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

ANCHOR
ENGINEERING SERVICES, INC.

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

TABLE OF CONTENTS

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.

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR
TOWN OF MANSFIELD

USGS TOPO
QUAD #41
SPRING HILL, CT

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.

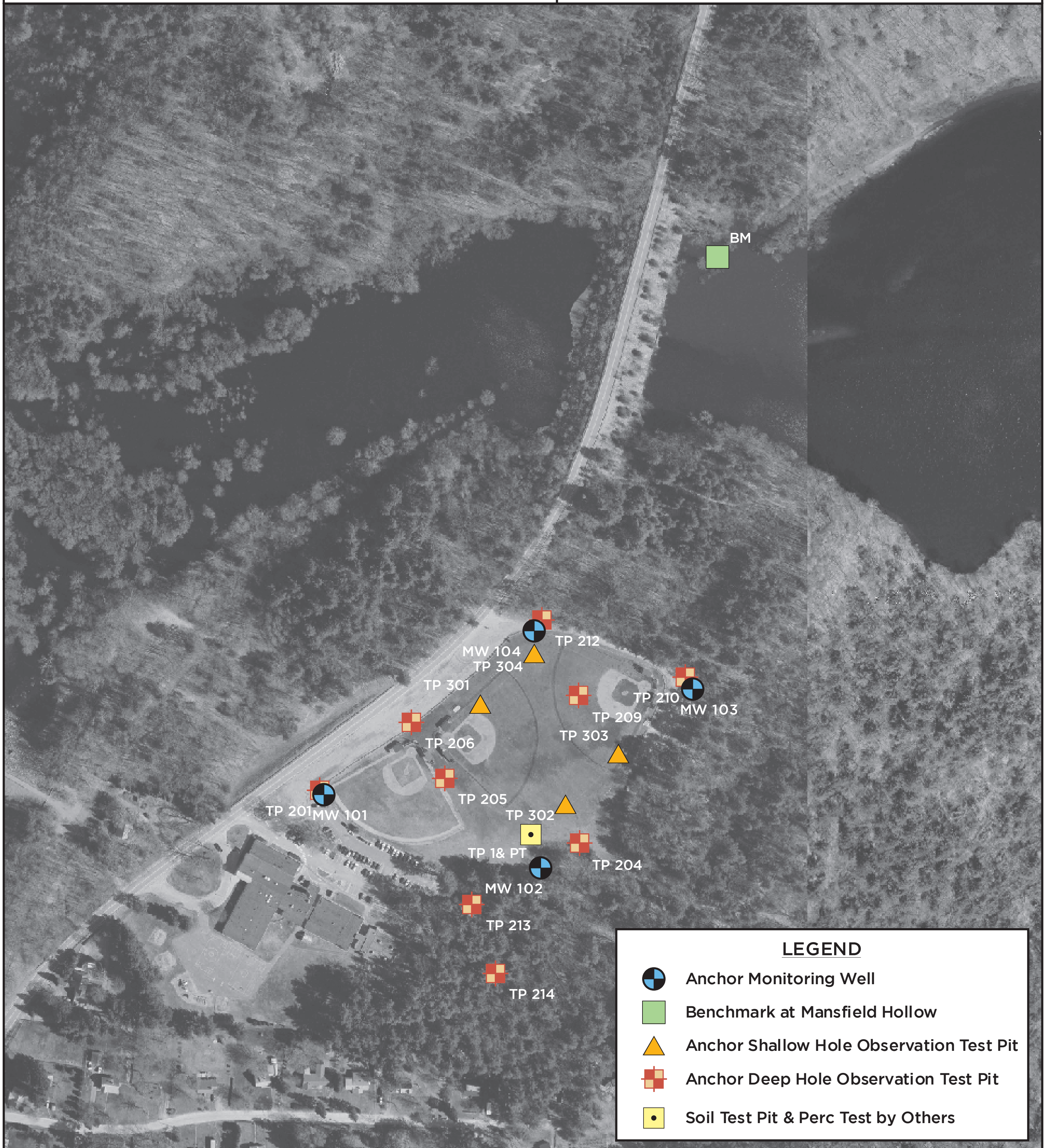
TOPOGRAPHIC FIELD SURVEY & MAPPING

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

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR
TOWN OF MANSFIELD



CONNDOT 2004
AERIAL IMAGERY
0410720412_4 & 7
0410720413_6 & 9

N W E S

0 150 300 600 900 Feet

FIGURE
2: SITE MONITORING

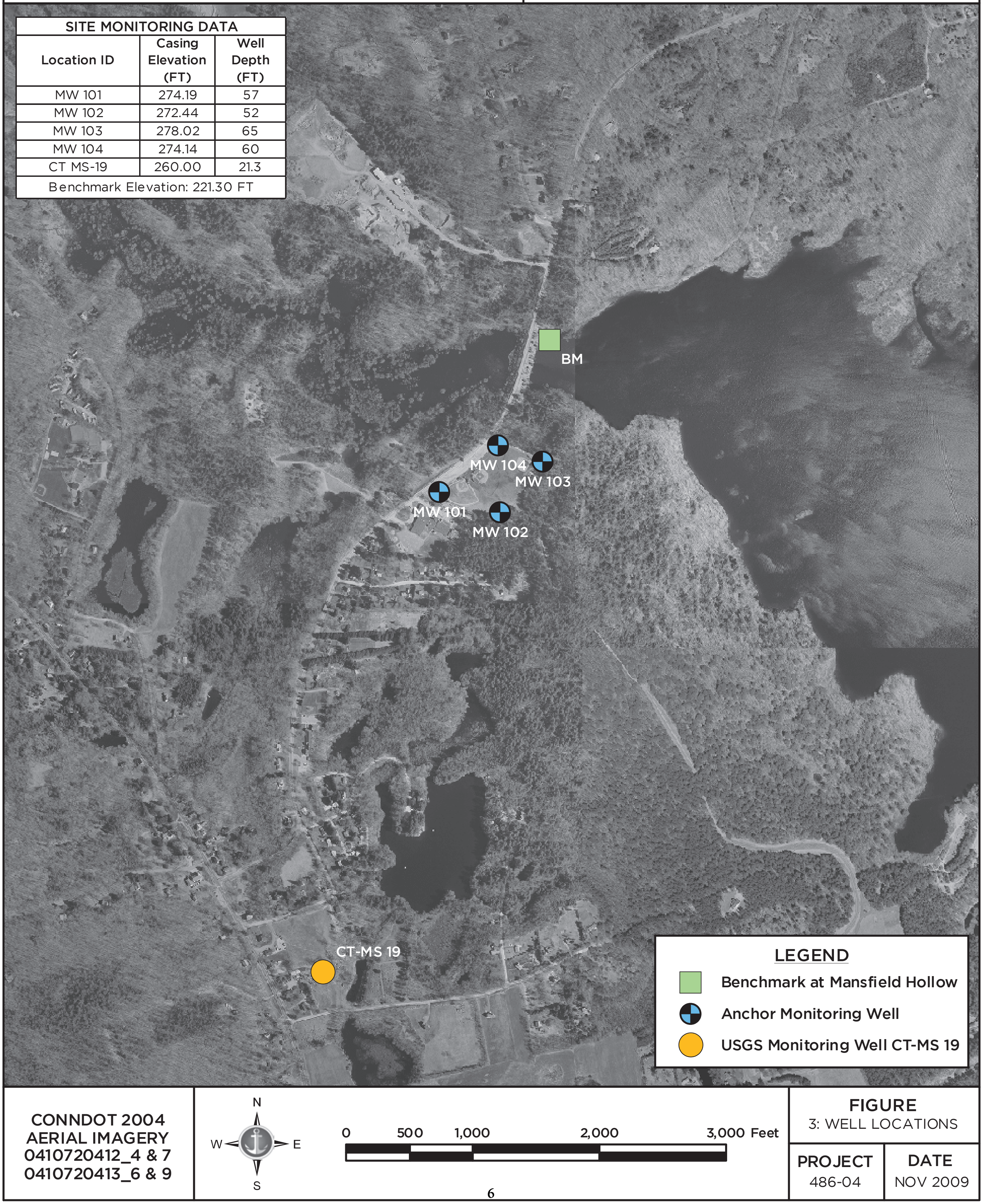
PROJECT	DATE
486-04	NOV 2009

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR
TOWN OF MANSFIELD

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		



CONNDOT 2004
AERIAL IMAGERY
0410720412_4 & 7
0410720413_6 & 9

FIGURE
3: WELL LOCATIONS

PROJECT	DATE
486-04	NOV 2009

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 Laboratory (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

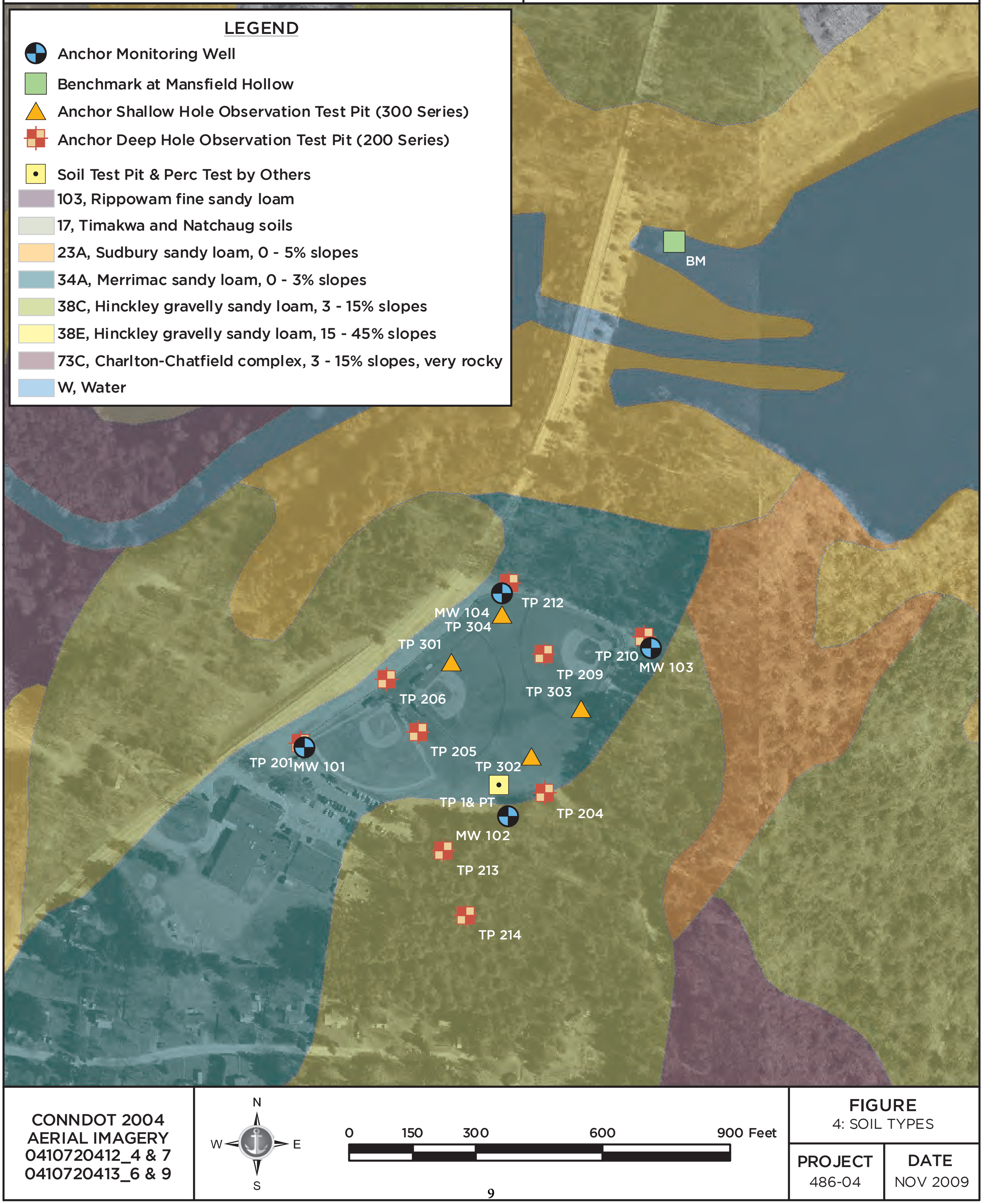
Table No. 2 – TP213 Permeability Test Results

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR

TOWN OF MANSFIELD



CONNDOT 2004
AERIAL IMAGERY
0410720412_4 & 7
0410720413_6 & 9

FIGURE
4: SOIL TYPES

PROJECT	DATE
486-04	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.

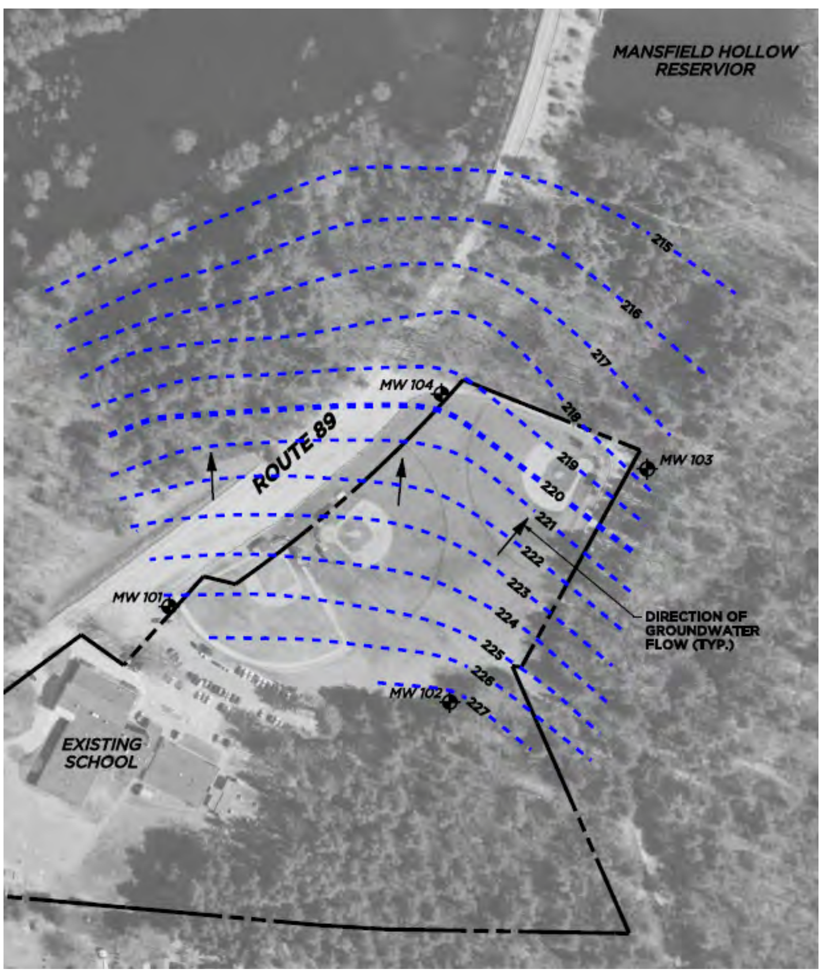


Figure No. 5 – Typical Groundwater Contour Map

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'

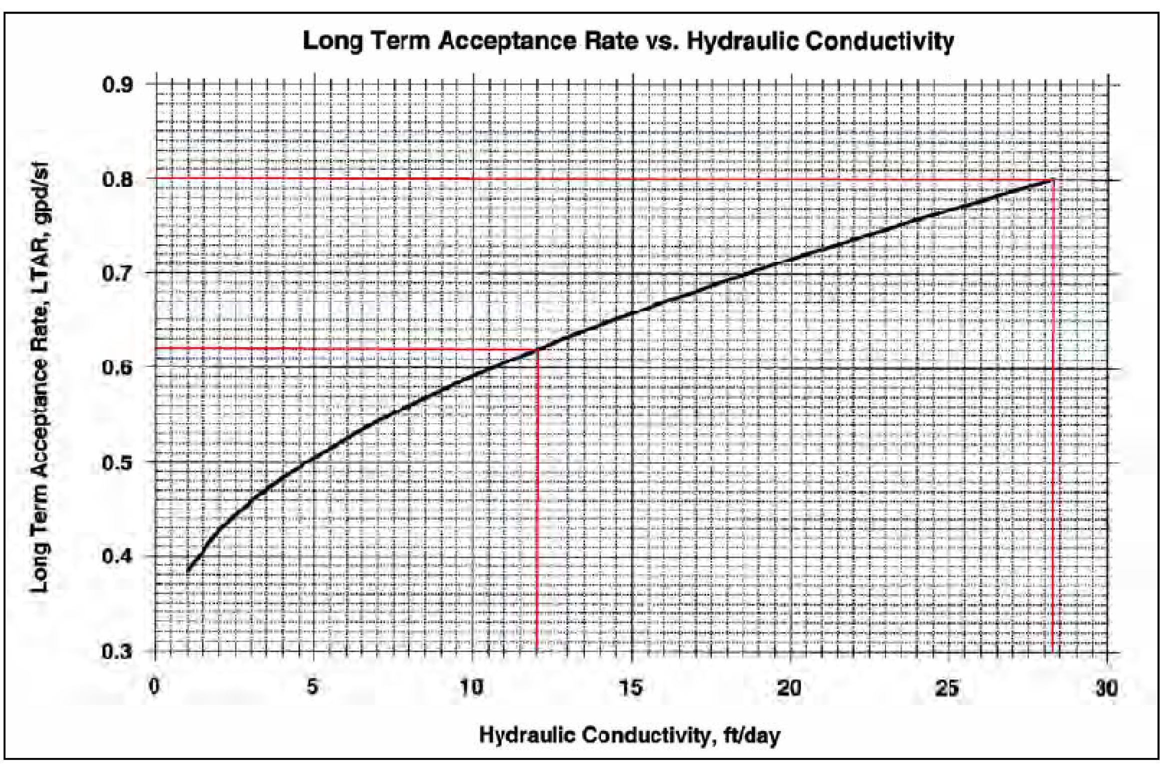
Based upon the above parameters, the minimum system spread was calculated to be 230 linear feet. Although the parameters used in the above preliminary calculations are conservative, it appears that the existing site can accommodate a system of this size.

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.

ANCHOR ENGINEERING SERVICES, INC.

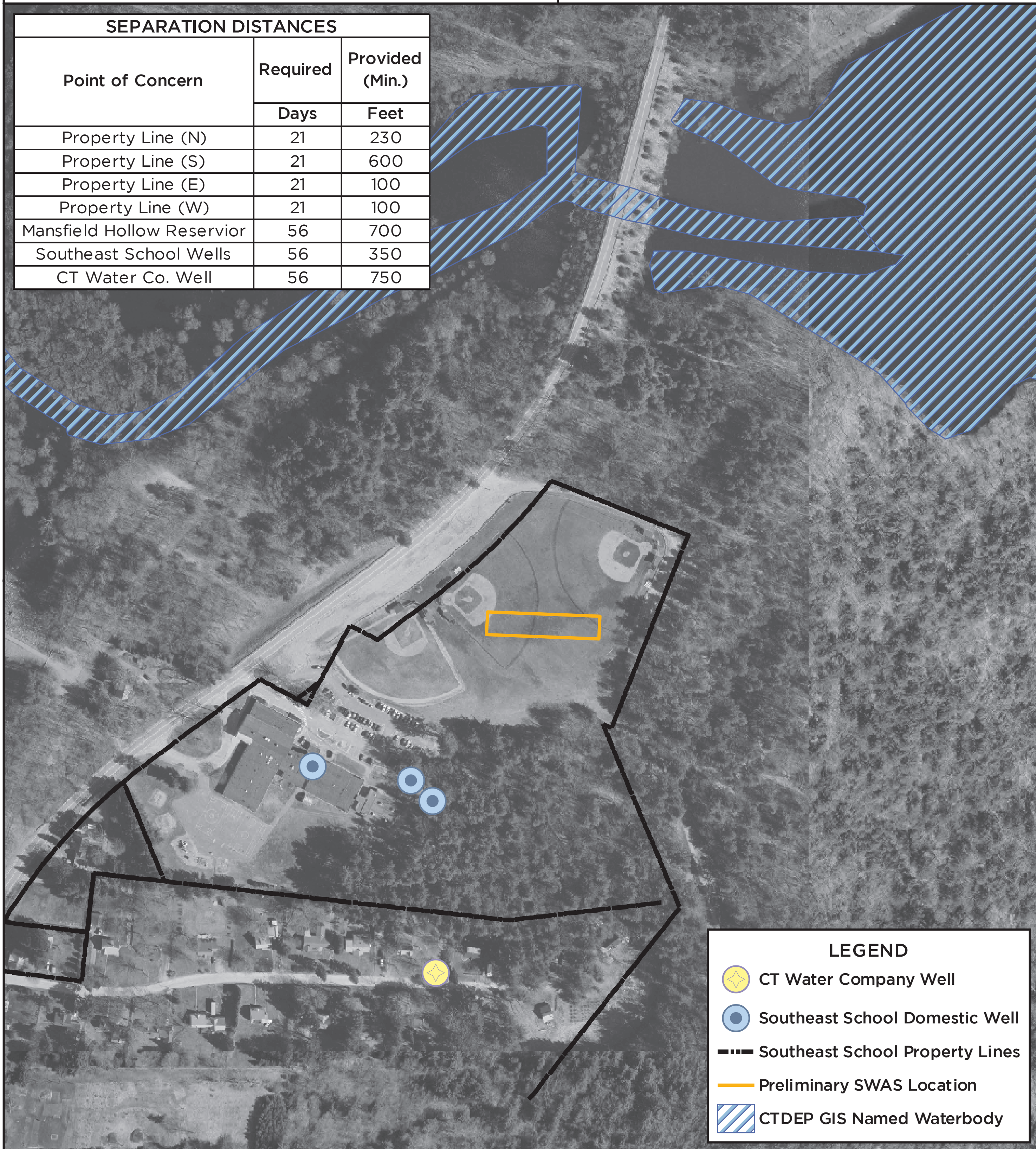
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR

TOWN OF MANSFIELD

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



CONNDOT 2004
AERIAL IMAGERY
0410720412_4 & 7
0410720413_6 & 9

FIGURE
7: POINTS OF CONCERN

PROJECT	DATE
486-04	NOV 2009

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

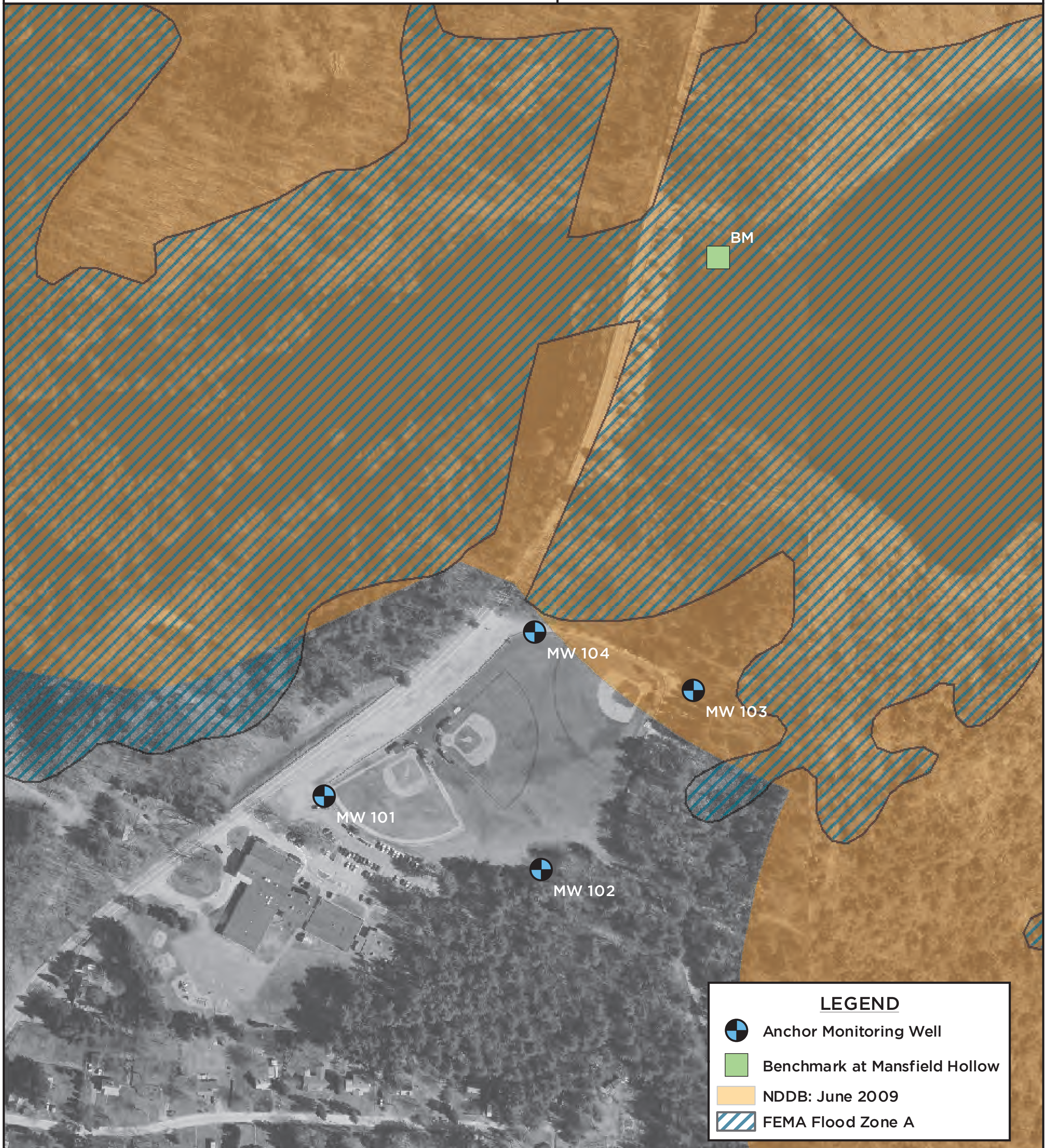
Data Collection:
Connecticut Department of Environmental Protection

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR

TOWN OF MANSFIELD



CONNDOT 2004
AERIAL IMAGERY
0410720412_4 & 7
0410720413_6 & 9

N W E S

0 150 300 600 900 Feet

FIGURE
ADDITIONAL DATA

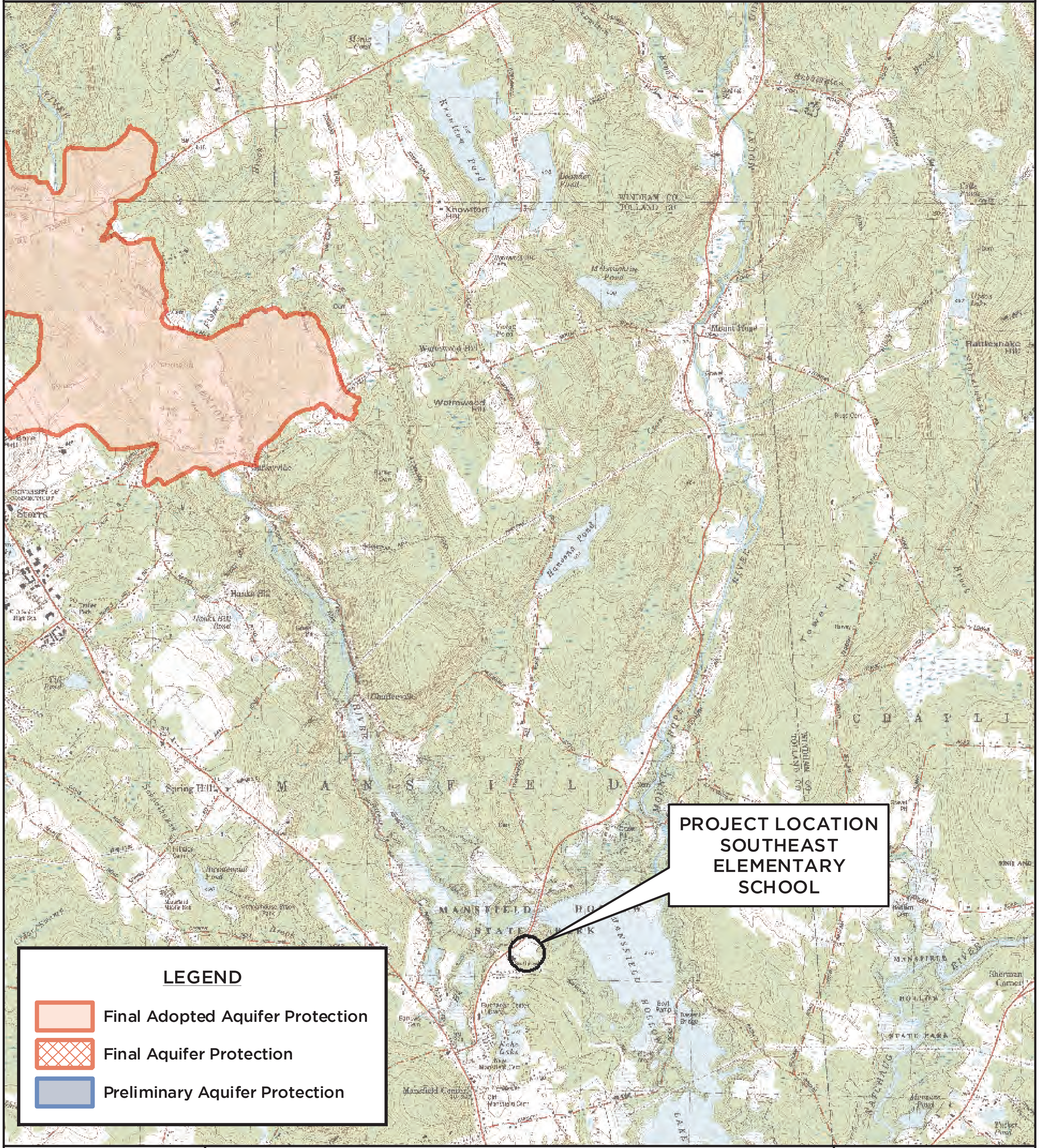
PROJECT	DATE
486-04	NOV 2009

ANCHOR ENGINEERING SERVICES, INC.

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

SEPTIC SUITABILITY ANALYSIS

PREPARED FOR
TOWN OF MANSFIELD



USGS TOPO QUAD #41 SPRING HILL, CT	N S E W 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
		Filtering capacity	1.00	Slope	1.00
		Slope	0.04		

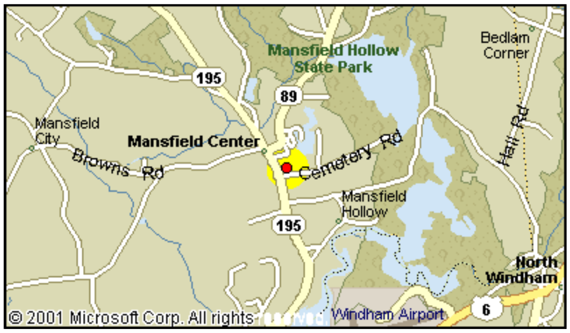
Appendix A3

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:

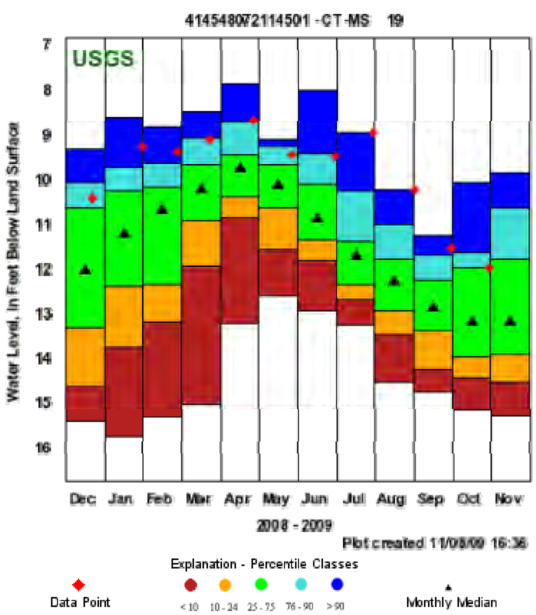
Field ground-water-level measurements

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

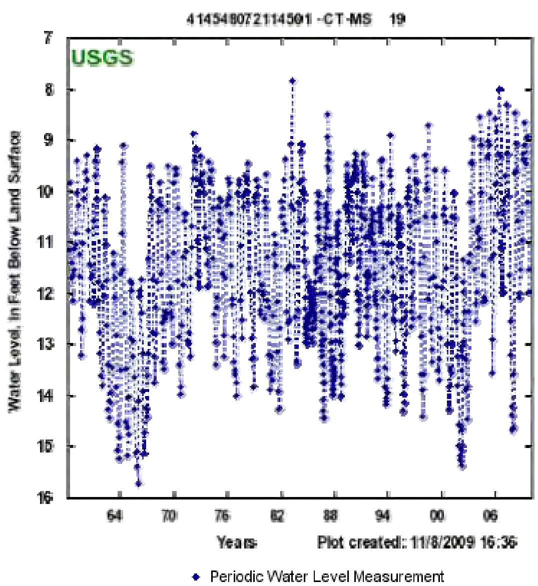
Begin Date	End Date	Number of Values
05/27/58	10/28/09	890

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

Return to County Page | Return to State Page | Return to National Page

Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior |U.S. Geological Survey
URL: http://groundwaterwatch.usgs.gov/AWLSites.asp
Page Contact Information: OGW Webmaster
Last update: Monday, September 14, 2009 at 11:44

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.
#
# ----- Agency Code: US GEOLOGICAL SURVEY
# -----  Station ID: 414548072114501, Station Name: CT-MS 19
# ----- Start of Data
USGS 414548072114501 72019 05/27/1958 9.84 ----- -
USGS 414548072114501 72019 06/28/1958 11.17 ----- -
USGS 414548072114501 72019 08/02/1958 11.41 ----- -
USGS 414548072114501 72019 08/29/1958 11.71 ----- -
USGS 414548072114501 72019 09/27/1958 12.15 ----- -
USGS 414548072114501 72019 10/31/1958 11.66 ----- -
USGS 414548072114501 72019 11/28/1958 11.53 ----- -
USGS 414548072114501 72019 12/30/1958 11.12 ----- -
USGS 414548072114501 72019 01/30/1959 11.04 ----- -
USGS 414548072114501 72019 02/27/1959 10.84 ----- -
USGS 414548072114501 72019 03/28/1959 10.03 ----- -
USGS 414548072114501 72019 04/29/1959 9.41 ----- -
USGS 414548072114501 72019 05/29/1959 10.28 ----- -
USGS 414548072114501 72019 06/30/1959 11.24 ----- -
USGS 414548072114501 72019 07/31/1959 11.67 ----- -
USGS 414548072114501 72019 09/01/1959 12.73 ----- -
USGS 414548072114501 72019 09/30/1959 13.22 ----- -
USGS 414548072114501 72019 10/30/1959 12.51 ----- -
USGS 414548072114501 72019 12/01/1959 11.02 ----- -
USGS 414548072114501 72019 12/30/1959 10.14 ----- -
USGS 414548072114501 72019 01/29/1960 9.97 ----- -
USGS 414548072114501 72019 04/01/1960 9.62 ----- -
USGS 414548072114501 72019 04/29/1960 9.30 ----- -
USGS 414548072114501 72019 06/01/1960 9.78 ----- -
USGS 414548072114501 72019 06/30/1960 10.77 ----- -
USGS 414548072114501 72019 08/02/1960 11.43 ----- -
USGS 414548072114501 72019 08/31/1960 12.15 ----- -
USGS 414548072114501 72019 09/27/1960 11.45 ----- -
USGS 414548072114501 72019 10/27/1960 11.70 ----- -
USGS 414548072114501 72019 11/30/1960 11.64 ----- -
USGS 414548072114501 72019 12/30/1960 11.65 ----- -
USGS 414548072114501 72019 02/01/1961 12.20 ----- -
USGS 414548072114501 72019 02/28/1961 10.57 ----- -
USGS 414548072114501 72019 03/30/1961 9.72 ----- -
USGS 414548072114501 72019 04/28/1961 9.40 ----- -
USGS 414548072114501 72019 06/01/1961 9.15 ----- -
USGS 414548072114501 72019 06/30/1961 10.14 ----- -
USGS 414548072114501 72019 08/02/1961 11.79 ----- -
USGS 414548072114501 72019 08/31/1961 12.14 ----- -
USGS 414548072114501 72019 09/29/1961 12.78 ----- -
USGS 414548072114501 72019 10/28/1961 13.18 ----- -
USGS 414548072114501 72019 11/30/1961 13.62 ----- -
USGS 414548072114501 72019 12/30/1961 13.80 ----- -
USGS 414548072114501 72019 01/30/1962 11.87 ----- -
USGS 414548072114501 72019 03/01/1962 12.07 ----- -
```

```
USGS 414548072114501 72019 04/02/1962 10.39 ----- -
USGS 414548072114501 72019 05/02/1962 10.12 ----- -
USGS 414548072114501 72019 06/02/1962 11.05 ----- -
USGS 414548072114501 72019 06/30/1962 11.75 ----- -
USGS 414548072114501 72019 07/30/1962 12.63 ----- -
USGS 414548072114501 72019 08/29/1962 13.41 ----- -
USGS 414548072114501 72019 09/29/1962 14.28 ----- -
USGS 414548072114501 72019 10/29/1962 14.43 ----- -
USGS 414548072114501 72019 11/29/1962 14.11 ----- -
USGS 414548072114501 72019 12/29/1962 14.15 ----- -
USGS 414548072114501 72019 01/29/1963 13.96 ----- -
USGS 414548072114501 72019 02/28/1963 13.45 ----- -
USGS 414548072114501 72019 03/29/1963 11.22 ----- -
USGS 414548072114501 72019 05/01/1963 11.43 ----- -
USGS 414548072114501 72019 05/29/1963 11.71 ----- -
USGS 414548072114501 72019 06/26/1963 12.09 ----- -
USGS 414548072114501 72019 07/31/1963 12.84 ----- -
USGS 414548072114501 72019 08/27/1963 13.84 ----- -
USGS 414548072114501 72019 09/26/1963 14.55 ----- -
USGS 414548072114501 72019 10/30/1963 15.08 ----- -
USGS 414548072114501 72019 11/27/1963 15.24 ----- -
USGS 414548072114501 72019 12/27/1963 14.82 ----- -
USGS 414548072114501 72019 01/29/1964 13.52 ----- -
USGS 414548072114501 72019 02/26/1964 11.62 ----- -
USGS 414548072114501 72019 03/30/1964 10.84 ----- -
USGS 414548072114501 72019 04/26/1964 9.44 ----- -
USGS 414548072114501 72019 05/26/1964 9.10 ----- -
USGS 414548072114501 72019 06/26/1964 11.55 ----- -
USGS 414548072114501 72019 07/28/1964 12.40 ----- -
USGS 414548072114501 72019 08/26/1964 13.49 ----- -
USGS 414548072114501 72019 09/28/1964 14.51 ----- -
USGS 414548072114501 72019 10/27/1964 14.64 ----- -
USGS 414548072114501 72019 11/25/1964 15.19 ----- -
USGS 414548072114501 72019 12/29/1964 14.77 ----- -
USGS 414548072114501 72019 01/27/1965 14.04 ----- -
USGS 414548072114501 72019 02/23/1965 12.88 ----- -
USGS 414548072114501 72019 03/30/1965 11.75 ----- -
USGS 414548072114501 72019 04/29/1965 11.82 ----- -
USGS 414548072114501 72019 05/27/1965 11.95 ----- -
USGS 414548072114501 72019 06/30/1965 12.94 ----- -
USGS 414548072114501 72019 07/28/1965 13.25 ----- -
USGS 414548072114501 72019 08/30/1965 13.64 ----- -
USGS 414548072114501 72019 09/27/1965 14.28 ----- -
USGS 414548072114501 72019 10/28/1965 15.12 ----- -
USGS 414548072114501 72019 11/24/1965 15.11 ----- -
USGS 414548072114501 72019 12/29/1965 15.39 ----- -
USGS 414548072114501 72019 01/26/1966 15.72 ----- -
USGS 414548072114501 72019 02/23/1966 14.12 ----- -
USGS 414548072114501 72019 03/30/1966 11.96 ----- -
USGS 414548072114501 72019 04/27/1966 12.07 ----- -
USGS 414548072114501 72019 05/26/1966 11.74 ----- -
USGS 414548072114501 72019 06/29/1966 12.39 ----- -
USGS 414548072114501 72019 07/28/1966 13.18 ----- -
USGS 414548072114501 72019 08/30/1966 13.93 ----- -
USGS 414548072114501 72019 08/31/1966 15.14 ----- -
USGS 414548072114501 72019 09/27/1966 14.75 ----- -
USGS 414548072114501 72019 10/27/1966 15.12 ----- -
USGS 414548072114501 72019 11/30/1966 14.24 ----- -
USGS 414548072114501 72019 12/28/1966 14.42 ----- -
USGS 414548072114501 72019 01/25/1967 13.63 ----- -
USGS 414548072114501 72019 02/27/1967 13.19 ----- -
USGS 414548072114501 72019 03/31/1967 11.33 ----- -
USGS 414548072114501 72019 04/25/1967 9.53 ----- -
USGS 414548072114501 72019 05/22/1967 9.72 ----- -
USGS 414548072114501 72019 06/28/1967 10.11 ----- -
USGS 414548072114501 72019 07/26/1967 10.40 ----- -
USGS 414548072114501 72019 08/29/1967 11.72 ----- -
USGS 414548072114501 72019 09/28/1967 12.76 ----- -
USGS 414548072114501 72019 10/26/1967 13.25 ----- -
USGS 414548072114501 72019 11/30/1967 13.75 ----- -
USGS 414548072114501 72019 12/28/1967 12.79 ----- -
USGS 414548072114501 72019 01/30/1968 12.28 ----- -
USGS 414548072114501 72019 02/27/1968 11.79 ----- -
USGS 414548072114501 72019 03/27/1968 10.21 ----- -
USGS 414548072114501 72019 04/25/1968 10.20 ----- -
USGS 414548072114501 72019 05/22/1968 10.61 ----- -
USGS 414548072114501 72019 06/26/1968 9.84 ----- -
USGS 414548072114501 72019 07/22/1968 10.28 ----- -
USGS 414548072114501 72019 08/28/1968 11.63 ----- -
USGS 414548072114501 72019 09/24/1968 12.58 ----- -
USGS 414548072114501 72019 10/21/1968 13.34 ----- -
USGS 414548072114501 72019 11/22/1968 13.47 ----- -
USGS 414548072114501 72019 12/26/1968 12.45 ----- -
USGS 414548072114501 72019 01/22/1969 12.35 ----- -
USGS 414548072114501 72019 02/25/1969 12.50 ----- -
USGS 414548072114501 72019 03/21/1969 12.43 ----- -
```

USGS 414548072114501 72019 04/21/1969 10.38 ----- -
USGS 414548072114501 72019 05/21/1969 9.51 ----- -
USGS 414548072114501 72019 06/23/1969 11.29 ----- -
USGS 414548072114501 72019 07/22/1969 11.91 ----- -
USGS 414548072114501 72019 08/25/1969 12.20 ----- -
USGS 414548072114501 72019 09/25/1969 12.40 ----- -
USGS 414548072114501 72019 10/22/1969 12.99 ----- -
USGS 414548072114501 72019 11/24/1969 12.46 ----- -
USGS 414548072114501 72019 12/23/1969 11.20 ----- -
USGS 414548072114501 72019 01/22/1970 9.84 ----- -
USGS 414548072114501 72019 02/19/1970 9.58 ----- -
USGS 414548072114501 72019 04/27/1970 9.58 ----- -
USGS 414548072114501 72019 05/21/1970 9.69 ----- -
USGS 414548072114501 72019 06/22/1970 10.34 ----- -
USGS 414548072114501 72019 07/22/1970 11.75 ----- -
USGS 414548072114501 72019 08/24/1970 12.86 ----- -
USGS 414548072114501 72019 09/23/1970 13.39 ----- -
USGS 414548072114501 72019 10/23/1970 13.98 ----- -
USGS 414548072114501 72019 11/24/1970 13.84 ----- -
USGS 414548072114501 72019 12/23/1970 12.63 ----- -
USGS 414548072114501 72019 01/25/1971 11.29 ----- -
USGS 414548072114501 72019 02/24/1971 11.84 ----- -
USGS 414548072114501 72019 03/25/1971 10.58 ----- -
USGS 414548072114501 72019 04/23/1971 10.45 ----- -
USGS 414548072114501 72019 05/21/1971 10.44 ----- -
USGS 414548072114501 72019 06/22/1971 11.18 ----- -
USGS 414548072114501 72019 07/23/1971 12.34 ----- -
USGS 414548072114501 72019 08/26/1971 12.94 ----- -
USGS 414548072114501 72019 09/27/1971 12.77 ----- -
USGS 414548072114501 72019 10/21/1971 12.98 ----- -
USGS 414548072114501 72019 11/23/1971 13.23 ----- -
USGS 414548072114501 72019 12/28/1971 11.70 ----- -
USGS 414548072114501 72019 01/24/1972 11.10 ----- -
USGS 414548072114501 72019 02/23/1972 10.69 ----- -
USGS 414548072114501 72019 03/24/1972 8.89 ----- -
USGS 414548072114501 72019 04/21/1972 9.75 ----- -
USGS 414548072114501 72019 05/22/1972 9.41 ----- -
USGS 414548072114501 72019 06/21/1972 9.17 ----- -
USGS 414548072114501 72019 07/24/1972 9.77 ----- -
USGS 414548072114501 72019 08/22/1972 10.96 ----- -
USGS 414548072114501 72019 09/25/1972 11.61 ----- -
USGS 414548072114501 72019 10/25/1972 11.91 ----- -
USGS 414548072114501 72019 11/22/1972 10.04 ----- -
USGS 414548072114501 72019 12/20/1972 9.33 ----- -
USGS 414548072114501 72019 01/22/1973 9.82 ----- -
USGS 414548072114501 72019 02/22/1973 9.67 ----- -
USGS 414548072114501 72019 03/23/1973 9.87 ----- -
USGS 414548072114501 72019 04/23/1973 9.64 ----- -
USGS 414548072114501 72019 05/22/1973 10.05 ----- -
USGS 414548072114501 72019 06/21/1973 10.71 ----- -
USGS 414548072114501 72019 07/24/1973 11.14 ----- -
USGS 414548072114501 72019 08/22/1973 10.92 ----- -
USGS 414548072114501 72019 09/25/1973 11.43 ----- -
USGS 414548072114501 72019 10/23/1973 11.88 ----- -
USGS 414548072114501 72019 11/26/1973 11.87 ----- -
USGS 414548072114501 72019 12/27/1973 9.43 ----- -
USGS 414548072114501 72019 01/22/1974 9.75 ----- -
USGS 414548072114501 72019 02/20/1974 9.83 ----- -
USGS 414548072114501 72019 03/22/1974 9.60 ----- -
USGS 414548072114501 72019 04/24/1974 9.61 ----- -
USGS 414548072114501 72019 05/20/1974 10.34 ----- -
USGS 414548072114501 72019 06/21/1974 11.32 ----- -
USGS 414548072114501 72019 07/24/1974 12.43 ----- -
USGS 414548072114501 72019 08/27/1974 13.39 ----- -
USGS 414548072114501 72019 09/23/1974 12.95 ----- -
USGS 414548072114501 72019 10/24/1974 12.29 ----- -
USGS 414548072114501 72019 11/22/1974 12.08 ----- -
USGS 414548072114501 72019 12/26/1974 10.77 ----- -
USGS 414548072114501 72019 01/23/1975 10.30 ----- -
USGS 414548072114501 72019 02/24/1975 10.57 ----- -
USGS 414548072114501 72019 03/21/1975 10.14 ----- -
USGS 414548072114501 72019 04/21/1975 10.20 ----- -
USGS 414548072114501 72019 05/20/1975 10.63 ----- -
USGS 414548072114501 72019 06/25/1975 10.94 ----- -
USGS 414548072114501 72019 07/25/1975 11.62 ----- -
USGS 414548072114501 72019 08/25/1975 12.82 ----- -
USGS 414548072114501 72019 09/24/1975 13.24 ----- -
USGS 414548072114501 72019 10/23/1975 11.70 ----- -
USGS 414548072114501 72019 11/20/1975 10.85 ----- -
USGS 414548072114501 72019 12/26/1975 10.27 ----- -
USGS 414548072114501 72019 01/26/1976 10.16 ----- -
USGS 414548072114501 72019 02/24/1976 9.77 ----- -
USGS 414548072114501 72019 03/25/1976 9.85 ----- -
USGS 414548072114501 72019 04/26/1976 10.13 ----- -
USGS 414548072114501 72019 05/25/1976 10.45 ----- -
USGS 414548072114501 72019 06/23/1976 11.47 ----- -

```
USGS 414548072114501 72019 07/26/1976 12.23 ----- -
USGS 414548072114501 72019 08/23/1976 12.12 ----- -
USGS 414548072114501 72019 09/24/1976 12.86 ----- -
USGS 414548072114501 72019 10/22/1976 13.34 ----- -
USGS 414548072114501 72019 11/22/1976 13.59 ----- -
USGS 414548072114501 72019 12/28/1976 13.50 ----- -
USGS 414548072114501 72019 01/25/1977 13.77 ----- -
USGS 414548072114501 72019 02/23/1977 13.99 ----- -
USGS 414548072114501 72019 03/25/1977 10.04 ----- -
USGS 414548072114501 72019 04/25/1977 9.88 ----- -
USGS 414548072114501 72019 05/23/1977 9.79 ----- -
USGS 414548072114501 72019 06/27/1977 11.07 ----- -
USGS 414548072114501 72019 07/25/1977 12.14 ----- -
USGS 414548072114501 72019 08/24/1977 12.53 ----- -
USGS 414548072114501 72019 09/26/1977 12.89 ----- -
USGS 414548072114501 72019 10/25/1977 10.08 ----- -
USGS 414548072114501 72019 11/21/1977 10.32 ----- -
USGS 414548072114501 72019 12/20/1977 10.06 ----- -
USGS 414548072114501 72019 01/23/1978 9.70 ----- -
USGS 414548072114501 72019 02/21/1978 10.00 ----- -
USGS 414548072114501 72019 03/24/1978 9.83 ----- -
USGS 414548072114501 72019 04/24/1978 9.47 ----- -
USGS 414548072114501 72019 05/23/1978 10.22 ----- -
USGS 414548072114501 72019 06/22/1978 10.82 ----- -
USGS 414548072114501 72019 07/21/1978 11.52 ----- -
USGS 414548072114501 72019 08/24/1978 11.98 ----- -
USGS 414548072114501 72019 09/25/1978 12.88 ----- -
USGS 414548072114501 72019 10/23/1978 13.30 ----- -
USGS 414548072114501 72019 11/28/1978 13.85 ----- -
USGS 414548072114501 72019 12/21/1978 13.27 ----- -
USGS 414548072114501 72019 01/24/1979 10.12 ----- -
USGS 414548072114501 72019 02/23/1979 10.22 ----- -
USGS 414548072114501 72019 03/26/1979 9.79 ----- -
USGS 414548072114501 72019 04/24/1979 10.07 ----- -
USGS 414548072114501 72019 05/29/1979 9.93 ----- -
USGS 414548072114501 72019 06/25/1979 10.47 ----- -
USGS 414548072114501 72019 07/24/1979 11.61 ----- -
USGS 414548072114501 72019 08/24/1979 11.94 ----- -
USGS 414548072114501 72019 09/24/1979 12.42 ----- -
USGS 414548072114501 72019 10/24/1979 12.33 ----- -
USGS 414548072114501 72019 11/28/1979 11.84 ----- -
USGS 414548072114501 72019 12/27/1979 12.02 ----- -
USGS 414548072114501 72019 01/28/1980 11.98 ----- -
USGS 414548072114501 72019 02/25/1980 12.50 ----- -
USGS 414548072114501 72019 03/27/1980 10.21 ----- -
USGS 414548072114501 72019 04/25/1980 9.67 ----- -
USGS 414548072114501 72019 05/27/1980 10.35 ----- -
USGS 414548072114501 72019 06/24/1980 11.30 ----- -
USGS 414548072114501 72019 07/29/1980 12.15 ----- -
USGS 414548072114501 72019 08/25/1980 12.27 ----- -
USGS 414548072114501 72019 09/25/1980 13.21 ----- -
USGS 414548072114501 72019 10/28/1980 13.60 ----- -
USGS 414548072114501 72019 11/25/1980 13.88 ----- -
USGS 414548072114501 72019 12/29/1980 13.23 ----- -
USGS 414548072114501 72019 01/26/1981 13.70 ----- -
USGS 414548072114501 72019 02/25/1981 12.44 ----- -
USGS 414548072114501 72019 03/24/1981 11.23 ----- -
USGS 414548072114501 72019 04/27/1981 10.85 ----- -
USGS 414548072114501 72019 05/27/1981 11.05 ----- -
USGS 414548072114501 72019 06/25/1981 11.45 ----- -
USGS 414548072114501 72019 07/29/1981 12.17 ----- -
USGS 414548072114501 72019 08/27/1981 13.15 ----- -
USGS 414548072114501 72019 09/25/1981 13.92 ----- -
USGS 414548072114501 72019 10/28/1981 14.27 ----- -
USGS 414548072114501 72019 11/24/1981 14.24 ----- -
USGS 414548072114501 72019 12/28/1981 12.70 ----- -
USGS 414548072114501 72019 01/26/1982 10.50 ----- -
USGS 414548072114501 72019 02/23/1982 10.19 ----- -
USGS 414548072114501 72019 03/25/1982 10.34 ----- -
USGS 414548072114501 72019 04/27/1982 9.79 ----- -
USGS 414548072114501 72019 05/26/1982 10.65 ----- -
USGS 414548072114501 72019 06/28/1982 9.38 ----- -
USGS 414548072114501 72019 07/27/1982 10.77 ----- -
USGS 414548072114501 72019 08/25/1982 11.53 ----- -
USGS 414548072114501 72019 09/27/1982 12.36 ----- -
USGS 414548072114501 72019 10/27/1982 12.90 ----- -
USGS 414548072114501 72019 11/22/1982 12.57 ----- -
USGS 414548072114501 72019 12/28/1982 12.52 ----- -
USGS 414548072114501 72019 01/25/1983 11.47 ----- -
USGS 414548072114501 72019 02/23/1983 10.28 ----- -
USGS 414548072114501 72019 03/28/1983 9.07 ----- -
USGS 414548072114501 72019 04/26/1983 7.85 ----- -
USGS 414548072114501 72019 05/26/1983 9.73 ----- -
USGS 414548072114501 72019 06/27/1983 10.37 ----- -
USGS 414548072114501 72019 07/26/1983 11.50 ----- -
USGS 414548072114501 72019 08/26/1983 12.46 ----- -
```

```
USGS 414548072114501 72019 09/27/1983 13.37 ----- -
USGS 414548072114501 72019 10/31/1983 13.33 ----- -
USGS 414548072114501 72019 11/28/1983 12.34 ----- -
USGS 414548072114501 72019 12/28/1983 10.23 ----- -
USGS 414548072114501 72019 01/31/1984 10.62 ----- -
USGS 414548072114501 72019 02/27/1984 9.84 ----- -
USGS 414548072114501 72019 03/28/1984 9.07 ----- -
USGS 414548072114501 72019 04/26/1984 9.22 ----- -
USGS 414548072114501 72019 05/29/1984 10.00 ----- -
USGS 414548072114501 72019 06/27/1984 9.78 ----- -
USGS 414548072114501 72019 07/26/1984 10.07 ----- -
USGS 414548072114501 72019 07/30/1984 10.17 ----- -
USGS 414548072114501 72019 08/06/1984 10.56 ----- -
USGS 414548072114501 72019 08/13/1984 10.82 ----- -
USGS 414548072114501 72019 08/20/1984 11.09 ----- -
USGS 414548072114501 72019 08/27/1984 11.39 ----- -
USGS 414548072114501 72019 09/04/1984 11.69 ----- -
USGS 414548072114501 72019 09/10/1984 11.37 ----- -
USGS 414548072114501 72019 09/17/1984 12.10 ----- -
USGS 414548072114501 72019 09/24/1984 12.30 ----- -
USGS 414548072114501 72019 10/01/1984 12.50 ----- -
USGS 414548072114501 72019 10/10/1984 12.66 ----- -
USGS 414548072114501 72019 10/15/1984 12.79 ----- -
USGS 414548072114501 72019 10/22/1984 12.97 ----- -
USGS 414548072114501 72019 10/29/1984 13.00 ----- -
USGS 414548072114501 72019 11/05/1984 12.89 ----- -
USGS 414548072114501 72019 11/13/1984 12.71 ----- -
USGS 414548072114501 72019 11/19/1984 12.57 ----- -
USGS 414548072114501 72019 11/26/1984 12.73 ----- -
USGS 414548072114501 72019 12/05/1984 12.82 ----- -
USGS 414548072114501 72019 12/12/1984 12.63 ----- -
USGS 414548072114501 72019 12/17/1984 12.61 ----- -
USGS 414548072114501 72019 12/24/1984 12.57 ----- -
USGS 414548072114501 72019 01/02/1985 12.43 ----- -
USGS 414548072114501 72019 01/10/1985 12.43 ----- -
USGS 414548072114501 72019 01/21/1985 12.61 ----- -
USGS 414548072114501 72019 01/28/1985 12.71 ----- -
USGS 414548072114501 72019 02/05/1985 12.88 ----- -
USGS 414548072114501 72019 02/15/1985 12.55 ----- -
USGS 414548072114501 72019 02/21/1985 12.48 ----- -
USGS 414548072114501 72019 02/28/1985 12.43 ----- -
USGS 414548072114501 72019 03/07/1985 12.40 ----- -
USGS 414548072114501 72019 03/19/1985 11.91 ----- -
USGS 414548072114501 72019 03/26/1985 11.80 ----- -
USGS 414548072114501 72019 04/01/1985 11.79 ----- -
USGS 414548072114501 72019 04/10/1985 11.86 ----- -
USGS 414548072114501 72019 04/19/1985 11.98 ----- -
USGS 414548072114501 72019 04/23/1985 12.00 ----- -
USGS 414548072114501 72019 04/30/1985 12.11 ----- -
USGS 414548072114501 72019 05/10/1985 11.93 ----- -
USGS 414548072114501 72019 05/17/1985 11.94 ----- -
USGS 414548072114501 72019 05/23/1985 12.07 ----- -
USGS 414548072114501 72019 05/30/1985 12.16 ----- -
USGS 414548072114501 72019 06/07/1985 12.25 ----- -
USGS 414548072114501 72019 06/17/1985 12.35 ----- -
USGS 414548072114501 72019 06/24/1985 12.43 ----- -
USGS 414548072114501 72019 07/03/1985 12.58 ----- -
USGS 414548072114501 72019 07/08/1985 12.68 ----- -
USGS 414548072114501 72019 07/17/1985 12.89 ----- -
USGS 414548072114501 72019 07/22/1985 12.96 ----- -
USGS 414548072114501 72019 07/29/1985 12.73 ----- -
USGS 414548072114501 72019 08/02/1985 12.26 ----- -
USGS 414548072114501 72019 08/07/1985 12.12 ----- -
USGS 414548072114501 72019 08/13/1985 12.18 ----- -
USGS 414548072114501 72019 08/23/1985 12.44 ----- -
USGS 414548072114501 72019 08/28/1985 12.45 ----- -
USGS 414548072114501 72019 09/09/1985 12.20 ----- -
USGS 414548072114501 72019 09/17/1985 11.93 ----- -
USGS 414548072114501 72019 09/25/1985 12.05 ----- -
USGS 414548072114501 72019 10/01/1985 12.11 ----- -
USGS 414548072114501 72019 10/10/1985 12.22 ----- -
USGS 414548072114501 72019 10/21/1985 12.40 ----- -
USGS 414548072114501 72019 10/28/1985 12.52 ----- -
USGS 414548072114501 72019 11/04/1985 12.68 ----- -
USGS 414548072114501 72019 11/15/1985 12.44 ----- -
USGS 414548072114501 72019 11/20/1985 12.04 ----- -
USGS 414548072114501 72019 11/27/1985 11.78 ----- -
USGS 414548072114501 72019 12/06/1985 11.35 ----- -
USGS 414548072114501 72019 12/11/1985 11.29 ----- -
USGS 414548072114501 72019 12/24/1985 11.35 ----- -
USGS 414548072114501 72019 01/03/1986 11.53 ----- -
USGS 414548072114501 72019 01/10/1986 11.41 ----- -
USGS 414548072114501 72019 01/17/1986 11.59 ----- -
USGS 414548072114501 72019 01/23/1986 11.60 ----- -
USGS 414548072114501 72019 01/31/1986 10.88 ----- -
USGS 414548072114501 72019 02/10/1986 10.43 ----- -
```

```
USGS 414548072114501 72019 02/26/1986 10.24 ----- -
USGS 414548072114501 72019 03/06/1986 10.42 ----- -
USGS 414548072114501 72019 03/14/1986 10.53 ----- -
USGS 414548072114501 72019 03/20/1986 10.04 ----- -
USGS 414548072114501 72019 04/02/1986 10.08 ----- -
USGS 414548072114501 72019 04/14/1986 10.25 ----- -
USGS 414548072114501 72019 04/29/1986 10.52 ----- -
USGS 414548072114501 72019 05/07/1986 10.72 ----- -
USGS 414548072114501 72019 05/14/1986 10.96 ----- -
USGS 414548072114501 72019 05/27/1986 11.26 ----- -
USGS 414548072114501 72019 06/09/1986 11.48 ----- -
USGS 414548072114501 72019 06/23/1986 11.71 ----- -
USGS 414548072114501 72019 06/27/1986 11.77 ----- -
USGS 414548072114501 72019 07/08/1986 12.01 ----- -
USGS 414548072114501 72019 07/22/1986 12.36 ----- -
USGS 414548072114501 72019 07/29/1986 12.55 ----- -
USGS 414548072114501 72019 08/12/1986 12.94 ----- -
USGS 414548072114501 72019 08/19/1986 12.79 ----- -
USGS 414548072114501 72019 08/26/1986 13.02 ----- -
USGS 414548072114501 72019 09/04/1986 13.12 ----- -
USGS 414548072114501 72019 09/09/1986 13.24 ----- -
USGS 414548072114501 72019 09/16/1986 13.41 ----- -
USGS 414548072114501 72019 09/24/1986 13.60 ----- -
USGS 414548072114501 72019 09/30/1986 13.75 ----- -
USGS 414548072114501 72019 10/16/1986 14.09 ----- -
USGS 414548072114501 72019 10/28/1986 14.31 ----- -
USGS 414548072114501 72019 11/04/1986 14.44 ----- -
USGS 414548072114501 72019 11/13/1986 14.44 ----- -
USGS 414548072114501 72019 11/17/1986 14.45 ----- -
USGS 414548072114501 72019 11/28/1986 13.77 ----- -
USGS 414548072114501 72019 12/05/1986 12.90 ----- -
USGS 414548072114501 72019 12/19/1986 12.00 ----- -
USGS 414548072114501 72019 12/26/1986 11.14 ----- -
USGS 414548072114501 72019 01/22/1987 10.25 ----- -
USGS 414548072114501 72019 01/28/1987 10.34 ----- -
USGS 414548072114501 72019 02/04/1987 10.50 ----- -
USGS 414548072114501 72019 02/13/1987 10.71 ----- -
USGS 414548072114501 72019 02/20/1987 10.92 ----- -
USGS 414548072114501 72019 02/25/1987 11.06 ----- -
USGS 414548072114501 72019 03/10/1987 10.41 ----- -
USGS 414548072114501 72019 03/19/1987 10.45 ----- -
USGS 414548072114501 72019 03/25/1987 10.61 ----- -
USGS 414548072114501 72019 04/02/1987 9.51 ----- -
USGS 414548072114501 72019 04/09/1987 8.51 ----- -
USGS 414548072114501 72019 04/20/1987 8.95 ----- -
USGS 414548072114501 72019 04/30/1987 9.24 ----- -
USGS 414548072114501 72019 05/11/1987 9.38 ----- -
USGS 414548072114501 72019 05/18/1987 9.61 ----- -
USGS 414548072114501 72019 05/28/1987 9.99 ----- -
USGS 414548072114501 72019 06/06/1987 10.59 ----- -
USGS 414548072114501 72019 06/25/1987 10.95 ----- -
USGS 414548072114501 72019 06/30/1987 11.08 ----- -
USGS 414548072114501 72019 07/08/1987 11.33 ----- -
USGS 414548072114501 72019 07/15/1987 11.54 ----- -
USGS 414548072114501 72019 07/30/1987 12.05 ----- -
USGS 414548072114501 72019 08/10/1987 12.38 ----- -
USGS 414548072114501 72019 08/19/1987 12.65 ----- -
USGS 414548072114501 72019 08/25/1987 12.61 ----- -
USGS 414548072114501 72019 08/31/1987 12.97 ----- -
USGS 414548072114501 72019 09/08/1987 13.13 ----- -
USGS 414548072114501 72019 09/14/1987 13.26 ----- -
USGS 414548072114501 72019 09/21/1987 13.31 ----- -
USGS 414548072114501 72019 09/28/1987 13.40 ----- -
USGS 414548072114501 72019 10/07/1987 13.41 ----- -
USGS 414548072114501 72019 10/13/1987 13.52 ----- -
USGS 414548072114501 72019 10/20/1987 13.62 ----- -
USGS 414548072114501 72019 10/26/1987 13.74 ----- -
USGS 414548072114501 72019 11/04/1987 13.87 ----- -
USGS 414548072114501 72019 11/13/1987 13.98 ----- -
USGS 414548072114501 72019 11/20/1987 13.99 ----- -
USGS 414548072114501 72019 11/27/1987 13.88 ----- -
USGS 414548072114501 72019 12/02/1987 13.80 ----- -
USGS 414548072114501 72019 12/10/1987 13.70 ----- -
USGS 414548072114501 72019 12/17/1987 13.67 ----- -
USGS 414548072114501 72019 12/24/1987 13.57 ----- -
USGS 414548072114501 72019 12/31/1987 ----- ----- O
USGS 414548072114501 72019 01/08/1988 13.54 ----- -
USGS 414548072114501 72019 01/19/1988 13.63 ----- -
USGS 414548072114501 72019 01/26/1988 13.45 ----- -
USGS 414548072114501 72019 02/01/1988 13.30 ----- -
USGS 414548072114501 72019 02/08/1988 12.93 ----- -
USGS 414548072114501 72019 02/17/1988 12.46 ----- -
USGS 414548072114501 72019 02/23/1988 11.85 ----- -
USGS 414548072114501 72019 02/29/1988 11.58 ----- -
USGS 414548072114501 72019 03/07/1988 11.42 ----- -
USGS 414548072114501 72019 03/16/1988 11.33 ----- -
```

USGS 414548072114501 72019 03/23/1988 11.40 ----- -
USGS 414548072114501 72019 03/29/1988 10.90 ----- -
USGS 414548072114501 72019 04/05/1988 10.62 ----- -
USGS 414548072114501 72019 04/13/1988 10.70 ----- -
USGS 414548072114501 72019 04/19/1988 10.77 ----- -
USGS 414548072114501 72019 04/27/1988 10.95 ----- -
USGS 414548072114501 72019 05/02/1988 10.62 ----- -
USGS 414548072114501 72019 05/12/1988 10.60 ----- -
USGS 414548072114501 72019 05/18/1988 10.67 ----- -
USGS 414548072114501 72019 05/24/1988 10.67 ----- -
USGS 414548072114501 72019 06/01/1988 10.41 ----- -
USGS 414548072114501 72019 06/07/1988 10.57 ----- -
USGS 414548072114501 72019 06/14/1988 10.82 ----- -
USGS 414548072114501 72019 06/20/1988 11.04 ----- -
USGS 414548072114501 72019 06/27/1988 11.32 ----- -
USGS 414548072114501 72019 07/05/1988 11.63 ----- -
USGS 414548072114501 72019 07/11/1988 11.85 ----- -
USGS 414548072114501 72019 07/15/1988 11.99 ----- -
USGS 414548072114501 72019 07/21/1988 12.13 ----- -
USGS 414548072114501 72019 07/25/1988 11.71 ----- -
USGS 414548072114501 72019 07/27/1988 11.69 ----- -
USGS 414548072114501 72019 08/08/1988 12.01 ----- -
USGS 414548072114501 72019 08/17/1988 12.21 ----- -
USGS 414548072114501 72019 08/25/1988 12.41 ----- -
USGS 414548072114501 72019 08/31/1988 12.58 ----- -
USGS 414548072114501 72019 09/07/1988 12.74 ----- -
USGS 414548072114501 72019 09/16/1988 12.95 ----- -
USGS 414548072114501 72019 09/26/1988 13.21 ----- -
USGS 414548072114501 72019 09/30/1988 13.33 ----- -
USGS 414548072114501 72019 10/12/1988 13.66 ----- -
USGS 414548072114501 72019 10/18/1988 13.99 ----- -
USGS 414548072114501 72019 10/27/1988 14.01 ----- -
USGS 414548072114501 72019 11/02/1988 14.02 ----- -
USGS 414548072114501 72019 11/15/1988 13.78 ----- -
USGS 414548072114501 72019 11/28/1988 12.47 ----- -
USGS 414548072114501 72019 12/08/1988 12.05 ----- -
USGS 414548072114501 72019 12/14/1988 11.99 ----- -
USGS 414548072114501 72019 12/28/1988 12.05 ----- -
USGS 414548072114501 72019 01/10/1989 12.20 ----- -
USGS 414548072114501 72019 01/20/1989 12.19 ----- -
USGS 414548072114501 72019 01/31/1989 12.28 ----- -
USGS 414548072114501 72019 02/16/1989 12.43 ----- -
USGS 414548072114501 72019 02/24/1989 12.02 ----- -
USGS 414548072114501 72019 03/02/1989 11.94 ----- -
USGS 414548072114501 72019 03/15/1989 11.95 ----- -
USGS 414548072114501 72019 03/22/1989 11.98 ----- -
USGS 414548072114501 72019 03/31/1989 11.66 ----- -
USGS 414548072114501 72019 04/07/1989 11.24 ----- -
USGS 414548072114501 72019 04/21/1989 10.31 ----- -
USGS 414548072114501 72019 04/27/1989 10.27 ----- -
USGS 414548072114501 72019 05/10/1989 9.93 ----- -
USGS 414548072114501 72019 05/23/1989 9.74 ----- -
USGS 414548072114501 72019 05/31/1989 9.83 ----- -
USGS 414548072114501 72019 06/15/1989 9.67 ----- -
USGS 414548072114501 72019 06/21/1989 9.49 ----- -
USGS 414548072114501 72019 07/05/1989 10.04 ----- -
USGS 414548072114501 72019 07/14/1989 10.28 ----- -
USGS 414548072114501 72019 07/28/1989 10.42 ----- -
USGS 414548072114501 72019 08/03/1989 10.58 ----- -
USGS 414548072114501 72019 08/14/1989 10.08 ----- -
USGS 414548072114501 72019 08/28/1989 10.40 ----- -
USGS 414548072114501 72019 09/08/1989 10.85 ----- -
USGS 414548072114501 72019 09/19/1989 11.24 ----- -
USGS 414548072114501 72019 09/25/1989 11.37 ----- -
USGS 414548072114501 72019 11/13/1989 9.86 ----- -
USGS 414548072114501 72019 11/30/1989 9.86 ----- -
USGS 414548072114501 72019 12/12/1989 10.16 ----- -
USGS 414548072114501 72019 12/28/1989 10.76 ----- -
USGS 414548072114501 72019 01/19/1990 10.98 ----- -
USGS 414548072114501 72019 02/14/1990 9.73 ----- -
USGS 414548072114501 72019 02/21/1990 9.51 ----- -
USGS 414548072114501 72019 03/19/1990 9.76 ----- -
USGS 414548072114501 72019 03/29/1990 9.78 ----- -
USGS 414548072114501 72019 04/09/1990 9.78 ----- -
USGS 414548072114501 72019 04/30/1990 9.63 ----- -
USGS 414548072114501 72019 05/10/1990 9.53 ----- -
USGS 414548072114501 72019 05/23/1990 9.26 ----- -
USGS 414548072114501 72019 05/29/1990 9.42 ----- -
USGS 414548072114501 72019 06/15/1990 9.68 ----- -
USGS 414548072114501 72019 06/21/1990 10.03 ----- -
USGS 414548072114501 72019 06/28/1990 10.32 ----- -
USGS 414548072114501 72019 07/09/1990 10.93 ----- -
USGS 414548072114501 72019 07/30/1990 11.71 ----- -
USGS 414548072114501 72019 08/07/1990 11.99 ----- -
USGS 414548072114501 72019 08/21/1990 12.04 ----- -
USGS 414548072114501 72019 08/28/1990 12.14 ----- -

USGS 414548072114501 72019 09/05/1990 12.33 ----- -
USGS 414548072114501 72019 09/17/1990 12.61 ----- -
USGS 414548072114501 72019 09/26/1990 12.82 ----- -
USGS 414548072114501 72019 10/04/1990 13.02 ----- -
USGS 414548072114501 72019 10/16/1990 12.15 ----- -
USGS 414548072114501 72019 10/26/1990 11.50 ----- -
USGS 414548072114501 72019 10/31/1990 11.35 ----- -
USGS 414548072114501 72019 11/19/1990 11.19 ----- -
USGS 414548072114501 72019 11/29/1990 11.33 ----- -
USGS 414548072114501 72019 12/18/1990 10.74 ----- -
USGS 414548072114501 72019 12/27/1990 10.50 ----- -
USGS 414548072114501 72019 01/02/1991 10.34 ----- -
USGS 414548072114501 72019 01/15/1991 10.44 ----- -
USGS 414548072114501 72019 01/30/1991 10.08 ----- -
USGS 414548072114501 72019 02/06/1991 10.18 ----- -
USGS 414548072114501 72019 02/15/1991 10.10 ----- -
USGS 414548072114501 72019 02/27/1991 10.21 ----- -
USGS 414548072114501 72019 03/05/1991 9.62 ----- -
USGS 414548072114501 72019 03/14/1991 9.43 ----- -
USGS 414548072114501 72019 03/20/1991 9.50 ----- -
USGS 414548072114501 72019 03/28/1991 9.27 ----- -
USGS 414548072114501 72019 04/15/1991 9.64 ----- -
USGS 414548072114501 72019 04/25/1991 9.73 ----- -
USGS 414548072114501 72019 04/30/1991 9.81 ----- -
USGS 414548072114501 72019 05/16/1991 9.64 ----- -
USGS 414548072114501 72019 05/31/1991 9.89 ----- -
USGS 414548072114501 72019 06/11/1991 10.55 ----- -
USGS 414548072114501 72019 06/20/1991 10.90 ----- -
USGS 414548072114501 72019 07/08/1991 11.66 ----- -
USGS 414548072114501 72019 07/23/1991 12.24 ----- -
USGS 414548072114501 72019 07/30/1991 12.44 ----- -
USGS 414548072114501 72019 08/16/1991 12.85 ----- -
USGS 414548072114501 72019 08/26/1991 11.93 ----- -
USGS 414548072114501 72019 09/12/1991 12.46 ----- -
USGS 414548072114501 72019 09/17/1991 12.10 ----- -
USGS 414548072114501 72019 09/24/1991 12.23 ----- -
USGS 414548072114501 72019 09/30/1991 11.75 ----- -
USGS 414548072114501 72019 10/11/1991 11.61 ----- -
USGS 414548072114501 72019 10/22/1991 11.58 ----- -
USGS 414548072114501 72019 10/29/1991 11.71 ----- -
USGS 414548072114501 72019 11/04/1991 11.82 ----- -
USGS 414548072114501 72019 11/18/1991 11.69 ----- -
USGS 414548072114501 72019 11/26/1991 11.19 ----- -
USGS 414548072114501 72019 12/09/1991 10.81 ----- -
USGS 414548072114501 72019 12/31/1991 10.85 ----- -
USGS 414548072114501 72019 01/13/1992 10.94 ----- -
USGS 414548072114501 72019 01/30/1992 10.37 ----- -
USGS 414548072114501 72019 02/10/1992 10.76 ----- -
USGS 414548072114501 72019 02/21/1992 10.67 ----- -
USGS 414548072114501 72019 02/28/1992 10.69 ----- -
USGS 414548072114501 72019 03/17/1992 10.48 ----- -
USGS 414548072114501 72019 03/26/1992 10.56 ----- -
USGS 414548072114501 72019 03/31/1992 9.76 ----- -
USGS 414548072114501 72019 04/20/1992 10.39 ----- -
USGS 414548072114501 72019 04/29/1992 10.45 ----- -
USGS 414548072114501 72019 05/08/1992 10.58 ----- -
USGS 414548072114501 72019 05/20/1992 10.82 ----- -
USGS 414548072114501 72019 05/29/1992 11.05 ----- -
USGS 414548072114501 72019 06/18/1992 11.02 ----- -
USGS 414548072114501 72019 06/29/1992 11.22 ----- -
USGS 414548072114501 72019 07/08/1992 11.36 ----- -
USGS 414548072114501 72019 07/22/1992 11.61 ----- -
USGS 414548072114501 72019 07/28/1992 11.72 ----- -
USGS 414548072114501 72019 08/07/1992 12.06 ----- -
USGS 414548072114501 72019 08/12/1992 12.14 ----- -
USGS 414548072114501 72019 08/21/1992 11.98 ----- -
USGS 414548072114501 72019 08/31/1992 12.23 ----- -
USGS 414548072114501 72019 09/15/1992 12.52 ----- -
USGS 414548072114501 72019 09/21/1992 12.70 ----- -
USGS 414548072114501 72019 09/29/1992 12.88 ----- -
USGS 414548072114501 72019 10/19/1992 13.30 ----- -
USGS 414548072114501 72019 10/29/1992 13.52 ----- -
USGS 414548072114501 72019 11/06/1992 13.68 ----- -
USGS 414548072114501 72019 11/27/1992 13.26 ----- -
USGS 414548072114501 72019 12/28/1992 10.62 ----- -
USGS 414548072114501 72019 01/15/1993 10.35 ----- -
USGS 414548072114501 72019 01/28/1993 10.41 ----- -
USGS 414548072114501 72019 02/19/1993 10.51 ----- -
USGS 414548072114501 72019 02/25/1993 10.64 ----- -
USGS 414548072114501 72019 03/05/1993 10.80 ----- -
USGS 414548072114501 72019 03/10/1993 10.72 ----- -
USGS 414548072114501 72019 03/19/1993 10.40 ----- -
USGS 414548072114501 72019 03/31/1993 9.40 ----- -
USGS 414548072114501 72019 04/16/1993 9.38 ----- -
USGS 414548072114501 72019 04/28/1993 9.42 ----- -
USGS 414548072114501 72019 05/17/1993 9.91 ----- -

```
USGS 414548072114501 72019 05/28/1993 10.32 ----- -
USGS 414548072114501 72019 06/17/1993 11.01 ----- -
USGS 414548072114501 72019 06/29/1993 11.52 ----- -
USGS 414548072114501 72019 07/16/1993 12.08 ----- -
USGS 414548072114501 72019 07/30/1993 12.45 ----- -
USGS 414548072114501 72019 08/30/1993 13.46 ----- -
USGS 414548072114501 72019 09/14/1993 13.84 ----- -
USGS 414548072114501 72019 09/29/1993 13.86 ----- -
USGS 414548072114501 72019 10/15/1993 14.07 ----- -
USGS 414548072114501 72019 10/29/1993 14.11 ----- -
USGS 414548072114501 72019 11/15/1993 14.16 ----- -
USGS 414548072114501 72019 11/29/1993 13.96 ----- -
USGS 414548072114501 72019 12/09/1993 13.68 ----- -
USGS 414548072114501 72019 12/15/1993 11.98 ----- -
USGS 414548072114501 72019 12/29/1993 11.06 ----- -
USGS 414548072114501 72019 01/14/1994 11.20 ----- -
USGS 414548072114501 72019 01/27/1994 11.06 ----- -
USGS 414548072114501 72019 02/15/1994 10.56 ----- -
USGS 414548072114501 72019 02/25/1994 10.32 ----- -
USGS 414548072114501 72019 03/16/1994 9.61 ----- -
USGS 414548072114501 72019 03/30/1994 8.92 ----- -
USGS 414548072114501 72019 04/29/1994 9.70 ----- -
USGS 414548072114501 72019 05/10/1994 9.99 ----- -
USGS 414548072114501 72019 05/25/1994 10.47 ----- -
USGS 414548072114501 72019 06/14/1994 11.05 ----- -
USGS 414548072114501 72019 06/28/1994 11.41 ----- -
USGS 414548072114501 72019 07/09/1994 11.68 ----- -
USGS 414548072114501 72019 07/25/1994 12.11 ----- -
USGS 414548072114501 72019 08/11/1994 12.50 ----- -
USGS 414548072114501 72019 08/27/1994 12.06 ----- -
USGS 414548072114501 72019 09/15/1994 12.52 ----- -
USGS 414548072114501 72019 10/03/1994 12.33 ----- -
USGS 414548072114501 72019 10/12/1994 12.55 ----- -
USGS 414548072114501 72019 10/31/1994 12.94 ----- -
USGS 414548072114501 72019 11/09/1994 13.12 ----- -
USGS 414548072114501 72019 11/23/1994 13.13 ----- -
USGS 414548072114501 72019 12/13/1994 12.08 ----- -
USGS 414548072114501 72019 12/29/1994 11.31 ----- -
USGS 414548072114501 72019 01/11/1995 10.92 ----- -
USGS 414548072114501 72019 01/29/1995 10.58 ----- -
USGS 414548072114501 72019 02/09/1995 10.75 ----- -
USGS 414548072114501 72019 02/28/1995 10.82 ----- -
USGS 414548072114501 72019 03/08/1995 10.60 ----- -
USGS 414548072114501 72019 03/29/1995 10.28 ----- -
USGS 414548072114501 72019 04/13/1995 10.50 ----- -
USGS 414548072114501 72019 04/26/1995 10.66 ----- -
USGS 414548072114501 72019 05/15/1995 10.74 ----- -
USGS 414548072114501 72019 05/31/1995 11.06 ----- -
USGS 414548072114501 72019 06/20/1995 11.51 ----- -
USGS 414548072114501 72019 06/28/1995 11.76 ----- -
USGS 414548072114501 72019 07/13/1995 12.20 ----- -
USGS 414548072114501 72019 07/30/1995 12.55 ----- -
USGS 414548072114501 72019 08/17/1995 13.15 ----- -
USGS 414548072114501 72019 08/31/1995 13.56 ----- -
USGS 414548072114501 72019 09/15/1995 13.97 ----- -
USGS 414548072114501 72019 09/28/1995 14.30 ----- -
USGS 414548072114501 72019 10/17/1995 14.15 ----- -
USGS 414548072114501 72019 10/31/1995 13.80 ----- -
USGS 414548072114501 72019 11/28/1995 12.50 ----- -
USGS 414548072114501 72019 12/11/1995 12.37 ----- -
USGS 414548072114501 72019 01/10/1996 12.80 ----- -
USGS 414548072114501 72019 01/30/1996 10.13 ----- -
USGS 414548072114501 72019 02/15/1996 10.25 ----- -
USGS 414548072114501 72019 02/28/1996 10.14 ----- -
USGS 414548072114501 72019 03/13/1996 10.15 ----- -
USGS 414548072114501 72019 03/29/1996 10.13 ----- -
USGS 414548072114501 72019 04/12/1996 9.93 ----- -
USGS 414548072114501 72019 04/30/1996 9.60 ----- -
USGS 414548072114501 72019 05/15/1996 10.02 ----- -
USGS 414548072114501 72019 05/30/1996 10.38 ----- -
USGS 414548072114501 72019 06/11/1996 10.70 ----- -
USGS 414548072114501 72019 06/27/1996 11.12 ----- -
USGS 414548072114501 72019 07/30/1996 11.60 ----- -
USGS 414548072114501 72019 08/15/1996 12.10 ----- -
USGS 414548072114501 72019 08/30/1996 12.35 ----- -
USGS 414548072114501 72019 09/12/1996 12.66 ----- -
USGS 414548072114501 72019 09/24/1996 12.49 ----- -
USGS 414548072114501 72019 10/29/1996 11.40 ----- -
USGS 414548072114501 72019 11/29/1996 10.61 ----- -
USGS 414548072114501 72019 12/27/1996 9.33 ----- -
USGS 414548072114501 72019 01/30/1997 9.80 ----- -
USGS 414548072114501 72019 02/27/1997 10.16 ----- -
USGS 414548072114501 72019 03/28/1997 10.20 ----- -
USGS 414548072114501 72019 04/25/1997 9.85 ----- -
USGS 414548072114501 72019 05/29/1997 10.60 ----- -
USGS 414548072114501 72019 06/27/1997 11.44 ----- -
```

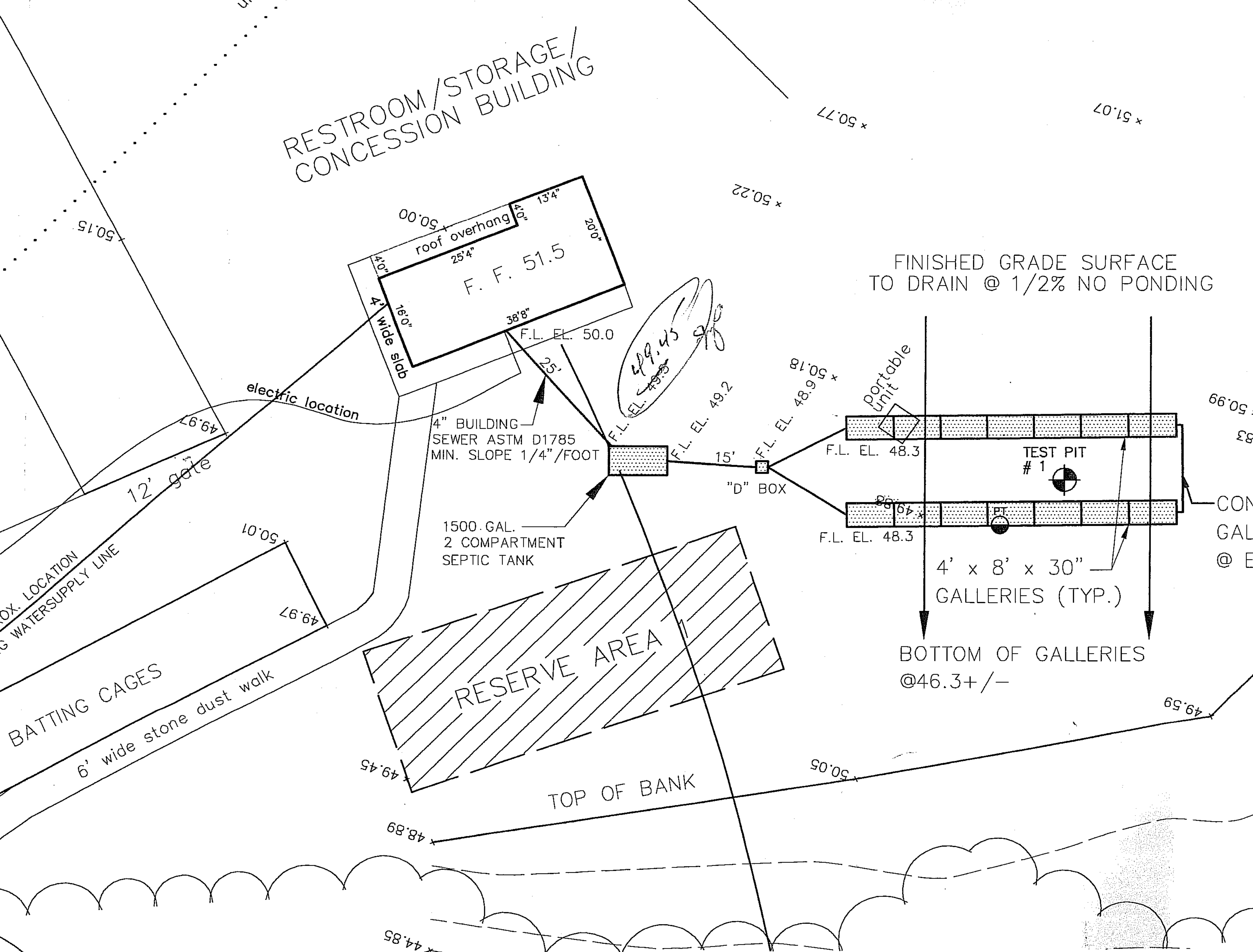
```
USGS 414548072114501 72019 07/30/1997 12.48 ----- -
USGS 414548072114501 72019 08/28/1997 12.85 ----- -
USGS 414548072114501 72019 09/26/1997 13.58 ----- -
USGS 414548072114501 72019 10/31/1997 14.41 ----- -
USGS 414548072114501 72019 11/24/1997 13.90 ----- -
USGS 414548072114501 72019 12/31/1997 13.60 ----- -
USGS 414548072114501 72019 01/30/1998 11.30 ----- -
USGS 414548072114501 72019 02/26/1998 10.51 ----- -
USGS 414548072114501 72019 03/30/1998 9.29 ----- -
USGS 414548072114501 72019 04/30/1998 9.96 ----- -
USGS 414548072114501 72019 05/28/1998 9.98 ----- -
USGS 414548072114501 72019 06/30/1998 8.72 ----- -
USGS 414548072114501 72019 07/30/1998 12.11 ----- -
USGS 414548072114501 72019 08/28/1998 11.74 ----- -
USGS 414548072114501 72019 09/29/1998 12.51 ----- -
USGS 414548072114501 72019 10/28/1998 12.75 ----- -
USGS 414548072114501 72019 11/24/1998 13.35 ----- -
USGS 414548072114501 72019 12/24/1998 13.11 ----- -
USGS 414548072114501 72019 01/27/1999 11.68 ----- -
USGS 414548072114501 72019 02/24/1999 10.51 ----- -
USGS 414548072114501 72019 03/25/1999 9.60 ----- -
USGS 414548072114501 72019 04/27/1999 10.50 ----- -
USGS 414548072114501 72019 05/25/1999 11.00 ----- -
USGS 414548072114501 72019 06/25/1999 11.88 ----- -
USGS 414548072114501 72019 07/26/1999 12.70 ----- -
USGS 414548072114501 72019 08/24/1999 13.50 ----- -
USGS 414548072114501 72019 09/23/1999 13.28 ----- -
USGS 414548072114501 72019 10/26/1999 13.69 ----- -
USGS 414548072114501 72019 11/23/1999 12.87 ----- -
USGS 414548072114501 72019 12/27/1999 12.27 ----- -
USGS 414548072114501 72019 01/26/2000 11.90 ----- -
USGS 414548072114501 72019 02/22/2000 11.75 ----- -
USGS 414548072114501 72019 03/28/2000 10.48 ----- -
USGS 414548072114501 72019 04/27/2000 9.59 ----- -
USGS 414548072114501 72019 05/23/2000 10.34 ----- -
USGS 414548072114501 72019 06/26/2000 10.61 ----- -
USGS 414548072114501 72019 07/24/2000 11.52 ----- -
USGS 414548072114501 72019 08/28/2000 12.35 ----- -
USGS 414548072114501 72019 09/26/2000 12.98 ----- -
USGS 414548072114501 72019 10/30/2000 13.83 ----- -
USGS 414548072114501 72019 11/27/2000 14.27 ----- -
USGS 414548072114501 72019 12/26/2000 13.49 ----- -
USGS 414548072114501 72019 01/31/2001 13.56 ----- -
USGS 414548072114501 72019 02/23/2001 13.00 ----- -
USGS 414548072114501 72019 03/27/2001 10.49 ----- -
USGS 414548072114501 72019 04/25/2001 10.04 ----- -
USGS 414548072114501 72019 06/27/2001 10.52 ----- -
USGS 414548072114501 72019 07/30/2001 11.71 ----- -
USGS 414548072114501 72019 08/28/2001 12.55 ----- -
USGS 414548072114501 72019 09/25/2001 13.24 ----- -
USGS 414548072114501 72019 10/26/2001 13.80 ----- -
USGS 414548072114501 72019 11/27/2001 14.58 ----- -
USGS 414548072114501 72019 12/28/2001 15.00 ----- -
USGS 414548072114501 72019 01/30/2002 15.19 ----- -
USGS 414548072114501 72019 02/27/2002 15.27 ----- -
USGS 414548072114501 72019 03/07/2002 15.36 ----- -
USGS 414548072114501 72019 03/14/2002 14.99 ----- -
USGS 414548072114501 72019 03/21/2002 15.08 ----- -
USGS 414548072114501 72019 03/26/2002 14.60 ----- -
USGS 414548072114501 72019 04/04/2002 14.70 ----- -
USGS 414548072114501 72019 04/12/2002 13.52 ----- -
USGS 414548072114501 72019 04/19/2002 13.23 ----- -
USGS 414548072114501 72019 04/25/2002 13.14 ----- -
USGS 414548072114501 72019 04/29/2002 13.05 ----- -
USGS 414548072114501 72019 05/02/2002 12.97 ----- -
USGS 414548072114501 72019 05/09/2002 13.01 ----- -
USGS 414548072114501 72019 05/16/2002 12.60 ----- -
USGS 414548072114501 72019 05/24/2002 11.98 ----- -
USGS 414548072114501 72019 05/28/2002 11.80 ----- -
USGS 414548072114501 72019 06/25/2002 11.35 ----- -
USGS 414548072114501 72019 07/25/2002 12.36 ----- -
USGS 414548072114501 72019 08/26/2002 13.30 ----- -
USGS 414548072114501 72019 09/24/2002 13.90 ----- -
USGS 414548072114501 72019 10/29/2002 14.46 ----- -
USGS 414548072114501 72019 11/25/2002 13.85 ----- -
USGS 414548072114501 72019 12/26/2002 12.35 ----- -
USGS 414548072114501 72019 01/27/2003 11.40 ----- -
USGS 414548072114501 72019 02/24/2003 11.25 ----- -
USGS 414548072114501 72019 03/26/2003 10.22 ----- -
USGS 414548072114501 72019 04/25/2003 9.43 ----- -
USGS 414548072114501 72019 05/29/2003 9.47 ----- -
USGS 414548072114501 72019 06/25/2003 8.97 ----- -
USGS 414548072114501 72019 07/29/2003 10.57 ----- -
USGS 414548072114501 72019 08/26/2003 11.55 ----- -
USGS 414548072114501 72019 09/29/2003 12.21 ----- -
USGS 414548072114501 72019 10/28/2003 12.54 ----- -
```

```
USGS 414548072114501 72019 11/24/2003 11.97 ----- -
USGS 414548072114501 72019 12/23/2003 10.80 ----- -
USGS 414548072114501 72019 01/27/2004 10.73 ----- -
USGS 414548072114501 72019 02/26/2004 11.11 ----- -
USGS 414548072114501 72019 03/31/2004 10.95 ----- -
USGS 414548072114501 72019 04/28/2004 8.55 ----- -
USGS 414548072114501 72019 05/26/2004 9.12 ----- -
USGS 414548072114501 72019 06/30/2004 10.03 ----- -
USGS 414548072114501 72019 07/27/2004 11.64 ----- -
USGS 414548072114501 72019 08/31/2004 12.17 ----- -
USGS 414548072114501 72019 09/30/2004 12.09 ----- -
USGS 414548072114501 72019 10/26/2004 12.15 ----- -
USGS 414548072114501 72019 11/30/2004 12.14 ----- -
USGS 414548072114501 72019 01/27/2005 9.34 ----- -
USGS 414548072114501 72019 02/25/2005 9.30 ----- -
USGS 414548072114501 72019 03/30/2005 9.02 ----- -
USGS 414548072114501 72019 04/27/2005 8.49 ----- -
USGS 414548072114501 72019 05/25/2005 9.11 ----- -
USGS 414548072114501 72019 06/21/2005 10.15 ----- -
USGS 414548072114501 72019 07/29/2005 11.33 ----- -
USGS 414548072114501 72019 08/29/2005 12.91 ----- -
USGS 414548072114501 72019 09/20/2005 13.56 ----- -
USGS 414548072114501 72019 10/31/2005 11.25 ----- -
USGS 414548072114501 72019 11/28/2005 10.77 ----- -
USGS 414548072114501 72019 12/29/2005 9.88 ----- -
USGS 414548072114501 72019 01/26/2006 8.59 ----- -
USGS 414548072114501 72019 02/27/2006 8.83 ----- -
USGS 414548072114501 72019 03/27/2006 9.85 ----- -
USGS 414548072114501 72019 04/26/2006 10.45 ----- -
USGS 414548072114501 72019 05/22/2006 9.27 ----- -
USGS 414548072114501 72019 06/28/2006 8.02 ----- -
USGS 414548072114501 72019 07/25/2006 9.32 ----- -
USGS 414548072114501 72019 08/28/2006 11.10 ----- -
USGS 414548072114501 72019 09/28/2006 11.98 ----- -
USGS 414548072114501 72019 10/31/2006 11.90 ----- -
USGS 414548072114501 72019 11/28/2006 10.20 ----- -
USGS 414548072114501 72019 12/28/2006 10.40 ----- -
USGS 414548072114501 72019 01/29/2007 9.70 ----- -
USGS 414548072114501 72019 02/27/2007 10.68 ----- -
USGS 414548072114501 72019 03/30/2007 9.26 ----- -
USGS 414548072114501 72019 04/26/2007 8.31 ----- -
USGS 414548072114501 72019 05/30/2007 9.26 ----- -
USGS 414548072114501 72019 06/27/2007 10.10 ----- -
USGS 414548072114501 72019 07/30/2007 11.66 ----- -
USGS 414548072114501 72019 08/28/2007 12.56 ----- -
USGS 414548072114501 72019 09/20/2007 13.20 ----- -
USGS 414548072114501 72019 10/29/2007 14.21 ----- -
USGS 414548072114501 72019 11/27/2007 14.39 ----- -
USGS 414548072114501 72019 11/30/2007 14.68 ----- -
USGS 414548072114501 72019 12/28/2007 14.64 ----- -
USGS 414548072114501 72019 01/23/2008 13.58 ----- -
USGS 414548072114501 72019 02/26/2008 9.64 ----- -
USGS 414548072114501 72019 03/24/2008 8.48 ----- -
USGS 414548072114501 72019 04/29/2008 9.08 ----- -
USGS 414548072114501 72019 05/29/2008 9.59 ----- -
USGS 414548072114501 72019 06/26/2008 10.58 ----- -
USGS 414548072114501 72019 08/26/2008 12.10 ----- -
USGS 414548072114501 72019 09/26/2008 12.01 ----- -
USGS 414548072114501 72019 10/31/2008 11.53 ----- -
USGS 414548072114501 72019 11/28/2008 10.98 ----- -
USGS 414548072114501 72019 12/22/2008 10.41 ----- -
USGS 414548072114501 72019 01/30/2009 9.27 ----- -
USGS 414548072114501 72019 02/27/2009 9.37 ----- -
USGS 414548072114501 72019 03/24/2009 9.10 ----- -
USGS 414548072114501 72019 04/27/2009 8.66 ----- -
USGS 414548072114501 72019 05/27/2009 9.45 ----- -
USGS 414548072114501 72019 06/30/2009 9.47 ----- -
USGS 414548072114501 72019 07/29/2009 8.95 ----- -
USGS 414548072114501 72019 08/31/2009 10.22 ----- -
USGS 414548072114501 72019 09/29/2009 11.54 ----- -
USGS 414548072114501 72019 10/28/2009 11.98 ----- -
# ----- End of Data
```

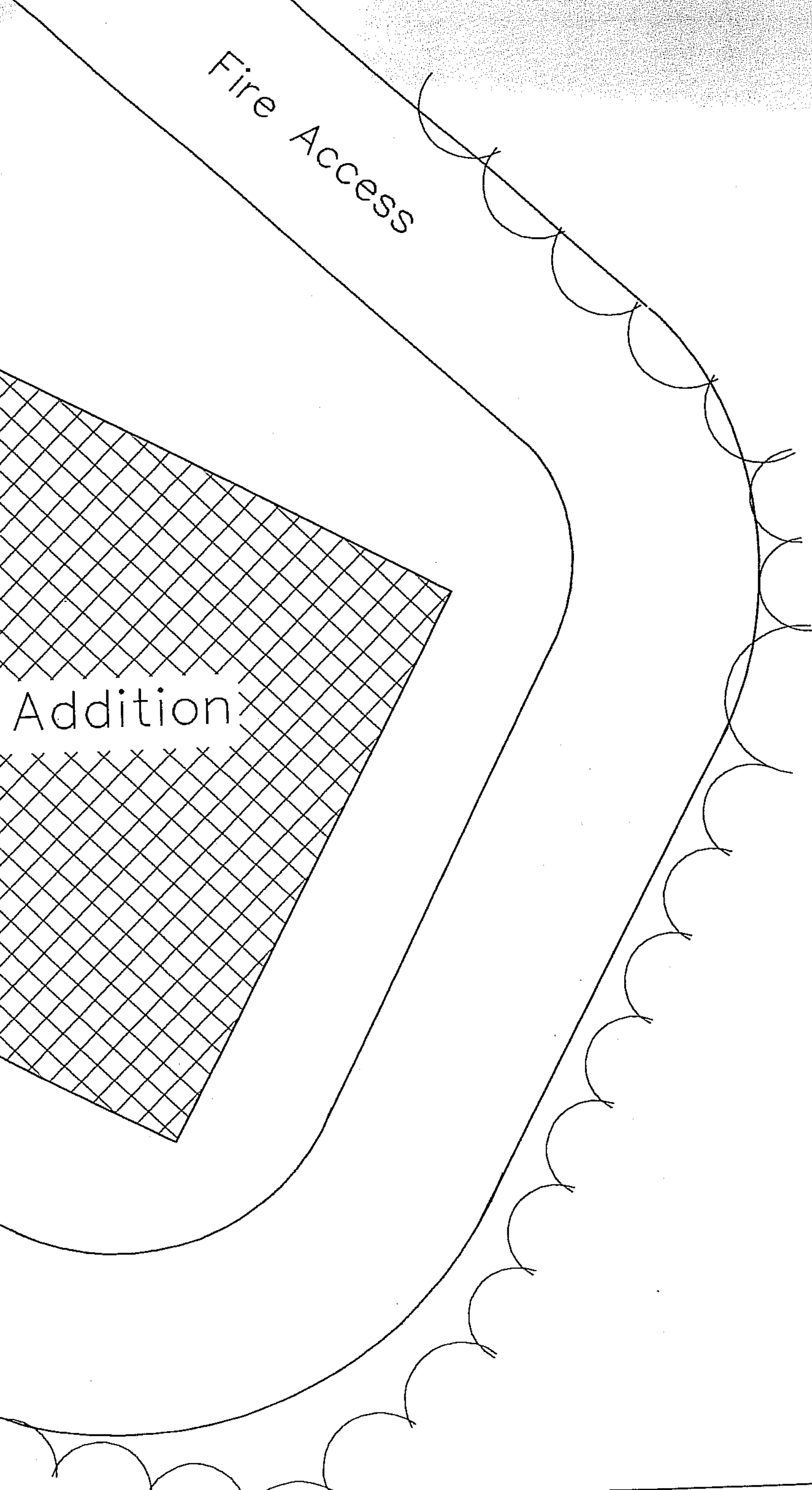
Return To Station Page | Return to County Page | Return to State Page | Return To National Page

Appendix A4

Data Collection:
Eastern Highlands Health District, Mansfield Office



RESTROOM/STORAGE/
CONCESSION BUILDING
roof overhang
13'4"
4'0"
20'0"
25'4"
4'0"
F. F. 51.5
16'0"
38'8"
4' wide slab
F.L. EL. 50.0
25'
4" BUILDING
SEWER ASTM D1785
MIN. SLOPE 1/4"/FOOT
1500 GAL.
2 COMPARTMENT
SEPTIC TANK
F.L. EL. 49.2
15'
F.L. EL. 48.9
"D" BOX
portable
unit
F.L. EL. 48.3
F.L. EL. 48.3
TEST PIT
1
PT
FINISHED GRADE SURFACE
TO DRAIN @ 1/2% NO PONDING
4' x 8' x 30"
GALLERIES (TYP.)
BOTTOM OF GALLERIES
@46.3+/-
CON
GAL
@ E
electric location
12' gate
APPROX. LOCATION
WATERSUPPLY LINE
BATTING CAGES
6' wide stone dust walk
RESERVE AREA
TOP OF BANK
50.77
51.07
50.22
50.00
50.15
50.18
50.99
49.97
50.01
49.97
49.45
50.05
49.59
48.89
44.85
49.45



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

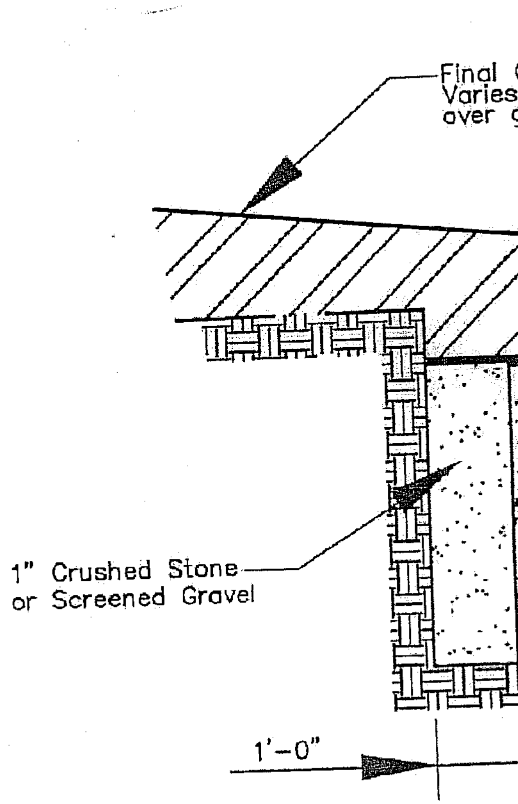
PERC TEST (7/27/05)

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 BOTTO

TEST PIT BOTTOM ELEV.

DIST. GALLERY BOTTOM

B

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-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.
							sand gravel	Tan, medium-coarse sand; fine-coarse gravel.
S-2	19.0-21.0'	13	23	26	26	10"		
							cobbles gravel sand	Pulverized cobbles & medium-coarse gravel; some fine-medium sand.
S-3	29.0-31.0'	27	50	100/3"	ref	8"		
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"		
S-3	30.0-32.0'	3	11	16	18	15"	sand cobbles	Tan, medium-coarse sand; few cobbles.
S-4	40.0-42.0'	10	24	38	26	20"	sand	Tan-orange, fine sand; some layering at 41"; little mottling.
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-101

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
S-1	10.0-12.0'	100/2"	ref	ref	ref	1"	pulverized rock
S-2	20.0-22.0'	25	7	11	14	11"	sand gravel
S-3	30.0-32.0'	46	11	14	16	15"	sand
S-4	40.0-42.0'	14	23	28	36	13"	sand
S-5	50.0-52.0'	8	14	19	20	18"	sand gravel

Field Classification And Remarks (Color, Grain Size, Moisture, Etc.)

MW-101 ~~MW-104~~

Augered to 10.0'.

Pulverized rock in tip.

Tan-orange, medium-coarse sand; little medium-coarse sand.

Orange-tan, fine sand.

Orange-tan, fine sand; some layering; trace silt.

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"

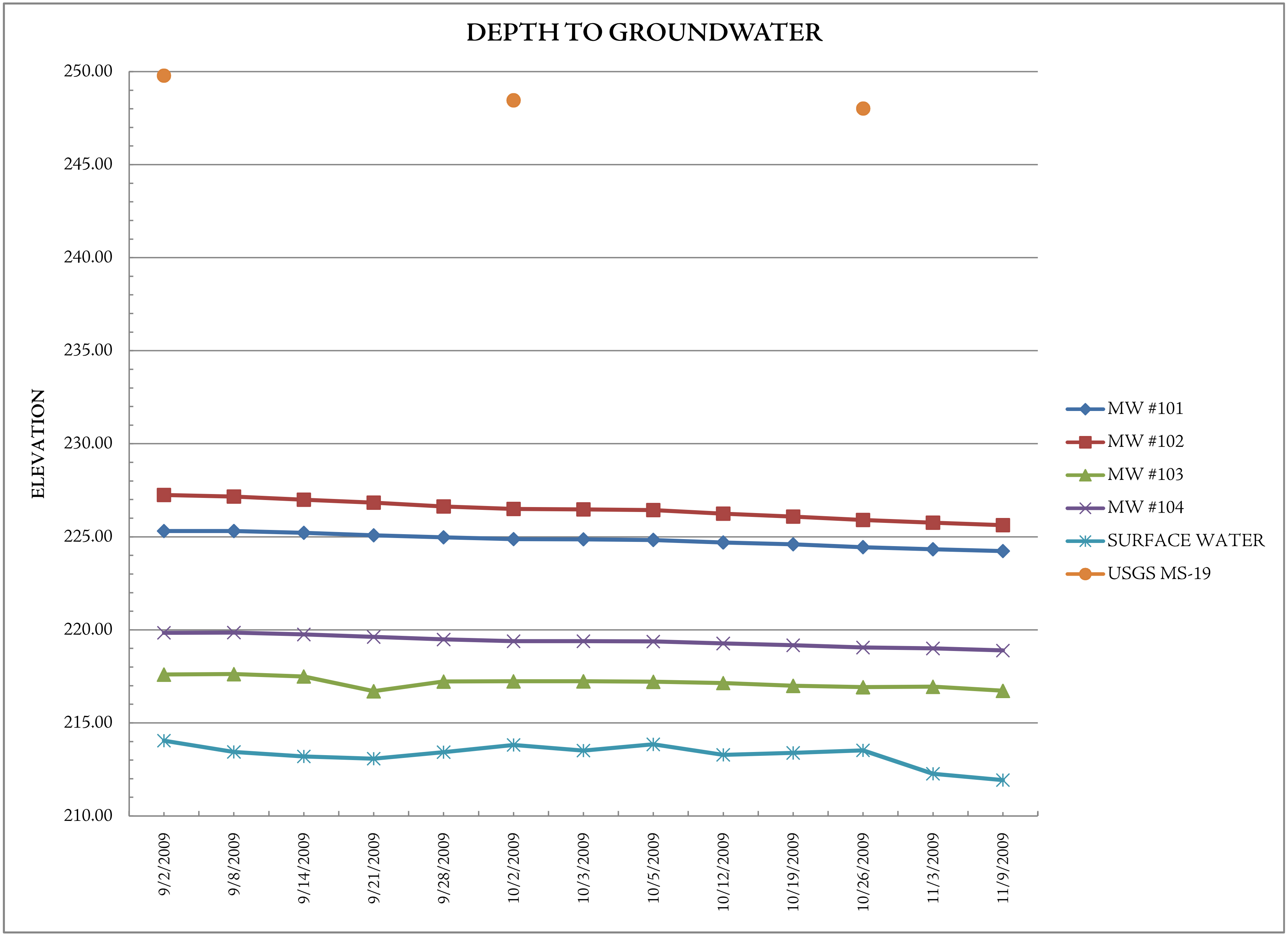
DATE	MONITORING WELL #101							
	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV. (FT)
9/2/2009	101	274.19	0.23	273.96	48.65	225.31	
9/8/2009	101	274.19	0.23	273.96	48.65	225.31	0.00
9/14/2009	101	274.19	0.23	273.96	48.75	225.21	-0.10
9/21/2009	101	274.19	0.23	273.96	48.88	225.08	-0.13
9/28/2009	101	274.19	0.23	273.96	48.99	224.97	-0.11
10/2/2009		274.19	0.23	273.96	49.09	224.87	-0.10
10/3/2009	101	274.19	0.23	273.96	49.10	224.86	-0.01
10/5/2009	101	274.19	0.23	273.96	49.13	224.83	-0.03
10/12/2009	101	274.19	0.23	273.96	49.27	224.69	-0.14
10/19/2009	101	274.19	0.23	273.96	49.37	224.59	-0.10
10/26/2009	101	274.19	0.23	273.96	49.52	224.44	-0.15
11/3/2009	101	274.19	0.23	273.96	49.63	224.33	-0.11
11/9/2009	101	274.19	0.23	273.96	49.73	224.23	-0.10

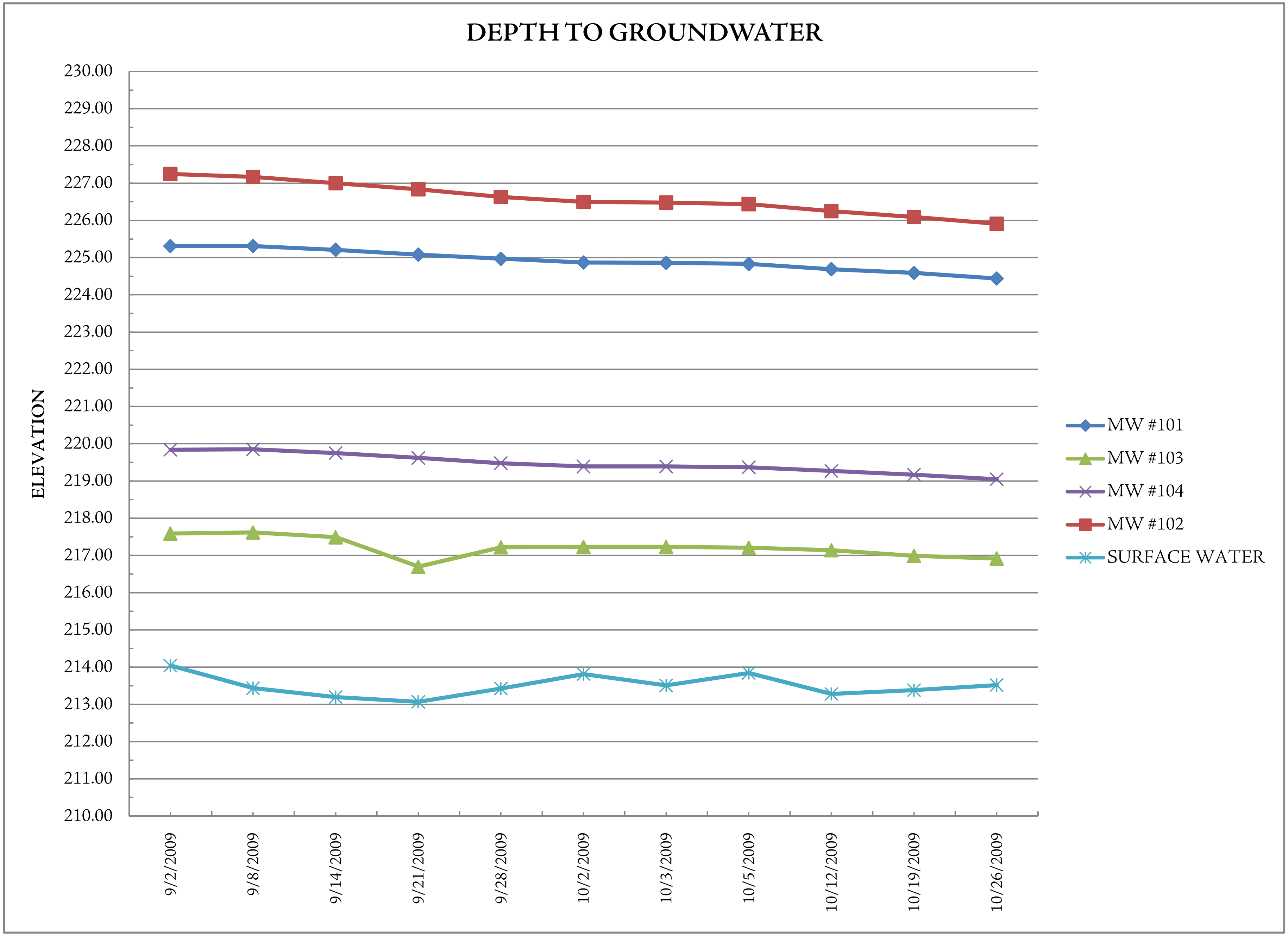
DATE	MONITORING WELL #102						
	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.
9/2/2009	102	272.44	0.39	272.05	44.80	227.25	
9/8/2009	102	272.44	0.39	272.05	44.88	227.17	-0.08
9/14/2009	102	272.44	0.39	272.05	45.05	227.00	-0.17
9/21/2009	102	272.44	0.39	272.05	45.21	226.84	-0.16
9/28/2009	102	272.44	0.39	272.05	45.42	226.63	-0.21
10/2/2009	102	272.44	0.39	272.05	45.55	226.50	-0.13
10/3/2009	102	272.44	0.39	272.05	45.57	226.48	-0.02
10/5/2009	102	272.44	0.39	272.05	45.61	226.44	-0.04
10/12/2009	102	272.44	0.39	272.05	45.80	226.25	-0.19
10/19/2009	102	272.44	0.39	272.05	45.96	226.09	-0.16
10/26/2009	102	272.44	0.39	272.05	46.14	225.91	-0.18
11/3/2009	102	272.44	0.39	272.05	46.29	225.76	-0.15
11/9/2009	102	272.44	0.39	272.05	46.42	225.63	-0.13

DATE	MONITORING WELL #103						
	WELL NO.	CASING ELEV.	MEASURE DOWN	PVC NOTCH ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.
9/2/2009	103	278.02	0.68	277.34	59.75	217.59	
9/8/2009	103	278.02	0.68	277.34	59.72	217.62	0.03
9/14/2009	103	278.02	0.68	277.34	59.85	217.49	-0.13
9/21/2009	103	278.02	0.68	277.34	60.64	216.70	-0.79
9/28/2009	103	278.02	0.68	277.34	60.12	217.22	0.52
10/2/2009	104	278.02	0.68	277.34	60.11	217.23	0.01
10/3/2009	103	278.02	0.68	277.34	60.11	217.23	0.00
10/5/2009	103	278.02	0.68	277.34	60.13	217.21	-0.02
10/12/2009	103	278.02	0.68	277.34	60.20	217.14	-0.07
10/19/2009	103	278.02	0.68	277.34	60.35	216.99	-0.15
10/26/2009	103	278.02	0.68	277.34	60.42	216.92	-0.07
11/3/2009	103	278.02	0.68	277.34	60.40	216.94	0.02
11/9/2009	103	278.02	0.68	277.34	60.62	216.72	-0.22

DATE	MONITORING WELL #104						
	WELL NO.	CASING ELEV.	MEASURE DOWN	CASING ELEV.	DEPTH FROM PVC NOTCH (FT)	GW ELEV.	CHANGE IN ELEV.
9/2/2009	104	274.14	0.58	273.56	53.72	219.84	
9/8/2009	104	274.14	0.58	273.56	53.71	219.85	0.01
9/14/2009	104	274.14	0.58	273.56	53.81	219.75	-0.10
9/21/2009	104	274.14	0.58	273.56	53.94	219.62	-0.13
9/28/2009	104	274.14	0.58	273.56	54.08	219.48	-0.14
10/2/2009	105	274.14	0.58	273.56	54.17	219.39	-0.09
10/3/2009	104	274.14	0.58	273.56	54.17	219.39	0.00
10/5/2009	104	274.14	0.58	273.56	54.19	219.37	-0.02
10/12/2009	104	274.14	0.58	273.56	54.29	219.27	-0.10
10/19/2009	104	274.14	0.58	273.56	54.39	219.17	-0.10
10/26/2009	104	274.14	0.58	273.56	54.51	219.05	-0.12
11/3/2009	104	274.14	0.58	273.56	54.56	219.00	-0.05
11/9/2009	104	274.14	0.58	273.56	54.67	218.89	-0.11

DATE	SURFACE WATERBODY				
	BRIDGE ELEV.	BRIDGE TO WATER SURFACE		GW ELEV.	CHANGE IN ELEV.
9/2/2009	221.30	87.13 in.	7.26 ft.	214.04	
9/8/2009	221.30	94.38 in.	7.86 ft.	213.44	-0.60
9/14/2009	221.30	97.25 in.	8.10 ft.	213.20	-0.24
9/21/2009	221.30	98.75 in.	8.23 ft.	213.07	-0.13
9/28/2009	221.30	94.50 in.	7.88 ft.	213.43	0.35
10/2/2009	221.30	89.88 in.	7.49 ft.	213.81	0.39
10/3/2009	221.30	93.50 in.	7.79 ft.	213.51	-0.30
10/5/2009	221.30	89.50 in.	7.46 ft.	213.84	0.33
10/12/2009	221.30	96.25 in.	8.02 ft.	213.28	-0.56
10/19/2009	221.30	95.00 in.	7.92 ft.	213.38	0.10
10/26/2009	221.30	93.38 in.	7.78 ft.	213.52	0.14
11/3/2009	221.30	108.50 in.	9.04 ft.	212.26	-1.26
11/9/2009	221.30	112.50 in.	9.38 ft.	211.93	-0.33


DEPTH TO GROUNDWATER
ELEVATION
250.00
245.00
240.00
235.00
230.00
225.00
220.00
215.00
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
11/3/2009
11/9/2009
MW #101
MW #102
MW #103
MW #104
SURFACE WATER
USGS MS-19

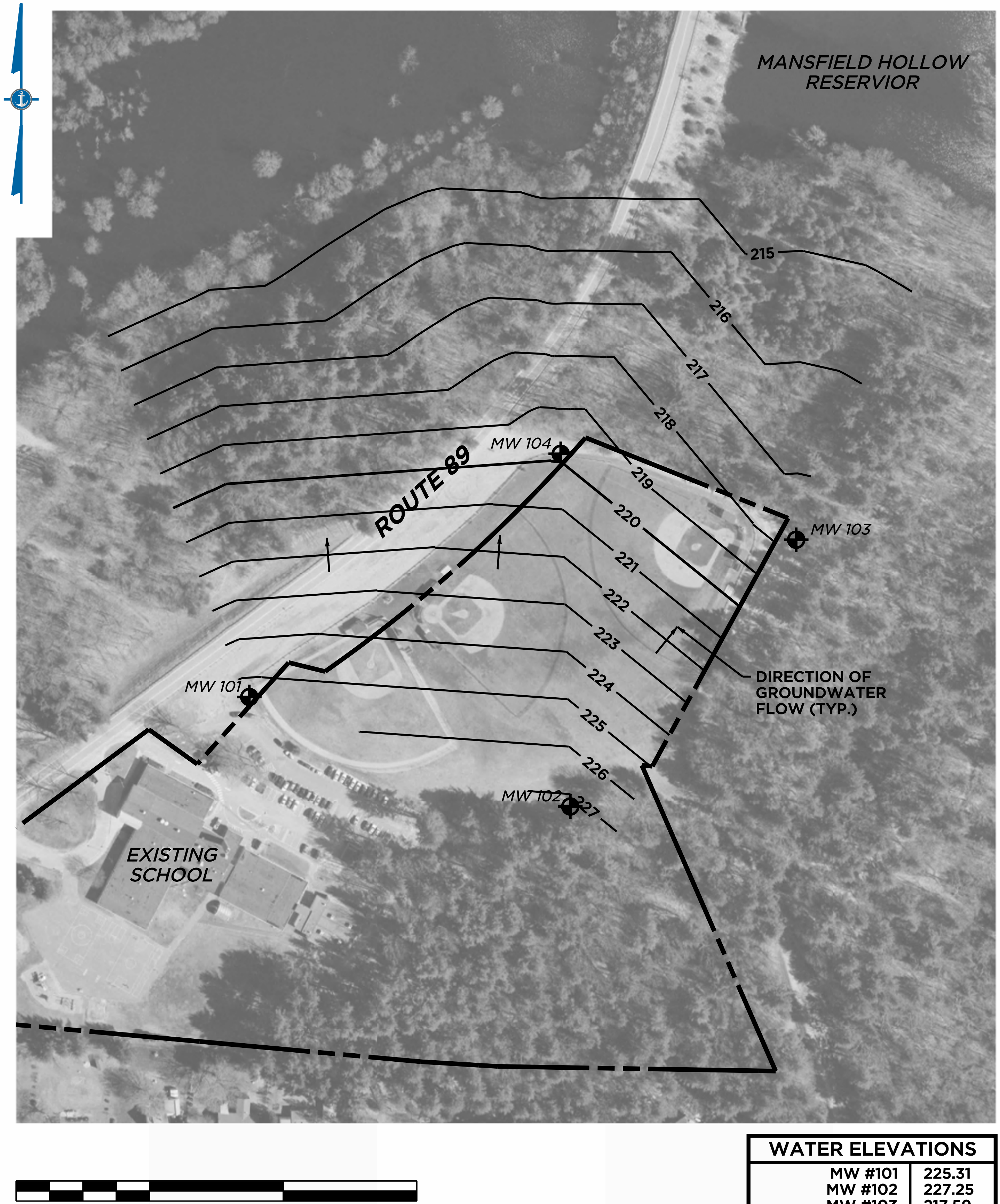

DEPTH TO GROUNDWATER
ELEVATION
230.00
229.00
228.00
227.00
226.00
225.00
224.00
223.00
222.00
221.00
220.00
219.00
218.00
217.00
216.00
215.00
214.00
213.00
212.00
211.00
210.00
9/2/2009
9/8/2009
9/14/2009
9/21/2009
9/28/2009
10/2/2009
10/3/2009
10/5/2009
10/12/2009
10/19/2009
10/26/2009
MW #101
MW #103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

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

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE OCT. 09



SCALE: 1"= 200'

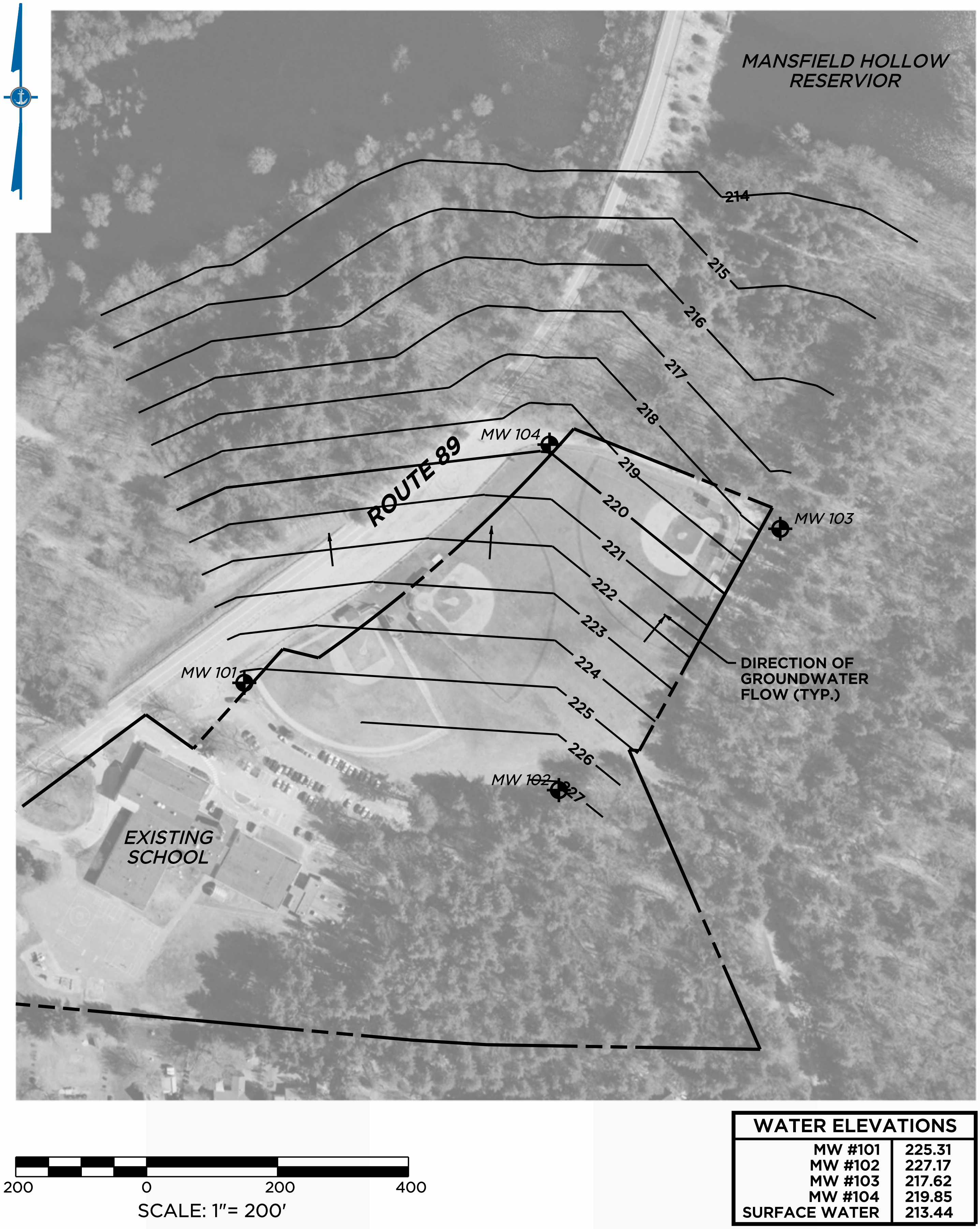
WATER ELEVATIONS	
MW #101	225.31
MW #102	227.25
MW #103	217.59
MW #104	219.84
SURFACE WATER	214.04

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

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE OCT. 09



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

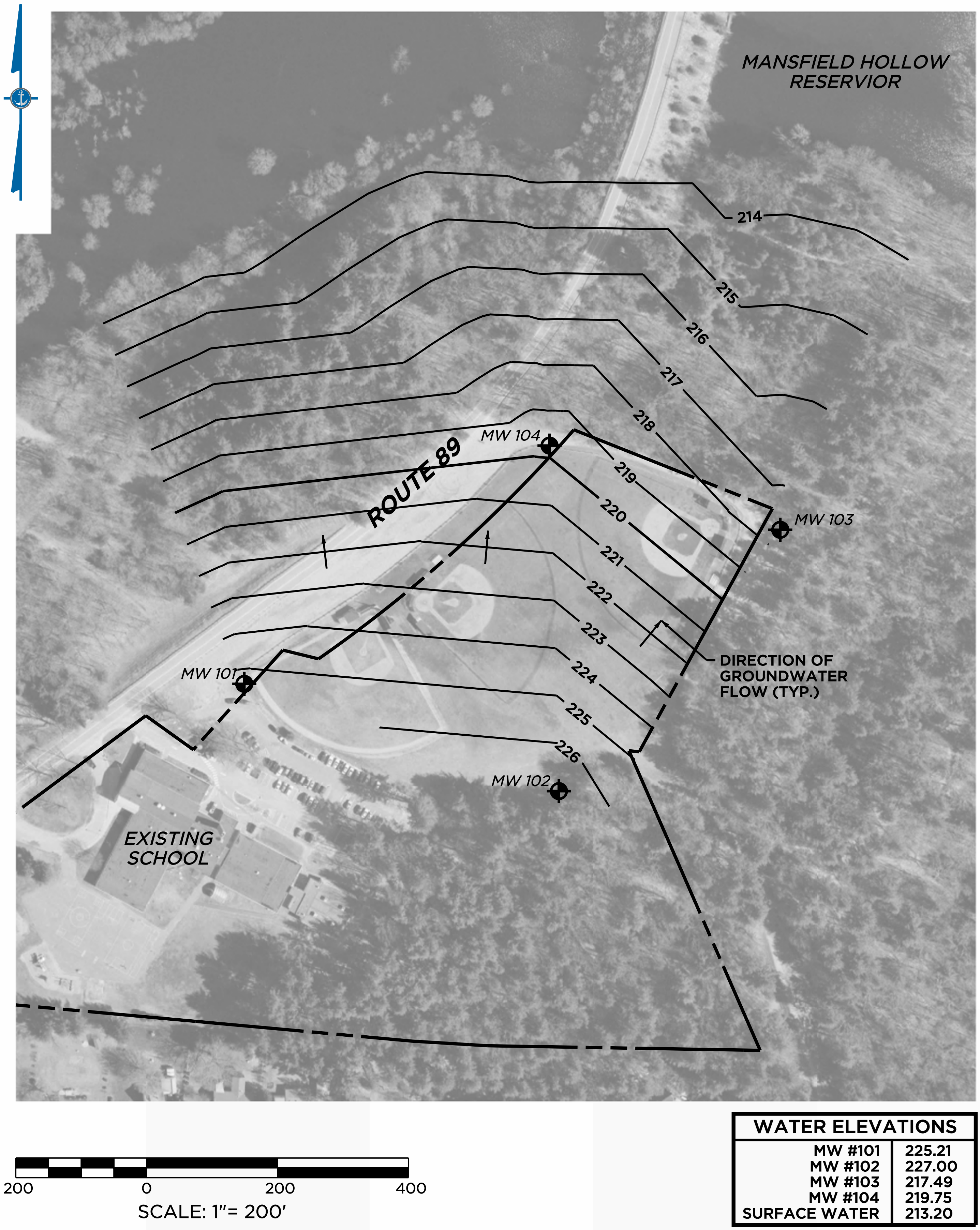
ANCHOR ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971
www.anchorengr.com
Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

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

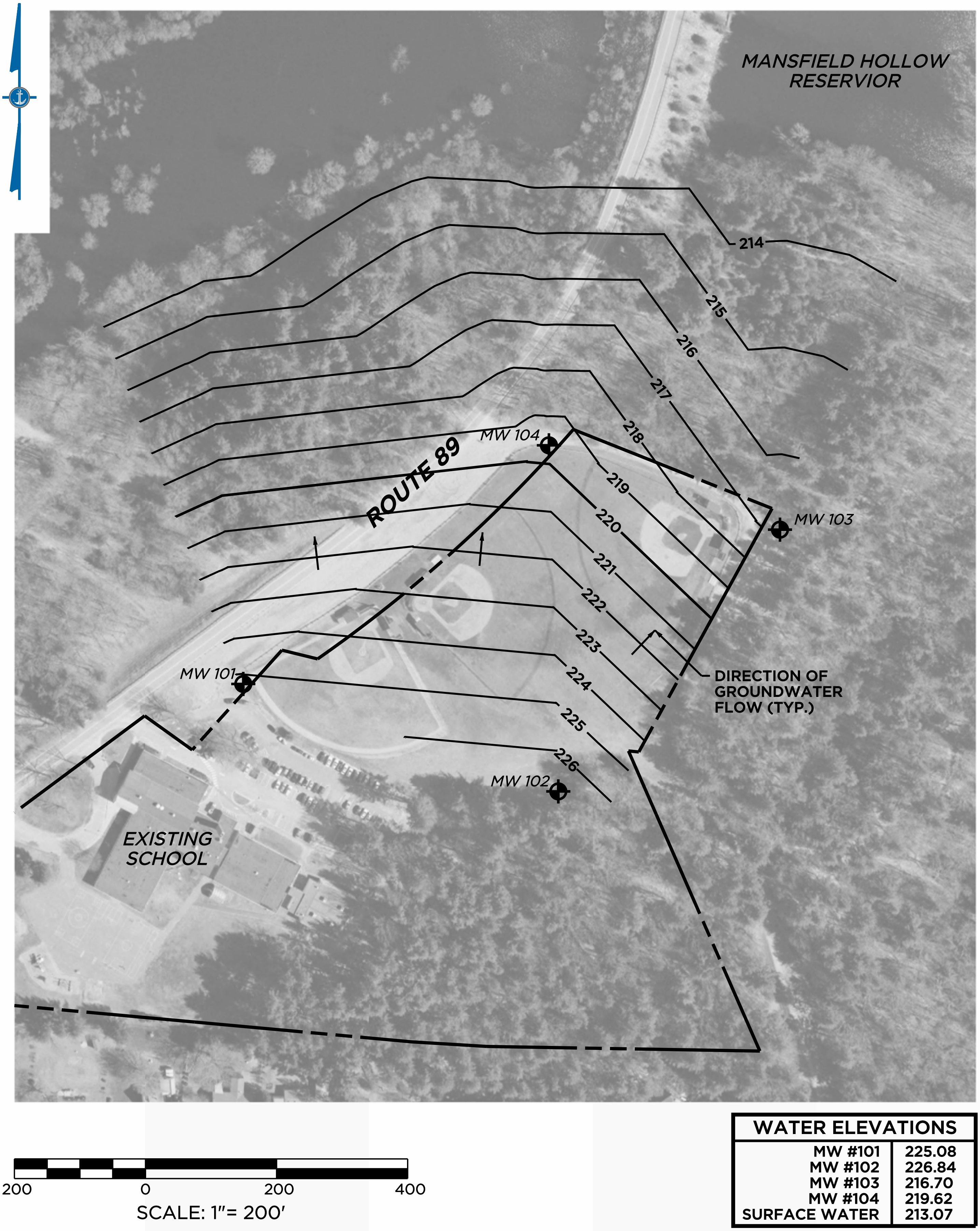
ANCHOR
ENGINEERING SERVICES, INC.
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971
www.anchorengr.com
Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

GROUNDWATER CONTOURS

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

FIGURE

PROJECT	DATE
486-04	OCT. 09



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

ANCHOR ENGINEERING SERVICES, INC.

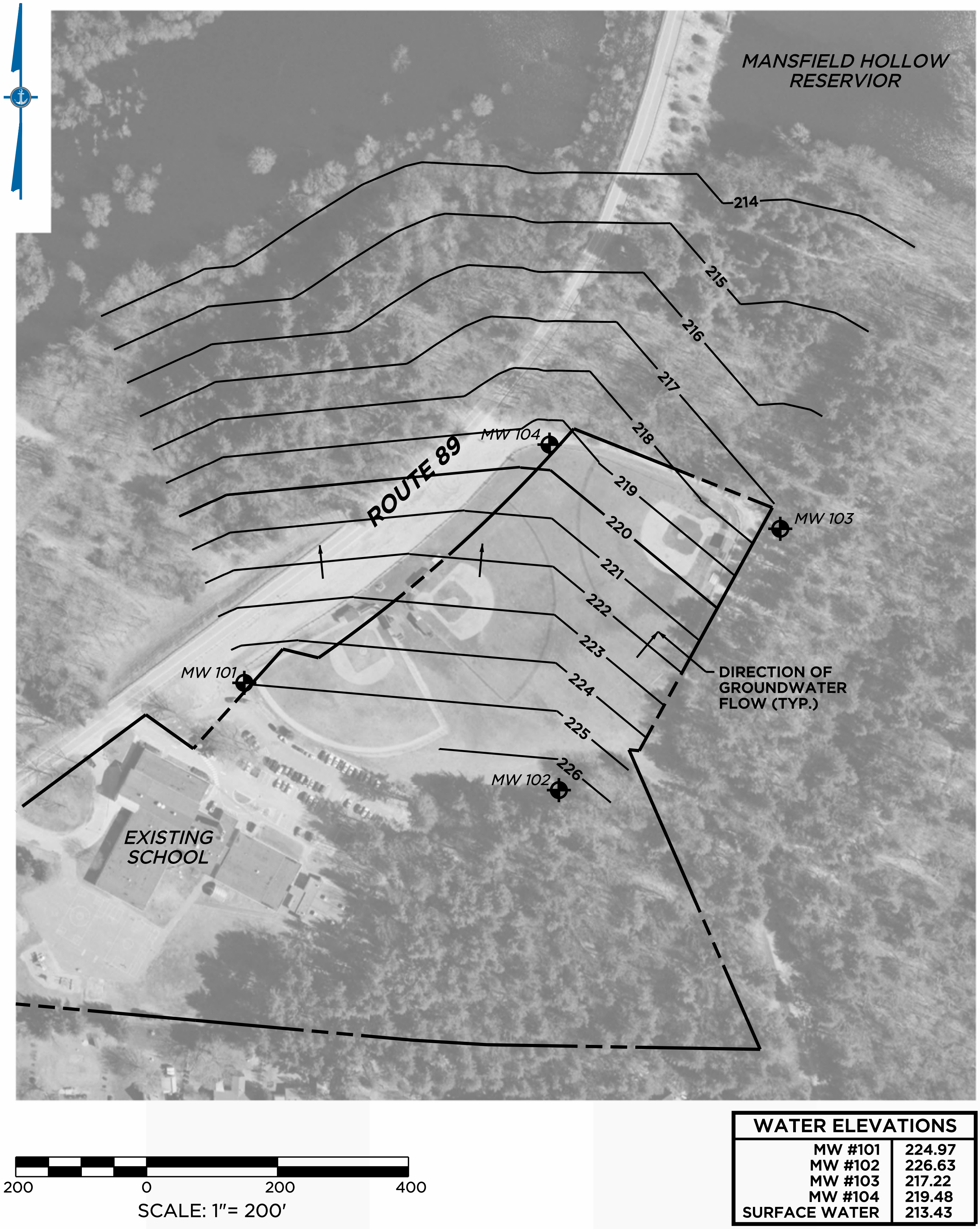
41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971
www.anchorengr.com

Civil Engineering • Environmental Consulting • Land Surveying • Construction Management

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE OCT. 09



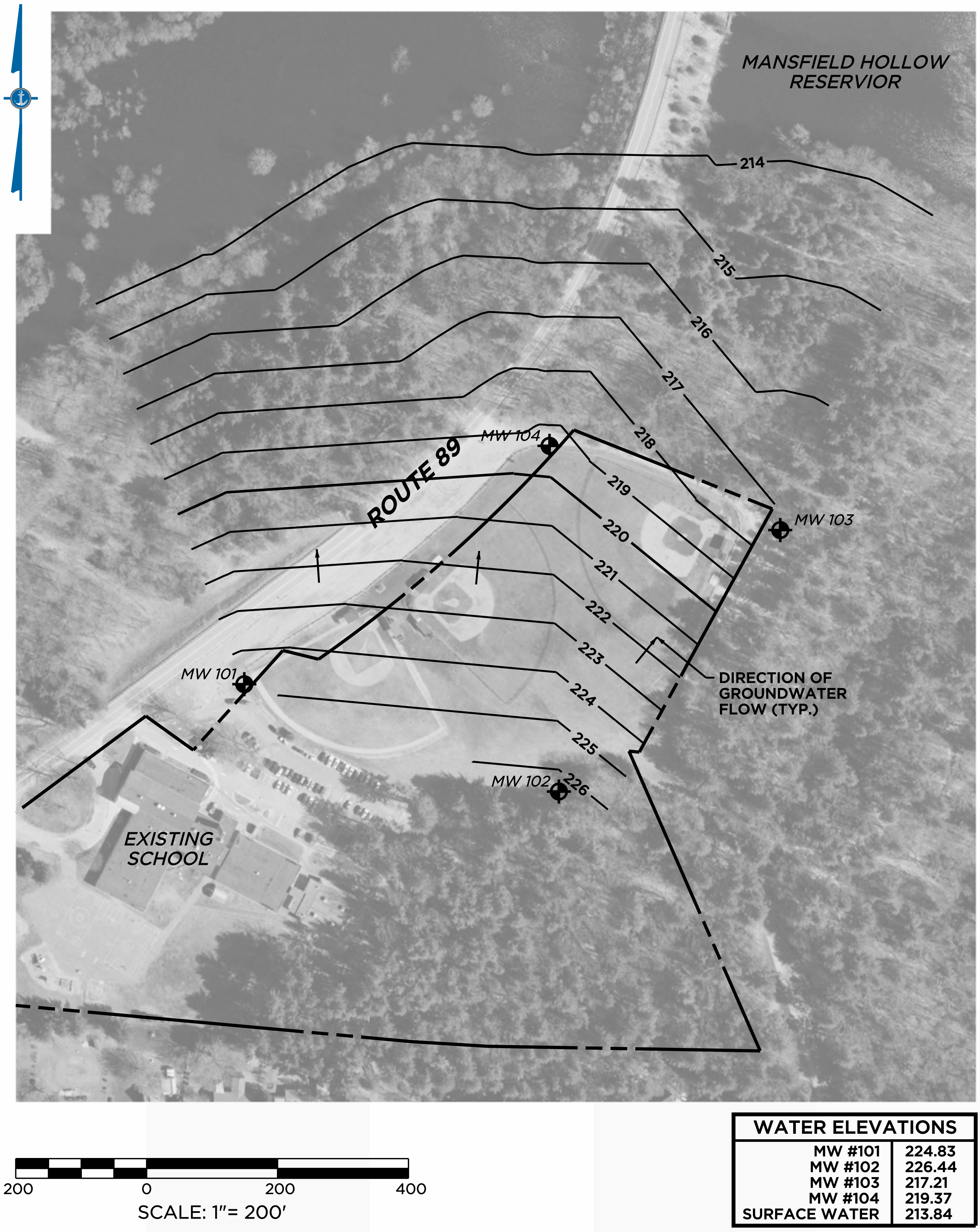
WATER ELEVATIONS	
MW #101	224.97
MW #102	226.63
MW #103	217.22
MW #104	219.48
SURFACE WATER	213.43

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

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE OCT. 09



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

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

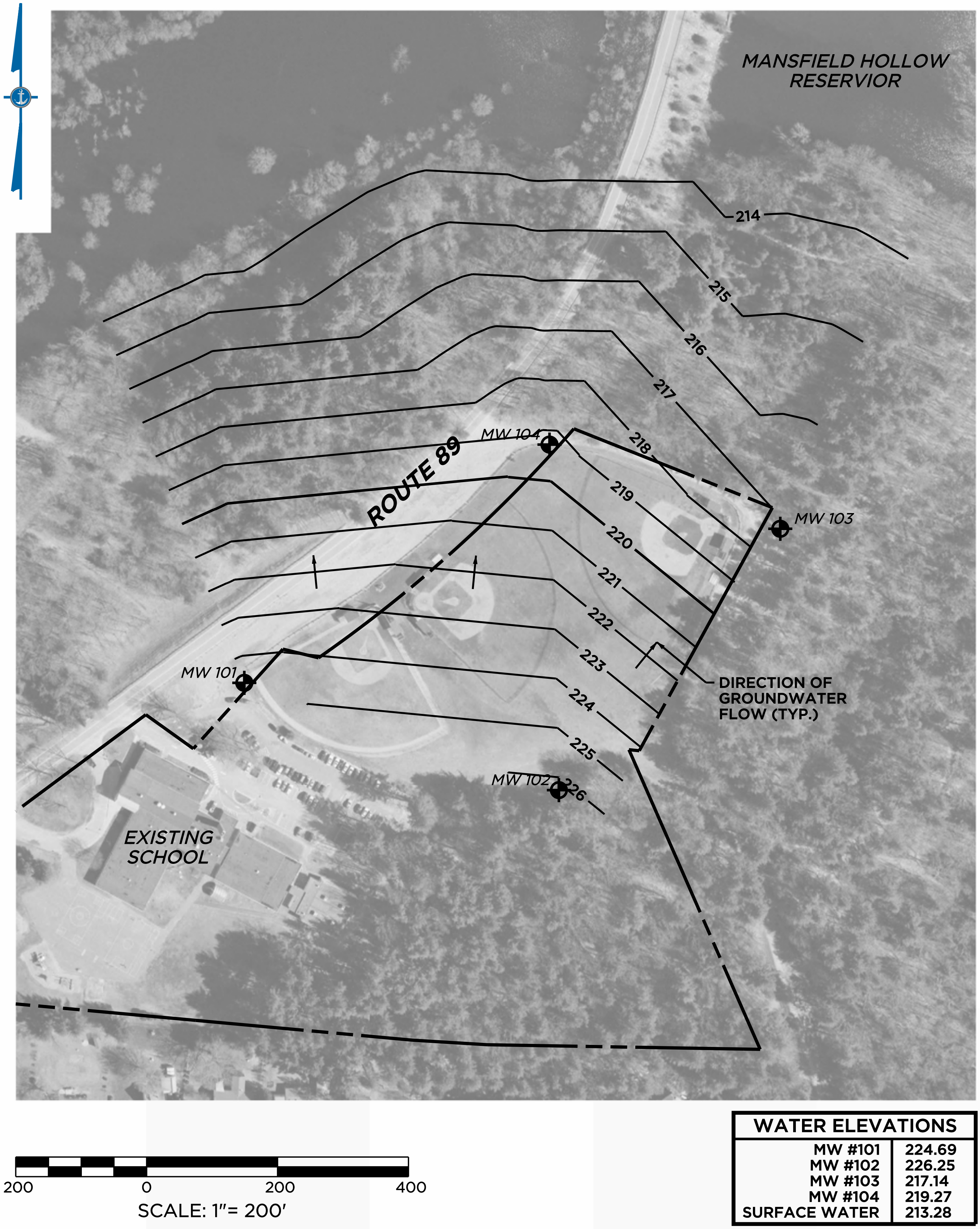
GROUNDWATER CONTOURS

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

FIGURE

PROJECT 486-04

DATE OCT. 09



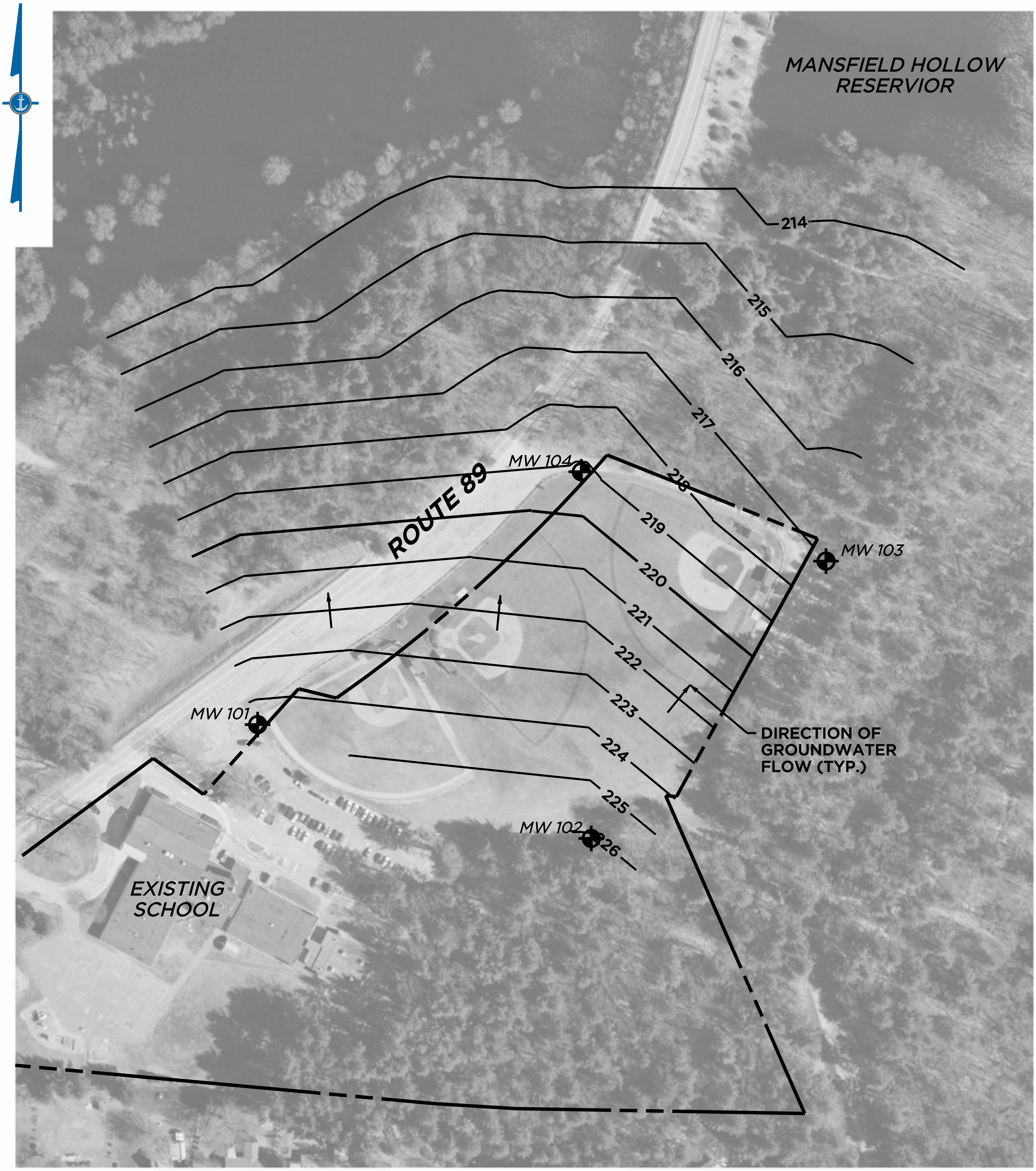
WATER ELEVATIONS	
MW #101	224.69
MW #102	226.25
MW #103	217.14
MW #104	219.27
SURFACE WATER	213.28

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

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'

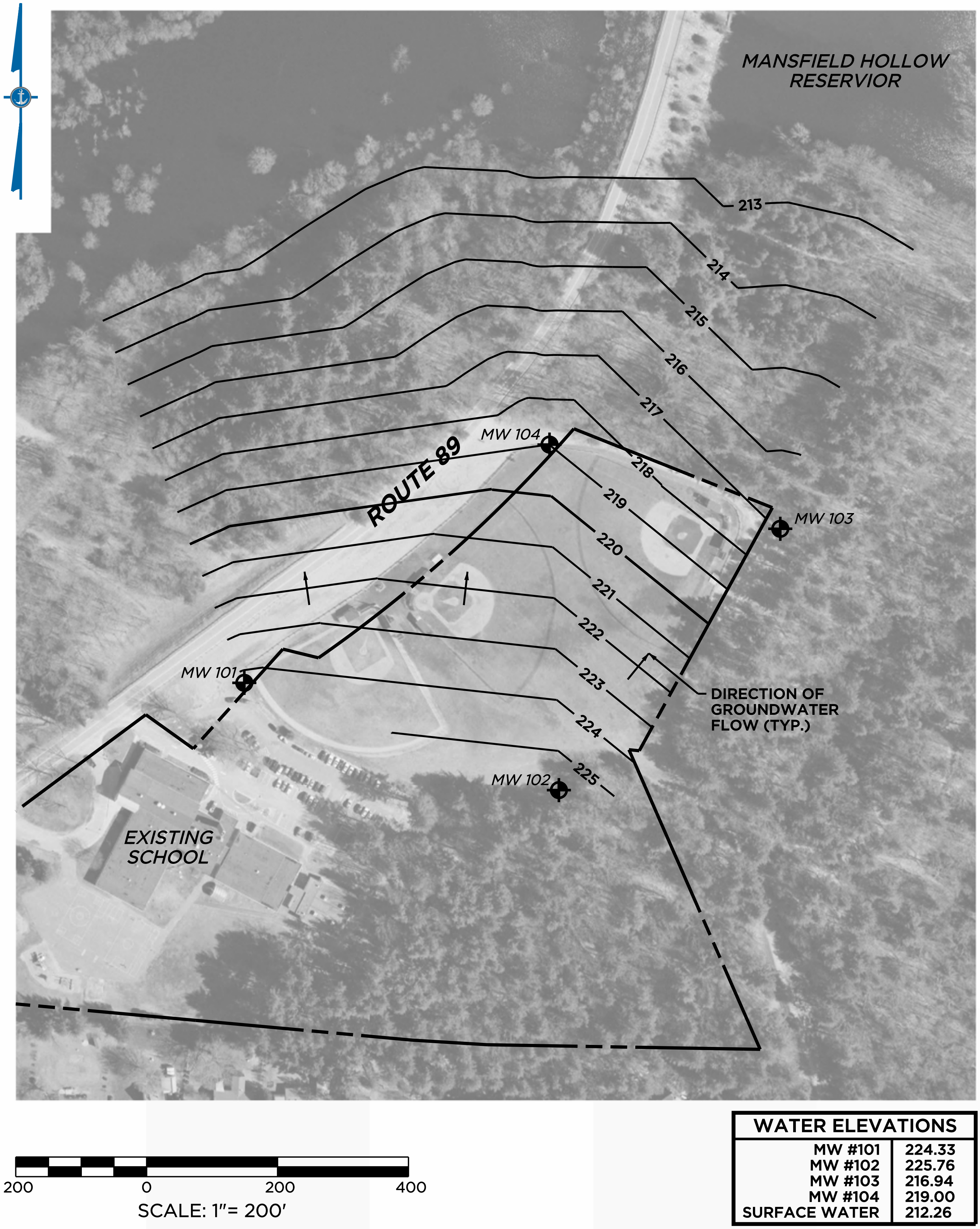
WATER ELEVATIONS	
MW #101	224.59
MW #102	226.09
MW #103	216.99
MW #104	219.17
SURFACE WATER	213.38

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

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE NOV. 09



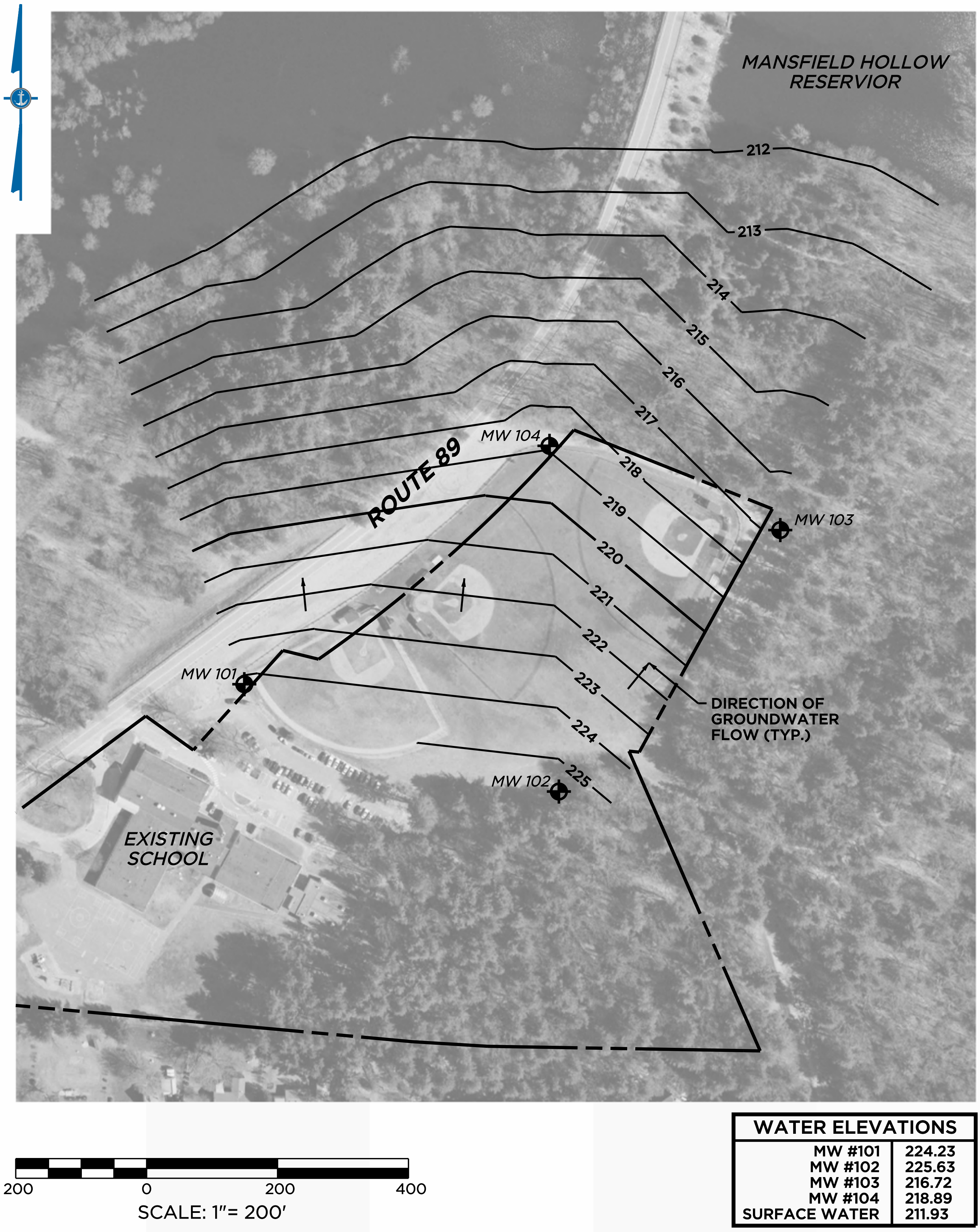
WATER ELEVATIONS	
MW #101	224.33
MW #102	225.76
MW #103	216.94
MW #104	219.00
SURFACE WATER	212.26

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

GROUNDWATER CONTOURS

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

FIGURE	
PROJECT 486-04	DATE NOV. 09



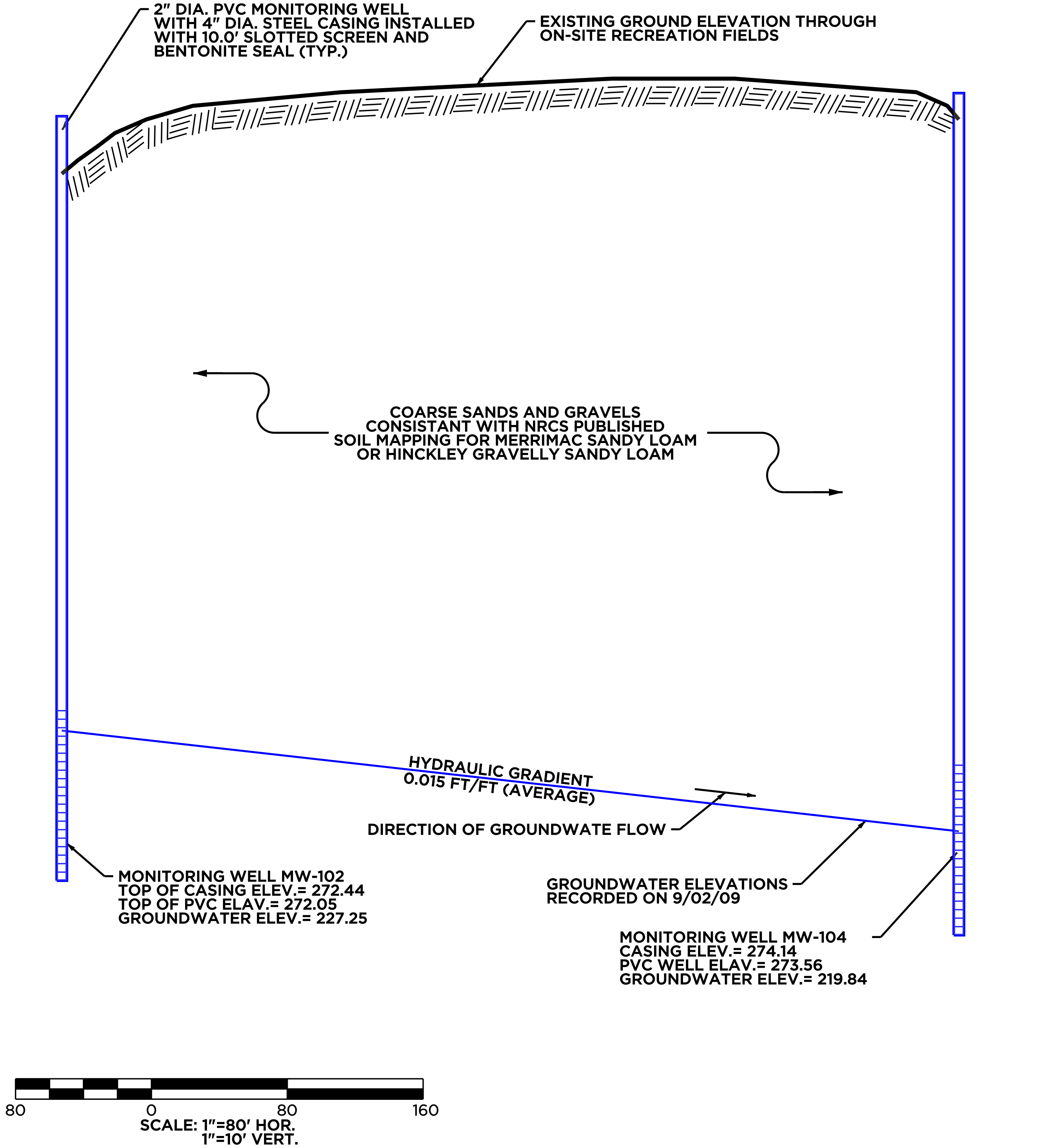
WATER ELEVATIONS	
MW #101	224.23
MW #102	225.63
MW #103	216.72
MW #104	218.89
SURFACE WATER	211.93

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

HYDRAULIC GRADE SECTION

PREPARED FOR TOWN OF MANSFIELD
SOUTHEAST ELEMENTARY SCHOOL MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	NOV. 09



C

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 TEST RESULTS

SOUTHEAST ELEMENTARY SCHOOL SITE
134 WARRENVILLE ROAD, MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE 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

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 TEST RESULTS

SOUTHEAST ELEMENTARY SCHOOL SITE
134 WARRENVILLE ROAD, MANSFIELD, CT

FIGURE	
PROJECT 486-04	DATE 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

D

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

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

IMTL
Accurate information you can rely on.

Soil Gradation Report

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. 10096 · LICENSED · PROFESSIONAL ENGINEER · 10-13-09

REVIEWED BY: 10-13-09

pc: Kevin Grindle, Anchor Engineering

kb

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

IMTL
Accurate information you can rely on.

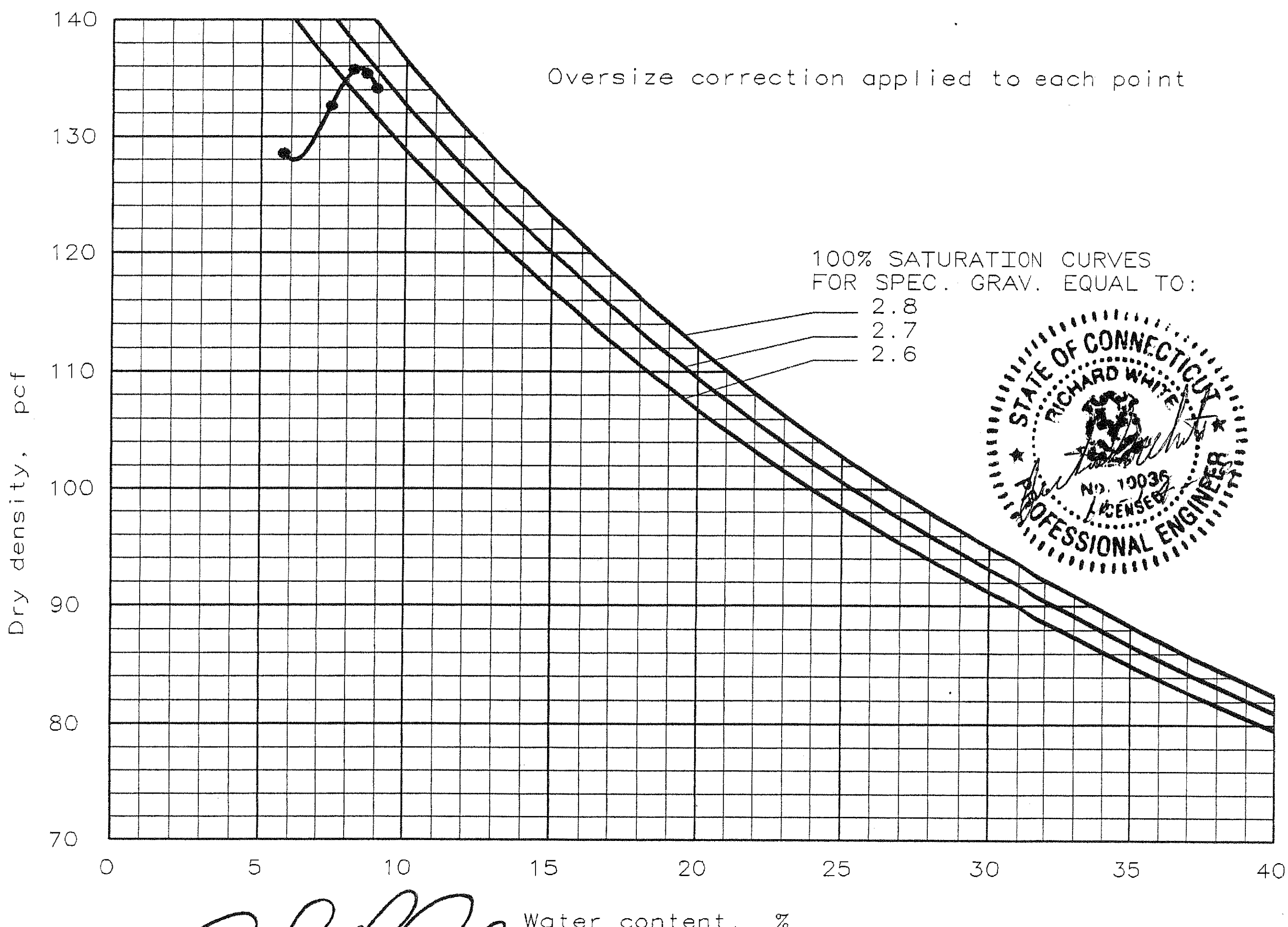
PROCTOR TEST REPORT

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: 10-14-09

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

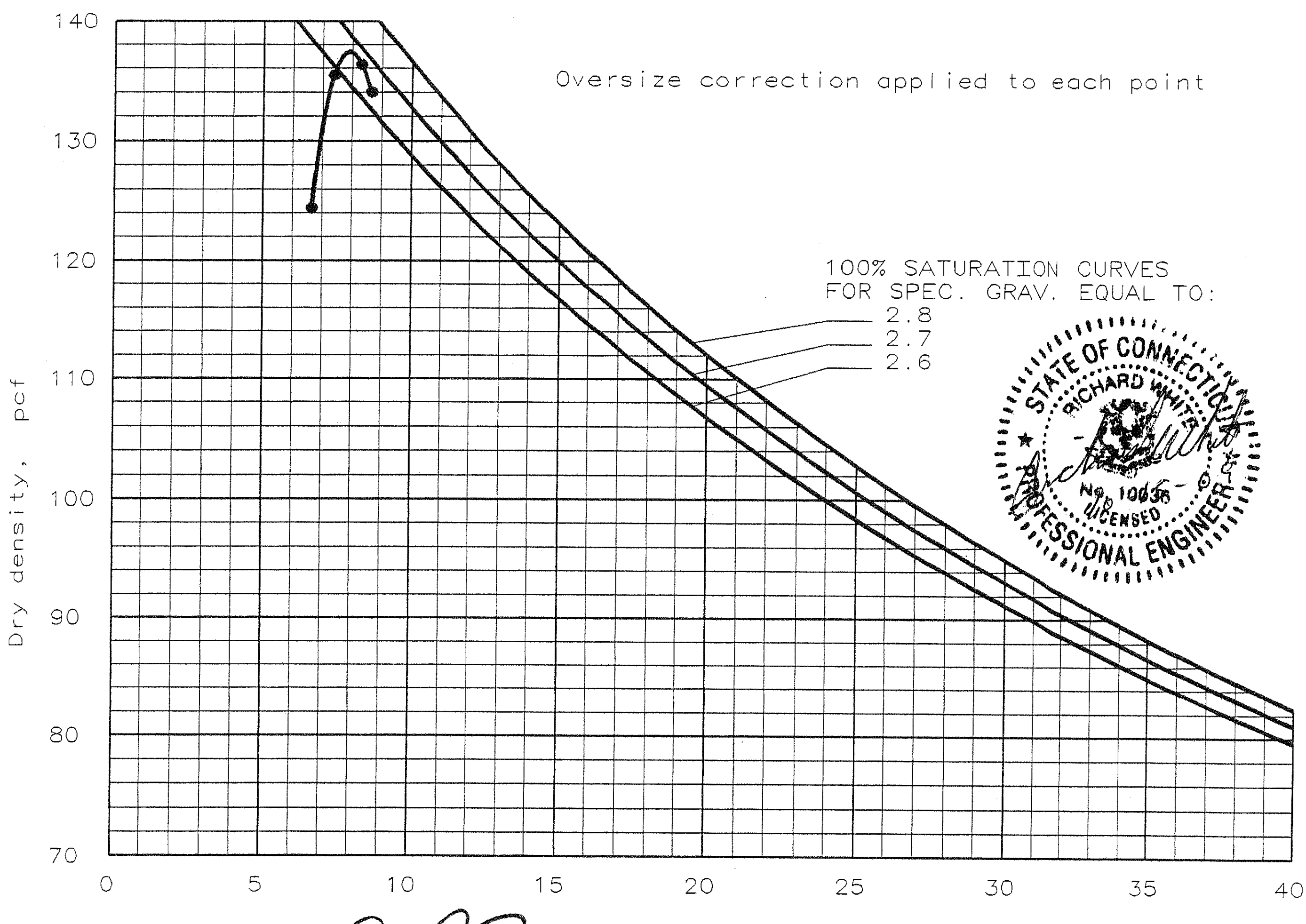
PROCTOR TEST REPORT

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

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

IMTL

Accurate information you can rely on.

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		

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

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

CT DEP/DPH Falling Head Permeability

IMTL
Accurate information you can rely on.

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. WALERYSZAK No. 17083 LICENSED PROFESSIONAL ENGINEER

*Sample size is insufficient to run the recommended procedure (ASTM D2434).

Report Revision: *Remark added.

pc: Kevin Grindle, Anchor Engineering
kb

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

IMTL
Accurate information you can rely on.

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
No. 10036
LICENSED
PROFESSIONAL ENGINEER

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

E

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

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
8gpd / per pupil ✓

• Additional 3gpd/pp for full kitchen facilities ✓

• Additional 3gpd/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: BDH

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

Project No. 486.04
Date Nov 2009

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

Checked By: BDH

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

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 232.15 (Approx. 40' below surface elevations)

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: BJH

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

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'

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

Therefore minimum Leaching System Spread = 230' LF

Prepared By: KRB

Checked By: BOH

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

SWAS DESIGN

Solve for: Long Term Acceptance Rate (LTAR)

GIVEN: LTAR = 5K - [1.2/(Log₁₀K)]

K = FT/MIN

12 FT/DAY = 0.0083 FT/MIN ✓

MAX LTAR per DEP = 0.8 = 28 FT/DAY

CONCLUSIONS:

LTAR @ 12 FT/DAY

$5 \times 0.0083 - [1.2/(\log_{10} .0083)] = 0.62$ gpd/LF

LTAR Range from 0.62 to 0.80 gpd/LF ✓

Solve for: Effective Leaching 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: KRG

Checked By: BJH

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

SWAS Design

Effective Leaching Area (ELA)

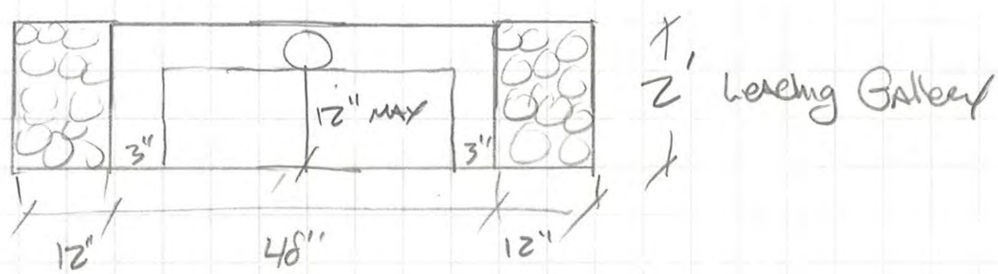
GIVEN: EFFECTIVE Sidewall height = Leaching Bottom to inlet invert not more than 1'-0"

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: BOH

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

HYDRAULIC GRADE SECTION

PREPARED FOR TOWN OF MANSFIELD
SOUTHEAST ELEMENTARY SCHOOL MANSFIELD, CT

FIGURE	
PROJECT	DATE
486-04	NOV. 09