Code officials may accept the stair, foyer, and second floor corridor as an exit enclosure, provided they are enclosed by one hour fire rated walls with the appropriately rated doors at both level one and two. All egress doors must be a minimum of 3'-0" x 6'-8". Handrails are required on both sides of the stair, and guardrails are required on open sides of the stair. The handrails on this stair must be upgraded to comply with code. For code compliance, the building will need visual, audible and automatic detection fire alarm systems, and appropriate exit and building signage.

Exterior: In addition to the repairs indicated in the architectural stabilization section, the building will need exterior repairs for complete restoration. The window boards installed during stabilization will have to be removed and the windows repaired. Many windows have broken glass and will need to be reglazed, cleaned, and painted. The front porch floors must be reconstructed as required in order to comply with accessibility requirements. The rear screened porch that was previously removed should be replaced if desired. Chimneys must meet current code requirements or be sealed from the interior to prevent their use. Any repairs remaining after stabilization must now be made.

Interior: Most of the interior repairs performed during stabilization have left extensive improvements required for restoration. Many rooms will require new wood flooring and all flooring should be refinished. Large areas of plaster ceilings and walls will require replacement as described in previous sections of this report. Some doors have steps at their thresholds which either must be removed or a waiver of code requirements applied for. If a kitchen is desired in the renovation, the cabinets, appliances, plumbing fixtures, and all finishes should be replaced. Plumbing fixtures should be replaced as indicated in the checklist or as required for handicapped accessibility. See the plumbing section of this report for any additional information. Appropriate insulation to meet current energy code requirements must be added in all accessible basements, walls, and attics. See the mechanical and electrical sections of this report for any additional information.

Structural Restoration for Partial Use: Restoration of this building for limited office use required evaluation of the floor structure for the code required live loads associated with the intended use, based on the requirements of the 1996 BOCA building code. The material strength is assumed to be 1200 p.s.i. in bending and 75 p.s.i. in shear for wood framing members. The BOCA building code requires 50 p.s.f. live load plus 20 p.s.f. partition load and 80 p.s.f. live load in corridors for general office use. We analyzed a typical floor joist and a typical floor beam for office use at the first and second level. Due to the extensive insect and structural damage to the existing first floor wood joists, the floor was found not adequate for code required loads. The second floor joists were also found not adequate for code required loads The main wall in the middle and running the full length of the house was assumed to be load bearing for this analysis. This analysis may not be appropriate for all conditions nor does it include roof framing. In order to evaluate all conditions, a more extensive testing and analysis program will be necessary. Restoration for partial use includes all repairs discussed in the stabilization section of this report in addition to the following repairs:

- The first floor framing will need to be rebuilt with 2x12 joists at 12 inches on center. A 10-inch deep steel beam will be required in the middle of the basement with steel posts at 10 feet on center with new footings. Using 12-inch deep joists and 10-inch deep beams may reduce the ceiling height in the basement.
- The size of the second floor framing could not be determined at this time. However, based on past experience, it is doubtful the joists will have the required capacity for office loading. Reinforcement of the floor will be required. Replace damaged floor sheathing and joists. Further investigation is required.
- Repoint existing chimney on the right side of the house. Minor repointing required for rear chimney.

- Replace rear screened-in porch.
- Replace rear open porch.
- Investigate interior load bearing wall for possible damage. Repair as required.

Mechanical, Electrical and Plumbing Restoration for Partial Use: The requirements for the stabilization section apply to the restoration for partial use.
This type of use will require extensive renovation to bring the facility up to current standards (code requirements) imposed by its new use.

- A new heating and cooling system needs to be installed. The current fuel oil system can be used to provide the source of heating to the building. The HVAC system should provide approximately 7-1/2 tons of cooling with one split system and a furnace of approximately 126,000 BTUH of heating capacity. The 1993 BOCA Mechanical Code, section M-1604, allows that the ventilation can be achieved by operable windows with openings that are equal to at least 4% of the floor area. In other areas where this requirement can not be met, 20 CFM of fresh air per person needs to be provided to those areas by the HVAC system.
- New controls for the new HVAC system need to be installed.
- A new ductwork distribution system needs to be installed and should include approximately (15) fifteen supply registers, (2) two return grilles and balancing dampers.
- Depending on the final rating of the walls and floors, other fire code requirement may apply. Installation of fire dampers in the ductwork system may be required, if ductwork penetrates a wall with a fire rating of 1-1/2 hour or higher.
- A new 100 CFM toilet exhaust fan needs to be installed to serve each toilet room.
- The plumbing system needs to be upgraded to meet ADA Requirements. This upgrade will require replacement of selected plumbing fixtures, in compliance with requirements of the 1993 BOCA Plumbing Code.
- A new 60 gallon electric hot water heater should be installed in place of the existing oil fired water heater. New valves and fittings may be required for the installation of this hot water heater.
- The electrical system will need to be upgraded to accommodate the increase of demand on the cooling and heating system, the addition of office equipment, and to bring the electrical system up to the code. A new 150 amp, 120/208 volt electrical panelboard needs to be installed. Installation should include a 2" feeder conduit with 4 wires.
- All outlets, switches and wiring need to be replaced. BX cable should be used as branch wiring to all receptacles, light fixtures and other equipment, as required.
- Changes in the lighting system will be necessary to achieve the required foot-candle level for the spaces. Approximately, twenty two new fluorescent light fixtures may be required, throughout the building. New light switches need to be installed. Approximately, four exit lights need to be installed.
- A fire alarm system will be required. This system should include all necessary devices for ADA compliance. The number and type of fire alarm devices depends on the use of each space i.e. conference rooms/assembly areas, offices, etc. This increase in power demand may require an increase in service from the local utility company. Therefore, new service and a meter should be installed by the power company.

Restoration for Full Public Use: *Assumed to be public exhibit and information space on the first floor and offices on the second.*

Architectural Restoration for Full Public Use: With more extensive public use additional code requirements and renovation needs must be met. Occupant loads will increase because of public use; therefore, additional accessible parking and toilet facilities will be required. The toilet facilities will require additional interior space, and place additional loads

on the existing plumbing system. See the plumbing section of this report for any additional information. Public assembly areas must be limited to 50 occupants in order to satisfy code requirements. Since the second floor only has one exit, this level will be limited to 30 occupants per BOCA 1010.3.

In addition to the previous requirements, substantial structural, mechanical, and electrical repairs must be made in order to stabilize or restore this structure. The restoration will be difficult and expensize as indicated in the cost estimate. Careful feasibility analysis should be conducted before attempting restoration of this building.

Structural Restoration for Full Public Use: Restoration of this building for full public use required evaluation of the floor structure for the code required live loads associated with the intended use, based on the requirements of the 1996 BOCA building code. The material strength is assumed to be 1200 p.s.i. in bending and 75 p.s.i. in shear for wood framing members. The BOCA building code requires 50 p.s.f. live load plus 20 p.s.f. partition load and 80 p.s.f. live load in corridors for general office use. The code also requires 100 p.s.f. live load for public assembly on the first floor. We analyzed a typical floor joist and a typical floor beam for public use at the first floor and office use on the second floor. Due to the extensive insect and structural damage to the existing first floor wood joists, the floor was found not adequate for code required loads. The second floor joists were also found not adequate for code required loads The main wall in the middle and running the full length of the house was assumed to be load bearing for this analysis. This analysis may not be appropriate for all conditions nor does it include roof framing. In order to evaluate all conditions, a more extensive testing and analysis program will be necessary.

- Restoration for full public use includes all repairs discussed in the stabilization section and restoration for partial use section of this report except as follows.
- The first floor framing will need to be rebuilt with 1 3/4" x 9 1/2" microlam joists at 12 inches on center or 4 x 10 joists at 12 inches on center. The main beam in the middle of the basement will require a 10-inch deep steel beam continuous for the length of the building with steel posts at 10 feet on center with new footings. Using 9 1/2 inch deep joists and 10-inch deep beams may reduce the ceiling height in the basement.
- The second floor requires the same repairs discussed in the Restoration for Partial Use section of this report.

Mechanical, Electrical and Plumbing Restoration for Full Public Use: The requirements for stabilization and restoration for partial use apply to restoration for full public use. These previous sections must be reviewed and included with the following before considering the restoration requirements:

- Due to the increase in occupancy load and public use, the mechanical, electrical and plumbing systems will have to be further expanded.
- The ventilation in the first floor may have to be increased due to the occupancy load. The 1993 BOCA Mechanical Code requires 15 CFM per person in assembly areas. The heating and air-conditioning system may need to be upgraded to accommodate the new cooling load.
- In order to determine the upgrade for the HVAC system, the occupant load must be considered after it has been established.
- The toilet exhaust fan needs to be upgraded to handle approximately 150 CFM.
- The electrical system will have to be upgraded to a larger commercial grade system, if the 150 amp service addressed in the restoration for partial use is not sufficient. New devices may have to be added to the fire alarm system to accommodate the exhibit/public use.
- The plumbing system may have to be modified in both domestic water and sewer to accommodate a larger number of plumbing fixtures. This may require site excavations to expand the existing system and connect to the city sewer.

on the existing plumbing system. See the plumbing section of this report for any additional information. Public assembly areas must be limited to 50 occupants in order to satisfy code requirements. Since the second floor only has one exit, this level will be limited to 30 occupants per BOCA 1010.3.

In addition to the previous requirements, substantial structural, mechanical, and electrical repairs must be made in order to stabilize or restore this structure. The restoration will be difficult and expensize as indicated in the cost estimate. Careful feasibility analysis should be conducted before attempting restoration of this building.

Structural Restoration for Full Public Use: Restoration of this building for full public use required evaluation of the floor structure for the code required live loads associated with the intended use, based on the requirements of the 1996 BOCA building code. The material strength is assumed to be 1200 p.s.i. in bending and 75 p.s.i. in shear for wood framing members. The BOCA building code requires 50 p.s.f. live load plus 20 p.s.f. partition load and 80 p.s.f. live load in corridors for general office use. The code also requires 100 p.s.f. live load for public assembly on the first floor. We analyzed a typical floor joist and a typical floor beam for public use at the first floor and office use on the second floor. Due to the extensive insect and structural damage to the existing first floor wood joists, the floor was found not adequate for code required loads. The second floor joists were also found not adequate for code required loads The main wall in the middle and running the full length of the house was assumed to be load bearing for this analysis. This analysis may not be appropriate for all conditions nor does it include roof framing. In order to evaluate all conditions, a more extensive testing and analysis program will be necessary.

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- The second floor requires the same repairs discussed in the Restoration for Partial Use section of this report.

Mechanical, Electrical and Plumbing Restoration for Full Public Use: The requirements for stabilization and restoration for partial use apply to restoration for full public use. These previous sections must be reviewed and included with the following before considering the restoration requirements:

- Due to the increase in occupancy load and public use, the mechanical, electrical and plumbing systems will have to be further expanded.
- The ventilation in the first floor may have to be increased due to the occupancy load. The 1993 BOCA Mechanical Code requires 15 CFM per person in assembly areas. The heating and air-conditioning system may need to be upgraded to accommodate the new cooling load.
- In order to determine the upgrade for the HVAC system, the occupant load must be considered after it has been established.
- The toilet exhaust fan needs to be upgraded to handle approximately 150 CFM.
- The electrical system will have to be upgraded to a larger commercial grade system, if the 150 amp service addressed in the restoration for partial use is not sufficient. New devices may have to be added to the fire alarm system to accommodate the exhibit/public use.
- The plumbing system may have to be modified in both domestic water and sewer to accommodate a larger number of plumbing fixtures. This may require site excavations to expand the existing system and connect to the city sewer.

COST ESTIMATE

PROJECT: M-NCPPC Historic Structures Survey		Page 2
ARCHITECT: Blackburn Architects, P.C.		RWB Job # 97-03-C
EST BY: R.W. Brown & Associates	**Crandall-Rothstein House**	03/20/97

RECAPITULATION

ITEM		LEVEL OF REHABILITATION: STABILIZE BUILDING	REFIT FOR PARTIAL USE	REFIT FOR PUBLIC USE
See Page:		3	7	17
DIV 1/GEN REQ, PERMITS, & FEES	20.00%	8,968	45,255	49,911
DIV 2/SITE WORK		7,568	44,809	47,939
DIV 3/CONCRETE		–	3,810	3,810
DIV 4/MASONRY		5,958	7,045	6,214
DIV 5/METALS		–	1,524	1,722
DIV 6/WOOD & PLASTICS		16,203	45,325	45,994
DIV 7/THERMAL & MOISTURE PROTECTION		6,122	8,853	7,905
DIV 8/DOORS & WINDOWS		1,400	20,638	32,446
DIV 9/FINISHES		6,677	41,631	45,023
DIV 10/SPECIALTIES		–	834	980
DIV 11/EQUIPMENT		–	1,208	1,208
DIV 12/FURNISHINGS		–	–	–
DIV 13/SPECIAL CONSTRUCTION		–	–	–
DIV 14/CONVEYING		–	–	–
DIV 15/PLUMBING		–	8,843	8,843
DIV 15/HVAC		912	13,588	14,146
DIV 15/FIRE PROTECTION		–	NOT APP	NOT APP
DIV 16/ELECTRICAL		–	28,168	33,324
SUBTOTAL		53,806	271,530	299,464
GENERAL CONTRACTOR'S OH&P	15.00%	8,071	40,729	44,920
SUBTOTAL		61,877	312,259	344,383
BOND @	2.00%	1,238	6,245	6,888
SUBTOTAL		63,115	318,504	351,271
CONTINGENCY @	20.00%	12,623	63,701	70,254
SUBTOTAL		75,738	382,205	421,525
ESCALATION @	4.00%	3,030	15,288	16,861
TOTAL CONSTRUCTION COST		78,767	397,493	438,386
DESIGN & INSPECTION FEES @	20.00%	15,753	79,499	87,677
TOTAL PROJECT COST		**$94,521**	**$476,992**	**$526,063**
GROSS AREA:	2,016 SF			
COST/GROSS AREA:		$46.89 /SF	$236.60 /SF	$260.94 /SF