Building the Hospital of the Future: Making Smart Investments

Baystate Medical Center
Springfield, MA

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Presenters

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President and CEO
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Baystate Medical Center Campus

Prior to Construction

Baystate Health Overview

Overall:
• Three hospitals
• 70+ medical practices & clinics
• $1.5m annual revenue
• 10,000 employees
• Managed care organization

Recognitions:
• 2011 Thomson-Reuters Top 15 mid-size healthcare systems
• Top 100 integrated healthcare system for last 10 years
Baystate Medical Center

Overview:
- Primary hospital of Baystate Health
- Academic medical center
- Tertiary center for Western Massachusetts
- 716 licensed beds
- 116,000 ED visits/year
- 2 million square feet
- Outpatient campus - half mile away

Recognitions:
- LeapFrog Group Top 40 Hospital
- Magnet Hospital designation in 2006 and 2010

2001 Master Plan Program Priorities

Outpatient Services
- Cancer
- Imaging
- Consolidation of services

Inpatient Program Priorities
- Inpatient bed replacement
- Surgery
- Endoscopy
- Emergency Department
- Heart and Vascular
- Imaging
- Parking

2001 Master Plan Program Result

- Expansion of Outpatient Campus
- D’Amour Center for Cancer Care (2004)
- Rehabilitation Center (2006)
- Outpatient Surgery Center (2011)
- Outpatient Imaging Center (2012)

2006 Master Plan Program Priorities

- Inpatient Bed Replacement
- Heart and Vascular Care
- Surgery
- Imaging
- Emergency Department
- Children’s Hospital
- Support Services
2006 Master Plan Program Result

Baystate Medical Center’s “Hospital of the Future”
640,000 gsf building with phased fit-out and shell space

Hospital of the Future

Phase 1 - Heart & Vascular & Beds Replacement (2012)
640,000 building
303,000 gsf fit-out
$251M total cost
Phase 2 – Emergency Dept (2012)
77,000 gsf fit-out
$45M total cost
Phase 3 – Beds Replacement (2015/6)
80,000 gsf fit-out
$44M total cost
Remaining Phases (schedule TBD)
180,000 gsf fit-out
Budget TBD

Guiding Principles

- Comprehensive Design Plan
  - Develop complete design through Schematic Design, then phase fit-out
- Sustainability, following Green Guide to Healthcare
- Healing Environment that reinforces the Six Aims of IOM
  - Safety
  - Effectiveness
  - Patient Centered
  - Timeliness
  - Efficiency
  - Equity
- Enhance the teaching environment
- Provide flexibility to support innovative care models

Reasons for Shell Space - Site Constraints

- Last buildable site adjacent to other patient care buildings
- Residential zoning for hospital - requires special permit for new construction
- Residential on 3 property lines
- Wetlands on east border
- Historically significant building restricted buildable area
Reasons for Shell Space - Construction Disturbance

Campus
- Construction Traffic
- Vibration to existing buildings
- Dust, Noise
- Utility work

Neighborhood – one 3 year construction period versus multiple construction periods

Reasons for Shell Space - Funding and Costs

Flexibility – Fit-out as funds and program require

Less Long-term Cost – economies of scale for shell ($120/sf +/- marginal add for shell space)

Inflation at time of decision (2006/7) was high, so discounted future cost of a second, later building was higher than building now

2008 Financial Crisis Testing Validity of Approach

Scenario in September 2008:
- Site work contract awarded April 2008 and underway
- Sub-contractor bids for shell and fit-out due September to November 2008
- Demolition of existing building underway
- Planned to sell bonds November 2008

Baystate Reaction (October 2008 to January 2009):
- Continued site work with own equity, delaying selling of bonds
- Re-analyzed program volume and revenue projections from scratch
- Re-assessed condition of existing buildings if we cancelled project
- Explored multiple options of smaller building with less or no shell space

Result:
- February 2009 Board decision to continue with project
- Implemented VE options (e.g. reduced fit-out by 2 OR’s)
- Reduced fit-out by 2 OR’s and other marginal items ($3M reduction)
- Delayed bonds to May 2009
- Increased New Market Tax Credit bonds from $20M to $70M
- Accelerated Emergency Department (Phase 2) by 3 years
The Hospital of the Future

640,000 sf replacement facility

- 96-192 Medical Surgical Beds (5-6-7)
- 30-72 Intensive Care Beds (3-4)
- 50 Pediatric Beds (3-4)
- 12 Cardiovascular Surgery ORs (2)
- 24 General Surgery ORs (2)
- Emergency Department / Imaging (1)
- Staff Support (B-1)
- CSP / Support (B)

Smart Planning & Smart Investments

- Master Planning for Mechanical Systems & Equipment
  - MEP Systems Needed to be Flexible (First Cost vs. Expandable)
  - N+1 Criteria for General Mechanical Equipment
  - N+1 Requirements for Operating Rooms
  - Master Planning Strategy – Phasing
  - Blocking & Massing of Building – Building & Program Optimization
The Hospital of the Future

Substations
- Double ended substations were provided each for the west wing, south wing, and chiller plant normal power.
- Single ended substations were provided each for the west wing, south wing, and chiller plant essential power.
- Each wing has 2 sets of closets that stack through the building for both normal and essential power distribution.

Shell spaces
- West wing, south wing, and pediatric wing shell spaces have temporary panels for small power and lighting, and the electrical closets are ready for future equipment.
- The pediatric wing temporary panels for small power and lighting are served from the south wing substation for phase 1.

Future equipment
- When the pediatric wing is fit out, the new pediatric wing substations will be installed in reserved spaces in the basement.
- Electrical closets within shell spaces will be fit out with new branch distribution to meet program requirements.

Chiller Plant

<table>
<thead>
<tr>
<th>Description</th>
<th>Installed Capacity (Tons)</th>
<th>Load (Tons)</th>
<th>Spare Capacity (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller Plant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase One Only</td>
<td>2900</td>
<td>1000</td>
<td>NA</td>
</tr>
<tr>
<td>(2) 1000 ton chillers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiller Plant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase One and E/O</td>
<td>2400</td>
<td>1500</td>
<td>NA</td>
</tr>
<tr>
<td>(2) 1000 ton chillers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiller Plant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase One and E/O (4) 2500</td>
<td>2400</td>
<td>1500</td>
<td>300</td>
</tr>
<tr>
<td>(2) 1000 ton chillers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiller Plant</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Phase One and E/O (with added 4th chiller)</td>
<td>4000</td>
<td>2012</td>
<td>1028</td>
</tr>
<tr>
<td>(4) 1000 ton chillers</td>
<td></td>
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</table>
### Boiler Plant

<table>
<thead>
<tr>
<th>Description</th>
<th>Installed Capacity (BHP)</th>
<th>Load (BHP)</th>
<th>Spare Capacity (BHP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler Plant Phase One Only</td>
<td>1500</td>
<td>420</td>
<td>340</td>
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<tr>
<td>(3) 500 BHP Boilers</td>
<td></td>
<td></td>
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<tr>
<td>Boiler Plant Phase One and ED (no added fourth tower)</td>
<td>1500</td>
<td>360</td>
<td>150</td>
</tr>
<tr>
<td>(3) 500 BHP Boilers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler Plant Phase One and ED (with added fourth tower)</td>
<td>2000</td>
<td>360</td>
<td>650</td>
</tr>
<tr>
<td>(4) 500 BHP Boilers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler Plant Fail Build Out (with added fourth boiler)</td>
<td>2500</td>
<td>1200</td>
<td>240</td>
</tr>
<tr>
<td>(4) 500 BHP Boilers</td>
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</tbody>
</table>

### Emergency Power

<table>
<thead>
<tr>
<th>Description</th>
<th>Installed Capacity (kW)</th>
<th>Load (kW)</th>
<th>Spare Capacity (kW)</th>
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</thead>
<tbody>
<tr>
<td>Emergency Generators Phase One Only</td>
<td>3000</td>
<td>1350</td>
<td>220</td>
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<tr>
<td>(2) 1500 kW generators</td>
<td></td>
<td></td>
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<tr>
<td>Emergency Generators Phase One and ED (no added generator)</td>
<td>3000</td>
<td>1824</td>
<td>94</td>
</tr>
<tr>
<td>(2) 1500 kW generators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Generators Phase One and ED (with added third generator)**</td>
<td>4000</td>
<td>1824</td>
<td>1396</td>
</tr>
<tr>
<td>(5) 1500 kW generators</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### AHU Riser

### Chiller Plant Flow Diagram
Thematic Language and Interpretation

Hospital of the Future

A Healing Rhythm

Rhythm of Color
Rhythm of Nature
Rhythm of Life
Rhythm of Innovation
Rhythm of Continuity

First Floor – New Emergency Department (Phase 2)

First Floor – Emergency Department
**Size Comparison of New ED to Existing ED**

<table>
<thead>
<tr>
<th></th>
<th>New ED</th>
<th>Existing ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>60,000sf</td>
<td>20,000sf</td>
</tr>
<tr>
<td>Visits/yr.</td>
<td>115,000</td>
<td>115,000</td>
</tr>
<tr>
<td>Trauma Rms</td>
<td>3 (2 pt. ea)</td>
<td>1</td>
</tr>
<tr>
<td>Treatment Spaces</td>
<td>94 Rooms</td>
<td>48 Bays</td>
</tr>
</tbody>
</table>

**New ED Summary Space Program**

- 3 Trauma Rooms (for 2 pt. each for surge capacity)
- 1 Pedi Resuscitation Room
- 17 Pedi Treatment Rooms
- 20 Urgent Care Rooms (GTA)
- 8 Behavioral Health Rooms (separate pod)
- 8 Adult Rooms
- 94 Rooms

Total Project Area = 77,000 SF

**ED Central Floor Plan**

**Second Floor Plan**
Applying New Acoustic Guidelines

- Single bed/same handed rooms
- “Back of House” noisy activities/spaces remote from patient rooms
- Triple glazing near helipad plus added structural mass
- Pt. visible w/ pt. room door closed
- Tested New Acoustic Guidelines for room noise levels and wall construction

Applying New Acoustic Guidelines

- Sound absorbing and cleanable materials researched
- Family gathering space away from patient rooms
- Mechanical system design to provide background noise levels supporting patient privacy
- Noisy mechanical spaces remote from patient rooms
Thank You.

Questions?

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