



Innovation Leading the Way: CTE for All Ages

01

Welcome & Introductions



INTRODUCTIONS

Your Presenters



Ernesto Alonso, AIA
Senior Associate | Senior Designer



Mo Arthur, AIA
Principal | K-12 Education Leader



Ian Kilpatrick, AIA
Principal | K-12 Education Leader





We're an integrated design firm.

Our promise is to elevate the human experience through design. This inspires a culture of design and fuels the work we do around the world. We are 100% employee-owned: every employee is literally invested in our clients' success. At the core of our firm are interdisciplinary employee-owner teams, engaged with all project life-cycle stakeholders. These teams champion true collaboration, open information sharing, shared risk and reward, value-based decision making, and proficient use of technology to elevate design.



Employee-Owners

Year
EstablishedOffices
Worldwide

Design Awards

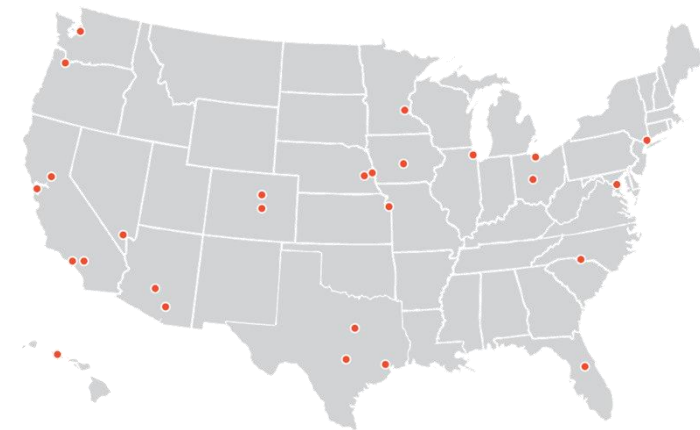


Locations

Sonoma

Tucson

Washington, D.C.



DLR Group K-12 Education Sector

DLR Group is transforming the educational learning environment.

Our team of educators, researchers, anthropologists, planners, architects, engineers, building performance experts, and interior designers draw from evidence-based design to aid schools in bridging the gap from old and new to improve all facets of operations, and elevate learning through design. Understanding the rapid pace of technological, social, and cultural change, our K-12 Education Studio works with schools across the country to navigate this change to better serve communities and improve educational experiences and outcomes for students.

1st

Architectural Firm with
3 MacConnell Awards for
Innovative School Design

#1

Leading Green Design Firm for
Educational Facilities

Engineering News-Record

850+

Early Childhood &
Elementary Schools

300+

Middle & K-8 Schools

800+

High Schools & CTE
Facilities

500+

Educational Facilities
Plans & Long Range
Facility Plans

Disciplines & Services

Architecture
Engineering
Interiors
Planning

Acoustic Design
Audiovisual Systems
Design BOLD
Development Management
Services

Experiential Graphic Design
High Performance Design
Landscape Architecture
Lighting Design

Reality Capture
Renewables
Science+Technology
Smart Buildings

Sustainability
Telecom+Security
Systems Design
Theater Design

400+ Higher Education Clients

30+ Southeast Institutions



Abilene Christian University
Adams State University
Aims Community College
Alabama A&M University
Albion College
Allan Hancock College
Alliant International University
Alma College
American University
Anoka Technical College
Anoka-Ramsey Community College
Antelope Valley College
Arapahoe Community College
Arizona College
Arizona State University
Augustana College
Baldwin Wallace University
Baylor University
Bellevue Community College
Benedictine University
Bethel University
Black Hills State University
Bristol Community College
Bryn Mawr College
Butler County Community College
Butte College
California Institute of Technology
California Polytechnic State University
- Pomona
California Polytechnic State University
- San Luis Obispo
California State University
- Channel Islands
California State University - Chico
California State University
- Dominguez Hills
California State University - Fullerton
California State University
- Monterey Bay
California State University - Sacramento
California State University - Stanislaus
California State University - Long Beach
Carleton College
Case Western Reserve University
Casper College
Catawba College
Catholic University of America
Cavendish University Uganda
Cavendish University Zambia
Central Arizona College
Central Oregon Community College
Central Washington University
Century College
Cerro Coso College
Chaffey Community College
Chandler Gilbert Community College
City Colleges of Chicago
Clemson University
Cleveland Institute of Music
Cleveland State University
Cloud County Community College
Cochise College
Colby College
Colgate University
College of DuPage
College of Marin
College of Saint Benedict

College of Saint Mary
Kenyatta University
College of San Mateo
College of the Canyons
College of the Desert
Colorado College
Columbia Gorge Community College
Compton College
Concordia University
Cosumnes River College
Creighton University
Crown College
Cuyahoga Community College
Cypress College
Dakota State University
Dallas County Community College District
Daytona State College
Delaware Valley College
Denison University
Des Moines Area Community College
Dine' College
Doane College
Drake University
Drew University
Dunwoody College of Technology
East Los Angeles College
Edmonds College
Egerton University
El Camino College
Embry-Riddle Aeronautical University
Everett Community College
Evergreen State College
Fashion Institute of Technology
Fitchburg State University
Flint Hills Technical College
Florida Gateway College
Florida Gulf Coast University
Florida Institute of Technology
Florida International University
Florida Polytechnic University
Front Range Community College Fullerton College
Garrett College
George Mason University
George Washington University
Georgetown University
Georgia Institute of Technology
Golden West College
Green River Community College
Harper College
Hastings College
Hennepin Technical College
Hillsdale College
Hiram College
Hood College
Illinois State University
Illinois Wesleyan University
Immaculata College
Iowa State University
Iowa Western Community College
Irvine Valley College
Jacksonville University
James Madison University
John Carroll University
Johnson County Community College
Kansas City University
Kansas State University - Manhattan
Kansas University
KCA University
Kent State University

Kenya Methodist University
Paradise Valley Community College
Kirkwood Community College
Klamath Community College
La Sierra University
Labette Community College
Lake Erie College
Lake Superior College
Lane College
Lane Community College
Laramie County Community College
Las Positas College
LaSalle University
Lewis & Clark College
Liberty University
Long Beach City College
Lorain County Community College
Los Angeles City College
Los Angeles Harbor College
Los Angeles Pierce College
Los Angeles Southwest College
Los Angeles Trade Technical College
Los Angeles Valley College
Louisiana State University
Luther College
Madison Community College
Mercer County Community College
Mesa Community College
Metropolitan Community College
Miami University
Midlands Technical College
Minneapolis Business College
Minneapolis Community and Technical College
Minnesota School of Business Minnesota State University - Mankato Minot State University
Missouri Southern State University
Mohave Community College
Monroe Community College
Moreno Valley College
Morgan Community College
Mt. San Jacinto College
Nebraska Indian Community College
Nebraska Wesleyan University
New York Institute of Technology
Norco College
Normandale Community College
Notre Dame College of Ohio
North Carolina State University
North Central University
North Hennepin Community College
North Seattle Community College
Northern Arizona University
Northern State University
Northland Pioneer College
Northwest Missouri State University
Northwest University
Northwestern University
Oakton Community College
Oberlin College
Occidental College
Ohio College of Pediatric Medicine
Ohio Northern University
Ohlone College
Oklahoma State University-Stillwater
Olivet Nazarene University
Orange Technical College
Oregon State University - Corvallis Oregon State University - Cascades

Palomar College
Paradise Valley Community College
Pennsylvania State University
Peru State College
Philander Smith College
Phoenix College
Point Park University
Pomona College
Portland State University
Prince Georges Community College
Red Rocks Community College
Redstone College
Robert Morris University
Roosevelt University
Rowan University
Sacramento City College
Saddleback College
Saint Joseph's University
Saint Mary's University
San Bernardino Valley College
San Francisco State University
San Juan Basin Technical College
San Juan College
Santa Barbara City College
Santa Fe College
Santa Monica College
Scottsdale Community College
Seattle Central Community College
Seattle University
Seminole State College
Shippensburg University
Simpson College
Skagit Valley College
Skyline College
Slippery Rock University
South Central College
South Mountain Community College
South University Of Science and Technology Of China
Southeast Missouri State University
Southeastern Iowa Community College
Southwest Minnesota State University
Southwestern College
St. Catherine University
St. Cloud State University
St. John's University
St. Petersburg College
Sterling College
SUNY Old Westbury
Swarthmore College
Tennessee College of Applied Technology
Texas A&M University
Texas State University
Texas Tech University
The College of New Jersey
The Ohio State University
The University of Tennessee Health Science Center
Tillamook Bay Community College Tohono O'odham Community College Tulane University
Umpqua Community College
University of Advancing Technology
University of Alaska Fairbanks
University of Alberta
University of Arizona
University of California Berkeley University of California Los Angeles

University of California River side
University of Central Florida
University of Central Missouri
University of Cincinnati
University of Colorado-Boulder
University of Colorado-Colorado Springs
University of Colorado-Denver
Anschutz Medical Campus
University of Florida
University of Hawaii at Hilo
University of Hawaii-West Oahu University of Houston
University of Illinois at Chicago
University of Iowa
University of Louisiana - Lafayette
University of Mary Hardin-Baylor
University of Miami
University of Michigan
University of Minnesota Crookston
University of Minnesota Duluth
University of Minnesota Morris
University of Minnesota Twin Cities
University of Mount Union
University of Nebraska Kearney
University of Nebraska Lincoln
University of Nebraska Medical Center
University of Nebraska Omaha
University of Nevada Reno
University of New Mexico
University of North Carolina
University of North Florida
University of Northern Iowa
University of Northern Colorado
University of Oregon
University of Ottawa
University of Pennsylvania
University of Puget Sound
University of South Carolina
University of Southern California
University of Tampa
University of Tennessee
University of Texas
University of Texas at Arlington
University of the Pacific
University of Vermont
University of Virginia
University of Washington-Seattle
University of West Florida
University of Wyoming
Valencia College
Vanderbilt University
Victor Valley College
Villanova University
Virginia Polytechnic Institute and State University
Washburn University
Washington State University - Pullman
Wayne State College
West Los Angeles College
West Texas A&M University
West Valley College
Western Illinois University
Western Kentucky University Westminster College
Whitworth University
Wilbur Wright College
Winona State University
Yavapai Community College
Yuba Community College District

WELCOME

Agenda

- 01 Welcome & Introductions
- 02 The Future of Work & Benefits of CTE
- 03 Curriculum Integration & Spaces that Support It
- 04 Case Study: Storm Lake Early Elementary School
- 05 Case Study: OCPS Career Technical College – West Campus



Learning Objectives

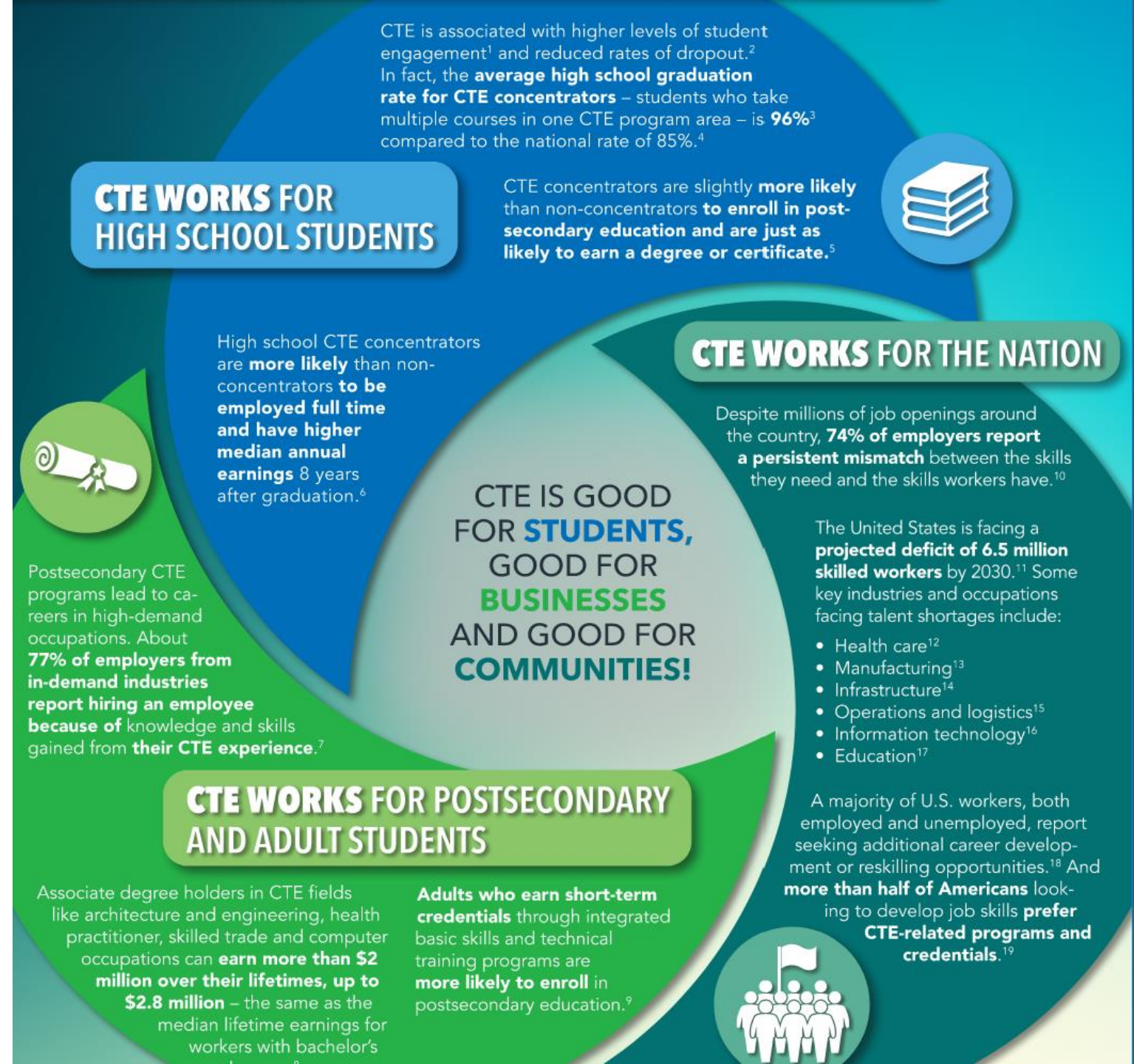
1. Learn how the latest in CTE design connects the built environment to special tailored curriculum and career pathways and creates a professional environment that reflects the culture of industry partners
2. Understand maker spaces and the what, how, and why they matter to learners of all ages
3. Hear the case study of Storm Lake Early Elementary School, located within an ethnically diverse city with over 60% of the population self-identifying as non-white, where students have access to STEM labs and can 'see themselves as a scientist'
4. Hear the case study of OCPS Orange Technical College - West Campus, a replacement campus designed and built to support the evolution of future CTE programs in response to the local market



Benefits of Career and Technical Education

Benefits of CTE

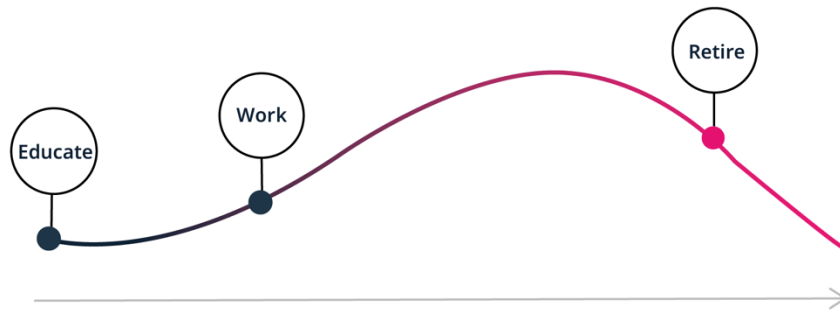
- Higher levels of student engagement
- Reduced dropout rates
- More likely to be employed after graduation
- Higher median annual earnings eight years after graduation
- Fiscal Benefits for Students and Communities



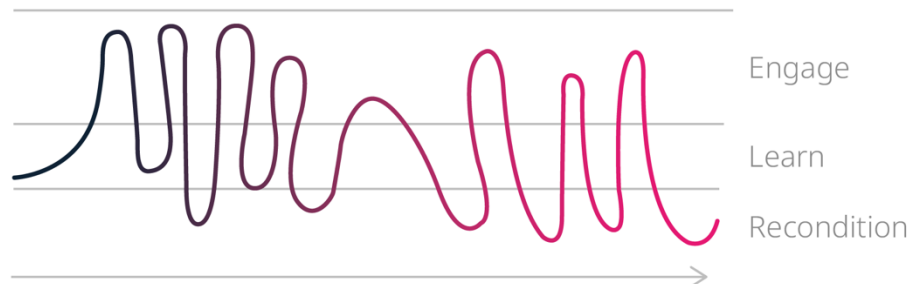
BENEFITS OF CAREER AND TECHNICAL EDUCATION

Push and Pull

old economy



new economy



"Future of Work: 8 Megatrends Shaping Change" – GetSmarter - <https://www.getsmarter.com/blog/market-trends/future-of-work-8-megatrends-shaping-change/>



Early Exposure



HANDS-ON

HANDS-ON EXPLORATION.

One of the most important ways that kids make connections between real-world ideas and STEM concepts is through hands-on exploration. They need to touch, play, explore, and invent in real life, in real-time.



INTEGRATION

INTEGRATION OF TWO OR MORE SUBJECTS.

STEM doesn't have to be a science lesson or a math lesson. It can be a Language Arts class that explores the subject in a new way – through the lens of STEM.



REAL WORLD CONNECTION

CONNECTION TO REAL-WORLD PROBLEMS AND SOLUTIONS.

Did you know that baking a cake is considered a STEM activity? It involves measurement, tools, design skills, chemical reactions, and – if you are ambitious and decide to apply frosting – art!



TECHNOLOGY

USE OF TECHNOLOGY TO FACILITATE LEARNING.

The newest technologies allow us to try things in physical and virtual classrooms that were not possible before. What you use depends fundamentally on what you are trying to accomplish.



CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

Ideas for Incorporation in Elementary



TALK ABOUT IT.

Use words like experiment, design, invent, prototype, etc. Incorporating STEM into kids' thinking is a powerful way to incorporate it into their reality and understanding. Contrary to what we may believe, kids can – and do – understand complex STEM topics.



MODIFY YOUR LESSONS.

Most schools and school districts don't have the budget to invest in large-scale STEM tools right away. That's why you should feel empowered to start small. Incorporate STEM-related books and activities into your everyday class routine. Choose an existing lesson plan and modify it to include a more in-depth question for students to consider.



CHANGE YOUR MINDSET.

Many educators never received STEM instruction in school themselves, nevermind learned how to teach it to their students. However, you may be surprised at how easy it is to dive in. STEM can be a way to enrich your lesson plans. Set aside a half hour per day in any subject to look at the topic through the lens of STEM – weaving science, technology, engineering, or math concepts into particular lessons.



INVOLVE FAMILIES.

Encouraging parents to actively participate in their kids' STEM education is a powerful way to forge strong home-school connections and to extend classroom teachings into the real world.



03

Curriculum Integration & Spaces that Support It



CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

Keys to Success

- Curriculum Alignment
- Professional Learning
- Business Partners
- Network of Knowledge
- Agile Functionality





What impacts student learning progress?

Individual student variability = **50%**

Teacher effectiveness = **30%**

Physical learning environment = **16%**

Resources = **4%**

[1] Hattie, John. "Visible learning: A synthesis of over 800 meta-analyses relating to achievement." (2008)

Nye, Barbara, Spyros Konstantopoulos, and Larry Hedges. "How large Are Teachers effects?" *Educational Evaluation and Policy Analysis* 26, no. 3 (2004): 237-57

[2] Barrett, Peter, Fay Davies, Yufan Zhang, and Lucinda Barrett. "The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis." *Building and Environment* 89 (2015): 118-133.

CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

FINNS Framework



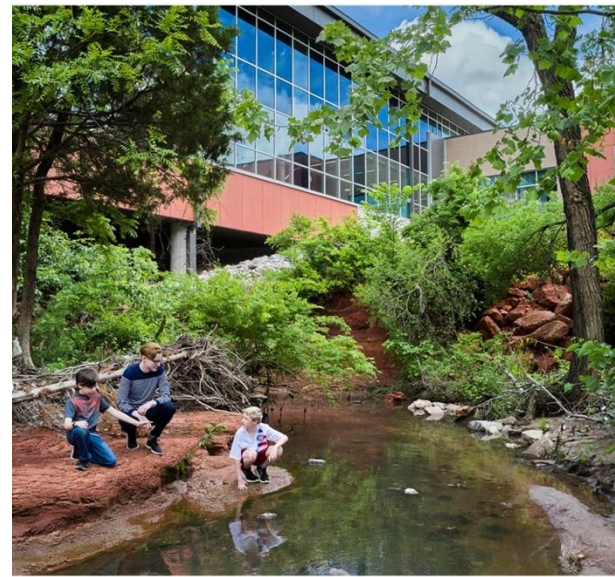
Flexibility & Operability

Movement Matters



Individualization

Physical Needs are Unique



Naturalness & Nature

Health & Comfort are Critical



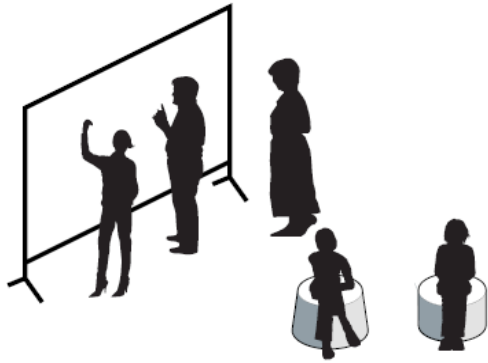
Stimulation

Activate the Senses

CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

FINNS Framework

Flexibility + Operability



CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

FINNS Framework

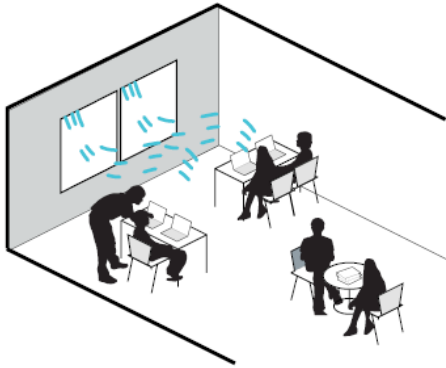
Individualization



CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

FINNS Framework

Naturalness + Nature



CURRICULUM INTEGRATION & SPACES THAT SUPPORT IT

FINNS Framework

Stimulation



04

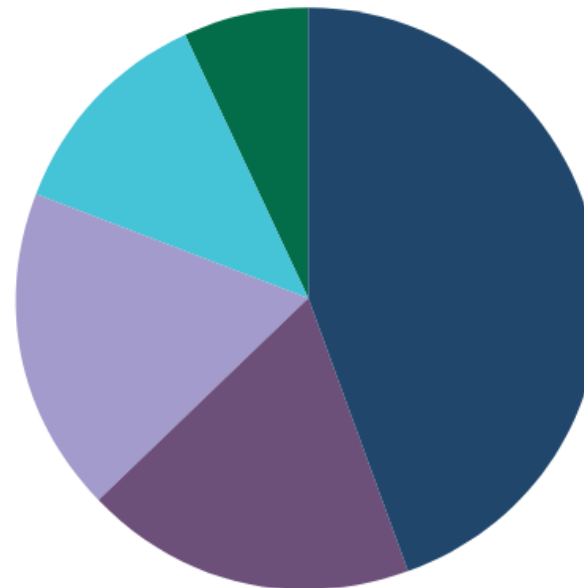
Case Study: Storm Lake



District Overview

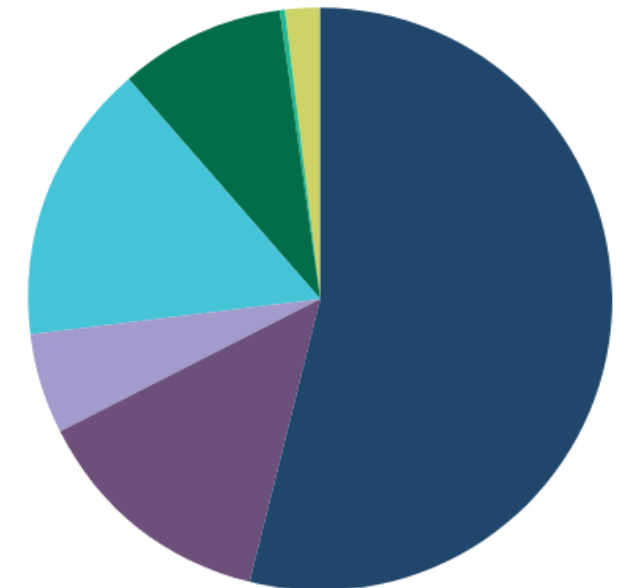
- Storm Lake is an ethnically diverse city
 - 60% of residents are non-white
- 86.4% of students enrolled at Storm Lake CSD non-Caucasian

2020 CENSUS
Civilian Employed Population



- Production, transportation, and material moving
- Management, business, science, and arts
- Sales and office
- Service
- Natural resources, construction, and maintenance

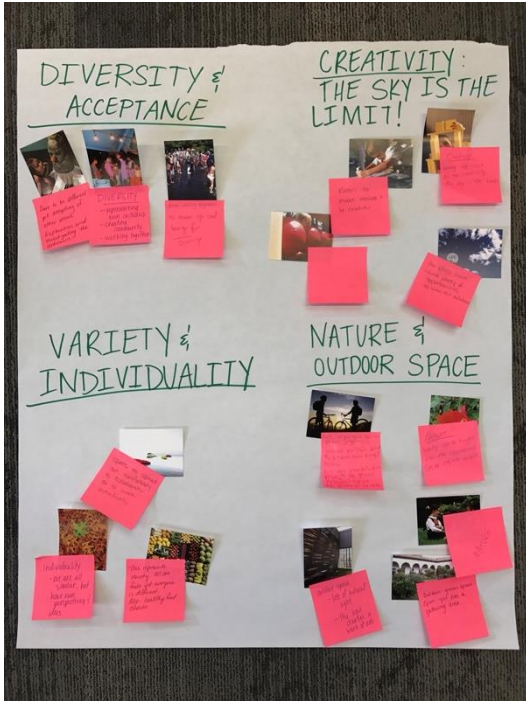
2020 STUDENT POPULATION
2,841 students



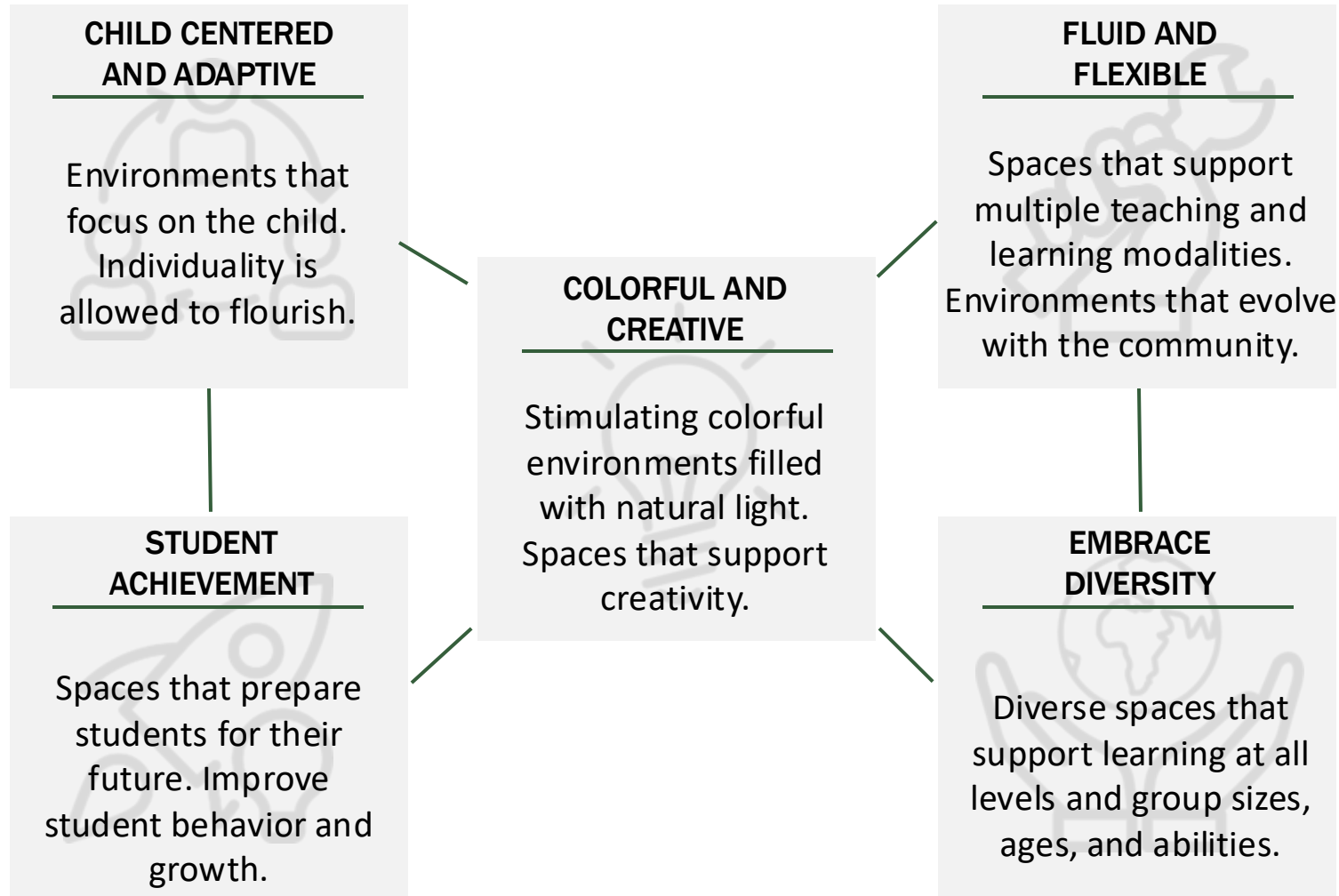
- Hispanic
- White
- Black
- Asian
- Pacific Islander
- Native American
- 2+ races

CASE STUDY – STORM LAKE EARLY ELEMENTARY SCHOOL

Visioning Process

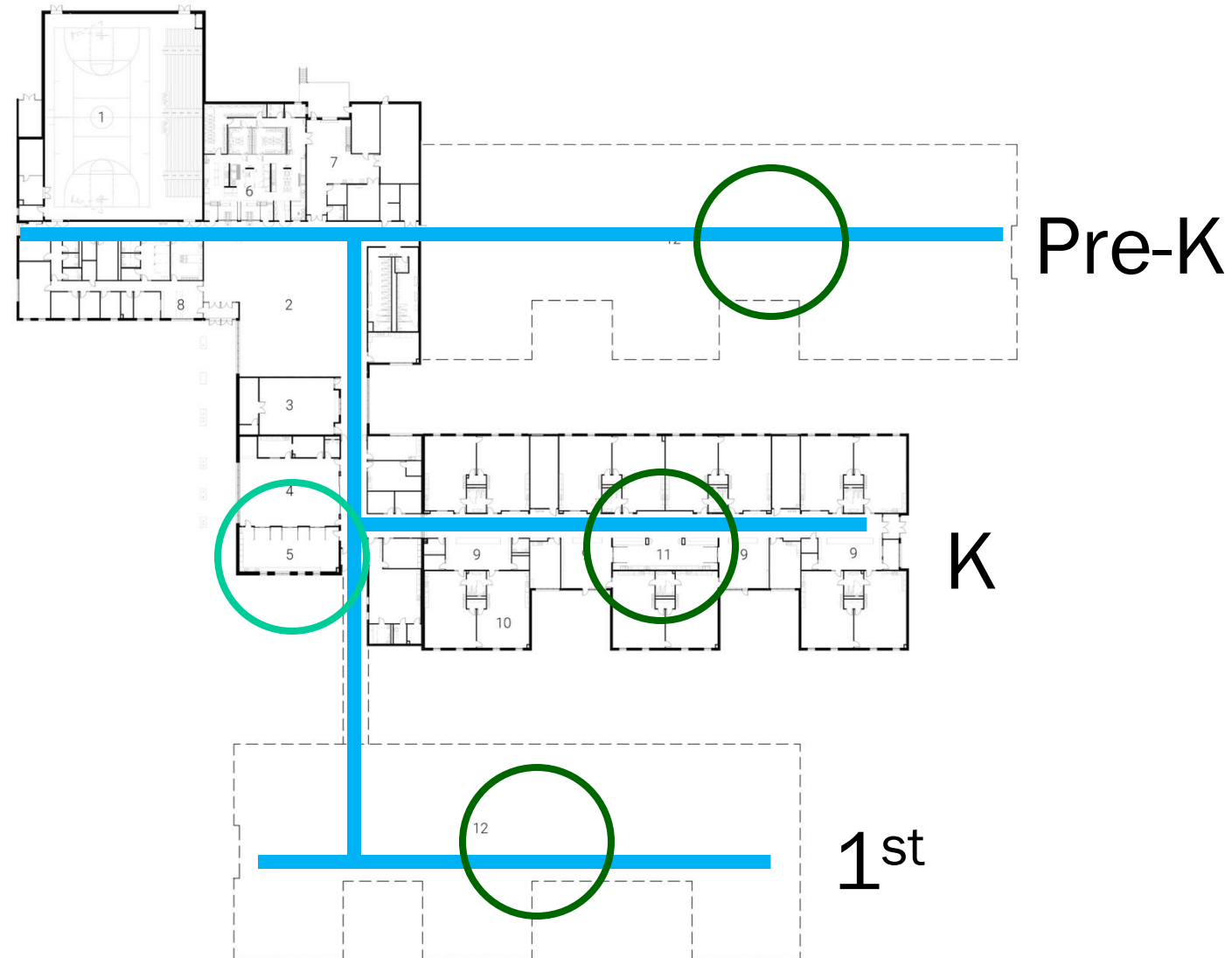


Guiding Principles



Distribution of Space

- Pre-K – 1st Grades
- Multi-Phased Project
- CTE/STEAM on Display
- Makerspace - Decentralized Art



CASE STUDY – STORM LAKE EARLY ELEMENTARY SCHOOL

Career Exposure



CASE STUDY – STORM LAKE EARLY ELEMENTARY SCHOOL

STEAM Lab



CASE STUDY – STORM LAKE EARLY ELEMENTARY SCHOOL

Makerspace – Discovery Art



Makerspace Benefits

- Providing the opportunity to innovate
- Creating real-world applications for classroom concepts
- Learning to take failure in stride
- Exposing students to new opportunities
- Building critical thinking and problem-solving skills
- Developing a wide range of 21st century skills



CASE STUDY – STORM LAKE EARLY ELEMENTARY SCHOOL

Instructor Testimonial



The Future



Every year this is one of my favorite days! The possibilities are endless for these tiny tornadoes.

Future Engineers...

Future Astronauts ...

Future Marine Biologists...

Future Software Developers...

Future Chemists...

The world is yours!

- Jacquie Drey, Storm Lake CSD STEAM Instructor

Case Study: OCPS Orange Technical College West Campus



District Overview



156 YEARS OF
CONSISTENT
GROWTH



207,484
STUDENTS



23
HIGH
SCHOOLS



7
TECHNICAL
COLLEGE
CAMPUSES



65
CTE DEGREE
PROGRAMS

Pathways



CASE STUDY: OCPS ORANGE TECHNICAL COLLEGE – WEST CAMPUS

Career Programs Offered

Advanced Esthetics

Architecture & Construction

- **Building Construction Technologies**
- **Carpentry**
- **Electricity**
- **HVAC / Refrigeration**
- **Plumbing**



CASE STUDY: OCPS ORANGE TECHNICAL COLLEGE – WEST CAMPUS

Career Programs Offered

Human Services

- Barbering
- Cosmetology
- Facials Specialty

Manufacturing

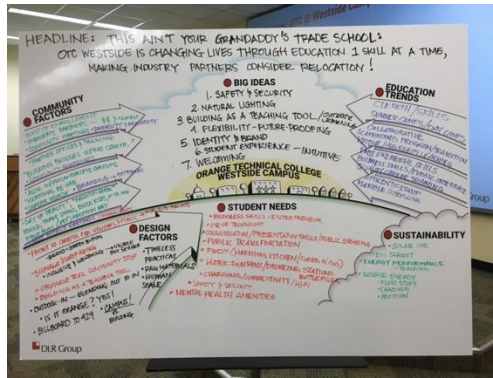
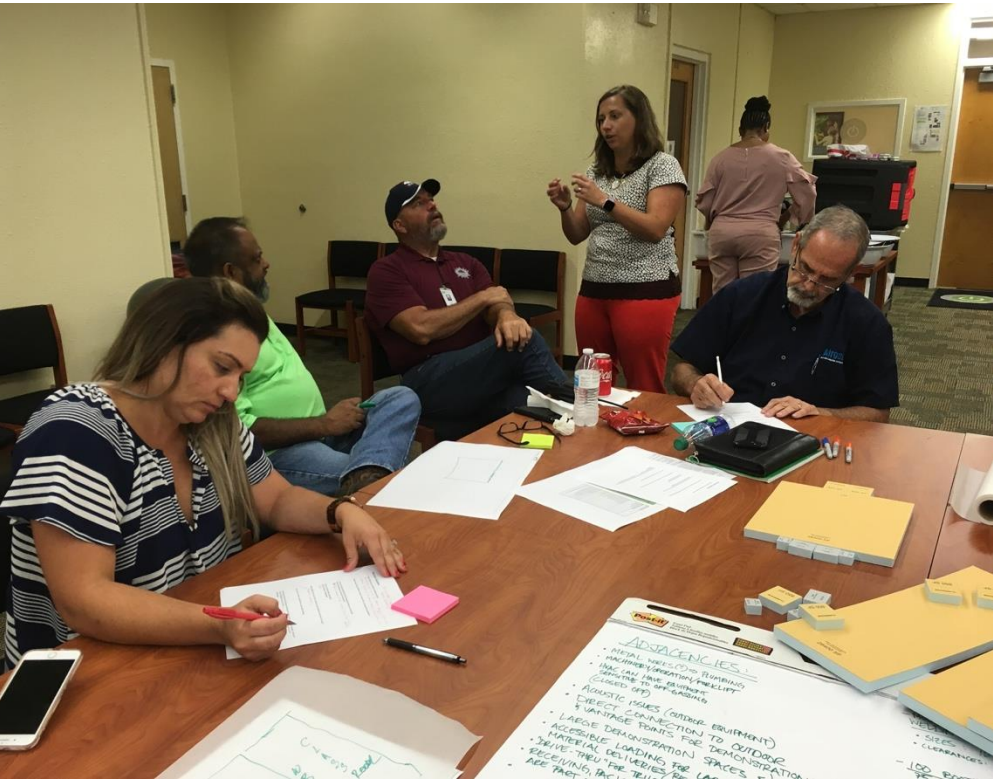
- Welding Technology

Nails Specialty



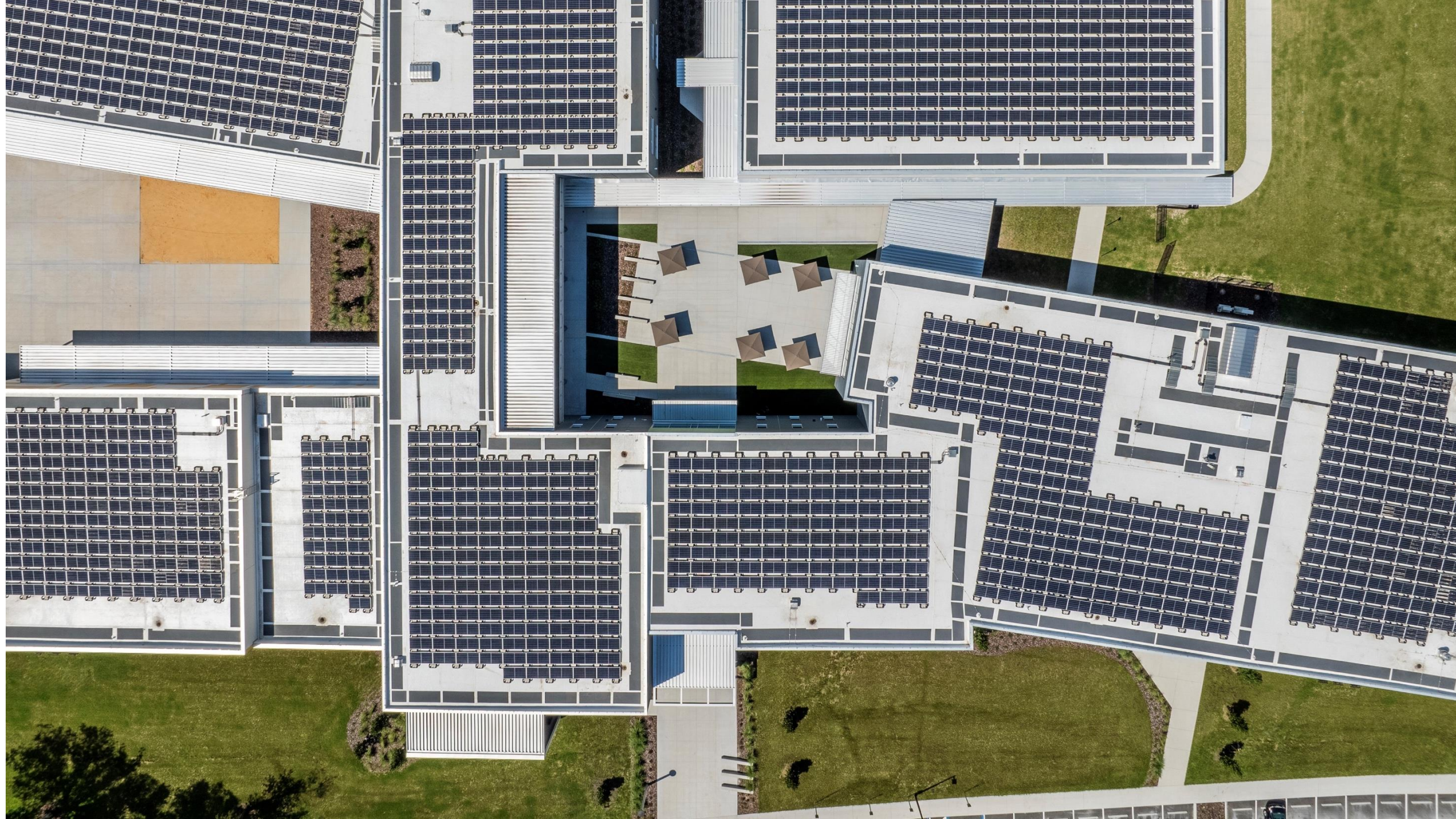
CASE STUDY: OCPS ORANGE TECHNICAL COLLEGE – WEST CAMPUS

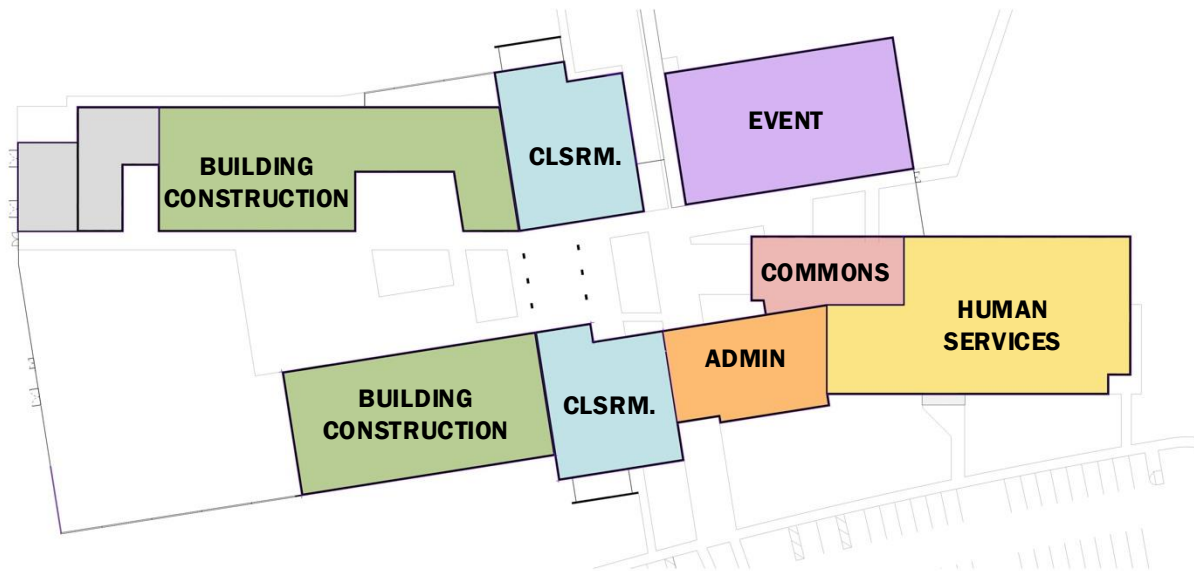
Planning Process



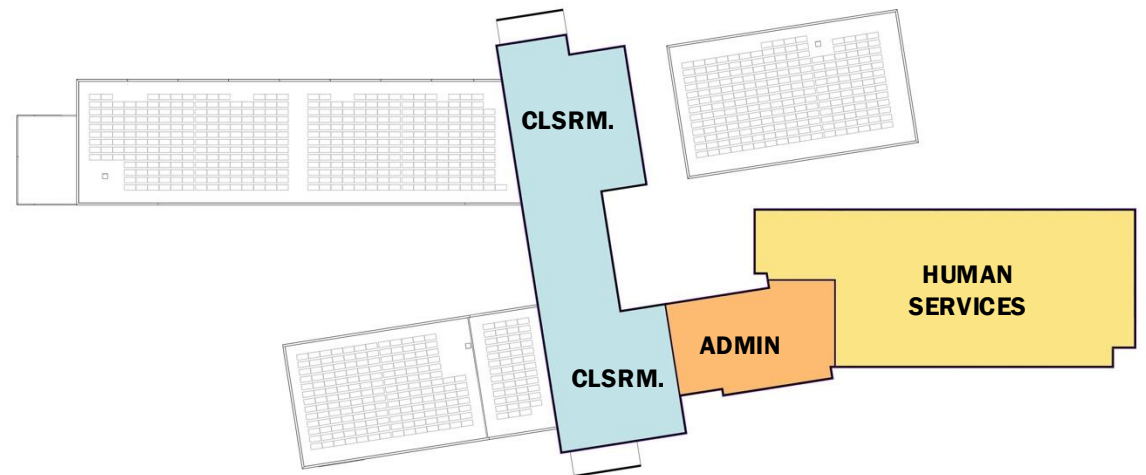








Level 1



Level 2















Innovation Leading the Way: CTE for All Ages

CTE FOR ALL AGES

Let's Connect



Ernesto Alonso, AIA

Senior Associate | Senior Designer



Mo Arthur, AIA

Principal | K-12 Education Leader



Ian Kilpatrick, AIA

Principal | K-12 Education Leader

