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APPENDIX C. SITE-SPECIFIC CHARACTERISTICS

This appendix provides detailed characteristics of each missile site.

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**Table C-1
Soil Properties, 446th Missile Squadron**

Soil Series	Wind Erosion	Hydric Soil ¹	Shrink-Swell ²	Excavation	Fill Suitability ³
Barnes	very slight	Inclusions	low - moderate	good	severe - piping
Binford	High	No	low	severe - cutbanks cave	good
Brantford	Slight	No	low	good	good
Buse	Moderate	Inclusions	low - moderate	good	severe - piping
Cavour	very slight	Inclusions	moderate - high	moderate - wetness	good
Cresbard	very slight	Inclusions	low - high	moderate - wetness	good
Divide	Moderate	Inclusions	low	severe - cutbanks cave	good
Easby	Moderate	Yes – saturation	moderate	severe - wetness	severe - piping
Gilby	Moderate	Inclusions	low - moderate	severe - wetness	severe - wetness
Glyndon	Moderate	Inclusions	low	severe - cutbanks cave	severe - piping
Hamerly	Moderate	Inclusions	moderate	severe - wetness	severe - piping
Lamoure	Moderate	Yes – saturation	low - moderate	severe - wetness	severe - wetness
Parnell	very slight	Yes - saturation, ponding	low - high	severe - ponding	severe - ponding
Renshaw	Slight	No	low	severe - cutbanks cave	good
Svea	Slight- moderate	Inclusions	low - moderate	moderate - wetness	severe - piping
Tiffany	High	Yes - saturation, ponding	low	severe - cutbanks cave	severe - ponding
Tonka	Slight	Yes - saturation, ponding	low - high	severe - ponding	severe - ponding
Vallers	Moderate	Yes – saturation	low	severe - wetness	severe - piping
Vang	Slight	No	low	severe - cutbanks cave	good
Walsh	Slight	No	moderate	severe - cutbanks cave	severe - piping
Waukon	very slight	No	low - moderate	good	severe - piping
Wyard	very slight	Inclusions	moderate	severe - wetness	severe - piping

¹ Hydric soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil (see text above). Inclusions are small areas within a soil series that are hydric.

² Shrink-swell is the change in volume in a soil when soil moisture changes markedly (the tendency to swell when wet and shrink when dry).

³ A major consideration for soil used as fill is the tendency for piping (formation of subsurface tunnels or pipe-like cavities by water moving through soil), which can cause severe erosion.

Sources: USDA, 1972; USDA, 1977a, USDA, 1981; USDA, 1990a (See Section 3.2.2.)

**Table C-2
Wetlands Near Missile Sites, 446th Missile Squadron¹**

Site	Type	Location
A-0	NWI Wetland	approx. 47' SE
A-01	NWI Wetland	approx. 664' NW, 530', 724' SW
A-01	Ephemeral Wetland	approx. 896' E
A-03	NWI Wetland	approx. 765', 746' NE, 978', 727' SE
A-03	Ephemeral Wetland	approx. 727' SW, 914' SE
A-04	NWI Wetland	approx. 55', 954' S
A-04	Ephemeral Wetland	approx. 797' W
A-05	NWI Wetland	approx. 890' W
A-05	Ephemeral Wetland	approx. 570' SE
A-06	NWI Wetland	approx. 332', 794' S, 659' E
A-07	NWI Wetland	approx. 390' NE
A-08	NWI Wetland	approx. 873' S
A-09	NWI Wetland	approx. 886' E, 572', 393', 703', 648' SW, 715' W
A-10	NWI Wetland	approx. 622' SE, 597' NE
B-0	NWI Wetland	on property SE; approx. 238' S
B-14	NWI Wetland	approx. 50' N, 227' W
B-15	NWI Wetland	approx. 147' SE, 575' S, 570', 422', 848', 999' NE, 716', 830' E
B-17	NWI Wetland	on property NW
B-19	NWI Wetland	approx. 392' SE
B-20	NWI Wetland	on SW property boundary; approx. 980' NW
B-20	Ephemeral Wetland	approx. 260' SE
C-0	NWI Wetland	on NE property; approx. 208' SE
C-21	NWI Wetland	approx. 50' E, 437' SE
C-22	NWI Wetland	on fenced property SE
C-24	NWI Wetland	approx. 394' W, 407' SE, 830' NW
C-25	NWI Wetland	approx. 597' N
C-26	NWI Wetland	on property NE; approx. 40' N, 400' NW, 240', 385' W, 74', 633', 892' S, 446', 967' E
C-27	NWI Wetland	approx. 622', 682', 902' N
C-29	NWI Wetland	on property S; approx. 256' NW, 70' SE, 397' NE
C-30	NWI Wetland	approx. 620', 740' E, 450' SE
D-0	NWI Wetland	approx. 400' E
D-31	NWI Wetland	approx. 230', 300', 450', 800' W, 300', 800' NW
D-32	NWI Wetland	approx. 670' NE, 800', 870' SW
D-33	NWI Wetland	approx. 40', 900', 960' N, 230' NE
D-34	NWI Wetland	on E property boundary; approx. 300' N, 380', 670' NE, 300' E, 600' SE, 760' SW, 480' W
D-35	NWI Wetland	approx. 500', 860' NE, 800' SW
D-36	NWI Wetland	approx. 300' SE
D-37	NWI Wetland	approx. 700' SE, 400', 1,000' SW, 1,000' W
D-38	NWI Wetland	approx. 150', 500', 600', 900' N, 260', 900', 1,000' E, 180', 450' SE, 160', 400' S, 440', 550' SW

Table C-2 Wetlands Near Missile Sites, 446th Missile Squadron¹		
Site	Type	Location
E-0	NWI Wetland	approx. 760', 800' E, 500' SE, 350', 400' SW, 180', 800' W, 360', 1,000' NW, 200', 740' NE
E-0	Ephemeral Wetland	approx. 300', 600', 1,000' NE, 750' E, 500', 700' SE, 400' SW, 150', 750', W, 1,000' NW
E-41	NWI Wetland	approx. 400' NW, 900' NE, 900'
E-41	Ephemeral Wetland	approx. 600', 1,000' N, 400' NW
E-42	NWI Wetland	approx. 700', 1,000' NE, 900' S
E-43	NWI Wetland	approx. 800' W, 640', 700' SW, 700' S, 500', 940' SE, 60' E, 500' N
E-44	NWI Wetland	approx. 40', 350' W, 500' SW, 650' S, 400', 700' SE, 1,000' NE
E-45	NWI Wetland	approx. 1,000' N, 250', 300', 900' NE, 860' SE, 270', 300', 530' S, 360' NW
E-46	NWI Wetland	approx. 650', 700', 900' E, 400' S, 300', 550' W, 840' NW, 750' NE
E-46	Ephemeral Wetland	approx. 1,000' NW, 800' NE
E-47	NWI Wetland	approx. 50', 800' N, 200' SE
E-48	NWI Wetland	approx. 200', 700' N, 240' NE, 600' E, 400' S, 200' SW, 350' W, 800', 900' NW
E-48	Ephemeral Wetland	approx. 400', 800' NE, 400' SW
E-49	NWI Wetland	on N, W, property boundary; approx. 600', 700', 850' N, 170', 800', 840' E, 85', 460', 800', 820' SE, 300', 700' S, 950' SW, 100', 150', 300' W, 650', 970' NW
E-50	NWI Wetland	approx. 600' NE, 630' E, 70', 150' SE
E-50	Ephemeral Wetland	on property NE; approx. 550', 650' NE

¹ Wetlands located within 1,000 feet of property boundary.
Source: USFWS NWI Maps, 1996; USGS Topographic Maps, various dates. (See EBS Section 3.2.4.)

Table C-3 Summary of Sites with Soil Sample Diesel and Gasoline Range Organics Levels above North Dakota Standard¹, 446th Missile Squadron		
<i>Site</i>	<i>DRO Level</i>	<i>GRO Level</i>
C-23 ²	100	NA
C-24 ²	230	NA
C-26 ²	370	NA
C-27 ²	560	NA
E-44 ³	24,000	200

All concentrations in mg/kg (parts per million)
¹ NDDH (North Dakota Department of Health) Standard is 100 ppm.
² Soil samples taken from sump pump outfall.
³ Discretionary soil sample taken north of LEB.
NA = not applicable; site did not exceed NDDH standard (100 ppm) for noted contaminant
Source: USAF, 1999b. (See Section 3.3.1.)

Sample Data	B-13	C-21	C-22	C-28	D-34
MW-1	ND	ND	1.0 ¹	ND	ND
MW-2	ND	ND	ND	ND	ND
MW-3	ND	ND	ND	ND	ND
MW-4	ND	ND	ND	ND	ND
MW-5	ND	NA	ND	ND	ND
MW-6	ND	NA	ND	NA	ND
MW-7	ND	NA	NA	NA	ND

ND = not detected; NA = Not applicable
¹ One sample was 1.0, duplicate was ND. Sample was unfiltered.
 All samples were analyzed for PCBs by USEPA SW-846 Method 8082. The samples were both filtered and unfiltered (included sediment). Samples are in micrograms per liter.
 Source: USAF, 2005 (See Section 3.3.3)

Ventilation Shaft Coating			Access Shaft Coating		
Site and type ¹	Waterproof coating concentration ²	Adjacent soil concentration ²	Site and type ¹	Waterproof coating concentration ²	Adjacent soil concentration ²
A-3 (1254)	19,000 ³	1.50	B-11	ND	ND
C-25 (1254)	74,000 ⁴	0.59	C-21 (1260)	0.38	NC
D-32 (1254)	6,100	0.95	C-23	ND	ND
E-48 (1254)	38,000	7.90	E-46 (1254)	0.30	0.096

Notes
¹ Various types of PCBs were sampled. Aroclor 1242, 1254, and 1260 were detected in locations as noted.
² Concentrations in mg/kg (parts per million)
³ Re-analysis of this sample indicated 8,300 mg/kg
⁴ Re-analysis of this sample indicated 22,000 mg/kg
 ND = not detected; NC = not collected
 Source: USAF, 1999b.

Site	TPH	4,000-gallon Heating Oil Tank (TK-106)				500-gallon Diesel Tank		1,000-gallon Heating Oil Tank (GAR)		
		SS-1	SS-2	SS-3	SS-4	SS-1	SS-2	SS-1	SS-2	SS-3
MAF B-0	GRO	490	NA	2,100	NA	NA	1,200	210	710	NC
	DRO	2,900	NA	9,600	NA	NA	6,400	930	3,600	NC
MAF D-0	GRO	NC	NC	NC	NC	NA	NA	430	NA	560
	DRO	NC	NC	NC	NC	NA	NA	2,600	200	3,500

All concentrations in mg/kg (parts per million)
 NA = not applicable; site did not exceed NDDH standard (100 ppm) for noted contaminant
 NC = not collected; SS = soil sample
 GRO = gasoline range organic; DRO = diesel range organic
 Source: USAF, 2001d (See Section 3.5.)

**Table C-7
Prime Farmland by Site, 446th Missile Squadron ¹**

<i>Site</i>	<i>None</i>	<i>Some</i>	<i>All</i>	<i>Site</i>	<i>None</i>	<i>Some</i>	<i>All</i>
A Flight							
MAF A-0			√	LF A-06		√	
LF A-01			√	LF A-07			√
LF A-02		√		LF A-08			√
LF A-03		√		LF A-09			√
LF A-04	√			LF A-10		√	
LF A-05		√		<i>Subtotal for Flight:</i>	1	5	5
B Flight							
MAF B-0			√	LF B-16		√	
LF B-11			√	LF B-17			√
LF B-12			√	LF B-18			√
LF B-13			√	LF B-19	√		
LF B-14			√	LF B-20			√
LF B-15	√			<i>Subtotal for Flight:</i>	2	1	8
C Flight							
MAF C-0			√	LF C-26			√
LF C-21			√	LF C-27			√
LF C-22		√		LF C-28			√
LF C-23		√		LF C-29			√
LF C-24		√		LF C-30	√		
LF C-25			√	<i>Subtotal for Flight:</i>	1	3	7
D Flight							
MAF D-0			√	LF D-36	√		
LF D-31			√	LF D-37	√		
LF D-32		√		LF D-38			√
LF D-33			√	LF D-39			√
LF D-34			√	LF D-40		√	
LF D-35			√	<i>Subtotal for Flight:</i>	2	2	7
E Flight							
MAF E-0		√		LF E-46		√	
LF E-41			√	LF E-47			√
LF E-42		√		LF E-48			√
LF E-43		√		LF E-49		√	
LF E-44			√	LF E-50			√
LF E-45			√	<i>Subtotal for Flight:</i>	0	5	6
446 MS							
Total for 446 MS					6	16	33
¹ “None” means that no prime farmland soils are found within the site; “some” means part of the site contains prime farmland soils; and “all” means the entire site is considered prime farmland. Source: USDA, 1972, 1977a, 1986, and 1990a (see Section 5.1.8).							

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