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FINAL SOIL INVESTIGATION LETTER REPORT MELVIILLE WATER TOWER SITE NS NEWPORT RI

2/14/2007

NAVFAC MIDLANT

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, MID-ATLANTIC
9742 MARYLAND AVENUE
NORFOLK, VA 23511-3095

IN REPLY REFER TO:

5090
15/OPNEEV4/6040

FEB 14 2007

Kymberlee Keckler
EPA New England, Region I
1 Congress Street
Suite 1100 (HBT)
Boston MA 02114-2023

Paul Kulpa
State of Rhode Island
Department of Environmental Management
Office of Waste Management
Providence RI 02908-5767

Dear Ms. Keckler & Mr. Kulpa

Subject: FINAL SOIL INVESTIGATION LETTER REPORT,
MELVILLE WATER TOWER SITE, PORTSMOUTH, RHODE ISLAND

The Navy is forwarding the Final Soil Investigation Letter Report for Installation Restoration (IR) Site 21 - Melville Water Tower located in Portsmouth, Rhode Island. This Final Letter Report describes the results of soil samples taken from the area underneath and adjacent to the former water tower located on this site.

The Final Letter Report has been revised to incorporate comments on a draft version of the Letter Report dated November 2006, which were submitted to the Navy by the USEPA Region I in an email dated December 11, 2006 and from the Rhode Island Department of Environmental Management (RIDEM) in a letter dated January 18, 2007. The Navy's responses to those comments are also attached.

Since both regulatory agencies have agreed that the best approach for this site would be to pursue a removal action to remove lead contamination in surface and subsurface soils, the Navy will begin to implement the recommendations specified in the Final Letter Report. Details regarding the implementation of such a removal action will be detailed in an upcoming submission of a Removal Action Work Plan which will be forwarded to both the USEPA Region I and RIDEM for review.

FEB 23 2007

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FEB 14 2007

If you have any additional questions regarding the enclosed document, you can contact me by phone at (757) 444-4217 or by email at james.colter@navy.mil.

Sincerely,

JAMES L. COLTER, P.E.
Remedial Project Manager
By direction of the
Commanding Officer

Enclosures

Copy to: (Paper Copies Only)
NAVSTA Newport, Cornelia Mueller (3 copies)
Newport RAB c/o C. Mueller, NAVSTA (4 copies)
Gannett Fleming, Jennifer Stump
TtNUS, Steve Parker
Administrative Record

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C-NAVY-02-07-2325W

February 8, 2007

Project Number GN1611

Commander Officer
NAVFAC Mid-Lant
Attn: Jim Colter
9742 Maryland Avenue
Norfolk, Virginia 23511-3095

Reference: CLEAN Contract No. N62472-03-D-0057
Contract Task Order No. 008

Subject: Results from Soil Sampling, Former Melville Water Tower
Portsmouth, Rhode Island

Dear Mr. Colter:

In accordance with the Statement of Work (SOW) from the Naval Facilities Engineering Command, EFA Northeast, dated 5/9/06, Tetra Tech NUS, Inc. (TtNUS) collected samples of soil for analysis of lead from the area underneath and surrounding the former location of the Navy Water Tower located at 1335 West Main Road near the Melville School, in Portsmouth Rhode Island during the period of September 25 through September 28, 2006. This letter and its attachments present the findings of this sampling and analysis effort.

Background:

Soil sampling and analysis described in this letter was conducted to confirm the findings of the sampling and sample screening effort conducted by the Rhode Island Department of Environmental Management (RIDEM) on December 27, 2005. Based on the screening analysis RIDEM concluded that there were elevated concentrations of lead and detectable concentrations of arsenic in soil around the tower, and cited the paint from the water tower as a possible source (RIDEM 3/29/06).

Figure 1 depicts the former location of the water tower relative to the surrounding properties.

In May 2006, TtNUS collected chips of paint from the steel structure and the wooden "Freeze Box" at the site, prior to their demolition. Lead was found in paint from four of the five samples tested, at concentrations typical of lead-formulated paint. While the presence of arsenic in one paint chip sample was found at a concentration of 74 mg/kg, it was concluded that based on the predominance of lead in the paint, contaminants present due to paint releases should be determined through sampling and analysis for lead only (TtNUS 6/2/06). While arsenic is known to have been used in some formulations of pigments used in paint, arsenic is also present in soil as a natural condition.

The sampling and analysis program was conducted in accordance with the Field Sampling Plan for Soil Investigation, Melville Water Tower, Portsmouth Rhode Island (Field Sampling Plan), prepared by TtNUS. The Field Sampling Plan was drafted June 2, 2006, and reviewed by RIDEM and the U. S. Environmental Protection Agency (USEPA). Comments on the Draft Field Sampling Plan were received from RIDEM 6/14/06 and from the USEPA 6/19/06. The comments were taken into consideration, and responses were submitted to both parties on 7/27/06. The Revised Field Sampling Plan was submitted on August 1, 2006.

Sampling and Analysis:

Samples of soil were collected and analyzed for lead only, in accordance with the work plan. Sample stations were selected to characterize the site using a grid oriented approximately north to south, with intersecting points 25 feet apart. Samples were taken at each grid intersection, in order to identify a pattern of lead deposition. Samples were collected from the surface soil at all grid positions, and from subsurface soil at a subset of those grid positions. In addition to the grid samples, one sample station was added next to each of the four footings for the former tower.

While on site, two stations were moved because the recent installation of a temporary water connection resulted in soil excavated at these stations. The station at grid point B175 was shifted approximately 20 feet south to be beyond the area excavated for the temporary connection, and renamed C162. The station A175 was split into two stations, and shifted north approximately 26 feet: Two stations were located north of the pad, and named Z163 and Z183.

Samples were collected using hand tools from depths of 0-3 inches (45 Locations), 3-6 inches (14 locations), 6-12 inches (14 locations), and with hydraulic tools from 12-24 inches (10 locations). The 0-3 inch interval and 3-6 inch interval were selected to match those collected for screening analysis by RIDEM in December 2005. The 6-12 inch interval was selected for a subset of locations to help determine depth of the highest concentrations of lead present in soil and to allow possible data averaging for a 0-1 foot interval. The 12-24 inch interval was also selected the same subset of locations as the 6-12 inch interval. This "top-down" sampling approach was selected based on the presumption that the lead contamination found by RIDEM is a result of paint deposition from above, and that this lead contamination would not likely have migrated into the deeper soils.

Samples from the upper intervals were collected with hand tools to assure adequate volume without sample recovery problems. Samples from the 12-24 inch interval were collected with a hydraulic direct-push technology soil probe system (DPT). However, at two locations (D175, and C162) the DPT rig could not gain access due to fencing and guard rails, and the depth interval of 12-24 inches was not achievable using hand tools. Additionally, the deep samples at location A75 and F2 (southwest tower footing) were attempted using DPT but not acquired due to poor recovery at the target interval despite repeated attempts. The large amount of gravel underlayment interfered with deep sample acquisition. Also, weathered bedrock was noted in the deep sample at location D75.

Samples were collected for analysis by total digestion according to USEPA SW846 Method 6010B. Raw data from the laboratory was reviewed by TtNUS using a Tier II data validation process, according to the Region I EPA-NE Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (Feb 1989).

Each sample was collected in duplicate and separate aliquots of each sample were analyzed by two different laboratories. This approach was utilized because it is known that sample heterogeneity is common for soil, and particularly common for soil contaminated with lead from paint. Such heterogeneity is a result of the nature of the contaminant: Lead paint typically falls in chips or particles prior to being entrained in the soil, and once there, it is not likely to break down further under normal conditions. Even if the paint matrix continues to degrade, the lead is present in the paint as particles in suspension, not as a dissolved substance. Therefore, after total breakdown of the paint material, the lead mostly remains as a particulate in the soil. During the laboratory analysis, the analyst opens the sample container and randomly grabs a small quantity of the material inside for acid digestion. If the analyst does not happen to grab some of the lead particles with the soil matrix, the result can be biased low. If the analyst happens to grab a large portion of the lead particles with the soil matrix, the result can be biased high. The

heterogeneity of the samples was anticipated and compensated by duplicate analysis of all samples collected in order to reduce these biases.

It should be noted that during soil sample collection, paint chips were not obvious in the soil, suggesting that the release or releases could have been fine particles, such as result during a sandblasting operation. It should also be noted that the gravel area west of the sampling grid was reported to be used as a lay-down area by the contractor who demolished the tank, and some blue paint chips were noted on the ground surface in this area. The lay-down area was not sampled as a part of this effort.

Sampling Conducted by Others

During the period of July 20 and August 14, 2006, a small excavation was conducted for the purpose of installing a temporary water connection to bypass the tower. The excavation was performed to place a concrete foundation at the east portion of the site, against the fence at West Main Road. During this excavation, side wall samples and bottom of excavation samples were collected by NAVSTA personnel, overseen by RIDEM. The data from the samples collected are described below.

Results:

A summary of results are provided on Tables 1 and 2, attached.

Table 1 presents results from samples collected by TtNUS, showing individual results from each laboratory, the relative percent difference calculated from the two analyses conducted, and the maximum concentrations measured at each of the locations. The maximum result for each of the sample stations was used to depict the presence of lead in soil at the site (Figures 2 through 6, attached). This approach may show a high bias to interpretation of the results, however, this is an acceptable and conservative approach to data interpretation used for the protection of public health.

Table 2 presents results from samples collected by others from the excavation of the foundation for the temporary water connection. As noted in Table 2, the north east bottom sample from this excavation exceeded a concentration of 150 mg/kg lead, and RIDEM requested this soil be removed. It was recognized that a removal action goal for this site had not been determined at the time of this request, however, because the soil was to be covered with a semi-permanent structure and that soil would not be accessible after a removal action goal was established, NAVSTA agreed to remove these soils so as not to delay the water connection.

Figures 2 through 5 present the results compared to RIDEM direct exposure criteria by depth. Stations marked in green were found to be below the RIDEM direct exposure criteria for lead in residential use soil (R-DEC) of 150 mg/kg. Stations marked in yellow were found to be above the R-DEC for lead, but below the direct exposure criteria for lead in industrial/commercial use property (I/C-DEC) of 500 mg/kg. Stations marked in orange were found to be above the I/C-DEC, but less than twice that value. Stations marked in red were found to be at or above twice the I/C-DEC level (1000 mg/kg and above).

These results indicate the presence of elevated concentrations of lead in soil in the vicinity of the former water tower. This signature is clearly shown on Figure 2 which shows the concentrations at the 0-3 inch interval. Figure 3 (3-6 inch interval) shows the highest concentrations of lead still focused under the former water tower, and Figures 4 and 5 show concentrations decreasing with depth. The one sample at 12-24 inches that depicts lead in excess of 1000 mg/kg was collected adjacent to the northeast footing for the former tower (Figure 5).

Discussion:

The distribution of the maximum concentrations from the samples collected confirms RIDEM speculation that lead from the former water tower structure has come to reside in the soil under that structure. However, most of the lead contaminants are localized to the area directly under the former tower. Figure 6 presents relative concentrations of lead detected in the soil samples. This figure clearly shows that the highest concentrations are present under the former tower. Concentrations appear to decrease with depth, and at most locations, concentrations drop below enforceable standards within two feet of the ground surface. Based on this distribution, the lead from the paint on the tower appears to have been trapped in the soil, and impacts to other media such as groundwater are not anticipated.

Overall, concentrations of lead in surface soil exceeding state criteria are within the area currently fenced. The highest concentrations are present in the area previously secured by the fence around the water tower. Concentrations of lead in the surface soil adjacent to the walkway between the school and the residential area to the south are below all state criteria with the exception of one station – A150, which showed concentrations of 130 mg/kg (below criteria) and 219 mg/kg (above criteria).

RIDEM requested that TtNUS sample a debris pile that was previously seen by them in the wooded area south of the site. The debris pile was sought on two occasions, once with RIDEM present and once without their representation. No debris pile was evident, however, it was noted at there is metal material at the edge of the tree line south of the tower, and this metal material appears to be scrap from previous maintenance of the tower. Although no specific pile was noted, metal was found scattered in the area of grid points E50, E75 and E100 (Figure 2). This material may be the source for slight exceedances of R-DECs at these stations. Other debris may be present in this area and obscured by seasonal vegetation.

The sample Z183 is located within two feet of the government fence that bounds the study area and separates it from the street (Figure 2). The elevated concentration at this station (536 mg/kg) may well be a result of either past treatments of the fence and/or lead dust from traffic on the four lane West Main Road, located only 4 feet east of the fence (refer to attached photos). The lead found at this location is not anticipated to be a result of the water tower, and is more likely to be a result of traffic along the road.

The side wall samples taken from the excavation for the temporary water connection were collected from the 6-12 inch interval, as shown on Figure 4. The distribution of the results from these samples further shows a lead signature near the fence and roadway. The lead found at this location is also not anticipated to be a result of the water tower, and is more likely to be a result of traffic along the road.

It should be noted that RIDEM Division of Site Remediation provides a R-DEC of 150 mg/kg as an enforceable standard for soil at residential properties. However, the Rhode Island Department of Health (R32-24.6-PB, February 1992 and updated January 2005) provides a permissible "lead-safe" standard for lead in soil due to presence of lead-based paint between 150 to 400 mg/kg when soil is exposed. Soil that is covered (by asphalt, or similar material) may contain concentrations of lead up to 1,000 mg/kg and be considered "lead safe" so long as the cover remains intact.

Summary:

Lead was found in paint taken from the tower prior to demolition in May 2006, at concentrations typical of lead-formulated paint. RIDEM and the Navy speculated that the lead found in the soil by RIDEM was present as a result of lead paint deposited on the ground from the water tower and former maintenance operations.

Soil sampling for lead conducted in September 2006 shows a predominance of lead in the soil under and surrounding the former water tower at concentrations exceeding the state standards. Concentrations decrease with depth, and indicate that soil exceeding the state standards exists within the top six inches of the ground surface across most of the affected area, but up to and beyond 24 inches below ground surface adjacent to the tower footings and former boiler house foundation, all of which are still in place.

Some lead contamination appears to be present at the edge of the wooded area to the south of the former water tower. However, these concentrations are not as high as those in the vicinity of the tower. In addition, slightly elevated concentrations of lead were found along West Main Road and within 2 feet of the fence line at the east of the site, but these are likely to be a result of roadway contaminants and / or former treatment of the fence which is also still present.

Recommendations:

It is recommended that a remediation plan be developed for the affected area as shown on the attached Figures 2 through 6. A conservative approach for prompt, effective and permanent remediation would involve removal of soil exceeding 150 mg/kg lead in soil due to the proximity to the school and residential properties to the south, and disposal of this material in accordance with local, state, and federal regulations. Effective removal of this material will require removal of the former water tower footings, and the boiler house foundation as well. Finally, the gravel area used for lay-down during demolition of the water tower should also be removed to approximately 3 inches to assure any paint chips lost in this area are removed from the site. In the meantime, the site should remain fenced to prevent access to the affected area.

If you have any questions on this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

SSP/rp

Enclosures

c: K. Keckler, USEPA (w/encl.)
P. Kulpa, RIDEM (w/encl.)
C. Mueller, NAVSTA (w/encl.)
J. Stump, Gannett Fleming (w/encl.)
NAVSTA RAB (c/o C. Mueller, w/encl.)
J. Trepanowski/G. Glenn, TtNUS (w/encl.)
File GN1611-3.2 (w/o encl.)/GN1611-8.0 (w/encl.)

TABLE 1
SUMMARY OF LEAD ANALYTICAL RESULTS
SOIL INVESTIGATION AT THE FORMER MELVILLE WATER TOWER
1331 WEST MAIN ROAD PORTSMOUTH RI

Grid Location		Sample Name	Depth in Inches			Analytical Results				
						Laboratory 1	Laboratory 2	RPD	Maximum Concentration	Units
A	0	MWT-S-SOA0-0003	0	to	3	22	60	92%	60	MG/KG
A	25	MWT-S-SOA25-0003	0	to	3	12	27	78%	27	MG/KG
A	50	MWT-S-SOA50-0003	0	to	3	130	246	62%	246	MG/KG
A	75	MWT-S-SOA75-0003	0	to	3	730	3310	128%	3310	MG/KG
A	75	MWT-S-SOA75-0306	3	to	6	35	369	165%	369	MG/KG
A	75	MWT-S-SOA75-0612	6	to	12	42	124	99%	124	MG/KG
A	100	MWT-S-SOA100-0003	0	to	3	410	697	52%	697	MG/KG
A	125	MWT-S-SOA125-0003	0	to	3	130	322	85%	322	MG/KG
A	150	MWT-S-SOA150-0003	0	to	3	130	219	51%	219	MG/KG
B	0	MWT-S-SOB0-0003	0	to	3	170	345	68%	345	MG/KG
B	25	MWT-S-SOB25-0003	0	to	3	190	91	70%	190	MG/KG
B	25	MWT-S-SOB25-0306	3	to	6	30	86	96%	86	MG/KG
B	25	MWT-S-SOB25-0612	6	to	12	10	70	150%	70	MG/KG
B	25	MWT-S-SOB25-1224	12	to	24	21	21	1%	21	MG/KG
B	50	MWT-S-SOB50-0003	0	to	3	610	1110	58%	1110	MG/KG
B	75	MWT-S-SOB75-0003	0	to	3	1800	2180	19%	2180	MG/KG
B	75	MWT-S-SOB75-0306	3	to	6	4200	12300	98%	12300	MG/KG
B	75	MWT-S-SOB75-0306-D	3	to	6	8100	12500	43%	12500	MG/KG
B	75	MWT-S-SOB75-0612	6	to	12	2200	7180	106%	7180	MG/KG
B	75	MWT-S-SOB75-1224	12	to	24	730	458	46%	730	MG/KG
B	100	MWT-S-SOB100-0003	0	to	3	740	1570	72%	1570	MG/KG
B	125	MWT-S-SOB125-0003	0	to	3	87	182	71%	182	MG/KG
B	125	MWT-S-SOB125-0306	3	to	6	170	313	59%	313	MG/KG
B	125	MWT-S-SOB125-0612	6	to	12	210	379	57%	379	MG/KG
B	125	MWT-S-SOB125-1224	12	to	24	400	65	144%	400	MG/KG
B	150	MWT-S-SOB150-0003	0	to	3	47	73	43%	73	MG/KG
C	0	MWT-S-SOC0-0003	0	to	3	10	72	153%	72	MG/KG
C	25	MWT-S-SOC25-0003	0	to	3	390	559	36%	559	MG/KG
C	25	MWT-S-SOC25-0003-D	0	to	3	530	757	35%	757	MG/KG
C	50	MWT-S-SOC50-0003	0	to	3	820	682	18%	820	MG/KG
C	75	MWT-S-SOC75-0003	0	to	3	890	2460	94%	2460	MG/KG
C	75	MWT-S-SOC75-0306	3	to	6	600	1090	58%	1090	MG/KG
C	75	MWT-S-SOC75-0612	6	to	12	530	873	49%	873	MG/KG
C	75	MWT-S-SOC75-1224	12	to	24	20	34	51%	34	MG/KG
C	100	MWT-S-SOC100-0003	0	to	3	480	317	41%	480	MG/KG
C	125	MWT-S-SOC125-0003	0	to	3	32	100	103%	100	MG/KG
C	150	MWT-S-SOC150-0003	0	to	3	22	47	73%	47	MG/KG
C	162	MWT-S-SOC162-0003	0	to	3	34	87	88%	87	MG/KG
C	162	MWT-S-SOC162-0306	3	to	6	20	42	71%	42	MG/KG
C	162	MWT-S-SOC162-0612	6	to	12	12	42	112%	42	MG/KG
C	175	MWT-S-SOC175-0003	0	to	3	26	54	69%	54	MG/KG
C	175	MWT-S-SOC175-0003-D	0	to	3	18	63	111%	63	MG/KG
D	0	MWT-S-SOD0-0003	0	to	3	29	77	91%	77	MG/KG
D	25	MWT-S-SOD25-0003	0	to	3	110	136	21%	136	MG/KG
D	25	MWT-S-SOD25-0306	3	to	6	19	52	93%	52	MG/KG
D	25	MWT-S-SOD25-0612	6	to	12	16	48	100%	48	MG/KG
D	25	MWT-S-SOD25-1224	12	to	24	14	26	59%	26	MG/KG
D	50	MWT-S-SOD50-0003	0	to	3	42	82	65%	82	MG/KG
D	75	MWT-S-SOD75-0003	0	to	3	120	209	54%	209	MG/KG
D	75	MWT-S-SOD75-0003-D	0	to	3	130	230	56%	230	MG/KG
D	75	MWT-S-SOD75-0306	3	to	6	77	282	114%	282	MG/KG
D	75	MWT-S-SOD75-0612	6	to	12	54	142	90%	142	MG/KG

TABLE 1
SUMMARY OF LEAD ANALYTICAL RESULTS
SOIL INVESTIGATION AT THE FORMER MELVILLE WATER TOWER
1331 WEST MAIN ROAD PORTSMOUTH RI

Grid Location		Sample Name	Depth in Inches			Analytical Results				
						Laboratory 1	Laboratory 2	RPD	Maximum Concentration	Units
D	75	MWT-S-SOD75-1224	12	to	24	8	12	39%	12	MG/KG
D	100	MWT-S-SOD100-0003	0	to	3	55	671	170%	671	MG/KG
D	125	MWT-S-SOD125-0003	0	to	3	86	124	36%	124	MG/KG
D	125	MWT-S-SOD125-0306	3	to	6	41	86	71%	86	MG/KG
D	125	MWT-S-SOD125-0612	6	to	12	20	73	114%	73	MG/KG
D	125	MWT-S-SOD125-1224	12	to	24	25	44	56%	44	MG/KG
D	150	MWT-S-SOD150-0003	0	to	3	36	60	50%	60	MG/KG
D	178	MWT-S-SOD178-0003	0	to	3	20	56	95%	56	MG/KG
D	178	MWT-S-SOD178-0306	3	to	6	34	36	6%	36	MG/KG
D	178	MWT-S-SOD178-0612	6	to	12	18	36	66%	36	MG/KG
E	0	MWT-S-SOE0-0003	0	to	3	32	48	41%	48	MG/KG
E	25	MWT-S-SOE25-0003	0	to	3	31	65	71%	65	MG/KG
E	50	MWT-S-SOE50-0003	0	to	3	240	494	69%	494	MG/KG
E	75	MWT-S-SOE75-0003	0	to	3	94	312	107%	312	MG/KG
E	100	MWT-S-SOE100-0003	0	to	3	200	321	46%	321	MG/KG
E	125	MWT-S-SOE125-0003	0	to	3	56	101	57%	101	MG/KG
E	150	MWT-S-SOE150-0003	0	to	3	27	67	86%	67	MG/KG
E	175	MWT-S-SOE175-0003	0	to	3	15	39	89%	39	MG/KG
E	175	MWT-S-SOE175-0003-D	0	to	3	16	43	91%	43	MG/KG
F	1	MWT-S-SOF1-0003	0	to	3	2900	6670	79%	6670	MG/KG
F	1	MWT-S-SOF1-0003-D	0	to	3	4200	9120	74%	9120	MG/KG
F	1	MWT-S-SOF1-0306	3	to	6	1400	2680	63%	2680	MG/KG
F	1	MWT-S-SOF1-0306-D	3	to	6	1300	2480	62%	2480	MG/KG
F	1	MWT-S-SOF1-0612	6	to	12	670	2210	107%	2210	MG/KG
F	1	MWT-S-SOF1-1224	12	to	24	370	486	27%	486	MG/KG
F	2	MWT-S-SOF2-0003	0	to	3	3400	5810	52%	5810	MG/KG
F	2	MWT-S-SOF2-0306	3	to	6	1700	3150	60%	3150	MG/KG
F	2	MWT-S-SOF2-0612	6	to	12	1400	3780	92%	3780	MG/KG
F	3	MWT-S-SOF3-0003	0	to	3	2700	3170	16%	3170	MG/KG
F	3	MWT-S-SOF3-0306	3	to	6	1800	3310	59%	3310	MG/KG
F	3	MWT-S-SOF3-0306-D	3	to	6	1900	3280	53%	3280	MG/KG
F	3	MWT-S-SOF3-0612	6	to	12	460	1430	103%	1430	MG/KG
F	3	MWT-S-SOF3-1224	12	to	24	28	53	62%	53	MG/KG
F	4	MWT-S-SOF4-0003	0	to	3	1800	2600	36%	2600	MG/KG
F	4	MWT-S-SOF4-0306	3	to	6	830	2380	97%	2380	MG/KG
F	4	MWT-S-SOF4-0612	6	to	12	880	1470	50%	1470	MG/KG
F	4	MWT-S-SOF4-1224	12	to	24	1300	3450	91%	3450	MG/KG
F	4	MWT-S-SOF4-1224-D	12	to	24	2800	3830	31%	3830	MG/KG
Z	163	MWT-S-SOZ163-0003	0	to	3	21	69	106%	69	MG/KG
Z	183	MWT-S-SOZ183-0003	0	to	3	180	536	99%	536	MG/KG

NOTES:

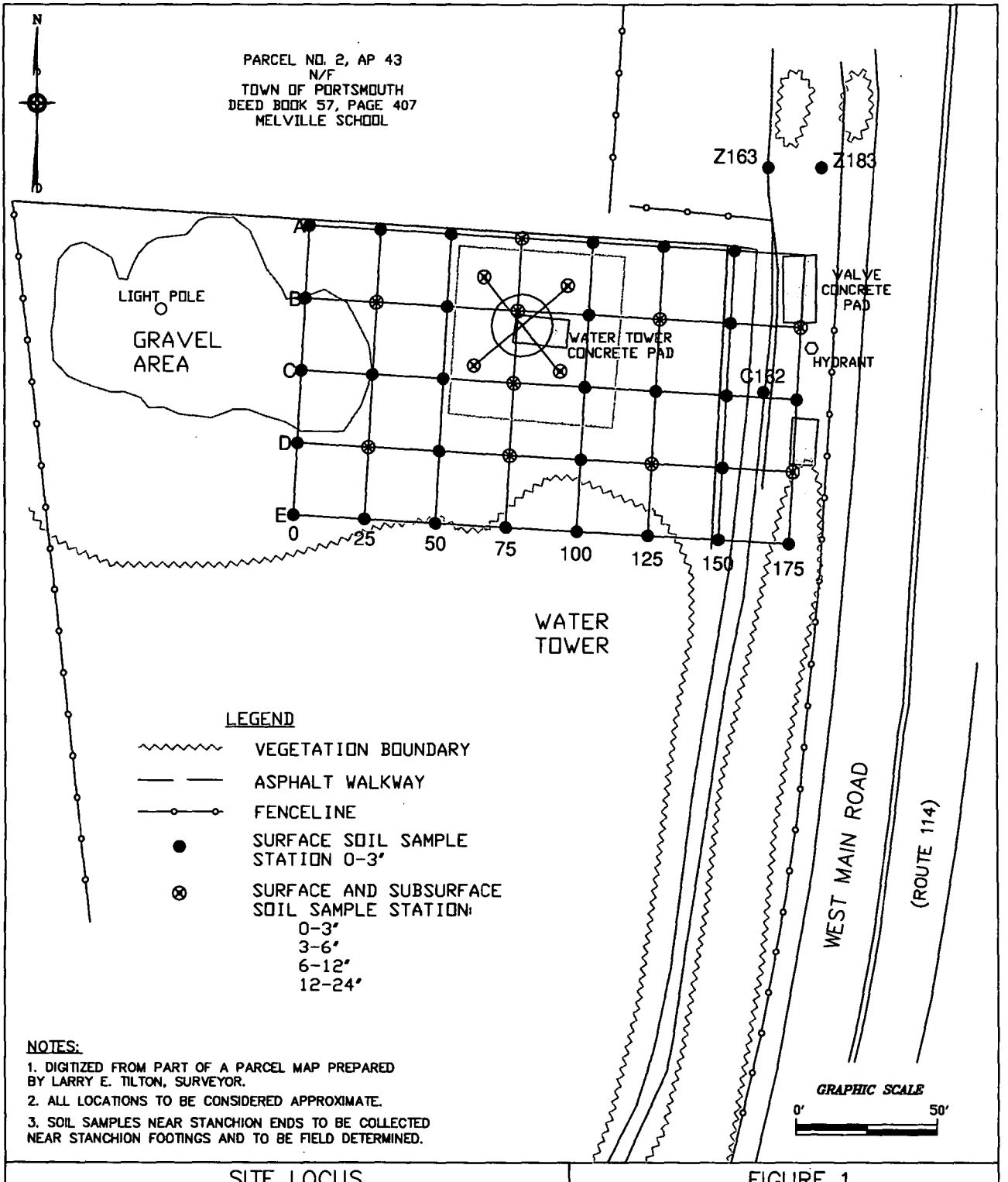
Refer to Figures 2-6 for grid positions

Maximum concentrations are used for mapping on Figures 2-6

TABLE 2
SUMMARY OF LEAD ANALYTICAL RESULTS
EXCAVATION FOR TEMPORARY CONNECTION FOUNDATION
MELVILLE WATER TOWER, 1331 WEST MAIN ROAD PORTSMOUTH RI

Location		Depth in Inches			Results	Units	Comments
Q1	East Wall	6	to	12	624	mg/kg	
Q1	South Wall	6	to	12	95	mg/kg	
Q1	Bottom	12	to	14	114	mg/kg	
Q2	East Wall	6	to	12	1110	mg/kg	
Q2	Bottom	12	to	14	84	mg/kg	
Q3	North Wall	6	to	12	49	mg/kg	
Q3	East Wall	6	to	12	197	mg/kg	
Q3	Bottom	12	to	14	288	mg/kg	Soil Removed
Q4	South Wall	6	to	12	506	mg/kg	
Q4	West Wall	6	to	12	37	mg/kg	
Q4	Bottom	12	to	14	26	mg/kg	
Q5	West Wall	6	to	12	48	mg/kg	
Q5	Bottom	12	to	14	74	mg/kg	
Q6	North Wall	6	to	12	91	mg/kg	
Q6	West Wall	6	to	12	99	mg/kg	
Q6	Bottom	12	to	14	85	mg/kg	

Refer to Figures 4 and 5 for sample stations



NOTES:

1. DIGITIZED FROM PART OF A PARCEL MAP PREPARED BY LARRY E. TILTON, SURVEYOR.
2. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
3. SOIL SAMPLES NEAR STANCHION ENDS TO BE COLLECTED NEAR STANCHION FOOTINGS AND TO BE FIELD DETERMINED.

SITE LOCUS

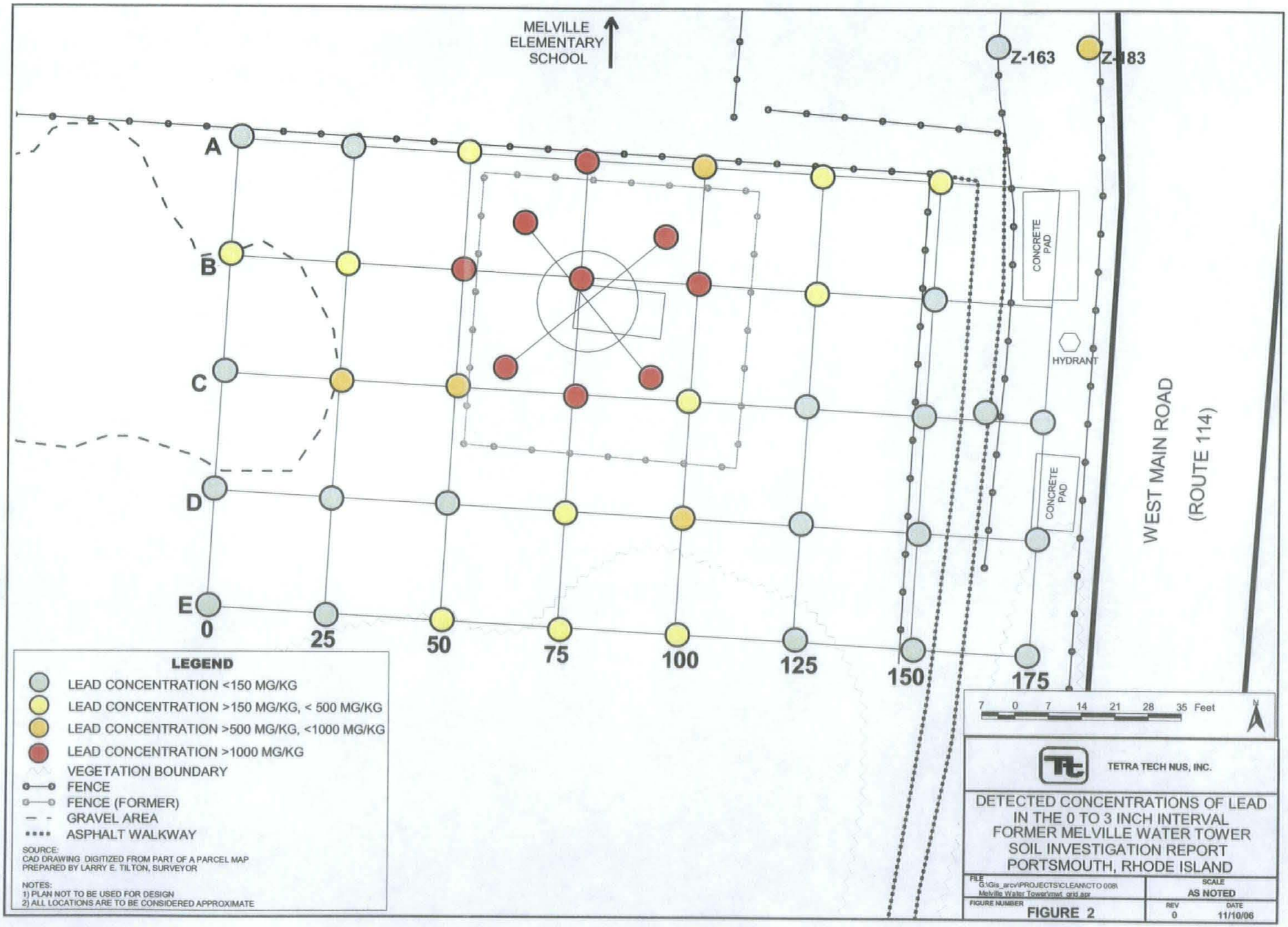
FIGURE 1

MELVILLE WATER TOWER

PORTSMOUTH, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	L. SEYDEWITZ	DATE:	OCTOBER 20, 2006
SCALE:	AS NOTED	ACAD NAME:	DWG\1611\0810\LOCUS_1.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899


MELVILLE ELEMENTARY SCHOOL
Z-163
Z-183
A
B
C
D
E
0
25
50
75
100
125
150
175
CONCRETE PAD
HYDRANT
CONCRETE PAD
WEST MAIN ROAD
(ROUTE 114)
LEGEND
LEAD CONCENTRATION <150 MG/KG
LEAD CONCENTRATION >150 MG/KG, < 500 MG/KG
LEAD CONCENTRATION >500 MG/KG, <1000 MG/KG
LEAD CONCENTRATION >1000 MG/KG
VEGETATION BOUNDARY
FENCE
FENCE (FORMER)
GRAVEL AREA
ASPHALT WALKWAY
SOURCE:
CAD DRAWING DIGITIZED FROM PART OF A PARCEL MAP
PREPARED BY LARRY E. TILTON, SURVEYOR
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE
7 0 7 14 21 28 35 Feet
N
TETRA TECH NUS, INC.
DETECTED CONCENTRATIONS OF LEAD
IN THE 0 TO 3 INCH INTERVAL
FORMER MELVILLE WATER TOWER
SOIL INVESTIGATION REPORT
PORTSMOUTH, RHODE ISLAND
FILE
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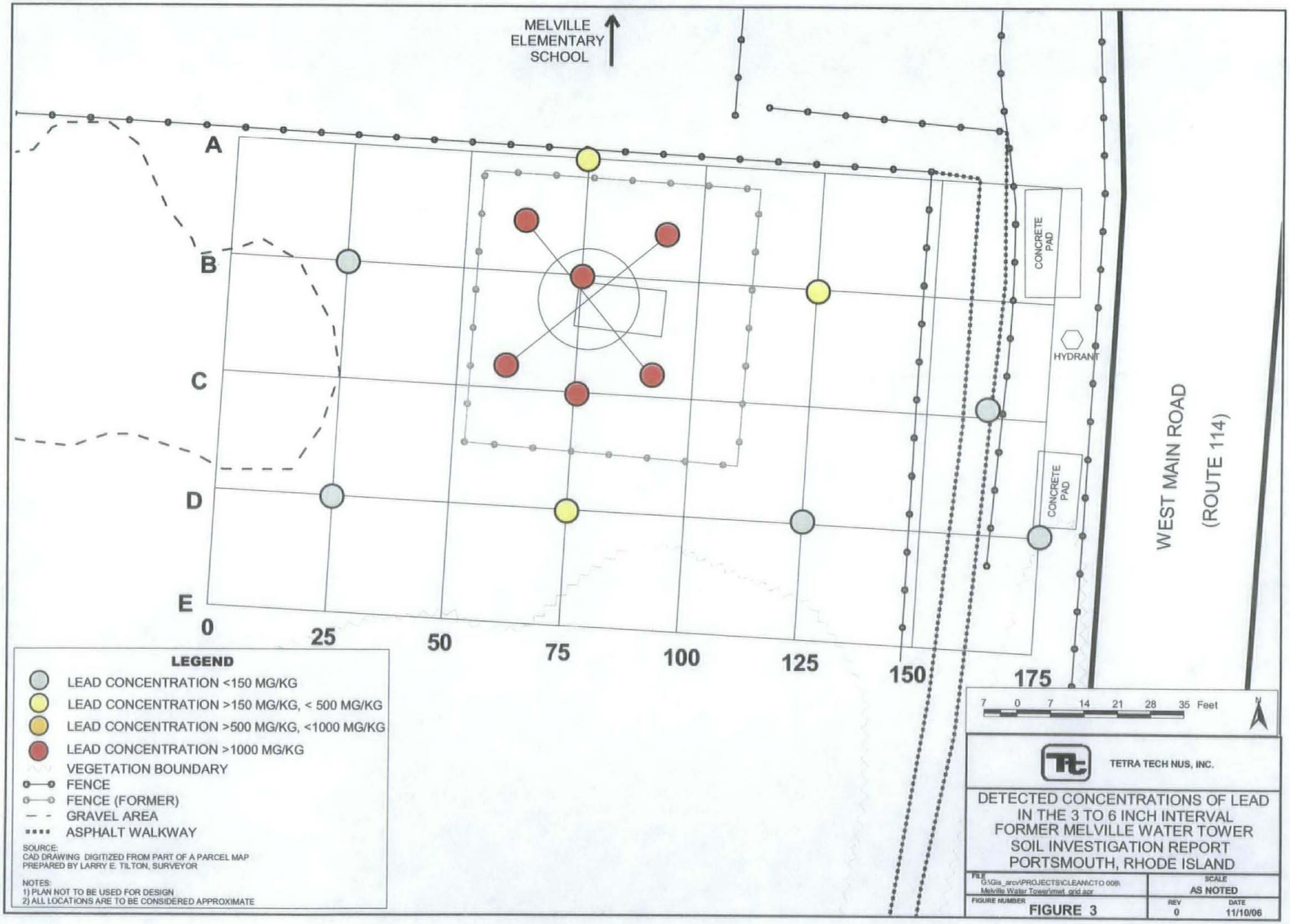
Melville Water Tower\mwt_grid.apr
SCALE
AS NOTED
FIGURE NUMBER
FIGURE 2
REV
0
DATE
11/10/06


MELVILLE ELEMENTARY SCHOOL
A
B
C
D
E
0
25
50
75
100
125
150
175
CONCRETE PAD
HYDRANT
CONCRETE PAD
WEST MAIN ROAD
(ROUTE 114)
LEGEND
LEAD CONCENTRATION <150 MG/KG
LEAD CONCENTRATION >150 MG/KG, < 500 MG/KG
LEAD CONCENTRATION >500 MG/KG, <1000 MG/KG
LEAD CONCENTRATION >1000 MG/KG
VEGETATION BOUNDARY
FENCE
FENCE (FORMER)
GRAVEL AREA
ASPHALT WALKWAY
SOURCE:
CAD DRAWING DIGITIZED FROM PART OF A PARCEL MAP
PREPARED BY LARRY E. TILTON, SURVEYOR
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE
7 0 7 14 21 28 35 Feet
N
TETRA TECH NUS, INC.
DETECTED CONCENTRATIONS OF LEAD
IN THE 3 TO 6 INCH INTERVAL
FORMER MELVILLE WATER TOWER
SOIL INVESTIGATION REPORT
PORTSMOUTH, RHODE ISLAND
FILE
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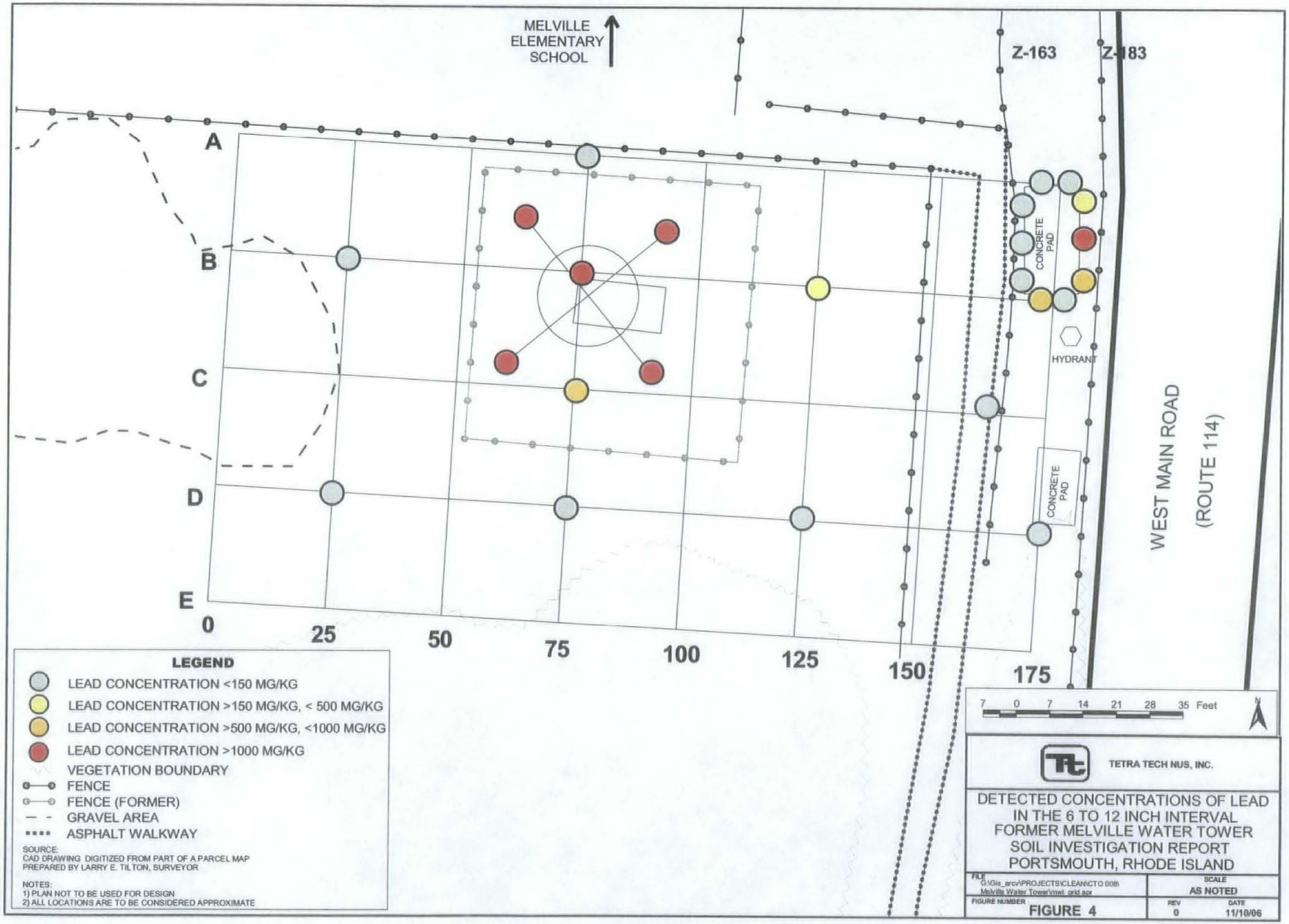
Melville Water Tower\mwt_grid.apr
SCALE
AS NOTED
FIGURE NUMBER
FIGURE 3
REV
0
DATE
11/10/06


MELVILLE ELEMENTARY SCHOOL
Z-163
Z-183
A
B
C
D
E
0
25
50
75
100
125
150
175
CONCRETE PAD
HYDRANT
CONCRETE PAD
WEST MAIN ROAD
(ROUTE 114)
LEGEND
LEAD CONCENTRATION <150 MG/KG
LEAD CONCENTRATION >150 MG/KG, < 500 MG/KG
LEAD CONCENTRATION >500 MG/KG, <1000 MG/KG
LEAD CONCENTRATION >1000 MG/KG
VEGETATION BOUNDARY
FENCE
FENCE (FORMER)
GRAVEL AREA
ASPHALT WALKWAY
SOURCE:
CAD DRAWING DIGITIZED FROM PART OF A PARCEL MAP
PREPARED BY LARRY E. TILTON, SURVEYOR
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE
7 0 7 14 21 28 35 Feet
N
TETRA TECH NUS, INC.
DETECTED CONCENTRATIONS OF LEAD
IN THE 6 TO 12 INCH INTERVAL
FORMER MELVILLE WATER TOWER
SOIL INVESTIGATION REPORT
PORTSMOUTH, RHODE ISLAND
FILE
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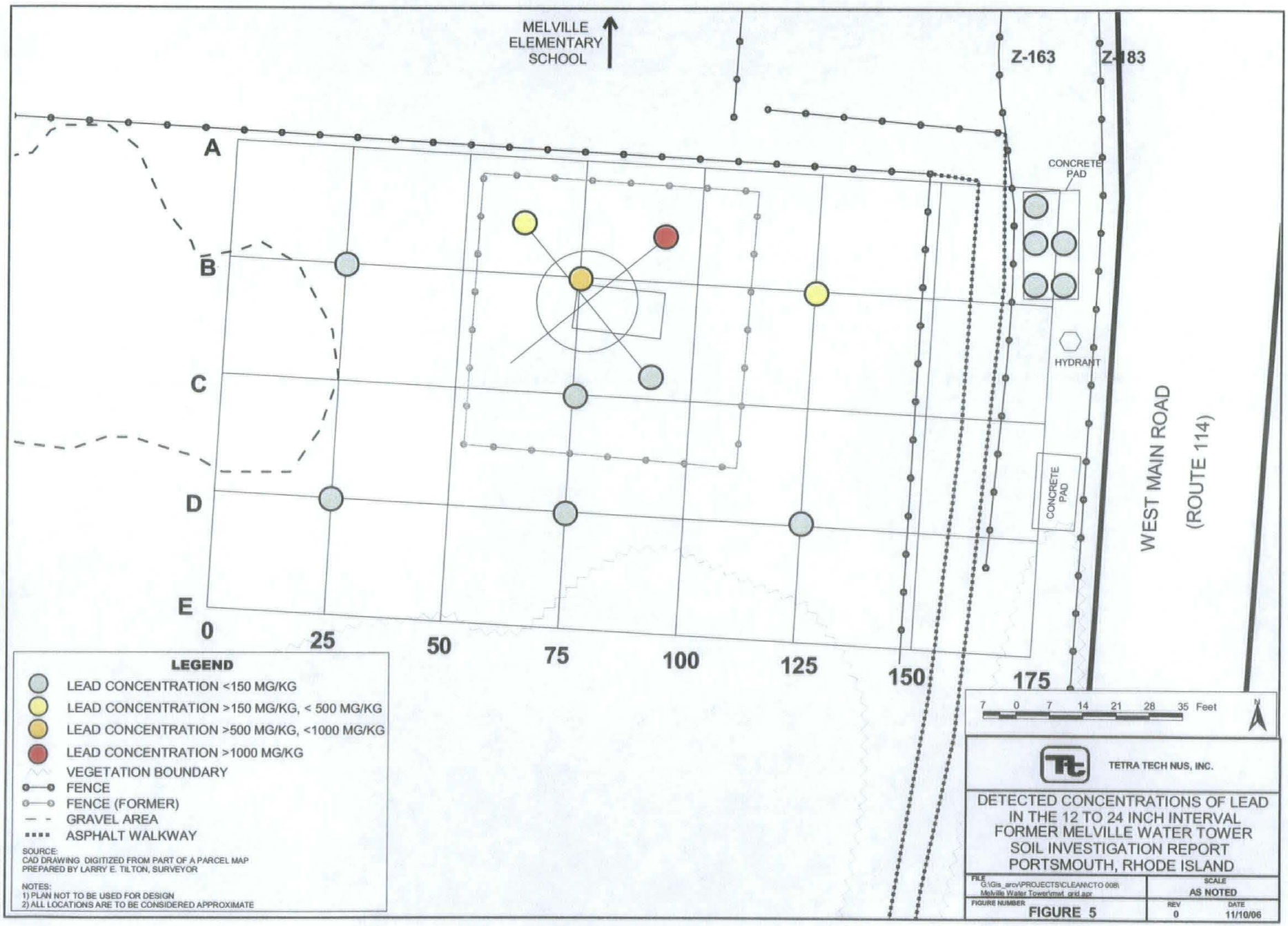
Melville Water Tower\mwt_grid.apr
SCALE
AS NOTED
FIGURE NUMBER
FIGURE 4
REV
0
DATE
11/10/06


MELVILLE
ELEMENTARY
SCHOOL
Z-163
Z-183
CONCRETE
PAD
HYDRANT
CONCRETE
PAD
WEST MAIN ROAD
(ROUTE 114)
A
B
C
D
E
0
25
50
75
100
125
150
175
LEGEND
LEAD CONCENTRATION <150 MG/KG
LEAD CONCENTRATION >150 MG/KG, < 500 MG/KG
LEAD CONCENTRATION >500 MG/KG, <1000 MG/KG
LEAD CONCENTRATION >1000 MG/KG
VEGETATION BOUNDARY
FENCE
FENCE (FORMER)
GRAVEL AREA
ASPHALT WALKWAY
SOURCE:
CAD DRAWING DIGITIZED FROM PART OF A PARCEL MAP
PREPARED BY LARRY E. TILTON, SURVEYOR
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE
7 0 7 14 21 28 35 Feet
N
TETRA TECH NUS, INC.
DETECTED CONCENTRATIONS OF LEAD
IN THE 12 TO 24 INCH INTERVAL
FORMER MELVILLE WATER TOWER
SOIL INVESTIGATION REPORT
PORTSMOUTH, RHODE ISLAND
FILE
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Melville Water Tower\mwt_grid.apr
SCALE
AS NOTED
FIGURE NUMBER
FIGURE 5
REV
0
DATE
11/10/06

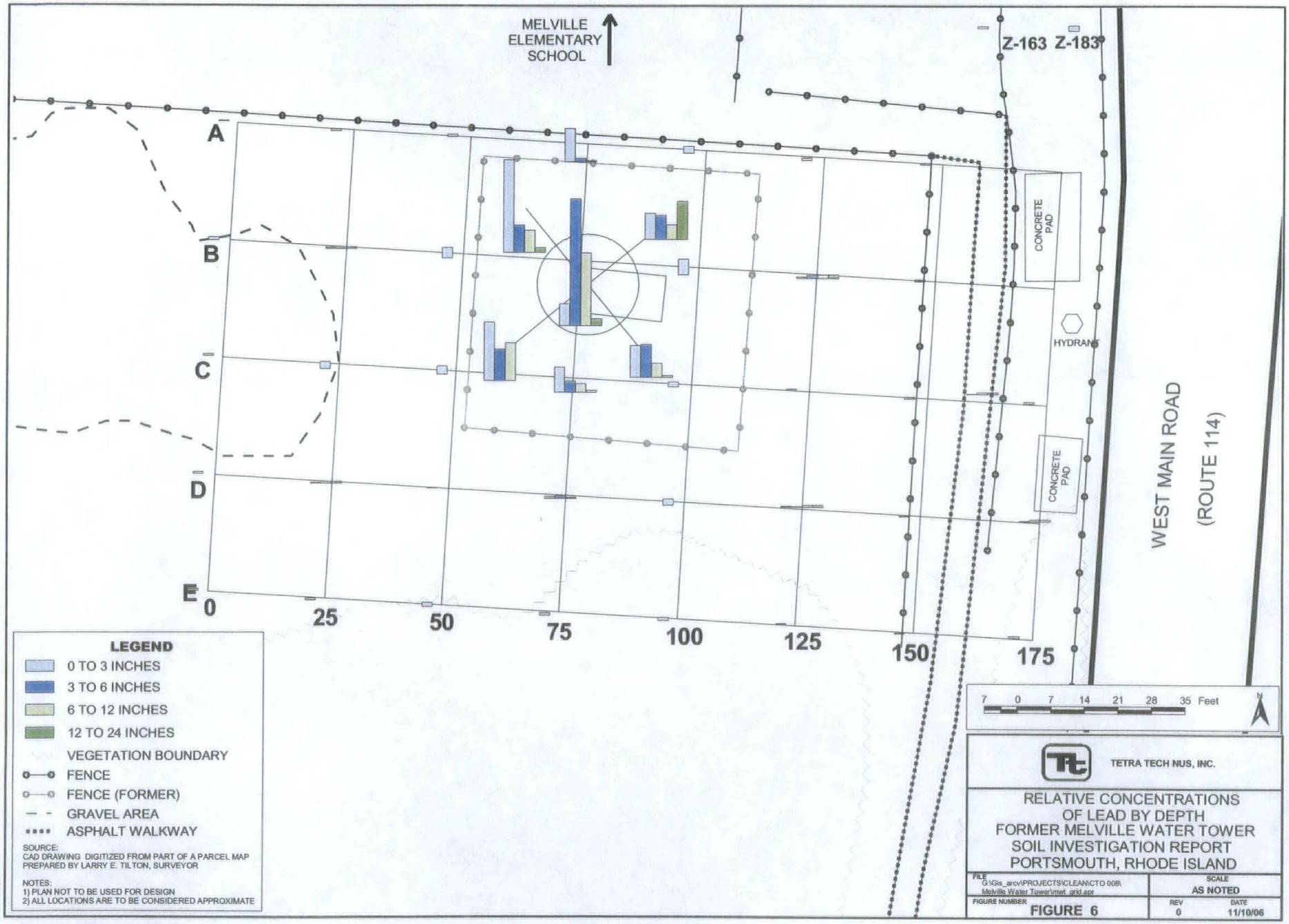
MELVILLE ELEMENTARY SCHOOL
Z-163 Z-183
A
B
C
D
E
0
25
50
75
100
125
150
175
CONCRETE PAD
CONCRETE PAD
HYDRANT
WEST MAIN ROAD
(ROUTE 114)
LEGEND
0 TO 3 INCHES
3 TO 6 INCHES
6 TO 12 INCHES
12 TO 24 INCHES
VEGETATION BOUNDARY
FENCE
FENCE (FORMER)
GRAVEL AREA
ASPHALT WALKWAY
SOURCE:
CAD DRAWING DIGITIZED FROM PART OF A PARCEL MAP PREPARED BY LARRY E. TILTON, SURVEYOR
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE
7 0 7 14 21 28 35 Feet
N
TETRA TECH NUS, INC.
RELATIVE CONCENTRATIONS
OF LEAD BY DEPTH
FORMER MELVILLE WATER TOWER
SOIL INVESTIGATION REPORT
PORTSMOUTH, RHODE ISLAND
FILE
G:\Gis_arcv\PROJECTS\CLEAN\CTO 008\
Melville Water Tower\mwt_grid.apr
SCALE
AS NOTED
FIGURE NUMBER
FIGURE 6
REV
0
DATE
11/10/06

Photo1
General Area of Station Z163
Area has been landscaped after installation of temporary water connection
View is to the north

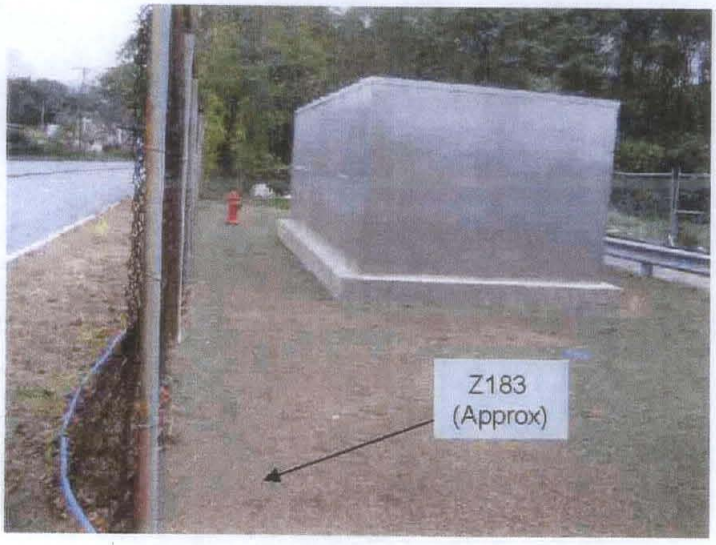

Photo2
General Area of Station Z163
Area has been landscaped after installation of temporary water connection
View is to the south

RESPONSES TO COMMENTS ON THE
DRAFT SOIL INVESTIGATION LETTER REPORT
MELVILLE WATER TOWER, PORTSMOUTH RI

Comment from Rhode Island Department of Environmental Management
Comment Dated 1/19/07

General Comment:

In general, the Navy found that the highest concentration of lead was found in the immediate vicinity of the water tower. Further, at most locations the concentration of lead decreased with depth, however, at some locations the concentrations increased with depth. Accordingly, the Navy recommended performing a removal action at the site, and that the remedial action goal for lead would be RIDEM's residential direct exposure standard which is 150 ppm. Finally, the fences at the site would remain as an interim measure until the site is remediated.

RIDEM agrees that a removal action should be conducted at the site. Specifics regarding the removal action, such as, affected areas, depth of excavation, confirmatory sampling procedures, contaminants of concern, and procedures for dealing with locations where contamination increased with depth, etc will be addressed in the removal action work plan.

Response: The comment is noted. Removal action plans will be developed and provided to the RIDEM and USEPA as draft documents for comment.

Comment from U.S. Environmental Protection Agency
Comment Dated 11/21/06

General Comment:

The first sentence of the second paragraph on page 2 states that samples were collected from the 12-24 in. horizon at 10 sample locations. However, the Field Sampling Plan states that samples would be collected from the 12-24 in. horizon at 14 locations. Is this change due to the sampling near the concrete pad depicted on Figure 5? Justification for the difference between 10 and 14 samples should be provided in the report.

Response: Samples from the upper intervals were collected with hand tools to assure adequate volume, without sample recovery problems. Samples from the 12-24 inch interval were collected with a hydraulic direct-push technology soil probe system (DPT). However, at two locations (D175, and C162) the DPT rig could not gain access due to fencing and guard rails, and the depth interval of 12-24 inches was not achievable using hand tools. Additionally, the deep samples at location A75 and F2 (southwest tower footing) were attempted using DPT but not acquired due to poor recovery at the target interval despite repeated attempts. The large amount of gravel underlayment interfered with deep sample acquisition. This will be clarified in the final report.