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Water Enterprise
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Executive Summary

In 2011 The Acorn Group began working with staff of the Water Enterprise of the San Francisco Public Utilities Commission (SFPUC) to develop an interpretive master plan for the Alameda Creek Watershed Center in Sunol (Center). Because interpretive planning, architectural design, and landscape architectural design are integral to this effort, The Acorn Group worked closely with the Sunol Long-Term Improvements Project (SLTIP) team to create a comprehensive plan that addresses all design aspects, including sustainable design.

The primary tasks for The Acorn Group included facilitating development of the Center’s mission and vision statements as well as the interpretive messages, conducting an educator needs assessment, traveling to sites in the Bay Area to study comparable facilities and interview staff, planning visitor experiences, developing recommendations for interpretive media, and creating a conceptual design framework and final interpretive master plan.

At the same time The Acorn Group began the interpretive planning work, Sustainable Agriculture Education (SAGE) began expanding their education program opportunities. SAGE also analyzed building capacity relative to those programs. Their work is summarized in a separate report.

Interpretive Planning Timetable

Spring 2011—Site visit; strategic planning session; educator needs assessment; meeting with Sunol community group

Summer 2011—interpretive planning session; development of interpretive summary; site visits to neighboring facilities; development of architectural considerations and visitor experience narrative

Fall 2011—Refinement of visitor experience narrative and building program; development of Watershed Discovery Trail narrative; meeting with Sunol community group

Winter 2012—Refinement of site plan; research into interpretive media options

Spring 2012—Meeting with Sunol community group

Summer 2012—Refinement of interpretive media options; meeting with Sunol community group; development of draft interpretive master plan; preparation of draft conceptual design framework

Fall 2012—Review of the interpretive master plan and conceptual design framework

Spring 2013—Delivery of the draft interpretive master plan and conceptual design framework
Part I
Project Overview

Interpretation moves beyond sharing facts. Its chief aim is to reveal deeper meaning and forge intellectual and emotional connections with visitors. At the Alameda Creek Watershed Center in Sunol, interpretive planning meant taking stock of the site’s remarkable features and designing strategies that invite visitors to take a closer look at the concept of a watershed. The ultimate purpose of the exhibits and displays is two-fold: to celebrate the site’s legacy stories and to help visitors understand the significance of the watershed and the Sunol Water Temple (Temple) in relation to the much larger SFPUC water supply system.

Our recommendations are the result of careful study and collaborative dialogue with many stakeholders. The architectural features, trail amenities, and interpretive media proposed in this report serve specific purposes and are respectful of history. Further, while they celebrate the watershed and the Temple, they also celebrate the capacity of each visitor to become a watershed steward at home, work, and school.

About the Site

The Alameda Creek watershed encompasses nearly 700 square miles extending east to the Diablo Range and west to the San Francisco Bay plain. Comprised of forests, woodlands, and scrublands, as well as streams and seeps, this botanically diverse region is home to equally diverse wildlife, including several species that are listed as endangered, threatened, or of special concern. While the Alameda Creek watershed is part of a water supply system that provides water to 2.6 million Bay Area residents, it remains part of a complex ecological system that sustains multiple native life forms. While we benefit from the resources and services the watershed provides, we have also learned to honor the watershed on its own terms.

Located in the Sunol Valley, the site of the Center helps convey the watershed’s significance to human and natural communities. Upon arrival, visitors are greeted by views of open space—oak-studded hills, riparian corridors, and agricultural lands that lie within this vast watershed. They are also greeted by views of the Temple and the corridors of Alameda Creek and Arroyo de la Laguna. The Temple is an architectural icon that marks the site where waters gather. Here, the life blood of San Francisco passed under the marble stone, en route to supply the City with nearly half of its water a century ago.

The Temple, a California Historical Engineering Landmark, is an important local gathering place and the Center serves as a portal to its “spirit of place.” Because of its proximity to the creeks, woodlands, and other natural features, the Center also serves as a sanctuary that helps define a “sense of place.” One paradigm focuses on the symbolic importance of the land and water. The other focuses on the tangible elements of the watershed—the elements and processes that shape it, as well as the plants, animals, and people that have called it home.

Planning Documents

Several SFPUC documents guided the planning process. They include the Alameda Watershed Habitat Conservation Plan, SLTIP Conceptual Engineering Report, and Alameda Watershed Management Plan. In addition, new planning tools emerged as a
result of the interpretive planning process: the project’s mission and vision statements, interpretive summary, visitor experience narrative, and building program. Together, these documents shed light on the intent and scope of interpretation, the design of buildings, and the selection of media and visitor experiences. These documents have been developed by The Acorn Group and the SLTIP team, and reviewed by an array of community interests in and around Sunol.

The mission statement indicates why the project exists. It gets to the “heart” of the Center, moving beyond a listing of activities and functions to clearly define its purpose and reveal an underlying philosophy.

The vision statement complements the mission statement, but focuses on desired outcomes that are at least five to ten years away. It captures the project’s vision and inspires the target audience.

The interpretive summary establishes the overall messages that will be conveyed through the exhibits and displays. It serves as a guiding document to focus the media and offer a thread that weaves the stories together.

The visitor experience narrative defines the sequence of activities from arrival at the monument gates to investigations on the grounds and in the buildings. It also suggests a “look and feel” for the interpretive media and defines architectural considerations, including LEED designation.

**Mission and Vision Statements**

Interpretation works in service of an institution’s guiding statements. To this end this interpretive master plan serves to advance the Center’s mission and vision. Our planning and design work has been purposeful and routinely cross-checked to ensure that decisions are made in accordance with the following tenets.

**Mission Statement**

Located in Sunol Valley at the confluence of Alameda Creek and the Arroyo de la Laguna, the Alameda Creek Watershed Center provides a community gathering place where history and science come alive. The Center inspires generations of visitors to discover and understand the history of water development and agriculture in the Sunol Valley and help protect this watershed and its natural resources.

**Vision Statement**

To cultivate an increasingly informed public that understands the significance of Alameda Creek, its watershed, its role in the SFPUC water supply system, and its biological diversity, and reflects this understanding by conserving water and taking action to protect and restore its natural resources.

**Target Audiences**

The Center likely will attract several different groups of visitors. These include K-12 students participating in a field trip; youth members of organizations; event participants; casual recreationists; science, nature, and history buffs; hiking and cycling enthusiasts; food and farm enthusiasts; and members of the local Sunol community. Formal, nonformal, and informal audiences are represented here, each bringing their own sets of agendas, personal experiences, needs, and interests.

Those associated with formal learning—K-12 students—are not necessarily voluntary visitors. They are part of groups seeking
structured opportunities that extend and build upon classroom learning. These audiences (the student portion) are “captive” because they do not have a choice to visit. A secondary group—members of youth organizations, such as Boy Scouts of America—seek opportunities that augment their organization’s programs, including merit badges and Eagle Scout awards. They too are following specific guidelines established by their institution, and these guidelines profoundly influence the choices they will make at the Center.

Those associated with non-formal audiences—individuals attending a lecture or special event—value lifelong learning. These self-motivated visitors seek inspiration, ideas, and even technical information they can apply in their personal lives and activities. They see free-choice learning as an essential human endeavor.

And those associated with informal audiences, such as drop-in visitors, seek unstructured opportunities for the primary benefit of enjoyment. Learning is folded into their experiences in ways that are entertaining and engaging. Like non-formal audiences, these audiences are not “captive” because they have a choice to visit or not. Their decision to view exhibits, attend a program, hike, have a picnic, or engage in other activities is entirely their own. Further, these groups are more heterogeneous than formal groups in terms of age, interests, existing knowledge base, and levels of awareness and motivation. Their personal and social needs are met while they spend leisure time with family and friends.

Because of all these variables, it is important to design a rich variety of interpretive media, including interior exhibits and displays, and wayside exhibits along the trails and pathways. Multiple “portals” of experiences using visual, tactile, and auditory means, and multiple reading levels in the panel copy, will help ensure that all visitors to some degree receive and understand the Center’s interpretive messages.
Part II
Interpretive Planning Process

The purpose of interpretive planning is to analyze a site thoughtfully and creatively in order to determine which programs and media best communicate the site’s purpose, significance, and messages. Because an interpretive plan simultaneously addresses the needs of visitors and the directives of the institution, it requires careful analysis of multiple components: management, markets, messages, mechanics of the site, and media.

Management—the management component takes into account directives established by the SFPUC, as well as documents and statements that define the project and the project site. Early in the planning process, the SLTIP team established the Center’s mission and vision statements. The interpretive media recommended in this plan reflect these guiding statements.

Markets—effective planning moves beyond promotion to include the factors that define demand for programs. This is an important, though often misunderstood aspect of interpretive planning. Meetings with members of the Sunol community and Sunol Water Temple Preservation Association, interviews with school district and county office of education administrators, and discussions with staff of neighboring park and museum facilities have yielded important information that has grounded our assumptions and made us aware of the needs and interests of existing and potential sectors of the target audience.

Message—the framing of content for the Center is based on three factors: 1. The watershed’s most significant natural and cultural heritage stories, 2. The things visitors are most interested in, and 3. Contextual information about the SFPUC. Our task has been to explore these elements and find the right mix of techniques to convey meaningful messages based on these factors.

Mechanics—effective planning results in a design balance between the site, the buildings, and interpretation. By considering interpretation from the start, practices related to architecture and landscape architecture advance the interpretive messages while enhancing the Temple and the surrounding landscape. The visitors’ experience has been considered in its entirety from arrival at the gates through departure. Planning reflects respect for both visitors and the resources they come to enjoy at the Center.

Media—the media include anything that helps communicate the message. As the last component of the planning process, it is the mix of methods and techniques to deliver messages to the audiences. Proposed media for the Alameda Creek Watershed Center in Sunol include wayside exhibits at the Temple and along the Watershed Discovery Trail, wayfinding and orientation panels, interior exhibits and displays in the Interpretive Center, as well as programs for both formal and informal audiences (as identified with assistance from SAGE). Ultimately, the focus of this interpretive plan is on the visitor and the cultivation of an informed public. The plan’s aim is to identify those strategies that will help the visitor become aware of, understand, and embrace the Center’s messages. These strategies will bring new understanding of the roles both water and the watershed play in shaping the natural and human history of this region.
Guiding Principles of Interpretation

While information consists of facts and figures, interpretation consists of communication strategies. Interpretation translates technical language to language the casual visitor will understand. In doing so, it captures the interest of the visitor, provokes curiosity, relates a message to the visitor’s everyday life, and reveals the message’s importance through an interesting perspective.

As a communication tool, interpretation strives to provoke, relate, and reveal. It moves beyond factual information to offer new insights into what makes a place, person, or object special. It enables the visitor to forge an immediate connection to the watershed, waterways, and the Temple. It strives to inform, entertain, and enlighten. It also strives to be meaningful and personal by finding linkages to concepts the visitor already understands and cares about. At the same time, interpretation is organized, enabling the visitor to follow the material easily and build upon it intellectually. Last, it links tangible objects, such as the water, steelhead, and the marble columns of the Temple, with intangible meanings in order to create emotional and intellectual connections. In this way, the Center’s stories are revealed in ways that are personally and universally meaningful.

Themes, Subthemes, Key Concepts

Developing the interpretive themes for the project first required identifying relevant topics. These serve as the subject matter for the interpretive media. Topics proposed by the SLTIP team include the Sunol Water Temple’s history and architecture, the conveyance and conservation of water, steelhead and salmon, whipsnakes and red-legged frogs, working landscapes, and watershed stewardship.

In interpretation, it is important to help visitors connect meanings emotionally as well as intellectually; for example, while visitors learn about whipsnakes and watersheds, they should also feel connected to them and want to help care for them.

To strengthen emotional connections tangible resources are linked to the intangible meanings they stand for: the region’s biological diversity, ecological footprints, legacy stories, and value of healthy watersheds. These intangible meanings go beyond the Temple and the grounds to embrace universally recognized values—natural heritage, stewardship, and civic pride—to forge deep and lasting meaning with visitors.

Interpretive Themes and Subthemes

Interpretive themes and subthemes evolve from discussions about topics, tangibles, and intangibles. A theme is the principal message, or story, about the subject matter that serves to connect topics and concepts together. It allows for a linkage of important ideas concerning the topic(s) and the association of the project’s tangible objects with intangible meanings. Research reveals that theme-based interpretation makes it easier for visitors to comprehend and recall messages at a later point. It also makes for a more powerful experience, both intellectually and emotionally.

Subthemes further develop the central theme, allowing for a logical progression into storylines. Typically, a well-planned
experience conveys three to five subthemes, all of which are subordinate, but directly related, to the central theme.

The following represents a synthesis of ideas proposed during the interpretive planning session held in June 2011. This “thematic hierarchy” consists of two complementary themes, subthemes, and key concepts. Together, these statements serve to focus the media and offer a thread that weaves the stories together. Subthemes support the themes; key concepts support the subthemes. Key concepts also help keep the information organized and focused, ensuring that, during the design development phase, the media cover important material and avoid straying from the theme and subthemes.

**Themes:**

Here at the Sunol Water Temple, we honor the watershed and the water that flows through it.

At this unique confluence of waterways, we also see the confluence of people and nature, and we are reminded of the significance of water in sustaining both.

**Subtheme 1:** Throughout time, water from Alameda Creek and Arroyo de la Laguna has sustained the lives and cultures of Sunol Valley people.

**Key concepts:**

a. Beyond fulfilling a basic biological need, water influences our decisions about where to live and how to make a living.

b. Attracted by abundant water, food, and wildlife, the Ohlone settled in the Sunol Valley thousands of years ago.

c. After secularization of the mission system in 1833, land in Alta California was distributed for private ownership as ranchos. The Rancho El Valle de San Jose land grant encompassed the area that would become Sunol and Pleasanton. This land was distributed among the four children of José Joaquin Bernal, a member of the 1776 De Anza Expedition. In the 1840s, Antonio Maria Suñol and Maria Bernal Suñol acquired 14,000 acres of the rancho, later the site of their son’s ranching operation near the present-day Sunol Water Temple.

d. After secularization, cattle ranching continued in the region, supported by the mild climate and vast rangelands.

e. After the gold rush, many prospectors became farmers, some settling in the Sunol Valley. Today, Sunol Valley and the surrounding region remain the home of farmers and ranchers, as well as others, all of whom continue to contribute to the cultural fabric of this land.

**Subtheme 2:** The Sunol Water Temple is a powerful icon that symbolizes the importance of water in nature and human culture.

**Key concepts:**

a. In 1906, William Bourn, a stockholder in Spring Valley Water Company, commissioned Bay Area architect Willis Polk to design a water Temple where people would celebrate the “meeting of the waters.” Polk based his design on the Temple of Vesta, a Roman Temple in Tivoli, Italy that was built in 80 B.C.E.

b. The location of the Temple is significant—it serves as a natural focal point of the watershed. The Temple
stands at the confluence of Alameda Creek and Arroyo de la Laguna where creek waters mixed with artesian well water. Half of San Francisco’s water supply once flowed through this Temple before continuing on its journey westward.

c. The biblical inscriptions on the frieze remind the reader of the significance of water. Today many take water for granted. One hundred years ago, this wasn’t the case. The Sunol Water Temple was deemed a very special place, revered as the source of pure, natural water for San Francisco.

d. Ultimately, the Temple’s intent was to enhance the public’s perception of the Spring Valley Water Company. The SFPUC purchased the company in 1930 and assumed responsibility for the beaux arts landmark.

e. The Temple has come nearly full circle. This once spectacular architectural monument was seriously damaged in the 1989 Loma Prieta earthquake and was restored with support from the local community and with assistance from the Oakland Museum in the late 1990s. Its wood panels, terra cotta roof tiles, Romanesque paintings, Corinthian columns, and crown of dolphins have been repaired and returned to their original splendor.

Subtheme 3: Human activities, including ranching, farming, mining, urban/suburban development, and individual behavior, can affect the health of the watershed.

Key concepts:

a. A watershed is defined as the region of land that drains water into a particular watercourse or body of water. At nearly 700 square miles, the Alameda Creek watershed is the Southern San Francisco Bay region’s largest drainage. It stretches from Mt. Hamilton and Mt. Diablo in the upper reaches to the Sunol Valley and Niles Canyon in the middle reaches, and the San Francisco Bay plain in the lower reaches.

b. Natural and human activity in a watershed can affect the quality and quantity of water that flows through it. Human activity in the Alameda Creek watershed includes farming, ranching, mining, commercial nursery operations, suburban/urban development, water conveyance/treatment, and recreation.

c. The agricultural traditions of Sunol Valley have their roots in California’s 18th century Mission Period. Olive orchards and vineyards were tended on Mission San José de Guadalupe lands. Remnant olive trees and cork oaks are still found in the area, perhaps originals from the mission. Later, walnut orchards were cultivated on the land surrounding the Temple.

d. Farming activity accelerated after the gold rush as miners traded pick axes for plows. At the turn of the last century, Sunol was known for its cherries, apricots, grapes, and almonds and later, for its strawberries, chives, and specialty lettuce. In addition to foods now grown at the AgPark, hay production remains a primary crop in this region.

e. The ranching traditions of Sunol Valley also have their roots in California’s 18th century Mission Period. Mission San José de Guadalupe boasted the largest herd of cattle of any California mission. Cattle ranching
continues to occur on private lands and
publicly leased grazing lands in the
Alameda Creek watershed.

f. Water, derived from local and regional
sources, sustains these activities.

g. Left unchecked, these activities can
affect the condition of the watershed and
quality of water in the creeks.

h. The Alameda Creek watershed is a
working landscape and informed
decisions regarding it are based on
enhanced understanding of watershed
dynamics. Watershed stewardship takes
the form of organic farming practices,
control of point and non-point source
pollution, adherence to grazing
guidelines, natural resource
management, habitat restoration, and
other measures.

i. Many local landowners are actively
working to manage their land carefully.
Several operations have become models
recognized statewide for their resource
protection and enhancement practices.

j. How individuals live can also affect
the condition of the watershed and
quality of water in the creeks.
Urban/suburban sprawl consumes land
and can contaminate water, most notably
through run-off. “Smart growth”
planning initiatives aim to address these
concerns.

k. Individuals can be become watershed
stewards by changing behaviors that
directly or indirectly alter the health of
their watershed. Personal watershed
stewardship takes the form of
responsible landscaping practices at
home, responsible disposal of products
such as used motor oil and pet waste,
and other measures.

Subtheme 4: The quality and quantity of
water affects the lives of humans and other
species.

Key concepts:
a. The health of a watershed largely
determines the health of its creeks or
rivers.

b. Consequences of problematic
practices and activities include
compacted soil; denuded, non-
recovering land; erosion and subsequent
sedimentation of creeks; introduction of
chemicals and pathogens to water;
increased nutrient loading and
subsequent eutrophication; altered or
eliminated habitat; declining populations
of native animals and plants; presence of
invasive species, and decreased quality
of drinking water.

c. Several local initiatives are
transforming how watershed lands are
managed. These occur at a variety of
scales, from rangelands and large
commercial sites to suburban backyards.

d. The Alameda Creek watershed is a
refuge for wildlife. Several species,
including the California tiger
salamander, California red-legged frog,
western pond turtle, and Central
California Coast steelhead, are
threatened with extinction.

e. Habitat restoration of watershed lands
and creeks, removal of non-native
species, removal of dams, controlled
releases of water from other dams, and
installation of fish ladders and fish
screens benefit these species and others,
either directly or indirectly.
**Subtheme 5:** The Spring Valley Water Company and SFPUC’s early water conveyance system along this waterway is a testament to human ingenuity. More recent action by the SFPUC is a testament to an evolving land and water ethic.

**Key concepts:**
a. By 1874, Spring Valley Water Company bought land and water rights in the valley to provide water to San Francisco.

b. Water flowing through the Sunol Water Temple dropped 40 feet into a gravity-fed 28-mile concrete aqueduct that ran through Niles Canyon and across San Francisco Bay to reservoirs on the San Francisco peninsula. In 1976, the Temple was designated a California Historical Engineering Landmark by the American Society of Civil Engineers.

c. The SFPUC bought the Spring Valley Water Company’s Alameda watershed lands in 1930, which augments water supplies from the Tuolumne River.

d. Currently, the SFPUC owns 36,816 acres within the Alameda Creek watershed. The SFPUC Water Enterprise’s Environmental Stewardship Policy includes references to its resource management program, which addresses all watershed activities, and to best management practices for the protection and conservation of water and natural resources.

e. The Alameda Creek water supply system includes the Turner Dam and San Antonio Reservoir, which stores water from the Tuolumne River watershed as well as local runoff; and Calaveras Dam and Reservoir and a water transmission system consisting of pipelines, tunnels, pumping stations, and treatment facilities. This system is part of a larger system that delivers water to 2.6 million customers.

f. Historically, securing pure and reliable supplies of water was the primary focus of the SFPUC’s Water Enterprise efforts. Now the focus has widened. Watershed management decisions are based on the protection of water quality within the context of multiple land uses and the protection and restoration needs of multiple native plant and animal species.

g. Steelhead are native to the watershed, but their access to lower Alameda Creek has been blocked for decades. However, plans are being developed to build fish ladders and remove passage barriers to restore access. Removal of the Niles and Sunol Dams (completed by the SFPUC in 2006) will allow passage for these migratory fish. Several organizations and agencies are working collaboratively in this watershed as members of the Alameda Creek Fisheries Restoration Workgroup.

h. Habitat restoration is underway in the Alameda Creek watershed. Special attention focuses on the restoration of habitats where the presence of rare species, such as the California red-legged frog and steelhead, is likely.

i. The Center reflects this evolving land and water ethic. Sustainable design elements are integrated throughout the buildings and grounds.
Interpretive Goals and Objectives

Goals and objectives serve to ensure that interpretation is purposeful and that results are kept in mind. Goals are statements of desired outcomes that guide media development. They articulate what interpretation is meant to do for the Alameda Creek watershed, as well as for the water resources of the East Bay and San Francisco. Objectives further advance goals by defining specific and measurable results. Goals and objectives guide the formation of interpretive media during the planning process and permit accurate and meaningful evaluation of the media before, during, and after development.

The project team’s vision focuses on cultivating an appreciative audience, imparting knowledge, and prompting stronger commitments to water conservation and watershed stewardship. Therefore, the proposed goals and objectives span three domains: affective, cognitive, and behavioral. While the affective domain deals with levels of awareness, attitudes, and value systems, the cognitive domain deals with levels of knowledge. Both work as complementary forces that influence changes in the behavioral domain. Research indicates people typically do not make behavioral changes if they only understand an issue; they must also feel that the issue is personally relevant and that a behavioral shift will bring a valued benefit.

Emotional Goals and Objectives

1.a. Visitors\(^1\) will have an enjoyable and satisfying time at the Center.

95% of visitors will indicate they had an enjoyable and satisfying time at the Center.

95% of visitors will express appreciation for the experiences offered at the Center.

1.b. Visitors will appreciate the historic and architectural significance of the Temple.

90% of visitors will express appreciation for the Temple’s significance.

90% of visitors will express appreciation for the efforts directed at preserving and restoring the Temple.

1.c. Visitors will become aware of the role water has played shaping the human history of the region.

90% of visitors will indicate awareness that this region (and the region’s water) has supported human communities over thousands of years.

90% of visitors will acknowledge the unique confluence of waterways at this site.

1.d. Visitors will be aware of the connection between the health of a watershed and the health of a creek.

90% of visitors will acknowledge their awareness of the connection between the

\(^1\) The term visitors refers to the full array of target audiences, including area residents, organizations, and businesses; the general public; and students and their teachers. Some goals are particularly relevant to certain audience segments. Therefore, actual interpretive messages and methods of delivery will be shaped to fit each target audience.
health of a watershed and the health of a creek.

1.e. Visitors will appreciate the sustainable design elements seen on the Center’s grounds.

90% of visitors will express appreciation for the SFPUC’s commitment to sustainability as reflected in the design, construction, and landscaping of the grounds.

90% of visitors will appreciate the SFPUC’s effort to reduce the ecological footprints created by resource consumption and waste generation.

1.f. Visitors will express a desire to participate in watershed stewardship activities.

80% of visitors will express interest in participating in watershed stewardship activities at home and within their community.

80% of visitors will express interest in participating in watershed stewardship activities at the Center.

1.g. Visitors will be inspired to change behavior in order to reduce their own impact on water and watersheds.

70% of visitors will indicate their willingness to change behavior in order to reduce their own impact on water and watersheds.

70% of visitors will acknowledge their personal responsibility to care for water and watersheds.

II. Cognitive Goals and Objectives

2.a. Visitors will recognize they are standing in a watershed.

70% of visitors will correctly state they are standing in the Alameda Creek watershed.

2.b. Visitors will be able to define a watershed.

70% of visitors will be able to define the meaning of the term watershed.

2.c. Visitors will be able to describe the significance of a watershed.

70% of visitors will be able to describe how land directs water into a particular watercourse.

70% of visitors will be able to describe how the health of the land influences the health of a watercourse, and ultimately, the body of water into which it drains.

2.d. Visitors will understand the human history of this region.

70% of visitors will be able to identify at least three major California historical periods that influenced settlement in the Sunol Valley.

70% of visitors will be able to describe how watershed resources sustained the lives of people who lived during one of these historical periods.

2.e. Visitors will understand the remarkable engineering feat of transporting this water to San Francisco.

70% of visitors will identify this confluence of water as a significant source of drinking water for San Francisco during the first half of the 20th century.
70% of visitors will be able to describe how water that once flowed through the Sunol Water Temple ended up in reservoirs on the San Francisco Peninsula.

2.f. Visitors will understand current water storage and conveyance infrastructure.

70% of visitors will identify the snowpack of the Sierra Nevada range as a primary source of water for the SFPUC water supply system.

70% of visitors will identify at least three components of the Alameda Creek water system, including at least one dam or reservoir.

2.g. Visitors will describe human activities in a watershed that could affect, both positively and negatively, the health of a creek, wildlife, and humans.

80% of visitors will be able to describe at least two activities that negatively affect the health of a creek, wildlife, and humans.

80% of visitors will be able to describe at least two activities that positively affect the health of a creek, wildlife, and humans.

2.h. Visitors will understand the steps the SFPUC and other landowners are taking to manage land in ways that protect natural and cultural resources while maintaining productivity through appropriate uses.

70% of visitors will be able to describe at least one step the SFPUC is taking to appropriately manage the Alameda Creek watershed.

70% of visitors will be able to describe at least one step neighboring landowners are taking to appropriately manage their land in the Alameda Creek watershed.

2.i. Visitors will distinguish between point and nonpoint source pollution.

70% of visitors will correctly define the meaning of the term, nonpoint source pollution.

70% of visitors will be able to describe how nonpoint source pollution affects the water quality of a creek.

2.j. Visitors will learn about their role in helping reduce nonpoint source pollution.

70% of visitors will be able to list three origins of nonpoint source pollution that are generated at home.

70% of visitors will be able to identify three specific steps individuals can take to reduce nonpoint source pollution.

2.k. Visitors will learn of practices agriculture-based businesses can adopt as watershed stewards.

70% of visitors will be able to identify two watershed stewardship practices that agriculture-based businesses can adopt.

2.l. Visitors will learn about species found in the Alameda Creek watershed, especially rare, threatened, or endangered species.

70% of visitors will be able to name at least two plants and two animals associated with the plant communities found in the Alameda Creek watershed.

70% of visitors will be able to name at least two threatened or endangered species found in the Alameda Creek watershed.

2.m. Visitors will understand the steps the SFPUC and other agencies and
organizations are taking to protect rare, threatened, or endangered species, and habitats, in the Alameda Creek watershed.

70% of visitors will identify at least three measures in place in the Alameda Creek watershed that are designed to protect rare, threatened, or endangered species.

70% of visitors will describe how these measures works to protect rare, threatened, or endangered species.

III. Behavioral Goals and Objectives

3.a. Visitors will experience a personal and enriching connection with nature in the vicinity of the Center.

80% of visitors will spend at least 15 minutes walking along the Watershed Discovery Trail or other nearby trails during their visit.

80% of visitors will indicate that, during their visit, their experiences in nature were enriching.

3.b. Visitors will engage in appropriate behaviors and activities.

95% of visitors will adhere to posted rules and regulations.

95% of visitors will demonstrate their respect for the Temple, Center, and Sunol AgPark by engaging in appropriate behavior and activities.

3.c. Visitors will interact with various exhibits and displays at the Temple and Center.

80% of visitors will spend at least 30 minutes exploring interpretive media they encounter on the grounds and in the Center.

3.d. Visitors will demonstrate their commitment to watershed stewardship by engaging in specific behaviors at home, such as conserving water and eliminating runoff.

70% of visitors will indicate they strive to conserve water at least two ways.

70% of visitors will indicate they strive to eliminate runoff at least two ways.

3.e. Visitors will involve others (family members, friends, classmates) in watershed stewardship activities.

70% of visitors will indicate they call out water wasting activities they observe to family members, friends, and classmates.

70% of visitors will indicate they call out runoff-producing activities they observe to family members, friends, and classmates.

3.f. Visitors will demonstrate their interest in and support of the Center, Temple, and Sunol AgPark.

40% of visitors will visit the site again in the next 12 months.

40% of visitors will return to participate in a program at the site in the next 12 months.

3.g. Visitors will support businesses, such as local organic farms, that adopt water stewardship practices.

30% of visitors will visit and support agriculture-based businesses, such as local organic farms, that adopt water stewardship practices.
Part III
Design Principles

The site of the Center poses an interesting challenge for interpretation. It requires respecting the classical Temple while making way for a modern, LEED-certified building. At the same time, it requires acknowledging the existing formality of the site while encouraging new interactions in an area immediately adjacent.

Architecture, landscape architecture, and interpretation have worked collaboratively in order to create intersections visitors can navigate physically and intellectually. How well the building and grounds transition from the formal to informal and from the human-designed to natural will profoundly influence the quality of visitor experiences. The Center is viewed through dual perspectives. One focuses on the importance of the land and water. The other focuses on the environmental history of the watershed.

The interpretive framework displayed on pages 9-14 guided the exhibit development process. This tool consists of two overarching themes that link important ideas together and five subthemes that further develop the themes and allow for a logical progression into storylines.

At the same time The Acorn Group developed the interpretive framework, the Sunol Long-Term Improvements Project team developed a building program for the Center. They established four goals: (1) to respect the Sunol Water Temple site; (2) create an innovative green building with a gold Leadership in Energy and Environmental Design (LEED) rating; (3) design for energy efficiency; and (4) design for a highly-efficient water system using innovative green design features. The Sunol Long-Term Improvements Project team also compiled a comprehensive list of spaces for the Center. These spaces, as well as their design considerations, are identified in this narrative. The proposed total interior floor area is approximately 13,000 square feet; proposed exterior space is 90,000 square feet, or two acres.

The interpretive themes and subthemes have informed the architectural and landscape planning processes. The architectural considerations in turn have informed the exhibit planning and landscape design processes by defining specific spaces. Through this multidisciplinary approach, information generated in one discipline influences information in other ones and creates a continuous “feedback loop” flowing between architecture, landscape architecture, and interpretation. This approach, including feedback from local community interests, is paramount for the SFPUC to meet its long-term objectives in Sunol Valley. Such collaboration is key to creating a Center that honors the project’s core values, creates a remarkable experience for the visitor, and addresses LEED requirements.
The Visitor’s Experience

The visitors’ experience likely will begin in advance of a physical visit. It may begin with looking at a website, an article or brochure, or other literature shared by friends or family members. It is therefore important to develop collateral for the Center that captures its essence and motivates people to visit. At the same time, we understand that the expectations this material creates needs to be commensurate with the quality of the actual experience.

Upon arrival, visitors will take note of the gateway—the entry monument, road, landscaping, and finally, the Temple. These elements are the fabric of first (and lasting) impressions and they set the tone for the experience ahead. Therefore, physical improvements to this journey from entrance to Temple are critical, particularly as they relate to landscaping, including landscaping to block views to the yard.

We recommend that cars no longer be allowed to drive up to the Sunol Water Temple from this point. Instead, they now travel down the entry road in a car or bus and park in the Center’s parking lot. Here there is a visitor loading zone that is set back from the road, ensuring the safety of people as they wait for a vehicle.

Ease of parking and access for emergency vehicles (e.g., Fire Department) are important design criteria for parking. For school and shuttle buses, paving adjacent to the Center should be able to accommodate two or three buses that may overlap arrivals and departures. For private vehicles, parking will need to accommodate 30-35 vehicles and include handicapped parking spaces. Assuming conferences and other events could attract approximately 100 people, we also need to consider overflow parking.

Once a car or bus is parked, the visitors’ experience at the Center begins. Proceeding on foot, they have three choices, each enabling direct contact with the natural and cultural resources that make this setting so significant. They can proceed on foot to the Temple, the Watershed Discovery Trail, or directly to the building. Signage serves to guide them.

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2 Sunol community members expressed strong interest in a safe trail from town to the Center.
Sunol Water Temple

The recommendations provided in the SLTIP Conceptual Engineering Report (CER) include replacing the asphalt at the Temple with other paving material and re-landscaping both road from the entry monument to the Temple to accentuate the architecture. Plans currently call for a forecourt composed of a native, drought-tolerant green swale on the Temple grounds. It is also noted that there should be trail access to the SAGE AgPark.

Because of the history and significance of the Temple, it is here that we can draw connections to the significance of the land and water. On the southwest side of the Temple, we recommend placement of a beaux arts-inspired frame system that presents a low profile panel series that does not block views. Here, visitors can read about the “pilgrimages” people made to the site in the early 1900s to see the Temple and its cistern, and attend picnics and even dances.

We also recommend reframing the existing wayside exhibits in historically relevant frames and repositioning them to allow for seamless viewing of the features called out in the text. As they currently stand, they require the reader to face away from the Temple. The panels that focus on Sunol Valley agriculture and the watershed should be moved.

Watershed Discovery Trail

Should visitors choose to visit the Watershed Discovery Trail, they will encounter a two-acre outdoor “immersion exhibit” that takes them on a meandering walk through a landscape that resembles the

Glossary of Sign Media

Gateway: architectural feature that announces the visitor’s arrival at the site.

Institutional panel: a sign that identifies the SFPUC the Center’s governing agency.

Orientation sign: a sign that welcomes the visitor, identifies the Center and the watershed, and orients the visitor to the Center’s building, features, and trails.

Directional sign: a wayfinding sign that incorporates a map, symbols, and words to identify locations of the Center’s building, parking, features, and trails.

Regulatory sign: a sign that states rules and regulations and explains reasons for them.

Interpretive panel: a sign that moves beyond facts to tell a story designed to connect the audience to the watershed and its resources.

Wayside exhibit: an interpretive panel that is located on a trail, deck, or overlook.

Exhibit label: small sign that identifies the contents of a display or architectural feature.
middle and upper reaches of the Alameda Creek watershed. This will present a tremendous opportunity to become engaged in experiential, water-focused learning about sustainable landscape architecture (e.g., use of vegetated swales, pervious walkway materials), water-wise and wildlife-friendly gardening, and bioregionalism. The trail will also present an opportunity to showcase the human heritage of the region, in particular, the Ohlone whose aboriginal homeland includes this land.

The grounds will also offer a peaceful retreat for those who are there simply to enjoy the day. Comfortable seating areas accentuated with shade and public art, such as theme-focused mosaics and sculptures, will be considered.

The Watershed Discovery Trail will be laid out metaphorically like the watershed itself, with the confluence of the waterways located symbolically at a low point behind an outdoor amphitheater. Here, a small water feature will present a strong visual element for visitors, as well as a passive cooling technique that utilizes prevailing summer winds coming up Niles Canyon to the west. It will serve as an important green building design feature.

The trail will extend from the northwest to the southeast, reflecting the correct orientation of the watershed corridor. Visitors will meander from a central coast live oak-riparian forest to a grasslands area, a section of Diablan sage scrub, an oak savanna, and last, to a mixed evergreen forest/oak woodland. Interpretive media will add interest to this outdoor exhibit space.

The following defines the five plant communities and suggested palettes represented within the Watershed Discovery Trail.

**Central coast live oak-riparian forest**—live oak and deciduous trees form a canopy that casts shade in this garden. Tall trees create an emergent canopy, while smaller trees and shrubs grow underneath. Representative plants include coast live oak, big-leaf maple, California buckeye, white alder, western sycamore, Fremont cottonwood, coyote brush, coffeeberry, California lilac, California wild rose, California blackberry, and blue elderberry.

**Pond**—a dry streambed weaves through this trail, hinting at the ephemeral nature of many of California’s streams. A pond is proposed as well. This pond will be situated at the lowest point in the landscape. Informal in design, it will blend in naturally with the riparian environment. The rocks and stones that define its borders are from the local landscape. Material moved from excavation sites along the trail would give one end of the pond some height and create a natural backdrop for a small waterfall. Beyond the aesthetic value of this feature, a waterfall will circulate water and add oxygen. An initial investment in equipment (liner, pump, and filter) and a carefully thought out design for the basin and waterfall will reduce maintenance issues.

This pond will serve many purposes, not least of which is visual relief (and undoubtedly, physical contact) on a hot day.
summer day. While not directly encouraging this activity, occasional water play will occur. Non-slip surfaces and shallow depths will keep visitor encounters within the water safe.

In addition to creating a remarkable gathering place and retreat, this water feature will also serve an educational purpose. Creek access policies have not been finalized and seasonal fluctuations can result in a lack of surface water flow during dry summer months and high (potentially dangerous) water flow during wet winter months. Therefore, the creek will not be conducive for regular, year-round, predictable explorations and an alternative site for water investigations is needed. While the dry streambed (and possibly a few seeps) will provide rich illustrations for docent- and staff-led discussions during guided walks (as well as focal points for interpretive panels), the pond conceivably will serve as a hands-on learning station for testing water quality parameters and sampling pond life.

Valley needlegrass grassland—perennial bunchgrasses anchor this sunny garden, creating a backdrop of texture and color that weave together as a native grassland. Seasonal wildflowers and bulbs accent the palette with splashes of yellow, orange, and purple. Representative plants include purple needlegrass, one-sided bluegrass, lupine (species), and California poppy.

Diablan sage scrub—sage scrub plants do well in the sun-drenched reaches of the watershed. In addition, their pungent scents and ever-changing colors become a feast for the senses. Representative plants include California sagebrush, California buckwheat, sage (species), bush monkeyflower, coyote brush, and bush lupine.

Oak savanna—oaks dominate this grasslands habitat, but comprise less than 30% of the landscape. With widely spaced trees, sunlight reaches the ground and sustains the growth of needlegrass and other grasses and forbs. Representative plants include blue oak, valley oak, coast live oak, and purple needlegrass.

Mixed evergreen forest/oak woodland—reflecting the woodlands that grow in the upper reaches of the watershed, this dense and shady garden is dominated by four species of oaks and several deciduous trees. This garden provides visitors with welcomed relief during warm weather visits, as well as an opportunity to experience a watershed landscape they might not otherwise see. Further, careful positioning of deciduous trees near the Center will add another dimension to the green building design. Representative plants include California bay, madrone, California buckeye, coast live oak, blue oak, valley oak, black oak, toyon, yerba santa, and common snowberry.

Visitors will be able to meander through these trail sections and read interpretive panels that identify representative plants and animals, explain the ecological relationships between physical and biological components, and reveal their location relative to the real watershed.
By “walking a transect line across the watershed,” visitors will begin to grasp the watershed’s enormity, as well as the rich mosaic of life forms found there. This aspect will be accentuated by fabricated wildlife tracks and other “sign” that are incorporated into the pathway and used in programs and self-guided wildlife scavenger hunt activities.

Additional interpretive media for the Watershed Discovery Trail include:

- five watershed “you are here” maps, each corresponding to the actual location of the plant community within the Alameda Creek watershed;

- wayside exhibits that highlight the passage of people across this land and the settlement of human communities;

- display of Quick Response (QR) codes (or use of Near Field Communication [NFC] tags) that visitors can scan with their smartphone to access links to data, narration, and images;

- cue cards corresponding to faux bronze resin sculptures: a California red-legged frog or western pond turtle on a streambed rock; a grasshopper sparrow or meadowlark in the grasslands; a western fence lizard on a rock, and a California quail and Alameda whipsnake in the sage scrub;

- Securely anchored media such as replicas that celebrate Ohlone heritage.
Watershed Center Grounds

Picnic Area

This part of the project will include an upgrade to the existing picnic facilities, increased public access, and opportunities to get closer to Alameda Creek. The SFPUC is working with East Bay Regional Park District (EBRPD) to eventually provide trail access across Alameda Creek to EBRPD’s Vargas Plateau. The Center and its surrounding grounds will be designed and constructed to prepare for this proposed increase in recreation and public access.

The cue cards introduced along the Watershed Discovery Trail will be integrated into this area. Given this well established riparian zone, with mature sycamore trees, dense understory, and creek, the cards will reference plant and animal life likely seen in “the wild,” rather than facsimiles represented in faux bronze.

Play Area

We recommend setting aside a small area within the picnic grounds specifically for play. Keeping in mind the theme and subthemes of this project, play equipment here could take the form of crawl-though water pipes, culverts, troughs, and moveable valves, spirals, and pumps. These features can function without water and be positioned in playground sand that is contained within this play space.

Outdoor Amphitheater

Since the Center is a potential conference center, there appears to be a strong argument to connect the building to an outdoor terraced seating area, or amphitheater. This outdoor space, roughly 3,700 square feet, could be considered an additional space for use during classes or conference break-out sessions when weather permits. Here, provisions for a drop down screen or monitor could accommodate video or still image projection for presentations.

Watershed Center Building

Both the Temple and entry pathways will ultimately lead to the building. This building is composed of four distinct interior spaces illuminated with both lighting and natural daylighting.

Exterior interpretative panels will be located where the buildings’ sustainable design features are most evident. Text, illustrations, and photographs will call attention to the building’s passive solar design, photovoltaic solar panel system, and greywater system. If applicable, the Center’s LEED certification will also be highlighted.

Sample interpretive panel

While the building layout has not been finalized, we do know that approximately 13,000 square feet will be allocated for interior exhibits and displays (interpretative exhibit/welcome pavilion as labeled in the SLTIP CER), a Watershed Discovery Lab (classroom), staff offices (learning lab/office and storage space as labeled in the SLTIP
CER), and a community room (auditorium/conference center as labeled in the SLTIP CER) with kitchen. Care has been exercised to maintain sight lines with the Temple, allow access for maintenance, operations, and emergencies via an access road, and integrate eastern portions of the Watershed Discovery Trail with the Center. Visitors will be able to exit from the front, center or rear of the building.

**Interpretive Exhibits**

It is anticipated that the interpretive exhibits and displays (SLTIP CER Interpretative exhibit/welcome pavilion, Bldg. 3) occupy over 50% of interior space. Architectural considerations include the design of space to accommodate a foyer, the stream profile, and the maintenance area for the stream profile. Other considerations include the use of natural light to illuminate the space and preservation of sight lines to the Temple, water infiltration gallery, and surrounding landscape, a critical aspect that enhances and provides orientation to the visitor experience. On one side of the building, we recommend placement of storage cabinets for the sack lunches of visiting students.

Experiences within the Center will enable visitors to grasp both the vastness and significance of the watershed, the human and natural history of the region, the Temple, the watershed connection of Spring Valley Water Company and the SFPUC, and the people and projects that are making a difference in the health of the watershed.

As visitors enter the building, they first encounter the welcome area. A staff member or docent greets them, orienting them to the Center, its amenities, and exhibits.

Visitors notice the large interpretive panels, other media on the wall (e.g. digital elevation model), and a spectacular stream profile aquarium.
Stream Profile Aquarium

Visitors study the 7,800-gallon freshwater stream profile aquarium\(^3\), interactive displays, and seating areas. At the aquarium, the position of view splits the water line of an acrylic wall, so that both the underwater stream and the stream bank above the water level are visible to visitors. The stream water moves swiftly through shallow rocky areas and form slow eddies in the sections with deeper pools. Inhabitants of this dynamic exhibit likely will include rainbow trout, as well as crayfish, newts and salamanders, and turtles. Fabricated branches of western sycamore and white alder extend from the wall and ceiling, appearing to emerge from a painted mural of Little Yosemite.

Tenji, Inc.

\(^3\) We recommend that SFPUC establish an aquarium maintenance contract with an outside firm.

The faux rock infrastructure ensures a highly realistic exhibit; viewing platforms and viewing windows are integrated into the rockwork’s design, providing visitors with a fish-eye view of underwater activity. Seating areas are provided for those who simply want to stop and enjoy the water and fish. The interpretive text on reading pedestals heightens visitor interest. Labeled photographs serve as a field guide to the plants and animals seen in the exhibit. One pedestal features a listening station where the songs of birds, as well as calls of various riparian wildlife (insects, amphibians, birds, and mammals) help visitors differentiate among wildlife sounds they may hear in the watershed. Ultimately, all of these media serve to remind the visitor that Alameda Creek sustains life.

Additional Exhibits

This gallery will also feature dramatic photomurals and free-standing interactive displays that explore local aquatic life, as well as explain the challenges various species have faced, including blockage of spawning grounds by dams, and erosion and sedimentation due to grazing in close proximity to the creek. A combination of conventional media (graphics with interpretive text, simple audiovisual media) and low tech media (simple interactive flip lids, flip books, push button devices), coupled with some technologically complex audiovisual media and touchscreen applications will enable visitors to learn of the diverse life forms found in the Alameda Creek watershed, both common and rare.

Media could include fabricated rock “flip lids” on hinges that reveal common stream life forms; a table with bas relief of native aquatic species so young visitors can create rubbings; and “A Fish Tale,” a video game...
that invites visitors to experience the challenges trout and salmon face as they journey to spawning grounds. Further, visitors will be able to virtually manipulate the watershed environment and witness the ecological consequences.

Displays will explore Alameda Creek water quality parameters and, using touchscreen applications, as well as a model similar to Enviroscape, help visitors understand the connection between human activity (including practices at home), watershed health, and water quality.

**History Alcoves**

A large archeological display case attracts the visitor and serves as the transition point between the natural sciences and history. To the right, the visitor sees a mural of the Ohlone and four exhibit alcoves. Each highlights a particular people or point in the history of Sunol Valley. Small, semi-immersive exhibits place the visitor at the banks of the stream 400 years ago, a 19th century ranch, early 20th century Sunol Water Temple construction site, and the Spring Valley Water Company’s early 20th c. water conveyance system to carry water from this confluence to peninsula reservoirs. At each niche, the visitor stands at an “overlook” to view photomurals and physical objects, hear ambient, era-specific noise in the background, and read copy on reading rails.

**Streamside harvests**: this small naturalistic exhibit could showcase the material culture of the Ohlone. Set along a stream and boulder-strewn bank, the scene depicts the harvest of steelhead, along with rushes, elderberry, alder, laurel, wild grape, and other edible and useful plants. A split-stick clapper instrument, partially woven basket, flute, and arrow shaft are visible in the foreground; they serve to document the Ohlone’s use of wood, fiber, and dyes of streamside plants. A complex of bedrock mortars is found in a boulder, indicating the streamside has been used for acorn processing. A fish net lies at the stream’s edge, soon to be stretched across the stream to collect spawning fish. Audio includes the sound of moving water and the voices of people speaking in their native language. Text reminds visitors of present-day Ohlone and their enduring traditions.

**Early ranching and agriculture**: this small, semi-immersive features invites visitors to stand on the veranda of a hacienda that overlooks nearly infinite expanses of grazing lands and agricultural fields with the creek corridor clearly visible. Audio recordings include Spanish voices.

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4 Subject to coordination with tribal representatives
(the distant calls of vaqueros) and lowing of cattle.

Sunol Water Temple: this small, semi-immersive exhibit features a construction scene with a partially built Temple. Objects include the historic architectural drawings of Willis Polk and antique construction equipment. Audio includes the din of an early 20th century construction site.

Early water conveyance: this small, semi-immersive exhibit focuses on early 20th c. construction of the Spring Valley Water Company’s water conveyance system in Sunol and Niles Canyon. Visitors can operate cranks and levers that mimic the opening and closing of dam valves. Oral histories (or facsimiles) record the experiences of water engineers in the 1920s as they oversaw construction of the aqueduct.

As visitors move beyond the last alcove their attention is directed to two large, wall-mounted touchscreens. Here, Microsoft Surface Pro serves as a repository for present-day and historical photographs, the San Francisco Estuary Institute’s maps, and images of Sunol Valley memorabilia and even physical objects manipulated by the visitor through touch.

Designed to endure foot traffic, a large map of the Alameda Creek watershed is painted on the floor. Visitors are encouraged to “walk the watershed” and, if applicable, discover where they live in relation to it.

As visitors move either toward the watershed classroom or the exit door, they see the final set of interpretive panels. One showcases the Hetch Hetchy Regional

Sample floor map, Rancho Los Alamitos

Water System. Other panels focus on the evolving land and water ethic embraced by the SFPUC, as evidenced by removal of the Niles and Sunol Dams, coupled with other creek restoration efforts, as well as by best practices at work in the Sunol Valley. Visitors are reminded they too can become watershed stewards at home.
Watershed Discovery Lab

The Center includes a Watershed Discovery Lab (1,110 square feet). Designed primarily for aquatic investigations, this space will serve as the basis for hands-on, program-driven experiences during school field trips or self-guided interactive experiences for weekend drop-in visitors, provided docents or staff are available to supervise.

This space is sized for 30 students and includes freshwater aquaria, and counter space with sinks, microscopes, water quality test kits, and other limnological or biological equipment, and eight lab tables with stools. Materials are stored in cabinets of varying heights; equipment includes a white board and SMART Board interactive whiteboard system.

Digital Technology

Mobile devices and digital technology are changing the way visitors interact with exhibits and each other. While traditional handheld devices, such as portable audio players and audio guides, have a role in the interpretive realm, emerging digital tools, such as multimedia tours, podcasts, interactive tours, and Internet-enabled tours enable visitors to craft their own experience with exhibit content. Digital tools have a role at the Center.

In addition to Microsoft Surface, smartphone applications could be of use along the Watershed Discovery Trail. We recommend that the SFPUC consider them, but remain flexible in response to this rapidly evolving field. Use of Quick Response (QR) codes or Near Field Communication (NFC) tags, for example, could enable visitors to creatively and realistically experience, through augmented reality, the higher-elevation reaches of the watershed, as well as learn about Sunol Valley’s history. New York’s Central Park recently launched their World Park Campaign with a system of QR codes that enable visitors to virtually witness history through multimedia programs, staff interviews and virtual guided tours, historical images, and other features not readily accessed elsewhere. Staff could also make use of QR codes or NFC tags (or other emerging technology) for plant and animal identification.

However, use of this technology comes with three caveats: 1. The field is rapidly changing and while QR codes are popular right now, they could be rendered obsolete in the future. 2. To maximize their use, QR codes and NFC tags need to be linked to a smartphone app, not a stagnant website. 3. Panels should display not only the QR code or NFC tag, but also an image of a smartphone and a brief explanation for those who are unfamiliar with the technology.

Increasingly, iPads are also emerging as a popular interpretive tool. Museums report high success with their use in small group settings (10-15 people) where detailed photographs, brief video demonstrations, and other features enhance a tour guide’s program. The challenge remains, however,
to use such technology sparingly. The focus should remain on the Temple, the watershed lands, the living systems, and the Center’s exhibits. An iPad would be there simply to enhance a docent or staff person’s discussion by sharing information not easily accessed through other means.

**Best Practices for Interpretive Panel Design**

While digital technology has a role at the Center, written text remains a highly efficient and effective way for visitors to connect to stories about the land and water. Well-designed panels positioned in the Center and on the decks and trail serve as an important interpretive tool.

The ultimate purpose of an interpretive panel is to enhance visitor understanding on any number of topics—plants, animals, ecosystems, historic figures, objects, and places. As with all forms of interpretation, the panel should adhere to certain principles that guide design as well as development of text.

Principle one—interpretive media must make a personal connection with, or be relevant to, the target audiences.

Visitors more readily integrate new learning by relating it to what they already know. There are several ways this is accomplished, including the use of humor, metaphor, stories, and analogies in panel copy. Testing readability during formative evaluation is an important step in this process.

Principle two—interpretive media should provide or encourage novel and varied experiences.

Posing thought-provoking questions, presenting intriguing designs, and encouraging diverse activity (e.g., watching for wildlife along the trail, counting trout, predicting consequences of water contamination, embracing a stewardship role) will help capture the interest of visitors. Interpretation is based first on recreation. Visitors are voluntary learners and all interpretive media fall within a leisure setting. Material that is perceived as fun is more likely read than that perceived as instruction.

Principle three—interpretive media should be organized with easy-to-follow structures.

Visitors tend to read panel titles first and it is therefore important to create interesting, visually rich, and eye-catching headers. Subtitles and callouts create a layered approach for the text and enable the reader to build their own “mental scaffold” of the interpretive material.

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5 *Designing Interpretive Signs*, Moscardo, Ballantyne, Hughes, 2007
Principle four—interpretive media should be based on a theme.

To some degree, all of the interpretive media proposed for the Center reflect the overarching theme and select sub-themes. Focusing on the “take-home messages” helps visitors see the big picture and organize new information into an intellectual framework they understand.

Principle five—interpretive media should engage visitors in the learning experience and encourage them to take control of their own learning.

Arranging material hierarchically on a panel enables visitors to decide on their own level of reading commitment. Research indicates most visitors generally spend three seconds, 30 seconds, or three minutes reading a panel, and that the attracting power of a panel is related to brevity of text, design appeal, and liberal use of images.

When activities and challenging questions are added to the mix, panels become springboards for discussion and thought.

Principle six—interpretive media should demonstrate an understanding of, and respect for, the audience.

It is likely teachers and caregivers will be bringing children to the Center. Therefore, interpretive media need to encourage conversations and focused attention. Vignettes along the trail—benches, wildlife sculptures, pullouts, wildlife viewing areas at the pond—will provide a forum for this type of activity, particularly if guided by interpretive panels.

The architecture, life forms, and stories surrounding the Alameda Creek Watershed Center serve as natural forums for discussion and discovery. In the spirit of interpretation and French poet, Anatole Frances, the intent is to light just a spark. The rest will be up to the visitor.
**Evaluation Strategies**

Evaluation needs to be addressed during all phases of developing media and programs. Conducted internally by SFPUC staff or externally by consultants, evaluation will inform the planning process and generate specific information that helps improve the outcome of an exhibit, program, or experience. Evaluation occurs at three stages: front-end, formative, and summative.

**Front-end evaluation**

Front-end evaluation work has already been conducted for the Center. The Acorn Group assessed field-trip needs, interests, and constraints among several school districts within two county offices of education. Results of this work are summarized in Appendix C.

The Acorn Group additionally studied water-focused exhibits at surrounding museums and nature centers, and interviewed staff regarding operational challenges. Results of this work are summarized in Appendix D.

Further, SAGE assessed facility-use needs, interests, and constraints among potential partners and audience sectors. In addition, SFPUC reached out to the Sunol community and Sunol Water Temple Preservation Association to update stakeholders about progress on the project and receive feedback along the way.

**Formative evaluation**

Formative evaluation should occur as programs and media are developed so that “mid-course” corrections can be made easily. It allows for an assessment of readability and legibility of print media; attraction and holding power of interpretive panels and exhibits; and optimal placement of media. It relies on the use of draft materials and models that are inexpensively produced, allowing for the media to be adjusted prior to fabrication or permanent installation.

**Summative evaluation**

Summative evaluation should occur after the interpretive media and programs are in place. Summative evaluation measures attainment of goals and objectives. It is based on qualitative methods such as field observations and interviews or quantitative methods such as pre- and post-tests. Its purpose is to yield information about how a program or interpretive element at the Center is producing results.
**Part IV**

**Architecture and Green Design**

As with all sections of this report, Part IV is a working draft subject to change based on recommendations of the SFPUC and Civic Design Review Committee. Placing the Center at the upstream side of the Temple accomplishes the following:

- minimizes the potential visual concerns of building near the Temple, thus protecting its role as a visual landmark and center piece for the site;
- avoids the need for a tremendous amount of fill material to be imported and compacted to create sufficient space for the Center at another location such as downstream of the Temple;
- creates additional space for the Center and surrounding grounds;
- allows more direct access to the picnic grounds and what will eventually be trail access over Alameda Creek to the EBRPD Vargas Plateau; and
- allows SAGE to continue to make use of its existing space for agriculture.

- allows the proposed building to be located outside the floodplain, significantly reducing the major risk of flood damage and enabling the project to be in compliance with the San Francisco Floodplain Management Program.

**Administrative Area**

Plans for administrative space in the Center (SLTIP CER Learning Lab/Office and Storage, Bldg. 2) are based on the assumption that office space is required for up to two-four staff members and a cadre of docents, assuming there will be a volunteer program in place to help administer the Center’s activities and programs. The building plan currently identifies the need for shared office space (approximately 650 square feet), plus a storage/copy room (90 square feet).

This area could also accommodate space for a watershed library (350 square feet). This room could contain wall bookshelves and cabinets for research documents, journals, and books.

Architectural considerations include the preservation of sight lines to the Temple, water infiltration gallery, and surrounding landscape, a critical aspect that enhances and provides orientation to the visitor experience.

Other space contained in this area includes public restrooms (500 square feet). Given that classes will be on tight field trip schedules, this would likely demand a higher number of water closets/urinals than normally required by the building code. The California Building Code lists educational facilities at one water closet per 50 females and one water closet/urinal per 50 males. The recommended number is a minimum of four water closets in the women’s restroom and two water closets and two urinals in the men’s restroom. This would require at least 200-250 square feet for each restroom. A janitor’s closet should be located inside one of the restrooms for storage of cleaning equipment. Due to the possibility of public access for picnicking and special events occurring when the Center is closed, having direct outdoor access to part or all of the restrooms from the Temple grounds may be desirable.
A unisex staff restroom and lockers should be located adjacent to the staff offices. This should encourage some staff members to bike to the Center, an aspect that addresses a requirement for a LEED point.

**Community Room**

The Community Room (SLTIP CER Auditorium/Conference Center, Bldg., 1) is a multi-purpose room that serves as a large gathering place for general program orientation with a capacity of approximately 100 people @ 15 square foot, or 1,500 square feet total. Capacity of this room remains a key question since it affects the floor area. Passive solar orientation should be a design consideration, as should preservation of sightlines to the Temple, water infiltration gallery, and the surrounding landscape.

We recommend the inclusion of a vestibule lobby (400 square feet) which, during very cold or warm weather, serves as an air lock to help keep the assembly space comfortable.

This lobby also affords an opportunity to display additional interpretive media, such as hanging banners, large format photographs, and casework, all of which serving to introduce new visitors to this remarkable site and to celebrate the Alameda Creek watershed. This space could also house temporary art exhibits.

There should be a storage space (150 square feet) for tables, chairs, and multimedia equipment directly adjacent to the assembly space. In addition, there should be some kind of kitchen (roughly 500 square feet) adjacent to the assembly space. Early comments suggest a commercial-grade kitchen. The programming for the Center will determine whether a commercial-grade kitchen is necessary, or if a staff kitchen, equipped with appliances and cabinets, will suffice. A staff kitchen could also be used for assembly of catered food brought in from the outside. A small food storage room (100 square feet) within this kitchen should be constructed to be vermin-proof.

The following is a preliminary list of innovative green building features that have been discussed for possible inclusion in the design of the Center. These need to be incorporated at the beginning of the design process. Additional green building features items will be fleshed out during design development.

**Passive Solar Design**—implementation of passive design techniques is critical to achieve the high energy efficiency standards established for the Center. These design techniques can help stabilize the interior temperature during both the hot summer and cold winter seasons without the need for excessive mechanical equipment. This is a fundamental green building technique that needs to guide the design of the overall building form and site layout.
Photovoltaic Solar Panel System—a photovoltaic system would generate renewable electrical energy to help achieve the goal of being a net zero energy building.

Greywater System—non-black wastewater from sinks and lavatories could be collected and treated on-site and then reused for irrigating the extensive landscaped grounds.

Outdoor Maintenance Yard

An enclosed and secure outdoor area will be needed for maintenance and repair. Mechanical and electrical equipment for the photovoltaic, greywater, and other systems should be located in this space (minimally 1,500 square feet).
Part V
Phasing

Exhibit development occurs in three phases. With the submittal of this report, the first phase—conceptual planning and preliminary design—has been completed for the Center. Overarching and supporting themes, goals, and objectives have been established; exhibit concepts have been developed; and conceptual drawings of exhibit areas and trail media define the “look and feel” for interpretation.

During the next phase, schematic design and design development, secondary, detailed drawings will refine the exhibit concepts. From these, finished detailed renderings and models, elevations, and section drawings are created. Preliminary specifications and written documents explicitly define the media in order to secure accurate cost estimates from various contractors. At this time writing and design of sign media also take place.

The third exhibit development phase encompasses final design and construction drawings. Following the bid process, contractors and fabricators are selected, and shop drawings are created. These serve as the “blueprints” for exhibit fabrication. The project then moves forward to construction and ultimately, installation. Throughout all phases, either the client, or the client and a consultant retain responsibility to approve all drawings and schedule ongoing inspection of fabrication and installation. This involvement and supervision is essential in order to protect the integrity of the planning work.

Implementation of this interpretive master plan needs to occur concurrently with implementation of an Education Program Plan. The Center’s design assumes staff will be hired (and someone designated as the first respondent should a power failure occur) and a core of docents and volunteers recruited and trained. While docents will serve as ambassadors, teachers, and tour guides, other volunteers will help maintain the Watershed Discovery Trail, including tending to the plant communities and pond.

Estimated Costs

We have identified cost estimates for the engineering, fabrication and installation of exhibits, displays, and equipment proposed for the Interpretive Center. It should be noted that these estimates are preliminary and should not be used as a basis for evaluation of construction bids. Companies responding with bids will be able to provide firm fabrication and installation costs after design development is undertaken.

Based on an average cost of $400.00 per square foot, development of exhibits in 2,910 sq. ft of space equates to $1,164,000. This average cost per square foot encompasses the following: conventional cases, graphics, simple interactives (e.g., flip lids and flip books), simple media (e.g., ambient sounds and lighting effects), more complex interactives (e.g., mechanical or electronic devices), period rooms and alcoves, and more technologically complex interactives, including computer touch screen interactives and electromechanical devices. The $1,164,000 estimate includes $200,000 - $250,000 for the design, fabrication, and installation of the 7,800
gallon aquarium; art commission fees for the watershed floor map and two murals, one in the foyer and the second behind the stream profile; and purchase of two Microsoft Surface Pro tablets. The cost estimate excludes interpretive media for the Watershed Discovery Trail, other exterior locations, such as the Temple and decks, as well as the gallery for temporary art in the Center.

In addition, soft costs associated with exhibit development include the following:

- interpretive planning and conceptual design (completed)
- design development (typically 7% of budget, but due to art fees, may be as high as 14%)
- final design and specifications (typically 7% of budget, but due to art complexities, may be as high as 10%).
Appendices
Appendix A: Conceptual Design
Drawings
Appendix B: Strategic Planning Session

Mission Statement Guidelines:

The mission statement indicates why Alameda Creek Watershed Visitor Education Center exists. It gets to the “heart” of the institution, moving beyond a mere listing of activities and functions to clearly define a niche and reveal an underlying philosophy. A mission statement usually has three elements: 1. identification of the market, clients, or those for whom services (products) are provided, 2. the goal toward which services (products) are delivered, and 3. broad description of the services (products) it provides.

Vision Statement Guidelines:

The vision statement complements the mission statement, but focuses on desired outcomes that are at least five to ten years away. Using powerful words, it captures the “vision” and inspires the target audience.

Examples of other institutions’ vision statements and mission statements:

American Forest Foundation (AFF)
Vision: AFF is committed to creating a future where North American forests are sustained by the public that understand and value the social, economic, and environmental benefits they provide to our communities, our nation, and the world.

Mission: We strive to ensure the sustainability of America’s family forests for present and future generations.

Avon Products, Inc.
Vision: To be the Company that best understands and satisfies the product, service and self-fulfillment of women—globally.

Bay Model Visitor Center
Mission: The Bay Model Visitor Center promotes public understanding of the mission of the U.S. Army Corps of Engineers South Pacific Division. The Bay Model Visitor Center fosters public support and stewardship of the aquatic, historic and cultural environments of the San Francisco Bay region relating issues via the simulated model of the San Francisco Bay and Delta. The Visitor Center utilizes the San Francisco Bay Model to link community assets and expand environmental education.

Vision: Through all our products, services, and relationships, we will add to life’s enjoyment.

Mission: The mission of Anheuser-Busch is to be the world’s beer company; enrich and entertain a global audience; and deliver superior returns to our shareholders.

AT&T Corp
Vision: Build shareholder value by providing “universal communications services” that put our customers in touch with the people or the information they need, whenever they want, wherever they are, in the form most useful to them, and at a competitive price.

Mission: We aspire to be the most admired and valuable company in the world. Our goal is to enrich our customer’s personal lives and make their businesses more successful by bringing to market exciting and useful communications services, building shareowner value in the process.

Mission: The mission of Anheuser-Busch is to be the world’s beer company; enrich and entertain a global audience; and deliver superior returns to our shareholders.

AT&T Corp
Vision: Through all our products, services, and relationships, we will add to life’s enjoyment.
Coca-Cola
Mission: We exist to create value for our shareowners on a long-term basis. We refresh the world. We do this by developing superior beverage products that create value for our Company, our bottling partners and our customers.

Microsoft Corporation
Vision: A computer on every desk and in every home.

Mission: At Microsoft, our mission and values are to help people and businesses throughout the world realize their full potential.

Principal Financial Group
Vision: To become the financial services company of choice for individuals, groups, businesses and their employees, and communities around the world.

Mission: To help individuals, groups and businesses meet their financial goal by providing high quality insurance and financial services.

Westin Hotels & Resorts
Vision: Year after year, Westin and its people will be regarded as the best and most sought after hotel and resort management group in North America.

Mission: In order to realize our Vision, our Mission must be to exceed the expectations of our customers, whom we define as guests, partners, and fellow employees. We will accomplish this mission by committing to our shared values and by achieving the highest levels of customer satisfaction, with extraordinary emphasis on the creation of value. In this way we will ensure that our profit, quality, and growth goals are met.

Writing a mission statement:

The reference to market or audience is usually only one or several words. The goal should convey how the project will make a difference (to the surrounding community or to a larger entity). The description of services should be inspiring—how does the project fulfill its greater purpose?

The typical length of a mission statement is one to two sentences.

Four shortcomings to avoid:
1. The mission statement reflects an internal focus and fails to relate the institution or project to the external environment and market niche.
2. The statement merely lists activities and fails to identify a greater purpose. It sounds formulaic.
3. The statement is perceived only as an internal document for official use only. It is not valued and it is virtually unknown to external stakeholders and target audiences.
4. The mission statement is not supported by other elements of a plan, such as core values, design principles, and goals. Thus, no mechanisms are in place to guide operations and ensure consistency in messages and actions.

Writing a vision statement: Like core values, a vision statement is an important extension of the mission statement. While the mission statement is abstract, the vision statement is concrete—it describes exactly where the institution is heading. More specifically, it describes what the future looks like if the mission is achieved.

Microsoft’s original vision statement was “a computer on every desk and in every home;”
its mission statement, “At Microsoft, our mission and values are to help people and businesses throughout the world realize their full potential.”

Vision statements are written in the present tense. They use words that inspire and have enough detail to evoke the right image in the mind of the reader.

Like core values, a vision statement is an important extension of the mission statement. While the mission statement is abstract, the vision statement is concrete—it describes exactly where the institution is heading. More specifically, it describes what the future looks like if the mission is achieved.

Alameda Creek Watershed Center in Sunol Current, revised. July 12, 2011:

**Mission Statement**

Located in Sunol Valley at the confluence of Alameda Creek and the Arroyo de la Laguna, the Alameda Creek Watershed Center provides a community gathering place where history and science come alive. The Center inspires generations of visitors to discover and understand the history of water development and agriculture in the Sunol Valley and help protect this watershed and its natural resources.

**Vision Statement**

To cultivate an increasingly informed public that understands the significance of Alameda Creek, its watershed, its role in the SFPUC water system, and its biological diversity, and reflects this understanding by conserving water and taking action to protect and restore its natural resources.
Appendix C: Educator Needs Assessment for the Alameda Creek Watershed Center

Introduction

Creating an interpretive master plan requires understanding the needs and interests of target audiences. Given that a key target audience for the new Alameda Creek Watershed Center (Center) is K-12 students, The Acorn Group embarked on an education needs assessment in spring 2011. The purpose of this needs assessment was to understand administrative criteria regarding the selection of school field trips. Specifically, we compiled interview questions to reveal needs, interests, and constraints that could influence a school’s potential use (and a district’s approval of such use) of the Center for a field trip. Understanding that SAGE is assisting with the development of the education program plan for the Center, we avoided questions that focused on the academic content of specific programs. When we asked about alignment to content standards, it was within the context of the Center’s exhibits, as well as experiences on the grounds.

Methodology

In May and June 2011, Acorn Group staff contacted 16 administrators associated with the curriculum and instruction or pupil services divisions of local county offices of education and school districts. The purpose of this communication was to schedule time for a 10-minute phone interview. Our contact list included Alameda County, Contra Costa County, Santa Clara County Offices of Education and San Francisco Public Schools. The list of school districts within those counties includes Fremont Unified School District, Hayward Unified School District, Livermore Unified School District, Newark Unified School District, Pleasanton Unified School District, New Haven Unified School District, Sunol Glen Unified School District, San Ramon Unified School District, Milpitas Unified School District, San Jose Unified School District (2 staff), and San Francisco Unified School District (2 staff). Phone calls followed correspondence by email. The roster and introductory letter are included in the first and second appendices.

With summer recess on the horizon, the timing for this assessment has not been optimal. To date, we have not reached staff at Fremont, Hayward, or San Jose Unified School Districts. However, because the feedback we have gathered thus far has been very consistent, we are compiling this report with the information we have in order to remain on schedule.

Findings

Nine phone interviews were conducted between May 26 and June 29, 2011. Two phone interviews were conducted in July, 2011. Each interview followed the same script. A brief description of the Center and project was followed by 10 questions. Responses to these questions are recorded in the third appendix.

Most of the respondents serve in some capacity related to science education within the curriculum and instruction divisions of their agencies. Approximately half of those interviewed (six respondents) are not familiar with the Sunol Water Temple. Only two individuals had actually been to the site (several years ago); another was aware of it because of the television show, Myth Busters.

Despite the lack of familiarity with the site and Temple, most respondents see the
proposed Center as a suitable field trip destination, provided certain conditions are met. One individual representing Santa Clara Office of Education and another representing San Francisco Unified School District expressed concern about the distance and constraints defined by district bus schedules. Districts “near the 680 corridor,” “on this side of the hill,” “that don’t have to cross bridges” likely will be more inclined to consider the new Center as a field trip destination. It should be noted that field trips typically need approval at both the school and district level. Decisions are based on relevance to content standards, grade level appropriateness, distance, cost, schedule relative to district bus schedule, and pupil safety (e.g., presence of venomous snakes, open water).

When asked how the Center could be used for educational purposes, most respondents noted the potential connection to science, not only at the elementary level, but also at the middle and secondary levels. Some also noted the history and social science connection, specifically the history of the state, the history of California’s water system, including the establishment of Hetch Hetchy, and the history of agriculture. Respondents view the proposed center as one that offers “real life” examples of what students are learning in the classroom. While they expressed concern about spending too much time indoors at the facility (given the rarity of students spending time outdoors), they expressed enthusiasm for the interpretive center and learning lab.

When asked about specific experiences offered to students and teachers, respondents voiced interest in hands-on, interactive learning. They indicated teachers are looked for opportunities to reinforce classroom learning with guided walks outdoors, use of science equipment such as microscopes, exposure to technology (e.g., iPads), data collection and analysis, and exposure to the region’s native plants and animals. One individual expressed interest in team-building exercise outdoors, comparable to what Chabot Space and Science Center is developing at their outdoor area. Another reiterated the importance of connecting to the real world—water quality testing, use of mathematical skills to interpret data, and the assimilation of this information into the students’ personal understanding of how the world works. Still another saw the connection of the Ag Park to the district’s garden program. Since almost every school in Pleasanton Unified School District has a garden, as well as a science specialist, there is strong potential to develop a program that meets academic needs in this particular district.

Not surprisingly, decisions to approve a field trip are based primarily on relevance to state content standards. In most cases, a district’s scope and sequence is derived from them. A couple of caveats should be noted: 1. The Acorn Group is creating the interpretive master plan and will be referencing these standards as interior and exterior exhibits and displays are developed. At the same time, we understand these media will be designed with multiple audiences in mind, and therefore, should not be geared to address the academic needs of K-12 students exclusively. 2. Currently, legislation has been introduced that would require review and subsequent revision of California’s Science and History-Social Science Content Standards. At the same time, California already has adopted Common Core Standards in English/Language Arts and Mathematics, thus opening up the door to consider eventually adopting similar national guidelines for Science and History-Social Science. Further, the Common Core
Standards in English/Language Arts and Mathematics have ties to science and history literacy. Because it will be years before this is sorted out, most respondents indicated they are using the state’s Science and History-Social Science Content Standards and new Common Core Standards for English/Language Arts and Mathematics as reference points.

Respondents offered uniform responses to the question about amenities that would enhance students’ experiences. These include picnic tables, shade structures, restrooms with soap, hot water, and adequate numbers of stalls, an outdoor deck for seating (e.g., during a general orientation talk), wheelchair accessibility, an enclosed area outdoors where students could “run around” after lunch, but remain within view of chaperones and faculty, a place to store bag lunches, and adequate parking for private cars (if parent chaperones are doing the driving.) One respondent expressed interest in composting and recycling facilities. Two respondents expressed concern about the district’s free and reduced lunch program and how this relates to field trips logistically speaking. Teachers are required to provide box lunches to students who qualify for this program. It was suggested that the SFPUC consider offering a free box lunch program for all students on a field trip.

Beside the cost of transportation and classroom time constraints, other limiting factors include the cost of substitute teachers should a middle and secondary level classes opt for a field trip, holding capacity of the Center (e.g., if a middle school participates, sometimes it is the entire class that goes), safety (it needs to be a relatively safe site), and access to phones (e.g., cell phone reception) in the event an emergency arises. One respondent suggested undertaking a marketing campaign to ensure that the Center is on the districts’ list of approved field trip sites and further, that teachers perceive the Center as academically relevant.

Seven of the nine respondents indicated it was very likely that schools would consider using the Center as a field trip site if free bus transportation was provided by the SFPUC. Two others found it difficult to say one way or another. One of these respondents is the director of pupil services—he does not have a role in academic support. The other represents Santa Clara County Office of Education whose jurisdiction admittedly extends far west of Sunol.

The average field trip is either a half-day or full-day event. Elementary level field trips range from two to four hours in length. Unless the field trip constitutes the outdoor science school—typically a three or five-day overnight program—it will not exceed one day in length.

Three additional suggestions were made that could inform SAGE’s work with program planning: 1. Market to charter schools and home schools (and use the testimonials of teachers for marketing); 2. Consider developing a visiting classroom program for those classes that cannot get to the Center; and 3. Seek teacher input early in the program development process.

Conclusion

Although this needs assessment reflects the input of only nine county and school district administrators, it nonetheless yields important information for the Center’s site plan, exhibits, and programs. While we will continue contacting those agencies that have not responded, we anticipate that the
feedback we receive will be similar in nature.

From the respondents’ perspective, the monetary cost of a field trip (admission and bus transportation) and “cost” of classroom time are significant constraints. In order to justify them, educators seek field trip experiences that are directly aligned to the state’s academic content standards, supported with pre-trip preparatory material, and enriched with hands-on, interactive investigations in the field. Given the current concern over children’s loss of connections with nature (Richard Louv’s Nature Deficit Disorder), educators are also seeking top-quality experiences outdoors. Time spent in the Center’s learning lab will need to be balanced by time spent on the grounds.

The possibility of free bus transportation appears to be a highly attractive incentive. Further, the availability of certain amenities, such as picnic facilities, restrooms, and access to scientific equipment, likely will serve as additional attractants.

Appendix I: Roster

Alameda County Office of Education
Robert Curtis, Science Coordinator, rcurtis@acoe.org, 510-670-4122

Districts in range:
Fremont Unified School District:
Instructional Services (510) 659-2583 (ext. 12280), Assistant Sup., Deborah Sims, E.D., dsims@fremont.k12.ca.us

Hayward Unified School District (510) 784-2600 TBD

Livermore Valley Joint Unified School District: Pauleen Heuber, Teacher on Special Assignment, Curriculum Special Projects Department, (925) 606-3204

Newark Unified School District: Bill Whitton, Coordinator of Pupil Services (510) 818-4226

Pleasanton Unified School District: Jane Golden, Director of Curriculum and Special Projects, (925) 426-4340, jgolden@pleasanton.k12.ca.us

New Haven Unified School District: Joe Feldman, Director, Instructional Programs, jfeldman@nhusd.k12.ca.us, (510) 471-1100 ext. 62612

Sunol Glen Unified School District, Molleen Barnes, Superintendent and Principal, mbarnes@sunol.k12.ca.us (925) 862-2026

Contra Costa County Office of Education
STEM Coordinator: Hilary Dito (925) 942-3396, HDito@cccoe.k12.ca.us (speaking on behalf of Director, Educational Services: Pam Tyson (925) 942-3381, ptyson@cccoe.k12.ca.us

Districts in range:
San Ramon Valley Unified School District, Rob Stockberger, Director, Secondary Education, (925) 552-2922, rstockb@srvusd.net

Santa Clara County Office of Education
Sandi Yellenberg, Science Coordinator, (408) 453-6692, sandra_yellenberg@sccoe.org

Districts in range:
Milpitas Unified School District, Educational Services, Beverly James, Assessment and Special Projects (408) 635-2600 (ext. 6041)

San Jose Unified School District, Nancy Albarrán, Curriculum, Instruction, and English Learner Services (PreK-5), Nancy_Albarran@sjusd.org, (408) 535-
We are hoping you are willing to assist us by answering a few questions. We are in the early stages of designing the Alameda Creek Watershed Center, a facility that will be adjacent to the Sunol Water Temple and the Sunol Agricultural Park. This facility will feature a learning lab, community gathering space, and interior and exterior exhibits that celebrate the natural and human history of this remarkable place. The Alameda Creek Watershed Center project is managed by the Natural Resources and Lands Management Division of the San Francisco Public Utilities Commission. The Commission has retained the services of The Acorn Group to develop the project’s interpretive master plan.

We would appreciate about 10 minutes of your time for a phone interview the week of May 23 or 30. We have nine questions to ask, all related to field trip logistics, potential constraints, and desired amenities and student experiences.

Please let us know if you are willing to provide some feedback and if so, what day and time is most convenient. (If we need to contact a different staff member, please let us know this as well.) We are striving to make the Center’s experiences as engaging and relevant as possible for students.

Thank you very much.

Sincerely,

Jennifer Rigby
The Acorn Group

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park? I was there seven years ago (lived in Fremont down by Niles).

2. Do you think the Center might become a field trip destination for schools within your district?
Yes, I think for anyone on that side of the hill.

3. (If yes) How might the schools use this Center for educational purposes? See below.

4. What experiences would you like to see offered for students as well as teachers? Would love to see some technology. Have experiences inside the Center (iPads) students can use. Videos and pictures studied in advance they use to compare to
the outdoors. Some centers build in team-building (learn science and have fun (comparable to a ropes course). See Chabot (currently building an outdoor education facility).

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?

Scopes and sequences are aligned to content standards. National science standards, common core standards, new national science framework, and proposed legislation to review/revise California’s science standards are placing people in the state in limbo.

6. What physical amenities would enhance your students’ experiences? Picnic tables, shade structure, outdoor instructional areas. Don’t spend all the students’ time indoors!

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the Center? Parents are allowed to drive (provided they have a certain amount of insurance). Field trip cost is also a factor.

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination? Absolutely!

9. What is the average length of time for a field trip in your school district? One full day. Target audience: elementary and middle school. Science isn’t being taught at elementary. But it is taught in middle school (and 8th grade is a test year). Overnight programs and evening programs as well.

10. Other
Stakeholder interview
Interview date: 07.20.11
District: Livermore Valley Joint Unified School District
Staff: Pauline Heuber
Title: Teacher on special assignment, Curriculum Special Projects Department

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?

Yes, years ago. But I know a friend who takes her class every year.

[Based on a brief description of proposed new facilities and exhibit and program focus]

2. Do you think the site might become a field trip destination for schools within your district?
I would certainly recommend it. I have heard great reviews of the docent program in place now.

3. (If yes) How might the schools use this site for educational purposes?
I don’t know how much it will be aligned with state standards. However, if comparable to the wildlife refuge (Alviso), yes. Align to the curriculum pre-, during, and post-trip. Develop a scheme that students can constantly refer to. Then I think it will be used a lot and considered very valuable. We can no longer afford one-shot deals. Chaperoning parents will return with their families as well.

4. What experiences would you like to see offered for students as well as teachers?
Definitely some preliminary classes (nighttime orientations) for the adults. For the students, hands-on programs. Get down and get dirty! Parents and students need to get directly involved. For the teachers, the same
thing, though they will be spending their
time doing classroom management. What
are the best management strategies for
outdoor field trips? (Share these tips with
them). Also, provide opportunities for kids
to take pictures (e.g., Science Odyssey. The
Art of Science entry).

5. Does the district base academic decisions
to use a site for field trips primarily on
relevance to grade-specific California State
Content Standards or the district's Scope
and Sequence? All of the above.

6. What physical amenities would enhance
your students’ experiences?

Adequate parking, clean and ample
restroom facilities, a picnic area for bag
lunches, protection during inclement
weather (e.g., a covered area), possibly an
orientation/projection display (would prefer
this given to teachers in advance), fresh
water (drinking), botanical ID tags, anything
to help students gain deeper knowledge and
appreciation.

7. Beyond the cost of bus transportation and
classroom time constraints, are there other
factors that could limit schools’ potential use
of the site?

Some places are so booked, they have
lotteries. Teachers may not get an opportune
time slot. Multilingual needs (Spanish is
predominant language in the district).
Access for students with special needs.
Ipods for non-English speaking students.

8. If the San Francisco Public Utilities
Commission provided bus transportation
from schools to the site, is it more likely
schools would consider using this site as a
field trip destination?

Absolutely. Our parent chaperones are
reduced in number. They no longer have
large SUVs and a lot of mothers now work.

9. What is the average length of time for a
field trip in your school district?
Grade-specific and dependent on the actual
set up for the field trip. If there are multiple
things to do, we could be there all day long,
as we are at Alviso. For most field trips,
however, it is typically a morning or an
afternoon.

10. Other
Website access.
Research opportunities for secondary level
students.

Stakeholder interview
Interview date: 06.29.11
District: Newark Unified School District
Staff: Bill Whitton
Title: Coordinator of Pupil Services

1. Are you familiar with the Sunol Water
Temple and the land surrounding it,
including the Sunol Ag Park?
Yes. Visited it and seen it on Myth Busters.

[Based on a brief description of proposed
new facilities and exhibit and program
focus]

2. Do you think the Center might become a
field trip destination for schools within your
district?
Sure. One-day trip that is less than 100 miles
one-way and academically relevant.

3. (If yes) How might the schools use this
Center for educational purposes?
If it’s tied to the state standards, it might fit
in as a science trip.

4. What experiences would you like to see
offered for students as well as teachers?
Outside of area of expertise.

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
State content standards.

6. What physical amenities would enhance your students’ experiences?
Outside my area of expertise. I look at safety.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the Center?
Those are the major concerns.

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination?
Hard to say.

9. What is the average length of time for a field trip in your school district?
Vast majority are less than one day. Our 6th graders do a one-week science camp experience. Burden of funding and burden of teacher time. This may be our last year of a week-long camp.

10. Other

**Stakeholder interview**
Interview date: 06.01.11
District: Pleasanton Unified School District
Staff: Jane Golden
Title: Director of Curriculum and Special Projects

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?
Yes, somewhat. I’ve lived in East Bay my entire life. I know that the Temple and park are there, but I haven’t visited. I live in San Leandro.

[Based on a brief description of proposed new facilities and exhibit and program focus]
2. Do you think the Center might become a field trip destination for schools within your district?
Definitely. We have science specialists at all of our schools. Each school has a full-time science specialist. Almost all of our schools have gardens. This is a big focus at the elementary level. At middle and high school, they take science every year. For the school district, it will be important to reach out to schools and teachers to develop packets that are standards-based.

3. (If yes) How might the schools use this Center for educational purposes?
At middle school, seventh grade for life science. At two of our middle schools, they have outdoor experiences (hot houses, gardens). At sixth grade, it is also relevant (earth science and resources).

4. What experiences would you like to see offered for students as well as teachers?
Hands-on is always really important, especially for younger kids. Lessons they can make connections to, to classroom and to bigger world. It must be fun. I would be happy to help organize direct input from Pleasanton USD teachers.

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
It is going to be a long time before science standards are changed. Science common core standards are coming, but 2018 is not unrealistic to expect any changes for instructional materials, assessment tools, standards.

6. What physical amenities would enhance your students’ experiences? Plenty of bathrooms, shade structures, parking for cars (adult drivers), if a half-day trip, a place to store bag lunches, picnic facilities, composting and recycling facilities.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the site? Cost of program.

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the site, is it more likely schools would consider using this site as a field trip destination? Yes. You would sell out!

9. What is the average length of time for a field trip in your school district? For 4th, 5th, probably half-day and all-day trips. (Assistant superintendent approves all field trips). Fifth grade goes to outdoor science for 2½ day program.

10. Other
Not that I can think of right now.

Stakeholder interview
Date: 05.31.11
District: New Haven Unified School District
Staff: Joe Feldman
Title: Director, Instructional Programs

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park? Not at all.

[Based on a brief description of proposed new facilities and exhibit and program focus]

2. Do you think the Center might become a field trip destination for schools within your district? I don’t know. It’s possible.

3. (If yes) How might the schools use this Center for educational purposes? Depends on grade levels. Reading level, accessibility. Finds ways to get teachers on board early. Teachers can take more than one field trip.

4. What experiences would you like to see offered for students as well as teachers? I would want to see standards across the disciplines, math, reading, critical thinking skills. I would want to see activities that connect to classroom learning. The field trip would therefore offer exploratory learning. Service-learning, per se, is not focus of the district. (There is a district requirement, but this doesn’t sound like a match).

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence? Field trips are ultimately approved at district level. Scope and sequence follows California content standards.

6. What physical amenities would enhance your students’ experiences? Comfort—bathrooms with plenty of stalls and sinks, shade, picnic tables, an area that is pretty clear so chaperone can see the kids.
7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the site?
Cost of field trip. Capacity of kids accommodated at one time. At middle school it is usually the entire the grade level that goes, but not necessarily at the same time.

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination?
Yes.

9. What is the average length of time for a field trip in your school district?
At the elementary level, it varies. For kindergarten-1st, it’s short. For fifth grade, it can be a day. New Haven does not go to outdoor science school.

10. Other

Stakeholder interview
Interview date: 05.26.11
District: Contra Costa County Office of Education
Staff: Hilary Dito (Pam Tyson)
Title: STEM Coordinator, Curriculum & Instruction

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park? Not very. And I grew up at Pleasanton.

2. Do you think the Center might become a field trip destination for schools within your district?
I could see it fitting into some of the environmental and science curriculum + historical interest.
Outlying schools (Richmond) probably won’t use it. But those on the 680 corridor would.

3. (If yes) How might the schools use this Center for educational purposes?
Hard to say, because I have a high school background. This could be used in California units, environmental units.

4. What experiences would you like to see offered for students as well as teachers?
I will be self-serving. Using science and technology to showcase the environmental (water testing, real life math, getting real world connections to their specific curriculum at that time)

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
Their scope and sequence is based on the California State Content Standards + Common Core (math + English/language arts [which is tied to science and history literacy]). I’ve seen the EEI units, and EP&Cs.

6. What physical amenities would enhance your students’ experiences?
Hands-on activities. Direct experience. The issue you get into is that amount of time spent on a specific subject, specific standards (state requirement).

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the site?
Geography (length of time to commute). Free bus transportation would be a huge drawing point.
Parents do volunteer to drive: a district by district waiver.

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination?
Yes. See above.

9. What is the average length of a field trip in your school district?
Generally, all day event or after hours events. Average two-three hours.

10. Other

Interview date: 07.26.11
District: San Ramon Valley Unified School District
Staff: Rob Stockberger
Title: Director, Secondary Education

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?
Yes, familiar with it. Played golf at Sunol. Driven by it several times and always wondered.

[Based on a brief description of proposed new facilities and exhibit and program focus]
2. Do you think the site might become a field trip destination for schools within your district?
Yes. I was already thinking it might be appropriate for all three levels, including AP environmental science.

3. (If yes) How might the schools use this site for educational purposes?
At elementary and middle, I absolutely see upper grade elementary relevance (e.g., self-contained 4th grade classroom for California history in concert with science). I see middle school (6th-8th [inc. physical science elements]). But push more for 7-8 to avoid consecutive visits. Perhaps recommend visits at 4th and 7th grade.

4. What experiences would you like to see offered for students as well as teachers?
Certainly an opportunity to go to the Temple, to have a docent provide the same history you just shared with me. At the upper grades, more than just the typical “visit, look, and listen.” Provide opportunities to engage in critical thinking. If there is a facility that features a lab, or access to the creek, that would be great.

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
These are connected. As we morph from content standards to common core standards, we will need to be flexible. Standards define content. Scope and sequence define timing and course offering. A decision to move to common core for science and history/social science will be based on politics. This is long way off. Part of me sees this as an opportunity to also engage in English/language arts and mathematics. Students should do some expository writing and apply math skills. Span the field trip experience across the curriculum.

6. What physical amenities would enhance your students’ experiences?
Access/egress safety. Parking lot suitable for buses, restrooms (adequate number of stalls), drinking fountains, shaded area, covered picnic area, covered, open air pavilion. Barbeques possibly.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the site?
Not really. This is amazingly close. This falls within a category one field trip (no board approval).

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the site, is it more likely schools would consider using this site as a field trip destination?
Sure.
Free is always better than asking parents than bus transportation donations.

9. What is the average length of time for a field trip in your school district?
It is content- and trip-specific defined. We drive 80 miles to Jackson for gold panning. This is at least a two hour plus travel trip for the elementary level and possibly a three hour trip for the middle/intermediate level and a four hour trip for the secondary level.

10. Other

Stakeholder interview
Interview date: 05.26.11
District: Santa County Office of Education
Staff: Sandi Yellenberg
Title: Science Coordinator, Curriculum & Instruction

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park? No

[Based on a brief description of proposed new facilities and exhibit and program focus]

2. Do you think the Center might become a field trip destination for schools within your district?
I hate to say this, but generally speaking, the schools are hesitant to go too far out of town. The practical reality is that buses have to be back in time by the end of day. Schools with private cards have a little more opportunity, controlled by individual district boards.

3. (If yes) How might the schools use this Center for educational purposes?
A couple of possibilities: As a teacher, the most exciting part is access to the learning lab if it had equipment I normally do not have access to. As far as other exhibits, it would really depend on the message you were giving and what I could not offer easily on my own grounds. (Have we thought about carbon footprints.)

4. What experiences would you like to see offered for students as well as teachers? On site, I would like to see them receive information and have questions posed that stretch their thinking. The what if...with paper and pencil that students post online; opportunities that support science fairs (Synopsis Championships at SCCOE).

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
Made district by district individually. Some schools forbid field trips.

6. What physical amenities would enhance your students’ experiences?
Would love to see Scaler Scopes run through computers interacting with the outdoors; images that they will recognize on the grounds, pre-field trip background information, and preparatory activities, trade books to read in advance, enough benches so that students can all sit, picnic area, adequate numbers of restrooms, wheelchair accessibility, signage (yes to wayfinding; depends on the interpretive. Adults want information on flora and fauna. On the other hand, does that detract from the aesthetic experience. Can this be on a handout? Show
plants at different stages, seasonal changes.) I love to have questions posed on signs whose answers are available in the teacher’s pack. Computers to display all this information. Have students think about the questions.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the Center?
Distance. Perceived learning potential.
Perceived is the operative word here. Is the marketing effective? Standards at 4th-5th, 8th and secondary level students due to testing. Focus on 6th (earth science, resources), 7th (due to life science).

8. If the San Francisco Public Utilities Commission provided free bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination?
I don’t know.

9. What is the average length of a field trip in your school district?
Elementary: two hours. Middle: half day or all-day (for the whole grade).

10. Other
Charter schools + home schools. Get testimonial from schools, teachers.

Stakeholder interview
Interview date: 06.10.11
District: Milpitas Unified School District
Staff: Beverly James
Title: Educational Services, Assessment and Special Projects

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?
I am not.

2. Do you think the Center might become a field trip destination for schools within your district?
I would think so. It appears to be in our range (within 50 miles) so would not have to get Board approval.

3. (If yes) How might the schools use this Center for educational purposes?
We have classes that go to farms, including Ardenwood and others closer to Santa Cruz. I definitely see the agricultural piece. Plus a focus of habitats.

4. What experiences would you like to see offered for students as well as teachers?
Hands-on, with some experiential learning. When I think of water, I think of filtering processes, use of microscopes. Interactive things that spark interest of students as well as teachers. Guided tours, e.g., Alviso EE Center requires teacher and chaperone training in advance of the field trip. I believe teachers would be willing (to go after school).

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
Yes.

6. What physical amenities would enhance your students’ experiences?
Restrooms with hot water and soap, drinking water access, a place for students to eat (picnic tables, deck). Free lunch program: Nutrition Services could prepare a bag lunch for these students.

7. Beyond the cost of bus transportation and classroom time constraints, are there other
factors that could limit schools’ potential use of the Center?
Needs to be a relatively safe environment (e.g., running water or lake fenced off), access to telephones (cell phone reception). If the activities are there for students to engage it, these become less significant issues. Is there a fee?

8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination?
Definitely! This is the highest cost. Some field trips extend beyond the course of a full day. This has not been an issue. We don’t have busing issues like other districts.

9. What is the average length of time for a field trip in your school district?
At the elementary level, four hours. I see this as more appropriate at the elementary levels. We see few field trips at middle and high school.

10. Other
Visiting classroom programs should be considered as an add-on. The key thing is that the program is interactive.

Stakeholder interview
Interview date: 06.01.11
District: San Francisco Unified School District
Staff: Nik Kaestner
Title: Director of Sustainability
Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?
Have not been there.

[Based on a brief description of proposed new facilities and exhibit and program focus]

2. Do you think the Center might become a field trip destination for schools within your district? Possible. We have to use school buses after 9 a.m. and must be back by 1 p.m. Students would have two hours only on-site.

3. (If yes) How might the schools use this Center for educational purposes?
Jean Darcy is a better person to answer this. Middle school (earth science and resources standards)

4. What experiences would you like to see offered for students as well as teachers?
I would say as much hands-on as possible. A project they could work on, as opposed to walking along and looking at a description of a water system.

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
There is talk about shifting to common core. That’s why we are hesitant to use EEI. I have been working on EE and an ecoliteracy project with the City. I have a new position focusing on operations.

6. What physical amenities would enhance your students’ experiences?
Picnic tables, shade structures, ability to walk around and explore things. If you entice people with grants (transportation grants, teacher training grants, free lunch) that would be a plus.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the site? Commute time, funding for the trip, standards alignment. And For middle and high school, substitute teacher costs.
8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the site, is it more likely schools would consider using this Center as a field trip destination?
Yes, definitely. SF Environment Dept: mandatory training plus sanctioned field trips (four sites). Get on this list.

9. What is the average length of time for a field trip in your school district? 9 a.m. – 1 p.m.
Also, some 4th and 5th grades go to outdoor science school and that decision is made at the teacher level.

10. Other.
Nik has a report on what teachers are looking for (NatureBridge).

Stakeholder interview
Interview date: 06.02.11
District: San Francisco Unified School District
Staff: Jeanne D’Arcy
Title: Supervisor, Mathematics and Science

1. Are you familiar with the Sunol Water Temple and the land surrounding it, including the Sunol Ag Park?
I am not.

[Based on a brief description of proposed new facilities and exhibit and program focus]

2. Do you think the Center might become a field trip destination for schools within your district?
I think it would be hard, partly because of crossing bridges, particularly given the district.

3. (If yes) How might the schools use this Center for educational purposes?

Depends on the grade level. Any connection to California content standards to science would be great. Social studies application (4th) also has merit. There is a connection to 6th grade as well (not just earth science, but also architectural and historical connection.)

4. What experiences would you like to see offered for students as well as teachers?
Anything about the water cycle, quality of water (testing), erosion (stream tables). Plus social studies, the history of California’s water system (Hetch Hetchy), agriculture.

5. Does the district base academic decisions to use a site for field trips primarily on relevance to grade-specific California State Content Standards or the district’s Scope and Sequence?
In science, it’s the scope (the what). The sequence is a recommended modular sequence. Things need to be taught (standards) but they are divided into chunks taught at different times of the year, depending on teacher preference, professional development, seasonal relevance, and availability of equipment.

6. What physical amenities would enhance your students’ experiences?
A place to eat, restrooms, at middle school, some kind of enclosed area (to channel that energy), a docent-led outside activity, ability to break into small groups, whole group activities indoors where they can sit down.

7. Beyond the cost of bus transportation and classroom time constraints, are there other factors that could limit schools’ potential use of the Center?
Food (free and reduced lunch). They are entitled to a free lunch. Teachers forget about this during field trip. Fund a box lunch.
8. If the San Francisco Public Utilities Commission provided bus transportation from schools to the Center, is it more likely schools would consider using this site as a field trip destination? Yes.

9. What is the average length of time for a field trip in your school district? Lower: about four hours, plus transportation. Middle school: about four hours plus transportation. High School: would be one or two teachers joining together. Kids are missing other classes with other teacher. Maybe four hours, inc. transportation. Not useful for school day school service-learning. During weekends and breaks, high schools could do service-learning.

10. Other
Appendix D: Neighboring Facilities Report

In June 2011 The Acorn Group staff visited six facilities located in or near to the Bay Area: Bay Area Discovery Museum, Bay Model Visitor Center, California Academy of Sciences, California Museum, EcoCenter at Heron’s Head Park, Lawrence Hall of Science, and Taylor Creek Visitor Center. Our goal was to examine exhibits in place that interpret water, watersheds, and aquatic life; understand “lessons learned” through interviews with facility staff; and apply this information to ensure exhibits proposed for the Center do not duplicate existing efforts elsewhere. Our findings are summarized below.

Bay Area Discovery Museum, Sausalito

The mission of the Discovery Museum is to “engage, delight and educate children through exploration of and connection with the local environment and the diverse communities that live here.” This bustling museum campus is situated at Fort Baker within the National Park Service’s Golden Gate National Recreation Area.

This museum was selected for our tour because of the water elements found in the Tot Spot, an exploratory outdoor exhibit area organized as four different habitats: wetlands, woodlands, stream, and meadow. Although the Tot Spot is designed exclusively for infants and toddlers, we wanted to study the interactions of young visitors and water, particularly within the context of suitable exterior exhibits at the Alameda Creek Watershed Center.

We found this water play exhibit to be nicely designed and well executed. Assuming a care giver is present and on-task at all times, the streambed beckons the child to the water’s edge. At its maximum height, the stream is raised to the level of a toddler’s waist, making it difficult to fall “up” into the water. The water flows from a simulated waterfall in a grouping of artificial rocks and descends step by step as it meanders across the patio. Play objects float in the water and regulatory signs focus on the positive.

Our conversation with the Director of Exhibitions revealed the following. Seventy-five percent of the museum’s 300,000 annual visitors go to the Tot Spot. The entrance is tightly controlled to ensure that only very little children enter. Scientific Art Studio, Inc. constructed the graduated streambed which slopes from very shallow water accessible to crawlers and early walkers to deeper water in a narrower channel. This portion is designed to encourage social play among toddlers.

The water is treated with bromine. The water is not skimmed, although staff scoop out eucalyptus debris on a regular basis. They do not have a problem with sand or wood chips in this play area, although they have a tremendous problem with these materials in the tide pool exhibit.

The most attractive aspect of the exhibit is its capacity to immerse its visitors. Children are transported to the world of a pond, a hill, and an underground burrow. They are free to be silly, as well as brave, as they venture into unchartered territory. They particularly enjoy the frog bubbles, the crawl-through waterfall, and the crawl-through root burrow. Optimally, they return on a regular basis. Since they are rapidly developing both physically and intellectually, they encounter new stimuli, challenges, and opportunities each time they do.
The museum budgets $600 per square foot for design and construction, but not evaluation. The original design resulted in having to walk entirely around the long, linear streambed to get to the other side. The bridge was an afterthought to accommodate adults. Toddlers have difficulty climbing the stairs and staffs realize the bridge probably should have been built with a sloped ramp instead.

Bay Model Visitor Center, Sausalito

The Bay Model is a three-dimensional, scaled working model of the San Francisco Bay and Sacramento-San Joaquin River Delta system that was created in 1957 as a scientific tool by the US Army Corps of Engineers. The manipulated ebb and flow of water simulates currents and tides, enabling researchers to predict the consequences of realigning or deepening channels, constructing wharfs, breakwaters, and landfills, and other activity that likely would influence the hydraulics of the Bay and its waterways. Computer-based modeling has replaced the Bay Model; it now serves as an educational tool.

Our first impressions of the Bay Model Visitor Center were very favorable. As we arrived in the introductory foyer upstairs, called From the Mountains to the Sea, we were surrounded by snow-covered artificial rock work that represents the high peaks of the Sierra Nevada. Beautifully painted murals show the mountains to the sea, the diverse landscape that water traverses on its way to the San Francisco Bay and Pacific Ocean. With text depicted on reading rails, visitors were reminded of the significance of the Sierra snowpack as a critical water resource for the State’s residents and industries and as the ultimate source of the Bay’s fresh water.

Beyond the dimensional rock work and well crafted graphic railings, more murals and a central topographic interactive model of the State comprise the exhibits in this wing of the visitor center. The interactive topographic map shows the flow of water from the Sierra Nevada to the Central Valley and then to the Bay-Delta using push button-activated fiber optics. It is simple, but effective.

The visitor center ranger we spoke with indicated this is a favorite stop among visitors. Visitors also compliment staff for the mural, an oil done on canvas. We all agreed that this exhibit is a clever use of a very small space. This individual remarked that the one improvement he would have liked to make is labeling the streams depicted in the carpeting. Visitors hardly notice this detail. It is, however, pointed out to school groups.
From there, the visitor is led to a round gallery to watch an orientation video on the Bay Model. After exiting the short video presentation, the visitor encounters several good interactive exhibits on the upper deck above the Bay Model. Featuring a variety of multi-modal displays (pull-up panels, touchable objects, recorded audio, to name a few) this deck serves to orient the visitor to the function and history of the Bay Model. This history includes the human story. One of the more interesting kiosks features audio recordings of Bay Model employees, from scientists to concrete masons.

This well-crafted look comes to an abrupt end once the visitor makes it down to the main floor, labeled “sea level.” Here, there is a mash-up of exhibit styles from the 1970s, 80s and 90s, and quite a few interactive exhibits that either do not work or are very tired looking.

The exhibition ends with a nicely done exhibit that tells the story of Marinship, the company that built transport and tanker ships for the WWII effort on this site between 1942-1945.

The staff member we spoke with did not know the cost of the Mountains to Sea exhibit. The visitor center has an exhibit technician on staff, so there rarely is a maintenance issue.

**California Academy of Sciences**  
**San Francisco**

Our visit to California Academy of Sciences was motivated by our interest in studying the freshwater aquaria. The most impressive of Steinhart Aquarium’s exhibits are those that present multilevel views. They aren’t simply beautiful to study; they’re accessible and engaging to a highly diverse, multi-age audience. Bubble windows and walk-through tunnels in particular create intimate immersive experiences for the visitor. While a Cal Academy-scale aquarium is neither practical nor appropriate for the Alameda Creek Watershed Center, a smaller-scale aquarium that displays freshwater species and offers both a fish-eye submerged view and another from above could be a hallmark of the new interpretive center. This feature could be crucial for capturing the interest of visitors who will not see the flow of water in either creek corridor because of accessibility issues or seasonal timing of their visit.

Our other reason to study Cal Academy was to examine how green architecture and green practices are interpreted for the public. In 2008, Cal Academy released the publication, *California Academy of Sciences, Architecture in Harmony with Nature*. Green practices, for those who aren’t reading the book or watching the DVD, *Under the Living Roof*, are most effectively showcased on the roof and in the Academy Café.
Visitors have access to the famed living roof where interpretive panels highlight the functions of various roof components—the native plants that constitute the green roof, skylights, drainage system, and stormwater filter fabric. Museum food, heralded as multicultural, local, seasonable, and organic, is literally “curated” through placards, menus, labels, and other media under the exhibit name of The Anthropology of Food.

**California Museum, Sacramento**

Home to California’s Hall of Fame, the California Museum offers exhibits that showcase the uniqueness of the State’s people and places. The facility is relatively new. It opened in 1998 for the purpose of displaying material from the State’s archives. Since then, its directives have shifted. In addition to permanent exhibits, at least six special exhibits are curated annually.

Our reason to visit the California Museum was to examine one of these special exhibits, Extreme Engineering: The California State Water Project Past, Present and Future. The museum website states, “This hands-on, interactive exhibit explores the complexities of water in California. Visitors will discover the world’s largest manmade water system and the people behind its creation, and be challenged to actively consider the choices facing policy makers today.”

In summary, this exhibit lacked good organization, both in terms of content and visual information. Its most interesting feature is found in the first room the visitor encounters, an orientation theater in the round. Large projected video images on the curved walls tell the story of the California State Water Project. The program talks about engineering feats and was augmented with workers and engineers telling their story. The video image quality on the center image is good, but less so on the two outer flanking projections, due to longer throw distances. The acoustics were acceptable.

From here, the experience begins to decline. Exhibits were lackluster and painfully text-heavy. Several of the interactive exhibits were not working (something we need to keep in mind when designing interactive exhibits). It will be essential to have a line item for exhibit maintenance built into the Alameda Creek Watershed Center budget.

Large panels of clear acrylic were used in the graphics. (We later learned the reason for them.) This made for distracting reflections and difficult reading for the visitor. Overall, the historical context of the State Water Project was explained, but some of the content seemed unbalanced and self-serving to the project. There were few dissenting voices and alternative perspectives covered in this exhibit.

A conversation with one of the museum’s curators indicated this exhibit is owned by the Department of Water Resources (DWR). Its intent, he believes, is to “impress legislators here at the Capitol with the need for funding for system improvements.”
Over 1,500 visitors each month pass through this particular section of the second floor to see other exhibits. It is therefore safe to say that these individuals were at least exposed to Extreme Engineering. Interestingly enough, more visitors comment favorably about the museum’s own casework that displays Los Angeles Aqueduct artifacts in an adjacent exhibit area than they do about this exhibit.

DWR indicated Exhibitree fabricated and installed the Extreme Engineering exhibits at a cost somewhere between $8,000 and $15,000 per display area, excluding design. The museum curator we spoke with felt Extreme Engineering feels more like a trade show than a museum exhibit and is not suitable for children. He agrees with us: the most attractive aspect is the high-definition DVD projection on the center screen. It is certainly the most eye-catching element.

Younger visitors enjoy the water pump challenge due to the physical interaction. They also apparently enjoy touching the exhibit panels, now covered with acrylic overlays to protect fingers from being pinched and lettering from being marred. The water pump—the only exhibit actually designed by DWR staff—receives the most abuse and has withstood it better than other exhibits.

**EcoCenter**
**Heron’s Head Park, San Francisco**

Despite visiting during posted hours of operation, the EcoCenter was closed when we arrived. Still, we were able to study some of the architectural features that make this building so noteworthy. These include an off-grid solar array, on-site blackwater wastewater treatment system; rainwater collection containers, and vegetative roof, designed by Rana Creek Nursery, the same firm that designed Cal Academy’s living roof. The entry pathway is landscaped with native plants; site planning incorporates sustainable site landscape and land management solutions, such as subservice irrigation to augment rainwater supplies. Interpretive panels, some permanent and others temporary, point out these features, making the walk from the parking lot to the building an interpretive experience onto itself.

Our concern with recently installed project, however, is maintenance. The wind was relentless during our visit and we expect that, given the weathered condition of the roof and plants, that material is constantly battered. Though new, the building and grounds looked tired.
Lawrence Hall of Science, Berkeley

Established in 1968, Lawrence Hall of Science serves as UC Berkeley’s public science center. Our reason for visiting was to study the outdoor science park where the exhibit, Forces That Shape the Bay, is located. This exhibit invites visitors of all ages to explore the processes and forces of earthquakes, erosion, wind, and weather through an interactive exhibit experience. Unfortunately, some of the exhibits were not operating during our visit.

The main message, “The Bay Area beneath your feet is a gigantic puzzle of massive pieces of earth…and the pieces move,” is provocative and enticing. The subthemes revolve around the concepts of faulting, earthquakes, erosion by wind and water, and big changes happening over time. Specific exhibit pods include an earthquake simulator, hands-on erosion tables, rockwork designed to simulate the Sierra Nevada over which water flows and is manipulated by visitors, and a time sequence of the bay’s formation over 10,000 years.

The larger kiosk-style graphic panels were nicely designed. Though the content was dense, it was accessible and pertinent. The smaller graphic panels were very well written, but the graphic layout and odd background colors (bright intense pinks and purples) did not seem to complement the content. After speaking with staff, we learned these colors were chosen specifically to counteract the predominant earth tones seen in this space.

As mentioned, several of the electronic and mechanical interactive exhibits were not in working order, including the most interesting examples, the earthquake shake tables and sediment layer folding exhibits. So much was not working, in fact, that we are certain many visitors may feel the urge to ask for a refund.

The water diversion interactive water play area is a great idea, but the poor execution of design and maintenance issues lead to a less than satisfactory visitor experience. Visitors are admonished (via signs that look like afterthoughts) not to climb on the rocks of the inviting waterfall structure. There are not enough of the small “dams” available for effective use of the main interactive feature. Of the eight “dams” visible, only three were accessible. The other five were circling drains in the middle of the pond. Those could not be reached without getting your shoes wet.
While water is an attractive feature and we should consider water-based activities at the watershed center, we need to keep these elements somewhat simple, fully accessible, and in working order.

This exhibit opened in 2003. According to the director of exhibits and facility operations, the cost approached $2.5 million and entailed substantial infrastructure, including construction of a new road. The exhibit portion cost between $1.5 and $2.0 million, funded through a National Science Foundation grant and with contributions by the class of 1948, Pacific Gas and Electric, East Bay Municipal Water District, and in-kind services.

From our interview with this staff member we learned the following. The most attractive aspect of exhibit is the water. Not surprisingly, children want to climb the waterfall. This is particularly problematic with students on field trips. Ideally, a monitor is posted outdoors, but often staff is not available to assume this position. It is nearly impossible to keep people off and out of the water feature. During hot summer months, the staff tend to be more accommodating in this realm. The surface of the water feature has a gripping texture to reduce the number of slips and falls. The maximum depth of water is 18 inches. The water is treated with bromine, skimmed one to two times a day, and drained several times a year. Infrastructure includes a pump house, hook-ups to the sanitary sewer, and heavy-duty, sand-tolerant filters.

The erosion tables are very popular. Children love them. This is an excellent exhibit for directed inquiry, led by an adult performing the role of interpreter.

There is actually a field guide to the rocks and native plants incorporated into the exhibits. The hand-selected rocks come from the Sierra Nevada, Central Valley, and Bay Area. It was the intent of staff of Lawrence Hall of Science and UC Berkeley to craft a blend of self-guided and interpreter-guided realistic geological experiences. The rock exhibit seen behind the earthquake simulation is modeled after the East Bay hills near Highway 24. The rocks in the grass area are intentionally offset to allow for an activity on faulting.

If given the opportunity to do things differently “next time,” the electronic components of the fault exhibit—a hydraulic ramp and computer—would be replaced with hand-operated cranks. Up until now, they have been fairly robust. Now they have exceeded their lifespan. Although not currently operating, the earthquake bench also has been reliable.
Staff feel the interpretive panels are content-heavy, largely due to “generous” contributions of information by faculty. Staff had hoped they would see repeat visitors who over time could really digest the information. Although formal evaluation has not taken place, it appears people who come again and again have learned a lot over time. With each visit, they tend to pick something new to talk to their child(ren) about.

The colors selected for the phenolic resin interpretive panels are calculatedly bright, warm hues that contrast against all the earthy tones. Dominated by reds, these colors tend to be the first to fade. Staff have replaced them three times.

**Taylor Creek Visitor Center**  
**South Lake Tahoe**

Managed by the US Forest Service, Taylor Creek Visitor Center is located on Lake Tahoe’s south shore. The visitor arrives here via Rainbow Trail, a meandering pathway through forest, meadow, and marsh. By the time the visitor reaches the building, they may have already seen the star of the exhibits, Kokanee salmon, spawning in the creek.

The main attraction of the visitor center is the stream profile chamber, built in the 1960s. Water diverted from Taylor Creek flows past tall aquarium windows, allowing for face to face (or rather, hair to scale) viewing of salmon, other fish, aquatic invertebrates, and even birds taking the plunge in search of a meal. A 180-degree curved diorama includes a mural that depicts seasonal life in this montane region. Taylor Creek Visitor Center receives between 250,000 and 300,000 visitors each year.

When asked about lessons learned from the stream profile chamber, the visitor center director emphasized the importance of preventative maintenance. Complete waterproofing of all displays, properly installed drains, and immediate access to a generator are essential in the event flooding occurs. Because algae accumulate daily on the viewing windows, a maintenance staff member needs to scrub the outer glass. Equipment for this task includes a safety harness (in the event this job involves leaning over the edge of a roof), a long pole, and a soft brush (hard bristles could scratch the glass).
Appendix E: Interpretive Planning Summary

Introduction

Staff of the San Francisco Public Utilities Commission (SFPUC) and San Francisco Department of Public Works (SFDPW), together with representatives from Alameda County Resource Conservation District (ACRCD), the community of Sunol, East Bay Regional Park District (EBRPD), Katherine Whitney and Associates (KWA), Okamoto-Saijo Architecture (OSA), San Francisco Estuary Institute (SFEI), Sustainable Agriculture Education (SAGE), and The Acorn Group (TAG) participated in an interpretive planning session on June 6, 2011.

Participants included: Nicholas Angel (SFDPW), Carin Apperson (SFPUC), Ruth Askevold (SFEI), Nick Cavagnaro (EBRPD), Bryan Dessaure (SFPUC), Amy Evans (ACRCD), Craig Freeman (SFPUC), Janet Hatano (SAGE), Martha Ketterer (SFDPW), Tim Koopmann (SFPUC), Sibella Kraus (SAGE), Jim O’Laughlin (Sunol), Paul Okamoto (OSA), Masood Ordikhani (SFPUC), Emily Powell (SFPUC), Tim Ramirez (SFPUC), Betsy Rhodes (SFPUC), Jennifer Rigby (TAG), Carla Schultheis (SFPUC), and Katherine Whitney (KWA).

This session launched the interpretive planning effort for the Alameda Creek Watershed Center, a new facility adjacent to the Sunol Water Temple. Current thinking is that this center will consist of a learning lab, community center, interpretive center, small outdoor amphitheater, displays and exhibits on the grounds, and a watershed nursery.

Topics, Tangibles, and Intangibles

The session began with a discussion of key components of an interpretive master plan. The group then identified topics germane to the site, surrounding lands, and people. Topics serve as the potential subject matter for the interpretive media. They range from the Temple’s history and architecture to the conveyance and conservation of water, from steelhead and salmon to whipsnakes and red-legged frogs, from working landscapes to watershed stewardship. The group clustered (and re-clustered) the topics into categories which would later help inform development of the theme. This categorization is summarized in the second appendix.

In interpretation, it is important to build the story “up,” rather than just “across.” In order to help visitors connect meanings emotionally as well as intellectually (meaning, care enough about the Alameda Creek watershed to help care for it) it will be important to link the tangible resources, such as the watershed’s plant communities and people, with the intangible meanings they stand for: the region’s biological diversity, ecological footprints, legacy stories, and value of healthy watersheds. These intangible meanings go beyond the Temple and the grounds to embrace universally recognized values—natural heritage, cultural legacy, stewardship, civic pride, hope—to forge deep and lasting meaning with visitors.

Interpretive themes and sub-themes

The group also began work preparing draft themes for the project; these ideas are summarized in the third appendix. In the context of interpretation, the theme is the principle message, or story, about the subject matter that serves to connect topics
and concepts together. A theme allows for a linkage of important ideas concerning the topic(s) and the association of the project’s tangible objects with intangible meanings. Theme-based interpretation makes it easier for visitors to comprehend and recall messages at a later point. It also makes for a more powerful experience, both intellectually and emotionally.

Subthemes further develop the central theme, allowing for a logical progression into storylines. Typically, a well-planned experience conveys three to five sub-themes, all of which are subordinate, but directly related, to the central theme.

The following represents a synthesis of ideas proposed by the group during the interpretive planning session. Once finalized, these statements will serve to focus the media and offer a thread that weaves the stories together. Given the proposed center focuses on two distinct features—the historic water Temple and a new, albeit small, “museum complex”—we opted for two complementary themes. Five subthemes support these themes. They, in turn, are supported by key concepts. Key concepts keep the information in check, ensuring that we cover important material, keep the interpretive goals in mind, and avoid straying from the theme and subthemes. They are not necessarily equally weighted.

**Proposed overarching themes:**

*Here at the Sunol Water Temple, we honor the watershed and the water that flows through it.*

*At this unique confluence of waterways, we also see the confluence of people and nature, and we are reminded of the significance of water in sustaining both.***

**Subtheme 1:** Throughout time, water from Alameda Creek and Arroyo de la Laguna has sustained the lives and cultures of Sunol Valley people.

**Key concepts:**

a. Beyond fulfilling a basic biological need, water influences our decisions about where to live and how to make a living.

b. Attracted by abundant water, foodstuffs, and wildlife, the Ohlone settled in the Sunol Valley thousands of years ago.

c. After secularization of the mission system in 1834, land in Alta California was distributed for private ownership as ranchos. The land grant, Rancho El Valle de San Jose, encompassed the land that would become Sunol and Pleasanton. This land was distributed among the four children of José Joaquin Bernal, a member of the 1776 De Anza Expedition. In the 1840s, Antonio Maria Suñol and Maria Bernal Suñol acquired 14,000 acres of the rancho, later the site of their son’s ranching operation near to the present-day Sunol Water Temple.

d. After secularization, cattle ranching continued in the region, supported by the mild climate and vast rangelands.

e. After the gold rush, many prospectors became farmers, some settling in the Sunol Valley. Today, Sunol Valley and the surrounding region remain the home of farmers and ranchers, as well as others, all of whom continue to contribute to the cultural fabric of this land.

**Subtheme 2:** The Sunol Water Temple is a powerful icon that symbolizes the importance of water in nature and human culture.
Key concepts:
a. In 1906, William Bourn, a stockholder in Spring Valley Water Company, commissioned Bay Area architect Willis Polk to design a water Temple where people would celebrate the “meeting of the waters.” Polk based his design on the Temple of Vesta, a Roman Temple in Tivoli, Italy that was built in 80 B.C.E.

b. The location of the Temple is significant—it serves as a natural focal point of the watershed. The Temple stands at the confluence of Alameda Creek and Arroyo de la Laguna where creek waters mixed with artesian well water. Half of San Francisco’s water supply once flowed through this Temple before continuing on its journey westward.

c. The biblical inscriptions on the frieze remind the reader of the significance and near sacredness of water. Today we take water for granted. One hundred years ago, this wasn’t the case. The Sunol Water Temple was deemed a very special place, revered as the source of pure, natural water for San Francisco.

d. Ultimately, the Temple’s intent was to enhance the public’s perception of the Spring Valley Water Company. The San Francisco Water District purchased the company in 1930 and assumed responsibility for the beaux arts landmark.

e. The Temple has come nearly full circle. This once spectacular architectural monument fell into disrepair before being restored with assistance by the Oakland Museum in the late 1990s. Its wood panels, terra cotta roof tiles, Romanesque paintings, Corinthian columns, and crown of dolphins have been repaired and returned to their original splendor.

Subtheme 3: Human activities, including ranching, farming, mining, urban/suburban development, and individual behavior, can affect the health of the Alameda Creek watershed.

Key concepts:
a. A watershed is defined as the region of land that drains water into a particular watercourse or body of water. At nearly 700 square miles, the Alameda Creek watershed is the Southern San Francisco Bay region’s largest drainage. It stretches from Mt. Hamilton and Mt. Diablo in the upper reaches to the Sunol Valley and Niles Canyon in the middle reaches, and the San Francisco Bay plain in the lower reaches.

b. Natural and human activity in a watershed can affect the quality and quantity of water that flows through it. Human activity in the Alameda Creek watershed includes farming, ranching, mining, commercial nursery operations, suburban/urban development, and recreation.

c. The agricultural traditions of Sunol Valley have their roots in California’s 18th century Mission Period. Olive orchards and vineyards were tended on Mission San José de Guadalupe lands. Remnant olive trees and cork oaks are still found in the area, perhaps originals from the mission. Later, walnut orchards were cultivated on the land surrounding the water Temple.

d. Farming activity accelerated after the gold rush as miners traded pick axes for plows. At the turn of the last century, Sunol was known for its cherries, apricots, grapes, and almonds and later, for its strawberries, chives, and specialty lettuce. In addition to foods now grown at the AgPark, hay production remains a primary crop in this region.
e. The ranching traditions of Sunol Valley also have their roots in California’s 18th century Mission Period. Mission San José de Guadalupe boasted the largest herd of cattle of any California mission. Cattle ranching continues to occur on private lands and leased grazing lands in the Alameda Creek watershed.

f. Water, derived from local and regional sources, sustains these activities.

g. Left unchecked, these activities, in turn, can affect the condition of the watershed and quality of water in the creeks.

h. The Alameda Creek watershed is a working landscape and informed decisions regarding it are based on enhanced understanding of watershed dynamics. Watershed stewardship takes the form of organic farming practices, control of point and non-point source pollution, adherence to grazing guidelines, habitat restoration, and other measures.

i. Many local landowners are actively working to manage their land carefully. Several operations have become models recognized statewide for their resource protection and enhancement practices.

j. How we personally live can also affect the condition of the watershed and quality of water in the creeks. Urban/suburban sprawl consumes land and can contaminate water, most notably through run-off. “Smart growth” planning initiatives aim to address these concerns.

k. Individuals can be become watershed stewards by changing behaviors that directly or indirectly alter the health of their watershed. Personal watershed stewardship takes the form of responsible landscaping practices at home, responsible disposal of products such as used motor oil and pet waste, and other measures.

**Subtheme 4: The quality and quantity of water affects the lives of humans and other species.**

**Key concepts:**

a. The health of a watershed largely determines the health of its creek or river.

b. Consequences of problematic practices and activities include compacted soil; denuded, non-recovering land; erosion and subsequent sedimentation of creeks; introduction of chemicals and pathogens to water; increased nutrient loading and subsequent eutrophication; altered or eliminated habitat; declining populations of animals and plants; and decreased quality of drinking water.

c. Several local initiatives are transforming how watershed lands are managed. These occur at a variety of scales, from rangelands and large commercial sites to suburban backyards.

d. The Alameda Creek watershed is a refuge for wildlife. Several species, including the California tiger salamander, California red-legged frog, western pond turtle, Central California Coast steelhead, and Valley Chinook salmon, are threatened with extinction.

e. Habitat restoration of watershed lands and creeks, removal of non-native species, removal of dams, controlled releases of water from other dams, and installation of fish ladders and fish screens benefit these species and others, either directly or indirectly.

**Subtheme 5: The Spring Valley Water Company and San Francisco Public Utilities**
Commission’s early water conveyance system along this waterway is a testament to human ingenuity. More recent action by the PUC is a testament to an evolving land and water ethic.

**Key concepts:**

a. By 1874, Spring Valley Water Company bought land and water rights in the valley to provide water to San Francisco, as well as Oakland.

b. Water flowing through the Sunol Water Temple dropped 40 feet into a gravity-fed 28-mile concrete aqueduct that ran through Niles Canyon and under San Francisco Bay to reservoirs on the San Francisco peninsula. In 1976, the Temple was designated a California Historical Engineering Landmark by the American Society of Civil Engineers.

c. The San Francisco Public Utilities commission bought the Alameda watershed in 1930 from the Spring Valley Water Company to augment water supplies from the Hetch Hetchy Reservoir.

d. Currently, the PUC owns 36,816 acres within the Alameda Creek watershed. The PUC’s mission statement includes reference to its resource management program, which addresses all watershed activities, and to best management practices for the protection and conservation of water and natural resources.

e. The Alameda Creek water system includes the Turner Dam and San Antonio Reservoir and Calaveras Dam and Reservoir (which store water from the Sierra Nevada range, as well as local runoff) and a water transmission system consisting of pipelines, tunnels, pumping stations, and treatment facilities. This system is part of a larger system that delivers water to 2.4 million customers in four counties.

f. Historically, securing pure and reliable supplies of water was the primary focus of the PUC’s Water Enterprise efforts. Now the focus has widened. Watershed management decisions are based on the protection of water quality within the context of multiple land uses and the needs of multiple species.

g. Steelhead have been sighted in lower Alameda Creek. Removal of the Niles and Sunol Dams has improved passage for these migratory fish, but other barriers, both natural and human-caused, still exist. Several organizations and agencies are working collaboratively to restore the steelhead population in this watershed.

h. Habitat restoration is underway in the Alameda Creek watershed. Special attention focuses on the restoration of habitats where the presence of rare species, such as red-legged frog and steelhead, is likely.

i. The Alameda Creek Watershed Center reflects this evolving land and water ethic as well. Sustainable design elements are integrated throughout the buildings and grounds.

**Interpretive goals**

The group also began to think about goals. Goals are statements of desired outcomes that guide media development. They articulate what interpretation is meant to do for the visitor, and indirectly, for the watershed, Temple, and PUC. They guide the formation of interpretive media and services during the planning process and, together with specific and measurable objectives (established later), permit accurate and meaningful evaluation of interpretive programming before, during, and after development. The following goals represent a blending of input received during the June 6 planning session and subsequent
work by The Acorn Group. Goal statements received during the meeting are recorded in the fourth appendix.

I. Emotional Goals
Visitors\(^6\) will:

a. Have an enjoyable and satisfying time at the Sunol Water Temple and the Alameda Creek Watershed Center.
b. Appreciate the historic and architectural significance of the Temple.
c. Appreciate the role water has played shaping the human history of the region.
d. Be aware of the connection between the health of a watershed and the health of a creek.
e. Appreciate the sustainable design elements seen at the center’s grounds and buildings.
f. Express a desire to participate in watershed stewardship activities.
g. Be inspired to change behavior in order to reduce their own impact on water and watersheds.

II. Cognitive Goals
Visitors will:

a. Recognize they are standing in a watershed.
b. Be able to define a watershed.
c. Be able to describe the significance of a watershed.
d. Understand the remarkable engineering feat of transporting this water to San Francisco.
e. Understand current water storage and conveyance infrastructure.
f. Describe human activities in a watershed that could affect, both positively and negatively, the health of a creek, wildlife, and humans.
g. Understand the steps the PUC and other landowners are taking to manage land in ways that protect natural and cultural resources while maintaining productivity through appropriate uses.
h. Distinguish between point and nonpoint source pollution.
i. Learn about our role in helping reduce nonpoint source pollution.
j. Learn about species found in the Alameda Creek watershed, especially rare, threatened, or endangered species.
k. Understand the steps the PUC and other agencies and organizations are taking to protect rare, threatened, or endangered species, and habitats, in the Alameda Creek watershed.
l. Learn of ways they can become watershed stewards, both here and at home.

III. Behavioral Goals
Visitors will:

a. Experience a personal and enriching connection with nature in the vicinity of the Alameda Creek Watershed Center.
b. Engage in appropriate behaviors and activities at the Sunol Water Temple, Alameda Creek Watershed Center, and Sunol AgPark.
c. Interact with various exhibits and displays at the Alameda Creek Watershed Center.

\(^6\)The term visitors refers to the full array of target audiences, including area residents, organizations, and businesses; the general public; and students and their teachers. Some goals are particularly relevant to certain audience segments. Accordingly, actual interpretive messages and methods of delivery will be shaped to fit each target audience.
d. Demonstrate their commitment to watershed stewardship by engaging in watershed stewardship activities, including conserving water and avoiding activities that degrade land and water quality.

e. Express a strong desire to involve others (family members, friends, classmates) in watershed stewardship activities.

f. Express a strong desire to return to this site in the near future.

g. Support businesses, such as local organic farms, that reflect water stewardship practices.

Action steps:

Please review this summary report, particularly the theme-subtheme-key concept outline and goal statements. Feel free to electronically track any changes and/or comments, and send to Carla Schultheis (CSchultheis@sfwater.org) and Jennifer Rigby (emailacorn@aol.com). Please respond by July 1, 2011 in order for us to remain on schedule.

As you review the material, please keep in mind the appendices record what was heard and written on Post-It notes and worksheets. As such, they should not be edited.

Appendix 1

Agenda

Alameda Creek Watershed Center Interpretive Planning Workshop June 6, 2011, 1:00-3:30 p.m.

Agenda

Group introductions

Introduction to the interpretive master plan—what it will accomplish and how it differs from other types of plans

Overview of the 5M approach to interpretive planning—understanding how the mission statement, target markets, mechanics of the site, messages, and selected media work together

All-group work Identifying topics for interpretation

Clustering topics into a coherent structure

Break

Sub-group work Developing draft interpretive goals and the theme, the principle message or story about the topics

All-group reporting

Next steps and adjournment

Appendix 2

Proposed topics:

Aesthetics: Sunol Valley, big existing trees, beautiful site, why come here, California pastoral landscapes, the water, mighty waters, processional, natural beauty, beauty, landscape, photography, environmental perception,

Temple: The Temple (why and meaning), Greek ancients, why a Greek
<table>
<thead>
<tr>
<th>Design for a water Temple, what it is, why was it built, architectural history, water Temple\textsuperscript{2}, history of the Temple\textsuperscript{7}</th>
<th>(sand and gravel quarry), development along the watershed, water for cities versus agriculture, trade-offs; ranching and grazing history and evolution, grazing: good or bad?, industrialization, balancing resource protection and extraction; impact of man, history of surrounding lands in the valley, land use history, surveying and mapping, ranching, agriculture, agricultural use of water from the creek, changing agricultural uses, sustainable agriculture, organic farming, urban-rural interface, early agricultural use: Japanese strawberry growers, English walnut orchard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temple history:</strong> History of the Temple and grounds (Ohlone [or earlier] to present, historical use of Temple and picnic grounds</td>
<td><strong>History, H\textsubscript{2}O:</strong> Heroic builders, machines for living, history of water development in Sunol Valley, history of SFPUC water system (in the valley)\textsuperscript{4}, history of Spring Valley Water Company/SFPUC system, positive role of government, Spring Valley/ SFPUC management of resources chronologically; how</td>
</tr>
<tr>
<td><strong>Human history:</strong> Famous people of the valley, archaeological significance of the area, cultural history of the watershed, history of the watershed, history of agriculture in Sunol Valley\textsuperscript{2}, native American (Ohlone) people\textsuperscript{3}, Ohlone village, stories of individual famers in the valley, history of Spanish land grant assignments and land use, history of surrounding lands</td>
<td></td>
</tr>
<tr>
<td><strong>Land use:</strong> Working landscapes, multiple land uses (mining, nursery, water supply); farming, ranching, agriculture; land use along the watershed</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{7} Superscript numbers denote frequency of response.
priorities and practices have changed

Water engineering: control of water (dams), how the water system works (historically and currently), reservoirs, water diversions along the creek, infrastructure (weirs, dams, gravel), aqueducts

Recreation: Recreation, recreational uses, volunteers, sense of place, enjoyment of nature, hiking, including the watershed; recreation in the watershed

Confluence of water, of recreation, of water systems

Climate change: climate, climate change, climate change and the watershed, cycles of drought, local climate change, science and research (who, what)

Watershed: Watershed, what is a watershed?, Alameda watershed and all of its resources, Alameda Creek watershed, sources of pollution that enter the watershed, geography of a watershed, do I live in a watershed?, what is a watershed?, drainage basin, drainage basin versus watershed (same or different?), where rainwater goes

Stewardship: What does stewardship mean?, protecting the watershed, stewards of Alameda Creek watershed over time, stewardship of Sunol Valley over time, who are the watershed stewards?, watershed protection, how can I protect my watershed, stewardship of natural resources at the farm, farmers as stewards of the land, pollinator hedgerow to support beneficial insects as part of IPM program, sustainable agriculture and its relationship to watershed stewardship, nature preserves or parks along the creek

Restoration: restoration, restoration projects along the creek

Alameda Creek: Importance of water source, water, history of Alameda Creek, source of water in Alameda Creek, Alameda Creek main stem—changes
(quarries, nurseries), perennial versus intermittent, tributaries to Alameda Creek (subwatersheds)

Conservation: Conserving resources, preservation and conservation, water conservation\(^2\), utilizing technology for conservation, water conservation at the farm

Flora: invasive species\(^2\),

Fauna: Animals that need the watershed, wildlife, depending on water, fauna in the watershed, birds, birds along the watershed, golden eagles, invasive species\(^2\), red-legged frog, Alameda whipsnake, endangered species, steelhead\(^3\), fish\(^3\), upper watershed land management for endangered species, California tiger salamander, migrating wildlife, land animals, fisheries and fish habitat (reduced water quality and quantity)

Natural resources: Natural resources, multifunctionality of all natural resources

Hydrology: Flashy hydrology, hydrologic cycle, water cycle\(^2\), the farming cycle and its relationship to the water cycle, flooding

Habits: Habitats, historical habitats, remnant habitats, sycamore alluvial woodlands, bird habitats (vary widely in Sunol Valley), creeks, wildlife corridors, riparian corridors\(^3\), human to multiple species (people too!), alluvial land

Water supply: Water supply, importance of water to urban growth, importance of water to food production, Bay Area mega region do we have enough water to go around for [the] environment, agriculture, and cities?, whose water is it? who needs this water to survive? (competing interests)

Water quality: Connection between healthy food, soil, water; source water protection\(^2\), Types of water (e.g., potable, non-potable, other), clean water\(^2\), clean water needed for growing crops on organic farms, farm practices for protecting water quality
Ecology: Ecology, aquatic food chain, watershed ecology

Geology: gravel/mining, geology, soils and geology, soils, especially prime farm soil at the AgPark

Green design: Green building, green building design, model of sustainability, sustainability, demonstrate sustainable practices at the watershed center (stormwater treatment, water conservation, erosion control, etc.)

Other Post-It notes: To inspire children to protect natural resources, to rejuvenate, to “tread lightly” on watershed lands

Appendix 3: Suggested themes and subthemes

Group One:
Group summary statement: not submitted

Individual team member one:
Theme:
Educate by use of visuals and physical means the history…and its importance to the Bay Are community.

Individual team member two:
Theme:
Water is precious, sustains life. Stewardship of the Alameda Creek watershed has a past, a present, and a future. Stewardship over time Delivery system Water is precious

Subthemes:
The Temple is a celebration, a monument to water, how is that reflected in the architecture.
Reflect on what water brings to life. The architecture, flora, fauna, how does water come to this site.

Water to tap.

Individual team member three:
Theme:
Stewardship of the Alameda Creek watershed has a past, a present, and a future (over time). See inscription on the Temple for the theme.

Subthemes:

8 Group one did not submit a synthesis of group input due to the wide-ranging individual ideas
Past stewards of the Alameda Creek watershed include indigenous people, farmers and ranchers, the local community, and the Spring Valley Water Company.

Current stewards of the Alameda Creek watershed include the SFPUC, farmers and ranchers, the local community, the EBRPD, Tri-Valley residents and businesses, and you!

Future stewards of the Alameda Creek watershed include all people, agencies, and businesses that depend on its many natural resources and that cherish and want to celebrate this precious place.

**Group Two:**
Group summary statement:

Theme:
The Alameda Creek watershed—humans and nature sharing the land.

Subthemes:
History of Spring Valley Water Company (water needs, land acquisitions, dam and conveyance construction) and SFPUC (Raker Act, up country dam and conveyance construction)

Historical land use (Ohlone history, food gathering, evolution into American culture, including the history of farming production and homesteading sites)

Biodiversity (how management policies impact species’ habitats).

**Individual team member one:**
Theme:
Protecting our water supply begins with protecting our watersheds and understanding our history

Subthemes:
Watersheds—history of system
Natural resources
Land Use

**Individual team member two:**
Theme:
We all make up a part of the water cycle and since we live in the Bay Ares, we are all users and contributors to the flow and use of water in this area.

Subthemes:
How much water do you use each day, month, year and how (lawns, bathing, cleaning, drinking)

What are you doing to use less water?

What do you think you can do in the future to use less water and use what we have without xx it, gray water systems, etc.

**Individual team member three:**
Not applicable

**Individual team member four:**
Theme:
To help visitors explore the connections between the natural and human communities in the Sunol Valley.

Subthemes:
Not applicable

**Individual team member five:**
Theme:
From native people to contemporary culture, we’ve had to make decisions about how we manage land and water in Sunol Valley. These decisions all had trade-offs.
Subtheme:
Native cultures managed diverse resources and food sources for a much smaller population. These historical habitats provided diversity for human cultures and native species.

Euro-American management has focused on water for agricultural systems and increasingly dense populations.

Management in the future will need to incorporate climate change.

**Group Three:**
**Summary group input:**

Theme:
The Alameda Creek watershed is a special place and a shared resource that needs to be protected for future generations.

Subthemes:
The choices people have made and will make in the future shape the land and have a direct impact on its health and well being.

Water as a connecting force.

Sustainability.

**Individual team member one:**

Theme:
The Alameda Creek watershed in the Sunol Valley is a very special place that provides water, recreation [and is] an oasis in East Bay/Bay Area endangered species that supports recreation, ranching, agriculture, and complex cultural and geological history all because it is drinking water.

Stewardship.

Notion that water comes from somewhere—shared resources

**Group Four:**
**Summary theme group input:**

Theme:
The Alameda Creek watershed represents a confluence of history, ecology, culture, and engineering that should be cherished and preserved through enhanced understanding and stewardship.

The Temple as a symbol. Draw upon “classical themes and elements.” Maintain “balance” in ecological relationships and land use. It exemplifies California landscape ideals—pastoral. Functional versus aesthetic use. Confluence: bringing together natural and man-made water resources. Fish (steelhead) as a focal point: the confluence of needs and institutions and management strategies (water quality, flows, habitat, barrier and removal). Numerous entities [are] involved with the issue of confluence.

**Individual team member one:**

Theme:
Understand, appreciate, and help protect watershed and its resources (steward of all resources)

Balance w/water use

Confluence if past/present/future; embrace human history (Temple as a symbol of confluence)

Subthemes: not applicable

**Individual team member two:**

Theme:
Sunol Water Temple is a powerful symbol of the importance of water in nature and human culture, our reverence and
understanding of this place can help point toward a sustainable future.

Subthemes:
Watershed geography: show how water seeks the easiest route to the bay
Working landscapes: illustrate the history of California ranching, livestock grazing on the land
Human history: interactions of humanity upon the natural landscape

Individual team member three:

Theme:
Confluence of past, future, and present: the unique landscape setting of the Sunol Watershed should be cherished and preserved.

Subthemes:
Architectural and landscape elements draw upon ‘classical’ ancient themes
Diversity of landscape elements from freeways to riparian.

Individual team member four:

Theme:
People, plants, enterprises used, Sunol Valley water over time in different ways.
Selling it, moving it, harvesting it, using it (fish crops). To maintain balance; need to give back; good management, stewardship, appreciation, understanding

Subthemes:
Ecological setting and relationships
Usage needs, farm needs
Sustain, management (how to maintain balance)

Appendix 4: Draft goals

Group One:
No group goals

Individual team member one:
Understand the history of the SFPUC water delivery system and watershed.

Individual team member two:
Enjoy the outdoor beauty of the site, marvel at the Temple and its function. Monument to water.

Educate why water is so precious and what it provides to sustain and nourish us.
Classrooms related to sustainability, history

Individual team member three:
Visitors will understand the Alameda Creek watershed as a place that has extraordinary cultural and natural resources.

Visitors will have a sense about what water stewardship means and who the stewards of the Alameda Creek watershed have been and are today.

Visitors will want to become stewards of the Alameda Creek watershed and/or stewards of their local watersheds.

Group Two
Group goals:
Visitors will appreciate the foresight, skills, work ethic, and engineering expertise of the designers and builders of the water system.

Visitors will be able to follow the cultural evolution of the watershed land uses from Native American through Spanish land grants and into the combination of water harvests, natural resources, and agriculture enhanced.
Visitors will understand the habitat needs of nature, threatened and common species in the watershed and how historical and current management policies have been used to maintain habitat values.

**Individual team member one:**
Visitors will understand what a watershed is, that they live in a watershed and what they can do to protect it.

Visitors will appreciate the unique area of the Sunol Valley and be inspired to protect it.

Visitors will demonstrate their understanding that water is a precious resource by being empowered to be better stewards.

**Individual team member two:**
To conserve water through better home use—landscaping, low-flow devices

xx pollution—to control we buy and what goes down the drain and into the landscape, pesticides, herbicides, etc.

To go away with the desire to help with water conservation with the understanding of the part they play in the system.

**Individual team member three:**
Where is this water coming from and where it is going?

Which side are you on?

**Individual team member four:**
Living in and managing a watershed requires we make complex decisions and there are trade-offs we make between water for native species, human use in cities, and agriculture.

The land has always been managed, from indigenous people to contemporary cultures.

**Individual team member five:**
To inspire diverse visitors to be stewards of the watershed.

To enhance visitors’ understanding of the engineering feat required to move the water.
To provide an enjoyable outing for families and adults.

To help visitors explore the reasons why Sunol Valley has supported different communities over time (physical location).

To look at the connections between healthy soil, water, and food production.

To help visitors discover how their actions can impact water quality.

To gain a better appreciation of how the movement of water enabled the growth of urban populations.

To help visitors become informed decision makers for future water policy.

To introduce urban children to farms and farmers.

To inspire children to eat fresh fruits and vegetables and feel more connected to the land (farming at Ardenwood).

**Group Three**

**Group Goals:**
The choices people have made and will make in the future shape the land and have a direct impact on its health and well-being.

Water as a connecting force.

Stewardship and sustainability.
**Individual team member one:**
Love the Temple.

Be in awe of complex history and uses of the site.

Be wowed by amazing oasis of Temple/watershed lands.

Understand where drinking water comes from.

Appreciate importance of good stewardship.

Tread lightly on watershed land.

Conserve water, not xxx

**Individual team member two:**
Visitors will appreciate their “sense of place” within the watershed—feel connected.

Visitors will understand the value and importance of water (natural resources) that support our lives.

Visitors will retain the message (cognitive goal) and make decisions that protect water, natural resources and healthy living.

**Individual team member three:**
Need for stewardship of Earth.

Understand impact of industrialization of natural resources.

Understand and respect for sustainable use of resources.

Respect multiple uses of resources.

Importance of preserving soil and water.

Evaluate the impact of man on the environment and others.

**Group Four:**
No group goals

**Individual team member one:**
(Ecological relationship; mixture of using/taking)
Visitors will gain an understanding of the importance of the Alameda Watershed and its natural resources.

Visitors will appreciate the Watershed and its history.

Visitors will demonstrate their understanding of the watershed by working to protect it and supporting its protection.

**Individual team member two:**
(balance, confluence, relationships)
Inspire visitors to respect water as an important natural resource.

Learn how tightly integrated water is to land, ecology, human health, and long-term sustainability.

To illuminate the importance of this place in the culture and history of the San Francisco Bay Area.

**Individual team member three:**
Importance of water in California life.

Provide visitors a vision of a historic California landscape.

Provide visitors a way of tying the past to the future.

**Individual team member four:**
Understand the water resources and present how they’ve been used over time.
Explore ecological relationships around water and life (need balance) (feel as part of eco…).
Stewardship: visitors leave with ideas on how to be stewards; help keep balance of give and take.
Appendix F: Academic Standards Alignment

Interviews with school district representatives reveal the importance of designing programs and exhibit experiences that are based on grade-specific standards. In California the Science and History-Social Science Content Standards for California Public Schools, as well as the Common Core Standards for both Mathematics and English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects, are mandated planning tools. Communicating how student experiences at the Alameda Creek Watershed Center are relevant to them is essential in order for teachers to justify out-of-class time and the cost of a field trip.

In addition, California now has a set of State-approved Environmental Principles and Concepts that have informed development of the Education and the Environment (EEI) Curriculum, and continue to inform development of new state frameworks.

It should also be noted that the State Board of Education is considering revising the State Content Standards for Science (established in 1998) and integrating the Next Generation Science Standards into them. The latter is based on the National Research Council’s *Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. These new standards are based on three equally important aspects of science education: science and engineering practices (e.g., asking questions and defining problems; analyzing and interpreting data); crosscutting concepts (e.g., patterns, systems and system models, energy and matter); and core ideas in physical sciences, life sciences, earth and space sciences, and engineering, technology, and the applications of science.

Should California adopt all or some of the Next Generation Science Standards, the nature of teaching science will change. Greater emphasis will be placed on applying math and language art skills in science; engaging in science process skills throughout each entire unit; and considering a systems thinking approach to viewing consequences of human behavior and activity.

When the State Board of Education makes its decision regarding accepting, revising, or rejecting California’s new science standards by November 2013, SFPUC staff will need to determine if student experiences at the Center need to be adjusted to better address new statements about essential learning.

Beyond helping teachers justify field trips, alignment to these guiding documents (as well as the interpretive goals defined on pages 14-18 of this document) ensures program and exhibit design that is purposeful. The Center’s planners and designers have made informed decisions based on what they expect the visitor (student) to learn and be able to do. Their work has been guided with specific goals in mind.

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9 Senate Bill 1200 allows the State Superintendent of Public Instruction to extend the deadline for the State Board of Education to adopt, reject, or modify new science standards based on the Next Generation Science Standards to November 2013.

California Science Content Standards

The current set of Science Content Standards for California Public Schools,
Kindergarten through Grade Twelve represents the content of science education and includes the essential skills and knowledge students need to be scientifically literate citizens in the twenty-first century. This content should be taught so that students have the opportunity to build connections that link science to technology and societal impacts. Science, technology, and societal issues are connected to community health, population, natural resources, environmental quality, natural and human-induced hazards, and other global challenges. The standards should be viewed as the foundation for understanding these issues.

California History-Social Science Content Standards

The History-Social Science Content Standards for California Public Schools, Kindergarten through Grade Twelve represent the content of history and social science education. They emphasize core knowledge in history, geography, civics, and economics. They also encourage development of critical thinking skills through the use of primary documents, such as diaries, letters, and speeches. Last, they emphasize historical narrative, the roles of significant individuals in state, national, and world history, and the rights and obligations of citizenship.

These standards proceed systematically across the grade level continuum and intentionally do not address ninth grade material since that year is typically when students take an elective.

Common Core Standards for Mathematics

These new standards establish common understanding of what students are expected to learn at each grade, K-5, and each mathematics course thereafter through 12th grade. They begin by establishing a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions, and decimals. They then develop procedural skills and conceptual understanding of geometry, algebra and probability and statistics. Finally, at the high school level, the standards emphasize the use of mathematics and statistics to analyze empirical situations, understand them better, and improve decisions.

Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

Based on a series of College and Career Readiness standards, these new standards set requirements for English language arts and literacy in four areas of study. The English language arts standards are organized according to reading, writing, speaking and listening, and language strands defined for each grade level from K-8 and in two year bands for 9-10 and 11-12. The literacy skills established for history-social studies, science, and technical subjects are designed to supplement (not replace) existing content standards. Ultimately, this approach aims to increase student proficiency in reading complex informational text in a variety of content areas.

Environmental Principles and Concepts

State legislation in 2003 and 2005 called for new and unified approaches to environment-based education. This effort, referred to as the Education and the Environment Initiative (EEI), specifically calls for the development of environmental principles and concepts as essential learning for students; the incorporation of these
principles and concepts into California’s curriculum frameworks and textbook adoption criteria for science, English/language arts, and history/social science; and their alignment to California’s academic content standards. EEI legislation also calls for development of a “Model Curriculum” designed to teach to mastery both the academic content standards and the principles and concepts. The EEI curriculum is now published; 85 units are available online.

The environmental principles and concepts examine the interactions and interdependence of human societies and natural systems. The principles and concepts are aligned to California’s existing content standards in science and history/social science. While the primary purpose of this alignment is to ensure that teaching these principles and concepts will help students achieve mastery of the content standards, a secondary purpose is to provide a meaningful context in which students perceive the significance of the standards to their daily lives.

Alignment to Content Standards

In California, the majority of students who participate in field trips are from K-5 classrooms where one teacher is responsible for teaching multiple subjects to one class. Beginning at the sixth grade, class schedules become block or modular, making it difficult for an entire grade level to participate in a field trip at one time. Therefore, the following standards alignment pertains only to K-5 grade levels. As specific programs at the Center are designed, further alignment may be needed, particularly if programs focus on 6th grade through secondary levels.

California Science Content Standards

Kindergarten
Science: Physical Sciences
Students know water can be a liquid or a solid and can be made to change back and forth from one form to the other.

Students know water left in an open container evaporates (goes into the air) but water in a closed container does not.

Science: Life Science
Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).

Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).

Science: Earth Science
Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.

Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.

Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.

Science: Investigation and Experimentation
Students will:
Observe common objects by using the five senses.

Describe the properties of common objects.
Describe the relative position of objects by using one reference (e.g., above or below).

Compare and sort common objects by one physical attribute (e.g., color, shape, texture, size, weight).

Communicate observations orally and through drawings.

Grade 1
Science: Life Sciences

Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

Students know both plants and animals need water, animals need food, and plants need light.

Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.

Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).

Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

Science: Investigation and Experimentation

Students will:

Draw pictures that portray some features of the thing being described.

Record observations and data with pictures, numbers, or written statements.

Record observations on a bar graph.

Describe the relative position of objects by using two references (e.g., above and next to, below and left of).

Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

Grade 2
Science: Life Sciences

Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.

Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.

Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment. Students know there is variation among individuals of one kind within a population.

Students know that light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.

Students know flowers and fruits are associated with reproduction in plants.

Science: Earth Sciences

Students know how to compare the physical properties of different kinds of rocks and know that rock is composed of different combinations of minerals.

Students know smaller rocks come from the breakage and weathering of larger rocks.

Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.
Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.

Students know that rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.

Science: Investigation and Experimentation
Students will:
Make predictions based on observed patterns and not random guessing.

Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.

Compare and sort common objects according to two or more physical attributes (e.g., color, shape, texture, size, weight).

Write or draw descriptions of a sequence of steps, events, and observations.

Construct bar graphs to record data, using appropriately labeled axes.

Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.
Follow oral instructions for a scientific investigation.

3rd Grade
Science: Life Sciences
Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.

Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.

Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.

Science: Investigation and Experimentation
Students will:
Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.

Differentiate evidence from opinion and know that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.

Use numerical data in describing and comparing objects, events, and measurements.

Predict the outcome of a simple investigation and compare the result with the prediction.

Collect data in an investigation and analyze those data to develop a logical conclusion.

4th grade
Science: Life Science
Students know plants are the primary source of matter and energy entering most food chains.

Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.

Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Students know ecosystems can be characterized by their living and nonliving components.

Students know in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

Science: Earth Sciences
Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

Students know natural processes, including freezing and thawing and the growth of roots, cause roots to break down into smaller pieces.

Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Science: Investigation and Experimentation
Students will:

Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.

Measure and estimate the weight, length, or volume of objects.

Formulate and justify predictions based on cause-and-effect relationships.

Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

Construct and interpret graphs from measurements.

Follow a set of written instructions for a scientific investigation.

Grade 5:
Science: Earth Sciences
Students know most of Earth’s water is present as salt water in the oceans, which cover most of Earth’s surface.

Students know when liquid water evaporates it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.

Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.

Students know the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
Students know the origin of the water used by their local communities.

Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns. Students know the causes and effects of different types of severe weather.

Students know how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.

Science: Investigation and Experimentation
Students will:
Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.

Develop a testable question.

Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.

Identify the dependent and controlled variables in an investigation.

Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.

Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.

Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.

Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.

California History-Social Science Content Standards

Kindergarten
Students understand how people lived in earlier times and how their lives would be different today (e.g., getting water from a well, growing food).

1st Grade
Students examine the structure of schools and communities in the past.

Students study transportation methods of earlier days.

Students understand the ways in which American Indians and immigrants have helped define Californian and American culture.

2nd Grade
Students compare and contrast basic land use in urban, suburban, and rural environments in California.

Students describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.

Students understand the role and interdependence of buyers (consumers) and sellers (producers) of goods and services.

Students understand how limits on resources affect production and consumption (what to produce and what to consume).
3rd Grade
Students identify geographical features in their local region (e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes). Students trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).

Students discuss the ways in which physical geography, including climate, influenced how the local Indian nations adapted to their natural environment (e.g., how they obtained food, clothing, tools).

Students research the explorers who visited here, the newcomers who settled here, and the people who continue to come to the region, including their cultural and religious traditions and contributions.

Students describe the economies established by settlers and their influence on the present-day economy, with emphasis on the importance of private property and entrepreneurship.

Students trace why their community was established, how individuals and families contributed to its founding and development, and how the community has changed over time, drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources.

Students demonstrate basic economic reasoning skills and an understanding of the economy of the local region.

Students describe the ways in which local producers have used and are using natural resources, human resources, and capital resources to produce goods and services in the past and the present.

4th grade
Students identify the locations of the Pacific Ocean, rivers, valleys, and mountain passes and explain their effects on the growth of towns.

Students use maps, charts, and pictures to describe how communities in California vary in land use, vegetation, wildlife, climate, population density, architecture, services, and transportation.

Students discuss the major nations of California Indians, including their geographic distribution, economic activities, legends, and religious beliefs; and describe how they depended on, adapted to, and modified the physical environment by cultivation of land and use of sea resources.

Students identify the early land and sea routes to, and European settlements in, California with a focus on the exploration of the North Pacific (e.g., by Captain James Cook, Vitus Bering, Juan Cabrillo), noting especially the importance of mountains, deserts, ocean currents, and wind patterns. Students describe the Spanish exploration and colonization of California, including the relationships among soldiers, missionaries, and Indians (e.g., Juan Crespi, Junipero Serra, Gaspar de Portola).

Students describe the mapping of, geographic basis of, and economic factors in the placement and function of the Spanish missions; and understand how the mission system expanded the influence of Spain and Catholicism throughout New Spain and Latin America.

Students describe the daily lives of the people, native and nonnative, who occupied the presidios, missions, ranchos, and pueblos.
Students discuss the role of the Franciscans in changing the economy of California from a hunter-gatherer economy to an agricultural economy.

Students describe the effects of the Mexican War for Independence on Alta California, including its effects on the territorial boundaries of North America.

Students discuss the period of Mexican rule in California and its attributes, including land grants, secularization of the missions, and the rise of the rancho economy.

Students identify the locations of Mexican settlements in California and those of other settlements, including Fort Ross and Sutter’s Fort.
Students compare how and why people traveled to California and the routes they traveled (e.g., James Beckwourth, John Bidwell, John C. Fremont, Pio Pico).
Students analyze the effects of the Gold Rush on settlements, daily life, politics, and the physical environment (e.g., using biographies of John Sutter, Mariano Guadalupe Vallejo, Louise Clapp).

Students study the lives of women who helped build early California (e.g., Biddy Mason).

Students discuss how California became a state and how its new government differed from those during the Spanish and Mexican periods.

Students describe the development and locations of new industries since the nineteenth century, such as the aerospace industry, electronics industry, large-scale commercial agriculture and irrigation projects, the oil and automobile industries, communications and defense industries, and important trade links with the Pacific Basin.

Students trace the evolution of California’s water system into a network of dams, aqueducts, and reservoirs.

5th grade
No direct alignment

Common Core Standards for Mathematics

Because mastery of standards for mathematics requires focused, systematic instructional sequences, the SFPUC cannot claim that the Center’s programs and exhibit experiences are aligned to specific mathematics standards. Some experiences, however, such as water quality testing, could reinforce certain mathematics skill sets.

Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

These standards are categorized according to grade group: K-5 and 6-12. For the purposes of the Center, only standards at the K-5 grade group have been highlighted.

Reading:
No direct alignment, although experience reading and discussing interpretive panels and exhibit copy (informational text) will help students in their ability to recall key details (Reading Standards for Informational Text, Standard 1), determine main ideas (Reading Standards for Informational Text, Standard 2), and use and interpret information presented visually, orally, digitally, and quantitatively (Reading Standards for Informational Text, Standard 7).
Writing:
No direct alignment

Speaking and Listening:
Students will participate in collaborative conversations with diverse partners about (grade-level appropriate) topics and texts with peers and adults (Speaking and Listening Standard 1).

Students will verbally describe (recount, report on) people, places, events, and opinions (Speaking and Listening Standard 4).

Language:
No direct alignment, although opportunities will be presented during programs for students to gain skills that ultimately will help them demonstrate command of the conventions of standard English grammar and usage when writing or speaking (Language Standard 1) and determine or clarify the meaning of unknown and multiple-meaning (grade level-appropriate) words and phrases (Language Standard 4).

California’s Education and the Environment Initiative (EEI):
Environmental Principles and Concepts

The key concepts presented in the Alameda Creek Watershed Center interpretive summary address EEI principles I – V and each principle’s corresponding set of concepts. As programs are developed at the Center, detailed alignment of their content to these principles and concepts is strongly suggested. This language (and associated content) will appear in frameworks and textbooks, as well as likely be integrated into the State’s assessment tools.

The environmental principles examine the interactions and interdependence of human societies and natural systems. The nature of these interactions is summarized in the environmental principles presented below.

Principle I: The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

Concept a. Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept b. Students need to know that the ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept c. Students need to know that the quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

Principle II: The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Concept a. Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept b. Students need to know that methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept c. Students need to know that the expansion and operation of human communities influences the geographic
extent, composition, biological diversity, and viability of natural systems.

Concept d. Students need to know that the legal, economic, and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

Principle III: Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

Concept a. Students need to know that natural systems proceed through cycles and processes that are required for their functioning.

Concept b. Students need to know that human practices depend upon and benefit from the cycles and processes that operate within natural systems.

Concept c. Students need to know that human practices can alter the cycles and processes that operate within natural systems.

Principle IV: The exchange of matter between natural systems and human societies affects the long-term functioning of both.

Concept a. Students need to know that the effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.

Concept b. Students need to know that the byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect.

Concept c. Students need to know that the capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

Principle V: Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

Concept a. Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Concept b. Students need to know the process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.

Eighty-five (85) curriculum units have been developed as part of the EEI project and several of these are relevant to the exhibit content proposed for the visitor center. Teachers who are substituting a textbook chapter with a particular EEI unit to teach to mastery of a standard will likely find a field trip the visitor center to be timely, relevant, and reinforcing of the content. These units are described in the EEI catalog appearing on the Cal EPA website: www.calepa.ca.gov/Education/EEI/documents/ExLiteracy.pdf.