PUBLIC COMMENT on PROPOSED BUILDING STANDARDS

For Publication in Title 24, California Code of Regulations

See instructions for completing this form on Page 2.

Commenter Contact Information

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Representing: Green Schoolyards America

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Proposed Building Standard

Title 24 Part #: (*select one*) Part 11 Section #: 5.107 Shade Trees

Proposing State Agency: Division of the State Architect

This comment is intended for review during: (*select one*)

- ○ Code Advisory Committee
- ◉ 45-Day Comment Period
- ○ 15-Day Comment Period
- ○ Commission Meeting

Your recommendation based on the criteria of Health and Safety Code Section 18930(a) printed on the back of this form is: (*select one*)

- ○ Approve
- ○ Disapprove
- ○ Further Study Required
- ◉ Approve as Amended

In support of your recommendation above, provide the rationale based on the criteria of Health and Safety Code Section 18930(a) printed on the back of this form. If you recommend anything other than approve, cite the criteria in your comment. If you oppose a proposed building standard, offer a solution or alternative for the state agency to consider. Please use separate pages if your comment does not fit in this space.

Please see the attached 4-page letter and additional 27-page slide deck with images and examples.

Please contact us if you have any questions about this submission:
sharon@greenschoolyards.org
Thank you.

Attachments?

■ Check if you have attached additional pages. The number of pages attached is: 31

For CBSC Office Use Only Date Received: _____ Rulemaking Item #: _____

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October 26, 2018

California Building Standards Commission
Attn: Mia Marvelli, Executive Director
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833
cbsc@dgs.ca.gov
DSAcommunication@dgs.ca.gov

RE: Support for *Section 5.107 Shade Trees* of the California Green Building Standards Code, California Code of Regulations, Title 24, Part 11 — Government Code Section 11346.5(a)(17)

Dear Ms. Marvelli,

We are writing to express Green Schoolyards America's strong support for the new *Shade Tree* section (Section 5.107) of the *45-Day Express Terms for Proposed Building Standards of the Division of the State Architect - Structural Safety (DSA-SS), Regarding the 2019 California Green Building Standards Code (CALGreen), California Code of Regulations, Title 24, Part 11.* **We are very pleased to see shade trees added to the Code, and commend your efforts to make California's schools more climate resilient and protect our state's children from the sun.**

Green Schoolyards America's mission is to transform asphalt-covered school grounds into park-like green spaces that improve children's well-being, learning, and play while contributing to the ecological health and resilience of our cities. We seek to change the norm for school ground design, use, and management so that all children will have access to the natural world in the places they already visit on a daily basis. Our work has a strong equity lens, and focuses on urban areas that have the greatest educational, environmental, health, and open space needs.

Green Schoolyards America is deeply immersed in topics related to school ground design, use, and management. Our founder and CEO, Sharon Danks, is an environmental city planner (MLA-MCP) who has worked with dozens of schools across the Bay Area, and visited hundreds of schools around the world to research green schoolyards. Our research and experience show us that planting trees on school grounds—particularly as part of green schoolyards—is extremely important for California's children and communities:

- **Education:** Green schoolyards that include trees provide valuable opportunities for hands-on teaching across all grade levels and subjects, while making the physical environment more comfortable and enjoyable. They also provide places for students to experience natural systems and to practice stewardship principles.

- **Climate:** Most of California's urban school grounds are covered with asphalt and rubber that heat up in the sun, contributing to urban heat islands. We have begun to measure surface temperatures on school grounds to document this problem. Our preliminary findings indicate that planting trees to shade asphalt and rubber surfaces, in particular, can reduce playground surface temperatures by up to 60°F.

- **Watersheds:** Removing schoolyard asphalt and allowing stormwater to infiltrate onsite in vegetated areas improves children's daily experience of their grounds, while reducing runoff and improving water quality.

- **Health:** Trees create shade, which can reduce playground temperatures and provide opportunities for children to be active, improving their physical fitness and motor coordination. Planting trees improves air quality, which

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is important for children's respiratory health. Many green schoolyards also include edible gardens with fruit orchards, improving nutrition.

- **Stress:** Research by Li and Sullivan (*http://bit.ly/TreeViewStudy*) indicates that students who have views of trees from their classroom windows recover faster from stress and mental fatigue, and have higher academic achievement than students who do not have a view of trees from their classroom window.

- **Parks and Equity:** Many of our cities do not have equitably distributed public green space. We see school grounds as a vital component of our public park system that can help to address this issue—if they receive greater investment to add trees and vegetation where children play. Every day, 6.2 million children and hundreds of thousands of adults "visit" roughly 130,000 acres of public school ground land in California. That is a higher DAILY "visitor rate" than Yosemite National Park receives in a whole YEAR. Furthermore, heavily paved, unshaded campuses are most common in disadvantaged communities, creating unhealthy conditions and adding to existing environmental justice concerns. **If we can add trees to all school grounds in California, *all* children and their communities will have access to the natural world, and its benefits, every day.**

California's school grounds desperately need more shade trees, and they need them most in places where they directly benefit children. A detailed study of Los Angeles's school grounds by researchers at Claremont Graduate University and the Council for Watershed Health found that ~20% of LAUSD's schools have 0% tree canopy and are also 100% paved (*http://bit.ly/LA-TreeStudy*). Moreover, this study found that for the schools with trees, the children's play areas had "approximately 50% less tree canopy coverage than that of the entire school site tree canopy coverage." So, schools that have trees are not placing many of them where children can benefit from the shade.

The California Department of Public Health and Green Schoolyards America have been working to characterize conditions on school grounds across the state, as a whole. We estimate that:

- only ~8,750 of California's ~130,000 acres of public school land is currently shaded by tree canopy
- 58% of public school grounds have less than 5% tree canopy
- **10% of public schools statewide have less than 2% tree canopy.**

Synergy: We appreciate that the tree planting specification in Section 5.107 has strong synergy with the HiAP Task Force's new *Action Plan to Promote Parks and Healthy Tree Canopy,* and other existing California state policies and initiatives across many sectors, including: the Living Schoolyard Resolution, ACR-128 (2014, Ting); Proposition 68; the Urban Greening Grant Program (California Climate Investments); the Drought Response Outreach Program for Schools (DROPS, from the SWRCB); CalFire's work; California's *Blueprint for Environmental Literacy* and SB720; and the Green Ribbon Schools program (CDE).

Recommendations: While we are very pleased to see that your agency is proposing to include shade trees in the new Code, Green Schoolyards America would like to recommend modifications to the language in Section 5.107 to help the new standards achieve maximum benefit for climate resilience while also improving the well-being of the millions of children who use California's school grounds every day.

1. **Optimize Section 5.107 to Benefit Children.**

   As the language in this section is currently written, the recommendations optimize tree canopy coverage for adults' needs, rather than children's. We can see why it might appear easier to plant trees in parking lots—but **we urge you to revise this section so that children are the main beneficiaries of the overall investment in shade trees, rather than cars. Children are greatly in need of direct protection from the sun and will not receive health benefits from this tree planting effort unless the language is changed.** We believe that this can be accomplished by setting a requirement for the entire school grounds (25% tree canopy coverage), and allowing schools to determine tree placement that prioritizes shade where children directly benefit.

We recommend that the text of Section 5.107 be amended and simplified to read as follows:

> **5.107.1 Shade trees. [DSA-SS]** Shade trees shall be planted to comply with Sections 5.107.1.1~~, 5.107.1.2, and 5.107.1.3~~. Percentages shown shall be measured at noon on the spring equinox. Landscape irrigation necessary to establish and maintain tree health shall comply with Section 5.304.6.
>
> **5.107.1.1 School grounds.** Shade tree plantings, minimum #10 container size or equal, shall be installed to provide shade over 25% of the school property within 15 years. Tree planting should prioritize student-accessible areas of the school grounds, so that students will directly benefit from shade during school hours.
>
> **Exception:** If building footprints cover more than 50% of the school property, tree canopy coverage may be reduced to 30% of the remaining land.

We recommend that sections 5.107.1.2 and 5.107.1.3 be eliminated, since the language above includes all areas of the school grounds in a single section.

Our rationale for these changes is as follows:

A. **Our current school ground land use patterns are not shading children.** We know from experience that if children are not explicitly identified as a priority, schools usually use their limited water and maintenance budgets to install trees in the places that adults prefer for aesthetic reasons and convenience (e.g. for curb appeal along exterior sidewalks, parking lots, and other spaces that are not open to children during the school day). This design pattern of trees on the outside of the fence line and acres of unshaded asphalt within the fence is widespread across California. This profound lack of shade has left millions of children standing in the sun when they are outdoors at school, increasing their risk of skin cancer and overheating. Directing schools to plant trees in child-accessible areas of the school grounds will dramatically improve temperatures on the playground, and will also increase academic learning opportunities and the number of days that children can exercise vigorously outdoors each year.

B. **Using a single metric for the whole school site will give schools the flexibility they need to meet the goal.** Remove exemptions for particular types of land use, such as play fields, and instead leave it up to the landscape architect to accommodate the required amount of trees in places where children will benefit from the shade. In a school ground land use scenario with 25% tree canopy coverage, the remaining land will be more than enough to accommodate school buildings, fields, walkways, and required hardscape.

C. **We believe that the recommendations above are reasonable and achievable** because we have seen examples of where this moderate level of tree canopy has been applied successfully, and garners multiple benefits for children and the environment. Attached are examples that illustrate the problems with existing unshaded school grounds—and show how two urban schools have already included ~25% tree canopy coverage, while also providing plenty of space for sports fields, hardscape, and other elements. In both cases, the schools optimize shade for children. They cluster their trees into small "forests" that provide cooler microclimates for children to seek refuge in during hot days. Both schools also use a lot of deciduous trees so children have increased access to sunlight in the winter.

2. **Improve Equity.** It is unclear to us how the new code will be rolled out and applied to school grounds. If new (or substantial) school construction is the only trigger, we are concerned that this will perpetuate the existing pattern of unequal distribution of tree canopy across schools grounds in our state. **We encourage your agency to put policies in place to ensure that schools in disadvantaged communities receive the full level of tree canopy coverage you intend for all school sites.**

3. **Develop an Integrated Program.** In our experience, planting trees on school grounds is most successful when it is part of a comprehensive "living schoolyard" program that connects the physical improvements onsite with the school districts' overall goals for education, mental and physical health, and community engagement. **We would like to collaborate with DSA and other agencies to help connect this new tree planting requirement with broader "living schoolyard" programs** that will make school ground tree plantings more useful to school communities and more likely to stand the test of time.

4. **Provide Guidance and Resources.** We know from two decades of experience of working with California schools that they often benefit from having additional guidance and resources available to make a transition from asphalt to ecosystems. **We recommend that this new section of the Code be accompanied by an online resource library**, that school districts and landscape architects can turn to for guidance about how to optimize school grounds for learning, play, and ecological outcomes. Green Schoolyards America is interested in helping you to develop this type of resource, and/or additional materials to make it easier for schools to unpave their grounds and add trees. We would also like to refer you to an excellent free tree and plant selection guide for schools, produced by our colleagues at Trees for Oakland, Bay Tree Design, and StopWaste (Alameda County Waste Management Authority). It's called, *Plants for Children's Landscapes*, and is available as a free download here: *http://bit.ly/Plants4Children*

Thank you again for including trees in the updated Code. We see this addition as a great leap forward and believe it will result in multi-benefit outcomes for education, health, communities, and the environment, if applied with the changes suggested above.

We would be happy to collaborate with you to help you make this Code update a success for school districts across the State. Please contact us at your earliest convenience to set up a time to meet and discuss how we can best be of assistance.

Sincerely,

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510-872-4554

cc: Ida Clair, Ida.Clair@dgs.ca.gov

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Sharon Danks, CEO
sharon@greenschoolyards.org
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Every day,

6.2 million K-12 students
attend public schools in California
on ~130,000 acres of public land.

Many of our school grounds lack tree canopies
and offer very little to improve the well-being of
students, their communities, or their environment.

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School grounds

in California need systematic investments in order to realize their potential as thriving centers for 21st Century education, public health, community engagement, and ecological resilience.

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California's School Ground Tree Canopy

58%

of California schools have less than

5% tree canopy

Reference: California tree canopy data from a GIS database compiled by Jason Vargo, California Dept. of Public Health, including data from GreenInfo Network's *California School Campus Database* and the USGS's *National Land Cover Database.*

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10%

of California schools have less than

2% tree canopy

Reference: California tree canopy data from a GIS database compiled by Jason Vargo, California Dept. of Public Health, including data from GreenInfo Network's *California School Campus Database* and the USGS's *National Land Cover Database.*

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Our Children Need Shade at School

Most schools in California have very little tree canopy— particularly in places where children are present.

~20%

of LAUSD schools have

NO trees

and are

100% paved

At schools in LAUSD that have trees, children's play areas have 50% less tree canopy than the school sites as a whole, exposing children to UV rays and hotter temperatures.*

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* Reference: *An Environmental Assessment of School Shade Tree Canopy and Implications for Sun Safety Policies, The Los Angeles School District* http://bit.ly/LA-TreeStudy

Mission

Green Schoolyards America is working to turn asphalt-covered schoolyards into green spaces that improve children's well-being, learning, and play while contributing to the ecological health and resilience of their cities.

Vision

We envision a future in which:

CHILDREN

…all children have daily access to nature right outside their classroom door, enabling dynamic hands-on learning across the curriculum, child-directed play, robust health, and a positive social environment.

ENVIRONMENT

…school grounds act as green infrastructure for their cities, helping to foster healthy urban watersheds, rich wildlife habitats, urban forests, improved climate, and better air quality.

PUBLIC LAND

…school grounds are vibrant, welcoming centers for their communities, and the public lands managed by schools also function as public parks after hours. Access to this green space on school grounds is equitably distributed and within a short walk of every resident.

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What are living schoolyards?

LIVING SCHOOLYARDS

are richly layered outdoor environments that strengthen local ecosystems while providing place-based, hands-on resources for learning, play and health for children and youth of all ages.

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Berlin, Germany's "Sponge School Grounds"

CASE STUDY #1

GREEN INFRASTRUCTURE, FOR CHILDREN

The City of Berlin, Germany is a world leader in creating child-compatible green infrastructure on school grounds. For the last 20 years, their "sponge school ground" program has required all schools to infiltrate **100%** of the rain that falls onsite in a "10 year storm"—and to plant trees to cool the environment and protect children from sun.

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Galilei Elementary School - Berlin, Germany

POLICY RESULTS

Berlin’s stormwater fee on impermeable surfaces has encouraged ~400 schools to unpave their grounds. “Sponge School Grounds”, like this one, now manage stormwater, moderate temperature with tree canopies—and provide fantastic, health-promoting play environments for children.

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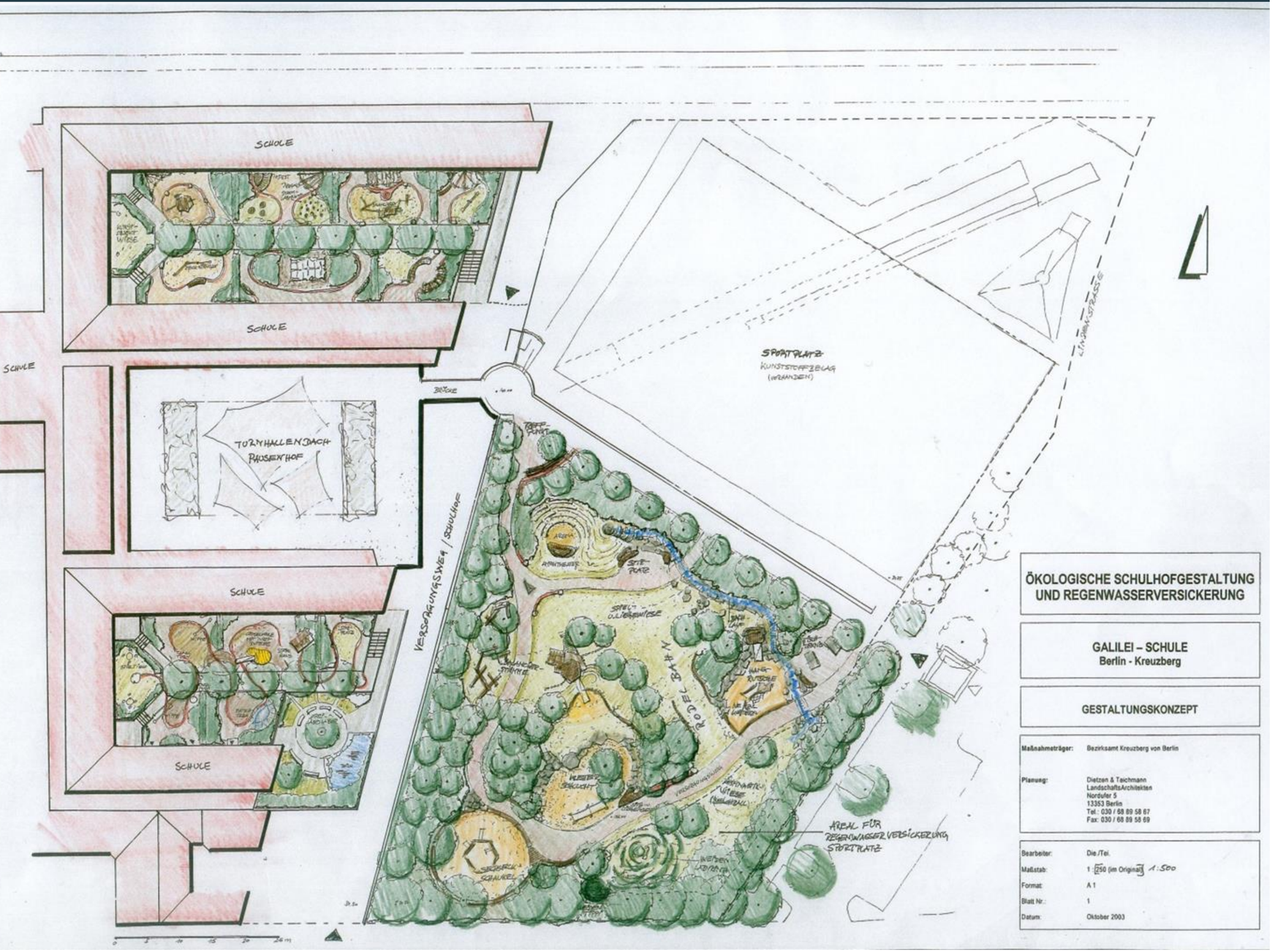

2003 - Galilei Elementary School - Berlin, Germany

SCHOOLYARD REDESIGN

In 2003, Galilei Elementary School's 4.3 acre campus in Berlin was redesigned to comply with the city's stormwater policy and became a "Sponge School Ground". The site design, left, was created by our colleagues at Dietzen & Teichmann Landscape Architects.

Pavement was removed from two of the school's three courtyards, and the majority of the playground was transformed from asphalt into a park-like environment filled with trees. The adjacent teacher parking lot was also planted with trees and partly unpaved.

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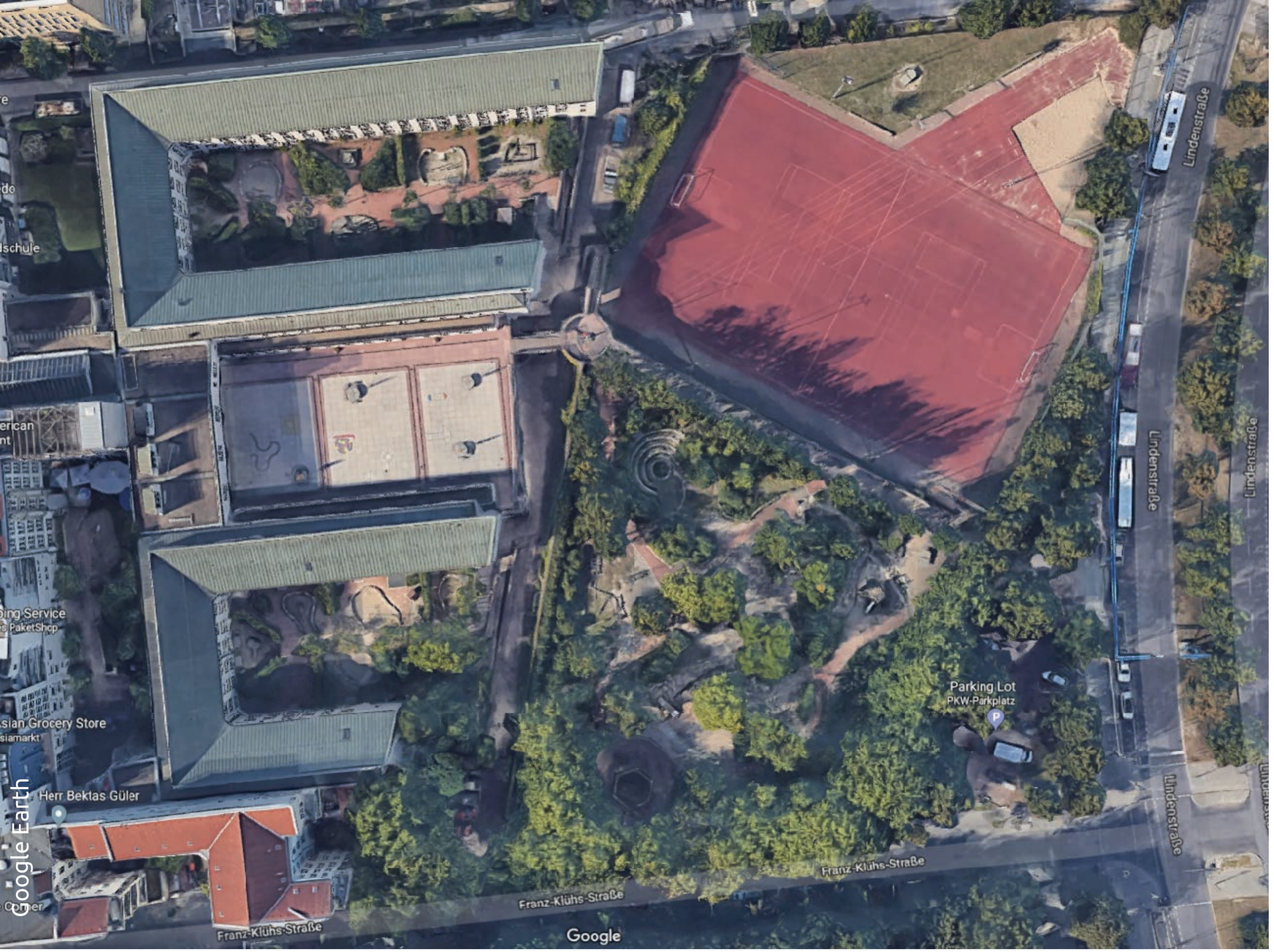

2018 - Galilei Elementary School - Berlin, Germany

AERIAL VIEW

As this current aerial photograph from Google Earth shows, the trees have grown substantially over the past 15 years, and the majority of the spaces accessible to children have a substantial amount of shade. The sports fields (red pavement) remain unobstructed by trees.

Our colleagues at Trees for Oakland calculated that tree canopies cover 22% of the entire school property. The forested “nature playground” area used by children has ~60% - 70% tree canopy coverage.

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2018 - Galilei Elementary School - Berlin, Germany

IMPACT

This image, also from Google Earth, shows the trees and buildings in perspective. The teachers' parking lot is also visible at the bottom corner of the site.

In addition to its impressive tree canopy, this site plan successfully infiltrates 100% of the rain that falls onsite in a 10 year storm. That includes runoff from all school ground surfaces, including the non-permeable sports field, and from all school building rooftops and the three large courtyards.

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Galilei Elementary School - Berlin, Germany

SPORTS FIELD

Galilei Elementary School has plenty of space for sports. Trees are located around the perimeter, but do not obstruct ball games. The drain along the edge of the field captures stormwater runoff, and sends it to the forested, natural playground where it can soak into the ground.

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Galilei Elementary School - Berlin, Germany

ASPHALT TO ECOSYSTEMS

The grounds at Galilei Elementary were almost completely paved prior to the renovation in 2003. This photograph from 2010 shows the lush vegetation after about 7 years of growth. A few of the trees, such as the one in the foreground, were onsite prior to construction. The resulting park-like landscape is enjoyed by children at recess, and by the community after hours.

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Galilei Elementary School - Berlin, Germany

SOCIAL SPACES

The park-like playground includes inviting spaces like these that act as informal gathering areas and places for teachers to use as outdoor classrooms.

The ground surfaces are shaded and permeable, and the topography has been sculpted to direct stormwater inward, away from the street.

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Berkeley, California: Time-Tested Forest

CASE STUDY #2

MODEL GREEN SCHOOLYARD

Washington Elementary School in Berkeley, California was one of the first green schoolyards developed in the USA. The project was created in 1975 by Robin Moore and Herb Wong, with extensive participation from the school community. It converted an entirely paved school ground into a rich, nature-based learning and play environment.

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2016 - Washington Elementary School - Berkeley, California

40 YEAR OLD FOREST

Much of the site design at Washington Elementary has shifted over the last four decades, but the forest that the children and school community planted has endured. As a result, generations of children have enjoyed access to the magnificent, mature trees in their playground's forest grove, and have benefited from the shade.

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VARIED LAND USE

In addition to the forested portion of the playground, the school site includes a field for sports, an extensive garden, hardscape for ball games, and a courtyard space with tables.

2016 - Washington Elementary School - Berkeley, California

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2018 - Washington Elementary School - Berkeley, California

AERIAL VIEW

As shown in this aerial photograph from Google Earth, Washington Elementary's main campus is ~2.1 acres. Our colleagues at Trees for Oakland calculated that 26% of the property on the main campus is covered by tree canopy. Most of the shade from these trees is also accessible to children during the school day.

Note: This analysis did not include the expanded area of the grounds, with portable classrooms.

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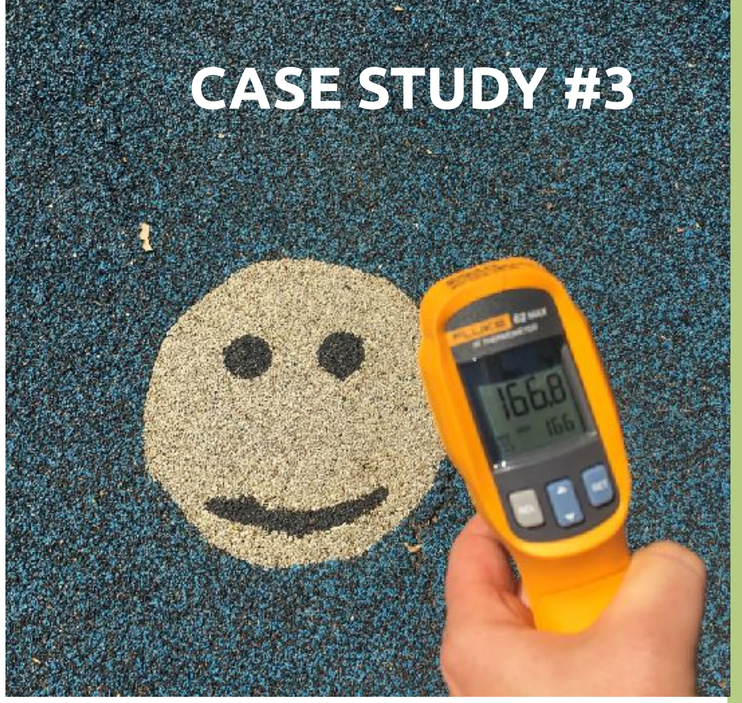

Research

SCHOOL GROUND TEMPERATURE STUDY

Green Schoolyards America has started to measure temperatures on school grounds to document how the choices we make to provide shade and select building and planting materials impacts school microclimates and contributes to urban heat island effects.

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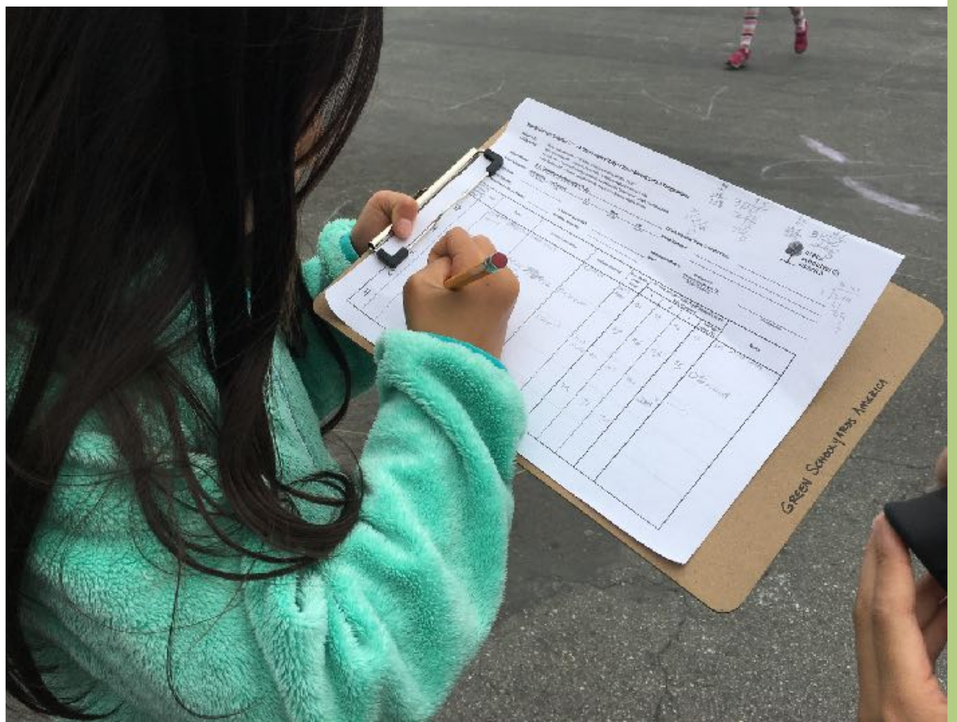
School Ground Temperature Study

FINDINGS

Our preliminary findings indicate that surface temperatures on sunny days for asphalt, plastic, and rubber can be 60°F to 90°F hotter than nearby shaded, vegetated areas.

This example illustrates temperatures recorded on a 66°F degree day in Oakland. Rubber “safety” surfaces in the sun were the hottest areas onsite, and areas with live grass under shade trees were the coolest.



Research

CITIZEN SCIENCE WITH CHILDREN

We are working with LAUSD to develop a version of our temperature study that is designed for 4th and 5th graders and is aligned with state educational standards. Students will collect data about their own school grounds, analyze their findings, and propose tree planting and other solutions to improve their school's microclimate.

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Recommendations

Tree Canopy - Green Schoolyards America recommends that DSA adopt a requirement that 25% of all school property should be covered by tree canopy—with emphasis on planting the majority of the trees where children will benefit directly from the shade during school hours.

Climate and Health Equity - We urge DSA and collaborating agencies to ensure that schools in disadvantaged areas and those with the smallest amount of shade will be able to meet this goal, to improve the climate and protect all children.

Recommendations

Integrated Program - Green Schoolyards America would like to collaborate with DSA, CDE, CalFire, the HiAP Task Force, and other agencies, to help connect the new tree planting initiatives and specifications into broader, integrated “living schoolyard” programs that will make school ground tree plantings more useful to school communities and more likely to stand the test of time.

Next Steps

Please contact us to set up a meeting to discuss how we can help the State of California get the most benefit from school ground land for children, the environment, and our communities.

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