Table of Contents

Executive Summary .............................................................................................................................................. 3
Overview............................................................................................................................................................... 4
Facility Condition Index (FCI) ............................................................................................................................... 5
Assessment Sequence ......................................................................................................................................... 5
2010-2011 Goals .................................................................................................................................................. 6
2010-2011 Results................................................................................................................................................ 6
2010-2011 Findings.............................................................................................................................................. 7
2011-2012 Goals .................................................................................................................................................. 7
Priority Class ......................................................................................................................................................... 8
  Graph 1: System Category by Priority Class for Surveyed Buildings ..............................................................8
  Graph 2: 15 Buildings with Higher FCI's .................................................................................................11
  Graph 3: 15 Buildings with Lower FCI's .................................................................................................11
2010-2011 Data Summary Table by Building .....................................................................................................12
2010-2011 Campus Data Summary Table .........................................................................................................15
2010-2011 FCAP Infrastructure Data Summary .................................................................................................16
Project Class ....................................................................................................................................................... 18
  Graph 4: Project Class by Priority Class for Surveyed Buildings ..............................................................18
  Graph 5: APPA Recommended Funding vs. Actual Funding 2001-2010 ...................................................21
Projection Modeling ............................................................................................................................................ 22
  Model 1: Campus Condition Over 20 Years at Average Funding Level .........................................................22
  Model 2: Funding Required to Reduce FCI Over 20 Years ...........................................................................23
  Model 3: Reinvestment Rate at 1.3% to Hold Backlog for 10 Years ..............................................................24
  Model 4: How FCI is Affected by Various Funding Rates over 20 Years ....................................................25
Facilities Assessment Checklist ..........................................................................................................................26
Status Maps........................................................................................................................................................ 29
Executive Summary

The FCAP team assesses the condition of campus buildings and identifies capital renewal and deferred maintenance needs. Corrective projects with cost projections are developed to address the identified deficiencies. Projects are assigned priorities based on urgency of need, which facilitates short- and long-term planning for major repair and replacement of equipment and buildings.

NCState University Property

Extends statewide in support of the university’s land-grant mission.

- 1170 Buildings = 16,700,000 GSF
- Current Replacement Value (CRV) = $3,847,097,508

Core Campus Buildings

FCAP is chiefly concerned with Main Campus, Centennial Campus, and Centennial Biomedical Campus.

- 452 Buildings = 14,448,536 GSF
- CRV = $3,801,550,063

Conditions of Surveyed Buildings

- 150 Surveyed Buildings = 6,825,668 GSF
- Project Costs in Surveyed Buildings = $339,843,338
- CRV of Surveyed Buildings = $2,149,439,872
- Facility Condition Index (FCI) of Surveyed Buildings = .158108

Conditions Campus-Wide

Data obtained from surveyed buildings is extrapolated to indicate the condition of the unsurveyed balance.

- 302 Unsurveyed Buildings = 7,622,868 GSF
- Project Costs in Unsurveyed Buildings = $261,211,607
- Project Costs Campus-Wide (Surveyed + Unsurveyed) = $601,054,945

Funding History

- Repair and Renovation Funding for Fiscal 2010-2011 = $11,112,500 (.0035 of CRV)
- Average Repair and Renovation Funding (2001-2010) = $10,136,554 500 (.0031 of CRV)

Book Values vs. NCSU Model Values

- CRVs reported in the AERES database are insurance values developed by NCDOI and UNC-GA, and are comparatively lower than CRVs produced by an NCSU model based on design and construction costs by building type.
- Analysis of this data establishes that the AERES values are ~80% of the NCSU model values. The FCI based on APPA values is adjusted downward to .158108; this indicates “poor condition” per APPA standards.

Recommendations

- Per APPA, an FCI of .10 or higher indicates poor condition. If the 10-Year Average Funding Level is maintained, by 2031 the backlog will rise to $1,300,000,000 and the campus-wide FCI will reach .39.
- Two reinvestment funding models are recommended, one to hold the FCI steady for 10 years, and one to reduce it to .09 (good condition) over 20 years.
Overview

The NCSU Facilities Condition Assessment Program is staffed by a cohesive team of professionals knowledgeable in structural design, building construction methods, and code requirements, and specifically trained in building assessment procedures. The findings from each facility assessment, with the team’s recommendations for repair, renovation, and improvement projects, are published and then uploaded to the AERES database. Color-coded maps which track the progress of the assessment team across campus have been developed and are included in this report. This year, with new management, both the scope of the team’s mission and the assessment process have been expanded to produce more informative reports with more detailed information beyond just the age and condition of major system components to now include thermal images, footcandle readings, and other documentation methods to describe those conditions. A secondary list of proposed projects is also included, from which maintenance work orders can be generated and future energy savings can be captured.

To date, the FCAP team has assessed 150 buildings, approaching one half of the targeted ~325 state-appropriated and combination-funded buildings of the core campus. The data collected from the surveyed buildings is extrapolated to indicate campus-wide conditions. The maintenance backlog is growing steadily, which is to be expected due to the general growth of the university, but the rising backlog of deferred maintenance continues to grow disproportionately faster than facility replacement values. Campus-wide FCI (currently .158108) will continue to rise in the absence of sustained and predictable maintenance funding. Graphs are provided herein to project the possible outcomes of alternate funding models.
Facility Condition Index (FCI)

The FCAP database is developed in the ISES software application. An early version of the application was in use at NCSU until late 2009, when it was reviewed on a trial basis in comparison to an alternate vendor’s product. FCAP made the decision to continue working with the ISES product, and an updated version of the ISES application was installed in early 2010. The database is continually updated with new information; the database also contains some older reports by outside contractors, which will be re-evaluated per the proposed sequence of assessments just as in-house outdated reports are replaced.

According to the National Association of College and University Business Officers in “Managing the Facilities Portfolio”, the FCI has become the industry standard tool by which facility conditions are measured and compared. The FCI represents a ratio of the proposed remediation project costs to the current replacement value of the facility (FCI = Deficiencies/CRV), and is used by many public and private colleges and universities, and other large institutions to gauge the overall condition of their assets. Acceptable ratio limits vary depending on the software application used and the goals of the individual institutions. NCSU FCAP uses the FCI values developed and recommended by APPA, as shown below:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Ratio Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Condition</td>
<td>Under .05</td>
</tr>
<tr>
<td>Fair Condition</td>
<td>05 to .10</td>
</tr>
<tr>
<td>Poor Condition</td>
<td>Over 0.10</td>
</tr>
</tbody>
</table>

Assessment Sequence

A sequence in which buildings are to be assessed has been developed and is modified as needed. No set schedule exists, although the sequence does contain square footage targets per calendar quarter. The FCAP group makes every effort to adhere to the sequence, but unscheduled activities outside of regular assessments can have a direct impact on exactly when specific buildings are assessed. The team contributes to a number of unit projects, coordinates work of outside contractors, conducts peer reviews of others’ work, and assesses new or pending acquisitions as requested. As the sequence of assessments is subject to change, it is best to contact the FCAP team directly with any questions regarding when any specific facility will be assessed.

Staining and suspected mold at Price Music Center due to leaking roof drainage assembly concealed in soffit
2010-2011 Goals

- Continuously update the ISES database, compiling data by building, by groups of buildings, and by campus
- Update standard procedures and incorporate emerging technology to make best use of time and resources
- Continue to complete building assessments to improve ratio of assessed to non-assessed facilities
- Update checklist protocol for improved inspector efficiency and reporting consistency
- Provide costs for interim projects in lieu of funding for more comprehensive renovations
- Identify potential energy-saving upgrades; provide initial costs and payback data
- Additional activities as required
- Publish an annual report

2010-2011 Results

The FCAP database continues to evolve year-to-year. As stated above, the current focus of the program centers on state appropriated academic, administrative, research, laboratory and support facilities. Data for remaining unsurveyed facilities is extrapolated from the known data obtained in the completed assessments. Athletic, Residential, and most other self-liquidating facilities have been removed from the database for this year’s report, so that the data produced will be more indicative of the condition and funding needs of this subset of the campus facilities. Data scrubbing may make it difficult to compare the dollar amounts in this year’s report to previous reports or to make other linear comparisons, but the relative percentages remain useful to track trending; this newer data collection and reporting methodology will form the basis of future reports. The FCAP procedures manual has been updated to include procedures and templates developed and implemented over the past year, including an item-by-item checklist designed to streamline survey and reporting efforts and to provide a more consistent product at the time of publication (a sample is attached at end of this report). Assessments are initiated by contacting the respective Building Liaisons and concluded with delivery of annotated floor plan updates to the Office of the University Architect. The most recent reports are more concise and include clearer instructions regarding interpretation of the data. One bound reference copy of each report is maintained in the FCAP library, and all reports are routinely uploaded to the AERES database. Minor maintenance issues are reported to the Facilities Customer Service Center, and the resultant work orders are tracked through completion by administrative staff.

A longstanding FCAP goal has been to offer receipt-based services to receipt-based university auxiliary units including University Housing, Dining, and Athletics. Two such assessments have been completed this period, as requested by AVC Alex Miller (Price Music Center) and Centennial Campus Development (Partners I). The FCAP team has participated in additional activities beyond its core mission, providing contributions to the R&R annual report, and assisting with the March 2011 NCAPPA Conference, hosted by NC State. Peer reviews were conducted of two facility assessments performed by outside vendors: Heery International’s report on the Dorothea Dix Council Building, and the Populous report on the RBC Center. The program’s scope has broadened to include assisting with the University’s energy compliance program; energy-related findings are currently reported on an appendix page at the end of each report, presenting footcandle readings and thermal images, and suggesting projects such as lighting upgrades and projects to achieve greater efficiencies. Conditions are documented where T12 lighting could be upgraded to T8 or LED, or where common areas and informal lounge/study areas could be equipped with light sensors to turn off lighting fixtures during times of abundant daylight; cost savings and paybacks are projected.
2010-2011 Findings

Each building assessment considers the following topics, or systems, and remediation project are proposed for each, ranked here per their highest to lowest portion of the total projected costs. Over 50% of total costs are represented by the top two system categories:

<table>
<thead>
<tr>
<th>System</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Systems</td>
<td>30.8%</td>
</tr>
<tr>
<td>Electrical Systems</td>
<td>19.3%</td>
</tr>
<tr>
<td>Interior / Finishes</td>
<td>14.6%</td>
</tr>
<tr>
<td>Exterior / Finishes</td>
<td>14.2%</td>
</tr>
<tr>
<td>Plumbing Systems</td>
<td>7.3%</td>
</tr>
<tr>
<td>Fire / Life Safety</td>
<td>5.7%</td>
</tr>
<tr>
<td>Health</td>
<td>4.4%</td>
</tr>
<tr>
<td>Accessibility</td>
<td>2.9%</td>
</tr>
<tr>
<td>Vertical Transportation</td>
<td>0.7%</td>
</tr>
<tr>
<td>Site</td>
<td>0.2%</td>
</tr>
<tr>
<td>Security</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

2011-2012 Goals

- Continue to retain, recruit, hire, and train full-time employees as needed
- Continue to update and improve the quality of information in the ISES database
- Continue to update procedures to incorporate new ideas which make best use of limited resources
- Continue to generate electronic and printed reports of assessments and recommendations
- Accomplish assignments as required, and participate in additional activities as time permits
- Continue to broaden customer base across campus
- Publish an annual report summarizing FCAP activities and accomplishments

Open junction box and rusted electrical components in the corrosive environment of the Monteith wastewater treatment facility
Priority Class

Priority 1 - Currently Critical (Year 1)
Projects in this category require immediate action:
• Return a facility to normal operation
• Halt accelerated deterioration
• Correct a cited safety hazard
• Building energy repairs (controls, lighting IAQ)
• In-depth inspections of HVAC and electrical services
• Review whether current space condition suits current use (classroom, office, lab)

Priority 2 - Potentially Critical (Years 1 – 3)
Projects in this category, if not corrected, will become critical within 1 to 3 years.
• Intermittent power interruptions
• Rapid deterioration
• Potential safety hazards

Priority 3 - Necessary – Not yet critical (Years 3 – 5)
Projects 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 4 - Recommended (Years 5 – 10)
Projects in this category include items that represent a sensible improvement to existing conditions or replacement of items nearing the end of their anticipated life cycle. These items will improve overall usability and/or reduce long-term maintenance.

Graph 1: System Category by Priority Class for Surveyed Buildings
This graph shows relative priorities of need within each topic addressed by FCAP. Summaries by each system are provided on the following pages. The largest share of costs for Deferred Maintenance and Capital Renewal is ranked as Priority 3 (Not Yet Critical, 3-5 Years), followed by those ranked Priority 2 (Potentially Critical, 1-3 Years). Deficiencies are prioritized by urgency of need: nearly 80% of all proposed actions are recommended to take place within the next 5 year period.
Several cracks in the brick veneer of Admin II are monitored with strain gauges for movement.
The graphs on this page illustrate which campus buildings scored the highest and lowest FCI. These charts are created from the surveyed building data without regard for building size, usage, or relative importance.

**Graph 2: 15 Buildings with Higher FCI’s**

**Graph 3: 15 Buildings with Lower FCI’s**
<table>
<thead>
<tr>
<th>Building Number</th>
<th>Building Name</th>
<th>Capital Renewal CR</th>
<th>Deferred Main DK</th>
<th>Deferred Main CRX</th>
<th>Plant Adapt. PA</th>
<th>Total Costs (kB)</th>
<th>GSF</th>
<th>Cost (kB) / Sq. Ft.</th>
<th>APPA RATES</th>
<th>APPA CRV</th>
<th>FPCI CRV (Net)</th>
<th>FPCI CRV (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td></td>
<td>$238,317</td>
<td>$0</td>
<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
<td>1.03</td>
<td>1.03</td>
</tr>
<tr>
<td>002</td>
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<td>$238,317</td>
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<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
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<td>13,165</td>
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<tr>
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<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
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<td>1.03</td>
</tr>
<tr>
<td>004</td>
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<td>$238,317</td>
<td>$0</td>
<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
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<tr>
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<td></td>
<td>$238,317</td>
<td>$0</td>
<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
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<td>1.03</td>
</tr>
<tr>
<td>006</td>
<td></td>
<td>$238,317</td>
<td>$0</td>
<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
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<tr>
<td>007</td>
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<td>$238,317</td>
<td>$0</td>
<td>$0</td>
<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
<td>1.03</td>
<td>0.08</td>
<td>13,165</td>
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<td>1.03</td>
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<tr>
<td>008</td>
<td></td>
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<td>$238,317</td>
<td>$238,317</td>
<td>$13,165</td>
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<td>0.08</td>
<td>13,165</td>
<td>1.03</td>
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</tbody>
</table>

**Notes:**
- The table continues with similar data for each building.
<table>
<thead>
<tr>
<th>Building Number</th>
<th>Building Name</th>
<th>Capital Cost</th>
<th>Annual Maintenance</th>
<th>Plant Seal. Fee</th>
<th>Total Costs (GSE)</th>
<th>Cost (GSE/Ru/Pl)</th>
<th>GF</th>
<th>APPA M.T.B.S</th>
<th>APPA C.R.Y</th>
<th>APPA M.T.B.S/APPAC.R.Y</th>
<th>APPA M.T.B.S/APPAC.R.Y</th>
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<td>Medical Center</td>
<td>$301,467</td>
<td>$56,673</td>
<td>$27,202</td>
<td>$385,342</td>
<td>$187,671</td>
<td>$99</td>
<td>$134,024</td>
<td>$200,990</td>
<td>$187,671</td>
<td>$187,671</td>
</tr>
<tr>
<td>113</td>
<td>Biomedical Research Lab</td>
<td>$305,439</td>
<td>$58,643</td>
<td>$26,645</td>
<td>$390,727</td>
<td>$195,364</td>
<td>$101</td>
<td>$137,410</td>
<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
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<tr>
<td>112</td>
<td>Cancer Research Laboratory</td>
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<td>$57,632</td>
<td>$26,643</td>
<td>$391,706</td>
<td>$195,853</td>
<td>$105</td>
<td>$140,073</td>
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<tr>
<td>111</td>
<td>Medical Science Lab</td>
<td>$309,413</td>
<td>$58,622</td>
<td>$26,643</td>
<td>$390,678</td>
<td>$195,364</td>
<td>$101</td>
<td>$137,410</td>
<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
</tr>
<tr>
<td>117</td>
<td>Research Laboratory</td>
<td>$307,421</td>
<td>$58,638</td>
<td>$26,643</td>
<td>$390,706</td>
<td>$195,364</td>
<td>$101</td>
<td>$137,410</td>
<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
</tr>
<tr>
<td>118</td>
<td>Bioinformatics Building</td>
<td>$309,413</td>
<td>$58,622</td>
<td>$26,643</td>
<td>$390,678</td>
<td>$195,364</td>
<td>$101</td>
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<td>$204,150</td>
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<td>Molecular Biology Research Lab</td>
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<td>$390,706</td>
<td>$195,364</td>
<td>$101</td>
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<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
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<tr>
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<td>$56,673</td>
<td>$27,202</td>
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<td>$99</td>
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<td>$195,364</td>
<td>$101</td>
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<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
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<tr>
<td>123</td>
<td>Biomedical Research Building</td>
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<td>$26,645</td>
<td>$390,727</td>
<td>$195,364</td>
<td>$101</td>
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<td>124</td>
<td>Medical Science Building</td>
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<td>$58,638</td>
<td>$26,643</td>
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<td>$101</td>
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<td>$204,150</td>
<td>$195,364</td>
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<tr>
<td>125</td>
<td>Research Laboratory</td>
<td>$305,439</td>
<td>$58,643</td>
<td>$26,645</td>
<td>$390,727</td>
<td>$195,364</td>
<td>$101</td>
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<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
</tr>
<tr>
<td>126</td>
<td>Bioinformatics Building</td>
<td>$307,421</td>
<td>$58,638</td>
<td>$26,643</td>
<td>$390,706</td>
<td>$195,364</td>
<td>$101</td>
<td>$137,410</td>
<td>$204,150</td>
<td>$195,364</td>
<td>$195,364</td>
</tr>
</tbody>
</table>
# 2010-2011 Campus Data Summary Table

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AERES Values</td>
<td>AERES Values</td>
<td>AERES Values</td>
<td>APPA Values</td>
</tr>
<tr>
<td>Total Campus GSF</td>
<td>11,648,420</td>
<td>12,325,225</td>
<td>13,857,902</td>
<td>14,448,536</td>
</tr>
<tr>
<td>Surveyed Buildings GSF</td>
<td>4,192,675</td>
<td>5,298,133</td>
<td>5,931,162</td>
<td>6,825,668</td>
</tr>
<tr>
<td>Current Replacement Value (CRV) of Campus per APPA</td>
<td>$2,397,333,440</td>
<td>$2,663,166,005</td>
<td>$2,926,545,680</td>
<td>$3,801,550,063</td>
</tr>
<tr>
<td>Current Replacement Value (CRV) of Surveyed Buildings per APPA</td>
<td>$1,062,811,680</td>
<td>$1,392,402,314</td>
<td>$1,615,659,802</td>
<td>$2,149,439,872</td>
</tr>
<tr>
<td>Current Project costs in Database</td>
<td>$354,658,266</td>
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<td>$374,845,060</td>
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</tr>
<tr>
<td>Deferred Maintenance Cost Per Sq.Ft. of Surveyed Buildings</td>
<td>$43</td>
<td>$53</td>
<td>$54</td>
<td>$50</td>
</tr>
<tr>
<td>Deferred Maintenance (CR+DM) Costs in Surveyed Buildings</td>
<td>$163,423,122</td>
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<td>$291,312,326</td>
<td>$311,821,290</td>
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<tr>
<td>Plant Adaptation Costs in Surveyed Buildings</td>
<td>$16,314,968</td>
<td>$23,485,832</td>
<td>$25,577,970</td>
<td>$28,022,048</td>
</tr>
<tr>
<td>Total Deferred Maintenance plus Plant Adaptation Costs</td>
<td>$179,738,090</td>
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<td>Deferred Maintenance % of CRV for Surveyed Buildings</td>
<td>15.38%</td>
<td>18.60%</td>
<td>18.00%</td>
<td>14.51%</td>
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<td>Plant Adaptation % of CRV for Surveyed Buildings</td>
<td>1.54%</td>
<td>1.69%</td>
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<td>1.30%</td>
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## Cost Projections

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<td>AERES Values</td>
<td>AERES Values</td>
<td>APPA Values</td>
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<td>Unsurveyed Campus GSF</td>
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<td>Unsurveyed Campus CRV</td>
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<td>Estimated Deferred Maintenance of Unsurveyed Building</td>
<td>$205,202,592</td>
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<td>Estimated Plant Adaptation of Unsurveyed Buildings</td>
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<td>Total Estimated Costs for Unsurveyed Buildings</td>
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<td>$272,534,716</td>
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<td>Total Costs-Surveyed and Unsurveyed Campus Buildings</td>
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<td>Infrastructure Costs</td>
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<td>Grand Total</td>
<td>$673,560,800</td>
<td>$694,512,210</td>
<td>$673,829,096</td>
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# 2010-2011 FCAP Infrastructure Data Summary

**NCSU Facilities Division**

**Utilities Services**

**2010 - 2011 FCAP Annual Report**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Project Title</th>
<th>Project Description</th>
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</table>

Total Project Costs: $116,625,000

Total Campus Asphalt, Curbs, Sidewalks: $2,669,738

Total Infrastructure Costs: $119,294,738

Total Project Costs: $70,035,000

Total Campus Asphalt, Curbs, Sidewalks: $2,739,151

Total Infrastructure Costs: $72,774,151
Flatbed-mounted packaged chillers supplement undersized equipment at Montelith
Project Class

**Capital Renewal:** A subset of regular or normal facility maintenance which refers to major repairs or the replacement and/or rebuilding of major facility components based upon expected life cycles (e.g., roof replacement at the end of its normal useful life is capital repair / capital renewal; roof replacement several years beyond its normal useful life is deferred maintenance). The routine replacement of aging/obsolete equipment/material accounts for nearly half of all probable costs.

**Deferred Maintenance:** Refers to expenditures for repairs which were not accomplished as a part of normal maintenance or capital repair, and which have accumulated to the point that facility deterioration is evident and could impair the proper functioning of the facility. Cost estimates for deferred maintenance projects should include compliance with current applicable codes, even if such compliance requires expenditures beyond those essential to affect the needed repairs. Deferred maintenance projects represent “catch up” expenses.

**Plant Adaptation:** Refers to expenditures required to adapt the physical plant to the evolving needs of the institution and/or to changing codes or standards. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by new teaching or research methods, and improvements to accompany the adoption of modern technology (e.g., personal computer networks).

**Routine Maintenance:** Refers to the day-to-day efforts to control deterioration of facilities through scheduled repetitive activities (e.g., cleaning), periodic scheduled work (e.g., inspections, equipment adjustments, filter replacement, painting) and minor repairs made on an as-needed basis. This type of work is not addressed in FCAP reports unless routine maintenance cycles appear to be insufficient or inadequate. Work Orders are created in the AiM work management system.

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**Graph 4: Project Class by Priority Class for Surveyed Buildings**

Graph 4 shows project costs classified as CR, DM, or PA, and when those costs are projected to occur over the 10-year window of this assessment. Summaries by each system are provided on the following pages.
Graph 5: APPA Recommended Funding vs. Actual Funding 2001-2010

Graph 5 compares APPA’s recommended reinvestment rate (approximately 3% of CRV) to the funding received by the NC State Facilities Division during the time period 2001-2010. The current process for obtaining funding produces the erratic pattern on the graph (red line), and makes it difficult to plan effectively for future needs of the campus. The upper line (blue) illustrates a pattern that steadily increases maintenance funding along with growth in the size and value of the campus, keeping pace with backlog growth and effectively controlling the FCI of campus assets at a favorable level while precluding further accumulation of a deferred maintenance backlog. Repair and Renovation funding for fiscal 2010-2011 is $11,112,500.00. The average Repair and Renovation funding obtained by NC State through 2001-2010 is $10,136,554.

Deteriorated Steam Piping Insulation at Poe Hall
Projection Modeling

Model 1: Campus Condition Over 20 Years at Average Funding Level
Model 1 illustrates the effect of the 10-year average funding on campus maintenance backlog and FCI over a 20 year period. If the average funding is maintained, the backlog will grow and the FCI will rise.

Adding VFD’s to aging condenser pumps at Monteith would improve their efficiency
Model 2: Funding Required to Reduce FCI Over 20 Years

Model 2 shows the recommended funding to reduce the campus FCI to within industry standards from .20 (poor condition) to .09 (fair condition) over a twenty year period. This model represents a gradual increase in reinvestment in five year divisions beginning with 1.9% of CRV and steadily increasing to the recommended standard of at least 3.0% of CRV. The backlog and FCI both decrease.
Model 3: Reinvestment Rate at 1.3% to Hold Backlog for 10 Years

Model 3 demonstrates the effect of a steady reinvestment rate at 1.37% of CRV to hold the FCI steady for approximately ten years and then gradually rising, to address a growing campus and a growing list of deficiencies and project costs as identified by the program.

Starting this year, electrical distribution panels are routinely scanned with an infrared camera during each building condition assessment. Thermal differentials are shown to be within acceptable limits in an IR image of this secondary distribution panel at Monteith.
Model 4: How FCI is Affected by Various Funding Rates over 20 Years

- 1.3% of CRV for 10 years = $41,400,000 annually
- 1.9% of CRV rising to 3% over 20 years = $60,500,000 rising to $107,000,000 annually
Facilities Assessment Checklist

FCAP Inspector ________________________________
Building Number ______________________________
Building Name ________________________________
Date _______________________________________

Fire and Life Safety
- Fire alarm panel(s)
- Fire alarm devices horn / strobes, (also in restrooms?), pull stations, etc.
- Generator, Transfer switch or Kirk key interlock
- Exit lights - Type of lamp-upgrade to LED?
- Power source? Placement/obstructions?
- Emergency egress lights – Type, sufficient quantity, power source
- Fire ratings (doors, walls, partitions, automatic doors, hold-opens.)
- Sprinkler system – standpipe, fire pump, jockey pump, fire pump controller, sprinkler head placement

Health
- Asbestos, lead-based paint
- Mold, dampness, inadequate ventilation
- Evidence of fumes, odors, spills
- Evidence of vermin, birds, pests

Accessibility
- Entrance doors, exit doors, automatic door openers
- Parking, ramps,
- Interior door handles / knobs/ levers
- Accessible route inside building
- Corridor widths
- Stairs, hand rails, areas of rescue assistance
- Elevators - Call buttons, Braille, lanterns, emergency communications panel
- Drinking fountains number, model, locations
- Toilet rooms - fixture counts, door widths, stall size, toilet seat heights, flush valve positions, grab bars, mirrors, sink heights, faucet style, pipe insulation, accessories and placement per reach range and hazardous locations
- Signage - Door signs, per university standard, Specialties - area of rescue assistance, etc, general wayfinding

Exterior Systems
- Roof system, type and condition - also flashings, coping, parapet, worker safety conditions/ fall protection, overhanging trees.
- Warranty?
- Drainage - gutters, scuppers, collectors, downspouts, etc.
- Fascia, trim, ornament, historical info
- Foundation, type, materials, conditions
- Superstructure – lead with distinguishing features – Identify architect, historical context?
- Building type - masonry, steel, precast
- Joints – masonry, metals, windows and doors
- Control joints in brick veneer, shelf angles/weeps, sills
- Windows – Type, square footage, age (check seal for date of manufacture)
- Doors - Quantity, type, condition - Service doors, Entry/exit doors
- Chiller - size, condition, type, quantity
- Chilled water pump(s), Condenser pump(s)
- Boiler(s)- size, quantity, condition, fuel, type, feed pumps, de-aerator, chemical waste treatment, and condensate stations
- Hot water pump(s), quantity
- Steam converter(s), quantity - District, central, local?
- Steam loop - District, central, local
- Hot water loop- District, central, local
- Reheats (usually with VAV or Mixing boxes)
- Preheats (usually on air handlers)
- Insulation, type and condition
- DX units
- Air handler units – outside/inside condition
- Energy Management System status
- Controls (DDC, pneumatic, et al.)
- VAV boxes
- VFDs
- Exhaust fans, general and toilet
- Fume hoods, other specialty exhausts
- Meters (chilled water, hot water, steam, condensate, potable hot and cold. etc.)
- Process gasses, fluids
- Manufacturer, model number, and serial number on all major assets
- Identify potential energy efficiency projects
- Service entrance transformer
- Main breaker, MDP
- Service gear (housing)
- Distribution gear
- Conduit
- Secondary load centers
- Secondary transformers
- Lighting – Lamp type, T-12 or T-8, LED, fixture quantities, footcandle readings
- Devices
- Wiring methods / wire composition
- Any unsafe conditions?
- Infrared Camera Photos – coordinate access with High Voltage
- Manufacturer, model number, and serial number on all major assets
- Identify potential energy efficiency projects
Interior Systems
- Functionality and space utilization (occupancy types - labs, offices, classrooms, gyms, other)
- General conditions, exceptions
- Doors and hardware
- Signage
- Finish materials - Ceilings, walls, floors throughout each type of space – appropriate?
- Condition? Improvements to recommend?

Plumbing
- Visible supply and drainage piping - copper, galvanized, ductile iron,?
- Domestic water heater(s), size, type, condition
- Supply - Back flow preventer?
- Toilet Room fixtures - age, condition, GPF rates. Functional? ADA-OK?
- Hot water circulation pumps
- Waste - Bell and spigot, No-hub?
- Insulation, type, condition
- Manufacturer, model number, and serial number on all major assets

Site
- Grading and drainage issues
- Landscaping, trees, flower beds, plantings, lawns
- Walkways, curb cuts, railings
- Parking spaces
- Adjacent structures
- Exterior lighting

Vertical Transportation
- Elevator type, quantity (traction, hydraulic)
- Interior cab finish
- Wheelchair lift
- Manufacturer, model number, and serial number on all equipment.

Security
- Security system hardware components, functioning
- General safety concerns, exterior lighting improvements
- Personal safety, opportunities for concealment

General
- Check ISES for obsolete projects

Followup
- Status map update
- Upload to AERES
- TY note to Liaison
- Annotated drawings/corrections to OUA
- Space utilization issues to OUA

The Honeywell fire alarm panel at West Dunn was manufactured in 1958 and is the oldest system on campus

Air handlers mounted above clean rooms at Monteith cannot be easily accessed from the floor below or the catwalk above

Supply diffusers at 3709 Hillsborough Street are blocked to force airflow further downstream