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NSB KINGS BAY
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LETTER REGARDING USGS COMMENTS TO TECHNICAL MEMORANDUM NUMBER 1 NSB
KINGS BAY GA
11/1/1993
ABB ENVIRONMENTAL



31547.000
16.01.00.0008

1 November 1993

Commanding Officer
Southern Division
Naval Facilities Engineering Command
P.O. Box 10068
North Charleston, SC 29411-0068

ATTN: Ed Lohr
Code 1868EL

Subject: Naval Submarine Base, Kings Bay, GA
Contract Task Order No. 041
Prime Contract N62467-89-D-0317
USGS Comments to Technical Memorandum Number 1

Dear Mr. Lohr:

Attached is a response to comments table for the USGS comments to Technical Memorandum Number 1. We apologize for the delay in delivery of this table. The comments did not impact any of the Final Draft RFI reports for Sites 11, 5, or 16. Please do not hesitate to call me if I can provide any additional information regarding our responses.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Frank B. Cater, PE
Task Order Manager

Enclosures: Response to Comments Table

pc: John Garner
Willard Murray
CTO 041 Files

ABB Environmental Services Inc.

Comment Number	Comment	Response
1	The dates of operation of the burial areas are apparently not given in TM1, and would have been helpful for considering time involved in contaminant transport. Even the year of closure of the Camden County landfill is not known?	The scope of the technical memorandum was limited to reporting the results of the RFI field program. The historical and background information for the sites were presented in the Work Plan, which preceded the technical memorandum.
2	The times of water-level measurements for potentiometric-surface maps are not given. At least a total time for all measurements at each site should be given. Contour intervals are only 0.5 foot at two sites, and, even considering the apparently small range of water-level fluctuations shown on hydrographs in Appendix D, small water-level changes due to elapse of time between measurements might affect how contours are drawn and interpreted.	Water levels were measured over an 1-hour period at Site 5, 1.2 hours at Site 11, and 0.42 hour at Site 16. From the hydrographs, the maximum change in head at Site 5 was 0.40 inch; at Site 11 was 0.45 inch; and at Site 16 was 1.0 inch. The tidal fluctuation graphs indicate that maximum observed rates of water level fluctuation at each of the sites is approximately 0.02 ft/hr at Sites 5 and 11 and 0.05 ft/hr at Site 16. These rates were calculated from areas of the graph where the most rapid change in water levels (steep slopes) occurred. Review of the potentiometric contour maps, considering elapsed time during measurements, does not indicate significant affects due to water level fluctuations.
3	Water-level and water-quality information would probably have been useful at the south end of Site 16. Was no well constructed there because, as noted on the potentiometric-surface map (Fig. 4-16, page 4-51), most of that area is "construction area C"? If limited access was the reason no well was installed at the south end, a comment to that effect in the text would have been helpful.	Construction activities were the reason that no well was installed at the south end of Site 16. In particular, the area was approximately 3 feet below its planned finished grade.
4	Why were surface-soil samples taken only from Site 5, and not from Sites 11 and 16? This is not explained in TM1.	Surface-soil sampling at Sites 11 and 16 was not included in the scope of the RFI as presented in the Work Plan. Most likely, this was not required because both sites have fill material (from unknown source) on top of them. At Site 5, metal debris and wastes are present at the surface indicating that surface soil contamination may be possible.
5	Only ranges of specific conductance and pH are given. All values should be included in the report. No statement is specifically made in the "Recommendations" section that specific conductance and pH will continue to be measured in the field (although it is assumed that they probably will continue). The simple measurement of specific conductance might prove useful for interpreting directions of flow of contaminated water.	Measurement of pH and specific conductance is a standard operating procedure and is specified in the "Sampling and Analysis Plan" for the project. All values will be reported in the future.

Comment Number	Comment	Response
6	<p>The statement is made in the Site 11 summary section (page 4-42, 2nd para) that terrain conductivity data indicated elevated values on the downgradient, western side of the landfill. Although correct, the statement is a bit misleading because no point is made that, based on concentrations of trace elements in groundwater, the terrain conductivity data are inconclusive for indicating a plume of contaminated water flowing from the landfill. Except for selenium and sulfide concentrations, the inorganic concentrations in water from upgradient wells 11-6, 11-7, 11-8, and 11-9 were greater, or approximately equal to, the concentrations of inorganics in water from most downgradient wells. Moreover, Well 5 evidently contains the highest concentrations of most inorganics, relative to other wells, and terrain-conductivity values are not greater at Well 5 (north of landfill).</p>	<p>We agree with this observation. No revision necessary.</p>
7	<p>Wells 5-3, 5-4, 5-5, 11-4, 11-5, and 16-3 are called downgradient (which is assumed to mean hydraulically downgradient of the burial sites), but can be interpreted from the potentiometric-surface maps as hydraulically upgradient if potentiometric-surface lines and burial-site boundary lines are considered to be accurate, and if flow is assumed to be at right angles to potentiometric lines. Also, only Wells 11-1, 11-7, 11-8, and 11-9 are referred to as upgradient wells at Site 11, but it is obvious from the potentiometric-surface map (Figure 4-12) that well 11-6 is also upgradient.</p>	<p>Potentiometric surface maps for six bimonthly sampling events are attached. The interpretation of data and location of contour lines has been re-evaluated. Boundaries of disposal areas are approximate. Well KBA-11-6 is near enough to disposed waste that dispersion of contaminants could cause contaminants to be present in the area of the well. Current knowledge of VOCs in groundwater at the landfill indicates this to be the case.</p>
8	<p>The concentrations of inorganics in groundwater are expected to be greater in areas downgradient of the burial sites, as noted in TM1. This relation is not apparent at the western (larger) section of Site 5, and at Site 11. Wells 5-1 and 5-2 are obviously upgradient, as interpreted from the potentiometric-surface contours shown on Figure 4-3. Wells 5-3, 5-4, and 5-5 are called hydraulically downgradient in TM1, but may not be downgradient, as explained in a previous paragraph. Concentrations of all inorganics in water from Well 5-4 are less than concentrations of all inorganics in water from Well 5-1. Concentrations of most inorganics in water from Wells 5-3 and 5-5 are less than, or approximately equal to, concentrations in water and upgradient Wells 5-1 and 5-2. Well 11-7 is called an upgradient well in TM1, but, except for Well 11-5, Well 11-7 exceeds all other wells at Site 11 for mercury, chromium, barium, arsenic, copper, zinc, cyanide, and sulfide - these are more than one-half the inorganics analyzed for.</p>	<p>Statistical analysis will be used to evaluate relative concentrations of inorganics in upgradient and downgradient groundwater at each site after six bimonthly sample events have been completed.</p>

Comment Number	Comment	Response
9	A comment - Wells 5-6 and 5-7 are obviously downgradient, as interpreted from Figure 4-3. These seem to be the only downgradient wells at Site 5 that have water with greater concentrations of inorganics than upgradient wells, and this relation might be the result of transport only from the small eastern burial area.	Decisions regarding whether or not a release of inorganics has occurred at a site will be deferred until more data are available. See response to comment No. 8.
10	Why was cadmium data for Site 16 not discussed, as was done for Sites 5 and 11? Is this because all concentrations at Site 16 were below the CRQL of 5.0 ug/L (all concentrations are shown as 2.9 U ug/L in Appendix C)? If so, a comment to that effect in the text would have been helpful.	The discussions of inorganics are site specific and limited to constituents detected in one or more groundwater samples. Cadmium was not detected in the groundwater samples for Site 16.
11	A comment - the cobalt data in Appendix C are different than other trace-element data in that cobalt concentrations in water samples from Site 11 are several times less than cobalt concentrations in water samples from Sites 5 and 16. Most dissolved trace elements at Site 11 have concentrations greater than, or about equal to, concentrations at the other two sites.	We agree with this observation, no revision is necessary.
12	A summary table would have been helpful in Section 4 or 5 which listed the samples, and organic and inorganic concentrations that show influence from waste burial.	Agree. However, this may have lead to premature conclusions regarding releases from the sites.
13	Recommendations are made in TM1 regarding future monitoring of pesticides, herbicides, PCBs, dioxins, and furans in groundwater at Sites 5 and 16, but no recommendations are made regarding these compounds at Site 11. Since none of these constituents were detected in groundwater at Site 11, are they to be omitted from analysis during future groundwater sampling as will be done at Site 16?	The recommendations section would have been more consistent if pesticides, PCBs, dioxins, and furans had been discussed for Site 11. The RFI includes two groundwater sample events with analysis of all Appendix IX parameters. If the results of the second sampling event confirm the absence of certain compounds at the site, the analytical program will be reduced to include potential contaminants. The soil data from a site will also influence recommendations to continue monitoring for particular parameters.

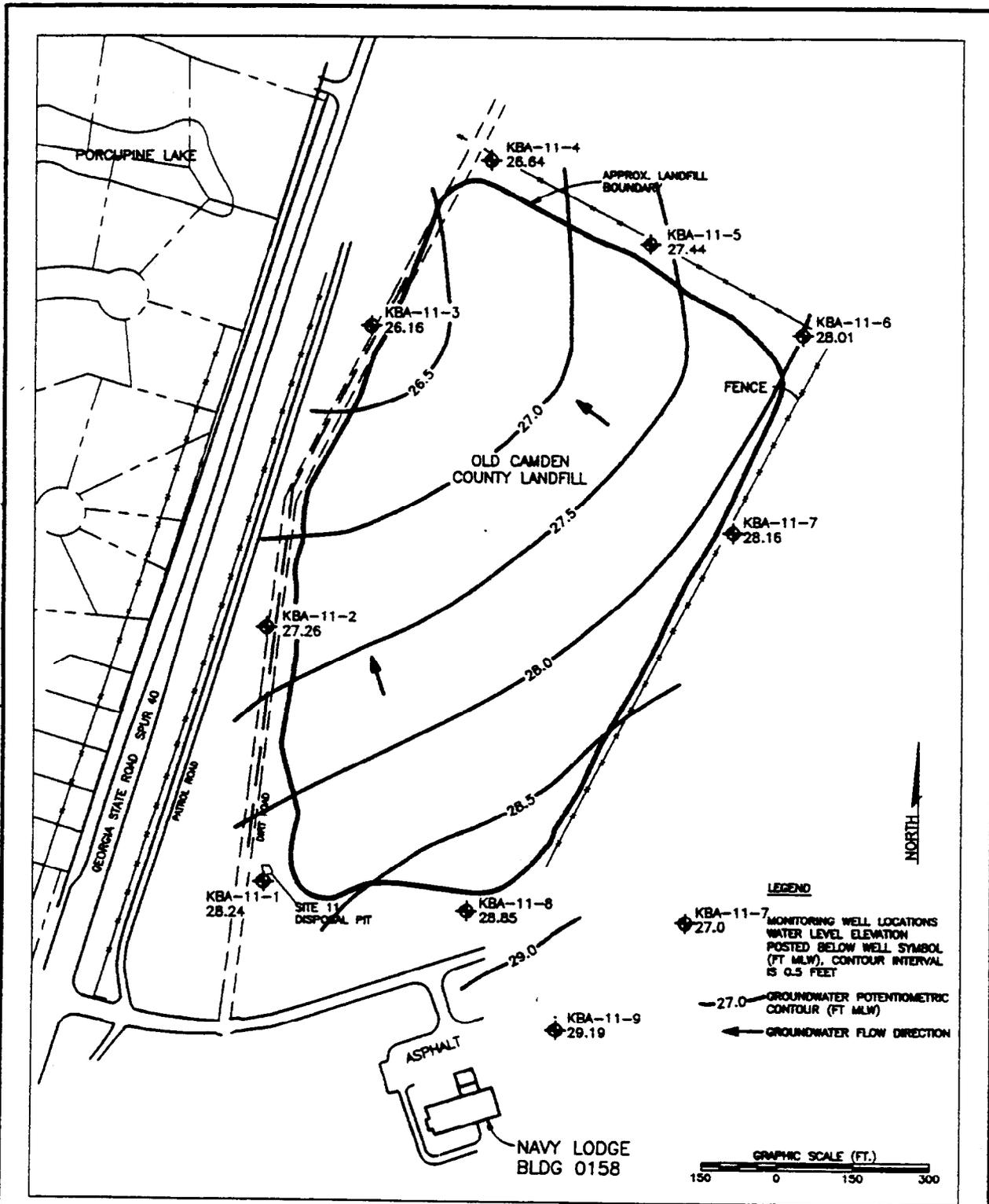
Comment Number	Comment	Response
14	<p>The discussion on "NEESA Level C Quality-Control Guidelines" in the analytical conformance section (Section 3) is not clear in regards to the "U" qualifier for the data. On page 3-12, statements at the second and third "bullets" mean that the basis for using the "U" qualifier is related to both the concentration of the CRQL and the concentration of the "associated" blank (call this case 1). The "associated" blank is assumed to be the laboratory method blank rather than the field blank. The statement at the fourth "bullet" means that the basis for using the "U" qualifier is the CRQL concentration only (call this case 2). A sample can have a concentration such that conditions for both case 1 and case 2 are satisfied. Which case then has precedence? These questions particularly apply to methylene chloride data for Site 5 soil samples SS-07 and SB-07, as described in the next two paragraphs.</p>	<p>The fourth bullet should read "present at greater than five times the concentration in the method blank." The value of the CRQL does not affect validation of data where the sample result is greater than five times (10 times for common laboratory contaminants) the concentration in the method blank.</p>
15	<p>The surface and subsurface soil analyses from Site 5, as shown in Table 4-1 (pages 4-5 and 4-6) - is the CRQL of 10 ug/kg shown for methylene chloride a typo error? Table 3-3 on pages 3-9 and 3-10 (the list of CRQL values used for analyses) shows that the methylene chloride CRQL is 5 ug/kg for both surface and subsurface-soil samples from Site 5. Appendix C (list of analyses) also shows the methylene chloride CRQL is 5 ug/kg for the Site 5 soil samples.</p>	<p>All of the tables should show 5 ug/kg (ug/l for aqueous analyses) for the CRQL for methylene chloride.</p>
16	<p>Why is the "U" qualifier applied in Table 4-1 to the methylene chloride concentration of 72 U ug/kg for sample SS-07? If the 10 ug/kg CRQL in Table 4-1 is supposed to be 5 ug/kg, and concentrations greater than 10 times the CRQL for methylene chloride are supposed to be reported as unqualified, as described for case 2 above, the 72 U ug/kg concentration for soil sample SS-07 perhaps should be shown as unqualified because 10x5 ug/kg is less than 72 ug/kg. Or is the "U" qualification used because case 1, as described above, has precedence over case 2? Table 3-3 (page 3-10) shows the "method blank" concentration for this sample as 8 ug/kg, and 10x8 exceeds 72, so if case 2 applies, the "U" qualifier would be used.</p>	<p>The value of 72 ug/kg was qualified as not detected with a "U" qualifier because the concentration in the sample was less than 10 times the concentration in the method blank.</p>
17	<p>Page 4-3, fourth paragraph, line six, is the 5-SS-01 sample described here a type error? Only the 5-SS-02 sample was shown in Table 4-1 as having a methylene chloride concentration of 110 J ug/kg.</p>	<p>Sample referred to in text should be 05-SS-02.</p>

Comment Number	Comment	Response
18	Page 4-3, first sentence of last paragraph, states that three surface-soil samples contained carbon disulfide, but the remainder of the sentence, and the data in Table 4-1, shows four surface-soil samples containing this compound. The error is repeated in the discussion of subsurface soil samples, on page 4-11, 3rd line of 3rd paragraph.	Text should indicate carbon disulfide was detected in four surface-soil samples.
19	Page 4-7, Table 4-1, the note at the bottom of the table defines the "U" qualifier as "not detected above or below the CRQL." Why do most of the organics concentrations in this table have a "U" qualifier even though the concentrations are greater than the CRQL? For example, the "380" in the "380 U" concentration of naphthalene in sample SS-01 is greater than the CRQL of 330, so why would a "U" qualifier be applied? If the "U" qualifier is applied because of the concentrations in the method blank, the footnote wording should be changed because 380 is certainly above 330.	The correction for soil moisture content affects the value of the detection limit reported for a soil sample.
20	Page 4-8, first paragraph, why is the concentration of 3 J ug/kg for sample 5-SS-02 the only one cited as a positive indication of trichlorofluormethane? Values of this compound in other surface-soil samples are greater than 3, but are given a "U" qualifier. Is the "U" used because of concentrations in the method blanks? Concentrations of trichlorofluormethane in method blanks are apparently not given in TM1.	Trichlorofluoromethane was not detected in any other soil sample besides 05-SS-02. The number to the left of a U qualifier is a value describing the magnitude of the concentration that could be quantified with a high degree of certainty for a sample, and should not be interpreted as a concentration detected in a sample.
21	Page 4-11, fourth paragraph, third line, shows a toluene concentration of 7 ug/L in sample SB-06, but Table 4-1 (page 4-5) and Appendix C show a toluene concentration of 4 J ug/L for this sample. The statement on the following line of this same paragraph states that xylene was found in seven samples (as also shown in Table 4-1), but only five are cited. This later sentence should probably have also included samples 05-SB-04 and 05-SB-05.	The cited toluene concentration for sample 05-SB-06 should be 4 J ug/kg. Samples 05-SB-04 and 05-SB-05 should be included in the list of samples containing detectable xylene concentrations.
22	Page 4-13, second paragraph, statement is made that the pond on the east side of Site 5 is recharging the aquifer in the vicinity of Well 5-5. How was this determined? The water-level elevation of the pond is not given and no groundwater mounding is apparent on the potentiometric-surface map. The pond surface could be just part of a continuous north-to-south slope of the water table in the area, and the pond water could be essentially groundwater discharge from the north.	This statement probably should not have been made.

Comment Number	Comment	Response
23	Page 4-21, last sentence, states that cyanide was detected in two soil samples and two groundwater samples from identical locations, but does not give the locations. This was not previously discussed. Is it in the appendices? Why not give the locations?	The detection of cyanide in subsurface-soil samples 05-SB-05 and 05-SB-07 is discussed on page 4-12, seventh paragraph. This paragraph provides soil-sample identifications and indicates that the groundwater samples from the monitoring wells installed at the same locations also contained detectable cyanide concentrations. The monitoring well identifications should also have been specified in this text. Figure 2-4 provides the needed information. The soil boring and monitoring well identifications are both shown at each location.
24	Page 4-22, first paragraph, first sentence, states that chromium and arsenic are in groundwater upgradient of Site 5 at concentrations above MCL. The only arsenic sample exceeding MCL is from Well 5-7, and this well was described on page 4-20 as downgradient.	We agree with this observation, no revision is necessary.
25	Page 4-22, first paragraph, second sentence, states that chromium, lead, and cadmium are in groundwater downgradient of the site at concentrations above that in upgradient water. However, concentrations of chromium and lead in water from upgradient Well 5-1 exceed concentrations in water from Wells 5-3, 5-4, and 5-5 which were previously described as downgradient. Is this a typo error? This statement directly contradicts the statement made about lead concentrations on page 4-20, second sentence.	The statements made on page 4-22 are a summary. Chromium, lead, and cadmium were detected in one or more downgradient groundwater samples at concentrations greater than that in one of the upgradient groundwater samples. A general comment was made in the summary to this effect and could have been more descriptive. The statement in the summary regarding lead concentrations in downgradient groundwater samples relative to upgradient groundwater is similarly derived from the occurrence of lead in groundwater samples from two downgradient monitoring wells at concentrations above that from the upgradient locations. The second and third sentences on page 4-20 should be considered together to avoid contradiction of the summary on page 4-22.
26	Page 4-39, second from last paragraph, second sentence, states that, except for Well 11-5, chromium in water samples from downgradient wells were below chromium concentrations in samples from upgradient wells. However, Wells 11-2 and 11-4 were described as downgradient, and the chromium concentrations in water from these wells exceed concentrations in water from upgradient Wells 11-8 and 11-9.	This statement should have indicated the basis for comparison was the maximum concentration of chromium detected in an upgradient groundwater sample. The sixth and seventh paragraphs on this page could have been combined to make the discussion clearer.

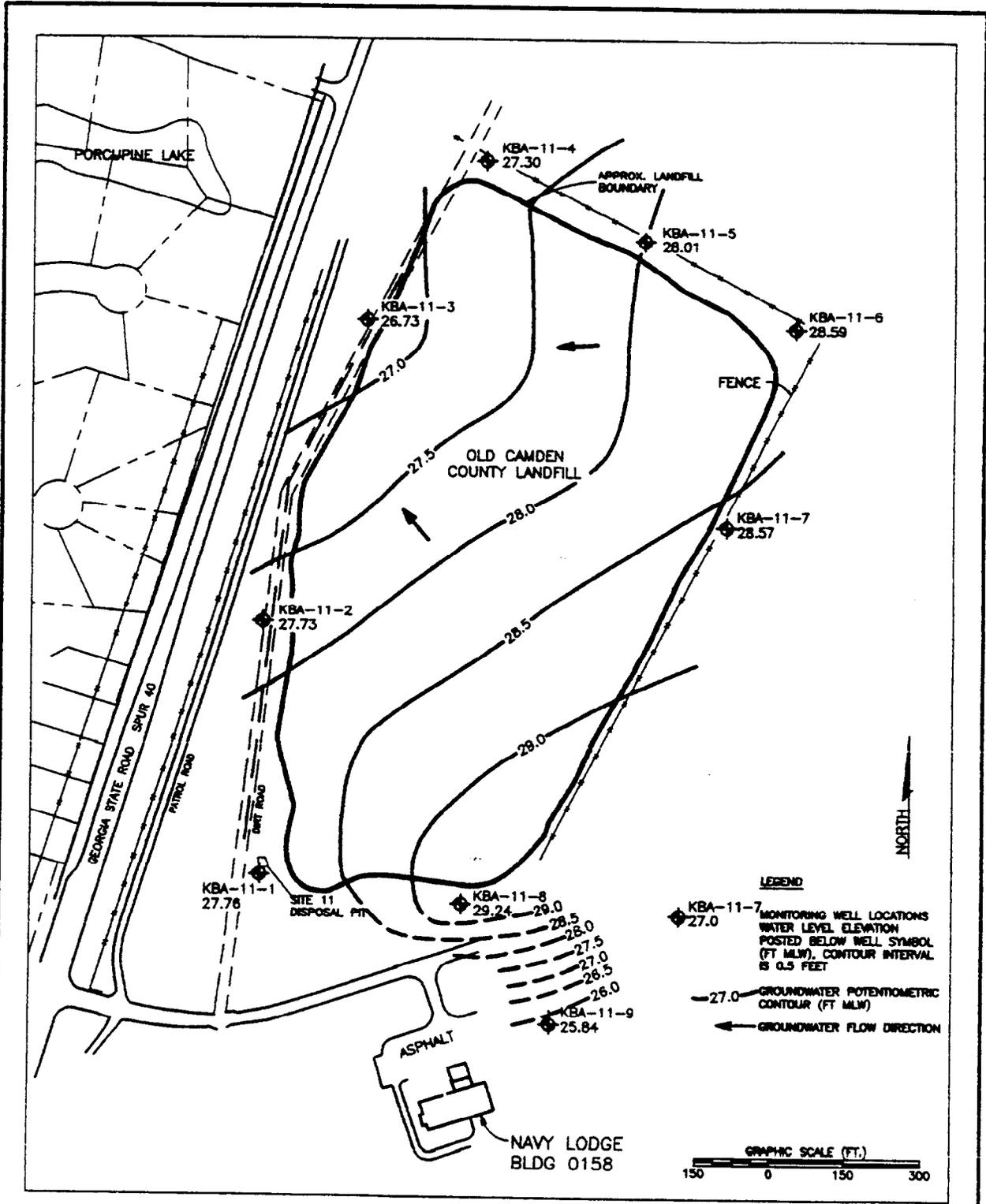
Comment Number	Comment	Response
27	Page 4-41, third paragraph, last sentence, states that 7.3 ug/L upper part of the range of arsenic concentrations for downgradient wells is below concentrations in samples from upgradient locations. However, water from upgradient wells 11-1 and 11-9 contain lower concentrations of 1.9 and 3.5 ug/L, respectively. Moreover, the 7.3 ug/L concentration is in water from Well 11-6 and, from Figure 4-12, Well 11-6 is obviously upgradient.	This statement is based on the occurrence of arsenic in one or more upgradient groundwater samples at a concentration greater than in all but one downgradient groundwater sample. Well KBA-11-6 is at a location that could be affected by dispersion of contaminants from adjacent wastes, see response to comment No. 7.
28	Page 4-41, fifth paragraph, last sentence, states that water from well 11-5 consistently contains concentrations of inorganics that are greater than in water from other wells. This is true for most inorganics, but is not really "consistent" in that exceptions are selenium, antimony, cyanide, and sulfide.	We agree with this observation, no revision is necessary.
29	Page 4-50, second from last paragraph, second sentence, states that the compound 4-methyl-2-pentanone was found only in water from well 16-3, but Table 4-7 (page 4-52) and a table in Appendix D show this compound as only in the same from well 16-2. Is this a typo error in the text or in the tables?	Text should indicate well KBA-16-2.
30	Page 4-52, Table 4-7 - Analysis of groundwater from Site 16 -- why is the "J" qualifier applied to all values for lead, and to the 17.3 ug/L concentration of thallium from Site 16-1 when all concentrations exceed the CRQL? Is the footnote 3 designation missing from the row of values for lead? There is no footnote 3 in the body of the table. Or does the latter part of the explanation of the J qualifier in Appendix C apply here (does not meet quality-control criteria)?	There should be a footnote 3 designation for lead and thallium in the table and the explanation for footnote 3 should include lead and thallium. The matrix spike recoveries for both of these constituents were outside QC limits.
31	Page 4-52, Table 4-7 - Analysis of groundwater from Site 16 -- concentrations in the associated blanks for some samples shown in this table evidently cannot be checked. No values are given in Table 3-5 (pages 3-13 and 3-14) for thallium for any samples, and lead in "associated samples" of groundwater for Sites 16-2, 16-3, and 16-4.	The lead and thallium data in Table 4-7 did not require qualification on the basis of blank contamination. Table 3-5 summarizes data for preparation blanks associated with inorganic analyses. If an inorganic constituent is not listed for a particular blank, then it was not detected in that blank.

Comment Number	Comment	Response
32	<p>Page 4-53 seems as if two different authors wrote the last two paragraphs. Next-to-last paragraph says MCL for lead is 5 ug/L. Actually, the old MCL is 50 ug/L and new "Action Level" is 15 ug/L. The 5 ug/L shown in the text is evidently not a type error because the author says the 12.0 ug/L at well 16-4 exceeds the MCL of 5 ug/L. Statement in the next paragraph is that the new MCL for lead is 15 ug/L. Also, in the last paragraph, three well-number prefixes are given as "II-", and probably should be "16-". The last three sentences of the last paragraph are redundant and probably could have been omitted.</p>	<p>This does not match the text in the final document. A copy of page 4-53, containing a discussion of lead concentrations in groundwater samples from Site 16, is attached.</p>
33	<p>Page 5-1, last paragraph, the recommendation in the first part of the paragraph is correct, but an incorrect statement is made in the third sentence that arsenic was detected at Site 5 in upgradient groundwater at a concentration greater than MCL. Only Well 5-7 had a concentration exceeding MCL at Site 5, and it is a downgradient well, as was stated in the ninth line of page 4-20.</p>	<p>We agree with this observation, no revision necessary.</p>
34	<p>Page 5-3, second paragraph, incorrect statement is made that chromium was at a concentration greater than MCL in the upgradient well. Well 16-4 was cited as the only upgradient well, and concentrations of chromium were less than MCL in well 16-4.</p>	<p>We agree with this observation, no revision necessary.</p>

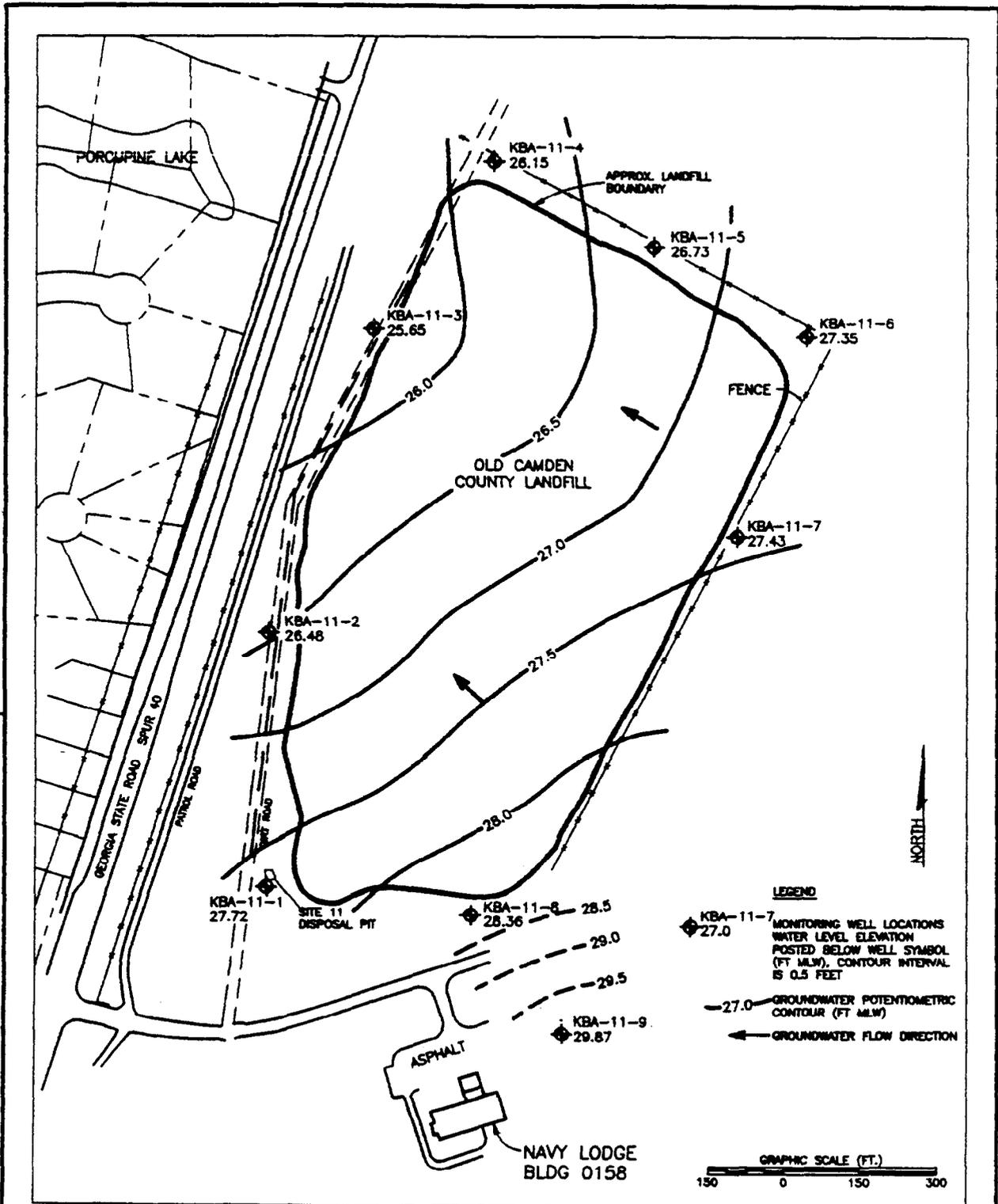


DWN: DMF	DES: NW	PROJECT NO.: 7553	TITLE: GROUNDWATER POTENTIOMETRIC SURFACE MAP MAY 6, 1992
CHKD: KMH	APPD.: LBH	FIGURE NO.:	
DATE: 7-23-93	REV.:		

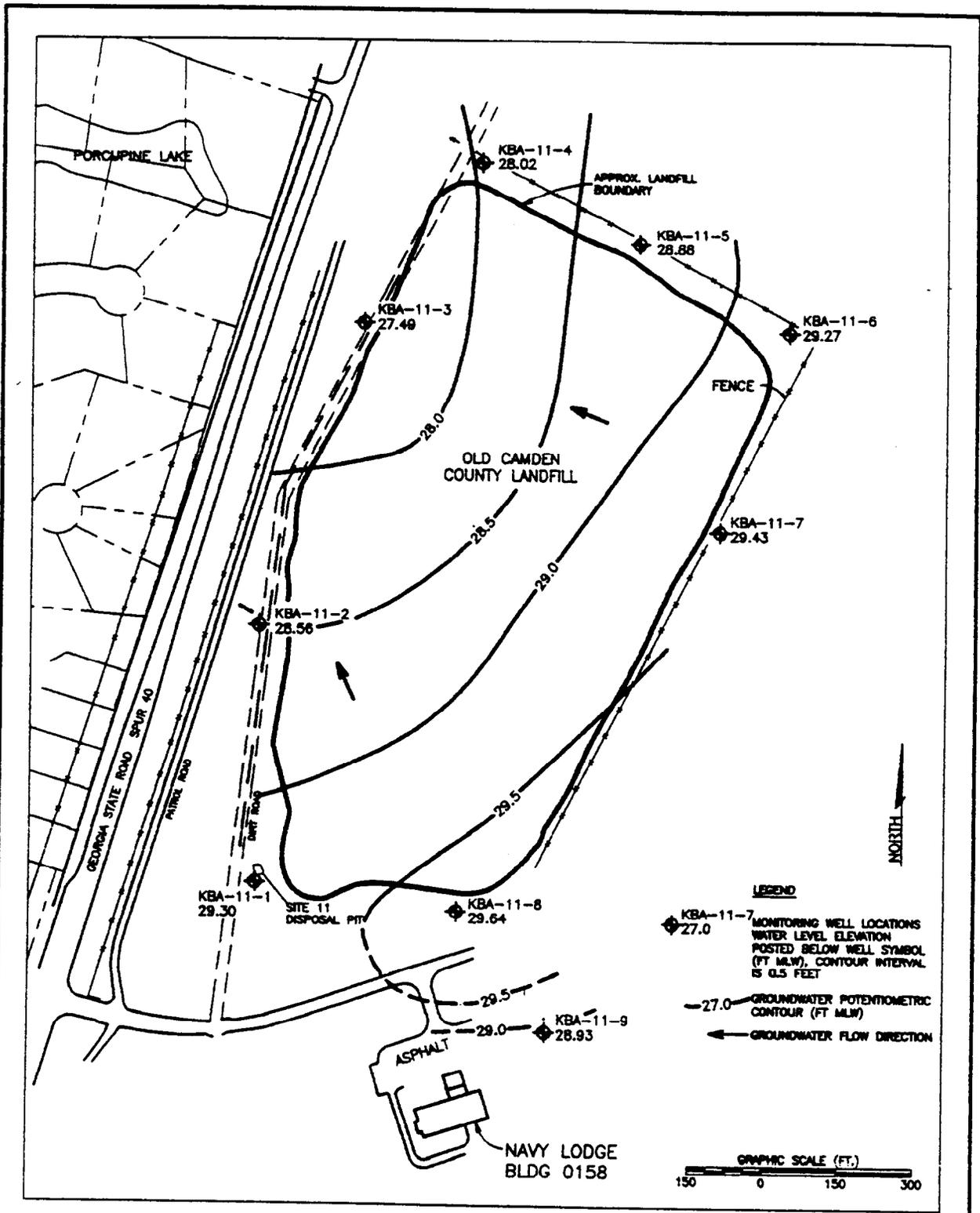




DWN: DMF	DES: NW	PROJECT NO.: 7553	TITLE: GROUNDWATER POTENTIOMETRIC SURFACE MAP JULY 9, 1992	 <p>NAVY SUBMARINE BASE, KINGS BAY, GEORGIA</p>
CHKD: KMH	APPD.: LBH	FIGURE NO.:		
DATE: 7-23-93	REV.:			

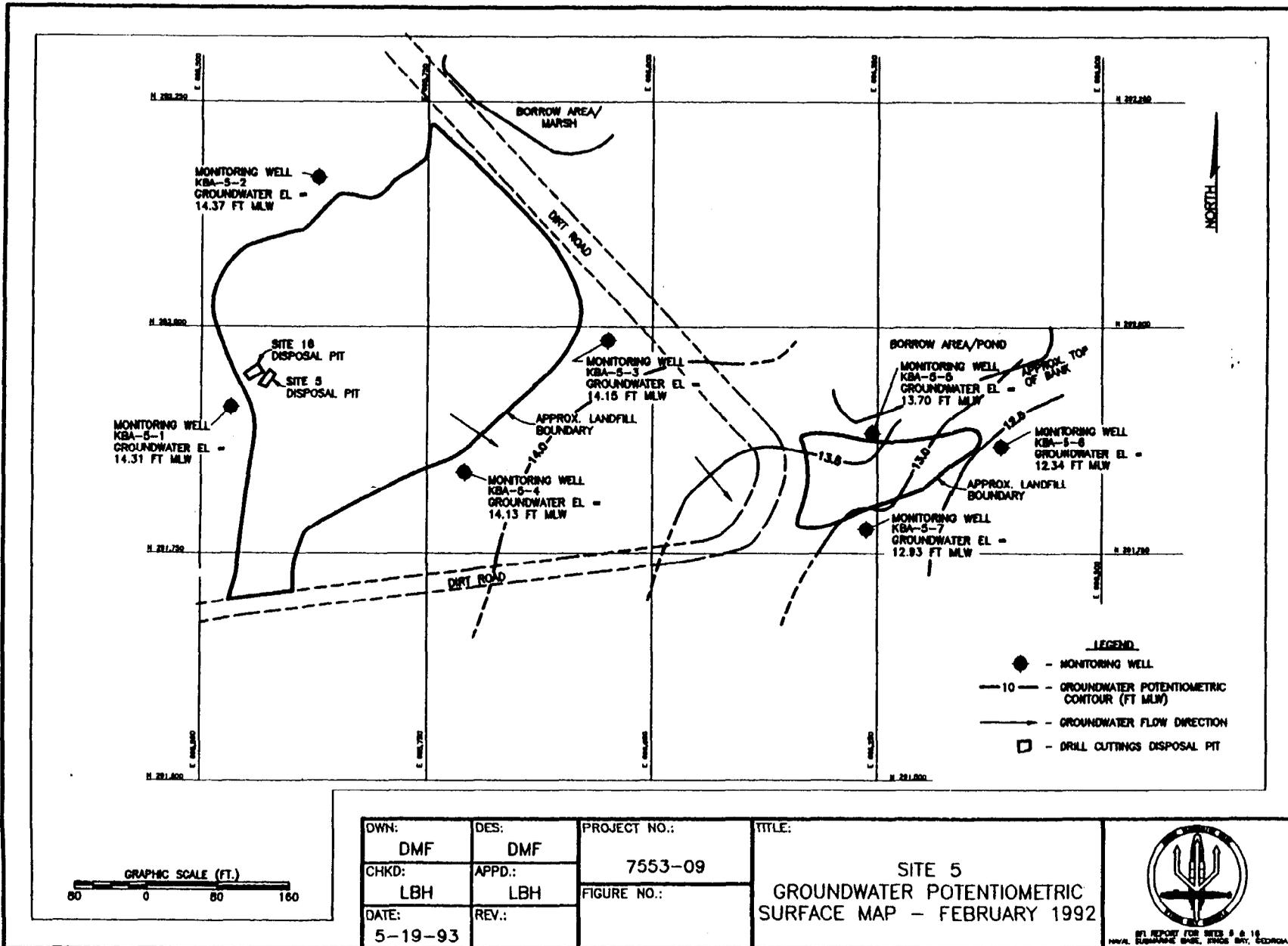


DWN: DMF	DES: NW	PROJECT NO.:	TITLE:
CHKD: KMH	APPD.: LBH	7553	GROUNDWATER POTENTIOMETRIC SURFACE MAP SEPTEMBER 9, 1992
DATE: 7-23-93	REV.:	FIGURE NO.:	



DWN: DMF	DES: NW	PROJECT NO.: 7553	TITLE: GROUNDWATER POTENTIOMETRIC SURFACE MAP NOVEMBER 10, 1992	<p>ENVIRONMENTAL PROTECTION AGENCY OFFICE OF PUBLIC AFFAIRS WASHINGTON, D.C. 20460</p> <p>FOR OFFICIAL REPORT FOR SITE 11 MUNICIPAL SOLID WASTE, KENNESAW, GEORGIA</p>
CHKD: KMH	APPD.: LBH	FIGURE NO.:		
DATE: 7-26-93	REV.:			

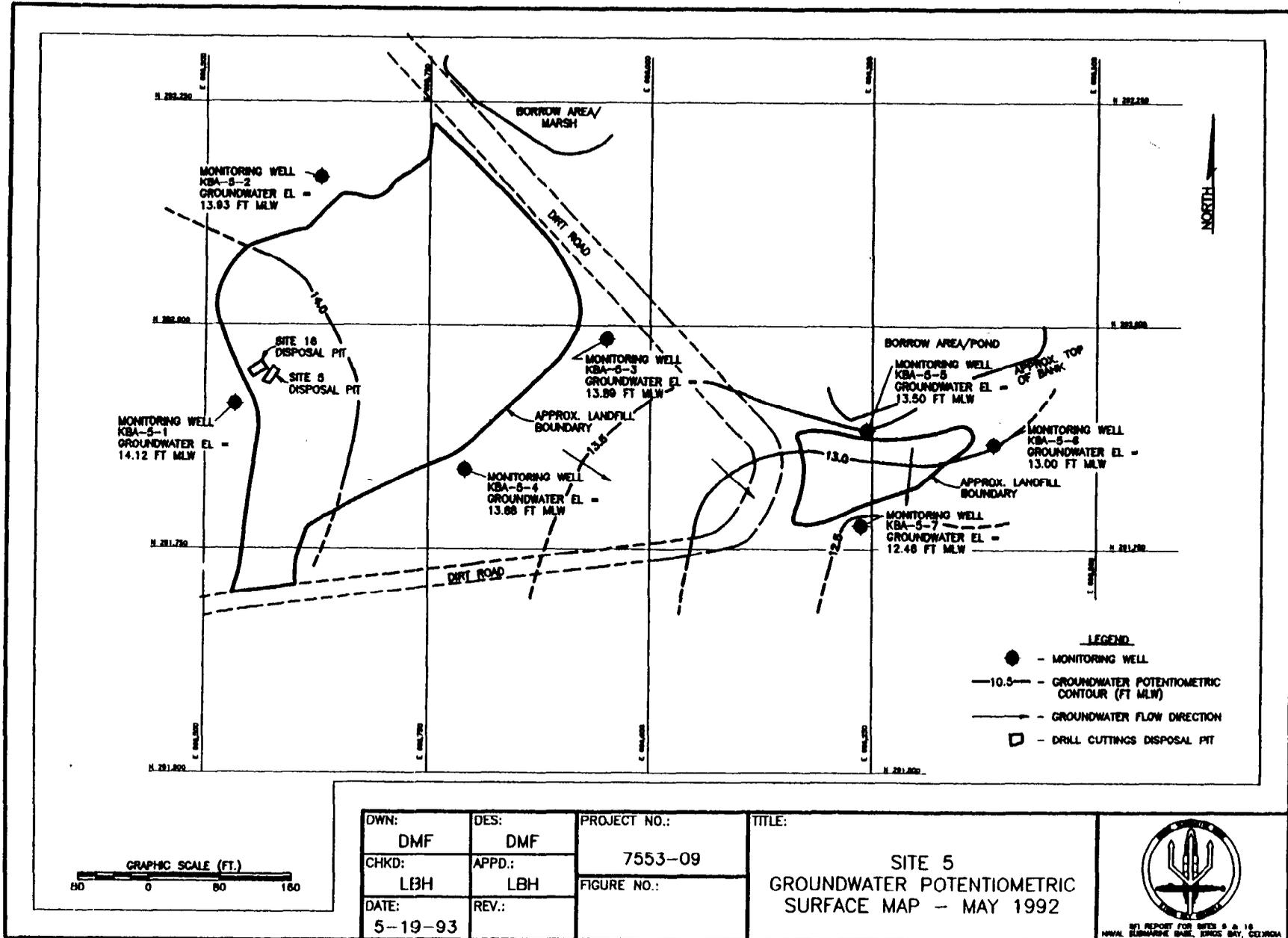
B-1'



OWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE:
CHKD: LBH	APPD.: LBH	FIGURE NO.:	SITE 5 GROUNDWATER POTENTIOMETRIC SURFACE MAP - FEBRUARY 1992
DATE: 5-19-93	REV.:		



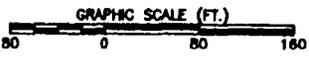
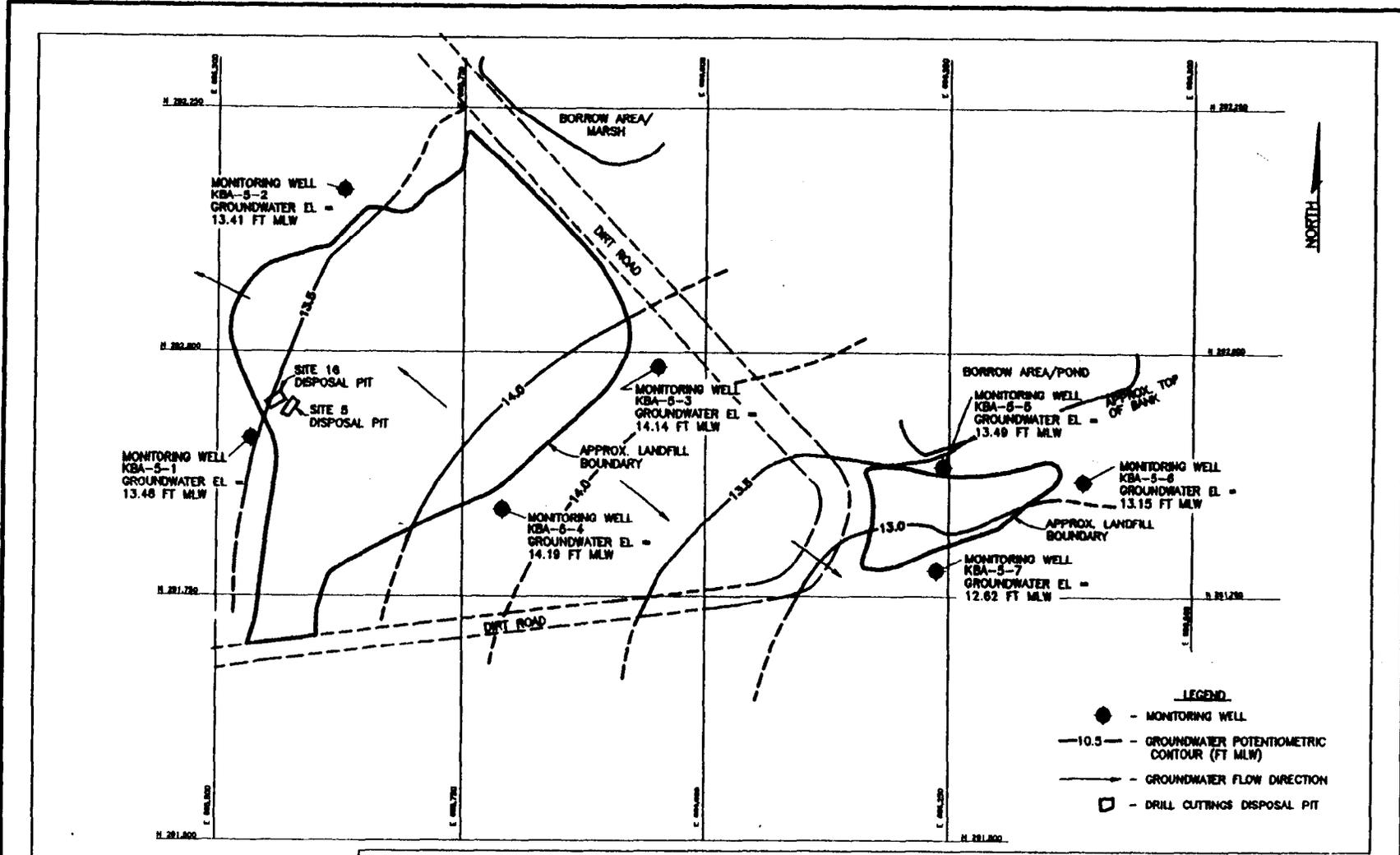
WPI REPORT FOR SITES 5 & 18
NORVA SUBSTATION, NORVA, BRUNSWICK COUNTY, GEORGIA



DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 5 GROUNDWATER POTENTIOMETRIC SURFACE MAP - MAY 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		



B-3

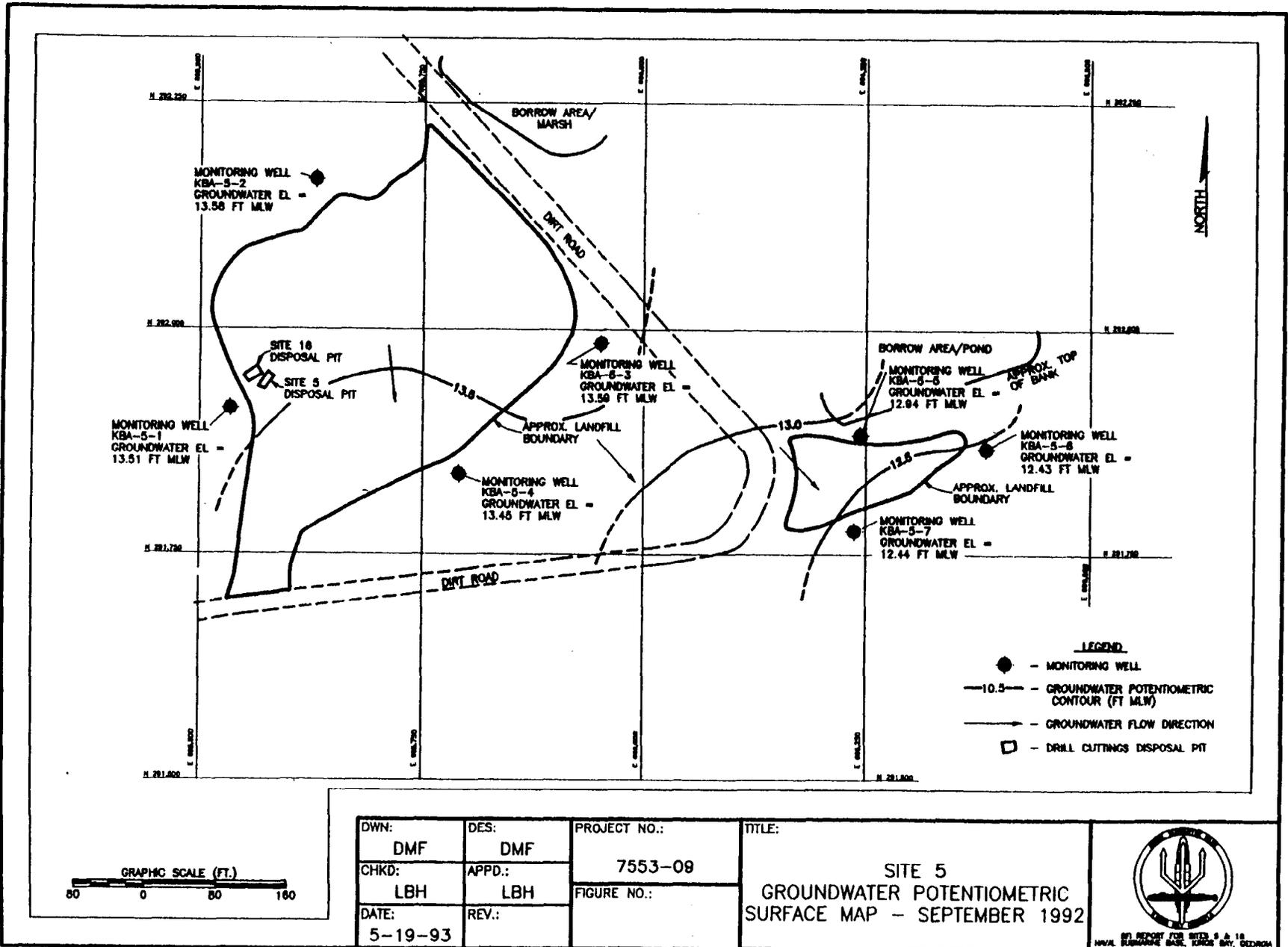


DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 5 GROUNDWATER POTENTIOMETRIC SURFACE MAP - JULY 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		



SP1 REPORT FOR SITES 5 & 18
HWAL BIRMINGHAM BASE, KNOX BAY, GEORGIA

B-4

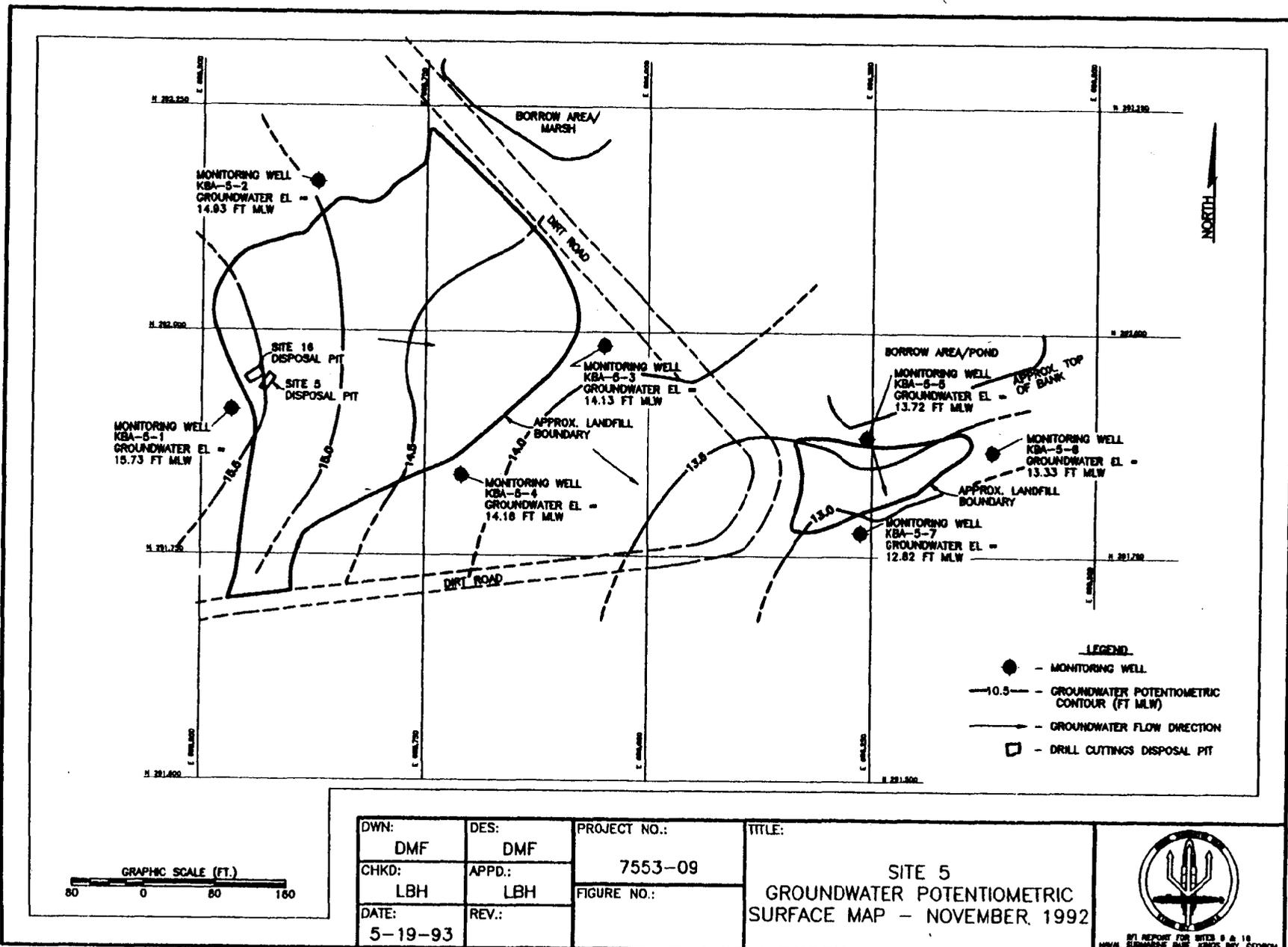


DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 5 GROUNDWATER POTENTIOMETRIC SURFACE MAP - SEPTEMBER 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		



BY REPORT FOR WQS 5 & 15
NVAJ SURFACE MAP, LORIS HWY, GEORGIA

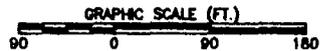
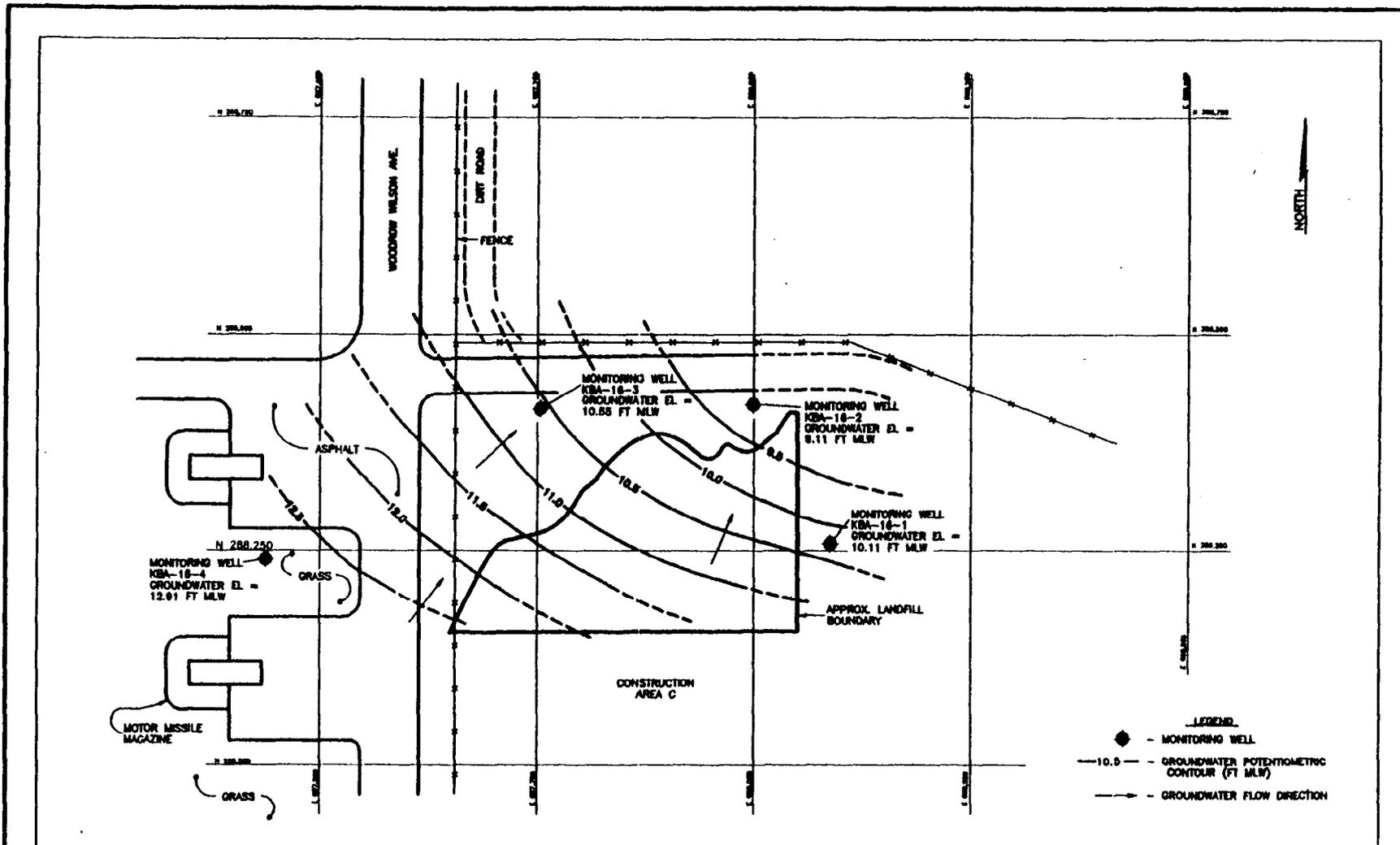
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DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 5 GROUNDWATER POTENTIOMETRIC SURFACE MAP - NOVEMBER 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		

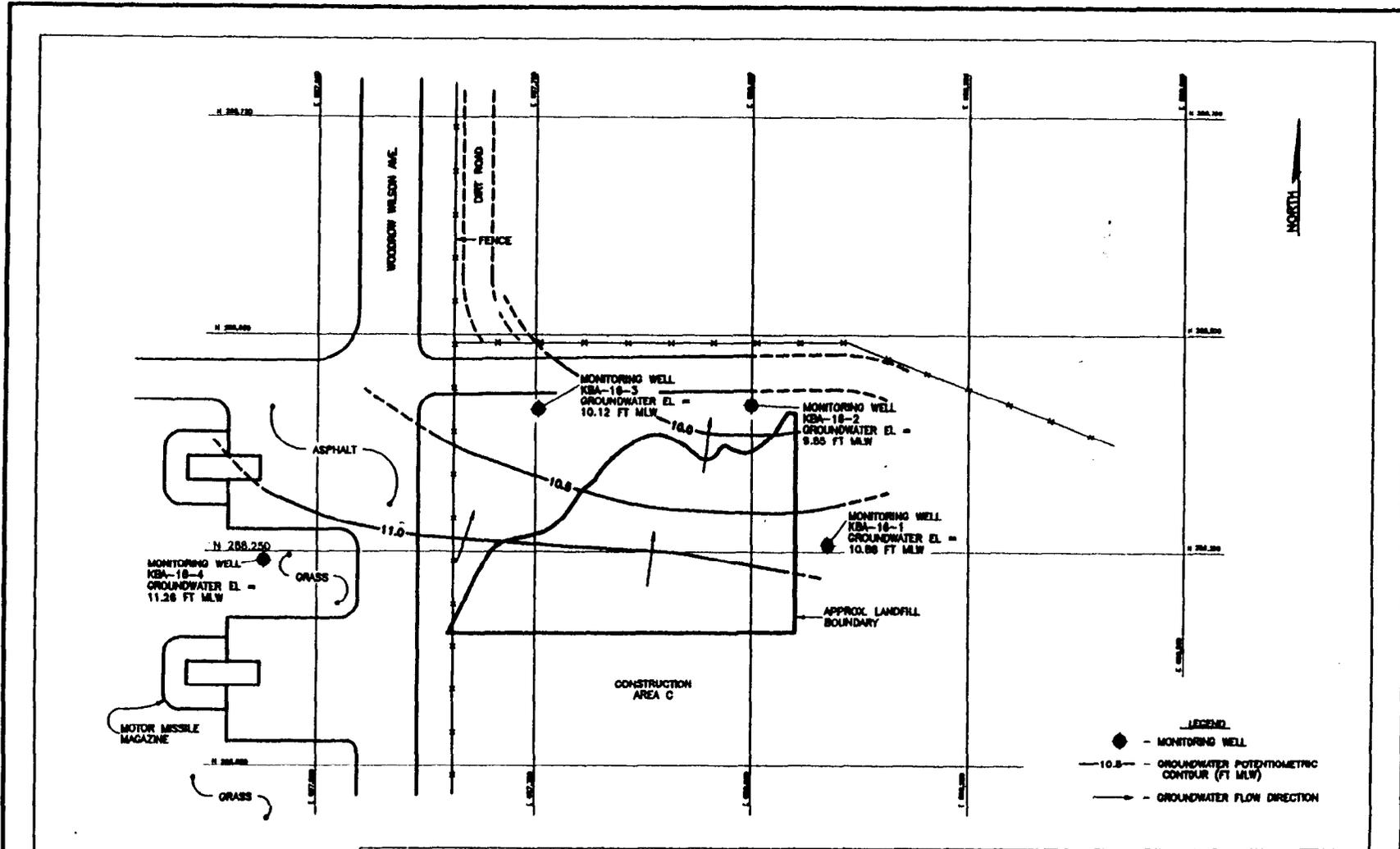


BY REPORT FOR SITES 5 & 16
HWAL STORMWATER BASIN, KINGS MOUNTAIN, GEORGIA



DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 16 GROUNDWATER POTENTIOMETRIC SURFACE MAP - FEBRUARY 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		



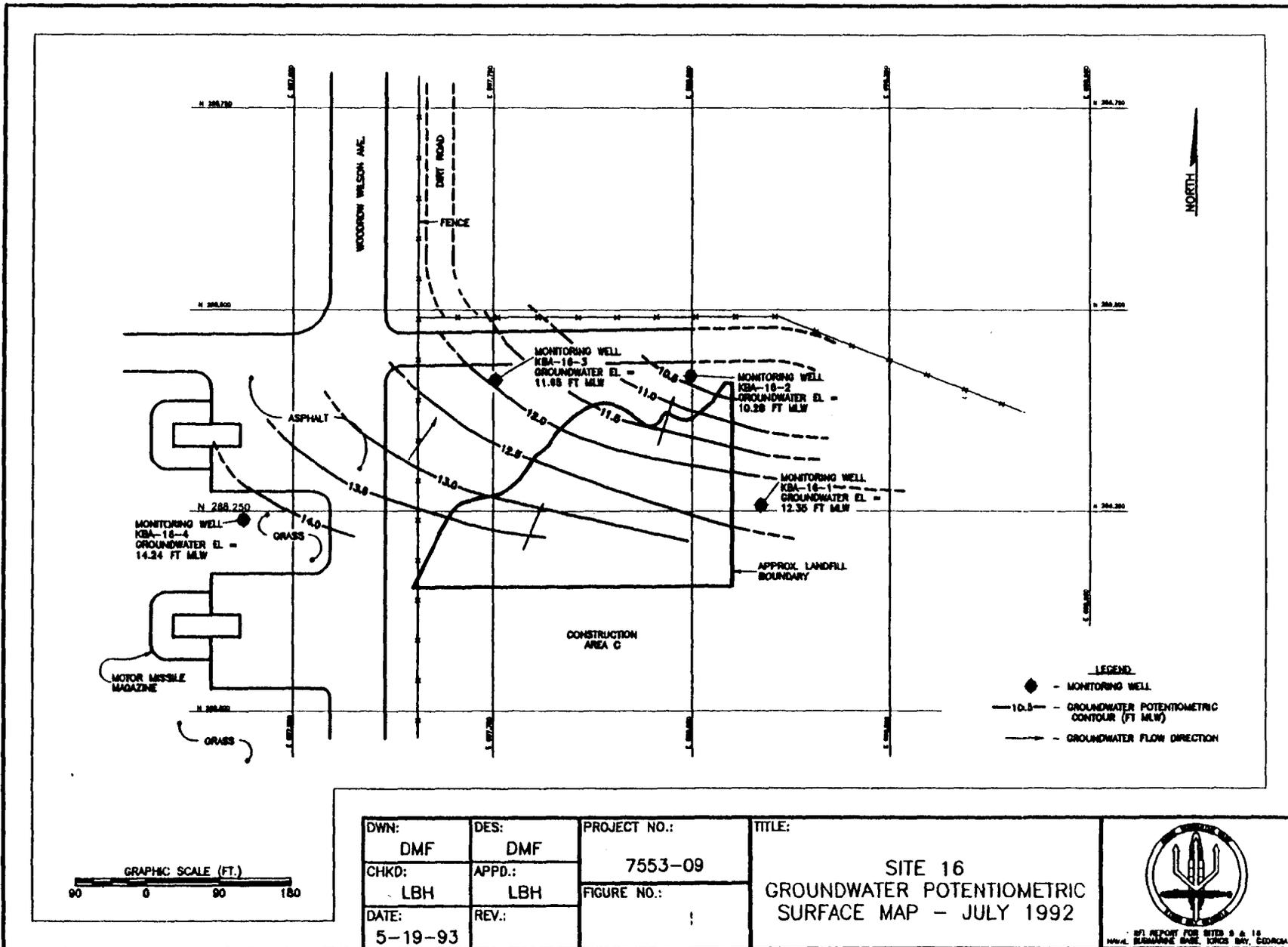


DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE:
CHKD: LBH	APPD.: LBH	FIGURE NO.:	SITE 16 GROUNDWATER POTENTIOMETRIC SURFACE MAP - MAY 1992
DATE: 5-19-93	REV.:		

- LEGEND
- - MONITORING WELL
 - 10.0 — GROUNDWATER POTENTIOMETRIC CONTOUR (FT MLW)
 - - GROUNDWATER FLOW DIRECTION

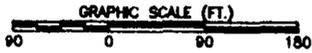
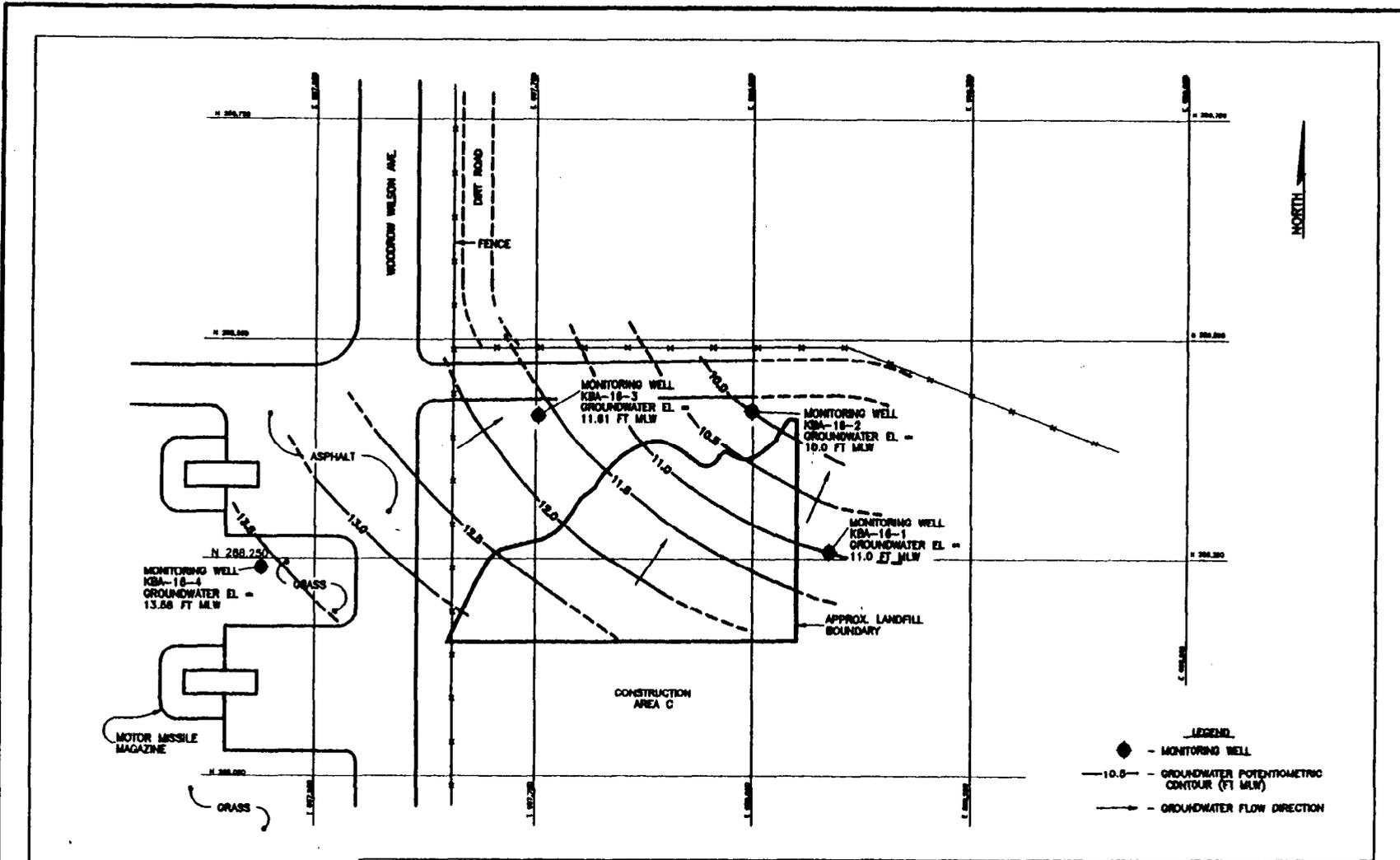


BY REPORT FOR SITES 5 & 16
NVAJ SUBMITTAL DATE, KING, GA, GEORGIA



DWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE:
CHKD: LBH	APPD.: LBH	FIGURE NO.:	SITE 16 GROUNDWATER POTENTIOMETRIC SURFACE MAP - JULY 1992
DATE: 5-19-93	REV.:	:	

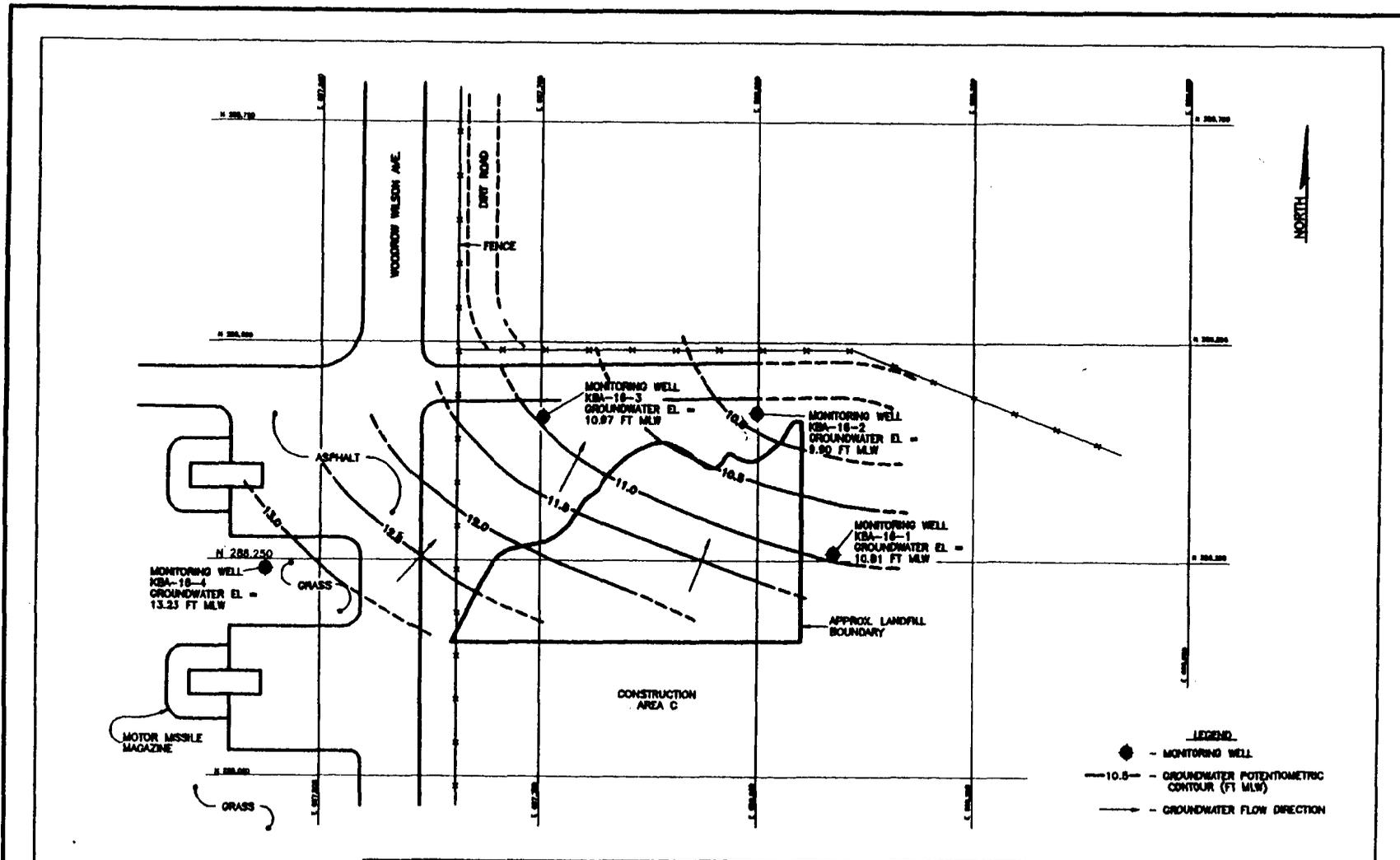
REPORT FOR SITES 9 & 16
NAVAL AIR STATION, TORONTO, ONT., CANADA



DWN: DMF	DES: DMF	PROJECT NO.: 7553-09
CHKD: LBH	APPD.: LBH	FIGURE NO.:
DATE: 5-19-93	REV.:	

TITLE:
SITE 16
GROUNDWATER POTENTIOMETRIC
SURFACE MAP - SEPTEMBER 1992





OWN: DMF	DES: DMF	PROJECT NO.: 7553-09	TITLE: SITE 16 GROUNDWATER POTENTIOMETRIC SURFACE MAP - NOVEMBER 1992
CHKD: LBH	APPD.: LBH	FIGURE NO.:	
DATE: 5-19-93	REV.:		



NO REPORT FOR SITES 6 & 18
NAVAL SUBMARINE BASE, KINGS BAY, GEORGIA

in soil and groundwater samples is considered representative of the sample media, xylene is not considered to be solely related to disposal of material at the site because it is present in subsurface soil upgradient of the disposal area.

4.3.3.2 Semivolatile Organic Compounds in Groundwater Four groundwater samples were analyzed for Appendix IX SVOCs. No SVOCs were detected in groundwater samples collected from Site 16.

4.3.3.3 Pesticides, Herbicides, and PCBs in Groundwater Four groundwater samples were analyzed for Appendix IX pesticides, herbicides, and PCBs. No pesticides, herbicides, or PCBs were detected in groundwater samples collected from Site 16.

4.3.3.3 Dioxins and Furans in Groundwater Four groundwater samples were analyzed for Appendix IX dioxins and furans. No dioxins or furans were detected in groundwater samples collected from Site 16.

4.3.3.4 Inorganics in Groundwater Four groundwater samples were analyzed for Appendix IX inorganic constituents. Table 4-7 summarizes inorganic data from the analysis of groundwater samples collected from Site 16. Fifteen inorganic compounds were detected in groundwater samples.

Concentrations of inorganics were compared to Federal Primary Drinking Water Standard MCLs to evaluate the site for adverse impact on groundwater quality. Monitoring well KBA-16-4 is located upgradient of the disposal site based on groundwater level measurements obtained to date. Laboratory data for this well was used in evaluating downgradient groundwater for adverse affects attributed to waste disposal. Figure 4-17 shows analytical data for six inorganics detected in groundwater in relation to Primary Drinking Water Standard MCLs. Appendix E presents groundwater inorganic data in relation to Primary Drinking Water Standard MCLs in bar-chart form.

Of the fifteen inorganics detected in groundwater from Site 16, six have Primary Drinking Water Standard MCLs, including arsenic, barium, chromium, lead, mercury, and selenium. No MCLs were exceeded in groundwater from the upgradient monitoring well.

The concentrations of lead in samples from monitoring wells KBA-16-1 and KBA-16-3 were 14.8 $\mu\text{g/L}$ and 19.9 $\mu\text{g/L}$, respectively, which are not significantly higher than the concentration detected in the groundwater from the upgradient monitoring well, KBA-16-4 (12.0 $\mu\text{g/L}$). Groundwater from monitoring well KBA-16-2 contained lead at a concentration of 36.3 $\mu\text{g/L}$, which is relatively high compared to the concentrations of lead detected in the other wells at the site. The current MCL for lead is 50 $\mu\text{g/L}$ and was not exceeded in groundwater samples from Site 16. On December 7, 1992, the MCL for lead will change to 15 $\mu\text{g/L}$. Groundwater samples from downgradient monitoring wells KBA-16-2 and KBA-16-3 contained lead at concentrations greater than 15 $\mu\text{g/L}$. The concentration of lead of 14.8 $\mu\text{g/L}$ in samples from downgradient monitoring well KBA-16-1 is very near the future MCL of 15 $\mu\text{g/L}$. Groundwater samples from the upgradient monitoring well, KBA-16-4, contained lead at 12 $\mu\text{g/L}$.