

OPTIONAL INFORMATION



The following pages provide:

- A sampling of the various accolades DAVIS, Smoot Construction, and Perkins Eastman has received for past projects
- Additional references from DAVIS, Smoot Construction, and Perkins Eastman
- Letters of Recommendation from Clients of Perkins Eastman

DAVIS CONSTRUCTION AWARDS AND HONORS



The Madeira School McLean, VA

- 2015 Excellence in Construction Award, Associated Builders and Contractors' Metro Washington Chapter

Georgetown School of Continuing Studies Washington, DC

- 2014 Award of Excellence: Best Renovation/ Adaptive RE-use, NAIOP MD/DC
- 2014 Merit Award – SCUP / AIA-CAE Excellence in Architecture-Building Additions or Adaptive Re-use, AIA (National)

Episcopal High School Alexandria, VA

- 2017 Excellence in Construction Award, Historic Restoration, Associated Building and Contractors (DC/VA combined)
- 2017 Excellence in Construction Award, Educational, Associated Building and Contractors (DC/VA combined)

George Washington University Law Clinic Washington, DC

- 2014 Craftsmanship Award – Sitework: Underpinning, Foundations and Excavations, WBC

Marymount University – Residence Hall and Academic Building Arlington, VA

- 2012 Award of Excellence: Education / Spiritual Design, Architectural Precast Association Awards

Burgin Center for the Arts at Mercersburg Academy Arlington, VA

- 2010 PA Council 7th Annual Design Awards Program, Society of American Registered Architects

SMOOT CONSTRUCTION AWARDS AND HONORS



Smoot Construction	Best Minority Owned Prime Contractor of the Year	Maryland Washington Minority Companies Association	2015
Dunbar Sr. High School	Presidential Citations in Sustainable Design	AIA DC	2014
	Best Project K-12 Education	ENR Mid-Atlantic	2014
Roosevelt High School	DC Preservation League Award	DC Preservation League	2016
US Capitol Dome Restoration	2016 Vision Award	Committee of 100 on the Federal City	2016
	Award of Merit Renovation/Restoration	ENR Mid-Atlantic	2016
	Renovation/Restoration Project Over \$100 Million	Associated General Contractors of Washington, DC	2016
	2016 Project of the Year	DC Society of Professional Engineers	2016
Smithsonian National Museum of African American History and Culture	Craftsmanship Awards	Washington Building Congress	2017
	2017 Project Achievement Awards for Infrastructure <\$150M dollars	Construction Management Association of America National Capital Chapter	2017
	Best Historic Renovation	NAIOP, the Commercial Real Estate Development Association	2017
	National Award - Greater Than \$75 Million	American Institute of Steel Construction	2017
	Best of the Best Award	NAIOP, the Commercial Real Estate Development Association	2017
	Best Institutional Facility	NAIOP, the Commercial Real Estate Development Association	2017
	USA 2017 Special Award	Owner Construction Association Of America	2017
2017 Public Building Architect of the Year	AYA	2017	
2017 WBC Craftmanship Award – Special Construction: Water Feature	Washington Build Congress	2015, 2016, 2017	
2017 WBC Craftmanship Award – Doors & Windows: Interior Glass			
2016 WBC Craftmanship Award - Structural Steel			
2016 WBC Star Award - Excellence in the Face of Adversity			
2016 WBC Craftmanship Award - Structural Steel			
2016 WBC Star Award - Excellence in the Face of Adversity			
2015 WBC Craftmanship Award - Cast-in-Place Concrete			
2016 WBC Craftmanship Award - Specialty Painting			
2016 WBC Craftmanship Award - Ornamental Metals			

PERKINS EASTMAN AWARDS AND HONORS



Dunbar Senior High School

Washington, DC

- 2015 USGBC NCR Award of Excellence: Schools Project of the Year and People's Choice
- 2015 USGBC MD 10th Annual Wintergreen Awards for Excellence in Green Building: Educational/School Facility
- Excellence in Green Building - Educational/School Facility
- 2014 Grand Prize Award, *Learning by Design*, Excellence in Educational Facility Design
- 2014 Project of Distinction, Council of Educational Facility Planners International NE Region
- 2014 Vision Award, The Committee of 100 on the Fed City
- 2014 Best Civic Building, Congress for New Urbanism Charter Award
- 2014 Honorable Mention, *School Planning & Management*
- 2014 Gold Citation, American School & University Educational Interiors Showcase
- 2014 Best Projects: K12 Education, ENR Mid-Atlantic
- 2014 Presidential Citation in Sustainable Design, AIA Chapter Design Awards
- 2014 Award in Architecture, AIA Chapter Design Awards
- 2014 ABC Excellence in Construction Award, Educational Facilities

Stenwood Elementary School

Vienna, Virginia

- 2013 VA Chapter of the Council of Educational Facility Planners International: Award for Best Renovation Design

Roosevelt High School

Washington DC

- 2016 DC Preservation League
- 2016 Committee of 100 on the Federal City: Vision Award
- 2016 ENR Mid-Atlantic Regional Best Projects: Award of Merit Renovation/Restoration
- 2016 AIA DC Presidential Citation for Sustainable Design
- 2016 Graphic Design USA: American In-House Design Awards
- 2016 Association General Contractors of DC Outstanding Renovation & Restoration
- 2016 Print Regional Design Annual

Yorktown High School

Arlington, Virginia

- 2014 USGBC Award of Excellence - Schools Project of the Year
- 2014 Innovation Bronze Award, VA Chapter of the Council of Educational Facility Planners
- 2013 Platinum Design Award, VSBA Exhibition of School Architecture

Stoddert Elementary School

Washington, DC

- 2012 US Department Of Education Green Ribbon Award
- 2011 *Learning By Design*, Citation Of Excellence
- 2011 AIA/DC Presidential Citation For Sustainable Design
- 2011 ENR Southeast Best K-12 Project
- US Green Building Council (USGBC) National Capitol Region, Honorable Mention



School Without Walls Senior High School
Washington, DC

- AIA Committee on Architecture for Education, CAE Design Awards: Citation Award
- DC Office of Planning, DC Award for Excellence: Historic Preservation
- *Learning by Design*, Excellence in Educational Facility Design: Grand Prize Award
- Washington Chapter AIA, Design Awards: Award of Merit in Historic Resources and Presidential Citation for Sustainable Design

Frederick Douglass Elementary School
Leesburg, Virginia

- 2013 VSBA Exhibition of School Architecture Gold Design Award
- 2013 VA Chapter of the Council of Educational Facility Planners International: Award for Best New Elementary School Design

Essex Agricultural and Technical High School
Danvers, Massachusetts

- 2016 Honorable Mention, *Learning by Design*, Excellence in Educational Facility Design

Wuhan International Education Center
Hubei, China

- 2016 International Property Awards: Asia Pacific

DREAM Charter School, East Harlem Center for Living and Learning
New York, New York

- 2016 American School & University Educational Interiors Showcase: Special Citation
- 2016 MFE Project of the Year: Affordable housing
- 2016 ULI NY: Awards for Excellence

Brightwood Elementary School
Washington, DC

- Washington's Winning Visions Committee of 100 on the Federal City

The Deanwood Community Center and Library
Washington, DC

- Recreation Management, Innovative Architecture and Design Awards: Editor's Choice
- 2011 Vision Award, The Committee of 100 on the Federal City

Avenues: The World School
New York, New York

- 2011 ENR Southeast, Best Interiors/Tenant Improvement

Concordia International School
Shanghai, China

- 2010 AIA Committee on Architecture for Education, CAE Design Awards: Citation Award
- 2009 AIA New York State, AIA NY State Design Award
- 2008 AIA Westchester-Mid Hudson, Design Awards: First Honor Award

REFERENCES

DAVIS CONSTRUCTION

Episcopal High School

Boota de Butts

Chief Financial Officer
Episcopal High School
1200 Quaker Lane
Alexandria, VA 22302
703.933.4092
whd@episcopalhighschool.org

The Madeira School – Dormitory Renovation

Alex Heiberger

Chief Financial Officer
The Madeira School
8328 Georgetown Pike
McLean, VA 22012
703.556.8241

St. Andrews Episcopal School

Joe Phelan

Director of Operations
St. Andrew's Episcopal School
8804 Postoak Road
Potomac, MD 20854
301.983.5200
jphelan@saes.org

SMOOT CONSTRUCTION

Gregory A. O'Dell

President and Chief Executive Officer, EventsDC
Walter E. Washington Convention Center
801 Mount Vernon Place, NW
Washington, DC 20001
202.249.3087
godell@eventsdc.com

U.S. Capital Dome Restoration

Joseph Abriatis

Project Controls Manager
Architect of the Capitol
Ford House Office Building, Suite H-537
3rd & D St., S.W, Washington, DC 20515
202.226-5989
jabriati@aoc.gov

Neil Albert

President and Executive Director

Downtown Business Improvement District

1250 H Street, NW, Suite 1000
Washington, DC 20005
202.638.3232
neil@downtowndc.org

National Museum of African American History & Culture

Derek Ross

Deputy Director, Engineering & Design Division
Smithsonian Institution
Office of Planning, Design and Construction
600 Maryland Ave. SW, Suite 5001
Washington, DC 20024
202.633.6276
rossde@si.edu

Carl Campioli

Senior Architect and Senior Program Manager
Office of Architecture and Engineering

The National Gallery of Art

2000 B South Club Drive
Landover, MD 20785
202.842.6257
c-campioli@nga.gov

PERKINS EASTMAN

George Mason High School Feasibility Study

Dr. Peter Noonan

Superintendent of Schools
Falls Church City Public Schools
803 W. Broad Street, Suite 300
Falls Church, VA 22046
703.248.5600
pnoonan@fccps.org

George Mason High School Feasibility Study

Marybeth Connelly

Vice Mayor, City Council
City of Falls Church
703.200.2426
mconnelly@fallschurchva.gov
Community Outreach Director
Falls Church City Public Schools
800 W Broad Street, Suite 203
Falls Church, VA 22046
703-248-5691
connellym@fccps.org

George Mason High School Feasibility Study

Michael Ankuma
Former FCCPS School Board member

Langley High School, Oakton High School and Fairfax County Ed Specs

Kevin Sneed

Director, Design & Construction Services
Fairfax County Public Schools
8115 Gatehouse Road, Suite 3500
Falls Church, VA 22042
571.423.2280
kmsneed@fcps.edu

Dunbar High School

Teddy Gebrimichael

Former Program Director at D.C. Department of General Services
McKissack & McKissack
1401 New York Ave. NW, Suite 900
Washington, DC 20005
202.645.4587
teddyg@mckissackdc.com



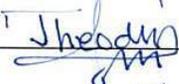
LETTERS OF RECOMMENDATION

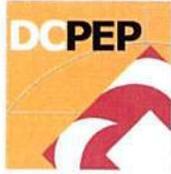
DUNBAR HIGH SCHOOL

PAST PERFORMANCE EVALUATION FORM

(Check appropriate box)

Performance Elements	Excellent	Good	Acceptable	Poor	Unacceptable
Quality of Services/ Work	✓				
Timeliness of Performance	✓				
Cost Control	✓				
Business Relations	✓				
Customer Satisfaction	✓				

1. Name & Title of Evaluator: Teddy Gebremichael
2. Signature of Evaluator: 
3. Name of Organization: Mckissack & Mckissack For DGS
4. Telephone Number of Evaluator: 202-645-4587
5. State type of service received: Architectural Design + C.A
6. State Contract Number, Amount and period of Performance GM-10-NC-1113-FM
7. Remarks on Excellent Performance: Provide data supporting this observation. Continue on separate sheet if needed) (See Attachment)
8. ~~Remarks on unacceptable performance: Provide data supporting this observation. (Continue on separate sheet if needed)~~



DC Partners for the
Revitalization of
Education Projects

DEPARTMENT OF GENERAL SERVICES
Program Management Team

1250 U Street, NW
3rd Floor
Washington, DC 20009

202.698.7763
www.dgs.dc.gov

November 12, 2013

To Whom it may concern:.

7. Remarks on Excellent Performance:

Perkinseastman provided an exceptionally high quality service on the Dunbar HS Modernization Project. Their approach on making everyone included in the design process was vital in delivering a quality project on time. The timeliness of the deliverables, their flexibility and availability to meet and discuss solution with stakeholders was superb. The design team worked with us tirelessly to assist, propose, and advise on cost effective solutions which translated into considerable savings on the overall project. The team is pleasant to work with and our customer (DGS) and the end users have expressed and continue to express their praise and satisfaction with the Perkinseastman Design Team that performed on the Dunbar HS Modernization project.

Teddy Gebremichael

Program Director

DGS - DCPEP

1250 U Street, NW, 3rd Floor

Washington, DC 20009

T 202.645-4587

C 202.359.1224

F 202.289.6461

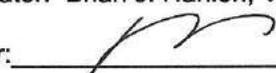
E-MAIL teddyg@mckissackdc.com

WEB www.dgs.dc.gov

DUNBAR HIGH SCHOOL

PAST PERFORMANCE EVALUATION FORM Perkins Eastman
 (Check appropriate box)

Performance Elements	Excellent	Good	Acceptable	Poor	Unacceptable
Quality of Services/ Work	/				
Timeliness of Performance	/				
Cost Control	/				
Business Relations	/				
Customer Satisfaction	/				

1. Name & Title of Evaluator: Brian J. Hanlon, VP, Director of Program Management
2. Signature of Evaluator:  _____
3. Name of Organization: Brailsford and Dunlavey, Inc.
4. Telephone Number of Evaluator: T: 202-266-3469
5. State type of service received: Architectural services
6. State Contract Number, Amount and period of Performance: Dunbar Senior High School,
 Washington, DC Project Cost: \$100M
 Start of Services: 1/3/2011; Construction completion: 8/15/2013
7. Remarks on Excellent Performance: Provide data supporting this observation. *OUTSTANDING FIRM, A+*
 Continue on separate sheet if needed)
8. Remarks on unacceptable performance: Provide data supporting this observation. (Continue on separate sheet if needed)

Note: Brian J. Hanlon's prior role was the Director of DC Department of General Services, Washington, DC

LANGLEY HIGH SCHOOL



Department of Facilities and Transportation Services
Design and Construction Services
8115 Gatehouse Road, Suite 3500
Falls Church, Virginia 22042-1203

February 14, 2017

To Whom It May Concern:

Fairfax County Public Schools has had the pleasure of working with Perkins Eastman (PE) in a number of schools dealing with total renovation and additions. As of this writing, Perkins Eastman is the Architect for Langley High School which is under construction and Oakton High School which is in the permit phase. Both projects are total renovation and addition to the existing schools.

Through each phase of the project, PE flawlessly submitted professional work in a timely manner. Their attention to detail and unwillingness to sacrifice quality within their work is what allows them to truly excel. Working with a team such as PE that has the level of drive and gifted staff to meet the owner's demanding needs and goals is one of the most important things we look for in a firm

Specifically, working with Andrea L. Shaw, Brian Donnelly, John Morris, Nicholas Williams and Khara James have helped out in all different phases of the project without any issues. Andrea's approach to the practice of Architecture is second to none. Her consistent availability for communication makes all of the coordination between our end and theirs both quick and effective. For us, such an approach on a phased renovation, allows us to maintain a certain level of peace of mind knowing that under her leadership, construction administration will run smoothly.

On that note, we have been more than satisfied with our work with PE and would absolutely recommend them for any educational facility project anywhere.

Sincerely,

Godson J. Nwosu, AIA
Architect, Capital Projects
Design and Construction, FCPS

ROOSEVELT HIGH SCHOOL

PAST PERFORMANCE EVALUATION FORM

(Check appropriate box)

Performance Elements	Excellent X	Good	Acceptable	Poor	Unacceptable
Quality of Services/ Work	X				
Timeliness of Performance	X				
Cost Control	X				
Business Relations	X				
Customer Satisfaction	X				

1. Name & Title of Evaluator: Kyle Whitley Project Manager
2. Signature of Evaluator: 
3. Name of Organization: Kyle Whitley Project Manager
4. Telephone Number of Evaluator: 202 207 7957
5. State type of service received: Design and Construction Administration Services
6. State Contract Number, Amount and period of Performance DCAM-13-AE-0062B Fixed Fee of \$3,018,024, including \$2,895,524 for design development documents, and allowances totaling \$122,500. July 15, 2015.
7. Remarks on Excellent Performance: Provide data supporting this observation. Continue on separate sheet if needed)
8. Remarks on unacceptable performance: Provide data supporting this observation. (Continue on separate sheet if needed)

PAST PERFORMANCE VALUATION FORM, Question 7

Quality of Service: Mary Rankin and her Perkins Eastman DC team work diligently to ensure compliance with the Owner's contractual and technical requirements. Their submissions are timely and appropriately detailed. Mary's level of experience and knowledge is high, which supports the timely resolution of challenges and risk mitigation.

Timeliness of Performance: Mary Rankin's organized and structured management of a large A/E team greatly attributed to the successful completion of design and permit drawings under a very tight schedule. Her, and the Perkins Eastman DC's dedicated staffing during Construction aided the Builder in meeting all construction milestones.

Cost Control: Open and ongoing communication by Mary's team, with the Builder and the Owner, assisted in identifying potential changes or schedule impacts early. The project remained on budget and no liquidated damages have been assessed.

Business Relations: Mary Rankin exhibits good judgement and is timely to DGS's requests. She conducts herself with a high degree of ethics and maintains a very professional environment at the project site and during meetings.

Customer Satisfaction: As the Owners Representative for the Roosevelt High School Modernization, I believe Mary Rankin and her Perkins Eastman DC team has distinguish themselves by executing obligations on a timely manner, with upmost professionalism and a high degree of knowledge in their trade. I highly recommend Mary and the Perkins Eastman DC team for future projects.

Regards,



Kyle Whitley-DGS Project Manager

NORTHERN VIRGINIA COMMUNITY COLLEGE

SIGAL
Construction
Corporation

2231 Crystal Drive
Suite 200
Arlington, VA 22202

703.302.1500 office
703.302.1520 fax

www.sigal.com

February 17, 2017

To Whom It May Concern

SIGAL Construction worked with Perkins Eastman Architects, more specifically John Morris, on the construction of the 40,000 square foot Northern Virginia Community College Higher Education Center. The three-story building included classrooms, offices, a recording studio, and a multipurpose room that cantilevered over the campus pond.

We were very pleased with our collaboration with John during Construction Administration. When presented with design or code related issues, John was consistently able to get the answers needed to keep the construction pace going. With his excellent communication skills and construction knowledge, John was always able to provide practical and reasonable solutions needed to maintain progress.

We look forward to work with John in future projects.

Sincerely,



Andrew Huang
Senior Vice-President

SIGAL Construction Corporation
202 345 0341 (Mobil)
ahuang@sigal.com
www.sigal.com

GEORGE MASON UNIVERSITY

G.W.C. WHITING
(1883-1974)

FOUNDED 1909

WILLARD HACKERMAN
PRESIDENT AND CEO

THE WHITING-TURNER CONTRACTING COMPANY

(INCORPORATED)

ENGINEERS AND CONTRACTORS

14900 CONFERENCE CENTER DRIVE, SUITE 550
CHANTILLY, VIRG NIA 20151
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INDUSTRIAL
WAREHOUSE/DISTRIBUTION
MULTI-FAMILY RESIDENTIAL
ENVIRONMENTAL
BRIDGES, CONCRETE

February 17th, 2017

Mr. John Morris
Senior Associate
Perkins Eastman
One Thomas Circle NW, Suite 200
Washington, DC 20005

**Re: George Mason University – Academic VII/ Research III
Letter of Recommendation**

Dear John,

I just wanted to express my gratitude and thanks to Perkins Eastman in regards to the CA services being provided at the GMU Academic VII project. The Perkins Eastman team led by John Morris has been instrumental in the quick resolution to many field coordination items that have come up during the course of the project. Perkins Eastman's understanding of the construction process and close collaboration with Whiting-Turner, have resulted in several practical and economical solutions to the typical coordination challenges that arise during the course of construction. The project has benefited greatly from your teams CA services and capabilities. Thank you.

Very truly yours,

THE WHITING-TURNER CONTRACTING COMPANY

Jon Evers
Project Manager

MARTIN LUTHER KING JR. SCHOOL

City of Cambridge

Richard C. Rossi • City Manager



Executive Department

Lisa C. Peterson • Deputy City Manager

April 5, 2016

To Whom It May Concern:

It is with pleasure that I write this recommendation for the Perkins Eastman team that worked with the City of Cambridge to plan, design and execute the recently completed Dr. Martin Luther King School Construction Project.

The City of Cambridge has worked with the Perkins Eastman's team for the past four and a half years on this complex urban project. The resulting high performance building is creative, practical and has exceeded expectations. Since the school opened in December of 2015, the building has garnered high praise from the City, Cambridge Public Schools, Department of Human Services, the neighborhood, and the learning community parents, students and staff.

Neighborhood engagement is most important to projects of this scale located in a congested urban area. John Pears led the community outreach process. He is a rare combination of flexible designer and active listener and was responsive to the requirements of the Owner while being approachable and flexible to neighborhood concerns. John expeditiously guided the team through the Special Permit Process and City Agency reviews by building consensus amidst the myriad of disparate interests of numerous constituents.

The educational programming process was led by Sean O'Donnell who worked collaboratively with Cambridge Public Schools and the Department of Human Services. CPS had just adopted a new grade configuration of JK-5 elementary schools and 6-8 middle schools at the start of this project. Sean's broad knowledge of education was invaluable in creating the new middle school program from scratch without benefit of middle school leadership which had not yet been hired.

Firm believers in the team concept, Perkins Eastman established a very collaborative working relationship with the City's project management team, the school department and the project contractors, making this a very successful project. Alicia Caritano, the Project Manager, has worked tirelessly to ensure the large team of consultants remain diligent and responsive in order to maintain project budget while adhering to the schedule. As the project comes to a close, Alicia continues to protect the City's best interest and ensure that the project is completed effectively and efficiently.

The project was also the first in the City to target Net Zero Energy (NZE). Project Architect Jana Silsby and John Pears worked collaboratively to shape the design to be both energy efficient and beautiful. Jana was instrumental in the NZE workshops and educating the City and CPS on their role in saving energy. Her commitment to the project extended throughout design and construction. Even after the project is occupied, Jana and team are still on-site helping to educate the school staff and students about the unique features of this highly sustainable building. The final project features a solar panel array that is estimated at providing 47% of the schools' required energy with 65 geothermal wells that support the heating / cooling system. This project has set a very high sustainable prototype for the rest of our schools.

City Hall • 795 Massachusetts Avenue • Cambridge • Massachusetts • 02139
617-349-4300 • fax: 617-349-4307 • tty: 617-492-0235 • www.cambridgema.gov

City of Cambridge

Richard C. Rossi • City Manager



Executive Department

Lisa C. Peterson • Deputy City Manager

As City Manager and former Deputy City Manager, I have led the City's Designer Selection process and managed hundreds of millions of dollars in capital construction for over 32 years. A very important element of a strong relationship between the design team and the City is the comfort of knowing that the team would hold the interests and goals of the City in the highest regard. Perkins Eastman did that at all levels. I find Mr. Pears and his Perkins Eastman team to be among the top 5% of all architects and design firms I have dealt with during that time. The City is very pleased with the outcomes of this project. We would indeed welcome future collaborations with Perkins Eastman.

Very truly yours,

A handwritten signature in cursive script that reads "Richard C. Rossi".

Richard C. Rossi
City Manager

FREDERICK DOUGLASS ELEMENTARY SCHOOL



Prince William County
PUBLIC SCHOOLS
Providing A World-Class Education

February 15, 2017

To Whom It May Concern:

I'm pleased to be presented with this opportunity to express my appreciation to Perkins Eastman Architects, as an outstanding architectural design firm. I would strongly recommend the use of their talents and abilities to perform any architectural, engineering and construction management activities on any facility.

Recently, I've worked with Perkins Eastman on the Frederick Douglass Elementary School Project for Loudoun County Public Schools. The scope of the work included the demolition of an existing support facility to make way for the construction of a new two-story 100,000 sq. ft. Elementary School. The Perkins Eastman architectural team led by Andrea Shaw as project manager, masterfully worked with the entire design team to provide means and solutions that resulted in a very successful project for the client.

During the design and construction of the project, Perkins Eastman provided invaluable project management and development coordination. They addressed local and county demands, acted efficiently to design changes and provided excellent project management in an expedient manner.

Perkins Eastman Architects, was very professional and effective in maintaining the design schedule and budget for the project. I look forward to working with Perkins Eastman Architects in the future and would recommend them for any professional services or construction management services.

Sincerely,

A handwritten signature in blue ink that reads "Gregory A. Miller".

Gregory A. Miller
Administrative Coordinator
Office of Facilities Services, Construction Division

GREGORY A MILLER

Office of Facilities Services, Administrative Coordinator, Construction Division

P.O. BOX 389, MANASSAS, VA 20108 • WWW.PWCS.EDU • 703.791.8717, FAX 703-791-8966

DAVIS/SMOOT JOINT VENTURE AGREEMENT

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FACILITY'S RESPONSE TO THE INTERNATIONAL BACCALAUREATE CURRICULUM

THE THOUGHT LEADERSHIP OF PERKINS EASTMAN

COLLECTIVE INTELLIGENCE



series volume

3.1

Facility's Response to the
International Baccalaureate Curriculum

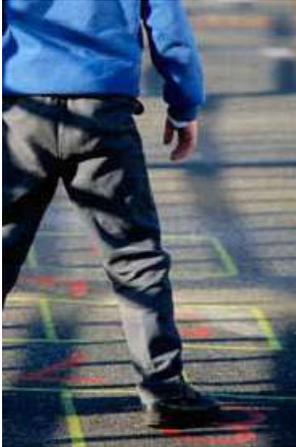
By
Liz Lee

Perkins Eastman

An architectural rendering of a modern school interior. The scene features a large, open-plan space with a prominent staircase in the foreground. The ceiling is a complex, geometric structure with a grid of white lines. A large glass wall or window is visible on the right side, and a person is walking on a platform to the right. The entire image is overlaid with a semi-transparent red rectangle that contains text.

"The primary feature of the IB is inquiry and investigative learning, so a space geared for 21st century learning will create access to the information systems and global networks required for students' academic work, and will provide a workspace that will facilitate open and collaborative interactions."

Michael Ortiz, IB Coordinator for American Embassy School (AES), New Delhi, India



Increasingly active citizens of the world, today's students have greater expectations and demands of their educational experience than has been true historically as a result of globalization aided by technology.

They must be prepared to compete and collaborate on an international stage while at the same time respond to their local environment and context.

Established in 1968 to answer to the needs of internationally mobile students preparing for university, the International Baccalaureate Organization (IBO) may be uniquely suited to help guide the educational experience of our global citizen students. The IBO is a non-profit educational foundation that works with schools, governments, and international organizations to develop a challenging curriculum and approach that is implemented on an international scale. The curriculum balances a western-based education with a unique "of this place" sensitivity, harmonizing differing national curricula and teaching methods at schools worldwide. With students around the world learning alongside their global peers, the goal is that this shared intercultural understanding will raise overall understanding and tolerance resulting in a better, more constructive world.

One of the few internationally recognized curricula to date, the International Baccalaureate (IB) is the comprehensive leader; its curriculum is deployed in over 3,800 schools in 140 countries. IB curriculum includes distinctive programs organized by age group that relate directly to the built school environment. Where there are challenges in effectively supporting a program that is simultaneously international and local, collaborative and individual, focused and contextual, there are also unique opportunities, including the development of a new model of what the school of the future may look like.

The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.

- IB Mission Statement

Standards and Practices

To ensure quality and consistency across all schools and all countries, IB curriculum operates from a general framework with established key performance indicators that allow the IBO to actively monitor each schools' implementation and effectiveness. But successful implementation isn't only a function of curriculum assessment and staff roles. From the numerous sources listed on National Clearinghouse of Educational Facilities website, we know that student learning and performance is also greatly impacted by their surroundings. The school facility should provide the proper programmatic spaces for the curriculum to engage the students. This finding is intrinsic to the IBO way and, as such, is deeply rooted in many of the curriculum standards, linking facility design inextricably to educational success as defined by IBO specifically.



left to right
The library is an essential facility component for the IB Primary Years Programme, which focuses on the development of the whole child as an inquirer.

Concordia International School Shanghai extends science experimentation space for group 4 and 6 Diploma Programme subjects to the outdoors.

Science wet labs are one of the few facility requirements for Middle and High Schools as stipulated by the IBO.

For the past five years, numbers in the three programmes have grown by an average 15% each year.

These program spaces include all learning environments, facilities, and resources and specialized equipment that support the implementation of the programmes, including labs and studios, technology facilities, and secure area locations for examination materials.

The greater the facility's design supports the IB curriculum, the greater chance of student success and demonstration of the 21st-century competencies required by the curriculum. To understand how the standards can be realized in the actual design of a school facility, it is helpful to organize them according to potential facility responses, outlined in the following matrix as an example.



The IB Library

If there is any space within the school building promoted and placed front and center by the IB curriculum, it is the library.

But in an era where many question the relevance of the library as an effective 21st-century learning environment, how does a school negotiate the IB requirement with a desire to provide a facility with lasting value for the entire school population? It begins with truly understanding the original intent of the library as a community resource and place of gathering.

The IB library prototype should embrace the IB mantra of “learning how to learn”. It should provide students with the tools and resources needed to relate their experiences from within the classroom to the world beyond, and should supplement knowledge and exposure through media and literature from varying sources and origins. The library should reflect an ethos of truth-seeking and research-based learning. It should also be a community resource by providing spaces for gathering.





No longer perceived as a depository for books, the library is a dynamic and active place for collaboration and exploration.

Media varies from hard copy books, on-line reference materials, self-generated ongoing video and audio projects, to digital essays and presentations. The environment is as varied as the reasons for being there; small group teaming rooms for project-based work, soft areas for informal interaction and casual reading, and class areas for secondary instruction including guided tours of computer-based resources.

The library as public gathering space also serves as an unofficial welcome center for parents and an opportunity for the exhibition of student work and broadcasting of school-related events. As a school-wide resource, the IB library may also consolidate the recommended resources for ongoing faculty professional development. The collocation not only enables more effective management of resources, but also brings the entire community together in one place, reinforcing the library as a symbol for culture and community enrichment.

While updating existing spaces into 21st century learning environments at the American Embassy School (AES) in New Delhi, India, school leadership simultaneously took a second look at how the campus was really being used. As most international schools are true community resources in that they provide support networks and resources unique to the needs of their diverse communities, AES looked to incorporate some public function to their facilities, opening their doors to parents, visitors and the greater community. After careful study and consideration, AES approved the conversion of a classroom building into the Stein Learning Center, comprised of the Middle School/ High School library, training and community events spaces, and High School student commons and café. This new conversion would not only showcase the importance of the library to the school, but also acknowledge the broadening of the library's role as a connection between user groups across campus.

*opposite, top to bottom
The New Stein Learning Center at American Embassy School in New Delhi showcases IB's emphasis on connectivity, collaboration, and inquiry by transforming their traditional library into a 21st century learning environment.*

By preserving and reinvigorating an original building on the AES campus, the project honors the campus' original 'international-mindedness' that blended a western-based approach with eastern philosophies and environments.

The most IB World Schools authorized to offer all three programmes are located in the Africa/Europe/Middle East region.



The Local International

With over 50% of all IB schools located in North America and the Caribbean, IB is well-represented throughout international, private independent, charter, and public schools.

The “filter” or level at which each school adopts the IB philosophy shapes the facility’s response, including the degree to which the facility is influenced, as well as how visible or underlying the characteristics may be.

The International School for Global Citizenship (ISGC) in East Hartford, Connecticut is established to develop “inquiring, knowledgeable, and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.” The preK-5 school is part of a larger initiative to assist school districts in reducing the racial, ethnic, and socioeconomic isolation of Greater Hartford students by initiating, developing, and managing innovative, high-quality, inter-district educational programs for minority students.

At ISGC, the IB approach to learning is wholly embraced by the school’s leadership and embedded within the school’s mission. Following the requirement stipulated by IBO, ISGC makes prominent and central the role of the library by literally placing it at the center of the proposed facility. Classrooms that radiate outward from the central library space benefit from an inquiry-based approach to learning, highlighted by an aptly named “Provocation Table”

located within each class space. Here students are presented with an object (or objects) during the day to study, discuss, analyze, and admire. While the school promotes a more progressive environment for student enrichment, they are still mandated to comply with state standards for facilities, testing, and assessment. The balance of these priorities roots a global perspective in the specific, local Connecticut setting.



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left to right
The planning for the new International School for Global Citizenship in East Hartford, Connecticut, interprets the IB Primary Years Programme requirement literally by placing the library at the center of the entire school.

Modest modifications to Thomas Jefferson Middle School positions the library as a 21st century resource and collaboration space in support of the Middle Years Programme.

In Arlington, Virginia, Thomas Jefferson Middle School sought to update their existing 1970s facility to better accommodate a comprehensive, student-centered approach to learning while improving the overall performance of their environment. Efforts focused on improving the multi-modal learning opportunities by promoting the library as the “hub” of the school and by identifying program to support technology integration, while preserving the connectivity and transparency between classrooms to reinforce trans-disciplinary learning. Also regulated by state-mandated space standards, the resulting environment is a carefully vetted, economical solution to 21st century learning.

There are expected to be one million IB students by 2014.



	IBO STANDARD	POTENTIAL FACILITY RESPONSE
PRIMARY Learning Modalities	<p><i>"The school is committed to a constructivist, inquiry-based approach to teaching and learning that promotes inquiry and the development of critical-thinking skills." (IBO Standard A-PYP:3c)</i></p> <p><i>"The school demonstrates a commitment to transdisciplinary learning." (IBO Standard A-PYP:3e)</i></p>	It is common for IB accredited schools to provide specific places for hands-on student experimentation outside of their regular classrooms. A suite of collocated spaces titled "Whole Brain Lab" provides wet areas for Art and Science , and integrates a technology component that permits young students to make connections between more creative (right brain) approaches and more rational (left brain) thinking, all supported by development of early research and fact-finding skills.
GENERAL Meeting and Collaboration	<p><i>"The curriculum provides opportunities for students to work both independently and collaboratively." (IBO Standard B1:11)</i></p>	The traditional role of the library as a "second classroom" or supportive learning environment is enhanced and magnified throughout the school facility in the form of breakout spaces and student commons areas . Configuration and flexibility of these collaboration areas, as well as increased accessibility by the entire school population, lend greatly to their success; rooms should vary in size from small group rooms for 4-6 people to large group meeting and testing space for up to 80.
GENERAL Teacher Training	<p><i>"The school ensures that teachers and administrators receive IB-recognized professional development." (IBO Standard B2:3)</i></p> <p><i>"The school provides dedicated time for teachers' collaborative planning and reflection." (IBO Standard B2:4)</i></p>	Another distinguishing factor of IB is its emphasis not only on program implementation but also regular faculty training so they are more able to effectively execute the program implementation that is itself continuously improving. Although mostly a scheduling demand on the faculty's part, this requirement also calls for dependable staff training space and planning areas. Collaboration and private work areas , as well as access to professional development resources, contribute to a conducive, IB-friendly workplace for teachers.
DIPLOMA College Preparation	<p><i>"The school has systems in place to guide and counsel students through the programme(s). The school provides guidance to students on post-secondary educational options." (IBO Standard B2-DP:9a)</i></p>	Like most college-preparatory environments, IB accredited schools are required to make available college guidance space as a resource and support area for students. Collocation with the library not only reinforces its central role, but also consolidates student resources in one area. As well, counselors gain passive access to students during their study periods, promoting a relaxed, supportive environment.

Raising the Bar

The "Whole Brain Lab" spatial prototype supports and promotes the six transdisciplinary themes – the most significant feature of the IB Primary Years Programme.

From a facility perspective, the IB guidelines are quite flexible and necessarily so. For instance, not all candidate schools have equal financial ability and means either due to the newness of their organization or socio-economic climate or context they are located in, so the facility recommendations include alternatives so that schools are able to personalize according to their unique situations, including their institutional vision, mission, and goals.



IBO guidelines include facility recommendations that IB schools increasingly consider necessary in order to support curriculum offerings. The majority of these are support spaces that help to enhance student engagement and increase teacher resources. In many ways, this expands upon what best practices would consider necessary for the built facility in support of IB, while others would suggest that the facility does not necessarily have to grow but that the overall area is reallocated.

Planned as a first-class college preparatory institution, Huijia International School's IB High School in Beijing, China, uses the IB curriculum as the primary framework for the growth and development of its 10th-12th grade students. Instead of retroactively adapting the curriculum and courses to the facility, Huijia had the unique opportunity to design the spaces on their new campus specifically to the curriculum.

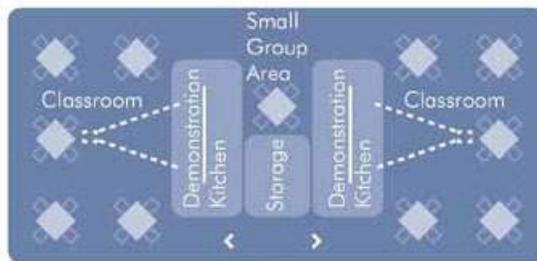
Curriculum courses have different demands for actual physical space. For instance, for final assignments in some courses--particularly Visual Art, Music, and Film--students are required to stage their portfolio of work, often one or

There are 120,000 Diploma Programme graduates entering university each year.



two years in the making. Staging the work can take several months and require temporary space that is both protected and out of the way. This curricular requirement was addressed at the Huijia IB High School by identifying an IB Project or Portfolio Room. Smaller than a typical classroom but bigger than a storage room and collocated with 2D and 3D art classrooms, this individualized work space provides an all-day area for student work without co-opting primary instruction space. Benefits include an increase in overall efficiency and utilization of space, as well as the protection of student work.

IB curriculum also naturally emphasizes language acquisition and development. For the Northbridge International School Cambodia (NISC), their recent IB accreditation prompted an analysis of their facilities to ensure that they were optimizing the facility to support all levels of the IB curriculum. The school opted to include the new space typology of the World Languages Food Lab in their new campus. This state-of-the-art instruction support space provides a backdrop for experiential opportunities that enhance more standard language instruction for upper elementary through high school students. Inspired by the



*left to right
This multi-sensory experiential support environment for instruction of World Languages as well as all culture-related subjects encapsulates the transdisciplinary nature of the IB approach.*

The IB art room, or portfolio room, provides students with the freedom to focus on long-term projects with storage, staging, and resource capabilities.

belief that students retain new information at a higher rate within multi-sensory, interactive environments, this utility-rich space provides an opportunity to learn language through cultural appreciation and experience. Centered around a kitchen demonstration area, the World Languages Food Lab transports students with the sights, smells, tastes, and sounds of their learned language's native country. A flexible, café-style seating arrangement also promotes more casual peer learning, an important additional interaction that can help root learned languages in real-time dialogue.



Conclusion

There are no- to low-cost bricks-and-mortar strategies that will increase a school's level of success during implementation of IB curriculum, and working with a partner knowledgeable with these standards will allow for consideration and planning early on in the process when the opportunity for cost savings is greatest. Our firm has had the privilege to partner with several IB schools that, despite varying means and makeup, all benefit from a synergy of effective curriculum, engaged and committed teachers, and responsive facilities. We are committed to helping schools maximize these investments to ensure the continued growth of their facilities and students.

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**MEASURING UP: USING PRE- AND POST-OCCUPANCY
EVALUATION TO ASSESS HIGH-PERFORMANCE SCHOOL DESIGN**



MEASURING UP

Using Pre- and Post-Occupancy Evaluation to Assess High-Performance School Design

By: Katie Herber, Emily Chmielewski, Heather Jauregui, Jana Silsby, Sean O'Donnell

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EXECUTIVE SUMMARY

The term “High-Performance School” is used to describe learning environments that provide educational, health, and social benefits to building occupants (students and faculty). High-performance design aims to reduce the amount of finite resources the building draws from our planet, such as energy and water, while simultaneously providing high-quality education. Thus, to fully understand the implications of a High-Performance School, it is important to assess the application of high-performance design strategies on the school—both in terms of educational, health, and social benefits and the building’s ecological impact.

In 2015-17, Perkins Eastman conducted a design research study on the Dr. Martin Luther King, Jr. School, located in Cambridge, MA, to assess the outcomes of applying high-performance design strategies to this school. The case study focused on two main aspects of a High-Performance

School: Indoor Environmental Quality (IEQ) and sense of community. For the purpose of this study, IEQ was defined as the daylighting, electric lighting, indoor air quality, thermal comfort, visual comfort, and acoustics of a space. Sense of community was evaluated on several scales, from person-to-person relationships, person-to-school, and person-to-the-community at large.

This paper provides a background on the impact of high-performance design strategies, followed by a description of the evaluated school and our qualitative and quantitative methodology. Our findings are then presented, through which we propose that high-performance design strategies can improve building performance and increase satisfaction, bringing the theoretical value-add proposition for high-performance design into reality.

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BACKGROUND

In regards to sense of community, there is existing research outlining the benefits of sense of community in schools, but there is little research correlating specific features of a school environment to the sense of community. Sense of community has been shown to help support the performance, mental health, and well-being of both teachers and students. In a study of 11th grade students, those who reported having higher feelings of community within their school were likelier to have slightly higher PSAT scores [1]. Community in schools can also improve students' well-being and prepare them to become active community participants as adults [2]. Further, school connectedness can improve school attendance and encourage students to choose healthy behaviors [3].

Students in schools with a highly rated sense of community are more likely to become thoughtful and reflective, to be self-directing but also to accept the authority of others, to be concerned for and respectful of others, to avoid courses of action that are harmful to themselves or others, and to maintain higher standards of ethical conduct [4] [5]. Through our research, we aimed to identify specific design elements, strategies, and environmental conditions that help to promote community within the school and the neighborhood at large.

There have been, and continue to be, many academic studies investigating how factors of IEQ affect students and staff in schools.

Key areas of research include daylight, thermal comfort, acoustics, and air quality (see Figure 1).

In terms of the importance of daylight, studies have shown that students in daylit classrooms progress 20% faster on math tests and 26% faster on reading tests than students in windowless classrooms [6]. Other studies have shown that access to natural light is important to children's melatonin cycles [7] and cortisol production [8], both of which affect concentration abilities as well as general well-being.

In regards to thermal comfort, uncomfortable temperatures can cause feelings of fatigue, irritability, and depression. Studies have shown that for every decrease of 1.8°F between 77°F and 68°F, students speed performance on tests was improved from 2-4% in all tasks [9].

Students who report higher **SENSE OF COMMUNITY** in their schools have **HIGHER TEST SCORES**.

There is a **POSITIVE CORRELATION** between sense of community in schools and both **POSITIVE ATTITUDES** toward school and better academic **MOTIVATION** and **ENGAGEMENT** [14].



When looking at the effects of noise, proper acoustics can enhance a student's ability to hear their teachers, as well as reduce levels of fatigue in teachers throughout the day, whereas poor acoustics can have deleterious effects. For instance, research has shown that students at a school under the regular flight path of a nearby airport performed 20% lower on a reading test than students in a nearby school [10].

Air quality also has an impact, with improved ventilation rates and systems decreasing instances of respiratory illness [11], improving student attendance [12], increasing task completion speed [9], and improving test scores and grades. Research has shown that students in classrooms with higher air ventilation rates scored 14-15% higher on standardized tests [13].

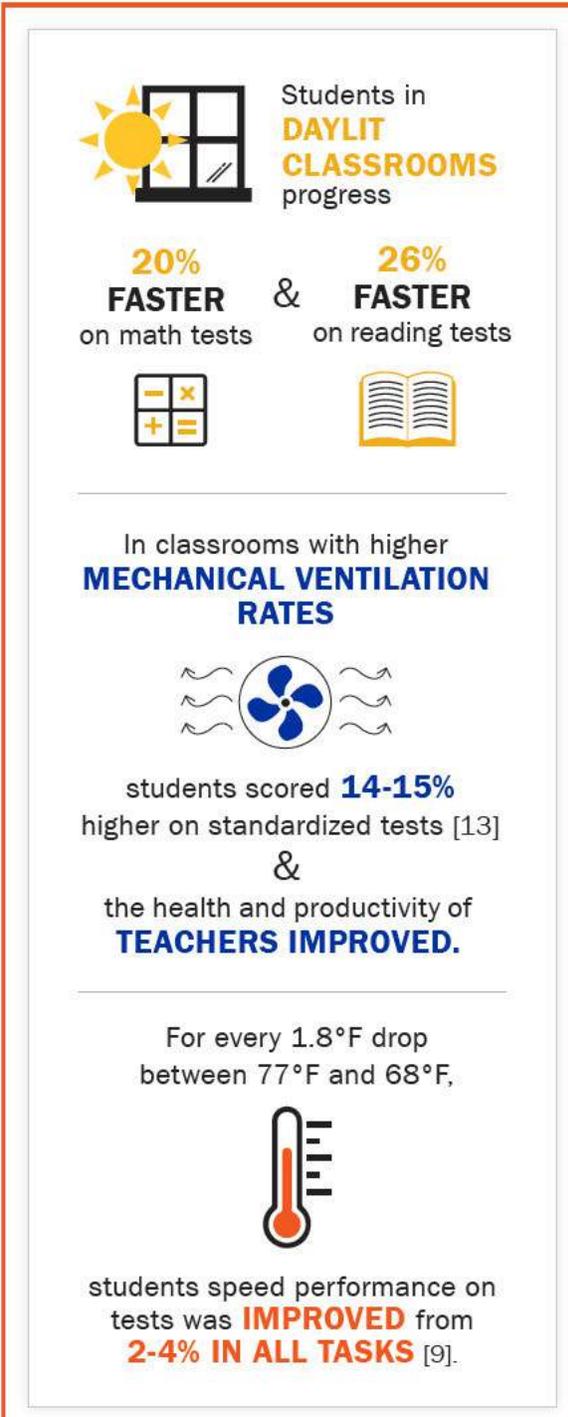
Most of these studies, however, investigated a single IEQ factor at a time, meaning they only studied single variables, such as daylight or acoustics, independent of each other. Very few studies attempt to look at IEQ factors in tandem to assess the overall impact of high-performance design strategies on building occupants. This study, however, was designed to study multiple, concurrent factors.

Teachers miss more workdays for



VOICE-RELATED PROBLEMS
than employees in other professions [15].

Figure 1



Students in **DAYLIT CLASSROOMS** progress

20% FASTER on math tests & **26% FASTER** on reading tests

In classrooms with higher **MECHANICAL VENTILATION RATES**

students scored **14-15%** higher on standardized tests [13] & the health and productivity of **TEACHERS IMPROVED.**

For every 1.8°F drop between 77°F and 68°F,

students speed performance on tests was **IMPROVED** from **2-4% IN ALL TASKS** [9].



THE DR. MARTIN LUTHER KING, JR. SCHOOL

Our case study investigation into high-performance schools focused on the Dr. Martin Luther King, Jr. School, which opened in 2015 in Cambridge, MA.

The Dr. Martin Luther King, Jr. School houses three schools on one campus: the Putnam Avenue Upper School (PAUS), Dr. Martin Luther King, Jr. School, and the Dr. Martin Luther King, Jr. Preschool. The project was complicated by its small and irregular site, the large and complex program accommodating 840 children from preschool to 8th grade, robust after-school programs, and an array of engaged stakeholders.

The overarching goal of the school's design was to synthesize the Cambridge Public Schools Superintendent's "Innovation Agenda," targeting significantly enhanced educational outcomes within this urban district, with the Mayor's desire to pursue Net Zero Energy. At first, many stakeholders involved were concerned that the two agendas would result in conflict over financial resources, which could diminish the District's educational and community goals. Instead, the process and design demonstrated a powerful synergy between the Innovation Agenda, sense of community within the school, and the pursuit of Net Zero Energy. Together, these goals inspired a sustainable, high-performance urban learning environment. See Figure 2 for an overview of the design strategies employed to promote community and IEQ at this school.

Figure 2



MASSING

To fit in its residential neighborhood, the building massing steps back, reducing shadows onto neighboring buildings. The school's two primary academic wings also provide a welcoming entry with the creation of a public entrance courtyard.



PUBLIC SPACES

King Street, an internal circulation spine, connects the different school communities, from the preschool to the Upper School, and helps create different zones and designated areas for the schools and the publicly shared spaces. King Street enables the joint-use public spaces, such as the Lower School gym, Upper School gym, Cafeteria, and Preschool by making them easily accessible and open to the public.



EXTENDED LEARNING

One aspect of the learning neighborhoods is that its circulation space was organized to provide flexible, informal, learning spaces that would allow for small group work to occur outside of classrooms, activating the "corridor" as a space for learning.

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Figure 2 (continued)



LEARNING NEIGHBORHOODS

To reduce the scale of the building and encourage greater interaction between faculty and students, both the lower and upper schools were organized into “neighborhoods” comprised of classrooms, labs, administrative offices, and teacher support spaces. Each school is organized as three “neighborhoods” that were intended to encourage a sense of community among a subset of the school population.



SECURITY

To reduce bullying and create positive connections, stairs, staff areas, and primary shared spaces selectively have glazing for views to corridors, breakout spaces, and outdoor spaces.



ACCESS TO NATURE

Both the Upper School and the Lower School gyms have large doors that open up to play space. The garden provides a school-wide learning opportunity.



■ PUBLIC COURTYARD

The Upper and Lower Schools each have a distinct entrance within the main courtyard, promoting their individual identities and creating a welcoming front door to each community.



■ AIR QUALITY

A demand-controlled ventilation system senses classroom occupancy and increases fresh air as needed.



■ DAYLIGHT

Interior light shelves bounce daylight deep into classrooms, providing a glare-free daylit experience for students and teachers.

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An evaluation of the Dr. Martin Luther King, Jr. School not only adds to the design industry's understanding of high-performance design, but was also important since the school was a prototype: It was designed to serve as a model and testing ground for high-performance design strategies for the rest of the schools in the Cambridge Public Schools district. The lessons learned from this case study—a transition from current, dated school facilities to a new learning environment—could impact future renovations and new construction throughout the city, in addition to having a potential impact on schools nationwide.



THE STUDY

With the hypothesis that high-performance design will improve occupant satisfaction and performance and improve sense of community among students and staff, a design research study was conducted by Perkins Eastman in 2015-17, with three main objectives:

- To become a comprehensive IEQ case study that demonstrates to the industry the value of high-performance design;
- Assess the design team's achievement of their project goals, to uncover lessons learned for the future; and
- Develop a standardized process for evaluation within the K12 education practice of our design firm.

From the outset of the study, a multi-disciplinary team was engaged. The design team enlisted the help of a practice-based design researcher to conduct a pre- and post-occupancy questionnaire to assess occupants' perceptions of performance. Sustainability specialists were brought on board to gather on-site quantitative measurements of indoor environmental quality using various measurement tools. School administrators who were involved in the design process assisted with the implementation of the evaluations, and will continue to provide on-going data regarding student and teacher performance.

While some form of post-occupancy evaluation (POE) is not uncommon in the design industry, the scope of this study intentionally expanded the typical POE process to look more holistically at the project. Our methodology included a pre-occupancy evaluation (Pre-OE) component to establish a benchmark for POE comparison, as well as comparisons of both qualitative and quantitative evaluations of IEQ.

Establishing a benchmark from which to evaluate the success and impact of the new building was an imperative step. While the new Dr. Martin Luther King, Jr. School was under construction, students from the upper and elementary school were housed for more than a year at two existing school buildings that the Cambridge school district used as swing spaces: The Kennedy Longfellow

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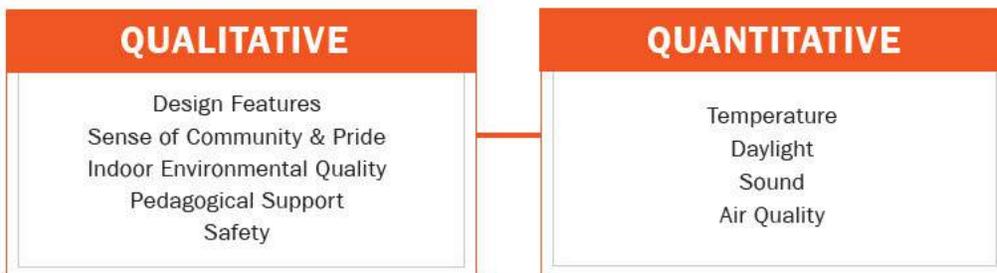


School where PAUS occupied the 3rd floor and the Longfellow Building on Broadway. Once the new building was complete, the students were relocated. However, the Kennedy Longfellow 3rd floor and Longfellow Building locations were again filled with another group of students, awaiting the construction of another new school. This allowed the research team the unique opportunity to have access to all three buildings simultaneously. The Pre-OE study focused on the swing spaces, the most recent learning environments that the students and staff had been in, and provided the benchmark against which findings from the POE of the newly built space were compared.*

For both the Pre-OE and POE, occupant feedback was collected through an online survey distributed to the school's faculty, both before and after the move to the new school building. In the pre-occupancy survey, 61 faculty participated and 47 participated at post-occupancy (31 of which indicated they also occupied the old swing schools), equating to a response rate of about 54% to

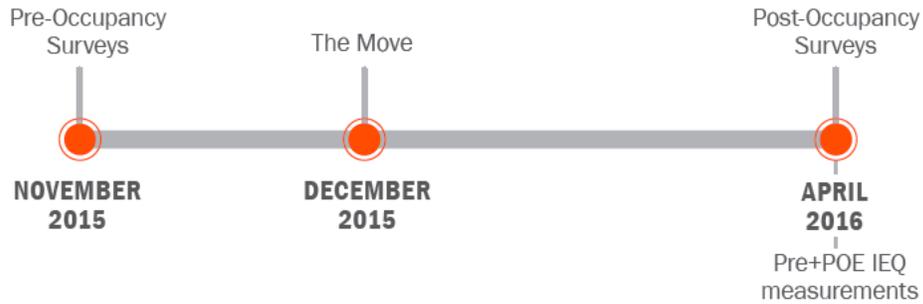
42%, pre- and post-occupancy respectively. In order to express an accurate comparison of the old and new buildings, data presented in this report is based on the 31 participants who experienced both the swing spaces and the new building. This qualitative data collection process assessed the building occupants' perceptions about the school's design features, sense of pride, sense of community, pedagogical support, safety, and Indoor Environmental Quality (IEQ). Note perceptual data from student surveys, though part of the original design of the research study, unfortunately could not be collected due to extenuating circumstances.

Quantitative measurements of Indoor Environmental Quality (IEQ) were collected concurrently in the new building and the old (swing) spaces, then occupied by the next group of students and faculty. IEQ metrics were gathered using temperature, light, sound, and air quality metering devices at both the old and new buildings. (See Appendix A for more details about the buildings' location, floor plans, and the IEQ on-site data collection.) The perceptual survey,



* For the purpose of this report, the swing spaces housing the PAUS and MLK school populations during the new school's construction are referred to as old MLK and old PAUS.

Study Timeline



alongside actual IEQ metrics data, allowed for a unique comparison of qualitative and quantitative data, and helped to eliminate the inherent biases that may occur when using one method or the other.

Data collection started in November of 2015 with pre-occupancy surveys, which asked building occupants about the swing spaces. After the students and teachers moved into the completed new school in December 2015, the post-occupancy surveys were distributed in April 2016, so that pre- and post-occupancy survey comparisons could be made among the same sample of building occupants.

Both the pre- and post-occupancy quantitative measurements were taken at the same time in April 2016. This allowed for outdoor conditions to be consistent across the pre- and post-occupancy measurements, allowing for direct comparison. Although this meant that the swing spaces that were studied were not occupied by the same student body, they were still occupied in the same manner and with a similar population as they had been when the Dr. Martin Luther King, Jr. School student body and PAUS student body were in them.

Two main classrooms were identified in each of the old swing space schools to conduct the pre-occupancy measurements. In the new Dr. Martin Luther King, Jr. School, four classrooms were studied to get an even broader dataset. Temperature, humidity, and CO2 levels were logged continuously throughout the week-long study using data-loggers and CO2 monitors. Additional data was collected throughout the week during occupied and unoccupied conditions. For acoustics, a Sound Level Meter was utilized to measure the ambient and occupied noise levels experienced within typical classroom environments in each of the schools. For lighting, a Light Meter was used to collect light levels in each classroom with electric lighting on and off, and a camera with different exposure settings was used to generate photos to assess the glare of these environments. For thermal comfort, in addition to the data-loggers, radiant surface temperatures of inner and outer facing walls were taken. A thermal imaging camera was also used to assess thermal bridging from the outdoors. For more information on the specific tools used in the study, see Appendix B.

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FINDINGS

In general, the findings suggest that the new Dr. Martin Luther King, Jr. School is performing significantly better than the previous swing spaces in almost every parameter studied, for both perceived and measured IEQ metrics, as well as the faculty ratings of how well the building fosters a sense of community. Although the study goes into several other specific factors, some of the general feedback provides great insight into the quality of the school environment that the new design creates. For instance, of the teachers who taught in both locations, 97% said that the new building is a better place to spend their day than the old building. Additionally, 100% agree that the design of the new school is a pleasant place to work and learn.

