

# Repair for Success: An Analysis of the Need and Possibilities for a Federal Investment in PK-12 School Maintenance and Repair

Prepared by the 21<sup>st</sup> Century School Fund  
November 16, 2009

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A new national commitment to address the deferred maintenance and renewal of our nations PK-12 public school buildings will improve our education system, the economy and the environment. A \$27 billion investment, just 10% of the minimum estimated total need, would take us a major step closer to ensuring that the nearly 55 million staff and students who attend school daily are in healthy, safe and educationally appropriate environments. This investment will also quickly create between 160,000 and 235,000 jobs<sup>1</sup> that will protect our environment and sustain the public infrastructure investments made by earlier generations.

In 1995 the GAO did an extensive survey and analysis and found that America needed \$113 billion (\$216 billion in today's construction dollars) to bring its school building inventory into good repair. Although the U.S. expended nearly \$550 billion (\$770 billion in 2008 dollars)<sup>2</sup> for public school construction from 1995 to 2007, most of these funds were to build new schools and additions to meet the space needs of the 4.8 million additional public school students added to our system during this time.

While thousands of new buildings were built, the 88,000 existing buildings and grounds were neglected. Most school districts were unable to catch up or keep up with the maintenance, repair or capital renewals needed to support the health, safety or educational requirements of staff and students.

Through a detailed analysis of what school districts have spent on maintenance, repair, and capital renewals, the 21<sup>st</sup> Century School Fund found that since 1995 the nation has not reduced its level of deferred maintenance. In fact nationally, using a conservative estimate and extremely modest standards, deferred maintenance in our PK-12 public school buildings has grown from \$216 to \$271 billion. This is an average of about \$41 per square foot of space and about \$5,400 per student. A more aggressive estimate pegs the total national deferred maintenance, repair and renewal needs of our public school buildings at \$650 billion.

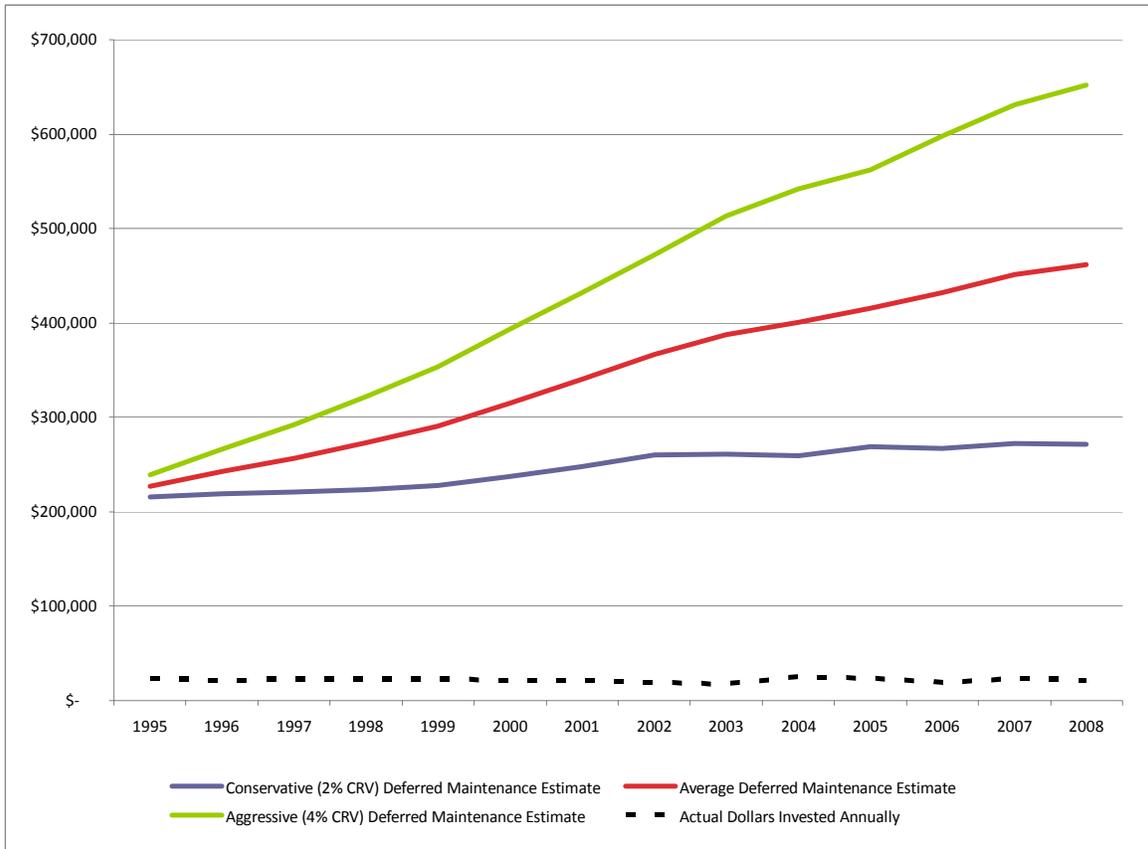
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<sup>1</sup> Job estimates created using ranges of direct jobs from JOBMOD2.1: A Comprehensive Model for Estimating Employment Generation from Federal-Aid Highway Projects; Technical Documentation, Boston University Center for Transportation Studies, July 2006; Chief Economist, US Army Corps of Engineers, October 2008; "The Economic Impact of Implementing the Cincinnati Public Schools' Facilities Master Plan on Greater Cincinnati," Jeff Rexhausen, Economics Center for Education and Research, University of Cincinnati, April 2003.

<sup>2</sup> U.S. Census Bureau, Governments Division, K-12 Public School Capital Outlay 1994-95 to 2006-07, includes construction and total equipment, but omits interest and land costs.

## US Public School Building Maintenance, Repair & Renewal Expenditures and Deferrals, 1995-2008

(All values adjusted to 2008 dollars and show in hundreds of thousands)



Chronic deferred maintenance, repair and capital renewals can result in unsafe drinking water, health risks from mold and poor air quality, outdated or inoperable alarm systems, compromised security from inoperable locks, reduced curricular and extra curricular offerings as specialized spaces like gyms and pools are closed due to poor maintenance, and danger from structural problems. Conditions like these throughout our nation's nearly 100,000 public schools make up the \$271 billion in deferred maintenance. Without adequate funds, school buildings are maintained as part of a "run to fail" system—neglecting preventive and routine maintenance and doing upgrades and replacements of major building systems, components and finishes only in response to crisis.



Through Your Lens, Student Photo 2009: [www.throughyourlens.org](http://www.throughyourlens.org)

An investment in public school maintenance, repair and renewal will yield valuable benefits for our public education system, for our environment, and for our economy:

- **For Education** - There is consistent evidence that if you provide a quality physical environment for teaching and learning, student performance is improved. Quality teachers are attracted to and remain in better facilities, attendance for students and teachers is improved, and students can concentrate and learn better in quality buildings. Investing in school maintenance and repair can support our nation's efforts to dramatically improve the results of our public education system.
- **For the Environment** - The labor and natural resources embodied within our public school buildings – most of which are over 40 years old – are important assets, which can be sustained or squandered. Maintenance and renewal of existing buildings means lower operating costs for energy use and preserves valuable resources, reducing landfill waste and demand for new construction materials.
- **For our Economy** - The work of maintaining, repairing and renewing our public school buildings will be labor intensive. Making progress on the most critically needed maintenance, repair and renewal efforts with an federal investment of \$27 billion, just 10% of the minimum estimate for deferred maintenance, repair and renewals can provide important productive work to between 160,000 to 235,000 people in the private and public sectors. This would essentially be employment for 2-3 people per school across the country – a manageable infusion of labor for school districts all with projects ready to be undertaken immediately. If we match these investments to those districts most in need of maintenance and repair efforts, these funds will also be targeted at low-income communities most in need of educational improvements and economic support.

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*The 21<sup>st</sup> Century School Fund would like to acknowledge and thank the following people who provided data and input into the development of this issue brief: Joe Agron, American School & University Magazine; Judy Marks, National Clearinghouse for Educational Facilities; Roger Newell, International Brotherhood of Teamsters; Lee Prevost, SchoolDude.com; Mark Wantage, Ohio School Facilities Commission; Jim Wilson, JFW Inc; and Roger Young, Young & Associates.*

*The opinions expressed in this issue brief and any errors in the calculations or assumptions are solely the responsibility of the 21<sup>st</sup> Century School Fund. For more information, please email [info@21csf.org](mailto:info@21csf.org) or visit <http://www.21csf.org>.*

## Estimate of Deferred Maintenance, Repairs and Renewals of US Public School Buildings, 1995-2008

		Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999	Fall 2000	Fall 2001
<b>(All figures in 1,000 except maintenance and new construction costs per Square Foot)</b>								
<b>Enrollment (1)</b>								
Pre-Kindergarten - 8th (Elem/Middle School)		32,341	32,764	33,073	33,346	33,488	33,688	33,938
9th-12th (High School)		12,500	12,847	13,054	13,193	13,369	13,515	13,734
<b>Total Enrollment (2007 and 2008 projected)</b>		<b>44,840</b>	<b>45,611</b>	<b>46,127</b>	<b>46,539</b>	<b>46,857</b>	<b>47,204</b>	<b>47,672</b>
<b>Building Square Footage (2)</b>								
	<b>SF Standard</b>							
Elementary/Middle Schools	120	3,880,860	3,931,726	3,968,772	4,001,496	4,018,605	4,042,596	4,072,514
High Schools	165	2,062,497	2,119,699	2,153,875	2,176,809	2,205,847	2,230,014	2,266,151
<b>Total Building Square Footage</b>		<b>5,943,357</b>	<b>6,051,425</b>	<b>6,122,647</b>	<b>6,178,305</b>	<b>6,224,453</b>	<b>6,272,610</b>	<b>6,338,666</b>
<b>Expenditures on Existing Facilities</b>								
Maintenance Cost per SF (3)		\$ 1.43	\$ 1.31	\$ 1.17	\$ 1.19	\$ 1.25	\$ 1.05	\$ 0.80
Maintenance & Repair		\$ 8,499,000	\$ 7,927,367	\$ 7,163,497	\$ 7,352,184	\$ 7,780,566	\$ 6,586,241	\$ 5,070,933
Capital Renewals (4)		\$ 3,577,132	\$ 3,571,769	\$ 5,019,676	\$ 5,419,187	\$ 5,735,232	\$ 6,535,733	\$ 6,842,437
<b>Total Expenditures</b>		<b>\$ 12,076,132</b>	<b>\$ 11,499,136</b>	<b>\$ 12,183,173</b>	<b>\$ 12,771,371</b>	<b>\$ 13,515,798</b>	<b>\$ 13,121,974</b>	<b>\$ 11,913,370</b>
<b>Current Replacement Value (CRV) of Existing Buildings (5)</b>								
New Construction Cost per SF Elementary/Middle Schools		\$ 100	\$ 110	\$ 113	\$ 117	\$ 123	\$ 145	\$ 142
New Construction Cost per SF High School Schools		\$ 98	\$ 109	\$ 96	\$ 123	\$ 139	\$ 159	\$ 159
Replacement Value Elementary/Middle Schools		\$ 388,086,012	\$ 432,489,882	\$ 448,471,236	\$ 466,174,298	\$ 494,288,459	\$ 584,155,139	\$ 578,297,028
Replacement Value High Schools		\$ 202,124,677	\$ 231,047,198	\$ 206,771,986	\$ 267,747,551	\$ 306,612,763	\$ 354,572,216	\$ 360,318,075
<b>Total Replacement Value</b>		<b>\$ 590,210,689</b>	<b>\$ 663,537,080</b>	<b>\$ 655,243,222</b>	<b>\$ 733,921,849</b>	<b>\$ 800,901,222</b>	<b>\$ 938,727,356</b>	<b>\$ 938,615,103</b>
<b>Industry Standard for Maintenance and Renewals (6)</b>								
	<b>Industry Standard</b>							
Low Estimate "Cost of Ownership" (2% of CRV)	2%	\$ 11,804,214	\$ 13,270,742	\$ 13,104,864	\$ 14,678,437	\$ 16,018,024	\$ 18,774,547	\$ 18,772,302
High Estimate "Cost of Ownership" (4% of CRV)	4%	\$ 23,608,428	\$ 26,541,483	\$ 26,209,729	\$ 29,356,874	\$ 32,036,049	\$ 37,549,094	\$ 37,544,604
<b>US General Accounting Office (GAO) Estimate of Total Deferred Maintenance, Repair and Renewals in 1995 (8)</b>								
In 1995 Dollars		\$ (113,000,000)						
Adjusted to 2008 Dollars		\$ (216,027,426)						
<b>Deferred Maintenance, Repair and Renewals</b>								
Low Estimate (2% of CRV)		\$ 271,919	\$ (1,771,606)	\$ (921,692)	\$ (1,907,066)	\$ (2,502,226)	\$ (5,652,573)	\$ (6,858,932)
High Estimate (4% of CRV)		\$ (11,532,295)	\$ (15,042,348)	\$ (14,026,556)	\$ (16,585,503)	\$ (18,520,251)	\$ (24,427,121)	\$ (25,631,234)
<b>Total Accumulated Deferred Maintenance @2%</b>		<b>\$ (112,728,081)</b>	<b>\$ (114,499,687)</b>	<b>\$ (115,421,379)</b>	<b>\$ (117,328,445)</b>	<b>\$ (119,830,672)</b>	<b>\$ (125,483,245)</b>	<b>\$ (132,342,177)</b>
<b>Total Accumulated Deferred Maintenance @4%</b>		<b>\$ (124,532,295)</b>	<b>\$ (139,574,643)</b>	<b>\$ (153,601,199)</b>	<b>\$ (170,186,702)</b>	<b>\$ (188,706,953)</b>	<b>\$ (213,134,074)</b>	<b>\$ (238,765,308)</b>
<b>Inflation Adjusted Totals (in 2008 dollars)</b>								
Low Estimate (2% of CRV)		\$ 538,034	\$ (3,386,863)	\$ (1,628,521)	\$ (3,369,561)	\$ (4,266,685)	\$ (9,219,932)	\$ (10,896,686)
High Estimate (4% of CRV)		\$ (22,818,471)	\$ (27,784,700)	\$ (25,908,433)	\$ (29,304,631)	\$ (31,579,909)	\$ (39,843,162)	\$ (38,807,014)
<b>Total Accumulated Deferred Maintenance @2%</b>		<b>\$ (215,489,392)</b>	<b>\$ (218,876,254)</b>	<b>\$ (220,504,775)</b>	<b>\$ (223,874,336)</b>	<b>\$ (228,141,022)</b>	<b>\$ (237,360,954)</b>	<b>\$ (248,257,641)</b>
<b>Total Accumulated Deferred Maintenance @4%</b>		<b>\$ (238,845,897)</b>	<b>\$ (266,630,597)</b>	<b>\$ (292,539,031)</b>	<b>\$ (321,843,661)</b>	<b>\$ (353,423,571)</b>	<b>\$ (393,266,732)</b>	<b>\$ (432,073,747)</b>

### Notes & Sources

- (1) National Center for Education Statistics (NCES) Table 3. Enrollment in educational institutions, by level & control of institution
- (2) PK-8th grade enrollment multiplied by 120 GSF and 9th - 12th grade enrollment by 165 GSF.
- (3) American School and University Annual Maintenance and Operations Cost Studies
- (4) McGraw Hill alterations and individual trades, equipment and materials.
- (5) Total GSF multiplied by cost of new construction (excludes site acquisition).
- (6) National Research Council "cost of ownership" for public buildings, 1990, field interviews.
- (7) Turner Construction Building Construction Index.
- (8) GAO estimate of deferred maintenance 1995: Condition of America's Schools.

## Estimate of Deferred Maintenance, Repairs and Renewals of US Public School Buildings, 1995-2008

	Fall 2002	Fall 2003	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Total
<b>(All figures in 1,000 except maintenance and new construction costs per Square Foot)</b>								
<b>Enrollment (1)</b>								
Pre-Kindergarten - 8th (Elem/Middle School)	34,116	34,202	34,179	34,205	34,221	34,589	34,903	
9th-12th (High School)	14,067	14,338	14,617	14,908	15,078	15,055	14,922	
<b>Total Enrollment (2007 and 2008 projected)</b>	<b>48,183</b>	<b>48,540</b>	<b>48,795</b>	<b>49,113</b>	<b>49,299</b>	<b>49,644</b>	<b>49,825</b>	
<b>Building Square Footage (2)</b>								
Elementary/Middle Schools	4,093,907	4,104,270	4,101,454	4,104,621	4,106,572	4,150,680	4,188,360	
High Schools	2,321,088	2,365,765	2,411,752	2,459,841	2,487,790	2,484,075	2,462,130	
<b>Total Building Square Footage</b>	<b>6,414,994</b>	<b>6,470,034</b>	<b>6,513,206</b>	<b>6,564,461</b>	<b>6,594,362</b>	<b>6,634,755</b>	<b>6,650,490</b>	
<b>Expenditures on Existing Facilities</b>								
Maintenance Cost per SF (3)	\$ 0.64	\$ 1.43	\$ 1.37	\$ 1.21	\$ 1.75	\$ 1.69	\$ 1.64	
Maintenance & Repair	\$ 4,105,596	\$ 9,252,149	\$ 8,923,093	\$ 7,942,998	\$ 11,540,133	\$ 11,212,736	\$ 10,906,804	\$ 114,263,295
Capital Renewals (4)	\$ 7,110,149	\$ 8,098,180	\$ 8,587,895	\$ 8,005,010	\$ 8,442,723	\$ 9,407,709	\$ 10,616,081	\$ 96,968,914
<b>Total Expenditures</b>	<b>\$ 11,215,745</b>	<b>\$ 17,350,329</b>	<b>\$ 17,510,988</b>	<b>\$ 15,948,008</b>	<b>\$ 19,982,856</b>	<b>\$ 20,620,445</b>	<b>\$ 21,522,885</b>	<b>\$ 211,232,209</b>
<b>Current Replacement Value (CRV) of Existing Buildings (5)</b>								
New Construction Cost per SF Elementary/Middle Schools	\$ 139	\$ 154	\$ 128	\$ 168	\$ 124	\$ 200	\$ 161	
New Construction Cost per SF High School Schools	\$ 158	\$ 118	\$ 120	\$ 180	\$ 169	\$ 175	\$ 154	
Replacement Value Elementary/Middle Schools	\$ 567,006,059	\$ 632,057,543	\$ 522,935,395	\$ 689,576,268	\$ 507,161,593	\$ 828,060,660	\$ 672,231,780	
Replacement Value High Schools	\$ 366,731,852	\$ 279,160,217	\$ 289,410,284	\$ 442,771,342	\$ 420,436,506	\$ 434,713,125	\$ 379,168,020	
<b>Total Replacement Value</b>	<b>\$ 933,737,910</b>	<b>\$ 911,217,761</b>	<b>\$ 812,345,679</b>	<b>\$ 1,132,347,610</b>	<b>\$ 927,598,098</b>	<b>\$ 1,262,773,785</b>	<b>\$ 1,051,399,800</b>	
<b>Industry Standard for Maintenance and Renewals (6)</b>								
Low Estimate "Cost of Ownership" (2% of CRV)	\$ 18,674,758	\$ 18,224,355	\$ 16,246,914	\$ 22,646,952	\$ 18,551,962	\$ 25,255,476	\$ 21,027,996	
High Estimate "Cost of Ownership" (4% of CRV)	\$ 37,349,516	\$ 36,448,710	\$ 32,493,827	\$ 45,293,904	\$ 37,103,924	\$ 50,510,951	\$ 42,055,992	
<b>US General Accounting Office (GAO) Estimate of Total Deferred Maintenance, Repair and Renewals in 1995 (8)</b>								
In 1995 Dollars	\$ (113,000,000)							
Adjusted to 2008 Dollars	\$ -							
<b>Deferred Maintenance, Repair and Renewals</b>								
Low Estimate (2% of CRV)	\$ (7,459,013)	\$ (874,026)	\$ 1,264,075	\$ (6,698,944)	\$ 1,430,894	\$ (4,635,031)	\$ 494,889	\$ (148,819,334)
High Estimate (4% of CRV)	\$ (26,133,771)	\$ (19,098,381)	\$ (14,982,839)	\$ (29,345,896)	\$ (17,121,068)	\$ (29,890,507)	\$ (20,533,107)	\$ (395,870,877)
Total Accumulated Deferred Maintenance @2%	\$ (139,801,190)	\$ (140,675,216)	\$ (139,411,142)	\$ (146,110,086)	\$ (144,679,192)	\$ (149,314,223)	\$ (148,819,334)	
Total Accumulated Deferred Maintenance @4%	\$ (264,899,079)	\$ (283,997,460)	\$ (298,980,299)	\$ (328,326,195)	\$ (345,447,263)	\$ (375,337,770)	\$ (395,870,877)	
<b>Inflation Adjusted Totals (in 2008 dollars)</b>								
Low Estimate (2% of CRV)	\$ (11,754,813)	\$ (1,373,002)	\$ 1,862,783	\$ (9,001,359)	\$ 1,742,672	\$ (5,241,373)	\$ 494,889	\$ (271,527,844)
High Estimate (4% of CRV)	\$ (40,392,791)	\$ (41,053,379)	\$ (28,144,023)	\$ (20,132,415)	\$ (35,740,080)	\$ (33,800,702)	\$ (20,533,107)	\$ (651,870,244)
Total Accumulated Deferred Maintenance @2%	\$ (260,012,453)	\$ (261,385,455)	\$ (259,522,672)	\$ (268,524,031)	\$ (266,781,360)	\$ (272,022,733)	\$ (271,527,844)	
Total Accumulated Deferred Maintenance @4%	\$ (472,466,537)	\$ (513,519,916)	\$ (541,663,939)	\$ (561,796,354)	\$ (597,536,434)	\$ (631,337,137)	\$ (651,870,244)	

<b>Key Comparative Statistics</b>	
Total Deferred Maintenance, Repairs & Renewals per Student (2008 Adjusted with 2% CRV)	\$ (5.450)
Total Deferred Maintenance, Repairs & Renewals per Student (2008 Adjusted with 4% CRV)	\$ (13.083)
Total Deferred Maintenance, Repairs & Renewals per Square Foot (2008 Adjusted with 2% CRV)	\$ (40.83)
Total Deferred Maintenance, Repairs & Renewals per Square Foot (2008 Adjusted with 4% CRV)	\$ (98.02)