

Executive Summary for Third Priority Projects (16-30 Years Old)

As part of a Prince George's County Public Schools (PGCPS) initiative, Parsons 3D/International (Parsons 3D/I), in association with three subcontractors, conducted a Level 1, General Facility Condition Assessment on 10 schools identified as Third Priority Projects (16-30 years old).

A Level 1, General Facility Condition Assessment is defined as an assessment of the various building systems that make up a facility; for example, foundation systems, structural systems, roofing systems, and HVAC systems. The work involves gathering information such as make, model, and installation dates of various systems. Deficiencies are generated at a systems level and are based on the system installation date and the expected useful life of the system.

The purpose of this assessment is to help PGCPS define deferred maintenance and capital renewal funding requirements. This assessment includes elementary schools, middle schools, high schools, and other facilities, totaling 584 thousand gross square feet with a replacement cost of \$149.46 million dollars.

According to the assessment, PGCPS' Third Priority Schools have an average Facility Condition Index (FCI) of 51.74%, which represents the relative physical condition of facilities (cost of needed repairs divided by replacement value). An FCI greater than 75% is considered poor by industry standards.

Deferred Maintenance Funding Need: The total rough order of magnitude budget required to address the current backlog of repair and renovations to Priority 3 school facilities is approximately \$77.33 million. This cost reflects, to a great extent, the aging condition of facilities.

Capital Renewal Funding Need: In addition to the current backlog, the future continuing aging of facilities and their systems will add approximately \$34.99 million in additional funding needed over the next 10 years. The current FCI of 51.74% would deteriorate to 75.15% if no funding was applied to renew expiring facility systems, as shown in the Figure 7 below.

This summary report summarizes the findings of all the Priority 3 school facilities assessed in 2007-2008 with the following reports:

- Cost Model
- Facility Condition Index (FCI)
- Deficiency Summary by Assembly
- Capital Renewal Summary
- Multi-scenario 10-year Funding Projections for Priority 3 Schools



Cost Model

The summary of the cost models developed for the building systems is noted below (See Attachment 1 for details):

Figure 1: Cost Model Summary at UNIFORMAT Level 1 for Priority 3 School Facilities

Systems	Unit Price\$ (Raw)	Unit Price\$	Unit of Measure	Qty	Renewal%	Renewal\$	Gen	Life	Installed	Calc Next Renewal	Next Renewal	CI%	Deficiency\$	Replacement Value	FC1%	Next Inspection
Total						\$156,824,349							\$77,245,373	\$156,028,222	50	
Substructure						\$9,071,287								\$9,071,287		
Shell						\$34,494,568							\$4,076,424	\$34,494,568	12	
Interiors						\$28,049,815							\$14,325,378	\$27,562,941	52	
Services						\$66,020,549							\$47,987,452	\$65,711,296	73	
Equipment & Furnishings						\$4,243,090							\$3,054,476	\$4,243,090	72	
Special Construction						\$5,673,579							\$6,614,702	\$5,673,579	117	
Building Sitework						\$9,271,461							\$1,186,941	\$9,271,461	13	

Figure 2: Cost Model Summary at UNIFORMAT Level 2 for Priority 3 Schools

Systems	Unit Price\$ (Raw)	Unit Price\$	Unit of Measure	Qty	Renewal%	Renewal\$	Gen	Life	Installed	Calc Next Renewal	Next Renewal	CI%	Deficiency\$	Replacement Value	FC1%	Next Inspection
Total						\$156,824,349							\$77,245,373	\$156,028,222	50	
Substructure						\$9,071,287								\$9,071,287		
Foundations						\$8,776,301								\$8,776,301		
Basement Construction						\$294,986								\$294,986		
Shell						\$34,494,568							\$4,076,424	\$34,494,568	12	
Superstructure						\$12,634,118								\$12,634,118		
Exterior Enclosure						\$10,825,293							\$3,024,675	\$10,825,293	28	
Roofing						\$11,035,157							\$1,051,749	\$11,035,157	10	
Interiors						\$28,049,815							\$14,325,378	\$27,562,941	52	
Interior Construction						\$10,481,500							\$2,606,393	\$10,481,500	25	
Stairs						\$101,606								\$101,606		
Interior Finishes						\$17,466,709							\$11,718,985	\$16,979,835	69	
Services						\$66,020,549							\$47,987,452	\$65,711,296	73	
Conveying						\$187,396							\$187,396	\$187,396	100	
Plumbing						\$7,709,997							\$5,970,609	\$7,709,997	77	
HVAC						\$39,226,299							\$28,718,364	\$38,932,262	74	
Fire Protection						\$2,766,950							\$2,262,636	\$2,766,950	82	
Electrical						\$16,129,907							\$10,848,447	\$16,114,691	67	
Equipment & Furnishings						\$4,243,090							\$3,054,476	\$4,243,090	72	
Equipment						\$4,243,090							\$3,054,476	\$4,243,090	72	
Furnishings																
Special Construction						\$5,673,579							\$6,614,702	\$5,673,579	117	
Special Construction						\$5,673,579							\$6,614,702	\$5,673,579	117	
Selective Building Demolition																
Building Sitework						\$9,271,461							\$1,186,941	\$9,271,461	13	
Site Preparation																
Site Improvements						\$1,606,948							\$543,338	\$1,606,948	34	
Site Mechanical Utilities						\$7,664,513							\$643,603	\$7,664,513	8	

Facility Condition Index

Using Condition Management Estimation Technology (COMET) software, we have used Facility Condition Index (FCI) and Extended Facility Condition Indices (EFCI) to score or rate facilities. Comparisons of facility condition can be made between any of the facilities in the County because these scores are calculated in a consistent manner from a common database.

a) Facility Condition Index:

One of the useful results of the assessment process is the determination of the Facility Condition Index (FCI). The FCI is a simple measurement of a facility's condition represented by the ratio of the cost to correct a facility's deficiencies to the current replacement value of the facility as shown in the following formula:

$$\frac{\text{Current Cost of Repairs}}{\text{Replacement Value}}$$

For example, if a building's replacement value is \$10,000,000 and the cost of correcting its existing deficiencies is \$5,000,000, the building's FCI is $\$5,000,000 \div \$10,000,000$, or 50 percent. The FCI is particularly useful when comparing similar facilities or schools within the same portfolio. Parsons 3D/I has assessed over a billion square feet for institutional and government clients across the country and, based on our experience, we have developed the following table (Table 1) for interpreting FCI results for schools.

Table 1: Interpreting FCI Results

Assessed Condition	FCI (Parsons - 3D/I Experience)
Good	0 to 40%
Fair	40 to 75%
Poor	> 75%

Compared to other school districts in Parsons 3D/I's historical database, the 51.74% FCI score for Priority 3 school facilities is fair, but trending towards poor.

b) Extended Facility Condition Index:

The Extended Facility Condition Index (EFCI) is similar in nature to the FCI with one exception. Whereas the formula for computing the FCI is the current cost of repairs divided by the replacement value of the facility, the EFCI calculation uses the following formula:

$$\frac{\text{Current Cost of Repairs} + \text{Projected Capital Renewal}}{\text{Replacement Value}} = \text{Total Deficiencies}$$

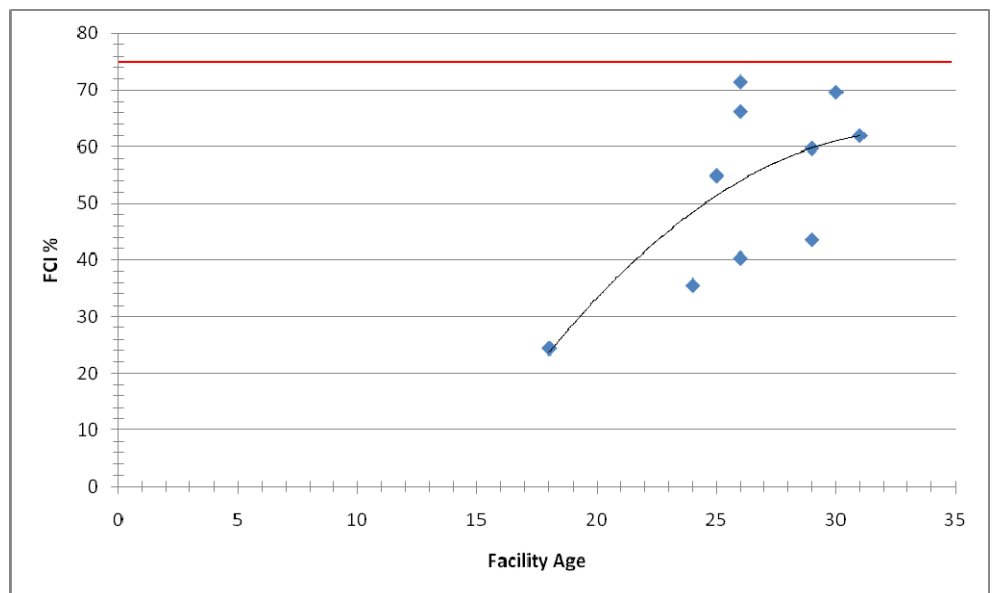
The estimated cost to repair current deficiencies at Priority 3 facilities is approximately \$77.33 million while the estimated replacement value of the facilities is approximately \$149.46 million. Table 2, Detailed Cost and FCI Analysis by Schools, provides an in-depth analysis of the assessment results by school type.

Table 2: Detailed Cost and FCI Analysis by Schools

Facility	Area	Deficiency	Replacement	FCI	EFCI
Grand Total	584,215	\$77,334,424	\$149,468,534	51.74%	75.15%
Priority 3 School Facilities (10 Facilities) Total	584,215	\$77,334,424	\$149,468,534	51.74%	75.15%
Priority 3 Elementary Schools (6 Schools) Total	349,403	\$42,722,372	\$86,206,330	49.56%	72.98%
Potomac Landing Elementary	60,596	\$9,913,070	\$14,256,415	69.53%	85.11%
Phyllis E. Williams Elementary	64,451	\$10,195,786	\$16,453,202	61.97%	80.95%
Riverdale Elementary	64,800	\$9,715,916	\$16,271,416	59.71%	80.22%
University Park Elementary	56,264	\$5,509,839	\$13,651,755	40.36%	70.69%
Mount Rainier Elementary	41,242	\$3,595,448	\$10,104,450	35.58%	66.97%
Bladensburg Elementary	62,050	\$3,792,313	\$15,469,092	24.52%	51.63%
Priority 3 Middle Schools (1 Schools) Total	120,800	\$12,428,703	\$28,490,793	43.62%	74.32%
Kettering Middle	120,800	\$12,428,703	\$28,490,793	43.62%	74.32%
Priority 3 Other Facilities (3 Facilities) Total	114,012	\$22,183,349	\$34,771,411	63.80%	81.24%
James Duckworth Center	41,480	\$8,672,361	\$12,145,638	71.40%	78.53%
Howard B. Owens Science Center	27,400	\$6,406,577	\$9,680,883	66.18%	76.04%
C. Elizabeth Rieg Center	45,132	\$7,104,411	\$12,944,890	54.88%	87.66%

Table 2 shows that the FCI ranges from 24.52% to 71.40%, which according to Table 1, Interpreting FCI Results, indicates facilities range from good to fair condition. Also from Figure 3, FCI by Building Age for Priority 3 School Facilities below, it is evident that most of the schools lie in between 40% and 75% FCI range and are in fair condition. The FCI information shown above is consistent with our experience considering the ages of the facilities we have evaluated.

Figure 3: FCI by Building Age for Priority 3 School Facilities



The accepted practice within the assessment field is to consider replacing rather than repairing a building when the FCI approaches or exceeds the 75% range. For facilities with an FCI in or near this range,

the master capital planning process should carefully weigh issues such as:

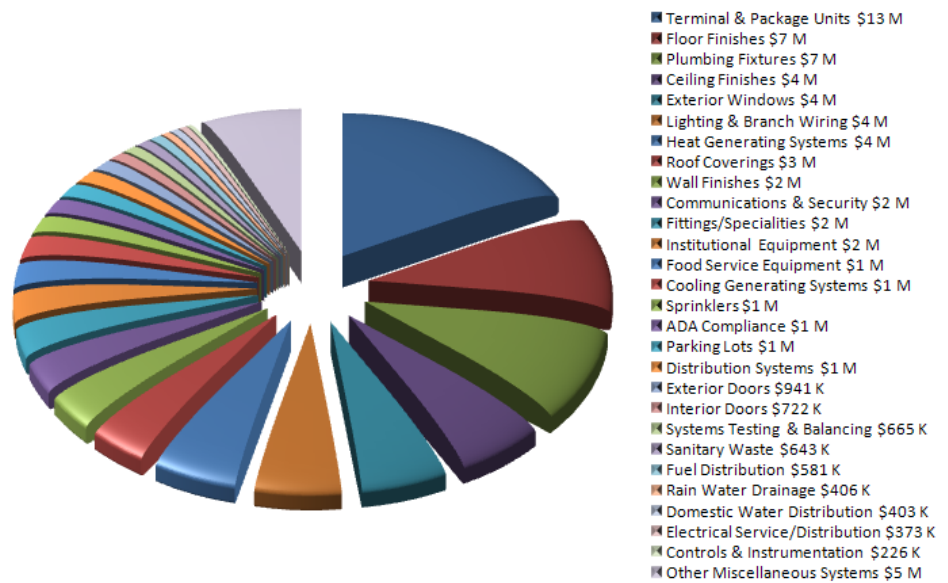
- Student population (current versus projected) of the school
- General condition of foundations and superstructures
- Needs for additional space
- Appropriateness of current location

There are no school facilities that lie above 75% range. The costs shown in Table 2 include upgrading all school building systems that are beyond their expected useful life and correcting current deficiencies.

Cost Estimate Summary by Building System

Much of the cost identified by this facility condition assessment is associated with **mechanical and electrical systems**. Costs pertaining to mechanical systems such as Terminal & Package Units are typically for adding or replacing unit ventilators, unit heaters, radiant heaters, window or through-the-wall air conditioners, heat pumps, air handling units, furnace, and rooftop air conditioners. Figure 4, Cost Estimate Summary by Building System for Priority 3 School Facilities, shows the percentage by system for correcting the deficiencies representing most of the cost for the Priority 3 facilities.

Figure 4: Cost Estimate Summary by Building System for Priority 3 School Facilities



See Attachment 3 for Deficiency Estimates for each individual assembly.

Other mechanical systems such as the heat generating systems include costs for repair or replacement of boilers, pipe insulation, and pumps; the cooling generating systems include chillers, cooling towers, evaporative coolers, pipe insulation, and pumps. The deficiency dollars associated with distribution systems include costs for replacing supply and return air systems, air handling units, ductwork, and exhaust

systems. The electrical system costs are typically associated with replacing service panels or branch circuit and replacing light fixtures.

In addition, **Food Service Equipment** is on average in poor condition and 65% of all food service equipment is beyond normal life expectancy, and most facilities do not comply with **ADA accessibility guidelines** due to their advanced ages.

Capital Renewal

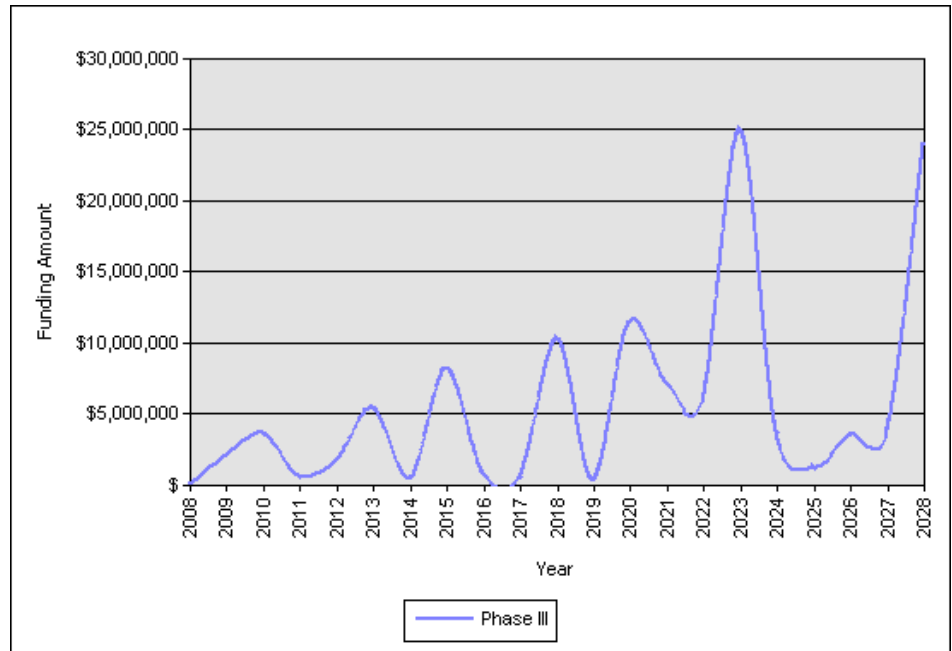
An integral part of this report is a look toward the future. Having identified today's needs, a forecast of future system depreciation was prepared. This forecast assists in the creation of budgets for future capital renewal requirements.

Future capital renewal requirements are estimated by taking the cost of a particular system renewal and forecasting the date of renewal by determining the expected life; we breakdown all building components in our cost models using this same logic. The information generated by the cost models allow us to assess the remaining life of each main system for every school and to forecast the expected time of replacement of those systems. Although the cost models do not provide perfect information, they do produce a reasonable approximation of the expected cost for system replacement. Figure 5, Capital Renewal Forecast for Priority 3 School Facilities, below shows the 20 year projection for capital renewal funding, excluding current deficiencies.

This process results in defining replacement projects needed in order to eliminate deferred maintenance and restore functionally obsolete facilities to usable condition. Over the life of a building, there are spikes in capital renewal due to building systems expiring and the need to reinvest in the building's functionality.

See Attachment 4 for renewal costs of building component systems, e.g., roofs, walls, plumbing systems, electrical systems, for all the schools.

Figure 5: Capital Renewal Forecast for Priority 3 School Facilities

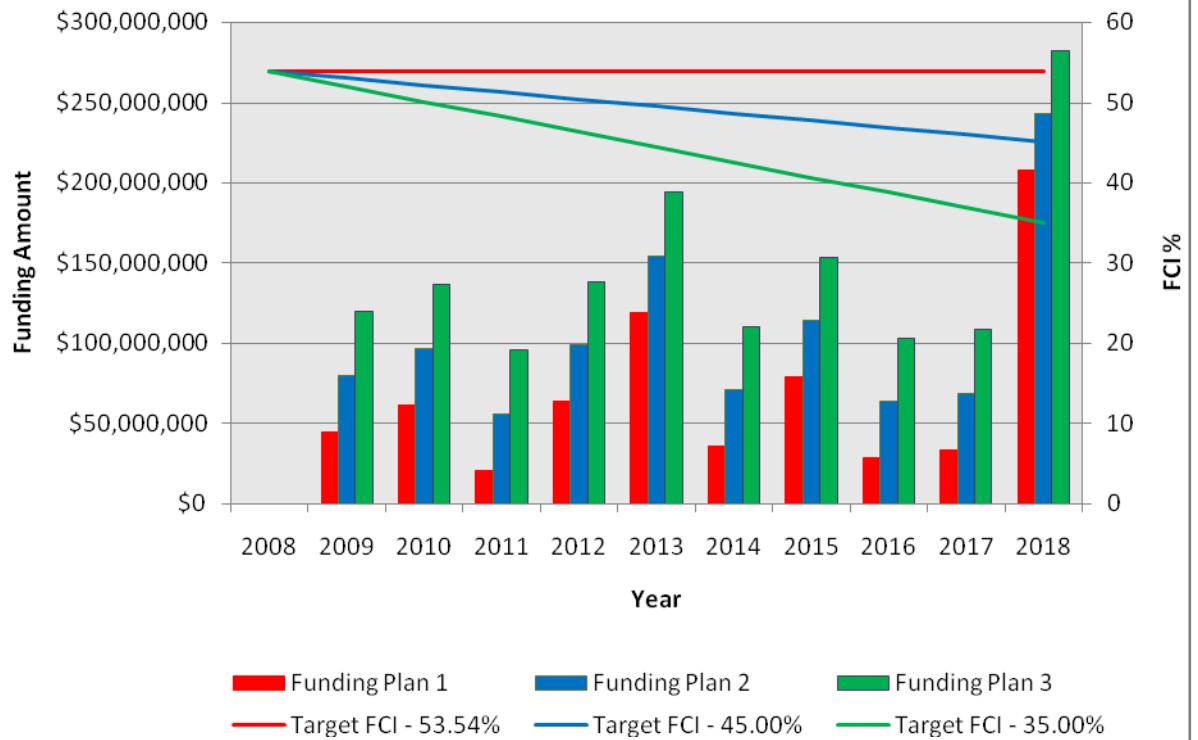


Because the forecast is based on the existing building systems, the above graph helps monitor the annual expenditures and improve the management of building conditions.

Multi-scenario 10-year Funding Projections for Prince George’s County

Figure 6, Facility Funding vs. FCI for Prince George’s County, shows the total funding requirements over the next 10 years for three funding scenarios. For example, Funding Plan 1 shows the annual funding needed to maintain the current FCI; Funding Plan 2 shows the annual funding needed to reduce the overall FCI to 45%; and Funding Plan 3 shows annual funding needed to reduce the overall FCI to 35%. Simple adjustments to the target FCI within the COMET software will allow Prince George’s County decision makers to create multiple “what if” scenarios that will provide them with a graphic illustration of each possible funding decision. The table below list the values used to compile the chart.

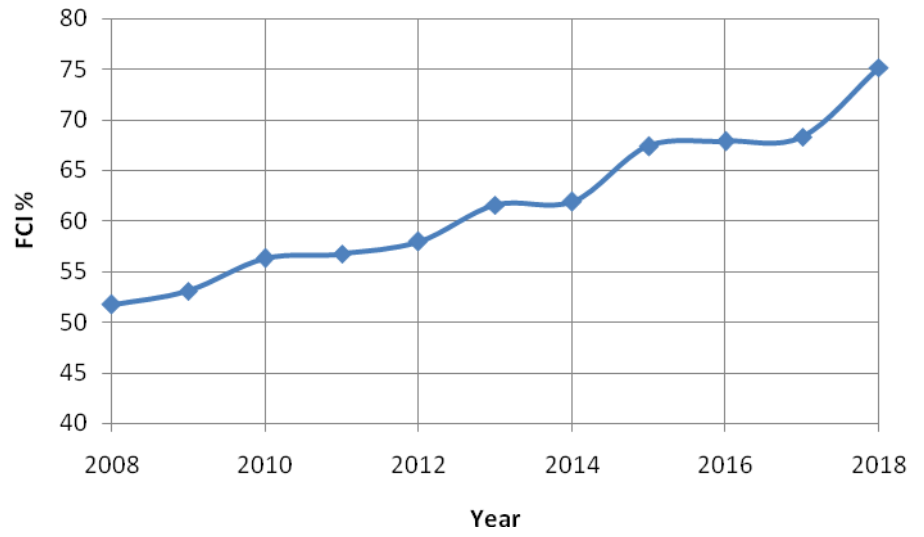
Figure 6: Facility Funding vs. FCI for Prince George's County



Year	Funding Plan 1 (FCI – 53.54 %)	Funding Plan 2 (FCI – 45 %)	Funding Plan 3 (FCI – 35 %)
2009	\$44,959,279	\$80,193,105	\$119,625,373
2010	\$61,868,023	\$97,101,849	\$136,534,117
2011	\$21,095,622	\$56,329,449	\$95,761,716
2012	\$63,982,976	\$99,216,803	\$138,649,070
2013	\$119,389,446	\$154,623,273	\$194,055,540
2014	\$35,811,546	\$71,045,373	\$110,477,640
2015	\$78,954,599	\$114,188,426	\$153,620,693
2016	\$28,736,811	\$63,970,638	\$103,402,905
2017	\$33,886,265	\$69,120,092	\$108,552,359
2018	\$207,922,355	\$243,156,182	\$282,588,449
Total:	\$696,606,923	\$1,048,945,191	\$1,443,267,863

If no money is spent on the schools to renew the expiring or failing systems for next 10 years, the FCI of the Prince George's Priority 3 schools would deteriorate from 51.74% to 75.15%, as shown in the Figure 7.

Figure 7: Increase in the FCI of Schools if No Money is Spent in Next 10 Years



Attachments

- 1) Cost Model Summary (Facility Condition Report) for Priority 3 Schools
- 2) Facility Condition Index Report for Priority 3 Schools
- 3) Deficiency Estimate Report for Priority 3 Schools
- 4) Renewal Summary Report for Priority 3 Schools