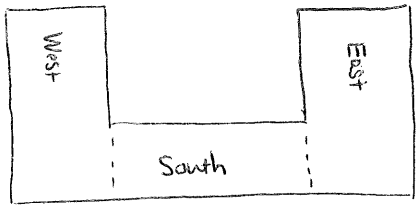
(1) 3/31/2010

Courthouse

Mark Archer

Mike Kasen

King Street



Ongoing Projects

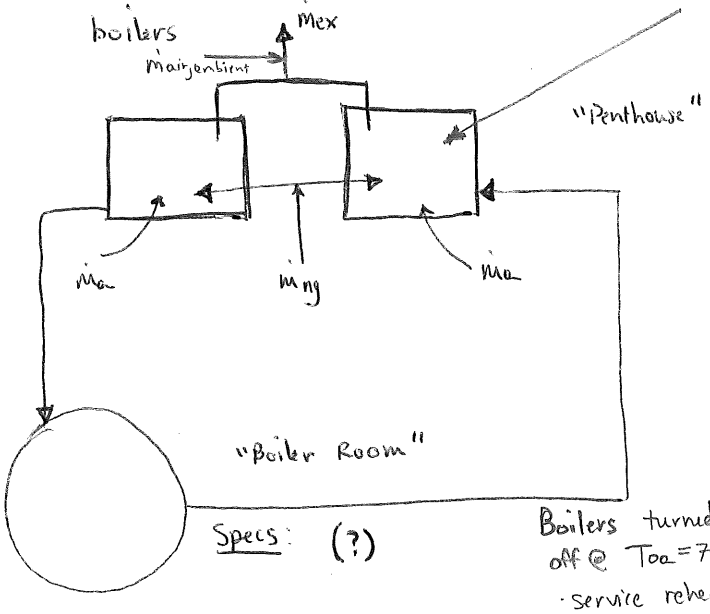
- change pneumatic to DDC controls

$S\frac{1}{3}W$ controls [installer]

- 177 total VAV boxes
  - 50 changed to DDC
  - Balance are pneumatic → switching to FX-9100
  - $2000 for JC DX9100 controller + instruments (4)
  - $800 for $S\frac{1}{3}W$ controls installation
- All VAVs and AHU ~ $35000 total
- DDCs will allow control of radiant heat (perimeter)
  - reset schedule
  - turn on/turn off

Basement Boiler Room

- Boilers do not operate
- Old hot water boiler, valved off and operates as storage tank for HW



Specs: (?)

Boilers turned off @ Toa = 70°F
- service reheat in VAV boxes and radiant heaters on perimeter

- HW system

2X · 119 gals
15KW
Model #: CSB 12Ø63 FEB · 92Ø

HWsp = 170°F
Natural Draft Boiler
Weil-Mclain LGB-7
Qin = 780000 Btu/hour
Qout = 681800 Btu/hour

Input MBH: 780
H.P.: 18.9
Steam Sq.ft.: 1975
Net Water MBH: 549

Reset Schedule

- Chillers

(2) York Millenium YSCABBS1-CFC

200 ton or 175 ton

- Typically run 1 @ a time. On hot humid days, run both.
- 90% of time, run one (1) at a time.

AR - Ticket booth in garage has transformer and requires AC; small roof-mounted AC; TX to boiler room
- Run chiller to AC ticket booth during off peak hours
- Mark estimates chiller @ 25% loading during off-peak hours when servicing ticket booth
  *Note: must keep AHU7 on as well to "absorb" load.

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Courthouse

Boiler Room (cont)

Pneumatics Controls:

7.5 hp (2) · 1 runs @ a time

Mark A. → cycles 6x/hour

Tank Size: (?)

Chillers (cont.)

Evaporator pumps:

(2) 15 hp run only 1 @ a time, unless both chillers running (90% of time)

Condensor pumps:

(2) 15 hp run only 1 @ a time, unless both chillers running (90% of time)

AHU 7 room

- Humidifier for libraries
  —do not operate.

- VSDs on supply fan and return fan

  Supply Fan: 20 hp

  @ time of visit

  882 cfm

  54 hz

  7.5 amps

  Return Fan: 1.5 hp

  780 cfm

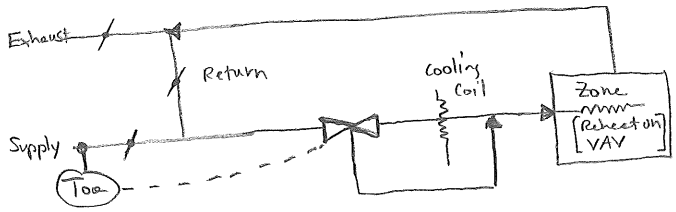
  47hz

  1.4 amps

- Economizer operates (Mark calls "Free cooling")

- 10 - 20% min OA

- "Face and Bypass"
  (1) to prevent cooling coils from freezing
  (2) match outdoor air temp to load exactly - only happens fraction of time during year.



Theory: if temperature would freeze coil and could meet load by itself, then bypass

- Economize up to 65°F
  * need to understand economizer cycle more in depth.

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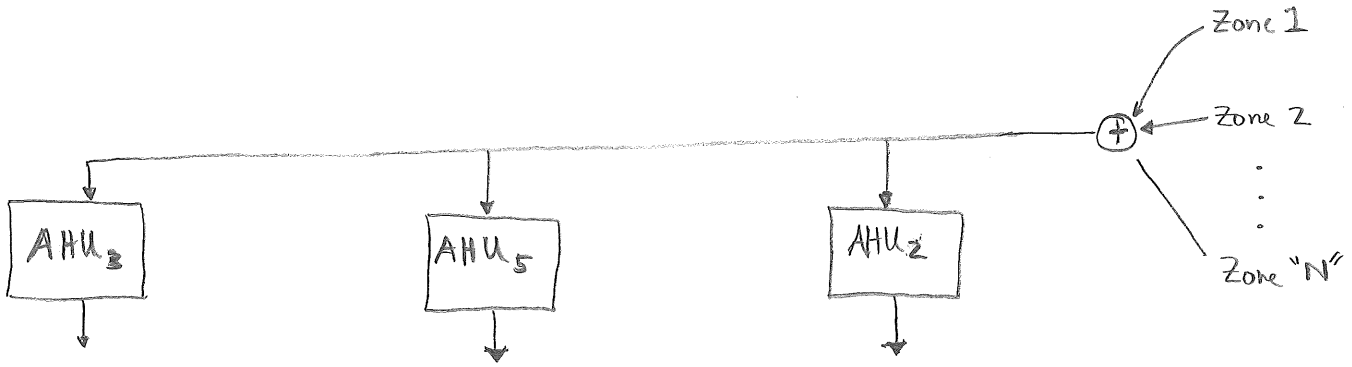
AHUs

- East

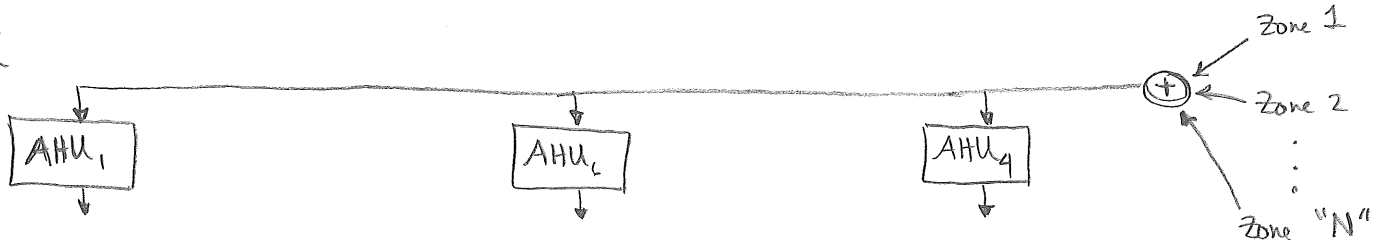


- (2) courtrooms
  - 2nd Floor
  - 4th Floor
- Constant Volume
  - Attached to VAV boxes?
  - AR* VSDs?
    Analyze variation in occupancy.
- Need fan sizes, volume of air *
- Economizer cycle? *
- Schedule (?) *
- # Zones *

- Ceremonial courtroom
- Constant Volume
  - Attached VAV boxes
  - AR* VSDs?
    Analyze variation in occupancy
- No heating coils
- Face-bypass
  - to help from freezing cooling coil

- VAV boxes
- largest AHU
- At visit
  - 26000 cfm (supply)
  - 25200 cfm (return)
  - 34A · 460V
  - 47 hz

- West



- Office Space VAV boxes

- Constant Volume
- Lobby

- (4) Courtrooms
- Constant Volume

④ 3/31/2010

Courthouse

- VFD Control
  - Controlled by differential pressure

$$\Delta P = P_{supply} - P_{RA}$$

maintain 1.5"-H_2O

  - Idea: What happens when ΔP ~~setpoint~~ is changed? Energy savings? *

- Lighting
  - 175 W MH

Example → lobbies of wings

2 floors in front of courtrooms

19 fixtures/floor

1st Floor

15 fixtures

  - Fluorescent fixtures

2 lamp T8 4ft 1 ballast

* contact Mike Kasen when done

* " " " specs.

  - Lighting schedules (?) *

(5) 3/31/2010
Courthouse

Judge "Haddock"

ERU

- Not currently operating
- * Review benefits to reheb

Solar Thermal System

- Review system

Mark's Ideas

- MH replacement

(1) Controls Replacement
- Pneumatic to DDC
- BMS installed
- monitor utilities

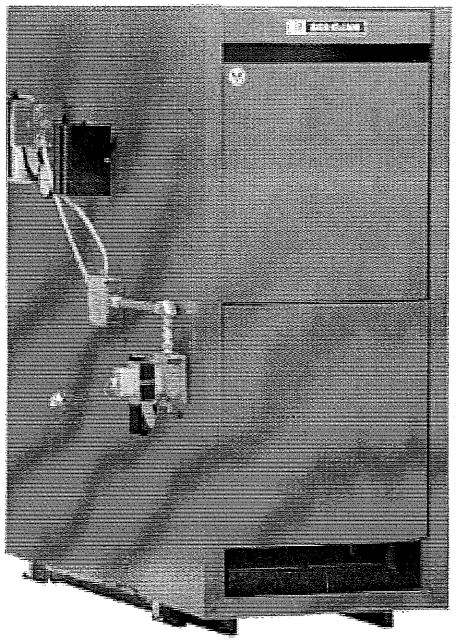
(2) Chillers / Boilers / AHUs off

(3) Optimize control system

Weil McLain

LGB

Atmospheric Gas Boiler (Water or Steam)



Models

LGB-4, LGB-5, LGB-6, LGB-8, LGB-9, LGB-10, LGB-11, LGB-12, LGB-13, LGB-14, LGB-15, LGB-16, LGB-17, LGB-18, LGB-19, LGB-20, LGB-21, LGB-22, LGB-23, LGB-7

Key Features

- Short draw rods permit faster, easier assembly of boiler sections
- Includes factory-assembled base and burners, and simplified piping for quick and easy installation
- Compact design allows for more piping and venting headroom
- Compact design allows for more piping and venting headroom
- The highest efficiency commercial cast iron atmospheric gas boiler available by Weil-McLain
- Built-in air separator diverts air to the expansion tank

- Gas natural draft water and steam boiler with cast iron sections

Efficiency Rating Chart

Model	A.G.A. Input (MBH)	DOE Heating Capacity (MBH)	Net I=B=R Ratings: Steam (Sq. Ft.)	Net I=B=R Ratings: Steam (MBH)	Net I=B=R Ratings: Water (MBH)	Min. Chimney Size
LGB-4	400	324	1013	243	282	10
LGB-5	520	421	1317	316	366	12
LGB-6	650	527	1645	395	458	12
LGB-7	780	632	1975	474	549	12
LGB-8	910	737	2305	553	641	14
LGB-9	1040	842	2635	632	733	14
LGB-10	1170	948	2965	711	824	16
LGB-11	1300	1053	3290	790	916	16
LGB-12	1430	1158	3620	869	1007	16
LGB-13	1560	1264	3955	949	1099	16
LGB-14	1690	1369	4313	1035	1190	16
LGB-15	1820	1474	4679	1123	1282	17
LGB-17	2080	1685	5408	1298	1465	17
LGB-18	2210	1790	5775	1386	1557	18
LGB-19	2340	1895	6125	1470	1648	18
LGB-20	2470	2001	6471	1553	1740	19
LGB-21	2600	2106	6813	1635	1831	19
LGB-22	2730	2211	7155	1717	1923	19
LGB-23	2860	2317	7496	1799	2014	20
LGB-16	1950	1580	5046	1211	1373	17

Product Manuals and Literature

- **User Manual**
  (3.59 MB)

Boiler Room

Michael Kaison

Controls → DDC

S↑W controls

$35,000 K

- AHU toggle ?
- DDC – radiant Ht ↑ amps

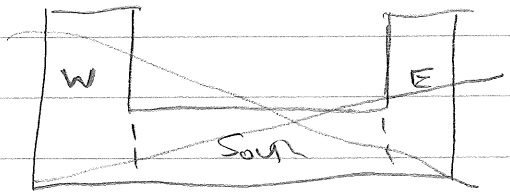
read schedule / turn off

East

West

South

King



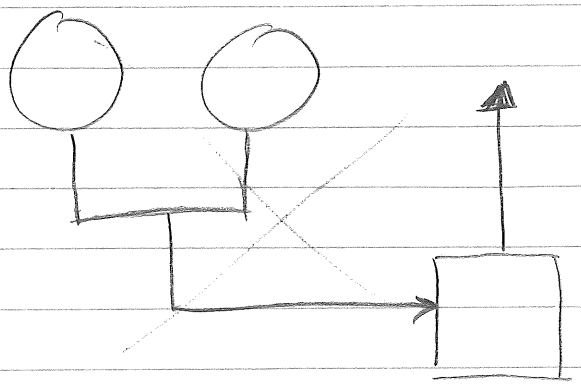
177 VAV boxes

50 DDC

others pneumatic

{ 4 · $2000 (us)
{ labor $800 (S↑W Controls)

Boilers



HW: 119 gals

15 kW

Model # CSB 1200 63 FEB – 920

7 AHU – DDC

AC → on ticket booth

→ 200 ton chillers
of 175

90% of time

run 1 @ a time

↳ York millenium → YSCABB51 – CFC

(2)

Chiller

AHU 7 kept on w/ ticket

25% loaded @ night

Pneumatics 7.5 hp

6 x / hour

Evap Pumps 15 hp

Condenser Pumps 15 hp

Ticket

① Remove transformer → boiler room

② unit on top

AHU # 7

65°F

VSD

20 hp Fan, supply

1.5 hp Fan, return

RA

47 Hz 780 cfm

1.4 A

Supply 882 cfm

54 Hz

7.5 amps

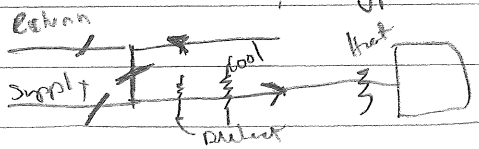
"Free Cooling"

Economize up to 65°F 20% min OA

55°F

- Boilers off @ 70°F T_{oa} → Reheat @ VAV boxes

"Face & bypass" – % of time with indoor = outdoor



3

175 MH — Lobbies

4 floors

2 floors

15 lights

11 + 8 = 19

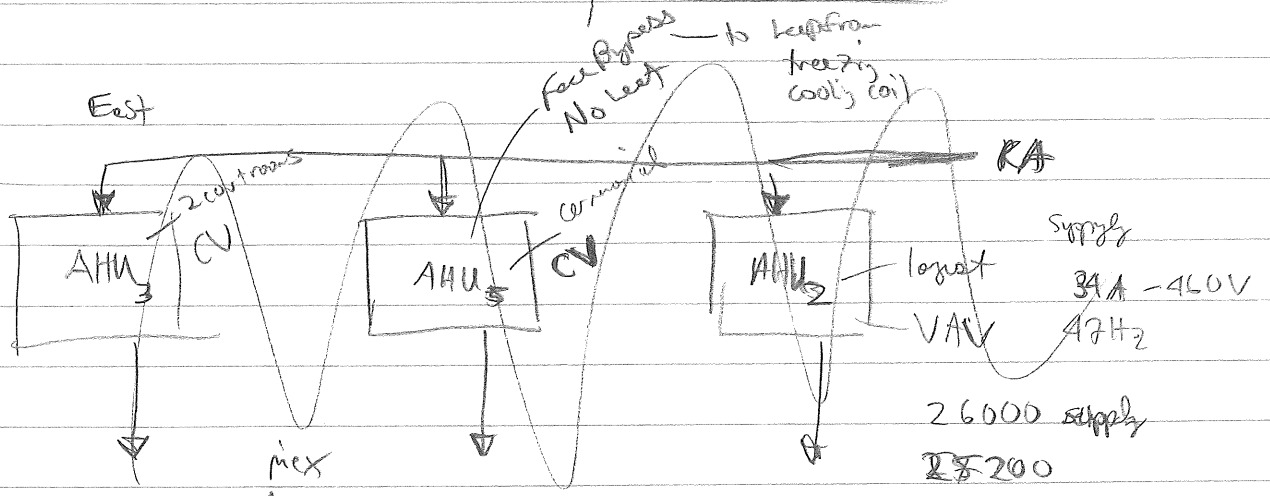
Countrooms (2) 2nd 4th Floor CVolume

East side

AHU 5 - ceremonial No heat

West

VAV → #2 #1



Reinstate VAV w/ reheat coils

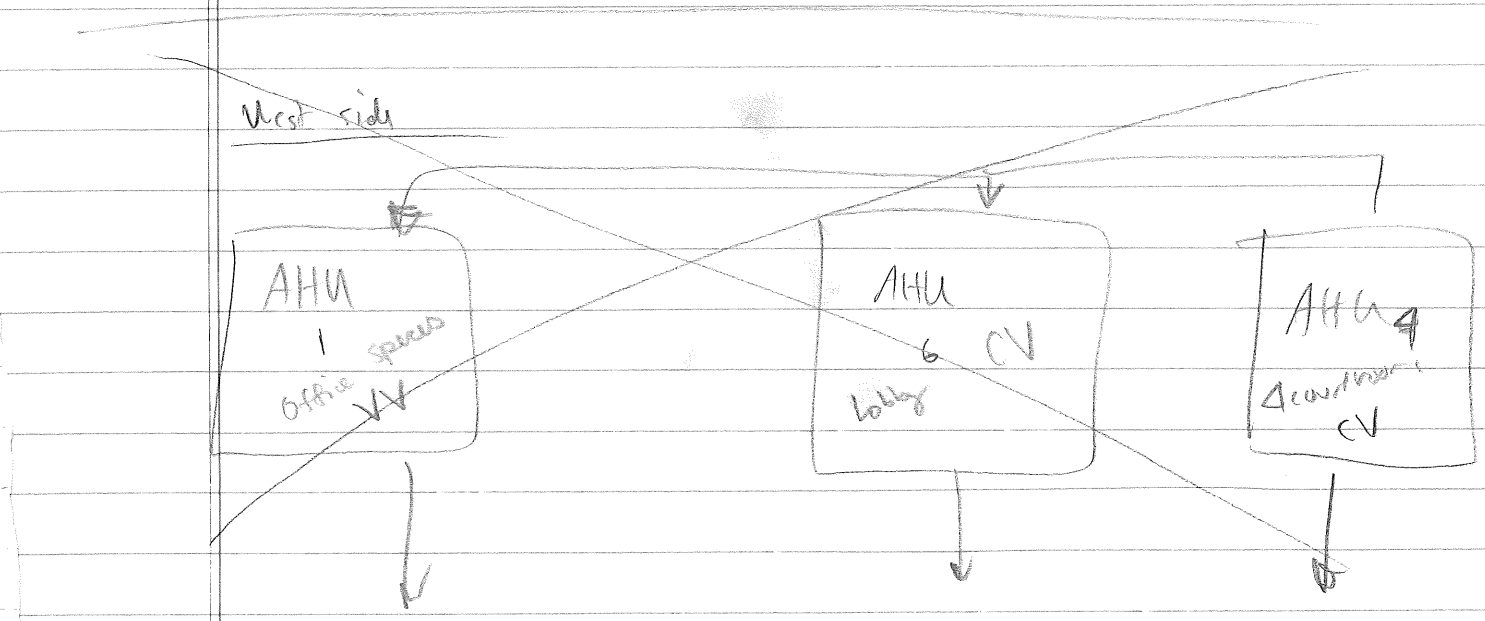
Radiant heat

(4)

ERU

- further investigation

control & mechanical



VFP

$$\Delta P = P_{e_{RA}} - P_{e_{Supply}}$$

1.5" H_2O

- Reduce Static @ VAV
  - ↳ problems

JC

DX-9100 → FX-9100

5

Lighting → ~~2 lamp~~
T8 → replaced - Mike Kenison

Mark's IDEAS:

- MH replacement.

① Controls replacement
② Chiller off
③ optimize controls

City Hall

DDC control UNT on AHUs
to shut fan down.

• 3-4 air systems • - different Balancing -

time clocks

- Judge Haddock -