



the tomatoes and  
the butterflies

mundo  
verde

los tomates y  
las mariposas



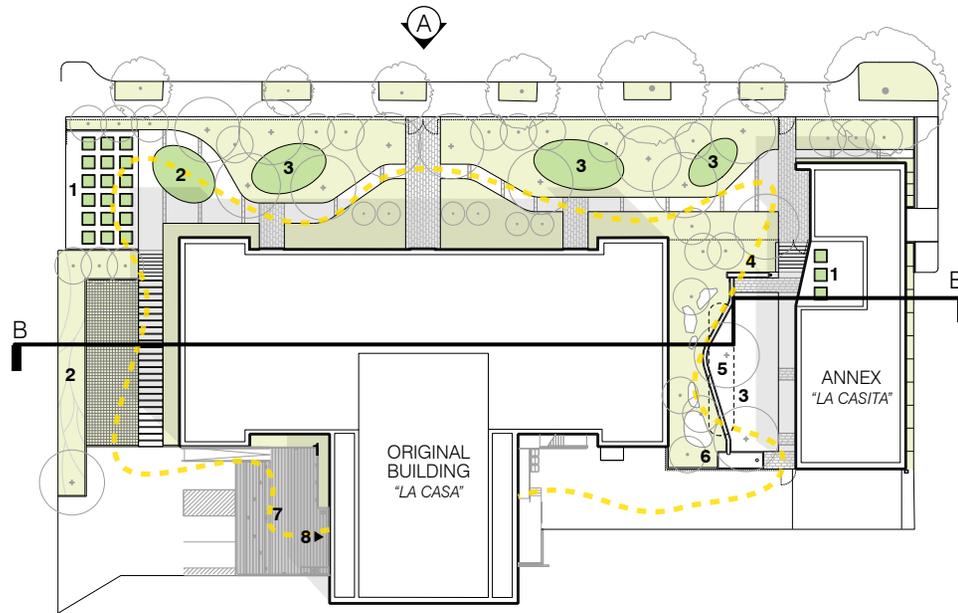
SCHOOL GARDEN



PRESCHOOL



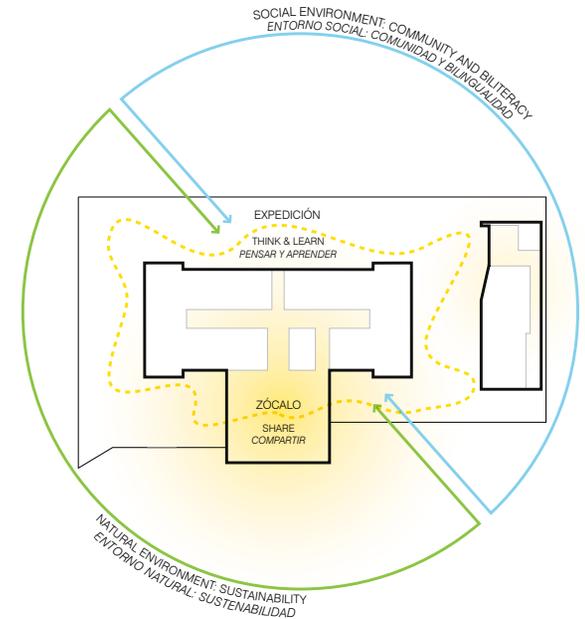
DAILY SCHOOL COMMUTE



- 1 EDIBLE GARDEN
- 2 NATIVE MEADOW & POLLINATOR GARDEN
- 3 OUTDOOR PLAY & CLASSROOM
- 4 WATER WALL WITH HAND PUMP
- 5 CONSTRUCTED STREAM & CISTERN
- 6 RAIN GARDEN
- 7 TERRACE
- 8 ZÓCALO



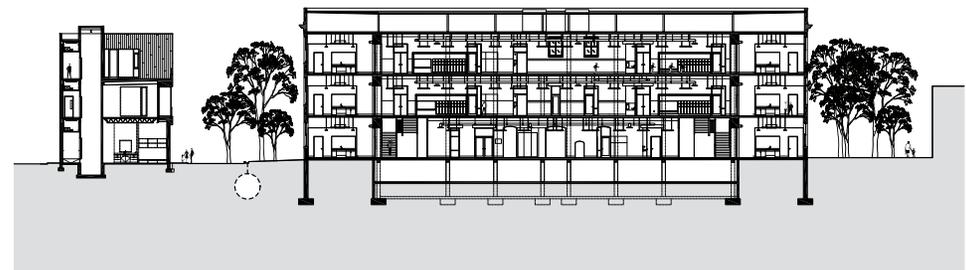
**SITE + EXPEDITION PLAN**



**SITE + CURRICULUM DIAGRAM**



**A ELEVATION**



**B SECTION**



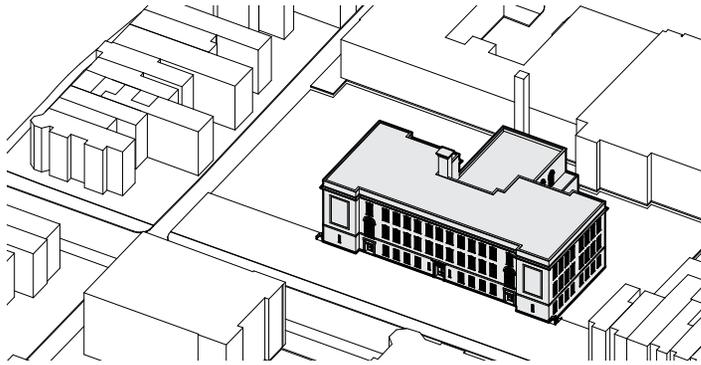
NORTH ELEVATION AND RECLAIMED GREEN PLAY SPACE



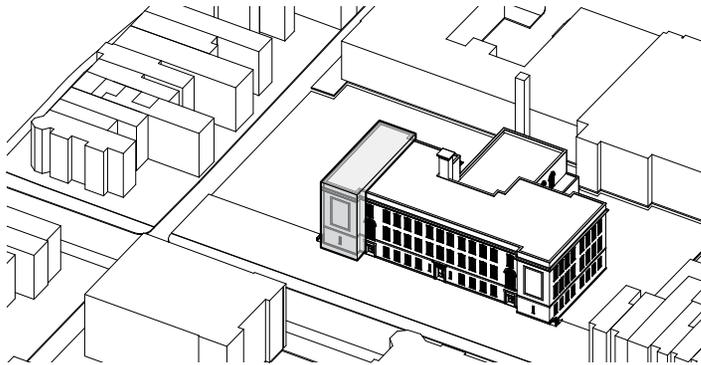
BEFORE



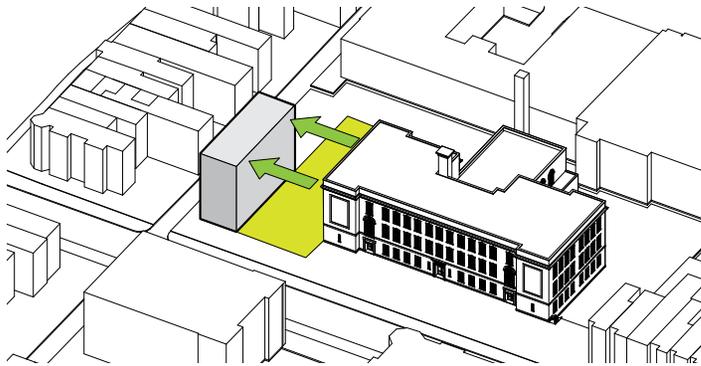
AFTER



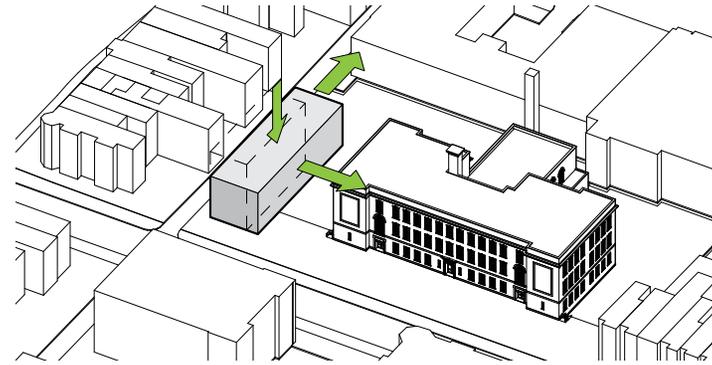
1 existing 1925 school building  
[edificio original construido en 1925]



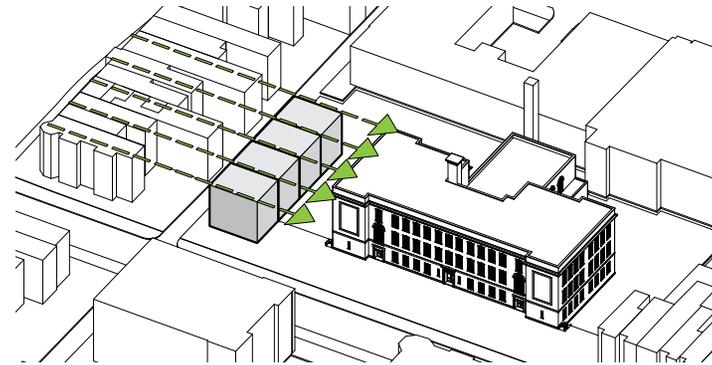
2 identify existing bar scheme and building scale  
[identificación de la volumetría y escala del edificio existente]



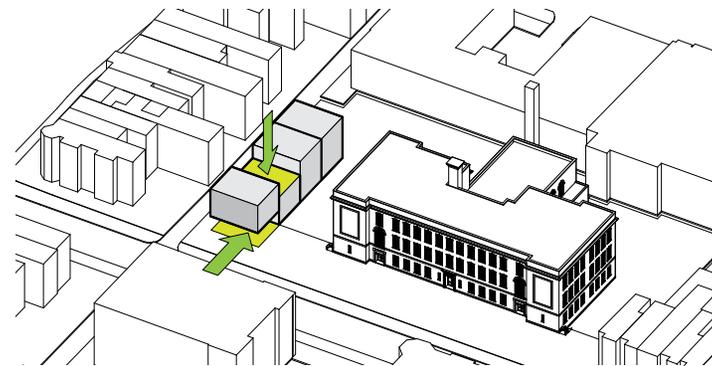
3 replicate the bar at the east end of the site to create green space and maintain urban edge [reproducción de la volumetría del extremo este del edificio para generar un espacio verde y reforzar el borde urbano al norte]



4 adjust building to programming requirements  
[adaptar el edificio a los requisitos programáticos]

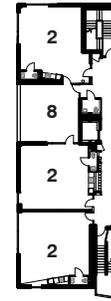
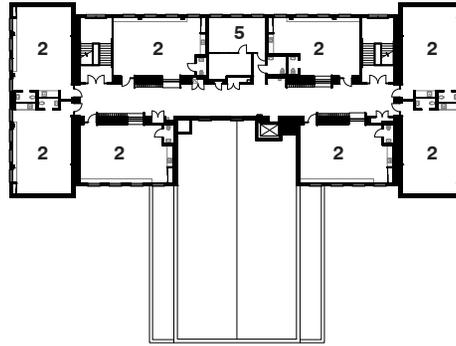


5 extend rowhouse site texture to articulate and scale the building  
[extender la grilla de las casas adedentes para articular y modificar la escala del edificio]

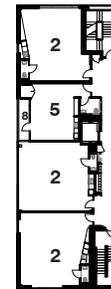
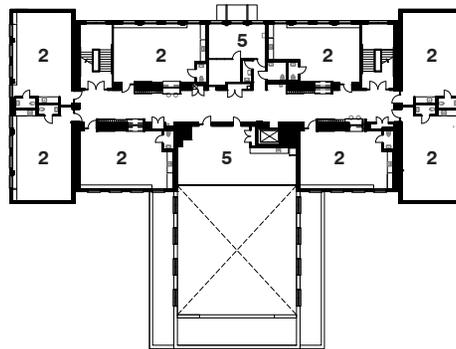


6 shift individual blocks to create entrance and rooftop classroom  
[desplazar volúmenes individuales para generar la entrada y el aula en la terraza]

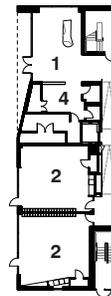
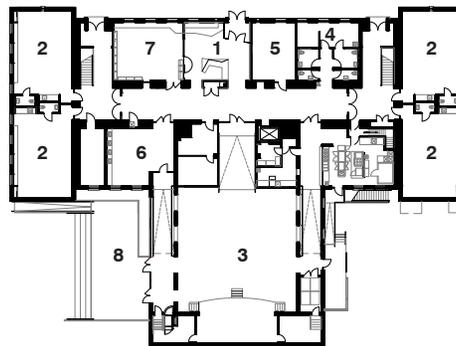




3RD FLOOR



2ND FLOOR



1ST FLOOR

- 1 ENTRY
- 2 CLASSROOM
- 3 ZOCALO
- 4 SUPPORT
- 5 COLLAB
- 6 ART
- 7 LIBRARY
- 8 TERRACE



FLOOR PLANS



The exterior stair along the alley façade of the Pre-K annex is both a landmark for the school within the community and a cost-saving strategy.

La escalera exterior del anexo de Pre-K, ubicada hacia el callejón posterior, es tanto un punto de referencia de la escuela dentro de la comunidad como una estrategia de ahorro de presupuesto.





INTERIOR STAIR



PLAYGROUND LEVEL CLASSROOM



OUTDOOR ROOFTOP CLASSROOM



CORRIDOR



EXISTING CLASSROOM BEFORE



CLASSROOM ENTRY



ZOCALO



ZOCALO TERRACE AND POROUS CONC



ZOCALO FROM TEACHER WORKROOM



## STATEMENT ON SUSTAINABILITY

### Design for Integration

Mundo Verde is a bilingual, sustainability-focused public charter school located in the District of Columbia. From the earliest planning for its permanent home, the school sought to build a sense of place and belonging within the broader community, meet an unparalleled demand for the unique education for sustainability model, increase high quality education available to high-need neighborhoods, and revitalize a derelict urban site as a demonstration for green, sustainable practices, operations, and education.

Early on, Mundo Verde had a direct question for the design team: “How can this project teach our students to be global stewards of our environment?” From the existing building renovation to the material and systems efficiency of the Pre-K annex, the entire campus actively fosters learning through environmental living. The project extends beyond LEED through numerous sustainable performance matrices, but most specifically with rigors and intensity with which the sustainability curriculum is inextricably interwoven to the buildings and campus. Through hands-on, real-world thematic units called expeditions, students explore complex sustainability issues, beginning in their own school building. The school evaluates sustainability integration annually for elements including: Culture, Understanding, Learning, Community and Management using the AuSSI-SA Education for Sustainability Rubric for Schools.

The resulting \$15 million project achieved Gold and Platinum LEED certifications for a campus that annually hosts nearly 600 students and achieves deep social, economic, and environmental impact. With relative cost effectiveness and targeted investments, the site maximizes positive impact on the environment; counters assumptions that green school projects are costlier and therefore less cost effective; and pushes each investment to have the highest impact on learning and student wellness with a focus on light, water harvesting, outdoor and indoor air quality, and the ability to grow and serve healthy foods on-site.

### Design for Community

MV knows schools are integral parts of communities and desires deep roots into its neighborhood, thus sought community support early in the design process. The original site was 95% asphalt, so MV hosted a Sidewalk Chalk Charrette to collect community aspirations. Equipped with big chalk, students, parents, and neighbors imagined their new community school. Much of the site design, (community gardens and expeditionary learning stations) are tangible results.

The school continues its evergreening path reflecting on how projects benefit the community. MV promotes social equity by providing education that prepares students for global stewardship regardless of their economic and social backgrounds. MV is improving public health by promoting students, families and staff reduce transportation-related emissions. The site is optimal due to public transportation accessibility. Auto use reduction strategies were prioritized early with a parking variance to trade paving for play space. Resultant 9-spaces (rarely used) are triple purposed: parking, playing and stormwater reservoirs!

MV actively reduces their carbon footprint discouraging single car driving reliance by promoting Safe Routes to School as a path to school; Sponsoring shuttlebus for a neighborhood with high family concentrations; Intersection crossing guards; Installing fifty bike racks; Metro and/or bike subsidies and staff shower facilities.

### Design for Ecology

On Earth Day 2014, Mundo Verde hosted an “Asphalt Breaking Ceremony” for their soon-to-be home. Community leaders, students and families gathered and planted a chokeberry bush and milkweed seed pods in a small existing cement



planter - the only non-asphalt outdoor surface on the property - launching the greening of the historically significant J.F. Cook School building and grounds. Symbolizing nurturing of the landscape, the chokeberry bush was the first indigenous species planted alluding to the newly productive gardens to come, while the milkweed, picked from the site the previous fall, illustrated a cycle of life from the site as it provided the foundation of the coming butterfly migratory gardens.

Since then the site has hosted several community garden build and two tree-planting days adding 40 indigenous and fruit bearing trees. The school's outdoor spaces are transformed into living learning landscapes as a Certified Wildlife Habitat highlights migratory insects and birds, and host to chickens and soon a rooftop beehive. Productive gardens demonstrate the food cycle where students harvest/sow/grow, tend/and harvest again: to later prepare, celebrate and share in the eating of the new harvest and composting the waste into rich soil for the next season.

## Design for Water

The site's buildings and landscape by design directly support students and the community in conserving water and preventing run-off in the Chesapeake Watershed. A constructed stream bed encircling the elementary play area symbolically traces the long-buried Tiber Creek. Fed in part by a hand pump designed for educational water play, the stream terminates into a rain garden. Third graders learn deeply about water cycle, erosion and quality - meeting with experts and developing petitions for recommendations

Rainwater from the buildings' roofs and foundation drainage tiles is collected in a 25,000 gallon cistern and used for flushing toilets and watering gardens. Annually, 300,000 gallons of potable water is saved, reducing demands on municipal supply and treatment systems.

Once 100% impervious surfaces, all hard surfaces on site are now porous concrete or pavers to accommodate storm-water percolation. A deep subsurface of gravel with a 15-year storm event capacity extends time for natural rainwater infiltration and significantly reduces the burden on an overtaxed storm sewer system.

Water fountains have bottle fillers and metering. Based on the first-year use measure, in less than five years Mundo Verde will divert enough plastic water bottles from the landfill to fill their two-story auditorium!

## Design for Economy

This project accomplishes a sustainable design on a very tight budget relative to other school projects in the District and across the country - illustrating that environmental responsibility may be achieved economically. Daylight harvesting, efficient lighting and mechanical systems achieve energy performance ratings in the mid-90s, 50% above target values. The proposed energy use is 50% less than comparable ASHRAE baselines and projected CO<sub>2</sub>-eq emissions are 28 metric tons per year, 48% less than other similar buildings. The Design + Construction team evaluated three possible mechanical systems for the building, evaluating first-cost and lifecycle cost. Difficult choices were made to allocate more investment into the first-cost systems focusing on their paradigm-shifting mission that "the building be more sustainable over time!"

To offset the systems cost, the site capitalizes on program with an innovative blend of flexible spaces. Nooks are carved from generous corridors, abandoned ventilation chases, and existing wall thicknesses. Bounded spaces with little visual/acoustic variation facilitate sensory mediation, counseling, or individual tutoring for students in need. In lieu of individual offices, administrators work in a nomadic system, and are equipped with laptops, walkie talkies, and rolling carrels. Shared spaces provide for connectivity, work stations and conferencing needs.



## Design for Energy

The design team ensured the project's energy conservation/generation by 1) studying the climate and opportunities/limitations inherited with the site; 2) analyzing energy consumption of the existing building; 3) optimizing the design of building systems and components; and 4) applying strategies to reach utility reduction requirements within the facility.

The resulting system reduces energy use through its fuel-efficient heat production, demand-based heat recovery ventilation system, and programming for optimal run times. Aligned to the cardinal directions of our urban grid, programming addresses microclimates due to varied solar exposure. Classrooms are equipped with daylight harvesting systems - efficient fixtures, lighting zones, vacancy sensors, and photocells for automatic dimming. In the annex, large windows and building orientation ensure light-filled classrooms. In the historic building, expansive windows stream light and preserve energy through thermally-broken insulated systems.

Conservation and generation of energy is a focus of the sustainability curriculum, 4th graders conduct deep studies of different sources and uses of energy in the semester long unit of study Energy Drives Us . The facility's campus monitoring system further supports the school's curriculum, eventually supporting student analysis of energy performance through resource use metering devices and onsite energy generation stations.

## Design for Wellness

The site's promotion of health and wellness of its inhabitants and visitors begins with a school commitment to ensuring positive, sustainable, safe, and health-promoting experiences and environments for students and staff. The campus design facilitates this wellness program with a focus on spaces for physical activity and food education.

Garden-to-plate-to-compost food education initiatives are supported through on-site gardens, a classroom dedicated to cooking classes, and indoor and outdoor spaces for composting. The recent addition of a long-planned kitchen will now nourish students with hearty and healthy meals produced on site and sourced locally. A green schoolyard provides students with onsite natural places for exploration, solace, and creative play, which are supplemented by neighborhood walks and use of nearby playgrounds.

The site minimizes student exposure to health-impacting toxins through selection of highest quality non-toxic construction materials, products and furniture; a tobacco-free school campus; use of environmentally friendly cleaning supplies; and filtering of air quality .

The school's kitchen contributes to reducing the environmental footprint of the campus through 1) a procurement system that builds in preferences for locally sourced (and when possible organic) ingredients and vendors, and 2) a zero-waste model with systems and strategies for efficiency in food production.

## Design for Resources

Mundo Verde's mission and passion for sustainability drove optimal resource choices. A cross-sectional analysis of environmental impact to cost/complexity of investment informed first-cost construction versus future greening installations. The campus achieves LEED Platinum (Annex) and LEED Gold (Renovation) at half the construction cost of other regional public-school projects struggling to achieve LEED Silver. The resource comparison is even more efficient on a per student/seat basis.

The project achieved 97% reuse of existing structural elements; 37% regional materials; 75% construction waste diversion; 22% recycled content; and 98% of wood used is FSC Certified. Materials include cork and rubberized flooring,



carpets, and millwork, including countertops. Construction assemblies were selected based on resilience, durability and self-finishing qualities. Cost priority was based on assemblies to increase thermal values (for passive design approaches), for systems controls, and operations for energy efficiency and variability.

The existing building historic grandeur is renewed through refurbishment and refinishing. Original 1920s wood floors were unearthed from layers of carpeting/tile. Existing high ceilings and expansive window openings maintained while updated to meet modern education, acoustical, and thermal performance standards. The Annex employs low-maintenance and economical materials. Integral-color cement panel cladding assembly meets the high-performance building envelope requirements warranted from stringent energy modeling.

### Design for Change

Functionality and value over time was a key issue in this project. With a renewable 30-year lease, this is Mundo Verde's permanent home for generations of students. The renovated building's sturdiness and outstanding design contributed to selection of the site. The renovation focused to completely overhaul existing systems, and an addition with new durable and long-lasting systems.

As an adaptive reuse of a 1920's school building, which for its day had a complex natural cooling and ventilation system. The generous ventilation shafts were repurposed and reprogrammed as study niches and 1-on-1 spaces for teachers and students. Materials of the existing building and new material of the Annex are enduring and requiring low to no annual maintenance.

Multiple features support this site's ability to be self-sufficient, mitigate risk, maintain passive survivability in the event of emergencies: the original building's thick walls, built-in underground ventilation shafts and storage spaces; new systems include pumps and filtration system for the 25,000 gallon cistern support emergency water access, large windows require minimal need for lights during daytime hours, and critical life safety systems are connected to an emergency generator designed to span power outages.

### Design for Discovery

True to the school's approach, the project is one of inquiry and discovery. The original RFP stated: "We seek an architect with the capacity to design a school that will showcase sustainability and our curriculum. We seek partners to build a demonstration project on a budget." The building vision presents a paradigm shift of becoming more sustainable over time. Every decision was measured on this rubric. Each year, through cost effective investments push the site to become ever greener, these expectations are matched.

The design/school team contributes to ongoing learning of sustainable design practices - collaborating to develop tours, presentations highlighting lessons learned (including for USGBC and National Network of Green Schools); a free bilingual book on making a school a teaching tool. This third year of operation, utility use tracking is proof-positive of the high resource efficiencies – water usage of 64gal/FTE vs 66gal/FTE forecast; electrically, the buildings are outperforming early energy models.

The school's buildings and landscapes were purposefully designed as dynamic partners in the education of nearly 600 children annually. It is in this campus and through it that students become lifelong learners and global stewards of the environment that extend this education into their homes and communities.

