LS-61
April 28, 1986

SITE EXCAVATION STUDY

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ARGONNE NATIONAL LABORATORY
HIGH ENERGY PHYSICS
Y. CHO
MAY 1 1986

April 28, 1986

To: Y. Cho Project Manager, HEP-LSP

From: A. N. Lowing PFS-FPE

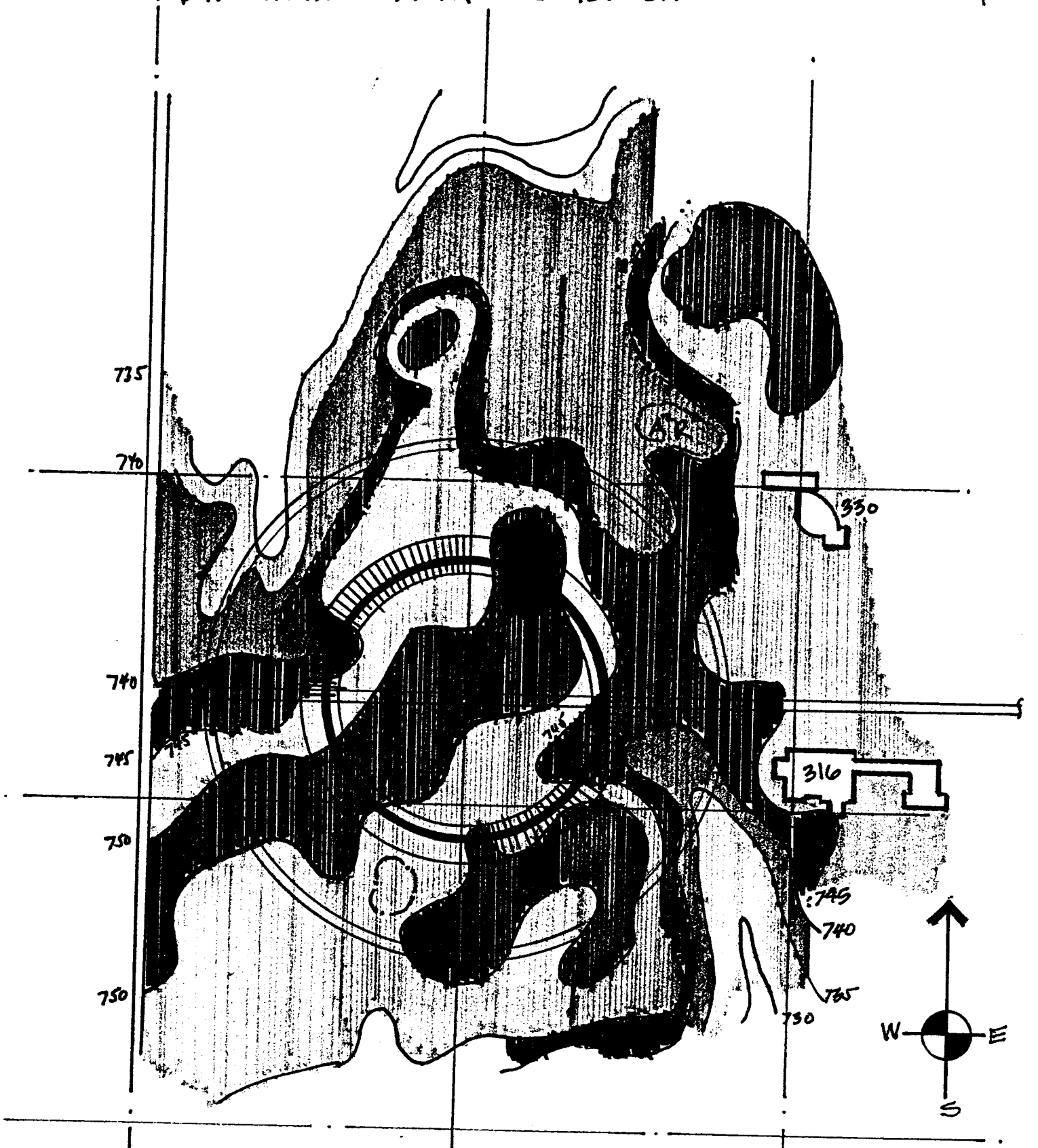
Subject: **Site Excavation Study**

As a method of identifying a site location for the GXS based upon least-excavation vs. zero percent fill material as a criteria, four separate sites each having three separate floor elevations were investigated. The attached study data indicates that site "C" with floor elevation at 742-Ø, appears to be the most cost-effective site.

Selection of site "C" will require relocating the utility service building from the position shown in the Conceptual Design Report, which could have a negative cost impact. The cost of site improvements will be increased since the estimated quantity of excavated material at site "C" exceeds the estimate prepared by L. B. Knight & Assoc. Further, the contour map used to estimate the necessary quanities of excavation is based upon an aerial survey map having contours at five foot vertical intervals. A new topographic survey with contour intervals at one foot may impact this estimate.

ANL:ss

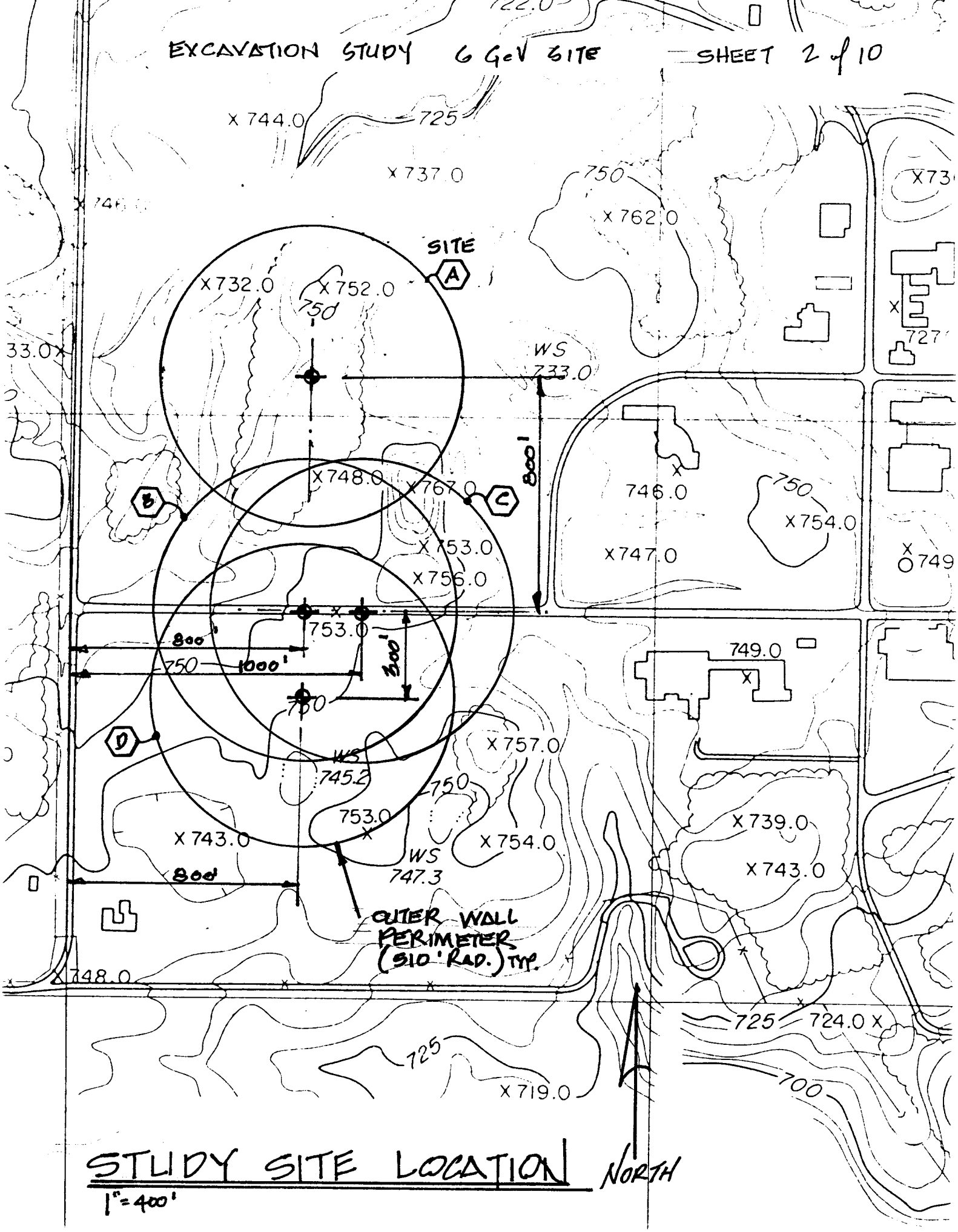
cc: L. J. Reinsch
E. Vanberkum
CF



CONTOUR MAP

1"=400'

EXCAVATION STUDY 6 GeV SITE SHEET 2 of 10



STUDY SITE LOCATION

1" = 400'

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SUMMARY

	SITE DESIGNATION	EXCAV. LEVEL	FLOOR LEVEL	EXCAVATION (CU. YD.)	% OF FLOOR SLAB ON FILL MAT'L
A	A_1	738.0	740.5	281,300	50 %
	A_2	736.0	738.5	381,500	40
	L.B. KNIGHT	738.0	740.5	206,000	N/A *

NOTE: THIS SITE ENCROACHES ON WETLAND AREA - 0% FILL NOT FEASIBLE.

* (USING 42,200 C.Y. of FILL)

B	B_1	740.0	742.5	570,000	12 %
	B_2	742.0	744.5	414,000	20
	B_3	744.0	746.5	338,000	25

NOTE: FOR 0% FILL, EXCAVATION QUANTITY > 570,000 C.Y.

C	C_1	740.0	742.5	541,000	0 %
	C_2	742.0	744.5	410,000	12
	C_3	744.0	746.5	338,000	37

D	D_1	745.0	747.5	256,000	33 %
	D_2	742.0	744.5	412,000	10 %

FOR 0% FILL EXCAVATION QUANTITY = 692,000 > 541,000

ALSO - THIS SITE MAY ENCROACH ON WEATHER STATION WHICH REQUIRES A "STAY-CLEAR" AREA TO AVOID WIND DISTURBANCE & AIR-BORNE CONTAMINANTS.

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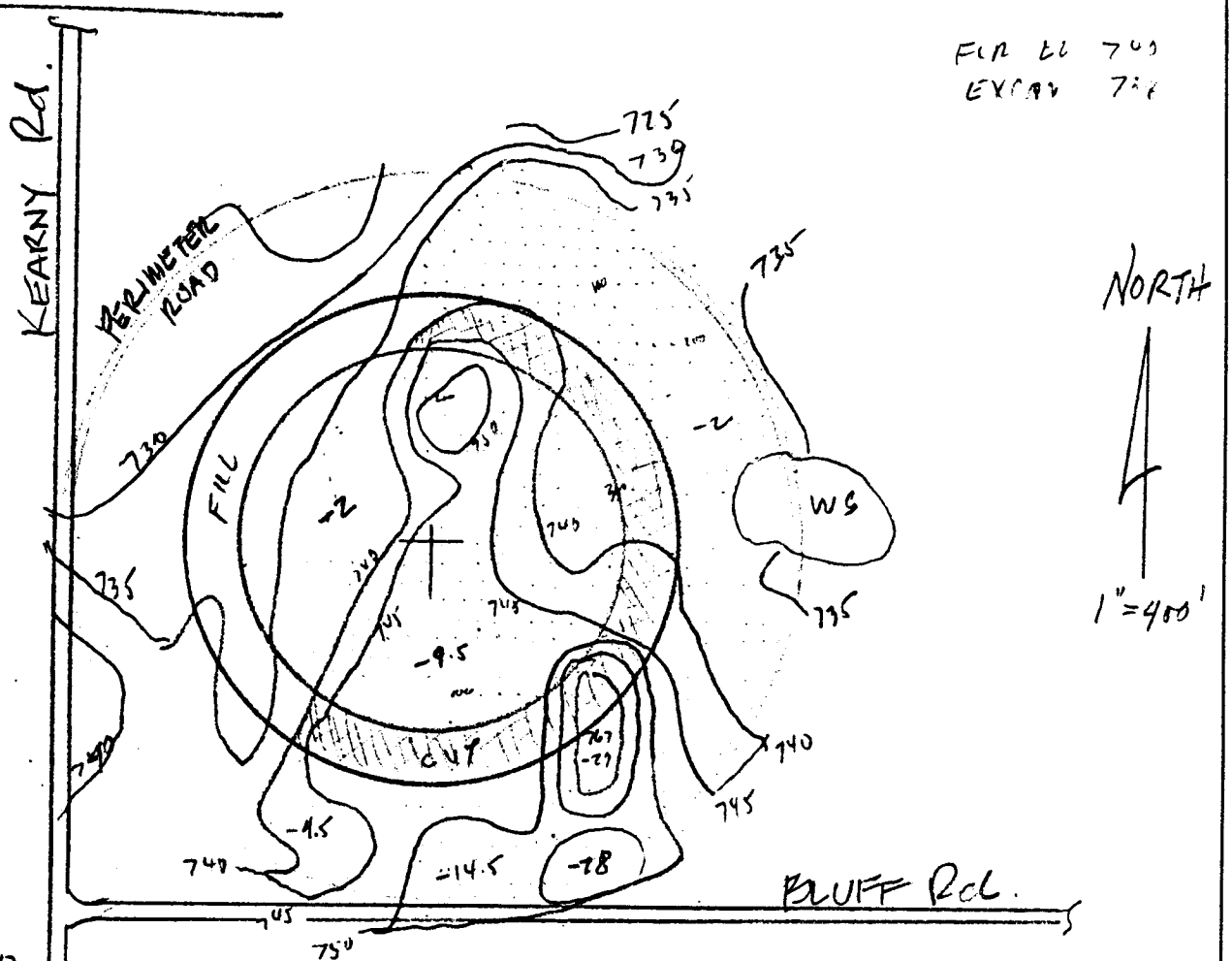
NORTH SITE (SITE "A")

FLR EL 740
EXCAV 738



A-9.5	=	232 (40×40) × 9.5'	=	3 526,400 cf	=	130,600 CY
A-14.5	=	68 (1600) × 14.5	=	1,577 600	=	58 430
A-18	=	16 (1600) × 18	=	460 800	=	17 070
A-29	=	25 (1600) × 29	=	1,160,000	=	43 000
A-4.5	=	136 (1600) × 4.5	=	980,000	=	32 200
					Σ	281,300

NOTE: FILL = 50% OF FLOOR SLAB → N.G.

NOTE: AN Additional 8 ft of excavation is required TO HAVE UNDISTURBED SOIL UNDER FULL FLOOR SLAB AREA.

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SITE "A" CONT

FLR EL. 738

EXCAV. 736

A-9.5 = 232(1600) × 2'/27 + 130600 = 158,100

A-14.5 = 68(1600) × 2'/27 + 58430 = 66500

A-18 = 16(1600) × 2/27 + 17070 = 18,900

A-29 = 25(1600) × 2/27 + 43000 = 44,000

A-4.5 = 136(1600) × 2/27 + 32,200 = 48,300

Below 740 Σ 281,300

A-2 = 369(1600) × 2'/27 = 43,700

Σ 381,500 C.Y

NOTE: 40% of FLR SLAB ON FILL → N.G.

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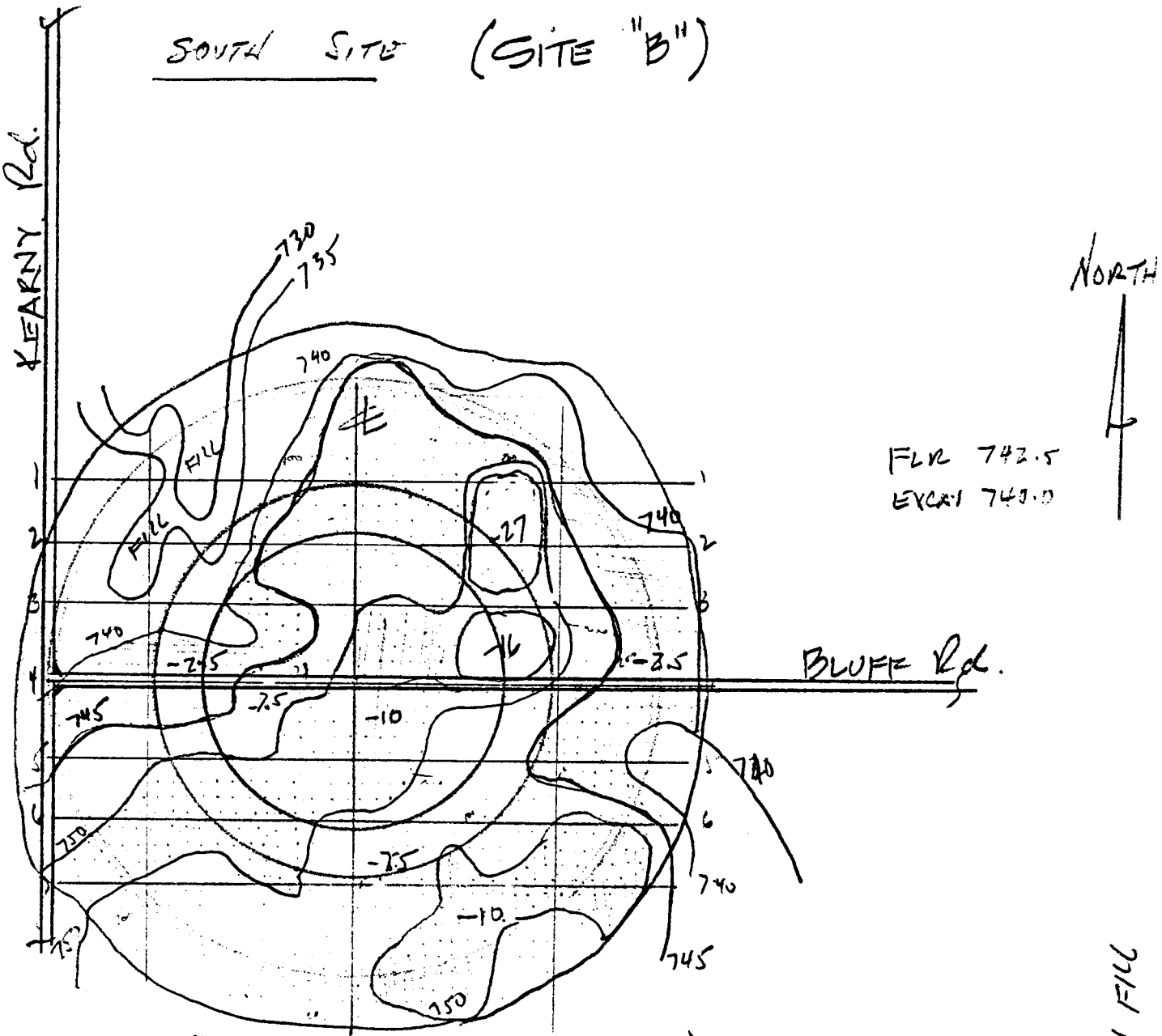
SOUTH SITE (SITE "B")



EXCAV. 740.0 (FLR. SLAB 742.5)

A-27	33(40×40)×27	=	1,425,000 CF	= 52,800 CY	12% ON FILL
A-16	25(1600)×16	=	640,000	= 23,700	
A-10 S	103(1600)×-10	=	1,648,000	= 61,000	
A-10 N	215(1600)×-10	=	3,440,000	= 127,400	
A-7.5 N	240(1600)×-7.5	=	2,880,000	= 106,600	
A-7.5 S	334(1600)×-7.5	=	4,008,000	= 148,500	
A-2.5	254(1600)×-2.5		1,016,000	= 37,600	
MISC CUT/FILL	100(1600)×-2	=	320,000	= 12,000	

570,000 CY

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SITE "B"

EXCAV 742 (FLR EL 744.5)

52800 × 25/27 = 48,900 CY
23700 × 14/16 = 20,700
61000 × 8/10 = 48 800
127,400 × 8/10 = 102 000
106,600 × 5.5/7.5 = 78 200
148,500 × 5.5/7.5 = 108,900
37,000 × 0.5/2.5 = 7 400

Σ 414,900 CY

NOTE: 20% SLAB FLR ON FILL

EXCAV 744 (FLR. EL 746.5)

52800 × 23/27 = 45000
23700 × 12/16 = 17 800
61 000 × 6/10 = 36 600
127,400 6/10 = 76 400
106,600 3.5/7.5 = 67 800
148,500 3.5/7.5 = 94 500

Σ 338,100 CY

NOTE: 25% SLAB FLR ON FILL

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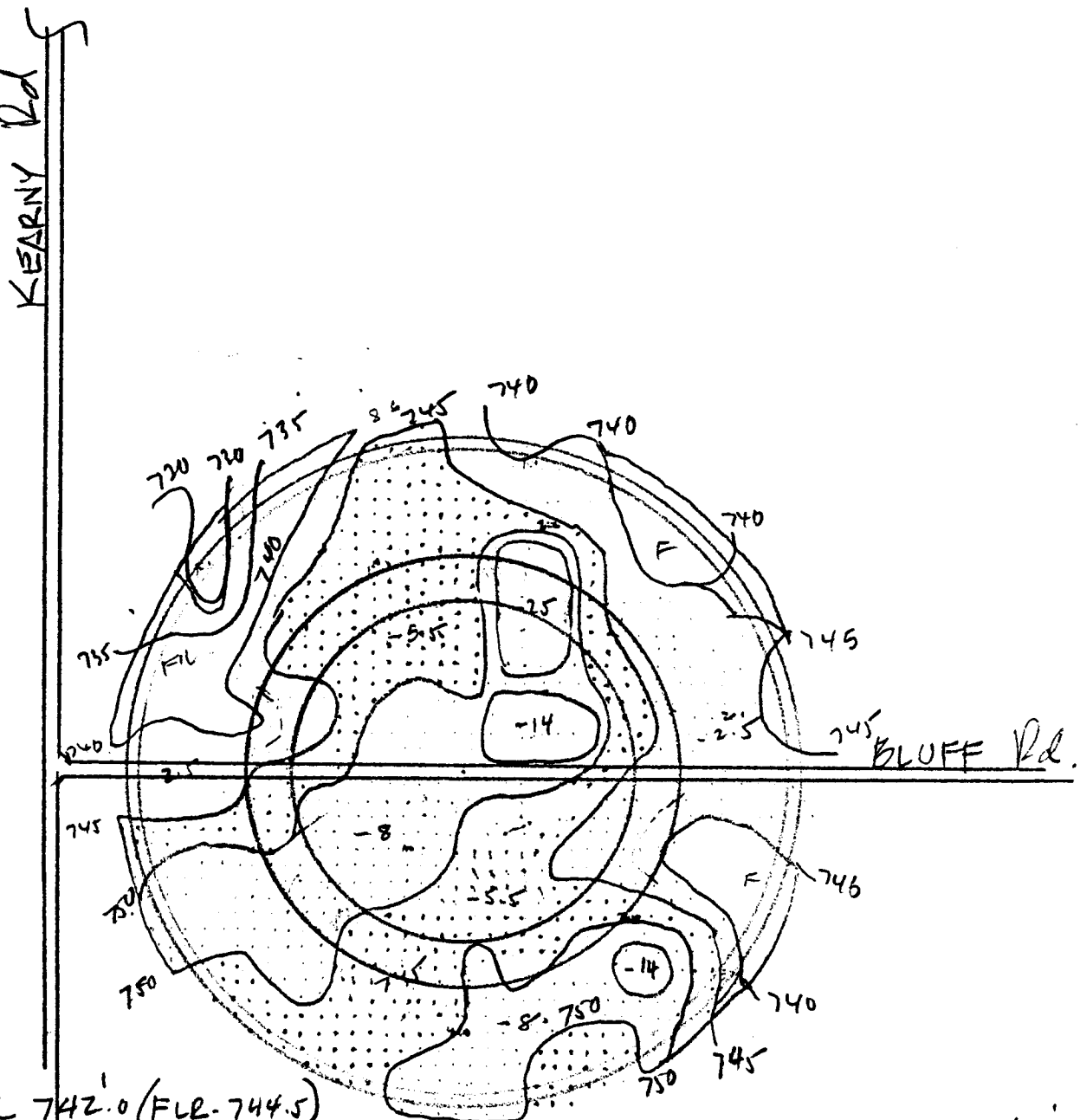
SITE "C"



EXCAV. EL 742'.0 (FLR-744.5)

A -25 = 32 (40×40) × 25/27 = 47400 CY
A -14 = 32 (1600) × 14/27 = 26600
A -8 = 310 (1600) × 8/27 = 147,000
A -5.5 = 442 (1600) × 5.5/27 = 144,000
A -2.5 = 300 (1600) × 2.5/27 = 44,400

Σ 410,000 CY

12% on fill

EXCAV EL 744.0'

× 23/25 = 43600
× 12/14 = 22800
× 6/8 = 110,200
× 3.5/5.5 = 91,600
N/A

268,200

37% ON FILL

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SITE "C"

EXCAV. TO 740.0 (0 FILL BELOW SLAB)

A-25 = 32 (1600) × 2/27 + 47,400 = 51 200
A-14 = 32 (1600) × 2/27 + 26,600 = 30 400
A-8 = 310 (1600) × 2/27 + 147,000 = 183 740
A-5.5 = 442 (1600) × 2/27 + 144,000 = 196 360
A-2.5 = 300 (1600) × 2/27 + 44,400 = 80 000

Note: Zero fill below floor slab

Σ 541,700 C.Y

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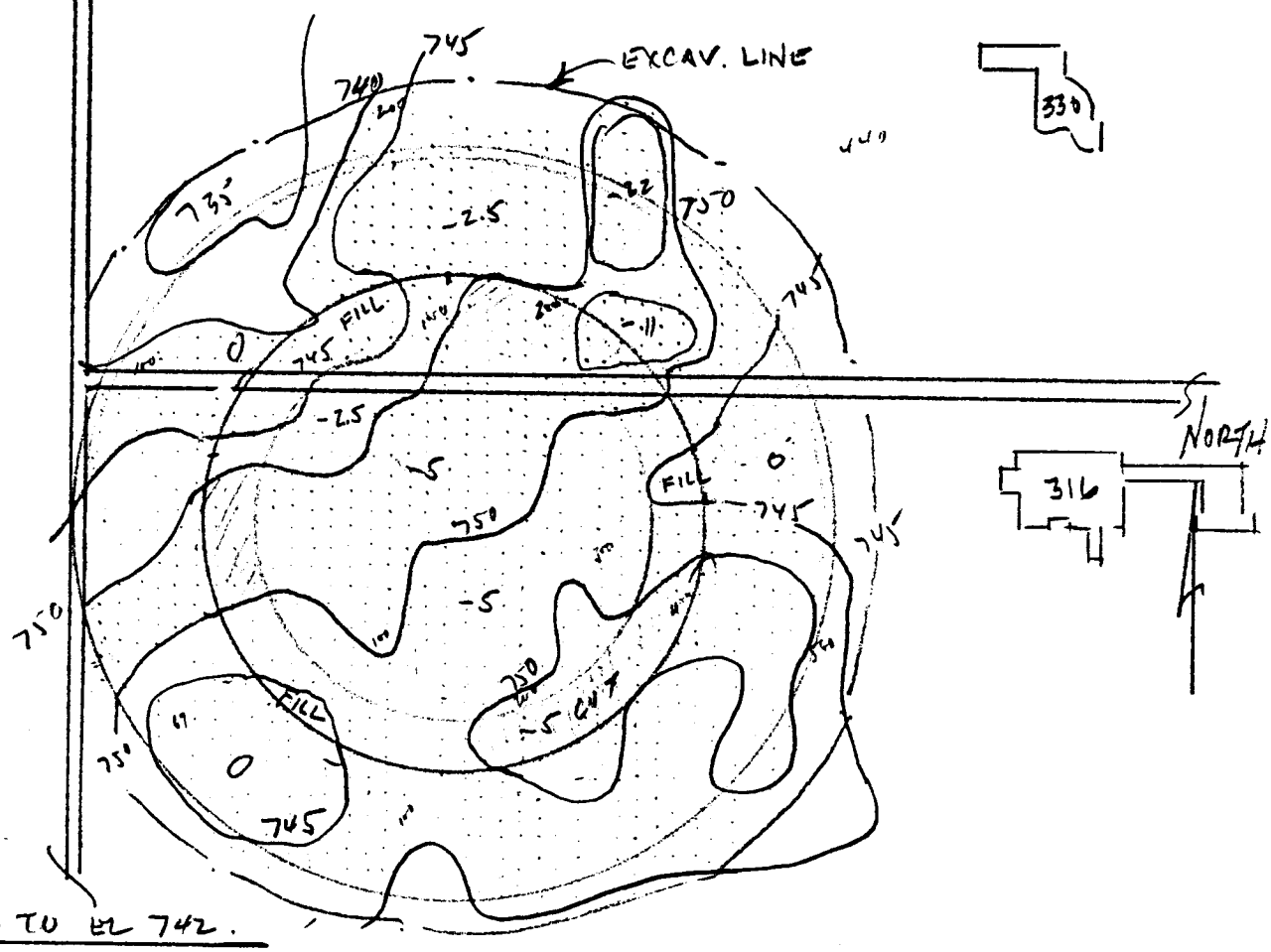
SITE "D" (KNIGHT SELECTED SITE) 300' SO. OF BLUFF Rd

EXCAV. TO EL 745-0 : (F.F. EL 747-5)

A-5	680 × (40×40)	× 5'/27	=	201,500 CY
A-22	25 × (160')	× 22/27	=	32 600
A-11	20 × (1600)	× 11/27	=	13 000
A-25	64 × (160')	× 25/27	=	9 500
				Σ 256,000 C.Y.



EXCAV. TO EL 742.

A-1 = 260 (1600) × 1'/27 = 15400 C.Y. + 396800 = 412,200

A-5 =	680 × 1600 × 3/27	+ 201500	=	322,400
A-22 =	25 × 1600 × 3/27	+ 32 600	=	37 000
A-11 =	20 × 1600 × 3/27	+ 13 000	=	16 500
A-25 =	64 × 1600 × 3/27	+ 9500	=	20 900

396,800

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