ASSOCIATES

A CONSTRUCTION CONSULTING FIRM

100 DUFFY AVENUE, HICKSVILLE NY 11801

TEL: (516) 932-1010

100% CDR ESTIMATE

BROOKHAVEN NATIONAL LAB

UPTON, NY 10023

July 28, 2016

VJ ASSOCIATES
100% CDR ESTIMATE
BROOKHAVEN NATIONAL LAB

UPTON, NY 10023

07/28/16

QUALIFICATIONS/EXCLUSIONS

1 This estimate is based on the 100% issue Conceptual Design Report for the BNL Core Facility Renovation project dated 7-1-2016 by HDR Architects, Inc.

2 Architectural and/or Engineering Fees are not included.

3 Overtime Labor rates are not anticipated or included.

4 No Asbestos Abatement/Hazmat Removal allowance is provided excepting removal of existing roofing.

5 Included are the following margins in addition to the Cost of the Work:

General Conditions	10%
GC Overhead and Profit	15%
Bid Contingency	BNL
Escalation	9.3%

6 Basis of Estimate
VJ Associates maintains a proprietary data base reflecting current market prices.
VJ Associates has substantial experience preparing estimates for Data Center projects.
VJ has substantial experience estimating projects in the greater area of Washington DC, New York, and Boston.
Material and labor prices are continuously updated based on information from suppliers and contractors.

7 The indicated escalation rate is based on the following resources:
VJ Associates Data Base
Bureau of Labor Statistics
Federal Reserve Bank

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SUMMARY

			VJ Associates
	DESCRIPTION		100% AMOUNT
1	GENERAL CONDITION		0
2	SITE WORK/DEMOLITION		891,504
3	CONCRETE		133,286
4	MASONRY		0
5	METAL		20,000
6	WOOD & PLASTICS		31,822
7	THERMAL & MOISTURE PROTECTION		2,620,000
8	DOORS AND WINDOWS		1,039,600
9	FINISHES		2,051,340
10	SPECIALTIES		3,000
11	FURNISHINGS		0
12	EQUIPMENT		0
13	SPECIAL CONSTRUCTION		132,757
15.1	FIRE PROTECTION		578,000
15.2	PLUMBING		85,500
15.3	HVAC		8,512,036
16	ELECTRICAL		15,748,548
			------------------------------
	subtotal		**$31,847,393**
	GENERAL CONDITIONS	10%	3,184,739
			------------------------------
	subtotal		$35,032,132
	OVERHEAD AND PROFIT	15%	5,254,820
			------------------------------
	subtotal		$40,286,952
	CONTINGENCY		0
			------------------------------
	subtotal		$40,286,952
	ESCALATION to Mid-Point of Construction	9.3%	3,746,687
	VJ Historical Data & Market/Economic Conditions		------------------------------
	CONSTRUCTION COSTS		**$44,033,638**

	ALTERNATES		
	ALT-01 Bypass Generator		$ 1,488,494
	ALT-02 Bypass UPS		$ 1,197,730
	ALT-03 GENERATOR/CUP		$ 1,388,409
	ALT-4: Chillers, Cooling Tower, HX, Pumps (3)		$ (799,939)
	ALT-05 1.2 MW Power		$ 10,448,466
	ALT-06 Exterior Envelope - Metal Wall Panels		$ 489,124
	ALT-07 Solar Hot Water		$ 20,740
	ALT-08 Exterior Envelope-Roof/Leak Detection System		$ (1,548,562)
	ALT-09 Build Phase II		$ 309,609
	ALT-10 UPS for Network Equipment (instead of ALT-02)		$ 672,086
	ALT-11 Fitout		$ 1,790,910
	ALT-12a Network Gaseous Fire Suppression FM 200		$ 80,193
	ALT-12b Network Gaseous Fire Suppression FM 200		$ 262,703
	ALT-13 RHIC/ATLAS - Direct ooling Infrastructure		$ 124,438

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	DESCRIPTION	QTY	UNIT	UNITS	AMOUNT
2	**SITE WORK/DEMOLITION**				
	Trench for electric run from HVAC to Building Mechanical room-Excavation		See electric		0
	Backfill		See electric		0
	General Demolition-Concrete,Masonry,Steel,Doors,Gypsum Board	53,643	sf	$ 15.00	804,645
	Mechanical Demolition	28,953	sf	$ 3.00	86,859

	TOTAL SITE WORK/DEMOLITION				**891,504**
3	**CONCRETE**				
	Trench for electric run from HVAC to Building Mechanical room		see electric		0
	Concrete Pad - Generator pads	600	sf	$ 10.00	6,000
	Concrete Sealer	53,643	sf	$ 2.00	107,286
	Misc	1	allow	$ 20,000.00	20,000

	TOTAL CONCRETE				**133,286**
5	**METAL**				
	Dunnage & Misc Metals	1	ls	$ 20,000.00	20,000

	TOTAL METAL				**20,000**
6	**WOOD & PLASTICS**				
	Rough carpentry:				
	Blocking & misc carpentry	53,643	ls	$ 0.50	26,822
	Millwork:				
	Pantry	1	ls	$ 5,000.00	5,000

	TOTAL WOOD & PLASTICS				**31,822**
7	**THERMAL & MOISTURE PROTECTION**				
	Ist floor roof 75,000sf	75,000	sf	$ 20.00	1,500,000
	Leak Detection System-dual roof	28,000	sf	$ 30.00	840,000
	Leak Detection System	28,000	sf	$ 10.00	280,000
					0

	TOTAL THERMAL & MOISTURE PROTECTION				**2,620,000**
8	**DOORS AND WINDOWS**				
	Demo	830	sf	$ 20.00	16,600
	Windows	830	sf	$ 100.00	83,000
	Demo	5,000	sf	$ 20.00	100,000
	Windows	5,000	sf	$ 100.00	500,000
	Demo for Louvers (Provide new openings)	2,000	sf	$ 20.00	40,000
	Louvers & Relate Work (Flashing, Interior Repairs & Steel Bracing)	2,000	sf	$ 150.00	300,000

	TOTAL DOORS AND WINDOWS				**1,039,600**
9	**FINISHES**				
	Ceilings:				
	ACT	1,680	sf	$ 7.00	11,760
	Mylar ACT	20,900	sf	$ 9.00	188,100
			sf		0
	Walls:				
	GWB - 2 hour 26'ht 6" stud	15,000	sf	$ 22.00	330,000
	GWB - 2 hour 13''ht 6" stud	40,000	sf	$ 18.00	720,000
	GWB - 2 hour 10''ht 6" stud	6,000	sf	$ 15.00	90,000
	GWB - Non-Rated 13'ht 3 5/8" Stud	15,000	sf	$ 12.00	180,000
	Ceramic Tile	2	loc	$ 2,500.00	5,000
	Floors: Raised Floor/Static Dissipative Vinyl Tile				
	Raised Floor w/Dissipative Vinyl Tile	14350	sf	$ 25.00	358,750
	Static Dissipative Vinyl Tile	6550	sf	$ 5.00	32,750
	Carpet Tile	1680	sf	$ 6.00	10,080
	Base	4,300	lf	$ 3.00	12,900
	Paints and Coatings:				
	Paint - GWB Walls -	140,000	sf	$ 0.80	112,000

	TOTAL FINISHES				**2,051,340**
10	**SPECIALTIES**				
	Toilet Accessories & Toilet Patitions	1	allow	$ 3,000.00	3,000

	TOTAL SPECIALTIES				**3,000**
12	**EQUIPMENT**				
	Floor Mounted Infrastructure (Polargy-Cold Aisle Containment-Cary Frame)		See HVAC		0

	TOTAL EQUIPMENT				**0**

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	DESCRIPTION	QTY	UNIT	UNITS	AMOUNT
13	**SPECIAL CONSTRUCTION**				
	ELECTRICAL COMMUNICATIONS				
	Remove Abandoned Cable	80	hrs	$ 133.58	10,686
	Corning ALTOS 288 SM Fiber Optics Cable OS2	5,000	lf	$ 6.98	34,900
	1 Inner Duct, Plenum Ratred	1,500	lf	$ 5.29	7,935
	Labor, Pull Fiber Thru Manholes Route 1-3m7d	168	hrs	$ 133.58	22,441
	Labor, Pull Fiber Thru Manholes Route 1-2m4d	64	hrs	$ 133.58	8,549
	Labor, Pull Fiber Thru Manholes Route 2-3m4d	96	hrs	$ 133.58	12,824
	Labor, Pull Fiber Thru Manholes Route 2-2m2d	32	hrs	$ 133.58	4,275
	LC Terminations 288x4	1	ls	$ 14,049.00	14,049
	Terminate Both Ends of Cable 2m4d	64	ls	$ 133.58	8,549
	Testing/Labling 2m2d	64	hrs	$ 133.58	8,549
					0

	TOTAL SPECIAL CONSTRUCTION				**132,757**
	FIRE PROTECTION				
	Remove existing sprinkler system, within the data center and Office	1	allow	10,000.00	10,000
	New double interlocked pre-action system, includes valve assembly, sprinkler head, distribution piping and Main/Loop pipes assumed 4" dia. (Data Center)	12,700	SF	15.00	190,500
	New Wet system, includes sprinkler head, distribution piping and Main/Loop pipes assumed 2 1/2"-3" dia.	36,300	SF	10.00	363,000
	FM 200 System, Assume 300 lbs Main/Reserve NET 1,000SF		see alt 12		
	NSLS see alt 11 fit out 3,450sf		see alt 11		
	Seismic bracing and supports	1	LS	7,000.00	7,000
	Hydraulic Calculation and Testing	1	LS	2,000.00	2,000
	Shop drawings/Submittals	1	LS	2,000.00	2,000
	Identification and Cleaning	1	LS	1,000.00	1,000
	Cutting and Patching	1	LS	2,500.00	2,500

	TOTAL FIRE PROTECTION				**578,000**
15.2	**PLUMBING**				
	Bathrooms & Pantry Fixtures	1	ls	30000	30,000
	Miscellaneous				
	Remove existing cw piping within data center, Assumed 250 LF	1	LS	3000	3,000
	New make up water for HVAC, Includes backflow preventer	1	LS	20000	20,000
	Floor Drains -Modify Existing w/some new drains	1	ls	30000	30,000
	Miscellaneous				
	Shop Drawings, Submittals, cutting , patching and Testing	1	LS	2,500	2,500

	Subtotal Plumbing				85,500
15.3	**HVAC**				
	Equipment				
	CH-1&2 Water Cooled Chillers 310 Tons	2	EA	$ 193,296.00	386,592
	CT-1&2 Cooling Tower 310 Tons	2	EA	$ 63,057.60	126,115
	SHX-1,2&3 Heat Exchanger capacity at 4.320 MBtuh	3	EA	$ 51,996.00	155,988
	HX-1&2 Flat Plate HX ; 300 gpm	2	EA	$ 42,729.60	85,459
	HWP-1,2&3 Hot Water Preheat Pumps 435 gpm, 70 ft of head, 40 HP	3	EA	$ 9,732.00	29,196
	PCHWP-1,2&3 Primary Chilled Water Pumps 620 gpm, 70 ft of head, 20 HP	3	EA	$ 7,932.00	23,796
	CWP-1,2&3 Condenser Water Pumps 930 gpm, 80 ft of head, 25 HP	3	EA	$ 8,532.00	25,596
	DCHWP-1,2&3 Direct Cooling Water Pumps 300 gpm, 70 ft of head, 10 HP	3	EA	$ 4,665.60	13,997
	VFD (Supply Only / Installed by Electrical Contractor)	1	LS	$ 50,400.00	50,400
	Dry Air Economizer 50,000 CFM	7	EA	$ 313,264.70	2,192,853
	Dry Air Economizer 12,500 CFM	4	EA	$ 90,996.00	363,984
	DOAS Units 2,500 CFM	2	EA	$ 35,328.00	70,656
	Thermal Storage Tank 600 Gallon	1	EA	$ 6,465.60	6,466
	Floor Mounted Infrastructure (Polargy - Hot Aisle Containment-Cary Frame)	1	LS	$ 500,000.00	500,000
	Piping				
	Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 8.60	423,043
	Direct Cooling Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 3.10	152,492
	Campus Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 3.60	177,088
	Steam & condensate Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 3.90	191,845
	Hot Water Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 6.30	309,903
	Condenser Water Pipe, fittings, valves, insulation, equipment connection etc	49,191	GSF	$ 5.70	280,389
	Condensate Drain Pipe, fittings, hangers, insulation etc	49,191	GSF	$ 1.60	78,706
	Ducting and accessories				
	GI Duct	156,208	LB	$ 11.00	1,718,286
	FG Insulation	21,088	SF	$ 7.00	147,614
	Liner	6,326	SF	$ 8.00	50,610
	Grills & Diffusers	1	LS	$ 22,485.60	22,486
	FDs, FSDs, Louvers, Motorized Dampers etc	1	LS	$ 13,740.00	13,740
	DD Control				
	Control Points	607	EA	$ 1,050.00	637,350
	Software, programming, training, tie in	1	LS	$ 26,388.00	26,388
	Miscellaneous				
	Shop Drawings & Submittals	1	LS	$ 20,000.00	20,000
	Identification and tagging	1	LS	$ 50,000.00	50,000
	Rigging	1	LS	$ 101,000.00	101,000
	Air & Water Balancing	1	LS	$ 80,000.00	80,000
	Testing and commissioning				By BNL

	TOTAL HVAC				**8,512,036**

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	DESCRIPTION	QTY	UNIT	UNITS	AMOUNT
16.0	**ELECTRICAL**				
	SITE WORKS				
	MV Duct bank - Manholes to HVSG-A,B				
	3W Splice in existing Feeders (725-1, 725-2)	2	EA	3,180.00	6,360
	6W Duct bank to HVSG (1 Active, 5 Spare) - 725-1, 725-2 to HVSG-A,B				
	5" PVC Sch 40	3,930	LF	35.92	141,166
	3-1/C - 500 MCM , 15 KV	655	LF	52.20	34,191
	Concrete	317	CY	387.00	122,550
	Excavation & backfill	1,267	CY	82.80	104,880
	3-1/C - 500 MCM , 15 KV in exisitng Ductbank	600	LF	52.20	31,320
	Remove existing CU Comm Cables fron one Duct, Provide (3)-3" Cell Fabric Innerduct	4,632	LF	16.53	76,567
	Manholes , Pull boxes				
	Manholes	2	EA	26,250.00	52,500
	Pull boxes - NEMA 4X	4	EA	3,180.00	12,720
	Bldg. Penetrations	4	Locs	6,888.00	27,552
	Generator to HVSG-G				
	5" PVC Sch 40	150	LF	35.92	5,388
	3-1/C - 500 MCM , 15 KV	150	LF	52.20	7,830
	Concrete	6	CY	387.00	2,150
	Excavation & backfill	22	CY	82.80	1,840
	HVSG-G to Feeders to HVSG - A, B				
	5" PVC Sch 40	100	LF	35.92	3,592
	3-1/C - 500 MCM , 15 KV	100	LF	52.20	5,220
	Concrete	4	CY	387.00	1,548
	Excavation & backfill	16	CY	82.80	1,325
	EMERGENCY POWER				
	POWER EQUIPMENT				
	1750KW Generators, 13.8KV w/ Load bank	2	EA	937,100.00	1,874,200
	HVSG-G-1200A, 15KV	1	EA	1,246,300.00	1,246,300
	SYSTEM 1				
	15KV EQUIPMENT				
	HVSG-A-1200A-15KV	1	EA	565,200.00	565,200
	SYS-1 (15 kV non-fused load interrupter switches-2Ea, 2000KVA X'mer)	1	EA	273,540.00	273,540
	480V EQUIPMENT				
	SWGR-1 - 3000A	1	EA	297,600.00	297,600
	ATS-1 - 1200A	1	EA	55,050.00	55,050
	MDP-1 - 1200A	1	EA	103,800.00	103,800
	UPS DOWNSTREAM				
	T-UPS-1 - 1200 KVA	1	EA	625,900.00	625,900
	M-UPS-1 - 50 KVA	1	EA	98,700.00	98,700
	TUSG-1-2000A-480V	1	EA	106,560.00	106,560
	MUDP-1-100A-480V	1	EA	7,650.00	7,650
	SS-1A,1B-2000A-480V	2	EA	41,610.00	83,220
	TUSB-1A,1B-2000A-480V	2	EA	136,560.00	273,120
	300KVA X'mers - K20 shielded isolation 480-208Y/120V transformers	6	EA	60,210.00	361,260
	1000A enclosed shunt trip CB - Disconnects at the secondary X'mer	6	EA	9,540.00	57,240
	TULDP-1A1 thru 1A3, 1B1 thru 1B3 - 1200A - 208Y/120V	6	EA	90,240.00	541,440
	TUHDP-1A1 , 1B1 - 208Y/120V	2	EA	90,240.00	180,480
	Overhead bus track above each rack row with snap-in power taps to serve individual racks	875	LF	395.40	345,975
	Ckt Breaker Drop Cords - Assume	300	EA	816.00	244,800
	Misc. Floor Panels Reqd	5	EA	12,300.00	61,500
	POWER FEEDERS				
	TO SS-1, 2				
	4" EMT	600	LF	35.32	21,192
	3-1/C - 500 MCM , 15 KV	600	LF	52.20	31,320
	PB to Swgr				
	4" EMT	300	LF	35.32	10,596
	#500 MCM	1,200	LF	16.50	19,800
	SWGR-1 to TUPS-1				
	4" EMT	240	LF	35.32	8,477
	#500 MCM	960	LF	16.50	15,840
	SWGR-1 to ATS-1,MDP-1				
	4" EMT	180	LF	35.32	6,358
	#500 MCM	720	LF	16.50	11,880
	MDP-1 to MUPS-1				
	4" EMT	25	LF	35.32	883
	#500 MCM	100	LF	16.50	1,650
	MUPS-1 to MUPD-1				
	4" EMT	15	LF	35.32	530
	#500 MCM	60	LF	16.50	990
	T-UPS-1 to T-USG-1				
	4" EMT	100	LF	35.32	3,532
	#500 MCM	400	LF	16.50	6,600
	T-UPS-1 to SS-1A,1B				
	4" EMT	200	LF	35.32	7,064
	#500 MCM	800	LF	16.50	13,200
	SS-1A,1B to T-UDP-1A,1B				
	4" EMT	250	LF	35.32	8,830
	#500 MCM	1,000	LF	16.50	16,500
	1200A Feeders				
	4" EMT	2,880	LF	35.32	101,722
	#500 MCM	11,520	LF	16.50	190,080

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	DESCRIPTION	QTY	UNIT	UNITS	AMOUNT
	SYSTEM 2				
	15KV EQUIPMENT				
	SYS-2(15 kV non-fused load interrupter switches-2Ea, 2000KVA X'mer)	1	EA	273,540.00	273,540
	480V EQUIPMENT				
	SWGR-2 - 3000A	1	EA	297,600.00	297,600
	MDP-2 - 1200A	1	EA	103,800.00	103,800
	UPS DOWNSTREAM				
	T-UPS-2 - 1200 KVA	1	EA	625,900.00	625,900
	M-UPS-2 - 50 KVA	1	EA	98,700.00	98,700
	TUSG-2-2000A-480V	1	EA	106,560.00	106,560
	MUDP-2-100A-480V	1	EA	7,650.00	7,650
	SS-2A,2B-2000A-480V	2	EA	41,610.00	83,220
	TUSB-2A,2B-2000A-480V	2	EA	136,560.00	273,120
	300KVA X'mers - K20 shielded isolation 480-208Y/120V transformers	8	EA	60,210.00	481,680
	1000A enclosed shunt trip CB - Disconnects at the secondary X'mer	8	EA	9,540.00	76,320
	TUDP-2A1 thru 2A4, 2B1 thru 2B4 - 1200A - 208Y/120V	8	EA	90,240.00	721,920
	Overhead bus track above each rack row with snap-in power taps to serve individual racks	875	LF	395.40	345,975
	Ckt Breaker Drop Cords - Assume	300	EA	816.00	244,800
	POWER FEEDERS				
	4" EMT	600	LF	35.32	21,192
	3-1/C - 500 MCM , 15 KV	600	LF	52.20	31,320
	PB to Swgr				
	4" EMT	300	LF	35.32	10,596
	#500 MCM	1,200	LF	16.50	19,800
	SWGR-1 to TUPS-1				
	4" EMT	280	LF	35.32	9,890
	#500 MCM	1,120	LF	16.50	18,480
	SWGR-1 to ATS-1,MDP-1				
	4" EMT	186	LF	35.32	6,570
	#500 MCM	744	LF	16.50	12,276
	MDP-1 to MUPS-1				
	4" EMT	30	LF	35.32	1,060
	#500 MCM	120	LF	16.50	1,980
	MUPS-1 to MUPD-1				
	4" EMT	20	LF	35.32	706
	#500 MCM	80	LF	16.50	1,320
	T-UPS-1 to T-USG-1				
	4" EMT	120	LF	35.32	4,238
	#500 MCM	480	LF	16.50	7,920
	T-UPS-1 to SS-1A,1B				
	4" EMT	220	LF	35.32	7,770
	#500 MCM	880	LF	16.50	14,520
	SS-1A,1B to T-UDP-1A,1B				
	4" EMT	270	LF	35.32	9,536
	#500 MCM	1,080	LF	16.50	17,820
	1200A Feeders				
	4" EMT	3,000	LF	35.32	105,960
	#500 MCM	12,000	LF	16.50	198,000
	BY PASS				
	15 KV				
	HVSG-B-1200A-15KV	1	EA	565,200.00	565,200
	SYS-B (15 kV non-fused load interrupter switches-2Ea, 2000KVA X'mer)	1	EA	273,540.00	273,540
	POWER FEEDERS				
	TO SS-1, 2				
	4" EMT	600	LF	35.32	21,192
	3-1/C - 500 MCM , 15 KV	600	LF	52.20	31,320
	PB to Swgr				
	4" EMT	300	LF	35.32	10,596
	#500 MCM	1,200	LF	16.50	19,800
	Lighting, Lighting Control system & Cktry	1	LS	333,500.00	333,500
	Wiring Devices & Cktry	1	LS	58,200.00	58,200
	Fire Alarm System including VESDA System	49,191	SF	7.00	344,337
	Telecommunications (Cabling & Infrastructure only)				
	FO Redundant Feed	650	LF	20.28	13,182
	Telecommunications (Cabling only)	1	LS	210,900.00	210,900
	4" EMT	350	LF	35.32	12,362
	2-1/2" EMT	60	LF	22.82	1,369
	24" W X 4" D Wire Basket Tray	800	LF	74.70	59,760
	12" W X 4"D Fiber runner	800	LF	55.80	44,640
	Spit outs over each rack	1	LS	29,880.00	29,880
	SECURITY SYSTEM				
	Card Readers & Tie into existing System	14	EA	1,590.00	22,260
	CCTV Cameras & Tie into existing System	14	EA	2,766.00	38,724
	MISC				
	Grounding including Raised Floor Grounding at Data Halls	1	LS	137,900.00	137,900
	Leak Detection System	1	LS	77,600.00	77,600
	Allowance for Misc. Feeders for Lighting & Receptacles Panels	1	LS	87,300.00	87,300
	Power Monitoring System	1	LS	66,900.00	66,900
	Mechanical Equipment Connections	1	LS	300,700.00	300,700
	30A ATS w/feeders - For Dry Air Economizers.	4	ea	3,850.00	15,400
	100A ATS w/feeders - For Dry Air Economizers.	14	ea	8,600.00	120,400
	Power to exterior cooling tower (100 LF concrete encased)	100	LF	267.60	26,760
	EPMS System	1	LS	16,770.00	16,770
	Temp Power & Lighting	1	ls	36,000.00	36,000
	Tie into DDC System	1	LS	11,040.00	11,040
	Testing & Commissioning		BNL		-

					15,748,548

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SCHEMATIC ESTIMATE
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100% Design-Alternates

7/11/2016

DESCRIPTION	QTY	UNIT	UNITS	AMOUNT
ALT-01 Bypass Generator Delete				
1750KW Generators, 13.8KV w/ Load bank	1	EA	$ 937,100.00	937,100
15KV Ckt Breaker	1	EA	$ 131,900.00	131,900
5" PVC Sch 40	100	LF	$ 35.92	3,592
3-1/C - 500 MCM , 15 KV	50	LF	$ 52.20	2,610
Concrete	2	CY	$ 387.00	774
Excavation & backfill	7	CY	$ 82.80	580
Total				1,076,556
			10%	107,656
				1,184,211
			15%	177,632
				1,361,843
			9.3%	126,651

ALT-01 Bypass Generator				**1,488,494**
ALT-02 Bypass UPS				
UPS DOWNSTREAM				
T-UPS-B - 1200 KVA	1	EA	$ 625,900.00	625,900
M-UPS-B - 50 KVA	1	EA	$ 98,700.00	98,700
T-USGB-2000A	1	EA	$ 134,010.00	134,010
MUDP-B-100A-480V	1	EA	$ 7,650.00	7,650
Total				866,260
			10%	86,626
				952,886
			15%	142,933
				1,095,819
			9.3%	101,911

ALT-02 Bypass UPS				**1,197,730**
ALT-03 Generator/CUP				
1200KW Generators, 13.8KV w/ Load bank at CUP	1	EA	$ 701,750.00	701,750
New sections to the existing 15kV outdoor switchgear for the paralleling controls and a new 15kV circuit breaker	1	LS	$ 290,700.00	290,700
5" PVC Sch 40	170	LF	$ 35.92	6,106
3-1/C - 500 MCM , 15 KV	80	LF	$ 52.20	4,176
Concrete	2	CY	$ 387.00	774
Excavation & backfill	8	CY	$ 82.80	662
Total				1,004,169
			10%	100,417
				1,104,586
			15%	165,688
				1,270,274
			9.3%	118,135

ALT-03 Generator/CUP				**1,388,409**
Alternate-4: Chillers, Cooling Tower, HX, Pumps (3) Campus Utility Pipe for CW				
HVAC				
Equipment				
CH-2 Water Cooled Chillers 310 Tons	(1)	EA	$ 193,296.00	-193,296
CT-2 Cooling Tower 310 Tons	(1)	EA	$ 63,057.60	-63,058
HX-2 Flat Plate HX 110 tons/each; 265 gpm @ 10ΔT/each	(1)	EA	$ 39,463.20	-39,463
PCHWP-3 Primary Chilled Water Pumps 620 gpm, 70 ft of head, 20 HP	(1)	EA	$ 11,798.40	-11,798
CWP-3 Condenser Water Pumps 930 gpm, 80 ft of head, 25 HP	(1)	EA	$ 8,532.00	-8,532
DCHWP-3 Direct Cooling Water Pumps 300 gpm, 70 ft of head, 10 HP	(1)	EA	$ 4,665.60	-4,666
VFD (Furnish only)	(1)	LS	$ 9,000.00	-9,000
Piping				
Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	(1)	LS	$ 31,065.60	-31,066
Direct Cooling Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	(1)	LS	$ 27,120.00	-27,120
Campus Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	(1)	LS	$ 24,288.00	-24,288
Steam & condensate Pipe, fittings, valves, insulation, equipment connection etc	(1)	LS	$ 23,421.60	-23,422
Condenser Water Pipe, fittings, valves, insulation, equipment connection etc	(1)	LS	$ 29,652.00	-29,652
Condensate Drain Pipe, fittings, hangers, insulation etc	(1)	LS	$ 4,905.60	-4,906
DD Control				
Control Points	(68)	EA	$ 1,079.40	-73,399
Programming, training, tie in	(1)	LS	$ 3,998.40	-3,998
Miscellaneous				
Shop Drawings & Submittals	(1)	LS	$ 3,000.00	-3,000
Identification and tagging	(1)	LS	$ 5,250.00	-5,250
Rigging	(1)	LS	$ 8,524.80	-8,525
Air & Water Balancing	(1)	LS	$ 14,119.20	-14,119
Testing and commissioning				By BNL
				-578,557
			10%	-57,856
				-636,413
			15%	-95,462
				-731,875
			9.3%	-68,064

Alternate-4: Chillers, Cooling Tower, HX, Pumps (3)				**-799,939**

Alternate-5: 1.2 MW POWER				
HVAC				
Equipment				
CH-3 Water Cooled Chillers 310 Tons	1	EA	$ 193,296.00	193,296
CT-3 Cooling Tower 310 Tons	1	EA	$ 63,057.60	63,058
HX-3 Flat Plate HX 110 tons/each; 265 gpm @ 10ΔT/each	1	EA	$ 39,463.20	39,463
PCHWP-4 Primary Chilled Water Pumps 620 gpm, 70 ft of head, 20 HP	1	EA	$ 11,798.40	11,798
CWP-4 Condenser Water Pumps 930 gpm, 80 ft of head, 25 HP	1	EA	$ 8,532.00	8,532
DCHWP-4 Direct Cooling Water Pumps 300 gpm, 70 ft of head, 10 HP	1	EA	$ 4,665.60	4,666
VFD (Furnish only)	1	LS	$ 9,000.00	9,000
Dry Air Economizer 50,000 CFM	3	EA	$ 313,264.70	939,794
Piping				
Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	1	LS	$ 31,065.60	31,066
Condensate Drain Pipe, fittings, hangers, insulation etc	1	LS	$ 4,905.60	4,906
Ducting and accessories				
GI Duct	26,134	LB	$ 12.00	313,609
FG Insulation	700	SF	$ 9.00	6,300
Liner	210	SF	$ 8.49	1,783
Grills & Diffusers	1	LS	$ 11,984.80	11,985
FDs, FSDs, Louvers, Motorized Dampers etc	1	LS	$ 2,006.40	2,006
DD Control				
Control Points	140	EA	$ 1,079.40	151,116
Programming, training, tie in	1	LS	$ 3,998.40	3,998
Miscellaneous				
Shop Drawings & Submittals	1	LS	$ 3,000.00	3,000
Identification and tagging	1	LS	$ 5,600.00	5,600
Rigging	1	LS	$ 20,779.20	20,779
Air & Water Balancing	1	LS	$ 16,516.80	16,517
ELECTRICAL				
SYSTEM 2				
1750kw Generator w/ associated Feeders	1	ea	$ 998,100.00	998,100
15KV EQUIPMENT				
SUS-3(15 kV non-fused load interrupter switches-2Ea, 2000KVA X'mer)	1	EA	$ 273,540.00	273,540
Allowance for associated MV Feeders and Equipment Upgrade	1	LS	$ 398,100.00	398,100
480V EQUIPMENT				
SWGR-3 - 3000A	1	EA	$ 297,600.00	297,600
MDP-3 - 1200A	1	EA	$ 103,800.00	103,800
UPS DOWNSTREAM				
T-UPS-3 - 1200 KVA	1	EA	$ 625,900.00	625,900
M-UPS-3 - 50 KVA	1	EA	$ 98,700.00	98,700
TUSG-3-2000A-480V	1	EA	$ 106,560.00	106,560
MUDP-3-100A-480V	1	EA	$ 7,650.00	7,650
SS-3A,3B-2000A-480V	2	EA	$ 41,610.00	83,220
TUSB-3A,3B-2000A-480V	2	EA	$ 136,560.00	273,120
300KVA X'mers - K20 shielded isolation 480-208Y/120V transformers	8	EA	$ 60,210.00	481,680
1000A enclosed shunt trip CB - Disconnects at the secondary X'mer	8	EA	$ 9,540.00	76,320
TUDP-2A1 thru 2A4, 2B1 thru 2B4 - 1200A - 208Y/120V	8	EA	$ 90,240.00	721,920
Overhead bus track above each rack row with snap-in power taps to serve individual racks	875	LF	$ 395.40	345,975
Ckt Breaker Drop Cords - Assume	300	EA	$ 816.00	244,800
POWER FEEDERS				
SUS-3 to Swgr - 3				
4" EMT	300	LF	$ 35.32	10,596
#500 MCM	1,200	LF	$ 16.50	19,800
To SS-3A,3B				
4" EMT	500	LF	$ 35.32	17,660
#500 MCM	2,000	LF	$ 16.50	33,000
SWGR-3 to TUPS-3				
4" EMT	280	LF	$ 35.32	9,890
#500 MCM	1,120	LF	$ 16.50	18,480
SWGR-3 to MDP-3				
4" EMT	186	LF	$ 35.32	6,570
#500 MCM	744	LF	$ 16.50	12,276
MDP-3 to MUPS-3				
4" EMT	30	LF	$ 35.32	1,060
#500 MCM	120	LF	$ 16.50	1,980
MUPS-3 to MUPD-3				
4" EMT	20	LF	$ 35.32	706
#500 MCM	80	LF	$ 16.50	1,320
T-UPS-3 to T-USG-3				
4" EMT	120	LF	$ 35.32	4,238
#500 MCM	480	LF	$ 16.50	7,920
T-UPS-3 to SS-3A,3B			$ -	0
4" EMT	220	LF	$ 35.32	7,770
#500 MCM	880	LF	$ 16.50	14,520
SS-3A,3B to T-UDP-3A,3B				
4" EMT	270	LF	$ 35.32	9,536
#500 MCM	1,080	LF	$ 16.50	17,820
450A Feeders				
2-1/2" EMT	480	LF	$ 22.82	10,954
#4/0	1,920	LF	$ 8.80	16,896
1200A Feeders				
4" EMT	3,000	LF	$ 35.32	105,960
#500 MCM	12,000	LF	$ 16.50	198,000
To SS-3A,3B				
4" EMT	500	LF	$ 35.32	17,660
#500 MCM	2,000	LF	$ 16.50	33,000
				7,556,868
			10%	755,687
				8,312,555
			15%	1,246,883
				9,559,438
			9.3%	889,028

TOTAL Alternate-5: 1.2 MW POWER				**10,448,466**

	ALT-06 Exterior Envelope - Metal Wall Panels				
	Refurbish Metal Wall Panel	40,200	sf	$ 8.00	321,600
				$ 0.10	32,160
					353,760
				10%	35,376
					389,136
				15%	58,370
					447,506
				9.3%	41,618

	ALT-06 Exterior Envelope - Metal Wall Panels				**489,124**
	ALT-07 Solar Hot Water	1	ls	$ 15,000.00	15,000
				10%	1,500
					16,500
				15%	2,475
					18,975
				9.3%	1,765

	ALT-07 Solar Hot Water				**20,740**
	ALT-08 Exterior Envelope-Dual Membrane/Leak Detection				
	THERMAL & MOISTURE PROTECTION				
	Leak Detection System-dual roof	(28,000)	sf	$ 30.00	-840,000
	Leak Detection System	(28,000)	sf	$ 10.00	-280,000
					-1,120,000
				10%	-112,000
					-1,232,000
				15%	-184,800
					-1,416,800
				9.3%	-131,762

	ALT-08 Exterior Envelope-Dual Membrane/Leak Detection				**-1,548,562**
	ALT-09 Build Phase II				
	Demolition	5,300	sf	$ 5.00	26,500
	Architectural	5,300	sf	$ 3.00	15,900
	2hr walls	5,300	sf	$ 3.00	15,900
	Doors	5,300	sf	$ 0.25	1,325
	Ventilation	5,300	sf	$ 7.00	37,100
	Fire Protection	5,300	sf	$ 5.00	26,500
	Fire Alarm	5,300	sf	$ 5.00	26,500
	Power	5,300	sf	$ 7.00	37,100
	Lighting	5,300	sf	$ 7.00	37,100
	Total				223,925
				10%	22,393
					246,318
				15%	36,948
					283,265
				9.3%	26,344

	ALT-09 Build Phase II				**309,609**
	ALT-10 UPS for Network Equipment				
	T-UPS-N-100KVA	1	EA	$ 190,500.00	190,500
	T-UHDP-N-225A	1	EA	$ 6,450.00	6,450
	SS-NA,NB - 200A	2	EA	$ 7,470.00	14,940
	112.5KVA X'mers	2	EA	$ 19,266.64	38,533
	TULDP-NA,NB-400A	2	EA	$ 13,140.00	26,280
	400A CBS	2	EA	$ 6,270.00	12,540
	Allowace for Bus Track & CB Drop cords	1	Allow	$ 140,100.00	140,100
	400A Feeders	200	LF	$ 101.32	20,264
	200-225A Feeders	600	LF	$ 58.00	34,800
	X'mer Primary Feedes	40	LF	$ 42.00	1,680
	Total				486,087
				10%	48,609
					534,696
				15%	80,204
					614,900
				9.3%	57,186

	ALT-10 UPS for Network Equipment				**672,086**

	Alternate-11: Fit out				
	HVAC				
	Equipment				
	Dry Air Economizer 50,000 CFM	2	EA	$ 313,264.70	626,529
	Piping				
	Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	1	LS	$ 20,709.60	20,710
	Condensate Drain Pipe, fittings, hangers, insulation etc	1	LS	$ 3,270.00	3,270
	Ducting and accessories				
	GI Duct	16,823	LB	$ 12.00	201,873
	FG Insulation	467	SF	$ 9.00	4,200
	Liner	140	SF	$ 8.49	1,188
	Grills & Diffusers	1	LS	$ 1,323.20	1,323
	FDs, FSDs, Louvers, Motorzed Dampers etc	1	LS	$ 1,337.20	1,337
	DD Control				
	Control Points	48	EA	$ 1,079.40	51,811
	Programming, training, tie in	1	LS	$ 2,865.60	2,866
	Miscellaneous				
	Shop Drawings & Submittals	1	LS	$ 2,000.00	2,000
	Identification and tagging	1	LS	$ 4,200.00	4,200
	Rigging	1	LS	$ 6,393.60	6,394
	Air & Water Balancing	1	LS	$ 5,328.00	5,328
	Testing and commissioning				By BNL
	ELECTRICAL	3,450	sf	$ 20.00	69,000
	Fit out of NSLS	3,450	ls	$ 40.00	138,000
	30" high access floor	3,450	sf	$ 30.00	103,500
	Mylar ACT	3,450	sf	$ 9.00	31,050
	Sprinklers	3,450	sf	$ 6.00	20,700
					1,295,278
				10%	129,528
					1,424,806
				15%	213,721
					1,638,527
				9.3%	152,383

	Alternate-11: NSLS II BES Fit out				**1,790,910**
	ALT-12A Fire Suppression FM-200 Network	1	ls	$ 48,000.00	48,000
	1000SF Network				10,000
					58,000
				10%	5,800
					63,800
				15%	9,570
					73,370
				9.3%	6,823

	ALT-12 Fire Suppression FM-200				**80,193**
	ALT-12B Fire Suppression FM-200 Tapes Storage	1	ls	$ 180,000.00	180,000
	3600sf Tapes				10,000
					190,000
				10%	19,000
					209,000
				15%	31,350
					240,350
				9.3%	22,353

	ALT-12 Fire Suppression FM-200				**262,703**
	ALT-13 RHIC/ATLAS - DIRECT COOLING INFRASTUCTURE				
	Piping				
	Direct Cooling Chilled Water Pipe, fittings, valves, insulation, equipment connection etc	1	ls	$ 80,000.00	80,000
					10,000
					90,000
				10%	9,000
					99,000
				15%	14,850
					113,850
				9.3%	10,588

	ALT-13 RHIC/ATLAS				**124,438**