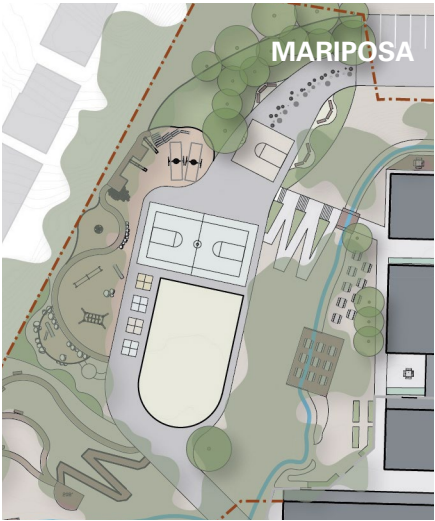


RESILIENT SAN CARLOS SCHOOLYARDS

FINAL REPORT

January 2023



ACKNOWLEDGMENTS

The creation of this report and project was funded by a grant from C/CAG. This project and report were funded by the California Resilient Challenge Grant Program administered by the Bay Area Council and created in partnership between the City/County Association of Governments of San Mateo County (C/CAG) and the San Carlos School District.

The overall project vision and goals were created with representatives from several agencies who are referred to as the Project Team. The development of each site was created with all school community members listed below and overseen by the school's Stakeholder Advisory Committee who acted as ambassadors for each project site plan and community engagement process. The deliverables throughout the project were developed by the Consultant Team who worked closely with the Project Team and the school communities to develop resilient landscapes for each school site.

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EXECUTIVE SUMMARY

I. Purpose

II. Process

III. Collaborative Committees

IV. Next Steps

EXECUTIVE SUMMARY

This report provides a record of the process and suggested next steps for this precedent-setting project which comes at a time when addressing climate resilience is increasingly urgent and vitally important to incorporate into all planning projects our communities undertake across the San Francisco Bay Area. The focus on schoolyard resilience planning provides a critical opportunity to incorporate schools, often an important and overlooked application for greening, into the broader efforts in our communities to reduce the impacts of climate change with respect to less frequent but larger storms, periodic drought, high heat and water quality degradation.

Resilient San Carlos Schoolyards (RSCS), was developed for San Carlos School District (SCSD) in partnership with the City/County Association of Governments of San Mateo County (C/CAG) who secured funding under the Bay Area Council's *California Resilience Challenge Grant Program* in 2020 RSCS focuses on the opportunity to improve the form and increase the ecological function of asphalt schoolyards through seamless integration of child-compatible green infrastructure.

I. Purpose

The main purpose of this project is to:

- Define what a Resilient Schoolyard is;
- Create a vision and goals to achieve resilient schoolyards for the District;
- Design a clear and objective process for site selection based on set quantitative and qualitative resilient schoolyard metrics that would provide the most benefits within the District;
- Develop a participatory school community engagement process to integrate school stakeholder input into the design process for

three selected sites (Arundel Lower Elementary School, Mariposa Upper Elementary School, and Tierra Linda Middle School);

- Provide deliverables that are both distinct to the SCSD and these particular sites but include processes that can be replicated in other school districts throughout San Mateo County, California, and the country.

II. Process

Resilient San Carlos Schoolyards project was completed in a series of five tasks and working with several collaborative groups: the Project Team, Stakeholder Advisory Committee for each school,

and the Consulting Team. Each group is outlined in the Acknowledgements section at the front of the report and defined further below.

The five tasks were:

- **Task 1 - Project Initiation and Vision** included developing the goals and selecting the sites;
- **Task 2 - Stakeholder Engagement** encompassed all school community input prior to and during the creation of the concept plans to understand the communities, uses, and desires for each site;
- **Task 3 - School Site Surveys** comprised developing base maps of each site and studying the physical elements of each site and its relationship to its watershed;
- **Task 4 - Resilient Schoolyard Concept Plans** incorporated the information from the first three tasks to develop comprehensive concept plans for each site.
- **Task 5 - Report** is the record of the previous four tasks and a guide for next steps.

Each of these tasks built on the previous tasks with the culmination being an engaged community, campus-wide resilient schoolyard concept plans that can support fundraising and implementation, and this report.

III. Collaborative Committees

The Project Team is comprised of a multi-agency group (representatives from SCSD, C/CAG, the Cities of San Carlos and Belmont, and the San Mateo County Office of Education) that has shared regional interests and capacity to help with future investments (construction costs, maintenance, and curriculum integration) for the project and the selected sites. Creating this formal group provided

an opportunity to develop an understanding of the complexity of a Resilient Schoolyard, expand on the existing working relationship across agencies, and offer a forum for clear decision making and project development. During the process the Project Team worked closely together with the Consulting Team in Task 1 - Project Initiation and Vision to develop the vision, goals, and guiding principles. The Project Team collaborated with the established Stakeholder Advisory Committees and the Consulting Team in Task 4 - Resilient Schoolyard Concept Plans, and Task 5 - Report to strategize on how to turn the ideas into a future reality and to ensure the plans were realistic from a construction and maintenance standpoint. It is recommended that following this report the Project Team continue to work together and collaborate with each Stakeholder Advisory Committee for fundraising and next steps.

The Stakeholder Advisory Committees (SACs) for each school included representatives from all parts of each school including the Principal, teachers and staff, students, family members, and NGO volunteers. These Committees brought an in-depth knowledge of: how the sites are currently used throughout the year; what investments the schools have made to their grounds through SCSD, PTA or NGO funds, and volunteer efforts; and what interests the schools have in expanding outdoor curriculum integration, climate resilience infrastructure, and different landscape elements and spaces that support the development of the “whole child / youth”. These Committees acted as the ambassadors for their communities during Task 2 - Stakeholder Engagement by attending all community engagement meetings at their schools and ensuring that the students at each school had an opportunity to learn about Resilient Schoolyards and voice their interests in potential site plan elements. In Task 4 - Resilient Schoolyard

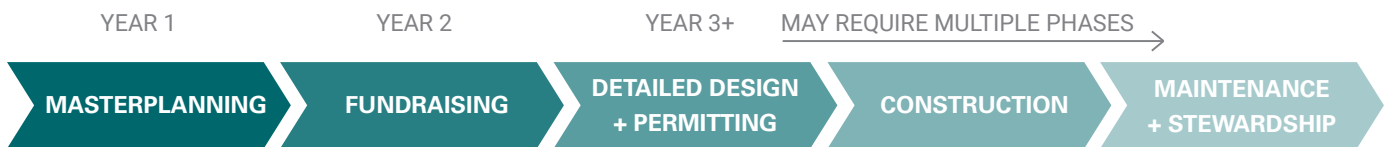
Concept Plans, the Committees reviewed the draft concept plans, shared with their school communities, and provided consolidated feedback from the communities at each site for refining the Final Plans. SAC comments were integrated with the Project Team comments to create the Final Plans. In Task 5 - Report the Committees continued with their role as primary reviewer and collector of comments as well as providing input and effort into the next steps. It is highly encouraged that each school maintain their SAC throughout funding, technical drawings, construction, and evolve as the stewardship committee after construction to help care for their enhance resilient schoolyard grounds.

The Consulting Team is comprised of three organizations (Bay Tree Design, Lotus Water, and Green Schoolyards America) that bring distinct knowledge, passion, and experience in climate resilient spaces and living schoolyards to this project. These three organizations worked closely together and with the Project Team and each SAC to provide their skills and knowledge, listen, and facilitate in the creation of all deliverables from the goals to the compilation of the final report. All deliverables were developed to be clear, transparent, replicable, child-centered, and forward-thinking while also being realistic and achievable.

IV. Next Steps

With the completion of this report the next steps to bring these plans to fruition include fundraising, technical drawings, permits, and construction at each site. Beyond construction, resilient schoolyards featuring green stormwater infrastructure must also be properly maintained to ensure durable and lasting benefits to schools and school communities. This report provides guidance and resources to help the SCSD and sites grow their resilient schoolyard programs into complete and sustainable programs backed by the necessary stewardship and maintenance practices. To support achievable implementation given time and resource constraints, this report recommends that elements within each plan may be developed separately via sequential grants or as part of SCSD Bond or Modernization processes. This could be a multi-year process will require significant and dedicated engagement from the school communities. The proposed overarching strategy and sequential process for developing Resilient Schoolyards in San Mateo County is shown in the graphic below.

As demonstrated in each plan and in this report, from the Pre-K yards at Arundel Lower Elementary School to the large shared spaces of Tierra Linda Middle School, **Resilient Schoolyards provide more developmental benefits to the unique**



Phasing diagram from ideas to implementation, with continued engagement from schools, District and partner agencies and organizations.

requirements of the different age groups from Early Childhood to Youth while also acting as Climate Resilient places as our communities continue to be impacted by increased storms, drought, and high heat. These spaces integrate small-scale and regional-scale stormwater management to clean, slow down, and or capture rainwater. They include visible green stormwater elements, such as rain gardens, pervious paving, and stormwater retention basins, which help return the natural water cycle which has become harnessed, isolated, and made invisible as a result of mid-20th century engineering. They include forested grounds to provide seasonal shade, play and learning opportunities, and places that inspire awe and kinship. They integrate nature exploration areas, permeable paving, and paving that moderates, rather than exacerbates heat. All of these Climate Resilient adaptations provide opportunities to expand hands-on outdoor learning, places to explore and to build knowledge, and graduated challenges to build confidence, while providing increased comfort and well-being for children and their school communities. **The overall result is healthier and happier children and environmentally supported places.**

A primary goal of the engagement, planning and conceptual design process as detailed in this report is to develop community champions and establish a path towards resilient schoolyard improvements through institutional support and resources. Yet, fully realizing the aspirations of the concept plans will require significant work ahead.

The challenges to make these plans real include:

- Providing funding for training and ongoing maintenance,
- Sharing the benefits of these play spaces with parents, families and others in the community,
- Helping schools with policies and adapting their practices to compliment the resilient schoolyard designs proposed onsite, and
- Supporting teachers to take their students outdoors.

Strategies and considerations to address these challenges are touched on throughout the report.

All societies come with cultural values. Public schools in California were physically shaped in the post WWII era, and state funding for school operations was dramatically decreased after Proposition 13. These key factors along with many other dynamics have created asphalt barren schoolyards with chain link fencing across our state, which require very little maintenance and simplify playground supervision but also provide very little play or learning value and create environmental, social and health liabilities for our schools and our communities. This report will support meaningful transformation with tangible tools and guidance to create a replicable model for other districts throughout the country.

The background image shows a school building with a wooden exterior and a window. In the foreground, there is a raised garden bed filled with various plants, including green leafy vegetables and purple flowers. A metal trellis structure is visible in the garden. The text is overlaid on a semi-transparent white banner at the top of the image.

INTRODUCTION

I. Effective and Replicable Models

II. Climate Resilient Approach

III. Ecological Literacy Curriculum

IV. Designing for Children

INTRODUCTION

The Resilient San Carlos Schoolyards Project was developed by the City/County Association of Governments of San Mateo County (C/CAG) under its San Mateo Countywide Water Pollution Prevention Program. Funding for the project was provided by the Bay Area Council through its *California Resilience Challenge Grant Program*. The vision for this project which was further refined with input from the San Carlos School District and Consultant Team is four-fold: to create an effective and replicable model for schoolyard greening and resilience planning; to develop three campus-wide school ground concept plans within the San Carlos School District with a climate resilient approach; to integrate ecological literacy curriculum into the process and grounds; and to design for children through a participatory engagement process.

I. Effective and Replicable Models

This precedent-setting project, which has shaped the Concept Plans for the three schools - Arundel Lower Elementary School, Mariposa Upper Elementary School, and Tierra Linda Middle School - can also influence future projects in the years to come. This project has the potential to affect the lives of thousands of children and hundreds of adults in the school communities in San Carlos and throughout San Mateo County as schools and school districts make meaningful progress towards transforming schools into Resilient Schools. The goals for the overall project and guiding principles to select sites are clearly laid out and documented in this report, providing a strong starting point for future projects throughout the County. Though the emphasis of the report is on the three selected campuses in San Carlos, the model for implementing Resilient Schoolyards detailed in the process outlined in this report is by design

a process that can easily be adapted by other school sites and districts in the county and beyond. This model emphasizes partnership-building and growing capacity among relevant partner agencies and stakeholders, creating participatory-based community engagement, curriculum integration with concept plans, multi-benefit and multi-climate risk based campus improvements centered on sustainable stormwater management and outdoor learning/play spaces and developing institutional momentum and leadership through this initial phase of engagement and planning. The overarching hope is to provide the tools and resources for the SCSD to advance through the project implementation phase and also to inspire other districts and schools to take up the same process. C/CAG proposed beginning this effort for the SCSD, of the 23 school districts throughout San Mateo County, having identified this District as a willing partner through earlier pilot projects, including a double rain barrel and rain garden

installation at Tierra Linda Middle School in 2019. The overall process for creating a model of Resilient Schoolyards described above is detailed in Chapters 1 and 2.

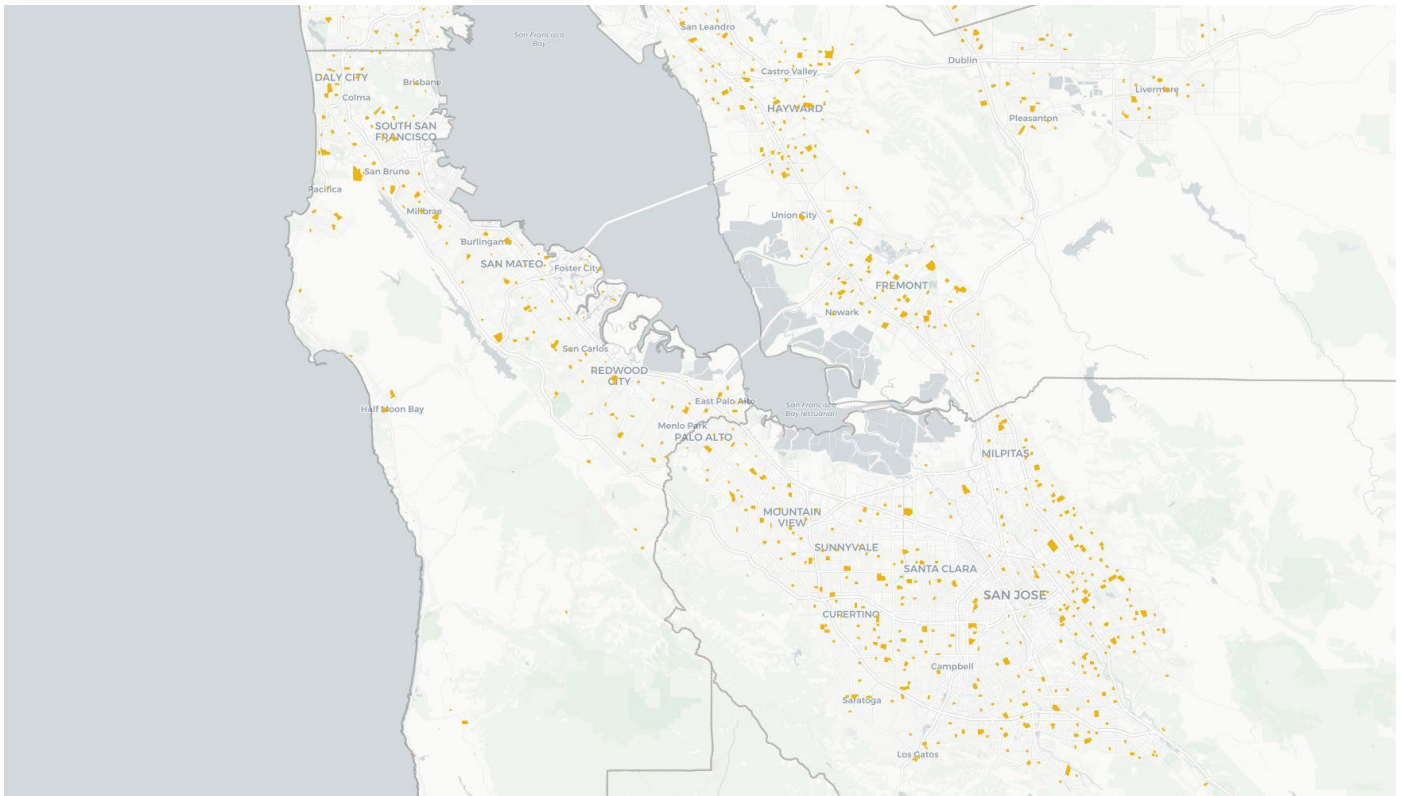
II. Climate Resilient Approach

Addressing climate resilience is increasingly urgent and vitally important to incorporate into all planning projects our communities undertake across the Bay Area. Public schools are large landowners within the Bay Area with school grounds that were historically built with asphalt, fencing, a play structure and possibly some grass. Resilient in Latin means able to recover quickly or leap back. We need places for our children and the community that are strong and flexible, places that leap back and provide comfortable microclimates year-round. These places need permeable surfaces that moderate hot temperatures while allowing



Students working in demonstration rain garden at Tierra Linda

stormwater to recharge back into the watershed. These grounds need forests - trees that are planted in groups - that can moderate heat, buffer winds, slow down stormwater events, clean the air, and provide native habitat. These grounds need stormwater improvements that can capture



Public school lands of the 23 school districts located in San Mateo County

water onsite and help with regional capture as well. All of these elements add value for play and learning as well as climate resilience, but they also add maintenance. Maintenance budgets in California public schools are notoriously low since Proposition 13 passed in 1978. In order to change school grounds, districts, local agencies, and the community must work together to sustainably maintain these new systems. A climate resilient approach is discussed throughout the report, and maintenance is discussed further in Chapter 5.

III. Ecological Literacy Curriculum

Resilient schoolyards present tremendous opportunities to engage students of all ages in standards-based, rich, hands-on learning opportunities in the sciences and across all subject areas. In the participatory design process the Consultant Team worked with teachers throughout the District and identified opportunities at each site to teach outside. Through the design and curricula engagement the Consultant Team’s goal was to make ecological systems and ecological processes visible onsite, so they will be instructional resources that teachers can use in class, while also engaging students in ecological understanding



Outdoor classroom in a schoolyard forest in England

when they are playing outside at recess. Green Schoolyards America worked with the teachers to discuss potential curriculum opportunities and outdoor instructional strategies that will help teachers move their indoor curriculum outside onto the school grounds; this is outlined further in Chapter 4.

IV. Designing for Children

Schools are incredibly important places for children and shape their experience of the world around them. What we put into children’s environments will influence their worldview, sense of identity, and perspective for years to come. Resilient Schoolyard design is an opportunity to instill knowledge of ecological literacy, an understanding of stewardship practices, and values related to the ways that a community can care for shared public space. The goal of this project is to design places that are top quality stormwater management systems that are also nurturing, interesting, dynamic places for children to grow up, explore, and understand more about themselves and the world around them. Each site was developed with the intent to help the District create spaces that will bring joy to children’s school days and support their mental health by providing daily contact with nature. Additionally each site was developed leveraging the participatory engagement process to influence the design process so that input from students and the school communities was a key part of the design. Children are at the center of all the Resilient Schoolyards with the ecological systems serving their needs while also producing the desired green infrastructure outcomes for stormwater management and urban heat island mitigation. This is outlined in Chapter 3 and discussed throughout the report.

CHAPTER 1

OVERALL PROJECT APPROACH

I. Defining an Achievable and Forward-Thinking Vision

- A. Vision
- B. Goals and Implementation Strategies

II. Selecting the Most Opportune Sites

- A. Guiding Principles
- B. School Site Studies
- C. Additional Questions To Finalize Site Selection



CHAPTER 1: OVERALL PROJECT APPROACH

This chapter illustrates the first two steps taken by the Project and Consulting Teams to look within the District for the most opportune sites that would benefit the most students and local community. Before selecting individual sites, the overarching vision, project goals, and implementation strategies were developed to help guide the Project Team in selecting the sites. These clearly outlined aspirations build on existing notions and create a cohesive path toward future schoolyard greening policies at a district scale, supporting the community engagement process, defining the site selection, and translating into actual design features. The vision and goals were developed in a series of meetings with the Project and Consultant Teams working together. With the vision and goals in mind Consultant Team developed guiding principles for site selection, garnered the site metrics, and proposed selected sites using a series of questions.

I. Defining an Achievable and Forward-Thinking Vision

The vision, goals, and implementation strategies below were developed specifically for the San Carlos School District by the Project and Consultant Teams and provide a replicable model for future school districts. The vision and goals intertwined the Teams' desire to: create climate resilient sites for the school and surrounding community; develop sites that support all learning modalities and foster whole childhood development; and work with an understanding of the codes, regulations, and operating budgets that shape their school grounds. The implementation strategies, outlined under each goal, build upon the goals and provide objectives that relate to the applicable codes, regulations, and practices at SCSD.

A. Vision

San Carlos School District's vision is to use its school grounds to demonstrate ecological and social resilience while strengthening children's education and well-being, promoting school community health, adapting to a changing climate, and managing stormwater. The District, in partnership with the City/County Association of Governments of San Mateo County (C/CAG), seeks to create a replicable model for other school districts to promote resilience and crisis preparedness through heat and stormwater management.

01 PROJECT INITIATION AND VISION

- Project Team (PT) formation and brainstorming
- Informational interviews
- Vision and goals developed with PT
- Guiding principles developed with PT
- School site studies of all sites in District
- Site selection

02 STAKEHOLDER ENGAGEMENT

- Curriculum integration session with District staff
- Stakeholder Advisory Committee (SAC) formed for each school
- Brainstorming session with each school community
- Student workshop with each school

03 SCHOOL SITE OPPORTUNITIES AND CONSTRAINTS

- Develop base map for each site
- Conduct site analysis
- Walk the site at each school with each SAC

04 RESILIENT SCHOOLYARD CONCEPT PLANS

- Draft concept plan
- Workshop review with SAC
- Final concept plan

05 REPORT

- Draft report
- Meeting review with SAC
- Final report

B. Goals and Implementation Strategies

The seven goals below are the pillars for the vision and identify key aspects to consider when developing a Resilient Schoolyard. The points below each goal identify concrete and achievable objectives.

1. Learning - Support outdoor teaching and learning and embody and reflect district-wide educational goals

Resilient Schoolyards will be hands-on learning environments for students of all ages that are integrated with standards-based instruction and with the District’s vision for the development of the “whole child.”

- Include outdoor classrooms in each schoolyard with opportunities for hands-on learning.
- Design outdoor learning environments based on input from teachers.
- Harness the natural features of the school, its surroundings, and stormwater management strategies for educational purposes.
- Use the grounds to support standards-based, hands-on curricula across PK-12 grade levels, including Next Generation Science Standards and the five Cs -- Critical thinking and problem solving, Communication, Collaboration, Citizenship (global and local), and Creativity and innovation.

2. Health - Care for the “whole child” by fostering social, emotional, cognitive, and physical development

7 Goals:

1. Learning
2. Health
3. Children’s Daily Space
4. Ecology
5. Community
6. Culture
7. Site Design



Hands-on learning in a school garden



Nature areas provide many play affordances

Resilient Schoolyards will promote students' whole development, health, and well-being by increasing physical activity, deepening understanding of nutrition, fostering social-emotional and mental health, and optimizing environmental health through school ground design and management.

- Integrate school curricula from every discipline with outdoor spaces and physical movement to harness the mental and physical benefits of spending time outside. Establish a regular routine of being outdoors to build healthy habits.
- Design the school grounds to offer a variety of experiences, from edible landscapes to restorative spaces for individuals and small groups to areas for active and imaginative collaborative play.
- Integrate graduated challenges into the landscape and design spaces to be as safe as necessary rather than as safe as possible.

3. Children's Daily Space - Protect and prioritize children's use of school grounds and treat the land with care

Resilient Schoolyards will center children's ideas, needs, and priorities in their overall site designs, and will ensure that students will not lose access to school ground space as the sites are developed. Site interventions will be designed to restore and improve local ecological systems and make school ground land cleaner and safer for the children and adults who spend time onsite.

- Children are the primary users of school grounds and access them as their daily



Resilient schoolyard in Germany



Stormwater elements integrated into schoolyard

landscape, thus their needs are the top priority when developing a Resilient Schoolyard.

- Avoid adding potential pollutants on or under the ground surface (e.g. If stormwater from offsite will enter the property, keep it confined to places on the property that are most likely to already have some pollutants present, such as parking lots.)
- Maximize accessibility to and visibility of stormwater interventions. Avoid creating areas that are "off limits".

- Avoid use of pesticides and herbicides on school grounds.
- Minimize potential contaminants from entering the site by diverting and/or treating stormwater runoff.

4. Ecology - Adapt green infrastructure on the grounds to be beneficial to children

Resilient Schoolyards will integrate green infrastructure opportunities for climate adaptation (e.g. addressing extreme heat, drought, and flooding) that are specific to the needs of children while also producing outcomes that are optimized to equally benefit children’s learning and health, climate resilience, and stormwater management.

- Aim for a minimum of 30% tree canopy cover in child-accessible areas of the schoolyard to address the Urban Heat Island effect and avoid planting trees in patterns that direct air pollution from nearby streets.
- Select drought-tolerant plants that are

expected to be resilient to a changing climate.

- Aim for a minimum of 30% pervious surface and minimize impermeable surfaces wherever feasible; maximize areas with natural and vegetated surfaces.
- Minimize the use of chemically based and future landfill materials such as synthetic turf and rubber safety surfacing.
- Select materials with high Solar Reflective Index values.
- Make green infrastructure an accessible, visible, interactive, and educational part of the landscape.

5. Community - Foster community and public partnerships to increase access to, engagement with, and support for Resilient Schoolyards’ grounds and programs

Resilient Schoolyards will be vital community spaces which will thrive with collaborative partnerships. The District is uniquely positioned to partner with the City, County, community



Trees, boulders, and permeable ground in schoolyard



Ribbon cutting and student stewards of nature space

members, and community-based organizations to create mutually beneficial spaces that support children’s education and well-being while generating benefits for the community such as access to nature and improved food security. Involving students in the process of building these spaces helps connect them to their communities while building confidence and boosting mental health.

- Include the community and the students in the conceptual design and planning of the Resilient Schoolyard.
- Include the community and students in the design and construction of elements that can be safely community-built.
- Open up Resilient Schoolyards to community members during non-school hours.
- Identify neighboring parks and open space adjacent to school grounds, such as parks, creeks, or drainage channels, to aggregate possibilities for community open space and climate resilient systems.
- Develop partnerships with local jurisdictions and organizations to aggregate land management and resources across jurisdictions and landowners.
- Develop clear expectations for maintenance and responsibilities between all parties and maintain clear communication with all partners regarding the development of and management of Resilient Schoolyards.

6. Culture - Work to proactively change the educational, maintenance, facilities, and supervision culture to embrace ecologically rich outdoor environments that support the whole child



Some maintenance work can happen while students are on site

In order to be built at an impactful scale, Resilient Schoolyards needs the District to allocate construction budgets for green infrastructure integration. Children ‘read’ the schoolyard landscape (consciously and subconsciously) and perceive the value the adult world places on them and the natural environment. In order to thrive, Resilient Schoolyards need the District to alter professional practices that positively impact children’s learning, play time, and environment to match the physical changes.

- Pass a school board policy to adopt Resilient Schoolyards as a long-term version for the school district.
- Include Resilient Schoolyards in the next Facilities Master Plan update.
- Include Resilient Schoolyards in future budgets and funding plans.
- Create Resilient Schoolyard master plans for each school that identify opportunities for climate adaptation.
- Provide professional development for teachers to help them utilize the school grounds for learning, transition to teaching



Stormwater bioswale as central feature in schoolyard

outside, and adjust supervision as the grounds change.

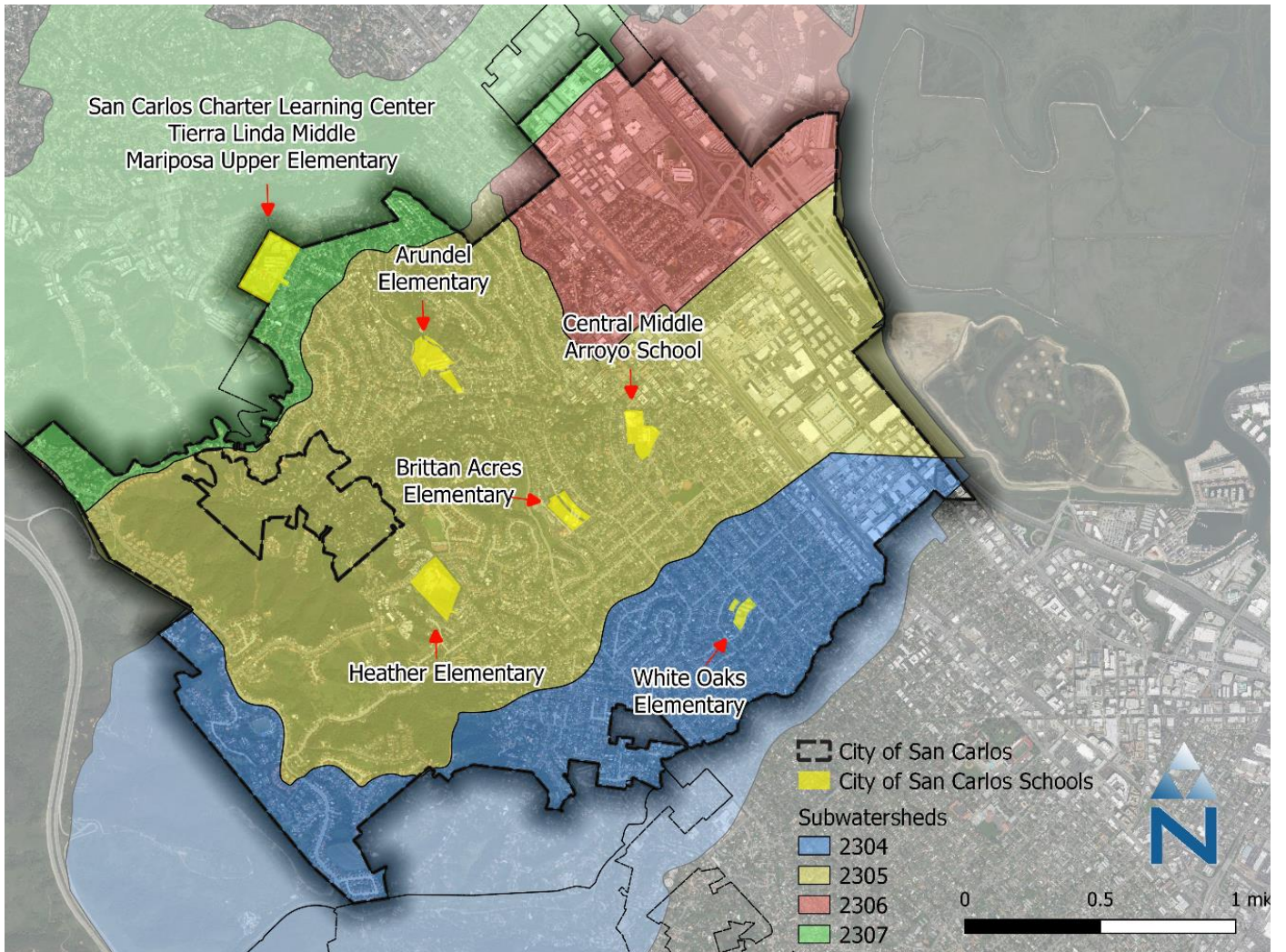
- Transition maintenance and stewardship to effectively manage greener grounds, including new/expanded professional development and training opportunities for teachers and school/district staff.

7. Site Design - Create physical site improvements to address climate resilience and benefit students

Resilient Schoolyards will be multi-benefit landscapes designed to capture and reuse stormwater while maximizing additional benefits such as improved mental health through connection to nature. The District will study opportunities for regional stormwater capture as well as site-based schoolyard capture to determine the most suitable site improvements, while ensuring that site designs are informed by education and ecoliteracy

goals. The District seeks to use space optimally and equitably by balancing the needs of ball play with outdoor learning and nature exploration as well as increasing the amount of permeable ground surfacing and tree canopy on the grounds.

- Design Resilient Schoolyards to uniquely reflect the school’s ecological setting and characteristics of the local community.
- Design regional and site stormwater elements in Resilient Schoolyards to maximize stormwater capture, harvest, and infiltration within the watershed while providing visible and tangible environmental benefits to the site that clearly demonstrate the stormwater processes and offer potential benefits of cooling, flow management, non-potable reuse, etc.
- Design Resilient Schoolyards to support all ages, stages, and abilities as well as provide a diversity of spaces for play and learning that support physical, social, emotional, and cognitive development. Spaces could include places to gather, to be active, to experiment, to have quiet, and to be in an ecological setting.
- Build resilience by reducing impervious surfaces, increasing green elements that improve water management, soil, air quality, and the environment.
- Design Resilient Schoolyards to utilize low tech and low maintenance systems and make use of natural processes that make maintenance more efficient and afford learning opportunities.
- Incorporate open-ended elements in Resilient Schoolyards that serve many purposes.



Map showing all sites

II. Selecting the Most Opportune Sites

The Consultant Team developed Guiding Principles and an associated series of questions to determine what planning level information for each site was to be collected for comparisons of the sites across the District. The purpose of these Principles was to help the District objectively determine which of the nine sites in the District would provide the most benefit to the students and the community given the need to work within the budget of the grant and prioritize up to three campuses to begin the Resilient Schoolyard process. This section includes

the guiding principles, summary of information for each site, and the “off-ramp” questions used as part of the process to finalize the selection.

This model provides a clear and objective direction for public school districts seeking to identify the highest impact sites to transform into Resilient Schoolyards in California. Before selecting sites, a district should use these tools to methodically evaluate the maximum potential for each site looking at social and ecological perspectives of the school while also considering regional benefits.

A. Guiding Principles

The Project and Consulting Teams developed the Guiding Principles and associated questions based on the above identified Resilient Schoolyards Goals to provide a framework for collecting planning level information on each school site. This information was documented in a table for each

site to create a systematic metrics-based process to evaluate and prioritize Resilient Schoolyard sites with the potential for the greatest benefit and demonstrating the greatest need. The four overarching Guiding Principles, which encompass the seven identified Goals and Implementation Strategies, and associated questions used to define Resilient Schoolyards metrics are provided below.

1. Enhance the well-being of students

- How many students attend the school?
- How vulnerable are the students to environmental and social stressors?
 - Percentage of students who are English learners, foster youth, or eligible for free/reduced-price meals, unduplicated
 - Vulnerability of children to heat, based on grades/ages of students
 - Cal EnviroScreen rating (exposure to pollution at the school)
- How much shade is available on site?
 - Existing tree canopy for the entire site now and estimated in 20-years if trees have been planted recently and it is feasible to calculate.
 - Existing child-accessible tree canopy™
- How does the Urban Heat Island index of the site compare to other schoolyards in the district?
- Are there suitable outdoor learning environments?
 - Number of existing outdoor classroom spaces on site
 - Educational environments that can be accessed daily
- Are there a variety of play opportunities?
 - Does the physical site (elements and layout) support ball play, imaginative play, creative play, nature exploration, places that support individual time, and places that foster gathering?
 - What percentage of school grounds that are accessible at recess are not devoted to ball play?
- Is there a creek onsite that is accessible for interactive learning

2. Prioritize projects with a high likelihood of success

- Is the Principal supportive of and a proponent for Resilient Schoolyards that facilitate outdoor learning, ecology, and varied play environments?
- Are teachers excited to teach outside?
 - Have teachers already received training from SMCOE on outdoor learning?
 - Are teachers currently using the school grounds for outdoor learning?
- Is the community interested and supportive?
 - Are there informal or formal groups (such as PTA) that have shown a consistent interest and active support in Resilient Schoolyards at this site?
- What types of funding are available for construction?
 - Upcoming Modernization?
 - Other upcoming projects within the District, City, County or other sources?
- What is the maintenance plan for this site?
- Is there a possibility for stewardship partnerships?
- What is the site slope?
- What type of soils are on site and is there any contamination?
- What is the depth of groundwater or bedrock?
- Are there potential utility conflicts that may make implementation difficult?

3. Enhance site and regional ecology and environmental quality

- How much of the site is impermeable?
- Are there exposed downspouts on buildings that could be diverted to a cistern or landscape?
- Is there an adjacent park or open space with the possibility of forming a partnership?
- Are there existing drainage problems that could be addressed by a schoolyard retrofit?
- Is there a regional stormwater capture opportunity to divert a nearby storm drain pipe into a subsurface facility?
 - What is the regional tributary drainage area?
 - What percentage of the regional tributary is impermeable surface?
 - Does the site have a large parking lot under which a subsurface facility could go?
- Is there a channelized or piped creek on or adjacent to the site that could be restored?

4. Maximize benefits to the immediate community (within ¼-mile radius walking distance from the school site)

- What is the density of the surrounding neighborhood? If data is available.
- How much open space acreage is currently available within a ¼-mile radius? If data is available.
- Is the school accessible to the community outside of school hours?
- What is the tree canopy cover of the surrounding neighborhood? If data is available.
- What is the Urban Heat Island index of the surrounding neighborhood?

B. School Site Studies

The team collected metrics on each school site within the District using publicly accessible data, statistics provided by the District, and by studying the sites on Google maps and with regional mapping data. The information collected was based on the Guiding Principles and included the following categories: site characteristics, region and adjacency relationships, ecological factors, human factors, learning landscapes, playscapes, and funding. This information was summarized for the data points and a basic diagram of each site and in *Appendix A: School Site Studies*.

There are some potential challenges in this process, even with quantifiable / qualitative method. For example, incomplete data on several metrics for all schools, unmatched data across schools in some categories with schools ranking similarly across some categories and differently across others; and more schools ranking high than resources available to develop initial concepts. Drivers that were key to identifying sites included: potential for the sites based on their location in

the watershed and physical campus with “low bearing fruit” stormwater and climate-related green infrastructure improvements, an interested principal who has a strong relationship with their faculty; and a school community that wants a living schoolyard.

Information on each of the school sites in SCSD is summarized in *Appendix A: School Site Studies*.

C. Additional Questions To Finalize Site Selection

After the analysis, the District had more than three sites that demonstrated significant need and benefit from Resilient Schoolyard planning. The Consultant Team developed a series of “off-ramp” questions to finalize the selection. These questions could be used by any district to help support site selection where the base metrics from the site studies result in a larger than desired number of high ranking opportunities. The questions and instructions are in *Appendix B: Questions to Finalize Site Selection*.



CHAPTER 2

SCHOOL SITES AND PARTICIPATORY COMMUNITY ENGAGEMENT

I. Site Opportunities and Constraints Maps

- A. Methodology for Site Analysis
- B. Existing Conditions and Regional Context
- C. Arundel Lower Elementary School
- D. Mariposa and Tierra Linda Schools

II. Participatory Community Engagement

- A. Stakeholder Advisory Committee Set Up
- B. Brainstorming Meeting
- C. Site Walk with Stakeholder Advisory Committee
- D. Student Workshops

CHAPTER 2: SCHOOL SITES AND PARTICIPATORY COMMUNITY ENGAGEMENT

This chapter describes the site analysis of the existing sites including opportunities and constraints analysis, and the community engagement process.

I. Site Opportunities and Constraints Maps

A. Methodology for Site Analysis

The Consulting Team took the next step of evaluating the selected sites for Resilient Schoolyard planning and developing the participatory community engagement strategy by creating opportunities and constraints maps for each school. The Team studied the existing uses, circulation, local ecology, existing materials, and regional context for each site. Garnering this information included separate site walks with District Facilities and with the SAC from each school. These walks served dual purposes: (1) helping the Team with site understandings and (2) serving as the first step in brainstorming with each school.

The opportunities and constraints diagram for each site defines opportunity zones as optimal spaces to meet overall project goals, as defined by Resilient Schoolyard goals and objectives described above. To simplify the initial evaluation of opportunities,

the Consulting Team classified areas of each campus into “opportunity zones” that align with two overarching Resilient Schoolyard Guiding Principles: opportunities to achieve child-centered goals and opportunities to achieve ecological goals. Within ecological opportunities, space is further defined as a site-specific opportunity or a regional opportunity. In accordance with project goal four, ecological opportunities are spaces with the potential to integrate green infrastructure for climate adaptation. Specifically, Resilient Schoolyards seek opportunities to address extreme flooding through stormwater management strategies and the urban heat island mitigation. Child-centered goals incorporate project goals one through three: outdoor learning, health of the “whole child,” and children’s daily space. Areas designated as a child-centered opportunity, inherently include opportunities for ecological enhancement, because the wellbeing of the whole-child intertwines with landscapes that are designed for environmental resilience.

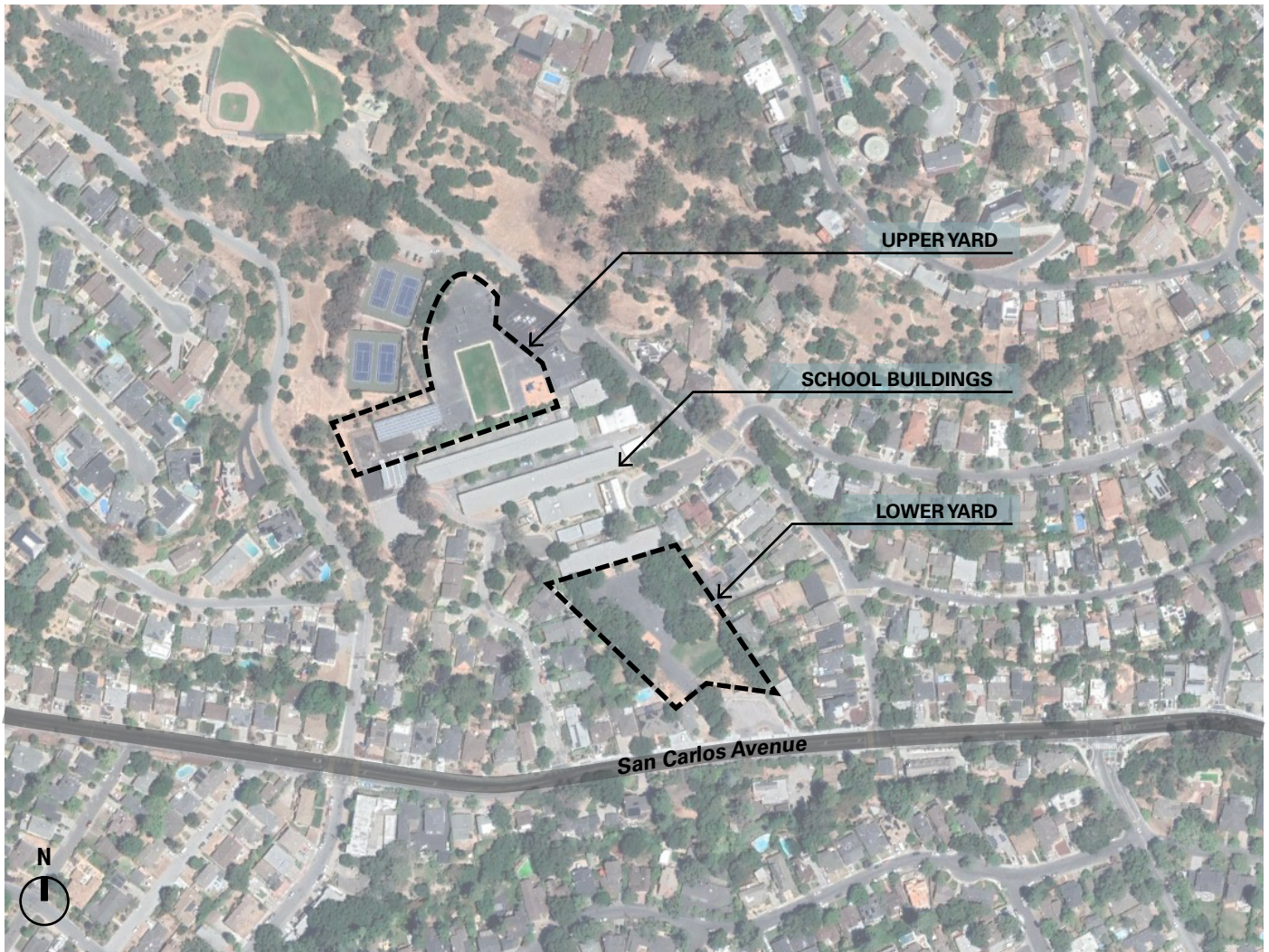
Opportunity zones were informed by site constraints, underutilized spaces, impervious

surfaces, tree canopy cover, conceptual stormwater calculations, relationship of site to watershed, topography, drainage patterns, existing uses and small improvements, and utilities. Site constraints include existing fire lanes, known underground utilities such as septic systems, play structures, and shade structures. Constraints were determined based on permanence of infrastructure, cost of removal/replacement, and safety. Underutilized spaces, impervious surfaces, and tree canopy cover were determined from site reconnaissance and communication with site staff.

B. Existing Conditions and Regional Context

Arundel Lower Elementary School is located in the middle of the Pulgas Creek watershed and is located on the arterial street of San Carlos Avenue.

The other two sites - Mariposa Upper Elementary School and Tierra Linda Middle School - are located on the same campus with distinct buildings and yards that are separate and some shared spaces. The two schools are adjacent to the San Carlos School Facilities Yard and San Carlos Charter School, which shares the entry and vehicular access areas with the two schools. This campus is located in the middle of the Belmont Creek Watershed and adjacent to two large arterial streets in the City, Alameda de las Pulgas and San Carlos Avenue. According to staff the site is often windy and 95 Fahrenheit degrees in warmer months making it unbearable.



Overview of Arundel Elementary School

C. Arundel Lower Elementary School

Arundel Elementary School campus that is currently accessed as daily space (does not include the hill or tennis court area) serves 370 students from TK to 3rd grade. The site utilizes nearly 6.8 acres.

The site is organized into three main parts along a steep slope: an upper yard, school buildings, and a lower yard.

1. Drop-Off Zone / School Entrance – Arundel’s main drop-off zone and school entrance takes place in a quiet residential street of San Carlos. This area includes the office and portables for the afterschool program. In addition to the main drop-off, parents also line up in the parking lot by the upper yard and drop-off the Kindergarteners and TK students in the lower parking lot off of San Carlos Avenue.

2. Upper Yard – This large play yard is primarily asphalt, includes a new solar panel array for lunch, some play equipment, a small nature area, and a small patch of grass. The lack of shade, except the solar panel structure, makes the yard very hot. The lawn is located in the lowest point of the yard and does not drain. The unshaded parking lot, chain link fence, and portable for after care line the east edge of the yard. This yard is used for recess and physical education for grades 1 to 3.

3. Pre-K Yard – Two separate pre-K programs are located on site and are separate from Arundel Lower Elementary School. The one on the western edge of the school’s property is separated from the upper yard by a chain link fence. It consists of a large asphalt area with a painted track, and loose play parts such as tires, stumps and toys. The only shade on site is provided by temporary shade structures along the building. Each Green Corner recently planted a number of trees around the yard, which do not currently provide much canopy coverage. The other program is located on the eastern edge of the site just below the upper yard. It has a small patio adjacent to the classroom building and an inaccessible slope. It is shaded with temporary shade sails that are attached to the eaves.



Lower parking lot entrance to Arundel Elementary School



Upper Yard



Pre-K Yard located on the western edge



Outdoor classroom adjacent to school building

4. Outdoor Classrooms –The design and layout of the buildings provide many opportunities for outdoor learning adjacent to the indoor classrooms. Each classroom on site has a patio at its front or back door. The ones in the TK and K wing are being used and are landscaped. The outdoor classrooms adjacent to the 1 to 3 grades are mostly concrete and appear to have been a place for meeting during 2020. These areas are full of potential. The other existing outdoor classrooms are in the garden which is detailed below.



Lower Yard with native oak woodland

5. Lower Yard –The lower yard located on the south / downhill slope of the school’s buildings, and dedicated to the younger grades, includes an incredible mature oak forest and combines several distinct areas:

- the steeply sloped asphalt yard which is a fire lane and space for ball play and physical education;
- a climbing and sliding play structure under the oaks;
- a forest of native oaks over asphalt that provide shade over tables and large concrete pipes; and
- a grass field.



Garden in Lower Yard created by Each Green Corner

6. Garden – Arundel’s garden was developed by Each Green Corner at the lower end of the school site and is sited next to some mature oaks which serve as a comfortable gathering space for an outdoor classroom. It is accessible to students under adult supervision and features tables, an outdoor sink, and a storage shed, fruit trees, robust gardens, compost, and many other learning elements such as the insect hotel. In addition to this garden there are several beds by the library near the grades

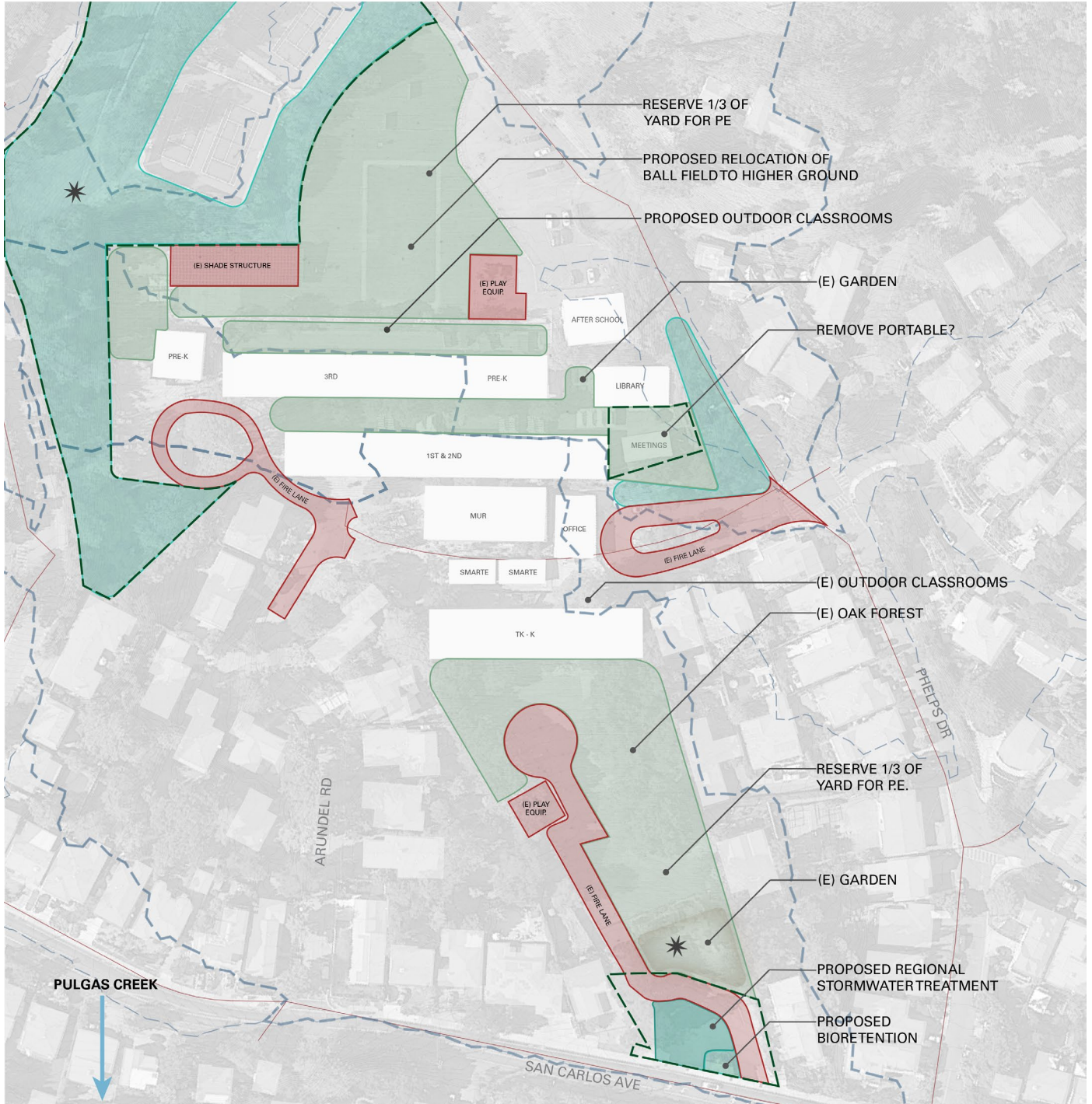
1 to 3 classrooms. Part of the garden area has been left and is unused. This area could be fixed up to include more raised beds, in-ground plantings, and an outdoor classroom for the garden and library.

7. Fire lane – Due to the complexity of the school site on a hill, the fire lane at Arundel is divided into three portions. The fire lane on the Opportunities and Constraints Map needs to be confirmed by District Facilities.

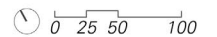
- The western fire lane is accessible from Arundel Road on San Carlos Avenue and reaches the west end of the school's buildings;
- The southern portion of the fire lane runs from San Carlos Avenue to the southern building at the lower yard.
- The eastern fire lane serves the school's entrance and nearby buildings and is located off of Phelps Road.

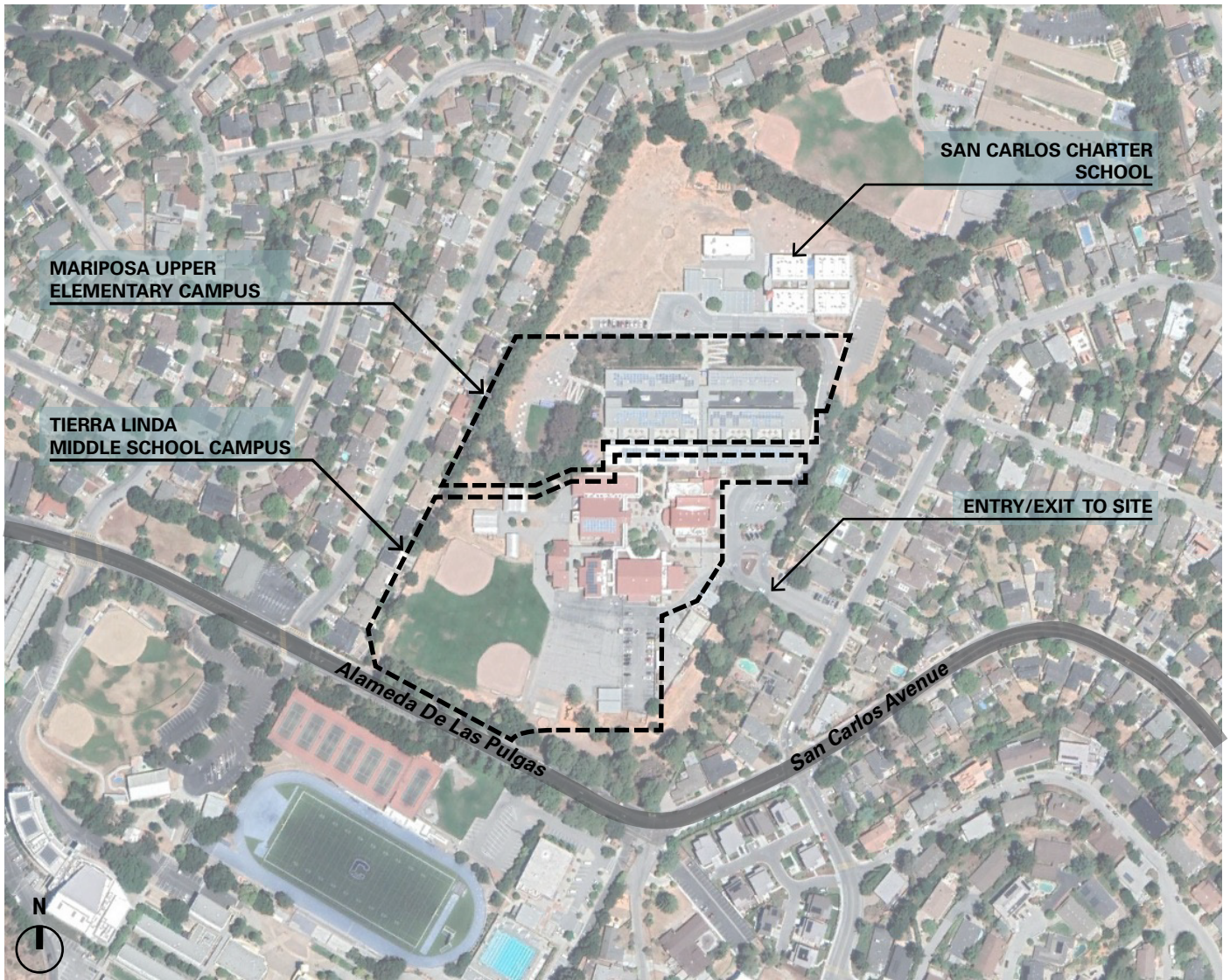
Legend

- Subcatchment Area
- Storm Drain
- Contour
- Child-Centered Goals Opportunities
- Site Ecology Goals Opportunities
- Regional Ecology Goals Opportunities
- Constraints
- Underutilized Space
- ✱ Outdoor Classroom



Opportunities and Constraints map - Arundel





Overview of Mariposa and Tierra Linda Schools

D. Mariposa and Tierra Linda Schools

Mariposa Upper Elementary School

Mariposa Upper Elementary School is located on 5.26 acres and has 314 students in attendance for grades 4 and 5. The impervious surfaces currently makes up 2.37 acres of the 5.26 acres, and there is no regional potential for stormwater management with the exception of the daylit creek. The site currently has 2% tree canopy coverage in accessible areas for students which is

significantly lower than the percentage required by the California Building Code 5.106.12 Shade Trees. This code requires 50% shade coverage over parking areas, 20% shade coverage over landscape areas, and 20% shade over hardscape areas (not including areas marked for organized sport activity) within 15 years of planting.

1. School Northern Entrance – Mariposa’s main entrance is located at the northern end of the site, on the hill above the school’s campus and greets students with a beautiful view of San Carlos’ woody hills. A wide staircase and ADA ramp lead to the academic buildings through a dense strip of vegetation and across the creek.

2. Creek –The creek running through the campus holds wonderful educational and play opportunities for students who would benefit from connecting more with their natural environment. The existing chain link fence and the dense vegetation prevent visual and physical access to the creek, blocking its interactive value and dividing the site. The creek landscape currently includes a mix of oaks, eucalyptus, and french broom. The eucalyptus and french broom are invasive species that are highly flammable and do not provide any educational or habitat benefits.

3. Play / Physical Education Yard –The school’s play yard, which is separated from the rest of the campus by the creek and a steep slope, is accessible via a wooden bridge and a set of newly built stairs and ramp. The yard is designed with traditional play components including a play structure, grass, two basketball courts, and several 4-square games, encircled by a track. There is space surrounding the asphalt that is undeveloped and not managed. This area includes some trees along the western property boundaries that bring shade and wind protection throughout the year. The current play structure does not provide play variety or currently meet ADA accessibility. The play equipment in this yard could be integrated more into the landscape, provide more options, and be designed as a circuit in a forest. This would cost less than traditional structures and



Entry to Mariposa with regional view beyond



Existing creek running through Mariposa campus



Mariposa Play Yard



Nature Zone in Mariposa Play Yard

provide more play opportunities for children of all abilities.

4. Nature Zone / Forest – A chain link fence and gate separate the play yard from the Nature Zone which is accessible to students by a schedule. This woody hill provides opportunities for nature play, exploration, and learning that are not part of the standard play yard. Mariposa students love this informal forest, and have expressed the wish to incorporate more trees, plants, and a water element. Students also wanted to include natural elements such as logs and stumps and boulders into the design concept.



Lunch space and outdoor classroom with oaks and creek (beyond fence)

5. Lunch Space and Outdoor Classroom –The lunch space and outdoor classroom developed by Each Green Corner are tucked between the buildings and the creek under the oaks. This comfortable space for outdoor learning and eating is separated from the creek by a chain link fence. The space contains many tables, an outdoor sink, outdoor writing board, and shade canopies for outdoor learning.



Creek at lunch area behind fence

6. Outdoor Courtyards and Space East of Buildings –The buildings were built in the traditional mid-century modern method of rows with outdoor corridors. The buildings have front doors and windows on the south façades with back doors and windows on the north façades. There are two series of outdoor courtyards tucked between the building rows of Mariposa School. These elongated spaces are conveniently located outside of each classroom. The Lower Courtyard was recently renovated and has many tables for outdoor classroom adjacency. The Upper Courtyard has not been redeveloped. Addition of trees, more comfortable and intentional grading,

addressing stormwater (with more permeable areas and a bioswale), and adding furnishings in the Upper Courtyard would significantly improve this area for outdoor learning and provide a more resilient campus. East of the buildings is a large area of asphalt that is fenced off from the students but could be developed as a resilient space for stormwater as well as an outdoor classroom.

Tierra Linda Middle School

Tierra Linda Middle School is 9.28 acres and has 500 students in grades six to eight. The impervious surfaces makes up 6.22 acres of the 9.28 acres, and the site has regional potential to help with stormwater benefits. Fifteen percent of the site is covered in tree canopy is lower than what is currently required by California Building Code. Wind is often strong coming from the west and the areas with asphalt get very hot in the Fall and Spring months.

- 1. Quad** –Tierra Linda’s central space, between the learning center, library, and gym, is a large outdoor room that has evolved through various construction projects over the years. The space in its present state shows no cohesion, with patched paving, cut awnings, and clusters of tables. Such large spaces can feel stressful for middle school-aged students where exposure can be quite intimidating. Recently, a portion of the quad was successfully redesigned for stormwater management with a demonstration barrel and garden with a grant from C/CAG. Another area to the north was also redesigned by Each Green Corner with vegetated buffers and permeable paving. Building on these types of improvements to create social spaces that are climate resilient would to divide the large room into a multitude of smaller spaces. These



Recent updates in courtyard at Mariposa



New landscaping in Tierra Linda courtyard



Quad looking towards library



Quad looking towards gym



Demonstration stormwater garden in Quad



Outdoor classroom created in 2020

intentional spaces would complete the most recent design efforts and foster socializing and learning. These spaces could be designed to match the student interests with a porch at the back of the Learning Center that could also act as an informal stage, a front plaza at the Library, a place for small activities like ping-pong or foosball, and small areas with social seating.

2. Outdoor Classrooms – During the pandemic the school created two outdoor classrooms with furnishings purchased by Each Green Corner and the PTA. These areas included a space by the math buildings and the library courtyard. While walking the site it was clear that in addition to these two temporary spaces the staff would like to utilize more of the site for outdoor learning opportunities. Additionally there are many opportunities on site to tie into the curriculum. These include another area or two by the math buildings, an area near the science classroom, and a large environmental area by the portable where TLEC is held.

3. Field – The school’s field, which is used by both schools for physical education and Tierra Linda for recess time, is large enough to accommodate sports games. The field is also used by the public during non-school hours. The current field is irrigated by traditional irrigation and in need of maintenance. A successful stormwater management plan would need to address water efficiency, which can be achieved with an EPIC system. Near the field at the western corner near Alameda de las Pulgas is the lowest point on the campus and there is evidence that water drains through the fence and over the curb into the gutter at this location.

4. **Creek** – A large portion of the creek on Tierra Linda’s schoolground runs below ground, on the back side of the math buildings and the field. Along this flowline are many existing mature trees many of which are stressed and/or dying most likely due to lack of water. Droughts are longer and less predictable so all trees need access to irrigation. Additionally since these trees are older and at the lee side of the campus for wind it would be beneficial to the campus to start planting the next generation of trees to create a healthy forest that would provide shade, a wind buffer, and beneficial habitat.



Shared field at Tierra Linda

5. **Play Yard / Shared PE Space** – In addition to the field the Play Yard at Tierra Linda includes a vast space with lots of potential, however it is mostly made of asphalt and remnant slabs of concrete from old portables. In this space there is not much shade and no hang out spaces. Other than the paving and chain link fencing there is a gaga pit which is very popular and a play structure which was relocated from the San Carlos Charter School. This play structure is designed for elementary-aged children and does not provide the elements that would appeal to middle school students. Adjacent to this area are trees along the southern edge of the site. Students are not allowed to hang out by the trees because of concerns of supervision.



Lowpoint of site at Tierra Linda where water flows onto street



Asphalt ball play area at Tierra Linda



Location of removed portable in play yard at Tierra Linda



District's Facilities Department's buildings on site



District's Facilities Department's Yard on site

Shared Areas of Site

1. Vehicular, Bicyclist, and Pedestrian

Circulation – Currently all people traveling to Mariposa, Tierra Linda or San Carlos Charter School enter the site at the driveway at Dartmouth Avenue. This includes school buses, parents and caregivers at drop-off and pick-up, students arriving by bike or walking, deliveries, and all vehicles accessing the District Facilities. Drop-off backs up because of the nearby high school with a peak of 20 minutes before bell at 8:40 AM and pickup can last up to 2 hours. The congestion is a safety concern for both schools for two reasons - pedestrian and bike safety as well as emergency vehicle access during pick-up and drop-off times. In addition to circulation there are three designated parking areas for Tierra Linda and Mariposa. They include parking spaces at the top of the hill near the Mariposa play yard, parking at the front of the school, and parking between the Facilities Yard and portable for Tierra Linda. The schools both stated that parking is very tight and they would prefer more parking as well as safer access for bicyclists and pedestrians to encourage more sustainable modes of transportation. Many students currently walk to school and need safer access.

2. District's Facilities Yard – The Facilities Department for the District is located on site in two of old buildings and a trailer. The two buildings are not seismically safe and are located near the entry and fire lane for the site. The facilities yard also includes a triangular fenced yard for parking of district vehicles.

3. Fire Access – A fire lane encircles the entire site starting at the Dartmouth Avenue entry and around Tierra Linda buildings, over the

creek, through the Mariposa play yard and through the upper parking lot. It is shown on the opportunities and constraints map. This area must remain asphalt or other Fire Marshall approved driving surface, and open to emergency vehicles at all times.

4. Septic System – Principal Ugrin told the Consulting Team that there is a septic system for the entire site located south of the lowest parking area. The site information provided to the Consulting Team locates the septic tank but does not indicate where a leach field may be. More information on this system will be required before any design in this area can be developed further.

5. Undeveloped land – A large swath of land from the septic system to Alameda de las Pulgas to the south and to the private houses to the east is undeveloped and includes an aging forest. The septic leach field is located in this area but the exact size and location is unclear. Deer, which are popular with the students, have been sited in this area as well. A portion of this area is also the place where some land may need to be given to the Four Corners Project to accommodate the proposed traffic roundabout.



Parking on site looking towards gym




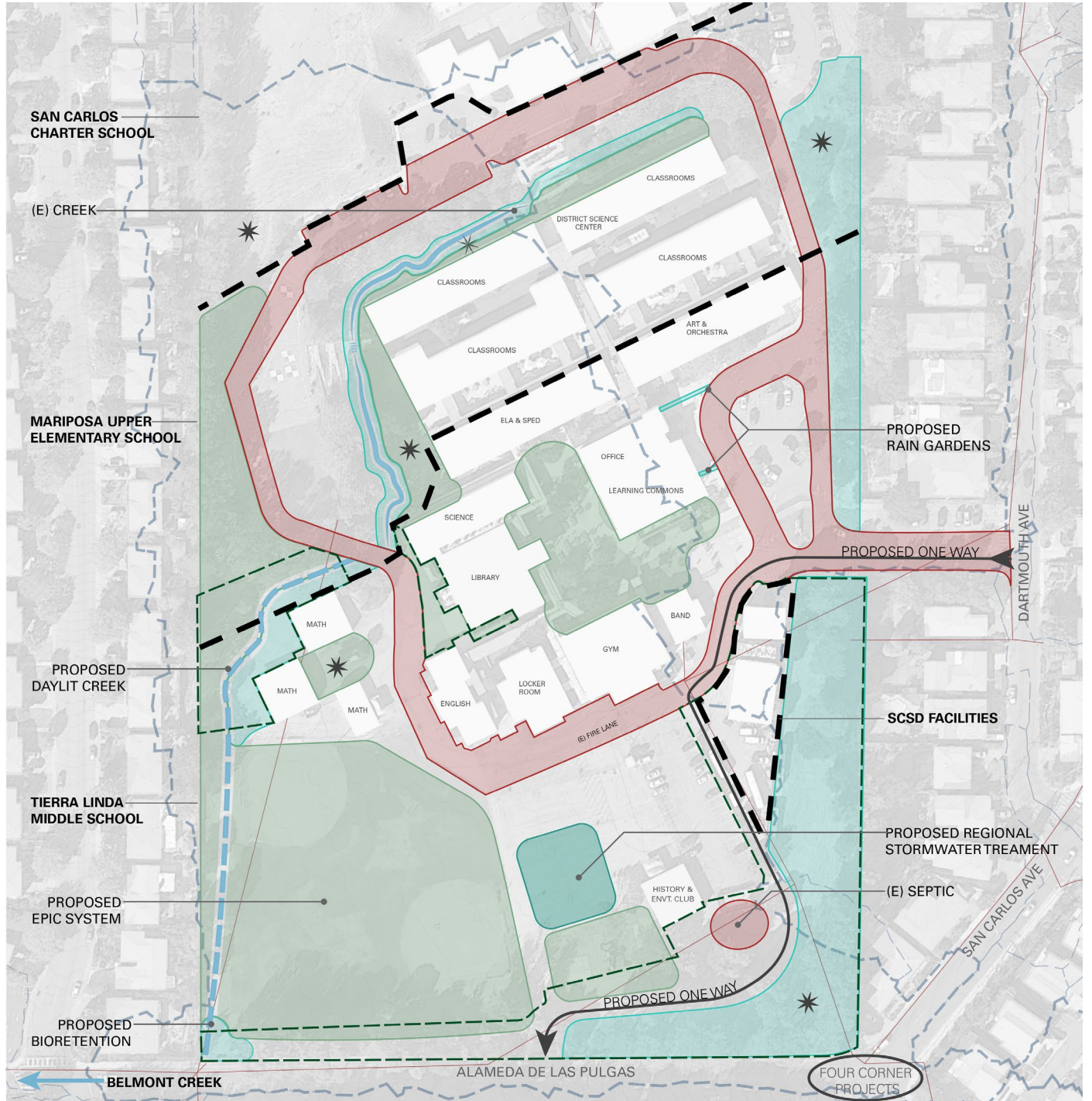
Septic infrastructure on site



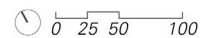
Forest and field at southeast corner of site

Legend

- | | | |
|---|--|--|
|  SITE BOUNDARIES |  Contour |  Constraints |
|  Channelized Creek |  Child-Centered Goals Opportunities |  Underutilized Space |
|  Subcatchment Area |  Site Ecology Goals Opportunities |  Proposed Circulation |
|  Storm Drain |  Regional Ecology Goals Opportunities |  Outdoor Classroom |



Opportunities and Constraints map - Mariposa and Tierra Linda



II. Participatory Community Engagement

The participatory community engagement strategy was developed in line with the school year to support stakeholder involvement. When maintaining continuity within a single school year momentum builds leading to consensus among a diverse group of stakeholders. Investing this time helps build community around the project and allows the school community to create their “own” outcome which lays a foundation for ongoing engagement with the site for years to come.

The overall engagement strategy included three parts: 1) establishing a Stakeholder Advisory Committee of representatives from each school site to guide concept plan development; 2) conducting initial brainstorming meetings with each SAC; providing student design workshop presentations for each school; 3) offering curriculum integration guidance and resources for linking outdoor and indoor teaching opportunities with new Resilient Schoolyard campus improvements. Further engagement occurred through separate meetings with district staff, site walk-throughs with each SAC, and design concept plan review and feedback. C/CAG also developed a project website for the San Carlos Resilient Schoolyards project on its outreach [website](#), as a platform for sharing the school community engagement process and concept plan creation.

Each meeting was tailored to the unique interests of each site, the age group of the schools and the relevant phase of the community engagement process (i.e., brainstorming, site walk-throughs, concept plan development). The purpose of these meetings was threefold:

1. To elicit constructive community input on site programming and current site assets and liabilities in order that each schoolyard could be specifically designed for their needs and uses as well as the site opportunities and constraints;
2. To listen to, engage, and further build community around each schoolyard and within the District and to ensure a broad group of stakeholders from each school was involved in the ideation of its Resilient Schoolyard plan.
3. To expand the community knowledge of Resilient Schoolyards - their benefits and needs - including environmental literacy, stormwater management, play benefits, and student health.

This process took place during the 2021-2022 school year which was the first full school year of in-person teaching following the COVID-19 pandemic. Virtual conference platforms, rather than in person participatory meetings were the chosen mode for meetings for the Brainstorming, Concept Plan development, and Report meetings. Effective school engagement over virtual conference platforms allows for a greater audience but not always a more engaged group. Student Workshops at Arundel and a site walk with the Stakeholder Advisory Committees at each site were held to develop some of the engagement in person.

A. Stakeholder Advisory Committee Set Up

A Stakeholder Advisory Committee (SAC) for each site was formed with the Consultant Team’s assistance at each school. The SAC, who are the key decision makers and ambassadors at each site, represent the overall community during the process of making the conceptual plans and

can continue to make the key decisions with the school district when the project moves beyond the conceptual/community design phase. This well-rounded group of people includes key individuals at each school who are open minded and dedicated to the school and grounds.

When forming a SAC at any school it should include the Principal, a few interested teachers, an after-hours care staff member, garden coordinator or outside teacher (if the school has one), and a few parents. The ideal size of the group should be five to twelve people. The SAC for each school is listed in the acknowledgments at the front of this report.

B. Brainstorming Meeting

Bay Tree Design facilitated one brainstorming meeting for Arundel and one for Mariposa and Tierra Linda so the communities could work together to form consolidated ideas for the shared spaces and resources as well as goals for each site. The goals for these meetings were to elicit constructive input from each school community

while expanding understanding of environmental literacy, stormwater management, and other benefits of climate resilient school grounds. The objective for this meeting was to work with any interested adults at each site, SAC and others, to listen to, inform with professional precedents, and continue to build the community's interest in the project. This meeting was also an opportunity to introduce the school communities to the overall effort and current scope of work, and to begin exploring possibilities.

The presentation was tailored specifically to the goals of this project and needs of the different sites. It included preliminary site analysis, and review of goals and aims of this project. It also included many ideas for how to improve the site in relation to the overall project goals.

Following the presentation at each brainstorming meeting, the participants discussed ideas in three breakout groups which were facilitated by BTD to brainstorm site-specific ideas. The meeting concluded with a sharing of ideas between the three groups.

1. Arundel Brainstorm

The ideas that were discussed included:

Climate Resilience

- Increase opportunities for rain catchment
- Integrate rainwater harvesting and use in the garden
- Include food forest in UpperYard
- Add trees along fence lines
- Add shade in UpperYard to it cool down
- Address drainage issue with grass area in UpperYard
- Include opportunities to have fun and explore with nature elements such as rocks and logs
- Incorporate activities that encourage slowing down and mindfulness such as a labyrinth

Outdoor Learning

- Incorporate an outdoor classroom in LowerYard attached to garden
- Add outdoor covered classroom in UpperYard
- Keep grass areas as a space for informal class talks
- Include peaceful seating areas that promote reflection, mindfulness and connection to the land
- Add composting station
- Create space for gardening in Upper Yard
- Use garden and nature as teaching tools to educate about compost, rainwater harvesting, growing food, food justice, native plants and wildlife.

Play

- Incorporate play elements that promote safe play and opportunities for exploration and imaginative play
- Include climbing walls
- Use existing hillside to place large slide
- Add more opportunities for ball play, specifically basketball
- Create opportunities for nature play using logs, rocks, and tree stumps
- Increase the variety and types of play with the selection of play equipment elements
- Replace paved areas with natural and permeable materials

2. Mariposa and Tierra Linda Brainstorm

The ideas that were discussed included:

Climate Resilience

- Increase rainwater collection, and add interactive elements such as measurement and musical parts
- Promote composting and recycling
- Integrate environmental standards into the school's identity
- Replace concrete paving and asphalt with permeable surfaces
- Plant trees for shade
- Add solar panels and other passive energy systems
- Design for sustainability and maintenance

Outdoor Learning

- Expand outdoor classrooms
- Create and expand nature play areas for each school
- Integrate playful educational elements such as solar calendars
- Educate about the interactions between native plants and wildlife habitat

Socializing and Exploring

- Integrate a platform for artistic performances
- Build challenging play for all skill levels (climbing structures, tree logs and stumps to jump from)
- Develop areas that promote physical activity
- Include boards for drawing, doodling, and writing
- Revive the creek and open it for exploration
- Create more gathering / hang out spaces
- Include children in design conversations
- Reserve quiet spaces for reflection
- Diversify the outdoor play and social activities opportunities

C. Site Walk with Stakeholder Advisory Committee

The Consultant Team met with each SAC to walk the site and learn about its daily and special event uses and patterns. This task was not part of the original scope due to COVID restrictions at the time but was added to help with building connections with the site stakeholders to build meaningful engagement, wanting to foster champions for each site. This step was essential given the lack of opportunities to convene in person due to remote participation by school and District staff. At each of these site walks the Consultant Team had a list of questions for the SAC so they would understand how the site is used daily - before, during and after school hours; for special events throughout the year; how the site uses change with the weather; and community access. The description of the information garnered from these walks is detailed further in the opportunities and constraints map above.

1. Arundel

At the site walk the Consultant Team learned that the yards are split by grade for daily use. The lower yard is primarily used by TK and Kindergarten during the school day and the SMARTE program in the afternoon. Many of the younger students enter the school campus at the gate at San Carlos Avenue. The upper yard is used by grades 1 to 3 and the daycare program adjacent to the yard which is very popular. Many students in the upper yard gravitate to the small area with the logs. The upper yard is often very hot and uncomfortable. The two pre-K yards are separate and mostly paved. One recently received some planting area and new trees at the edges.

2. Mariposa and Tierra Linda

During the site walk each SAC pointed out some key concerns and desires which included addressing the drop-off and pick-up congestion, taking advantage of easily missed opportunities for outdoor learning such as the area next to the library, connecting to the creek, creating more age appropriate and varied activities in the Tierra Linda yard, and making both yards more comfortable for the students from the heat and wind.



SAC on site walk at Arundel



SAC on site walk at Tierra Linda

D. Student Workshops

Student workshops were held at each school to engage the students and teach the student bodies about stormwater and the benefits of possible improvements related to play and learning opportunities in their schoolyard and to garner their ideas for their schoolgrounds. The student workshops at Arundel were held with each grade meeting as a group to see a slide show, ask questions and then return to their rooms with their teachers to draw their ideal schoolyard.

At Mariposa and Tierra Linda they were facilitated by the teachers using a pre-recorded presentation created by BTB for each school. The presentation at each school included the goals and vision of

this project, information on stormwater and the benefits of possible improvements related to climate resilience, environmental quality, play and learning opportunities that related to each school's site and student population's interests. Following the presentation students were asked to draw or write their vision for their schoolyard. Each school provided BTB with the student drawings and writings which were tallied so that the popular and realistic ideas from the students could be integrated into the concept plans.

In addition to these student workshops the engagement process included a Curriculum Integration session offered to all teachers within SCSD. This is detailed in Chapter 4: Curriculum Connections.



Student workshop at Arundel

1. Arundel

The tallied data from Arundel students who participated in the workshops and provided input via drawings, suggest active play closely followed by climate resilient and natural elements as the primary features the students would like to incorporate into the schoolyard concept plans. These two categories captured approximately 82% of the input from the 1st, 2nd and 3rd grade students, with active play leading between these two top interests.

Arundel students' most popular ideas for active play were climbing, sports games with rules, sliding, and swinging in descending order.

Arundel students chose plants as the largest

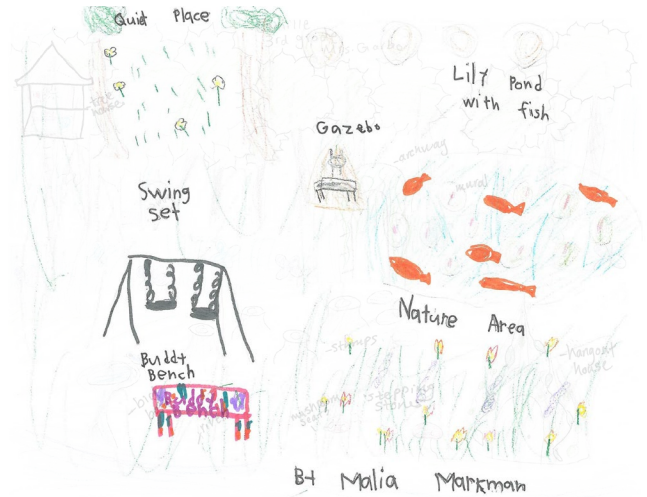
interest in their details of climate resilient and natural elements. Plants were the primary element in their tallied input next in popularity by edible gardens and related infrastructure. The majority of their drawings of plants were forests and grass, with flowers.

The remaining 18% of input from Arundel students, tallied Comfort, Form and Function and Imaginative Play. Outdoor classrooms, shading and seating for study areas and dining, forts and treehouses were the predominant interests shared in descending order.

A table detailing this information and additional student drawings are in *Appendix C: Student Workshops*.



Arundel Elementary example of student drawings



Arundel Elementary examples of student drawings

2. Mariposa and Tierra Linda

The tallied data from Mariposa and Tierra Linda, suggest that climate resilient and natural elements along with active play are the elements they want most incorporated into the schoolyard concept plans.

The Mariposa students primarily chose climate resilient and natural elements and wanted more spaces and elements that support active play. These two categories captured approximately 80% of the student input for the 4th and 5th grade students.

Mariposa students conceptualized incorporating trees and forest elements which BTD tallied under climate resilient elements and nature exploration. Some added boulders and logs and others included water as a pond or creek.

Mariposa students' most popular ideas for active play included traditional swings and basketball. Other interests included traditional slides, four-square, a zip-line, and a rock climbing wall.



Mariposa Upper Elementary examples of student drawings

The remaining 20% of Mariposa's total feedback focused on Social Spaces and Elements and Comfort, Form and Function. Leading examples of Social Space and Elements detailed by students are spaces to hang out with friends, outdoor classrooms, benches, shade, treehouses, and quiet areas in descending order.

Similar to Mariposa, Tierra Linda's 6th grade population shared their main interests: climate resilient elements and nature exploration, and active play, capturing 76% of the Tierra Linda's total student data equally. Tierra Linda's top interests highlighted trees and forests, with creeks and edible gardens as a second favorite. Following those items active play elements such as swings, volleyball and bridge came in third.

A table detailing this information and additional student drawings are in *Appendix C: Student Workshops*.

These four steps - SAC creation, brainstorming, SAC site walk, and student workshops were the core elements of the engagement in the beginning of the process.



Plant More flowers!



Hang up bird houses on the trees in nature zone



At least 5/10/20 Room D

Add places to sit up at recess yard



Build a garden



Make a big chalk board at recess yard.



Igloo-like place for hanging out w/ friends



set up the small libraries



in nature zone

Add places to sit up at recess yard



Build a garden



Make a big chalk board at recess yard.



Igloo-like place for hanging out w/ friends



set up the small libraries



Outdoor space idea project

proposal [Final draft]



Hi my name is Julissa. Recently my friends have been complaining because people always take our bench during recess so i've come up with an idea. Instead of how the stream area is right now

With all of the trash inside of the stream area there is, the trash inside of the stream area there is, a tiny bit of water

We could turn it into something like this master-piece that took me five minutes to draw. By taking down the fence, cleaning the trash, making wooden seating areas for us to sit on, and growing more plants and trees.

Thank you for your time!



A creek for anyone to use. Nice shading, but also for making Outdoor learning. Maybe a hill for our school. Growing more trees may help the environment. A garden to produce more flowers so bees and other insects can pollinate.

Mariposa and Tierra Linda examples of student drawings

Community engagement during this project continued through the concept plan development and the report review. Community engagement is a long and extended process where the Project Team and Stakeholder Advisory Committees need

to continue to site champions engaged beyond the concept plan and report and take this into the development process - fundraising to construction and beyond. This is detailed out further in Chapter 5: Funding, Priorities, and Maintenance.



CHAPTER 3

RESILIENT SCHOOLYARD CONCEPT PLANS

I. Arundel Lower Elementary School

- A. Upper Yard: Grades 1-3
- B. Pre-K Yards
- C. Common Areas
- D. Lower Yard: TK-K
- E. Regional
- F. Climate Resilient Elements

II. Mariposa and Tierra Linda Schools

- A. Mariposa Upper Elementary Campus
- B. Tierra Linda Middle School Campus
- C. Circulation and District Facilities
- D. Climate Resilient Elements

CHAPTER 3: RESILIENT SCHOOLYARD CONCEPT PLANS

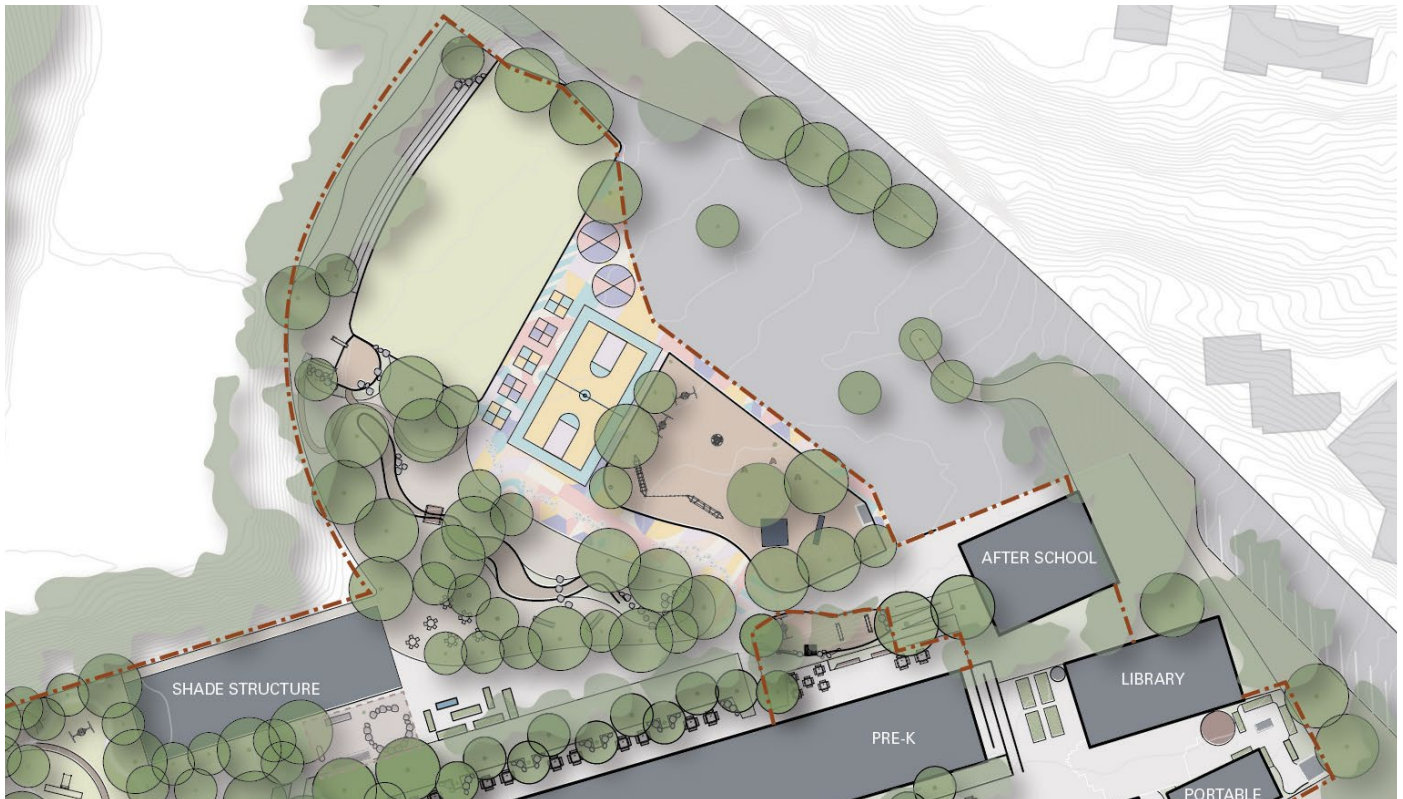
I. Arundel Lower Elementary School

The description below walks through the different outdoor spaces of the campus and describes the proposed design for each site,, which is illustrated on the following page, Figure 1: Arundel Resilient Schoolyard Concept Plan. The plan integrates many of the features the school community enjoys and is proud of, from the outdoor sinks supplied by Each Green Corner to the new solar shade structure installed by the District. The site is divided as follows: upper yard - grades 1-3, pre-K yards, common areas, lower yard - TK-K and regional.

- ① Amphitheater & Field
 - ② Nature Exploration Area
 - ③ Play structure - Grades 1-3
 - ④ Lunch Area
 - ⑤ Pre-KYard 1
 - ⑥ Outdoor Covered Classroom for "Cooking" and Expanded Garden
 - ⑦ Pre-KYard 2
 - ⑧ Outdoor Classroom Areas
 - ⑨ Library Courtyard and garden
 - ⑩ Watershed Map
 - ⑪ Outdoor Classroom Area
 - ⑫ Lunch Area and Amphitheater
 - ⑬ Play Forest
 - ⑭ Sports Court
 - ⑮ Existing Field
 - ⑯ Garden
 - ⑰ Regional Treatment System
 - ⑱ Bioswale
 - ⑲ Gathering Circle in Forest
- Note:
Scavenger Hunt Options
Throughout Campus
- Fencing



Figure 1: Arundel Resilient Schoolyard Concept Plan



Blow-up plan of UpperYard

A. Upper Yard: Grades 1-3

The proposal for the upper yard transforms the existing site and adds a diverse collection of spaces that are climate resilient and comfortable. The variety of elements and spaces encourage movement, play, nature exploration, outdoor learning, and social interaction for grades 1-3 at Arundel Elementary. This area is also designed to be used by kids attending afterschool at Arundel.

- 1. Amphitheater and Field** -The amphitheater and field are located at the north end of the upper yard with the amphitheater tucked into the existing slope and the turf on the high point of the yard for positive drainage. The field provides ample space for physical education, ball play and running games. The amphitheater provides seating for both teachers and students and creates a space for socialization.

Students who prefer to stay on the sidelines and observe, also have a designated place to be, and in this way, they can engage with the activity on the field. The proposed field is living turf – which moderates temperatures and is permeable for stormwater events.



Amphitheater used as a gathering space and place to hang out

2. Nature Exploration Area -The current existing small nature play area in the upper yard is the most popular area on site, and the design proposes to expand this outdoor area into a larger nature exploration space with more potential experiences. A long and winding dry creek is the central element of this area and invites children to explore the many nooks and crannies in and along the creek. It also creates opportunities for balance play and movement; stepping stones can turn into an obstacle course and bridges and rocks offer different ways to cross the dry creek. In addition to creating an environment that encourages kids to use their imagination, it is also a great opportunity for them to learn about the natural environment in a hands-on way. The creek area includes a continuation of the endemic Oak woodland, informal seating areas for socializing and outdoor classes, and places for creative constructive play such as den building and fairy house creations. This entire area transforms an asphalt surface into a permeable natural area with the dry creek which can demonstrate how water moves in watersheds at a tangible scale.

To take advantage of the steep terrain, two slides are built into the existing hillside at the top of the dry creek. A winding path allows for ADA access to the top of one slide as well, making this area an inclusive space.

3. Play Area – Grades 1-3 -The play area is divided into two spaces - a soft-surfaced play area on engineered wood fiber and a hard-surfaced area with colorfully painted asphalt. The first area includes play equipment nestled between trees to challenge and develop children’s motor skills. The existing climbing structure is integrated into the design at its current



Children play in forest setting with loose parts



Dry creek at an elementary school



Obstacle course play elements designed as a circuit



Nest swing and carousel

location and new elements such as a climbing obstacle course, carousel, and two nest swings are introduced. The swings and carousel add opportunities for vestibular movement which is essential for whole development. The nest swings can contain more than one child at once, which is a great group activity, and it is inclusive and ADA accessible.

The asphalt area is brightened up with a lively colorful surface that will lower the heat while also incorporating activities such as basketball, four square, tether ball, and math hopscotch.



Colorfully painted asphalt with different activities

4. Lunch Area - The lunch area in the upper yard is placed under the new solar panels and between the creek and the school building. The placement creates a pleasant environment and ample shade to enjoy lunch outdoors in the open air.

5. Outdoor Covered Classroom for "Cooking" and Expanded Garden - Raised beds are added between the play area and school building so that grades 1-3 have access to gardening activities as well. The outdoor covered classroom for 'cooking' includes a gathering space and a food prep area (including the existing sink), creating an opportunity for hands-on learning where kids can learn about where their food comes from.

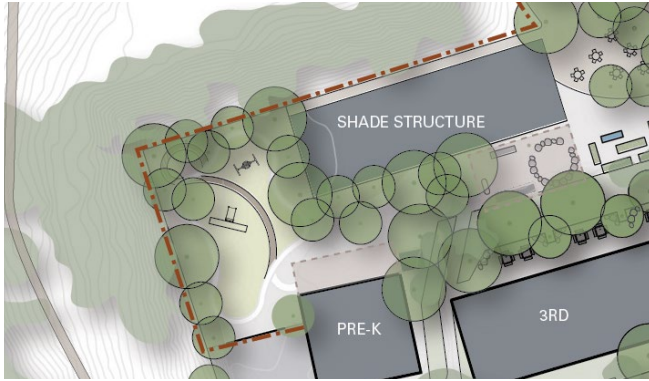


Outdoor classroom in schoolyard

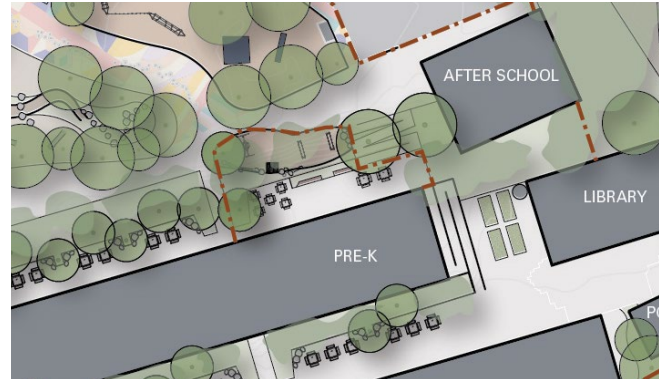
6. Outdoor Classroom Areas - This concept plan incorporates spaces to encourage outdoor learning. There are multiple locations along both sides of the 3rd grade and pre-K building which are furnished as outdoor classrooms. This allows for teachers to go outside with their students and create learning opportunities in fresh air when weather permits.



Map over outdoor learning opportunities



Blow-up plan of Pre-K Yard 1



Blow-up plan of Pre-K Yard 2

B. Pre-K Yards

1. Pre-K Yard 1 - The asphalt area is transformed into a play landscape and incorporates the new changes at the edges with trees and landscaping. The surfacing of the play area is engineered wood fiber and features a nest swing and a play structure with a slide presenting age-appropriate challenges for the young children. A striped track borders the play area where the children can ride around on their tricycles or ride-on cars. The yard also includes a covered patio space for fine motor skill play and a little forest.

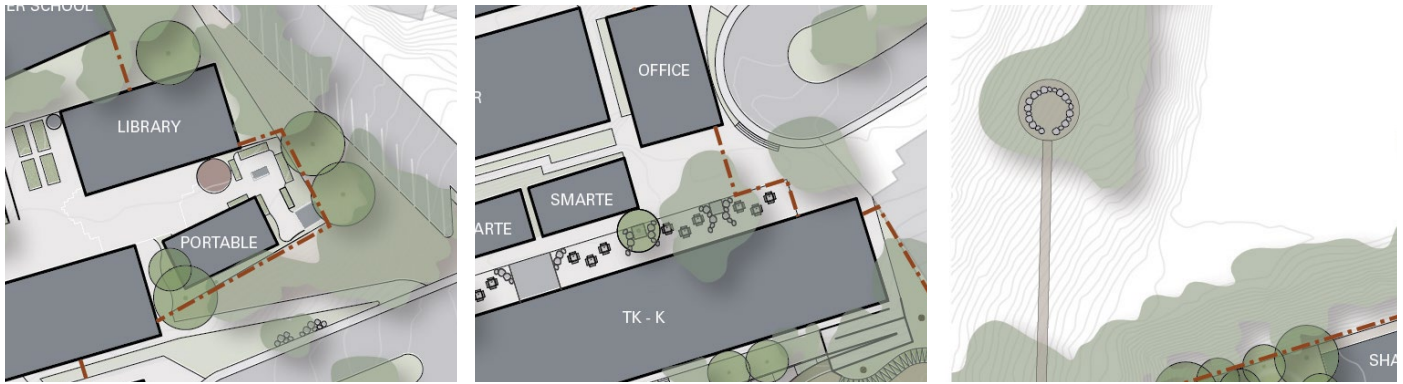


Riding track connects play areas in Pre-K yard

2. Pre-K Yard 2 - This play yard features a nest swing and two slides built into the sloped terrain. The surface is engineered wood fiber and the area is fenced in and surrounded by trees, creating a safe and intimate space for children to explore.



Double embankment slide for socializing and gross motor skills



Blow-up plans from left to right of: Library Courtyard, location of Watershed Map, and Gathering Circle in Forest

C. Common Areas

1. **Library Courtyard** - The library courtyard features new permeable paving (away from the buildings) allowing stormwater to drain directly to the soil below. Planters are added in the corner next to the gazebo to add greenery and create a quiet environment to reflect.
2. **Watershed Map** - The main entrance to the school and the courtyard in front of the office includes a watershed map of Pulgas Creek, locating the school, showing the creek and illustrating the SF Bay. This map would be developed later in design and could be made in stone, with non-slip outdoor pavement paint, or with a retardant and concrete. The map could include an informational sign and/or a exaggerated model for learning nearby.
3. **Gathering Circle in Forest** - At the south end of the eastern parking lot, a path through the forest leads to a gathering spot in the trees. This is a place where teachers can bring students to explore and have a change of scenery. The gathering spot is a circle of large stones where teachers can facilitate outdoor lessons or other activities such as story time or a show and tell. It is located in the “forest” and has views of the SF Bay and beyond.



Watershed map engraved into surfacing



Collecting elements from nature



Blow-up plan of Lower Yard

D. Lower Yard: TK-K

The design of the lower yard includes maintaining existing areas as well as reorganizing and adding new functions to the school yard to increase opportunities for play activities for TK-K students. The proposal includes a new lunch area, amphitheater, play forest and sports court, taking into consideration accessibility and improving climate resiliency.

1. Outdoor Classroom Area - Outdoor classroom areas are designated at the northern façade of the TK-K building. Each classroom has their own designated space which is separated from the other classrooms by fencing. Patio with clusters of tables and chairs and other elements are located next to each classroom.



Amphitheater used as a gathering space and place to hang out

2. Lunch Area and Amphitheater - The lunch area in the lower yard is moved to the west onto a new area with paving and an array of trees providing comfortable shade in the warmer months. This creates a designated space for

lunch, a place for assemblies, and for smaller group sized outdoor lessons. The lunch area is raised above the rest of the yard and an amphitheater is integrated into the south end creating a gradual transition to the play area with plenty of opportunities for climbing and sitting.

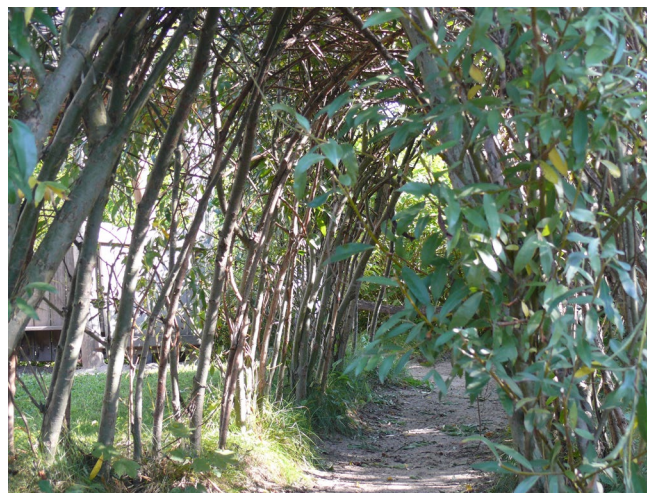
- 3. **Play Forest** - By moving the lunch area to the west, the area under the beautiful existing oak trees can be transformed into a play forest providing a space where kids spend more time than lunch. The play forest features age-appropriate play elements, such as a climbing structure, nest swings and balance elements under the trees on engineered wood fiber surfacing. A vine tunnel acts as the border at the north end where children can play. An accessible path winds through the yard connecting students to the various places for play and learning.

- 4. **Sports Court** - At the bottom of the amphitheater is the sports court. The sports court has a playful and colorful asphalt surfacing with SRI colors to lower the ambient air temperature and provide opportunities for ball play and other social games. Teachers and students can hang out on the amphitheater and easily oversee the activity on the sports court.

- 5. **Existing Field** - The existing field is kept in this proposal as a green space for open ended play and ball play where kids have a large space to run around. The asphalt area around the field is brightened up with painted games such as math hopscotch.



Play elements integrated into forest



Vine tunnel



Painted asphalt with colorful graphics

6. Garden - The existing garden is also kept in the design as a wonderful space for kids to learn about nature through a hand-on approach. In addition to being a learning space, the garden enhances the social and emotional well-being of the students. Features are added to boost learning opportunities in the garden such as a covered outdoor classroom.

7. Scavenger hunt options throughout campus - As the school yard is built there are many opportunities for teachers to incorporate scavenger hunt options throughout the campus that relate to the ecology and other interesting topics.

E. Regional

1. Regional Treatment System - This design proposes to convert a section of the asphalt drop-off zone to a regional treatment system to collect and treat stormwater from San Carlos Avenue, enhancing the climate resilience of the region by managing storm flows and reducing potential flooding. The system will divert and treat flows from a 79-acre subwatershed, consisting of primarily low-density residential housing. Flows in excess of the regional stormwater system's capacity during heavier storms will bypass the system via overflow structures and continue through the existing stormwater drain system.

2. Rain Garden - Located in prominent location along San Carlos Avenue and at the lowest point of the site, is a visible bioretention basin as the gateway to the school and the Kindergarten drop-off zone. The bioretention



Bioretention rain garden

basin will treat runoff flows from the southern portion of the elementary school site and creates a more beautiful and welcoming environment for visitors and parents dropping off their kids.

F. Climate Resilient Elements

Incorporating climate resilient elements in the design of the concept plan for Arundel Elementary School has been an important aspect of the project. To summarize the elements that have been described in each area above, this proposal removes asphalt and paints large areas of asphalt in bright colors to increase the Solar Reflective Index value. It also replaces a significant percentage of impervious surfaces with permeable surfaces and plants a number of new trees. To address the issue of stormwater, it adds both regional stormwater management for a 79-acre subwatershed and site stormwater management for the southern portion of the elementary school.

II. Mariposa and Tierra Linda Schools

The Mariposa and Tierra Linda Schools site is divided into two distinct campuses within one shared space. The site includes a third school, San Carlos Learning Charter Center, which was not a part of this process. The presence of a creek on site brings stormwater opportunities at both local and regional scales. The proposed design includes a creek, a forest, regional stormwater collection, more permeable surfaces, and better access to the campus for bicyclists and pedestrians. The creek becomes a central point of the campus – figuratively and literally – and supports students’ play and learning opportunities. The design also focuses on supporting the cognitive, gross motor, social and emotional needs of the two student groups as part of the redesign. All of the proposed design features build on the community engagement input, are designed to be inclusive and ADA accessible, and integrate and build on the improvements created by Each Green Corner, the PTAs, and the school district.

- ① Address stormwater at San Carlos Charter Learning Center in the future with vegetation and stormwater BMPs
 - ② Play Equipment - 4th and 5th Grade
 - ③ Outdoor Science Classroom at Creek
 - ④ Bioswale with Overflow
 - ⑤ Nature Play Zone
 - ⑥ Creekside Classroom and Lunch Space
 - ⑦ Mariposa Outdoor Science Space
 - ⑧ Outdoor Classroom at "18"
 - ⑨ Science Classroom at Library
 - ⑩ Quad with Micro-Climate Niches and Permeable Paving
 - ⑪ Raingarden with Culvert
 - ⑫ Butterfly Garden
 - ⑬ Outdoor Library
 - ⑭ EPIC System
 - ⑮ Regional Stormwater Treatment
 - ⑯ Gaga Ball
 - ⑰ Relocated District Facilities Dept.
 - ⑱ Bioretention/Rain Garden
 - ⑲ Learning Forest
 - ⑳ District Facilities Yard
 - ㉑ Nature Exploration Area
 - ㉒ Play Equipment - 6th, 7th and 8th Grade
 - ㉓ Kitchen for Environmental Literacy
 - ㉔ Relocated Parking
 - ㉕ Two-Way Entrance
 - ㉖ Bike Path
- Fencing



Figure 2: Mariposa and Tierra Linda Resilient Schoolyard Concept Plan



Blow-up plan of Mariposa Elementary Campus

A. Mariposa Upper Elementary Campus

This campus is designed for students in 4th and 5th grades. This is a wonderful age where many students are reading to learn rather than learning to read, are at the crossroads between middle childhood and youth, and are open to many forms of learning and socializing. This portion of the design focuses on the particular needs of this age group providing them with a comfortable and memorable place to learn and grow.

- 1. Play / Physical Education Yard** - At Mariposa Upper Elementary, the main play yard features a variety of play equipment that supports gross motor skills as well as collaborative play and several hangout spaces. The play equipment is shown as a circuit with vestibular play elements as well as climbing elements. The



Multi-child rope swing, nest swing, and carousel

circuit of individual elements costs less than a large structure and spreads out play providing more access and encouraging more quality play interactions.

2. Nature Zone - Nature play provides a variety of opportunities during free play times from collaboration, creative constructive play, to restorative moments. The current nature play area is expanded with a series of wandering paths through the woods and down to a small amphitheater and observation deck over the creek. The newly accessible forest becomes an opportunity for place-based learning and science curriculum as well as play by cultivating a strong connection with the natural environment through activities such as den building, making fairy houses, observing birds, and witnessing the seasonal changes of trees.

3. Creek - While the creek currently divides the campus, opening it for visual and physical access helps bring the campus together, and allows for a stronger connection between each space. Currently the creek receives flows from a 38-acre subwatershed north of the school, consisting of 13 acres of school and park land with the remaining acres consisting of low-density residential neighborhoods. Flows will remain unchanged in the proposed design that will feature a lunch deck that traverses the creek and is overseen from the upper play area. An outdoor classroom north of the buildings is also located on site to allow for a small area to study the creek and do outdoor school work in a natural setting. The creek is also the most prominent element seen from the drop-off zone. Creek opportunities include removing invasive species and planting with native creek habitat to encourage beneficial wildlife and naturalize the riparian corridor to



Open-ended play in a forest setting



Creek incorporated into children's space



Creek connections at a school



Bioswales in courtyard setting



Bioswale in a public plaza

restore ecological systems with stormwater management capabilities.

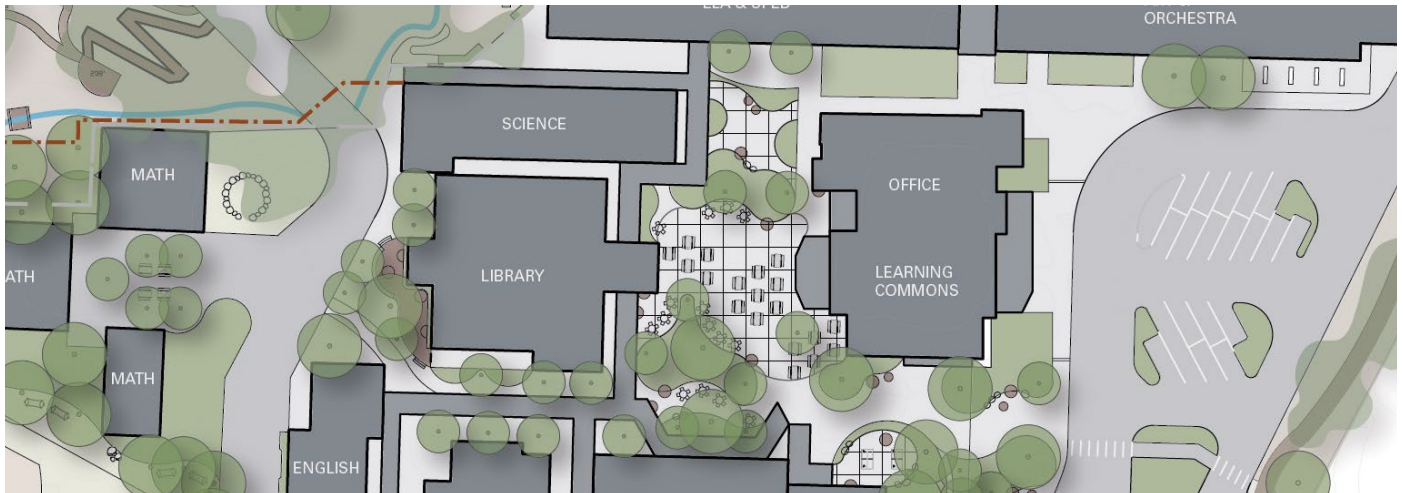
4. Lunch Space - The reimagined lunch space above the open creek, along with new outdoor science classrooms, reinforces the campus' identity by fully taking advantage of its exceptional natural landscape of mature oaks, creek, and natural habitat. Two outdoor science classrooms were added near the creek to encourage science learning, enhance academic motivation, and promote well-being. The science space just south of the lunch area integrates Each Green Corner's existing edible garden to complete the range of learning opportunities and help develop children's relationship to natural processes further.

5. New Courtyard around Stormwater and Outdoor Classrooms - The lower courtyard was recently developed by the District and provides opportunities for outdoor learning adjacent to the classrooms. The proposed design incorporates additional outdoor learning spaces between buildings to complete and reinforce the ongoing stormwater management efforts. Within the western portion of the classrooms, the new courtyards will also feature a network of bioswales across the length of the outdoor hallways to treat and redirect surface runoff into the rehabilitated creek.



● Outdoor learning opportunities

Map showing outdoor learning opportunities



Blow-up plan of Tierra Linda Quad

B. Tierra Linda Middle School Campus

Tierra Linda Middle School welcomes students ranging from 6th to 8th grades, at an age when they tend to show an increased interest in peer relationships and want to blend in. Outdoor spaces that support varied academic and social opportunities are crucial for these students who enjoy comfortable hang out spaces during free time. Sustainability and student comfort is integrated throughout the site with a variety of environmental strategies with micro-climate niches, permeable paving, rain gardens, a butterfly garden, a mixed-forest, and the creek.

1. Quad - The quad is designed to provide spaces around the needs of youth with opportunities for socializing, eating, outdoor learning, places to perform, and places to gather such as around outdoor ping pong tables. Students at this age need to explore, and opportunities to gather in small groups and feel like they can be seen but not heard. Small rooms offering diverse types of seating and dispersed around the edges of a broader central space accommodate individual needs as well as



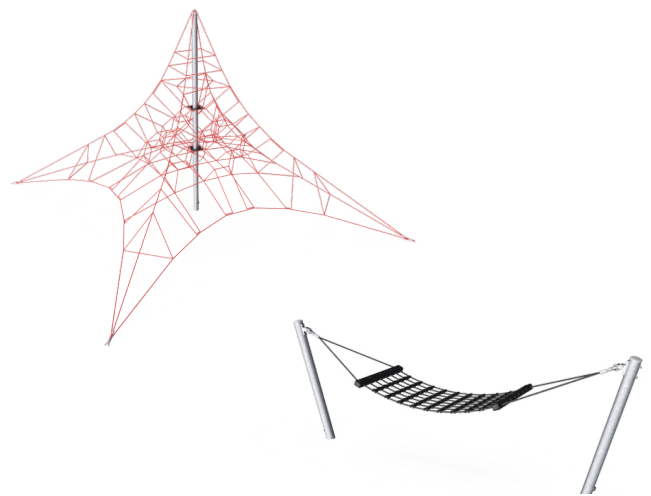
Hang out areas for socializing

larger events, while the permeable paving and increased tree canopy help bring nature back into the quad to make it a comfortable space and enhance the school's stormwater management strategies. Additionally, the proposed design suggests strengthening the connection between this central area and the learning center by expanding the existing demonstration rain barrel and rain garden eastward.



Blow-up plan of Tierra Linda play yard forest, and field

2. Play Yard / Shared PE Space -The reorganized play yard creates elements and spaces that support the current ball play demand with higher quality materials while also providing a variety of elements and spaces that foster social, emotional, and physical development for adolescents. This includes age-appropriate play equipment with places to perch, “drape”, hang out, and have graduated physical challenges. The space also includes information areas under the new forest to hang out and has relocated the gaga pit closer to other ball activities. The yard also serves an important environmental function. A regional stormwater



Climbing and hang out equipment

capture system lays beneath the basketball courts. The proposed regional stormwater system will divert and treat flows from a 127-acre subwatershed, consisting of primarily low-density residential housing. Flows in excess of the regional stormwater system's capacity during heavier storms will bypass the system via overflow structures and continue through the existing stormwater drain system.

3. Forest - The mixed-forest tree canopy provides comfortable seasonal shade, wind buffers throughout the year, and helps transform theoretical knowledge into practical, evidence-based learning opportunities that support a variety of learning modalities. The forest will also help expand the academic curriculum at the adjacent kitchen for environmental literacy.

4. Field - A stormwater management EPIC (Environmental Passive Integrated Conveyance) system installed beneath the existing field provides a playable field within 30 minutes following a rainstorm, and moderates temperatures rather than exacerbating them, which counterbalances the increase in ambient air temperatures caused by artificial turf. It also allows the District to capture stormwater for later irrigation reuse after it has been treated by the proposed bioretention that will capture and treat flows from the creek and the 38-acre receiving subwatershed before piping it into the EPIC system for later irrigation reuse. The bioretention footprint—located outside the main field area and extending up to the proposed fencing—has been designed to the largest size feasible based on site constraints and design objectives to enhance the creek and field areas for student experience. Incorporating a high-rate filtration solution is recommended for the bioretention to maximize



Yard with play equipment



Playing and learning in forest environment



EPIC system

filtration treatment of the receiving creek flows before feeding into the EPIC system. Higher flows beyond the bioretention and EPIC system capacity will flow into an overflow structure that connects to the existing storm drain system.

5. Creek - Starting at the math buildings and winding down to the lower corner of the site by Alameda de las Pulgas, the creek is now open and reintegrated to the campus' identity through a variety of strategies, including a bioretention area with seasonal overflow, and the opportunity to renew the forest along the flowline with new climate-adapted trees under which to sit and hang out. The creek will terminate at the proposed bioretention at the southwestern corner of the field for treatment before entering the EPIC system, while overflows will connect to the existing storm drain system via overflow structure.

6. Outdoor Classroom and Learning Opportunities -The proposed design integrates many outdoor spaces and curriculum connections. The main outdoor spaces include: enhancing the library patio with more intentional furnishings and softening the existing wall; building on the outdoor classroom by the math building as a more permanent outdoor space; adding a pollinator garden with small break out spaces by building 18; creating an outdoor space adjacent to the science classroom; and filling the forest with learning opportunities connected to the environmental club and future kitchen classroom.



Creek incorporated into children's space



Outdoor learning space in school garden

C. Circulation and District Facilities

The site currently has one access point to accommodate all three school campuses and the facilities department. The City has been working on a plan, the Four Corners Project, to alleviate the traffic congestion in this area. BTD has integrated the Four Corners Project proposed design while considering the on-site need to provide more efficient and safer access for vehicles, bicyclists, and pedestrians. The proposed design around the existing septic tank features an additional entry and exit point to the school site. To achieve this circulation, the district facilities – office and warehouse – would need to be demolished and rebuilt further east on undeveloped land on the site or relocated to another site. Additionally, a public bike path runs along the outer buffer to provide safe access for bicyclists and pedestrians from the corner of Alameda de las Pulgas and San Carlos Avenue. The configuration of crosswalks within the site would need to be developed so only one crossing guard is required at pick-up and drop-off.



Rain garden at front of school

D. Climate Resilient Elements

Sustainability is at the heart of the Mariposa and Tierra Linda redesign project, which proposes eliminating nearly 35,000 square feet of impervious surfaces in children’s spaces and planting 183 trees throughout the site. New permeable surfaces include planting areas, rain gardens, permeable pavers, and nature play areas with engineered wood fibers. The design also proposes to naturalize the creek to restore riparian habitat and manage 38 acres of existing subwatershed runoff that will then be treated and stored for reuse, thereby reducing reliance on potable water for campus irrigation. The site will also provide regional stormwater management for a 127-acre subwatershed by redirecting piped storm drain flows to the regional treatment system for treatment and detention.

The background image shows a school hallway. On the left, a whiteboard has the text "GARDEN TIME! WELCOME" written on it, with colorful drawings of pumpkins and leaves. Below the whiteboard, a child's hand is visible. In the center, a white door is decorated with a row of colorful fruit cutouts. On the right, a child in a white shirt is partially visible. The overall scene is bright and educational.

CHAPTER 4

CURRICULUM CONNECTIONS

I. Key Concepts to Understand Prior to Teaching

- A. Freshwater versus Saltwater
- B. Stormwater and Runoff
- C. Food Chains

II. Background for the San Carlos Area

III. Sequence of Stormwater Concepts and Lessons

- A. Step 1: Freshwater versus Saltwater - The Focus is Freshwater
- B. Step 2: Understanding Schoolyard Surfaces - Get Students Curious
- C. Step 3: Watersheds - Understand the Big Picture
- D. Step 4: Water Transport of Pollution - Understanding the Problem
- E. Step 5: Pollution in the Food Chain - Understanding the Problem
- F. Step 6: Solutions - Putting It All Together

IV. Additional Curriculum Ideas and Resources

- A. Additional Curriculum Resources
- B. Field Trips and School Classroom Visits
- C. SF Bay
- D. To Purchase

V. San Mateo County Resources

VI. Conclusion

CHAPTER 4: CURRICULUM CONNECTIONS

As San Carlos schools continue to reimagine their school grounds to include interactive stormwater management infrastructure, as well as greening, there will be more opportunities to take learning outside and there are many benefits to doing so:

- **Social-emotional Benefits:** Outdoor learning enhances children’s social interaction skills, confidence building, problem solving, independence, negotiation skills, and creativity.
- **Cognitive and Learning Benefits:** Spending time in nature replenishes voluntary focus and has benefits for attention, motivation, concentration, and working memory.
- **Physiological Benefits:** Outdoor learning enhances brain development and function, increases physical activity participation and health resiliency, and reduces risk of infectious and chronic disease.
- **Mental Health Benefits:** Higher levels of greenness on school grounds are associated with increased sense of restoration and quality of life. Connecting with nature directly and indirectly improves childhood mental health.
- **Improved Vision and Sleep:** Humans evolved to be in sunlight all day. Increasing the time spent outdoors reduces children’s incidence of myopia, improves their sleep/wake schedule, and helps them get more sleep.

School districts often are some of the largest land owners in cities and suburbs and can manage that land for children’s happiness and health, as well as for ecological benefits. The Resilient San Carlos Project is an example of a district-wide approach to schoolyard land management that incorporates ecosystem services like stormwater management. This approach represents a paradigm shift in how schools think about and use their outdoor space.

As part of the community engagement process, Green Schoolyards America facilitated a district wide meeting specifically designed to show teachers ways to integrate water and stormwater curriculum connections into the schoolyard to take advantage of outdoor learning features and learning environments. The presentation was given over Zoom and a recording of the video was provided to the project for posting. This is a significant component of the bigger vision of creating robust Resilient Schoolyard programs and leverages decades of work from Green Schoolyards America on creating healthier more ecologically aligned schoolyards. There are also a number of excellent resources for teachers and administrative staff to refer to and thus warrants its own chapter.

Source: [Green Schoolyards America](#)

The following background information and curriculum resources will support teachers in engaging their students around the concept of stormwater. The resources will be especially helpful for schools with visible stormwater management infrastructure that shows water flow from higher elevation to lower elevation, percolation, and any infrastructure that slows and sinks water. However, all of the following activities and lessons can be done outside at any school site. The lessons and ideas listed here are meant to be adapted across K-8, though some activities are specifically designed for middle school.

I. Key Concepts to Understand Prior to Teaching

Three key concepts are important to cover prior to jumping into more specifics of water in relation to the school grounds.

A. Freshwater versus Saltwater

When teaching about stormwater, it is important to note that we are talking about freshwater. Teachers can connect content such as The Water Cycle and Freshwater is a precious resource on a planet made mostly of saltwater to this concept.

B. Stormwater and Runoff

To get into the appropriate mindset for teaching about stormwater, it is helpful to remind yourself about what runoff looks like and where it goes during a rain event.

C. Food Chains

The concept of a food chain is important to keep in mind as you think about where stormwater, and the pollution that it can carry, goes.

II. Background for the San Carlos Area

The San Mateo Countywide Water Pollution Prevention Program is the public outreach arm of Flows to the Bay and was established in 1990. The goal of the program is to reduce the pollution carried by stormwater into local creeks, San Francisco Bay, and the Pacific Ocean. The following links contain important background information and resources for teachers looking to introduce their students to local watershed and stormwater concepts.

- [Flows to the Bay - What is a Watershed](#)
- [Flows to the Bay - Teacher and Educator Resources](#)
- [Flows to the Bay - Watershed Map](#)
- [Resilient San Carlos Schoolyards Project Background](#)
 - [Site Improvements](#)

III. Sequence of Stormwater Concepts and Lessons

Green Schoolyards America has curated the following sequence of concepts and lessons that teachers can follow in order to introduce and dive into the concepts of watersheds, stormwater, and pollution runoff. This sequence starts with the fundamental understanding of the water cycle and watersheds that is needed to support the later concepts of stormwater runoff, percolation, and non-point source pollution. Teachers can also pick and choose from these resources to meet their needs. All lessons are meant to be taught outdoors in the schoolyard.

A. Step 1: Freshwater versus Saltwater - The Focus is Freshwater

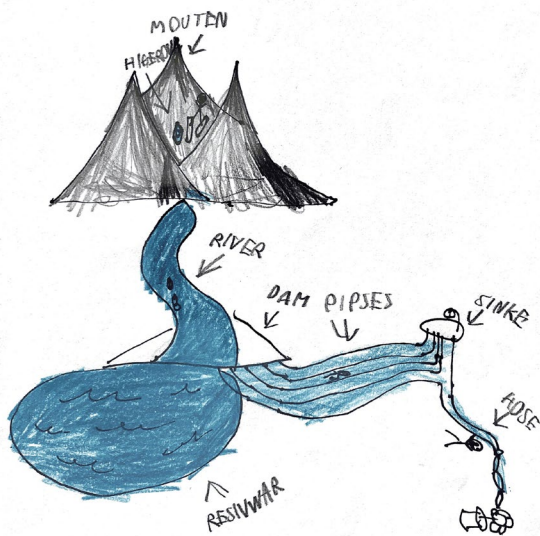
It is important to help students understand that when discussing stormwater, we're talking about freshwater. There are many ways to explore this topic. Two ideas are listed here.

1. Taste Test Saltwater and Freshwater

This is an easy and quick way to engage students using their sense of taste.

2. [The Water Cycle](#)

This is an important place to start and helps students understand the fundamentals of one of earth's life-sustaining processes.



Watershed drawing by student

B. Step 2: Understanding Schoolyard Surfaces - Get Students Curious

Outdoor experiments are an engaging way for students to observe and evaluate a variety of surfaces and slopes in their schoolyard, and for teachers to connect various science and

math concepts. Students can investigate water flow patterns as well as the permeability or impermeability of surface materials. Equipped with more knowledge and questions, students will be better prepared to propose solutions and be watershed stewards at their school and in San Francisco Bay.

1. [Investigate Different Surfaces and Slopes Outdoors](#)

In these experiments, students test different schoolyard surfaces and different slopes to observe the behavior of water. This activity is from "Science in the Schoolyard" from the Boston Schoolyards Initiative.

2. [Rainy Day Investigation \(page 160\)](#)

See "Follow the Water" activity for an activity from The Trust for Public Land where students go outside when it's raining or just afterwards to map the movement of water in their school, while learning the locations of drain pipes, gutters, and storm drains.

3. [Experimenting with Runoff \(PDF page 21, document page 16\)](#)

See "When Rain Hits the Land" from the Save the Bay Watershed Curriculum. This is a series of experiments on water runoff and percolation.

Dive Deeper

4. [Calculate Surface Runoff Area and Volume](#)

Grade 5-8. This math activity provides guidance on measuring schoolyard surface area and calculating surface runoff based on local rainfall patterns. This activity is called "Follow the Drop" from Earth Partnership for Schools.

5. [Measuring Slopes in the Schoolyard \(page 42-45\)](#)

Grade 6-8. In this math activity, students measure slope and percent slope in their schoolyard and potentially use it for planning a rain garden. This activity is from Earth Partnership's Rain Garden Curricular Sampler.

6. [Permeability of Materials](#)

Grades K-8. These are experiments on permeability and volume of water that drains through a surface. These activities are from Teach Engineering.

7. [Exploring the Flow of Water through Soils: Infiltration and Absorption \(PDF page 37-41 and page 31-35 in document\)](#)

Grades 6-8. These experiments use a cut-can infiltrometer to investigate the infiltration of soils in natural school yard areas. This activity is from Earth Partnership's Rain Garden Curricular Sampler.

8. [Watershed Walk Worksheets \(page 1-4\)](#)

Grades K-5. These guided questions provide more structure, if needed, to investigate where water goes in the schoolyard and environs. This activity is from Arizona State University's Ecology Explorers program.

C. Step 3: Watersheds - Understand the Big Picture

Make a watershed model in your schoolyard to understand how stormwater runoff from your school ends up in creeks, San Francisco Bay, and the ocean. Working outdoors is a much easier place to make a watery mess! These models can be set up in small groups or done as one large demo. Some examples of models are below.

1. [PBS Kids](#)

Build a Watershed video.

2. [Make a Watershed Model from Skidmore](#)

Lesson plan PDF.

3. [Earthlabs/NOAA](#)

Make a Watershed Model write-up.

D. Step 4: Water Transport of Pollution - Understanding the Problem

The watershed model can next be used to investigate how pollution is transported by water and into creeks and San Francisco Bay. The possible sources of pollution are also important to understand. Food coloring is a good option. Remember not to use polluting materials (such as glitter or other synthetics) outdoors.

1. [Video Teacher Guidance from Plum Landing](#)

This is a three-minute video to help teachers visualize set-up for this activity.

2. See, Think, Wonder

Grades K-8. This includes two posters that can be used to kick off discussions of urban sources of pollution and to brainstorm solutions.

- See [Solutions to Pollution PDF](#) from Flows to Bay
- See [Drain Rangers Elementary Curriculum](#) for the poster on page 21

3. [Where is the Pollution Coming from?](#)

Grades K-8. This has a short worksheet for matching pollution to its sources. See Activity 1 by Columbia RiverKeeper.

4. [Pollution Soup \(PDF page 52, document page 46\)](#)

Grades K-8. Using a jar of clean water, students 'pollute' it with a variety of materials that mimic real-world pollutants so they can see the changes first-hand. Find this activity in the Watershed Stewardship Curriculum from the SF Public Utilities Commission.

E. Step 5: Pollution in the Food Chain - Understanding the Problem

This section addresses the movement of pollution through aquatic food chains to help build an understanding of how different species in San Francisco Bay and the ocean may be affected by polluted stormwater. Lesson links include outdoor food chain games as well as resources for researching what species live in San Francisco Bay.

1. [Food Web Outdoor Tag \(page 129\)](#)

Grades 2-5. In this version of the game of Tag, students act out different trophic levels in an ecosystem. Rounds can be modified to mimic different environmental conditions, including pollution or improved water quality. This activity is from Greening of Detroit.

2. [Sea Lion Food Chain Game](#)

This version of the game of Tag simulates the food chain of sea lions, anchovies, and plankton in San Francisco Bay and how it can be affected by a variety of scenarios. See lesson 2 in Aquarium of

the Bay's 7th Grade Teacher Resource Guide.

3. [Web of Life \(page 110\)](#)

Grades K-8. This classic food web activity using a ball of string can be taken outdoors. The activity demonstrates the interconnections between all living things and can be used to model disruptions to the system. This activity is offered by Green Schools Ireland.

4. [Wetland Habitat and Food Chain Activities](#)

Grades K-8. Guidance on making wetland dioramas and food chains. This activity is from San Francisco Bay Wildlife Society.

5. [Human Impact in the San Francisco Bay Watershed](#)

This teacher guide was written for grade 6, but it has useful background information for teachers of all grade levels looking to dive deeper. This resource is from Aquarium of the Bay.

F. Step 6: Solutions - Putting It All Together

Soil and other permeable surfaces in the schoolyard allow stormwater to slow, spread, and percolate down through the schoolyard into groundwater instead of running off into creeks and San Francisco Bay. Through this process, many pollutants are filtered out. Students can brainstorm solutions and/or view rain garden design plans.

1. [Stormwater Filtration Experiment \(page 169\)](#)

Grades K-8. This experiment demonstrates the movement of water through permeable surfaces and the filtration of possible pollutants. The system can be pre-built for younger grades. This activity is from California State University, Chico.

2. **Water and Erosion in Different Ecosystems** (page 132)

Grades K-8. This experiment with vegetated and unvegetated soils allows students to visualize what happens to water runoff in a variety of situations. This activity is from Education Outside.

- [Demo video](#)

3. **Student Survey of the Schoolyard**

In this activity, students fill out a stormwater 'report card' and give points to a variety of features in their schoolyard as they assess what happens to rainwater runoff. This activity is from Save the Bay.

4. **Schoolyard Water Assessment Worksheet** (PDF page 15, document page 13)

This assessment is from Project Learning Tree.

5. **Calculate Water Filtration in Natural Areas**

Grades 6-8. In this math activity, students measure the area of a garden or other natural area with permeable surfaces to calculate how much water is filtered by these areas. This activity is from The Nature Conservancy.

6. **Role of Plants in Water Filtration**

Grades 4-7. In this activity from the U.S. Environmental Protection Agency (EPA) students experiment with different types of simulated pollution to test soil and plants' ability to filter water.

7. **Video of Green Stormwater Features**

From Santa Clara Urban Runoff Pollution Prevention Program



Hands-on learning

Dive Deeper

8. **Removing Nitrogen and Phosphorus Pollution - Experiments** (page 110)

Grade 8. This activity comes from the Drain Rangers Curriculum for Secondary School from Puget Sound Starts Here.

9. **Rain Garden Location Planning** (page 17)

Grades 4-8. "Noting Notable Features" guides student teams around the schoolyard. This activity is from the University of Wisconsin's Earth Partnership's Rain Garden Curriculum Sampler.

10. **How Water Works in your Garden**

Grades K-12. This set of activities is from The Nature Conservancy.

IV. Additional Curriculum Ideas and Resources

Below are some additional resources and possible local field trips that build on the suggested curriculum above.

A. Additional Curriculum Resources

- [SFPUC: K-12 Water Stewardship Curriculum](#)
- [Puget Sound Starts Here: K-5 Drain Ranger Curriculum Guide and 6-8 Engineering Solutions Guide](#)
- [Earth Partnership: K12 Rain Garden curriculum](#)
- [Claremont Soil and Water Conservation District: K12 Rain Garden Activity Guide](#)
- [Groundwater Foundation](#)
- [US EPA: Exploring Your Watershed](#)
- [CA Department of Water Resources: K12 Water Units](#)

B. Field Trips and School Classroom Visits

- [Kids for the Bay](#)
- [Don Edwards San Francisco Bay National Wildlife Refuge](#)
- [Save the Bay Student Programs](#)

C. SF Bay

- <https://baykeeper.org/>
- <https://savesfbay.org/>

D. To Purchase

- [Project Wet: Maps, Educator Guides, and Children's Activity Guides](#)

V. San Mateo County Resources

The San Mateo County Office of Education's Sustainability program supports a Teacher Fellowship called The Environmental Solutionary Teacher Fellowship. The fellowship is a knowledge-to-action program that builds teacher capacity for designing and delivering learning experiences that are student-centered, problem-project-based, solutions-oriented, and integrates real-world environmental justice issues. Teachers can learn more about this program at the link below.

- [SMCOE Solutionary Teacher Fellowship Program](#)

VI. Conclusion

The Resilient San Carlos Project offers teachers opportunities to take learning outside and connect lessons and activities to real-world issues and solutions. The concepts outlined above are easier to approach in the outdoors on schoolyards where activities can be messy and wet, if needed. Going outdoors also allows students an opportunity to see first-hand how their watershed works and how their school is part of the solution by including stormwater management infrastructure.

CHAPTER 5

FUNDING, PRIORITIES, AND MAINTENANCE

I. Funding Opportunities

- A. Federal Funding Sources
- B. State Funding Sources
- C. Regional Funding Sources and Partnerships
- D. District Funding
- E. Foundation Funding
- F. Grant Funding for Resilient Schoolyard Elements through Non-Governmental Organizations

II. Priorities

- A. Arundel Lower Elementary School
- B. Mariposa and Tierra Linda Schools

III. Maintenance and Stewardship Considerations

CHAPTER 5: FUNDING, PRIORITIES, AND MAINTENANCE

Advancing from a concept plan drawing to a fully constructed, enjoyed, utilized, and maintained Resilient Schoolyard takes many necessary steps that are beyond the scope of this project. As conveyed by the Resilient Schoolyards process graphic below, from “start to finish” these steps are:

1. Master planning (this project)
2. Fundraising
3. Detailed Design and Permitting
4. Construction
5. Maintenance and Stewardship (on-going)

As these projects move forward, collaborative fundraising is the next key and crucial step. This step includes everything from grant applications to incorporating these plans in the District Master Planning project that is currently underway. There is a broad range of approaches that are detailed below in Section I. Funding Opportunities. Potential stakeholders for fundraising include: SCSD (particularly the Board, Facilities Department, and Principals / Committees at each school), key external partners such as C/CAG and COE, and the Cities - both San Carlos and Belmont.

Due to the scope of the campus-wide Resilient Schoolyard Concept Plans and the process of evolving Resilient Schoolyard Programs over time, it's important to consider setting near and longer-term priorities and to phase project implementation. Priorities for each site were developed working with the Stakeholder Advisory

Committee for each school and are detailed below in Section II: Priorities.

As fundraising proceeds with the support of the school communities and partners, portions of the scopes of work detailed in the Concept Plans can be defined for development based on applicable funds, current estimates for cost of construction, priorities set by each school community, and other logistical factors such as construction sequencing considerations. Construction may encompass many phases as detailed below. Projects that require permitting would include the following steps: detailed construction documents for permit approval with the Division of State Architect, permit approval and bidding (hiring a contractor) and construction. Smaller projects may be much simpler to plan out and construct, and may even be volunteer built, but should seek SCSD approval before being developed. These projects, such

as small rain gardens, tree planters, etc., would require limited funds, not require structural review or complex irrigation plans, and would not trigger ADA accessibility or egress requirements.

Following construction, Resilient Schoolyards will require ongoing support and stewardship. Schoolyards need to adapt over time as they evolve through Modernization, as schools replace materials such as asphalt with a stormwater feature or engineered wood fiber to create a nature-based infrastructure or exploration area. Resilient Schoolyards are designed living systems that go far beyond asphalt, rubberized playgrounds, and chain link fencing. These systems

provide many benefits and in exchange need more frequent and more specialized maintenance and stewardship than what is currently required by most campuses. This maintenance and stewardship is defined further below in Section III: Maintenance and Stewardship Considerations and requires an engaged facilities staff and school community working in harmony.

This chapter focuses on strategies to get to these next steps by summarizing funding opportunities, working with each school to set their priorities, and reviewing basic maintenance to get the conversation going on how to add living systems in a public school district.



Phasing diagram from ideas to implementation

I. Funding Opportunities

The integrated nature of the Resilient Schoolyard program—one designed to be multi-beneficial with goals for resiliency by tying separate design elements into an approach for holistic schoolyard improvements—broadens the availability of grant opportunities to fund more complex design projects. Funding options for Resilient Schoolyards can come from: grants (Federal to local), partnerships with other NGOs; School District Bond and Modernization projects; a partnership via an MOU or other format with the City of San Carlos for schoolyard/park improvements; a partnership with the City of Belmont for Belmont Creek watershed improvements; foundations; and from PTA fundraising. For example, a lawn and nature play zone that replaces asphalt blacktop would be an obvious candidate for a living schoolyard grant. However, by designing it as a component of impervious reduction and linking it with a downstream water quality treatment train, the entire project could also qualify for water quality and other natural resource agency funds. Similarly, a cistern and rain garden would be a choice candidate for water quality funding programs, but highlighting a component for outdoor learning could increase funding opportunities and turn the rain garden into usable social space.

To help schools streamline the process of developing grants which can often be a time-consuming and cost-constrained process, the tables and descriptive relationships and possible

funding streams below have been developed as a tool to pre-identify applicable grants. Funding programs in the tables are divided into three categories that address the overall vision and goals of the Resilient Schoolyard program. While all funding opportunities listed in the tables were selected with the intent of broadly applying to any proposed project through the Resilient Schoolyard program, the resiliency category can help schools tailor the application process to what the proposed project may emphasize on.

Resiliency Categories for funding considerations:

- **Climate resilience** to improve environmental well-being by mitigating impacts through design measures, such as through stormwater management, urban heat island reduction, flood reduction, or ecological preservation
- **Social resilience** to improve community well-being by strengthening connections between each other and the environment, such as through increased opportunities for community interaction, environmental stewardship, and outdoor education
- **Health resilience** to improve individual well-being by encouraging active recreation and opportunities to be engaged in physical activity

A. Federal Funding Sources

TABLE 1: Potential Federal Funding Sources

Funding Entity	Funding Program	Overview/Funding Focus	Available Funding (in most recent cycle)	Resiliency Category
U.S. Environmental Protection Agency	Water Quality Improvement Fund Grants / BIL Funds	Projects delivering environmental and public health benefits for communities with environmental justice concerns; building resilience in underserved communities	Total \$5M available per year for 5 years; \$200K - \$1M per project	Climate
	Water Quality Improvement Fund Grants	Protecting and restoring San Francisco Bay watersheds and wetlands, with a focus on water quality results, such as restoration of impaired waters and enhancement of wetland habitats	Total \$24M available; \$1-3M per project	Climate
	Clean Water State Revolving (additional Bipartisan Infrastructure Law funds)	Water infrastructure and water quality improvement projects, including stormwater, water conservation, and watershed projects	Varies	Climate
U.S. Department of the Interior	Great American Outdoors Act	Preserve critical lands, protect critical watersheds, and enhance public access to lands for recreation	\$900M	Climate
			per year	Social
	Living Schoolyards Act	Re-envision school yards as connections to nature and to provide spaces for hands-on learning and recreation connected to outdoor education.	Undergoing congressional approval;	Social
			contact congress person to vote for the Act	Health

B. State Funding Sources

TABLE 2: Potential California State Funding Sources

Funding Entity	Funding Program	Overview/Funding Focus	Available Funding (in most recent cycle)	Resiliency Category
Dept. of Water Resources	Prop 1	Projects that support integrated water management, including stormwater management, water conservation, water supply, etc.	Total \$65M available for Bay Area projects	Climate
	Integrated Regional Water Management			
	Urban Streams Restoration Program	Convert hard-lined urban creek channels to protect, enhance, and restore the natural and ecological value of streams; Naturalize drainage flows into urban creeks through bioswales	\$12.4M total program funding	Climate
Natural Resources Agency	Urban Greening Grants	Greening and urban forestry projects that reduce greenhouse gas emissions and provide multiple benefits	Total \$47.5M available;	Climate
			no minimum or maximum grant amounts	Social
CalFire	California School Forest System sm	Create schoolyard forests by increasing tree canopy cover to directly shade students and mitigate rising temperatures in climate change; build environmental literacy by fostering forest stewardship	\$150M	Climate
			over the next three years	Social
Coastal Conservancy	Prop 68	Strengthen communities' ability to adapt to unavoidable climate change impacts such as water retention, drought tolerance, landscape resilience, habitats, and develop future recreational opportunities	\$5.7M	Climate
	San Francisco Bay Area Conservancy Program Climate Adaptation Funds		total program funding	Health

TABLE 2: Potential California State Funding Sources, continued

Funding Entity	Funding Program	Overview/Funding Focus	Available Funding (in most recent cycle)	Resiliency Category
	Clean Water State Revolving (additional Bipartisan Infrastructure Law funds)	Water infrastructure and water quality improvement projects, including stormwater, water conservation, and watershed projects	Varies	Climate
Wildlife Conservation Board	Riparian Habitat Conservation	Protect, preserve, and restore riparian habitats to promote native vegetation restoration and natural hydrology of waterways	\$3M over four years	Climate
	Monarch Butterfly and Pollinator Rescue	Protect, sustain, and aid recovery of populations of monarch butterflies and other pollinators by creating suitable habitats for them; offers a chance for outdoor education on pollinators	\$5M over four years	Climate Social
	Climate Adaptation and Resiliency	Provide assistance for local conservation efforts focused on resilience towards projected climate impacts, including protecting and restoring native ecosystems, water quality improvements, carbon sequestration, and associated project co-benefits (social, environmental, economic)	\$2M	Climate
				Social
CA Dept. of Education	After School Education and Safety	Created for after school partnerships between schools and communities; education enrichment	\$1.7M	Social
		programs may involve physical activity and general recreation, health/nutrition promotion, and community service-learning	for FY '22-23	Health

C. Regional Funding Sources and Partnerships

TABLE 3: Funding Sources and Partners

Funding Entity	Funding Program	Overview/Funding Focus	Available Funding (in most recent cycle)	Resiliency Category
Community Foundation of San Carlos	Each Green Corner	Provide grants for educational programs, outdoor education, and vegetable gardens	\$4K-\$10K	Social
			per project	Health
San Mateo County Office of Education	Living Schoolyard Grant	Support living schoolyard developments to diversify play opportunities, enhance ecological benefits of school grounds, and access to quality green spaces for children	\$5K	Social
			per project for FY '22-23	Health

Four Corners Project - The Cities of Belmont and San Carlos are currently working on the Four Corners Project to address traffic congestion along Alameda de las Pulgas. The project includes adding a roundabout at the intersection of Alameda de las Pulgas and San Carlos Avenue. In order to construct this the cities would need to extend into San Carlos School District property. When the school district works with the cities to develop this project, funding for construction associated projects on site such as a bike and pedestrian path, realignment of parking, and possible relocation of the facilities may be a consideration.

Partnering with the City of San Carlos - In addition to the Four Corners Project SCSD may consider partnering with the City for continued maintenance for areas accessible to the public after school hours such as the fields at Tierra Linda Middle School.

Continue partnering with C/CAG to apply for

grants for future projects such as the one that funded this conceptual work and community engagement.

Continue partnering with the San Mateo County Office of Education on a district scale for sustainable and climate ready schools initiatives, guidance and support for outdoor curriculum and opportunities for grant partnerships beyond the funding listed in the associated table.

D. District Funding

Modernization projects, building renovation, new buildings, and associated landscaping to bring facilities up to modern code standards are funded with 60% of the costs being covered by the State of California and 40% of costs paid for by the school district. These campuses are currently not scheduled for any Modernization work. The improvements and schedule are determined by the

Facilities Department and will be clearly laid out in the District Master Plan.

Voter Bonds are specifically defined projects that can be developed in a District Master Plan and/or work such as the Resilient Schoolyards plans. This project and the Resilient Schoolyard concept plans and report can help advance the overall schoolyard greening process the District is currently undergoing as it updates its District Master Plan. The goals and objectives from this report could influence the development of the District greening policy and the concept plans could be integrated into the recommendations for improvements at each site. Voters have considered hundreds of propositions for public infrastructure projects throughout the state of California. Bond financing is a type of long-term borrowing that finances a particular project. An example is the recent Measure W that passed for Sequoia Union High School District. The Resilient San Carlos Schoolyard Plans should be integrated into the District Master

Plan and the priorities in the Master Plan can be written into a voter bond for an upcoming election.

E. Foundation Funding

Foundations are a good source for funding and include local examples such as Silicon Valley Community Foundation, Pisces Foundation or WaterNow Alliance which currently has a project accelerator based on sustainable water management.

F. Grant Funding for Resilient Schoolyard Elements through Non-Governmental Organizations

There are many smaller grants for gardens and outdoor classrooms that are easy for schools to apply for. Some of these include Kid's Gardening, Life Lab, Whole Kids, Edible Schoolyard, and Big Green. Green Schoolyards America often update possible funding on their website.

II. Priorities

This section outlines the priorities identified by each school based on an understanding of what is possible from a funding perspective, what would make a significant and beneficial impact to the site, and considerations for construction. Developing a phasing implementation plan with each school makes improvements possible to be added over realistic time periods and within funding and school resource availability. The priorities listed are based on discussions with each of the SACs and school input.

A. Arundel Lower Elementary School

Upper Yard

1. Take advantage of natural landscape elements in particular the hillside to incorporate play elements such as a slide. Establish new nature zone areas to encourage exploration, nature play and learning.
2. Improve and increase opportunities for play by adding and spreading out play equipment so more children can simultaneously engage in play. Play equipment such as an obstacle course that challenges and develops children's motor skills are of particular interest.
3. Transform areas of the upper yard by painting the asphalt surfacing with a playful and colorful design to provide opportunities for ball play and reduce ambient air temperature.
4. Increase tree canopy to create much needed shade and more comfortable spaces.

Lower Yard

1. Transform an area of the lower yard by painting the asphalt surfacing with a playful

and colorful design to provide opportunities for ball play and reduce ambient air temperature.

2. Incorporate seating into the hillside which can be used for outdoor assemblies and teaching larger groups.
3. Add an outdoor covered classroom in the garden to create an improved environment for outdoor learning.
4. Incorporate nature seating options and add more natural elements that encourage imaginative nature play and physical activity.
5. Improve circulation in the lower yard by removing parts of the asphalt and adding permeable and accessible walking paths.

Climate Resilience

1. Improve grass areas in both the upper and lower yard with Eco-Mat subsurface irrigation. Relocate the grass area in the upper yard from the low point of the yard to a more optimal location to address drainage issues.
2. Add a watershed map onto the surface of the school as an educational tool to teach students about water management and other climate issues.
3. Remove asphalt and add a bioswale and regional stormwater treatment system at the southernmost entry point to the school by San Carlos Avenue. This could also present an opportunity to create a small playground for younger children on top of the new surfacing which would be open and accessible by all in the community. In addition, include smaller distributed opportunities for stormwater features throughout the rest of the campus.

B. Mariposa and Tierra Linda Schools

Whole Campus

1. Apply for a grant to replace turf with the EPIC system for climate resilience and community.
2. Work with the City on the Four Corners project to integrate improvements on site including providing safe and easy pedestrian and cyclist access to the campus and possibly relocating the maintenance and parking / vehicular access along Alameda de las Pulgas. This work may possibly move facilities to another location and off site. If parking is realigned, include the Learning Forest with priority 3 below.
3. Plant trees with district funds, PTA funds, and/or the CalFire state funds for California Schoolyard Forest Systems. Plant trees that provide seasonal shade and year round wind buffers (along the western edge of the site) in areas where all students have access to the site, particularly around the asphalt which gets very hot. This could include the trees along the eastern edge of the field. Start planting young trees near the mature trees along Alameda de Las Pulgas - area 21 - and the western property line near the turf field to provide wind buffers to this large open area for sports.
4. Turn the campus identity and activity towards the creek and make stormwater visible including a bioretention rain garden. The work could be funded by many of the stormwater grants listed above.

Mariposa Upper Elementary School

1. Turn the campus activity and identity towards the creek and remove the fence at the lunch area. Removal of the fence could be

completed by an outside contractor or district maintenance.

2. Remove some of the asphalt, plant some trees, and create an outdoor classroom area along the creek. This work would need to apply for a grant and could involve the community in invasive plant removal and native planting days.
3. Improve the play equipment options in this yard for play quality and inclusivity.

Tierra Linda Middle School

1. Improve the Quad to support socializing, be comfortable, and act as the center for the Tierra Linda school. Remove some of the impermeable surfaces, add trees for seasonal shade, create niches for socializing, and provide furnishings that support outdoor learning and activities.
1. Replace the existing play structure with play equipment that is more age appropriate. Choose equipment that provides places to be seen but not heard; places to be high or perch; and places to hangout.

Climate Resilience

1. Include a regional stormwater retention cistern under the asphalt play area.
2. Integrate a stormwater management EPIC system below the field to treat and improve rainwater collection at a regional scale and lower the schools' water need for irrigation. EPIC systems also help moderate air temperatures locally, ameliorating conditions for children playing on the field, including directly following a rainstorm.

3. Replace (approximately 35,000 square feet of) impervious surface with permeable paving strategies to help replenish ground water and prevent infrastructure damage during large storm events.
4. Daylight, integrate stormwater BMPs at the low point of it on site and remove invasive plant species and naturalize the creek to help strengthen native planting and support riparian habitat.
5. Add tree canopy throughout the site with climate-adapted trees to provide seasonal shade, lower air temperatures, and encourage filtration.

III. Maintenance and Stewardship Considerations

Designing and building a Resilient Schoolyard is exciting and inspiring, but after the ribbon cutting, the deeper work of caring for and maintaining these dynamic, organic spaces begins. Core areas of maintenance needed for Green Infrastructure on schools includes stormwater, elements and living turf fields. The maintenance of these spaces needs to be a group effort. It takes a village. This can include:

- District grounds staff with training for the new elements. Training could be incorporated into the construction budget of new elements;
- City staff, if using spaces as a park, the City could provide and work with the school district on taking care of the shared public spaces such as the turf fields;
- Funding from construction projects could include contractors maintenance for portions of the landscape during the establishment phase (2 to 5 years);
- Non-Profit groups and other agencies can act as stewards for specific elements related to their mission such as C/CAG’s green streets stewardship pilot program.
- Utilizing the many resources C/CAG has created such as the Green Infrastructure Design Guide on schoolyard maintenance ([LINK](#)), the maintenance video created by Urban Rain Design ([LINK](#)) with its framework of the “Essential 8” maintenance requirements;
- School stewardship which is community-driven and should be woven into the overall culture of a school as much as possible. The school stewards includes the site administration, teachers, parents, caregivers, community



Students watering plants



Students and volunteers planting a pollinator garden



Municipal staff working on plant maintenance

members and anyone else involved in the Resilient Schoolyard at San Carlos School District.

Like any other institution, schools are held together by relationships among people and place. Ongoing and sustained relationships and stewardship requires strong relationships between members of the school community, the District, other agencies, as well as with the natural world that exists in the schoolyard.

As each school campus develops portions of their Resilient Schoolyard, maintenance and stewardship should be discussed and reviewed. During the design phase the landscape architect or designer should review their design with the District, City, non-profit, school community stewards or other responsible party to determine if the proposed design can be sustainably maintained, who will “own” the maintenance, what are the potential added costs, and does the proposed design require training. The responsibilities should be reviewed with each design submission during the technical drawing phase.

Roles and responsibilities should be outlined between all parties via a maintenance plan and maintenance contract, as applicable. Areas should be clearly delineated on a site plan for all parties. The school community stewards, which may change from year to year, should review their roles and responsibilities of the schoolyard with the District annually. Having a basic understanding of “Green Stormwater Infrastructure” maintenance activities and frequencies will help Resilient Schoolyard champions develop the more detailed design plans with district architects and ensure long-term maintenance is planned for and implemented into the overall program. Many practices are as simple as observing the facilities before and after rain to see that inlets and outlets

are functioning properly, checking for sediment and debris build up, proper plant health, irrigation needs and soil amendments/mulching. C/CAG’s GI Design Guide and “Essential 8” short maintenance video are great resources to help school and district staff and community stakeholders get a basic understanding of the foundation for proper Resilient Schoolyard maintenance for Green Stormwater Infrastructure. With these tools in hand, any school can become a Resilient Schoolyard champion.

“The Essential Eight”

- Perform visual assessments **every month** throughout the year
- Remove trash and organic debris **every month**
- Remove sediment build up **during rainy season**
- Hand weed the landscape **every three months**
- Properly trim plants **every six months** or as needed
- Check irrigation system function **during dry season**
- Maintain an adequate mulch layer and erosion control **year round**
- Replace plants, as needed, in **early spring or late fall**

APPENDICES

A. School Site Studies

B. Questions to Finalize Site Selection

C. Student Workshops

D. Photo Credits



APPENDIX A: SCHOOL SITE STUDIES

1. Arroyo Elementary School

- Site - Shared space with Central Middle School, 4.16 acres, grades 4-5, 284 students
- Regional open space relationships - Near Burton Park
- Ecological factors - 6% tree canopy and approximately 66% of site has impervious surfaces
- Watershed - Pulgas Creek Watershed
- Stormwater factors - 2.75 acres of impervious surfaces and no regional potential
- Human factors - Unknown
- Learning elements - Garden and outdoor classrooms
- Funding towards Resilient Schoolyards - Each Green Corner



Arroyo Elementary School Aerial

2. Arundel Elementary School

- Site - 7.29 acres, grades PK -3, 409 students
- Regional open space relationships - Near Arguello Park
- Ecological factors - 2% tree canopy and approximately 62% of site has impervious surfaces / adjacent creek
- Watershed - Pulgas Creek Watershed
- Stormwater factors - 3.43 acres of impervious surfaces and regional potential
- Human factors - Principal is interested in Resilient Schoolyards
- Learning elements - Garden, nature area, and some outdoor classrooms (K yard)
- Play areas - Mostly ball play
- Funding towards Resilient Schoolyards - Each Green Corner



Arundel Elementary School Aerial

3. Brittan Acres Elementary School

- Site - 7.10 acres, grades PK -3, 393 students
- Regional open space relationships - none
- Ecological factors - 28% tree canopy and approximately 54% of site has impervious surfaces / adjacent creek
- Watershed - Greenwood Drainage Watershed
- Stormwater factors - 3.83 acres of impervious surfaces and no regional potential
- Human factors - Unknown
- Learning elements - 22 courtyards and nature area
- Play areas - Variety of options
- Funding towards Resilient Schoolyards - Unknown



Brittan Acres Elementary School Aerial

4. Central Middle School

- Site - Shared space with Arroyo, 4.37 acres, grades 6 - 8, 501 students
- Regional open space relationships - Near Burton Park
- Ecological factors - 2% tree canopy and approximately 62% of site has impervious surfaces / adjacent creek
- Watershed - Pulgas Creek Watershed
- Stormwater factors - 2.71 acres of impervious surfaces and no regional potential
- Human factors - Principal is interested in Resilient Schoolyards
- Learning elements - Garden
- Play areas - Mostly ball play
- Funding towards Resilient Schoolyards - Each Green Corner



Central Middle School Aerial

5. Heather Elementary School

- Site - 14.35 acres, grades PK-3, 304 students
- Regional open space relationships - Adjacent to Heather School Park
- Ecological factors - 2% tree canopy and approximately 46% of site has impervious surfaces / adjacent creek
- Watershed - Greenwood Range Watershed
- Stormwater factors - 6.60 acres of impervious surfaces and no regional potential
- Human factors - Unknown
- Learning elements - Eight small gardens
- Play areas - Mostly ball play
- Funding towards Resilient Schoolyards - Unknown



Heather Elementary School Aerial

6. Mariposa Upper Elementary School

- Site - Shared vehicular areas with San Carlos Charter School and Tierra Linda Middle School; Shared schoolyard space with Tierra Linda Middle School; 5.26 acres, grades 4-5, 314 students
- Regional open space relationships - Adjacent to McDougal park
- Ecological factors - 2% tree canopy and approximately 46% of site has impervious surfaces / adjacent creek
- Watershed - Belmont Creek Watershed
- Stormwater factors - 2.37 acres of impervious surfaces and no regional potential
- Human factors - Principal is interested in Resilient Schoolyards
- Learning elements - Outdoor classrooms
- Play areas - Mostly ball play with nature play area



Mariposa Upper Elementary School Aerial

- Funding towards Resilient Schoolyards - Each Green Corner and Four Corners Project?

7. San Carlos Charter School

- Site - Shared vehicular areas with Mariposa Upper Elementary School and Tierra Linda Middle School; 4.76 acres, grades K-8, 384 students
- Regional open space relationships - Adjacent to McDougal park
- Ecological factors - 1% tree canopy and approximately 32% of site has impervious surfaces / adjacent creek
- Watershed - Belmont Creek Watershed
- Stormwater factors - 1.52 acres of impervious surfaces and no regional potential
- Human factors - Principal is interested in Resilient Schoolyards
- Learning elements - Outdoor classrooms and habitat area
- Play areas - Variety of spaces
- Funding towards Resilient Schoolyards - PTA and Four Corners Project?



San Carlos Charter Learning Center

San Carlos Charter School Aerial

8. Tierra Linda Middle School

- Site - Shared vehicular areas with Mariposa Upper Elementary School and San Carlos Charter School; Shares schoolyard space with Mariposa Upper Elementary for Physical Education; 9.28 acres, grades 6-8, 500 students
- Regional open space relationships - Adjacent to McDougal park
- Ecological factors - 15% tree canopy and approximately 67% of site has impervious surfaces / adjacent creek
- Watershed - Belmont Creek Watershed
- Stormwater factors - 6.22 acres of impervious surfaces and has regional potential
- Human factors - Principal is interested in Resilient Schoolyards
- Learning elements - Outdoor classrooms and habitat area
- Play areas - Mostly ball play
- Funding towards Resilient Schoolyards - Each Green Corner and Four Corners Project?



Tierra Linda Middle School

Tierra Linda Middle School Aerial

9. White Oaks Elementary

- Site - 3.62 acres, grades PK-3, 310 students
- Regional open space relationships - Greenway between campus
- Ecological factors - 16% tree canopy and approximately 64% of site has impervious surfaces



White Oaks Elementary

White Oaks Elementary School Aerial

- Watershed - Cordilleras Creek Watershed
- Stormwater factors - 2.32 acres of impervious surfaces and no regional potential
- Human factors - Active Green Team
- Learning elements - Unknown
- Play areas - Variety of play spaces
- Funding towards Resilient Schoolyards - Unknown

APPENDIX B: QUESTIONS TO FINALIZE SITE SELECTION

After the analysis the District had more than three sites that appeared equal. The Consultant Team developed a series of “off-ramp” questions to finalize the selection. These questions could be used by any District if there was no clear site after reviewing the site analysis and metrics. The questions and instructions are provided below.

To analyze each site, go through the following questions in order. For each numbered question (i.e. 1a) ask the overarching question and supporting question(s) in italics. If the answer to the question(s) for a given school is “off ramp” then discontinue analyzing the school as a possible site for the Resilient Schoolyard Master Plan study. If the answer is “continue on” then continue to the next set of questions. Go through the questions until you end up with the number of schools identified by your project to receive a master plan. If you go through all the questions and still have more eligible schools than capacity for the project, further analysis will be required. Throughout the process the underlying question is always - Will the intervention benefit the children directly? This can be part of the further analysis as well as elaborating on answers where possible such as the amount of funding available, number of years the Principal has demonstrated support, and a number of teachers currently teaching outside.

1. Site Leadership

1a. Is the site Principal interested and supportive of Resilient Schoolyard benefits?

Is the Principal supportive of Resilient schoolyards for outdoor learning, ecology, and varied play environments? Further analysis: If so, how have they demonstrated this support? And for how long?

Yes (continue on)

No (off-ramp)

2. Need versus Possibility

2a. Site

- 2a1. Does that site include significant constraints that would preclude or make it significantly expensive to modify the yard to be a Resilient Schoolyard? These may include: (a) hazardous materials in asphalt or soil such as lead or serpentinite (naturally occurring asbestos); (b) underground utilities in key locations that prevent improvements; (c) fire lane covering a majority of the area; or (d) other constraints.

Yes (off-ramp)

No (continue on)

- 2a2. Will the site easily support stormwater and resilient schoolyard improvements?
 - Is there a water body such as a creek onsite for learning access?
 - Is there a channelized / underground creek on site?
 - Is the site large enough to accommodate changes?

Yes, there is a channelized or above-ground creek on site, or another water body, or the site is large enough to accommodate changes (continue on)

No (off-ramp)

2b. Positive Student Impact

- 2b1. How much will the students benefit at this site in comparison to other District sites? Is the site currently hotter and less shaded in the areas accessible to children than the other sites within the District? Is the site more paved?
 - What percentage of the site is paved compared to other schools in the district?
 - What is the site's heat island comparison in relation to other schoolyards in the District
 - What is the potential to increase access to shade on site?
 - What is the existing tree canopy site wide?
 - What is the Child-Accessible Tree Canopy™?
 - Is the school burdened by multiple sources of pollution? How does its CalEnviroScreen pollution burden percentile compare to other schools in the District?

Schools with high potential for positive impact (continue on)

Schools with low potential for positive impact (off ramp)

- 2b2. How many students will be impacted and how many of those are vulnerable students?
 - How many students attend the school?
 - Are the students considered particularly vulnerable? (Look at Free/Reduced-Price Meals, English Learners and Foster Youth, age of children and their vulnerability to heat.)

Schools with greatest potential for positive impact (continue on)

Schools with least potential for positive impact (off ramp)

- 2b3. What condition are the site and facilities in? Have they recently been upgraded (within the past 5 years)? Are they up soon for Modernization?
 - What types of funding are available for construction?
 - Upcoming Modernization
 - Other upcoming projects

Schools with most need for upgrades and/or upcoming Modernization (continue on)

Schools with recent improvements (off ramp)

- 2b4. What is the possibility of the site transforming into better learning grounds?
 - Are teachers excited to teach outside?
 - Can design changes to outdoor learning environments be easily integrated?

Yes (continue on)

No (off-ramp)

- 2b5. What is the likelihood that the play opportunities at the site will change significantly?
 - How much of the site is devoted just to ball play?
 - Would the supervision culture support changes a Resilient Schoolyard would bring to the grounds and allow children to access these areas during playtime?

Schools with areas devoted to ball play but with supervision culture supporting change (continue on)

Schools with a good variety of play environments and/or a supervision culture that will not support change (off ramp)

3. Agency Relationships and Community

3a. Does the site currently have partners or is it adjacent to other public agency land where future partnerships would be beneficial?

- Is there a nearby park or open space and are there possibilities for partnerships?
 - Is there a possibility for stewardship partnerships?
 - Is there a possibility for construction funding with partnerships?

Schools with beneficial adjacencies or potential partnerships (continue on)

Schools with no beneficial adjacencies or potential partnerships (off ramp)

3b. Is the current school community active, engaged, and supportive of changes a resilient schoolyard would bring?

- Is the community supportive and are there organized volunteer groups currently helping with the yard and outdoor programs?

Yes (continue on)

No (off-ramp)

3c. What is the value of positive impact to the community in relation to the school site (within 1/4 mile radius walking distance)?

- What is the density of the surrounding neighborhood?
- How much open space acreage is currently available?
- What amenities already exist at parks within a 1/4 mile radius?
- Is this site currently or could this site become accessible to the community during non-school hours?

Schools with highest density neighborhood, least amount of open space nearby, and a yard that can be accessible during off hours (continue on)

Schools in low density neighborhoods and with parks are a lower priority (continue on if no other schools)

Schools with many quality parks and a variety of amenities like a schoolyard nearby (off ramp)

4. Regional Value

4a. Does this site offer more regional benefits than other potential sites in the District?

- What is the site's location in the watershed?
- Is there an onsite tributary drainage area?
- What is the site's regional capture potential?

Is there parking on site? (A place to store regional capture)

Sites with more regional benefits (continue on)

Sites with fewer regional benefits (off-ramp)

At the end of these questions your site selection should be clear.

APPENDIX C: STUDENT WORKSHOPS

The information below provides detailed tabulation and more images of the drawings and input provided by the students at Arundel Lower Elementary School, Mariposa Upper Elementary School, and Tierra Linda Middle School from their separate workshops as detailed in Chapter 2: School Site and Community Engagement.

	Design Elements	Arundel ES (Grades K-3)	Mariposa ES (Grades 4-5)	Tierra Linda MS (Grades 6-8)
Sustainability	Pond	40	46	3
	Creek	24	77	10
	Rainwater Tank	4	10	1
	Pollution Clean-up		11	1
	Stormwater Management	5	11	
	Solar Panels	5		
Garden Features	Wildlife Garden	18	46	1
	Edible Garden	38	63	8
	Orchard	7	10	2
	Garden Infrastructure	4	16	3
	Trees and Forest	68	103	10
	Flowers	28	42	1
	Grass	60	57	5
	Bushes/"Greenery"	24	35	5
	Rock Garden		6	
	Farm Animals	22	13	

Table 4: Student workshop input

APPENDIX D: PHOTO CREDITS

All images in this report are from BAYTREE DESIGN's image archives unless credited below:

Cover	www.epictws.com
page 12	C/CAG
page 12	California School Campus Database
page 13	Green Schoolyards America, Sharon Danks
page 17	Randy Wiederhold (top image of children in garden)
page 21	SFPUC
page 22	www.flowstobay.org
page 29	Aerial image from Google maps
page 33	Aerial image from Google maps
page 34	Aerial image from Google maps
page 42	Aerial image from Google maps
page 48	Arundel Teacher
page 49 - 52	Drawings by students at Arundel, Mariposa, and Tierra Linda schools
page 57	SFRPD (top image of loose parts) SFPUC (middle image of dry creek) Richter Spielgeraete (bottom image of play equipment)
page 58	Kompan (top images) Trust for Public Land, Bothman (middle aerial image of sports court)
page 61	Stacy Levy: www.stacylevy.com (middle image of paving)
page 63	www.playground-landscape.com (top image of play elements in forest) Trust for Public Land, Amy Osborne (bottom image of painted asphalt)
page 64	Kevin Robert Perry: www.urbanraindesign.com
page 67	Kompan
page 68	Rooted in Place: www.rootedinplace.com (middle image of dry creek) EHDD Architects (bottom image of creek connections)
page 69	Sasaki Associates (top image of bioswale) Berger Partnership (bottom image of bioswale)
page 72	Kompan

- page 73 Kerry Logan, Nature Play Solutions (top image of High School quad)
www.epictws.com (bottom image of EPIC system)
- page 74 Gardens for Life: www.creategardensforlife.com (top image of creek in child's space)
- page 75 Kevin Robert Perry: www.urbanraindesign.com
- page 79 Ayesha Ercelawn
- page 82 Ayesha Ercelawn
- page 96 C/CAG (top image of students watering plants)
Randy Wiederhold, (middle image of planting a pollinator garden)
C/CAG (bottom image of staff working on maintenance)

Appendix A: All photo aerials diagrams based on Google Maps images