

# School as Community Catalyst:

Happy, Healthy and High-Performing

Virginia Municipal League Annual Conference | October 4 @ 9:45 AM





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Virginia Municipal League Annual Conference | October 4 @ 9:45 AM



**Corey Clayborne, AIA**  
Executive VP  
AIA Virginia



**Kelly Callahan, AIA**  
Principal  
VMDO Architects



**THE CITY OF  
HARRISONBURG  
VIRGINIA**

**Chris Jones**  
City Councilor & Former Mayor  
City of Harrisonburg



**Anne Lintner**  
Founding Principal, Bluestone ES  
Harrisonburg City Public Schools

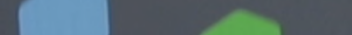


## Welcome to Bluestone

## Be Active!

## Our School Cleans Water!

## Eat Healthy!



Bluestone Elementary School



# Harrisonburg City Public School Stats (2021)

City of Harrisonburg Population: **53,000+**

# of Schools: **1 HS + 2 MS + 6 ES + 1 PK (+1 HS underway)**

Student Enrollment: **6,680**

Projected Growth: **+ 150 Students / Year\***

Languages Spoken: **50+**

F/R Eligible%: **72%**

\*2019 – 2024 Weldon Cooper







2014-2015

2016-2017

2017-2018

2020-2021

 = 10 STUDENTS

 = 20 STUDENTS  
= 1 CLASSROOM

 = 15 WAITLIST STUDENTS

PRE-K



GRADES: PRE-K  
CAPACITY: 250  
ENROLLMENT: 245  
WAITLIST: 80



GRADES: PRE-K  
CAPACITY: 250  
ENROLLMENT: 250  
WAITLIST: 101

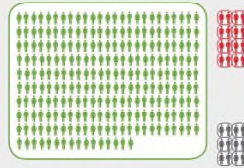


GRADES: PRE-K  
CAPACITY: 350  
ENROLLMENT: 350  
WAITLIST: 15



GRADES: PRE-K  
CAPACITY: 350  
ENROLLMENT: 350  
WAITLIST: 59

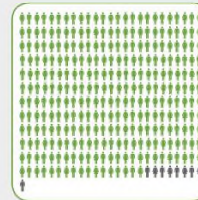
ELEMENTARY



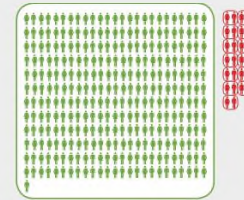
GRADES: PRE K-4  
CAPACITY: 2,332  
ENROLLMENT: 2,481 (+149)  
DEFICIT: 8 CLASSROOMS



GRADES: PRE K-4  
CAPACITY: 2,332  
ENROLLMENT: 2,614 (+282)  
DEFICIT: 15 CLASSROOMS



GRADES: K-5  
CAPACITY: 3,065  
ENROLLMENT: 2,977 (-88)



GRADES: K-5  
CAPACITY: 3,065  
ENROLLMENT: 3,339 (+274)  
DEFICIT: 13 CLASSROOMS

MIDDLE



GRADES: 5-8  
CAPACITY: 1,680  
ENROLLMENT: 1,591 (-89)



GRADES: 5-8  
CAPACITY: 1,680  
ENROLLMENT: 1,718 (+38)  
DEFICIT: 2 CLASSROOMS



GRADES: 6-8  
CAPACITY: 1,500  
ENROLLMENT: 1,316 (-184)



GRADES: 6-8  
CAPACITY: 1,500  
ENROLLMENT: 1,476 (-24)

HIGH



GRADES: 9-12  
CAPACITY: 1,350  
ENROLLMENT: 1,489 (+139)  
DEFICIT: 7 CLASSROOMS



GRADES: 9-12  
CAPACITY: 1,350  
ENROLLMENT: 1,607 (+257)  
DEFICIT: 13 CLASSROOMS



GRADES: 9-12  
CAPACITY: 1,350  
ENROLLMENT: 1,670 (+320)  
DEFICIT: 16 CLASSROOMS



GRADES: 9-12  
CAPACITY: 1,350  
ENROLLMENT: 1,873 (+523)  
DEFICIT: 27 CLASSROOMS

# New PK + New ES + SHIFT 5<sup>TH</sup> BACK TO ES = MORE CAPACITY





Bluestone Elementary School



10.8 acre site pre-development



Final site aerial view



## HARRISONBURG CITY PUBLIC SCHOOL BOARD

Andrew **Kohen**, Chair  
Nick **Swayne**, Vice Chair  
Tom **Domonoske**  
Brent **Holsinger**  
Kelly **Rooney**  
Kerri **Wilson**

Dr. Scott R. **Kizner**, Division Superintendent

## HCPS CAPITAL PROJECTS STEERING COMMITTEE

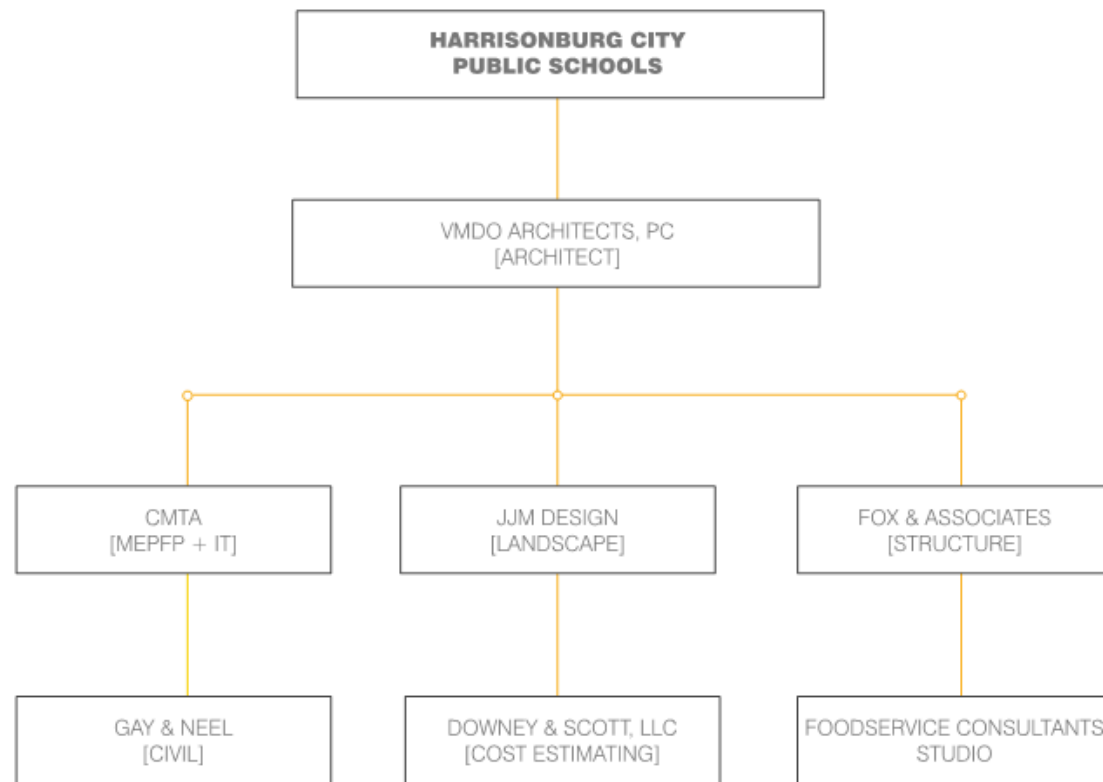
Dr. Scott R. **Kizner**, Division Superintendent  
Craig **Mackail**, Director of Operations & School Safety  
Andy **Cohen**, School Board Chair

## DESIGN ADVISORY COMMITTEE

Jeremy **Weaver**, Director of Elementary Education  
Anne **Lintner**, Keister Elementary Principal  
Silvia **Whitney Beitzel**, Parent Representative

## VMDO ARCHITECTS PROJECT TEAM

Bob **Moje**, FAIA, Partner-in-Charge  
Kelly **Callahan**, AIA, Project Manager  
Bryce **Powell**, AIA, Project Architect  
Dina **Sorensen**, Project Designer | Research Coord.  
Doug **Dickerson Jr.**, Job Captain  
Silvi **Stefi**, Staff Designer  
Lydia **Hatfield**, Staff Designer



## USER GROUP MEETING PARTICIPANTS

Sandi <b>Bontrager</b>	Fifth Grade Teacher, THMS
Norris <b>Bunn</b>	First Grade Teacher, Smithland Elementary
Christiana <b>Campbell</b>	Fourth Grade Teacher, Waterman Elementary
Randy <b>Dove</b>	Building & Site Maintenance
Andrea <b>Early</b>	Executive Director of School Nutrition
April <b>Elliott</b>	Third Grade Teacher, Stone Spring Elementary
Joan <b>Keeley</b>	Second Grade Teacher, Spotswood Elementary
Julie <b>King</b>	Guidance Counselor, Waterman Elementary
Nolan <b>Kite</b>	Building & Site Maintenance
Roy <b>Kite</b>	Building & Site Maintenance
Bette <b>Lam</b>	Stone Spring Elementary, School Nurse
Dianne <b>Murray</b>	Spotswood Elementary, Media Specialist
Alan <b>Quimby</b>	ITRT/Instructional Technology Coordinator
Amy <b>Sabarre</b>	Adv. Learning/Innovative Program Coordinator
Stephanie <b>Shifflett</b>	Kindergarten Teacher, Keister Elementary
Toni <b>Sheets</b>	Executive Director of Technology
J.R. <b>Snow</b>	Fine Arts Coordinator / Music
Kristi <b>Wease</b>	PreK Teacher, Stone Spring Elementary
Amy <b>Wheeler</b>	Health & Physical Education Coordinator



## Students + Families

A place where  
**students want to be.**

## Teachers + Administrators

A place that  
**honors + facilitates**  
their work.



## Operations + Maintenance

A place that's  
**easy to maintain** with  
**low costs to operate.**

## City + School Leadership

A place guided by  
**wise public stewardship**  
that is safe and secure.

Diverse Steering Committee





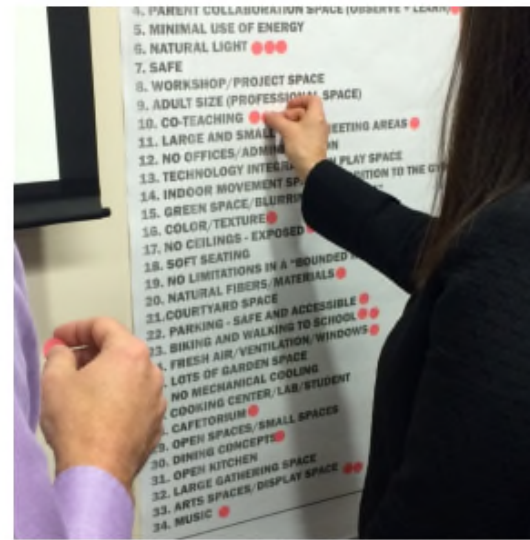
PROGRAMMING KICK-OFF MEETING



SCHEMATIC DESIGN CHARETTE



PROGRAMMING BLOCKS ON PHYSICAL SITE MODEL



GOAL SETTING EXERCISE



SPACE PROGRAMMING EXERCISE

# Hands-on programming process





## Top Project Goals:

- Make it welcoming.
- Embrace our diversity.
- Use it all the time.
- Reduce maintenance + operational costs.
- Model sustainability (net-zero ready).



A topographic map with brown contour lines serves as the background. Scattered across the map are several colorful building blocks in shades of green, blue, yellow, and red. Some blocks are stacked, while others are single. A small, dried plant is visible in the upper right corner.

CIP priorities:

Schools are an investment with lasting benefits for the entire community.

- Project life-expectancy of 50+ years
- Positive social effects for the entire community
- Potential to significantly reduce operational costs
- Increases the quality of life for students + citizens
- Improves environmental impacts
- Potential to increase property values
- Attracts and retains students, faculty and staff





10.8 acre site

103,700 SF on 3-stories

730 students K-5

Net-Zero Energy Ready

Geothermal HVAC

Demand Control Ventilation

All LED Lighting

Real-Time Power Monitoring

Target EUI = 23 kBtu/sf/year

Actual EUI = <20 kBtu/sf/year

\$26.7 Million (\$257/sf)

LEED Gold Certified

CBE 2019 Livable Building Award

Planned 450 kW PV array via PPA

Bluestone Elementary School – Harrisonburg City Public Schools

VMD



A common misconception was:

“You will never get the  
money back that you invested  
in the building to make it green...  
**You really won't save any money.”**





Another question that we received:

“How much (cheaper) would it be...  
**if we didn't make this building green?”**



K–12 *energy costs* are second only to *personnel costs* as the leading draw on school district operating budgets.

Each *energy unit* reduction saved in design + construction results in *continuous monthly savings* in operation over the life of the building.







## FY 2018 / Total Utility Summary

Waterman Elementary School + Bluestone Elementary School

School	GSF	Year	Total Utilities	Cost Per SF
Waterman ES	79,896	17-18	\$105,937	\$1.33
<b>Bluestone ES</b>	<b>103,703</b>	<b>17-18</b>	<b>\$66,743</b>	<b>\$0.64</b>

48%







## YTD 2019 / Total Utility Summary

Waterman Elementary School + Bluestone Elementary School

School	GSF	Year	Total Utilities	Cost Per SF
Waterman ES	79,869	YTD 19	\$53,337	\$0.67
Bluestone ES	103,703	YTD 19	\$29,043	\$0.28

41%

**Bluestone's Annual Utility Cost Savings = ~~\$80,000 / year~~  
with PV array = \$140,000 / year**







## FY 2018 / Electric Summary

Waterman Elementary School + Bluestone Elementary School

School	GSF	Year	KWH	KWH/SF
Waterman ES	79,896	17-18	796,796	9.97
<b>Bluestone ES</b>	<b>103,703</b>	<b>17-18</b>	<b>625,500</b>	<b>6.03</b>

60%







Energy Efficiency

VMD O





## Sustainable Strategies

- 3-story Massing & Orientation
- High-Performance Glass & Envelope
- Sunshades
- Geothermal Water-Source HP system
- Daylight Harvesting & Sun-Tubes
- LED Lighting
- Energy-Efficient / All Electric Equipment
- PV-Ready Roof Design







Energy Efficiency\_A community model for sustainability







## FY 2018 / Water Summary

Waterman Elementary School + Bluestone Elementary School

School	GSF	Year	Cost	Cost Per SF
Waterman ES	79,896	17-18	\$8,714	\$1.09
<b>Bluestone ES</b>	<b>103,703</b>	<b>17-18</b>	<b>\$4,027</b>	<b>\$0.38</b>

<35%







Water Efficiency







## Sustainable Strategies

- No irrigation
- Water-efficient, native landscape
- Low-flow plumbing fixtures
- Rainwater harvesting (cisterns and scuppers)







Dining Commons: An inspiring gathering hub





Dining Commons: First day of school 2017



Since then, so much has changed....

How did we address health at Bluestone???  
(even before the pandemic, here's how we focused on health)







Indoor Air Quality







## Sustainable Strategies

- Low-VOC Materials, Finishes & Coatings
- Lighting & HVAC Controls
- CO2 Sensors  
(Demand-Control Outside Air)
- Daylighting & Views
- Enhanced Acoustics







Entry Lobby: A Welcome Place to Celebrate Learning





Active Design – promoting movement









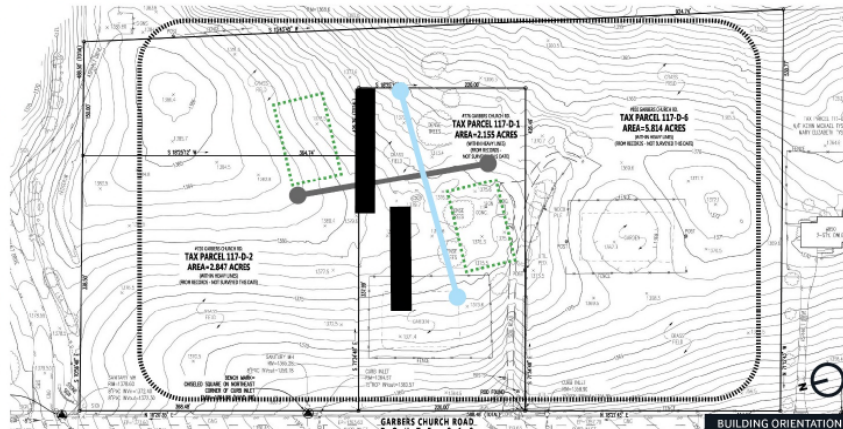
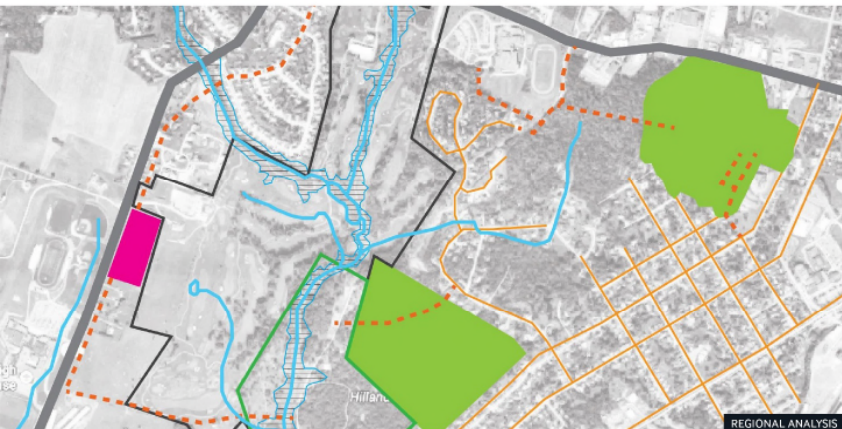


## Sustainable Strategies

- Access to Public Transportation
- Bicycle Storage & Changing Rooms
- Maximize Open Space
- Stormwater Quantity Control
- Heat Island Effect, Roof
- Light Pollution Reduction







# Planning / Site Analysis







Nature-based play & site amenities: A community asset





Human + Ecosystem Health





103,000 sq ft  
10.8 acres

# Welcome to Bluestone

## Be Active

- A** Gymnasium and Fitness
- B** K-2 Play Lawn
- C** K-2 Playground
- D** K-2 Play Terrace
- E** 3-5 Playground
- F** Recreational Sports Field
- G** Open + Free Play
- H** School + Community Open Lawn
- I** Outdoor Classroom
- J** Hard Court Play Area
- K** Bike Depot

 1/4 Mile Walking Circuit

## Find the Water

- L** Bioretention Garden
- M** Water Cistern
- N** Geothermal Well Field

## Explore Nature

- O** Native Meadow
- P** Art Terrace + Garden Courtyard
- Q** Sycamore Grove

## Eat Healthy

- R** Dining Commons
- S** Kitchen Garden
- T** Picnic Knoll
- U** Outdoor Dining
- V** Fruit Trees

0 50' 100' 200'





HCPS Fall of 2018 Teacher Engagement Survey:

Bluestone **ranked highest**  
among district-wide Elementary Schools  
in both **Resources & School Climate\***

\* relationships between administration, teachers, staff & students,  
students' enthusiasm about being at school, attitudes about quality of working environment







## FY 2018 / Absentee Rates per Teacher

Bluestone Elementary School + Surrounding Elementary Schools

School	Building Absences	# of Teachers	Avg. Absences
Bluestone ES	144	52	2.7
KES	115	38	3.02
SMES	225	48	4.6
SES	199	46	4.3
SSES	218	50	4.3
WES	259	49	5.2

>36%  
fewer



## NEWS

[Centerline](#)

[Centerline Archive](#)

[CBE in the News](#)

• [Livable Buildings Awards](#)



AWARD WINNER 2019

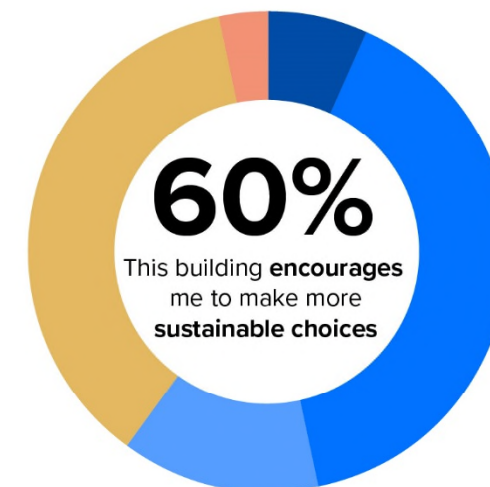
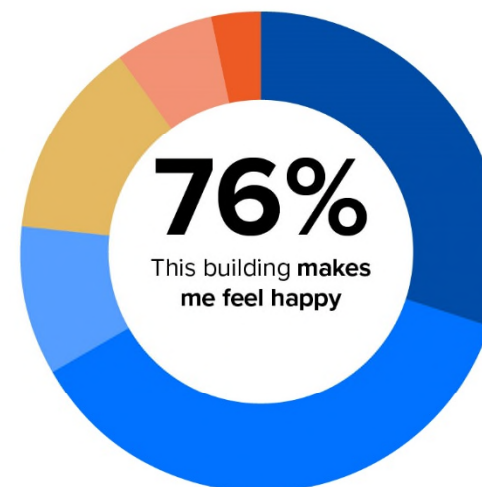
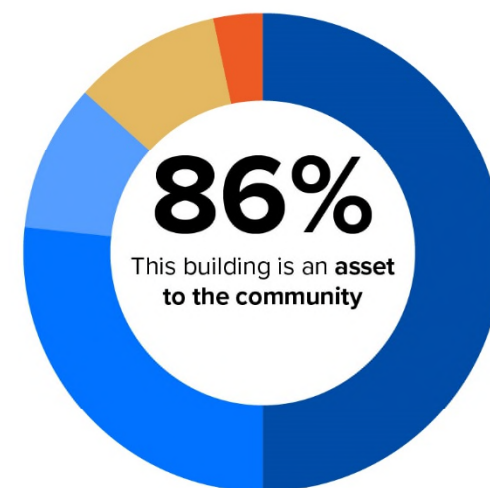
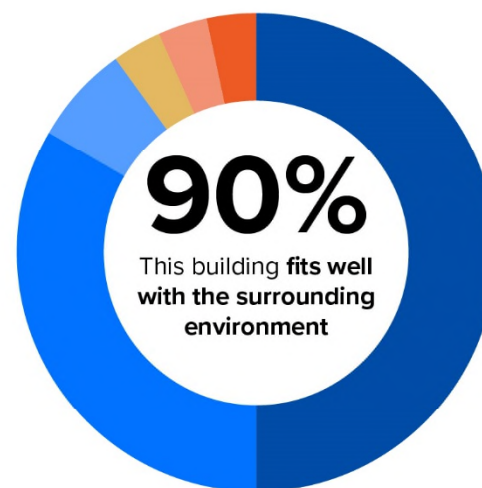
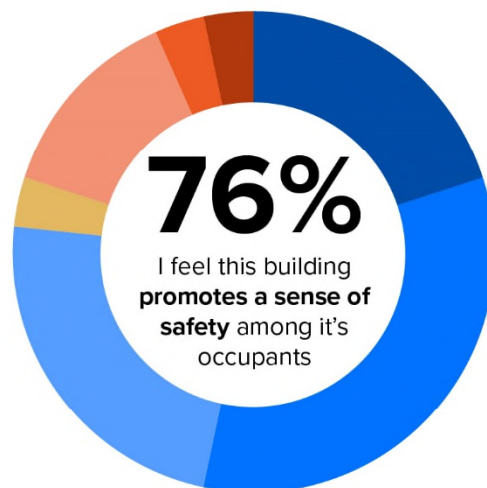
## Bluestone Elementary School

Harrisonburg, Virginia

2019 Livable Buildings Award

V M D O



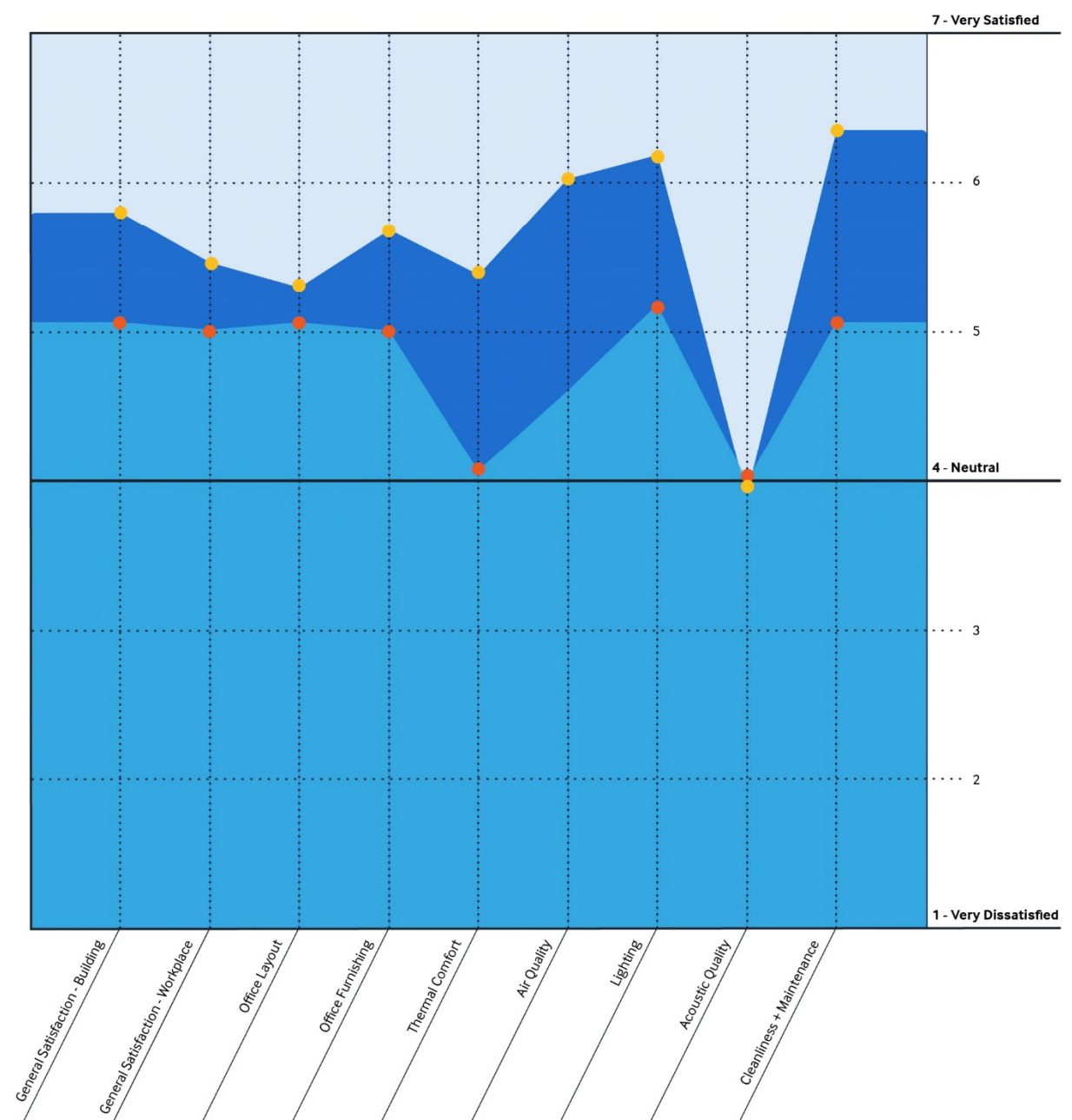




# CBE Database Average

VS.

# Bluestone Elementary School









# Top 10 Strategies for Success

1. **Make a case for healthy, high performing schools** among community members, stakeholders, and elected officials
2. Understand your schools' enrollment capacities, your anticipated growth, and a timeline of future school construction costs.
3. Build momentum and **develop consensus among school board members** and leadership for a sustainable project
4. **Develop a selection process** that reflects your goal for happy, healthy & high-performing schools
5. **Hire a qualified design team** with experience delivering net-zero energy schools
6. **Include educators, administrators, and students** in the process to promote a culture of stewardship
7. **Allow time for the new administration** to hire staff, order materials and prepare for the school climate.
8. **Design for added value** by ensuring systems are right-sized, utilizing light-weight structures and air-tight envelopes, and providing flexible and adaptable interiors
9. **Measure** everything and **make strategies visible**
10. **Children are your most precious commodity. Design with them as your top priority!**





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## Panel Discussion



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**THE CITY OF  
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# Questions + Answers

## **Presentation Material**

Planning + Site Analysis  
Diverse Steering Committee  
The Challenges  
Total Utility Summary  
Electric Summary  
Water Summary  
Absentee Rates per Teacher  
Indoor Air Quality  
Site Connectivity + Committee + Site Plan  
Post Occupancy Evaluation  
Top 10 Strategies for Success

## **Supporting Material**

Sustainable Design / Building Performance  
Building Organization  
Diversity + Inclusion  
Community Building  
Active Design  
Wayfinding Themes  
Materiality  
Human + Ecosystem Health  
Maximize Site Amenities  
EUI – Energy Demand Per Sq. Ft.  
Sustainable Design Strategies for Added Value



## Conservation

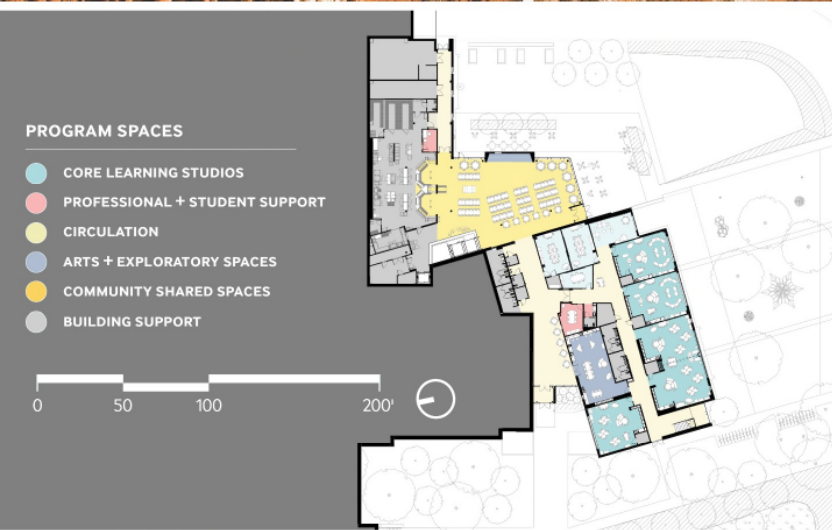
- 1 BUILDING ENVELOPE
- 2 SOLAR ORIENTATION
- 3 LIGHTING / SOLAR TUBES
- 4 SENSORS
- 5 ALL ELECTRIC KITCHEN
- 6 SHADING

## Production

- 7 PV-READY ROOF DESIGN
- 8 GEOTHERMAL WELL-FIELD
- 9 BUILDING MASSING







# Building Organization







Diversity + Inclusion












**Stay Hydrated**

Water makes up about 60% of our body weight. To stay healthy and hydrated, we need to drink 6-8 glasses of water every day! We lose water all day long by breathing, sweating, and going to the bathroom. It's important to re-hydrate often.



8 Glasses  
(8 ounces each)

OR



2 Liters

OR




1/2 Gallon




**Discover Virginia's Forests**


62% of Virginia is made up of forests! These forests are home to over 70 amphibian and reptile species, 200 bird species, and 55 mammal species.



55  
Mammals



70  
Amphibians & Reptiles



200  
Birds

27 of the plant and animal species found in Virginia forests are threatened or endangered and need their habitat protected!

How many different animals can you spot living in the trees in your neighborhood?



**Healthy Minds, Healthy Bodies**

Our classroom furniture allows us to be active and healthy! The brain relies on the body to get its needed fuel - oxygen and glucose - to the brain. Move more for brain health!



Movement and exercise are beneficial for our brain.

Improves Coordination and Motor Skills



Increases Bone Density



Improves Self-Esteem




Prompts Growth of New Nerve Cells and Blood Vessels

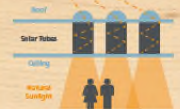


**Harnessing Daylight**

Solar tubes capture sunlight with their rooftop domes, then transfer it indoors through a reflective tube that runs from the roof to inside. The 20 solar tubes in our school allow us to switch off electric lights during the day, which reduces energy bills and environmental pollution.



If the sun is providing enough natural light, turn off the lights to save energy!



Can you find all of the solar tubes in our school?

**Garden to Table**




Tomato Flower



Tomato Fruit



Tomato Seed

Our school's garden is a place to explore nature's wonders and learn about healthy ecosystems. Plants depend on sun, water, and soil nutrients to grow, but they also need insects, pollinators and your help to take care of them. Can you help by watering the plants with rainwater collected in the cistern? Or find and identify the beneficial insects to have in your school garden like earthworms, damselfly, ground beetles, ladybugs or lady beetles? Eating fruits and vegetables every day keeps you happy, strong, and healthy!



**Kitchen Garden**

# Wayfinding Themes







## Bluestone

Rocks carry the clues to understanding the history of the earth. Feature walls in our school are made of blue limestone, similar to stone found in local quarries. The rock weathers from dark to light gray over time and was formed at the bottom of an ocean millions of years ago.



## A Walk Through Our Forest

Look up! The wood used in Bluestone is White Ash and Western Red Cedar. It is certified by the FSC (Forest Stewardship Council), which means it was grown and harvested sustainably. Can you identify the 2 local wood species by their leaves?



White Ash

Western Red Cedar







Human + Ecosystem Health



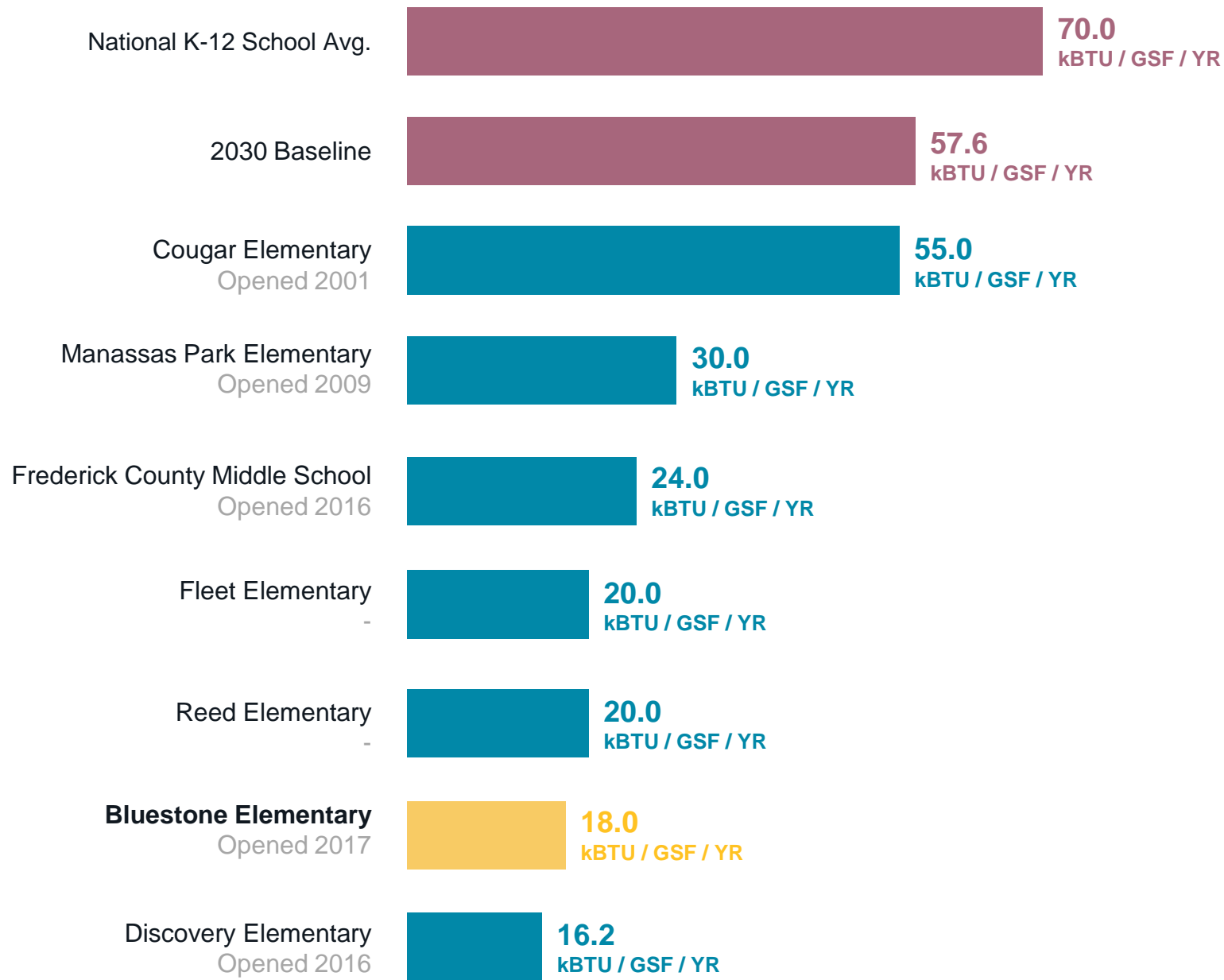




Maximizing Site Amenities



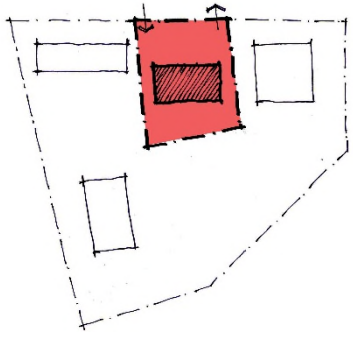




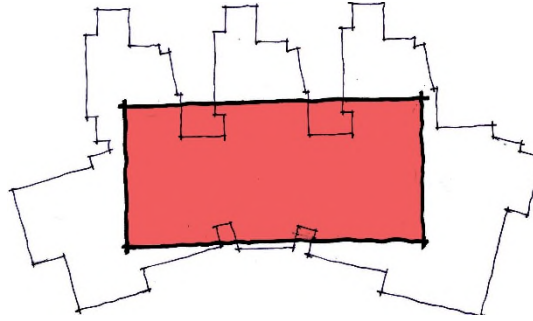
Energy Use Intensity (EUI) - Energy Demand Per Square Foot



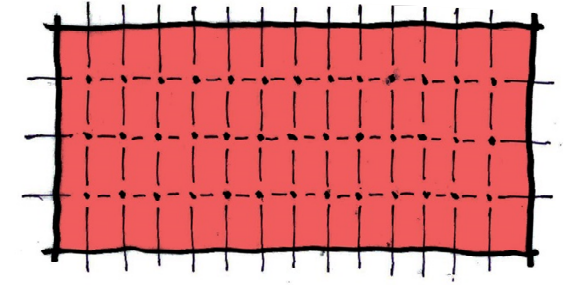




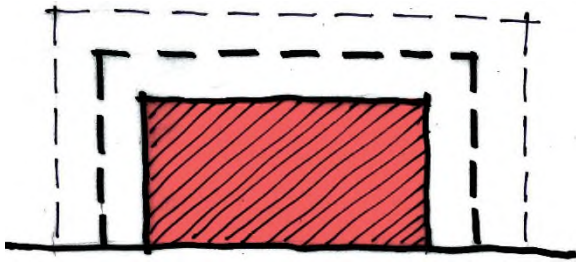
**Compact Boundary**



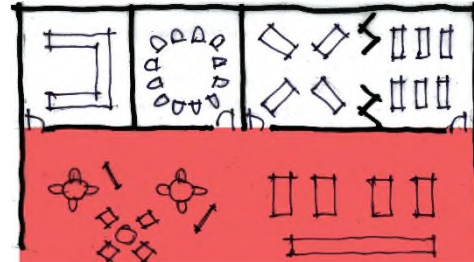
**Area to Envelope Ratio**



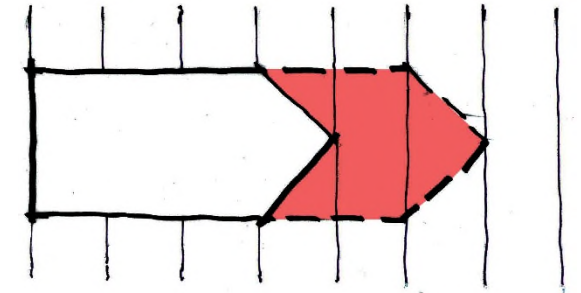
**Simple Lightweight Structures**



**Right-Sized Systems**



**Build Less, Furnish More**



**Speed to Market**

