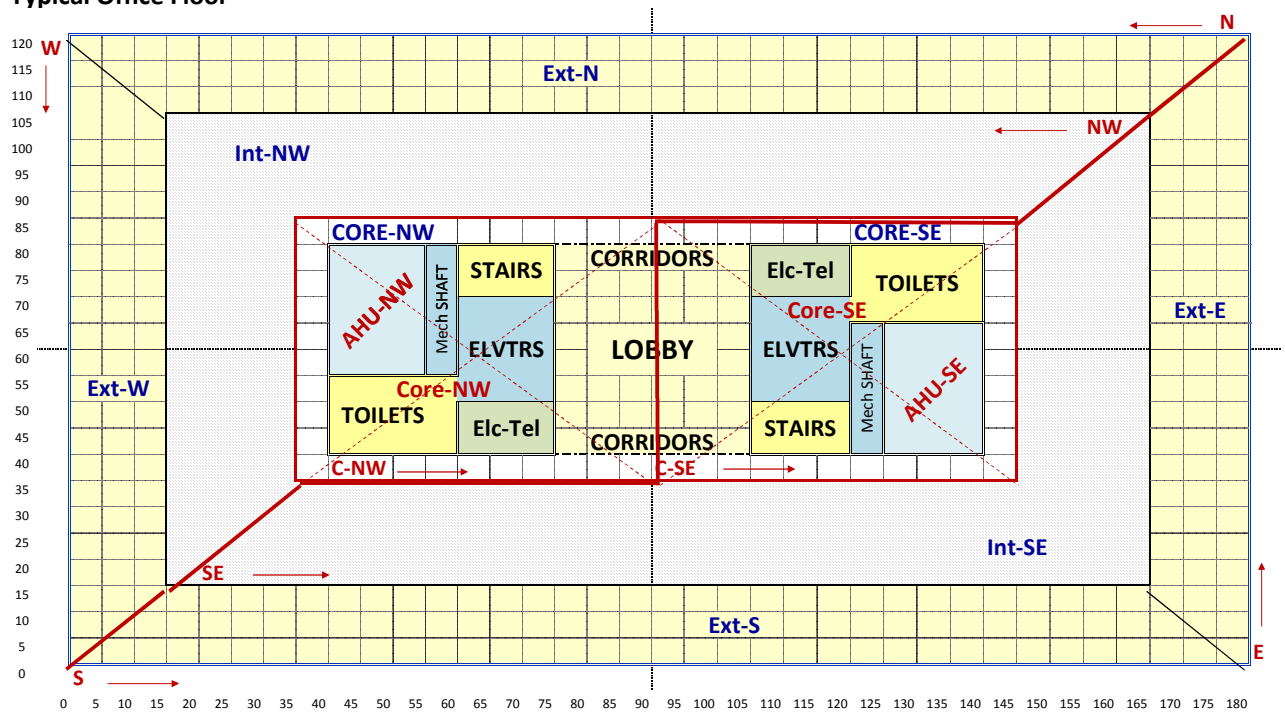
Typical Office Floor



	ORIGINS		SPACE-COORDINATES				SPACE-COORDINATES				SPACE-COORDINATES				AREAS and % Areas		
SPACES	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	Areas	EXT-INT	%
Ext-N	180	120	0	120	15	105	165	105	180	120					2,475	8,100	37.5
Ext-E	180	0	180	120	165	105	165	15	180	0					1,575		
Ext-S	0	0	180	0	165	15	15	15	0	0					2,475		
Ext-W	0	120	0	0	15	15	15	105	0	120					1,575		
Int-NW	165	105	15	105	15	15	35	35	35	85	145	85	165	105	4,000	8,000	37.0
Int-SE	15	15	165	15	165	105	145	85	145	35	35	35	15	15	4,000		
Cor-NW	35	35	90	35	90	85	35	85	35	35					2,750	5,500	25.5
Cor-SE	90	35	145	35	145	85	90	85	90	35					2,750		
															21,600	21,600	100

Floor Polygons served by OAU-SE and OAU-NW

Floor Polygons served by AHU-SE and AHU-NW

NW	180	120	0	120	0	0	35	35	90	35	90	85	145	85	180	120	8,050
SE	0	0	180	0	180	120	145	85	90	85	90	35	35	35	0	0	8,050

Exterior-Wall Origin is Lower Left Corner (LLC) looking at
Wall from the Outside. Draw Space Outlines Counter-Clockwise

GENERAL OFFICES

Area/Floor = 16,100 sf
Occupancy = 150 sf/Person
Lighting = 1.3 W/sf
Equipment = 1.0 W/sf
Outdoor-Air = 20 cfm/Person
Systems = AHU-SE & AHU-NW
(per Floor - OA from OAU)

SERVICE CORE (Average)

Area/Floor = 5,500 sf
Occupancy = 300 sf/Person
Lighting = 0.5 W/sf
Equipment = 0.5 W/sf
Outdoor-Air = 15 cfm/Person
Exhaust = 2,000 cfm
Systems = OAU-SE & OAU-NW
(Central 100% OA - All Floors)

CORE Areas

	Area sf	%
1. Elevators	600	8.8
2. Elec+Tel Closets	300	
3. Mech Rms+Shafts	1,000	
4. Toilets	600	4.2
5. Stairs	300	
Total 1 - 5	2800	13

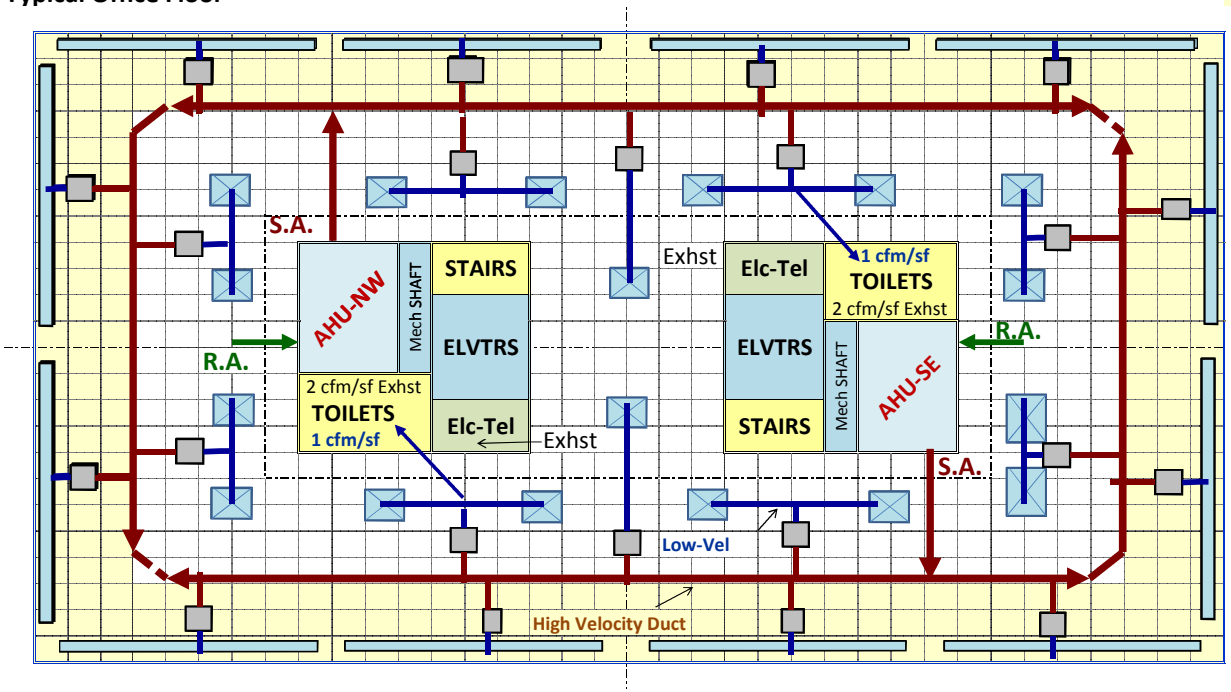
	Area sf	%
1. Lobby	1,200	12.5
2. Corridors	1,500	

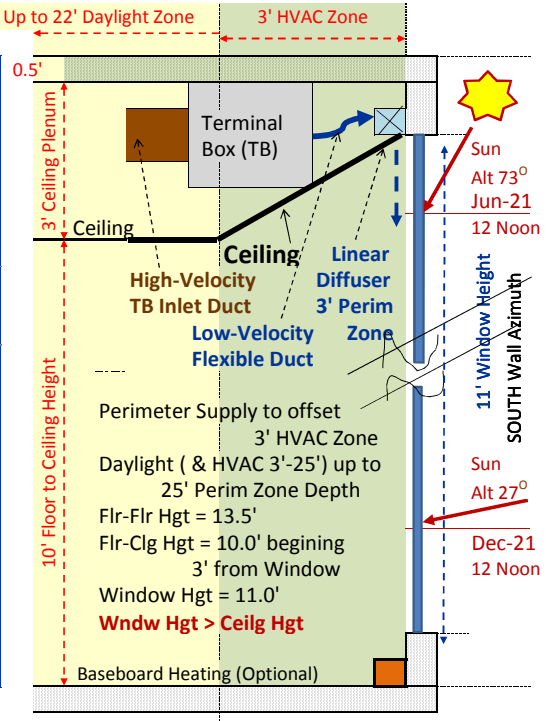
SPACES	Areas	AHU-sf	SYSTEM
Ext-N	2,475	8,050	AHU-NW
Ext-W	1,575		
Int-NW	4,000		
Ext-S	2,475	8,050	AHU-SE
Ext-E	1,575		
Int-SE	4,000		
Cor-NW	2,750	2,750	OAU-NW
Cor-SE	2,750	2,750	OAU-SE
	21,600		

THERMAL ZONES

Exterior Walls and Space Origins

Typical Office Floor





LOADS (LS-A) and SYSTEMS (SV-A) Results from eQUEST/DOE2.2 Reports

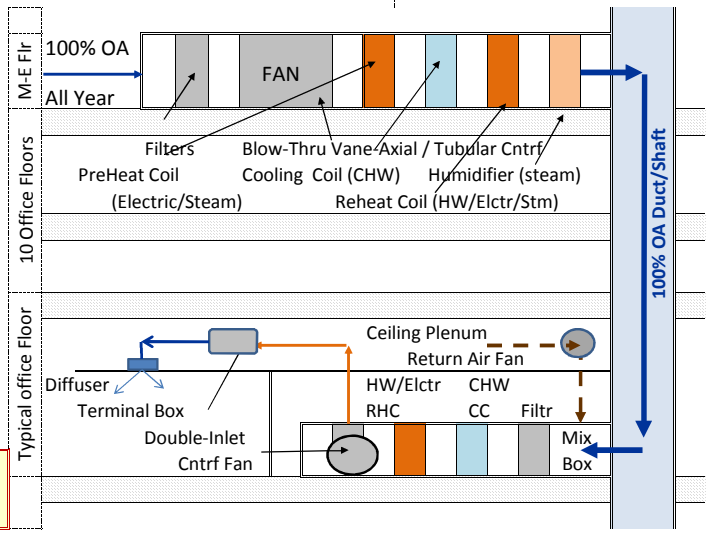
	SUMMER COOLING (from LS-A)		WINTER HEATING (from LS-A)		Sytm (SV-A)	
SPACE NAME	Kbtu/h	Peak-Time OA-DB/WB	Kbtu/h	Peak-Time OA-DB/WB		Total
SE-Floor Ceiling Plnm	5	AUG 27 3 PM 88.F 80.F	13	JAN 6 7 AM -18.F -18.F	0	AHU-
South Perim Spc (G.S1)	131	OCT 7 2 PM 75.F 59.F	74	DEC 31 4 AM -20.F -20.F	4,336	SE
East Perim Spc (G.E2)	82	JUN 23 10 AM 81.F 66.F	48	DEC 31 4 AM -20.F -20.F	3,903	10,539
SE Inter Spc (G.C5)	24	MAY 27 5 PM 94.F 75.F	0	0.F 0.F	2,300	
NW-Floor Ceiling Plnm	2	JUN 29 12 NOON 87.F 75.F	8	JAN 6 7 AM -18.F -18.F	0	AHU-
North Perim Spc (G.N3)	51	MAY 27 4 PM 95.F 76.F	73	JAN 4 11 PM -13.F -14.F	2,229	NW
West Perim Spc (G.W4)	84	JUN 29 7 PM 89.F 75.F	49	DEC 31 4 AM -20.F -20.F	4,388	8,917
NW Inter Spc (G.C6)	24	MAY 27 5 PM 94.F 75.F	0	0.F 0.F	2,300	
SE Core Spc (G.C7)	10	MAY 27 5 PM 94.F 75.F	0	DEC 31 12 MDNT-21.F -21.F	949	OA-SE
NW Core Spc (G.C8)	10	MAY 27 5 PM 94.F 75.F	0	DEC 31 12 MDNT-21.F -21.F	949	OA-NW
SUM	5,484		3,452			
BUILDING PEAK	3,787	OCT 7 4 PM 80.F 62.F	3,165	DEC 31 4 AM -20.F -20.F		

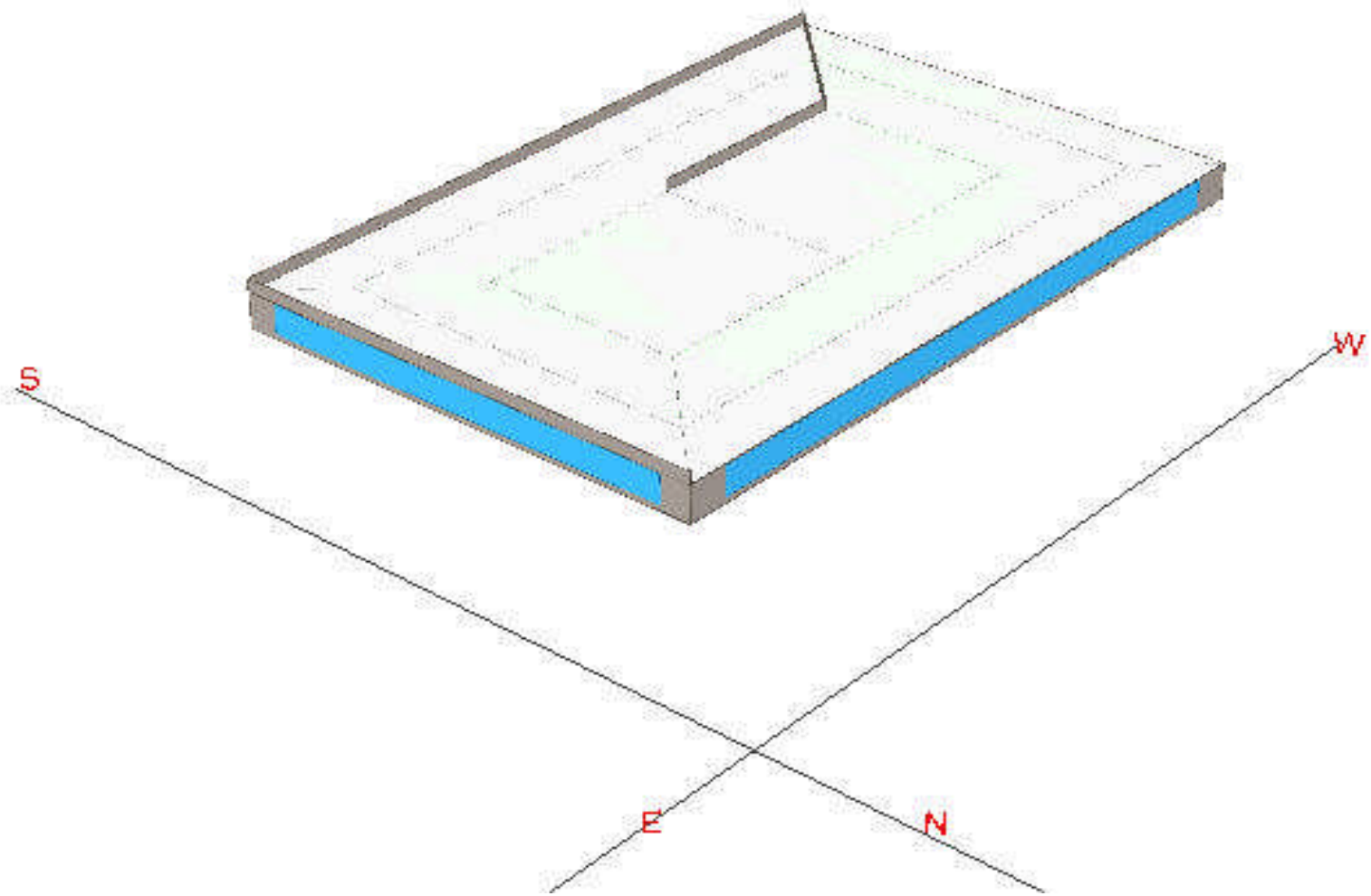
	Flr-Area	People	OA-Ratio	CFM/Flr	OA-CFM
AHU-SE	9,425	48	0.085	11,093	943
AHU-NW	9,425	48	0.100	9,388	939
OAU-SE	2,750	9	0.145	949	138
OAU-NW	2,750	9	0.145	949	138

AHU Floor Areas adjusted for Plenum-A

OAU must have at leat 1 Zone (Core Assigned)

OAU (100% OA Unit) supplies OA to AHU
OAU cfm does not add up to OA for AHU
Outdoor CFMs do not make sense

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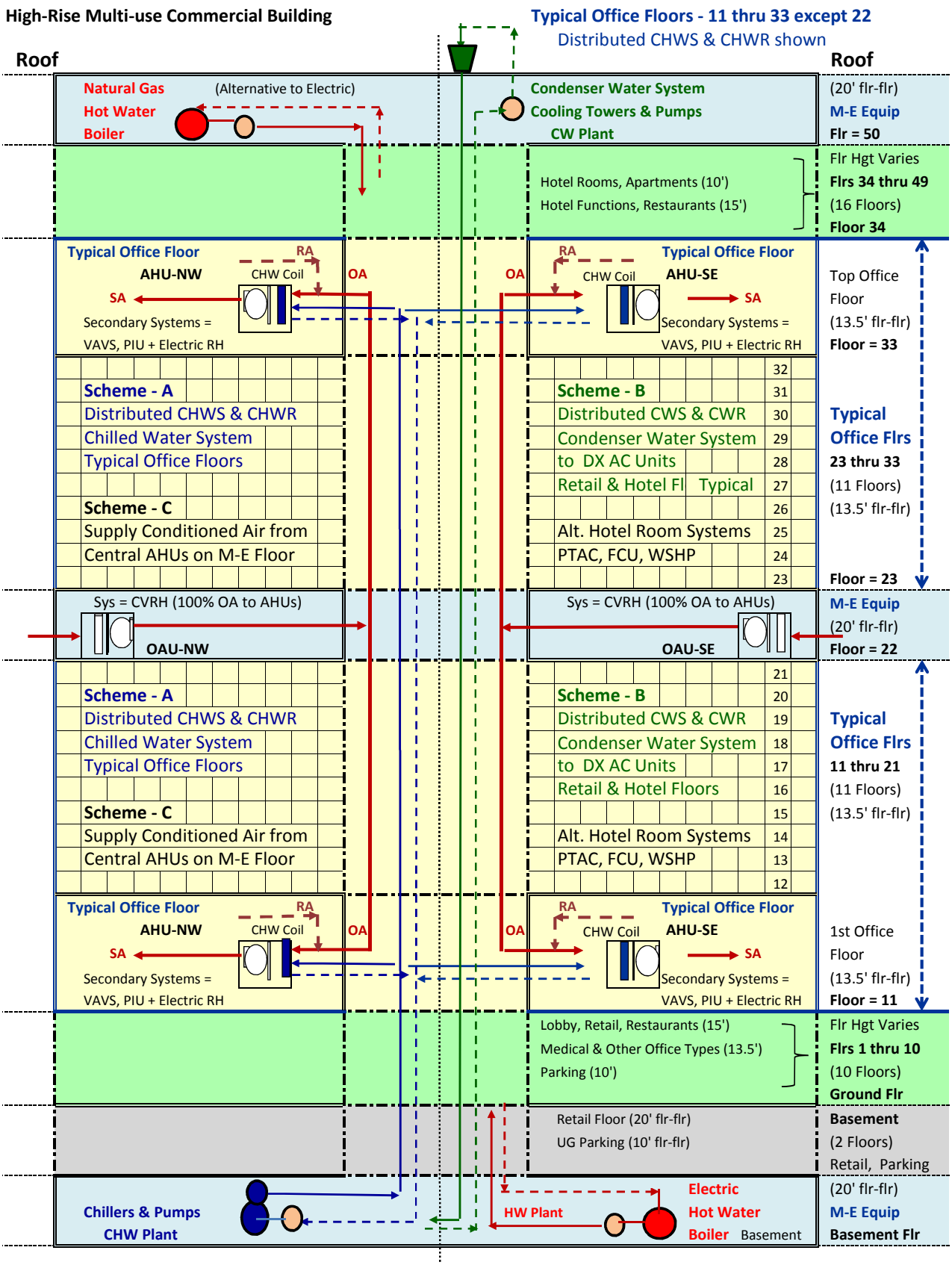
High-Rise Multi-use Commercial Building
Typical Office Floors - 11 thru 33 except 22
Distributed CHWS & CHWR shown
Roof
Roof
Natural Gas
Hot Water
Boiler
(Alternative to Electric)
Condenser Water System
Cooling Towers & Pumps
CW Plant
(20' flr-flr)
M-E Equip
Flr = 50
Hotel Rooms, Apartments (10')
Hotel Functions, Restaurants (15')
Flr Hgt Varies
Flrs 34 thru 49
(16 Floors)
Floor 34
Typical Office Floor
AHU-NW
RA
CHW Coil
OA
SA
Secondary Systems =
VAVS, PIU + Electric RH
Typical Office Floor
AHU-SE
Top Office
Floor
(13.5' flr-flr)
Floor = 33
Scheme - A
Distributed CHWS & CHWR
Chilled Water System
Typical Office Floors
Scheme - C
Supply Conditioned Air from
Central AHUs on M-E Floor
Scheme - B
Distributed CWS & CWR
Condenser Water System
to DX AC Units
Retail & Hotel Fl Typical
Alt. Hotel Room Systems
PTAC, FCU, WSHP
32
31
30
29
28
27
26
25
24
23
Typical
Office Flrs
23 thru 33
(11 Floors)
(13.5' flr-flr)
Floor = 23
Sys = CVRH (100% OA to AHUs)
OAU-NW
OAU-SE
M-E Equip
(20' flr-flr)
Floor = 22
21
20
19
18
17
16
15
14
13
12
Typical
Office Flrs
11 thru 21
(11 Floors)
(13.5' flr-flr)
1st Office
Floor
(13.5' flr-flr)
Floor = 11
Lobby, Retail, Restaurants (15')
Medical & Other Office Types (13.5')
Parking (10')
Flr Hgt Varies
Flrs 1 thru 10
(10 Floors)
Ground Flr
Retail Floor (20' flr-flr)
UG Parking (10' flr-flr)
Basement
(2 Floors)
Retail, Parking
Chillers & Pumps
CHW Plant
HW Plant
Electric
Hot Water
Boiler
Basement
(20' flr-flr)
M-E Equip
Basement Flr

REPORT- SV-A System Design Parameters for OAU-SE-Core WEATHER FILE- Minneapolis MN TMY2

SYSTEM TYPE	FLOOR ALTITUDE FACTOR	AREA (SQFT)	MAX PEOPLE	OUTSIDE AIR RATIO	COOLING CAPACITY (KBTU/HR)	SENSIBLE (SHR)	HEATING CAPACITY (KBTU/HR)	COOLING EIR (BTU/BTU)	HEATING EIR (BTU/BTU)	HEAT PUMP SUPP-HEAT (KBTU/HR)
VAVS	1.000	35750.0	119.	0.145	527.973	0.585	-892.772	0.000	0.000	0.000

FAN TYPE	CAPACITY (CFM)	DIVERSITY FACTOR (FRAC)	POWER DEMAND (KW)	FAN DELTA-T (F)	STATIC PRESSURE (IN-WATER)	TOTAL EFF (FRAC)	MECH EFF (FRAC)	FAN PLACEMENT	MAX FAN CONTROL	MIN FAN RATIO (FRAC)	MIN FAN RATIO (FRAC)
SUPPLY	12334.	1.00	10.133	2.54	3.5	0.50	0.55	BLOW-THRU	SPEED	1.00	0.30

ZONE NAME	SUPPLY FLOW (CFM)	EXHAUST FLOW (CFM)	MINIMUM FAN (KW)	OUTSIDE AIR FLOW (FRAC)	COOLING CAPACITY (CFM)	SENSIBLE (KBTU/HR)	EXTRACTION RATE (FRAC)	HEATING CAPACITY (KBTU/HR)	ADDITION (KBTU/HR)	RATE ZONE MULT
OFC SE Core Zn (G.C7)	949.	0.	0.000	1.000	138.	0.00	0.00	22.54	-95.80	-67.63 13.

REPORT- SV-A System Design Parameters for AHU-SE-Zones WEATHER FILE- Minneapolis MN TMY2

SYSTEM TYPE	FLOOR ALTITUDE FACTOR	AREA (SQFT)	MAX PEOPLE	OUTSIDE AIR RATIO	COOLING CAPACITY (KBTU/HR)	SENSIBLE (SHR)	HEATING CAPACITY (KBTU/HR)	COOLING EIR (BTU/BTU)	HEATING EIR (BTU/BTU)	HEAT PUMP SUPP-HEAT (KBTU/HR)
VAVS	1.000	245050.0	625.	0.085	5913.182	0.591	-4250.368	0.000	0.000	0.000

FAN TYPE	CAPACITY (CFM)	DIVERSITY FACTOR (FRAC)	POWER DEMAND (KW)	FAN DELTA-T (F)	STATIC PRESSURE (IN-WATER)	TOTAL EFF (FRAC)	MECH EFF (FRAC)	FAN PLACEMENT	MAX FAN CONTROL	MIN FAN RATIO (FRAC)	MIN FAN RATIO (FRAC)
SUPPLY	144210.	1.00	203.112	4.36	6.0	0.50	0.55	BLOW-THRU	SPEED	1.00	0.30
RETURN	144210.	1.00	50.778	1.09	1.5	0.50	0.56	RETURN	SPEED	1.00	0.30

ZONE NAME	SUPPLY FLOW (CFM)	EXHAUST FLOW (CFM)	MINIMUM FAN (KW)	OUTSIDE AIR FLOW (FRAC)	COOLING CAPACITY (CFM)	SENSIBLE (KBTU/HR)	EXTRACTION RATE (FRAC)	HEATING CAPACITY (KBTU/HR)	ADDITION (KBTU/HR)	RATE ZONE MULT
OFC South Perim Zn (G.S1)	4336.	0.	0.000	0.300	330.	0.00	0.00	103.01	-131.34	-92.71 13.
OFC East Perim Zn (G.E2)	3903.	0.	0.000	0.300	210.	0.00	0.00	92.73	-118.23	-83.46 13.
OFC SE Inter Zn (G.C5)	2300.	0.	0.000	0.300	400.	0.00	0.00	54.65	-69.68	-49.18 13.
OFC AHU-SE Plenum Zn (G.S	0.	0.	0.000	0.000	0.	0.00	0.00	0.00	0.00	0.00 13.

System	Enterg	Enterg	AIR TEMP	AIR TEMP	TOT HTG	TOT CLG	TOT SYST	MOISTURI	OUTSIDE
AHU-SE	Htg Coil	Clg Coil	ENTERNG	RETURN	COIL PWR	COIL PWR	FLOWRATE	CHANGE	TOT FLOW
	F	F	F	F	BTU/HR	BTU/HR	CFM	LB	FRAC.OR
	----(1	----(2)	----(3)	----(4)	----(5)	----(6)	---(17)	---(38)	---(39)
21-Jan								Added	
1 21 7	61.3	61.3	60.9	66.8	4,226	0	12334	12.6	0.145
1 21 8	94.3	94.3	63	69.3	413,801	0	12334	12.6	0.145
1 21 9	82.6	82.6	66.4	73.3	213,648	0	12334	0	0.145
1 21 10	75	75	67.9	74.3	92,769	0	12334	0	0.145
1 21 11	17.6	65	65	74.8	0	0	12334	0	0.209
1 21 12	19.6	65	65	74.9	0	0	12334	0	0.216
1 21 13	23.6	65	65	75	0	0	12334	0	0.234
1 21 14	21.6	65	65	75.2	0	0	12334	0	0.228
1 21 15	20.6	64.5	64.5	75.3	0	0	12334	0	0.234
1 21 16	19.6	64	64	75.4	0	0	12334	0	0.24
1 21 17	16.6	63.6	63.6	75.4	0	0	12334	0	0.234
1 21 18	14.6	64.3	64.3	75.3	0	0	12334	0	0.216
1 21 19	11.6	65	65	75.2	0	0	12334	0	0.194
21-Jul								Removed	
7 21 6	79.9	65	79.7	77.3	0	239,899	12334	46.1	0.145
7 21 7	53.6	65	79.5	76.8	0	240,586	12334	51.8	0.145
7 21 8	53.4	65	80.0	77.0	0	268,758	12334	71.6	0.145
7 21 9	54.4	65	80.2	76.9	0	272,459	12334	73.0	0.145
7 21 10	54.6	65	80.2	76.8	0	271,791	12334	72.0	0.145
7 21 11	54.6	65	80.5	76.7	0	265,476	12334	63.6	0.145
7 21 12	54.2	65	80.6	76.6	0	256,677	12334	54.7	0.145
7 21 13	53.7	65	80.4	76.6	0	259,000	12334	58.6	0.145
7 21 14	53.8	65	80.3	76.6	0	246,937	12334	48.9	0.145
7 21 15	53.3	65	80.2	76.7	0	242,534	12334	46.3	0.145
7 21 16	53.1	65	79.9	76.7	0	236,921	12334	44.5	0.145
7 21 17	53.0	65	79.6	76.5	0	219,240	12334	30.8	0.145
7 21 18	53.0	65	79.2	76.4	0	207,405	12334	25.0	0.145