

# FACILITY CONDITION ASSESSMENT AND LEVEL I ENERGY AUDIT

**CITY OF BURLINGTON**

645 Pine Street  
Burlington, Vermont 05402  
**Martha Keenan**



## FACILITY CONDITION ASSESSMENT AND LEVEL I ENERGY AUDIT of MEMORIAL AUDITORIUM 250 Main Street Burlington, Vermont 05401

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| <b>Immediate Repairs Report</b><br><b>Memorial Auditorium</b><br><b>10/24/2014</b> |        |  |          |         |             |           |  |
|--|--------|--|----------|---------|-------------|-----------|---|
| Report Section   | ID     | Cost Description   | Quantity | Unit    | Unit Cost   | Subtotal  | Deficiency Repair Estimate *  |
| 3.2  | 273332 | Measured ADA Study of Property                                 | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |
| 5.4  | 280659 | Civil Engineer Drainage study                                  | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |
| 5.4  | 280658 | Retaining wall repair, concrete                                | 200      | SF Face | \$42.72     | \$8,544   | \$8,544   |
| 5.5  | 280660 | Lighting Consultant Study                                      | 1        | EA      | \$5,000.00  | \$5,000   | \$5,000   |
| 6.1  | 280661 | Engineering Study for structural exterior wall                 | 1        | Each    | \$5,500.00  | \$5,500   | \$5,500   |
| 6.3  | 280663 | Roof flashing  | 220      | LF      | \$3.25      | \$715     | \$715   |
| 6.5  | 280671 | Replace fire escape stair and platform                         | 2        | Flight  | \$7,200.00  | \$14,400  | \$14,400  |
| 6.5  | 280673 | Remove and replace wood stairs                                 | 1        | Riser   | \$1,600.00  | \$1,600   | \$1,600   |
| 6.5  | 280675 | Repair Concrete stairs (spalls)                                | 4800     | SF      | \$19.30     | \$92,640  | \$92,640  |
| 6.5  | 280672 | Replace concrete stairs  | 300      | SF      | \$76.50     | \$22,950  | \$22,950  |
| 7.1  | 273330 | HVAC system study  | 1        | EA      | \$7,250.00  | \$7,250   | \$7,250   |
| 7.1  | 273329 | Mechanical Engineer Study for Ventilation                      | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |
| 7.1  | 273324 | Replace steam boiler, gas 3563 MBH                             | 2        | Each    | \$51,100.00 | \$102,200 | \$102,200   |
| 7.1  | 273328 | Exhaust Fan 2000 CFM   | 6        | EA      | \$2,720.00  | \$16,320  | \$16,320  |
| 7.1  | 273326 | Cast iron radiator, remove, strip, repaint, reinstall          | 100      | EA      | \$492.00    | \$49,200  | \$49,200  |
| 7.1  | 273327 | Radiator control valve, install                                | 100      | EA      | \$133.50    | \$13,350  | \$13,350  |
| 7.2  | 273331 | Follow-up Study of Domestic Hot Water System Engineering       | 1        | Each    | \$5,500.00  | \$5,500   | \$5,500   |
| 7.2  | 273336 | Water Heater 80-Gallon Residential                             | 1        | EA      | \$2,092.24  | \$2,092   | \$2,092   |
| 7.2  | 273335 | 30 to 40 gallon gas water heater                               | 4        | EA      | \$1,330.00  | \$5,320   | \$5,320   |
| 7.4  | 273337 | Lighting Consultant Study                                      | 1        | EA      | \$5,000.00  | \$5,000   | \$5,000   |
| 7.4  | 273340 | Generator, Natural Gas, 20 to 40 KW, Install                   | 1        | EA      | \$30,000.00 | \$30,000  | \$30,000  |
|  | 273325 | Hydronic heating, refurbish the piping and traps, per radiator | 100      | EA      | \$43.83     | \$4,383   | \$4,383   |
| <b>Immediate Repairs Total</b>   |        |  |          |         |             |           | <b>\$408,464</b>  |
| * Location Factor (1.0) included in totals.  |        |  |          |         |             |           |   |

**Replacement Reserves Report**

**Memorial Auditorium**  
**10/24/2014**



| Report Section | ID     | Cost Description   | Lifespan (EUL) | EAge | RUL | Quantity | Unit    | Unit Cost   | Subtotal  | 2014      | 2015      | 2016 | 2017 | 2018 | 2019 | 2020    | 2021    | 2022    | 2023 | 2024     | 2025    | 2026 | 2027 | 2028 | 2029    | 2030     | 2031 | 2032 | 2033 | Deficiency Repair Estimate |          |
|----------------|--------|--|----------------|------|-----|----------|---------|-------------|-----------|-----------|-----------|------|------|------|------|---------|---------|---------|------|----------|---------|------|------|------|---------|----------|------|------|------|----------------------------|----------|
| 3.2            | 273332 | _0001 Measured ADA Study of Property                           | 0              | 0    | 0   | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,500                    |          |
| 5.2            | 280657 | G2022 Crack sealing and seal coating of the asphalt            | 5              | 4    | 1   | 1629     | SY      | \$3.56      | \$5,799   |           | \$5,799   |      |      |      |      | \$5,799 |         |         |      |          | \$5,799 |      |      |      |         | \$5,799  |      |      |      | \$23,197                   |          |
| 5.4            | 280659 | _0001 Civil Engineer Drainage study                            | 0              | 0    | 0   | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,500                    |          |
| 5.4            | 280658 | G2042 Retaining wall repair, concrete                          | 0              | 0    | 0   | 200      | SF Face | \$42.72     | \$8,544   | \$8,544   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$8,544                    |          |
| 5.5            | 280660 | _0001 Lighting Consultant Study                                | 0              | 0    | 0   | 1        | EA      | \$5,000.00  | \$5,000   | \$5,000   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,000                    |          |
| 6.1            | 280661 | B2010 Engineering Study for structural exterior wall           | 0              | 0    | 0   | 1        | Each    | \$5,500.00  | \$5,500   | \$5,500   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,500                    |          |
| 6.3            | 280663 | B3011 Roof flashing  | 0              | 0    | 0   | 220      | LF      | \$3.25      | \$715     | \$715     |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$715                      |          |
| 6.3            | 280662 | B3011D Modified bitumen, Total roof replacement                | 25             | 24   | 1   | 188      | SQ      | \$631.54    | \$118,730 |           | \$118,730 |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$118,730                  |          |
| 6.3            | 280665 | B3022 Replace roof hatch                                       | 25             | 24   | 1   | 1        | EA      | \$1,591.90  | \$1,592   |           | \$1,592   |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$1,592                    |          |
| 6.3            | 280664 | G2041 Masonry wall repairs and improvements                    | 20             | 19   | 1   | 1856     | SF Face | \$10.84     | \$20,119  |           | \$20,119  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$20,119                   |          |
| 6.4            | 280667 | B2011 Repoint masonry  | 40             | 39   | 1   | 4060     | SF      | \$7.68      | \$31,181  |           | \$31,181  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$31,181                   |          |
| 6.4            | 280668 | B2011 Pressure wash existing masonry                           | 10             | 9    | 1   | 8450     | SF      | \$1.74      | \$14,703  |           | \$14,703  |      |      |      |      |         |         |         |      | \$14,703 |         |      |      |      |         |          |      |      |      | \$29,406                   |          |
| 6.4            | 280669 | B2011 Caulking, expansion joints,1"x1/2", remove and replace   | 15             | 14   | 1   | 656      | LF      | \$6.31      | \$4,139   |           | \$4,139   |      |      |      |      |         |         |         |      |          |         |      |      |      |         | \$4,139  |      |      |      | \$8,279                    |          |
| 6.4            | 280666 | G2041 Masonry wall repairs and improvements                    | 20             | 19   | 1   | 3020     | SF Face | \$10.84     | \$32,737  |           | \$32,737  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$32,737                   |          |
| 6.5            | 280671 | B1015 Replace fire escape stair and platform                   | 0              | 0    | 0   | 2        | Flight  | \$7,200.00  | \$14,400  | \$14,400  |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$14,400                   |          |
| 6.5            | 280673 | B1015 Remove and replace wood stairs                           | 0              | 0    | 0   | 1        | Riser   | \$1,600.00  | \$1,600   | \$1,600   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$1,600                    |          |
| 6.5            | 280675 | C2011A Repair Concrete stairs (spalls)                         | 0              | 0    | 0   | 4800     | SF      | \$19.30     | \$92,640  | \$92,640  |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$92,640                   |          |
| 6.5            | 280672 | C2011A Replace concrete stairs                                 | 0              | 0    | 0   | 300      | SF      | \$76.50     | \$22,950  | \$22,950  |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$22,950                   |          |
| 6.5            | 280674 | C2014A Replace metal handrail                                  | 20             | 19   | 1   | 15       | LF      | \$47.39     | \$711     |           | \$711     |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$711                      |          |
| 6.5            | 280676 | C2020 Refinish metal handrail                                  | 7              | 6    | 1   | 660      | LF      | \$1.94      | \$1,280   |           | \$1,280   |      |      |      |      |         | \$1,280 |         |      |          |         |      |      |      | \$1,280 |          |      |      |      | \$3,841                    |          |
| 6.5            | 280677 | G2014 Guard rail-metal-paint                                   | 10             | 9    | 1   | 660      | LF      | \$8.00      | \$5,280   |           | \$5,280   |      |      |      |      |         |         |         |      | \$5,280  |         |      |      |      |         |          |      |      |      | \$10,560                   |          |
| 6.6            | 280681 | B2011 Steel lintels, replace, up to 5' long                    | 40             | 39   | 1   | 40       | Each    | \$1,492.00  | \$59,680  |           | \$59,680  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$59,680                   |          |
| 6.6            | 280679 | B2021 Aluminum window replacement, 2-0 x 4-0, operable         | 25             | 24   | 1   | 66       | Each    | \$576.00    | \$38,016  |           | \$38,016  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$38,016                   |          |
| 6.6            | 280678 | B2039 Replace 3'-0" x 7'-0" metal grated painted door          | 30             | 29   | 1   | 10       | EA      | \$2,430.50  | \$24,305  |           | \$24,305  |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$24,305                   |          |
| 6.6            | 280680 | G2041 Masonry wall repairs and improvements                    | 20             | 19   | 1   | 600      | SF Face | \$10.84     | \$6,504   |           | \$6,504   |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$6,504                    |          |
| 6.8            | 280683 | A1031A Minor repairs to concrete floor                         | 15             | 14   | 1   | 450      | SF      | \$41.80     | \$18,810  |           | \$18,810  |      |      |      |      |         |         |         |      |          |         |      |      |      |         | \$18,810 |      |      |      | \$37,620                   |          |
| 6.8            | 280682 | B2011 B2011 - Paint, duplex, per SF                            | 7              | 6    | 1   | 6300     | SF      | \$1.42      | \$8,946   |           | \$8,946   |      |      |      |      |         | \$8,946 |         |      |          |         |      |      |      | \$8,946 |          |      |      |      | \$26,838                   |          |
| 6.8            | 280684 | C3021A Paint interior concrete floors                          | 8              | 7    | 1   | 2100     | SF      | \$0.84      | \$1,764   |           | \$1,764   |      |      |      |      |         |         | \$1,764 |      |          |         |      |      |      |         | \$1,764  |      |      |      | \$5,292                    |          |
| 6.8            | 280685 | C3024 Sand and refinish hardwood floor                         | 10             | 9    | 1   | 2375     | SF      | \$5.50      | \$13,063  |           | \$13,063  |      |      |      |      |         |         |         |      | \$13,063 |         |      |      |      |         |          |      |      |      | \$26,125                   |          |
| 7.1            | 273330 | _0001 HVAC system study  | 0              | 0    | 0   | 1        | EA      | \$7,250.00  | \$7,250   | \$7,250   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$7,250                    |          |
| 7.1            | 273329 | _0001 Mechanical Engineer Study for Ventilation                | 0              | 0    | 0   | 1        | EA      | \$5,500.00  | \$5,500   | \$5,500   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,500                    |          |
| 7.1            | 273324 | D3021 Replace steam boiler, gas 3563 MBH                       | 35             | 35   | 0   | 2        | Each    | \$51,100.00 | \$102,200 | \$102,200 |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$102,200                  |          |
| 7.1            | 273328 | D3042 Exhaust Fan 2000 CFM                                     | 10             | 10   | 0   | 6        | EA      | \$2,720.00  | \$16,320  | \$16,320  |           |      |      |      |      |         |         |         |      | \$16,320 |         |      |      |      |         |          |      |      |      | \$32,640                   |          |
| 7.1            | 273326 | D3044 Cast iron radiator, remove, strip, repaint, reinstall    | 25             | 25   | 0   | 100      | EA      | \$492.00    | \$49,200  | \$49,200  |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      |                            | \$49,200 |
| 7.1            | 273327 | D3044 Radiator control valve, install                          | 25             | 25   | 0   | 100      | EA      | \$133.50    | \$13,350  | \$13,350  |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$13,350                   |          |
| 7.2            | 273331 | _0001 Follow-up Study of Domestic Hot Water System Engineering | 0              | 0    | 0   | 1        | Each    | \$5,500.00  | \$5,500   | \$5,500   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,500                    |          |
| 7.2            | 273336 | D2023 Water Heater 80-Gallon Residential                       | 15             | 15   | 0   | 1        | EA      | \$2,092.24  | \$2,092   | \$2,092   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         | \$2,092  |      |      |      | \$4,184                    |          |
| 7.2            | 273335 | D2023 30 to 40 gallon gas water heater                         | 12             | 12   | 0   | 4        | EA      | \$1,330.00  | \$5,320   | \$5,320   |           |      |      |      |      |         |         |         |      |          | \$5,320 |      |      |      |         |          |      |      |      | \$10,640                   |          |
| 7.4            | 273337 | _0001 Lighting Consultant Study                                | 0              | 0    | 0   | 1        | EA      | \$5,000.00  | \$5,000   | \$5,000   |           |      |      |      |      |         |         |         |      |          |         |      |      |      |         |          |      |      |      | \$5,000                    |          |

**Replacement Reserves Report**



**Memorial Auditorium**  
**10/24/2014**

| Report Section   | ID     | Cost Description   | Lifespan (EUL) | EAge | RUL | Quantity | Unit | Unit Cost   | Subtotal | 2014      | 2015      | 2016 | 2017 | 2018 | 2019 | 2020    | 2021 | 2022     | 2023    | 2024     | 2025     | 2026    | 2027 | 2028 | 2029     | 2030     | 2031     | 2032 | 2033     | Deficiency Repair Estimate |     |     |
|--|--------|--|----------------|------|-----|----------|------|-------------|----------|-----------|-----------|------|------|------|------|---------|------|----------|---------|----------|----------|---------|------|------|----------|----------|----------|------|----------|----------------------------|-----|-----|
| 7.4  | 273340 | D5092 Generator, Natural Gas, 20 to 40 KW, Install                   | 0              | 0    | 0   | 1        | EA   | \$30,000.00 | \$30,000 | \$30,000  |           |      |      |      |      |         |      |          |         |          |          |         |      |      |          |          |          |      |          | \$30,000                   |     |     |
| 8.1  | 280689 | C1021 Refinish door  | 10             | 9    | 1   | 10       | EA   | \$158.50    | \$1,585  |           | \$1,585   |      |      |      |      |         |      |          |         |          | \$1,585  |         |      |      |          |          |          |      |          | \$3,170                    |     |     |
| 8.1  | 280686 | C3024 Replace Vinyl tile   | 18             | 17   | 1   | 355      | SY   | \$67.75     | \$24,051 |           | \$24,051  |      |      |      |      |         |      |          |         |          |          |         |      |      |          |          | \$24,051 |      | \$48,103 |                            |     |     |
| 8.1  | 280687 | C3025 Replace carpet, standard commercial, medium traffic            | 8              | 7    | 1   | 44       | SY   | \$59.90     | \$2,636  |           | \$2,636   |      |      |      |      |         |      |          | \$2,636 |          |          |         |      |      |          | \$2,636  |          |      | \$7,907  |                            |     |     |
| 8.1  | 280688 | C3032 Replace acoustical ceiling tiles - partial                     | 9              | 8    | 1   | 20       | CSF  | \$550.00    | \$11,000 |           | \$11,000  |      |      |      |      |         |      |          |         | \$11,000 |          |         |      |      |          |          | \$11,000 |      | \$33,000 |                            |     |     |
|  | 273325 | D3043 Hydronic heating, refurbish the piping and traps, per radiator | 25             | 25   | 0   | 100      | EA   | \$43.83     | \$4,383  | \$4,383   |           |      |      |      |      |         |      |          |         |          |          |         |      |      |          |          |          |      | \$4,383  |                            |     |     |
| <b>Totals, Unescalated</b>                                     |        |  |                |      |     |          |      |             |          | \$408,464 | \$446,630 | \$0  | \$0  | \$0  | \$0  | \$5,799 | \$0  | \$10,226 | \$4,400 | \$27,320 | \$40,430 | \$5,320 | \$0  | \$0  | \$12,319 | \$28,749 | \$4,400  | \$0  | \$35,051 | \$1,029,108                |     |     |
| <b>Location Factor (1.00)</b>                                  |        |  |                |      |     |          |      |             |          | \$0       | \$0       | \$0  | \$0  | \$0  | \$0  | \$0     | \$0  | \$0      | \$0     | \$0      | \$0      | \$0     | \$0  | \$0  | \$0      | \$0      | \$0      | \$0  | \$0      | \$0                        | \$0 | \$0 |
| <b>Totals, Escalated (3.0% inflation, compounded annually)</b> |        |  |                |      |     |          |      |             |          | \$408,464 | \$460,029 | \$0  | \$0  | \$0  | \$0  | \$6,925 | \$0  | \$12,954 | \$5,740 | \$36,716 | \$55,964 | \$7,585 | \$0  | \$0  | \$19,192 | \$46,133 | \$7,272  | \$0  | \$61,463 | \$1,128,438                |     |     |

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## CERTIFICATION

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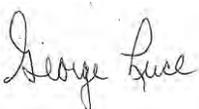
The City of Burlington, Vermont retained EMG to perform this Facility Condition Assessment and Level I Energy Audit in connection with its Memorial Auditorium, 250 Main Street, Burlington, Vermont, the "Property". It is our understanding that the primary interest of The City of Burlington, Vermont is to locate and evaluate materials and building system defects that might significantly affect the value of the property and to determine if the present Property has conditions that will have a significant impact on its continued operations.

The conclusions and recommendations presented in this report are based on the brief review of the plans and records made available to our Project Manager(s) during the site visit, interviews of available property management personnel and maintenance contractors familiar with the Property, appropriate inquiry of municipal authorities, our Project Manager's walk-through observations during the site visit, and our experience with similar properties.

No testing, exploratory probing, dismantling or operating of equipment or in depth studies were performed unless specifically required under Section 2 of this report. This assessment did not include engineering calculations to determine the adequacy of the Property's original design or existing systems. Although walk-through observations were performed, not all areas were observed (See Section 4.2 for areas observed). There may be defects in the Property, which were in areas not observed or readily accessible, may not have been visible, or were not disclosed by management personnel when questioned. The report describes property conditions at the time that the observations and research were conducted.

Any reuse or distribution of this report without such consent shall be at The City of Burlington, Vermont and the recipient's sole risk, without liability to EMG.

**Prepared by:** Scott Lattimer, PE, Project Manager  
Cheyenne Irby, AIA assoc., Project Manager

**Reviewed by:** 

---

Reviewer for

Brett Byers, Senior Engineering Consultant  
[bbyers@emgcorp.com](mailto:bbyers@emgcorp.com) 800.733.0660 x6701

## 1. EXECUTIVE SUMMARY

### 1.1. PROPERTY INFORMATION AND GENERAL PHYSICAL CONDITION

The property information is summarized in the table below. More detailed descriptions may be found in the various sections of the report and in the Appendices.

| Property Information               |  |
|------------------------------------|--|
| Address:                           | 250 Main Street, Burlington, Chittenden County, Vermont 05401  |
| Year constructed:                  | 1928   |
| Current owner of property:         | City of Burlington, Vermont  |
| Management Point of Contact:       | City of Burlington, Martha Keenan, Capital Improvement Program Manager<br>802.540.0701 phone   |
| Property type:                     | Public gathering   |
| Site area:                         | 0.9 Acres  |
| Gross floor area:                  | 57,562 Square Feet   |
| Number of buildings:               | 1  |
| Number of stories:                 | 6  |
| Parking type and number of spaces: | 20 spaces in open lots   |
| Building construction:             | Masonry bearing walls and steel-framed roof<br>Steel frame with concrete-topped metal decks  |
| Roof construction:                 | Flat roofs with built-up membrane  |
| Exterior Finishes:                 | Brick and cut stone  |
| Heating and/or Air-conditioning:   | Hot water for the central heating system is supplied by two H.B. Smith Company 450 Mills Cast Iron natural gas-fired, steam water boilers. Each boiler has a natural gas rated input capacity of 3,011 MBH and is located within the main mechanical room.<br><br>Heating is provided throughout the facility by the steam radiator and unit heaters. All steam and condensate piping, valves, and fixtures appear to be original to the building. |
| Fire and Life/Safety:              | Fire sprinklers, hydrants, smoke detectors, alarms, extinguishers  |
| Dates of visit:                    | 8.28.2014 and 8.29.2014  |
| Point of Contact (POC):            | Martha Keenan  |
| Assessment and Report Prepared by: | Scott Lattimer (Engineer) and Cheyenne Irby (Architect)  |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| Property Information |  |
|----------------------|--|
| Reviewed by:         | George Luce<br>Technical Report Reviewer<br><a href="mailto:gluce@emgcorp.com">gluce@emgcorp.com</a><br>800.733.0660 x6261 |

Generally, the property appears to have been constructed within industry standards in force at the time of construction. The property appears to have been maintained since it was first occupied and is in poor overall condition.

According to property management personnel, no major capital improvements have been made over the past three years.

#### Summary of Significant Issues:

Structural and foundation integrity

Windows leaking

Crumbing masonry

Unsafe exterior stair case

Drainage issues

#### Summary of Energy Audit:

EMG has conducted an Energy Audit on the Memorial Auditorium. The study included a review of the building's construction features, historical energy and water consumption and costs, review of the building envelope, HVAC equipment, heat distribution systems, lighting, and the building's operational and maintenance practices.

EMG has identified 6 Energy Conservation Measures (ECMs) for this property. The savings for each measure are calculated using standard engineering methods followed in the industry, and detailed calculations for ECM are provided in Appendix H for reference. A 10% discount in energy savings was applied to account for the interactive effects amongst the ECMs. In addition to the consideration of the interactive effects, EMG has applied a 15% contingency to the implementation costs to account for potential cost overruns during the implementation of the ECMs.

#### Summary of Financial Information for Recommended Energy Conservation Measures

| Item  | Estimate                                 |
|---|--|
| Total Projected Initial ECM Investment        | \$ 102059<br><i>(In Current Dollars)</i> |
| Estimated Annual Cost Savings Related to ECMs | \$26,578<br><i>(In Current Dollars)</i>  |
| Net Effective ECM Payback                     | 3,84 years                               |
| Estimated Annual Energy Savings               | 63.44%                                   |
| Estimated Annual Cost Savings                 | 42.53%                                   |

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## 1.2. SPECIAL ISSUES AND FOLLOW-UP RECOMMENDATIONS

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As part of the FCA, a limited assessment of accessible areas of the building(s) was performed to determine the presence of mold, conditions conducive to mold growth, and/or evidence of moisture. Property personnel were interviewed concerning any known or suspected mold, elevated relative humidity, water intrusion, or mildew-like odors. Sampling is not a part of this assessment.

There are no visual indications of the presence of mold growth, conditions conducive to mold growth, or evidence of moisture in representative readily accessible areas of the property.

The following issues should be considered:

- Verify that all warranties are transferable.
- Verify that any alterations, installations, or other improvements since the project was first constructed and occupied have been properly permitted and approved by municipal agencies.
- Verify that no defective materials or equipment are used at the property.

Copies of the documents listed below should be obtained:

- All roof, equipment and system warranties/guarantees and transfers. Manufacturers often levy a warranty transfer fee and require that the equipment or system be in pristine condition in order to provide such transfers. This requirement often necessitates upgrades, repairs, or servicing.
- All available site and building construction drawings and specifications.
- All government documents such as Certificates of Occupancy, permits, zoning variances, easements, tax receipts, and other pertinent records.

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## 1.3. OPINIONS OF PROBABLE COST

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Cost estimates are attached at the front of this report (following the cover page).

These estimates are based on Invoice or Bid Document/s provided either by the Owner/facility and construction costs developed by construction resources such as *R.S. Means* and *Marshall & Swift*, EMG's experience with past costs for similar properties, city cost indexes, and assumptions regarding future economic conditions.

Opinions of probable costs should only be construed as preliminary, order of magnitude budgets. Actual costs most probably will vary from the consultant's opinions of probable costs depending on such matters as type and design of suggested remedy, quality of materials and installation, manufacturer and type of equipment or system selected, field conditions, whether a physical deficiency is repaired or replaced in whole, phasing of the work (if applicable), quality of contractor, quality of project management exercised, market conditions, and whether competitive pricing is solicited, etc. ASTM E2018-08 recognizes that certain opinions of probable costs cannot be developed within the scope of this guide without further study. Opinions of probable cost for further study should be included in the PCR.

### 1.3.1. Methodology

#### Physical Needs Assessment:

Based upon site observations, research, and judgment, along with referencing Expected Useful Life (EUL) tables from various industry sources, EMG opines as to when a system or component will most probably necessitate replacement. Accurate historical replacement records, if provided, are typically the best source of information. Exposure to the elements, initial quality and installation, extent of use, the quality and amount of preventive maintenance exercised, etc., are all factors that impact the effective age of a system or component. As a result, a system or component may have an effective age that is greater or less than its actual chronological age. The Remaining Useful Life (RUL) of a component or system equals the EUL less its effective age. Projections of Remaining Useful Life (RUL) are based on continued use of the Property similar to the reported past use. Significant changes in tenants and/or usage may affect the service life of some systems or components.

Where quantities could not be derived from an actual take-off, lump sum costs or allowances are used. Estimated costs are based on professional judgment and the probable or actual extent of the observed defect, inclusive of the cost to design, procure, construct and manage the corrections.

The evaluation period identified in this report is defined as 20 years.

The physical condition of building component to be repaired is typically defined as being in one of five categories: Priority One through Five. For the purposes of this report, the following definitions are used:

- Priority One -** These items are to be addressed as Immediate. Items in this category require immediate action and include corrective measures to:
1. Correct life safety and/or code hazards
  2. Repair item permitting water leaks into the building or structure
  3. Repair mold or mildew conditions
  4. Down unit repairs
  5. Further study investigations
- Priority Two -** These items are to be addressed within the next 1 year. Items in this category require corrective measures to:
1. Return a system to normal operation
  2. Stop deterioration to other systems
  3. Stop accelerated deterioration
  4. Replace items that have reached or exceeded their useful service life
  5. ADA/UFAS deficiencies
- Priority Three -** These items are to be addressed within the next 2-3 years. Items in this category, if not corrected expeditiously, will become critical in the next several years. Items in this category include corrective measures to:
1. Stop intermittent interruptions
  2. Correct rapid deterioration
  3. Replace items that will reach or exceed their useful service life
  4. Correct functionality and/or aesthetic issues that are not critical
- Priority Four -** These items are to be addressed within the next 3-5 years. Items in this category include conditions requiring appropriate attention to preclude predictable deterioration or potential downtime and the associated damage or higher costs if deferred further.
- Priority Five -** These items are to be addressed within 6-20 years. Items in this category represent a sensible improvement to the existing conditions. These are not required for the most basic function of the facility; however, Priority 5 projects will improve overall usability and/or reduce long-term maintenance costs.

**Energy Audit:**

All the ECMs are broken into two major categories:

1. **No/Low Cost Recommendations:** No/Low cost is defined as any project with initial investment of less than \$1000
2. **Capital Cost Recommendations:** Capital cost defined as any project with initial investment greater than \$1000

EMG screens ECMs based on the payback criteria.

Simple Payback Period –The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates. ECMs with a payback period greater than the Expected Useful Life (EUL) of the project are not typically recommended, as the cost of the project will not be recovered during the lifespan of the equipment. These ECMs are recommended for implementation during future system replacement. At that time, replacement may be evaluated based on the premium cost of installing energy efficient equipment.

$$\text{Simple Payback} = \frac{\text{Initial Cost}}{\text{Annual Savings}}$$

**1.3.2. Immediate Repairs and Short Term Costs**

Immediate repairs are opinions of probable costs that require immediate action as a result of: (1) material existing or potential unsafe conditions, (2) material building or fire code violations, or (3) conditions that, if not addressed, have the potential to result in, or contribute to, critical element or system failure within one year or will most probably result in a significant escalation of its remedial cost.

Short term costs are opinions of probable costs to remedy physical deficiencies, such as deferred maintenance, that may not warrant immediate attention, but that require repairs or replacements, which should be undertaken on a priority basis in addition to routine preventive maintenance. Opinions of probable costs may include costs for testing, exploratory probing, and further analysis should this be deemed warranted by the consultant. The performance of such additional services is beyond the FCA scope of work. Generally, the time frame for such repairs is within one to two years. Short Term costs are included in the Replacement Reserves Report.

**1.3.3. Replacement Reserves**

Replacement Reserves are for recurring probable expenditures, which are not classified as operation or maintenance expenses. The replacement reserves should be budgeted for in advance on an annual basis. Replacement Reserves are reasonably predictable both in terms of frequency and cost. However, Replacement Reserves may also include components or systems that have an indeterminable life but, nonetheless, have a potential for failure within an estimated time period.

Replacement Reserves exclude systems or components that are estimated to expire after the reserve term and are not considered material to the structural and mechanical integrity of the subject property. Furthermore, systems and components that are not deemed to have a material effect on the use of the Property are also excluded. Costs that are caused by acts of God, accidents, or other occurrences that are typically covered by insurance, rather than reserved for, are also excluded.

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Replacement costs are solicited from ownership/property management, EMG's discussions with service companies, manufacturers' representatives, and previous experience in preparing such schedules for other similar facilities. Costs for work performed by the ownership's or property management's maintenance staff are also considered.

EMG's reserve methodology involves identification and quantification of those systems or components requiring capital reserve funds within the assessment period. The assessment period is defined as the effective age plus the reserve term. Additional information concerning system's or component's respective replacement costs (in today's dollars), typical expected useful lives, and remaining useful lives were estimated so that a funding schedule could be prepared. The Replacement Reserves Schedule presupposes that all required remedial work has been performed or that monies for remediation have been budgeted for items defined in the Immediate Repairs Report.

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## 2. PURPOSE AND SCOPE

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### 2.1. PURPOSE

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EMG was retained by the client to render an opinion as to the Property's current general physical condition on the day of the site visit.

Based on the observations, interviews and document review outlined below, this report identifies significant deferred maintenance issues, existing deficiencies, and material code violations of record at municipal offices that affect the Property's use. Opinions are rendered as to its structural integrity, building system condition and the Property's overall condition. The report also notes building systems or components that have realized or exceeded their typical expected useful lives.

The physical condition of building components is typically defined as being in one of three categories: Good, Fair, and Poor. For the purposes of this report, the following definitions are used:

- Good = Satisfactory as-is. Requires only routine maintenance during the assessment period. Repair or replacement may be required due to a system's estimated useful life.
- Fair = Satisfactory as-is. Repair or replacement is required due to current physical condition and/or estimated remaining useful life.
- Poor = Immediate repair, replacement, or significant maintenance is required.

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### 2.2. SCOPE

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The standard scope of the Facility Condition Assessment includes the following:

- Visit the Property to evaluate the general condition of the building and site improvements, review available construction documents in order to familiarize ourselves with, and be able to comment on, the in-place construction systems, life safety, mechanical, electrical, and plumbing systems, and the general built environment.
- Identify those components that are exhibiting deferred maintenance issues and provide cost estimates for Immediate, Short Term, and Replacement Reserves based on observed conditions, maintenance history and industry standard useful life estimates. This will include the review of documented capital improvements completed within the last five-year period and work currently contracted for, if applicable.
- Provide a full description of the Property with descriptions of in-place systems and commentary on observed conditions.
- Provide a general statement of the subject Property's compliance to National Building Code Accessibility standards. This will not constitute a full survey, but will help identify exposure to issues and the need for further review.
- Perform a limited assessment of accessible areas of the building(s) for the presence of mold, conditions conducive to mold growth, and/or evidence of moisture. EMG will also interview Project personnel regarding the presence of any known or suspected mold, elevated relative humidity, water intrusion, or mildew-like odors. Potentially affected areas will be photographed. Sampling will not be considered in routine assessments.
- List the current utility service providers.

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- Review maintenance records and procedures with the in-place maintenance personnel.
- Observe a representative sample of the interior tenant spaces/units, including vacant spaces/units, in order to gain a clear understanding of the property's overall condition. Other areas to be observed include the exterior of the property, the roofs, interior common areas, and mechanical, electrical and elevator equipment rooms.
- Appropriate inquiries of municipal officials regarding the existence of pending unresolved building or fire code violations on file, and a determination of the current zoning category, flood hazard area, and seismic zone for the Property.
- Provide recommendations for additional studies, if required, with related budgetary information.
- Tenant responsibility for maintenance, repair or replacement of finishes, fixtures, or equipment is not addressed by this scope of services.
- Provide an Executive Summary at the beginning of this report with cost estimates as a quick, user-friendly summary of the Property's condition and the assigned costs by category. These costs are tied to the report sections where reference to the issues are clearly defined and expanded.

**2.3. PERSONNEL INTERVIEWED**

The following personnel from the facility and government agencies were interviewed in the process of conducting the FCA:

| <b>Name and Title</b>                                     | <b>Organization</b>                | <b>Phone Number</b> |
|---|------------------------------------|---------------------|
| Martha Keenan<br>Capital Improvement Program<br>Manager   | City of Burlington                 | 802.540.0701        |
| Sybil Thomas<br>Burlington Code Enforcement<br>Department | Burlington Code Enforcement Office | 802.863.0442        |
| Nic Anderson<br>Planning and Zoning Clerk                 | Burlington Planning Department     | 802.865.7188        |
| Meghan Sweeney<br>Administrative Assistant                | Burlington Fire Department         | 802.865.5387        |

The FCA was performed with the assistance of Martha Keenan, Capital Improvement Program Manager, City of Burlington, the on site Point of Contact (POC), who was cooperative and provided information that appeared to be accurate based upon subsequent site observations. The on site contact is completely knowledgeable about the subject property and answered most questions posed during the interview process. The POC's management involvement at the property has been for the past 7 months.

**2.4. DOCUMENTATION REVIEWED**

Prior to the FCA, relevant documentation was requested that could aid in the knowledge of the subject property's physical improvements, extent and type of use, and/or assist in identifying material discrepancies between reported information and observed conditions. The review of submitted documents does not include comment on the accuracy of such documents or their preparation, methodology, or protocol. The Documentation Request Form is provided in Appendix E.

Although Appendix E provides a summary of the documents requested or obtained, the following list provides more specific details about some of the documents that were reviewed or obtained during the site visit.

- Floor plan documents by Burlington Department of Parks and Recreation dated July 2012.

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## **2.5. PRE-SURVEY QUESTIONNAIRE**

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A Pre-Survey Questionnaire was sent to the Client's representative prior to the site visit. The questionnaire is included in Appendix E. Information obtained from the questionnaire has been used in preparation of this report.

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## **2.6. WEATHER CONDITIONS**

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On the days of the site visit August 28 and 29 2014 the weather was clear, with temperatures in the 80s (°F) and light winds

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### 3. CODE INFORMATION AND ACCESSIBILITY

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#### 3.1. CODE INFORMATION, FLOOD ZONE AND SEISMIC ZONE

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According to Sybil Thomas of the Burlington Code Enforcement Department, there are no outstanding building code violations on file. The Building Department does not have an annual inspection program. They only inspect new construction, work that requires a building permit, and citizen complaints. A copy of the original Certificates of Occupancy were requested but were not available.

Based on a review of the zoning classification information at the Burlington Planning and Zoning Department, the property is located within the downtown mixed use zoning district and appears to be a conforming use.

The fire inspection sticker on the fire panel states that there are violations associated with the property. Further requests were left with the fire department to clarify the violations. The most recent inspection conducted by the Fire Department was within the current year.

According to information obtained from the appraisal, the property is not located in a flood hazard zone. FEMA flood map 50007C0252D of July 18, 2011 classifies the site to be in Zone X.

According to the 1997 Uniform Building Code Seismic Zone Map of the United States, the property is located in Seismic Zone 2A, defined as an area of low to moderate probability of damaging ground motion.

According to the Wind Zone Map, published by the Federal Emergency Management Agency (FEMA), the property is located in Zone II and is not located in a Hurricane-Susceptible Region or Special Wind Region.

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#### 3.2. ADA ACCESSIBILITY

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Generally, Title III of the Americans with Disabilities Act (ADA) prohibits discrimination by entities to access and use of "areas of public accommodations" and "commercial facilities" on the basis of disability. Regardless of its age, these areas and facilities must be maintained and operated to comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Buildings completed and occupied after January 26, 1992 are required to comply fully with the ADAAG. Existing facilities constructed prior to this date are held to the lesser standard of compliance to the extent allowed by structural feasibility and the financial resources available. As an alternative, a reasonable accommodation pertaining to the deficiency must be made.

During the FCA, a limited visual observation for ADA accessibility compliance was conducted. The scope of the visual observation was limited to those areas set forth in *EMG's Abbreviated Accessibility Checklist* provided in Appendix D of this report. It is understood by the Client that the limited observations described herein does not comprise a full ADA Compliance Survey, and that such a survey is beyond the scope of EMG's undertaking. Only a representative sample of areas was observed and, other than as shown on the Abbreviated Accessibility Checklist, actual measurements were not taken to verify compliance.

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At a public gathering property, the areas considered as a public accommodation besides the site itself and parking, are the exterior accessible route, the interior accessible route, the interior common areas, including the common area restrooms.

The facility generally appears to be accessible as stated within the defined priorities of Title III of the Americans with Disabilities Act.

A full ADA Compliance Survey may reveal aspects of the property that are not in compliance. The cost of this survey is included in the Replacement Reserves Report.

## 4. EXISTING BUILDING ASSESSMENT

### 4.1. TENANT UNIT TYPES

The majority of the building is occupied by the City of Burlington but the ground floor has been leased out as annex spaces for various uses.

The following table identifies the reported tenant unit types and tenant mix at the subject property.

| Tenant Unit Types and Mix |                              |                 |
|---------------------------|------------------------------|-----------------|
| Quantity                  | Type                         | Floor Area (SF) |
| 1                         | Generator – Art & Technology | 6,952           |
| 1                         | Burlington City Arts         | 3,440           |
| 1                         | Burlington Telecom           | 1,080           |
| 1                         | 242 Main Club                | 1,620           |
| 1                         | Auditorium and operations    | 44,470          |
|                           | <b>TOTAL</b>                 | <b>57,562</b>   |

### 4.2. TENANT UNITS OBSERVED

Most of the building was observed in order to gain a clear understanding of the property's overall condition. Other areas accessed included the exterior of the property and the roof.

## 5. SITE IMPROVEMENTS

### 5.1. UTILITIES

The following table identifies the utility suppliers and the condition and adequacy of the services.

| Site Utilities      |  |                      |
|---------------------|--|----------------------|
| Utility             | Supplier   | Condition & Adequacy |
| Sanitary sewer      | City of Burlington                                     | Good                 |
| Storm sewer         | City of Burlington                                     | Good                 |
| Domestic water      | City of Burlington                                     | Good                 |
| Electric service    | Burlington Electric Department<br>Green Mountain Power | Good                 |
| Natural gas service | Vermont Gas Systems                                    | Good                 |

#### Observations/Comments:

- The utilities appear to be adequate for the property. There are no unique, on site utility systems such as septic systems, water or waste water treatment plants, or propane gas tanks.

### 5.2. PARKING, PAVING, AND SIDEWALKS

The main entrance drive is located along South Union Street on the east side of the property. Additional entrance drives located off Main Street and through the adjacent library's parking lot. The parking areas and drive aisles are paved with asphaltic concrete.

Based on a physical count, parking is provided for 20 cars. The parking ratio is 2.85 spaces per thousand square feet of floor area. All of the parking stalls are located in open lots. There are no handicapped-accessible parking stalls. The parking area adjacent to the auditorium is connected to the library parking lot which does have handicapped-accessible parking stalls. The immediate parking next to the auditorium is reserved for employees of the auditorium. Other parking is provided by public parking garages and street parking.



The sidewalks throughout the property are constructed of cast-in-place concrete. Cast-in-place concrete steps with metal handrails are located at grade changes.

The curbs and gutters are constructed of cast-in-place concrete. Surface runoff is directed to municipal drainage in the drive aisles.

**Observations/Comments:**

- The property does not have a dedicated paving repair and maintenance contractor. On site personnel maintain the paving and flatwork or a contractor is retained when required.
- The asphalt pavement is in good to fair condition. There are no significant signs of cracks or surface deterioration. In order to maximize the pavement life, pothole patching, crack sealing, seal coating, and re-striping of the asphalt paving will be required during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The concrete pavement is in good condition. There are no significant signs of cracks or surface deterioration. Epoxy sealing of minor cracks will be required during the assessment period as part of the property management's routine maintenance program.
- The concrete curbs, gutters, and sidewalks throughout the property are in good condition. Routine cleaning and maintenance will be required during the assessment period.

**5.3. DRAINAGE SYSTEMS AND EROSION CONTROL**

Storm water from the roof drain into underground piping connected to the municipal storm water management system.

Storm water from the landscaped areas and paved areas flows across the surface into the adjacent public streets and drainage in the drive aisles.

**Observations/Comments:**

- There is no evidence of storm water runoff from adjacent properties. The storm water system appears to provide adequate runoff capacity. There is no evidence of major ponding or erosion.

**5.4. TOPOGRAPHY AND LANDSCAPING**

The property slopes gently down from the east side of the building to the west property line.

The landscaping consists of trees, shrubs, and grasses. Flower beds are concentrated around the entrance of the building.

Landscaped areas are irrigated by an in-ground sprinkler system, which consists of underground piping, shut-off valves, pop-up sprinkler heads, and automatic timers.

Surrounding properties include commercial, residential and public use developments.

Reinforced concrete retaining walls are located at grade changes throughout the site. Painted metal railings are mounted on top of the retaining walls.



**Observations/Comments:**

- It was reported by the tenants that during storms the south side of the building backs up with municipal drainage water. The topography and adjacent properties present conditions detrimental to the property. An engineering drainage study is required to determine the cause and possible solutions. The cost of this work is included in the Replacement Reserves Report.
- The landscape materials are in good condition and will require routine maintenance during the assessment period.
- The retaining wall on the south side of the property and the retaining wall on the north side driveway ramp are in fair condition. The walls have minor signs of cracking and spalling. To maintain the overall integrity of the wall the faults will require repair during the assessment period. The cost to study this work is included in the Replacement Reserves Report.

**5.5. GENERAL SITE IMPROVEMENTS**

Property identification is provided by engraved letters in stone located on the top of the east elevation of the building. An additional bronze label and dedication plaque is located at the main entrance. Tenant logo signs are displayed on their entrance doors.

Site lighting is provided by metal street light standards. The light standards are spaced along the drive aisles throughout the parking areas. Metal pole-mounted light fixtures are located along public streets.

Exterior building illumination is provided by light fixtures surface-mounted on the exterior walls.

Dumpsters are located in the parking area on the north side of the building.

**Observations/Comments:**

- The property and tenant identification signs are in fair condition. Routine maintenance will be required during the assessment period.
- The exterior site and building light fixtures are in poor condition. It appears that at one point in time, all the entrances to the building were equipped with building-mounted lamps. All but two entrances have had their lamps removed. The two lamps that remain are at service and side entrances and they are in poor condition. The reason for removal is unknown but the lamps are being stored in the basement of the building. Other than public street lighting the site has no other form of illumination. It is recommended that the original lamps be refurbished and re-installed at the entrances to the building. A lighting consultant is required to assess the re-installation and refurbishing of the historic lamps. The cost of this work is included in the Replacement Reserves Report.
- The dumpsters are owned and maintained by the refuse contractor.

## 6. BUILDING ARCHITECTURAL AND STRUCTURAL SYSTEMS

### 6.1. FOUNDATIONS

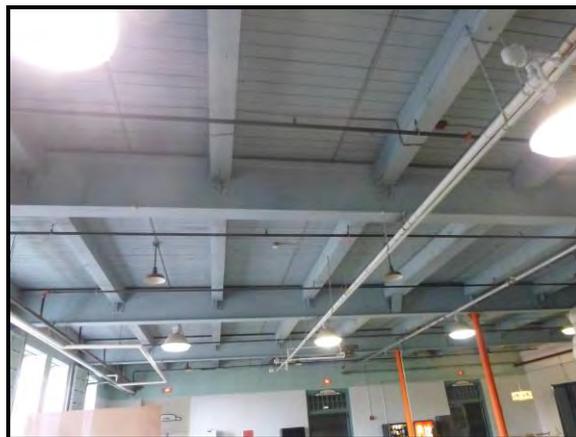
Based on structures of similar size, configuration, and geographic location, it is assumed that the foundations consist of cast-in-place concrete perimeter wall footings with concrete foundation walls. The foundation systems include reinforced concrete column pads.

#### **Observations/Comments:**

- Limited observation of the foundation walls could be seen in the basement of the building. The masonry perimeter wall is in poor condition. There is evidence of movement that could indicate excessive settlement. There is also evidence of serious water and moisture infiltration through the perimeter wall into the basement. The walls are cracking and spalling in various places as well as crumbling suggesting that the status of the wall is in sub standard condition. Historical data states that the building was built upon a rubble filled gorge. This is the same case as Fletcher Free Library and major structural interference was required to stabilize the building. This may be the same case for the Memorial Auditorium. An engineering study is required to investigate and discuss possible solutions to the issue. The cost of this work is included in the Replacement Reserves Report.

### 6.2. SUPERSTRUCTURE

The building has structural steel columns, which support the upper floor and roof diaphragms. The upper floors have wooden plank decks and are supported by steel beams and wood beams. The roof is constructed of metal decks, which are supported by steel beams and open web steel joists.



#### **Observations/Comments:**

- The superstructure is exposed in some locations, which allows for limited observation. It was reported by the maintenance personnel that the building's exterior walls are pulling away from each other. Through a limited on site investigation the walls and floors do not appear to be plumb, level, and stable. There are some signs of deflection and movement, mainly localized on the southern wall. The building is located on a site adjacent to the Fletcher Free Library, which saw similar reported issues. The building had to take measures by adding increased structural elements to stabilize the building movement. The cause of the library's movement was due to the ground conditions. The auditorium is located in the vicinity of the library and may be suffering from similar issues. An engineering study will be required to assess the issues and possible solutions. The study will be included with the one mentioned in section 6.1.

### 6.3. ROOFING

The primary roof is classified as flat roof. The roof is finished with a mineral-surfaced cap sheet over a multi-ply bituminous built-up membrane. The roof is insulated with rigid insulation boards.

The exterior perimeter walls extend above the surface of the roof, creating parapet walls. The roof membrane turns up the sides of the parapet walls and terminates at sheet metal copings.

Storm water is drained from the roofs by internal drains.

There are no attics.



#### **Observations/Comments:**

- The property does not have a dedicated roof repair and maintenance contractor. On site personnel maintain the roof or a contractor is retained when required.
- The roof finishes appears to be 20 or more years of age.
- The roof membrane is in poor condition. The membrane that turns up the parapet walls is fraying away from the walls thus allowing water to run into the underside of the membrane and down the interior of the wall. There are various leaks throughout the building. Based on its current condition, the roof membrane will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- There is evidence of active roof leaks throughout the building.
- Giving the number of leaks in the building and condition of the membrane it is assumed that there is possible roof deck or insulation deterioration. The roof substrate and insulation should be inspected during any future roof repair or replacement work.
- There is no evidence of fire retardant treated plywood (FRT).
- The roof flashings are in poor condition. In localized areas the flashing is beginning to pull away from the parapet wall thus not being able to direct water away from the buildings surface. Due to its current condition the flashing will require replacement early in the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The parapet walls and copings are in poor condition. The upper portion of the building's masonry is crumbling. The worst parts are located on the north eastern corner of the building. Large portions of the wall have crumbled away it has begun exposing the interior metal reinforcing bars. It was observed that large chunks of the building's masonry had fallen off and many more pieces are ready to fall off in the near future. During the day of the on site visit a large piece of masonry could be dislodged from the building with a light push of a finger. This issue can cause a tremendous life safety issue because the problem is located at the building's main entrance and along public sidewalks. Repair of the wall is an immediate issue that must be completed during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- Roof drainage is not adequate. Clearing and minor repair of drain system components should be performed regularly as part of the property management's routine maintenance program. During the day of the on site many of the drains were clogged and blocked thus not allowing for proper roof drainage.

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- The roof area is littered with construction debris that has been left up there from previous jobs. Any debris or construction material left on the roof will not allow it to drain properly. All debris should be removed from the roof as routine maintenance during the assessment period.
- The roof vents are in fair condition and will require routine maintenance during the assessment period.
- During severe wind storms, roofing aggregate (ballast) may become wind-borne and may harm nearby persons or may damage surrounding properties or building or site elements of the subject property. National, regional, and local building codes vary widely in the treatment of this issue and should be consulted during any future roofing repairs or replacements.
- The roof access hatch is a shop constructed wooden hatch. The hatch is held down with light gauge chains and wood screws, secured with a padlock. For security and safety issues the wooden hatch should be replaced with a proper metal roof hatch. Also the padlock on the hatch offers little security. During the site visit it was observed that the chain and screw had simply been pulled out of the wooden hatch thus leaving the roof hatch unsecured. Based on safety and security issues it is recommended that the roof hatch be replaced during the assessment period. The cost of this work is included in the Replacement Reserves Report.

## 6.4. EXTERIOR WALLS

The exterior walls are finished with brick and stone masonry veneer

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.

### **Observations/Comments:**

- The exterior finishes are in poor condition. Re-pointing and power washing the brick will be required during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- Similar to the parapet walls, portions of the stone work around the building is crumbling resulting in possible life safety issues. Based on the stone work's current condition it will require repair during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The sealant is not flexible, cracked, and in poor condition and will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.

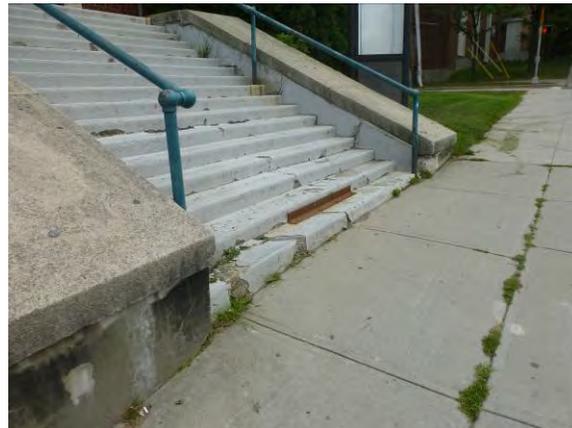


## 6.5. EXTERIOR AND INTERIOR STAIRS

The exterior stairs at the main entrances are constructed of reinforced concrete. The handrails and balusters are constructed of metal.

There are additional exterior stairs on the north and south side of the building that are constructed of steel and have open risers and steel treads. The handrails and balusters are constructed of metal.

The interior stairs are constructed of steel and have concrete filled treads. The balusters are constructed of metal and have wood handrails.



### **Observations/Comments:**

- The steel exterior stairs, balusters, and handrails are in poor condition, there are signs of excessive rusting with gaps and soft spots in the treads as well as rusted and loose railings. The south and north exterior exit stairs will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The exterior concrete stairs at the main entrances are in fair to poor condition. The stairs on the east and north sides are in fair condition and will require routine maintenance during the assessment period. The stairs on the south side is in poor condition with large areas of deterioration resulting in foot size holes and gaps in the concrete. The resulting damage in the stairs is threatening the structural integrity of the stair structure. During the day of the on site, with one foot pressure could be applied to the stairs and the concrete stair tread would oscillate back and forth. This is an immediate life safety problem and due to liability issues it is recommended that the stairs be roped off until repairs can be made. The cost of this work is included in the Replacement Reserves Report.
- The west side of the building is equipped with a wooden staircase that is in poor condition. The staircase is loose and wobbles when you walk on it. There are also minor areas of deteriorated wood. The stairs will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The west side of the building is equipped with cast in place concrete stairs. The stairs are missing its metal railing. So safety issues the metal railings should be replaced. The cost of this work is included in the Replacement Reserves Report.
- The interior stairs are in fair to poor condition. The stair treads have been heavily worn, cracked and spalling. The stairs should be resurfaced/repared during the assessment period. Resurfacing/repairing the tread is necessary to provide an even travel surface for the public for safety proposes. The cost of this work is included in the Replacement Reserves Report.
- The interior stair's balusters will require re-painting and the wooden handrails will need to be refinished to maintain the longevity of the stairs. The cost of this work is included in the Replacement Reserves Report.

## 6.6. EXTERIOR WINDOWS AND DOORS

The windows are steel-framed, single-glazed hopper units.

The main entrance doors are metal framed doors with single glazing security glass insets. The doors have cylindrical locksets with push/pull handle hardware.

The tenant unit entrance doors are aluminum framed glazed store front style units set in metal frames. The tenant entrance doors have cylindrical locksets with lever handle hardware and keyed deadbolts.

The service doors are painted metal doors set in metal frames. The doors have cylindrical locksets with push/pull handle hardware.

A total of two overhead doors are located on the north side of the building. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers.



### Observations/Comments:

- The main entrance doors are in poor condition. The bottom portions of the doors have rusted and a pen can be pressed through the door panel. The doors weather stripping has failed and the doors no longer sit within their frames flush thus offering an inadequate seal. The frames that the doors rest in are rusted as well. Due to the age and current condition of the doors they will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The service and glazed storefront doors are in fair condition and will require routine maintenance over the assessment period.
- There is evidence of window leakage throughout the entire building. The windows are rusted, no longer close tightly and sealant around the windows has deteriorated. The windows are in poor condition and will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- Various window sills around the building have begun to crack and shall. These window sills no longer shed water proper and will need to be repaired. The cost of this work is included in the Replacement Reserves Report.
- The steel lintels above the window opening are in varying states of corrosion. Some lintels are only slightly rusted but in localized areas the lintels have corroded so far as to have lost their structure strength and the weight of the bricks are collapsing into the window opening. Most of the window lintels will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The overhead doors are in good condition and will require routine maintenance during the assessment period.

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## 6.7. PATIO, TERRACE, AND BALCONY

An exterior exit balcony provides access and emergency exit from the main auditorium space. The balcony decks are sheathed metal grates. The balconies have painted metal guardrails.

### Observations/Comments:

- The exit balconies are part of the metal exterior stair system mentioned in section 6.5. Work pertaining to the exit balconies will be included with the stairs during the assessment period.



## 6.8. COMMON AREAS, ENTRANCES, AND CORRIDORS

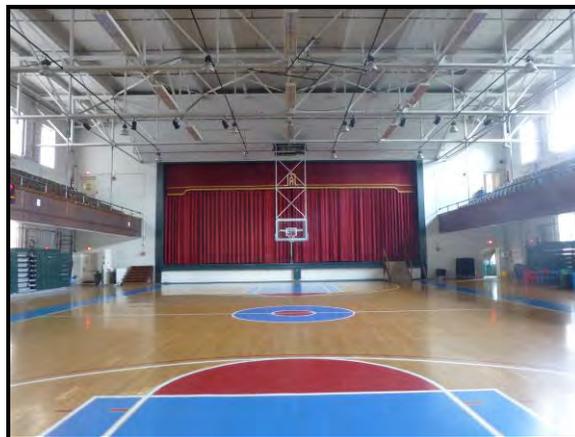
The lobby contains, directories, ticketing and concessions. Two sets of stairwells are accessed directly from the lobby.

Restrooms, offices and the mezzanine levels are accessed from corridors beyond the main stairwells on each floor.

An additional corridor behind the stage provides access to the dressing room area.

Restrooms are located throughout the building. There are a total of 8 restrooms. Handicap accessible restrooms are located in the main lobby.

The following table identifies the interior areas and generally describes the finishes in each common area.



| Common Area            | Floors           | Walls   | Ceilings        |
|------------------------|------------------|---|-----------------|
| Lobby                  | Terrazzo         | Painted plaster                               | Painted wood    |
| Auditorium             | Wood             | Vinyl covering over drywall / Painted drywall | Painted wood    |
| Corridor, upper floors | Wood             | Unpainted and painted brick                   | Painted wood    |
| Corridor, lower floors | Painted concrete | Unpainted brick and painted plaster           | Painted wood    |
| Restroom, Main Lobby   | Vinyl tile       | Ceramic tile wainscots and painted drywall    | Painted drywall |

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| Common Area            | Floors           | Walls         | Ceilings        |
|------------------------|------------------|---------------|-----------------|
| Restroom               | Painted concrete | Painted brick | Painted plaster |
| Restroom, Ground level | Ceramic tile     | Painted brick | Painted drywall |

**Observations/Comments:**

- It appears that the interior finishes in the common areas are original. No major finish renovations have been completed since the construction of the building.
- The interior finishes in the common areas are in fair to poor condition. Based on its estimated Remaining Useful Life (RUL), the common area hard surface flooring will require refinishing during the assessment period. The cost of this work is included in the Replacement Reserves Report. Interior painting and wall finish replacement will also be required during the assessment period. The cost of this work is also included in the Replacement Reserves Report.
- There are various areas throughout the restrooms where the concrete flooring has been heavily worn or has spalled away. For safety concerns the concrete floors should be repaired to level conditions. The cost of this work is also included in the Replacement Reserves Report.

## 7. BUILDING MECHANICAL AND PLUMBING SYSTEMS

### 7.1. BUILDING HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

Hot water for the central heating system is supplied by two H.B. Smith Company 450 Mills Cast Iron natural gas-fired, steam water boilers. Each boiler has a natural gas rated input capacity of 3,011 MBH and is located within the main mechanical room.

Heating is provided throughout the facility by the steam radiator and unit heaters. All steam and condensate piping, valves and fixtures appear to be original to the building.

Various office and work areas throughout the facility are cooled utilizing self-contained individual window air conditioners. These units operate and are controlled independent of the buildings central systems.



A lower level work area utilizes a newer energy recovery ventilator and adjacent areas utilize older suspended smoke eaters to assist in improving indoor air quality. A lower level curtained welding area has no ventilation installed.

The stair wells, restrooms, and other areas are ventilated by mechanical exhaust fans. Large capacity ventilation fans are mounted on the roof and are connected by concealed ducts to each ventilated space.

#### **Observations/Comments:**

- The property does not have a dedicated HVAC repair and maintenance contractor. On site personnel maintain the HVAC equipment or a contractor is retained when required. or
- Records of the installation, maintenance, upgrades, and replacement of the HVAC equipment have not been maintained since the property was first occupied.
- Approximately 90 percent of the HVAC equipment is original. HVAC equipment is reportedly replaced on an "as-needed" basis.
- The common area HVAC equipment appears to be in poor condition. Based on its estimated Remaining Useful Life (RUL), the complete system will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The boilers appear to be in poor condition. Based on their estimated Remaining Useful Life (RUL), the boilers will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The ventilation systems are in poor condition. Based on its estimated Remaining Useful Life (RUL), the complete ventilation system will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.

## 7.2. BUILDING PLUMBING AND DOMESTIC HOT WATER

The plumbing systems include the incoming water service, the cold water piping system, and the sanitary sewer and vent system. The risers and the horizontal distribution piping are threaded galvanized. The soil and vent systems are cast iron.

The water meter is located in under the southeast basement stairwell.

There are no central hot water systems. See Section 8.4. for descriptions and comments regarding the tenant unit hot water systems.

Domestic hot water is supplied by numerous under counter point of use electric water heaters located throughout the facility and one 100-gallon A.O. Smith gas water heater located in the basement mechanical room.

The restrooms have commercial-grade fixtures and accessories including water closets and lavatories.



### **Observations/Comments:**

- The plumbing systems appear to be original to the building and in poor condition. The water pressure appears to be adequate. The plumbing systems will require routine maintenance during the assessment period.
- There is no evidence that the property uses polybutylene piping for the domestic water distribution system.
- The pressure and quantity of hot water appear to be adequate.
- The water heaters appear to be in fair condition. Based on their estimated Remaining Useful Life (RUL), the water heaters will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.
- The accessories and fixtures in the restrooms are in poor condition and will require routine maintenance during the assessment period.

## 7.3. BUILDING GAS DISTRIBUTION

Gas service is supplied from the gas main on the adjacent public street. The gas meter and regulator is located along the exterior wall of the building. The gas distribution piping within the building is malleable steel (black iron).

### **Observations/Comments:**

- The pressure and quantity of gas appear to be adequate.
- The gas meter and regulator appear to be in good condition and will require routine maintenance during the assessment period.
- Only limited observation of the gas distribution piping can be made due to hidden conditions. The gas piping appears to be in good condition.

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**7.4. BUILDING ELECTRICAL**

The electrical supply lines run underground to a pad-mounted transformer, which feed interior-mounted electrical meters.

The main electrical service size is 800 amps, 120/208 volt three-phase four-wire alternating current (AC). The electrical wiring is copper, installed in metallic conduit. Circuit breaker panels are located throughout the building.

A natural gas-powered 37.5 KVA emergency electrical generator is located in the basement mechanical room. The generator provides back-up power for elements of the fire and life safety systems.

**Observations/Comments:**

- The on site electrical systems up to the meter are owned and maintained by the respective utility company.
- The electrical service and capacity are adequate for the property's demands.
- The switchgear, circuit breaker panels, and electrical meters appear to be in good condition and will require routine maintenance during the assessment period.
- The generator is in fair condition and is reportedly tested on a weekly basis. Based on the estimated Remaining Useful Life (RUL), the generator will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Report.

**7.5. BUILDING ELEVATORS AND CONVEYING SYSTEMS**

Not applicable. There are no elevators or conveying systems.

**7.6. FIRE PROTECTION AND SECURITY SYSTEMS**

The fire protection system consists of a wet-pipe sprinkler system, a wet standpipe with fire department hose valves and connections, portable fire extinguishers, smoke detectors, pull stations, and alarm horns. Siamese connections are located on the exterior of the buildings. Hard-wired smoke detectors are located throughout the building. The nearest fire hydrants are located along the public streets bordering the property.

Common areas and corridors are equipped with battery back-up exit lights, illuminated exit signs, pull stations, alarm horns, and strobe light alarms.

Fire sprinkler risers are located under the southeast stairwell. The system is equipped with a back flow preventer.



A central fire alarm panel is located in the main entry and monitors the pull stations, smoke detectors, and flow switches. The alarm panel also sounds the alarm and automatically notifies the monitoring service or the fire department in the event of trouble.

Interior fire exit stairwells are accessed from the common area corridors. The walls of the fire stairwells are exposed masonry. The stairs discharge at the ground floor and directly to the exterior of the building.

**Observations/Comments:**

- Information regarding fire department inspection information is included in Section 3.1. .
- The fire sprinklers appear to be in good condition and are inspected by a qualified contractor on a routine basis. The fire sprinklers will require routine maintenance during the assessment period.
- The fire extinguishers are serviced annually and appear to be in good condition. The fire extinguishers were serviced and inspected within the last year.
- The pull stations and alarm horns appear to be in good condition and will require routine maintenance during the assessment period.
- Smoke detector replacement is considered to be routine maintenance.
- Exit sign and emergency light replacement is considered to be routine maintenance.
- The central alarm panel appears to be in good condition and is serviced regularly by a qualified fire equipment contractor. Equipment testing is not within the scope of a Facility Condition Assessment.
- The dry chemical extinguishing systems appear to be in good condition and are serviced regularly by a qualified fire equipment contractor. The exit stairwells appear to be constructed in accordance with applicable codes in force at the time of construction.
- The stairwell doors and door hardware are fire-rated. Components bearing certification labels are displayed on the doors.

## 8. INTERIOR SPACES

### 8.1. INTERIOR FINISHES

The following table generally describes the interior finishes in tenant units:

| Typical Tenant Unit Finishes         |                       |                                   |  |
|--------------------------------------|-----------------------|-----------------------------------|--|
| Room                                 | Floor                 | Walls                             | Ceiling  |
| Dressing room                        | Carpet and Vinyl tile | Painted drywall and painted brick | Painted drywall  |
| Dressing room restrooms              | Ceramic tile          | Ceramic tile                      | Painted drywall  |
| Generator annex                      | Vinyl tile            | Painted drywall and brick         | Painted wood   |
| Burlington City Arts                 | Vinyl tile            | Painted drywall and painted brick | Suspended T-bar system with acoustical tiles and painted drywall |
| 242 Main Club                        | Painted concrete      | Painted brick                     | Painted wood   |
| Burlington Telecom and storage areas | Vinyl tile            | Painted drywall and painted brick | Suspended T-bar system with acoustical tiles                     |
| Offices                              | Wood                  | Painted drywall and brick         | Painted wood   |

The interior doors are painted and stained hollow-core wood doors set in metal frames. The interior doors have cylindrical locksets with push/pull hardware handle hardware.

The doors to the auditorium are oversized stained wooden doors set in wood frames. The uppers portion of the doors has glazing insets. The doors have cylindrical locksets with push/pull hardware handle hardware.

The service doors are painted metal doors set in metal frames. The doors have cylindrical locksets with push/pull hardware handle hardware.



#### Observations/Comments:

- The interior doors and door hardware are in fair condition and will require routine maintenance during the assessment period.
- The doors to the auditorium are in fair condition and will require refinishing during the assessment period. The cost of this work is included in the Replacement Reserves Report.

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**8.2. COMMERCIAL KITCHEN EQUIPMENT**

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Not applicable. No kitchen exists

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**8.3. HVAC**

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Not applicable. See Section 7.1. for descriptions and comments regarding the HVAC systems.

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**8.4. PLUMBING**

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Not applicable. See Section 7.2. for descriptions and comments regarding the building plumbing systems.

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**8.5. ELECTRICAL**

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Not applicable. See Section 7.4. for descriptions and comments regarding the building electrical systems.

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## **9. OTHER STRUCTURES**

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Not applicable. There are no major accessory structures.

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## **10. ENERGY AUDIT - PURPOSE AND SCOPE**

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The purpose of this Energy Audit is to provide the City of Burlington with a baseline of energy usage, the relative energy efficiency of the facility, and specific recommendations for Energy Conservation Measures. Information obtained from these analyses may be used to support a future application to an Energy Conservation Program, Federal and Utility grants towards energy conservation, as well as support performance contracting.

The approach taken in this energy audit began with a benchmarking analysis of the building and associated building systems by:

- 1) Developing an energy baseline that becomes the basis for the energy savings plan and cost savings plan.
- 2) Gathering utility data for each building and benchmarking against models by square footage, by facility use and type of structure.

The energy audit consisted of an on site visual assessment to determine current conditions, itemize the energy consuming equipment (i.e. Boilers, split system cooling, DHW equipment); review lighting systems both exterior and interior; and review efficiency of all such equipment. The study also included interviews and consultation with operational and maintenance personnel.

## 11. FACILITY OVERVIEW AND EXISTING CONDITIONS

### 11.1. BUILDING OCCUPANCY

Typically, 40 – 2,500 people occupy the facility during normal operating hours. After hours occupants include approximately 10 people.

|                                      |    |
|--------------------------------------|----|
| Facility Occupancy (avg. people/day) | 60 |
| Standard Operating Hours/day         | 11 |
| Maintenance/ Staff Hours/day         | 11 |

#### Summary of Facility Operating Hours

|               | Hours Open to the Public | Hours Open to Employees |
|---------------|--------------------------|-------------------------|
| Monday-Friday | 8am-5pm                  | 7am-6pm                 |
| Saturday      | 8am-5pm                  | 7am-6pm                 |
| Sunday        | 8am-5pm                  | 7am-6pm                 |

### 11.2. BUILDING ENVELOPE

The building envelope consists of the exterior shell, made up of the walls, windows, roof, and floor. The envelope provides building integrity and separates the exterior from the interior conditioned space.

#### Foundation:

Based on structures of similar size, configuration, and geographic location, it is assumed that the foundations consist of cast-in-place concrete perimeter wall footings with concrete foundation walls. The foundation systems include reinforced concrete column pads.

#### Structure:

The building has structural steel columns, which support the upper floor and roof diaphragms. The upper floors have wooden plank decks and are supported by steel beams and wood beams. The roof is constructed of metal decks, which are supported by steel beams and open web steel joists.

**Exterior Walls:**

The exterior walls are finished with brick and stone masonry veneer.

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.

**Roof:**

The primary roof is classified as flat roof. The roof is finished with a mineral-surfaced cap sheet over a multi-ply bituminous built-up membrane. The roof is insulated with rigid insulation boards.

The exterior perimeter walls extend above the surface of the roof, creating parapet walls. The roof membrane turns up the sides of the parapet walls and terminates at sheet metal copings.

Storm water is drained from the roofs by internal drains.

**Windows:**

The windows are steel-framed, single-glazed hopper units.

**Doors:**

The main entrance doors are metal framed doors with single glazing security glass insets. The doors have cylindrical locksets with push/pull handle hardware.

The tenant unit entrance doors are aluminum framed glazed store front style units set in metal frames. The tenant entrance doors have cylindrical locksets with lever handle hardware and keyed deadbolts.

The service doors are painted metal doors set in metal frames. The doors have cylindrical locksets with push/pull handle hardware.

A total of two overhead doors are located on the north side of the building. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers.

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**11.3. BUILDING HEATING, VENTILATION AND AIR-CONDITIONING (HVAC)**

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**Heating:**

The facility is heated by central natural gas-fired steam boilers. The boilers have a rated input capacity of 3,011 MBH each and are located in the basement mechanical room.

**Cooling:**

The facility doesn't have central cooling system. Numerous areas utilize individual window air-conditioning units for space cooling.

**Air Distribution:**

Steam piping provides heating to each temperature-controlled space by a steam supply and condensate return distribution system. The steam piping supplies the radiators, baseboard heaters, and unit heaters throughout the facility.

**Space Ventilation:**

The restrooms, shower rooms, and other areas are ventilated by mechanical exhaust fans. Large capacity ventilation fans are mounted on the roof and sidewall and are connected by concealed ducts to each ventilated space.

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**11.4. BUILDING LIGHTING**

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**Space Lighting:**

Due to the age and type of building it has a mix of lighting types. Most office, storage, restroom, and corridor areas still utilize the original incandescent fixtures, while a few of the larger areas have been upgraded at some point to florescent. The recently updated lower level technology area utilizes metal halide and the gymnasium area utilizes a combination of metal halide and florescent. The stage area utilizes specialty performance lighting typically associated with stage performances.

**Lighting Controls:**

The facility doesn't have any automatic lighting controls on internal light fixtures.

**Exterior Lighting:**

Utility-owned metal light poles provide site lighting. The poles are spaced along the drive aisles throughout the parking areas.

Surface-mounted light fixtures on the exterior walls provide the exterior building with site illumination.

Exterior lighting remains on from dusk to dawn.

**Emergency Lighting:**

The building emergency light fixtures and "EXIT" fixtures are continuously energized. In the event of a power failure, the emergency battery in each fixture will be activated to power these fixtures.

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**11.5. BUILDING ELEVATORS AND CONVEYING SYSTEMS**

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Not applicable. There are no elevators or conveying systems.

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**11.6. BUILDING DOMESTIC WATER**

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The water meter is located in a vault adjacent to the public streets.

Domestic hot water is supplied by numerous under counter point of use electric water heaters located throughout the facility and one 100-gallon A.O. Smith gas water heater located in the basement mechanical room.

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**11.7. BUILDING NATURAL GAS AND ELECTRICITY**

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**Natural Gas:**

The building is connected to the natural gas utility (Vermont Gas). The gas main on the adjacent public street supplies the natural gas service. The gas meter and regulator are located along the exterior walls of the buildings. The gas distribution piping within the building is malleable steel (black iron).

The property has only one gas meter.

**Electricity:**

The main electrical service size is 800 amps, 208/120-volt, three-phase, four-wire alternating current (AC). The electrical wiring is copper, installed in metallic conduit. Circuit breaker panels are located throughout the building.

The facility is individually metered for electricity. There are a total of two electric meters at the property.

**Emergency Electricity Generator:**

A natural gas-engine-driven 37.5 kVA emergency electrical generator is located in the basement mechanical room. The generator provides back-up power for elements of the fire and life safety systems.

## 12. ENERGY CONSERVATION MEASURES

EMG has identified 6 Energy Conservation Measures (ECMs) for this property.

| List of Recommended Energy Conservation Measures For Memorial Auditorium |  |                              |                                 |              |                                |                        |                              |                                     |                |        |                    |                            |
|--|--|------------------------------|---------------------------------|--------------|--------------------------------|------------------------|------------------------------|-------------------------------------|----------------|--------|--------------------|----------------------------|
| ECM #  | Description of ECM   | Projected Initial Investment | Estimated Annual Energy Savings |              | Estimated Annual Water Savings | Estimated Cost Savings | Estimated Annual O&M Savings | Total Estimated Annual Cost Savings | Simple Payback | S.I.R. | Life Cycle Savings | Expected Useful Life (EUL) |
|  |  |                              | Natural Gas                     | Electricity  |                                |                        |                              |                                     |                |        |                    |                            |
|  |  | \$                           | Therms                          | kWh          | kgal                           | \$                     | \$                           | \$                                  | Years          |        | \$                 | Years                      |
| <b>No/Low Cost Recommendations</b>                                       |  |                              |                                 |              |                                |                        |                              |                                     |                |        |                    |                            |
| 1  | Replace Existing Refrigerator(s) With Energy Star Certified Refrigerator(s)<br>Details: In The Kitchen Area              | \$1,222                      | 0                               | 1,641        | 0                              | \$307                  | \$0                          | \$307                               | 3.98           | 3.00   | \$2,448            | 15                         |
| <b>Totals for No/Low Cost Items</b>                                      |  | <b>\$1,222</b>               | <b>0</b>                        | <b>1,641</b> | <b>0</b>                       | <b>\$307</b>           | <b>\$0</b>                   | <b>\$307</b>                        | <b>3.98</b>    |        |                    |                            |
| <b>Capital Cost Recommendations</b>                                      |  |                              |                                 |              |                                |                        |                              |                                     |                |        |                    |                            |
| 1  | Control External Air Leakage In Commercial Buildings<br>Details: Replace Weather Stripping                               | \$2,238                      | 2,651                           | 0            | 0                              | \$2,690                | \$135                        | \$2,825                             | 0.79           | 10.76  | \$21,856           | 10                         |
| 2  | Replace Inefficient Heating Plant<br>Details: Replace Cast Iron Boilers With Condensing Boilers                          | \$12,386                     | 12,086                          | 0            | 0                              | \$12,264               | \$368                        | \$12,632                            | 0.98           | 17.76  | \$207,574          | 25                         |
| 3  | Replace External Windows<br>Details: Replace Single Pane Windows With Energy Efficient Double-Pane, Throughout           | \$36,300                     | 9,042                           | 0            | 0                              | \$9,176                | \$92                         | \$9,267                             | 3.92           | 5.00   | \$145,342          | 30                         |
| 4  | Install Thermostatic Radiator Valve (TRV) controls for Steam/Hot Water Radiators<br>Details: For Better Response At Unit | \$12,500                     | 1,764                           | 0            | 0                              | \$1,790                | \$0                          | \$1,790                             | 6.98           | 1.71   | \$8,864            | 15                         |
| 5  | Replace Defective Steam Traps<br>Details: Increase System Efficiency   | \$24,100                     | 2,671                           | 0            | 0                              | \$2,711                | \$0                          | \$2,711                             | 8.89           | 1.34   | \$8,260            | 15                         |
| <b>Total For Capital Cost</b>  |  | <b>\$87,525</b>              | <b>28,214</b>                   | <b>0</b>     | <b>0</b>                       | <b>\$28,630</b>        | <b>\$594</b>                 | <b>\$29,224</b>                     | <b>2.99</b>    |        |                    |                            |
|  | Interactive Savings Discount @ 10%   |                              | -2,821                          | -164         | 0                              | -\$2,894               | -\$59                        | -\$2,953                            |                |        |                    |                            |
|  | Total Contingency Expenses @ 15%   | \$13,312                     |                                 |              |                                |                        |                              |                                     |                |        |                    |                            |
| <b>Total for Improvements</b>  |  | <b>\$102,059</b>             | <b>25,392</b>                   | <b>1,477</b> | <b>0</b>                       | <b>\$26,044</b>        | <b>\$535</b>                 | <b>\$26,578</b>                     | <b>3.84</b>    |        |                    |                            |

## 13. UTILITY ANALYSIS

Establishing the energy baseline begins with an analysis of the utility cost and consumption of the building. Utilizing the historical energy data and local weather information, we evaluate the existing utility consumption and assign it to the various end-uses throughout the buildings. The Historical Data Analysis breaks down utilities by consumption, cost and annual profile.

This data is analyzed, using standard engineering assumptions and practices. The analysis serves the following functions:

- Allows our engineers to benchmark the energy and water consumption of the facilities against consumption of efficient buildings of similar construction, use and occupancy.
- Generates the historical and current unit costs for energy and water
- Provides an indication of how well changes in energy consumption correlate to changes in weather.
- Reveals potential opportunities for energy consumption and/or cost reduction. For example, the analysis may indicate that there is excessive, simultaneous heating and cooling, which may mean that there is an opportunity to improve the control of the heating and cooling systems.

By performing this analysis and leveraging our experience, our engineers prioritize buildings and pinpoint systems for additional investigation during the site visit, thereby maximizing the benefit of their time spent on site and minimizing time and effort by the customer's personnel.

Based upon the utility information provided about the Memorial Auditorium, the following energy rates are utilized in determining existing and proposed energy costs.

### Utility Rates used for Cost Analysis

| Electricity<br>(Blended Rate) | Natural Gas   | Water / Sewer |
|-------------------------------|---------------|---------------|
| \$0.19/kWh                    | \$1.01 /therm | \$6.58/kGal   |

The data analyzed provides the following information: 1) breakdown of utilities by consumption, 2) cost and annual profile, 3) baseline consumption in terms of energy/utility at the facility, 4) the Energy Use Index, or Btu/sq ft, and cost/sq ft.

**FACILITY CONDITION ASSESSMENT**

&amp; LEVEL I ENERGY AUDIT

**110266.14R-009.294****13.1. ELECTRICITY**

Burlington Electric satisfies the electricity requirements of the facility.

**Electricity Consumption and Cost Data**

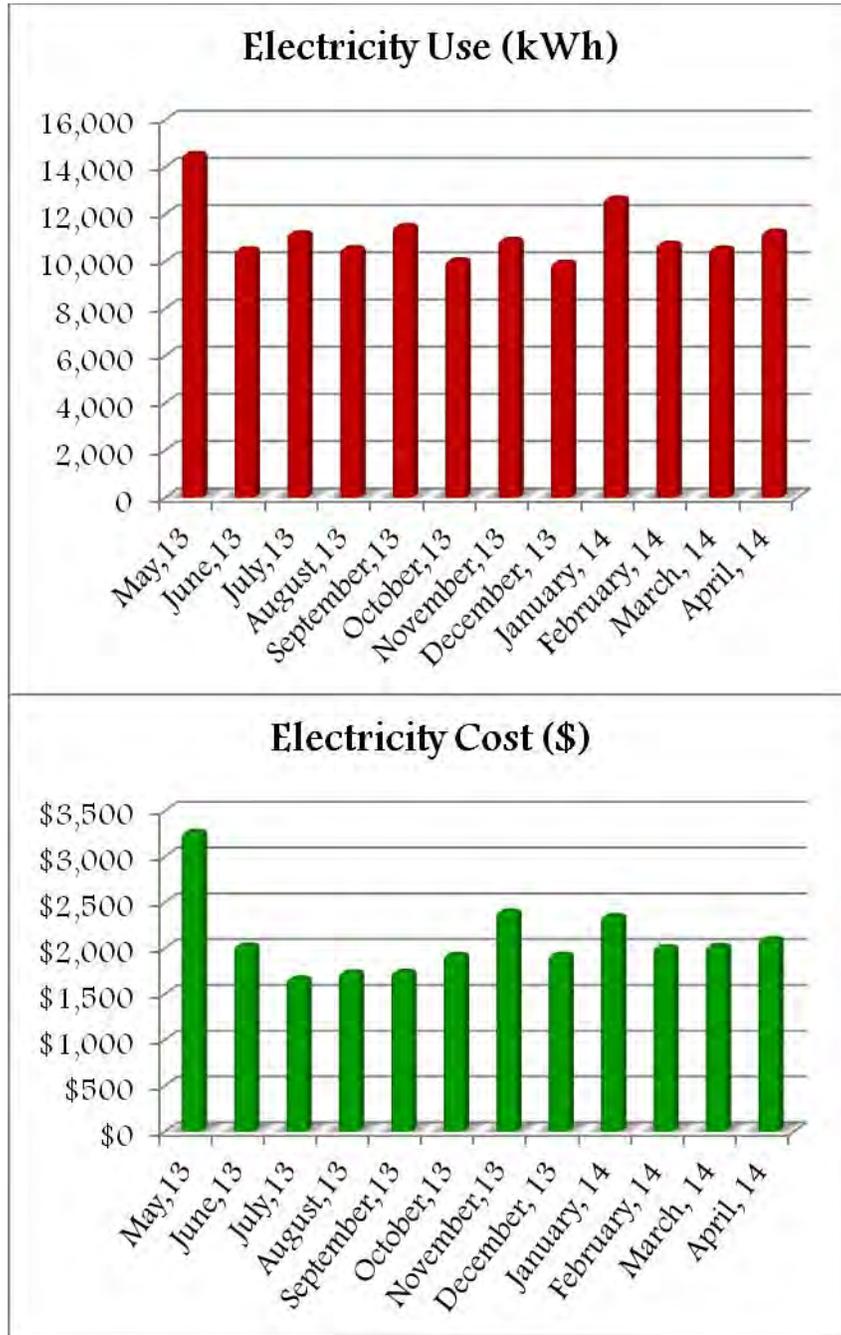
Based on the 2013 electric usage and costs, the average price paid during the year was \$0.19 per kWh. The total annual electricity consumption for the 12-month period analyzed is 134,524 for a total cost of \$25,200

| Billing Month | Consumption (kWh) | Unit Cost/kWh | Total Cost      |
|---------------|-------------------|---------------|-----------------|
| May,13        | 14,560            | \$0.22        | \$3,271         |
| June,13       | 10,520            | \$0.19        | \$2,031         |
| July,13       | 11,200            | \$0.15        | \$1,669         |
| August,13     | 10,565            | \$0.16        | \$1,738         |
| September,13  | 11,506            | \$0.15        | \$1,742         |
| October,13    | 10,051            | \$0.19        | \$1,928         |
| November,13   | 10,922            | \$0.22        | \$2,401         |
| December, 13  | 9,953             | \$0.19        | \$1,930         |
| January, 14   | 12,671            | \$0.19        | \$2,353         |
| February, 14  | 10,755            | \$0.19        | \$2,013         |
| March, 14     | 10,550            | \$0.19        | \$2,026         |
| April, 14     | 11,271            | \$0.19        | \$2,098         |
| <b>Total</b>  | <b>134,524</b>    | <b>\$0.19</b> | <b>\$25,200</b> |

# FACILITY CONDITION ASSESSMENT

& LEVEL I ENERGY AUDIT

110266.14R-009.294



## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

**13.2. NATURAL GAS**

Vermont Gas satisfies the natural gas requirements of the facility are satisfied by.

**Natural Gas Consumption and Cost Data**

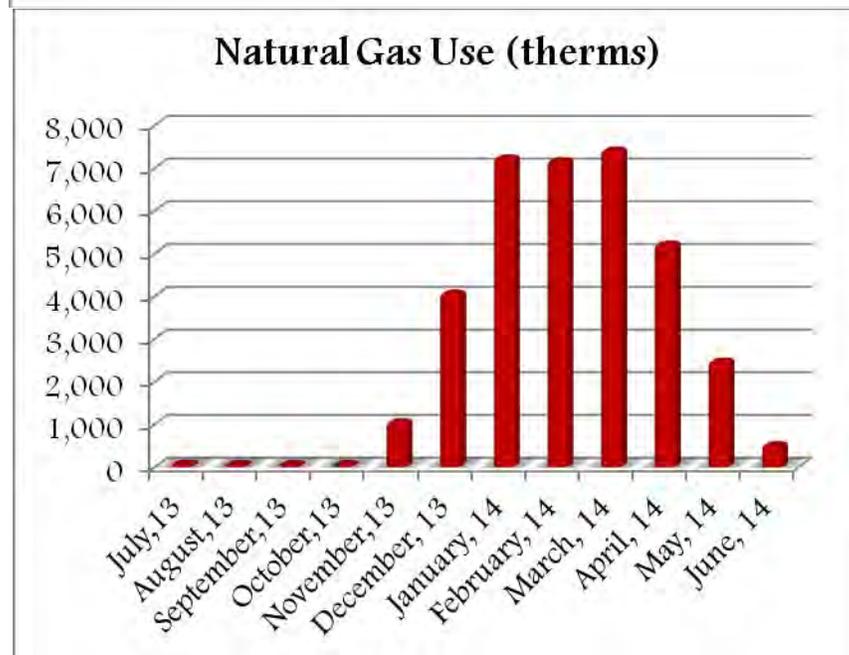
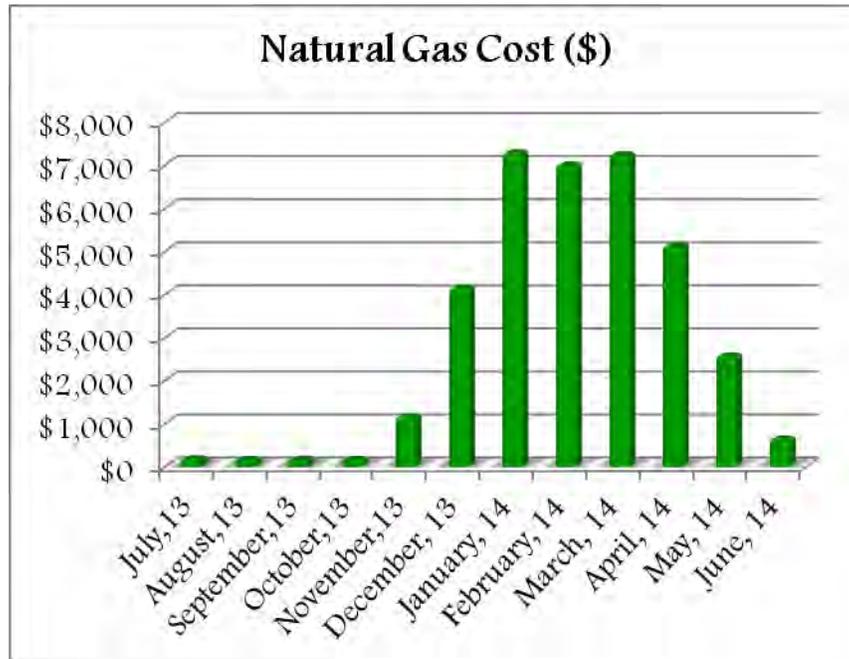
Based on the 2013 natural gas usage and costs, the average price paid during the year was \$1.01 per therm. The total annual natural gas consumption for the 12-month period analyzed is 35,512 for a total cost of \$36,035.

| Billing Month | Consumption (Therms) | Unit Cost/Therm | Total Cost      |
|---------------|----------------------|-----------------|-----------------|
| July,13       | 77                   | \$2.57          | \$198           |
| August,13     | 64                   | \$2.80          | \$179           |
| September,13  | 59                   | \$3.12          | \$184           |
| October,13    | 60                   | \$2.97          | \$178           |
| November,13   | 1,068                | \$1.10          | \$1,171         |
| December, 13  | 4,080                | \$1.02          | \$4,157         |
| January, 14   | 7,244                | \$1.01          | \$7,304         |
| February, 14  | 7,183                | \$0.98          | \$7,019         |
| March, 14     | 7,428                | \$0.98          | \$7,262         |
| April, 14     | 5,231                | \$0.98          | \$5,145         |
| May, 14       | 2,488                | \$1.04          | \$2,584         |
| June, 14      | 530                  | \$1.23          | \$654           |
| <b>Total</b>  | <b>35,512</b>        | <b>\$1.01</b>   | <b>\$36,035</b> |

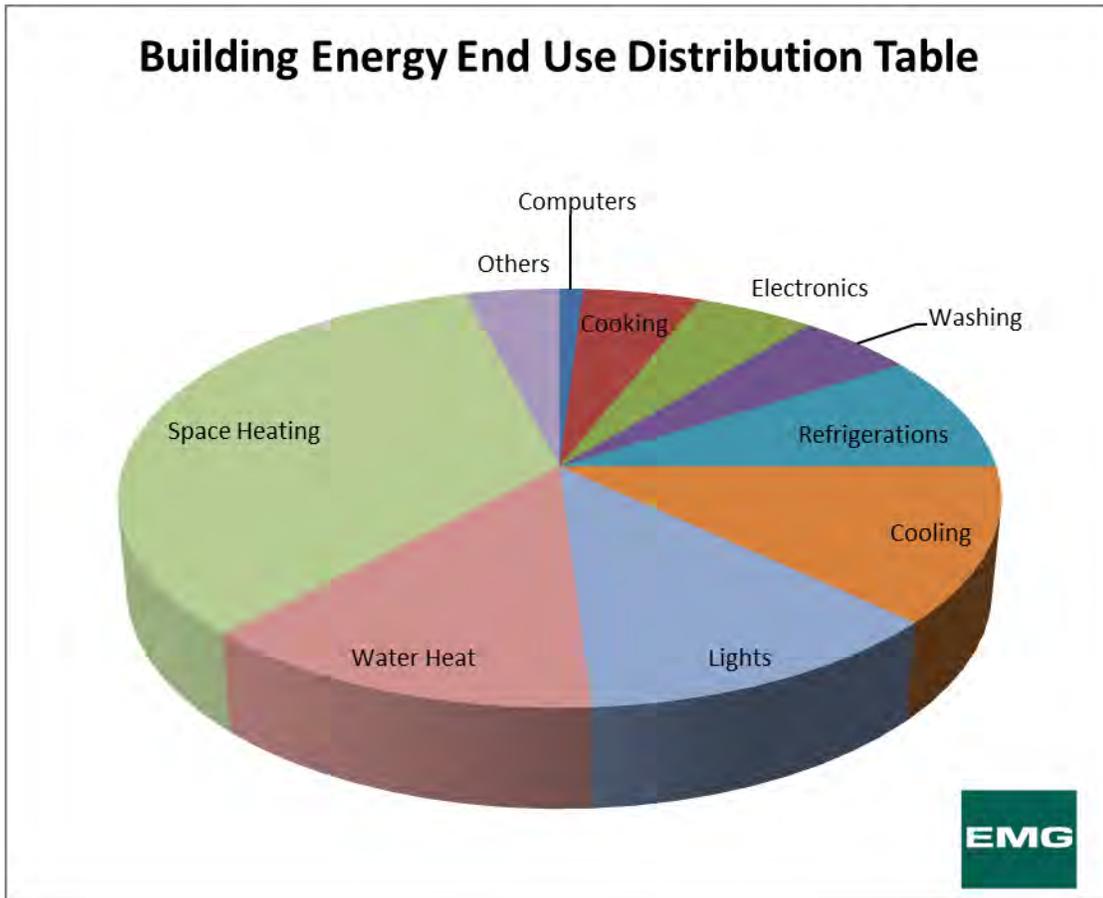
# FACILITY CONDITION ASSESSMENT

& LEVEL I ENERGY AUDIT

110266.14R-009.294



End Use Energy Distribution



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## **14. APPENDICES**

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APPENDIX A: Photographic Record

APPENDIX B: Site Plan

APPENDIX C: Supporting Documentation

APPENDIX D: EMG Abbreviated Accessibility Checklist

APPENDIX E: Pre Survey Questionnaires and Documentation Request Checklist

APPENDIX F: Terminology

APPENDIX G: Glossary of Terms-Energy Audits

APPENDIX H: Energy Conservation Measures

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**APPENDIX A:  
PHOTOGRAPHIC RECORD**

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EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #1: Natural gas meter located at the south elevation



Photo #2: Domestic water meter located under the main southeast stairwell



Photo #3: Electrical meters located in the basement mechanical room



Photo #4: 800 amp 120/208 volt 3 phase incoming electrical service located in the basement mechanical room



Photo #5: Onan 37.5 kva natural gas emergency back-up generator located in the basement mechanical room



Photo #6: H. B. Smith co. 450 mills cast iron natural gas-fired steam boilers located in the basement mechanical room



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #7: Steam heating condensate system located in the basement mechanical room



Photo #8: Typical floor mounted steam heating radiator



Photo #9: Typical wall mounted steam heating radiator



Photo #10: Typical ceiling mounted steam unit heater



Photo #11: Typical surface mounted steam radiator



Photo #12: Suspended smoke eaters located in the ceramics workshop



**EMG PHOTOGRAPHIC RECORD**

**Project No.:** 110266.14R-009.294

**Project Name:** Memorial Auditorium



Photo #13: Typical user installed window air conditioning unit



Photo #14: Typical user installed portable air conditioning unit



Photo #15: Mitsubishi split air conditioning unit located in the computer server room



Photo #16: Grade mounted air conditioner condensing unit



Photo #17: Renew aire energy recovery ventilator serving the printing workshop



Photo #18: Exhaust ductwork serving the printing workshop



**EMG PHOTOGRAPHIC RECORD**

**Project No.:** 110266.14R-009.294

**Project Name:** Memorial Auditorium



Photo #19: Typical wall mounted exhaust fan



Photo #20: Typical roof mounted exhaust fan



Photo #21: Typical roof mounted relief vent



Photo #22: Typical roof drain



Photo #23: Typical restroom vanity area



Photo #24: Typical restroom urinal area



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #25: Typical restroom toilet area



Photo #26: Typical restroom shower area



Photo #27: Typical a.o. Smith point of use under counter electric water heater



Photo #28: Typical a.o. Smith point of use 30 gallon electric water heater



Photo #29: A.o. Smith 100 gallon gas water heater located in the basement mechanical room as well as an abandoned old unit



Photo #30: Utility sink located in the ceramic workshop



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #31: Updated ada restroom located in the main building lobby



Photo #32: Incoming domestic water meter located under the southeast building stairwell



Photo #33: Incoming fire protection service located under the southeast building stairwell



Photo #34: Most recent vermont fire and building safety inspection tag #13-02042 dated february 8, 2013 stating violations exist



Photo #35: Fire department sprinkler connection located at the south east corner of the building



Photo #36: Fire alarm panels located at the main building lobby



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #37: Most recent vermont fire and building safety inspection tag #1208873 dated december 2012 stating violations exist



Photo #38: Typical fire sprinkler piping and heads



Photo #39: Typical fire alarm pull station and alarm with strobe



Photo #40: Typical restroom fire alarm with strobe



Photo #41: Typical incandescent lighting fixture



Photo #42: Typical incandescent lighting fixture



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #43: Updated metal halide lighting located in the lower level workshop



Photo #44: Updated electrical sub panel located in the lower level workshop



Photo #45: Updated electrical panels located in the computer server room



Photo #46: Computer server equipment

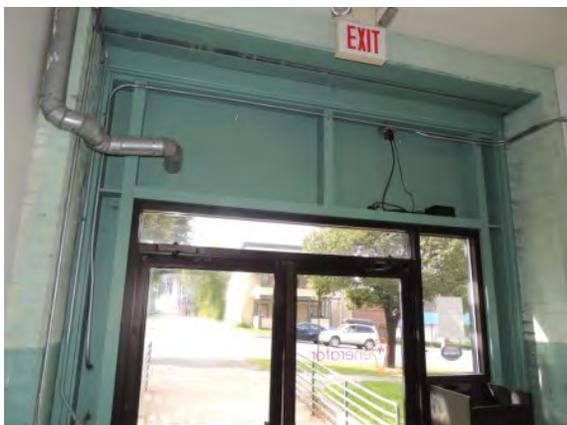


Photo #47: Typical exit sign located throughout the building

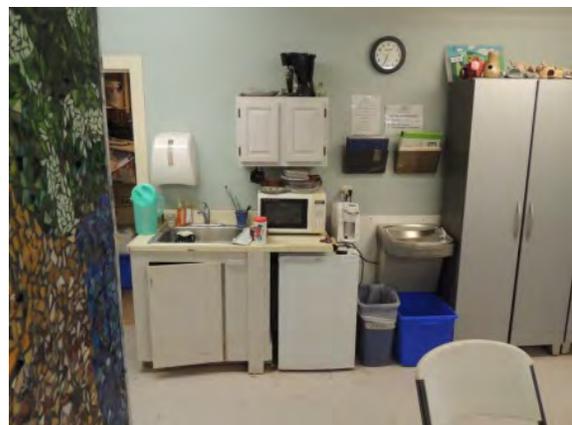


Photo #48: Kitchenette located in lower level work area



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #49: Florescent lighting typical throughout the lower level art work area



Photo #50: User installed electric ceramics drying kiln



Photo #51: Sump pump and portable humidifier located in basement mechanical room



Photo #52: Combination of metal halide and florescent lighting installed in the gymnasium assembly area

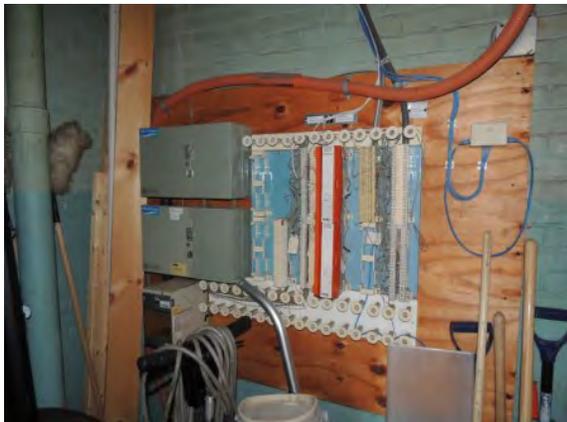


Photo #53: Communications board located in the maintenance office



Photo #54: Incandescent lighting fixture located in an office area that a paper napkin has been utilized as a lighting diffuser



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #1: East elevation



Photo #2: North elevation



Photo #3: West elevation



Photo #4: South elevation

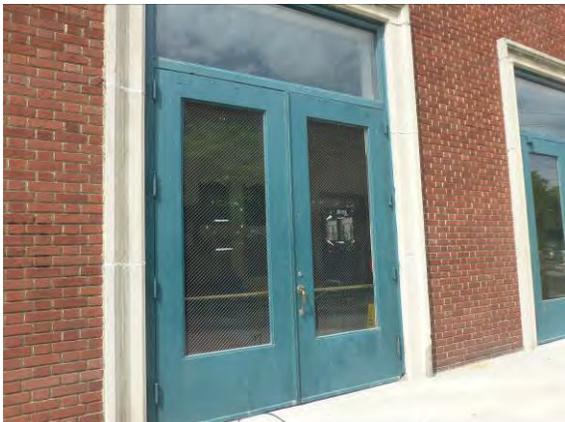


Photo #5: Exterior doors



Photo #6: Exterior doors



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #7: Exterior overhead doors



Photo #8: Exterior stairs



Photo #9: Retaining wall



Photo #10: Exterior stairs



Photo #11: Basement access hatch



Photo #12: Exterior stairs



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #13: Exterior stairs



Photo #14: Window



Photo #15: Window sill



Photo #16: Drive aisle



Photo #17: Parking area ramp

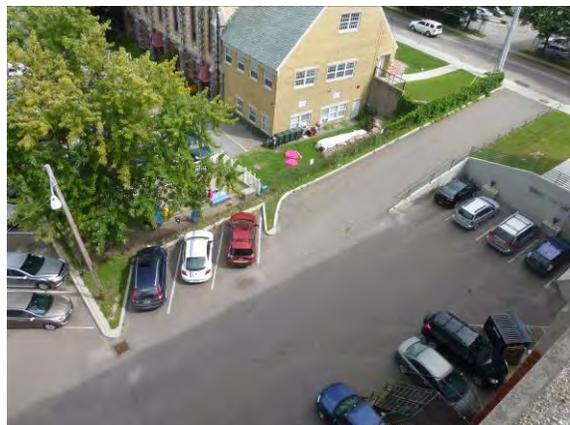


Photo #18: Parking area



**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-009.294**

**Project Name: Memorial Auditorium**



Photo #19: Sidewalk and curbing



Photo #20: Roof overview



Photo #21: Parapet wall



Photo #22: Roof access



Photo #23: Debris on roof



Photo #24: Damaged parapet wall



**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-009.294**

**Project Name: Memorial Auditorium**



Photo #25: Parapet wall detail



Photo #26: Main auditorium



Photo #27: Auditorium seating



Photo #28: Stage



Photo #29: Loft area



Photo #30: Dressing room



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #31: Performance space



Photo #32: Dressing room shower



Photo #33: Dressing room restroom



Photo #34: Dressing room restroom



Photo #35: Maintenance area



Photo #36: Work space



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #37: Restroom water closets



Photo #38: Restroom urinals



Photo #39: Restroom lavatories



Photo #40: Mechanical space



Photo #41: Artist space



Photo #42: Artist space



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #43: Artist space entrance



Photo #44: Main entrance



Photo #45: Corridor

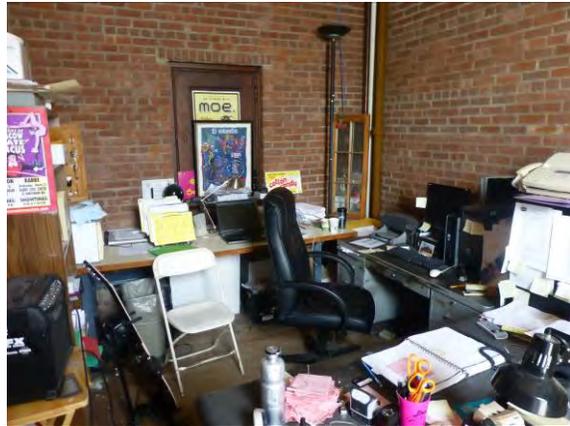


Photo #46: Office



Photo #47: Office



Photo #48: Interior stairs



**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-009.294**

**Project Name: Memorial Auditorium**



Photo #49: Interior stairs



Photo #50: Auditorium stairs



Photo #51: Interior doors



Photo #52: Interior doors



Photo #53: Overhead doors

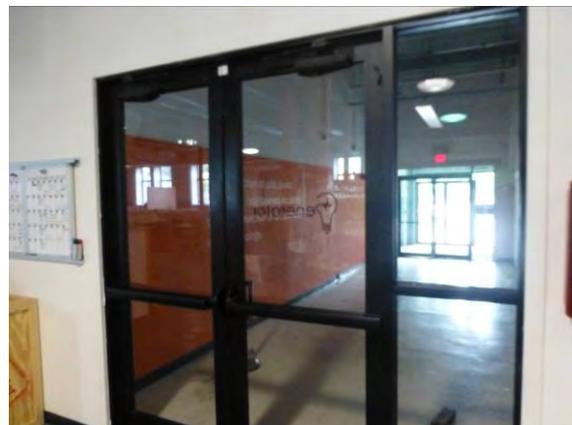


Photo #54: Interior doors



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



Photo #55: Interior doors



Photo #56: Interior doors



Photo #57: Window



Photo #58: Window detail



Photo #59: Vinyl flooring detail



Photo #60: Ceramic flooring detail



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-009.294

Project Name: Memorial Auditorium



|            |                            |
|------------|----------------------------|
| Photo #61: | Auditorium flooring detail |
|------------|----------------------------|



|            |                          |
|------------|--------------------------|
| Photo #62: | Terrazzo flooring detail |
|------------|--------------------------|



|            |                          |
|------------|--------------------------|
| Photo #63: | Concrete flooring detail |
|------------|--------------------------|



|            |                        |
|------------|------------------------|
| Photo #64: | Wooden flooring detail |
|------------|------------------------|



|            |                        |
|------------|------------------------|
| Photo #65: | Ceiling and insulation |
|------------|------------------------|



|            |             |
|------------|-------------|
| Photo #66: | Wall detail |
|------------|-------------|



**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-009.294**

**Project Name: Memorial Auditorium**



Photo #67: Interior walls



Photo #68: Interior walls and ceiling detail



Photo #69: Roof structure



Photo #70: Flooring structure



Photo #71: Ground floor structure



Photo #72: Foundation walls

**FACILITY CONDITION ASSESSMENT**

& LEVEL I ENERGY AUDIT

**110266.14R-009.294**

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**APPENDIX B:  
SITE PLAN**

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### Site Plan



Not drawn to scale. The north arrow indicator is an approximation of 0° North.

**Project Number:**  
110266.14R-009.294

**Project Name:**  
Memorial Auditorium

**On-Site Date:**  
August 28, 2014

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**APPENDIX C:  
SUPPORTING DOCUMENTATION**

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**FACILITY CONDITION ASSESSMENT**

& LEVEL I ENERGY AUDIT

110266.14R-009.294

**RECORD OF COMMUNICATION**

**Date:** August 25, 2014  
**Recorded by:** Cheyenne Irby  
**Project Name:** Memorial Auditorium  
**Project Number:** 110266.14R-009.294

**Communication with:** Sybil Thomas  
**of:** Burlington Code Enforcement Office  
**Phone:** 802.863.0442

**Communication via:**

- Telephone Conversation
- Discussions During Site Inspection
- Office Visitation/Meeting

**Re:**

Outstanding violations, Certificate of Occupancy, and other record information.

**Summary of Communication:**

See Section 2.5 for information regarding the Point of Contact



**FACILITY CONDITION ASSESSMENT**

& LEVEL I ENERGY AUDIT

110266.14R-009.294

**RECORD OF COMMUNICATION**

|  |
|--|
| <b>Date:</b> August 25, 2014<br><b>Recorded by:</b> Cheyenne Irby<br><b>Project Name:</b> Memorial Auditorium<br><b>Project Number:</b> 110266.14R-009.294 |
|--|

|  |
|--|
| <b>Communication with:</b> Nic Anderson<br><b>of:</b> Burlington Planning and Zoning Department<br><b>Phone:</b> |
|--|

**Communication via:**

|   |
|---|
| <input type="checkbox"/> Telephone Conversation<br><input type="checkbox"/> Discussions During Site Inspection<br><input checked="" type="checkbox"/> Office Visitation/Meeting |
|---|

**Re:**

Outstanding violations, Certificate of Occupancy, and other record information.

**Summary of Communication:**

|  |
|--|
| See Section 2.3 and 3.1 for information regarding the Point of Contact |
|--|



**FACILITY CONDITION ASSESSMENT**

& LEVEL I ENERGY AUDIT

110266.14R-009.294

**RECORD OF COMMUNICATION**

|  |
|--|
| <b>Date:</b> August 25, 2014<br><b>Recorded by:</b> Cheyenne Irby<br><b>Project Name:</b> Memorial Auditorium<br><b>Project Number:</b> 110266.14R-009.294 |
|--|

|  |
|--|
| <b>Communication with:</b> Meghan Sweeney<br><b>of:</b> Burlington Fire Department<br><b>Phone:</b> 802.865.5387 |
|--|

**Communication via:**

|   |
|---|
| <input type="checkbox"/> Telephone Conversation               |
| <input type="checkbox"/> Discussions During Site Inspection   |
| <input checked="" type="checkbox"/> Office Visitation/Meeting |

**Re:**

Outstanding fire code violations and inspection history

**Summary of Communication:**

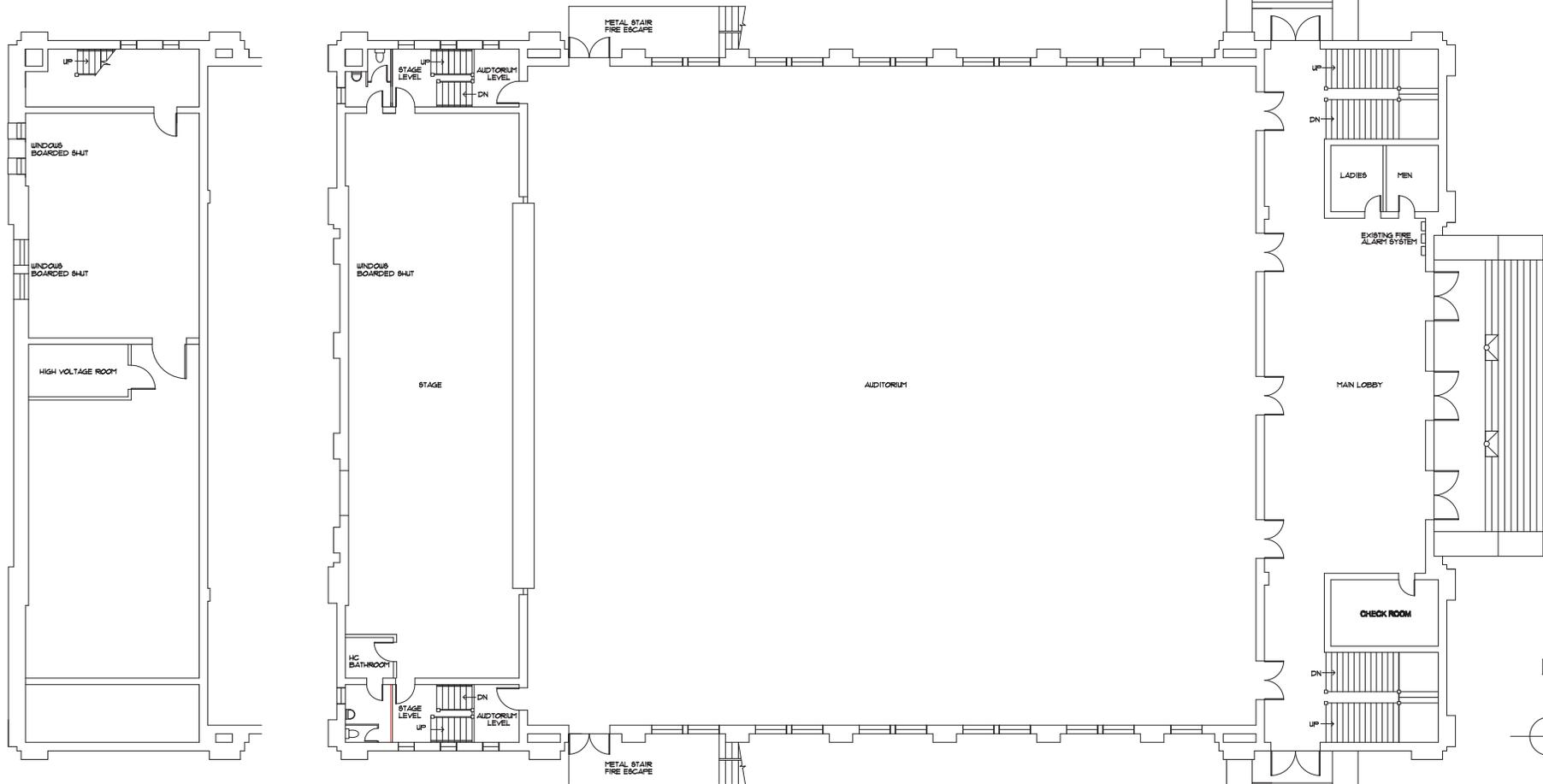
|  |
|--|
| See Section 2.3 and 3.1 for information regarding the Point of Contact |
|--|



# Flood Map



|   |   |   |
|---|---|---|
|  | <p><b>Source:</b></p> <p>FEMA Map Number: 50007C0252D<br/>Dated: July 18, 2011</p>  | <p><b>Project Number:</b></p> <p>110266.14R-009.294</p> |
|   |  <p>Not drawn to scale. The north arrow indicator is an approximation of 0° North.</p> | <p><b>Project Name:</b></p> <p>Memorial Auditorium</p>  |
|   |   | <p><b>On-Site Date:</b></p> <p>August 28, 2014</p>      |



**BASEMENT/BOILER ROOM**  
SCALE: 1/8" = 1'-0" BELOW ANNEX 4 MAINTENANCE OFFICE

**AUDITORIUM FLOOR PLAN**  
SCALE: 1/8" = 1'-0"

**NOTES:**

1. THIS PLAN IS BASED ON ORIGINAL DRAWINGS PREPARED BY FRANK LYMAN AUSTIN, ARCHITECTS DATED 11-19-26. VARIOUS RENOVATION PROJECT PLANS PROVIDED BY MEMORIAL AUDITORIUM.
2. THE BUILDING WAS FIELD CHECKED BY BUXTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED. FOR FUTURE RENOVATIONS, ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.
3. NO DEMOLITION WAS PERFORMED TO DETERMINE ALL WALL THICKNESSES - WALL THICKNESS THAT VARY FROM LOCATION TO LOCATION. WALL LOCATIONS MUST BE FIELD VERIFIED WHEN NEW RENOVATIONS EMERGE.

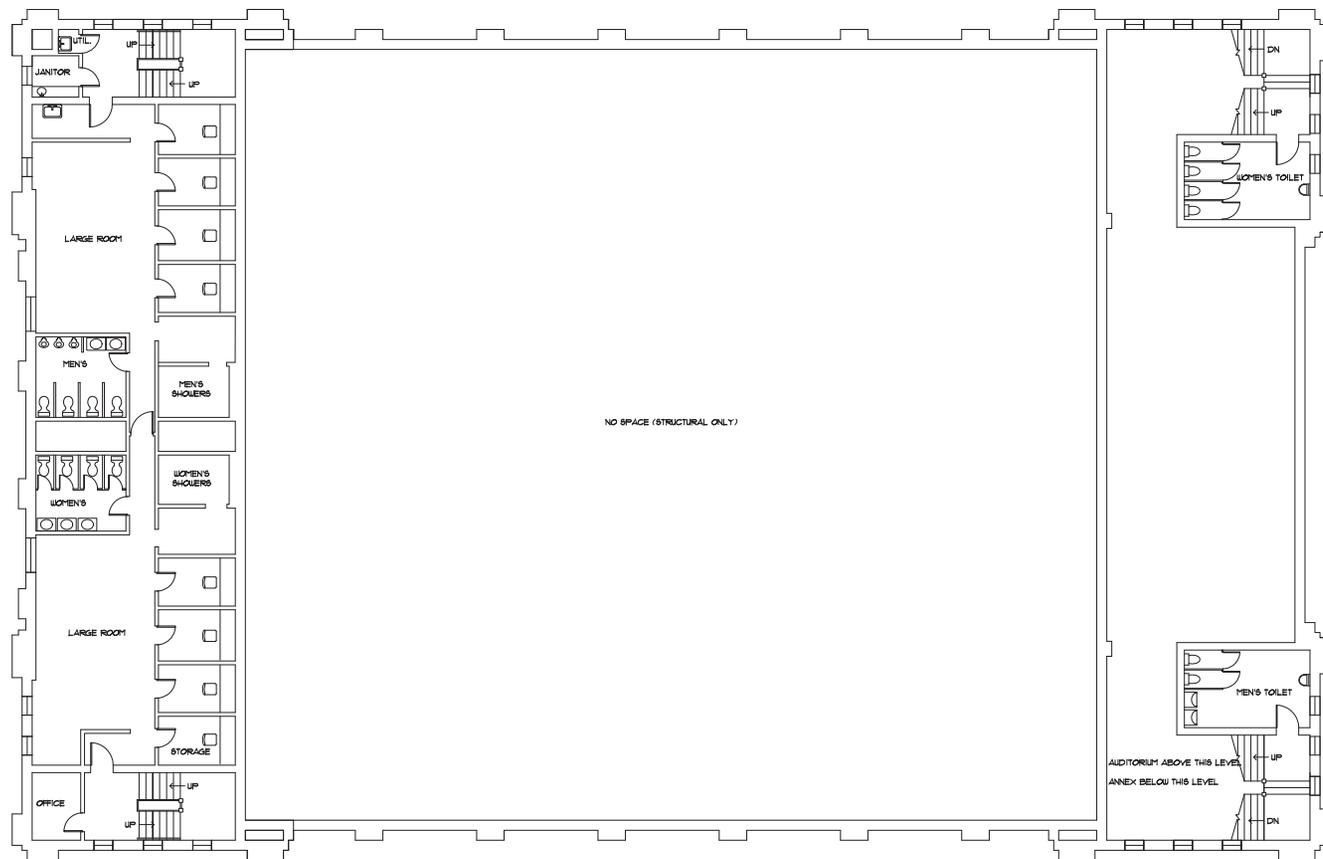
DISCLAIMER: THIS PLAN WAS FIELD CHECKED BY BUXTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED. FOR FUTURE RENOVATIONS, ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.

**CITY OF BURLINGTON**  
**DEPARTMENT OF PARKS & RECREATION**  
**BURLINGTON, VERMONT**  
(802) 658-4293

**MEMORIAL AUDITORIUM**  
**BURLINGTON, VERMONT**  
**AUDITORIUM FLOOR PLAN**

|             |              |
|-------------|--------------|
| DATE:       | JULY 2012    |
| SCALE:      | 1/8" = 1'-0" |
| DRAWN BY:   | LRB          |
| CHECKED BY: | BDS          |

**A-1**



**SECOND MEZZANINE FLOOR PLAN**

SCALE: 1/8" = 1'-0"

**NOTES:**

1. THIS PLAN IS BASED ON ORIGINAL DRAWINGS PREPARED BY FRANK LYMAN AUSTIN, ARCHITECTS DATED 11-15-26. VARIOUS RENOVATION PROJECT PLANS PROVIDED BY MEMORIAL AUDITORIUM.
2. THE BUILDING WAS FIELD CHECKED BY DUKTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED FOR FUTURE RENOVATIONS. ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.
3. NO DEMOLITION WAS PERFORMED TO DETERMINE ALL WALL THICKNESSES - WALL THICKNESSES MAY VARY FROM LOCATION TO LOCATION. WALL LOCATIONS MUST BE FIELD VERIFIED WHEN NEW RENOVATIONS EMERGE.

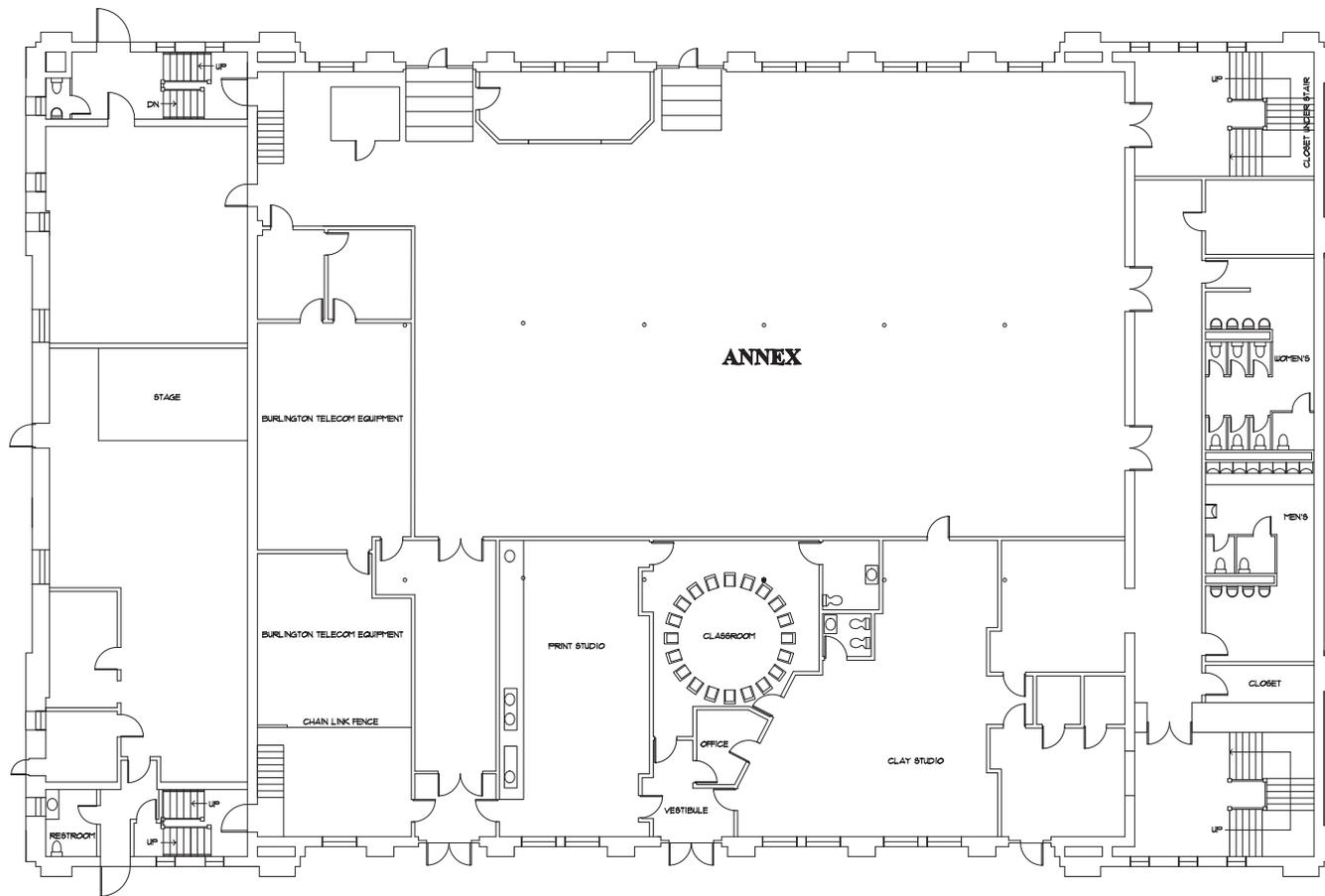
DISCLAIMER: THIS PLAN WAS PREPARED FOR THE CITY OF BURLINGTON. THE CITY OF BURLINGTON DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, OPINIONS, OR ADVICE HEREIN. THE CITY OF BURLINGTON SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LIABILITY ARISING FROM THE USE OF THIS PLAN. CHECK ALL DIMENSIONS AND DETAILS DURING ANY CONSTRUCTION PHASE.

**CITY OF BURLINGTON  
DEPARTMENT OF PARKS & RECREATION  
BURLINGTON, VERMONT**  
(802) 658-4293

**MEMORIAL AUDITORIUM  
BURLINGTON, VERMONT**  
**SECOND MEZZANINE FLOOR PLAN**

|         |              |
|---------|--------------|
| DATE    | JULY 2012    |
| SCALE   | 1/8" = 1'-0" |
| DRAWN   | LRB          |
| CHECKED | BDS          |

**A-2**



**242 MAIN STREET**  
SCALE: 1/8" = 1'-0"

**242 MAIN STREET AND ANNEX**  
SCALE: 1/8" = 1'-0"

**NOTES:**

1. THIS PLAN IS BASED ON ORIGINAL DRAWINGS PREPARED BY FRANK LYMAN AUSTIN, ARCHITECTS DATED 11-15-26. VARIOUS RENOVATION PROJECT PLANS PROVIDED BY MEMORIAL AUDITORIUM.
2. THE BUILDING WAS FIELD CHECKED BY DIXTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED FOR FUTURE RENOVATIONS. ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.
3. NO DEMOLITION WAS PERFORMED TO DETERMINE ALL WALL THICKNESSES - WALL THICKNESSES MAY VARY FROM LOCATION TO LOCATION. WALL LOCATIONS MUST BE FIELD VERIFIED WHEN NEW RENOVATIONS EMERGE.

DISCLAIMER: THIS PLAN WAS FIELD CHECKED FOR GENERAL CONFORMANCE WITH THE ORIGINAL DRAWINGS. THE ARCHITECTS DO NOT WARRANT THE ACCURACY OF THE PLAN. THE ARCHITECTS DO NOT CHECK ALL DIMENSIONS AND DETAILS DURING ANY CONSTRUCTION PHASE.

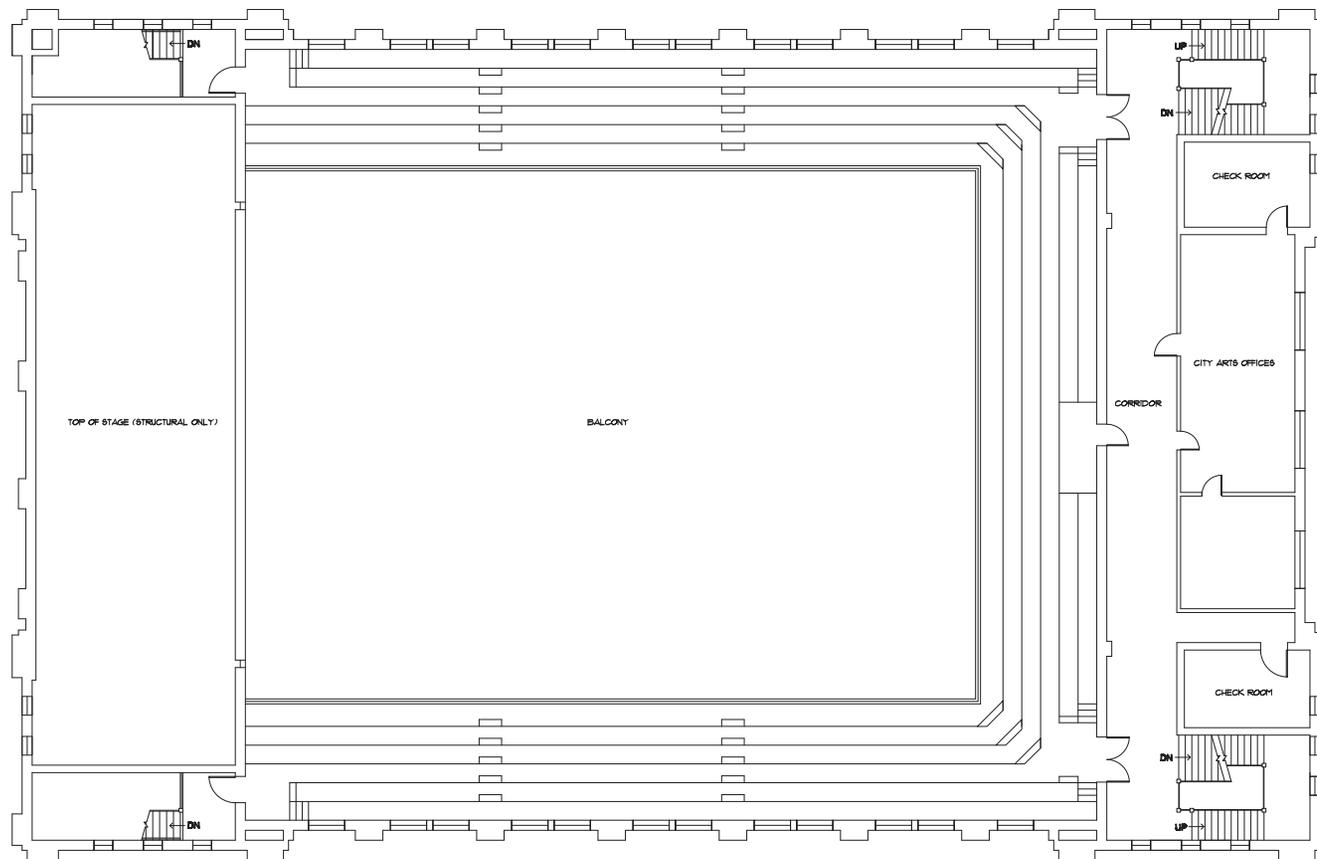
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BURLINGTON, VERMONT**  
(802) 658-4293

**MEMORIAL AUDITORIUM  
BURLINGTON, VERMONT**

**242 MAIN AND ANNEX**

|             |              |
|-------------|--------------|
| DATE:       | JULY 2012    |
| SCALE:      | 1/8" = 1'-0" |
| DRAWN BY:   | LRB          |
| CHECKED BY: | BDS          |

**A-3**



**BALCONY FLOOR PLAN**  
SCALE: 1/8" = 1'-0"



**NOTES:**

1. THIS PLAN IS BASED ON ORIGINAL DRAWINGS PREPARED BY FRANK LYMAN AUSTIN, ARCHITECTS DATED 11-15-26. VARIOUS RENOVATION PROJECT PLANS PROVIDED BY MEMORIAL AUDITORIUM.
2. THE BUILDING WAS FIELD CHECKED BY DUKTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED FOR FUTURE RENOVATIONS. ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.
3. NO DEMOLITION WAS PERFORMED TO DETERMINE ALL WALL THICKNESSES - WALL THICKNESSES THAT VARY FROM LOCATION TO LOCATION. WALL LOCATIONS MUST BE FIELD VERIFIED WHEN NEW RENOVATIONS EMERGE.

DECLARER: THIS PLAN WAS FIELD CHECKED BY DUKTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED FOR FUTURE RENOVATIONS. ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.

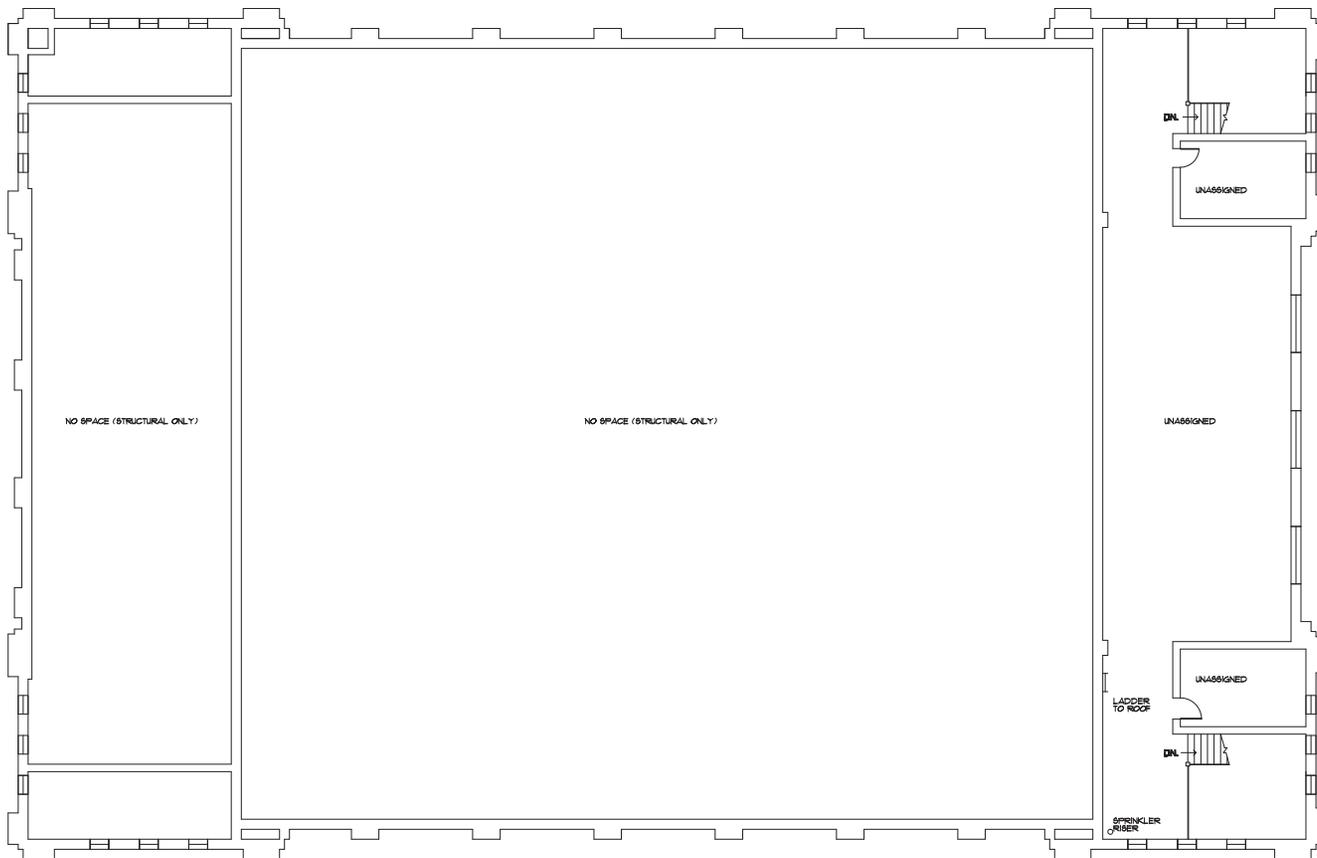
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BURLINGTON, VERMONT**  
(802) 658-4293

**MEMORIAL AUDITORIUM  
BURLINGTON, VERMONT**

**BALCONY FLOOR PLAN**

|         |              |
|---------|--------------|
| DATE    | JULY 2012    |
| SCALE   | 1/8" = 1'-0" |
| DRAWN   | LRB          |
| CHECKED | BDS          |

**A-4**



**THIRD FLOOR PLAN**  
SCALE: 1/8" = 1'-0"



**NOTES:**

1. THIS PLAN IS BASED ON ORIGINAL DRAWINGS PREPARED BY FRANK LYMAN AUSTIN, ARCHITECTS DATED 11-15-26. VARIOUS RENOVATION PROJECT PLANS PROVIDED BY MEMORIAL AUDITORIUM.
2. THE BUILDING WAS FIELD CHECKED BY BUXTON DRAFTING SERVICES IN JULY, 2012. THE PLANS WERE THEN MODIFIED TO REFLECT FIELD MEASUREMENTS. THE ENTIRE BUILDING WAS NOT MEASURED FOR FUTURE RENOVATIONS. ACTUAL DIMENSIONS MUST BE FIELD VERIFIED.
3. NO DEMOLITION WAS PERFORMED TO DETERMINE ALL WALL THICKNESSES - WALL THICKNESSES THAT VARY FROM LOCATION TO LOCATION. WALL LOCATIONS MUST BE FIELD VERIFIED WHEN NEW RENOVATIONS EMERGE.

DISCLAIMER: THESE PLANS HAVE BEEN PREPARED BY AN ARCHITECT AND SHOULD BE USED AS A GUIDE ONLY. THE USER SHOULD CHECK ALL DIMENSIONS AND DETAILS DURING ANY CONSTRUCTION PHASE.

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**MEMORIAL AUDITORIUM  
BURLINGTON, VERMONT**  
**THIRD FLOOR PLAN**

|         |              |
|---------|--------------|
| DATE    | JULY 2012    |
| SCALE   | 1/8" = 1'-0" |
| DRAWN   | LRB          |
| CHECKED | BDS          |

**A-5**

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**APPENDIX D:  
EMG ABBREVIATED ACCESSIBILITY CHECKLIST**

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## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

Property Name: Memorial AuditoriumDate: 8/28/2014 and 8/29/2014Project Number: 110266.14R-009.294

| EMG Abbreviated Accessibility Checklist |  |     |    |     |          |
|---|--|-----|----|-----|----------|
|   | Building History   | Yes | No | N/A | Comments |
| 1.                                      | Has the management previously completed an ADA review?   |     | ✓  |     |          |
| 2.                                      | Have any ADA improvements been made to the property?   | ✓   |    |     |          |
| 3.                                      | Does a Barrier Removal Plan exist for the property?  |     | ✓  |     |          |
| 4.                                      | Has the Barrier Removal Plan been reviewed/approved by an arms-length third party such as an engineering firm, architectural firm, building department, other agencies, etc.?  |     | ✓  |     |          |
| 5.                                      | Has building ownership or management received any ADA related complaints that have not been resolved?  |     |    | ✓   |          |
| 6.                                      | Is any litigation pending related to ADA issues?   |     |    | ✓   |          |
|   | Parking  | Yes | No | N/A | Comments |
| 1.                                      | Are there sufficient parking spaces with respect to the total number of reported spaces?   |     |    | ✓   |          |
| 2.                                      | Are there sufficient van-accessible parking spaces available (96" wide/ 96" aisle for van)?  |     |    | ✓   |          |
| 3.                                      | Are accessible spaces marked with the International Symbol of Accessibility? Are there signs reading "Van Accessible" at van spaces?   |     |    | ✓   |          |
| 4.                                      | Is there at least one accessible route provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, if provided, and public streets and sidewalks? |     |    | ✓   |          |
| 5.                                      | Do curbs on the accessible route have depressed, ramped curb cuts at drives, paths, and drop-offs?   |     |    | ✓   |          |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| EMG Abbreviated Accessibility Checklist |   |     |    |     |          |
|---|---|-----|----|-----|----------|
| Parking (cont.)                         |   | Yes | No | N/A | Comments |
| 6.                                      | Does signage exist directing you to accessible parking and an accessible building entrance?   |     |    | ✓   |          |
| Ramps                                   |   | Yes | No | N/A | Comments |
| 1.                                      | If there is a ramp from parking to an accessible building entrance, does it meet slope requirements? (1:12)                                     |     |    | ✓   |          |
| 2.                                      | Are ramps longer than 6 ft complete with railings on both sides?  |     |    | ✓   |          |
| 3.                                      | Is the width between railings at least 36 inches?   |     |    | ✓   |          |
| 4.                                      | Is there a level landing for every 30 ft horizontal length of ramp, at the top and at the bottom of ramps and switchbacks?                      |     |    | ✓   |          |
| Entrances/Exits                         |   | Yes | No | N/A | Comments |
| 1.                                      | Is the main accessible entrance doorway at least 32 inches wide?  | ✓   |    |     |          |
| 2.                                      | If the main entrance is inaccessible, are there alternate accessible entrances?   | ✓   |    |     |          |
| 3.                                      | Can the alternate accessible entrance be used independently?  | ✓   |    |     |          |
| 4.                                      | Is the door hardware easy to operate (lever/push type hardware, no twisting required, and not higher than 48 inches above the floor)?           | ✓   |    |     |          |
| 5.                                      | Are main entry doors other than revolving door available?   | ✓   |    |     |          |
| 6.                                      | If there are two main doors in series, is the minimum space between the doors 48 inches plus the width of any door swinging into the space?     | ✓   |    |     |          |
| Paths of Travel                         |   | Yes | No | N/A | Comments |
| 1.                                      | Is the main path of travel free of obstruction and wide enough for a wheelchair (at least 36 inches wide)?                                      | ✓   |    |     |          |
| 2.                                      | Does a visual scan of the main path reveal any obstacles (phones, fountains, etc.) that protrude more than 4 inches into walkways or corridors? | ✓   |    |     |          |
| 3.                                      | Are floor surfaces firm, stable, and slip resistant (carpets wheelchair friendly)?  | ✓   |    |     |          |
| 4.                                      | Is at least one wheelchair-accessible public telephone available?   | ✓   |    |     |          |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| EMG Abbreviated Accessibility Checklist |  |     |    |     |          |
|---|--|-----|----|-----|----------|
|   | Paths of Travel (cont.)  | Yes | No | N/A | Comments |
| 5.                                      | Are wheelchair-accessible facilities (toilet rooms, exits, etc.) identified with signage?  | ✓   |    |     |          |
| 6.                                      | Is there a path of travel that does not require the use of stairs?   | ✓   |    |     |          |
| 7.                                      | If audible fire alarms are present, are visual alarms (strobe light alarms) also installed in all common areas?                    | ✓   |    |     |          |
|   | Elevators  | Yes | No | N/A | Comments |
| 1.                                      | Do the call buttons have visual signals to indicate when a call is registered and answered?  |     |    | ✓   |          |
| 2.                                      | Are there visual and audible signals inside cars indicating floor change?  |     |    | ✓   |          |
| 3.                                      | Are there standard raised and Braille marking on both jambs of each host way entrance?   |     |    | ✓   |          |
| 4.                                      | Do elevator doors have a reopening device that will stop and reopen a car door if an object or a person obstructs the door?        |     |    | ✓   |          |
| 5.                                      | Do elevator lobbies have visual and audible indicators of car arrival?   |     |    | ✓   |          |
| 6.                                      | Does the elevator interior provide sufficient wheelchair turning area (51" x 68")?   |     |    | ✓   |          |
| 7.                                      | Are elevator controls low enough to be reached from a wheelchair (48 inches front approach/54 inches side approach)?               |     |    | ✓   |          |
| 8.                                      | Are elevator control buttons designated by Braille and by raised standard alphabet characters (mounted to the left of the button)? |     |    | ✓   |          |
| 9.                                      | If a two-way emergency communication system is provided within the elevator cab, is it usable without voice communication?         |     |    | ✓   |          |
|   | Restrooms  | Yes | No | N/A | Comments |
| 1.                                      | Are common area public restrooms located on an accessible route?   | ✓   |    |     |          |
| 2.                                      | Are pull handles push/pull or lever type?  | ✓   |    |     |          |
| 3.                                      | Are there audible and visual fire alarm devices in the toilet rooms?   | ✓   |    |     |          |
| 4.                                      | Are corridor access doors wheelchair-accessible (at least 32 inches wide)?   | ✓   |    |     |          |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| EMG Abbreviated Accessibility Checklist |  |     |    |     |          |
|---|--|-----|----|-----|----------|
|   | Restrooms (cont.)  | Yes | No | N/A | Comments |
| 5.                                      | Are public restrooms large enough to accommodate a wheelchair turnaround (60" turning diameter)?         | ✓   |    |     |          |
| 6.                                      | In unisex toilet rooms, are there safety alarms with pull cords?   |     |    | ✓   |          |
| 7.                                      | Are stall doors wheelchair accessible (at least 32" wide)?   | ✓   |    |     |          |
| 8.                                      | Are grab bars provided in toilet stalls?   | ✓   |    |     |          |
| 9.                                      | Are sinks provided with clearance for a wheelchair to roll under (29" clearance)?                        | ✓   |    |     |          |
| 10.                                     | Are sink handles operable with one hand without grasping, pinching or twisting?                          | ✓   |    |     |          |
| 11.                                     | Are exposed pipes under sink sufficiently insulated against contact?                                     | ✓   |    |     |          |
| 12.                                     | Are soap dispensers, towel, etc. reachable (48" from floor for frontal approach, 54" for side approach)? | ✓   |    |     |          |
| 13.                                     | Is the base of the mirror no more than 40" from the floor?   | ✓   |    |     |          |

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**APPENDIX E:  
PRE SURVEY QUESTIONNAIRES AND  
DOCUMENTATION REQUEST CHECKLIST**

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## Energy Audit Pre-Survey Questionnaire

This questionnaire must be completed by the property owner, the owner's designated representative, or someone knowledgeable about the subject property. **The completed form must be provided on or before the day of the site visit.** If the form is not completed, EMG's Project Manager will require **additional time** during the on-site visit with such a knowledgeable person in order to complete the questionnaire. During the site visit, EMG's Field Observer may ask for details associated with selected questions. This questionnaire will be utilized as an exhibit in EMG's final report.

|                      |          |             |
|----------------------|----------|-------------|
| Name of institution: |          |             |
| Name of Building:    | MEMORIAL | Building #: |

| Unk = Unknown, NA = Not Applicable                               | Yes                                 | No                                  | NA                       | Unk                      | Comments |
|--|-------------------------------------|-------------------------------------|--------------------------|--------------------------|----------|
| 1. Are the plumbing fixtures Low Flow (Below 2.0GPM, 1.6GPF)     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 2. Are there any vacant buildings or significant building areas? | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 3. Do tenants pay for utilities at leased properties?            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 4. Does the owner pay for exterior site lighting electricity?    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |          |

| Site Information                   |                                     |                                     |                          |                          |                          |
|------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|
| Primary Heating System & Fuel?     | gas                                 |                                     |                          |                          |                          |
| Secondary Heating System & Fuel?   |                                     |                                     |                          |                          |                          |
| Primary Cooling System & Capacity? | window A/C's - electric             |                                     |                          |                          |                          |
| Year of Construction?              | 1928                                |                                     |                          |                          |                          |
| No. of Stories?                    | 5                                   | Floors.                             | whseement                |                          |                          |
| Total Site Area?                   | Acres                               |                                     |                          |                          |                          |
| Total Building Area?               | Sqft                                |                                     |                          |                          |                          |
| Area Heated (%)                    | 100 %                               |                                     |                          |                          |                          |
| Area Cooled (%)                    | 10 %                                |                                     |                          |                          |                          |
| Total Conditioned Area (%)         | 10 %                                |                                     |                          |                          |                          |
|                                    | Elec.                               | Natural Gas                         | Propane                  | No.2 Oil                 | Dist. Steam              |
| Primary Heating Fuel?              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Secondary Heating Fuel?            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Domestic Water Heater Fuel?        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Building Occupancy/Schedule                          |                      |                   |                     |
|--|----------------------|-------------------|---------------------|
| Facility Occupancy (avg. people ea. day)             |                      |                   |                     |
| After Hours Facility Occupancy (avg. people ea. day) |                      |                   |                     |
| Standard Building Occupancy Timing                   | 7-5PM                | : AM/PM           | : AM/PM             |
| Maintenance Staff Hours                              | : AM/PM - : AM/PM    |                   |                     |
|  | Hours open to Public |                   | Hours open to Staff |
| Monday   | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Tuesday  | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Wednesday  | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Thursday   | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Friday   | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Saturday   | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Sunday   | : AM/PM - : AM/PM    | : AM/PM - : AM/PM |                     |
| Number of Months the Facility Operates in a Year?    | Months               |                   |                     |
| Estimated Percentage of Male Staff and Guests (%)    | %                    |                   |                     |

Auditorium depends on event schedule  
BA/Generator in basement

**PROPERTY CONDITION ASSESSMENT :PRE-SURVEY QUESTIONNAIRE**

This questionnaire should be completed by someone knowledgeable about the subject property. *The completed form should be presented to EMG's Field Observer on the day of the site visit.* If the form is not completed, EMG's Project Manager will require *additional time* during the on-site visit with such a knowledgeable person in order to complete the questionnaire. During the site visit, EMG's Field Observer may ask for details associated with selected questions. This questionnaire will be utilized as an exhibit in EMG's final Property Condition Report.

**Name of person completing questionnaire:** \_\_\_\_\_

**Association with property:** \_\_\_\_\_

**Length of association with property:** \_\_\_\_\_

**Date Completed:** 8-4-14

**Phone Number:** \_\_\_\_\_

**Building Name:** Memorial Auditorium

**Directions:** Please answer all questions to the best of your knowledge and in good faith. Please provide additional details in the Comments column, or backup documentation for any Yes responses.

| INSPECTIONS |   | DATE LAST INSPECTED  | LIST ANY OUTSTANDING REPAIRS REQUIRED                  |
|-------------|---|--|--|
| 1           | Elevators   | <u>0</u>   |  |
| 2           | HVAC, Mechanical, Electric, Plumbing                            |  |  |
| 3           | Life-Safety/Fire  |  | <u>sprinkler<br/>fire alarm<br/>fire extinguishers</u> |
| 4           | Roofs   | <u>2013</u>  |  |
| QUESTION    |   | RESPONSE   |  |
| 5           | List any major capital improvement within the last three years. | <u>front handicap ramp<br/>bleachers<br/>retaining wall on NE side</u> |  |
| 6           | List any major capital expenditures planned for the next year.  | <u>ON HOLD</u>   |  |
| 7           | What is the age of the roof(s)?                                 | <u>18+1</u>  |  |

| Mark the column corresponding to the appropriate response. Please provide additional details in the Comments column, or backup documentation for any Yes responses. Note: NA indicates "Not Applicable", Unk indicates "Unknown" |  |          |   |    |     |          |
|--|--|----------|---|----|-----|----------|
| QUESTION   |  | RESPONSE |   |    |     | COMMENTS |
|  |  | Y        | N | NA | Unk |          |
| 23   | Are there any problems with the landscape irrigation systems?                    |          |   | X  |     |          |
| 24   | Has a termite/wood boring insect inspection been performed within the last year? |          | X |    |     |          |
| 25   | Do any of the HVAC systems use R-11, 12, or 22 refrigerants?                     |          |   |    | X   |          |
| 26   | Has any part of the property ever contained visible suspect mold growth?         | X        |   |    |     |          |
| 27   | Is there a mold Operations and Maintenance Plan?                                 |          | X |    |     |          |
| 28   | Have there been indoor air quality or mold related complaints from tenants?      |          | X |    |     |          |
| 29   | Is polybutylene piping used?   |          |   |    | X   |          |
| 30   | Are there any plumbing leaks or water pressure problems?                         |          | X |    |     |          |
| 31   | Are there any leaks or pressure problems with natural gas service?               |          | X |    |     |          |
| 32   | Does any part of the electrical system use aluminum wiring?                      |          |   |    | X   |          |
| 33   | Do Residential units have a less than 60-Amp service?                            |          |   | X  |     |          |
| 34   | Do any Commercial units have less than 200-Amp service?                          |          | X |    |     |          |
| 35   | Are there any recalled fire sprinkler heads (Star, GEM, Central, Omega)?         |          |   |    | X   |          |
| 36   | Is there any pending litigation concerning the property?                         |          | X |    |     |          |
| 37   | Has the management previously completed an ADA review?                           |          |   |    | X   |          |
| 38   | Have any ADA improvements been made to the property?                             |          |   |    | X   |          |
| 39   | Does a Barrier Removal Plan exist for the property?                              |          |   |    | X   |          |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

## REQUEST FOR DOCUMENTATION

On the day of the site visit, provide EMG's Field Observer the documents listed below. Signify which documents will be copied, available for review at the site, not available, or not applicable by placing a check mark in the appropriate columns. Also provide this completed checklist.

|    |  | Copies Provided | Reviewed at Site | Not Available | Not Applicable |
|----|--|-----------------|------------------|---------------|----------------|
| 1  | <b>Maintenance Contractor List.</b> Provide the company name, phone number, and contact person of all maintenance contractors who serve the property, such as mechanical contractors, roof contractors, fire sprinkler and fire alarm testing contractors, and elevator contractors. | ✓               |                  |               |                |
| 2  | <b>Construction Documents (Blueprints).</b> Provide all available construction documents for the original construction of the building or for any tenant improvement work or other recent construction work.   |                 |                  |               |                |
| 3  | <b>Site plan.</b> Provide a site plan, preferably 8 1/2" X 11", which depicts the arrangement of buildings, roads, parking stalls, and other site features.  |                 |                  |               |                |
| 4  | <b>Certificates of Occupancy</b> and original <b>Building Permits.</b>   |                 |                  |               |                |
| 5  | <b>Tenant List.</b> For commercial properties, provide a tenant list, which identifies the names of each tenant, vacant tenant units, the floor area of each tenant space, and the gross and net leasable area of the building(s).   |                 |                  |               |                |
| 6  | <b>Apartment Unit Summary.</b> For apartment properties, provide a summary of the apartment unit types and quantities, including the floor area of each apartment unit as measured in square feet.   |                 |                  |               |                |
| 7  | <b>Hotel &amp; Nursing Home Room Summary.</b> For hotel or nursing home properties, provide a summary of the room types and room type quantities, including the floor area of each room type.  |                 |                  |               |                |
| 8  | <b>Occupancy Percentage.</b> Provide the current occupancy percentage and typical turnover rate records (for commercial and apartment properties).   |                 |                  |               |                |
| 9  | <b>Inspection Documents and Certificates.</b> Fire, building, and health department inspection reports and elevator inspection certificates.   |                 |                  |               |                |
| 10 | <b>Warranties.</b> Roof and HVAC warranties or any other similar relevant documents.   |                 |                  |               |                |
| 11 | <b>Utility Companies.</b> The names of the local utility companies which serve the property, including the water, sewer, electric, gas, and phone companies.   |                 |                  |               |                |
| 12 | <b>Capital Improvement Summary.</b> A summary of recent (over the last 5 years) capital improvement work which describes the scope of the work and the cost of the improvements.   |                 |                  |               |                |
| 13 | <b>Proposed Improvements.</b> Pending contracts or proposals for future improvements.  |                 |                  |               |                |
| 14 | <b>Historical Costs.</b> Costs for repairs, improvements, and replacements.  |                 |                  |               |                |
| 15 | <b>Records.</b> Records of system & material ages (roof, MEP, paving, finishes, furnishings).  |                 |                  |               |                |
| 16 | <b>Brochures or Marketing Information.</b>   |                 |                  |               |                |
| 17 | <b>Appraisal,</b> either current or previously prepared.   |                 |                  |               |                |
| 18 | <b>Previous reports</b> pertaining to the physical condition of property.  |                 |                  |               |                |
| 19 | <b>ADA survey</b> and status of improvements implemented.  |                 |                  |               |                |
| 20 | <b>Litigation.</b> Current / pending litigation related to property condition.   |                 |                  |               |                |

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**APPENDIX F:  
TERMINOLOGY**

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## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

The following are definitions of terms utilized in this report.

| TERMINOLOGY                        |   |
|------------------------------------|---|
| Actual Knowledge                   | Information or observations known first hand by EMG.  |
| ADA                                | The Americans with Disabilities Act   |
| Ancillary Structures               | Structures that are not the primary improvements of the Property but which may have been constructed to provide support uses.   |
| Appropriate Inquiry                | Requests for information from appropriate entity conducted by a Freedom of Information Letter (FOIL), verbal request, or by written request made either by fax, electronic mail, or mail. A good-faith one time effort conducted to obtain the information in light of the time constraints to deliver the FCA. |
| ASTM                               | American Society for Testing and Materials  |
| Base Building                      | That portion of the building (common area) and its systems that are not typically subject to improvements to suit tenant requirements.  |
| Baseline                           | A minimum scope level of observation, inquiry, research, documentation review, and cost estimating for conducting a Facility Condition Assessment as normally conducted by EMG.   |
| BOMA                               | Building Owners & Managers Association  |
| Building                           | Referring to the primary building or buildings on the Property, which are within the scope of the FCA as defined under Section 2.   |
| Building Codes                     | A compilation of rules adopted by the municipal, county and/or state governments having jurisdiction over the Property that govern the property's design &/or construction of buildings.  |
| Building Department Records        | Information concerning the Property's compliance with applicable Building, Fire and Zoning Codes that is readily available for use by EMG within the time frame required for production of the Facility Condition Assessment.   |
| Building Systems                   | Interacting or interdependent components that comprise a building such as structural, roofing, side wall, plumbing, HVAC, water, sanitary sewer and electrical systems.   |
| BUR                                | Built Up Roof   |
| Client                             | The entity identified on the cover of this document as the Client.  |
| Commercial Real Estate             | Real property used for industrial, retail, office, agricultural, other commercial, medical, or educational purposes, and property used for residential purposes that has more than four (4) residential dwelling units.   |
| Commercial Real Estate Transaction | The transfer of a mortgage, lease, or deed; the re-financing of a commercial property by an existing mortgagee; or the transferring of an equity interest in commercial property.   |
| Component                          | A piece of equipment or element in its entirety that is part of a system.   |
| Consultant                         | The entity or individual that prepares the Facility Condition Assessment and that is responsible for the observance of, and reporting on the physical condition of Commercial Property.   |
| Dangerous or Adverse Conditions    | Situations which may pose a threat or possible injury to the Project Manager, or those situations which may require the use of special protective clothing, safety equipment, access equipment, or any precautionary measures.  |
| Deferred Maintenance               | Deficiencies that result from postponed maintenance, or repairs that have been put off until a later time and that require repair or replacement to an acceptable condition relative to the age of the system or property.  |
| Dismantle                          | To take apart; disassemble; tear down any component, device or piece of equipment that is bolted, screwed, secured, or fastened by other means.   |
| DWV                                | Drainage Waste Ventilation  |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| TERMINOLOGY                |   |
|----------------------------|---|
| EIFS                       | Exterior Insulation and Finish System   |
| EMS                        | Energy Management System  |
| Engineering                | Analysis or design work requiring extensive formal education, preparation and experience in the use of mathematics, chemistry, physics, and the engineering sciences as provided by a Professional Engineer licensed to practice engineering by any state of the 50 states.   |
| Expected Useful Life (EUL) | The average amount of time in years that a system or component is estimated to function when installed new.   |
| FEMA                       | Federal Emergency Management Agency   |
| FFHA                       | Federal Fair Housing Act  |
| Fire Department Records    | Information generated or acquired by the Fire Department having jurisdiction over the Property, and that is readily available to EMG within the time frame required for production of the FCA.  |
| FIRM                       | Flood Insurance Rate Maps   |
| FM                         | Factory Mutual  |
| FOIA                       | U.S. Freedom of Information Act (5 USC 552 et seq.)   |
| FOIL                       | Freedom of Information Letter   |
| FRT                        | Fire Retardant Treated  |
| Guide                      | A series of options or instructions that do not recommend a specific course of action.  |
| His                        | Referring to either a male or female Project Manager, or individuals interviewed by the Project Manager.  |
| HVAC                       | Heating, Ventilating & Air-conditioning   |
| IAQ                        | Indoor Air Quality  |
| Immediate Repairs          | Physical deficiencies that require immediate action as a result of: (i) existing or potentially material unsafe conditions, (ii) significant negative conditions impacting tenancy/marketability, (iii) material building code violations, or (iv) poor or deteriorated condition of critical element or system, or (v) a condition that if left "as is", with an extensive delay in addressing same, has the potential to result in or contribute to critical element or system failure within one (1) year. |
| Interviews                 | Interrogatory with those knowledgeable about the Property.  |
| Material                   | Having significant importance or great consequence to the asset's intended use or physical condition.   |
| MEP                        | Mechanical, Electrical, and Plumbing  |
| NFPA                       | National Fire Protection Association  |
| Observations               | The results of the Project Manager's Walk-through Survey.   |
| Observe                    | The act of conducting a visual, unaided survey of items, systems or conditions that are readily accessible and easily visible on a given day as a result of the Project Manager's walk-through.   |
| Obvious                    | That which is plain or evident; a condition that is readily accessible and can be easily seen by the Project Manager as a result of his Walk-through without the removal of materials, moving of chattel, or the aid of any instrument, device, or equipment.   |
| Owner                      | The entity holding the deed to the Property that is the subject of the FCA.   |
| FCA                        | Facility Condition Assessment, the Purpose and Scope of which is defined in Section 2. of this report.  |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| TERMINOLOGY                 |   |
|-----------------------------|---|
| Physical Deficiency         | <p>Patent, conspicuous defects or significant deferred maintenance of the Property's material systems, components, or equipment as observed during the Project Manager's Walk-through Survey.</p> <p>Material systems, components, or equipment that are approaching, have realized, or have exceeded their typical Expected Useful Life (EUL); or, that have exceeded their useful life result of abuse, excessive wear and tear, exposure to the elements, or lack of proper or adequate maintenance.</p> <p>This definition specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous repairs, normal operating maintenance, and conditions that do not present a material deficiency to the Property.</p> |
| PML                         | Probable Maximum Loss   |
| Practically Reviewable      | Information that is practically reviewable means that the information is provided by the source in a manner and form that, upon examination, yields information relevant to the property without the need for extraordinary analysis of irrelevant data.  |
| Practice                    | A definitive procedure for performing one or more specific operations or functions that does not produce a test result.   |
| Primary Improvements        | The site and building improvements that are of fundamental importance with respect to the Property.   |
| Project Manager             | The individual Professional Engineer or Registered Architect having a general, well rounded knowledge of all pertinent site and building systems and components that conducts the on site visit and walk-through observation.   |
| Property                    | The site and building improvements, which are specifically within the scope of the FCA to be prepared in accordance with the agreement between the Client and EMG.  |
| Readily Accessible          | Those areas of the Property that are promptly made available for observation by the Project Manager without the removal of materials or chattel, or the aid of any instrument, device, or equipment at the time of the Walk-through Survey.   |
| Reasonably Ascertainable    | Information that is publicly available provided to EMG's offices from either its source or an information research/retrieval concern, practically reviewable, and available at a nominal cost for retrieval, reproduction or forwarding.  |
| Recreational Facilities     | Spas, saunas, steam baths, swimming pools, tennis courts, playground equipment, and other exercise, entertainment, or athletic facilities.  |
| Remaining Useful Life (RUL) | <p>The consultant's professional opinion of the number of years before a system or component will require replacement or reconditioning. The estimate is based upon observation, available maintenance records, and accepted EUL's for similar items or systems.</p> <p>Inclement weather, exposure to the elements, demand on the system, quality of installation, extent of use, and the degree and quality of preventive maintenance exercised are all factors that could impact the RUL of a system or component. As a result, a system or component may have an effective age greater or less than its actual age. The RUL may be greater or less than its Expected Useful Life (EUL) less actual age.</p>                                     |
| Replacement Costs           | Costs to replace the system or component "in kind" based on Invoices or Bid Documents provided by the current owner or the client, construction costs developed by construction resources such as <i>Means</i> and <i>Dodge</i> , EMG's experience with past costs for similar properties, or the current owner's historical incurred costs.  |
| Replacement Reserves        | Major recurring probable expenditures, which are neither commonly classified as an operation or maintenance expense. Replacement Reserves are reasonably predictable both in terms of frequency and cost. However, they may also include components or systems that have an indeterminable life but nonetheless have a potential liability for failure within the reserve term.   |
| RTU                         | Rooftop Unit  |
| RUL                         | Remaining Useful Life (See definition)  |

## FACILITY CONDITION ASSESSMENT

&amp; LEVEL I ENERGY AUDIT

110266.14R-009.294

| TERMINOLOGY             |   |
|-------------------------|---|
| Short Term Repair Costs | Opinions of Costs to remedy Physical Deficiencies, such as deferred maintenance, that may not warrant immediate attention, but requiring repairs or replacements that should be undertaken on a priority basis, taking precedence over routine preventive maintenance work within a zero to one year time frame. Included are such Physical Deficiencies resulting from improper design, faulty installation and/or substandard quality of original system or materials. Components or systems that have realized or exceeded their Expected Useful Life (EUL) that may require replacement to be implemented within zero to one-year time frame are also included. |
| Shut-Down               | Equipment or systems that are not operating at the time of the Project Manager's Walk-through Survey. Equipment or systems may be considered shutdown if it is not in operation as a result of seasonal temperatures.   |
| Significant             | Important, material, and/or serious.  |
| Site Visit              | The visit to the property by EMG's Project Manager including walk-through visual observations of the Property, interviews of available project personnel and tenants (if appropriate), review of available documents and interviews of available municipal personnel at municipal offices, all in accordance with the agreement for the Facility Condition Assessment.  |
| Specialty Consultants   | Practitioners in the fields of engineering, architecture; or, building system mechanics, specialized service personnel or other specialized individuals that have experience in the maintenance and repair of a particular building component, equipment, or system that have acquired detailed, specialized knowledge in the design, assessment, operation, repair, or installation of the particular component, equipment, or system.   |
| Structural Component    | A component of the building, which supports non-variable forces or weights (dead loads) and variable forces or weights (live loads).  |
| Suggested Remedy        | A preliminary opinion as to a course of action to remedy or repair a physical deficiency. There may be alternate methods that may be more commensurate with the Client's requirements. Further investigation might make other schemes more appropriate or the suggested remedy unworkable. The suggested remedy may be to conduct further research or testing, or to employ Specialty Consultants to gain a better understanding of the cause, extent of a deficiency (whether observed or highly probable), and the appropriate remedy.  |
| Survey                  | Observations as the result of a walk-through scan or reconnaissance to obtain information by EMG of the Property's readily accessible and easily visible components or systems.   |
| System                  | A combination of interacting or interdependent components assembled to carry out one or more functions.   |
| Technically Exhaustive  | The use of measurements, instruments, testing, calculations, exploratory probing or discover, and/or other means to discover and/or troubleshoot Physical Deficiencies, develop scientific or Engineering findings, conclusions, and recommendations. Such efforts are not part of this report unless specifically called for under Section 2.2.  |
| Term                    | Reserve Term: The number of years that Replacement Reserves are projected for as specified in the Replacement Reserves Cost Estimate.   |
| Timely Access           | Entry provided to the Project Manager at the time of his site visit.  |
| UST                     | Underground Storage Tank  |
| Walk-through Survey     | The Project Manager's site visit of the Property consisting of his visual reconnaissance and scan of readily accessible and easily visible components and systems. This definition connotes that such a survey should not be considered in depth, and is to be conducted without the aid of special protective clothing, exploratory probing, removal of materials, testing, or the use of special equipment such as ladders, scaffolding, binoculars, moisture meters, air flow meters, or metering/testing equipment or devices of any kind. It is literally the Project Manager's walk of the Property and observations.   |

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**APPENDIX G:  
GLOSSARY OF TERMS-ENERGY AUDITS**

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### **Glossary of Terms and Acronyms-Energy Audit**

**ECM** – Energy Conservation Measures are projects recommended to reduce energy consumption. These can be No/Low cost items implemented as part of routine maintenance or Capital Cost items to be implemented as a capital improvement project.

**Initial Investment** – The estimated cost of implementing an ECM project. Estimates typically are based on R.S. Means Construction cost data and Industry Standards.

**Annual Energy Savings** – The reduction in energy consumption attributable to the implementation of a particular ECM. These savings values do not include the interactive effects of other ECMs.

**Cost Savings** – The expected reduction in utility or energy costs achieved through the corresponding reduction in energy consumption by implementation of an ECM.

**Simple Payback Period** –The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates.

**EUL** – Expected Useful Life is the estimated lifespan of a typical piece of equipment based on industry accepted standards.

**RUL** – Remaining Useful Life is the EUL minus the effective age of the equipment and reflects the estimated number of operating years remaining for the item.

**SIR** - The savings-to-investment ratio is the ratio of the present value savings to the present value costs of an energy or water conservation measure. The numerator of the ratio is the present value of net savings in energy or water and non-fuel or non-water operation and maintenance costs attributable to the proposed energy or water conservation measure. The denominator of the ratio is the present value of the net increase in investment and replacement costs less salvage value attributable to the proposed energy or water conservation measure. It is recommended that energy-efficiency recommendations be based on a calculated SIR, with larger SIRs receiving a higher priority. A project typically is recommended only if the SIR is greater than or equal to 1.0, unless other factors outweigh the financial benefit.

**Life Cycle Cost** - The sum of the present values of (a) Investment costs, less salvage values at the end of the study period; (b) Non-fuel operation and maintenance costs; (c) Replacement costs less salvage costs of replaced building systems; and (d) Energy and/or water costs.

**Life Cycle Savings** – The sum of the estimated annual cost savings over the EUL of the recommended ECM, expressed in present value dollars.

**Building Site Energy Use Intensity** - The sum of the total site energy use in thousand of Btu per unit of gross building area. Site energy accounts for all energy consumed at the building location only not the energy consumed during generation and transmission of the energy to the site.

**Building Source Energy Use Intensity** – The sum of the total source energy use in thousand of Btu per unit of gross building area. Source energy is the energy consumed during generation and transmission in supplying the energy to your site.

**Building Cost Intensity** - This metric is the sum of all energy use costs in dollars per unit of gross building area.

**Greenhouse Gas Emissions** - Although there are numerous gases that are classified as contributors to the total for Greenhouse Emissions, the scope of this energy audit focuses on carbon dioxide (CO<sub>2</sub>). Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).

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**APPENDIX H:  
ENERGY CONSERVATION MEASURES**

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|   |  |   |                                   |
|---|--|---|-----------------------------------|
| <b>UIC</b>  | <b>Replace External Windows</b>  |   |                                   |
| <b>EAE2</b>   | Details: Replace Single pane windows with energy efficient double-pane, throughout |   |                                   |
| <b>ENTER EXISTING CONDITIONS</b>  |  |   |                                   |
| <b>Existing and Proposed Window Properties</b>  |  | <b>Existing &amp; Proposed Air Leakage Through Windows</b>  |                                   |
| Total Sq.Ft window area:  | 660 Sq.ft  | Insert Existing Estimated Air Change Rate/Hr (ACH 1):<br><small>(Existing Air Changes Per Hour, 3 is very leaky and 0.35 ideal)</small> | 3.00                              |
| Approximate number of windows:  | 66   | Insert Proposed Estimated Air Change Rate/Hr (ACH 2):   | 1.50                              |
| Total existing window area:   | 660 Sq.Ft  | Estimated Space Volume Under Consideration  | 500,000.00 Cu. Ft                 |
| Select The Existing Window Type   | Wooden Frame & Double Glazing <small>(Select)</small>                              |   |                                   |
| Existing U-value of window: (1/R)   | 0.49 Btu/ ft <sup>2</sup> *F-h   |   |                                   |
| ASHRAE Climatic Zone  | Zone-6   | Is the Property Cooled ?  | No <small>(Select)</small>        |
| New U-value with Double pane Low E window: (1/R)<br><small>AHRAE 90.1 Recommended Value</small>         | 0.31 Btu/ ft <sup>2</sup> *F-h   |   |                                   |
| <b>WINTER</b>   |  | <b>SUMMER</b>   |                                   |
| Select Type of Heating Fuel   | Natural Gas <small>(Select)</small>  | Select Type of Cooling Fuel:  | Electric <small>(Default)</small> |
| Net heating plant & distribution system efficiency:   | 95.00 %  | Cooling Plant Efficiency (EER):   | EER                               |
| Annual Heating Hours:   | 2,651 HDD  | Annual Cooling Hours:   | 732 CDD                           |
| Estimated Total Annual Input Heating Energy Savings By Replacing Windows                                | 0.80 Therms  | Annual Total Input Cooling Fuel Savings During Summer Season By Replacing Windows   | #DIV/0! kWh                       |
| Estimated Total Annual Input Heating Energy Savings Achieved By Controlling Air Leakage Through Windows | 9,041 Therms   | Estimated Total Annual Input Cooling Energy Savings Achieved By Controlling Air Leakage Through Windows                                 | 0 kWh                             |
| Estimated Total Input Heating Fuel Savings From Replacing Windows                                       | 9,042 Therms   | Estimated Total Input Cooling Fuel Savings From Replacing Windows   | 0 kWh                             |
| <b>ENERGY &amp; COST ANALYSIS</b>   |  |   |                                   |
| Insert Cost of Heating Fuel:  | \$1.01 \$/Therm  | Annual Heating Cost Savings:  | \$9,175.51 \$\$                   |
| Insert Cost of Cooling Fuel:  | \$0.19 \$/kWh  | Annual Cooling Cost Savings:  | \$0.00 \$\$                       |
| <b>Total Annual Cost Savings</b>  | <b>\$9,267</b>   | <b>Total Annual Cost Savings From Heating &amp; Cooling:</b>  | <b>\$9,176</b> \$\$               |
| <b>Cost of window upgrade:</b>  | <b>\$36,300</b>  | <b>Estimated Annual O&amp;M Savings</b>   | <b>\$92</b> \$                    |
| <b>Simple payback:</b>  | <b>3.92</b> Yrs  | <i>Type of Recommendation</i>   | Capital Cost ECM Recommendation   |

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**ECM DESCRIPTION:**  
 Windows play a major role in the energy use and comfort of an interior space. In the winter, heat in a room is lost when cold outside air infiltrates around the edges of windows. Heat also can be lost by conduction directly through the pane, even if the window fits tightly. Windows with insulated panes, such as those filled with Argon address this issue, while proper caulking and sealant address the infiltration issue. The cold drafts and the chilly windowpane make the room uncomfortable. Windows also can help to heat a room by letting the sun's rays enter. While this solar radiation is beneficial in the winter, it can be a major source of discomfort in hot, summer climates. Energy Star rated windows with Low-E glazing are designed to keep the solar heat gain minimized during the summer months. Choosing a replacement window that fits properly has the desired U-value, and proper glazing characteristics is critical to energy conservation through window upgrades.

**Summary:**  
 Initial Investment: \$36,300      Simple Payback      3.92 Yrs  
 Annual Energy Cost Savings: \$9,267.26

| UIC   |   | Control External Air Leakage In Commercial Buildings   |  |
|---|---|--|--|
| EAE4A   |   | Details: Replace weather stripping   |  |
| <b>ENTER EXISTING CONDITION</b>   |   |  |  |
| Insert Existing Estimated Air Change Rate/Hr (ACH 1):<br><small>(Existing Air Changes Per Hour, 3 is very leaky and 0.35 ideal)</small> | <input type="text" value="1.50"/>                 | Cubic Feet/Min (CFM 1):  | <input type="text" value="12,500"/>      |
| Insert Proposed Estimated Air Change Rate/Hr (ACH 2):   | <input type="text" value="1.35"/>                 | Cubic Feet/Min (CFM 2):  | <input type="text" value="11,250"/>      |
| Estimated Space Volume Under Consideration  | <input type="text" value="500,000"/>              | Cu.Ft  |  |
| <b>WINTER</b>   |   | <b>SUMMER</b>  |  |
| Select Type of Heating Fuel   | <input type="text" value="Natural Gas"/> (Select) | Is The Building Cooled?  | <input type="text" value="No"/>          |
| Estimated Annual Heating Plant Efficiency   | <input type="text" value="63.00"/> %              | Estimated Annual Cooling Plant Efficiency  | <input type="text" value="0.00"/> EER    |
| Annual Heating Degree Days(HDD):  | <input type="text" value="6,994"/>                | Annual Cooling Degree Days(CDD):   | <input type="text" value="732"/>         |
| Estimated Total Annual Input Heating Energy Savings   | <input type="text" value="2,651"/> Therms         | Estimated Total Annual Input Cooling Energy Savings  | <input type="text" value="0"/> kWh       |
| Cost/Unit of Heating Fuel:  | <input type="text" value="\$1.01"/> \$/Therm      | Cost/Unit For Electricity  | <input type="text" value="\$0.19"/> \$\$ |
| Estimated Annual Heating Cost Savings   | <input type="text" value="\$2,690"/> \$\$         | Estimated Annual Cooling Cost Savings  | <input type="text" value="\$0"/> \$\$    |
| <b>Cost Analysis</b>  |   |  |  |
| Install Flush Mounted, Vinyl Door Sweeps ?  | <input type="text" value="Yes"/>                  | Total Length of Door Sweeps to Be Installed:<br><small>(3.5' Standard Width Door)</small>  | <input type="text" value="35"/> LF       |
| Install Window Air Conditioner Covers For Winter:   | <input type="text" value="No"/>                   | Number of Air Conditioner Covers To Be Installed:<br><small>(Covers would meet HUD Chapter-12 Energy Conservation Compliance Section 329C)</small> | <input type="text" value="0"/>           |
| <b>Estimated Annual O&amp;M Savings</b>   | <input type="text" value="\$135"/>                | Estimated Length of Joints To Be Re-Caulked:<br><small>(Includes Demolition and Re-Caulking)</small>   | <input type="text" value="656"/> LF      |
| Total Estimated Annual Cost Savings   | <input type="text" value="\$2,825"/>              | Total Cost For Controlling Air Leakage   | <input type="text" value="\$2,238"/>     |
| Simple Pay Back Period  | <input type="text" value="0.79"/> Yrs             | <i>Type of Recommendation</i>  | <b>Capital Cost ECM Recommendation</b>   |

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**ECM DESCRIPTION:**

One of the most commonly used methods for reducing air leakage through building structures is caulking and weather stripping. Particularly effective measures include caulking cracks around windows and door frames and weather stripping around windows and doors. Weather-stripping and caulking of doors and windows, helps in thermally isolating of the building with the outside atmosphere. This prevents the infiltration of external un-conditioned air along with moisture and humidity into the conditioned space at the same time, prevents the conditioned air from escaping out. A precisely thermally isolated building directly affects the cooling and heating load on the facilities HVAC system as it has to put in less effort in maintaining the desired temperature inside the facility. As per ASHRAE a well insulated and ventilated building will reduce the energy consumption and operating costs. In order to ensure proper thermal isolation of the property, EMG recommends ensuring that the weather-stripping and caulking of all external doors and windows remains intact. It is also recommended that door sweeps be installed under all the doors opening into conditioned space. Any visible cracks between the window frame and wall should be plugged by caulking. In case of building with window airconditioners, EMG recommends use of interior/exterior window airconditioner covers so as to prevent cold air drafts into the conditioned space during the winter so as to save on heating costs.

**SUMMARY:**

|                             |            |                         |          |
|-----------------------------|------------|-------------------------|----------|
| Initial Investment:         | \$2,238.26 | Simple Pay Back Period: | 0.79 Yrs |
| Annual Energy Cost Savings: | \$2,824.62 |                         |          |

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|  |   |          |  |
|--|---|----------|--|
| <b>UIC</b>   | <b>Install Thermostatic Radiator Valve (TRV) controls for Steam/Hot Water Radiators</b> |          |  |
| <b>EAC2</b>  | <b>Details: For better response at unit</b>   |          |  |
| Select Type of Heating Fuel                          | <input type="text" value="Natural Gas"/>  | (Select) |  |
| Estimated/Actual Usage of Heating Fuel:              | <input type="text" value="22,706"/>   | Therms   |  |
| Existing Heat Distribution Efficiency:               | <input type="text" value="95%"/>  |          |  |
| New Distribution efficiency with TRVs                | <input type="text" value="103%"/>   |          |  |
| Estimated new heating fuel consumption with new TRV: | <input type="text" value="20,942"/>   | Therms   |  |
| Estimated annual heating fuel savings:               | <input type="text" value="1,764"/>  | Therms   |  |
| Annual average cost/unit of heating fuel:            | <input type="text" value="\$1.01"/>   | \$/Therm |  |
| Estimated annual cost savings:                       | <input type="text" value="\$1,790"/>  | \$\$     |  |
| Number of TRVs to be installed:                      | <input type="text" value="50"/>   |          |  |
| Estimated cost to install all TRVs:                  | <input type="text" value="\$12,500"/>   | \$\$     |  |
| Simple payback:                                      | <input type="text" value="6.98"/>   | years    |  |
| <i>Type of Recommendation</i>                        | <input type="text" value="Capital Cost ECM Recommendation"/>                            |          |  |

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**ECM DESCRIPTION:**

A Thermostatic Radiator Valve (TRV) is a self regulating control device for hot water heating and steam (also known as air vent valves) systems consisting of hot water baseboard heaters/ radiators. A TRV consists of two parts: a valve that opens or closes to control the hot water flow and a sensor that controls the opening of the valve. The sensor contains an actuator with a sensing substance, which adjusts the valve opening based on the temperature in the room and via a physical connection between the actuator-spindle and the valve-spindle/cone. TRVs control the temperature in the room based on an individually set temperature. TRVs also come in different motorized and electronic actuator design and can also work together with outdoor temperature controls, supply flow temperature controls, pressure controls and time set-back devices.

TRVs help to control the flow of hot water/steam in the heating system that is used throughout the spaces. By controlling the fluid flow in response to the actual heating demand, energy costs can be reduced by limiting the amount of steam or hot water being un-necessarily being produced. TRVs help to improve temperature control in individual spaces by relating the desired space temperature to the flow required in the radiator unit. This efficient control method reduces overheating of the space and modulates the demand for steam. The result is better distribution of hot water/steam throughout the building, which reduces energy consumption related to space heating.

**SUMMARY**

|                             |          |                 |      |
|-----------------------------|----------|-----------------|------|
| Initial Investment          | \$12,500 | Simple Payback: | 6.98 |
| Annual Energy Cost Savings: | \$1,790  |                 |      |

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| UIC   | Replace Inefficient Heating Plant                            |  |
|---|--|--|
| EAH1A   | Details: Replace cast iron boilers with condensing boilers   |  |
| <b>Existing System</b>  |  |  |
| Select Type of Heating Fuel   | <input type="text" value="Natural Gas"/>                     | Existing Boiler Type: <input type="text" value="Cast Iron"/>         |
| No. of Heating Units To Be Replaced:  | <input type="text" value="2"/>                               | Qty  |
| Rated Heating Capacity of Each Existing Boilers:  | <input type="text" value="3001 - 4000 MBH"/>                 |  |
| Estimated Actual Heating Fuel Used For Heating:   | <input type="text" value="34,792"/>                          | Therms   |
| Existing Average Annual Heating Plant Efficiency:   | <input type="text" value="62%"/>                             | %  |
| Cost For Demolition of Existing Heating System:   | <input type="text" value="\$11,469"/>                        |  |
| <b>Proposed Heating System</b>  |  |  |
| Proposed Heating Fuel   | <input type="text" value="Natural Gas"/>                     | Proposed Boiler Type: <input type="text" value="Condensing Boiler"/> |
| Proposed Boiler Type-1  | <input type="text" value="2,000"/>                           | MBH  |
| Proposed Boiler Type-2  | <input type="text" value="0"/>                               | MBH  |
| Proposed Boiler Type-3  | <input type="text" value="0"/>                               | MBH  |
|   | <input type="text" value="3"/>                               | Qty  |
| Proposed Heating Plant Efficiency:  | <input type="text" value="95%"/>                             | %  |
| Estimated Fuel Consumption With Improved Efficiency:  | <input type="text" value="22,706"/>                          | Therms   |
| <b>Financial Analysis</b>   |  |  |
| Existing Annual Heating Cost:   | <input type="text" value="\$35,305"/>                        | Proposed Annual Heating Cost: <input type="text" value="\$23,041"/>  |
| Annual Energy Cost Savings  | <input type="text" value="\$12,264"/>                        | Estimated Annual O&M Savings: <input type="text" value="\$368"/>     |
| Total Annual Cost Savings:  | <input type="text" value="\$12,632"/>                        |  |
| Cost of Type-1 New Boilers (Material + Installation):   | <input type="text" value="\$0"/>                             |  |
| Cost of Type-2 New Boilers (Material + Installation):   | <input type="text" value="\$0"/>                             |  |
| Cost of Type-3 New Boilers (Material + Installation):   | <input type="text" value="\$0"/>                             |  |
| Total For Material +Installation+Demolition:  | <input type="text" value="\$11,469"/>                        |  |
| Estimated Engineering and Architecture Fees:  | <input type="text" value="\$918"/>                           |  |
| Install New Gas Line & Gas Meter?   | <input type="text" value="No"/>                              |  |
| Estimated Cost For Installing New Gas Line & Gas Meter :  | <input type="text" value="\$0"/>                             |  |
| <small>(The Above Cost is the cost for gas pipeline from gas meter to heating plant only ie. within the property)</small> |  |  |
| Estimated Cost For Extending Gas Pipeline To The Property:  | <input type="text" value="\$0"/>                             |  |
| Estimated Total Cost For Replacing All Heating Plants:  | <input type="text" value="\$12,386"/>                        |  |
| Simple Payback:   | <input type="text" value="0.98"/>                            |  |
|   | years  |  |
| Type of Recommendation  | <input type="text" value="Capital Cost ECM Recommendation"/> |  |

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**ECM DESCRIPTION**

Standard boilers on the market generally attain operating efficiencies around 80% (Output MBH / Input MBH). The operating efficiencies for condensing boilers are above 90% and reduce the energy requirements for heating significantly. Condensing boilers utilize the latent heat of condensing exhaust gasses to extract additional heat from the input fuel, thus achieving a significantly higher operating efficiency. Additionally, many condensing boilers have the ability to modulate the input rate to meet a reduced heating demand, which boiler cycling on days of moderate temperature. . A properly-sized modulating condensing boiler will reduce the input energy required for heating and will provide ability for the boiler to turn-down the firing rate during periods of reduced heating load, further conserving heating energy. Sizing analysis and design for replacement by a local professional engineer is recommended prior to replacement of the heating equipment. This step will ensure that the new boilers are properly sized and configured to meet the building hot water demands and operate in the most efficient manner. In addition to reducing the energy consumption, the increased efficiency may also allow for a decrease in the required input capacity.

**SUMMARY:**

Initial Investment: \$12,386                      Simple Payback: 0.98 Yrs  
 Energy Cost Savings: \$23,041

|  |  |                 |
|--|--|-----------------|
| <b>UIC</b>   | <b>Replace Defective Steam Traps</b>       |                 |
| <b>EAH10</b>   | <b>Details: Increase system efficiency</b> |                 |
| Select Type of Heating Fuel:   | <b>Natural Gas</b>                         |                 |
| Type of Steam Trap:  | <b>Distribution System Steam Trap</b>      |                 |
| Annual Heating Fuel Usage:   | <b>22706.00</b>                            | Therms          |
| Name plate thermal efficiency of the steam boiler system:              | <b>95%</b>                                 |                 |
| Estimated current distribution system efficiency with defective traps: | <b>75%</b>                                 |                 |
| Total aggregated available kBtus for heating at the radiators/load:    | <b>1,617,803</b>                           | kBtu            |
| Estimated new distribution system efficiency with new steam traps:     | <b>85%</b>                                 |                 |
| Estimated annual heating fuel usage with new steam traps:              | <b>20,035</b>                              | Therms          |
| Estimated annual heating fuel savings with new steam traps:            | <b>2,671</b>                               | Therms          |
| Heating Fuel Rate::  | <b>\$1.01</b>                              | \$/Therm        |
| Estimated annual heating cost savings:                                 | <b>\$2,711</b>                             |                 |
| Estimated installed cost of steam traps:                               | cost/trap:                                 | <b>\$482</b>    |
|  | Total No. of traps to be replaced:         | <b>50</b>       |
|  | Total project cost:                        | <b>\$24,100</b> |
| Simple payback:  | <b>8.89</b>                                | years           |
| <i>Type of Recommendation</i>  | <b>Capital Cost ECM Recommendation</b>     |                 |

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**ECM DESCRIPTION:**

Steam traps are found in steam piping, separators, and all steam-heated or steam-operated equipment. They are installed to remove condensate and non-condensable from the steam system as quickly as they accumulate. Over time, the internal parts of a steam trap begin to wear and fail to open and close properly. A closed trap reduces the heating capacity of the steam sys-tem. Condensate builds up in the system, which may cause water hammering and will eventually destroy valves and coils. In addition, condensate may freeze in cold climates and rupture lines and coils. When the trap fails to open, it passes steam to the condensate return lines, reducing system capacity and control (NCEL 1985). Steam traps should be periodically inspected and all worn or malfunctioning ones EMG recommends replacing all the failed steam traps that have been indentified above.

**Summary:**

Initial Investment: \$24,100    Simple Payback Period: 8.89  
 Annual Cost Savings: \$2,711

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| UIC  | Replace Existing Refrigerator(s) With Energy Star Certified Refrigerator(s) |  |                          |  |
|--|---|--|--------------------------|--|
| EAA1   | Details: In the kitchen area  |  |                          |  |
| Number of Refrigerators To Be Replaced   |   | 2<br>Qty   |                          |  |
| Details of Existing Refrigerator:  |   | 1990-1992 Top Freezer 7.5-16.4 CuFt -1202.5 kWh  |                          |  |
| Estimated Annual Energy Consumption By The Existing Refrigerator:                        |   | 1,203 kWh/Year                                   |                          |  |
| Proposed New Refrigerator:   |   | 2010 -2012 Top Freezer 16.0-19.5 CuFt-382 kWh/Yr |                          |  |
| Estimated Proposed Annual Energy Consumption of The New Refrigerator:                    |   | 382 kWh/Year                                     |                          |  |
| Annual Kwh Savings Per Unit (Kwh/year)   |   | 821 kWh  |                          |  |
| Total Annual Kwh Savings (Kwh/year)  |   | 1,641 kWh  |                          |  |
| Current Electrical Tariff (\$/Kwh)   |   | \$0.19 \$/kWh                                    |                          |  |
| Annual Cost Savings From All Refrigerators (\$\$)  |   | \$307 \$\$                                       |                          |  |
| Total Installation Cost Including, Eco Friendly Disposal Of Existing Refrigerator (\$\$) |   |  |                          |  |
| 2<br>No. of Units  | \$50<br>Disposal Tax  | \$561<br>Unit Cost                               | \$1,222 \$<br>Total Cost |  |
| Simple Return on Investment  |   | 3.98 Yrs   |                          |  |
| <b>Note-</b> Average Life of a Refriferator is 15 Years                                  |   |  |                          |  |
| <i>Type of Recommendation</i>  |   | Capital Cost ECM Recommendation                  |                          |  |

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