H1 + H2)/2}$$

Time (min.)	H1 (in.)	H2 (in.)	H1 - H2	H1 + H2/2	K (in/min.)	K (in/hr)
0	5.75					
5.00	5.75	5.250	0.500	5.500	0.073	4.36
10.00	5.75	4.625	1.125	5.188	0.087	5.20
5.00	5.75	5.250	0.500	5.500	0.073	4.36
10.00	5.75	4.750	1.000	5.250	0.076	4.57
					Average=	**4.63**

30 Minute Pre-Soak

Appendix C

Septic Suitability Calculations

ANCHOR ENGINEERING SERVICES, INC.

41 Sequin Drive
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

SSDS Design Calculations — Vinton

Solve For: Sewage Flow Estimate

Given: Town of Mansfield proposes a 375 student Elementary school

- Table #4 of the Conn. Public Health Code
  - 8 gpd/pupil (Base flow)
  - 3 gpd/pupil additional for kitchen
  - 3 gpd/pupil additional for showers
- Showers are not typical for elementary schools therefore the 3gpm/pubil will not be included
- A conservative calculation of 11 gpd/pupil shall be applied

Conclusion:

375 students X 11 gpd/pupil = 4,125 gal per day

Proposed Daily Sewage Flow for the Proposed School will be

4,125 gal per day

Prepared By: E.C.P.   Checked By: BOK

ANCHOR ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

SSDS Design Calculations

Solve for: Effective Leaching Area (ELA)

Given:

- Daily Design flow = 4,125 gpd (3000 gpd/students + 1,125 gpd kitchen)
- Application Rate
  - use app rate of 1.5 for base Student Flow (Table #8)
  - use app rate of 0.8 for Kitchen Flow (Table #7)
  - percolation Rate = 5.1 to 10.0 min/in

Conclusion:

$$ELA = \frac{\text{Daily Design flow}}{\text{Application Rate}}$$

$$= \frac{3{,}000 \text{ gpd}}{1.5} + \frac{1{,}125 \text{ gpd}}{0.8}$$

$$= 2{,}000 \text{ S.F.} + 1{,}406.25 \text{ S.F.}$$

$$= 3{,}406.25 \text{ Sq. Ft.}$$

Required Effective Leaching Area = **3,406.25 sq. ft.**

Prepared By: E.C.P. Checked By: [signature]

ANCHOR ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

Project No. 486-06
Date Apr. 2012

SSDS Design Calculations

Solve for: Minimum Leaching System Spread (MLSS)

Given: Depth to restrictive layer = 65+ inches

Conclusion:

- MLSS is not applicable on sites that have a receiving soil depth exceeding 60 inches

Prepared By: E.C.P. Checked By: [illegible]

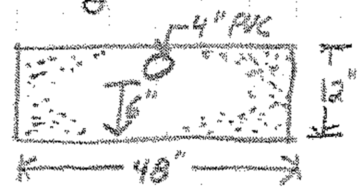
ANCHOR
ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone 860-633-8770
Fax 860-633-5971

Project No. 486-06
Date Apr. 2012

SSDS Design

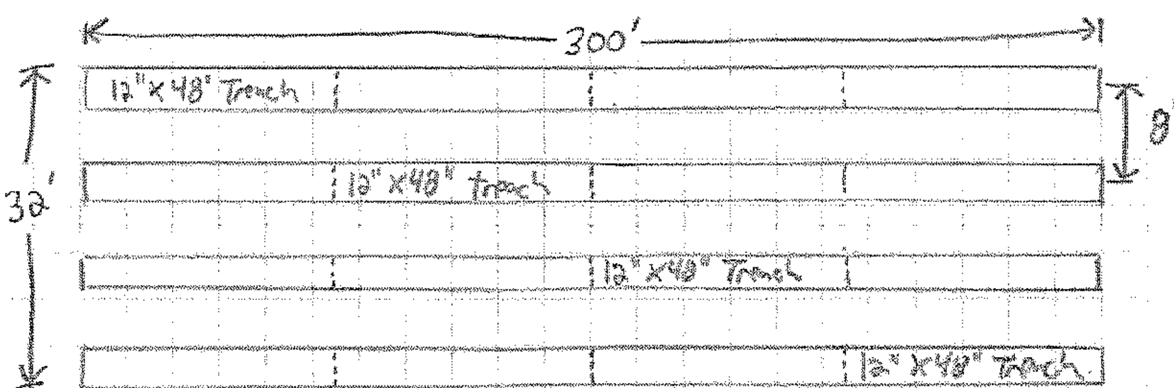
Solve for: Possible System Size

Given:
- ELA = 3,406.25 Sq. Ft.
- MLSS = N/A
- Stone Leaching Trench = 12" x 48"

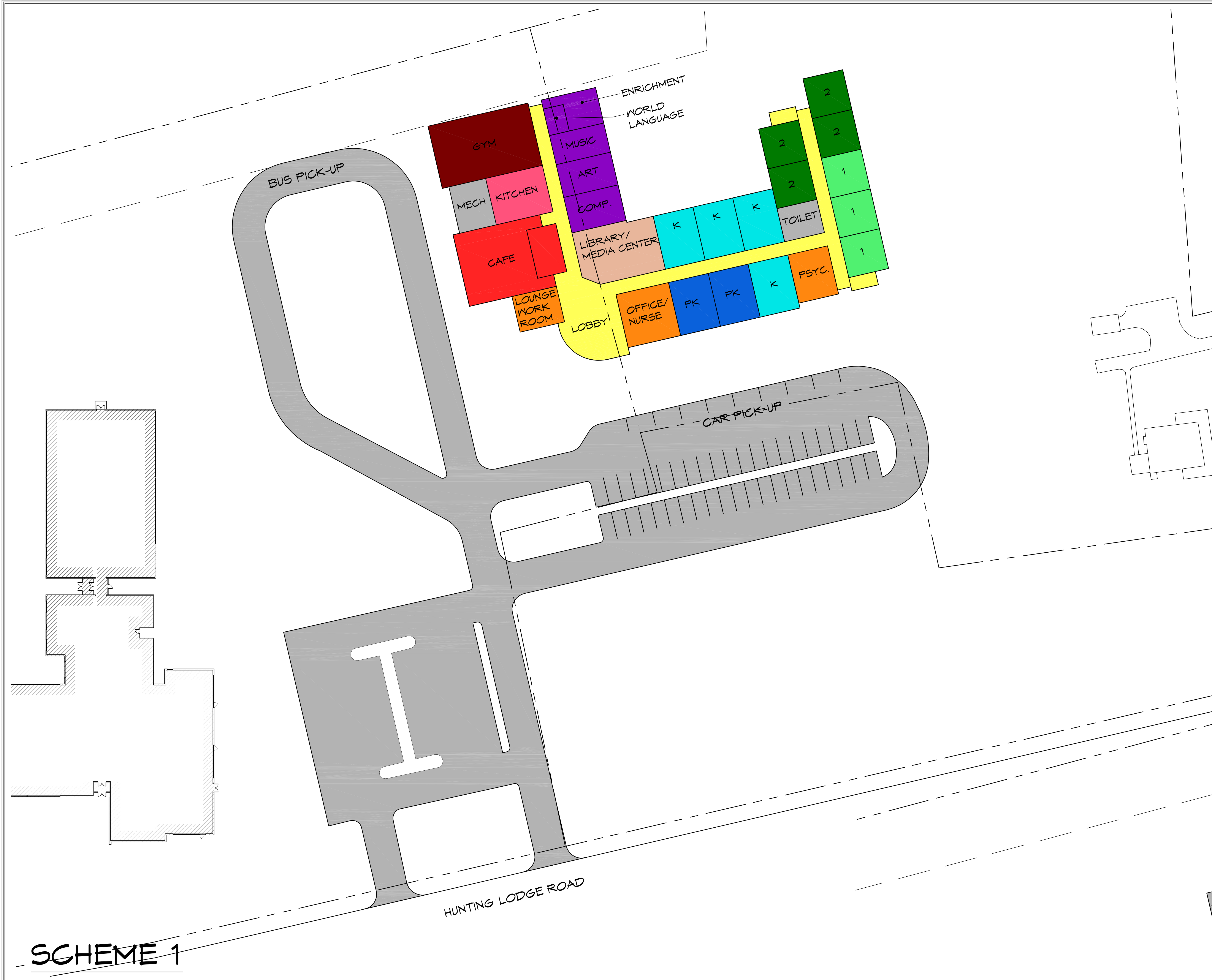


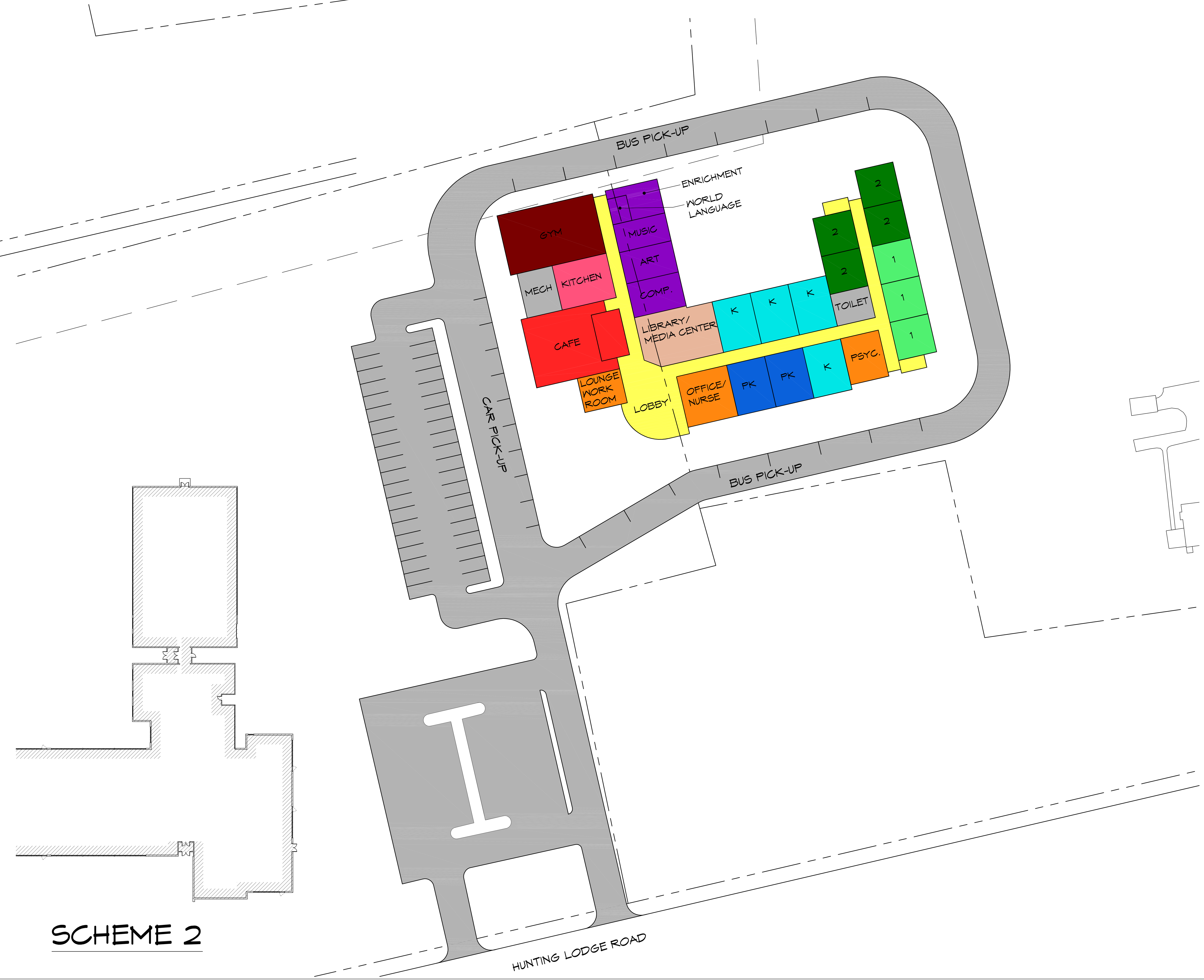
- Effective Leaching Area = 3.0 sf/LF (section VIII.B)
- Center to Center Spacing = 8.0 ft (section VIII.B)

Conclusion:
- Length of Trench = $\frac{ELA}{3.0\ sf/LF} = \frac{3,406.25\ SF}{3.0\ SF/LF} =$ **1135.5 LF**
- Use 4 rows at 300 LF each (4 segments at 75' each)



Prepared By: E.C.P. Checked By: BM





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1075 TOLLAND TURNPIKE. MANCHESTER, CT 06042
FAX: (860) 643-4373 (860) 643-2161
WWW.THELAWRENCEASSOCIATES.COM

PROJECT NUMBER: 06-0067
STATE PROJECT NO.:

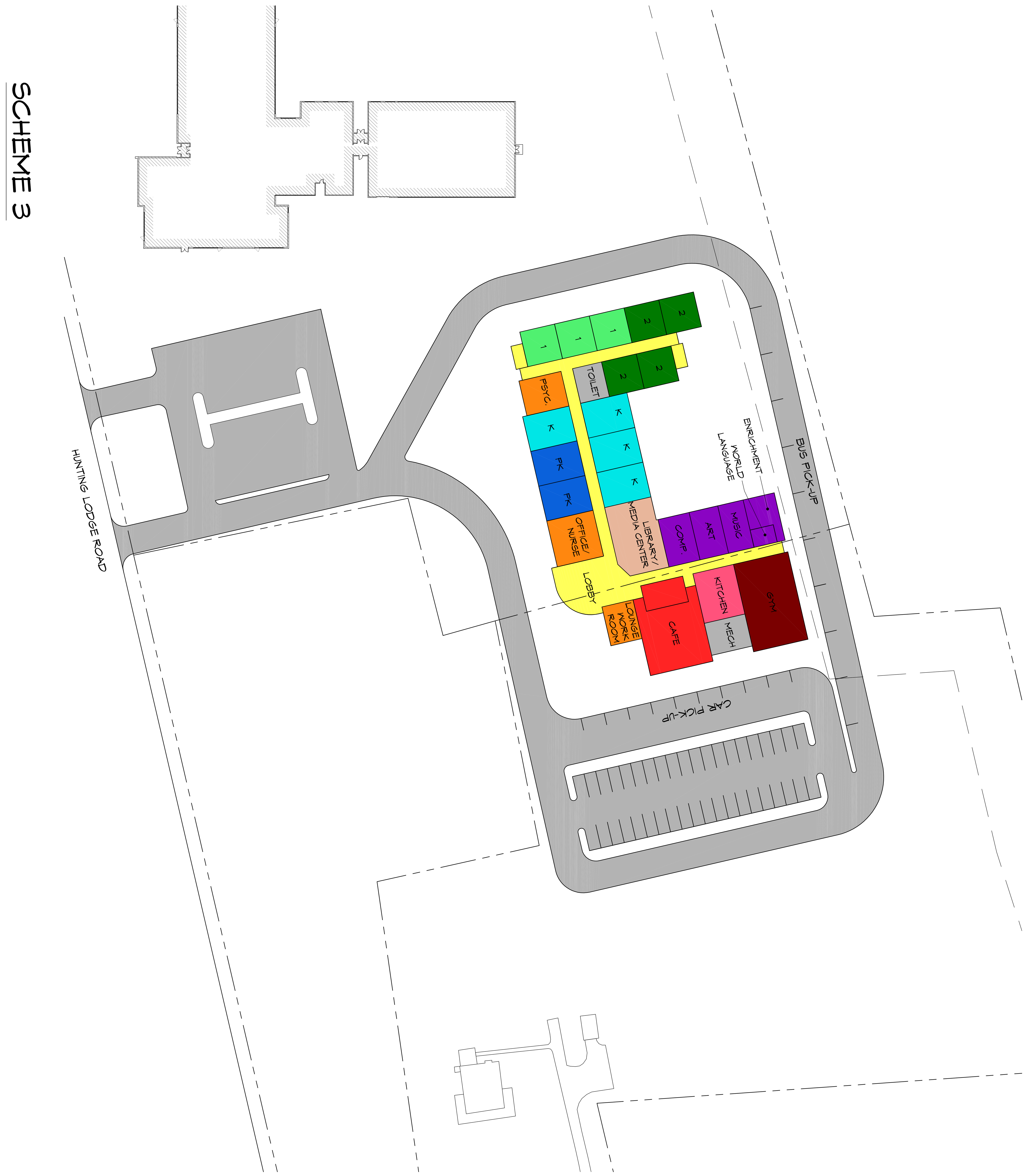
PROJECT TITLE:
DOROTHY GOODWIN ELEM. SCHOOL
321 HUNTING LODGE ROAD
MANSFIELD, CT

N

DRAWING TITLE:

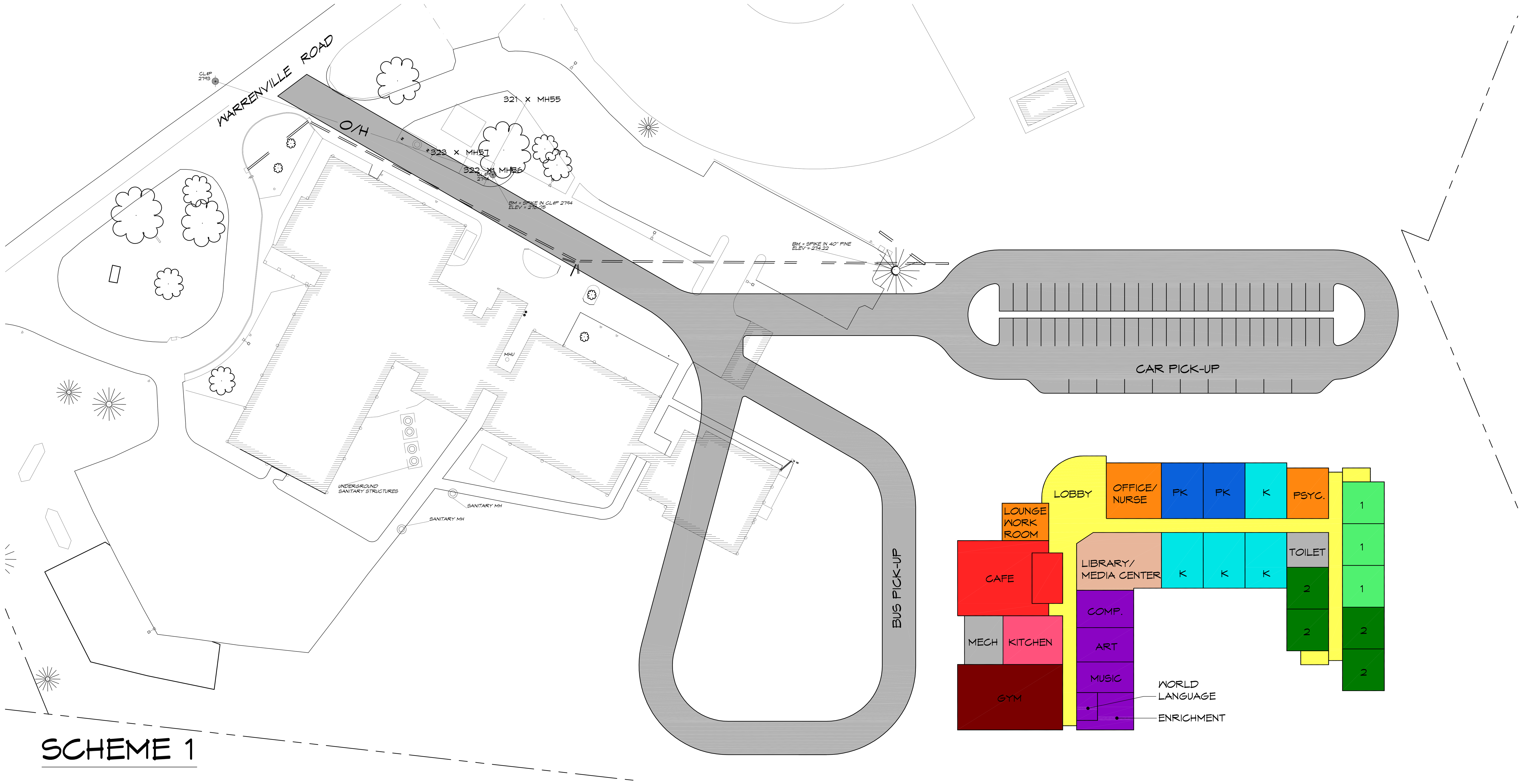
SCALE: 1" = 40'-0"
DATE: 2/9/11

DRAWING OF



DRAWING OF	SCALE: 1" = 40'-0" DATE: 2/9/11	DRAWING TITLE:	N	PROJECT TITLE: DOROTHY GOODWIN ELEM. SCHOOL 321 HUNTING LODGE ROAD MANSFIELD, CT	THE LAWRENCE ASSOCIATES ARCHITECTS / PLANNERS, P.C. 1075 TOLLAND TURNPIKE. MANCHESTER,CT 06042 FAX: (860) 643-4373 (860) 643-2161 WWW.THELAWRENCEASSOCIATES.COM PROJECT NUMBER: 06-0067 STATE PROJECT NO.:

NO. DATE DESCRIPTION REVISIONS



SCHEME 1

SCHEME 2

OWNERSHIP OF DOCUMENTS

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1075 TOLLAND TURNPIKE, MANCHESTER, CT 06042
FAX: (860) 643-4373 (860) 643-2161

PROJECT NUMBER: 06-0067

STATE PROJECT NO.:

PROJECT TITLE:

SOUTHEAST ELEMENTARY SCHOOL

135 WARRENVILLE ROAD
MANSFIELD, CT

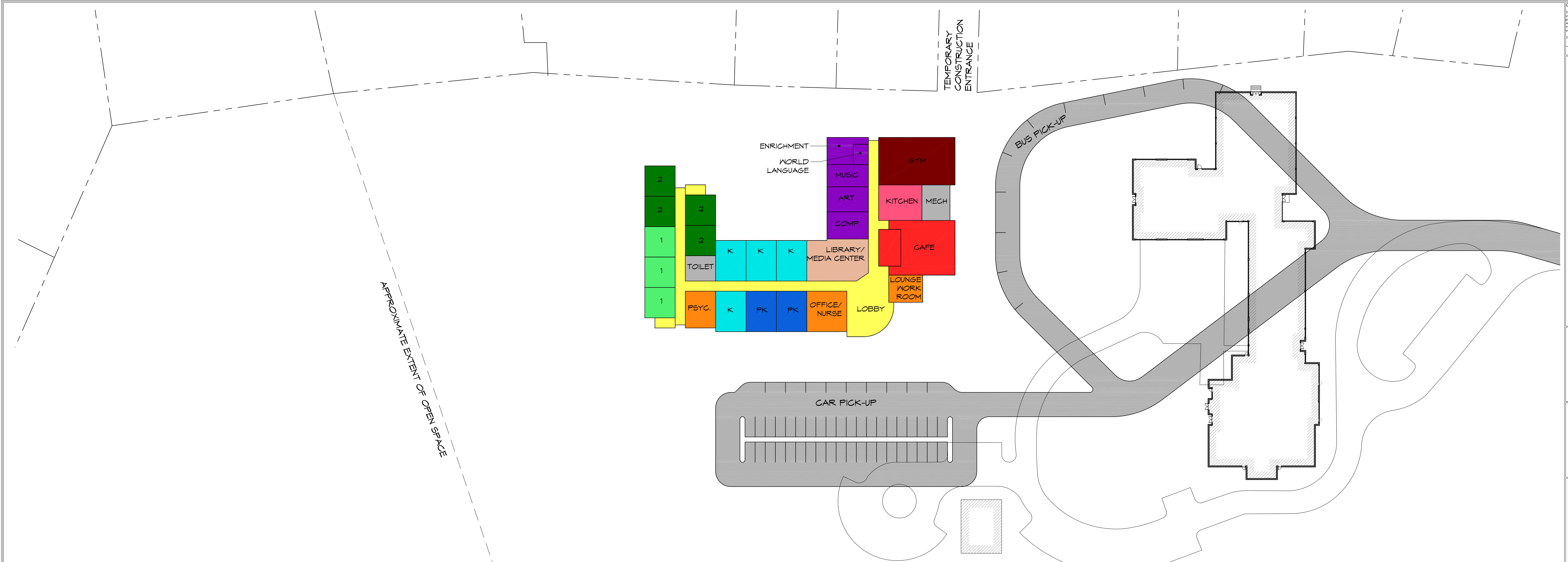
N

DRAWING TITLE:

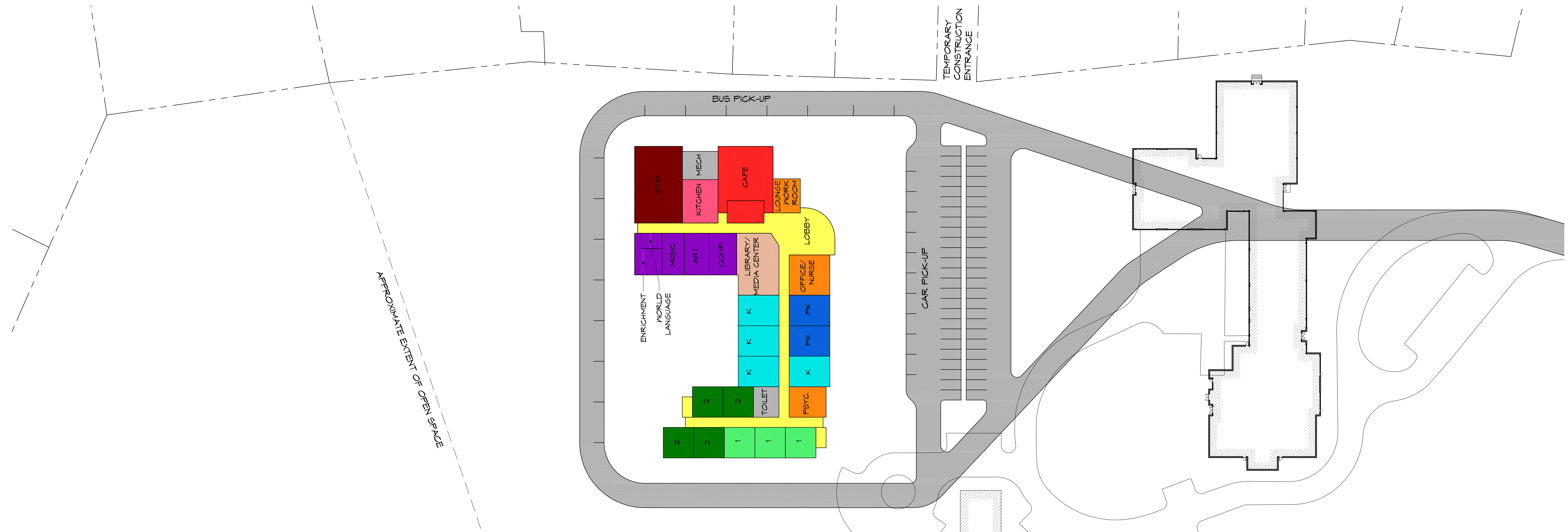
SCALE: 1" = 40'-0"

DATE: 2/9/11

DRAWING OF



SCHEME 1



SCHEME 2

REVISIONS

NO.	DATE	DESCRIPTION

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ARCHITECTS / PLANNERS, P.C.
1075 TOLLAND TURNPIKE. MANCHESTER, CT 06042
(860) 643-2161 FAX: (860) 643-4373

STATE PROJECT NO.

PROJECT NUMBER: 06-0067

PROJECT TITLE:

ANNIE VINTON ELEMENTARY SCHOOL

306 STAFFORD ROAD
MANSFIELD, CT

N

DRAWING TITLE:

SCALE: 1" = 40'-0"

DATE: 2/17/11

DRAWING OF

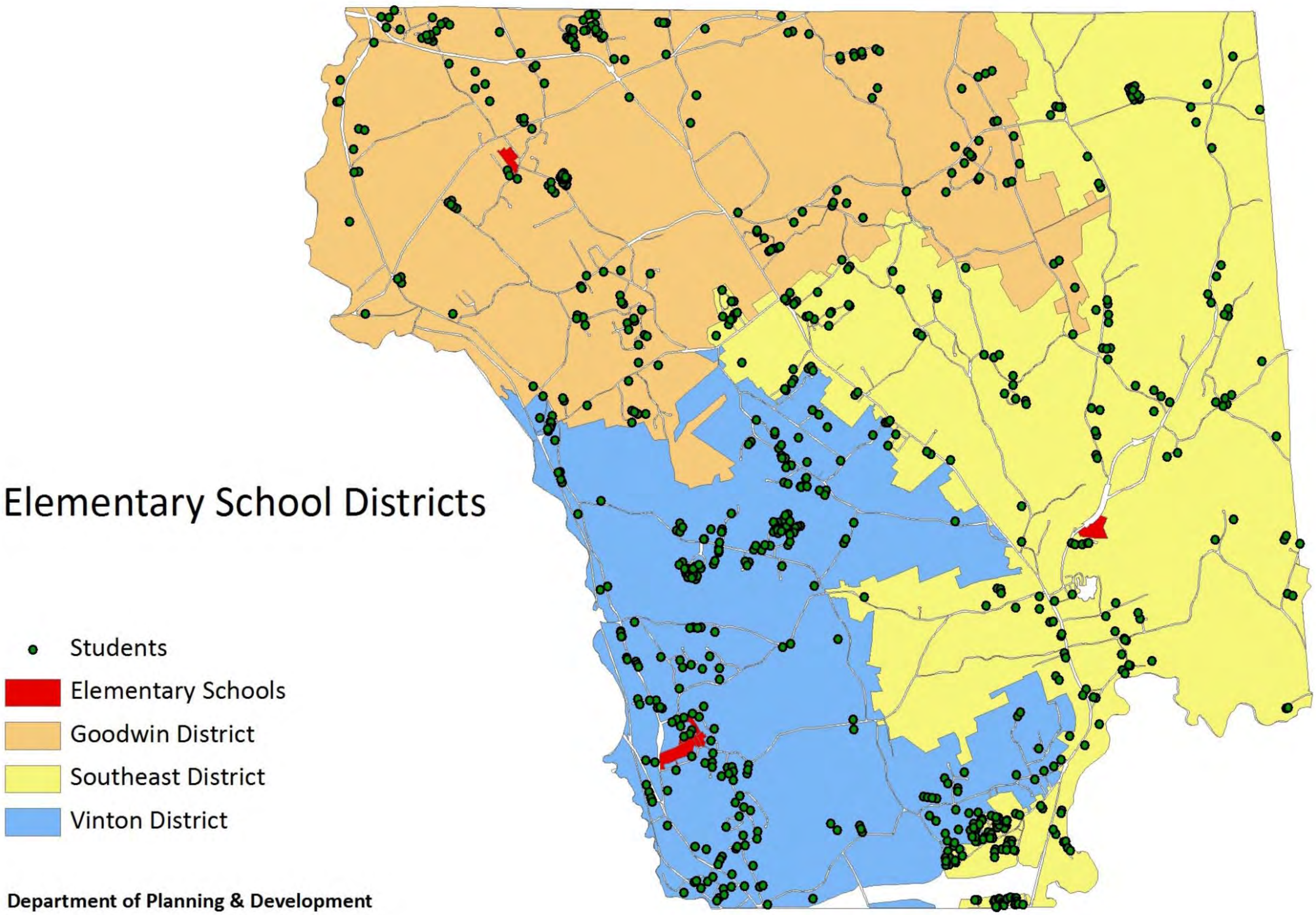
School Siting Considerations

Town Council Special Meeting

May 17, 2012

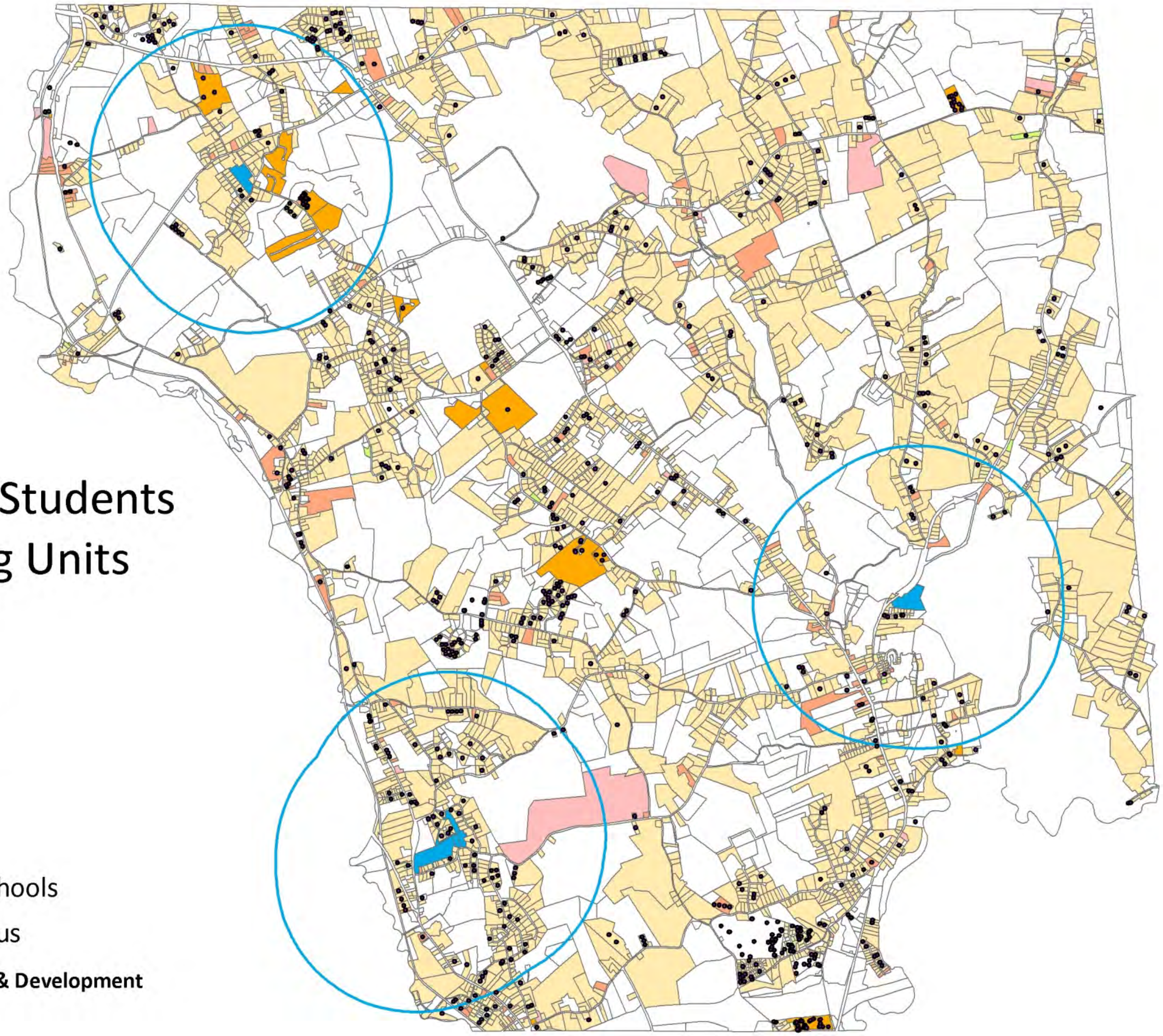
Prepared by: Department of Planning and Development

Elementary School Districts



Department of Planning & Development

May 15, 2012



Location of Students and Housing Units

- Single Family
- Two Family
- Three Family
- Four Family
- Multi-Family
- Students
- Elementary Schools
- One Mile Radius

Department of Planning & Development

February 21, 2012

Within One Mile Radius of Goodwin Elementary

- 215 Single Family Homes
- 10 Two-Family Homes
- 1 Three-Family Home
- 2 Multi-Family Developments* (Holinko Estates and Renwood)
- **Total Units: 337**

*Does not include student apartments

Housing Units Within One Mile Radius of Vinton Elementary

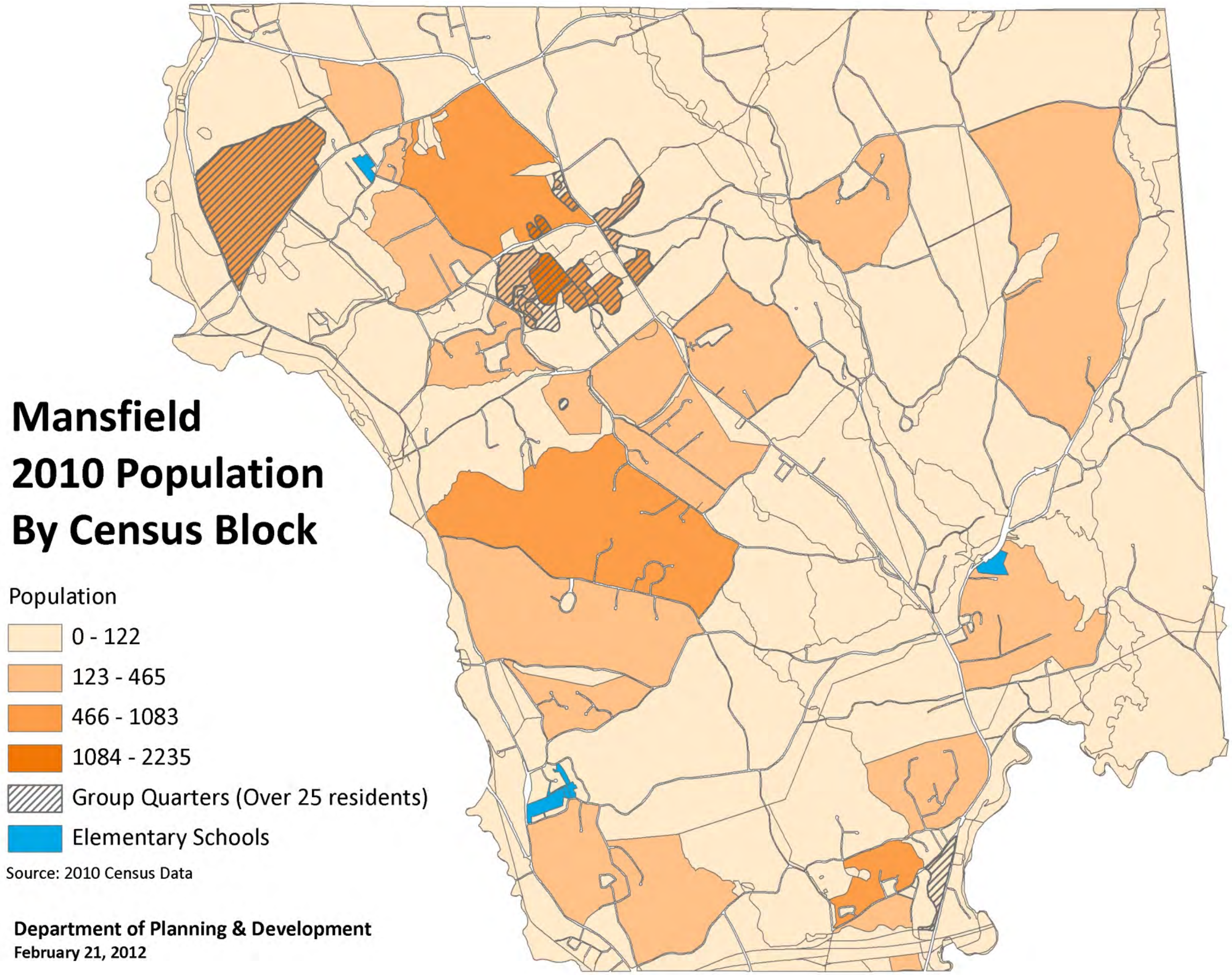
- 410 Single Family Homes
- 18 Two-Family Homes
- 6 Three-Family Home

- **Total Units: 434**

Housing Units Within One Mile Radius of Southeast Elementary

- 251 Single Family Homes
- 20 Two-Family Homes
- 1 Three-Family Home
- 2 Four Family
- 1 Multi-Family Developments

- **Total Units: 284**


Mansfield
2010 Population
By Census Block
Population
0 - 122
123 - 465
466 - 1083
1084 - 2235
Group Quarters (Over 25 residents)
Elementary Schools
Source: 2010 Census Data
Department of Planning & Development
February 21, 2012

2010 Population Density

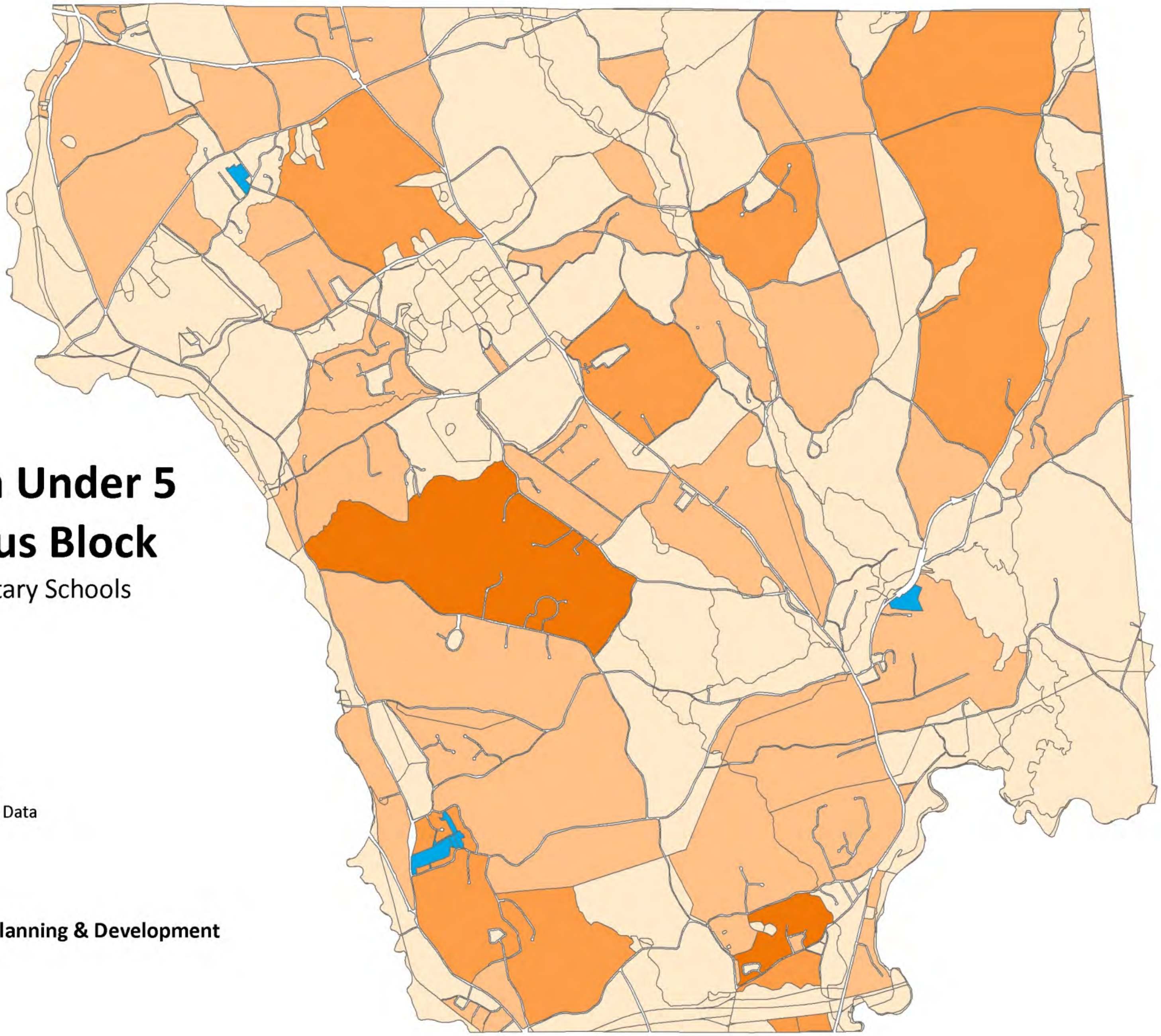
- As expected, the highest population density is located in and around UConn. Hatched areas represent blocks containing group quarters (university housing, correctional facility, etc.) providing housing for 25 or more residents

- For areas not adjacent to the university, the highest density per census block is in the area bounded by Maple Road on the north and Mansfield City Road on the South, and the Freedom Green area in southeast Mansfield

Children Under 5
By Census Block

- Elementary Schools
- 0 - 2
- 3 - 8
- 9 - 23
- 24 - 43

Source: 2010 Census Data

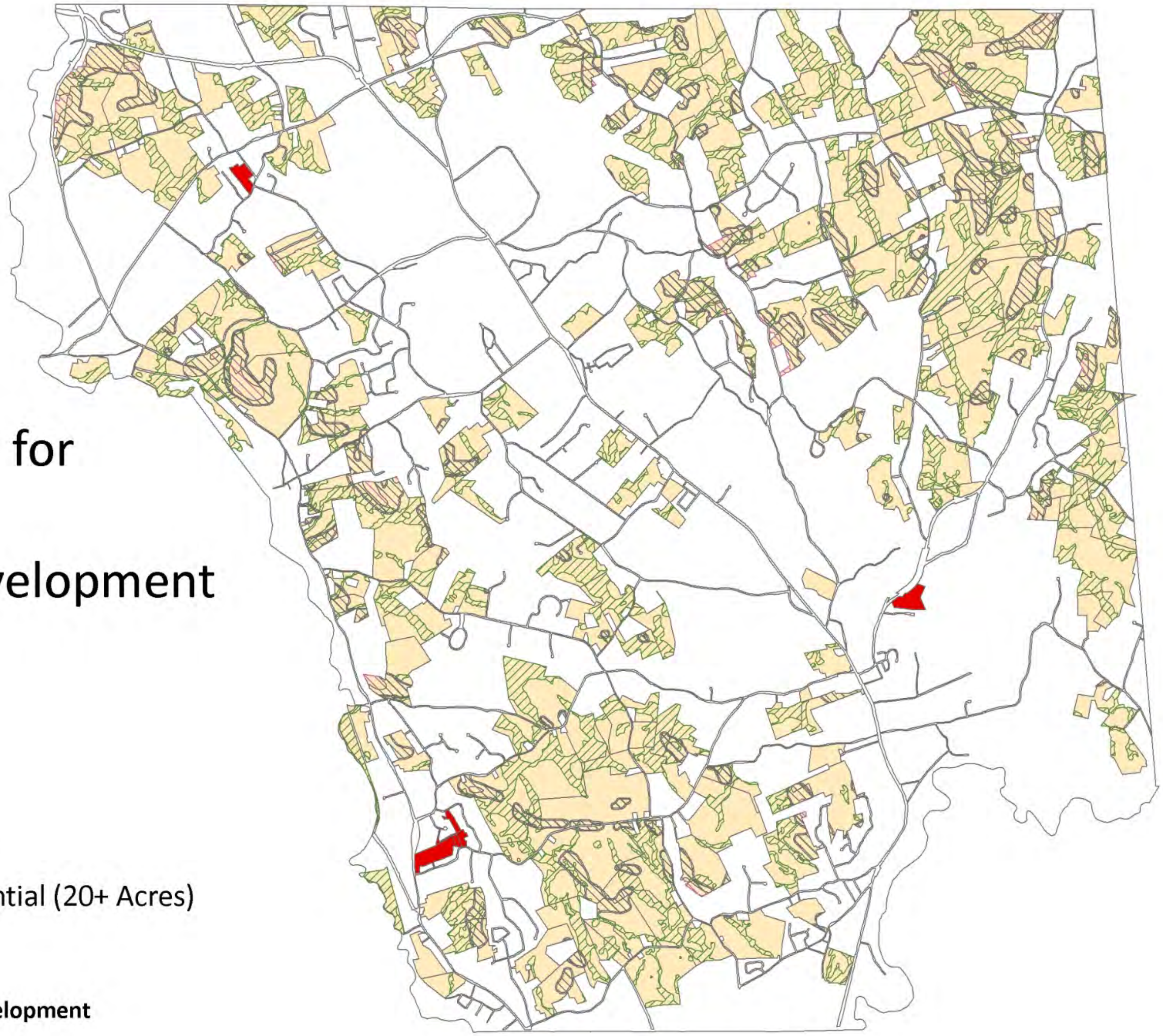


Department of Planning & Development
February 21, 2012

2010 Population Density: Children Under the Age of 5

- Similar to the overall population density map, the highest concentrations of children under the age of 5 years are located in the area bounded by Maple Road on the north and Mansfield City Road on the South, and the Freedom Green area in southeast Mansfield

Potential Areas for Low Density Residential Development

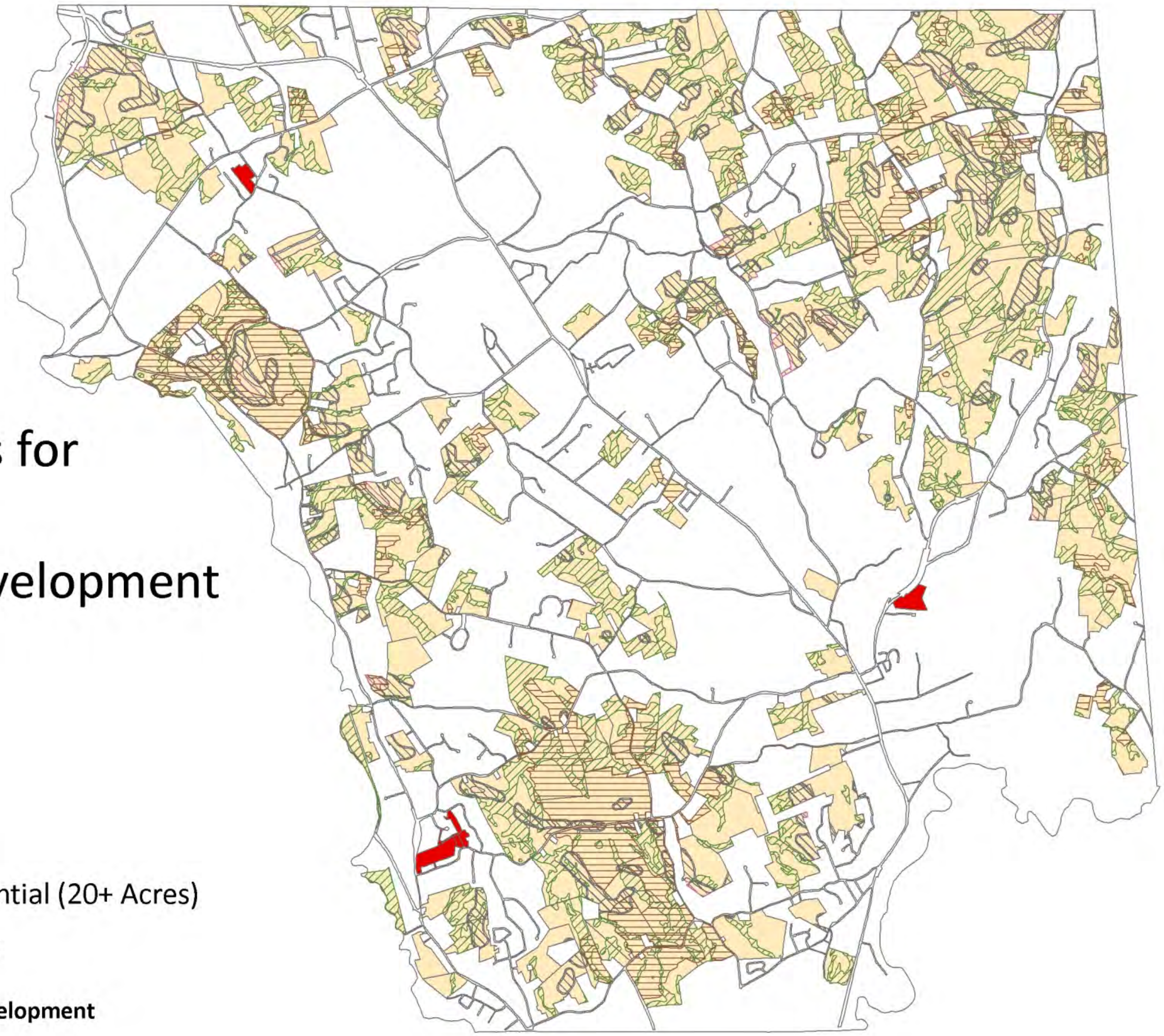


Percentage Slope

- 20%+
- 30%+
- Wetlands
- Elementary Schools
- Low Density Residential (20+ Acres)

Department of Planning & Development
February 21, 2012

Potential Areas for Low Density Residential Development



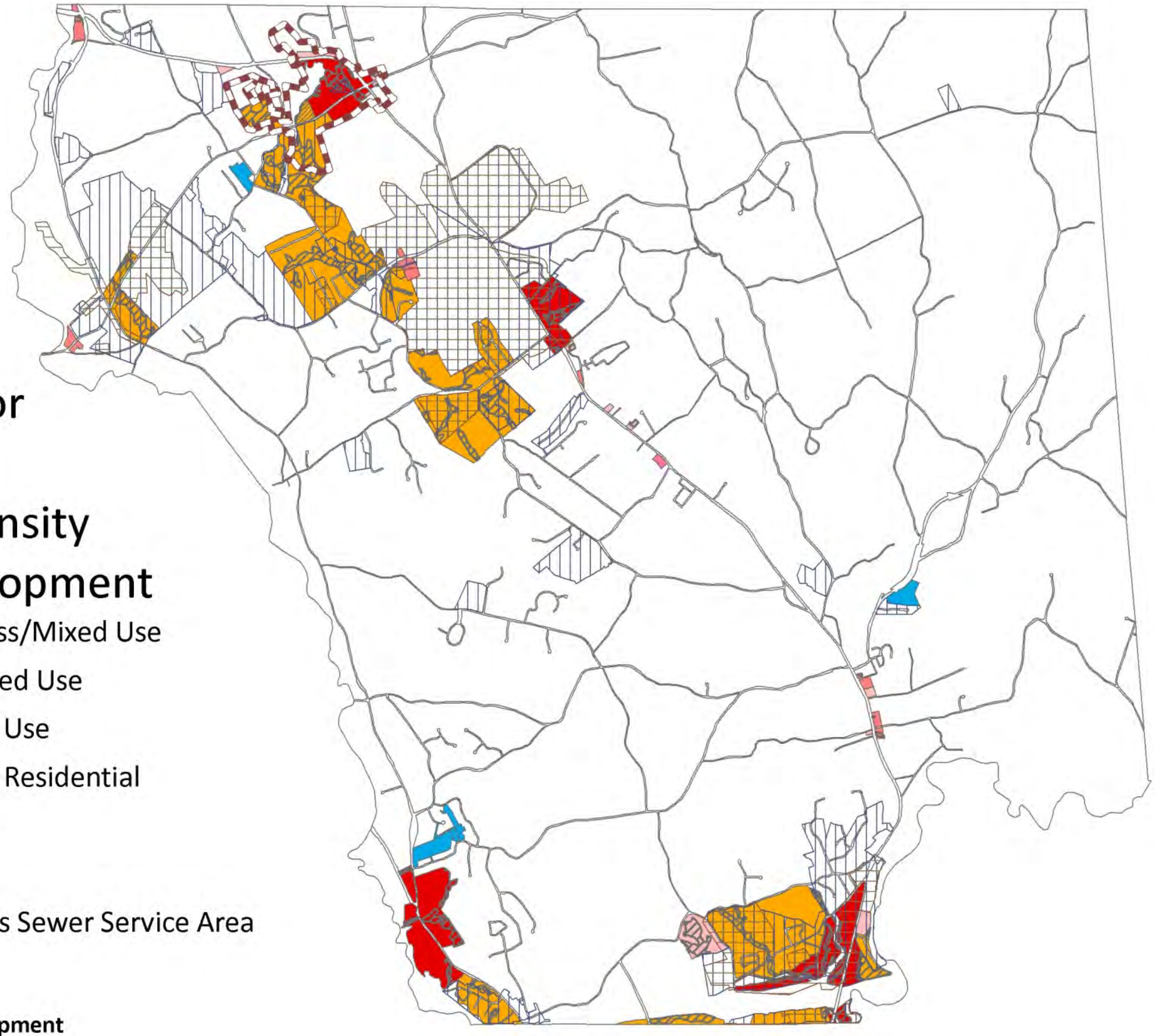
Percentage Slope

- 20%+
- 30%+
- Wetlands
- Agricultural Soils
- Low Density Residential (20+ Acres)
- Elementary Schools

Department of Planning & Development
February 21, 2012

Potential Areas for Low Density Residential Development

- To identify the area with the greatest potential for single-family residential development, the maps on the previous slides isolated parcels 20 acres or greater in size.
- Of the ±9,600 acres shown, approximately 2,600 are covered by wetlands; there are also several areas of steep slopes that further limit suitability for development.
- Of the areas suitable for development, a large portion is classified as agricultural soils, which in many cases the town has an interest in preserving
- Most of the land identified as potentially suitable for low density development is located south and west of Mansfield City Road, and along Route 32, north of Route 275



Potential Areas for Mixed Use and Medium-High Density Residential Development

- Neighborhood Business/Mixed Use
- Planned Business/Mixed Use
- Planned Office/Mixed Use
- Medium-High Density Residential
- Water Service Areas
- Sewer Service Areas
- Proposed Four Corners Sewer Service Area
- Elementary Schools

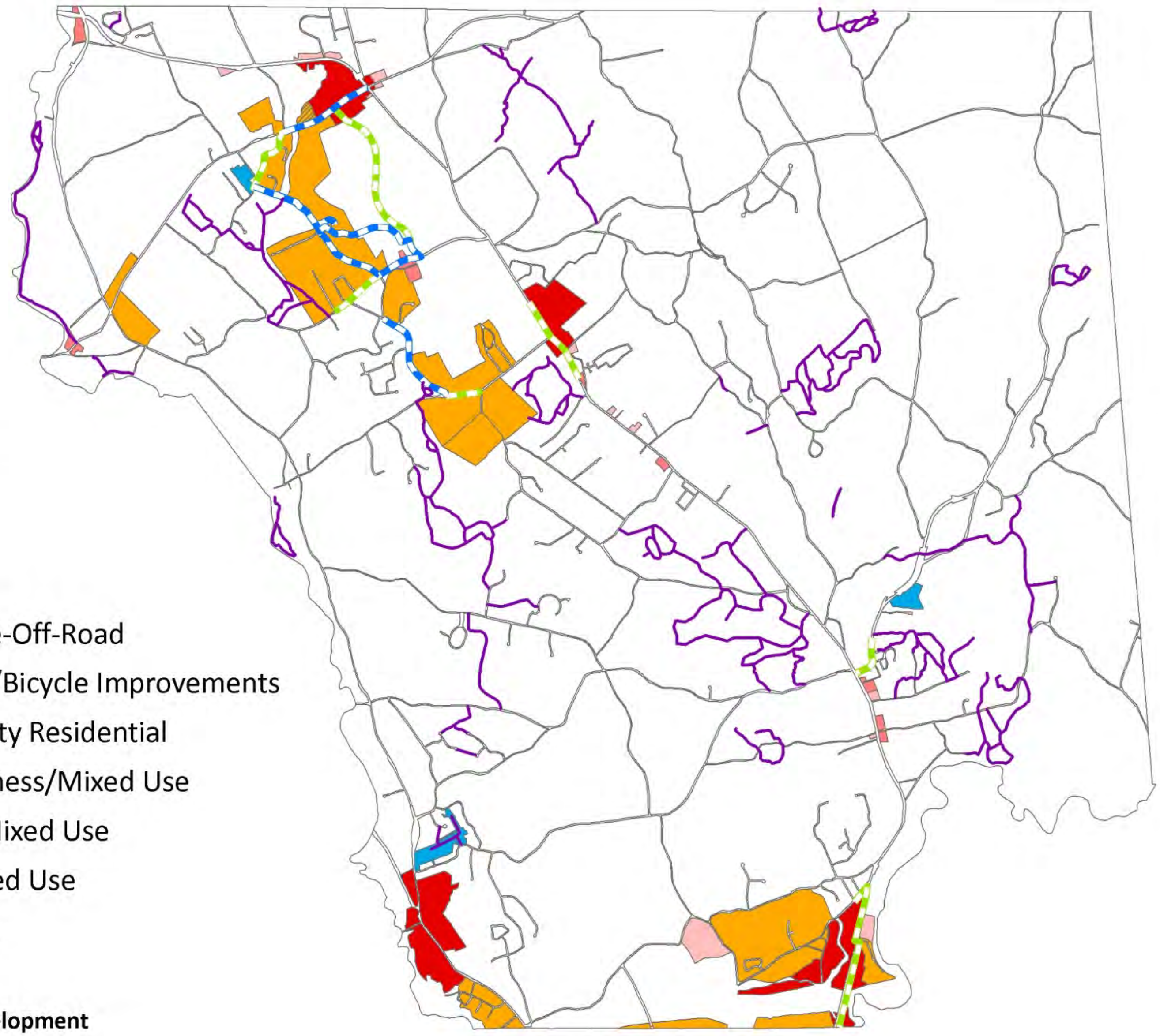
Department of Planning & Development

February 21, 2012

Potential Areas for Mixed Use and Medium to High Density Residential Development

- Areas identified as potentially supporting medium to high density residential development and more intense commercial development are located in areas with the potential to be served by water and sewer
- Most of the potential mixed use and higher density residential development is anticipated to occur in the areas north and west of UConn, as well as southern Mansfield between Mansfield City Road and Route 195.
- Perkins Corner is also identified as an area for future development. There is a potential sewer project being initiated by the Town of Coventry that could serve this area.

Transportation Infrastructure



- Trails_Town
- Pedestrian & Bicycle-Off-Road
- Planned Pedestrian/Bicycle Improvements
- Medium-High Density Residential
- Neighborhood Business/Mixed Use
- Planned Business/Mixed Use
- Planned Office/Mixed Use
- Elementary Schools

Department of Planning & Development

February 21, 2012

Proximity to Transportation Infrastructure

- As shown in the previous slide, Goodwin Elementary currently has the best access for pedestrians and bicyclists.
- A pedestrian walkway is planned, but not yet funded, to connect Southeast Elementary to Mansfield Center.

Mansfield Sustainability Committee
Elementary School Siting Recommendations Summary
March 4, 2012

The Mansfield Sustainability Committee has been keenly interested in the issue of school siting since its inception in 2010, around the time that the town was developing options to address current inadequacies and future needs of our elementary schools. Public schools are critical community elements to which substantial community resources are devoted, and their placement both drives future development patterns and has the potential to create a rich set of shared community relationships between public and private land uses. The decision as to where to place a school will have larger community sustainability affects for decades to come.

At that time, the Sustainability Committee researched and prepared a matrix of Sustainability Considerations for School Siting. This matrix, which is included as part of our recommendations, is a list of site features and locational relationships which fall primarily within three main areas:

- Site is in a community-centered location and has connectivity to community amenities and public spaces.
- Site is walk/bike/transit accessible.
- Site is environmentally suitable for development.

These considerations could be applied to renovating or rebuilding on an existing school site or to the search for a new, and potentially more suitable, site. They do not provide any specific site recommendations, but do outline specific site features that will optimize the educational potentials of the school, the environmental performance of the school and the community, and use of existing infrastructure and community resources.

Now in 2012, a more specific course of action has been developed through the School Board's and many others' hard work and careful deliberation. As the option to build two new schools on two of the three existing school sites has been recommended by the School Board, the Sustainability Committee has revisited and applied its School Siting Considerations with this option in mind. In a series of 2 full committee meetings and 2 school siting sub-group meetings over the past month, the committee has developed our recommendations. Ultimately we felt that our most important contribution would involve not limiting site selection to the existing school sites but to think more broadly about how to apply our Sustainability Considerations for School Siting to two community-centered hubs in Mansfield. Our process, which considers sustainability opportunities and constraints of land within 2-mile radius areas around two community hubs, is outlined in the meeting minutes provided with these recommendations. The process did not identify two specific sites, but helped us to arrive at these summarizing conclusions:

1. *The site selection should provide for a northern and southern school*. The significant effort and focus on centering new development and infrastructure around existing municipal and institutional uses in Storrs Center recommends for the siting of a school in this primary

northern hub of the town. The community hub of the Mansfield Center village area and significant residential population in the southern reaches of Mansfield recommends for the siting of a second school in a southern location.

2. *Locations of existing residential populations is a critical factor, but not the only factor in sustainable siting considerations.* Although the group did not come to consensus about the weighting of factors, it strongly agreed that proximity to existing community uses and amenities such as recreational facilities, library, cultural and natural lands, and pedestrian/bike friendly "complete streets" should be given strong consideration, as our Siting Consideration matrix suggests.

3. *If a selected school site does not have surrounding community uses or complete streets, these related improvements and future community/civic features should be planned and incorporated to strengthen the community hub.* As in the case of both the Vinton and Southeast School sites, the state roads they are located along are very lacking in pedestrian and traffic calming amenities. In the case of Vinton School, there is little, if any, other community uses in this area, which is concerning from a sustainability viewpoint.

4. *Although the existing school sites are the only ones being considered currently, there are likely several other sites that would be stronger candidates.* Because this is such a long-term decision that will drive so many other needs, opportunities and decisions, we urge the prudent consideration of the full range of feasible options.

Although we are fully aware that there are many other pressures and considerations that must be weighed in this decision, we hope these sustainability recommendations might be helpful in the further definition of our community course of action in school development.

Town of Mansfield
School Building Project
Decision Timeline for November 2012 Referendum
05/17/12 draft*

Action	**Date**
Public hearing	03/05/12
Council workshop	05/17/12
Council workshop	05/31/12
Council preliminary decision on option & site; referral to PZC	06/07/12
PZC review	June-July 2012
Direct mail piece	August 2012
Council bond authorization; schedule referendum	09/04/12
Explanatory text	Sep 2012
Public info sessions	Oct 2012
Referendum	11/06/12
Submit application	06/28/13
Begin construction, preK-4	Feb 2015
Begin construction, MMS	Mar 2016
Complete construction, preK-4	Sep 2016
Complete construction, MMS	Aug 2017

*To be reviewed by bond counsel