N00164.AR.000979
NSWC CRANE
5090.3a

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO
5090/S4.7.1
Ser RP3/5283

6 SEP 2005

Indiana Department Of Environmental Management
Office Of Land Quality
Hazardous Waste Permits
100 North Senate Ave.
MC 64-45 IGCN 1101
Indianapolis, IN 46204-2251

Dear Mr. Griffin:

Crane Division, Naval Surface Warfare Center submits the final round 3 sampling plan for the Building 106 Pond (B106P), Solid Waste Management Unit 8 as enclosure (1). The sampling plan was also emailed to you on August 22, 2005. The permit required Certification Statement is provided as enclosure (2).

If you require any further information, my point of contact is Mr. Thomas J. Brent, Code RP3-TB, at 812-854-6160, email thomas.brent@navy.mil.

Sincerely,

Christina D. Freeman
for JAMES M. HUNSICKER
Manager, Environmental Protection
By direction of the Commanding Officer

Enclosures: 1. Round 3 Field Work Strategy for B106P
2. Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code ES31) (w/o encl)
USEPA (Pete Ramanauskas)
TTNUS (Ralph Basinski) (w/o encl)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Christine D. Freeman

SIGNATURE

for Manager, Environmental Protection

TITLE

9/6/05

DATE

ROUND 3 FIELD WORK STRATEGY
(Rev. 1, 08/19/05)

BUILDING 106 POND

SWMU 8
NSWC CRANE
CRANE, INDIANA

SAMPLING STRATEGY AND PLAN, ROUND 3
SWMU 8 – BUILDING 106 POND (REV. 1)
NSWC CRANE
CRANE, INDIANA

INTRODUCTION AND ABBREVIATED CONCEPTUAL MODEL

Two rounds of sampling at SWMU 8 (Building 106 Pond) were completed in January and June 2005, respectively. Locations where all surface water and groundwater samples were collected are shown on Figure 1. The numbers of samples and the types of analyses performed during both rounds are listed in Table 1. Four temporary wells were sampled during Round 1. Three more temporary wells and 11 permanent monitoring wells were installed and sampled during Round 2. The physical characteristics of each well are listed in Table 2.

The monitoring wells (temporary and permanent) have been divided into four water bearing zones based on the elevations of the screen intervals and the stratigraphic units in which the screens were placed. These units are listed in Table 2. The monitoring wells screened in the overburden (OB) and the uppermost Pennsylvanian stratum (Puz) were grouped together and water levels measured in these wells are presented in Figure 2. The following characteristics are noted for the water bearing zones represented by these wells:

- The potentiometric surface of shallow groundwater ranged from approximately 670 up to 687 feet above mean sea level (ft above msl). Shallow groundwater is highest on the north side of the SWMU and is flowing toward the south and southeast.

- Shallow groundwater is perched on a black shale that is located between approximately 660 and 675 ft above msl.

- The Building 106 Pond was excavated through the overburden soil when it was constructed. The base of the pond is resting on, or almost on, the bedrock surface. The distance from the ground surface to the base of the pond is approximately 10 to 15 feet.

- Based on the potentiometric surface, shallow groundwater should be entering the pond laterally from the north and northwest sides, and the pond water should be seeping laterally through the overburden soils toward the south and east.

The groundwater elevation data from the wells screened in the middle Pennsylvanian strata (Pmz) and the lower Pennsylvanian strata (Plz) have been grouped together and the resulting potentiometric surface is presented in Figure 3. The following characteristics are noted for the water bearing zones represented by these wells:

- The potentiometric surface of deeper groundwater ranged from approximately 588 up to 636 ft above msl. Deeper groundwater is highest on the north side of the SWMU and is flowing toward the south and southeast.

- Three well pairs were installed at SWMU 8; each pair has one well screened in the overburden and one well screened in the Pmz stratum. The differences in hydraulic head pressure between the upper and middle zones in these three pairs ranged from 34 to 46 feet. Hence, downward flow of groundwater between the upper and middle zones is impeded at the locations represented by the three well pairs. However, presence of contaminants in the middle zone (Pmz) wells indicates that the overlying aquitard is laterally discontinuous.

Based on these potentiometric surface maps, groundwater flows south and southeast toward the unnamed creek, which flows west to east on the south side of Route 45.

A summary of select chemical data obtained during Rounds 1 and 2 is presented in Table 3. The tabulated chemicals represent the most significant contamination at SWMU 8. Select trichloroethene (TCE) and 1,1,1-Trichloroethane (1,1,1-TCA) results are posted in Figure 4. These chemicals represent the contaminants which were detected in highest concentrations. During Round 1, TCE, 1,1,1-TCA, and their degradation products were detected in the pond water, the pond sediments, in the unnamed creek flowing past the pond, in soils, and in groundwater collected from shallow temporary wells (see Table 3).

Elevated concentrations of TCE, 1,1,1-TCA, other chlorinated VOCs, and bis(2-ethylhexyl)phthalate were detected in the Building 106 Pond water and/or sediment (Table 3). The Building 106 Pond is assumed to be the primary source of contaminants detected at SWMU 8. The highest aqueous concentrations of TCE and 1,1,1-TCA (590 and 200 ug/L, respectively) were detected in sample 08SW00402, collected from near the bottom of the pond. The water in the pond is roughly four to six feet deep. The bottom sediment contained VOCs at concentrations approaching percent levels.

TCE and 1,1,1-TCA (34 and 13 µg/L, respectively) were detected in a sample (08SW00601) collected from the small gulley that runs southeast past the pond (location 08SW/SD006, Figure 4), but the concentrations of VOCs were barely detectable (TCE = 0.6 µg/L, 1,1,1-TCA was not detected) near the gulley outlet (location 08SW/SD007). Elevated concentrations of TCE, 1,1,1-TCA, and their degradation

products were also detected in groundwater in the overburden, in the Puz, and in the Pmz during Round 2 (see Table 3 and Figure 4). Additional observations are presented below:

- The highest aqueous concentrations of TCE and 1,1,1-TCA were detected in Pmz wells 08MWT01 and 08MWT03, which are located downgradient of the pond, and in 08MWT05, which is located downgradient of Building 106 and possibly the pond.

- In the two Pmz wells located immediately downgradient of the pond, TCE is the most predominant VOC. However, 1,1,1-TCA is more prevalent in 08MWT05, which is located south of Building 106. This difference in relative VOC concentrations is interpreted to mean that there might be multiple sources for the VOCs.

- No VOCs were detected in upgradient wells 08MWT07 and 08MWT08, except for a very small concentration (2 µg/L) of TCE in well 08MWT08.

- A low concentration of 1,1,1-TCA (16 µg/L) was detected in well 08MWT09, and no VOCs were detected in the other two wells installed southeast of the SWMU along Route 45. Hence, it is believed that the area of contaminated groundwater is bounded laterally on the south and southeast sides.

- There were significant concentrations of TCE and 1,1,1-TCA biodegradation products detected in the pond, gulley water, and groundwaters (see Table 3). Hence, biodegradation of the chlorinated VOCs appears to be active.

VOCs and SVOCs were detected in only a few soil samples and only at low concentrations. Therefore, these data have not been used as guides to determine placements of new monitoring wells at SWMU 8. Round 2 metals data are not yet available; however, the surface water and groundwater data collected during Round 1 do not indicate that metals contamination is significant at SWMU 8 and that additional wells are not required to delineate metal contamination in groundwater.

GOALS OF ROUND 3 INVESTIGATION

The overall objectives of the Round 3 investigations will be to:

1. Determine whether any source(s) of chlorinated solvents exist under Buildings 106 or 107 in the soils that might serve as a continuing source of groundwater contamination.

2. Verify that the extent of groundwater contamination in the horizontal direction is bounded by either clean wells or physical flow barriers (i.e., stream valleys).

3. Determine the vertical extent of groundwater contamination.

4. Provide data necessary to complete the RFI, including risk assessments.

5. Provide data necessary to conduct a CMS.

More specifically, additional well drilling and installations will be performed during Round 3 in order to:

- Better delineate distribution of VOCs in the Pmz south of Building 106; this will be accomplished by installing 08MWT012 (see Figure 5 and Table 4).

- Determine whether contaminants have migrated downward into the Plz near Pmz wells 08MWT03 and 08MWT05 (this data will be used to help bound contaminant migration vertically); this will be accomplished by installing wells 08MWT13 and 08MWT14 (see Figure 5 and Table 4).

- Determine whether there is another source(s) of VOC or 1,4-dioxane contamination besides the Building 106 pond. Groundwater flow directions and differences in contaminants present at each location will be used to determine if more than one source and plume are present at SWMU 8.

- Gather additional groundwater elevation data to more accurately interpret directions and rates of groundwater movement.

Another round of sampling will be performed at existing surface water, and monitoring well locations in order to:

- better define the nature of contaminant impacts to surface waters.

- provide a second set of groundwater data to help establish trends in contaminant concentrations. (note: more rounds of sampling in the future would be needed to establish trends)

- confirm the occurrence of VOC degradation and natural attenuation in groundwater.

ROUND 3 ACTIVITIES

1. Install three new monitoring wells (see Figure 5 and Table 4). Two deep wells [90-110 feet below ground surface (bgs)] will be installed next to 08MWT03 and 08MWT05. One mid depth well (approximately 60 feet bgs) will be installed south of building 106, between the paint lockers and the perimeter road, southwest of 08MWT05.

2. Install 17 new DPT borings in and around Building 106 (seven from the inside floor area, 10 along the outside perimeter) and 14 new DPT borings in and around Building 107 (five from the inside floor area, 9 along the outside perimeter). See Figures 6 and 7, respectively.

3. Three soil samples will be collected at each new DPT boring location. The samples will be collected at the following intervals: 0-2 feet (zero interval starts below the floor and any floor construction material such as gravel, rebar, and concrete), 2-6 feet, 6-10 feet. If bedrock is encountered below 10 feet, a sample will be collected in the soil 2 feet above the bedrock surface in lieu of the 6-10 feet sample. If bedrock is encountered above 10 foot bgs, two samples will be collected (surface and soil/bedrock interface). Discretionary samples will also be collected at points that show elevated PID readings.

4. Up to 10 perched groundwater samples will be collected from the DPT borings and will be taken just above the bedrock surface, if water is encountered. No more than one sample will be collected from each DPT boring.

5. All water, groundwater, and soil samples will be analyzed for VOCs (see Table 5). Groundwater samples will be analyzed for 1,4-dioxane but surface water and soil samples will not. The objective of the collection of soil samples for analysis is to determine whether chlorinated solvents are present in rock underlying Buildings 106 and 107. Any 1,4-dioxane would be present only if a trichloroethane release occurred. Because 1,4-dioxane is more mobile than trichloroethane, it is less likely to remain sorbed to soil or bedrock and is therefore less likely to be detectable. The presence or absence of chlorinated solvents will be used to evaluate whether soil contaminant sources are present (see Table 6).

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs						Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs	Pesticides	Herbicides	PCBs	Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Groundwater																	
Round 1																	
08GWTW001	X	X		X			X		X	X				X			
08GWTW001-F						X											
08GWTW002	X	X		X			X		X	X				X			
08GWTW002-F						X											
08GWTW003	X	X		X			X		X	X				X			
08GWTW003-F						X											
08GWTW004	X	X		X			X		X	X				X			
08GWTW004-F						X											
Analyzed	**4**	**4**		**4**		**4**	**4**		**4**	**4**				**4**			
Omitted																	
Round 2																	
08GWT00101				X			X	X									
08GWT00201				X			X	X									
08GWT00301				X			X	X									
08GWT00401				X			X	X									
08GWT00501				X			X	X									
08GWT00601				X			X	X									
08GWT00601-F						X											
08GWT00701				X			X	X									
08GWT00701-F						X											
08GWT00801				X			X	X									
08GWT00901				X			X	X									
08GWT01001				X			X	X									
08GWT01101				X			X	X									

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
Round 2 (Continued)																	
08GWT01101-F						X											
08GWTW00501				O			O	O									
08GWTW00601				O			X	X									
08GWTW00701				O			O	O									
08GWTW00801				O			O	O									
08GWTW00901				O			O	O									
08GWTW01001				O			O	O									
Analyzed				**11**		**3**	**12**	**12**									
Omitted				**6**			**5**	**5**									

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs						Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs	Pesticides	Herbicides	PCBs	Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Surface Water Round 1																	
08SW00101	X	X	X				X	X	X	X							
08SW00101-F					X												
08SW002	O	O	O				O	O	O	O							
08SW00301	X	X	X				X	X	X	X							
08SW00301-F					X												
08SW00401	X	X	X				X	X	X	X							
08SW00401-F					X												
08SW00402	X	X	X				X	X	X	X							
08SW00402-F					X												
08SW00501	X	X	X				X	X	X	X							
08SW00501-F					X												
08SW00502	X	X	X				X	X	X	X							
08SW00502-F					X												
08SW00601	X	X	X				X	X	X	X			X				
08SW00601-F					X												
08SW00701	X	X	X				X	X	X	X			X				
08SW00701-F					X												
08SW00801	X	X	X				X	X	X	X			X				
08SW00801-F					X												
08SW00901	X	X	X				X	X	X	X			X				
08SW00901-F					X												
Analyzed	**10**	**10**	**10**		**10**		**10**	**10**	**10**	**10**			**4**				
Omitted	**1**	**1**	**1**				**1**	**1**	**1**	**1**							

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
Round 2																	
08SW001				O		O	O	O									
08SW002				O		O	O	O									
08SW00302				X			X	X									
08SW00302-F						X											
08SW006				O		O	O	O									
08SW00702				X			X	X									
08SW00702-F						X											
08SW00802				X			X	X									
08SW00802-F						X											
08SW00902				X			X	X									
08SW00902-F						X											
08SW01001				X			X	X									
08SW01001-F						X											
08SW011				O		O	O	O									
08SW01201				X			X	X									
08SW01201-F						X											
08SW013				O		O	O	O									
08SW01401				X			X	X									
08SW01401-F						X											
08SW01501				X			X	X									
08SW01501-F						X											
08SU00101				X			X	X						X			
08SU00101-F						X											
Analyzed				**9**		**9**	**9**	**9**						**1**			
Omitted				**5**		**5**	**5**	**5**									

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Seep Round 2																	
08SP001				O		O	O	O						O			
08SP00201				X		X		X						X			
08SP00201-F							X										
08SP003				O		O	O	O						O			
08SP004				O		O	O	O						O			
Analyzed				**1**		**1**	**1**	**1**						**1**			
Omitted				**3**		**3**	**3**	**3**						**3**			
SWMU 08 Sediment Round 1																	
08SD001010006	X	X					X		X	X							
08SD002010006	X	X					X		X	X							
08SD003010006	X	X					X		X	X							
08SD004010006	O	O					O		O	O							
08SD004010012	X	X					X		X	X							
08SD004011224	X	X					X		X	X							
08SD005010006	O	O					O		O	O							
08SD005010012	X	X					X		X	X							
08SD005011224	X	X					X		X	X							
08SD006010006	X	X					X		X	X			X				
08SD007010006	X	X					X		X	X			X				
08SD008010006	X	X					X		X	X			X				
08SD009010006	X	X					X		X	X			X				
Analyzed	**11**	**11**					**11**		**11**	**11**			**4**				
Omitted	**2**	**2**					**2**		**2**	**2**							

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs						Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs	Pesticides	Herbicides	PCBs	Fecal Coliform	Cyanide	CEC	TOC
Round 2																	
08SD001020006								X									
08SD002020006								X									
08SD003020006								X									
08SD006020006								X									
08SD007020006								X									
08SD008020006								X									
08SD009020006								X									
08SD010010006				X			X	X									
08SD011010006				X			X	X									
08SD012010006				X			X	X									
08SD013010006				X			X	X									
08SD014010006				X			X	X									
08SD015010006				U			U	U									
08SL001010006				O			O	O						O			
Analyzed				**5**			**5**	**12**									
Omitted				**1**			**1**	**1**						**1**			

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs						Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs	Pesticides	Herbicides	PCBs	Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Surface Soil Round 1																	
08SS0010002	X	X		X				X	X	X							
08SS0020002	X	X		X				X	X	X							
08SS0030002				X				X	X	X			X				
08SS0040002	X	X		X				X	X	X							
08SS0050002	X	X		X				X	X	X							
08SS0060002	X	X		X				X	X	X			X				
08SS0070002	X	X		X				X	X	X			X				
08SS0080002	X	X		X				X	X	X			X				
08SS0090002	X	X		X				X	X	X			X				
08SS0100002				X				X	X	X	X	X	X				
08SS0110002				X				X	X	X	X	X	X				
08SS0120002				X				X	X	X	X	X	X				
08SS0130002				X				X	X	X	X	X	X				
08SS0140002																X	X
Analyzed	**8**	**8**		**13**				**13**	**13**	**13**	**4**	**4**	**9**			**1**	**1**
Omitted																	

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Subsurface Soil																	
Round 1																	
08SB0010206	O	O		O					O	O							
08SB0010610	O	O		O					O	O							
08SB001xxxx	O	O		O					O	O							
08SB0020206	O	O		O					O	O							
08SB0020610	O	O		O					O	O							
08SB002xxxx	O	O		O					O	O							
08SB0030206				O					O	O			O				
08SB0030610				O					O	O			O				
08SB003xxxx				O					O	O			O				
08SB0040206	X	X		X					X	X							
08SB0040610	O	O		O					O	O							
08SB004xxxx	O	O		O					O	O							
08SB0050206	O	O		O					O	O							
08SB0050610	O	O		O					O	O							
08SB005xxxx	O	O		O					O	O							
08SB0060206	X	X		X					X	X			X				
08SB0060610	X	X		X					X	X			X				
08SB006xxxx	O	O		O					O	O			O				
08SB0070206	X	X		X					X	X			X				
08SB0070610	X	X		X					X	X			X				
08SB0071013	X	X		X					X	X			X				
08SB0080206	X	X		X					X	X			X				
08SB0080610	X	X		X					X	X			X				
08SB008xxxx	O	O		O					O	O			O				
08SB0090206	X	X		X					X	X			X				
08SB0090610	X	X		X					X	X			X				

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
SWMU 08 Subsurface Soil Round 1 (Continued)																	
08SB009xxxx	O	O		O					O	O			O				
08SB0100206				X					X	X	X	X	X				
08SB0100610				X					X	X	X	X	X				
08SB0101013				X					X	X	X	X	X				
08SB0110206				X					X	X	X	X	X				
08SB0110610				O					O	O	O	O	O				
08SB011xxxx				O					O	O	O	O	O				
08SB0120206				X					X	X	X	X	X				
08SB0120610				X					X	X	X	X	X				
08SB0121018				X					X	X	X	X	X				
08SB0130206				X					X	X	X	X	X				
08SB0130610				X					X	X	X	X	X				
08SB0131013				X					X	X	X	X	X				
08SB0140206																O	O
08SB0140610																O	O
08SB014xxxx																O	O
Analyzed	**10**	**10**		**20**					**20**	**20**	**10**	**10**	**19**				
Omitted	**14**	**14**		**19**					**19**	**19**	**2**	**2**	**8**			**3**	**3**

TABLE 1

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES, ROUNDS 1 AND 2
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Misc			
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC
Round 2																	
08SB015xxxx				O			O	O									
08SB016xxxx				O			O	O									
08SB017xxxx				O			O	O									
08SB018xxxx				O			O	O									
08SB019xxxx				O			O	O									
08SB020xxxx				O			O	O									
Analyzed																	
Omitted				6			6	6									

X = Analyzed.
O = Omitted (See Table 2-4 for reason).
AVS/SEM - Acid volatile/simultaneously extracted metals.
CEC - Cation exchange capacity.
SVOC - Semivolatile organic comounds.
VOC - Volatile organic compounds.
TOC - Total organic carbon.
Metals - U.S. EPA Contract Laboratory Program Target Analyte List Metals.

TABLE 2

PHYSICAL CHARACTERISTICS OF MONITORING WELLS AND STAFF GAUGES AND WATER LEVEL MEASUREMENTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Top of Riser or Reference Point Elevation (feet amsl)	Total Depth (feet bgs)[1]	Screened Interval				Water-Bearing Zone	June 2-4, 2005	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)
Permanent Monitoring Wells													
08MWT001	5/15/05	1306612.22	3015096.71	682.84	684.62	55.0	35.00	55.00	647.84	627.84	Pmz	50.00	634.62
08MWT002	5/11/05	1306611.21	3015090.07	683.76	685.88	14.0	4.00	14.00	679.76	669.76	OB	9.90	675.98
08MWT003	5/16/05	1306595.51	3015055.82	685.56	687.66	60.0	50.00	60.00	635.56	625.56	Pmz	53.22	634.44
08MWT004	5/12/05	1306601.17	3015055.05	685.51	688.14	12.0	7.00	12.00	678.51	673.51	OB	8.15	679.99
08MWT005	5/16/05	1306438.87	3014963.79	685.85	687.82	60.0	50.00	60.00	635.85	625.85	Pmz	52.00	635.82
08MWT006	5/12/05	1306442.25	3014968.67	686.00	688.36	18.0	8.00	18.00	678.00	668.00	OB	18.21	670.15
08MWT007	5/13/05	1306840.18	3014993.62	699.73	701.31	33.0	18.00	33.00	681.73	666.73	Puz	14.43	686.88
08MWT008	5/15/05	1306739.74	3014736.53	695.60	697.59	30.0	15.00	30.00	680.60	665.60	Puz	11.35	686.24
08MWT009	5/17/05	1306185.27	3015006.81	635.49	637.61	30.0	15.00	30.00	620.49	605.49	Pmz	18.86	618.75
08MWT010	5/24/05	1306174.25	3015302.10	601.97	604.22	30.0	15.00	30.00	586.97	571.97	Plz	15.44	588.78
08MWT011	5/23/05	1306329.81	3015534.85	600.55	602.91	30.0	15.00	30.00	585.55	570.55	Plz	9.16	593.75
Temporary Monitoring Wells													
08TW001	12/12/04	1306658.71	3015014.79	685.93	NM	8.0	3.00	8.00	682.93	677.93	OB	NM	NM
08TW002	12/12/04	1306635.29	3015085.32	683.17	NM	17.0	7.00	17.00	676.17	666.17	OB	NM	NM
08TW003	12/12/04	1306537.90	3015024.73	687.56	NM	17.5	7.00	17.00	680.56	670.56	OB	NM	NM
08TW004	12/12/04	1306446.71	3014961.65	685.46	NM	19.0	9.00	19.00	676.46	666.46	OB	NM	NM
08TW005	5/24/05	1306642.86	3015097.96	678.49	680.54	8.0	5.00	8.00	673.49	670.49	OB	dry	NA

TABLE 2

PHYSICAL CHARACTERISTICS OF MONITORING WELLS AND STAFF GAUGES AND WATER LEVEL MEASUREMENTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Top of Riser or Reference Point Elevation (feet amsl)	Total Depth (feet bgs)(1)	Screened Interval				Water-Bearing Zone	June 2-4, 2005	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)
08TW006	5/24/05	1306652.51	3015115.42	670.46	672.72	6.0	1.00	6.00	669.46	664.46	OB	NM	NM
08TW007	5/25/05	1306642.36	3015121.14	666.37	667.92	1.5	0.80	1.50	665.57	664.87	OB	dry	NA
Staff Gauges													
08SG001	6/4/05	1305356.06	3014589.12	NM	629.38	NA	NA	NA	NA	NA	Plz	NM	NM
08SG002	6/4/05	1305718.11	3014599.61	NM	621.90	NA	NA	NA	NA	NA	Plz	NM	NM
08SG003	6/4/05	1306182.83	3015170.28	NM	609.23	NA	NA	NA	NA	NA	Plz	NM	NM
08SG004	6/4/05	1306309.48	3015518.64	NM	598.80	NA	NA	NA	NA	NA	Plz	NM	NM
08SG005	6/4/05	1306762.44	3014957.35	NM	688.08	NA	NA	NA	NA	NA	NA	NM	NM
08SG006	6/4/05	1306678.68	3017413.97	NM	551.64	NA	NA	NA	NA	NA	Plz	NM	NM
08SG007	6/4/05	1306625.46	3015034.80	681.22	683.62	NA	NA	NA	NA	NA	Plz	NM	NM

Notes:

1 = Total depth of boring, total depth of well may be less.
bgs = Below ground surface.
btor = Below top of riser/reference point.
amsl = Above mean sea level (NAVD88).
NA = Not applicable.
NAVD = North American Vertical Datum
NM = Not measured

OB = Overburden Soil
Puz = Upper Pennsylvanian water-bearing zone
Pmz = Middle Pennsylvanian water-bearing zone
Plz = Lower Pennsylvanian water-bearing zone

TABLE 3

ANALYTICAL DATA SUMMARY (VALIDATED AND UNVALIDATED DATA)
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE INDIANA

Location	Sample Number [1]	Sample Date	TCE	cis-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE
Surface Water (µg/L)								
08SW/SD001	08SW00101	1/9/05	ND	ND	ND	ND	ND	ND
08SW/SD003	08SW00301	1/9/05	ND	ND	ND	ND	ND	ND
	08SW00302	6/5/2005	1	2	0.8	ND	ND	ND
08SW/SD004	08SW00401 [2]	1/10/05	7.3	12	0.7	21	18	ND
(pond samples)	08SW00402 [2]	1/10/05	590	140	40	200	99	7.7
08SW/SD005	08SW00501 [2]	1/10/05	8.8	22	3.4	33	30	ND
(pond samples)	08SW00502 [2]	1/10/05	9.2	30	8.8	39	41	1.5
08SW/SD006	08SW00601	1/9/05	34	7.9	ND	13	4.9	1.1
08SW/SD007	08SW00701	1/9/05	0.6	ND	ND	ND	ND	ND
	08SW00702	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD008	08SW00801	1/9/05	ND	ND	ND	ND	ND	ND
	08SW00802	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD009	08SW00901	1/9/05	ND	ND	ND	ND	ND	ND
	08SW00902	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD010	08SW01001	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD011	08SW01101	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD012 (pond sample)	08SW01201	6/5/05	6	100	24	ND	2	1
08SW/SD013	08SW01301	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD014	08SW01401	6/5/05	ND	ND	ND	ND	ND	ND
08SW/SD015	08SW01501	6/5/05	ND	ND	ND	ND	ND	ND
Seeps (µg/L)								
08SP02	08SP00201	6/4/2005	5	2	ND	4	27	6

TABLE 3

ANALYTICAL DATA SUMMARY (VALIDATED AND UNVALIDATED DATA)
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE INDIANA

Location	Sample Number [1]	Sample Date	TCE	cis-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE
Temporary Wells (µg/L)								
08TW001	08GWTW001	1/6/2005	12	1.1	ND	ND	ND	ND
08TW002	08GWTW002	1/6/2005	55	380	120	850	2,500	200
08TW003	08GWTW003	1/6/2005	ND	5.5	21	ND	1.3	ND
08TW004	08GWTW004	1/6/2005	6.3	1.1	3	11	89	18
08TW006	08GWTW006	5/4/2005	180	250	ND	180	98	28
Permanent Wells (µg/L)								
08MWT001	08GWT00101	6/2/2005	2,300	110	2	580	260	370
08MWT002	08GWT00201	6/2/2005	12	20	7	1	27	4
08MWT003	08GWT00301	6/2/2005	3,700	110	5	610	200	550
08MWT004	08GWT00401	6/3/2005	ND	6	2	ND	30	ND
08MWT005	08GWT00501	6/3/2005	2	8	2	2,700	240	1,700
08MWT006	08GWT00601	6/4/2005	2	ND	ND	1	11	4
08MWT007	08GWT00701	6/2/2005	ND	ND	ND	ND	ND	ND
08MWT008	08GWT00801	6/4/2005	2	ND	ND	ND	ND	ND
08MWT009	08GWT00901	6/3/2005	ND	ND	ND	16	4	3
08MWT010	08GWT01001	6/3/2005	ND	ND	ND	ND	ND	ND
08MWT011	08GWT01101	6/4/2005	ND	ND	ND	ND	ND	ND
Sump								
08SU001	08SU00101	6/7/2005	1	2	ND	4	3	ND

TABLE 3

ANALYTICAL DATA SUMMARY (VALIDATED AND UNVALIDATED DATA)
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE INDIANA

Location	Sample Number [1]	Sample Date	TCE	cis-1,2-DCE	Vinyl Chloride	1,1,1-TCA	1,1-DCA	1,1-DCE
Sediment (ug/kg) (Data not plotted on figures)*								
08SW/SD001	08SD0010006	1/9/2005	ND	ND	ND	ND	ND	ND
08SW/SD002	08SD0020006	1/9/2005	ND	ND	ND	ND	ND	ND
08SW/SD003	08SD0030006	1/9/2005	ND	ND	ND	ND	ND	ND
08SW/SD004	08SD0040012 [3]	1/10/2005	5,300,000	290,000	ND	6,600,000	440,000	320,000
(pond samples)	08SD0041224 [3]	1/10/2005	27,800,000	390,000	ND	17,300,000	1,100,000	1,500,000
08SW/SD005	08SD0050012 [3]	1/10/2005	24,000	9,000	ND	178	200	178
(pond samples)	08SD0051224 [3]	1/10/2005	2,100	2,300	54	ND	75	14
08SW/SD006	08SD0060006	1/9/2005	4	ND	ND	ND	ND	ND
08SW/SD007	08SD0070006	1/9/2005	2	ND	ND	2	ND	ND
08SW/SD008	08SD0080006	1/9/2005	3	ND	ND	ND	ND	ND
08SW/SD009	08SD0090006	1/8/05	ND	ND	ND	2	ND	ND
08SW/SD010	08SD010010006	6/5/2005	ND	ND	ND	ND	ND	ND
08SW/SD011	08SD011010006	6/5/2005	ND	ND	ND	ND	ND	ND
08SW/SD012 (pond sample)	08SD012010006	6/5/2005	ND	ND	ND	ND	5	ND
08SW/SD013	08SD013010006	6/5/2005	ND	ND	ND	ND	ND	ND
08SW/SD014	08SD014010006	6/5/2005	ND	ND	ND	ND	ND	ND
08SW/SD015	08SD015010006	6/5/2005	ND	ND	ND	ND	ND	ND

1 - Sample Numbers may have to be changed after completion of data validation to accommodate multiple rounds of sampling.

2 - The last two digits of the pond water samples refer to the different depths that samples were collected in the water column. "01" refers to a shallow sample collected from near the water column surface. "02" refers to a sample collected from near the bottom of the pond.

3 - The last two digits of the pond sediment samples refer to the different depths that sediment samples were collected. "0012" refers to a shallow sample collected from 0 to 12 inches deep. "1224" refers to a sample collected from 12 to 24 inches deep in the pond bottom.

ND = Not Detected
µg/L = micrograms per liter

TABLE 4

APPROXIMATE DRILLING SPECIFICATIONS FOR NEW MONITORING WELLS TO BE INSTALLED DURING ROUND 3
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Well No.	Overburden cored with HSA split spoons (feet bgs)	Bedrock reamed to 6-in diameter w/ no coring (feet bgs)	Bedrock cored and reamed to 6-in diameter (feet bgs)	Temporary steel casing installed (feet bgs)	Permanent 6-in diameter steel casing installed (feet bgs)	Total Depth, approximate (feet bgs)	Screen Interval (feet bgs)
08MWT12	0 - 20		20 - 60	0 - 20	0	60	40-60
08MWT13	0 - 20	20 - 70	70 - 110	0 - 20	0 - 80	110	90-110
08MWT14	0 - 20	20 - 70	70 - 110	0 - 20	0 - 80	110	90-110
Approximate Totals (feet)	60	100	120	60	160	280	

bgs = below ground surface

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
Permanent Monitoring Wells				
08MWT001	08MWT00102	1	1	Confirm concentrations observed during first and second rounds.
08MWT002	08MWT00202	1	1	Confirm concentrations observed during first and second rounds.
08MWT003	08MWT00302	1	1	Confirm concentrations observed during first and second rounds.
08MWT004	08MWT00402	1	1	Confirm concentrations observed during first and second rounds.
08MWT005	08MWT00502	1	1	Confirm concentrations observed during first and second rounds.
08MWT006	08MWT00602	1	1	Confirm concentrations observed during first and second rounds.
08MWT007	08MWT00702	1	1	Confirm concentrations observed during first and second rounds.
08MWT008	08MWT00802	1	1	Confirm concentrations observed during first and second rounds.
08MWT009	08MWT00902	1	1	Confirm concentrations observed during first and second rounds.
08MWT010	08MWT01002	1	1	Confirm concentrations observed during first and second rounds.
08MWT011	08MWT01102	1	1	Confirm concentrations observed during first and second rounds.
08MWT012	08MWT01201	1	1	To determine if contaminants are migrating downward from 08MWT03 and establish vertical extent of contamination.
08MWT013	08MWT01301	1	1	To determine if contaminants are migrating downward from 08MWT05 and establish vertical extent of contamination.
08MWT014	08MWT01401	1	1	To determine if contaminants are migrating downward from 08MWT05 and establish vertical extent of contamination.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
Temporary Monitoring Wells				
08TW008	08TW00801	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW009	08TW00901	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW010	08TW01001	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW011	08TW01101	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW012	08TW01201	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW013	08TW01301	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW014	08TW01401	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW015	08TW01501	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW016	08TW01601	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
08TW017	08TW01701	1	1	Perched groundwater will be sampled within the bedrock/soil interface to determine if VOCs are present.
Surface Water				
08SW/SD001	08SW00102	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD002	08SW00201	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD003	08SW00303	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD004	08SW00403	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD006	08SW00602	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD007	08SW00703	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD008	08SW00803	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD009	08SW00903	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD010	08SW01002	1	0	Confirm concentrations observed during first and second rounds.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SW/SD011	08SW01101	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD013	08SW01301	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD014	08SW01402	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD015	08SW01502	1	0	Confirm concentrations observed during first and second rounds.
08SW/SD016	08SW01601	1	0	To determine if and where groundwater discharges are contributing contaminants to the the gully before irt reaches Boggs Creek.
08SW/SD017	08SW01701	1	0	To determine if and where groundwater discharges are contributing contaminants to the the gully before irt reaches Boggs Creek.
08SW/SD018	08SW01801	1	0	To determine if culvert discharges contain contaminants emanating from the west side of the SWMU.
08SW/SD019	08SW01901	1	0	To determine if culvert discharges contain contaminants emanating from the west side of the SWMU.
08SW/SD020	08SW02001	1	0	To determine if unnamed tributary gulley contains SWMU 8 contaminants.
08SW/SD021	08SW02101	1	0	To determine water quality in Boggs Creek downstream of confluence with 08SW/SD020; this is the sample location farthest downstream on Boggs Creek.
Total Water Samples		**43**	**24**	

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
Surface and Subsurface Soil				
08SB15	08SS0150002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0150206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB015xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB16	08SS0160002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0160206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB016xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB17	08SS0170002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0170206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB017xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB18	08SS0180002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0180206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB018xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB19	08SS0190002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0190206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB019xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SB20	08SS0200002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0200206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB020xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB21	08SS0210002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0210206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB021xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB22	08SS0220002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0220206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB022xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB23	08SS0230002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0230206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB023xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB24	08SS0240002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0240206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB024xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB25	08SS0250002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0250206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB025xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SB26	08SS0260002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0260206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB026xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB27	08SS0270002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0270206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB027xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB28	08SS0280002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0280206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB028xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB29	08SS0290002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0290206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB029xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB30	08SS0300002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0300206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB030xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB31	08SS0310002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0310206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB031xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SB32	08SS0320002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0320206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB032xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB33	08SS0330002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0330206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB033xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB34	08SS0340002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0340206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB034xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB35	08SS0350002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0350206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB035xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB36	08SS0360002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0360206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB036xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB37	08SS0370002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0370206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB037xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SB38	08SS0380002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0380206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB038xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB39	08SS0390002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0390206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB039xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB40	08SS0400002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0400206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB040xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB41	08SS0410002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0410206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB041xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.

TABLE 5

PROPOSED ROUND 3 SAMPLING LOCATIONS AND RATIONALE
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Sample Number	Analyses		Rationale
		VOC 8260B	SVOC[1] 8270C (1,4-dioxane only)	
08SB42	08SS0420002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0420206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB042xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB43	08SS0430002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0430206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB043xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB44	08SS0440002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0440206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB044xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
08SB45	08SS0450002	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB0450206	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
	08SB045xxxx	1	0	To determine if VOCs are present near the overburden/bedrock interface at the new well locations.
Total Soil Samples		**93**	**0**	

1 - Analyze for 1,4-dioxane only

TABLE 6

SUMMARY OF QA/QC SAMPLES BASED ON PROPOSED ROUND 3 GROUNDWATER, SURFACE WATER, SUBSURFACE AND SURFACE SOIL SAMPLING
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Type of OA/QC Sample	VOCs (Method 8260B)	SVOCs (Method 8270C for 1,4-dioxane only)
Field Duplicates (Water Samples)	3	2
Field Duplicates (Soil Samples)	5	0
MS/MSD (Water Samples)	2	2
MS/MSD (Soil Samples)	5	0
Trip blanks	7	0
Rinsate Blanks	3	1
Source Blank	1	1
Total Number of Water plus Soil Samples from SWMU 8	**136**	**24**
Total QA/QC Samples (aqueous plus soil)	**26**	**4**
Total Samples from SWMU 8	**162**	**28**

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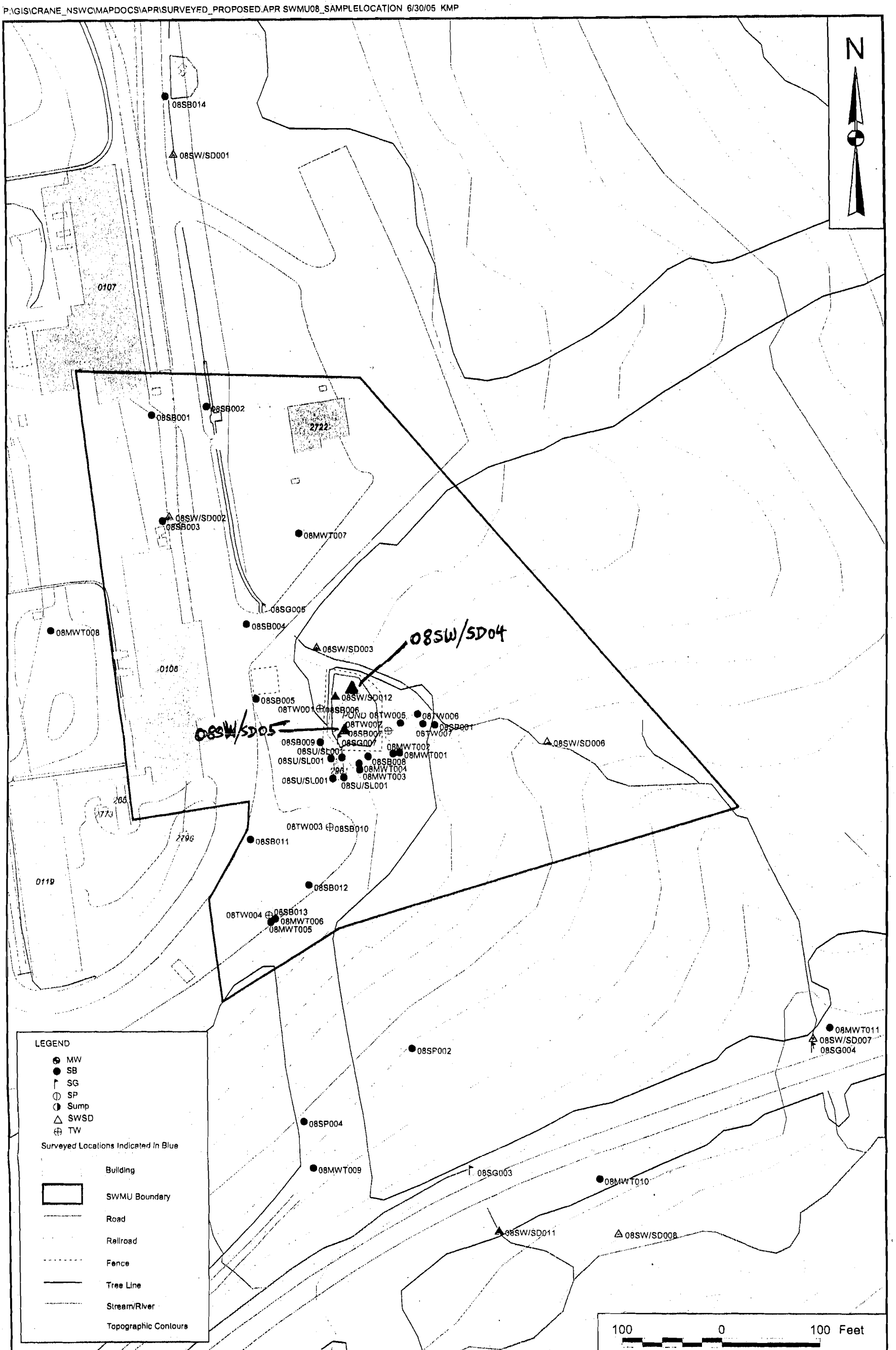

DRAWN BY	DATE
K. PEILA	3/23/05
CHECKED BY	DATE
J. GOERDT	3/23/05
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
CTO 0331	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE . 1	REV 0

EXISTING SAMPLE LOCATIONS

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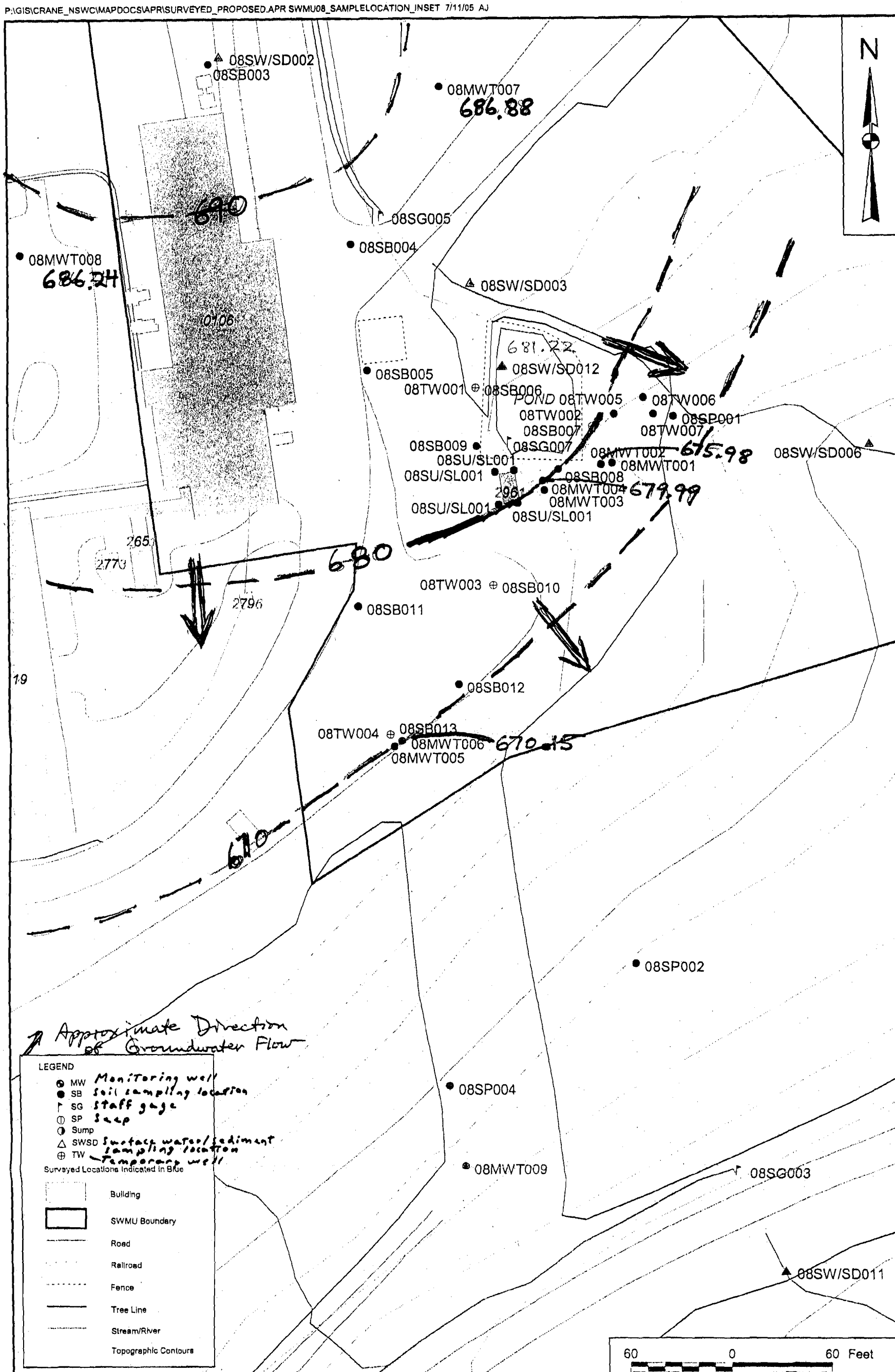

DRAWN BY	DATE
K. PEILA	3/23/05
CHECKED BY	DATE
J. SCHUBERT	7/11/05
COST/SCHEDULE-AREA	
SCALE	AS NOTED

NAVFAC

Potentiometric Surface in the Upper Pennsylvania Bedrock and Overburden

SWMU 8 - BUILDING 106 POND

NSWC CRANE

CRANE, INDIANA

CONTRACT NUMBER CTO 0331

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 2

REV 0

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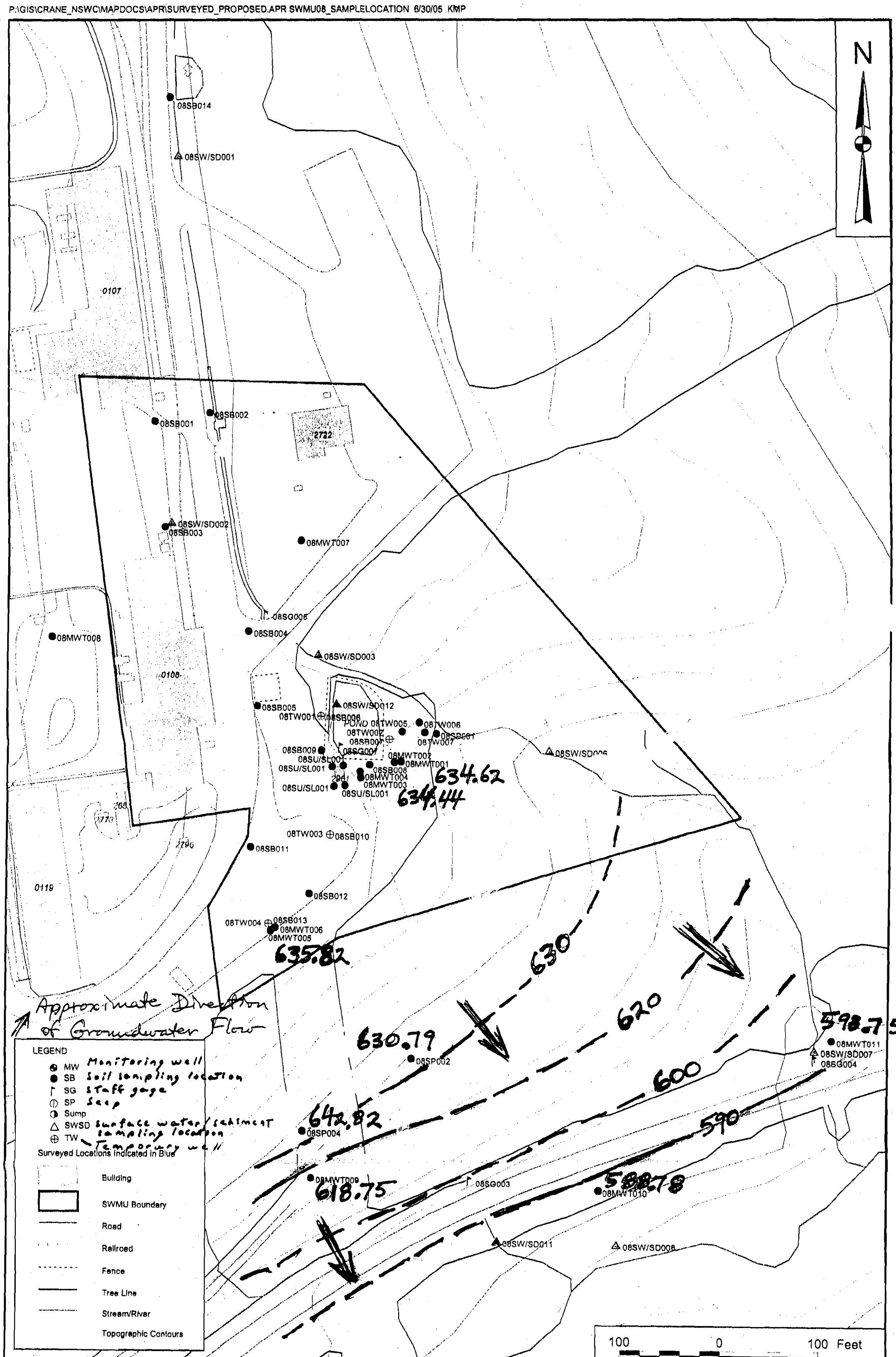

DRAWN BY	DATE
K. PEILA	3/23/05
CHECKED BY	DATE
J. GOERDT	3/23/05
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE IN THE MIDDLE PENNSYLVANIAN BEDROCK AND LOWER

SWMU 8 - BUILDING 106 POND

NSWC CRANE

CRANE, INDIANA

CONTRACT NUMBER	
CTO 0331	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV 0

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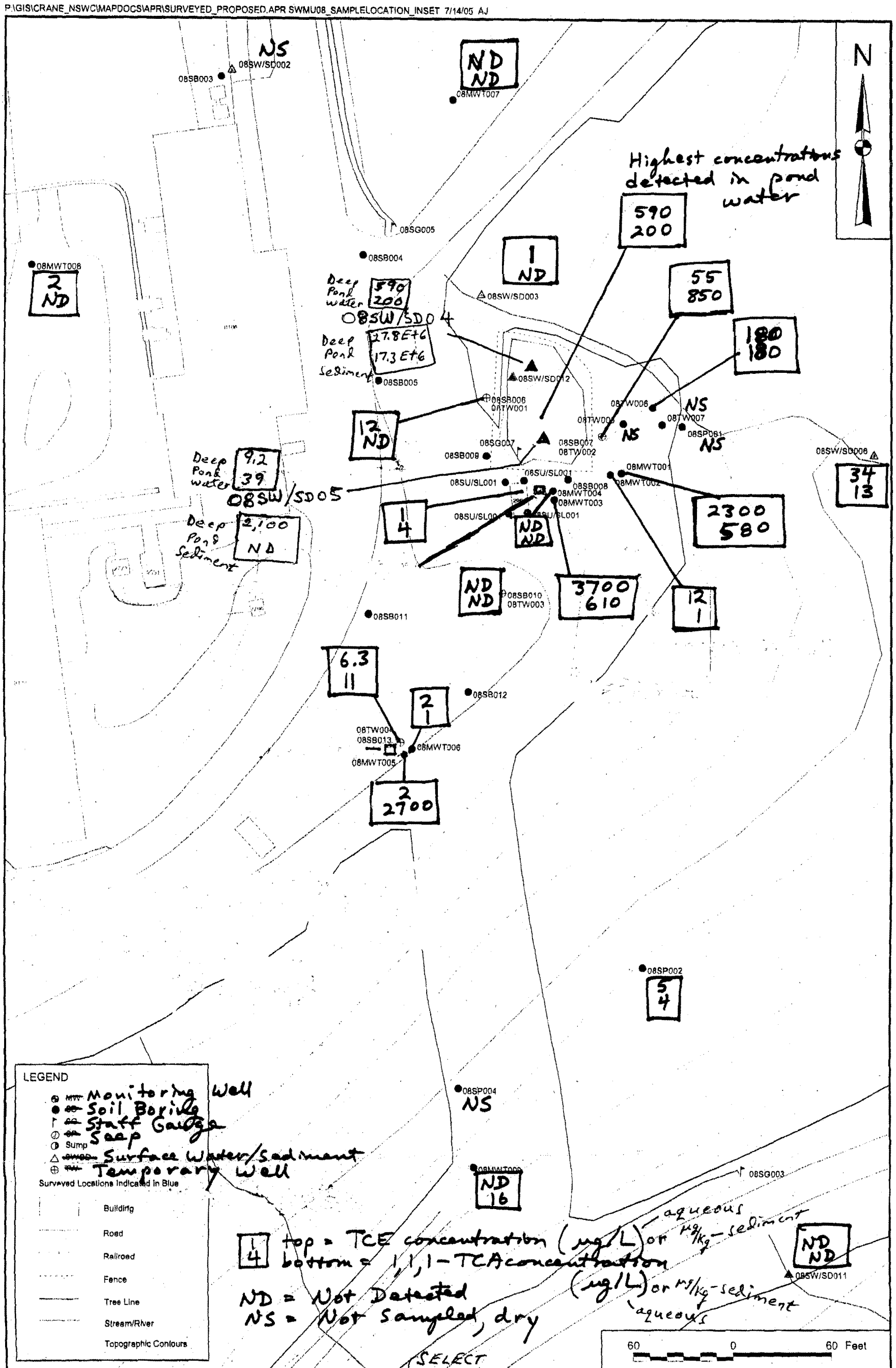

DRAWN BY	DATE
K. PEILA	3/23/05
CHECKED BY	DATE
J. SCHUBERT	7/11/05
COST/SCHEDULE-AREA	
SCALE	AS NOTED

NAVFAC

SUMMARY OF SELECT ANALYTICAL DATA FOR AQUEOUS SAMPLES AND POND SEDIMENT

SWMU 8 - BUILDING 106 POND

NSWC CRANE

CRANE, INDIANA

CONTRACT NUMBER CTO 0331

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 4

REV 0

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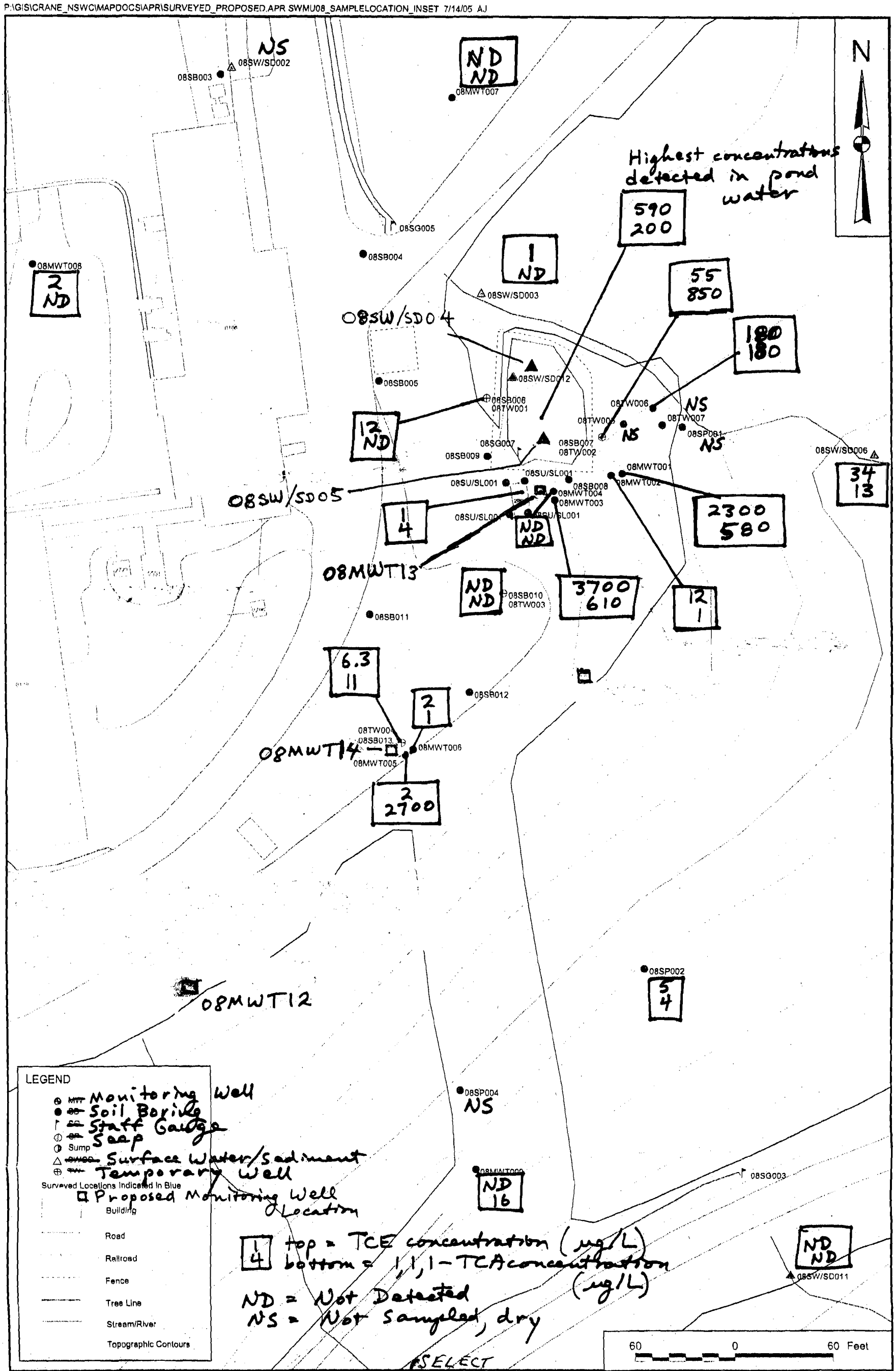

DRAWN BY	DATE
K. PEILA	3/23/05
CHECKED BY	DATE
J. SCHUBERT	7/11/05
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SELECT

SUMMARY OF ANALYTICAL DATA AND LOCATIONS OF PROPOSED WELLS

SWMU 8 - BUILDING 106 POND

NSWC CRANE

CRANE, INDIANA

CONTRACT NUMBER	
CTO 0331	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5	REV 0

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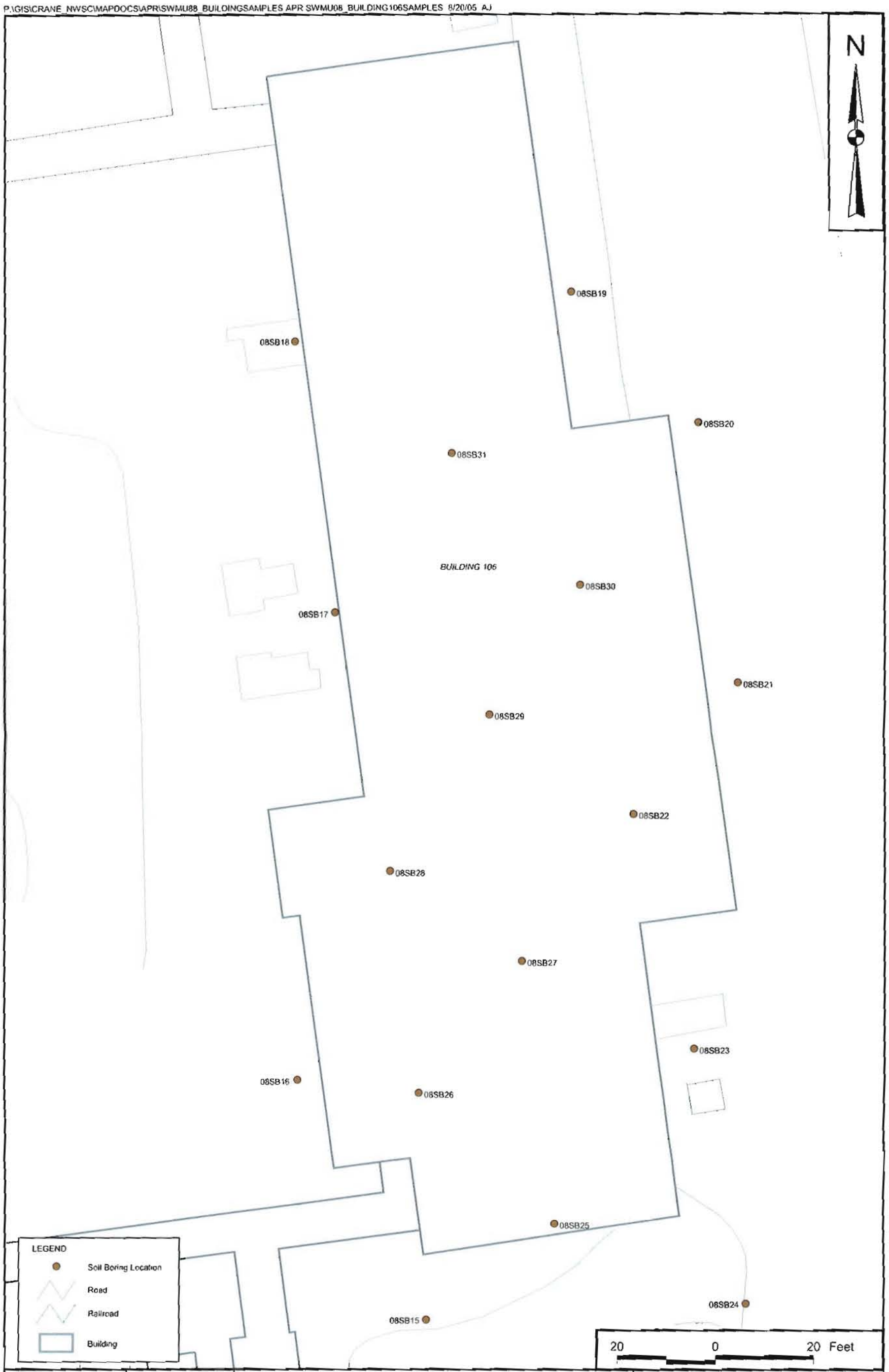

DRAWN BY K. PEILA	DATE 8/17/05	PROPOSED SOIL BORING LOCATIONS BUILDING 106 NWSC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 331
CHECKED BY G. WAGNER	DATE 8/17/05		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO FIGURE 6 REV 0

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DRAWN BY K. PEILA — DATE 8/17/05	NAVFAC	PROPOSED SOIL BORING LOCATIONS BUILDING 107 NWSC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 331
CHECKED BY G. WAGNER — DATE 8/17/05			APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 7 — REV 0