# APPENDIX G:

## Complete Facility Condition, Quality and Efficacy Study

# FACILITY QUALITY AND CONDITION SHOULD SUPPORT QUALITY EDUCATION

## PREMISE

The following premises and assumptions frame the collected data, methods of analyses and questions explored in this chapter:

Facility condition and quality affect the safety and comfort of students and educators, and can limit programming. They may also influence parent and student perceptions about school quality. To better understand this impact, a mobility analysis was undertaken to understand facility quality within the context of in-boundary student attendance rates.

To guide strategic capital expenditure on facilities, it is critical to understand where facility condition and quality needs are greatest in the city and the condition and quality needs that are most persistent among similar schools.

Facility condition and facility quality are different, and should be measured separately. Facility condition is the state of repair of the building enclosure (roof, walls, windows, etc); interiors (walls, finishes, lighting, etc); and building systems (mechanical, plumbing, electrical). Facility quality is the suitability of the school building for learning and its architectural and aesthetic quality. A school building can be in great physical condition, but of low quality in terms of learning and architectural merit. A high quality building for learning can be in poor physical condition.

DCPS facilities that have been fully modernized since 2008 are assumed to be in good condition and of high facility quality, and, therefore, were assessed to have no condition or quality need over the five-year planning horizon of this master plan. DCPS facilities that were modernized before 2008 were assumed to have some condition need. Those that have yet to be modernized were assumed to have the greatest need.

Since very limited data was available about the time frame and scope of charter school modernization, this report relies on survey data from charters to describe in broad terms the quality and condition of facilities.

Highly effective teaching and learning, functional programming and rich student experiences are the basis of quality facilities and the design of school environments should be measured against them. This report summarizes lessons learned from assessing a sample of schools yet to be modernized through the Educational Facility Effectiveness Instrument (EFEI). The EFEI measures the effectiveness of facilities in supporting education goals outlined in the current DCPS Design Guidelines and national best practices.

# PURPOSE

This section of the Master Facilities Plan examines the relative state of repair and quality of public education facilities across the District on a neighborhood basis. It identifies patterns of facility needs among charter and DCPS facilities that may influence the effectiveness of facilities to support quality programming. This portion of the plan answers the following questions:

- Where are the greatest facility condition needs?
- Are there any significant geographic patterns in facility quality across the city?
- How equitably has modernization funding for DCPS been distributed across the city?
- Among DCPS facilities that have yet to be modernized and all charter schools, are there patterns of specific facility needs that should be addressed by future modernizations?

# DATA COLLECTION

## FACILITY CONDITION INDEX

DCPS facility condition was assessed on an "asset" or building systems basis (roof, window, mechanical system, etc.). Building assets were originally assessed on a scale from "unsatisfactory" to "good" based on the facility condition index (FCI). The scale used for this analysis converted the original assessments to numerical scores on a scale from one (1) to five (5). These building element scores were converted to a composite condition score by adding the individual building element scores and then dividing this total number by the maximum score.

Although detailed building assessments for all DCPS inventory are ongoing, there was not complete data for all DCPS facilities at the time of printing. Therefore, this report relies on the 2008 Master Facilities Plan for the base data for building assessments, with updates based on modernizations that have occurred from 2008 to 2011.

There was no reliable data point for Charter school facility condition (see Limitations of Data in this chapter). Detailed facility assessments of all DCPS school facilities were commissioned by the DC Department of General Services, but given the scale of the school inventory, the results were not ready for publication at the time of printing.

The facility condition data on DCPS schools from 2008 is also quite detailed and includes assessments of the following building elements or "assets:"

- ADA Compliance
- Conveying Systems
- Electrical Systems
- Exterior Finish
- HVAC
- Interior Finish
- Plumbing
- Roof
- Structure
- Technology

Each of the building assets was assessed by dividing the total cost of outstanding maintenance, repair and replacement deficiencies of the asset against the current replacement value of the asset. This calculation yields what is commonly called a facility condition index or FCI. In general, this index is a relative indicator of condition. The closer the cost of the outstanding maintenance and repair deficiencies are to the cost of replacement, the worse the condition of the asset is assessed to be. The index is expressed as a decimal. The 2008 Master Plan

used the following scale to rate the FCI of each asset:

- Good (FCI <= .25)
- Fair (FCI 0.26 – 0.50)
- Poor (FCI 0.51 – 0.85)
- Unsatisfactory (FCI >= .86)

To assess the relative condition of the entire facility, all building system FCIs were totaled for each facility and then divided by the maximum score. This composite FCI score, expressed as a percentage, was then ranked as follows: 1 percent to 25 percent is good with a rank of 1; 26 percent to 50 percent is fair with a rank of 3; 51 percent to 85 percent is poor with a rank of 4; and 86 percent to 100 percent is unsatisfactory with a rank of 5. To determine a neighborhood cluster's score, the rankings were averaged for the cluster.

## FACILITY QUALITY

### DC Public Schools (DCPS)

Facility Quality was assessed across the District by documenting the modernization progress of each school. Data on modernization progress was provided by the DC Department of General Services. Building on the premise that modernized DCPS schools have necessarily been improved in terms of facility quality, a numerical scale based on need was developed for modernization, with 0 for a full modernization, 2 for a pre-2008 full modernization, 4.5 for a Phase 1 modernization and 5 to 9 for a facility yet to be modernized. A scale of 9 was used to be comparable to the nine qualitative measures of the charter Facility Efficacy Survey (described later in this section).

Phase 1 modernizations as outlined by the 2008 Master Plan address learning environment quality. Therefore, it is assumed that these modernizations have reduced facility quality needs in terms of learning environments. However, the vast majority of these modernizations have not addressed building systems controlling temperature and indoor air quality, or shared programming needs, such as auditoria, gymnasia or outdoor spaces. Therefore, Phase 1 modernizations were assigned a numerical need score of 4.5 out of 9.

No Phase 2 modernizations have taken place. Phase 2 modernizations have been planned to address shared programming needs, such as auditoria, gymnasia and outdoor spaces.

Full modernizations completed prior to the 2008 Master Plan received a score of 2 out of 9.

Full modernizations completed after 2008, many of which are entirely new construction, are assumed to have addressed both learning environment and building system quality. In terms of relative need and in the context of the five-year horizon of this master plan, full modernizations have no need for further investment compared to schools that have not been received any modernization funding to date. Therefore the need for fully modernized facilities was scored numerically as 0.

### DC Public Charter Schools

For charters, facility quality was assessed by analyzing the scores from a facility survey conducted by the Deputy Mayor for Education's office, since there was no reliable data regarding facility modernization. The charter Facility Efficacy Survey was conducted during facility walkthroughs by staff from the Deputy Mayor for Education (DME), with a 77 percent participation rate among all charter schools.

The survey—developed by the technical team and the DME and its consultants—is comprised of nine measures distilled from the more expansive EFEI tool that was used

to evaluate selected DCPS schools. These measures were awarded points on a scale of 0, 0.5 and 1; 0 indicates that the item in question is not present; 0.5 indicates it is partially present or present but inadequate; and 1 means it is present and sufficient. Points were assigned based on an evaluation by the technical team of school participants' verbal comments.

This survey was designed to demonstrate level of sufficiency for charter schools. For comparison with the needs-based facility quality analysis, the total scores were inverted such that a score of 0 indicates the most need and 9 represents facilities of sufficient quality.

## Neighborhood Cluster Analysis

To understand patterns of facility quality needs across the city, the DCPS modernization data and charter school facility survey data were normalized to a percentage score and then assessed through a need-based rating from 1 to 5 based on the percentage score.

As a stand-in for facility quality, the total points for each school out of 9 measures were expressed as a percentage. That percentage was aligned with the DCPS facility quality percentages, then scored on a common scale from 0 to 5 as follows:

- 70 - 100 percent 5
- 54 - 69 percent 4
- 39 - 53 percent 3
- 20 - 38 percent 2
- 1 - 19 percent 1
- 0 percent 0

A substitute measure for charter facility quality was necessary because reliable data on the date and scope of charter facility modernizations was unavailable for comparison to DCPS facilities. A comparison of quality on a neighborhood cluster basis offers a way of examining the equity of facility expenditure across the District.

In addition, only a limited number of DCPS facilities could be assessed utilizing the EFEI tool, making it impossible to analyze all schools on a neighborhood cluster basis. In the future, once efficacy data is available for all schools, both DCPS and charter, and modernization has been distributed more widely across the District, measures of facility quality may no longer be needed. The more comprehensive measure of the success of the Master Facilities Plan may be the effectiveness of facilities in supporting education and the condition of facilities.

## FACILITY EFFICACY

### Educational Facilities Effectiveness Instrument (EFEI)

Fielding Nair International, one of the consultants on this plan, developed the Educational Facilities Effectiveness Instrument (EFEI) to measure how well educational facilities support teaching and learning. Since 2005, the tool has been used to evaluate facilities of all grade levels throughout the world, culminating in close to $1 billion worth of assets. Fielding Nair continues to develop the tool according to best practices and the highest standards in design for 21st-century learning. The EFEI does not measure education programming, educators or facility condition; rather, it focuses on the educational effectiveness of the school facility itself, based on criteria customized for each school district.

The efficacy or ability of a facility to support the education goals of DCPS and national best practices was assessed for 36 of the 52 schools yet to be modernized. This study focused on DCPS because a single EFEI could be customized to support the shared education goals of all DCPS schools and the design standards published in the 2009 District of Columbia Public Schools Facility Design Guidelines. A detailed look at 36 individual schools, this data presents a view of both highly specific issues and trends in educational facility effectiveness throughout the District.

The EFEI can be customized to to address the particularities of each school district's location, educational models, and goals for facility quality. They were then tested and refined to best support the aspirational goals and physical realities of DCPS schools. A final version of the tool was used to evaluate the educational effectiveness and quality of 36 elementary,

middle, high schools and education campuses that have yet to be modernized.

The DCPS EFEI survey measures schools against 33 patterns of good school design. Each of these patterns asks five specific questions and rates the answers according to a ternary scale of 0, 0.5, and 1 (where 0 indicates an item in question is not present; 0.5 indicates it is partially present or insufficient; 1 indicates it is present and sufficient). These points are then combined to produce a single score for each pattern. Each pattern is ranked from 1 to 5, then combined to create a total score for the school facility.

The patterns are divided into three sections, relating to the areas of DCPS schools addressed in each phase of modernization. A sample of the full DCPS EFEI assessment listing all 33 patterns and supporting questions can be found in Appendix H. A list of each pattern by name and description of its goal and rationale follows. DCPS EFEI data was analyzed according to the following scores:

- Unweighted average scores for each pattern for all schools.
  - This analysis allows the technical team to detect pervasive patterns of need or sufficiency across schools in the District.
- Total EFEI scores by construction dates in the CIP
  - This chart seeks to detect whether construction dates stated in the CIP align with facilities in urgent need.
- Total EFEI scores by original construction date
  - EFEI assessors noticed design similarities in schools of similar vintage. This analysis seeks to determine whether the original construction date of a school correlates to its EFEI score.

## Charter Facility Efficacy Analysis

Charter school efficacy was analyzed to develop a basic understanding of its facility suitability. Because charter schools have a much broader range of educational approaches and programming than DCPS schools, it was not feasible to conduct an EFEI or such a survey that closely considers each school's educational goals. Thus, the measures included in the analysis were considered to be more universal in nature, while still relating to the educational effectiveness of the facility. The measures for this analysis were created from selected EFEI patterns as follows:

- Space Variety
  - Principal Learning Areas and Learning Communities
  - Campfire Space
- Welcoming Entry
- Specialized Learning Spaces (Arts & Sciences)
  - Areas For Hands-On Experimentation
  - Arts Studios
  - Music and Performance
- Health and Physical Fitness
- Daylight
- Outdoor Learning
- Indoor Air Quality and Comfort
  - Natural Ventilation
- Connected to Community
- Technology

The charter school survey was developed by the technical team and the DME and its consultants and comprises nine measures distilled from the more expansive EFEI tool that was used to evaluate selected DCPS schools.

These measures were awarded points on a scale of 0, 0.5 and 1 where 0 indicates that the item in question is not present; 0.5 indicates it is partially present or present but inadequate; and 1 indicates it is present and sufficient. Points were assigned based on participant indication of points and evaluation by the technical team of participants' verbal comments.

Points assigned to multi-part questions were averaged into a single score. These unweighted points were averaged to achieve a total score for each school.

The charter Facility Efficacy Analysis measures were derived from the following questions:

- Space Variety: Do you have gathering spaces for the whole school, multiple classes, small groups of three to six students? (Y/N) Please describe.
- Welcoming Entry: Does the main entrance to the school provide a clear visual connection to the reception area and administration? (Y/N)
  - Is there a clear visual connection to the street or surrounding area from the main lobby? (Y/N)
  - Is there a place near the main entrance for parents and caregivers to be received and sit down? (Y/N)
- Specialized Learning Spaces (Arts and Sciences): Are there adequate visual and performing arts spaces in the facility to support your mission? Science labs, engineering or other STEM spaces? If not, please describe the challenges the facility poses to the mission-specific programming at your school.
- Health and Physical Fitness: Are there adequate physical fitness and wellness facilities on your site to support your student population? (These could include a gym, a dance studio, an indoor play room, an outdoor play space, etc.) (Y/N)
- Daylight: Do the majority of learning spaces have access to daylight? (Y/N) Please describe.
- Outdoor Learning: Are there amenities on the site for outdoor learning (e.g. kitchen garden, nature walk, outdoor classroom or amphitheater)? (Y/N) Please describe.
- Indoor Air Quality & Comfort: Is the air quality and temperature comfortable for students? (Y/N) Please add any additional comments about air quality and temperature in the facility.
- Connected to Community: Are there adequate spaces for the community partnerships that you have? (Y/N)
- Technology:
  - Wi-fi network for students (Y/N)
  - Large scale digital display in most classrooms (Y/N)
  - Access to computers, tablets or other devices in the classroom (Y/N)
  - Access to electronic or print resources outside the classroom (i.e. lending library, internet) (Y/N)

The following analysis were made for the charter Facility Efficacy Analysis:

- Average scores for each measure for all schools.
- Total scores for all schools.

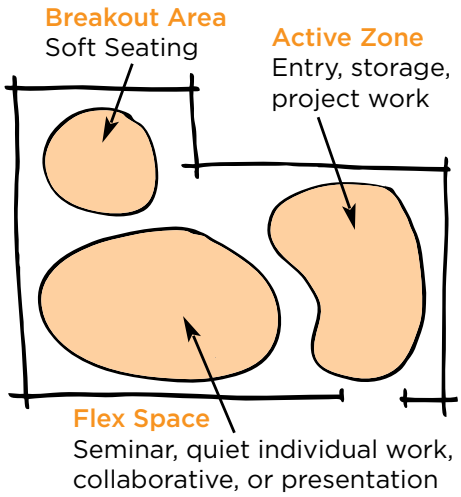



*Figure G.1: A flexible design allows for greater differentiation within the classroom*

*Figure G .2: Project-Based Learning at an elementary school in Medford, OR*

# EFEI PATTERNS TO MEASURE SCHOOL FACILITY EFFICACY

## PATTERNS ALIGNED WITH DCPS PHASE ONE MODERNIZATION

### 1a: Differentiation

How effectively do the principal learning spaces support differentiation?

To help every child reach his or her potential, teachers often need to provide different avenues for acquiring content, processing concepts, constructing knowledge or making sense of ideas. Differentiated instruction requires flexible and agile learning environments suitable to a variety of learning activities and student group sizes. This adaptability is particularly critical in learning environments where there is great diversity in ability, from students with special needs to those on an accelerated learning track.

### 1b: Project Based Learning

How effectively do the principal learning areas support project-based learning?

The DCPS Facility Design Guidelines state that “the middle school program is based on team teaching with a focus on a project-based interdisciplinary curriculum.” Project-based learning (PBL) is structured, student-directed learning that develops multiple skill sets, including critical thinking, research skills and core academics. Students may work independently or in teams on multifaceted, often interdisciplinary projects, which access learning standards. This set of criteria evaluates the effectiveness of the physical environment to support this educational goal.

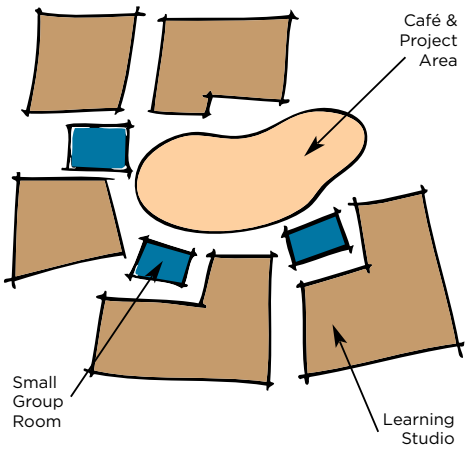



*Figure G.3: small learning community allows for greater flexibility in teaching and learning groups*

*Figure G.4: Science Labs at Oyster-Adams Bilingual School in Washington, DC*

## 1c: Learning Communities

How effectively do the principal learning areas support the organization of the school as a cluster of learning communities?

The DCPS Facility Design guidelines call for "academic clusters" (early childhood, primary and intermediate); "houses" (middle school), and "academies" (high school). These three concepts can be broadly described as learning communities –smaller units within the school comprised of students and teachers who collaborate and learn together. They use a variety of instructional strategies and grouping sizes beyond the standard classroom. Research shows that the size of a learning community should be no larger than 150 students to maintain a sense of community where all are known and feel valued.

## 1d: Areas for Hands-On Experimentation

How well equipped are spaces for hands-on experimentation of the natural world through the sciences, mathematics and other curricula?

Hands-on experimentation is critical for building understanding in the sciences and mathematics. Both advanced placement (AP) and international baccalaureate (IB) programs require hands-on experimentation and lab time. In fact, AP has recently increased its requirements for lab time. The following criteria were used to evaluate the effectiveness of learning spaces to support hands-on experimentation both inside and outside of labs.

*Figure G.5: Transparency allows for passive supervision of student-directed activity at Hillel School of Tampa, FL*

## 1e: Transparency

To what extent are there visual connections between spaces to ease transitions from learning activities and support passive supervision of learning activities?

Transparent boundaries, such as glass walls, between spaces encourage more flexible use of those areas and dynamic learning by allowing teachers to supervise students outside of their immediate classroom. Transparent spaces also encourage chance meetings and informal discussions that can enhance collaborative learning.

*Figure G.6: Campfire spaces support lectures and teacher-directed learning at Harbor City International School in Duluth, MN*

## 1f: Campfire Spaces

How well do campfire spaces function?

Noted educational futurist David Thornburg outlines several "Primordial Learning Metaphors" to understand the modes through which we gain information. These metaphors set the stage for the variety of ways we learn and the types of spaces needed to support these ways of learning. The first of these spatial types is called the campfire, where one learns from stories of experts, teachers or student presenters.

## 1g: Watering Hole

What is the quality of watering hole spaces?

One of David Thornburg's Primordial Learning Metaphors, the watering hole, is a space where peers share information and learn from each other.

*Figure G.7: Cave spaces for quiet reading at Roosevelt Elementary in Medford, OR*

*Figure G.8: A broad range of furnishings support student comfort and study*

## 1h: Cave Space

What is the quality of cave spaces?

One of David Thornburg's Primordial Learning Metaphors, the cave, is a place for introspection and learning from oneself.

## 1i: Universal Design

To what extent does the school provide for students of all mental and physical abilities?

Universal Design for Learning (UDL) principles for curriculum development offer instructional goals, methods, materials and assessments that work for students of all abilities. UDL is now included in the Common Core Standards for all District schools?

The Americans with Disabilities Act (ADA) requires physical accessibility to all principal learning spaces. UDL and ADA criteria can measure to what extent the physical environment supports the delivery of curricula that meet the needs of learners of all abilities. For more on Universal Design for Learning see the National Center on Universal Design for Learning: http://www.udlcenter.org

## 1j: Furniture

Is a variety of furnishings offered throughout school?

A space used for a variety of learning activities should offer flexible furnishings to best support students while they are engaged in various activities. Additionally, furniture should be sized to ergonomically support student's bodies as they develop and allow for the sort of movement that maintains blood flow and attention.

*Figure G.9: Students use mobile laptops for group research at GATES Senior High School in Lutz, FL*

*Figure G.10 A good teacher workroom provides space and resources for teachers and Professional Learning Communities to work together and collaborate*

## 1k: Technology

How well is technology integrated with the curriculum and principal learning spaces?

In order for students to engage in inquiry and project-based learning, and build 21st century literacies and skills, they must have access to computing and communication technology. The physical environment should enable the use of this technology in everyday curricula to be seamless and support multiple ways of engaging technology.

## 1l: Acoustics

What is the quality of acoustics in principal learning areas?

The relationship between poor acoustics and lowered academic achievement is well documented by a number of studies. Appropriate acoustics are critical for students to be able engage verbal presentations and even more critical in environments where multiple learning activities are taking place simultaneously. The criteria below are consistent with best practice as set forth by Acoustical Society of America (ASA).

## 1m: Teacher Professional Space

To what extent does school create a professional environment for teachers?

To support DCPS's professional learning communities (teaching teams) and teacher professional development, teachers should have professional office space to plan coursework, collaborate with colleagues and meet with parents.

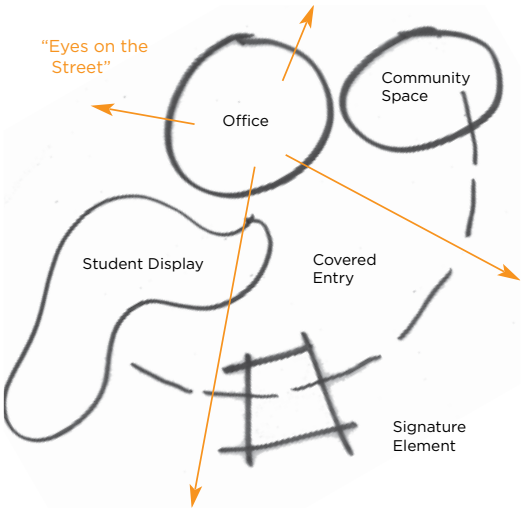



*Figure G.11: A welcoming entry should be inviting to students, families, and members of the school community*

*Figure G.12: The library at Francis-Stevens Elementary School in Washington, DC offers books, Writeboards, and other media to students and teachers*

## PATTERNS ALIGNED WITH DCPS PHASE TWO MODERNIZATION

### 2a: Welcome Entry

How welcoming is the entrance to the school?

Research shows student achievement increases with greater parental and community involvement. The physical environment of the school should make parents and community members feel welcome, and provide space for them to be received and learn about the school.

### 2b: Shared Media Resources

To what extent are media resources distributed for just-in-time access?

To support inquiry and project-based curricula, students need access to digital and print media resources on demand. This set of criteria evaluates the ways in which the Library Media Center functions as "high technology information distribution center," as described by the DCPS Design Guidelines. It determines the ways in which the Library Media Center is a place for students to connect with the world through books, communication technology, and information technology.

### 2c: Student Display Space

How extensive are student display spaces?

Student achievement and work in progress should be celebrated and presented throughout the school to provide positive reinforcement to learners and inform the community within and outside of the school. This set of criteria evaluates the extent and quality of display space and systems.

*Figure G.13: Tiered music room at Francis-Stevens Education Campus in Washington, DC*

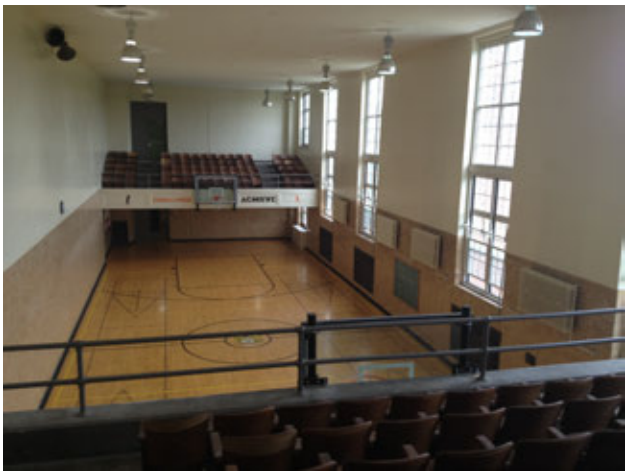


*Figure G.14: One of two gyms at Francis-Stevens Education Campus in Washington, DC*

## 2d: Arts Studios

How well equipped are art labs?

The visual arts provide an opportunity for student creative expression and learning through making. This set of criteria evaluates the effectiveness of visual arts space in supporting student work in a variety of media – physical and digital, and the flexibility of these spaces for different modes of art instruction.

## 2e: Music and Performance

To what extent is music and performance supported?

The practice and performance of music and drama offer students an opportunity to build confidence and express themselves beyond verbal and written communication. This set of criteria evaluates the quality of space for music and performance.

## 2f: Life Skills Areas

To what extent is a life skills curriculum supported?

The school should provide for the practical life skills, and emotional skills needed to become a whole, productive adult. This set of criteria evaluates the extent to which the facility supports programming and experiences that help students build life skills.

## 2g: Health and Physical Fitness

To what extent are health and physical fitness supported?

The school environment should support student health and well-being, and offer opportunities to develop lifelong fitness habits. This set of criteria evaluates the quality of indoor and outdoor space for supporting student health and fitness through exercise and recreation.

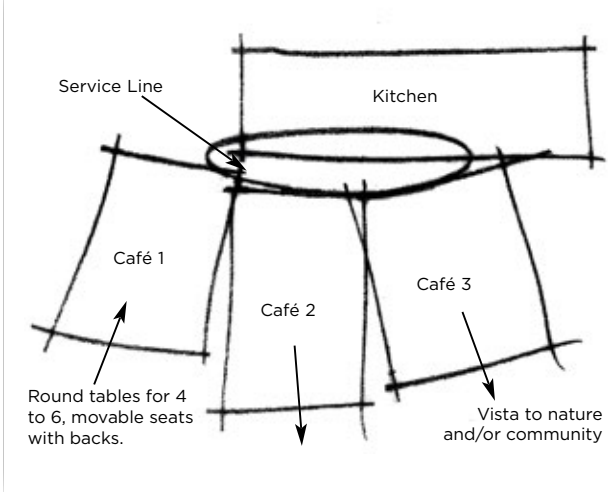



*Figure G.15: Smaller scale cafeterias with a sense of community can help make lunchtime more comfortable and manageable*

*Figure G.16: A visually transparent entrance at Cristo Rey High School allows administrators to more easily monitor who has access to the school*

## 2h: Bathrooms

To what extent does the design of the bathroom meet needed standards of safety, privacy and cleanliness?

This set of criteria evaluates the effectiveness of the bathrooms' location and design, to support student safety, dignity and cleanliness.

## 2i: Student Dining

How effectively does the physical environment of the school provide for student nourishment, and support positive dining etiquette and social skills?

Growing students need access to healthy, nourishing food. The size, location and arrangement of dining facilities often drives the school schedule, rather than the needs of students. This set of criteria evaluates the effectiveness of the learning environment in providing for student nutrition and the quality of the environment created for dining, developing social skills and etiquette.

## 2j: Safe Learning Spaces

How effectively does the school facility provide for the safety and security of students and teachers, and community?

The school building must provide a physically safe place for students to learn, as well as the security to explore, intellectually and emotionally grow, and thrive. This set of criteria evaluates the effectiveness of the school facility in support student and teacher safety, and security.

*Figure G.17: Excellent access to daylight and exterior views in the auditorium of Prospect Learning Center in Washington, DC*

*Figure G.18: Covered decks connect indoors and outdoors at Shorecrest Preparatory School in St. Petersburg, FL*

## PATTERNS ALIGNED WITH DCPS PHASE THREE MODERNIZATION

### 3a: Daylighting

To what extent does natural daylight penetrate learning areas?

Appropriate daylighting strategies can improve student performance as much as 20 percent. In addition, daylighting indoor learning environments is a sustainable design strategy, as it reduces electrical lighting and cooling loads. This criteria measures both the quantity and quality of daylight in the learning environment.

### 3b: Full Spectrum Lighting

What is the quality of artificial lighting?

Poor indoor lighting conditions often contribute to many symptoms of "sick building syndrome," such as tension headaches and fatigue, and reduces the legibility of learning material. Good indoor lighting creates a healthier, more pleasant learning environment.

### 3c: Exterior Vistas

To what extent do interior spaces have views and vistas?

Views to the outside, particularly onto natural scenery, improve students' emotional and intellectual well-being.

### 3d: Indoor-Outdoor Connection

What is the quality of the indoor-outdoor connections?

Strong indoor-outdoor connections allow for seamless movement from indoor learning activities to outdoor learning and engagement with the natural world. These connections reduce lost learning time in moving students, and increases opportunities for students to access the outdoors safely.

*Figure G.19: Students dig in the school garden at Learning Gate Elementary School in Lutz, FL*


*Figure G.20: Rain barrel at Garrison Elementary School in Washington, DC*

## 3e: Outdoor Learning

How well is outdoor learning supported?

Student engagement of the outdoor urban and natural environment fosters a deep understanding of neighborhood and community, environmental stewardship and makes learning fun. This set of criteria evaluates the effectiveness of the outdoor learning spaces on the school site.

## 3f: Natural Ventilation

What is the quality of natural ventilation?

Adequate fresh air contributes to a student's readiness to learn by reducing fatigue, increasing general comfort and by making a direct connection to the outdoors. Natural ventilation can cut down on ventilation and air-conditioning costs.

## 3h: Sustainable Elements/Building as 3D Textbook

To what extent has sustainability been considered in school design?

Teaching students the principles, applications and purposes behind sustainable practices is made tangible and meaningful for students when eco-friendly features are utilized as artifacts and resources for study, enabling them to draw lessons from their experiences within the building.

*Figure G.21: Local architectural styles seen in Murch Elementary School in Washington, DC*


*Figure G.22: Parent Resource Center in Aiton Elementary School in Washington, DC encourages parents to become part of the school community*

## 3i: Local Signature

To what extent does the facility design connect students to the culture, history, and ethos of the local neighborhood and the District of Columbia?

This set of criteria evaluate the ways in which the school facility reflects the culture, history and ethos of the District of Columbia at large, and the local neighborhood in which the school is located, and the ways in which it contributes to the neighborhood.

## 3j: Connected to Community

To what extent is the school connected to its surrounding community?

This set of criteria evaluates the ways in which the school engages the community, and its resources, as well as the ways in which it provides resources to the community.

## 3k: Aesthetics

What is the quality of aesthetics?

The learning environment should be inviting, inspiring and pleasant.  A school facility that invites and inspires students is more likely to encourage them to engage the school. A beautiful school becomes a point of pride for the community and encourages strong parental and community involvement and support.

# LIMITATIONS OF DATA

## FACILITY CONDITION DATA

There are no current data for DCPS Facility Condition Indexes (FCIs); thus, DCPS FCIs were calculated from 2008 facility condition sets and indications of whether a facility has received modernizations. Because there is no data available for charter facility condition, facility condition maps represent DCPS data only.

## CHARTER SCHOOL DATA

The charter Facility Efficacy Survey is based on surveys conducted by DME walkthroughs. Of the 92 charter schools in the District, 71 responded to the survey. Survey data was based on opinions of charter school administrators, not an external facilities auditor.

Charter school survey data was used a substitute measure for facility quality, since no modernization data was available for charter schools.

There is limited efficacy data available on charters, given their wide range of programming and educational goals. The survey was created from the more universal, less program-specific patterns from the EFEI tool.

## EFEI DATA

The EFEI assessment for this report covered 36 of the 52 schools that have not yet received modernizations.

The EFEI tool was customized based on DCPS comments, however where school input was unavailable, the tool relied on best practices in educational design.

No data set is comprehensive. The technical team made professional judgments where necessary to augment, update or substitute data.

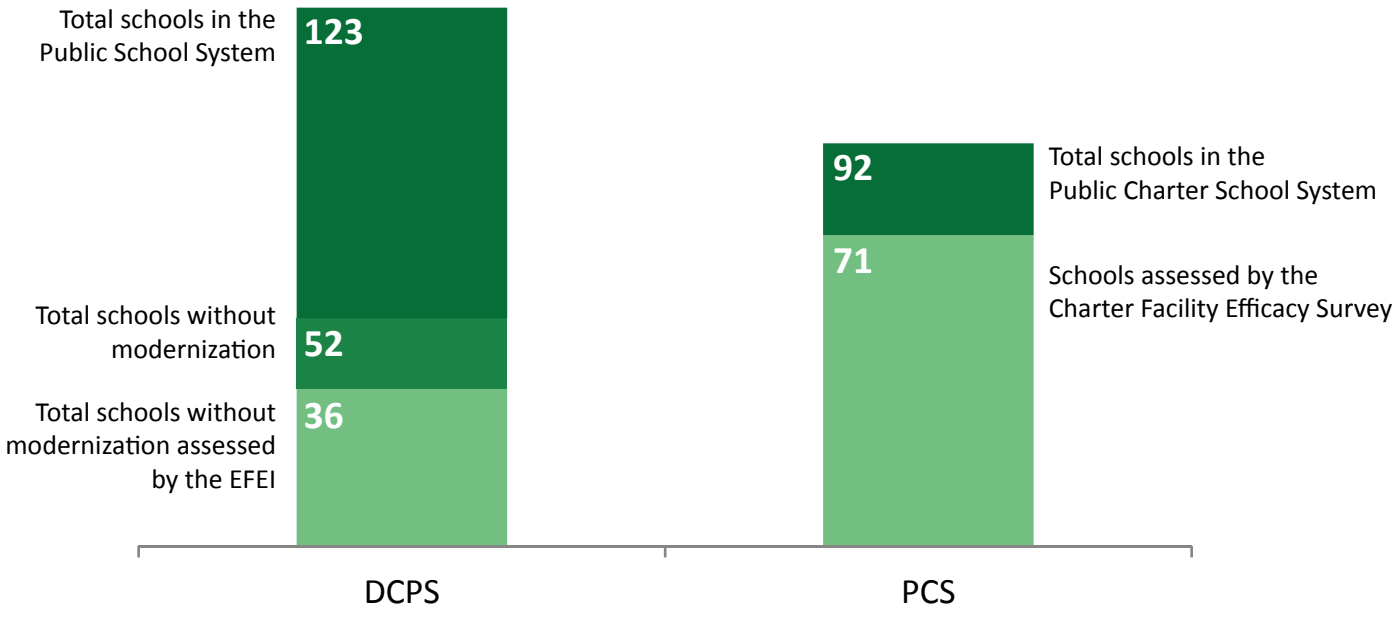



*Figure G.23: Sample sizes for conditions, quality, and effectiveness studies*

# FINDINGS

These findings refer to the neighborhood cluster-based maps on the following pages. The findings of the facility efficacy study follow the map-based studies.

## FACILITY CONDITION

The greatest facility condition need for DCPS schools are concentrated in neighborhood clusters bordering Rock Creek Park, the north point of the District, Capitol Hill, and several clusters east of the Anacostia River.

There were 14,651 DCPS students (based on the October 2011 audited enrollment) enrolled in clusters that are classified in moderately high need of facility condition improvement. There are no clusters that rank at the high need category.

There were 6,964 DCPS students (based on the October 2011 audited enrollment) enrolled in schools in clusters that are classified in low to very low need of facility condition improvement. Those clusters classified as low to very low need of facility condition are the clusters where full modernizations have taken place at some point from 1998 to 2012.

## FACILITY QUALITY

Facility quality needs are mixed throughout the city, but tend to be greatest in neighborhood clusters bordering Rock Creek Park and east of the Anacostia River. Facility quality needs were particularly high for elementary schools east of the Anacostia River (see Figure G.24).

## EQUITY

Clusters of high facility condition and quality need roughly correspond to clusters where total facility expenditure has been the lowest from 1998 to 2012. These clusters are located along the edges and through much of the core of the District (Figure G.25).

Projected facility expenditure from 1998-2018 begins to address some of the clusters of high facility condition and quality need along the northern edges and core of the district, and some clusters east of the Anacostia River (Figures G.26 and G.27).

## CLUSTER ENROLLMENT PARTICIPATION

Travel distance for both Elementary and all students is lowest just west of Rock Creek Park, towards the center of the district, and many clusters east of the Anacostia River. Highest travel distances occur in clusters clusters along the northeast District boundary, while cluster 44 (east of the Potomac River) has the highest travel distance in the District.

Elementary school enrollment participation on a neighborhood cluster basis was highest west of Rock Creek Park in Cluster 13, which includes neighborhoods such as the Palisades and Foxhall Village.

# FACILITY CONDITION

## AVERAGE FACILITY CONDITION NEED FOR DCPS ELEMENTARY SCHOOLS BY NEIGHBORHOOD CLUSTER

Facility condition data is derived from the facility assessments in the 2008 Master Plan, the last reliable data point for all DCPS facilities at the time of printing.

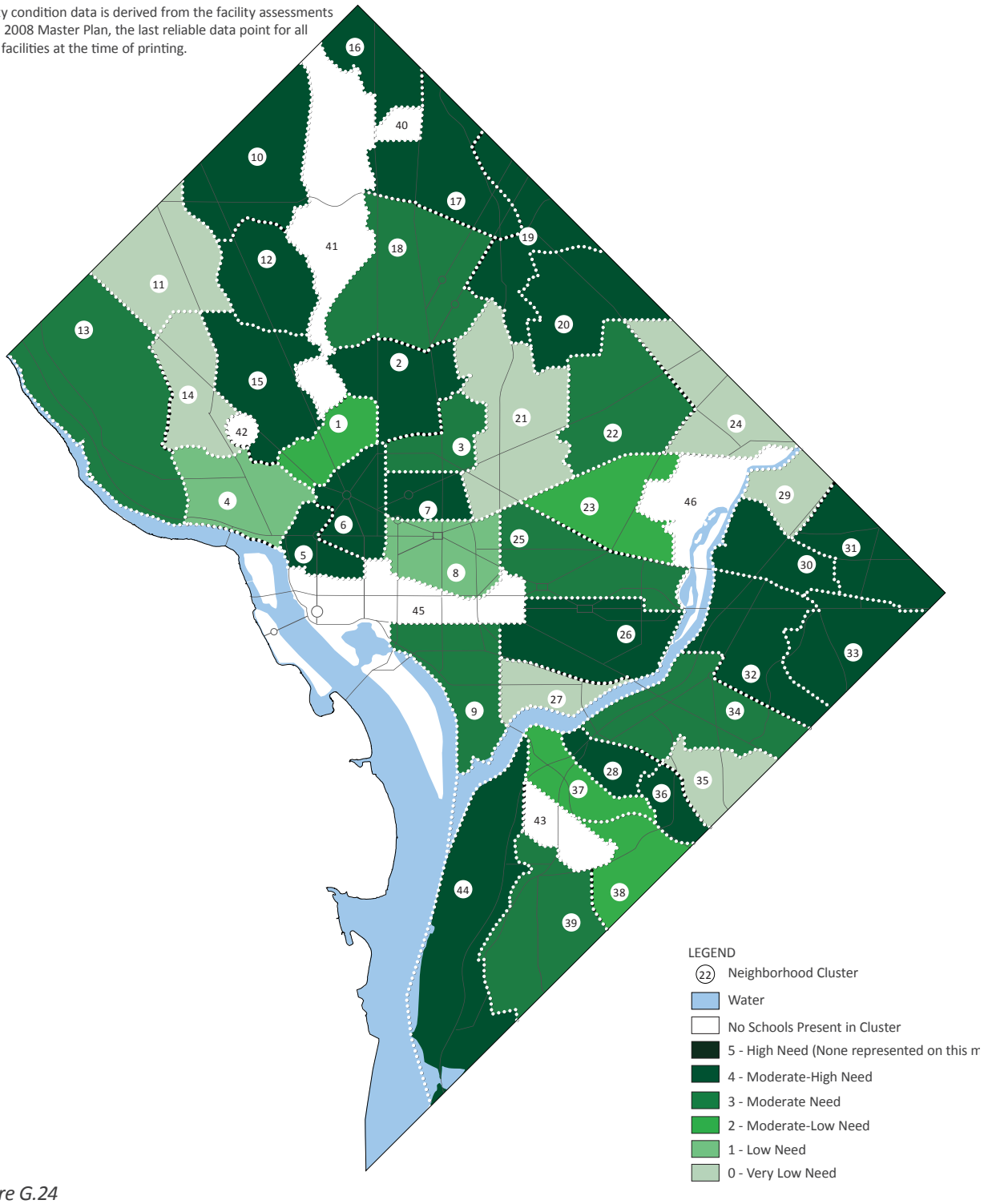



*Figure G.24*

# FACILITY CONDITION

## AVERAGE FACILITY CONDITION NEED FOR DCPS SCHOOLS BY NEIGHBORHOOD CLUSTER

Facility condition data is derived from the facility assessments in the 2008 Master Plan, the last reliable data point for all DCPS facilities at the time of printing.

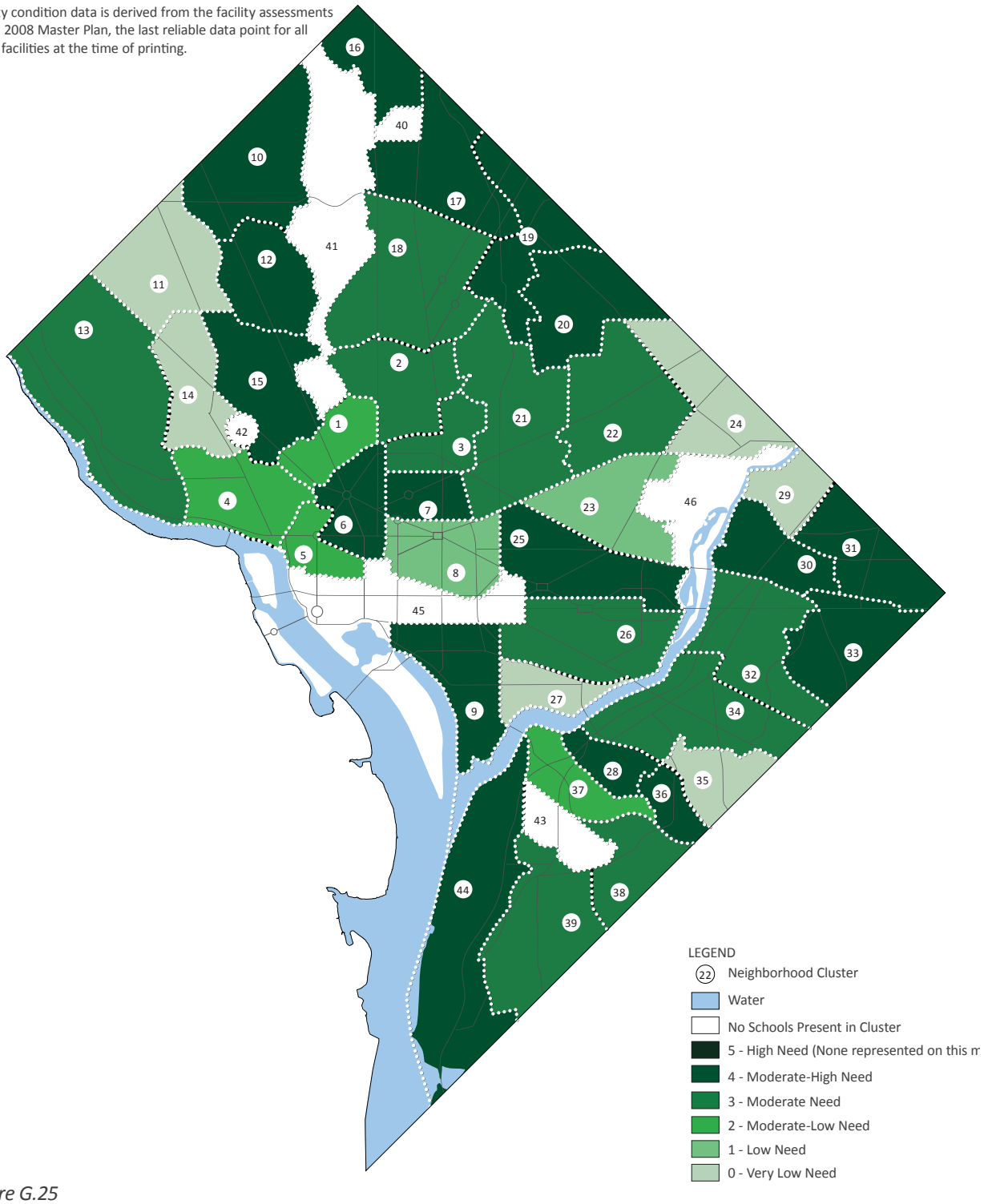



*Figure G.25*

# FACILITY QUALITY

## FACILITY QUALITY NEED FOR ALL DCPS AND CHARTER ELEMENTARY SCHOOLS BY NEIGHBORHOOD CLUSTER

Facility quality data is derived from the Charter Facility Effectiveness Survey and the modernization phase completed for the DCPS schools.

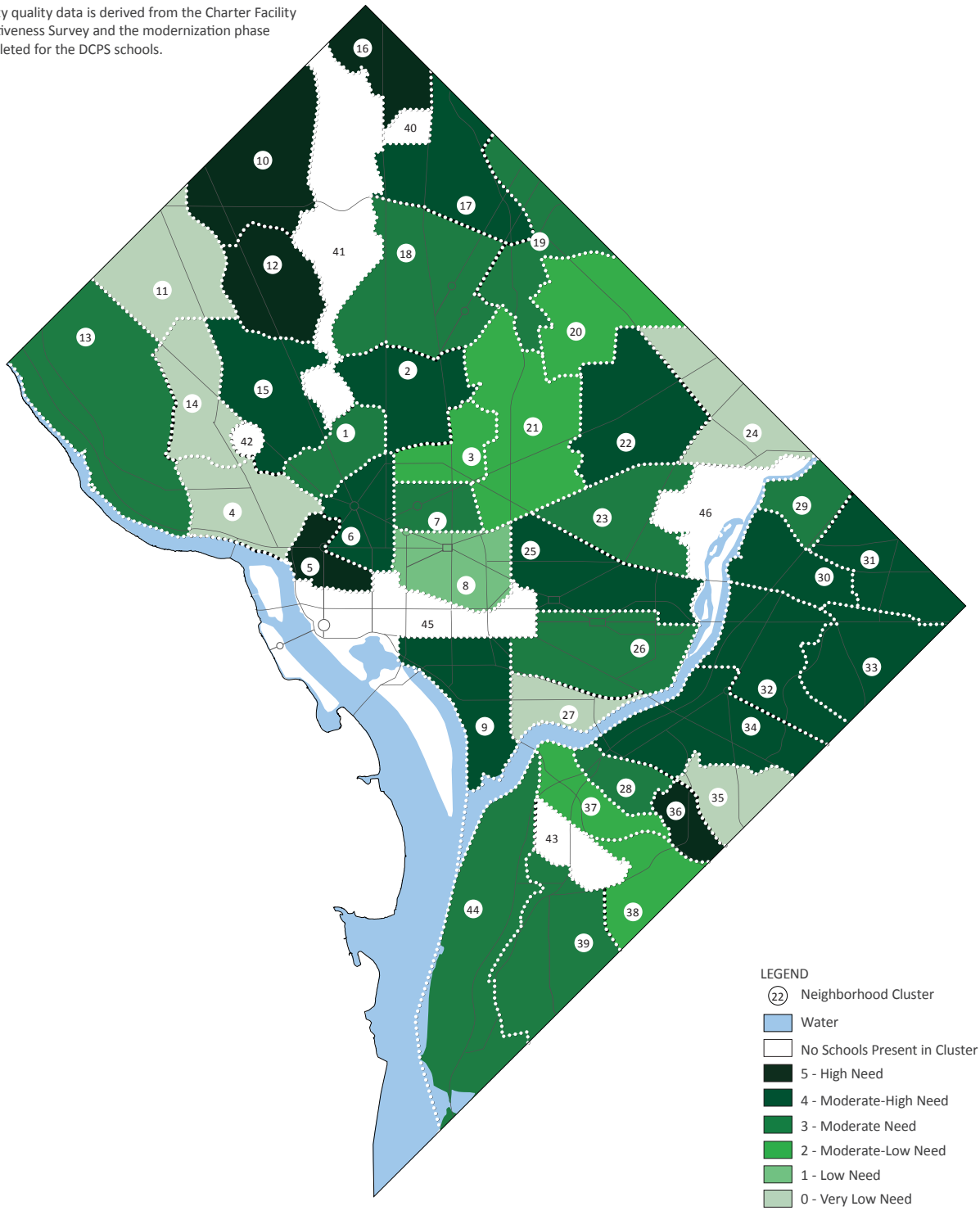



*Figure G.26*

# FACILITY QUALITY

## FACILITY QUALITY NEED FOR ALL DCPS AND CHARTER SCHOOLS BY NEIGHBORHOOD CLUSTER

Facility quality data is derived from the Charter Facility Effectiveness Survey and the modernization phase completed for the DCPS schools.

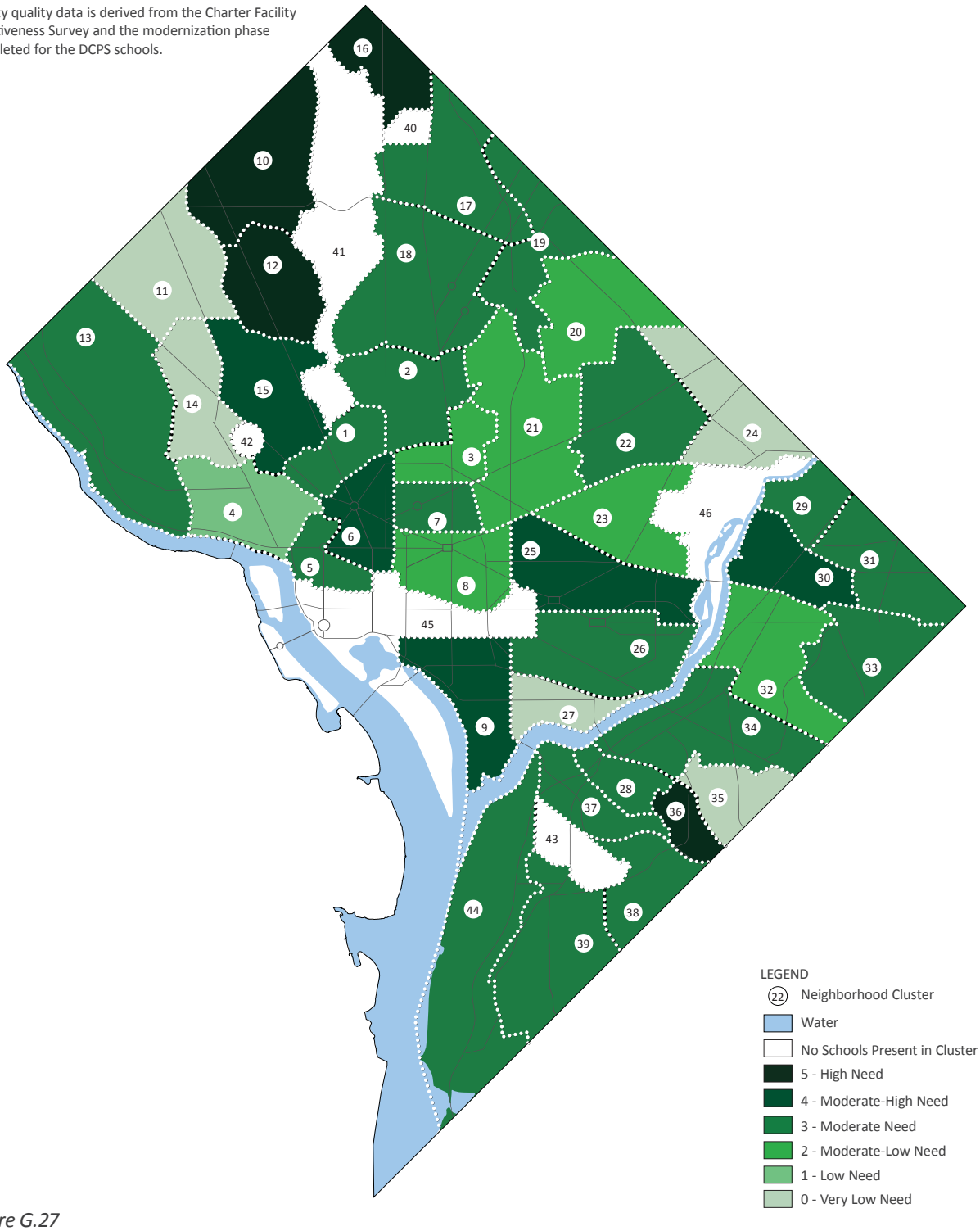



*Figure G.27*

# EQUITY

## 1998-2012 DCPS TOTAL DOLLARS SPENT PER CLUSTER

Modernization dollars data supplied by 21st Century School Fund.

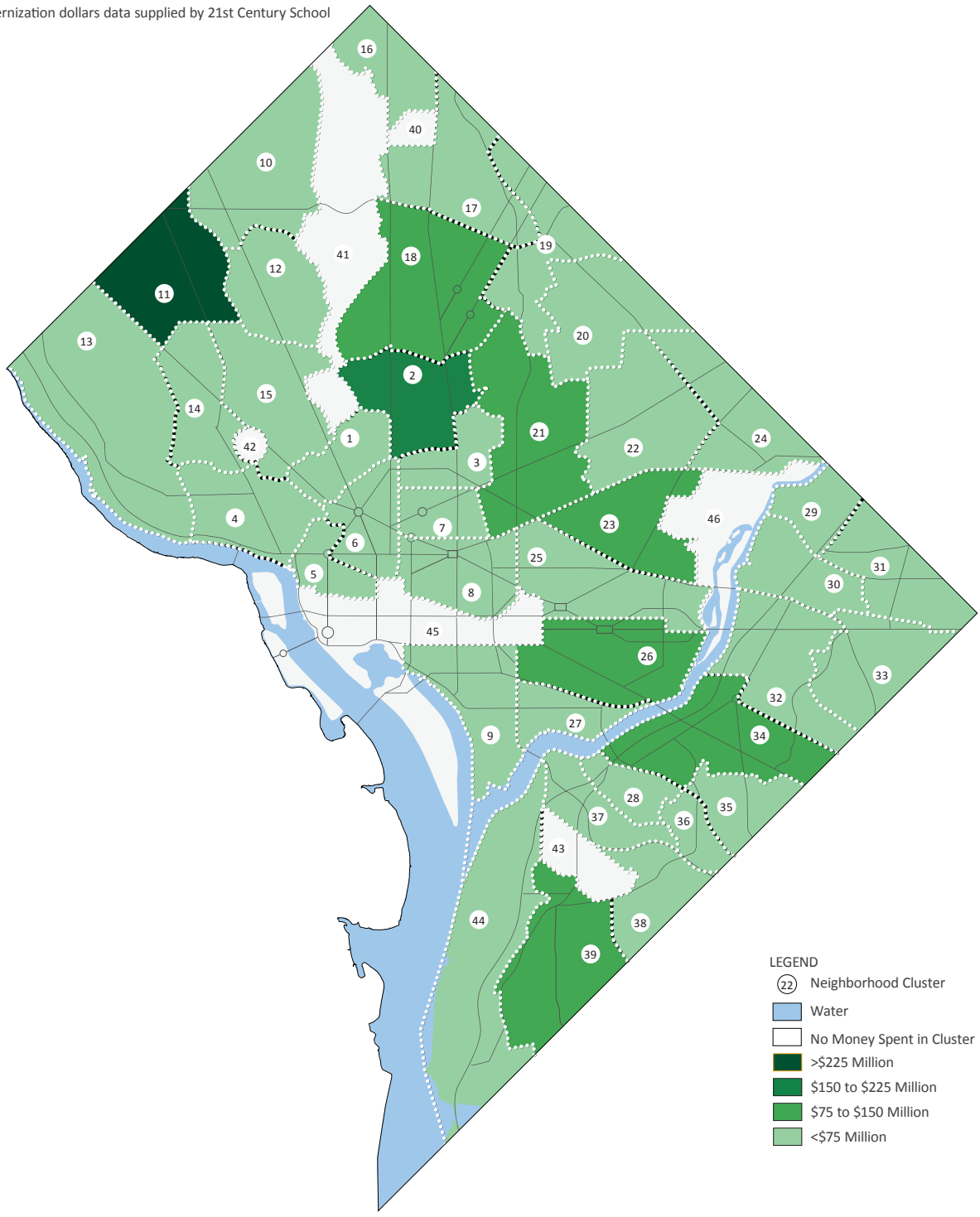



*Figure G.28*

# EQUITY

## 1998-2018 DCPS AVERAGE MODERNIZATION DOLLARS PER SQUARE FOOT

Total dollars between 1998-2018 divided by school gross square footage (GSF).

Modernization dollars data supplied by 21st Century School Fund.

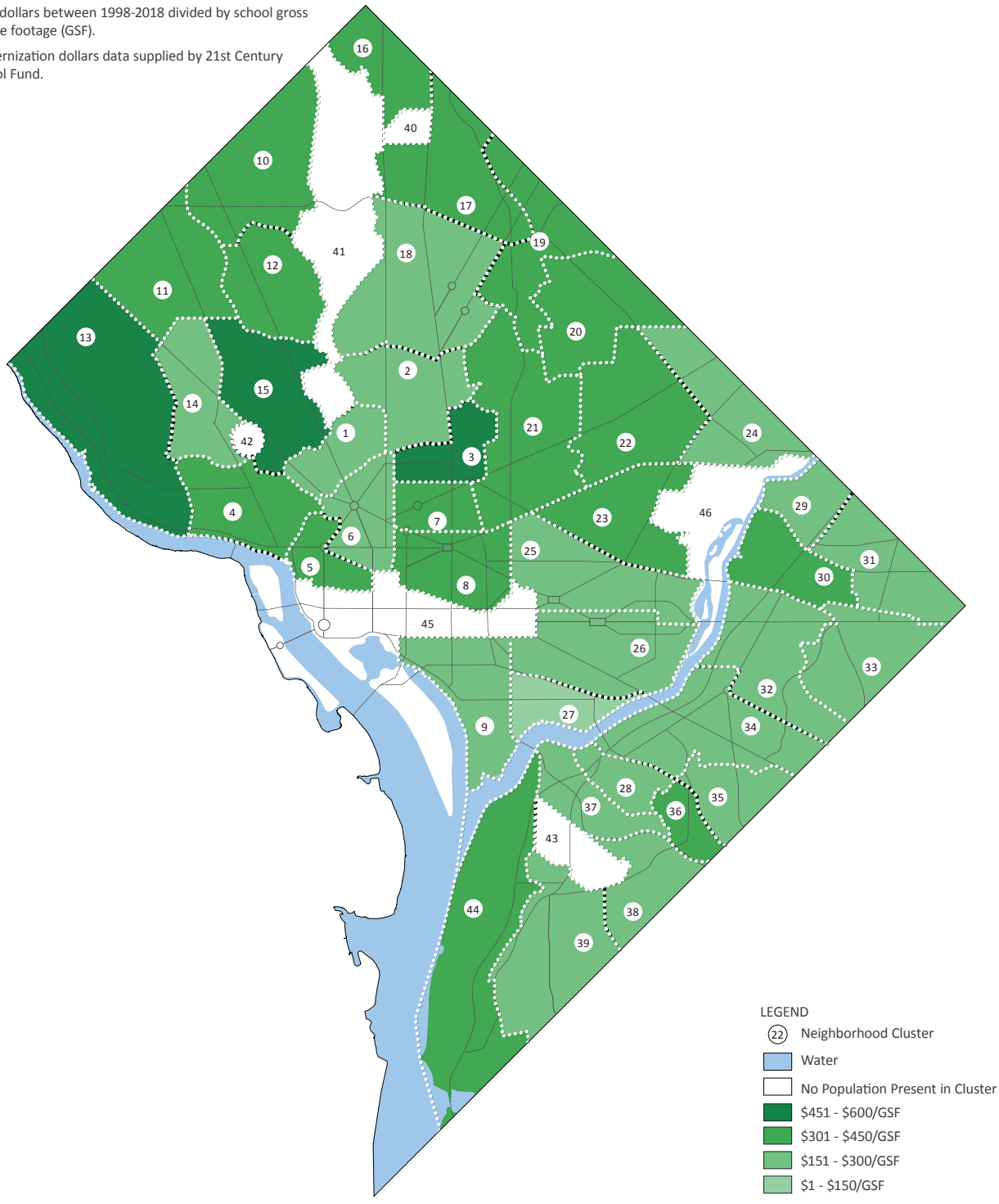



*Figure G.29*

# EQUITY

## 1998-2018 DCPS AVERAGE MODERNIZATION DOLLARS PER ENROLLED STUDENT

Enrollment data for both DCPS and Charter Schools was gathered from the Office of the State Superintendant of Education (OSSE) October 2011 Audited Enrollment.

Modernization dollars data supplied by 21st Century School Fund.

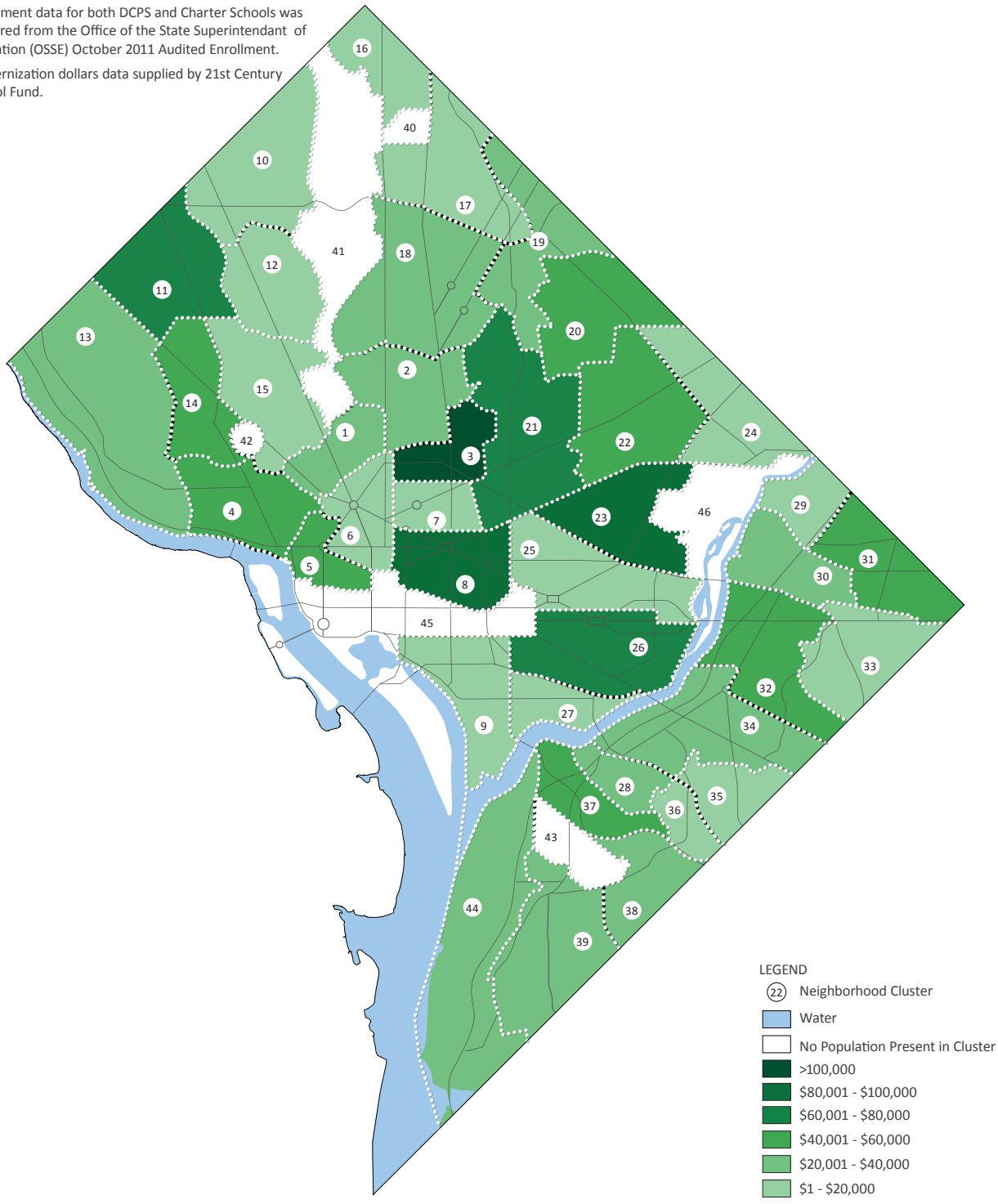



*Figure G.30*

# TRAVEL DISTANCE

## AVERAGE DISTANCE TRAVELED FOR ELEMENTARY STUDENTS FROM HOME TO SCHOOL BY NEIGHBORHOOD CLUSTER

Travel distance data was provided by the Office of the State Superintendant of Education (OSSE).

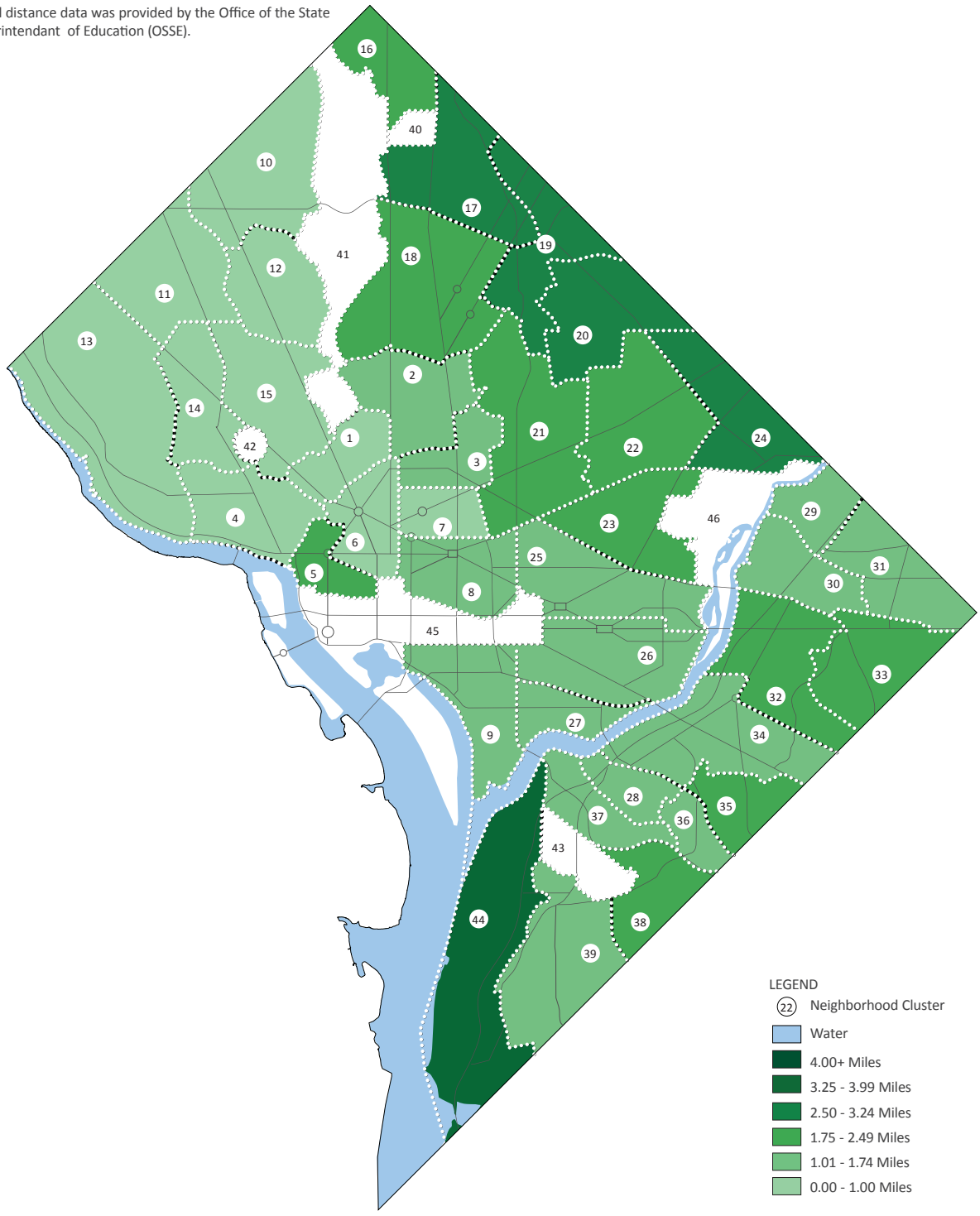



*Figure G.31*

# TRAVEL DISTANCE

## QUALITATIVE EXTENT OF TRAVEL FOR STUDENTS FROM HOME TO SCHOOL BY NEIGHBORHOOD CLUSTER

Travel distance data was provided by the Office of the State Superintendant of Education (OSSE).

Acceptable travel distances for elementary school students are generally less than those for high school students. Thus, rather than consider travel distance purely in miles for all grade levels, a qualitative scale was created to reflect appropriate travel distances.

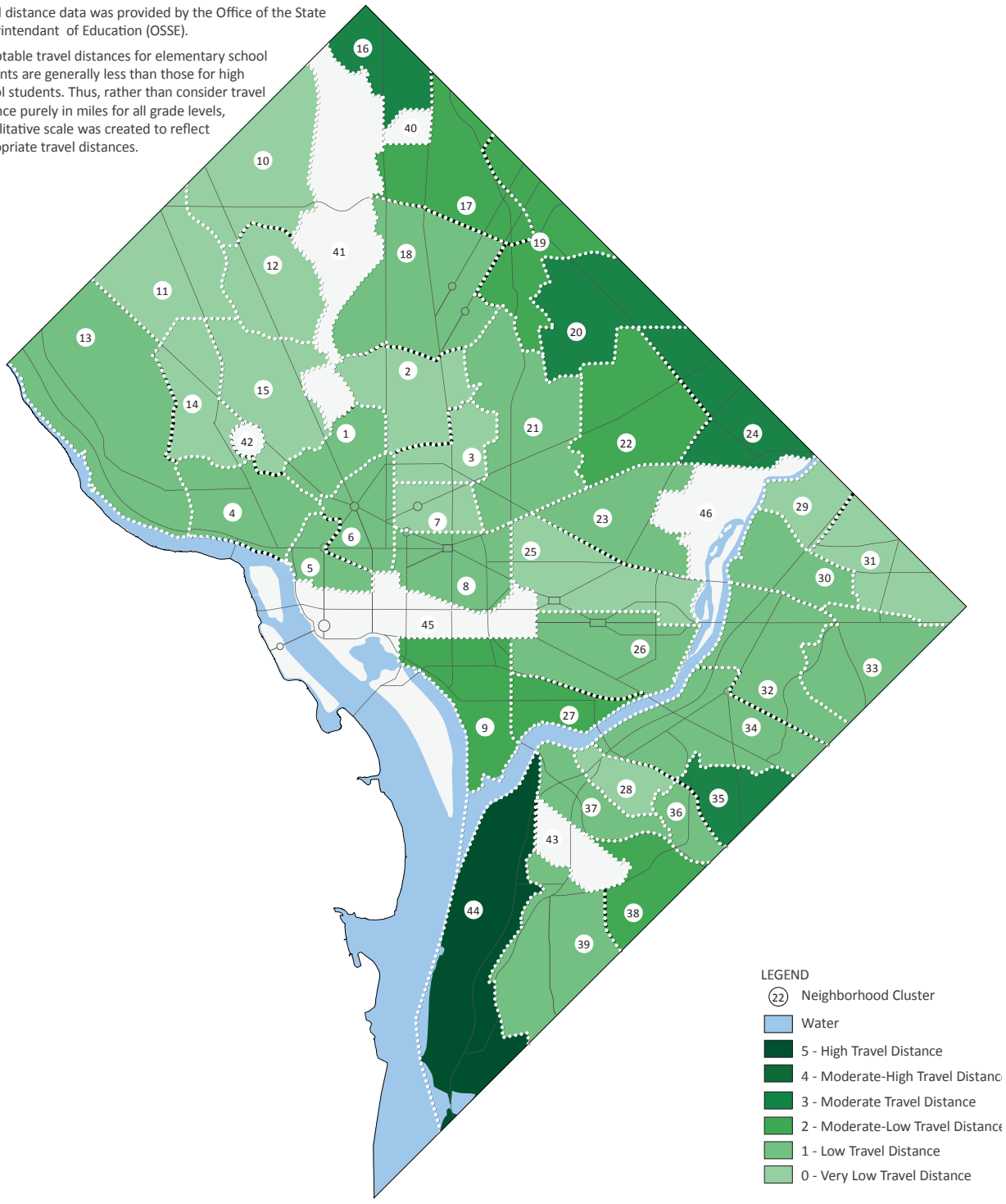



*Figure G.32*

# EFEI

## Total Scores

Figure G.33 presents the total EFEI scores for all 36 of the assessed DCPS schools that have yet to receive modernizations. The EFEI scores for DCPS schools yet to be modernized tended to be fairly low overall. While these scores reflect the quality of the educational facility, they do not necessarily represent the efforts of educational leaders in the schools and the District. During the assessment walkthroughs, the assessors found examples of school leadership working to provide a 21st-century education to its students despite facility limitations. These efforts include the following:

- At Prospect Learning Campus, the teacher workroom was well-equipped, but was not centrally located or integrated into the learning community. To promote greater use of this amenity, teachers were encouraged to keep their work desks in the collaboration room instead of their individual classrooms.
- At Langdon Education Campus, a former open classroom space was transformed into the Computer Assisted Instruction (CAI)—a multidisciplinary technology lab. While students use and benefit from this lab on a regular basis, the space itself lacks adequate daylight, visual clarity and aesthetic quality.
- Kramer Middle School has just initiated a 1:1 laptop-blended classroom program that provides students with a technology-rich, highly individualized learning experience. Although Kramer's traditional facility does not provide spaces designed to support this innovative curriculum, the school is working to create a new teacher collaborative workroom and a cyber café to enrich the student experience.

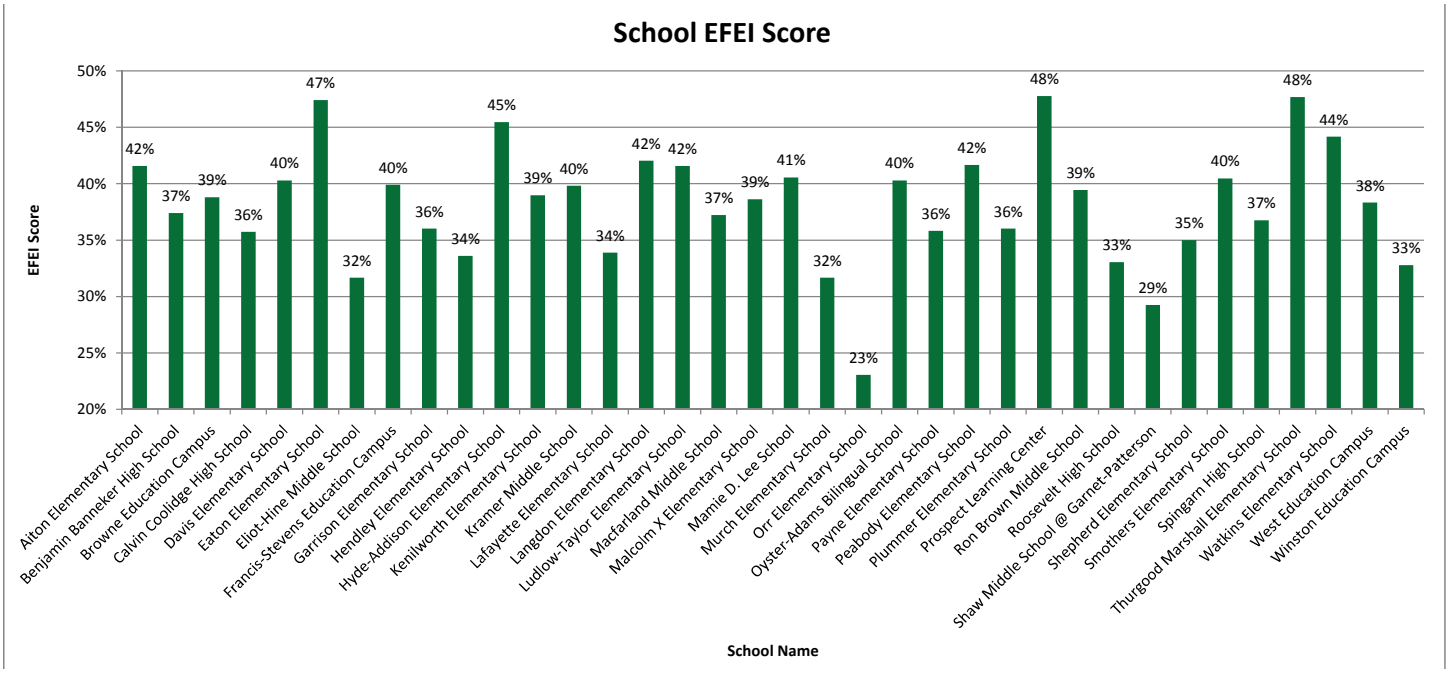
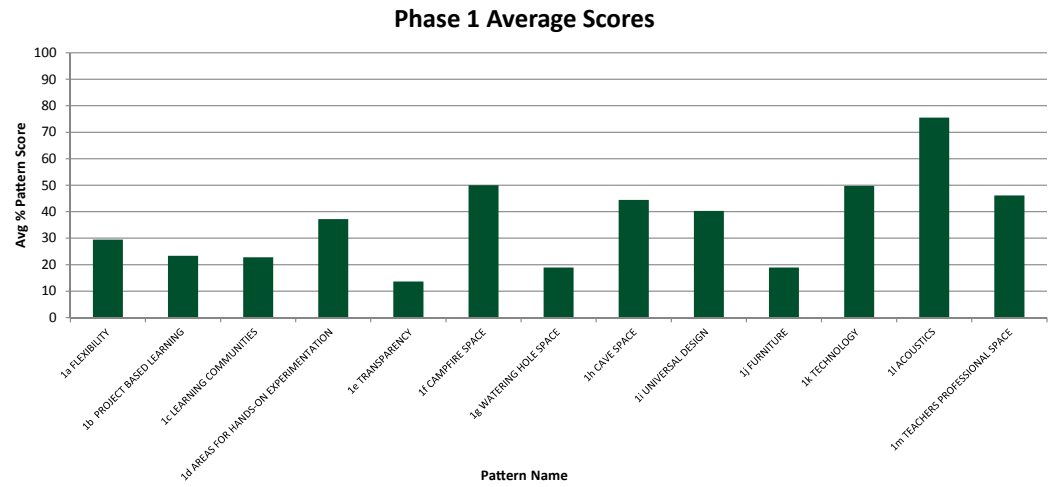
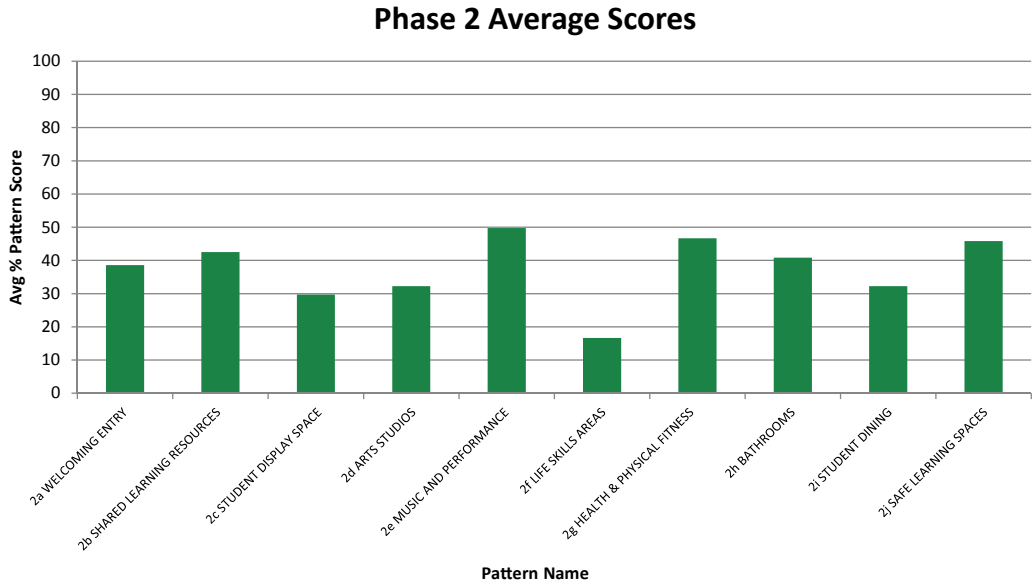



*Figure G.33: Total EFEI Scores for Assessed Schools That Have Not Yet Received Modernizations*



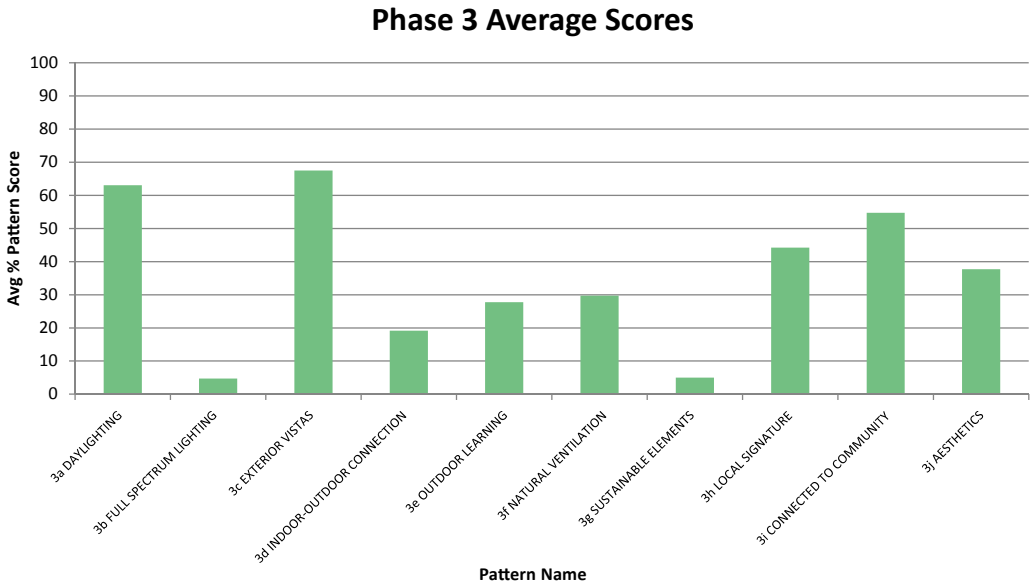




*Figure G.34: EFEI Pattern Scores by Modernization Phase*

## Persistent Areas of Need

Figure G.34 examines what patterns from the EFEI assessment reveal pervasive elements of need across DCPS schools.

» Flexibility: EFEI score 29.4 percent, 11th lowest score (out of 33 patterns)

  Small or crowded classrooms, restrictive furnishings (such as tablet-arm desks), lack of breakout spaces and confining corridors limit the potential for flexible student activity and teacher collaboration in many DCPS schools.

» Project Based Learning: EFEI score 23.2 percent, 8th lowest scoring pattern

  Many DCPS schools scored low on PBL support spaces—a finding corroborated by teacher and principal reports of spatial impediments to implementing project-based learning curricula. In particular, students in many schools lacked space to collaborate and execute large projects.

» Learning Communities: EFEI score 22.8 percent, 7th lowest scoring pattern

  Contrary to DCPS Facility Design Guidelines' goals of establishing learning communities or academies within its schools, many of these older school buildings are departmentalized—classrooms are clustered by subject instead of by grade or student grouping. This restrictive organization and a pervasive lack of spaces for collaborative teaching and learning inhibit the potential of schools to create functioning student communities for learning.

» Furniture: EFEI score 18.9 percent, 5th lowest scoring pattern

  Many of the examined schools had inflexible furnishings, such as tablet-arm desks and hard plastic chairs, and few or no soft-seating options. Furnishings can have a great impact on learning spaces and are relatively inexpensive compared to construction costs; strong efforts should be made to ensure more dynamic and flexible furnishings are provided during Phase 1 modernizations.

» Sustainable Elements: EFEI score 5 percent, lowest scoring pattern of all

  A few of the surveyed schools showed a keen interest in increasing the sustainability of their facility and raising their students' environmental awareness; Payne Elementary School, for example, has formed a partnership with the United States Green Buildings Council to build outdoor classrooms and other green networks in the school. The modernization process is a unique opportunity for DCPS to improve the sustainability of its schools across the district.

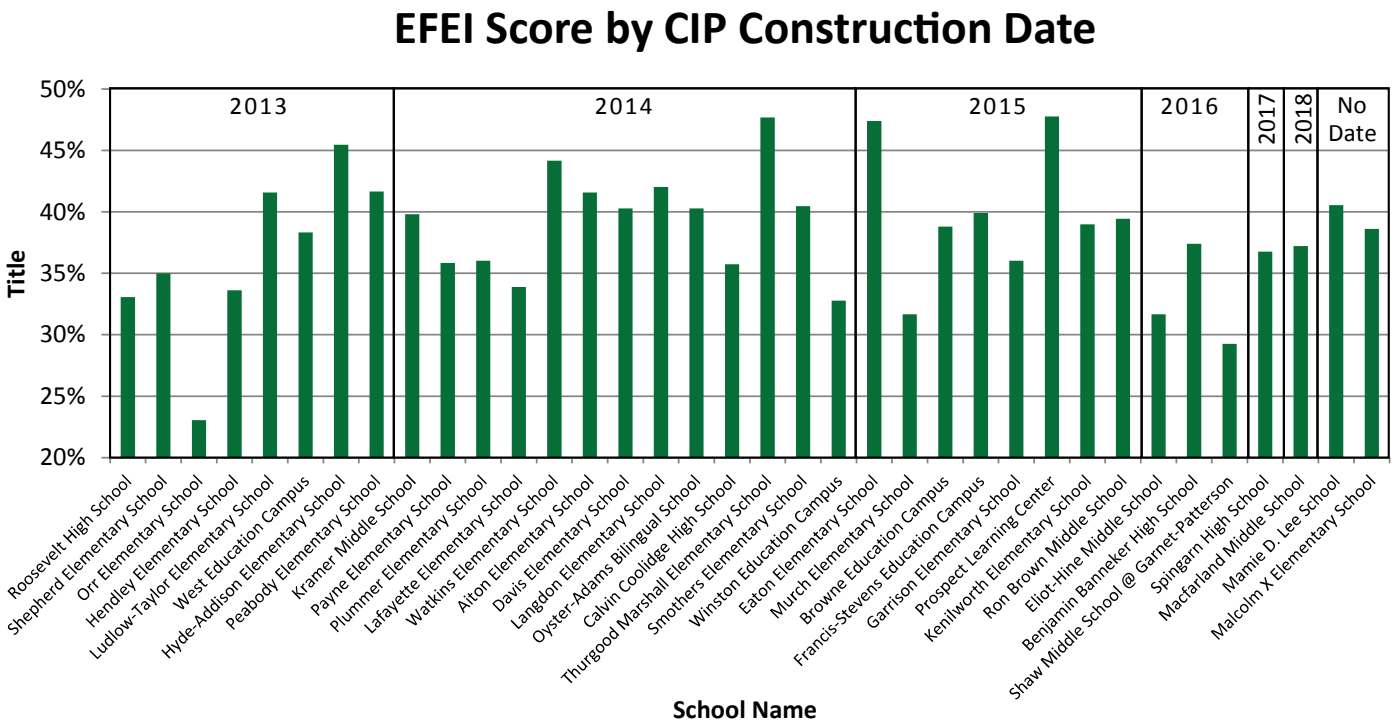



*Figure G.35: EFEI Scores by CIP Construction Date*

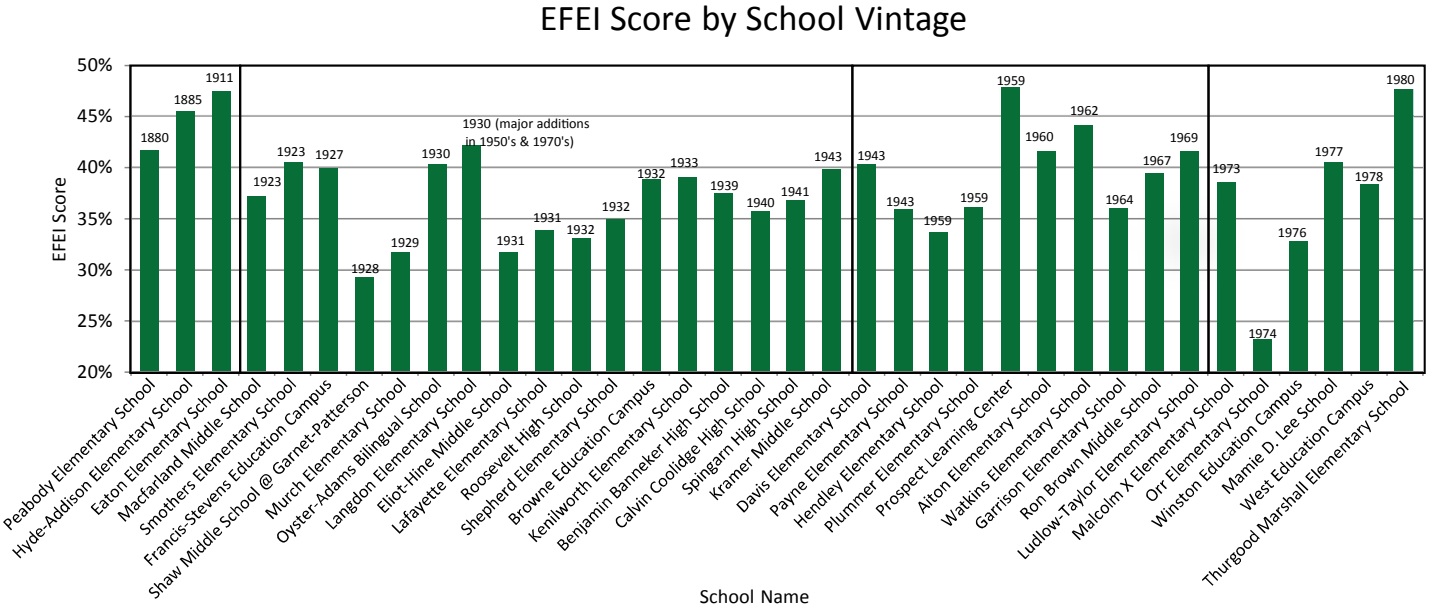



*Figure G.36: EFEI Scores by School Vintage*

## Capital Improvement Plan Construction Dates

This chart seeks to detect whether the Capital Improvement Plan construction dates align with facilities in urgent need (Figure G.35). No strong correlations were found.

## Original School Construction Data

EFEI assessors noticed strong design similarities among schools of similar "vintage" (original date of construction). This chart seeks to determine how vintage relates to EFEI scores (see Gigure 5.36).

- 1880s-1910s. With consistently higher EFEI scores (41 to 47 percent), school buildings of this era have unique architectural features and a tendency towards "learning community" models with academic clusters and shared common spaces. All facilities reviewed have good daylight and stimulating views to the outside.
- 1920s-1940s. Schools built during these decades have a medium range of EFEI scores (29 to 42 percent). They typically feature double-loaded corridors lined with isolated small- to medium-sized classrooms. Facilities tend to have good daylight and view access in most spaces.
- 1940s-1960s. With medium to higher EFEI scores (33 to 47 percent), all these facilities have double-loaded corridors with sidelight windows into classrooms that allow for a little more transparency than in most schools assessed. Construction of this era is extremely recognizable and variations in aesthetics or sense of welcome in these buildings is largely related to facility condition. Most facilities have good daylight and views to the outside.
- 1970s-1980s. The open classroom-model dominates buildings of this era, with great variation in facility success and quality (both reported by school leadership and reflected in EFEI scores, which range from 23 to 47 percent). Acoustical quality, daylight and views tend to be limited in these facilities, in some instances, creating highly undesirable spaces. The more successful of these schools have common spaces within their academic clusters as well as spaces suited to a variety of student groupings and activities.

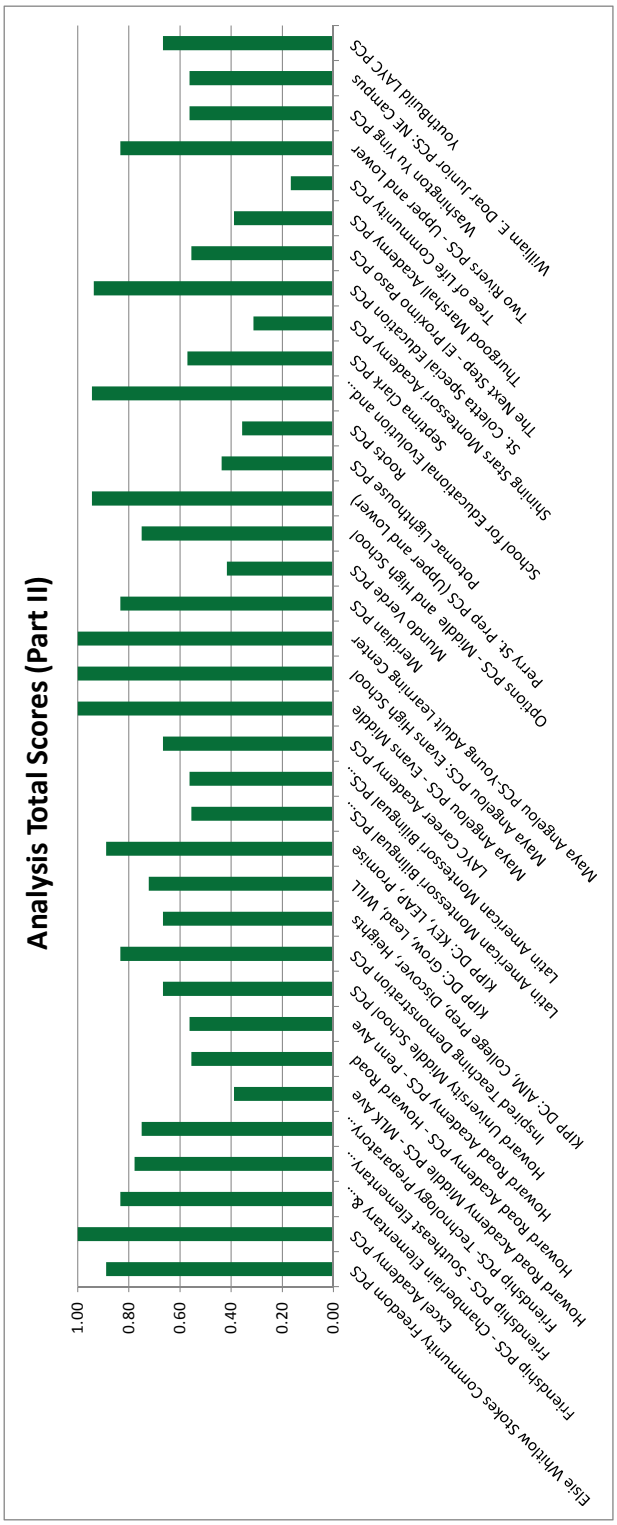



*Figure G.37: Charter Facility Efficacy Analysis Results*

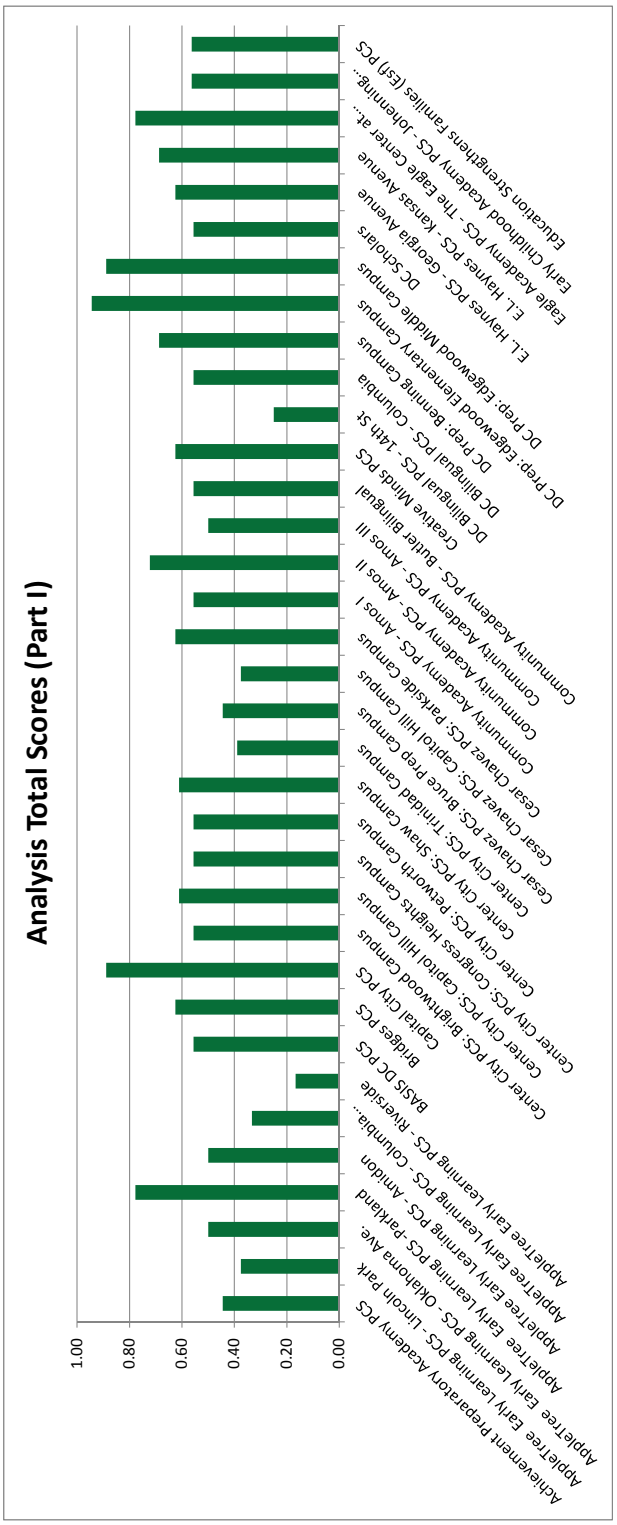



*Figure G.38: Charter Facility Efficacy Analysis Result*

## CHARTER FACILITY EFFICACY ANALYSIS

These charts examine what elements of need are revealed by the charter Facility Efficacy Analysis data (Figure G.39). Scores express the level of sufficiency for each question across the surveyed charter schools.

» Specialized Learning Areas (Arts and Sciences): 34.8 percent

Of the surveyed charter schools, 57.7 percent indicated a lack of space for any kind of specialty classrooms, messy spaces such as art and science labs in particular. Montessori and early childhood schools noted that such spaces are integrated into primary learning spaces.

» Outdoor Learning: 43.5 percent

Like DCPS, many charter schools have limited outdoor learning spaces. In an urban area like the District, it is increasingly important to provide students opportunities for outdoor learning on a regular basis. Of the charter schools, 54.9 percent reported no outdoor learning facilities.

» Space Variety: 50.0 percent

Spatial variety creates greater opportunities for flexibility in program and curriculum. Many school cited multipurpose spaces and libraries essential for large gatherings, but 35.2 percent found these room types lacking in their facilities.

» Health & Physical Fitness: 50.0 percent

Physical activity and play are critical to students physical, mental and academic well-being. Several schools indicated multipurpose spaces and outdoor recreation facilities of various types, though 38 percent of charter schools noted they have no such spaces at their disposal.

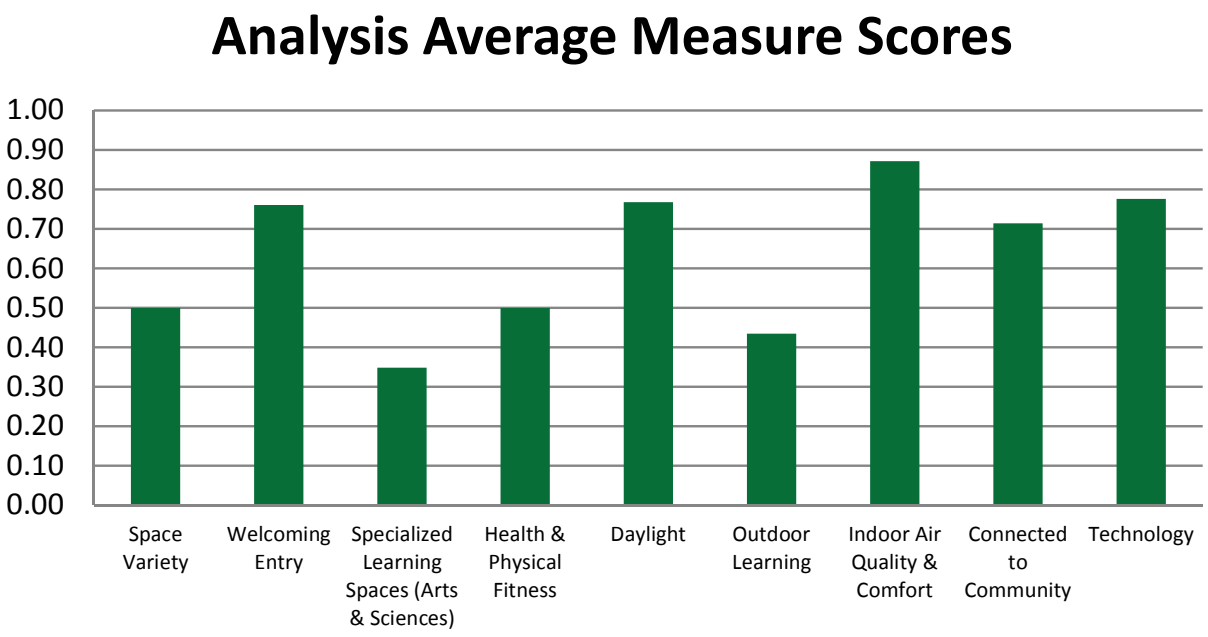



*Figure G.39: Charter Facility Average Scores by Question*