

E-7

Salem Probate & Family Court Building
DCAM TRC9910ST2
Salem, MA

EXISTING ELECTRICAL
SUPERIOR COURT ATTIC PLAN

ARCHITECTURE
PLANNING
PRESENTATION

**GOODY
CLANCY**

334 Boylston Street
Boston, Massachusetts 02116
617 262-2760 fax 617 262-9512
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Stamp:

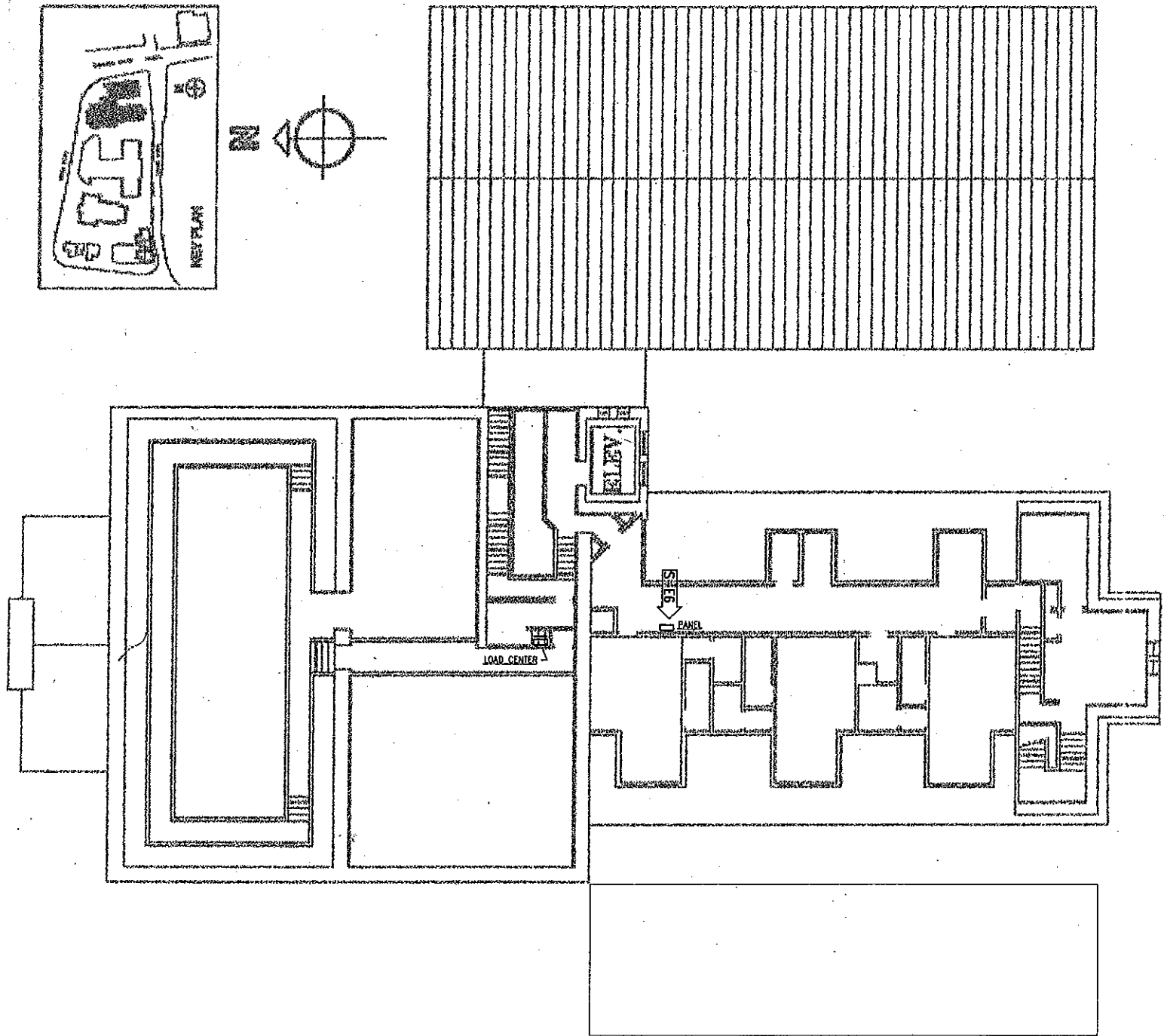
Consultant:

SEI COMPANIES

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EXISTING CONDITIONS

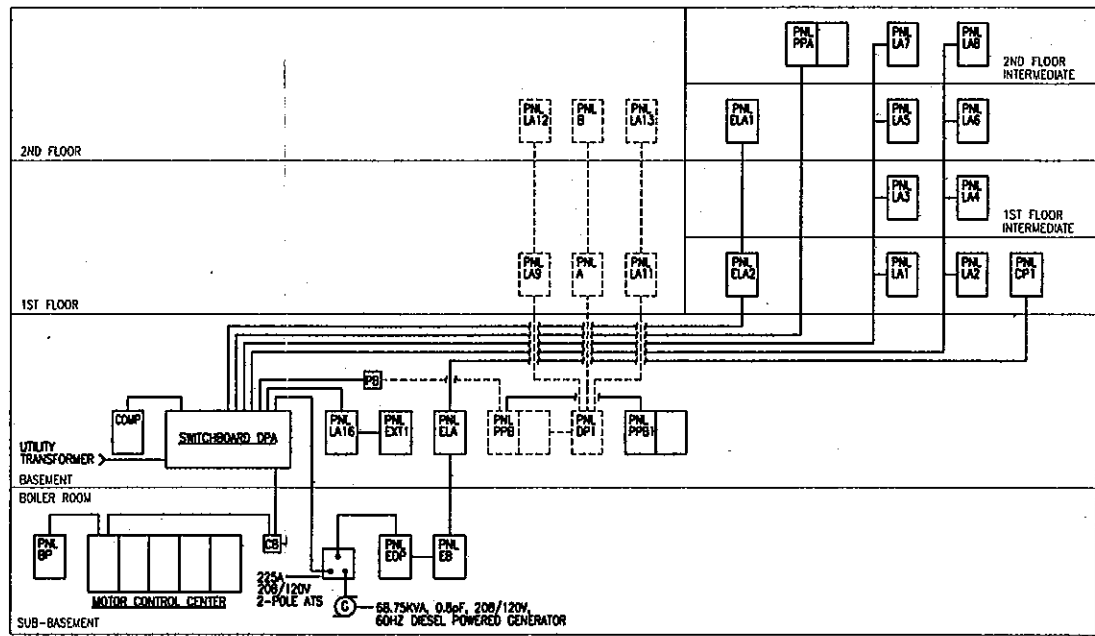
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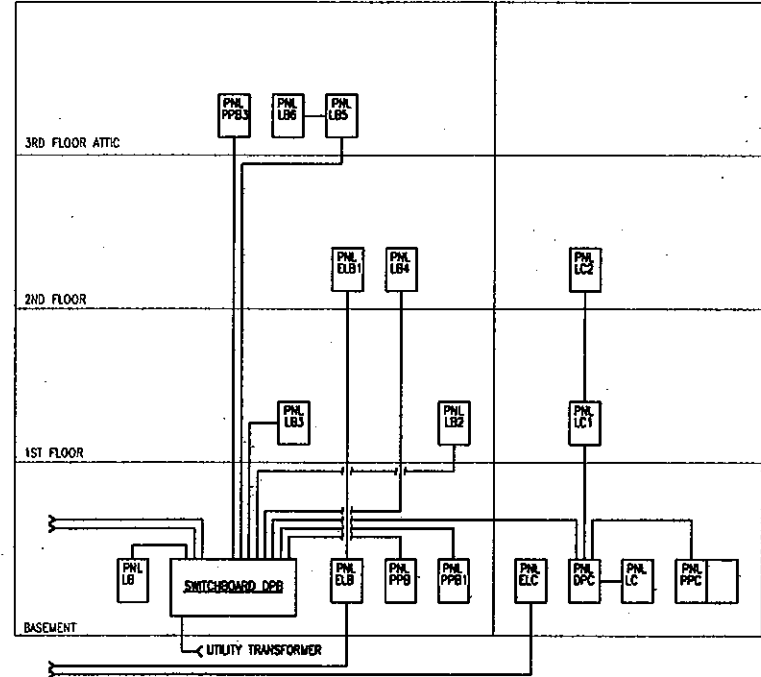
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Salem Probate & Family Court Building DCAM TRC9910ST2 Salem, MA		GOODY CLANCY 334 Boylston Street Boston, Massachusetts 02116 617.262.2769 fax 617.262.9512 www.goodyclancy.com	Stamp:	Consultant: SEI COMPANIES 80 Back Cove Avenue, Suite 200 Boston, Massachusetts 02102-24 617.262.2769 www.sei.com	EXISTING CONDITIONS
EXISTING CONDITIONS		Revision:			
Goody Clancy #205128.00					
FILE NO:					
DATE: 9/23/05		BY: KES			
SCALE: 1/8" = 1'-0"		CHK: AP			
DRAWN:					
E-8					



PROBATE AND FAMILY COURT (BUILDING "A")
 PARTIAL POWER SINGLE-LINE DIAGRAM
 N.T.S.



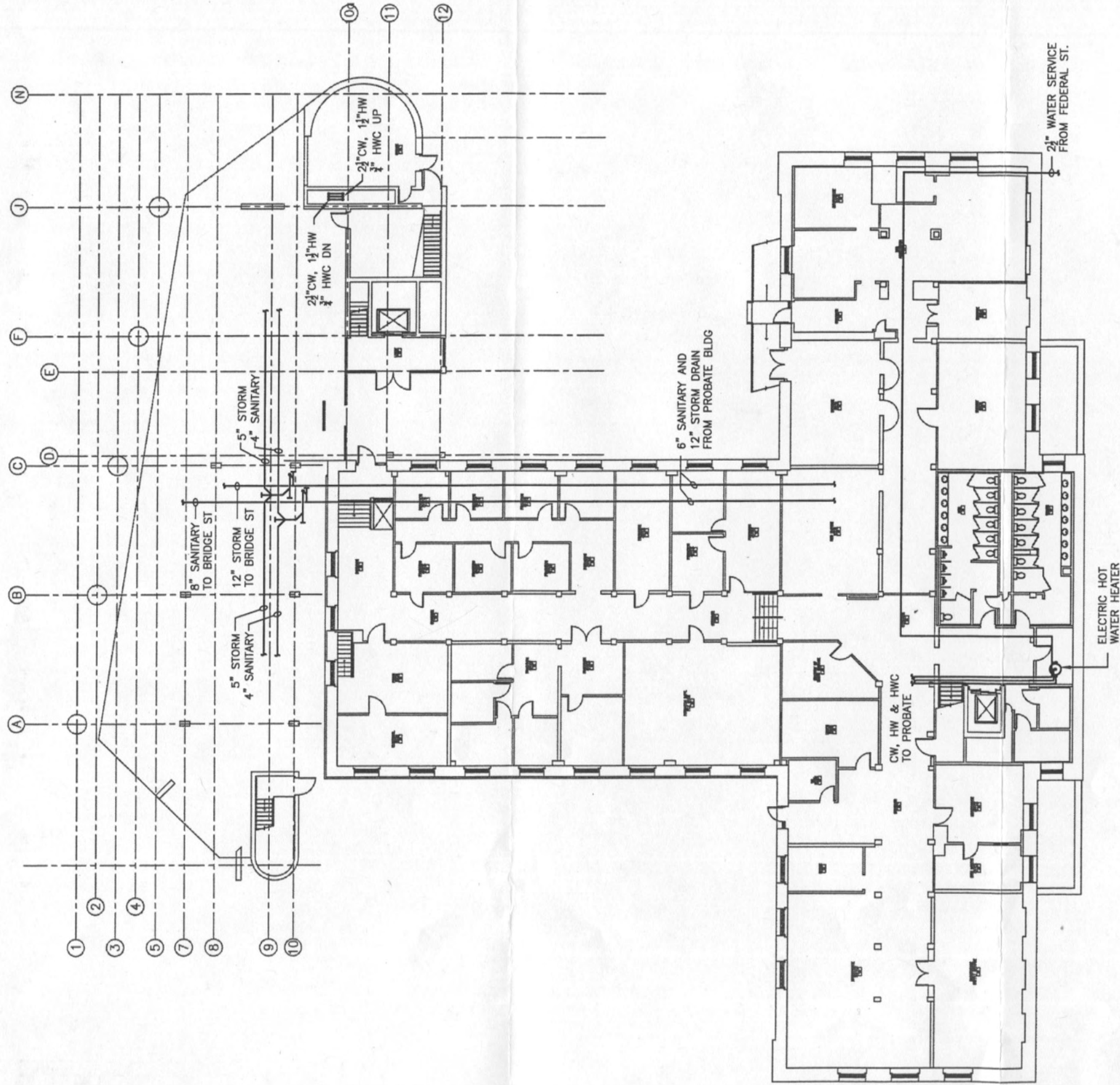
SUPERIOR COURT (BUILDING "F") AND COUNTY COMMISSIONER'S (BUILDING "C")
 PARTIAL POWER SINGLE-LINE DIAGRAM
 N.T.S.



EXISTING CONDITIONS Goody Clancy #205128.00		Consultant: SEI COMPANIES 88 BAY FRENCH AVENUE, SUITE 200 BOSTON, MASSACHUSETTS 02116 TEL: 617.252.2700 FAX: 617.252.2912 WWW.SEI-COMPANIES.COM	Stamp: ARCHITECTURE PLANNING PRESERVATION GOODY CLANCY 354 Boylston Street Boston, Massachusetts 02116 TEL: 617.252.2700 FAX: 617.252.2912 WWW.GOODYCLANCY.COM COPYRIGHT © GOODY CLANCY & ASSOCIATES, INC. 2001	Salem Probate & Family Court Building DCAM TRC9910ST2 Salem, MA ELECTRICAL RISER DIAGRAMS
E-9				

Appendix

v. Plumbing and Fire Protection System Diagrams



EX-1P

Goody Clancy #6290
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 DATE 9/30/05
 SCALE 1/8"=1'-0"
 DRAWN

Salem Probate & Family Court Building
 DCAM TRC9910ST2
 Salem, MA
 EXISTING BASEMENT
 PLUMBING PLAN

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EXISTING CONDITIONS

Revisions	

A2.2 Salem Probate and Family Court Space Program

DCAM

Draft March 6, 2006

SALEM: Probate and Family Court Space Inventory Space Summary

Data Sheet Ref	Program Area	Total Staff Existing	Total Staff Projected	Net Square Feet	Dept. Gross Factor	Dept. Gross Sq. Ft	Notes
	Courtroom Sets			9,760	1.25	12,200	
	Judicial Offices	16	23	4,264	1.30	5,543	
	Transaction Offices	43	55	15,632		23,448	
	Superior Court						1
	Clerk Magistrate						
	Probation						
	District Court						1
	Clerk Magistrate						
	Probation						
	Probate & Family Court	43	55	15,632	1.50	23,448	
	Register of Probate	24	29	9,866	1.50	14,799	
	Probation	19	26	5,766	1.50	8,649	
	Juvenile Court						1
	Clerk Magistrate						
	Probation						
	Housing Court						1
	Court Support	2	2	4,044		5,341	
	Central Detainee Holding			140	1.90	266	
	Court Officers	2	2	320	1.30	416	
	Jury Pool			-	1.30	-	1
	Trial Court Secure Waiting Area	0	0	520	1.30	676	
	Interpreter Services			-	1.30	-	1
	Court Reporters			-	1.30	-	1
	Public Areas	0	0	2,664	1.30	3,463	
	Staff Support			400	1.30	520	
	Court Operations						1
	Law Library						
	Supplemental Operations	2	7	1,228		1,572	
	District Attorney						1
	Attorney's Room						1
	Alternative Dispute Resolution	0	2	-	1.25	-	
	Court Clinic	0	3	480	1.25	<u>600</u>	
	Juvenile Court Clinic						1
	Child Care Center						1
	Social Services			150	1.30	<u>195</u>	
	DOR - Child Support	2	2	598	1.30	<u>777</u>	
	Building Support	2	2	2,804	1.30	3,645	

TOTAL STAFF	65	89	
TOTAL NET SQUARE FEET		37,732	
TOTAL DEPARTMENT GROSS SQUARE FEET			51,750
BUILDING MECHANICAL @ 8% DGSF			4,140
SUBTOTAL			55,890
BUILDING GROSS FACTOR			1.25
TOTAL BUILDING GROSS SQUARE FEET			69,863
% NET TO GROSS			54%
GSF/COURTROOM*			13658
% SUPPLEMENTAL OPERATIONS			2%

* GSF is Subtotal of the building sf (before grossing factor) (E50) minus Supplemental Operations and Court Operations divided by the number of courtrooms

Notes:

1. These functions are located in the main Trial Court Building. During study and design, operational implications should be identified and reviewed between DCAM and AOTC / Courts staff

COURTROOM SETS

Data Sheet Ref	Area Description	Units	Area Per Unit	NSF	Notes
	<u>Courtrooms</u>				5
	Probate & Family Court				
1.3	Large Non-Jury Courtroom	1	2,000	2,000	6
1.3	Medium Non-Jury Courtroom	0	1,600	-	
1.3	Small Non-Jury Courtroom	4	1,200	4,800	7
	Subtotal	5		6800	
	Total Courtrooms	5		6,800	
	<u>Courtroom Support</u>				
6.1	Off-bench Judge's Conf. Room	0	130	-	①
1.15	Courtroom Entrance Vestibule	5	80	400	
1.16	Waiting Area - X-Large Courtrooms	0	400	-	n/a
1.16	Waiting Area - all Juvenile Courtrooms	0	400	-	
1.16	Waiting Area - Large Courtrooms	1	300	300	
1.16	Waiting Area - Med. Courtrooms	0	200	-	n/a
1.16	Waiting Area - Small Courtrooms	4	200	800	
6.1	Pre-Trial Conference Room	10	120	1,200	2
1.17	A/V Storage	1	30	30	
1.18	Evidence Vault	0	50	0	n/a
	Subtotal			2730	
	<u>Courtroom Holding Area</u>				3
1.19	Detainee Staging	1	50	50	
1.19	Detainee Soundlock	1	40	40	
1.19	Detainee Holding Cell (group)	0	150	-	8
1.19	Detainee Holding Cell (indiv.)	2	70	140	
1.14	Detainee Dock	0	80	-	4
	Subtotal			230	
	<u>Jury Deliberation Areas</u>				
1.20	Jury Deliberation Room	0	300	-	
1.20	Vestibule w/toilets	0	200	-	
1.20	Court Officers' Alcove	0	48	0	
	Subtotal			0	
	Total NSF- Courtroom Sets			9,760	
	Departmental Gross Factor			1.25	
	Department Gross Square Feet			12,200	

in main Trial Court building

Notes:

1. Based on one per two courtrooms or distance from courtroom to collegial suite. This includes 30sf toilet.
2. Two per courtroom
3. Detainee area is shared among all courtrooms. In study & design, evaluate feasibility of courtroom holding cells upstairs with secure circulation to several courtrooms.
Due to minimal detainees presence in PFC. It is preferred not to duplicate central detention in this building
Only Arraignment courtrooms require 2 holding cells in core- smaller can have 1.
4. Included in all Arraignment courtrooms, 1 large SC courtroom and 1 DC standard courtroom
5. Note: Courtroom sizes may differ due to existing conditions
6. This is an existing courtroom that will be preserved
7. Due to existing conditions; construction to allow for circulation
8. Group detainee holding cells located next to 1st and 2nd session and X-large Superior Court courtroom. Number of group holding cells depends on adjacency to each core. If 1st session, 2nd session and X-large Superior courtrooms share a core, then 2 groups cells between them will suffice. If any of the named courtrooms share a core by other courtrooms, 2 group cells will be required and no individuals cells. All other shared cores will have 2 individual cells.

Data Sheet		Staff	Staff		Area		
Ref	Area Description	Existing	Projected	Units	Per Unit	NSF	Notes
Staff							
Probate & Family Court							
2.1	Judge	5	5	5	330	1,650	1
4.2	Judicial Secretary	3	5	5	80	400	
4.2	Law Clerk	2	3	3	80	240	
	Subtotal	10	13			2,290	
Judicial Support Staff							
4.1	1st Assistant Register	1	1	1	150	150	7
4.1	Assistant Register	3	5	5	120	600	
4.2	Sessions Clerk	2	4	4	80	320	
	Subtotal	6	10			1,070	
	Total PFC Judicial Support Staff	16	23			3,360	
Support							
3.1	Entry & waiting			1	120	120	2
3.1	Reception Desk			1	64	64	
6.1	Library/ Conference Room			1	300	300	
5.2	Equipment Room			1	130	130	
5.2	Supply Room			1	130	130	
5.1	File Room			1	130	130	
7.22	Kitchenette			1	30	30	
	Subtotal					904	
	Total NSF- Judicial Offices					4,264	
	Departmental Gross Factor					1.30	
	Department Gross Square Feet					5,543	

Notes:

1. Includes 30sf toilet and 10sf coat closet.
2. Support area to be located within shared (DC/PFC/JC/HC) judicial suite area with circulation capacity to SC judicial offices
3. Superior Court judicial offices to be located adjacent to SC courtrooms; all other judicial offices can be arranged in collegial suites
4. In Superior Court Only, to be located adjacent to courtroom and judicial offices (1 per SC courtroom)

Data Sheet Ref.	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
Transaction Area Staff							
4.1	Register of Probate	1	1	1	200	200	
4.1	Adm Dep Assistant Register	1	1	1	150	150	
4.2	Supervisory Clerical	3	3	3	80	240	
4.2	Clerical	19	24	24	64	1,536	
Subtotal		24	29			2,126	
Support							
3.1	Transaction Counter/ Service			1	90	90	1,2
3.1	Transaction Waiting Space			1	500	500	3
3.3	Public Research Area			1	300	300	
6.1	Public Conference Room			1	120	120	
6.2	Hearing Room			2	300	600	4
3.4	Family Law Information Center			1	420	420	sf is placeholder; combined Court Law Clr & Lawyer of Day office. Actual size ldd
6.1	Staff Conference Room			1	300	300	5
5.2	Equipment Room			1	130	130	
5.2	Supply Room			1	130	130	
5.1	Active Records Storage			1	5,000	5,000	6
5.1	Secure Records and Tapes Storage			1	150	150	
7.19	Breakroom (shared)						7
Subtotal						7,740	
Total NSF- Register of Probate						9,866	
Departmental Gross Factor						1.50	
Department Gross Square Feet						14,799	

Notes:

1. Assumes 4 staff positions at the counter at 22.5 sf each, including 30" deep counter and circulation space.
2. Transaction counter will require a small safe to handle cash transactions in the department.
3. Assumes 25 people, based on 200sf minimum at 20 sf/person to accommodate 10 people (if >10 people add 15 sf/person)
 Note: initial 20 sf/person includes display space for forms, counter space for filling them out, etc.
4. Assumes 15 people at 20 sf/person.
5. For depts with 10 people or less, provide 200sf; For depts with greater than 10 people, provide 300sf
6. Assumes high density shelving. Inactive records are stored elsewhere. Calculate actual & projected based on court dept. needs.
7. Refer to staff support section page 17 for breakroom information.

Data Sheet	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
Ref							
Staff							
4.1	Chief Probation Officer	1	1	1	200	200	
4.1	1st Assistant Chief Probation Officer	0	1	1	150	150	
4.1	Assistant Chief Probation Officer	2	3	3	150	450	
4.1	Probation Officer	13	16	16	120	1,920	
4.2	Associate Probation Officer	0	0	1	80	80	
4.2	Supervisory Clerical	0	1	1	80	80	
4.2	Clerical	3	4	4	64	256	
	Subtotal	19	26			3,136	
Support							
3.1	Transaction Counter/ Service			1	90	90	1,2
3.1	Transaction Waiting Space			1	400	400	3
6.1	Staff Conference Room			1	300	300	4
6.1	Interview Room/ Intake			2	120	240	
6.1	Dispute Intervention Room			8	120	960	7
3.2	Drug Testing Toilet Room w/storage			1	80	80	
5.2	Equipment Room			1	130	130	
5.5	Supply Room			1	130	130	
5.1	Active Record Storage			1	300	300	5
7.19	Breakroom (shared)						6
	Subtotal					2,630	
Total NSF- Probation						5,766	
Departmental Gross Factor						1.50	
Department Gross Square Feet						8,649	

Notes:

1. Assumes 4 staff positions at the counter at 22.5 sf each, including 30" deep counter and circulation space.
2. Transaction counter will require a small safe to handle cash transactions in the department.
3. Assumes 10 people, based on 200 sf minimum at 20 sf/person to accommodate 10 people (if >10 people add 15 sf/person)
 Note: initial 20 sf/person includes display space for forms, counter space for filling them out, etc.
4. For depts with 10 people or less, provide 200sf; For depts with greater than 10 people, provide 300sf
5. Assumes high density shelving. Inactive records are stored elsewhere. Calculate actual & projected based on court dept. needs.
6. Refer to staff support section page 17 for breakroom information.
7. Includes an additional 200sf to accommodate waiting space for Dispute Intervention
8. If two-way observation mirror is needed, locate between these 2 rooms with blinds on each side so that the mirror can be hidden when not in use (note: specific to PFC due to type of services provided and child observations conducted)

COURT SUPPORT
CENTRAL DETAINEE HOLDING
and COURT OFFICERS

Data
 Sheet
 Ref.

Area Description

Units

Area
 Per Unit

NSF

Notes

Adult Central Detainee Holding

3

7.4	Group Holding (Male)	0	150	-	Refer to Courtroom Sets for Courtroom Holding Cells and additional info
7.4	Individual Holding (Male)	0	70	-	
7.4	Group Holding (Female)	0	150	-	
7.4	Individual Holding (Female)	0	70	-	
7.4	Observation Cell	0	70	-	
Total Adult Cells		0		-	

Juvenile Central Detainee Holding

3

7.4	Group Holding (Male Juvenile)	0	150	-
7.4	Individual Holding (Male Juvenile)	0	70	-
7.4	Group Holding (Female Juvenile)	0	150	-
7.4	Individual Holding (Female Juvenile)	0	70	-
7.4	Observation Cell	0	70	-
Total Juvenile Cells		0		-

Detainee Holding Support

7.2	Detainee Staging Area	1	100	100	minimum 2 for egress Verify size & requirements
7.2	Detainee Entry Trap (w/double door)	1	40	40	
7.3	Control Room	0	100	-	
7.21	Toilet	0	50	-	
7.6	Property Storage Closet	0	80	-	
10.15	Shower/ Janitor Closet	0	30	-	4
7.5	Attorney Waiting Area	0	30	-	
7.5	Attorney-Client Conference (Accessible)	0	80	-	
7.3	Transport Officer's Room	0	150	-	
7.1	Vehicle Sallyport	0	800	-	
Subtotal		0	0	140	

Total NSF - Detainee Holding

140

Departmental Gross Factor

1.90

Department Gross Square Feet

266

Court Officer's AreaStaff

4.1	Chief Court Officer	1	1	1	120	120	check staff count / adjust breakrm size accordingly
7.19	Court Officers' Break Room	1	1	1	200	200	
Subtotal		2	2			320	

Total NSF- Court Officers' Area

320

Departmental Gross Factor

1.30

Department Gross Square Feet

416

Notes:

1. Adjacent to Control Room.
2. C.O.'s share one room; includes kitchenette.
3. Number of holding cells to be determined by the custody count at each location
4. Within or directly adjacent to control room

COURT SUPPORT
JURY POOL, TRIAL COURT SECURE WAITING AREA
and INTERPRETER SERVICES

Data Sheet Ref.	Area Description	Units	Area Per Unit	NSF	Notes
	<u>Jury Pool</u>				in main Trial Court bldg
7.7	Jury Check-in area	0	100	-	
7.7	Jury Waiting Area	0	1,800	-	1
7.7	A/V Storage Closet	0	15	-	
7.7	Jury Toilets	0	50	-	
7.7	Vending alcove	0	30	-	
7.7	Public Telephone alcove	0	10	-	
	Subtotal			-	
	Total NSF - Jury Pool			-	
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			-	
7.8	<u>Trial Court Secure Waiting Area</u>				2
	Staff				
4.1	Office	0	0	1	120
4.2	Receptionist	0	0	1	80
	Subtotal	0	0		200
	<u>Support</u>				
7.8	Waiting/ Play Area	1	120	120	
7.14	Toilet	1	50	50	
7.22	Kitchenette	1	30	30	
6.1	Conference Room	1	120	120	
	Subtotal			320	
	Total NSF - Secure Waiting Area			520	
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			676	
	<u>Interpreter Services</u>				4
7.9	Office area	0	120	-	3
	Total NSF - Interpreter Services			-	
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			-	
	<u>Court Reporters</u>				4
7.10	Office area	0	120	-	3
	Total NSF - Court Reporters			-	
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			-	

Notes:

- Accommodates 100 persons, as follows: Provide a 70/30 split between chair seating and table seating.
Chair seating for 70 persons @ 15 sf/person = 1050sf / tables for 30 persons @ 25 sf/person = 750sf
Size to be adjusted based on actual # of jurors from Jury Commissioner; if >100 persons, add 15 sf/person
- This area should be located adjacent to main entry
- Shared workspace off of public circulation
- Main office to be in adjacent Trial Court building

Data Sheet Ref.	Area Description	Units	Area Per Unit	NSF	Notes
	<u>Public Lobby</u>				
7.11	Weather Vestibule	1	200	200	1
7.12	Security Screening & Queuing Area	1	200	200	2
7.11	Information Desk	1	64	64	
7.11	Lobby	1	2,000	2,000	6
7.13	Concession/ Vending/ Storage	0	150	-	in main Trial Court bldg
	Subtotal			2,464	
	<u>Public Lobby Support Functions</u>				
7.16	Main Entry Security Office	1	200	200	7
7.17	Police Room	0	150	-	in main Trial Court bldg
	Subtotal			200	
	Total NSF - Public Areas			2,664	
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			3,463	
	<u>Staff Support</u>				
7.19	Staff Break Room w/kitchenette	2	200	400	3,4
7.20	Staff Female Shower/ Lockers/ Toilet	0	200	-	5, 8
7.20	Staff Male Shower/ Lockers/ Toilet	0	200	-	5, 8
	Subtotal			400	
	Total NSF - Staff Support			400	lockers in main Trial Court building
	Departmental Gross Factor			1.30	
	Department Gross Square Feet			520	

Notes:

1. 200sf minimum; 10 sf/ per person additional.
2. Includes 2 security screening stations. 200sf min is placeholder; may need to be increased pending further research.
3. Assumes 200sf to serve approx. 45-50 staff.
4. Breakrooms should be conveniently located in a neutral area so that they can be easily shared.
Assumes shared use by departments; Exception: where staff exceeds 45-50 people, provide designated breakroom
5. # of lockers will be determined by number of staff. Base on 1 per court officer / 1 per maintenance staff / % of total court staff tbd
6. Size may differ due to existing conditions
7. Gunlocker housed inside security office.
8. Court Officer (CO) and Assistant Court Officers (ACO) shall have full sized lockers. Maintenance staff and all other staff to have half sized lockers. Maintenance staff lockers shall be separate and located near maintenance offices/ floor. Another staff to share with CO and ACO.

SUPPLEMENTAL OPERATIONS**ALTERNATIVE DISPUTE RESOLUTION
and COURT CLINIC**

Data Sheet Ref.	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
9.4	<u>Alternative Dispute Resolution</u>						Located in main Trial Court building
	Staff						
4.1	Office	0	1	0	120	-	
4.2	Clerical	0	1	0	64	-	
	Subtotal	0	2			0	
	Support						
9.4	Waiting Area			0	120	-	
6.1	Mediation Room			0	150	-	
6.1	Conference Room			0	200	-	
5.2	Equipment/ Supply Room			0	80	-	
	Subtotal					-	
	Total NSF- Alternative Dispute Resolution					-	
	Departmental Gross Factor					1.25	
	Department Gross Square Feet					-	
9.5	<u>Adult Court Clinic: (PFC)</u>						
	Staff						
4.1	Clinician's Office	0	1	1	120	120	
4.1	Social Worker	0	2	2	120	240	
	Subtotal	0	3	3		360	
	Support						
9.5	Reception/ Waiting Area			1	120	120	
	Subtotal					120	
	Total NSF- Court Clinic					480	
	Departmental Gross Factor					1.25	
	Department Gross Square Feet					600	

SUPPLEMENTAL OPERATIONS
CHILDCARE CENTER and SOCIAL SERVICES

Data Sheet Ref.	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
Childcare Center							1
Staff							Located in main Trial Court building
4.1	Director's Office	0	0	0	120	-	
4.2	Clerical Workstation	0	0	0	64	-	
Subtotal						-	
Support							
9.6	Reception/ Waiting Area			0	240	-	2
9.6	Multi-Purpose Room			0	1,000	-	
9.6	Laundry/ Kitchenette			0	30	-	
9.6	Storage Closet			0	50	-	
7.14	Toilet			0	50	-	3
Subtotal						-	
Total NSF - Childcare Center						-	
Departmental Gross Factor						1.30	
Department Gross Square Feet						-	
Social Services							
6.1	Shared Workroom / Conference Room			1	150	150	4
Subtotal						150	
Total NSF - Social Services						150	
Departmental Gross Factor						1.30	
Department Gross Square Feet						195	

Notes:

1. Childcare Center must be located at grade level for emergency egress.
2. Includes interview alcoves
3. 1 toilet for staff / 1 toilet for children
4. Instead of defined offices, social services area should be comprised of unassigned conference space where people can meet.

SUPPLEMENTAL OPERATIONS
DEPARTMENT of REVENUE- Child Support

Data Sheet	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
Ref.							
Staff							
4.1	Regional Counsel	0	0	0	120	-	
4.2	Counsel	0	0	0	80	-	
4.1	Attorney/Family Law Facilitator	0	0	0	120	-	Salem is the first to list this role: need add'l info
4.2	Child Support Worker	2	2	2	64	128	
4.2	Clerical	0	0	0	64	-	
	Subtotal	2	2	2		128	
Support							
9.8	Transaction Counter / Service			1	90	90	
9.8	Transaction Waiting Space			1	200	200	1,2
9.8	Interview Room			1	100	100	
5.2	Equipment/Supply Room			1	80	80	
	Subtotal					470	
Total NSF - DOR Child Support						598	
Departmental Gross Factor						1.30	
Department Gross Square Feet						777	

Notes:

1. DOR area must be located near an area that can handle overflow waiting.
2. Assumes 10 people, based on 200sf minimum at 20 sf/person to accommodate 10 people (if >10 people add 15 sf/person)

Data Sheet Ref.	Area Description	Staff Existing	Staff Projected	Units	Area Per Unit	NSF	Notes
Staff							
4.1	Building Manager	1	1	1	120	120	
4.2	Clerical	1	1	1	64	64	
	Subtotal	2	2			184	
Support							
10.1	Judge's parking			5		-	4 1, 2
10.1	Secure Staff Parking			2		-	Refer to main Space Inventory
10.2	Security Equipment Server Room			1	120	120	
10.3	Central I.T. Computer Room			1	400	400	
10.4	Central Mail Room			1	150	150	
10.5	Loading Dock/Receiving Area			1	800	800	
10.6	Maintenance Equipment Storage			0	300	-	
10.7	Maintenance Shop			0	150	-	Verify need and size for each of these
10.8	Outdoor Equipment Storage			0	300	-	spaces, given the relationship of this
10.9	Trash/Recycling Room			1	150	150	building to the Main Trial Court
10.10	Janitorial Supply Room			0	300	-	building.
10.11	Bicycle Storage Room			0	120	-	
10.12	Building System Manager Office			0	300	-	
10.13	Inactive Records Storage			1	1000	1,000	3
	Subtotal					2,620	
Total NSF - Building Support						2,804	
Departmental Gross Factor						1.30	
Department Gross Square Feet						3,645	

Notes:

1. Confirm with specific site and project requirements; parking based on # of judges + # of Chief CM / Chief PO + 1-2 add'l each
2. This should be 450sf per space if single-loaded arrangement, 350sf / space if double loaded.
3. Minimum 500sf to accommodate storage boxes.
4. The following building support spaces are included in the Grossing Factor for the building:
 - Life Safety Equipment Room
 - Switchgear Room
 - Tel / Data Closets
 - Electrical Closets/ Emergency Elec Rm
 - Generator Room
 - Janitorial Supply Closets
 - Elevator Machine Room

A2.3 Chapter 34 Evaluation Renovation of the Probate and Family Court Building

Salem, Massachusetts

J. Michael Ruane Judicial Center

Rolf Jensen & Associates, Inc.

April 19, 2006



ROLF JENSEN & ASSOCIATES, INC.

**CHAPTER 34 EVALUATION
RENOVATION OF THE
PROBATE & FAMILY COURT BUILDING
SALEM, MASSACHUSETTS**

**J. MICHAEL RUANE JUDICIAL CENTER
TRC 9910 ST2**

Prepared for:

Goody Clancy & Associates
334 Boylston Street
Boston, MA 020116-3866

April 19, 2006

Project B37863

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EXECUTIVE SUMMARY

Rolf Jensen & Associates (RJA) conducted a code review study of the Probate and Family Court Building (PFC Building) and the Administrative Addition (AA Building) located in Salem, Massachusetts. Our survey focused on items that are required to be addressed in Chapter 34 of the Massachusetts State Building Code (MSBC). These items include: means of egress, height and area limitations, fire protection systems, enclosure of stairways, and structural requirements. It should also be noted that the building is listed in the Historical Register and is classified as a Partially Preserved Building. The major code issues in accordance with Chapter 34 include:

- Spaces in the building are “shifting around.” For example, some spaces that are classified as Use Group B, Business, are becoming Use Group A, Assembly spaces (i.e. Courtrooms). Since the building will remain a courthouse, it is the opinion of RJA that a change in use is not occurring. Since a change in use is not occurring, the Construction Type of the building is not required to be addressed.
- Elevators are located within two (2) of the building’s stairs. This may be viewed as a hazardous means of egress condition. The issue of elevators within Stairs requires further discussion with the local Authority Having Jurisdiction (AHJ) and possibly a variance.
- Assembly spaces (i.e. the Courtrooms) are being renovated and thus should comply with the MSBC for new Construction. This includes eliminating the dead-end corridors at the East and West ends of the building. It is proposed that new Stairs will be added that flank the building to eliminate the dead-end conditions.
- Although new stairs are being added outside the footprint of the building, it is the opinion of RJA that these small additions do not require that the Construction Type of the building be evaluated since the stairs are being added to improve the life safety of the building.
- The open Monumental Stair is considered part of the historic portion of the building. However, Chapter 34 does require that it be enclosed or treated as an atrium with a smoke control system or 2-story vertical opening. It is the intent of the design team to enclose the stair at the Basement Floor, such that the space creates a 2-story floor opening with a “bump down” to the Basement. This approach will require discussions with the local AHJ.
- Exit signage and emergency lighting should be provided in lacking areas.

- The fire alarm system should be reconfigured for any renovated spaces.
- A standpipe system should be added to the PFC Building
- A sprinkler system is required to comply with Chapter 9 of the MSBC.
- The entire building should comply fully with MAAB since the cost of the renovation exceeds 30% of the fair and full cash value of the building, unless a variance is sought and obtained for historic portions of the building.

INTRODUCTION

Goody Clancy and Associates (GCA) has retained Rolf Jensen & Associates, Inc. (RJA) to perform an evaluation of the existing Probate and Family Court Building(hereafter referred to as “the PFC” or “the building”) for proposed renovation work on the building, located in Salem, Massachusetts. The purpose of the evaluation is to assess compliance with applicable provisions of the Massachusetts State Building Code, Sixth Edition (MSBC), the Massachusetts Architectural Access Board (MAAB), and American Disability Act Accessibility Guidelines (ADAAG), given proposed alterations. This report documents the Chapter 34 Evaluation required by Section 3402.0 of the MSBC and details the requirements a building must satisfy if the building is to be altered or substantially renovated.

PROJECT DESCRIPTION

The PFC portion of the Building consists of a basement level, two above-grade levels and an attic. The AA portion of the Building consists of a ground level parking and four above-grade levels, two for each of the Probate and Family Court Building's levels. The PFC portion and the AA portion of the Building are physically connected by an adjoining wall, with several doors leading from one portion to the other on each of the PFC levels. The PFC portion of the Building was built in 1912, and consists of various offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms and storage rooms. The Administrative Addition portion of the Building was built in 1979, and consists of offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms, and storage rooms. In addition, a maintenance tunnel leads from the basement level of the Administrative Addition portion of the Building eastward to a boiler room that houses the heating plant for this Building and the adjacent Superior Court/County Commissioner's Building (32 Federal Street). The maintenance tunnel and boiler room were included in the survey.

The Probate and Family Court portion of the Building is constructed primarily of stone, with a steel-frame hip roof with wood decking and wood plank on the attic floor, and concrete basement and foundation. The Administrative Addition portion is constructed primarily of steel-reinforced concrete with a flat built-up roof and concrete basement and foundation. Interior finish materials in both portions of the Building include vinyl, ceramic tile, carpet, and terrazzo flooring; sheetrock, marble, plaster, and wood finished walls; and metal, acoustical ceiling tiles, and plaster ceilings.

APPLICABLE CODES

The applicable codes for the project include the following:

- The Massachusetts State Building Code, Sixth Edition (MSBC)
- The Massachusetts State Fire Prevention Regulations (Fire Code)
- The Massachusetts Architectural Access Board (MAAB)
- Americans with Disabilities Act, Accessibility Guidelines (ADAAG)

The Commonwealth of Massachusetts has undertaken efforts directed towards the adoption of a new statewide building code. This new code will be based on the 2003 edition of the International Building Code (IBC). RJA is participating in the code development process and expects that adoption of the new code will approximately begin in January 2007. It is anticipated that there will be a six (6) month period following adoption during which use of either the "old" or new code will be permitted. In mid January, 2007, it is expected that use of the new, IBC based, MSBC will be required. It is possible that this schedule will slip between 3 and 6 months.

At this time, the project team is proceeding with design using the new MSBC 7th Edition, with the goal of submitting for initial building permits after January 1, 2007. Since Chapter 34 of the 7th Edition of the MSBC is currently not available, the building was evaluated in accordance with Chapter 34 of the 6th Edition. It is expected that the Chapter 34 requirements contained in the 7th Edition will be very similar to the 6th Edition requirements.

Based on our prior involvement in the development of the current MSBC 6th Edition, and our involvement in the development of the proposed new, IBC based, MSBC, we believe that:

- The structural fire resistance requirements of the new, IBC based, MSBC will be no more stringent than the current MSBC requirements.
- The Means of Egress provisions in Chapter 10 of the current MSBC will remain largely unchanged.
- The Structural Loads provisions in Chapter 16 of the current MSBC will be retained.
- The Energy Conservation provisions in Chapter 13 of the current MSBC will be retained

PFC EXISTING CONDITIONS REVIEW

Jeremy A. Mason and Brian P. Carnazza of RJA surveyed the PFC building on February 22, 2006. The survey was limited to visual review of existing conditions. Destructive or invasive inspections and systems testing were not performed.

This section of the report documents existing conditions only.

GENERAL

The existing 1912 building is two (2) stories in height while the addition is five (5) stories. **Since it appears that the addition is a true addition and not a separate building, the building will hereafter be referred to as a five (5) story building.**

The existing principal user group for the facility are the Registry of Deeds and the PFC. The building is classified as a mixed-use occupancy containing the following specific uses:

- Use Group A-3, Assembly – Courtrooms, conference rooms, library reading rooms (if 50 or more persons in each room)
- Use Group B, Business – Offices
- Use Group S-1, Moderate Hazard Storage – Compact shelving areas, storage rooms
- Use Group S-2, Low Hazard Storage – Vehicle parking areas, mechanical/ electrical/ plumbing rooms
- Use Group H, Hazardous – Diesel Fuel Storage located under the addition

The Courthouse and business areas, including the addition, are not separated from one another and are considered as a **non separated mixed-use building. Thus, the entire building should be counted when determining the construction type.**

CONSTRUCTION CLASSIFICATION - HEIGHT AND AREA

The PFC original building is two (2) story structure with a five (5) story addition (i.e. the AA Building). The height of the original PFC building is 47-feet to the attic floor and 67-feet the gable roof. The height of the AA Building is 48-feet to the uppermost occupiable floor slab and 59-feet to the flat roof slab. The maximum gross area per floor of the building (original PFC Building plus the AA Building) is approximately 21,533 square feet.

The 1912 portion of the building construction includes load bearing masonry walls (both interior and exterior), vaulted masonry floors with concrete topping supported by unprotected steel beams, and columns. The roof is constructed of steel trusses with wood planks with the outside covered with copper. It should be noted that the attic floor is also wood planks. The 1912 building is a mix of noncombustible and combustible construction with varying degrees of fire resistance. The original building most clearly resembles Type IIB; Unprotected, Noncombustible, Construction if the attic wood floor was replaced with Noncombustible Construction. If the wood attic floor remains as-is, the building would likely be Type VB, Combustible, Unprotected Construction.

The addition to the original building consists of substantial concrete construction. Based on the concrete construction, the addition appears to be at least Type IIA, Protected, Noncombustible Construction.

As previously stated, it appears that the addition was not constructed as a separate building meaning that it is a true addition to the original 1912 building. Therefore, both construction types detailed above should be considered when determining the construction type of the complete building. **The PFC building defaults to Type IIB (assuming the attic floor is replaced) or Type 5B Construction if the floor remains "as-is." This will be confirmed by the structural engineer once their report is completed.**

FIRE PROTECTION SYSTEMS

Sprinkler and Standpipe Protection – The main building is not equipped with an automatic fire sprinkler system or a standpipe system. Partial sprinkler protection is provided at the exterior First (1st) Floor between the existing building and the addition. The exterior windows and covered parking at grade level is provided with sprinkler heads. In addition, standpipes are located in the two enclosed stairways of the addition, but not in the main building.

Fire Alarm System – The building is in the process of being provided with a newly installed fire alarm system. The fire alarm is activated by smoke detectors, heat detectors, and manual pull stations. Each floor is provided with fire alarm horns and strobes. The fire alarm panel is located in the nearby building located at 32 Federal Street (Superior Court).

Other Fire Protection Systems – Fire extinguishers are provided in the building.

MEANS OF EGRESS

GENERAL

The existing PFC and Registry of Deeds (ROD) means of egress includes two (2) enclosed stairways, although one stair does contain an elevator within it. The building also contains an open Monumental Stair that is not permitted to be used as a means of egress. The buildings means of egress also contains corridors and various doors to the exterior.

Door and stair egress width capacity are currently not sufficient for the existing building occupant load.

ADDITIONAL COMMENTS

The following additional observations were made during our survey:

- It was apparent that some of the assembly spaces (Courtrooms) in the existing buildings have an occupant load of greater than 50 occupants, but are only provided with one means of egress from the space (refer to the attached existing Second Floor Plan).
- The door swing of the double doors on the First (1st) Floor leading from the Plan Storage Rooms into the Main Lobby does not swing in the direction of egress travel (refer to the attached existing First Floor Plan).
- The Monumental Stairway in the main portion of the building may be considered a hazardous means of egress since it should be provided with a one (1) hour FRR enclosure. The Monumental stair and one (1) of the two stairs in the AA building contain elevators within them and may be considered a hazardous means of egress.

- The spiral staircases serving the attic and the break room from the Second (2nd) Floor of the main building may be deemed hazardous or dangerous to life by the AHJ.
- It appears that dead end corridors exceeding a travel distance of 20-feet in the 1912 portion of the building in the East and West corridors serving Courtrooms and Offices on both the First (1st) and Second (2nd) Floors.

EXIT SIGNAGE AND LIGHTING

The Exit Signage was not compliant with the MSBC. During our survey, exit sign observations included inadequate illumination, improper location, and exits missing in locations. Emergency lighting with emergency backup has recently been added to the building.

ACCESSIBILITY

The following observations were made during our survey:

- The front entrance on the Ground Floor will be accessible once the newly constructed ramp is opened (completed March 2005). The lowest portion of the Lower Level (Main Building) is not provided with an accessible entrance or route for a disabled person to reach the Probation area of the floor (i.e. accessible only by stairs). Stairs located within the building near the rear entrance as well as the intermediate stairs located in the south end of the Probation area corridor prevent accessible access to the space.
- The building is equipped with two accessible elevators meeting the minimum elevator cab dimensional requirements for existing elevators of Section 28.7 MAAB.
- Panic bar door hardware was located approximately 51-inches above the floor on the door serving the enclosed stairway with the elevator in the recent addition portion of the building on the Lower Level. Hand-operated door opening hardware should be located 36-inches to 48-inches above the floor (MAAB 26.11.2).

- The top of the handrail gripping surface serving stairways was mounted between 30- inches and 33-inches for all stairways, except the Monumental Stair had handrails at 28-inches. MAAB require that the top of handrail gripping surface should be mounted between 34-inches and 38-inches above the stair nosings (MAAB 27.4.2).
- The bottom handrail extension for the open stair way only extends a minimum of six (6) inches. Handrails installed in stairways should terminate at the top and bottom of a stair run, and should have extensions at the top and bottom at least 12-inches beyond the top and bottom riser and parallel with the floor (MAAB 27.4.3).
- The water closets located in the North West corner of the Building on the Second (2nd) Floor of the 1970's addition are not accessible with approximate maximum dimensions of 60-inches by 56-inches (door swings in). Water closets that are required to be accessible should be provided with clear floor space as shown in Fig. 30d. of Section 30.7.1 of MAAB. The above water closets should be equipped with a door that swings out and overall minimum dimensions of 60-inches by 72-inches.
- In each adult public toilet rooms, at least one water closet and one sink in each location should be accessible to persons in wheelchairs, or a separate accessible unisex toilet room should be provided at each location (MAAB 30.1).
- All the Drinking fountains located in the building were not accessible, with the exception of the new Drinking Fountains added at the Basement, since no clear knee space was provided. MAAB requires that where only one drinking fountain is provided on a floor it should be accessible (MAAB 36.1). Wall and post-mounted cantilevered units allowing only a front approach should have a clear knee space between the bottom of the apron and the floor ground of 27 inches high, 30 inches wide and 17 inches to 19 inches deep (MAAB 36.2).

PROPOSED WORK

The proposed work of the renovation of the PFC building includes reorganizing existing courtroom and office spaces, and creating additional courtroom spaces within previously occupied office spaces. From here on, this report addresses the effect proposed work has on the existing building.

CHAPTER 34 EVALUATION

This report section documents the Chapter 34 Evaluation of the PFC Building in accordance with Section 3402 of the MSBC.

GENERAL CODE APPLICATION REVIEW

The majority of the provisions contained within the MSBC are intended for application to new construction projects. The application of these provisions to existing buildings is specifically addressed in Chapter 1, Administration, Section 102.0, Applicability.

Section 102.5.2 addresses the general applicability to existing buildings. The section states: *“Unless specifically provided otherwise in 780 CMR, any existing building or structure shall meet and shall be presumed to meet the provisions of the applicable laws, codes, rules or regulations, bylaws or ordinances in effect at the time such building or structure was constructed or altered and shall be allowed to continue to be occupied pursuant to its use and occupancy, provided that building or structure shall be maintained in accordance with 780 CMR 103.0.”*

Section 102.5.5 addresses application to alteration projects in existing buildings. The section states: *“Existing buildings or parts or portions thereof which are proposed to be enlarged, altered, repaired or changed in use or occupancy shall comply with the provisions of 780 CMR 34.”*

CHAPTER 34 – SCOPING PROVISIONS

Chapter 34, Section 3400.1 identifies that the provisions contained therein are intended *“...to maintain or increase public safety, health, and general welfare in existing buildings by permitting repair, alteration, addition, and/or change in use without requiring full compliance with the code for new construction except as otherwise provided for in 780 CMR 34.”* Based on this intent, Chapter 34 provisions are tailored to be less restrictive than new construction provisions.

The provisions of Chapter 34 categorize projects based on type of project and specify minimum requirements respectively. Continuation of the same use group, or a change in use group which results in a change in use of one or less should conform to Section 3404.0.

Another general provision of Chapter 34 addresses the qualification of a building to use the less restrictive provisions of Chapter 34. Qualifying buildings are those existing buildings that have been legally occupied and/or used for the last five years. In addition, qualifying buildings cannot have any outstanding violations for which an abatement order has been issued and remain unresolved. **It is assumed that the PFC Building satisfies these requirements and therefore is qualified to use Chapter 34.**

APPLICATION TO NON-RENOVATED AREAS

The extent to which non-renovated portions of a building must be upgraded is dependent on their present condition and on the type and **amount** of renovation work that is proposed. In all cases, the new work, including that associated with upgrades resulting from **application** of the evaluation method, should conform to the specific "new construction" requirements of the **Code**.

In general, non-renovated portions of an existing building are not required to comply with all of the "new construction" requirements of the Code. However, the Code generally addresses existing buildings by:

- Mandating that minimum levels of fire and life safety be maintained. This is achieved by requiring continued compliance with the edition of the code in effect at the time of original construction, by upgrades retroactively required by the Code, and by upgrades deemed necessary by the authorities having jurisdiction (AHJ) for the general safety and welfare of the building occupants and the public.
- Providing a methodology for evaluating the compliance of an existing building undergoing renovations with the level of fire and life safety intended by the Code and, if necessary, selecting upgrades which will result in an acceptable level of fire and life safety.

APPLICATION TO RENOVATED AREAS

Existing buildings that are **renovated** must be **evaluated** against the specific **provisions of Chapter 34**. Chapter 34 also contains specific requirements relative to historic buildings as noted in future sections of the report.

In general, all new work including that associated with additions and substantial renovations should conform to the specific "new construction" requirements of the Code. The level of fire/life safety in non-renovated portions of the facility must not be reduced as a result of the renovation/addition work.

Alterations or repairs to the fire resistance rated portions of the facility's structural system should be made with materials complying with the "new construction" requirements of the Code. However, historical buildings may be repaired or replaced in kind without requiring that system to comply following with the code for new construction (MSBC 3409.3).

Renovated portions of the existing mechanical, plumbing, electrical, and other systems should be made in conformance with the "new construction" requirements of the Code. Renovations to existing systems should not cause a reduction in the level of safety or adversely affect the performance of the system. Where renovations subject portions of the building to excessive loads, those portions should be upgraded to comply with the "new construction" requirements of the Code.

MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB)

It is the understanding of RJA that the cost of the renovation work to the PFC building will exceed 30% of the full and fair cash value of the building. Thus, the entire building is required to comply with MAAB (MAAB 3.3.2).

It should be noted that any historic building that is listed in the National or State Register of Historic Places or is designated as historic under appropriate state or local laws may be granted a variance by the Board to allow alternate accessibility (MAAB 3.9). According to the Massachusetts Cultural Resource Information System database the Essex County Southern PFC located at 36 Federal Street, Salem Massachusetts was added to the National Register in 1983. If the design team so desires, it may be possible to seek a variance to allow portions of the building to not comply fully with MAAB.

Per discussions with Goody Clancy, it is the understanding of RJA that DCAM intends to make the entire building accessible in accordance with MAAB, with the possible exception of the historic monumental stair. This issue of whether this requires a variance requires further discussion.

HISTORIC BUILDINGS

GENERAL

In applying the requirements of Chapter 34 to the existing building, the following MSBC definitions are applicable (MSBC 3401.1):

Historic Buildings — Any building or structure individually listed on the National Register of Historic Places; or any building or structure evaluated by the Massachusetts Historical Commission (MHC) to be a contributing building within a National Register or State Register District; or any building or structure which has been certified by the MHC to meet the eligibility requirements for listing on the National Register of Historic Places.

Partially Preserved Building — Any building or structure individually listed on the National Register of Historic Places or any building or structure certified as an historic building by the MHC and not designated as totally preserved.

Totally Preserved Building — An historic building or structure whose principal use is as an exhibit of the building or the structure itself which is open to the public not less than 12 days per year. Additional uses, original and/or ancillary to the principal use are permitted within the same building up to a maximum of 40% of the gross floor area.

Substantial Renovation or Substantial Alteration — Work which is major in scope and expenditure when compared to the work and expenditure required for the installation of a fire protection system, when such system is required by Chapter 9 for a particular use group. The building official shall make the determination and may request the owner or applicant to provide such supporting information as necessary to make such determination.

The PFC is listed in the National and State Registers of Historic Places. Based on the above definitions, the building should be classified as a Partially Preserved building. These historic requirements/ exceptions do not apply to the 1970's addition.

PARTIALLY PRESERVED BUILDING REQUIREMENTS

Section 3409.0, Historic Buildings, governs all buildings and structures that are legally designated as historic buildings and **preempts** all other regulations of the Code governing the reconstruction, alteration, change of use and occupancy, repairs, maintenance, and additions (MSBC 3409.1).

A partially preserved building is required to conform to MSBC Chapter 34 as modified by the following (MSBC 3409.3.1):

Structural Systems

Partially Preserved Historic Buildings are exempt from the structural requirements of the Code, including seismic (MSBC 3400.3(10)). **Per discussion with the design team's structural engineer, it is the understanding of RJA that this exception is not intended to allow structurally dependent additions to historic buildings without requiring compliance with Section 3408.**

Existing Systems

Individual components of an existing building system may be repaired or replaced in kind without requiring that system to comply fully with the code for new construction (MSBC 3409.3.1).

Specific Exceptions

Repairs, or in kind replacement of building features, are allowed so as not to compromise the architectural integrity of the historical characteristics and qualities which contributed to the eligibility for listing in the National Register of Historic Places (MSBC 3409.3.2). These repairs include:

1. Roofing
2. Windows
3. Entries/Porches
4. Wood Siding/Decorative Elements
5. Masonry
6. Metals
7. Interior Features

The legal use and occupancy may be continued without change or further compliance with the Code (MSBC 3409.3.4).

Energy Requirements

Except for additions, partially preserved buildings are exempt from the energy requirements of Chapter 13, Energy Conservation.

HISTORIC SUMMARY

The PFC/ ROD Building is classified as a Partially Preserved Building since it is listed in the National Register. A Partially Preserved building is required to conform to MSBC Chapter 34 with the exception of requirements detailed above contained in Section 3409.3 of the MSBC.

NON-HISTORIC AREAS

GENERAL

Certain areas in historic buildings may be interpreted as being non-historic. Such areas may be required to comply with the remaining provisions of Chapter 34 that are associated with a change in Hazard Index of one or less (MSBC 3404.1). **The 1970's addition is not considered historic and is required to comply with the following requirements.**

STRUCTURAL

Any alteration within an assembly use group should comply with the requirements of the code for new construction, except that earthquake requirements need only conform to MSBC 3408. These requirements include:

- Where buildings constructed prior to January 1, 1975 are altered, their structural systems are required to conform to the code applicable at the time of the original building permit. In the event of conflict between the prior code and MSBC Section 3408.0, the provisions of MSBC 3408.0 govern (MSBC 3408.1.2).
- Additions which are structurally separated from the existing portion of the building are considered as separate structures for earthquake design purposes, and should conform to all provisions of MSBC 1612.0 (MSBC 3408.3.1). Existing portions of the structure should conform to MSBC 3408.5.

Existing portions of buildings with new additions that are not structurally separated are required to comply with Section 3408.4.3.2 based on the percent increase in the area and weight of the building.

- A structural engineer should make an evaluation of the existing building to determine the adequacy of all structural systems that are affected by the alteration (MSBC 3408.2).
- The load capacity of all floors affected by the alteration should be adequate to support the loads required by MSBC 1605.0 through 1608.0, 1613.0 and 1614.0 inclusive, or the floors should be reinforced or replaced with new structural members (MSBC 3408.5.5).
- The wind load capacity of the structure-as-whole should not be less than that required for Exposure A in MSBC Section 1611.0. The existing lateral load resisting system should be reinforced or new lateral load resisting elements or systems should be added, as necessary, to meet this requirement (MSBC 3408.5.3).

The building official may waive this requirement if the alterations are minor and if the structural engineer certifies that there are no alterations to structural elements.

- The Seismic Hazard Category (SHC) for existing building should be determined from Table 3408.1. It is the opinion of RJA that a change in use is not occurring. Per discussions with the design team's structural engineer, an assumption has been made that the construction cost of the renovation work will exceed 50% of the assessed value of the building. Based on this assumption, the SHC will be given a rating of 2. The structural engineer will outline requirements associated with SHC 2 in his or report.

Per discussions with the design team's structural engineer, it is the understanding of RJA that the majority of the existing 1970's addition elements (with the exception of the roof) will remain in the current configuration, but meet Section 3408.5, *Alterations, Repairs, and Change of Use*, requirements for floor, live, and wind loads along with earthquake loads based on seismic hazard category. The historic building is permitted to remain "as is."

SECTION 3404.3 NEW BUILDING SYSTEMS

Any new building system or portion thereof must conform to the requirements for new construction to the fullest extent practical. Where an impracticality issue arises, a compliance alternative will need to be developed and approved by the Building Official.

New building systems will conform to the requirements of the current code.

SECTION 3404.4 ALTERATIONS AND REPAIRS

This section allows alterations and repairs to be made with “like” materials based on the continuation of the same use. Where compliance cannot be achieved due to impracticality, a compliance alternative will need to be developed and approved by the Building Official.

Repairs to the existing building should be made with materials equivalent to those currently existing in the building.

HAZARD INDEX REVIEW

The Chapter 34 method involves the assignment of a hazard index to the original occupancy and a hazard index to the new occupancy. The difference between the original and new hazard indices determines the extent of compliance necessary.

The proposed PFC Building renovation project involves continued use of the building as a courthouse classified as a mixed use occupancy containing primarily Use Group A-3, Assembly Occupancy, and Use Group B, Business Occupancy spaces. Use Group A-3 is assigned a Hazard Index of 4; Use Group B is assigned a Hazard Index of 2 (MSBC T3403). Although spaces are being “shifted around” (i.e. portions of Offices becoming Courtrooms and vice versa), it is the opinion of RJA that a change of use is not occurring because the building still functions as a Courthouse. This issue requires further discussion with RJA, GCA, and the local AHJ’s. Since a change in use is not occurring, the Hazard Index remains at its current level.

Based on the continuation of the **same** use (i.e., **no** change in **Hazard Index**), certain aspects of the existing building must be **reviewed**. Also, because of the historic aspect of the existing building, specific criteria for Registered Preserved buildings are applicable. The **following subsections** discuss the **considerations** of these criteria.

CHAPTER 34 REQUIREMENTS APPLICABLE TO THE ENTIRE BUILDING

GENERAL

The sections below contain the requirements from Chapter 34 that are applicable both the historic courthouse and the 1970's addition.

SECTION 3400.4

Existing Non Conforming Means of egress should comply with Section 3400.4 of the MSBC. The number of means of egress required for every space and/or story should comply with Table 1010.2 and the capacity of means of egress components should comply with section 1009 of the MSBC (MSBC 3400.4).

The occupant load for the **proposed use** of each floor was calculated using the floor area allowances per occupant for the applicable space within the building (MSBC 1008.1). Exit capacity was calculated using the factors permitted for fully sprinklered buildings since the entire building will be sprinklered. Further, the Monumental Stair is not expected to be enclosed and thus is not permitted to be used as a means of egress.

It should be noted that the occupant load for each floor was not calculated on a room by room basis. The approximate total area for the Use Group on the floor was divided by the occupant load factor for the occupancy type and rounded up to the nearest whole number. Once plans become more developed, it is anticipated that a more detailed occupant load will be developed.

Lower Level (Basement) of the Original Building

Occupant Load for Lower Level of the Original Building

Occupancy	Area (sf)	Factor (sf/Occ)	Load (Occ)	MSBC Reference
Offices	4,410	100	45	1008.1
Storage/ MEP Spaces	10,350	300	36	1008.1
Assembly (waiting area)	360	15	24	1008.1
Total	15,120	---	105	---

Exit Capacity for Lower Level of the Original Building

Egress Element	Width (in)	Factor (in/Per)	Capacity (Per)	MSBC Reference
South East Exit Door	33	0.15	220	1009.2
South West Exit Door	33	0.15	220	1009.2
North West Exit Door	33	0.15	220	1009.2
Total	99	---	660 >105	---

Adequate exit capacity is provided for the Lower Level

First Floor of the Original Building & the Administrative Addition

Occupant Load for First Floor of the Original Building & the Administrative Addition

Occupancy	Area (sf)	Factor (sf/Occ)	Load (Occ)	MSBC Reference
Offices	20,700	100	207	1008.1
Storage/ MEP Spaces	183	300	1	1008.1
Assembly	650	15	44	1008.1
Total	21,533	---	252	---

Exit Capacity for First Floor of the Original Building & the Addition

Egress Element	Width (in)	Factor (in/Per)	Capacity (Per)	MSBC Reference
South East Stair	44	0.2	220	1009.2
North West Stair	44	0.2	220	1009.2
Front Entrance	66	0.15	440	1009.2
Total	154	---	880 > 252	---

Adequate exit capacity is provided for the First Floor

First Floor Mezzanine of the Administrative Addition

Occupant Load for First Floor Mezzanine of the Administrative Addition

Occupancy	Area (sf)	Factor (sf/Occ)	Load (Occ)	MSBC Reference
Offices	5,792	100	58	1008.1
Storage/ MEP Spaces	160	300	1	1008.1
Assembly	461	15	31	1008.1
Total	6,413	---	90	---

Exit Capacity for First Floor Mezzanine of the Administrative Addition

Egress Element	Width (in)	Factor (in/Per)	Capacity (Per)	MSBC Reference
South East Stair	44	0.2	220	1009.2
North West Stair	44	0.2	220	1009.2
Total	88	---	440 > 90	---

Adequate exit capacity is provided for the First Floor Mezzanine

Second Floor of the Original Building & the Administrative Addition

Occupant Load for Second Floor of the Original Building & the Administrative Addition

Occupancy	Area (sf)	Factor (sf/Occ)	Load (Occ)	MSBC Reference
Offices		100	115	1008.1
Storage/ MEP Spaces	120	300	1	1008.1
Assembly	10,000	15	667	1008.1
Total	21,533	---	783	---

Exit Capacity for Second Floor of the Original Building & the Administrative Addition

Egress Element	Width (in)	Factor (in/Per)	Capacity (Per)	MSBC Reference
South East Stair	44	0.2	220	1009.2
North West Stair	44	0.2	220	1009.2
Total	159	---	440 < 783	---

Adequate exit capacity is **not** provided for the Second Floor. Additional means of egress are required that serve the Second Floor.

Third Floor and Fourth Floor of the Administrative Addition

Occupant Load for Third and Fourth Floor of the Administrative Addition

Occupancy	Area (sf)	Factor (sf/Occ)	Load (Occ)	MSBC Reference
Offices	6,413	100	65	1008.1
Total	6,413	---	65	---

Exit Capacity for Third and Fourth Floor of the Administrative Addition

Egress Element	Width (in)	Factor (in/Per)	Capacity (Per)	MSBC Reference
South East Stair	44	0.2	220	1009.2
North West Stair	44	0.2	220	1009.2
Total	88	---	440 > 65	---

Adequate exit capacity is provided for the Third and Fourth Floor.

As previously detailed in the Observations section of this report, Courtrooms on the Second Floor have an occupant load of greater than 50 occupants, but are only provided with one means of egress from the space. Assembly spaces with an occupant load of greater than 50 occupants should be provided with two means of egress (MSBC 1017.4). **Additional means of egress from these Courtrooms should be provided once these spaces are renovated**

The door swing of the double doors on the First (1st) Floor leading from the Plan Storage Rooms into the Main lobby does not swing in the direction of egress travel. All doors should swing in the direction of egress where serving an occupant load of 50 or more persons or where serving high hazard occupancy (MSBC 1017.4). The doors should be reversed as part of the renovation project.

SECTION 3400.5

In any existing building or structure not provided with exit facilities in which the exits are deemed hazardous or dangerous to life and limb, the building official should declare such building dangerous and unsafe in accordance with the provisions of 780 CMR 121 (MSBC 3400.5).

As previously detailed, the following observations were made during our site survey that the local AHJ could deem as hazardous means of egress issues:

- The Monumental stairway in the 1912 portion of the building may be considered a hazardous means of egress since it is not enclosed with a one (1) hour FRR enclosure. **However, it is the intent of design team to close off the Monumental Stair at the Basement such that the space creates a two (2) story floor opening with a “bump-down” to the Basement. It is the opinion of RJA that this approach is code-compliant but this requires discussion with the local AHJ’s.**
- One of the stairs in the AA Building contains an elevator within it and may be considered a hazardous means of egress. **This issue may require a compliance alternative or a variance and further discussions amongst the design team, DCAM, and the local AHJ’s.**
- The spiral staircase serving the attic Floor of the main building may be deemed hazardous or dangerous to life by a building official. **This issue requires further discussion.**
- The spiral staircase serving the break room and bathrooms from the Second (2nd) Floor may be deemed hazardous or dangerous to life by a building official. **However, these spaces are likely to be renovated into Mechanical spaces so the spiral staircases may be acceptable. This issue requires further discussion.**

- It appears that dead end corridors exceeding a travel distance of 20-feet in the main building in the East and West corridors serving courtrooms and offices on both the First (1st) and Second (2nd) Floors (refer to the attached existing First and Second Floor Plans attached). **It is expected that these dead-ends will be eliminated once new means of egress at the East and West ends of the building are added.**

SECTION 3400.6

In any existing building, or portion thereof, in which (a) the light or ventilation do not meet the applicable provisions of 780 CMR 12.0 and (b) which, in the opinion of the building official, are dangerous, or hazardous, to the health and safety of the occupants, the building official should order the abatement of such conditions to render the building or structure occupiable or habitable as applicable for the posted use and occupant load.

In enforcing the provisions of 780 CMR 3400.6 the *building official* may require or accept engineering or other evaluations of the lighting and/or ventilation systems in order to evaluate possible dangerous or hazardous conditions and acceptable solutions.

Where full compliance with 780 CMR for new construction is not practical for structural and/or other technical reasons, the *building official* may accept compliance alternatives, or engineering or other evaluations which adequately address the building or structure livability for the posted use and occupant load (MSBC 3400.6).

Means of egress lighting in all building, rooms or spaces required to have more than one exit or exit access should be connected to an emergency electrical system that complies with 527 CMR 12.00, the Massachusetts Electrical Code, referenced in 780 CMR 27, and listed in Appendix A to assure continued illumination for a duration of not less than 1.5 hours in case of emergency or primary power loss (MSBC 1024.4).

Emergency lighting with emergency backup has recently been added to the building, but it was unclear to RJA if adequate lighting is provided in all locations (specifically in the Monumental stair).

SECTION 3404.5

Every floor or story of any existing building should provide at least the number of means of egress as required by Section 3400.4 and which are acceptable to the building official (MSBC 3404.5). This section was discussed previously in the report for the both historical and non historical requirements. **Currently, an inadequate number of means of egress are provided from the Second floor, but are sufficient on other floors. However, it is expected that new means of egress will be added during the renovation and that sufficient means of egress will be provided.**

SECTION 3404.6

All required means of egress should comply with Section 1009 of the MSBC. Existing means of egress may be used to contribute to the total egress capacity requirements based on the unit egress widths of Section 1009 of the MSBC (MSBC 3400.6). The capacity of the means of egress components has already been addressed previously in the report. **Adequate egress capacity is provided on each floor except the Second Floor. However, it is expected that new means of egress will be added during the renovation and that sufficient capacity will be provided.**

SECTION 3404.7

Exit signs and lighting should be provided in accordance with Section 1023 of the MSBC.

A majority of the Exit Signage is not compliant with the Section 1023 of the MSBC. In several locations exit signage was not provided or was not proper illuminated.

SECTION 3404.8

Means of egress lighting should be provided in accordance with Section 1024 of the MSBC (MSBC 3404.8). The means of egress lighting in the existing building has already been addressed previously in the report. **The means of egress lighting as currently configured is not adequate. However, additional means of egress tied into the emergency power system of the building will be provided to comply with Section 1024 of the MSBC once the building is renovated.**

SECTION 3404.9 HEIGHT AND AREA LIMITATIONS

This section requires that the height and area of the building to be re-evaluated if a change in use or an addition is proposed.

As previously stated, it is the opinion of RJA that the building is not undergoing a change in use and therefore is not required to comply with this section.

It should be noted that if the building was to be considered to have undergone a change in use, the 7th edition of the MSBC would permit a Use Group A-3 Assembly Building of Type IIB construction to be 3-stories (75 feet) and 33,250 square feet (with sprinkler and open perimeter increases taken). The existing 1912 Building would meet the height and area requirements for Type IIB construction under the 7th Edition of the MSBC (IBC based). However, the building as a whole (i.e. the 1912 Building and the AA Building) would exceed the number of stories permitted. Since the AA building is of Type IIA Construction, it is the opinion of RJA that a variance could be sought and obtained.

Lastly, it should be noted that two (2) sets of stairs will be added to the building which are located outside of the current building envelope. It is the opinion of RJA that these stairs do not require that the height and area of the building be re-evaluated since they are only added to improve the life safety of the building.

SECTION 3404.10 EXISTING FIRE AND PARTY WALLS

This section allows existing fire and party walls to remain without complying with new construction requirements for such elements.

There are no existing fire and party walls. Further, there is not a true fire separation wall that separates the 1912 Building from the AA Building and thus the facility is considered a single building.

SECTION 3404.11 AND SECTION 3404.12 FIRE PROTECTION SYSTEMS

This section addresses the need to provide fire protection systems, if not already provided. Such systems are required based on substantial alteration and where otherwise required by Chapter 9 or where needed to meet height and area limitations. An automatic fire suppression system should be provided throughout all portions of Use Group Assembly and/or Business Occupancies (MSBC 904.2). A fire alarm system should be installed in all Use Group A, Assembly Occupancies (MSBC 917.4.1). In addition, a standpipe system should be provided when a substantial alteration occurs, and when the building is two (2) or more stories in height (MSBC 914.2.1).

The PFC Building will be “substantially renovated,” and although a fire alarm system is already provided it should be reconfigured appropriately in accordance with Section 917 of the MSBC. In addition, a standpipe system should be installed in the main building in accordance with Section 914 and a sprinkler system in accordance with Section 906 of the MSBC.

SECTION 3404.13 ENCLOSURE OF STAIRWAYS

Chapter 34 prohibits open stairways except in one and two-family dwellings. All egress stairways must be enclosed. There is no minimum fire resistance rating (FRR) required for an existing stairway enclosure, however partitions or other new construction which are added to enclose an open stairway should provide a 1-hour rating. All doors in such assemblies must be 1-hour fire resistance rated, self-closing, and tight fitting with approved hardware.

Section 3404.13 of Chapter 34 prohibits open stairways. However, there is no minimum fire resistance rating required for existing enclosures.

If the Monumental Stair is to be enclosed, it is not required to be upgraded to 1-hour FRR construction; however, any new doors that are added to separate the unenclosed stair from the remainder of the building should be 1-hour FRR, self closing, and tight fitting with approved hardware.

However, it is the opinion of RJA that if the space meets requirements contained in the current MSBC that allow it to be open, then it can remain open. These requirements include being considered an atrium with a smoke control system or an open stair in accordance with Section 713.3 Exception No. 2 of the MSBC and 2003 IBC Section 707.2 Exception No. 7. As previously detailed in this report, it is the intent of the design team to close off the stair at the Basement Level such that a two-story opening with a “bump-down” is created. This approach will require discussions and approval from the local AHJ’s.

SECTIONS 3404.14

Notwithstanding the provisions of Section 3404, Assembly Use Groups should comply with the provisions of Section 3400.3, item six (6) of the MSBC (MSBC 3404.14). A change from any other use group to an assembly use group (A) or any alteration or change in occupancy within an assembly use group should comply with the requirements of the code for new construction, except that earthquake requirements need only conform to Section 3408 of the MSBC (MSBC 3400.3).

Assembly spaces (i.e. courtrooms) will be altered and thus, these spaces should comply with new construction requirements. This includes eliminating the current dead-end corridors.

SECTIONS 3404.15 THROUGH 3404.16

These sections address specific uses and the need to provide compliance with new construction requirements. Where compliance cannot be achieved due to impracticality, a compliance alternative will need to be developed and approved by the Building Official.

These sections are not applicable to the PFC Building.

SECTION 3404.17 FIRE HAZARD TO ADJACENT BUILDINGS

This section addresses projects that constitute a change in use and that result in an increased fire exposure to adjacent buildings.

It is the opinion of RJA that a change of use is not occurring. This issue requires further discussion with RJA, GCA, and the local AHJ’s. Since a change in use is not occurring, Section 3404.17 is not applicable.

SECTION 3404.18 ACCESSIBILITY FOR PERSONS WITH DISABILITIES

This section requires projects to comply with 521 CMR, The Massachusetts Architectural Access Board to the extent of MAAB's scoping provisions. MAAB application criteria for existing buildings are identified in MAAB Section 3.3.

Based on the scope of work and the value of the building, it is assumed that the cost of the renovation work to the PFC Building will exceed 30% of the full and fair cash value of the building, and thus the entire building must be made to comply with MAAB with the possible exception of the historic Monumental Stair which may be preserved.

An accessible route should be provided to all accessible spaces. An accessible route should be 36-inches wide however it is permitted to be reduced to 32-inches at door openings (MAAB 20.3). All spaces including offices are required to be accessible and should be provided with an accessible route leading to the space. The entire building should be designed to be accessible in accordance with the MAAB and ADA.

As discussed previously, if the design team decides a variance should be pursued for the historical section of the building, further discussion with RJA is required.

CONCLUSION

To be compliant with Chapter 34 for existing buildings the following features of the building should be addressed:

- Spaces in the building are "shifting around." For example, some spaces that are classified as Use Group B, Business, are becoming Use Group A, Assembly spaces (i.e. Courtrooms). Since the building will remain a courthouse, it is the opinion of RJA that a change in use is not occurring. Since a change in use is not occurring, the Construction Type of the building is not required to be addressed.
- Elevators are located within two (2) of the buildings stairs. This may be viewed as a hazardous means of egress condition. The issue of elevators within Stairs requires further discussion with the local Authority Having Jurisdiction (AHJ) and possibly a variance.

- Assembly spaces (i.e. the Courtrooms) are being renovated and thus should comply with the MSBC for new Construction. This includes eliminating the dead-end corridors at the East and West ends of the building. It is proposed that new Stairs will be added that flank the building to eliminate the dead-end conditions.
- Although new stairs are being added outside the footprint of the building, it is the opinion of RJA that these small additions do not require that the Construction Type of the building be evaluated since the stairs are being added to improve the life safety of the building.
- The open Monumental Stair is considered part of the historic portion of the building. However, Chapter 34 does require that it be enclosed or treated as an atrium with a smoke control system or 2-story vertical opening. It is the intent of the design team to enclose the stair at the Basement Floor, such that the space creates a 2-story floor opening with a “bump down” to the Basement. This approach will require discussions with the local AHJ.
- Exit signage and emergency lighting should be provided in lacking areas.
- The fire alarm system should be reconfigured for any renovated spaces.
- A standpipe system should be added to the PFC Building
- A sprinkler system is required to comply with Chapter 9 of the MSBC.
- The entire building should comply fully with MAAB since the cost of the renovation exceeds 30% of the fair and full cash value of the building, unless a variance is sought and obtained for historic portions of the building.

In addition, the areas of alteration must be compliant with new construction requirements to the fullest extent practical. Where compliance is not feasible due to impracticalities, compliance alternatives must be developed by the project team and approved by the Building Official.


The review and approaches identified herein are consistent with the requirements of the applicable codes and their criteria. The project provides an equivalent or higher degree of protection without the entire building complying with the new construction requirements of the Code keeping with the intent of Chapter 34. Although, not required, the building fire and life safety protection will be greatly increased with the addition of a sprinkler system.

If you have any questions regarding the above information, please do not hesitate to contact us.

PROBATE & FAMILY COURT- RENOVATION
CHAPTER 34 EVALUATION

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April 19, 2006

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A2.4 Mechanical and Electrical Systems Analysis

Salem Trial Courts

SEi

February 13, 2007

Mechanical Drawings

Salem New Trial Court

February 6, 2007

Plumbing and Fire Protection Systems Analysis

J. Michael Ruane Judicial Center

Salem, Massachusetts

Draft February 2007

MECHANICAL & ELECTRICAL SYSTEMS ANALYSIS

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PART 1 - INTRODUCTION

- A. Originally, the Salem Courts project included analysis and renovations to the Probate and Family Court (P&FC) as well as the New Trial Court. Over the course of the analysis and study, the scope of work has been reduced to encompass only the New Trial Court Building (NTC) and the Church building.
- B. Under separate reports, different studies were performed:
 - 1. October 17, 2005 – HVAC & Electrical Existing Conditions Report
 - 2. October 19, 2005 – Separation of Heating Systems
 - 3. September 27, 2006 – MEP/HVAC Options for Minimal Renovation to the P&FC
 - 4. January 31, 2006 – Mechanical & Electrical Systems Analysis
- C. The mechanical and electrical systems description for the New Trial Court follows.

PART 2 - HVAC SYSTEM DESCRIPTION

2.1 PRIMARY AIR HANDLING SYSTEMS

- A. A major factor in the system selection is the varied usage and varying people densities in the different spaces. This characteristic requires proper ventilation to each space type (i.e., courtroom, vs. office vs. conference room) and the ability to control that ventilation in occupied/unoccupied modes for energy efficiency. Our recommendation brings us to a dual air approach to maximize energy efficiency and to minimize building duct distribution, yet providing superior air quality and temperature control characteristics.
- B. The first air system is comprised of three Dedicated Outdoor Air Systems (DOAS) which will provide the outdoor air ventilation requirement to each of the building spaces. These units will directly provide OA to each courtroom or building zone. These units, complete with enthalpy heat recovery, will be variable volume in control with individual zone air box on/off control according to occupancy. This control assures the exact OA to each space as required yet can be shut off when the zone is not in use to maximize energy savings.
- C. The second air system is comprised of multiple VAV air handlers providing the individual room air temperature control. Used in concert with the DOAS system, these VAV air handlers are then fully recirculating units such that heating coils are not necessary in the units eliminating coil HW piping. The units will, however have airside economizer controls (the use of all outdoor air for cooling) to maximize energy efficiency in the intermediate cooling seasons.
- D. Due to the architectural configuration of the proposed new building construction, the HVAC air distribution pattern lends itself to four broad air handling zones: two vertical distribution zones along the Bridge Street building axis, one zone for the south wing toward Federal Street and one zone for the church reuse.
- E. For the axis along Bridge Street, the air handling units would be located in the roof penthouse with distribution running vertical and horizontal from this location. For the south wing toward Federal Street, the air handling units would be located on the roof penthouse on that wing with distribution running vertical and horizontal from this location. For the church renovation into the law library, it is proposed that those units would be located in the new basement of that church building.
- F. The Church renovation building would be served by a single VAV air handling system complete with its full outdoor air component. As the building is generally one zone, there is no need to provide two systems for this building. This unit will be in the 12,000 CFM

range. When final plan layouts and space usage is defined and envelope characteristics are determined, we will determine if and where baseboard radiation will be needed.

- G. The air handling units shall feed a common supply duct headers in the penthouse and be distributed to vertical shafts serving the building floors below.
- H. Supply risers shall have sound attenuators in the vertical drops. Air shall be distributed through VAV valves with VAV manufacturer's attenuators and duct mounted reheat coils.

2.2 GENERAL EXHAUST SYSTEMS

- A. Roof mounted centrifugal dome fans shall be used for toilet exhaust systems and penthouse mechanical room exhaust systems.

2.3 CHILLED WATER SYSTEM

- A. Chilled water for the project shall be provided by two 280-ton centrifugal water cooled chillers located in the basement of the new trial court. The chillers will have variable frequency drives.
- B. The chilled water system will be designed around a temperature differential of 14°F (42° to 56°F).
- C. A primary chilled water pumping system shall be provided. The system shall consist of three (3) variable speed vertical split coupled chilled water pumps (1 is a standby).
- D. Two (2) 280-ton cooling towers shall be located on the roof. The cooling towers fans will have variable speed drives. The condenser water system will have three (3) vertical split coupled pumps (1 is a standby).

2.4 HOT WATER SYSTEM

- A. Building heating hot water for the project will be provided by three (3) 80 boiler horse power (BHP) gas-fired, flexible water tube boilers located in the basement of the new trial court.
- B. Hot water will be distributed to hot water reheat coils, air handling unit heating coils and perimeter baseboard radiation via three (3) vertical split coupled variable speed drive pumps.
- C. Boiler breeching shall be double wall and extend to 10 feet above the roof of the building.

2.5 HEAT RECOVERY

- A. The building's dedicated outside air system (DOAS) exhaust and supply air handling units shall contain enthalpy heat recovery wheels...

2.6 ENTRY, WAITING AND CONCOURSE AREAS

- A. These multi-story spaces will be designed so as not to require a dedicated smoke emergency evacuation system. It will be conditioned from the main supply and return air system and supplemented by an under floor hot water/chilled water radiant heating system.

2.7 LOADING DOCK VENTILATION AND HEATING

- A. Variable flow exhaust fans with a capacity of 1.5 CFM/SF will provide the motive force for ventilation. The rate of exhaust flow will be determined by carbon monoxide (CO) sensors distributed throughout the area.
- B. Makeup air will be provided by a combination of the open truck entrance and transfer ductwork with direct connections to the outdoors.
- C. Heating will be provided by overhead radiant heaters.

2.8 STAIR PRESSURIZATION

- A. Provide stairway and elevator hoistway pressurization systems.

2.9 CONTROLS

- A. The building will have a stand-alone Direct Digital Control (DDC) system to control and monitor all functions of the building mechanical systems. The front-end controls computer will be located in the basement mechanical room.

2.10 MISCELLANEOUS SYSTEMS

- A. Mechanical and main electric rooms shall be ventilated with 100% outdoor air via side wall intake louvers and ducted exhaust to either a sidewall louver or roof mounted fan. The exhaust system shall be controlled by a room thermostat. Heating shall be accomplished via hot water horizontal unit heaters.
- B. Entries and exterior stairwells shall have hot water cabinet unit heaters.
- C. Elevator machine rooms and tel/data rooms shall be cooled via the main building supply air units.

2.11 SYSTEMS COMMISSIONING

- A. The new Trial Court Building will be fully and formally commissioned. The owner will retain an independent third-party commissioning authority/agent (Cx-A) to act as the Commissioning Authority. The Commissioning Authority will observe and document the commissioning work.
- B. All prime contractors, trade contractors, subcontractors, installing subcontractors, air balancing and controls contractors, vendors, equipment and material suppliers and the like are part of the commissioning team and are required to take part in the complete commissioning process.

PART 3 - HVAC OUTLINE SPECIFICATION

3.1 GENERAL

- A. Permits: Give notices, file plans, obtain permits and licenses, pay fees and backcharges.
- B. Coordination Drawings: Prepare coordination drawings for all mechanical, electrical, plumbing and fire protection work.
- C. Product Data: Submit catalog data sheets and defining published materials showing requirements of equipment and their accessories.

- D. Shop Drawings: Submit shop drawings indicating physical size and arrangement.
- E. Operation and Maintenance Manuals: Prepare complete manuals for all systems and equipment.
- F. Identification: All equipment and devices shall be identified by nameplates, tags, signs or directories.
- G. Testing and Commissioning: Completely test and inspect all parts of the work provided under this Section.
- H. Record Documents: Prepare final record documents for the work as completed. Provide hard copies as well as electronic files submitted on CD format.
- I. Vibration Isolation: Provide vibration isolation for all rotating and motive. Furnish necessary structural supports for equipment to distribute weight evenly on isolators. Provide free standing spring isolators, equipment bases and inertia blocks and structural steel bases.
- J. Motors: All motors to be premium efficient. Motors less than ½ HP, 120 volt, 1 phase; ½ HP or over, 480 volts, 3 phase. All motors shall be 1750 RPM unless otherwise specified. Motors for use with VFDs shall be rated for "Inverter Duty".
- K. Motor Controllers: Fused disconnect switch and magnetic starters. Each controller complete with: overload protection, control circuit transformer and fusing, pilot lights, necessary interlocking contacts and time delay relays. Provide start-stop switch for manually operated equipment. H-O-A or maintained contact type switch for automatic equipment.

3.2 PIPES AND PIPE INSULATION

- A. Materials
 - 1. Chilled Water Piping: 2-1/2" and larger, Schedule 40 black steel welded 2" and smaller, L type copper.
 - 2. Condensate Drain Piping (cooling): Type L copper.
 - 3. Hot Water Piping: 2-1/2" and larger, Schedule 40 black steel welded 2" and smaller L type copper.
- B. Cover all chilled water and hot water piping with 1-1/2 inch thick fibrous glass insulation with factory-applied fire retardant vapor barrier jacket.
- C. Cooling coil condensate drain piping shall have 3/4" thick insulation.
- D. Provide electrical heat tracing on all outdoor piping.

3.3 SHEET METAL WORK and DUCT INSULATION

- A. Ductwork
 - 1. Galvanized Steel
 - a. Air handling systems, supply and return air.

- b. Toilet and general building exhaust air.
 - B. Flexible Ducts: Flexible ducts can be used in office areas for the final 5 foot connection to diffusers and registers. Do not use flexible duct on exhaust systems.
 - C. Duct Insulation
 - 1. Concealed Air Conditioning Ductwork
 - a. Fiberglass 1-1/2" thick, 3/4 lb. density with reinforced aluminum foil, flame resistant kraft vapor barrier securely sealed on all supply air ductwork.
 - 2. Exposed Ductwork and Plenums
 - a. Semi-rigid fiberglass board 1-1/2" thick, 3 lb. Density with factory-applied fire retardant foil-reinforced kraft vapor barrier facing on all exposed supply and fresh air ducts and exposed plena.
 - b. In mechanical rooms use semi-rigid fiberglass board for up to 10' AFF. Above 10 feet use fiberglass wrap.
- 3.4 AIR HANDLER – CUSTOM BUILT-UP
- A. Provide built-up air handling units for the penthouse air handling units. Units shall be factory-fabricated for shipping and field re-assembly.
 - B. Housing - design pressure shall be equal to 1.5 times fan static pressure, at fan shut off pressure.
 - C. Panels shall be double wall galvanized steel with inner perforated liner and non-perforated exterior sheet. Panels shall be minimum of 4" thick packed with fibrous glass.
 - D. Electrical - provide vapor tight incandescent lighting fixtures in each AHU compartment.
 - E. Provide galvanized rigid steel conduit from fan motors through wall of casing for wiring. Connection to fan motor shall be liquid-tight steel conduit.
 - F. Provide backward inclined airfoil fans, internally isolated with inertia bases and spring isolators.
 - G. Provide air traverse station at inlet of each fan.
 - H. Provide variable frequency drive for each supply and exhaust air fan.
 - I. Water Coils shall have seamless copper tube with aluminum plate type fin construction. All Water coils shall have galvanized steel casings except chilled water coils, which shall have stainless steel casings.. Factory tested at 250 psi air pressure under water. Cooling coils shall have drain pan extending 24" past end of coil.
 - J. Provide heat recovery systems and show on the drawings.
 - K. Air Filters: Two inch 30% pre-filters and 12 inch 95% final filters.
 - L. Filter bank framing shall be 16 gauge galvanized steel or extruded aluminum rack system

by Farr, Cambridge or AAF.

3.5 PUMPS

- A. Pumps shall have non-overloading characteristics throughout the design curve. Impeller shall be no more than 90% of casing size. Materials of construction shall be for a bronze-fitted pump with cast iron casings.
- B. Pumps shall have isolation valving on both sides of pumps and provide cyclone-type abrasive separators to provide clean water flush to seals on all pumps.
- C. Pumps shall be of vertical split couple design.

3.6 BOILER

- A. Provide flexible water tube hot water boilers of capacities noted in system descriptions.
- B. Boilers shall come complete with gas trains in compliance with Massachusetts State Codes.
- C. The full modulation of the burner shall be controlled by water temperature. A modulating temperature control shall be supplied to modulate a burner mounted damper motor, controlling both fuel and air supply by means of direct mechanical linkage.
- D. The burner shall utilize a Fireye type flame safeguard programmer incorporating 7 LED indicate lights to annunciate the current operating status of the burner.
- E. The boiler manufacturer shall furnish a microprocessor based control system to sequence the starting stopping and controls modulation firing rate for two boilers, as well as providing lead/lagging of the boilers.

3.7 RADIANT HEAT

- A. Provide a hot/chilled water radiant in-slab heating/cooling system for the entrance waiting areas.

3.8 CHILLERS

- A. Provide water-cooled centrifugal chillers of capacities noted in system descriptions.
- B. Chillers shall utilize R-134 or R-123 refrigerant and be rated in accordance with ARI Standard 550.
- C. Compressors shall be serviceable hermetic type and shall be equipped with a variable speed drive for the compressor, therefore a separate starter is not required.
- D. Provide factory installed 3/4" thick closed cell foam insulation for all cold surfaces.
- E. Provide chillers with marine water boxes with flanged connections to allow service access for cleaning of the heat exchanger tubes without the need to break the water piping.
- F. The chiller shall be controlled by a stand-alone microprocessor based controller to control chiller operation and monitoring of chillers sensors, actuators, VFD's, relays and switches. The chiller controller shall interface with the building DDC Building Automation

System (BAS) to allow start/stop, resetting of chilled water supply temperature and alarming BAS.

- G. Chillers shall be furnished with reseating relief valves in lieu of rupture discs. Relief's shall be vented to outdoors.

3.9 COOLING TOWERS

- A. Provide open cell induced draft cooling towers of capacities as noted in system descriptions.
- B. The thermal performance of all towers shall be tested in accordance with CTI Standard 201.
- C. Towers shall have top inlet and bottom outlet connections and shall be capable of satisfactory operation down to 40°F CWT. Towers shall be off in winter.
- D. Provide stainless steel components for wet deck and cold water basins.
- E. Provide towers with floats for water make-up.
- F. Towers shall have belt drives with the motor mounted outside the airstream.
- G. The towers shall be equipped with an enclosed OSHA ladder and perimeter handrail on top of the tower.
- H. Provide vibration limit switch to shut off tower in case of excess vibration.

3.10 TERMINAL UNITS, VARIABLE VOLUME

- A. Provide single duct variable volume air control assemblies with manufacturer's 3' long sound attenuators for all office spaces.
- B. Assemblies shall be pressure independent.

3.11 BASEBOARD RADIATION

- A. Hot water baseboard heat in public spaces shall be by Runtal Radiator Co.

3.12 CHEMICAL TREATMENT

- A. Provide centralized water treatment for all primary water systems, except for the condenser water system, which shall be provided with a Dolphin Series 2000 pulsed water treatment system by Clearwater Systems Corporation.

3.13 DIFFUSERS/REGISTERS/GRILLES

- A. All diffusers/registers/grilles for general labs and office spaces shall be of painted steel construction.

3.14 FANS

- A. Toilet exhaust and mechanical room exhaust fans shall be roof mounted dome style fans.

3.15 BUILDING CONTROLS AND AUTOMATION

- A. A direct digital control system (DDC) will be provided to control and monitor all functions of the building mechanical systems.
- B. All large control valves and dampers, as well as all Tek air pneuma valves and associated reheat coil control valves will be pneumatically actuated using campus compressed air. All fan-coil unit valves, single duct VAV boxes and associated reheat coil control valves will be electronically actuated.

PART 4 - ELECTRICAL SYSTEM DESCRIPTION

4.1 ELECTRIC SERVICE AND DISTRIBUTION

- A. National Grid will provide primary electric service, including wiring and exterior pad mounted switch and two 2,000 kVA transformers and pads to serve 277/480 volts to the Courthouse's interior switchboards.
- B. Provide primary conduit ductbank and secondary conduit ductbank and wiring from the exterior transformers to building's interior switchboards. Each switchboard shall be 4,000Amp 277/480 volt, 3 phase 4 wire 60 hz grounded circuit breaker switchboard with 3,000A-3P main circuit breaker.
- C. New distribution throughout the building shall be 277/480 volt, 3 phase 4 wire for mechanical and lighting loads. Dry type step down transformers shall be provided to provide power for incandescent lighting, receptacles and other 120/208 volt loads.
- D. Panelboards for lighting, office power and mechanical power shall be located in electric closets and mechanical rooms. Where practical, elevator rooms will be stacked to allow flexibility and ease of maintenance.
 - 1. New Wiring Methods
 - a. MC and AC cable may be used for branch circuiting as allowed by the NEC and as allowed by the local authorities having jurisdiction.
 - b. All penetrations through fire and smoke partitions and floors will be firestopped.
 - c. Fishwires will be installed in all empty raceways.

4.2 EMERGENCY SERVICE AND DISTRIBUTION

- A. All emergency lighting and smoke evacuation shall be provided from a 1,250 kW, 480/277 volt diesel powered generator. Generator shall be installed on site with acoustic weatherproof enclosure. Emergency generator shall provide power to standby loads including heating and other loads as dictated by design.
- B. Provide 2 hour rated feeders and emergency distribution closet for all life safety and emergency loads.
- C. The emergency distribution will be broken up into three systems with one or more transfer switches serving each of the following:
 - 1. Life safety
 - 2. Elevator

3. Standby (non-essential)
- D. Emergency lighting shall be provided in courtrooms. Select fixtures shall also be provided with battery backup ballasts to provide lighting during the transfer from normal to emergency power. The lighting shall be designed such that this emergency lighting does not provide spot lighting for the judge's bench.
- E. In addition to the courtrooms and circulation areas for egress, emergency lighting shall be provided in the following areas:
 1. Jury assembly area
 2. Trial jury suite
 3. Grand jury suite
 4. Judge's private chambers, conference room and rolling room
 5. Other areas as dictated by design

4.3 GROUNDING

- A. A perimeter grounding system comprising driven ground rods, buried copper cable, connections to building steel and copper ground buses shall be provided. The maximum resistance to ground for the ground system shall be two ohms.
- B. All feeders and branch circuits shall be provided with a green equipment ground conductor. A ground wire and ground buses shall be provided in all telecommunications rooms and closets.

4.4 LIGHTING AND POWER

- A. Provide convenience outlets generally in courtrooms, offices, public areas, mechanical rooms and electrical rooms as dictated by design.
 1. Lighting will be designed to meet the aesthetic qualities for the individual design areas. The lighting will also be designed in accordance with Owner's standards for quality and efficiency.
 2. The lighting will be designed to meet and exceed the requirements of the Massachusetts State Energy Code.
 3. Lighting levels and quality will be designed to meet or exceed IESNA guidelines.
 4. Lighting controls will be provided for individual occupancy control in each design area. Controls will be provided to allow for multiple levels of lighting for occupant comfort and use.
 5. Occupancy sensors and time clock controlled lighting contractors will be incorporated to provide automatic lighting controls throughout the facility and for exterior site lighting. Automatic lighting controls for individual spaces will be provided to meet the individual requirements of the respective spaces and will be determined in subsequent meetings.

4.5 FIRE ALARM

- A. An addressable type fire alarm system shall be provided. The main control panel (FACP) shall be located in the water fire service room. The system shall be connected to the Salem Fire Department via a leased telephone line for alarm and trouble indications in accordance with the building code.

1. The fire alarm system shall operate manually via fire alarm pull stations located at egress locations on each level.
2. The fire alarm system shall operate automatically via smoke detectors located in corridors, lobbies, electrical closets, and other selected spaces. Automatic operation shall also be initiated by smoke detectors in the HVAC air-handling units. Sprinkler system shall also initiate automatic operation. Alarms shall be horn/strobe units.
3. Activation of the sprinkler system shall also trip a radio master box to alarm the Salem Fire Department.

4.6 OTHER ELECTRICAL SYSTEMS

- A. Where heat trace systems are provided under section 15000 provide power and final testing and connections.
- B. An empty raceway system shall be provided for security system and CCTV devices in the building to corridors, stairwells and grade level perimeter doors.
- C. An empty raceway system shall be provided for audio/visual systems.
- D. No conditioned power (Uninterruptible power supplies (UPS), special transformers, isolated ground systems etc) is anticipated at this time.

4.7 TELECOMMUNICATIONS

- A. Verizon Service
 1. Verizon will provide a single point of entry into the new Court House Building. Verizon's infrastructure shall be via copper cable terminated on lightning protection and or fiber optic cables or both. This presence will be in The Main distribution Frame (MDF).
 2. Telephone Distribution
 - a. The telephone distribution will be copper backbone cabling distributed from the proposed MDF located on the basement level. The (2) proposed IDF closets per floor shall be connected via new copper backbone cables to the proposed MDF. All new voice station cabling shall be terminated on 110 type terminations. Cables will feed from the MDF/IDF to all voice outlets.
- B. Data Distribution
 1. High speed data communications services will be distributed from the MDF to each IDF via multi strand multimode fiber optic cables.
- C. Telecommunications Grounding System
 1. A telecommunications main grounding busbar will be in the MDF connected with a minimum #4 grounding conductor to the main electrical ground.

2. Provide a telecommunications bonding backbone from the MDF main grounding busbar through the IDF rooms and terminated on a grounding busbar at the last closet.
 3. Provide a telecommunications busbar in each closet
 4. Bond all busbars to the telecommunications bonding backbone.
 5. Bond all tap/splitters, distribution devices, racks etc to the grounding busbar.
- D. Codes and Standards
1. The Telecommunications System will be designed to conform, as a minimum, to the following codes and standards:
 - a. Local and State Building Department Codes.
 - b. Occupational Safety and Health Act (OSHA).
 - c. Underwriters Laboratories (UL).
 - d. National Fire Protection Association (NFPA).
 - e. National Electrical Code (NEC).
 - f. Massachusetts Electrical Code (MEC)
 - g. Americans with Disabilities Act (ADA).
 - h. ANSI /TIA/EIA 568-B 2.1 Commercial building cabling standard.

4.8 SECURITY

- A. The Security System shall consist of Security Management System (SMS), Closed Circuit Television (CCTV) System, Card Access System, Intercom System, Graphical User Interface (GUI). All applicable wire and cable, and the functional integration of all subsystems through subsystem interfaces.

PART 5 - ELECTRICAL OUTLINE SPECIFICATION

5.1 GENERAL

- A. Codes and Standards
1. Electrical systems within the building will conform to the following codes and standards:
 - a. Americans With Disability Act (ADA)
 - b. National Electrical Code (NEC) with Massachusetts Amendments (CMR 527 12.00)
 - c. National Fire Protection Association (NFPA)
 - d. Massachusetts State Building and Energy Codes (CMR 780)
 - e. American National Standards Institute (ANSI)
 - f. Electronic Industries Association (EIA)
 - g. Institute of Electrical and Electronic Engineers (IEEE)
 - h. Illuminating Engineering Society of North America (IESNA)

- i. National Electrical Contractors Association (NECA)
 - j. National Electrical Manufacturers Association (NEMA)
 - k. Telecommunications Industry Association (TIA)
 - l. Underwriters' Laboratories, Inc. (UL)
- B. Permits: Give notices, file plans, obtain permits and licenses, pay fees and backcharges.
- C. Coordination Drawings: Prepare coordination drawings for all mechanical, electrical, plumbing and fire protection work.
- D. Product Data: Submit catalog data sheets and defining published materials showing requirements of equipment and their accessories.
- E. Shop Drawings: Submit shop drawings indicating physical size and arrangement.
- F. Operation and Maintenance Manuals: Prepare complete manuals for all systems and equipment.
- G. Identification: All equipment and devices shall be identified by nameplates, tags, signs or directories.
- H. Testing and Commissioning: Completely test and inspect all parts of the work provided under this Section.
- I. Record Documents: Prepare final record documents for the work as completed. Provide hard copies as well as electronic files submitted on CD format.

5.2 WORK

- A. Work shall include but shall not be limited to the following:
- 1. Low voltage switchboards.
 - 2. Distribution panelboards and lighting panelboards.
 - 3. Dry type transformers.
 - 4. Motor starters
 - 5. Lighting fixtures.
 - 6. Conduit and raceways.
 - 7. Branch circuit wiring.
 - 8. Wire and cable.
 - 9. Telephone and data conduit and outlet system.
 - 10. Security and CCTV conduit and outlet system.
 - 11. Fire alarm system and devices.
 - 12. Disconnect switches.
 - 13. Wiring devices.
 - 14. Multi outlet assemblies.
 - 15. Lightning Protection.
 - 16. Cable tray systems.
 - 17. Grounding.
 - 18. Variable frequency drives.
 - 19. Generator and Automatic Transfer Switches

5.3 MATERIALS AND EQUIPMENT

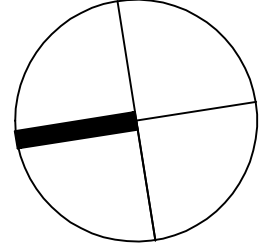
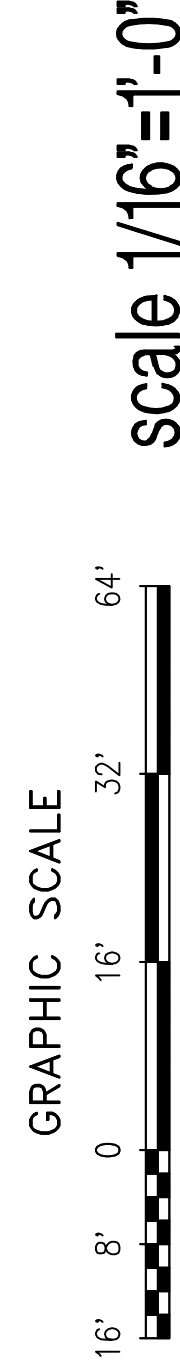
- A. Low voltage switchboards shall be an front only accessible, indoor type, complying with UL891 and NEMA PB-2 standards. The switchboard shall consist of vertical free standing structures joined together to form a unitized assembly. The switchboard shall contain a front accessible distribution section with molded case circuit breakers. The main bus shall be copper braced for a minimum interrupting rating of 65,000 symmetrical amperes. The main switchboard shall be manufactured by Square-D, GE, Siemens or Eaton.
- B. Motor Starters shall be NEMA sized combination type installed in NEMA 1 enclosures for indoor applications and NEMA 3R for outdoor applications. Starters shall be magnetic, across the line type with fusible switch disconnect in common enclosure, except as indicated or specified otherwise.
- C. Distribution Panelboards and Lighting Panelboards shall be by Square-D, Siemens, Eaton or General Electric, and shall be UL-listed dead-front type, and shall meet or exceed requirements of NEMA Standard Publication PB-1, and WL-50, and 67. Panelboards shall be provided with cabinets containing flush hinges and combination catch and lock. Circuit breakers installed in the panelboards shall be molded case, bolt-on, thermal-magnetic, common-pole type. Panelboards shall contain separate equipment ground bus and shall have integrated short circuit current rating equal to or greater than circuit breaker AIC ratings schedule on drawings.
- D. Dry type step-down transformers shall meet requirements of NEMA No. ST20, TP-1 compliance and UL Standards. Transformers shall have separate primary and secondary windings for each phase and shall have 220°C insulation system. Transformers shall be ambient air-cooled and ventilated, suitable for floor or wall mounting. Transformers shall be by Square-D, or General Electric.
- E. Lighting Fixtures
 - 1. Fluorescent fixtures shall have low loss, high efficiency, high power factor energy saving fully electronic 277 volt ballast, with sound rating A and shall be CBM certified. HID fixtures shall have high power factor; encapsulated ballasts, sound rating A, and shall be CBM-certified. Lamps shall be Octron T-8 type, manufactured by Sylvania or approved equal, and electronic ballast shall be by Advance, Magnetec, or Motorola.
- F. Raceways
 - 1. Rigid metallic conduit shall be of mild steel tube, hot dip galvanized, and manufactured in accordance with UL6 and ANSI C80.1 Intermediate metal conduit shall be hot dip galvanized and manufactured in accordance with WL 1242.
 - 2. Electrical metallic tubing shall be electro-galvanized and manufactured in accordance with NEMA TL2. Raceways shall be by Allied Tube and Conduit Corporation, Triangle PWC Inc., or Wester Tube and Conduit Corporation.
- G. Wire and Cable (600 V and below)
 - 1. Single conductor, annealed copper wire, and cable with insulation rated 600 volts shall be used for secondary service, feeders, branch, and system wiring.

2. Armored cable shall be Type AC 600 volt copper with full-sized insulated ground conductor.
 3. Wire #10 and larger shall be stranded, #12 and smaller shall be solid. Wire and cable shall have THWN-THHN or XHHW insulation. Wire and cable shall be Basic Wire and Cable Corporation, Triangle, or Okonite.
 4. Two hour rated cable systems shall be MI.
- H. Safety Disconnect Switches
1. Quick-make/quick-break Type HD heavy duty switches shall be provided. Switches shall be ITE or approved equal, NEMA 1 for dry applications and NEMA 3R for wet locations. Switches shall be rated 600 volts and shall be capable to withstand available fault currents without damage. Safety switches shall be Square-D, General Electric, Siemens or Eaton.
- I. Wiring Devices: Duplex 20 amp, 125 volt grounding receptacles specification grade will be provided. Heavy duty outlets will have voltage and amperage ratings as required. Lighting switches will be 20 amps and device plates will be brushed stainless steel. Devices shall be Hubbell, Bryant, or Levitton.
- J. Fire Alarm System (Addressable)
1. The fire alarm system shall comply with all applicable NFPA, ADA, and local codes and shall be by FCI, Siemens or Simplex. The Fire Alarm System shall be completely addressable, multiplexed type consisting of state-of-the-art, stand-alone fire alarm system equipment.
 2. The Fire Alarm System shall consist of a main fire alarm panel with provisions for connection to the central campus system and shall include all components as required for a complete and operational system, including but not limited to: addressable smoke and heat detectors, manual pullstations, duct detectors, flow and tamper switches, audible/visual devices.
- K. A lightning protection system shall be by Heary Brothers Lightning Protection Company, Warren Lightning Rod Co., or Independent Protection Company. The system shall include solid copper 1/2 inch diameter air terminals, extending minimum of 10 inches above the protected object. Conductors shall be 28 strands, 0.066 diameter each strand copper wire cable, weighing 375 pounds per 1000 feet.
- L. Generator and Automatic Transfer Switches (ATS)
1. Generator shall diesel fired and be installed at grade in an acoustic weatherproof enclosure.
 2. ATS's shall consist of power transfer assembly and controls to provide complete automatic operation. ATS shall be installed in a common NEMA-1 enclosure. The ATS shall be open transition, instant transfer.
 3. Generator shall be by Caterpillar or Onan, ATS's shall be by Automatic Switch Co. or Russelectric.

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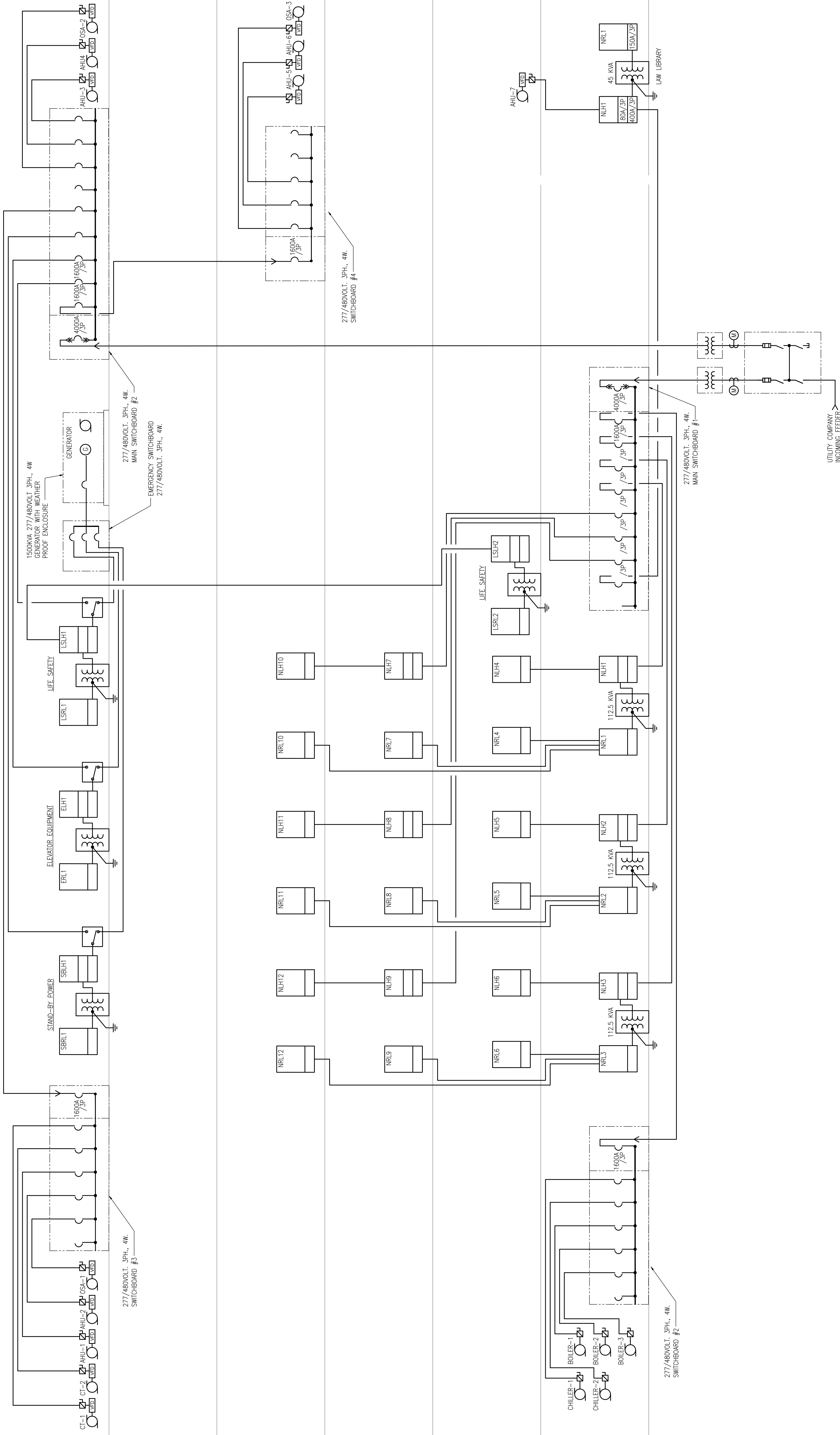
February 6, 2007

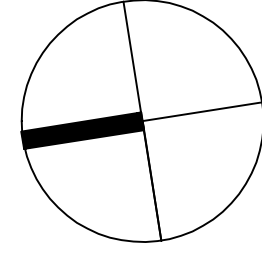
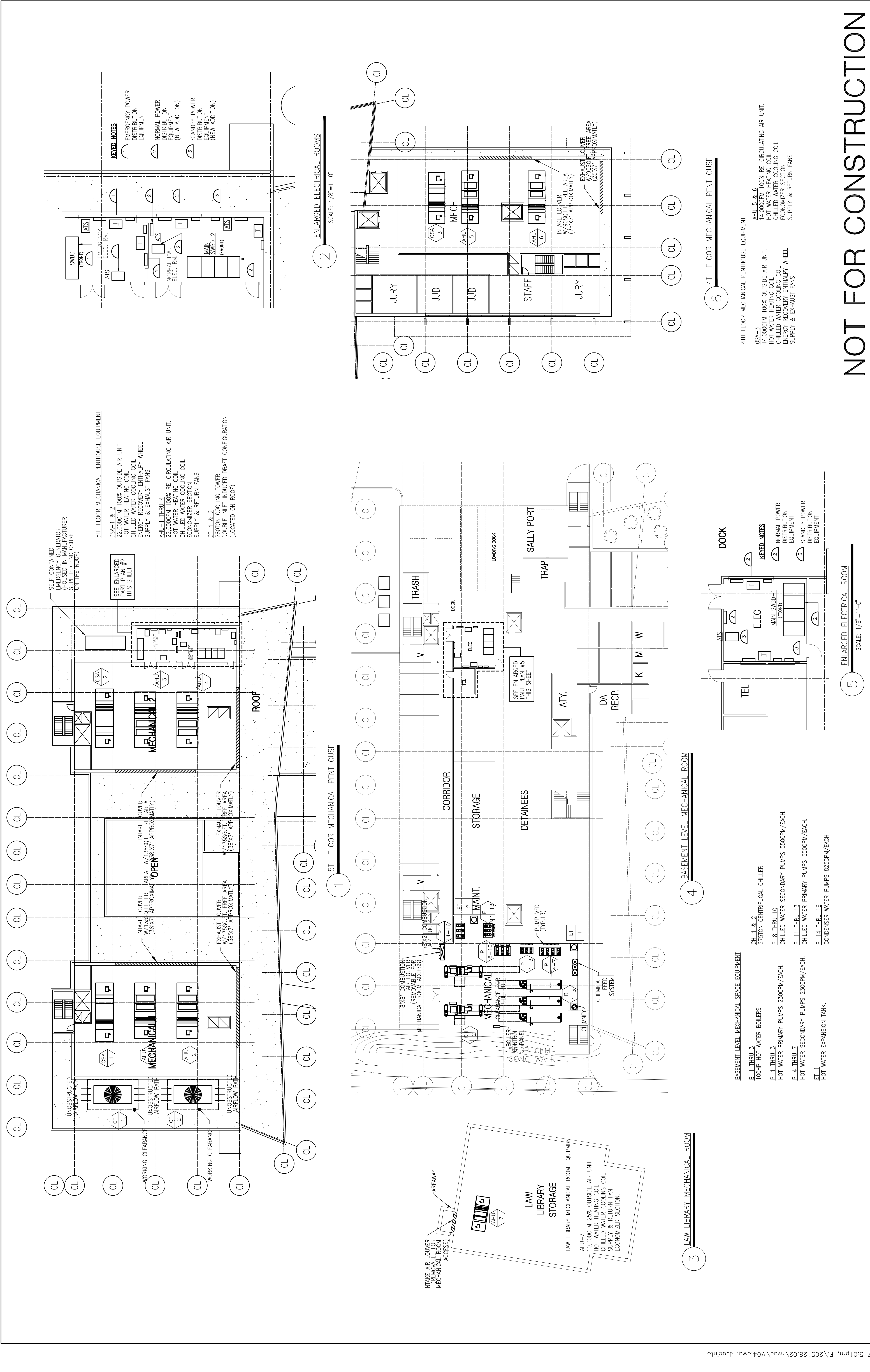
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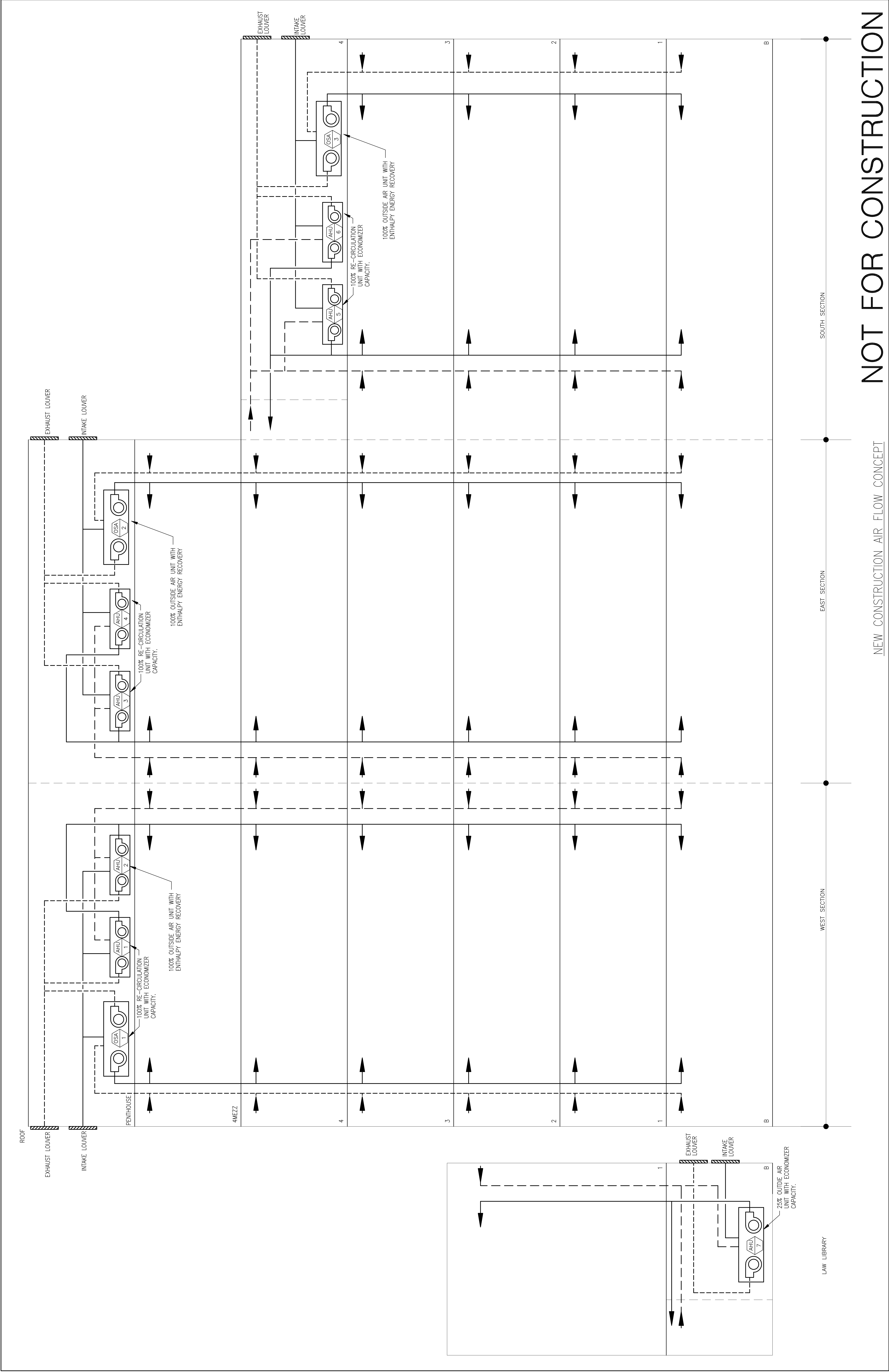


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ELECTRICAL POWER RISER DIAGRAM
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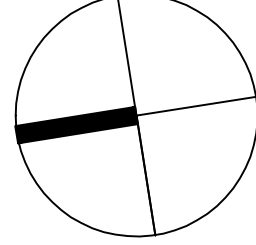






NOT FOR CONSTRUCTION

Salem New Trial Court - DUCT RISERS



J. Michael Ruane Judicial Center
Salem Massachusetts
TRC 9910 ST2

Plumbing and Fire Protection Systems Analysis
DRAFT – February 2007

1. Introduction

The purpose of this study is to evaluate and recommend plumbing and fire protection systems for the renovation of the existing Probate and Family Court Building and the proposed new Trial Court Building.

With a firm understanding of what new systems will be necessary this study will address to what extent the existing systems can be reused or modified to support the new program. To do this we will refer to the existing condition report completed in August 2005. (See Appendix I) this report will also provide for utility locations, systems types, required equipment and its location, rough pipe sizes and routing, and possible interface points with other disciplines.

2. Building Descriptions

The Probate and Family Court portion of the Building consists of a basement level, two above-grade levels and an attic. The Administrative Addition portion of the Building consists of ground level parking and four above-grade levels, two for each of the Probate and Family Court Building's levels. The Probate and Family Court portion and the Administrative Addition portion of the Building are physically connected by an adjoining wall, with several doors leading from one portion to the other on each of the Probate and Family Court levels. The total floor area of the building including its addition is 77,600 GSF.

The Probate and Family Court portion of the Building were built in 1912, and consists of various offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms and storage rooms. The Administrative Addition portion of the Building was built in 1979, and consists of offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms, and storage rooms. In addition, a maintenance tunnel leads from the basement level of the Administrative Addition portion of the Building eastward to a boiler room that houses the heating plant for this Building and the adjacent Superior Court/County Commissioner's Building (32 Federal Street). The maintenance tunnel and boiler room were included in the survey.

The proposed new Trial Court Building will be a separate, 178,000 GSF, 5-story structure with a basement. One of the floors will have a mezzanine level. The building will be connected to the Probate and Family Court Building by an underground passage for detainees and an elevated connection for staff.

3. Approach to the Plumbing and Fire Protection System Evaluation

- A. The previously completed existing conditions survey of the original Probate and Registry of Deeds Building and the 1979 addition to it found the following:
- The plumbing systems in the original Probate and Registry of Deeds Building (with the exception of the new work performed under the “Accessibility, Life Safety & Related Work Project”) was not suitable to be reused.
 - Fire Protection Systems in the original Probate and Registry of Deeds Building do not exist.
 - The plumbing and fire protection systems in the 1979 addition were found to be in good shape and suitable for reuse.
- B. Based on the proposed scope of work – particularly in the 1979 addition – it is likely impractical to attempt to reuse any existing system. Although the systems in the 1979 addition are in good condition, they are small and we feel it would be more cost effective to remove them rather than rework them to accommodate the new program.
- C. Our approach to this project will be that all systems serving the original Probate and Registry of Deeds Building, the 1979 Addition, and the new Trial Court Building will be new. Therefore the approach to this report will be simply to determine the most appropriate systems, locations, and routings.

4. Plumbing Systems

- A. *General:* The plumbing systems evaluated include the following: storm water drainage, sanitary waste, sanitary vent, domestic cold water, domestic hot water, domestic hot water re-circulation, fixtures, and hot water generating and distribution equipment.
- B. *Storm Water System:* the storm water drainage system for the original Probate and Registry of Deeds Building/1979 Addition and the new Trial Court Building will be separate and will exit on the Bridge Street side of the respective buildings.

Only the existing 12” storm line beneath the 1979 Addition will be reused. Similar to the existing configuration, this is where the collected drains from the original Probate and Registry of Deeds Building, and the 1979 Addition will connect. Roof drain locations will remain the same and new leaders will be installed and routed as necessary to accommodate the new program.

Two new storm drains will serve the new Trial Court Building. Each will be 10” in diameter and will discharge to Bridge Street. Storm leaders will run vertically from their respective roof drains to horizontal collection points on the lower floors. Any portion of the horizontal line exposed to outdoor conditions will be heat traced.

- C. *Sanitary Waste*: the sanitary waste system for the original Probate and Registry of Deeds Building/1979 Addition and the new Trial Court Building will be separate and will exit on the Bridge Street side of the respective buildings.

Only the existing 8" sanitary line beneath the 1979 Addition will be reused. Similar to the existing configuration, this is where the waste collects from the original Probate and Registry of Deeds Building, and the 1979 Addition. Vertical waste lines and vent stacks will run as necessary to accommodate the new program.

Two new sanitary waste lines will serve the new Trial Court Building. Each will be 8" in diameter and will discharge to Bridge Street. Sanitary waste lines will run vertically from their respective toilet rooms cores to collection points on the lower floors. Vent stacks will run vertically to the roof as necessary to accommodate the new program. Any portion of the horizontal line exposed to outdoor conditions will be heat traced.

- D. *Domestic Cold Water*: As indicated in the existing conditions report the original Probate and Registry of Deeds Building and the 1979 Addition each have a dedicated water service. Each is in good condition, however, considering the extent of the renovation we should take the opportunity to consolidate the water service into one location. A single entrance and a single water meter should be used. The location will be in the rear of the building in the same location as the existing water service currently serving the 1979 Addition.

The new Trial Court Building will be served by a dedicated 4" water service. This service will enter from the Bridge Street side of the building into a small mechanical room. The mechanical room will serve only the water service entrance, water meter, and backflow preventer.

The original Probate and Registry of Deeds Building/1979 Addition and the new Trial Court Building will each have a dedicated cold water distribution system delivering water to all fixtures. The piping will be routed as necessary to accommodate the program. If pressure is insufficient booster pumps will be provided.

- E. *Domestic Hot Water*: As indicated in the existing conditions report the original Probate and Registry of Deeds Building and the 1979 Addition each have a dedicated electric hot water heater. Both are in good condition, however, considering the scope of the renovation we should take this opportunity to consolidate the hot water heating into one location.

A gas fired water heater will be provided in the existing boiler room. This is an ideal location because of the available space, proximity to existing gas service, and the proximity to the existing chimney.

Likewise, the new Trial Court Building will be provided with a dedicated gas fired water heater. The heater will be located in a dedicated mechanical room

close to the water service entrance. A new gas service will be provided along with through wall venting and air intake.

Considering distances between some fixtures and the hot water heater the system will be provided with a re-circulation pipe loop to maintain the water temperature. Circulating pumps will be necessary to deliver and return the hot water to remote parts of the system.

F. Water and Sewer Estimates:

DCAM has developed water consumption quantities based on water efficient equipment. Anticipated water consumption for the courthouse will come from domestic uses (drinking and sanitary), janitorial activities and provision of makeup water to mechanical systems (i.e., air handlers, cooling towers, pumps, etc). The City of Salem will supply the proposed courthouse water needs via an existing water main located in Federal Street.

Based on data collected from existing courthouses of 1,350 persons, the maximum domestic water consumption would be 4,725 gpd. The non-domestic water consumption during winter months is anticipated to be 5,000 to 6,000 gpd. The seasonal range in daily consumption is due to the need for makeup water to compensate for evaporation loss from the cooling towers.

In anticipation of achieving LEED certification, attempts have been, and will be made, to reduce the water consumption at the proposed courthouse by use of energy/water efficient equipment and limiting the use of potable for landscape irrigation.

Probate and Registry of Deeds Building/1979 Addition

- Domestic Water Usage - 5,820 Gallons Per Day
- Discharge to Sewer - 5,820 Gallons Per Day

New Trial Court Building

- Domestic Water Usage - 11,000 Gallons Per Day
- Discharge to Sewer - 11,000 Gallons Per Day

5. Fire Protection Systems

- General:* The fire protection systems evaluated include the following: fire service entrance to the buildings, fire pump requirement, standpipe system, and sprinkler system.
- Fire Service Entrance:* the fire service entrance for the original Probate and Registry of Deeds Building/1979 Addition and the new Trial Court Building will be separate and will enter on the Bridge Street side of the respective buildings.

The fire service serving the Probate and Registry of Deeds Building/1979 Addition will be upgraded to 6" and enter the existing mechanical room in the same location as the existing 4" line. The fire department connection and water flow alarm location will not change.

The fire service for the new Trial Court Building will enter in the same location as the domestic water service. The service will be 6" in diameter, with a 4" fire department connection and water flow alarm located in a conspicuous location in the rear of the building.

- C. *Fire Pump*: as indicated in the existing conditions report the 1979 addition to the Probate and Registry of Deeds building is served by a standpipe system. It is assumed that adequate pressure is available at the street to provide the necessary system requirements.

The system pressure requirements for the renovation and new building will be no more than the requirements of the existing system. Therefore, a new fire pump will not be required for either building. However, this will need to be confirmed by a water flow test to determine water flow, static and residual pressure.

- D. *Standpipe System*: a 4" standpipe along with the required 2-1/2" fire department valves will be provided in each stairwell and anywhere else required by the new program. In certain locations the standpipe will be in combination with the sprinkler system.
- E. *Sprinkler System*: As indicated in the existing conditions report (with the exception of a small portion of the 1979 Addition) a sprinkler system does not exist. The Probate and Registry of Deeds Building, 1979 Addition and the new Trial Court Building will all be provided with full sprinkler coverage.

In some locations the sprinkler riser will be in combination with the standpipe system. Sprinklers will generally be concealed pendant type. Special care will be taken in the original Probate and Registry of Deeds Building to install the system in such a manner as to avoid disturbing the historic character of the building.

A2.5 Salem Additional Service Alternate Plan B Draft Study

**Task 9—Identify Possible Levels of Partial Renovation of the PFC
November 21, 2006**

Introduction

The Commonwealth of Massachusetts has embarked upon a program of upgrading the judicial facilities in downtown Salem by renovating the existing Registry of Deeds building and constructing a new Trial Court building. The amount of money available for this project is \$106,600,00. The expected cost of construction was about \$70,000,000.

In anticipation of not being able to fully fund the new Trial Court Building and the full renovation of the Registry of Deeds building, DCAM requested that Goody Clancy identify levels of partial renovation of the Probate and Family Court building to match potential budgets of about \$4, \$7.5, \$11.9 and \$17.5 million. The Registry of Deeds will move permanently to a new location and the existing building is to be renovated for the sole use of the Probate and Family Court (PFC).

Building Overview

The Registry of Deed building was constructed in 1912 and consists of 2 floors, a full basement and an attic with approximately 50,000 SF of floor space. An administrative addition was built in 1979 consisting of a first floor open ground level parking area with four floors above, two floors for each of the two floors of the original building. The Addition contains approximately 27,000 SF of floor space. A shared wall physically connects the original building and the Addition with several doors leading from one portion to the other on each of the PFC levels.

The original building contains lobbies, courtrooms, judge's chambers, office space, record and file storage, toilet rooms and a maintenance facility. The administrative addition contains open office areas, private offices, conference rooms, toilets and storage rooms. A tunnel connects the Addition to a below grade boiler room and another tunnel connects the boiler room to the adjacent Superior Court and County Commissioner's Building.

The original building is a masonry walled, concrete encased, steel structure with cast concrete floors. The attic is framed with steel trusses with wood roof decking and a wood plank floor. Interior walls are constructed of clay tile covered with plaster and in some areas marble wainscoting and wood paneling. Floors are finished in terrazzo, composite tile, linoleum or carpet. Ceilings are finished in plaster on lath.

The Administrative Addition is a steel reinforced cast concrete structure with a flat built-up roof, cast concrete walls and an aluminum and glass curtain wall exterior. Interior walls are sheetrock on metal studs. Ceilings include suspended metal slats and acoustic ceiling tile. Floors are composite tile, ceramic tile and carpet.

Existing Conditions

An existing conditions survey by Goody Clancy (draft report dated September 26, 2005) found that access/life safety and related work was in progress providing a handicap access ramp for the main entrance and new accessible public toilet rooms in the basement. The roofs were being re-roofed with new copper roofing, built-up roofing and associated flashing.

Exterior Condition Summary

The re-roofing will address roof leaks that have stained and damaged ceilings and walls on the interior. The original divided light, wood, double hung windows and wood sills in the original portion of the building need to be refurbished, the masonry walls need repointing and holes left in the masonry when steel fire escapes were removed should be sealed and stains from rusting iron removed. Some loose stones need to be reset and anchored as necessary. Exposed stone anchors should be replaced with concealed stainless steel anchors. New metal cap flashing should be installed above cornice stone around the entire building. Cast iron light poles should be refurbished.

Interior Condition Summary

The original 1912 building's public circulation spaces such as the first floor entry lobby, the second floor lobby and waiting area, the connecting monumental stair and elevator, and the cross corridors on the first and second floor have retained their historic character with nicely detailed marble pilasters and wainscoting, plaster walls and coffered ceilings, terrazzo flooring, decorative ironwork elevator cage, oak panel doors with oak trim and original hardware. The Session 1 courtroom on the 2nd floor has the original oak paneling with a circular plaster coffered ceiling. The two main file rooms on the first and second floor feature decorative plaster coffered ceilings. All these spaces combine to achieve the quality of finish indicative of early twentieth century municipal architecture and contribute to the building's distinctiveness. These areas and features should be retained and refurbished. The remaining spaces are not particularly noteworthy and will require a gut rehab to accommodate new program. A hazardous material inventory of the building conducted by ATC Associates, revealed materials that will require abatement.

Mechanical & Electrical Condition Summary

The majority of the existing mechanical system in the 1912 portion of the PFC is original to the building and should be replaced. The mechanical system in the 1979 Addition is in fair to good condition and can be reused depending on the final programmed use of the building. The existing heating plant consists of a mixture of old and newer equipment and systems. It is inefficient and would require extensive upgrades for reuse in the existing PFC. Window air conditioners cool the courts and some offices but the majority of the original building is unconditioned in the summer.

It is recommended that a new heating and cooling plant sized for both the planned new Trial Court Building and the PFC be constructed.

Most of the existing electrical gear and distribution is 25 to 35 years old. Some of the equipment is no longer manufactured and replacement parts are not available. A major renovation of the original building and the Addition will require complete replacement of all the electrical and communication systems to meet the new load and functional requirements of the facility.

Existing allocation of space within the PFC and Administrative Addition

Currently the lower level is occupied by Probation, Maintenance, Storage for the Registry of Deeds, and Mechanical and Electrical rooms. The first floor of the PFC and the first and second floors of the Administrative Addition are occupied by the Registry of Deeds, which will be vacating the building. Courtrooms and the Registry of Probate occupy the second floor of the PFC and the third and fourth floors of the Administrative Addition.

Four Levels of Renovation of the PFC

In reviewing the preferred alternative for the renovation of the PFC/Addition developed by Goody Clancy and comparing the scope of that alternative to the cost modeling performed by Faithful and Gould with DCAM, it is possible to identify a progression of renovation steps that would lead to the complete renovation envisioned by the preferred alternative.

Option 1: Upgrade the mechanical and electrical plant.

Option 2: To Option 1 add the installation of mechanical and electrical distribution systems to serve the existing spaces and refurbishing/restoring the exterior masonry and windows.

Option 3: To Option 1, add renovating the lower level for Probation and refurbishing/restoring the exterior masonry and windows.

Option 4: To Option 3, add renovating the first floor for the Registry of Probate.

Option 1

To address the most pressing need, Option 1 proposes to provide the PFC and Administration Addition with a new heating and cooling plant and upgraded electrical service. It is believed that a new central mechanical plant constructed in the PFC serving the proposed new Trial Court building and the PFC would be the most cost effective. The estimated cost for this plant, including upgraded electrical service, is about \$9,000,000. The apportioned cost of the plant serving the PFC would be about \$3,000,000. (Note: if this plant was a separate and independent plant serving only the PFC/Addition the cost

would increase to about \$3,200,000) The cost of the architectural work (new and reconfigured mechanical and electrical rooms, roof work etc.) to accommodate the new central plant is about \$689,000. To accommodate and screen the new roof top cooling towers and other roof top mechanical equipment it is proposed to remove the existing roof of the Administrative Addition (leaving the walls in place) and locate it on the fourth floor of the Administrative Addition. This will necessitate the relocation of offices currently on the fourth floor to the vacated second floor of the Administrative addition at a cost of about \$ 669,000.

The total cost would be approximately \$4,508,000 in today's dollars and \$5,161,000 when escalated to the midpoint of construction (assumed to be 2 years at 7% per year). See Figure 1, Option 1. This covers the installation of the new mechanical plant and electrical upgrade but **no distribution of mechanical systems to occupied spaces**. If the cooling towers and chillers were to be relocated to the new Trial Court, splitting the central plant, the cost would be transferred with a premium to the new building and this option would be reduced considerably.

Option 2

To the above work in option 1 add the cost of providing a heating, cooling and electrical distribution system to the existing Courts, Registry of Probate and Probation as they are currently configured, and the cost of refurbishing/restoring the exterior masonry and windows. Figure 1, Option 2 shows a total cost of about \$10,798,000 (escalated out 24 months) for this work.

It should be noted that the retrofitting of new mechanical systems into the existing spaces, along with haz/mat abatement is expensive and will be very disruptive. If the PFC/Addition is likely to be renovated to accommodate the new program in the near future, it would be unwise to spend this amount to serve the present layout with a new heating, cooling and electrical distribution system.

Option 3

This option adds the renovation of the lower level for Probation (to the new program requirements) to Option 1. While it is assumed that the Registry of Deeds will be moved out of the building, it will be very disruptive to Courts and Register of Probate if they remain in the building during the work. The total cost of this option is estimated at approximately \$12,371,000. (See figure 1, Option 3).

The layout of the lower level for Probation in the preferred scheme would be improved and allow for some future expansion of Probation, if the mechanical space could be relocated on grade under the Administrative Addition. If the cooling towers and chillers were to be relocated to the new Trial Court, splitting the central plant, the cost would be transferred with a premium to the new building and this option would be reduced.

Option 4

This option renovates the lower level of the PFC for Probation and the first floor of the PFC and Administrative Addition for the Registry of Probate leaving most of the second floor of the PFC and the second and third floors of the Administrative Addition vacant. The cost of this work including the cost of refurbishing the windows and exterior masonry is about \$13,513,000. (See figure 1, Option 4).

Conclusions

Scope of work for budget of \$4,000,000

It is apparent from this study that the minimum scope of work recommended (Option 1) exceeds the DCAM's target of \$4,000,000. One could proceed with refurbishing the exterior windows and masonry for a cost of \$811,000.

Scope of work for budget of \$7,500,000

Option 1, constructing a new central mechanical & electrical plant for \$5,160,866 falls under this budget. Window and masonry restoration could be added to this option for a total of \$6,090,000.

Scope of work for budget of \$11,900,000

Option 2, which adds the mechanical and electrical distribution systems to existing spaces is projected to cost \$10,798,000 falls within this budget of \$11,900,000.

Scope of work for budget of \$17,500,000

Both option 3, which adds renovation of the lower level to Option 2 (\$12,371,000) and option 4, which adds to Option 3 the renovation of the first floor for the Registry of Probate (\$13,513,000) fall with the budget of \$17,500,000.

If DCAM expects to renovate the PFC/Addition within the next few years to the preferred alternate, Option 2, would not be recommended. Option 2 proposes to provide new mechanical and electrical systems to serve the existing spaces as they are presently configured, excluding the Registry of Deeds that will vacate the building. The construction would be very disruptive and expensive and these systems will have to be reconfigured in the future to meet the new program requirements of the preferred alternative.

Options 1, 3 and 4 propose renovations that fulfill the space program as laid out in the preferred alternative for renovation. Option 4 would be done as gut renovation with the occupants temporarily relocated during construction and would be the most cost efficient Option.

End

A2.6 Asbestos, Lead Paint and Other Hazardous Materials Survey

Probate and Family Court Complex

ATC Associates Inc.

April 1, 2006

**ASBESTOS, LEAD PAINT
AND OTHER HAZARDOUS
MATERIALS SURVEY**



**PROBATE AND FAMILY COURT
COMPLEX**

**36 FEDERAL STREET
SALEM, MASSACHUSETTS**

**PREPARED FOR:
DIVISION OF CAPITAL MANAGEMENT
ONE ASHBURTON PLACE
BOSTON, MA 02108**

APRIL 1, 2006

**ATC ASSOCIATES, INC.
600 WEST CUMMINGS PARK
SUITE 5500
WOBURN, MA 01801**

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1.0 EXECUTIVE SUMMARY

ATC Associates Inc. (ATC) of Woburn, Massachusetts was retained by the Commonwealth of Massachusetts Division of Capital Asset Management (DCAM) to compile a building and hazardous materials inventory of the Probate and Family Court Complex located at 36 Federal Street in Salem, Massachusetts. ATC's scope of work was performed in accordance with the DCAM Request for Response (RFR) dated August 31, 2005. Hazardous materials assessed as part of ATC's scope of services included asbestos-containing materials, polychlorinated biphenyls (PCB's), mercury, lead paint, refrigerants, containerized wastes and raw products storage.

The Probate and Family Court Complex consists of two sections; the Administrative Addition (27,000 SF) and the Probate and Family Court (50,000 SF). The Administrative Addition is a 4-story building currently being used for one Hearing Room and Office Space. Common public areas include hallways, stairwells, elevator lobbies and building entrance lobbies. The interior finishes include vinyl and ceramic tile, carpet, sheetrock walls, metal and metal ceilings.

The Probate and Family Court portion of the building consists of a basement level, two above-grade levels, and an attic. The Administrative Addition portion of the building consists of a ground level parking garage and four above-grade levels, two for each of the Probate and Family Court building's levels. The Probate and Family Court Building and the Administrative Addition portion of the building are physically connected by an adjoining wall, with several doors leading from one portion to the other on each of the Probate and Family Court Building levels. The Probate and Family Court portion was built in 1912, and consists of offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms and storage rooms. The Administrative Addition portion of the building was built in 1979, and consists of various offices, common rooms, lobbies, maintenance/janitorial rooms, bathrooms, and storage rooms. In addition, a maintenance tunnel leads from the basement level of the Administrative Addition portion of the building eastward to a boiler room that houses the heating plant for this and the adjacent Superior Court/County Commissioners Building (32 Federal Street). The maintenance tunnel and boiler room were included in the survey.

The Probate and Family Court building is constructed primarily of stone, with a steel-frame hip roof and concrete basement and foundation. The Administrative Addition is constructed primarily of steel-reinforced concrete with a flat built-up roof and concrete basement and foundation. Interior finish materials in both portions of the building include vinyl, ceramic tile, carpet, and terrazzo flooring; sheetrock, marble, plaster, and wood finished walls; and metal, acoustical ceiling tiles, and plaster ceilings.

1.1 Asbestos

The asbestos survey of the facility was performed by Massachusetts Department of Labor and Workforce Development (MDLWD) licensed inspectors Bryan Thompson (MDLWD # AI 060472), Robert Verdi (MDLWD # AI 061261) and David Carvalho (MDLWD # AI 000082) between December, 2005 and January 23, 2006. ATC's inspectors performed both the visual inspection and bulk sampling in the building according to methods outlined in the U.S. Environmental Protection Agency (EPA) guidance document titled, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (Document No. 560/5-85/024). The findings of this

report are based upon observations of accessible areas and analytical results of representative bulk samples that were collected. Please find the ProScience Analytical Services, Inc. PLM bulk sample results included in Appendix A.

Table I, found in Section 2.0, contains the detailed findings of the inspection, including location, type of asbestos-containing material (ACM), current condition and the estimated quantity of each material, for the facility.

Table II, found in Section 2.0, contains cost estimates for the removal of all identified and assumed asbestos-containing materials from the facility. The estimated total cost for the removal of both identified and assumed asbestos-containing materials is approximately **\$788,040.00**. Please note that cost estimates do not include project design or project oversight services.

Below is a summary of the building materials identified to be asbestos-containing via laboratory analysis.

Administrative Addition

- HVAC Duct Sealant
- 12" x 12" Floor Tile and Associated Mastic (various types)
- Residual Mastic Under Carpet
- Interior Door Unit Caulking
- Perimeter Unit Window Caulking
- Sink Coating
- Granite Facade Caulking

Probate and Family Court

- Plaster Walls and Ceilings
- 12" x 12" Floor Tile and Associated Mastic (various types)
- Exterior Window Caulking
- Pipefitting Insulation (various pipe sizes)
- Pipe Insulation (various pipe sizes)
- HVAC Vibration Cloth

ATC recommends that any asbestos-containing material (ACM) that will be disturbed by demolition and renovation activities be removed prior to commencing the demolition and renovation or maintenance activity. ATC recommends implementation of an O & M Program to manage ACM building materials and to perform maintenance.

1.2 Lead-Based Paint

ATC performed a lead paint determination of representative surfaces of each floor of the Probate and Family Court and Administrative Addition, Salem, Massachusetts. Licensed Massachusetts lead inspector, Mr. Frank Bifano (Lic. #13240), performed the survey. The primary method of determining the lead content on the painted surfaces throughout the building was by X-ray Fluorescence (XRF) Analysis. ATC utilized an RMD LPA-1 Lead Paint Analyzer for this survey.

Lead-based paint (readings of 1.0 mg/cm^2 or greater) and lead-containing paint (readings of greater than 0.0 mg/cm^2) were detected on many of the coated surfaces tested throughout the facility.

Below is a list of building components coated with lead-based/lead-containing paint:

Administrative Addition/Probate and Family Court

- Concrete Walls/Floors
- Brick/Block Walls
- Wood Walls
- Plaster Walls/Ceilings
- Sheetrock Walls/Ceilings
- Metal Ceilings
- Door Components
- Window Components
- Metal Structural Components
- Metal Mechanical Components
- Metal Stairwell Components

ATC estimates that demolition/renovation of building components coated with lead-containing paints is approximately **10 - 15%** above the cost for general demolition. This cost includes contractor record-keeping requirements, personal protection of workers, and possible isolation of the work area to comply with the OSHA Lead Standard (29CFR 1926.62) and DLWD 454 CMR 22.11. Additional costs may include disposal of some of the debris as hazardous waste depending on the results of TCLP testing.

1.3 PCB, Mercury, and Other Hazardous Materials Survey

ATC performed a Hazardous Materials survey within accessible areas of the Probate and Family Court and the Administrative Addition, which is scheduled for demolition or renovation. The objective of the hazardous materials survey was to evaluate the presence of polychlorinated biphenyl (PCB)-containing ballasts and electrical equipment, mercury-containing electrical and building components, and other potential hazardous materials including chemicals, refrigerants, or unlabeled containers that will require disposal as part of the proposed demolition/renovation project.

Various fluorescent light ballasts, fluorescent light bulbs, high intensity light bulbs, mercury switch thermostats, mercury switches, air conditioners containing refrigerant, refrigerators/freezers/vending machines, motors/pumps/blowers containing lubricating oils, fire extinguishers, televisions/monitors, computers, diesel above-ground storage tanks, hydraulic oil reservoirs, fuel storage containers, rechargeable batteries, paint, and cleaning/maintenance products were observed within the surveyed building. It is assumed that many of the items, such as televisions/monitors, computers, air conditioners, refrigerators/freezers/vending machines, fire extinguishers, fuel storage containers, paint, cleaning/maintenance products, and hydraulic oil reservoirs, will not require removal and disposal because either 1) they are located in areas of the building that will not be renovated or 2) it is presumed that they will be removed by occupants

prior to demolition/renovation activities. The inspection and results are discussed in Section 4.0. This survey is representative only of items present as of the dates of the survey.

The total estimated cost for transport and disposal of the identified items is \$18,138. Care should be taken when handling the inventoried materials. The materials should be disposed of according to applicable local, state, and federal regulations.

Limitations

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with customary principles and practices in the field of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.

Environmental evaluations are limited in the sense that conclusions and recommendations are developed from personal interviews and information obtained from limited research and secondary sources. Except as set forth in this report, ATC has made no independent investigations as to the accuracy or completeness of the information derived from the secondary sources and personal interviews and has assumed that such information was accurate and complete.

This report is intended for the sole use of the Commonwealth of Massachusetts Division of Capital Asset Management. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations, is at risk of said user.

Respectfully submitted this 1st day of April 2006.

ATC ASSOCIATES INC.



Robert Verdi
Project Manager



Doug Rader
Director, Building Sciences

2.0 ASBESTOS-CONTAINING BUILDING MATERIALS SURVEY

2.1 Sampling Methodology

Prior to beginning this survey, ATC reviewed a report supplied by DCAM with the Request for Response (RFR) dated August 31, 2005. The report titled "Limited Asbestos Inspection, Lead In Paint Testing And Hazardous Materials Assessment", dated July 14, 2001 and prepared by Covino Environmental Associates, Inc. (CEA), was reviewed and used for reference during this inspection.

The field survey was conducted in two separate phases. The first phase consisted of a room-by-room visual inspection. During this phase, ATC collected an inventory of all visibly accessible building materials throughout all areas of the building included in ATC's survey scope of work, which is defined in ATC Proposal No. 05-0535, in response to the in-depth DCAM RFR dated August 31, 2005. Bulk sampling was not performed as a part of phase one. The second phase of the survey consisted of bulk sampling all suspect asbestos-containing materials that were readily accessible.

ATC's survey scope of work did not include exterior suspect asbestos-containing materials, roofing systems, elevator shafts or exterior components, except for exterior window materials, and mortar joint on roof, therefore no samples were collected from the exterior or elevator shafts. The mortar joint on roof is located where the Probate and Family Court Building and the Administrative Addition are connected. Also excluded from the scope of work was an area in the Probate and Family Court Basement due to on going renovations of the Basement Bathroom and Bar Association Area. DCAM has reported that all asbestos abatement was performed in this area prior to the renovation.

Areas that were inaccessible (locked) or were otherwise not inspected during the survey included the following rooms:

Room	Portion of Building	Level	Reason Not Surveyed
New Restrooms	Probate and Family Court	Basement	Under Renovation
G110 and Adjoining Rooms	Probate and Family Court	Basement	Under Renovation
122A	Probate and Family Court	1 st Floor	Locked
221	Probate and Family Court	2 nd Floor	Locked
AA101	Administrative Addition	1st Floor	Locked
AAC108M	Administrative Addition	2 ND Floor	Locked
AAC107M	Administrative Addition	2 ND Floor	Locked
AA105M	Administrative Addition	2 ND Floor	Locked

ATC's inspectors conducted a thorough inspection of all accessible areas within the building, including attics and an interstitial space between the first and second floor of the Probate and Family Court Building. Exploratory demolition was not performed as part of the survey. A reasonable effort was made to identify multiple layers of flooring systems, as well as any suspect materials located within wall chases, plenum chases, and plumbing chases. Bulk samples, representing individual homogenous areas of suspect materials, were collected in a randomly distributed manner, in accordance with the AHERA (40 CFR Part 763, Subpart E) methods outlined below.

Suspect asbestos-containing building materials exist in the form of thermal systems insulation (TSI), surfacing materials, and miscellaneous materials. Roofing materials were not sampled as part of this survey but DCAM has reported that all roofs have been replaced within the last ten years and that the original materials were removed.

The following illustrates the sampling strategy employed by ATC:

- (a) Surfacing materials - In a randomly distributed manner, an accredited asbestos inspector collected bulk samples of surfacing materials, representative of each homogeneous area, unless it was assumed to be an asbestos-containing material (ACM), as follows:
 - (1) Collect at least three bulk samples from each homogeneous area that is less than or equal to 1,000 ft².
 - (2) Collect at least five bulk samples from each homogeneous area that is greater than 1,000 ft², but less than or equal to 5,000 ft².
 - (3) Collect at least seven bulk samples from each homogeneous area that is greater than 5,000 ft².
- (b) Thermal systems insulation.
 - (1) In a randomly distributed manner, an accredited asbestos inspector collected, at a minimum, three (3) bulk samples of thermal systems insulation material, representative of each homogeneous area, unless it was assumed to be ACM.
 - (2) An accredited asbestos inspector collected, at a minimum, one (1) bulk sample of patched thermal systems insulation, representative of each homogenous area providing the section of patch was less than 6 linear or square feet.
 - (3) An accredited asbestos inspector collected, at a minimum, three (3) representative bulk samples of each insulated mechanical system, unless it was assumed to be ACM, including, but not limited to cementitious material used on fittings such as tees, elbows, or valves. Representative sampling was conducted in a manner sufficient as to identify whether each homogenous area of material is either asbestos or non-asbestos containing.
- (c) Bulk samples are not required to be collected from any homogeneous area where the accredited asbestos inspector has determined that the thermal systems insulation is a non-suspect material (e.g., fiberglass, foam glass, rubber, or any other non-ACM).

- (d) Miscellaneous materials - An accredited asbestos inspector collected, at a minimum, one (1) representative bulk samples of each miscellaneous material not assumed to be ACM, including, but not limited to ceiling tiles, floor tiles, associated floor tile mastic, etc. Representative sampling was conducted in a manner sufficient as to identify whether each homogenous area is either asbestos or non-asbestos containing.

For the purpose of this report, ATC has classified the asbestos-containing materials as being in either Intact, Minor Damage or Damaged condition. The following are the general definitions of each category:

Intact - Any material which is intact with no noticeable damage

Minor Damage - Any material with a small/minor amount of overall or localized damage (generally less than 10% of the entire area).

Damaged - Any material with a large amount of damage (generally greater than 10% of the entire surface area).

2.2 Asbestos-Containing Building Materials

Below are lists of all suspect asbestos-containing materials sampled by ATC:

Administrative Addition

- | | |
|----------------------------------|---|
| • Sheetrock | • Yellow Carpet Mastic |
| • Joint Compound | • Residual Black Mastic |
| • Cove Base Mastic | • 12"x12" Blue Floor Tile with Associated Mastic |
| • 2'x2' Acoustical Ceiling Tile | • 12"x12" White with Black Dot Floor Tile and Associated Mastic |
| • Perimeter Unit Window Caulking | • 12"x12" White with Tan Fleck Floor Tile and Associated Mastic |
| • Interior Unit Window Glazing | • 12"x12" White with Grey Floor Tile and Associated Mastic |
| • Interior Unit Door Caulking | • Ceramic Tile Grout and Associated Mastic |
| • Granite Façade Caulking | • Textured Paint on Columns |
| • Sink Coating | • Red HVAC Duct Sealant |
| • 6" Pipe Fitting Insulation | • Grey HVAC Duct Sealant |
| • 6" hard Pack Insulation | • Mortar Joint (Exterior) |

Probate and Family Court

- | | |
|--------------------------------|---|
| • Sheetrock | • Carpet Square Mastic |
| • Joint Compound | • 12"x12" White with Black Dot Floor Tile and Associated Mastic |
| • Base and Skim Coat Plaster | • Brown Linoleum and Associated Mastic |
| • 0-6" Pipe Insulation | • Cove Base Mastic |
| • 0-6" Pipe Fitting Insulation | • 1'x1' Spline Ceiling Tile |

- 6-12" Pipe Insulation
- 6-12" Pipe Fitting Insulation
- >12" Pipe Insulation
- >12" Pipe Fitting Insulation
- End Cap Insulation
- Cloth on Fiberglass Insulation
- 2'x4' Acoustical Ceiling Tile
- Fire Stop Sealant
- Sink Coating
- Exterior Window Glazing
- Exterior Window Caulking
- Plaster Daub

See Appendix B, Building Material Location Drawings, for locations of above materials. Appendix D, Sample Location Drawings, will show approximate bulk sampling locations for the above materials.

Below are lists of all materials determined to be asbestos-containing via laboratory analysis:

Administrative Addition

- Perimeter Unit Window Caulking
- Interior Unit Door Caulking
- Granite Façade Caulking
- Sink Coating
- Red HVAC Duct Sealant
- Grey HVAC Duct Sealant
- Residual Black Mastic
- 12"x12" Blue Floor Tile with Associated Mastic
- 12"x12" White with Black Dot Floor Tile and Associated Mastic
- 12"x12" White with Tan Fleck Floor Tile and Associated Mastic
- 12"x12" White with Grey Floor Tile and Associated Mastic

Probate and Family Court

- 12"x12" White with Black Dot Floor Tile and Associated Mastic
- 0-6" Pipe Insulation
- 6-12" Pipe Insulation
- >12" Pipe Insulation
- Exterior Window Caulking
- Base Coat Plaster
- 0-6" Pipe Fitting Insulation
- 6-12" Pipe Fitting Insulation
- >12" Pipe Fitting Insulation

Please note that sampling results generally confirmed results of the CEA report titled "Limited Asbestos Inspection, Lead In Paint Testing And Hazardous Materials Assessment", dated July 14, 2001.

See Appendix C, Asbestos Containing Material Location Drawings, for locations of above Asbestos-containing materials.

The following table provides the type and estimated quantity of each material identified as asbestos-containing materials throughout the facility:

TABLE I - ASBESTOS-CONTAINING BUILDING MATERIALS

Location	Material	Estimated Quantity
Administrative Addition		
1 st Floor (AA-1)	12"x12" White with Black Floor Tile and Associated Mastic	5,300 SF
	Black Residual Mastic	350 SF
	Interior Unit Door Caulking	560 LF
	Perimeter Unit Window Caulking	1,050 LF
	Caulking Along Granite	120 LF
	Pink Sink Coating	5 SF
	Red Duct Sealant	Throughout
2 nd Floor (AA-2)	12"x12" White with Black Floor Tile and Associated Mastic	1,850 SF
2 nd Floor (AA-2)	12"x12" White with Tank Fleck Floor Tile and Associated Mastic	500 SF
	12"x12" Blue Floor Tile and Associated Mastic	500 SF
	Yellow/Black Residual Mastic	1,800 SF
	Interior Unit Door Caulking	760 LF
	Perimeter unit Window Caulking	1,050 LF
	Pink Sink Coating	5 SF
	Red Duct Sealant	½ Floor
	Grey Duct Sealant	½ Floor
3 rd Floor (AA-3)	12"x12" White with Black Floor Tile and Associated Mastic	2,700 SF
	Yellow/Black Floor Tile Mastic Associated with 12"x12" White with Grey Floor Tile	700 SF
	Interior Unit Door Caulking	575 LF
	Perimeter Unit Window Caulking	1,050 LF
	Pink Sink Coating	5 SF
	Grey Duct Sealant	Throughout
4 th Floor (AA-4)	12"x12" White with Black Floor Tile and Associated Mastic	1,550 SF
	Black Residual Mastic	2,650 SF
	Interior Unit Door Caulking	575 LF
	Perimeter Unit Window Caulking	1,050 LF
	Caulking Along Granite	120 LF
	Pink Sink Coating	5 SF
	Red Duct Sealant	Throughout
Probate and Family Court		
Boiler Room	0"-6" Pipe Fitting Insulation	5 Each
	0"-6" Pipe Insulation	40 LF
	>12" Pipe Insulation	140 LF
	>12" Pipe Fitting Insulation	10 Each

Location	Material	Estimated Quantity
Basement	Electrical Wire Insulation (Assumed)	750 LF
	Flange Gasket (Assumed)	80 Each
	0"-6" Pipe Fitting Insulation	50 Each
	0"-6" Pipe Insulation	220 LF
	6"-12" Pipe Fitting Insulation	15 Each
	6"-12" Pipe Insulation	360 LF
	>12" Pipe Insulation	15 LF
	HVAC Vibration Cloth (Assumed)	5 Each
1 st Floor (OC-1)	12"x12" White with Black Floor Tile and Associated Mastic	8,000 SF
	12"x12" White with Black Floor Tile Associated with non-ACM Mastic	3,200 SF
	Glue Daub Associated with Ceiling Tile (Assumed)	500 SF
	Base Coat Plaster Walls and Ceilings	36,000 SF
2 nd Floor (OC-2)	12"x12" White with Black Floor Tile and Associated Mastic	470 SF
2 nd Floor (OC-2)	12"x12" White with Black Floor Tile Associated with non-ACM Mastic	6,700 SF
	Base Coat Plaster Walls and Ceilings	36,000 SF
Interstitial Space	6"-12" Pipe Fitting Insulation	25 Each
	6"-12" Pipe Insulation	50 LF
Exterior	Exterior Window Caulking	3,125 LF

Caulking along granite is located on the interior hallway where the Probate and Family Court and the Administrative Addition meet. The caulking is found in the interior hallway of the Administrative Addition and also in some offices. See Appendix C, Asbestos-Containing Material Location Drawings, for location of caulking.

Perimeter unit window caulking is located on the interior of the exterior windows along the perimeter of the Administrative Addition. The material is used as a weather proofing between window panes.

See Appendix A, Bulk Sample Analysis Results, for all bulk sample analysis reports.

Bulk samples of friable suspect materials were analyzed by ProScience Analytical Services, Inc., of Woburn, Massachusetts (ProScience) using the EPA approved polarized light microscopy with dispersion staining (PLM/DS) method using the visual estimation technique for asbestos quantification. When PLM/DS results indicated an asbestos content between 1% and 10% asbestos, the sample was re-examined using the point count technique for asbestos quantification. Whenever a sample was re-examined by PLM/DS analysis utilizing the point count technique and a result of less than 1% asbestos was obtained that sample was considered a negative result. Therefore any samples within the same homogenous area that were not analyzed due to application of the "Stop at First Positive" were analyzed until a positive result was obtained or until all samples had been analyzed

By using the PLM/DS method, a trained microscopist is able to identify and distinguish between asbestos group minerals and other fibrous materials such as cellulose (paper), mineral (rock), wood, or glass fiber. The quantity of each of these substances is visually estimated and recorded as a percent. Only the asbestos content, if any, is recorded in the bulk sample Report of Analysis (Appendix A). If a material contains greater than 1% asbestos, it is considered to be asbestos-containing material.

Bulk samples of non-friable suspect materials were analyzed by ProScience, using the PLM/DS NOB Method. When PLM/DS NOB results of an organically bound material indicated an asbestos content less than 1% asbestos, ProScience was instructed to perform Transmission Electron Microscopy (TEM) analysis

ProScience is certified by the State of Massachusetts (MDLWD # AA 000156) to perform all types of asbestos analysis. ProScience, is also accredited by the EPA National Voluntary Laboratory Accreditation Program (NVLAP). The PLM/DS analytical method is modeled after 40 CFR Part 763, Subpart F, Appendix A: "Interim Method for the Determination of Asbestos in Bulk Insulation Samples." TEM analysis modeled after the EPA Method 600, ELAP Method 198.4 NY State NOB.

Consideration for Hidden Materials

ATC evaluated all areas that were reasonably accessible at the time of the survey, including the perimeter and interior walls, enclosed pipe chase walls in bathrooms or other areas to access potential hidden asbestos in areas where ceiling tiles could be temporarily removed and replaced. ATC's survey scope of work did not include performing exploratory demolition activities in random areas to access potential hidden ACM. During the inspection ATC did not find ACM pipe insulation in the Administrative Addition. The pipes were bare, fiberglass or sampled and determined to be negative for asbestos content. Based on the age of the Probate and Family Court Building, ATC's professional opinion is that hidden pipe insulation is likely to be found.

ATC's inspector did not identify any multiple layers of floor tiles in areas where asbestos containing floor tile was identified. However, there is a possibility that additional multiple layering of flooring materials may exist. Since the asbestos survey activities were non-destructive, any hidden materials discovered during demolition/renovation activities and not identified within this report should be assumed to be asbestos containing until laboratory analysis proves otherwise. Exploratory demolition and bulk sampling should be performed prior to construction activity in order to evaluate these issues. ATC's inspectors sampled base coat plaster in the Probate and Family Court Building. A Total of 14 bulk samples were taken and 2 were analyzed using PLM. Results indicated that base coat plaster contained 5% asbestos. All samples were then reanalyzed using point count methods. These results indicate that base coat plaster contained >1% asbestos and must therefore be treated as an ACM. Bare pipes were observed in crawl spaces located in the basement of the Probate and Family Court Building. However, due to limited visibility and access there is a potential for ACM pipe insulation and fittings to be present in these crawl spaces.

ATC suspects that internal asbestos-containing boiler components, such as rope gaskets, insulating paper, etc. may exist in areas of the boilers not accessible to ATC at the time of the survey. ATC also has assumed that all the flange gaskets and fire doors located in the boiler room to be asbestos containing.

Due to the height of the ceilings, ATC was unable to access areas above acoustical ceiling tile in the Probate and Family Court Building. During the initial walk thru, ATC noticed glue daubs on the plaster ceiling that could not be sampled due to the height of the ceiling. ATC assumes that the glue daubs on the ceiling are an ACM material and should be treated as such.

2.3 Quality Assurance/Quality Control

ATC's inspectors were required to maintain daily field documentation in bound logbooks. The following information was recorded during the daily screening and collection of samples:

- Team members and their responsibilities;
- Time of arrival and time of departure;
- Other personnel on-site;
- Summary of any meetings or discussions with other parties; and
- Deviations from written procedures.

Photographs were taken at every sample location to document conditions at the completion of sample collection. Digital and conventional photography were utilized to facilitate reproduction of photographs for inclusion in reports and maintaining an unalterable photographic record. Photographs were also taken at every entry above the ceiling. These photographs were taken in a panoramic manner showing all directions, where possible. Representative digital photographs can be found in Appendix E of this report and representative film/conventional photographs can be found in Appendix F of this report.

2.4 COST ESTIMATE

The costs associated with the abatement of asbestos-containing materials are based upon current Department of Labor and Workforce Development and OSHA standards and requirements. ATC estimates the cost for the removal and disposal of all identified and assumed asbestos-containing materials, which will be impacted by upcoming construction activities to be approximately **\$788,040.00**. It is our understanding that the renovation project is anticipated to begin in late 2008 and should be completed in late 2010, and our estimates are based on assuming a mid-point of construction of mid 2009. Using an inflation factor of about 4% a year (16%), this cost should be increased to **\$914,126.00** if the project's eventual construction midpoint is 2013. Additional costs will be incurred if future bulk sampling reveals additional asbestos-containing materials are located in either ceiling or wall voids. Please see to the table below for the breakdown of costs.

Additional costs will be incurred for additional sampling, project design, project management and air monitoring, including final visual Inspection by a Massachusetts Department of Labor and Workforce Development (MDLWD) licensed Project Monitor.