Minnesota State Capitol Preservation

Presentation to the Capitol Preservation Commission
December 8, 2011
Capitol Preservation Commission
Guiding Principles

Commission Directions

• Work within Building Footprint

Guiding Principals

• Architectural Integrity
• Effective Building Function of State Business
• Life Safety and Accessibility
Agenda Item 2

UPDATE ON MECHANICAL & ELECTRICAL ASSESSMENT
Mechanical Electrical Plumbing
Guiding Principles

• Architectural Integrity
  – Respectful of historic significance
  – Repair / replace aged infrastructure

• Effective Function for State Business
  – Provide modern standard of function

• Life Safety and Accessibility
  – Improve health and safety
  – Meet Code and legal requirements
  – Minnesota B3 / 2030 guidelines
MEP Systems - Existing

• Maintained and Managed Well, however:
  – Cass Gilbert ventilation systems were open windows and natural ventilation – impractical today.
  – Retrofitted systems do not ventilate all areas of the building – not code compliant.
  – Recirculation of interior air only, creating an unhealthy environment.
  – Leaking Pipes are a risk to damage the building.
  – Aged systems - higher costs for maintenance and energy use.
Conditions of Existing Systems

- **Ventilation Systems** – The building has been retrofitted over the years to where today it has 32 air handling units. These units are primarily located in the basement. Two units have been installed on the roof to serve the House and Supreme Court assembly areas. The systems serving the rotunda and the grand stairs areas do not have a direct source of outside air ventilation and originally relied on natural air flow through the building.

**Recommendation:** The systems should be removed and replaced to provide a modern standard of function and to make ready for the next 100 years.
Conditions of Existing Systems

• **Plumbing Systems** – The current systems are original in many areas and have reached their expected life.

• **Water distribution** - was upgraded in 1984, however, the system pipe materials include copper and galvanized steel. Over the years dissimilar materials have created corroding and leaking of joints.

• **Hot Water** - heated from district energy to temperatures of 110 Deg. F for general use and 140 Deg. F for the kitchen. A booster is used for the dishwasher to reach 180 Deg. F.

• **Storm, waste and vent piping** - uses a combination of materials. Leaks in accessible locations are repaired as needed.

**Recommendation:** The systems should be removed and replaced to make ready for the next 100 years.
Conditions of Existing Systems

• **Building Controls** – Have been updated over time for direct digital control of most of the central systems. Pneumatic systems remain at terminal devices.

• **Fire Protection** – Approximately 1/3 of the building total floor area has been retrofitted with a fire protection system.

**Recommenation:** Building controls and a complete Fire Protection plan should be part of the restoration.
Conditions of Existing Systems

• **Communication/Data** – The communication and data systems are run “as needed” currently. This need to be reworked to provide more efficient distribution of service. Wireless need to also be configured.

• **Electrical Service** - Current service in to the building is 208 volt. The building is set for 13.8 KV, with the utility vaults outside of the Capitol. Transition to 480 volt should be relatively straight forward.

**Recommendation:** Building communication/data systems need to be upgraded. The electrical service can be reused, however, the distribution wiring and panels should be replaced to provide a modern standard of function.
Conditions of Existing Systems

• **District Energy Service** – the building heating and cooling is provided by St. Paul District Energy. Service piping enters the building in the northwest corner of the building. Currently there is a project underway to improve the hot water service entrance and distribution piping.

**Recommendation:** The district energy services are in good condition and can be re-used to the greatest extent possible.
MEP Challenge

• Effective preservation planning requires a strategy of renovation to integrate engineered systems to provide a modern standard of function with no modification to the historic fabric.
MEP Approach

• Modern systems require connectivity throughout the building. The challenge is make connections where none were intended.
  – Outside Connections
  – Equipment Locations
  – Horizontal Distribution
  – Vertical Distribution
ENGINEERING STUDY OPPORTUNITIES

- Outside Air / Relief
- Equipment Space
- Air Handling Units
- Horizontal Distribution
- Vertical Distribution

BASEMENT

Existing Electrical Vault for New 480-Volt Service
District Energy Heating Service
District Energy Cooling Service
ENGINEERING STUDY OPPORTUNITIES

- Outside Air / Relief
- Equipment Space
- Air Handling Units
- Horizontal Distribution
- Vertical Distribution

1ST FLOOR
ENGINEERING STUDY OPPORTUNITIES

- Outside Air / Relief
- Equipment Space
- Air Handling Units
- Horizontal Distribution
- Vertical Distribution

2ND FLOOR
ENGINEERING STUDY OPPORTUNITIES

- Outside Air / Relief
- Equipment Space
- Air Handling Units
- Horizontal Distribution
- Vertical Distribution

3RD FLOOR
Typical Attic
Exterior of Dome
Rooftop Equipment
# Building Needs Summary

<table>
<thead>
<tr>
<th>FLOOR</th>
<th>AREA SERVED</th>
<th>DESCRIPTION</th>
<th>SYSTEM TYPE</th>
<th>AREA (SQ FT)</th>
<th>MIXED AIR SYSTEM SUPPLY AIR GYM</th>
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MEP Systems Study

• Two System Approaches:
  – **Mixed Air System** – a traditional approach of re-circulating building air mixed with a portion of fresh air. Requires standard size ductwork and equipment.
  – **De-coupled Cooling Systems** – new more efficient approach delivers a high concentration of fresh air for ventilation. Less air is circulated requiring smaller equipment and ductwork. Devices located in each room provide temperature control.
Mixed Air Systems

• **Advantages**
  – Chilled water piping routed to centralized locations
  – All new systems work within the building footprint
  – Reasonably efficient to operate
  – Systems capable of air side free cooling
  – Cleans up roof of existing mechanical equipment

• **Challenges**
  – Maintaining effective mechanical service areas
  – Integrating horizontal/vertical distribution into the design
  – Integration of the exterior duct enclosures
  – Smoke management system approach
De-coupled Cooling Systems

• **Advantages**
  – Smaller equipment and ductwork easier to integrate into design
  – All new systems work within the building footprint
  – Central unit heat recovery/better energy performer
  – Most outside air intakes located on the roof
  – Smaller outside air connections
  – Cleans up roof of existing mechanical equipment

• **Challenges**
  – Integration chilled beams into ceiling or wall design
  – Integration of the exterior duct enclosures
  – Integrating horizontal/vertical distribution into the building
  – Smoke Management Systems approach.
INTERVIEWS & FUNCTIONAL DIAGRAM FINDINGS
Committee Rooms and Conference Committee Rooms

- There is a majority that feel that additional rooms that are well organized would serve the public and legislature better.
- The building columns impose limitation on these spaces.

*In the Restoration, spaces should be identified that limit the number and location of columns.*
Finding From the Diagramming Exercise

The Capitol’s configuration limits collaboration with Members and Constituents

• Having Senators spread throughout the Capitol makes it hard on constituents and first time visitor to easily find senators.

• Collaboration between Senators is planned rather than naturally occurring due to physical locations.

Restoration should consider improving the physical relationships.
Finding From the Diagramming Exercise

The Capitol is the Peoples House

- School Buses and loading and unloading creates problems for both security and tours, staging and movement.
- Visitors expect to see government in action in the capitol and see the Capitol as the focal point of the legislative session.

_The restoration should accommodate school buses as well as providing better accommodations for visitors to witness the session._
Finding From the Diagramming Exercise

Acoustics and Technology is lacking

• Acoustics within the Committee rooms and some Conference Committee rooms need to be improved for the Public to better participate.

• Technology for Presentation needs to be provided as a standard for the Committee Rooms.

• Communications systems (wifi) should be provided

Restoration should improve on acoustics and technology.
Finding From the Diagramming Exercise

Proximity of House Chamber to the Senate Chamber

- Critical to move information physically between the bodies quickly (minutes).
- Physical configuration of the building limits this by forcing people to move through the crowded public spaces.

The building remodel should facilitate this movement.
Finding From the Diagramming Exercise

100 year Focus – the Capitol will benefit Minnesota for many years to come

• “...it is about doing what is right for the people of Minnesota for the next 100 years.”

• All decisions from office location and occupancy to materials and equipment should be considered to be 100 years decisions.

The restoration should be a 100 year restoration
Acceptance

ACCEPTANCE OF FINDINGS
Agenda Item 4

FUNCTIONAL COMPARISON WITH OTHER CAPITOLS
Functional Comparison with other Capitols

The following Capitols were used in the analysis because they have been through some level of Restoration:

- California
- Idaho
- Kansas
- Michigan
- Oklahoma
- South Carolina
- Texas
- Utah
- Virginia
- Washington
- West Virginia
- Wisconsin
## Minnesota Legislature

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<td><strong>Senators in Capitol</strong></td>
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<td>55% of the Senate (37)</td>
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<td>31% Leaders (38)</td>
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<td>23% Have None (47)</td>
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<td><strong>total House members</strong></td>
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<td>15% Have None (112)</td>
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<td><strong>Committee Rooms</strong></td>
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## Minnesota Executive/Judiciary

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Agenda Items 5

SCENARIO DISCUSSION
Reduced Useable Square Footage

- Mechanical & Electrical
- Restrooms
- Exit Stairways
- Returned Public Space
- Possible additions or expansions to existing Committee and Committee Conference Rooms
Basement Available Space
First Floor Available Space
Second Floor Available Space
Third Floor Available Space
### Other Space Changes

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<td>24,908 SF</td>
<td>28,566 SF</td>
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<td>Second</td>
<td>19,562 SF</td>
<td>12,036 SF</td>
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<td>Third</td>
<td>20,324 SF</td>
<td>13,515 SF</td>
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<td><strong>Totals</strong></td>
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<td><strong>174,272 SF</strong></td>
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A General Reduction of Square Footage is due to:
1. Stairs (Required – Code)
2. Restrooms (Required – Code)
3. Mechanical, Electrical and Plumbing (Required by Code, Life Safety)
4. Meeting Space (Flexibility)
Possible Proposed Uses

• Staff – Legislative – Partisan vs. Non Partisan
• Senate Leadership
• Senate Committee Chair
• Senate Majority
• Full Senate
• Constitutional Office Holders
• More Meeting Space
• Education Space
• Public Space
Scenarios

What Scenarios Should be investigated?
Agenda Item 6

NEXT STEPS
Estimating Process

• Benchmark study for general understanding
  – Average $163,000 at $600.00 SF
  – Minnesota $198,000 at $523.00 SF
• Estimator has walked the building
• Building Square footage breakdown
  – Historic
  – Public
  – Functional
• Mechanical/Electrical concept progressing
• Scope Development is underway (Discussions)
Approximate Square Footages

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<tr>
<td>Second Floor</td>
<td>59,500 sf</td>
</tr>
<tr>
<td>Third Floor</td>
<td>43,750 sf</td>
</tr>
<tr>
<td>TOTAL</td>
<td>358,000 sf</td>
</tr>
</tbody>
</table>

Current Public Space: 84,250 sf
Historic Public Space: 91,750 sf

Minnesota State Capitol
Public Space Allocation
Approximately 117,292 sf Total

- Public Space: 8,015 sf
- Historic Space: 3,331 sf
- Meeting Space: 0 sf
- Office Space: 105,946 sf

Minnesota State Capitol - Basement Floor
Restoration Space Definition
Approximately 68,460 sf Total

Public Space: 30,649 sf
Historic Space: 0 sf
Meeting Space: 15,093 sf
Office Space: 22,718 sf

Minnesota State Capitol - Ground Floor
Restoration Space Definition
Approximately 67,140 sf Total

- Public Space: 29,067 sf
- Historic Space: 3,548 sf
- Meeting Space: 9,617 sf
- Office Space: 24,908 sf

Minnesota State Capitol - First Floor
 Restoration Space Definition
Approximately 59,609 sf Total

- Public Space: 13,969 sf
- Historic Space: 19,701 sf
- Meeting Space: 12,753 sf
- Office Space: 13,186 sf

Minnesota State Capitol - Second Floor
Restoration Space Definition
Approximately 43,778 sf Total

- Public Space: 8,088 sf
- Historic Space: 9,706 sf
- Meeting Space: 11,319 sf
- Office Space: 14,665 sf

Minnesota State Capitol - Third Floor
Restoration Space Definition
Budget Next Steps

• Identify large cost Items
  – Decorative Painting
  – Historic Materials Restoration
    • Windows, Stone & Plaster
  – Lighting
    • Historic Restoration
    • New Historic Family Fixtures
    • New High performance fixtures
  – Exterior Stone Restoration and Repair
Non Code Compliant items

Stairways and doors
• Handrails on the steps
• Tread to riser ratio
• Panic hardware on the doors
• Obstructions in the hallways
• Travel distance (evacuation route)

Lighting, Signage, Cameras, Notification Systems
• Emergency lighting
• Emergency exit signs
• Security cameras
• Motion detectors
• Notification system
Budget Wrap Up

• Determine Rough order magnitude costs from both existing work on Capitol and other similar project on other capitol.
• Compute general space costs
• Mechanical/Electrical Costs
• Repair and Renovation Costs
• Provide Contingency of 10% for unknown conditions
• Escalate to mid point of Construction
• Finalize the Budget.
Budget Questions

• Furniture – Provide New or Reuse Existing?
• Technology – Teleconference, Video Meetings?
• Swing Space – Should this be included?
• Opening Costs – What type of grand reopening do you want?
• Communication or Public Relation costs?
Next Steps

- Scheduling Subcommittee Meetings
- Next Full Commission Meeting January 11, 10am-12pm
- Report to Legislature due January 15, 2012
- Resources:
  - [www.admin.state.mn.us/recs/capitol/capbldg.html](http://www.admin.state.mn.us/recs/capitol/capbldg.html), and
  - Future Legislative Coordinating Commission website