ALICE WEST FLEET ELEMENTARY SCHOOL

Arlington, Virginia // Arlington Public Schools

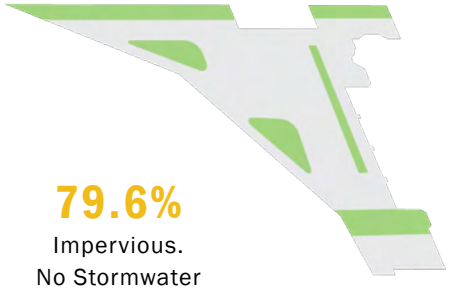
AIA Committee on the Environment - Top Ten Awards

CONTEXT AERIAL

BUILD UP, NOT OUT

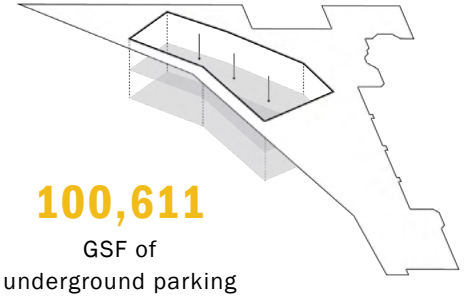
This project re-imagined the elementary school typology into a 6-story structure while still maintaining ideal solar orientation and massing to make it one of the largest net-zero-energy schools in the country. A collaborative public design process transformed a parking lot into an engaging landscape for students, neighbors, and the community.

1 Re-imagine Asphalt



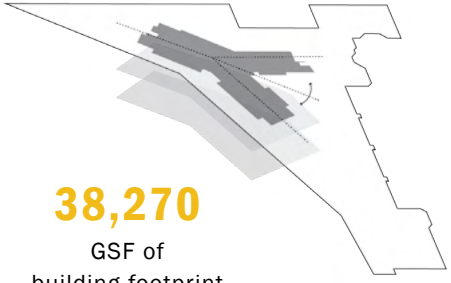
79.6%
Impervious.
No Stormwater Management

2 Dig a Big Hole



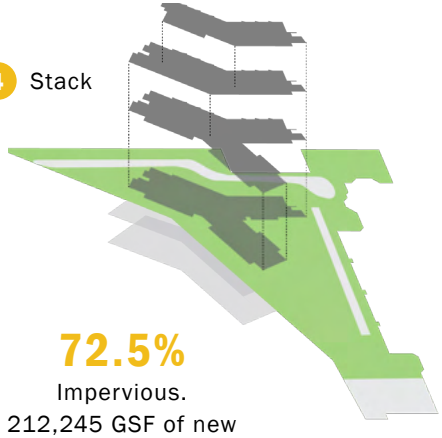
100,611
GSF of
underground parking

3 Compress Footprint

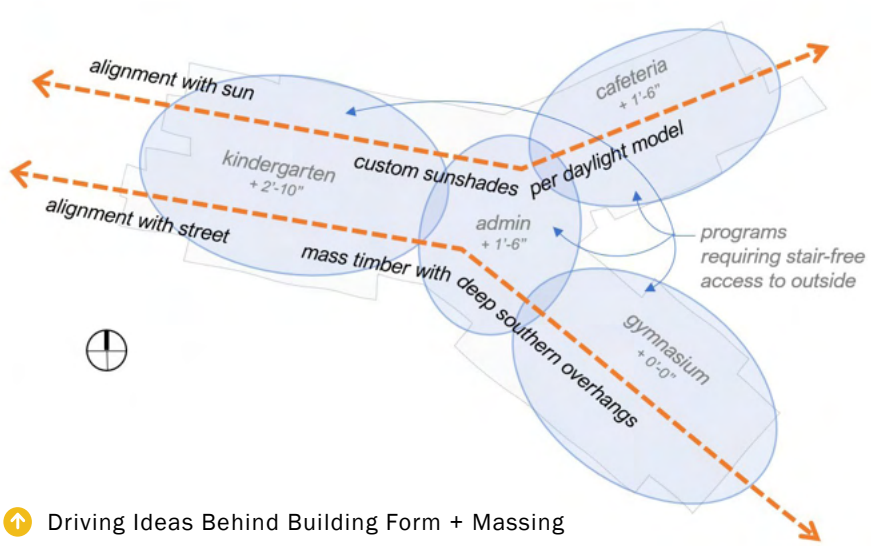


38,270
GSF of
building footprint

4 Stack



72.5%
Impervious.
212,245 GSF of new space for 870 new students and staff



Driving Ideas Behind Building Form + Massing

BUILDING CONSENSUS

Three years of engagement and evaluation of test-fit schemes occurred to select the site. That process addressed some of the trickiest questions with public space: How do you balance competing uses? Which voices should decide? The six months of concept and schematic design were built around 28 public meetings, including 15 design workshops.

2012 Original Site Study

2013 Study of school with affordable housing

2014 Thomas Jefferson Working Group

2015 South Arlington Working Group

2016 Concept + Schematic Design

2017 Use Permit, DD + CD

2018 Construction

2019 Construction

2020 COVID-19 Pandemic

2021 School Re-opens

2022 Post Occupancy Evaluation

4 Community Forums

10 Public Charettes

30+ Hours of Public Deliberation

15 Public Charettes

8 Public Commission Meetings

24 Monthly Updates

3+ Studies of Air Quality

2 Post Occupancy Meetings + Surveys

PUBLIC SPACE STUDIES

The team worked with community members to look at every part of the 25-acre Thomas Jefferson Park – exploring how we could increase program use without loss of recreation space or tree cover. Public space was always designed first, and the building design responded to those moves.

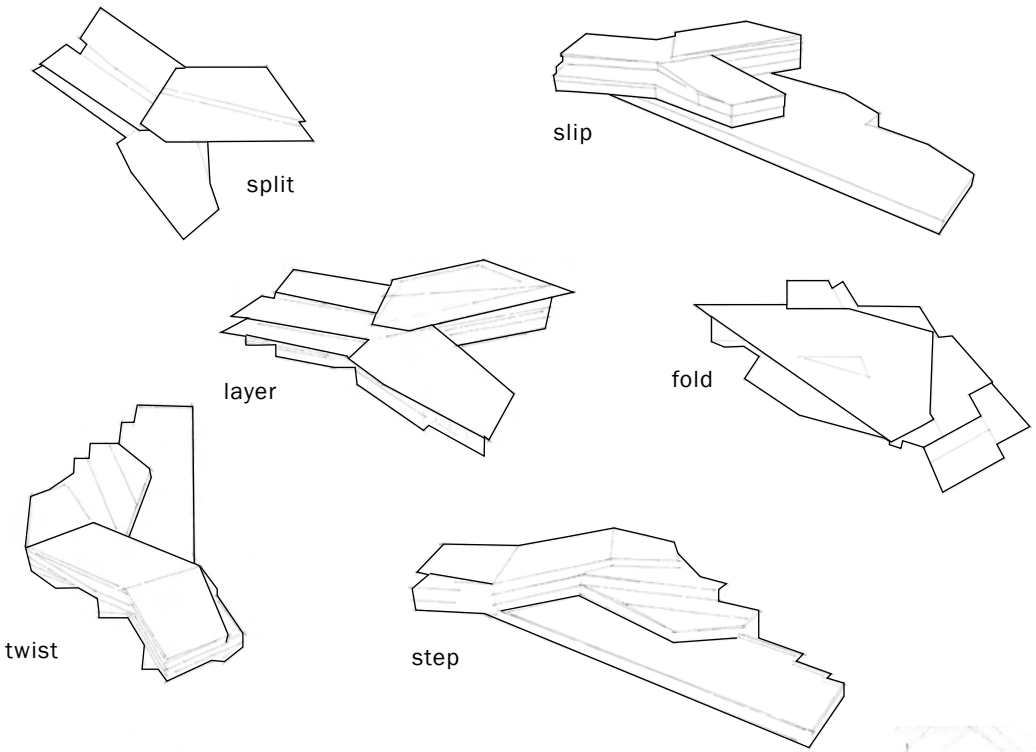
Fire lane reconfigured to become a controlled bus lane AND a playscape.

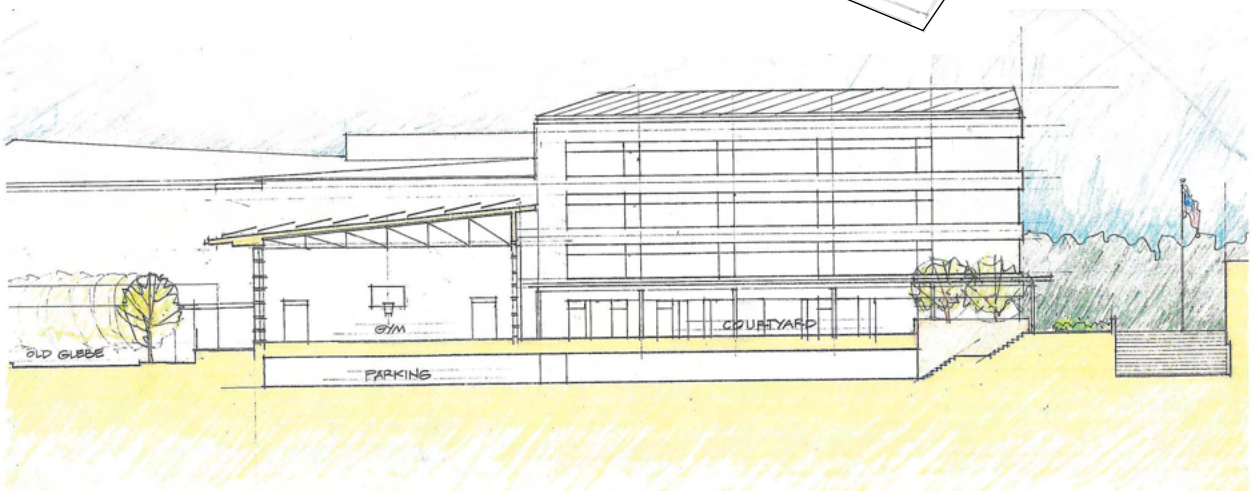
A hillside transformed into an accessible community garden AND playground.

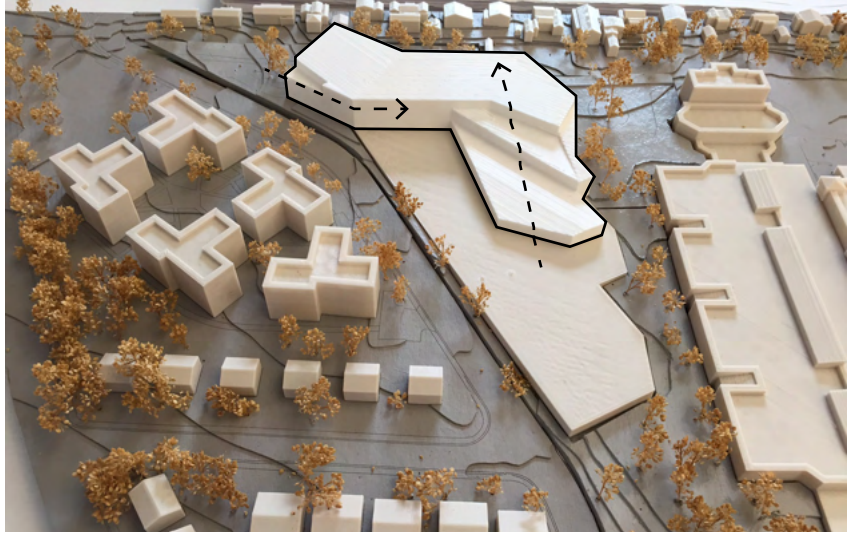
Approved concept design: Additional community workshops de-emphasized on-site car drop off, pushed the garage underground, and created more permeable, verdant, at-grade public space.

MASSING ITERATION

Using roofs that don't shade each other, concept design options were blocked and stacked with the sun, while keeping the principle parti axis east-west and minimizing the building footprint. The collection of the sun's photons became a major driver of form.







A RESILIENT, ZERO-ENERGY BUILDING CO-CREATED WITH THE COMMUNITY THAT PRESERVES AND ENHANCES PUBLIC SPACE

SITE PLAN

Existing Surface Parking Lot

1. Elementary School Main Entry
2. Existing Middle School Main Entry
3. Shared Parent Drop-off
4. Community Entrance: Cafeteria
5. Community Entrance: Gymnasium
6. Sensory Garden
7. Woodland Play Area
8. Play Courts
9. Shared Bus Loop
10. Outdoor Classroom
11. Parking Garage Entrance
12. Turf Play Area Over Parking
13. Turf Play Area Over Stormwater Retention
14. Early Childhood Play Area with Milk-snake Playmound

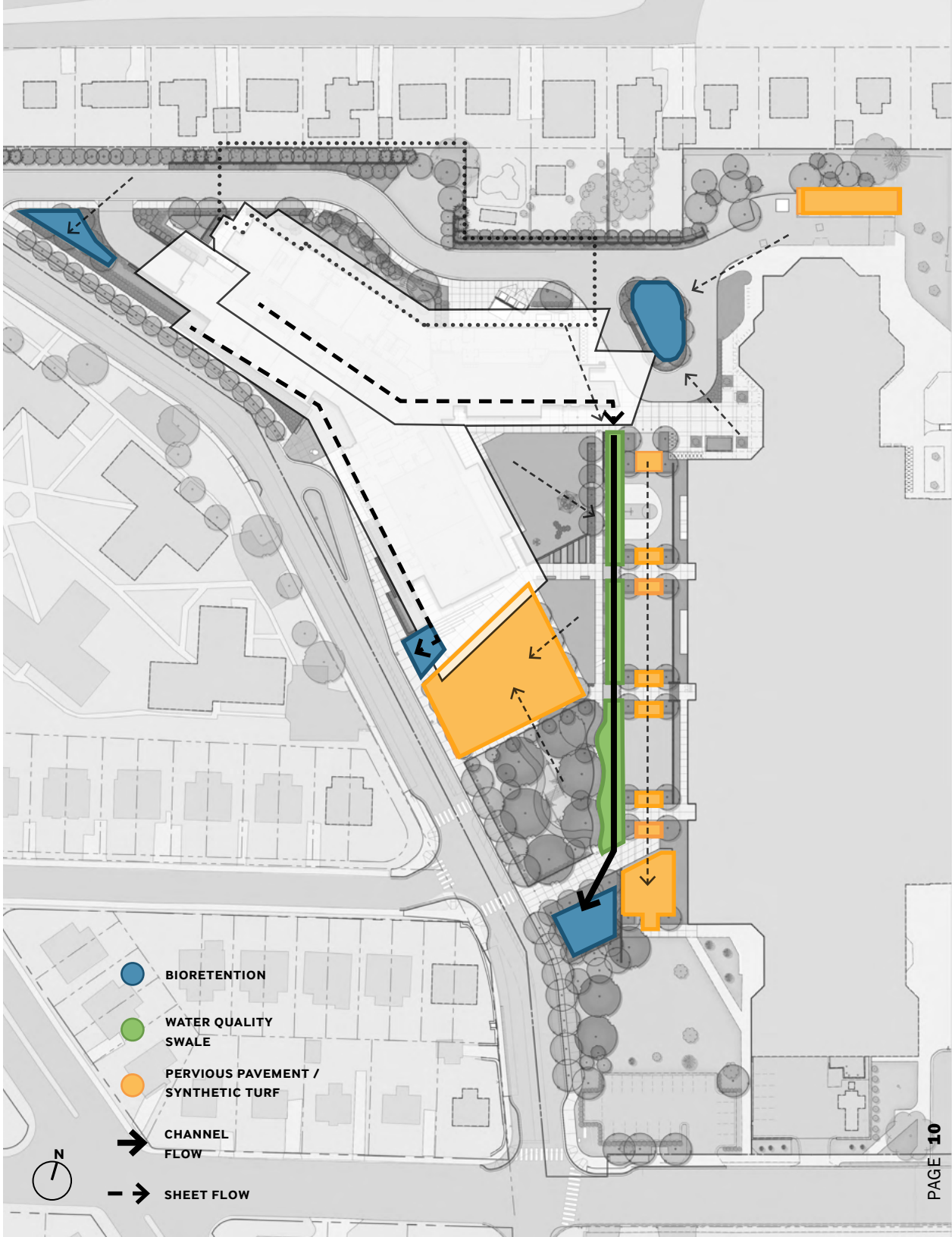
"It's the talent of our architect, but also the community - the conversations we've had, the positive constructive ways we've worked together to develop a school that's going to be great for kids, but also addressing many of the issues the community raised."

-Barbara Kannien,

Arlington Public Schools Board Chair

WATER TREATMENT

The angled roofs stack upwards to the north to collect light, while shedding all water to the south. Although the project added 212,245 gross square feet of space, site impermeability decreased by 7%. The long conveyance barrier cleans the water and acts as a natural barrier between elementary and middle school play spaces.



“Being able to have a field trip right at our school has been so life-changing.”

-Ashley Snyder, 4th Grade Science + History Teacher

RESPONSIVE FACADES

The two “arms of the Y” each had less than ideal solar orientation. The arm aligned with the street used mass timber with deep overhangs to produce shade, while the other arm fine-tuned the angle and size of its apertures and used custom shading solutions.

Southwest-facing Facade

Southeast-facing Facade

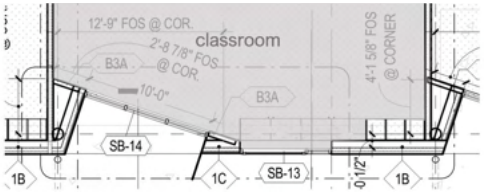
Northwest-facing Facade

North-facing Facade

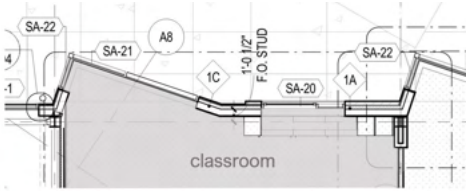
SUN-SHADING

Each elevation was fine tuned to allow maximum daylight with minimal solar heat gain. Northwest facing classrooms “pushed out”, allowing floor-to-ceiling glass to face due north, while southeast facing classrooms did the opposite. Although the custom sunshades look like playful follies, daylight modeling dictated the precise forms needed to block direct light. Where direct sunlight is allowed in, it’s done purposely for a cushioned reading nook (bottom left).

South-facing Classroom



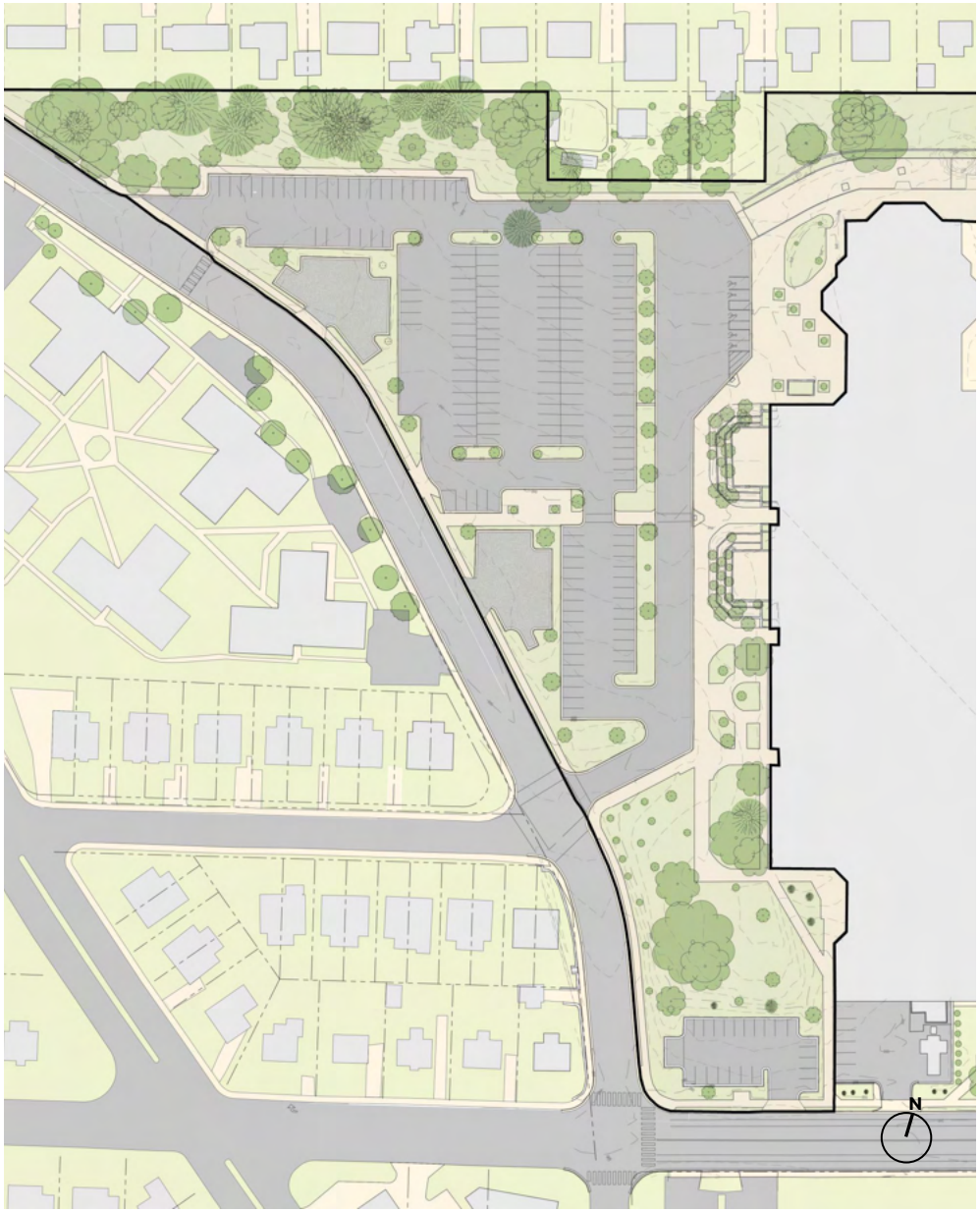
North-facing Classroom




SCHOOL BUS

MAKING IT GREEN

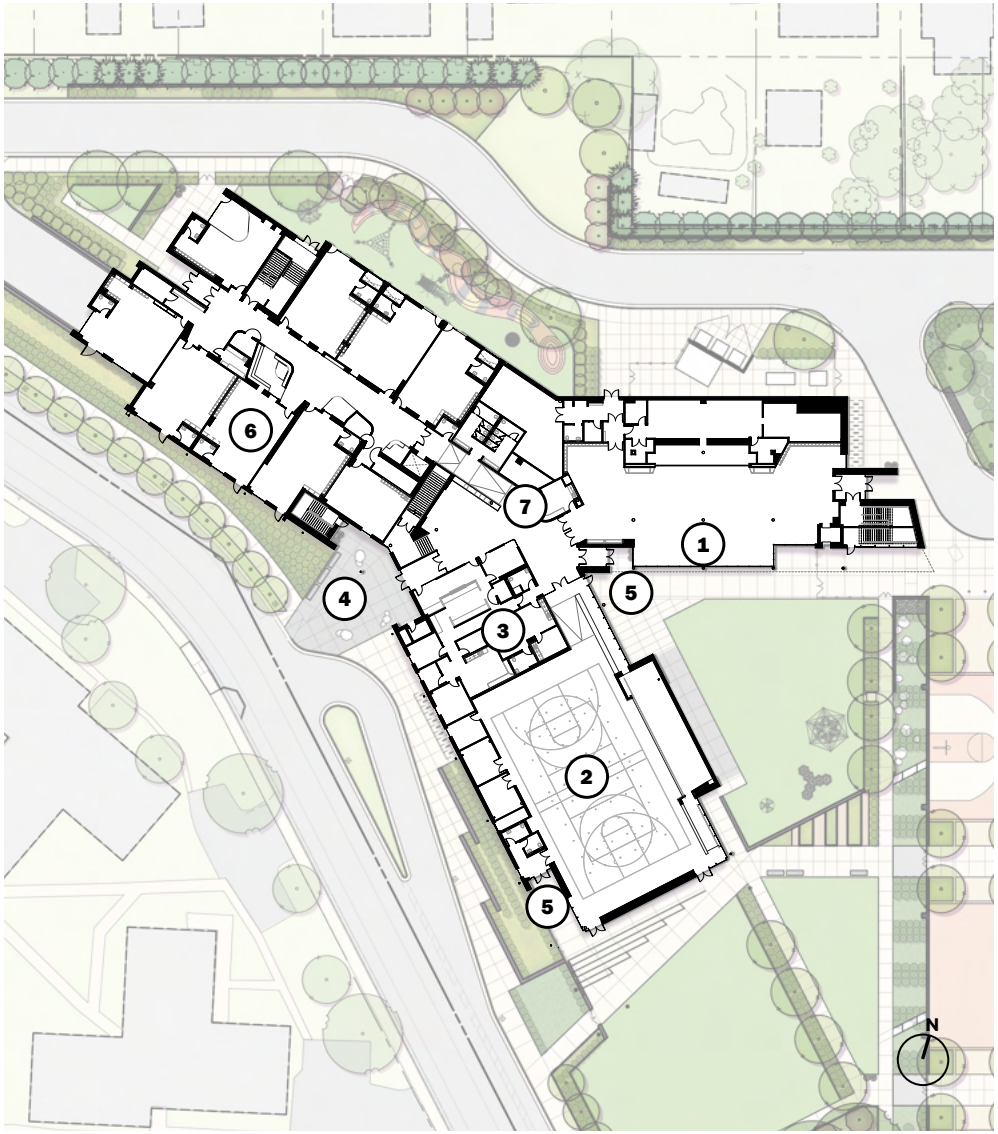
In the existing condition, trees were confined to buffers or struggled to survive in a sea of asphalt. The project returned tress to the vibrant center of the site. The vegetated area west of the existing middle school increased by 14.5% - incorporating over 85 different native species and cultivars of trees, shrubs, grasses, and herbaceous groundcovers.



Green Space + Tree Coverage Before

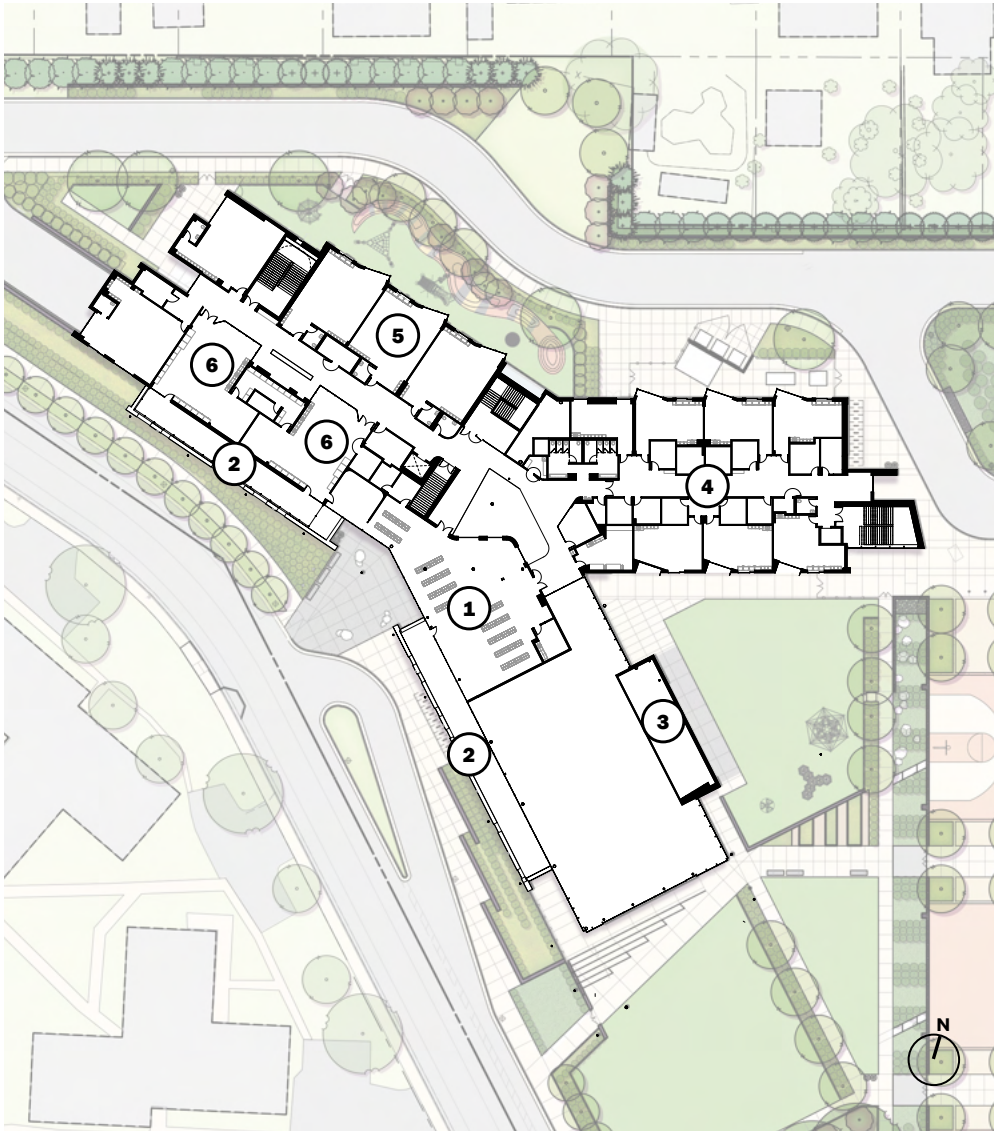
Green Space + Tree Coverage After

LEVEL 1



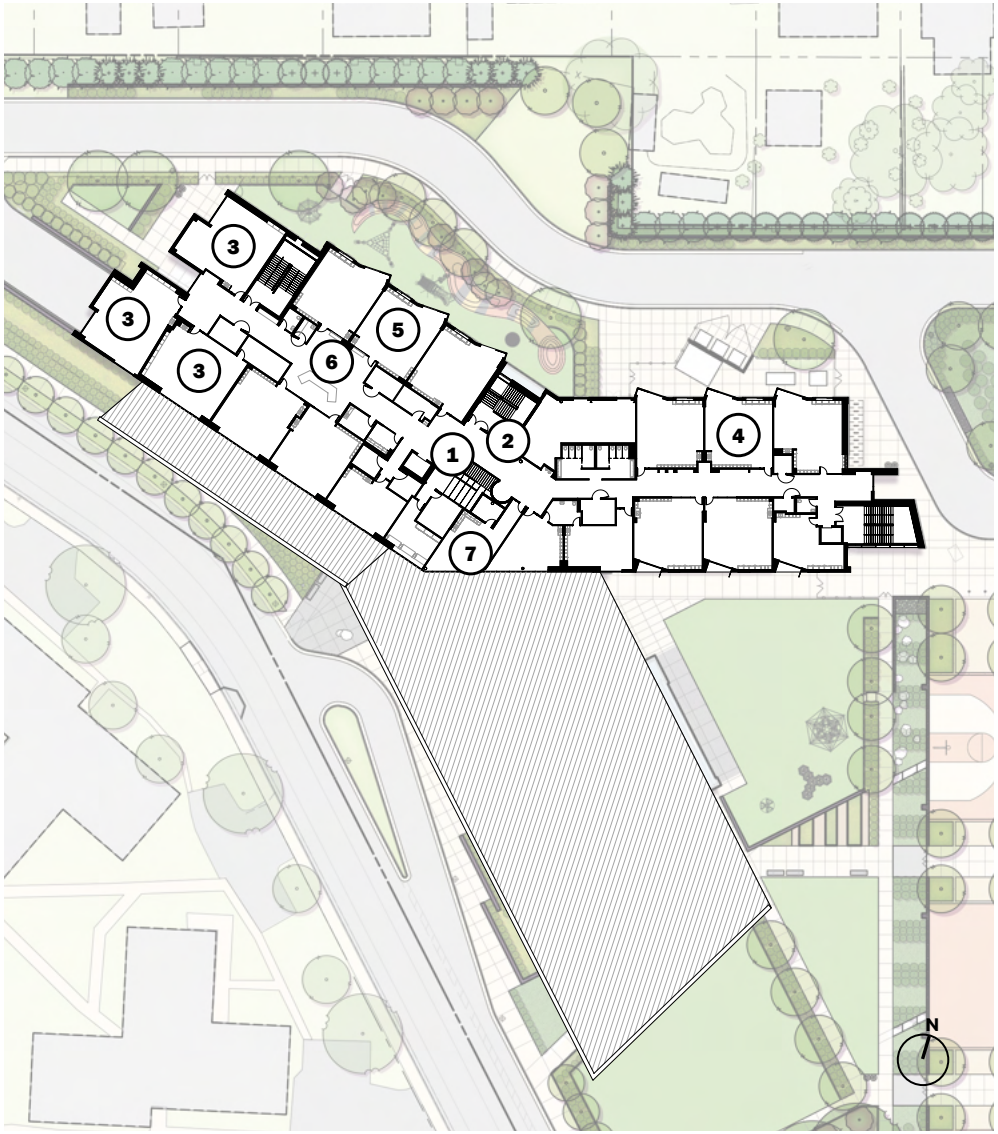
1. Cafeteria
2. Gymnasium
3. Administration
4. Main Entrance
5. Community Entrance
6. Kindergaren Classroom (typ.)
7. After Hours Childcare Administration

LEVEL 2



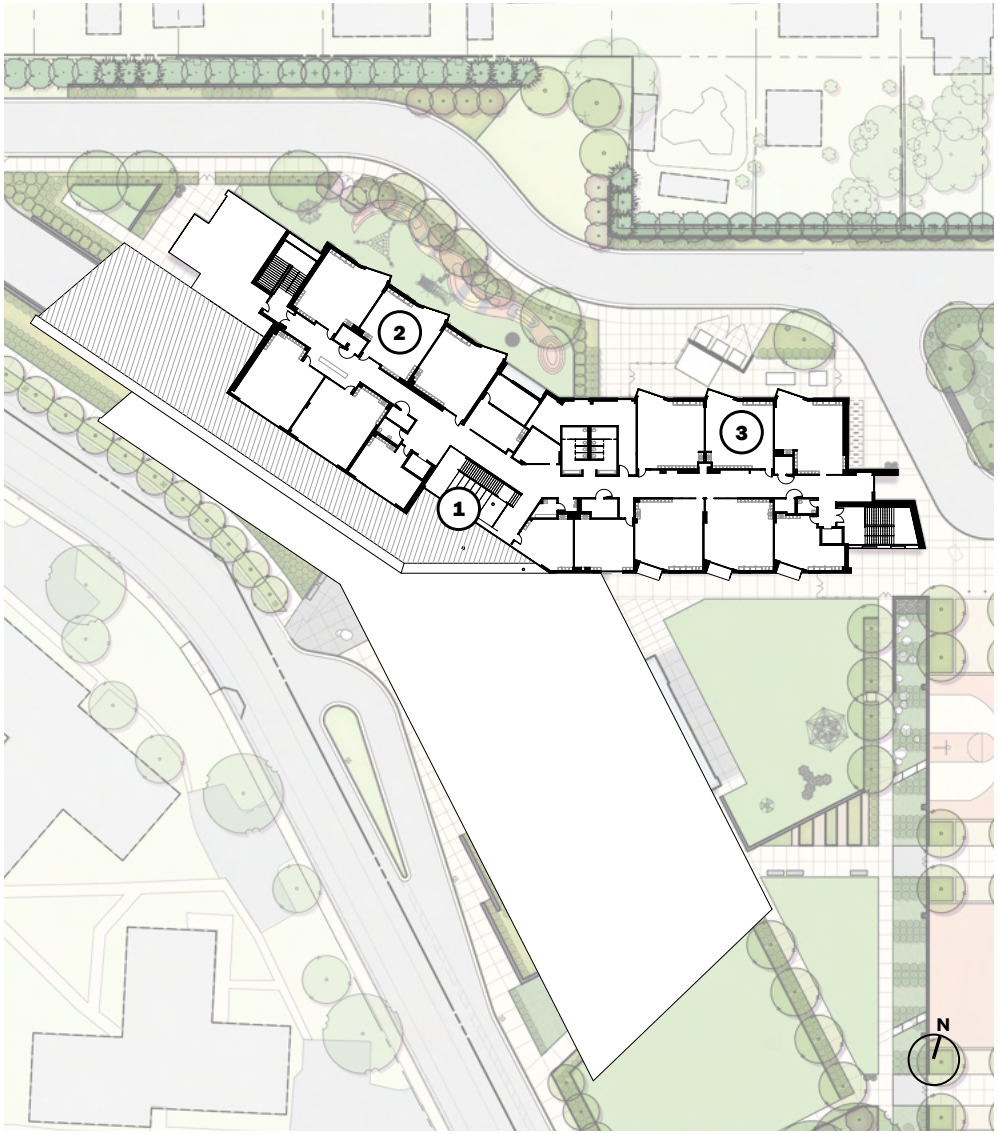
1. Library
2. Learning Porches
3. Stage (below)
4. Special Needs Suite
5. First Grade Classroom (typ.)
6. Art Classroom

LEVEL 3



1. Story Steps
2. Stair + Slide
3. Music Classrooms
4. Second Grade Classroom (typ.)
5. Third Grade Classroom (typ.)
6. Large Group Breakout
7. Occ/Phys Therapy

LEVEL 4



1. Story Steps
2. Fourth Grade Classroom (typ.)
3. Fifth Grade Classroom (typ.)

SUSTAINABLE STRATEGIES

IMPROVED BUILDING ENVELOPE including added insulation, increased airtightness, thermally-broken frames and improved glazing

EFFICIENT LIGHTING, primarily from daylight and complemented by LED fixtures, results in a 76% reduction in lighting power density

DEDICATED OUTDOOR AIR SYSTEM with heat recovery and demand control decouples ventilation from heating/cooling and provides fresh air

SENSOR NETWORK monitors occupancy, light levels, and CO2 levels to maintain optimal conditions while limiting energy use

OPERABLE WINDOWS encourage occupants to engage with the building and open up when weather conditions permit

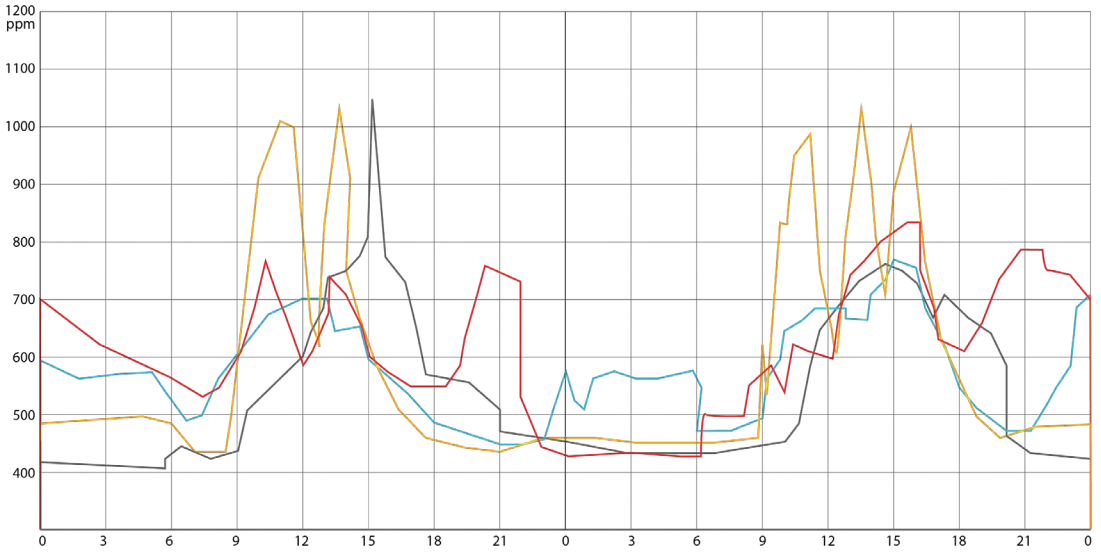
GEOTHERMAL ENERGY connected to water-source heat pumps deliver low-maintenance, low-energy heating, cooling, and domestic hot water

HLR SYSTEM removes CO2, VOCs and other contaminants from the air, improving IAQ while reducing outside air demand

ALL ELECTRIC KITCHEN eliminates on-site combustion and fryers and means fresher, healthier food

HEALTHY SPACES

Although the overall glazing percentage is 31%, the building is full of natural light and visual connections to the outside. Scrubbing units that remove CO2 and VOCs produce early morning air quality that is usually better than outside air! CO2 is continuously monitored and was carefully tracked during the pandemic. The readings shown below were measured on the first very cold day after students returned from lockdown (meaning most occupants were inside all day)



Measured CO2 Readings, December 9-10, 2021. Hourly average temperature was 39 degrees.

Pre-K 1st Grade Dining Gymnasium

HEALTHY MATERIALS

30%

total products installed with environmental product declarations (EPDs)

55%

total products installed within the waterproofing membrane with ingredient disclosure

67%

total products installed within the waterproofing membrane are CDPH-compliant

18%

reduction in embodied carbon (kg CO2e/ sf) compared to LEED Materials + Resources baseline

"Our school has been so incredible and life changing, not only for our students but our community members, who when students come in and tell me, 'I'm getting a rain barrel at my house because I was inspired by the sustainability mission' "

-Ashley Snyder,
Science Teacher, Alice West Fleet Elementary School

SPACE FOR LEARNING

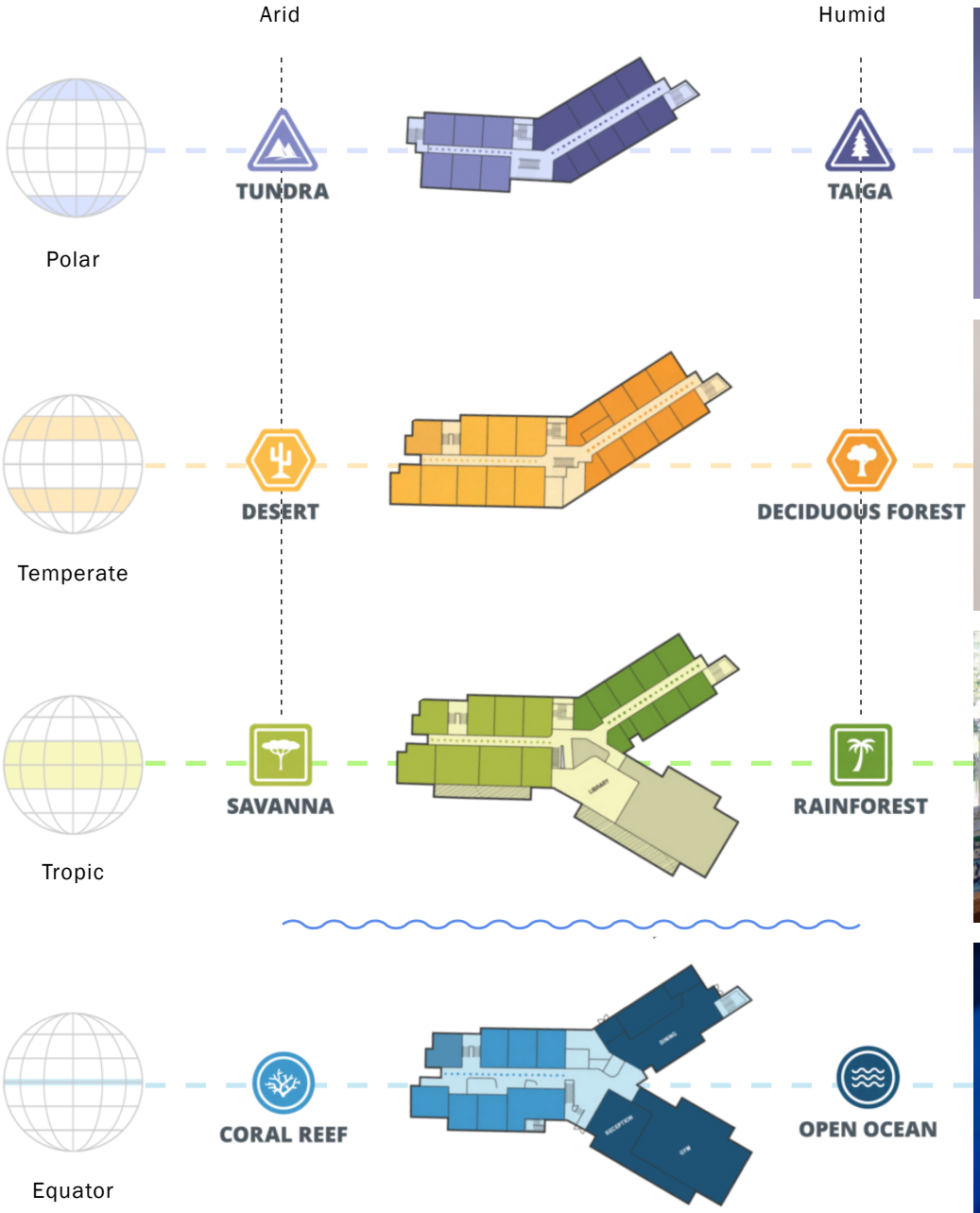
All learners are unique, and instruction is always evolving – especially as we address social and emotional needs in public schools. Extra space outside of the traditional classroom is used in a variety of ways - and proved especially valuable for social distancing during the pandemic.

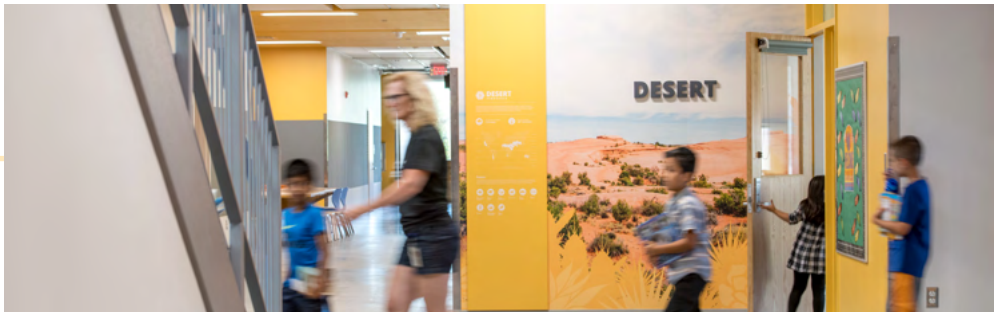
"To see a building like this used as a **total learning experience** is just marvelous."

-Christine Todd Whitman
Former New Jersey Governor and EPA Administrator

TEACHING TOOLS

The school is organized around the earth's major biomes. Children enter the building "underwater" in the ocean and moving up in the building (and up in grade levels) is a process of moving from the equator to the poles. Classrooms are named after animals found in their respective habitats. Entire ecosystems can be explored via a field trip inside the school.





SHOWING + TELLING

The school's "power pole" displays real time energy in 10 kilowatt increments – with orange LED nodes representing building consumption and blue nodes representing solar panel production. Students can easily see if their school is net-positive or net-negative at any moment – even clouds moving overhead will cause the real time data to change before their eyes.

These pictures were taken 9/14/2023 at 9:40am and show 230kW of solar production and 80kW of consumption.

JOY + DELIGHT

One of the best contributions architecture can make to education is to create places where people want to be. Child-scaled features send a clear and inclusive message to young learners: “this place is for you!”. The building and landscape encourage children to be curious about the world around them. The kindergarten playground features a wheelchair accessible play-mound in the shape of a colorful, non-venomous milk snake (bottom right)

"As more people experience the grief of their own climate awakenings, they can look to bring their passions, interests, and expertise to make a difference. To meet this moment, we need everyone's unique contribution to the collective fight. As others embark on their own climate paths, I hope they live by the motto of Alice West Fleet: **"Let nothing and no one stop you."**

-Laura Schifter,

Senior Fellow with the Aspen Institute

Alice West Fleet Elementary School
VMDO Architects
Arlington Public Schools, Arlington, Virginia

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