

Honey Bee Haven Garden

Harry H. Laidlaw Jr. Honey Bee Research Facility

Design Competition Submission
January 30, 2009

UC Davis

College of Agricultural
& Environmental Sciences

Ann F. Baker
Jessica Brainard
Chika Kurotaki
Donald Sibbett



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Greetings

January 30, 2009

Dear Committee Members:

We are pleased to submit this proposal to the California Center for Urban Horticulture at UC Davis College of Agricultural & Environmental Sciences for the design of the Honey Bee Haven garden.

Based in the Bay Area, our multidisciplinary team brings together the expertise of award-winning landscape architects, exhibit designers, and interpretive planners with a commitment to sustainability and visitor-centered design. Our collective experience in ecological design, natural history interpretation, and visitor studies makes our team uniquely qualified to create a plan that addresses the functional, aesthetic, experiential, and educational goals of the Honey Bee Haven garden project.

We look forward to the opportunity to work closely with UC Davis to ensure the successful implementation of our garden design. We are confident that this series of interconnected gardens and the interpretive storyline woven throughout will not only provide a year-round food source for honey bees, but will also serve to raise public awareness about the plight of honey bees and how individuals can help.

Thank you for considering our garden design submission.

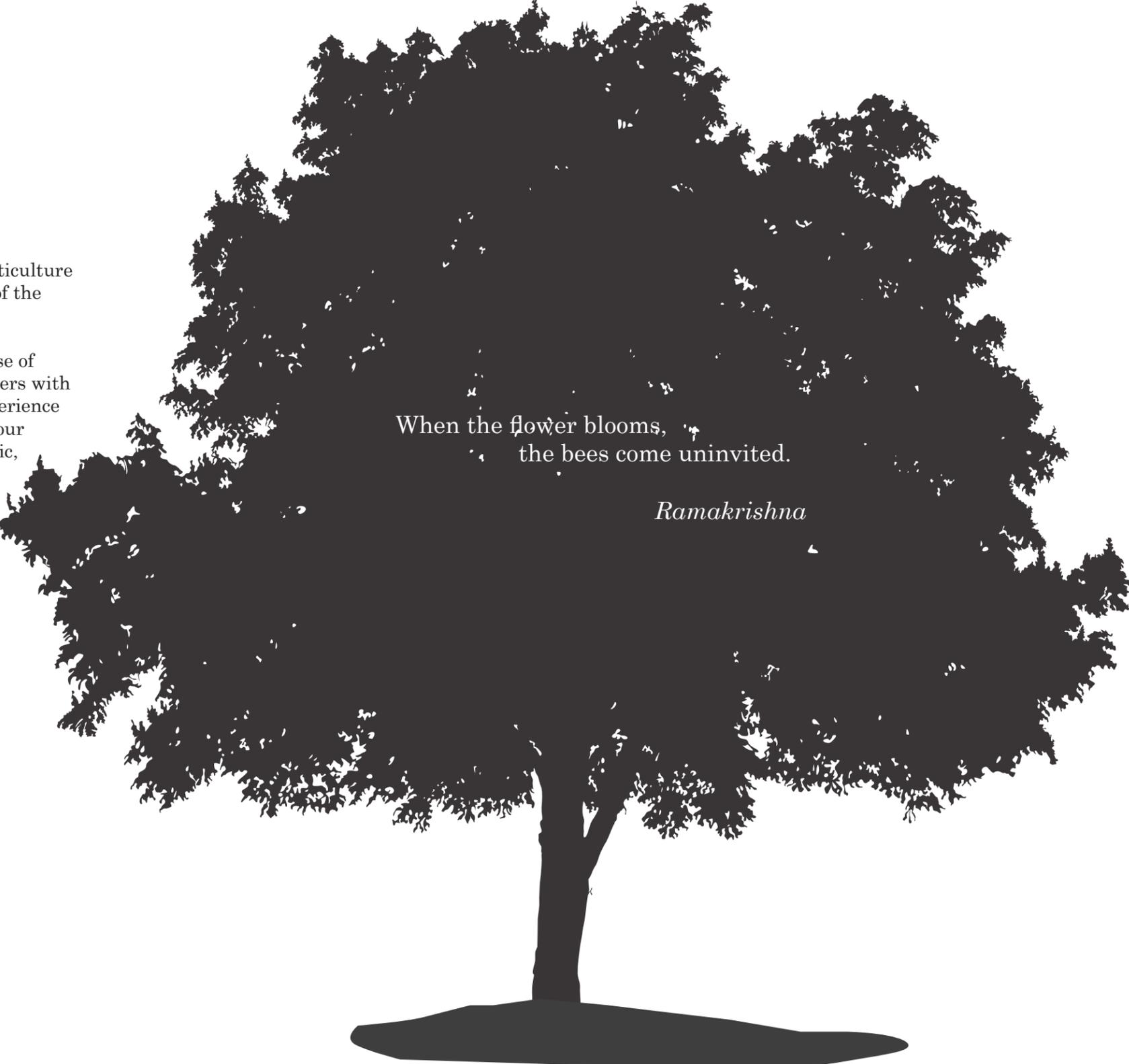
Sincerely,

Ann F. Baker
Landscape Architect

Jessica Brainard
Interpretive Planner

Chika Kurotaki
Exhibit Designer

Donald Sibbett
Landscape Architect & Exhibit Designer



When the flower blooms,
the bees come uninvited.

Ramakrishna

Introduction

Three words—story-driven, responsive, and scalable—sum up our approach to the design of the Honey Bee Haven garden.

Story-driven

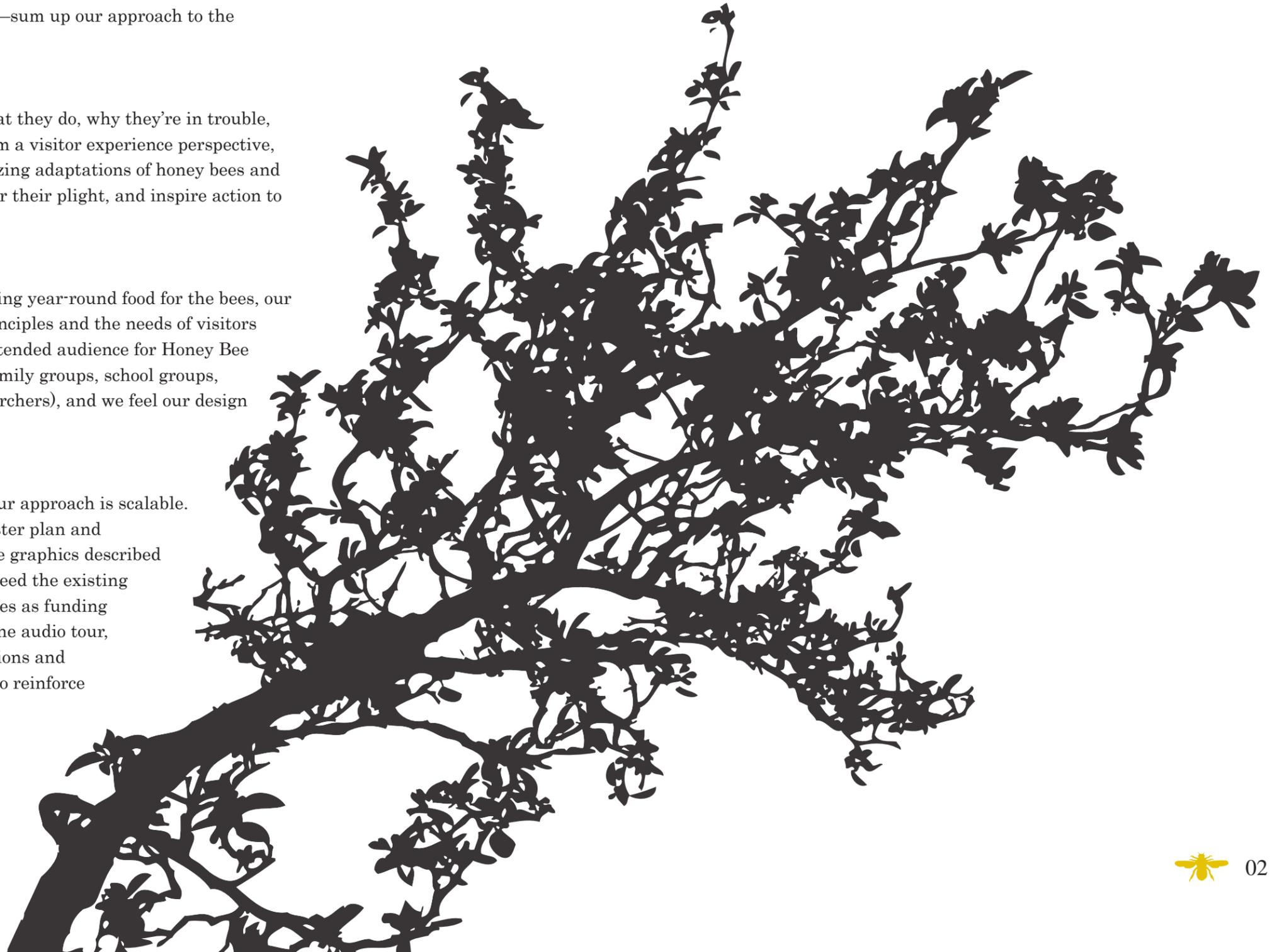
The interpretive storyline—what honey bees are, what they do, why they're in trouble, and how we can help—drives our garden design. From a visitor experience perspective, our approach aims to foster appreciation for the amazing adaptations of honey bees and the invaluable service they provide, build empathy for their plight, and inspire action to help save them.

Responsive

In addition to meeting the overarching goal of providing year-round food for the bees, our garden design is responsive to sustainable design principles and the needs of visitors (e.g., wayfinding, comfort and interpretation). The intended audience for Honey Bee Haven garden is diverse (i.e., recreational visitors, family groups, school groups, Master Gardeners, and UC Davis students and researchers), and we feel our design will effectively reach multiple audiences.

Scalable

Although our basic garden design is within budget, our approach is scalable. The design provides a framework to be used as a master plan and implemented over time. For example, the interpretive graphics described in the visitor experience narrative, although they exceed the existing garden budget, can be designed and installed in phases as funding allows. Additional interpretation including a cell phone audio tour, a bee-friendly gardening brochure, investigation stations and interactive exhibit opportunities could be developed to reinforce and extend the messages about bees and pollination.



Visitor Experience

Four interconnected gardens—Honeycomb Hideout, Pollinator Patch, My Backyard, and Nectar Nook—form the physical and interpretive framework for our Honey Bee Haven design. Although visitors may enter from several directions and circulate at will, the storyline begins at Honeycomb Hideout, at the north entrance to the garden, and runs counterclockwise.

As visitors travel through Honey Bee Haven, they encounter a seasonal variety of blooming native and ornamental plants and fruit trees, which, together, provide a year-round food source for the honey bees. Connecting each garden is a series of trails, each thematically named to support the interpretive storyline. Trellises define the entryways to most gardens and reinforce the passage to the next space.

Incorporated into each of the four sections are gathering spaces that serve as orientation points for guided tours, facilitated programs, and “chat time” with beekeepers and entomologists. Throughout the garden, ID labels inform visitors of the diversity of species and provide ideas for plants they can grow in their own backyards. Accessible interpretive graphics throughout the garden support the storyline and provide opportunities for observation and discovery.

Running along the north side of the existing hoop house structures is Langstroth Lane, a nod to L.L. Langstroth, the designer of the 10-frame hive commonly used today. An iconic latticework wall of honeycomb-shaped (hexagonal) wire mesh securely fixed to a wood structure provides screening for the Learning Center (i.e., Hoop House) and creates a sense of scale and a magical space for visitors to be a bee. This passageway serves as both a unifying element to playfully connect the garden areas and as an orientation device for visitor wayfinding. Passionflower, jasmine, and other flowering vines cover the lattice and provide an additional food source for the bees. Additional interpretation about the history of beekeeping and examples of the evolution of the hive enhance the visitor experience.

In each of the four sections of the garden, a hexagonally-shaped cast concrete stone connected to the irrigation system provides a bee-friendly water source. Around the perimeter of the garden, additional native plantings provide winter food for honey bees and native bees alike. Ample seating throughout the garden encourages visitors to linger. Straw bail seating strategically tucked under tree canopies serve as shade islands for visitor comfort. A map and directional signs installed at all decision points assist visitors with finding their way.



Rendered Site Plan



Interpretive Concept Diagram

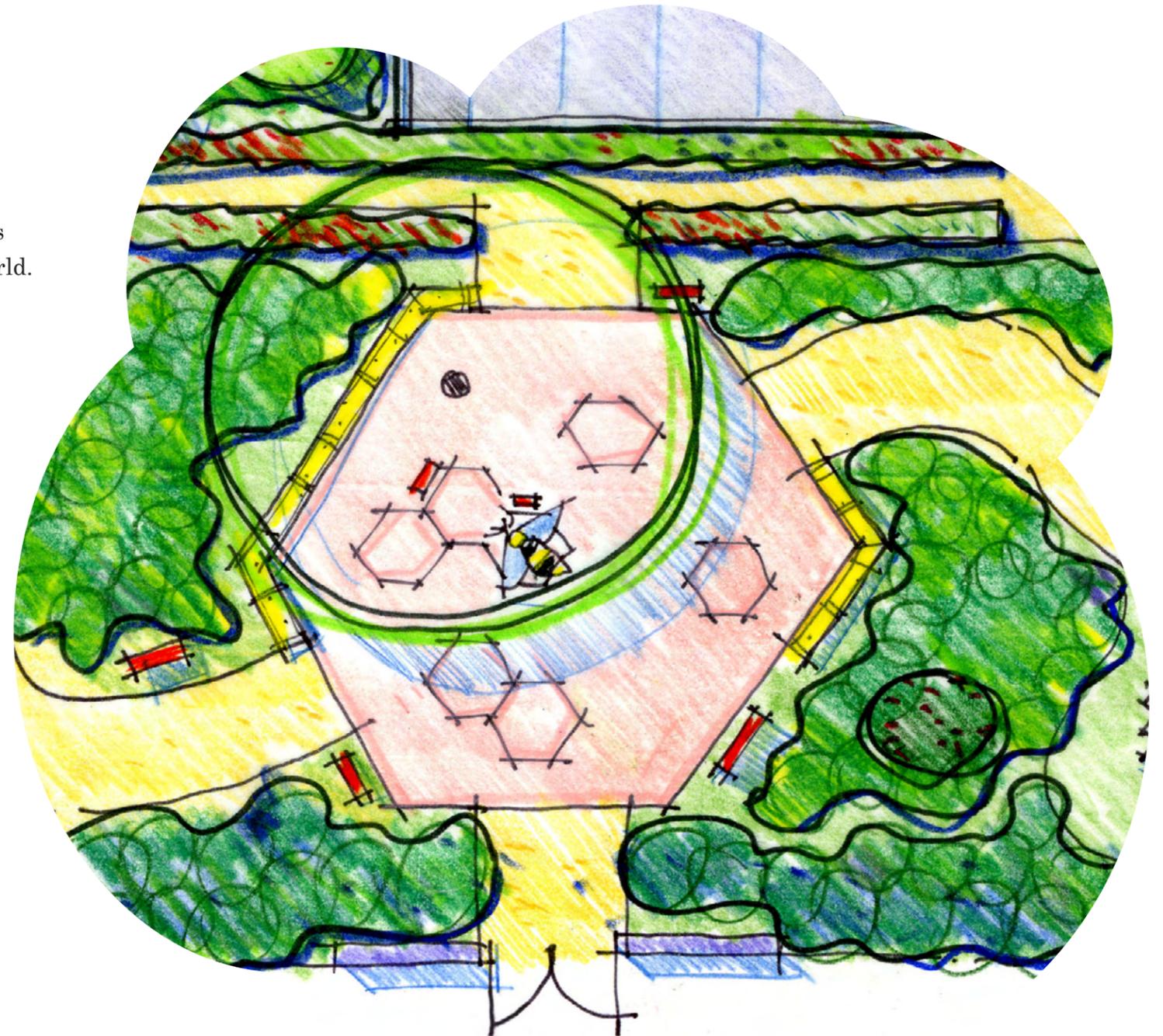


Honeycomb Hideout

Honeycomb Hideout is the first garden visitors encounter as they pass through the main gateway at the north entrance. Hexagonal in shape, the garden design reflects honeycomb geometry and reinforces the message that you are entering the bees' world. With sunflowers and other large blossoms, the space plays with scale and invites visitors to experience the garden from the bee's perspective. This orientation area serves as a gathering space for guided tours and school groups. For the casual visitor, a welcome sign with a map of Honey Bee Haven provides an overview of what to do, see, and experience during their visit. A straw bail seat-wall lines the edges of the garden.

At the center of the garden, a large-scale touchable model highlights honey bee anatomy and illustrates the special adaptations that make these winged heroes the worlds' best pollinators. Interpretive graphics communicate bee diversity and explain that honey bees (*Apis mellifera*) are just one of thousands of bee species. Additional interpretation addresses bee safety and challenges our unfounded fears of bees.

From this location, visitors can access the Learning Center (i.e., Hoop House) or head off on Waggle Dance Way to explore the rest of the garden. This pathway of decomposed granite winds through a mixture of salvia, coyote bush, and other plants, mostly native. A cluster of bee hives on the north edge is accessible from Waggle Dance Way and visible to the passerby from outside the garden. Here, an observational hive encourages visitors to take a closer look at a bee colony and experience the sounds and smells of the hive. Interpretive graphics describe the fascinating behavior and communication strategies of honey bees. Playful prompts invite visitors to waggle like a bee.

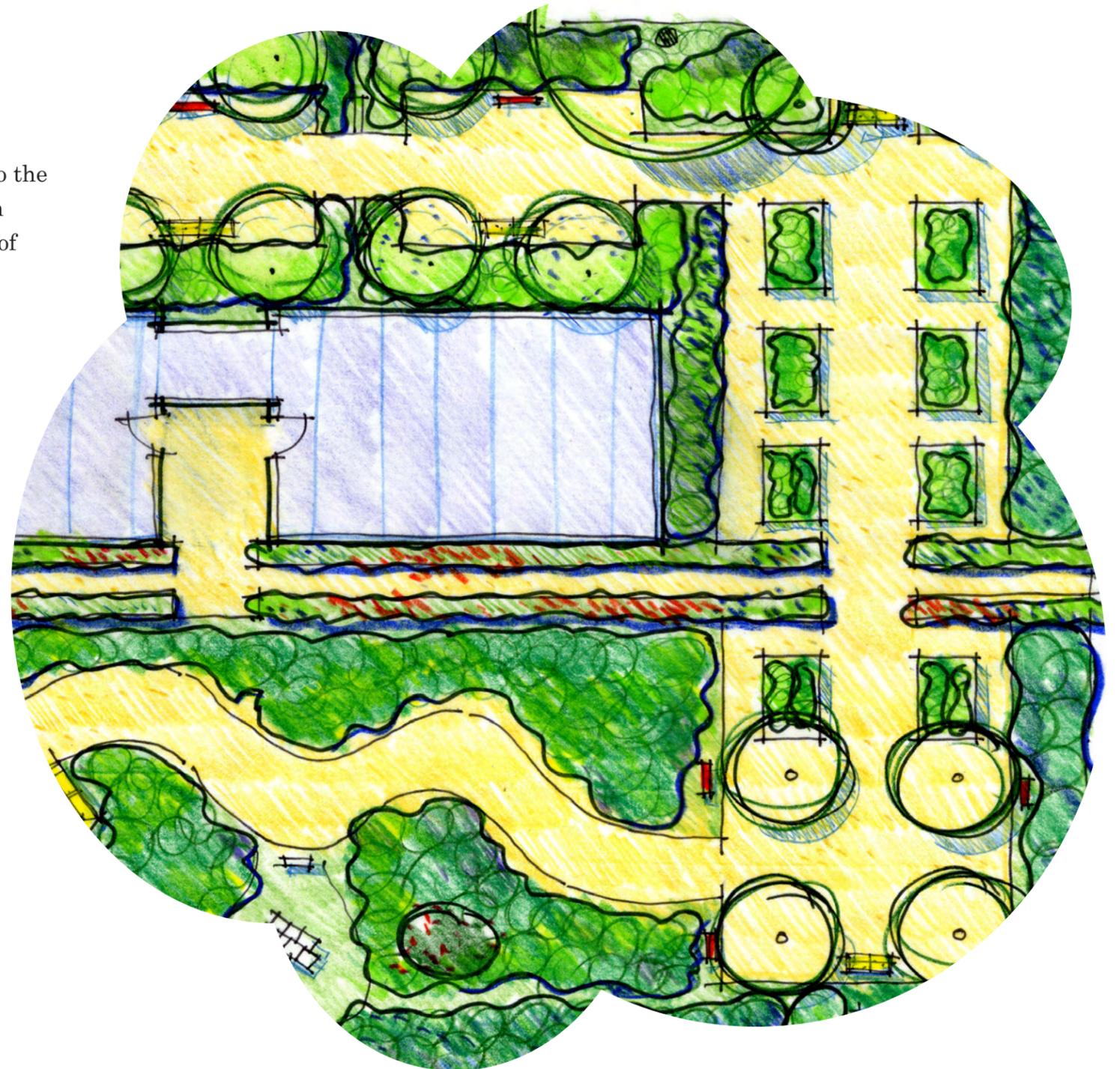


Pollinator Patch

A trellised gateway marks the transition from the meandering Waggle Dance Way to the agricultural setting of the Pollinator Patch. This garden tells the story of pollination and celebrates the benefits humans glean from bees—from honey to the pollination of one-third of the foods we eat. Quadrangle of persimmon trees defines the space and provides an inviting public programming area. Interpretive graphics illustrate the process of pollination and introduce visitors to the fundamentals of beekeeping.

From the gathering space, visitors can cross Langstroth Lane into Growers Grove, a demonstration garden marked by orderly rows and raised beds. Familiar food crops and garden herbs not only provide a seasonal food source for the bees, but also reinforce the connection between honey bees and the foods we eat. When the season is right, visitors might even be lucky enough to sample a strawberry, or nibble on a raspberry.

The existing almond trees in this area mark the transition to Orchard Alley, a long narrow row of fruit trees—almond, plum, and apple—at the south end of the garden. When in bloom, the orchard offers a tranquil space for visitors. The single bloom cycle also provides an interpretive opportunity to discuss commercial beekeeping and managed pollination, and the high demand of monoculture on our pollinator friends. Accompanying ground cover in Orchard Alley provides an additional food source for the bees.

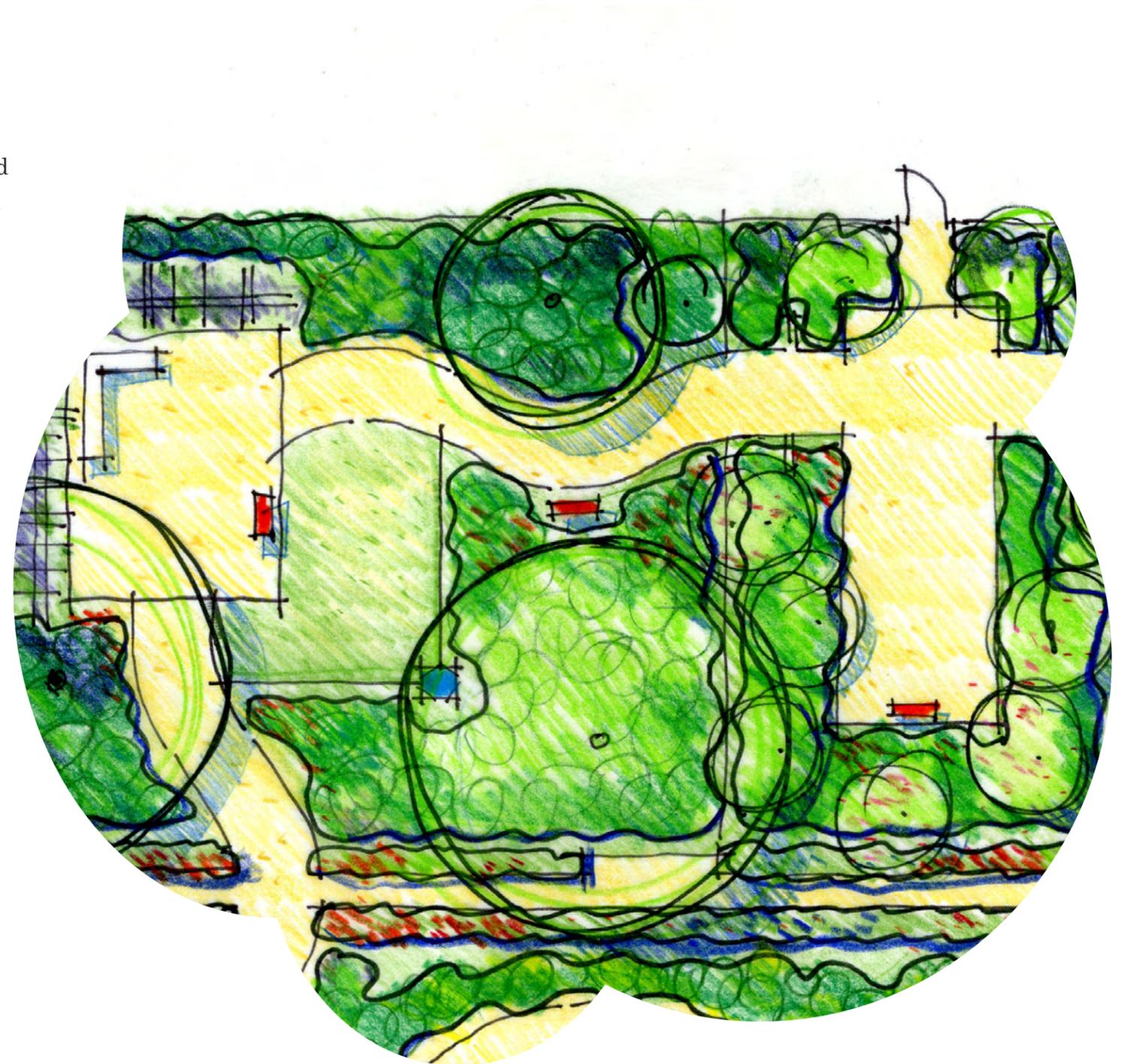


My Backyard

Save-the-Bees Sanctuary offers an additional gathering space for visitor groups, and serves as a bridge between the large-scale monoculture story introduced in Orchard Alley and small-scale home gardening demonstrated in My Backyard.

Here, visitors learn that the honey bee population is dwindling at an alarming rate. Interpretive graphics addressing Colony Collapse Disorder and its suspected causes are paired with suggested actions visitors can take to help honey bees.

One action visitors can take is to transform their backyard into a bee-friendly garden. My Backyard demonstration garden offers tips on how to do that. At first glance, this space might look like a typical backyard found in the Central Valley. But the plants in this garden, both native and ornamental, are carefully selected and strategically spaced to attract foraging honey bees. Roman chamomile and dwarf yarrow substitute a grass lawn. Hollyleaf cherry and toyon replace species such as oleander as hedging. Willow and linden trees provide bountiful, and in the case of willow, early spring flowers for bees. Additional interpretive graphics explain that bee-friendly gardens have the potential to create valuable habitat corridors between agricultural sites.

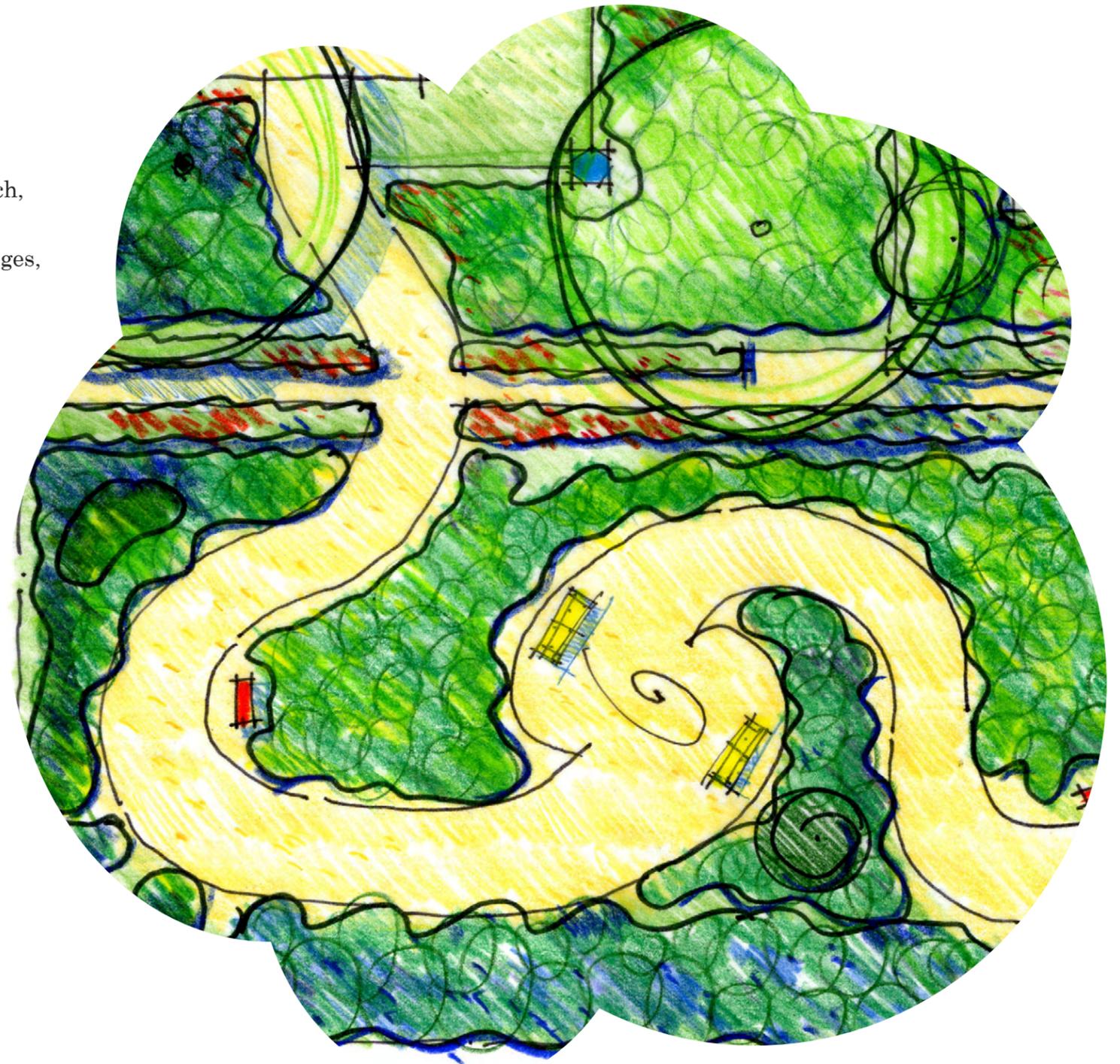


Nectar Nook

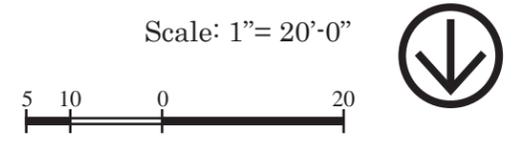
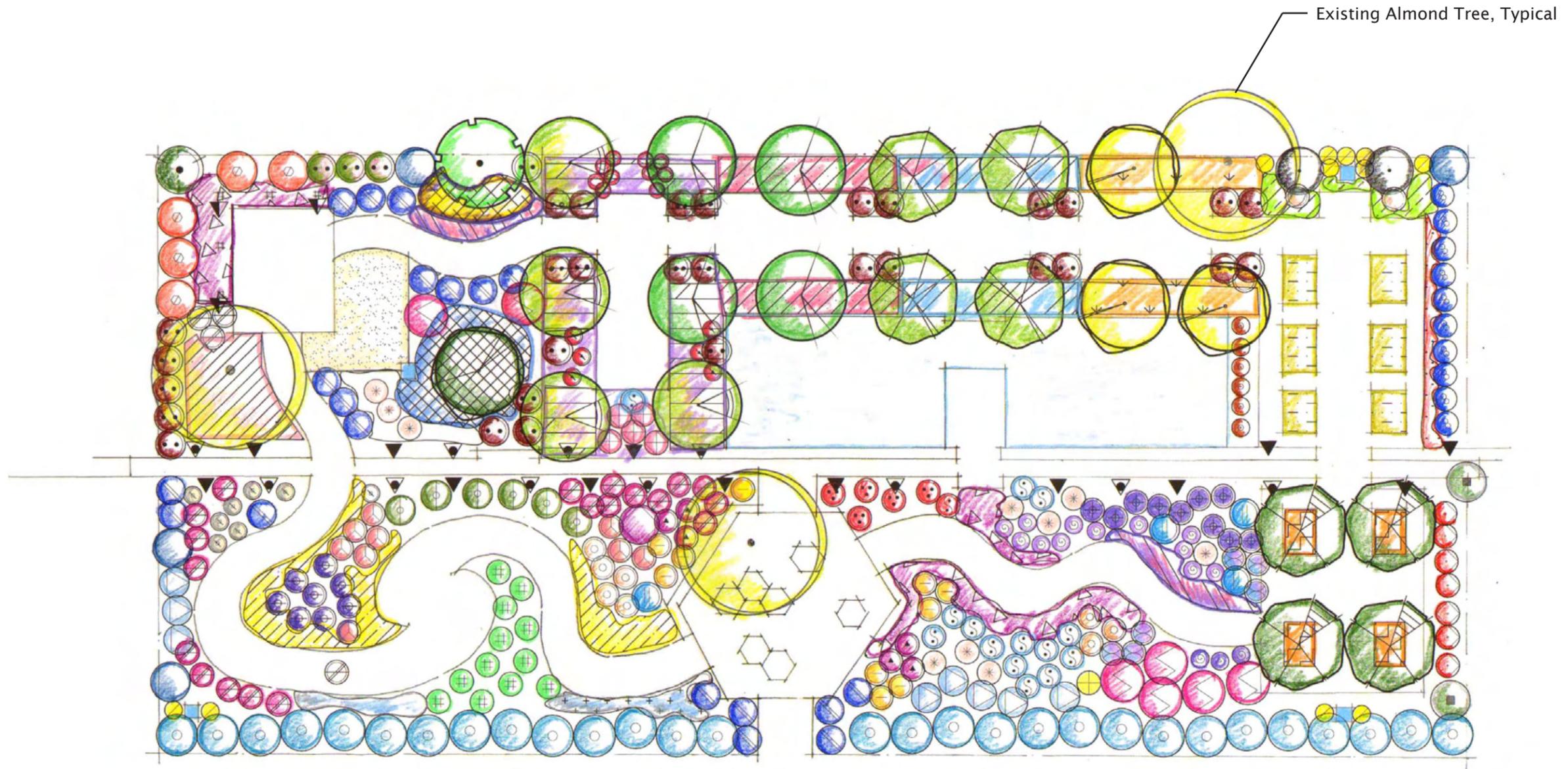
In contrast to the groomed look of My Backyard and the linear feel of Pollinator Patch, the design of Nectar Nook garden is organic and sculptural. The pathway undulates through clusters of mounded planting beds and a high diversity of plants, such as sages, Indian blanket flower, native buckwheat and types of aster, which give visitors the sense that they are in a natural habitat.

Winter flowering natives including willow and coyote bush help provide year-round food for the honey bees, and attract a diversity of other pollinators and insects. Although feeding the honey bees is the primary goal of Honey Bee Haven, native bees find refuge here as well. An interpretive graphic helps visitors identify other bee species and explains that where wild bees are abundant, honeybees are more effective in pollinating.

As visitors wind their way through the garden, they come upon Round Dance Circle. A reference to bee foraging behavior and a compliment to Waggle Dance Way, this open space provides a central gathering area for the Nectar Nook garden and serves as an orientation point for visitors.



Planting Plan



Planting Legend

Symbol	Botanical name	Common Name	Size	Quantity	Spacing Remarks
TREES					
	<i>Malus</i> ssp.	Apple	Bare Root	4	As Shown
	<i>Prunus dulcis</i>	Almond	Bare Root	3	As Shown
	<i>Salix discolor</i> or <i>S. caprea</i>	Pussywillow	5 gal	1	As Shown
	<i>Prunus</i> ssp.	Plum	Bare Root	4	As Shown
	<i>Crataegus phaenopyrum</i>	Washington Thorn	15 Gal	4	As Shown
	<i>Diospyros kaki</i>	Persimmon	15 Gal	4	As Shown
	<i>Tilia americana</i>	American Linden	15 Gal	1	As Shown

Symbol	Botanical name	Common Name	Size	Quantity	Spacing Remarks
SHRUBS					
	<i>Sambucus nigra</i>	Black Elderberry	Bare Root	2	As Shown
	<i>Berberis aquifolium</i>	Oregon Grape	1 Gal	9	As Shown
	<i>Ceanothus</i> 'Concha'	NCN	1 Gal	29	As Shown
	<i>Ceanothus maritimus</i> 'Valley Violet'	NCN	1 Gal	19	As Shown
	<i>Ceanothus</i> 'Ray Hartman'	NCN	1 Gal	3	As Shown
	<i>Cercis occidentalis</i>	Western Redbud	1 Gal	1	As Shown
	<i>Cercocarpus betuloides</i>	Mt. Mahogany	1 Gal	2	As Shown
	<i>Heteromeles arbutifolia</i>	Toyon	1 Gal	5	As Shown
	<i>Isomeris arborea</i>	Bladderpod	1 Gal	1	As Shown
	<i>Leucophyllum langmaniae</i> 'Lynn's Legacy'	Silverleaf	1 Gal	3	As Shown
	<i>Ribes malvaceum</i>	Chaparral Current	1 Gal	5	As Shown
	<i>Ribes viburnifolium</i>	Evergreen currant	1 Gal	10	As Shown
	<i>Rosa x odoratus</i> 'Mutabilis'	NCN	1 Gal	10	As Shown
	<i>Salvia microphylla</i>	Mint Bush Sage	1 Gal	8	As Shown
	<i>Monardella villosa</i>	Coyote Mint	1 Gal	15	As Shown
	<i>Baccharis pilularis</i>	Coyote Brush	1 Gal	6	As Shown
	<i>Salvia mellifera</i> 'Tera Seca'	Black Sage	1 Gal	12	As Shown
	<i>Salvia greggii</i>	Texas Sage	1 Gal	5	As Shown
	<i>Rosa rugosa</i>	Rugosa Rose	1 Gal	6	As Shown
	Blueberry 'Sunshine Blue'	Sunshine Blueberry	1 Gal	10	As Shown
	Raspberry	Raspberry	Bare Root	6	As Shown
	<i>Rosa californica</i>	California Rose	1 Gal	6	As Shown
	<i>Rhamnus californica</i>	Coffeeberry	1 Gal	5	As Shown
	<i>Myrtus communis</i>	Greek Myrtle	1 Gal	8	As Shown
	<i>Prunus illicifolia</i>	Hollyleaf Cherry	1 Gal	1	As Shown
	<i>Salvia</i> 'Bees Bliss'	Bee's Bliss Sage	1 Gal	8	As Shown
	<i>Eriogonum giganteum</i>	St. Catherine's Lace	1 Gal	7	As Shown
	<i>Salvia</i> 'Poza Blue'	Poza Blue Sage	1 Gal	3	As Shown

Planting Legend

Symbol	Botanical name	Common Name	Size	Quantity	Spacing Remarks
Perennials and Subshrubs					
	Lavandula 'Goodwin Creek Grey'	Lavender	1 Gal	10	As Shown
	Agastache rupestris, A. foeniculum	Agastache	1 Gal	22	As Shown
	Echium wildpretii	Tower of Jewels	1 Gal	6	As Shown
	Eriogonum fasciculatum	California Buckwheat	1 Gal	9	As Shown
	Angelica pachycarpa	Angelica	1 Gal	4	As Shown
	Salvia apiana	White Sage	1 Gal	9	As Shown
	Helianthus angustifolia	Swamp Sunflower	1 Gal	10	As Shown
	Nepeta x faassenii	Hybrid Catmint	1 Gal	13	As Shown
	Echios ritro	Globe Thistle	1 Gal	6	As Shown
VINES					
	Passiflora caerulea	Passionflower vine	5 Gal	13	6' O.C.
	Lonicera periclymen	Woodbine Honeysuckle	5 Gal	3	6' O.C.
	Lonicera hispidula	California honeysuckle	5 Gal	11	6' O.C.

Symbol	Botanical name	Common Name	Size	Quantity	Spacing Remarks
GROUND COVERS					
	Heuchera 'Rosada'	Rosada Corral Bells	1 Gal	x	12" O.C.
	Ceratostigma plumbaginoides	Dwarf Plumbago	1 Gal	x	12" O.C.
	Oreganum 'Betty Rollins'	Dwarf Oregano	4"	x	12" O.C.
	Aster 'Purple Dome'	Purple Dome Aster	1 Gal	x	18" O.C.
	Erigeron karvinskianus	Mexican Daisy	4"	x	24" O.C.
	Lessingia filaginifolia var. californica	Silver Carpet Aster	4"	x	12" O.C.
	Lotus scoparius	Deer Weed	Seed	x	As recommended
	Palestine Strawberry Clover	Clover species	Seed	x	As recommended
	Soil Builder Cover Crop	See Peaceful Valley mix	Seed	x	As recommended
	Crimson Clover	See Peaceful Valley	Seed	x	As recommended
	Thymus praecox arcticus	Mother of Thyme	4"	x	8" O.C.
	Chamaemelum nobilis + Achillea tomentosum, miniature clovers	Lawn Substitute	Seed	300	9" O.C.
	Garden Vegetables and Herbs		Seed	x	As recommended
	Strawberries	Clover species	Bare Root	x	As recommended
	White Clover	See Peaceful Valley mix	Seed	x	As recommended
	Rose Clover	See Peaceful Valley	Seed	x	As recommended

Maintenance Program

Season	Tasks	Description
Spring		
(March - May)	Planting & Seeding	Sow Spring herbs & vegetables. Plant replacement plants
	Fertilizing & Amendments	Add organic amendments/fertilizer to edible plants and trees
	Pest & Disease Control	Observe garden for pests. Use IPM techniques
	Weed Control	Weed seedlings early with hoe or hand pull
	Irrigation	Begin watering 1-2 times/week as necessary
Summer		
(June - August)	Irrigation	Continue watering 2-3 times/week for non-native plants, 1 time/week for natives
	Pest & Disease Control	Observe garden for pests. Use IPM techniques
	Weed Control	Continue weeding or hand pulling weeds
	Pruning	Lightly pruned fruit trees for balance as necessary
	Compost	Add Spring vegetable crops to compost and turn often
Fall		
(September - November)	Fertilizing & Amendments	Amend soil lightly for non-native plants
	Propagation & Seed Collection	Collect seed from summer crops
	Planting & Seeding	Sow fall vegetables and plant replacement plants
	Irrigation	Continue Summer watering schedule until fall rain begin, then cut back
	Pest & Disease Control	Observe garden for pests. Use IPM techniques
	Weed Control	See mulching
	Compost	Add Summer vegetable crops to compost and turn often
	Mulching	Top dress mulch and sheet much. Leave bare soil area for native bees
Winter		
(December - February)	Propagation	Take cuttings for plants propagation
	Planting	Plant replacement plants in January or February
	Pest & Disease Control	Observe garden for pests. Use IPM techniques
	Pruning	Structural pruning for trees and edible shrubs
	Mulching	
	Compost	Cover compost during rains, continue to turn

This garden has been designed to adhere to the basic guidelines described on page 17 of "A Guide to Green Maintenance and Operations." The garden will require zero insecticide application and the use of herbicides will be absent or limited to minimal applications of organic compounds.

The adjacent program outlines a monthly maintenance program for the garden. This program assumes the garden will be maintained by a volunteer gardening crew of three individuals during a three-hour period performed on a weekly basis.

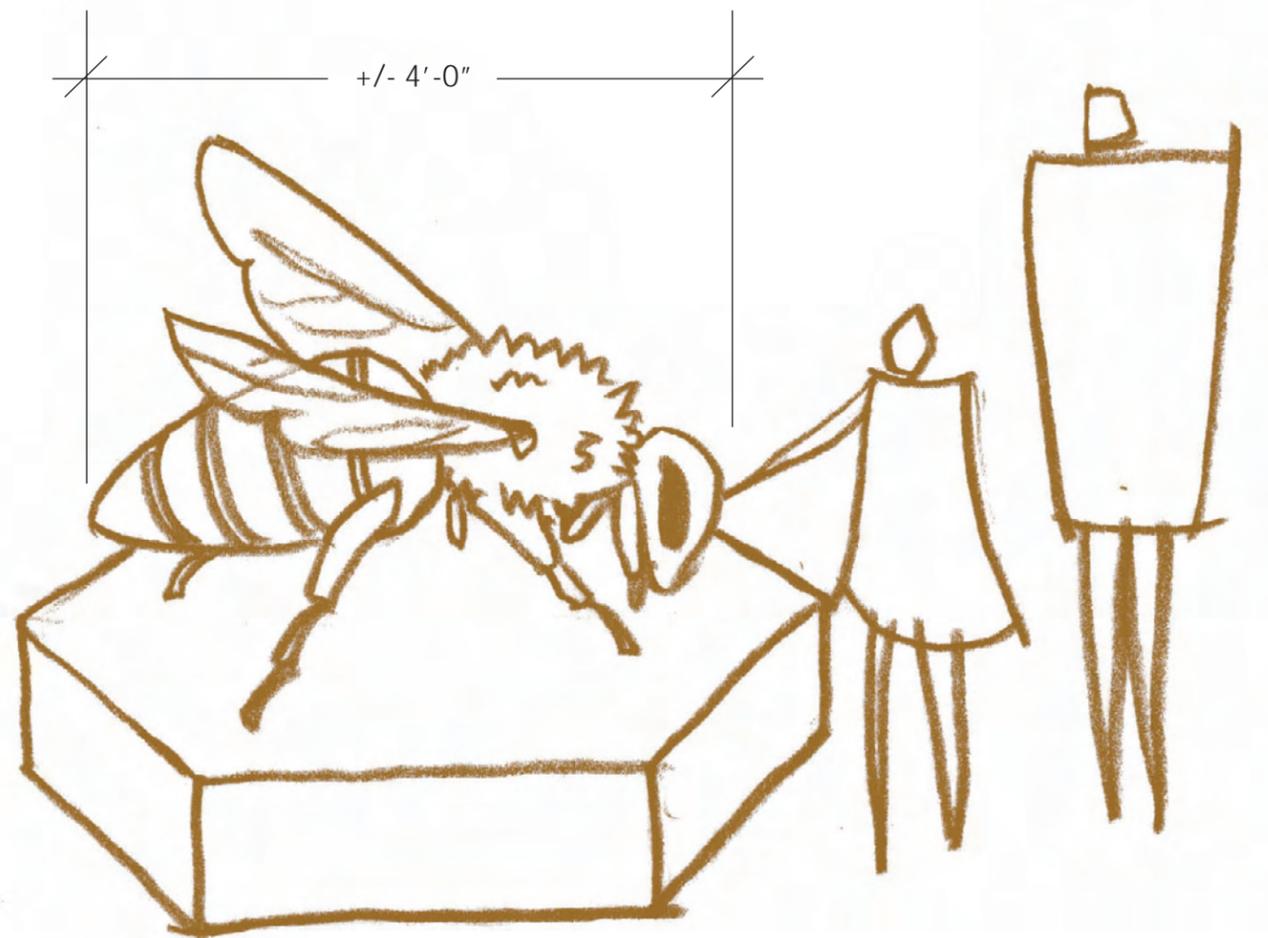
Estimated Construction Cost

Division, Description and Notes	Quantity	Units	Cost/Unit	Cost
Landscape Construction Materials				
Entry Trellis and Double Gate - Wood (Note 1)	1	LS	-	\$2,500
Unit Pavers - Orientation Area (Note 2)	700	SF	\$5.00	\$3,500
Decomposed Granite - Pathways and gathering areas (Note 3)	6,200	SF	\$2.50	\$15,500
Header Boards - Straights (Note 4)	690	LF	\$2.50	\$1,725
Raised Beds (Note 5)	384	LF	\$10.00	\$3,840
Bee Water Source (Note 6)	4	EA	\$100.00	\$400
Irrigation Materials				
Assumes 6 hose bibs, hoses and hand watering	-	LS	-	\$6,000
Planting Materials				
Soil preparation, Soil Test Amendments, Mulch	13,000	SF	\$0.75	\$9,750
Plants	Per Plan	LS	\$3,600	\$3,600
MATERIALS TOTAL - NOT LABOR				\$46,815
ESTIMATED LABOR TOTAL (4 person crew, 5 weeks)				\$20,000
OPTIONAL ITEMS				
Garden Gates (Note 7)	3	EA	\$500	\$1,500
Seating - Straw Bay Seating	22	EA	\$6	\$132
Signage - Garden Identification Sign at Entry	1	LS	-	\$2,000
Signage - Dedication Plaque	1	LS	-	\$5,000
Signage - Plant ID	100	EA	\$5	\$500
Signage - Wayfinding and Directional Signs	6	EA	\$200	\$1,200
Learning Center / Hoop House - Modifications (Note 8)	-	LS	-	\$1,000
Irrigation - Drip System and Controller	13,000	SF	\$1.75	\$22,750
Interpretive Graphics - Trailhead and wayside graphics (Note 9)	16	EA	\$2,500	\$40,000
Bee Biological Model - Touchable	1	LS	-	\$30,000
Vine Trellis - Langstroth Lane	1	LS	-	\$16,000
Vine Trellis - My Backyard Wood Trellis and Bench	1	LS	-	\$4,000
Cell Phone Audio Tour	-	-	-	TBD
Brochure	-	-	-	TBD
Interactive Exhibits	-	-	-	TBD

NOTES:

- 1) Entry Trellis and Double Gate - Use reclaimed wood. Install 8" x 8" posts 10' above finished grade. Attach a double 2" x 8" beam with 2" x 3" trellis structure to posts. Install two 3' wide swing gates with hardware.
- 2) Unit Pavers - Set hexagonal pattern concrete pavers on 3/4" of sand over 4" of 3/4" gravel base.
- 3) Decomposed Granite - Set 1" of DG over 4" of 3/4" gravel above filter fabric.
- 4) Header Boards - Use recycled plastic lumber and stakes on all straights. Do not install headers on curves.
- 5) Raised Beds - Use recycled plastic lumber. Install 2" x 6" boards and 4" x 4" posts with top at 6" above finished grade.
- 6) Water Source - Cast in place an 18" diameter hexagonal concrete slab for bee water source. Install a hose bib on an 18" rigid riser at edge of slab. When not in use for hand watering, open faucet to allow water to drip on slab.
- 7) Garden Gates - Use reclaimed wood. Install 4" x 4" posts 4' above finished grade. Install two 3' wide swing gates with hardware at each location.
- 8) Learning Center / Hoops House - Create ADA compliant entries and pathway surfacing as required.
- 9) Interpretive Graphics - Includes exhibit design, research, content development, writing, fabrication and installation. Does not include original illustration, photography or image acquisition.

Additional Construction Details Honey Bee Model



Touchable Honey Bee Model
with hexagonal base

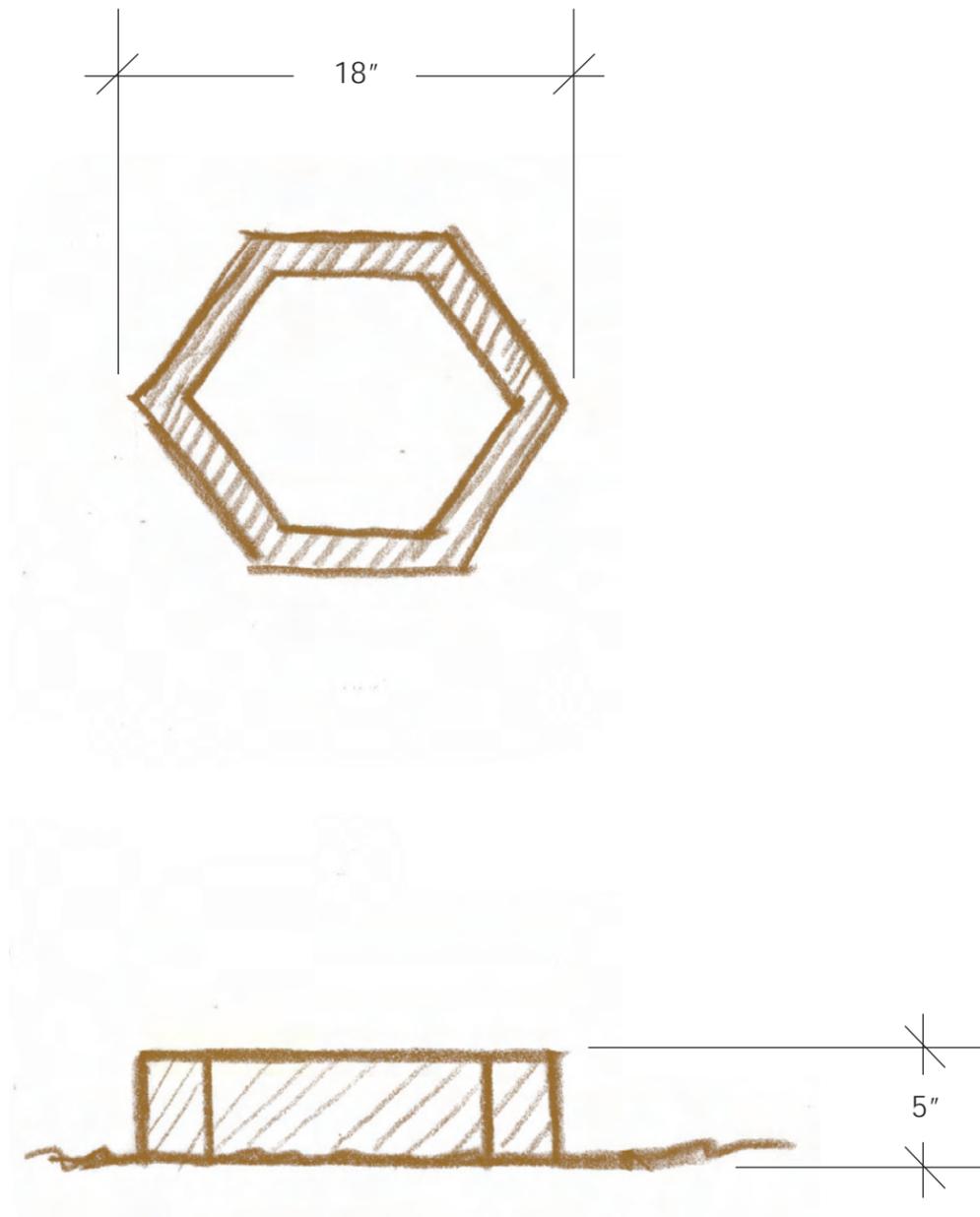
Additional Construction Details Langstroth Lane Honeycomb Lattice



Hexagonal wire lattice framed with 4" x 4"
wood posts and beams every 8'-0"

Additional Construction Details

Water Source



Hexagonal concrete slab cast in place with a hose bib

Design Team

Donald Sibbett
Landscape Architect and Exhibit Designer

Known for his creative design approach, Donald combines his experience as a landscape architect and exhibit designer to craft memorable, visitor-centered interpretive experiences. As principal of The Sibbett Group, Donald has designed over 60 learning environments for nature centers, public gardens, and museums including the Laurance S. Rockefeller Preserve, the Gore Range Natural Science School and the Yosemite National Institute/Headlands Institute.

Chika Kurotaki
Exhibit Designer

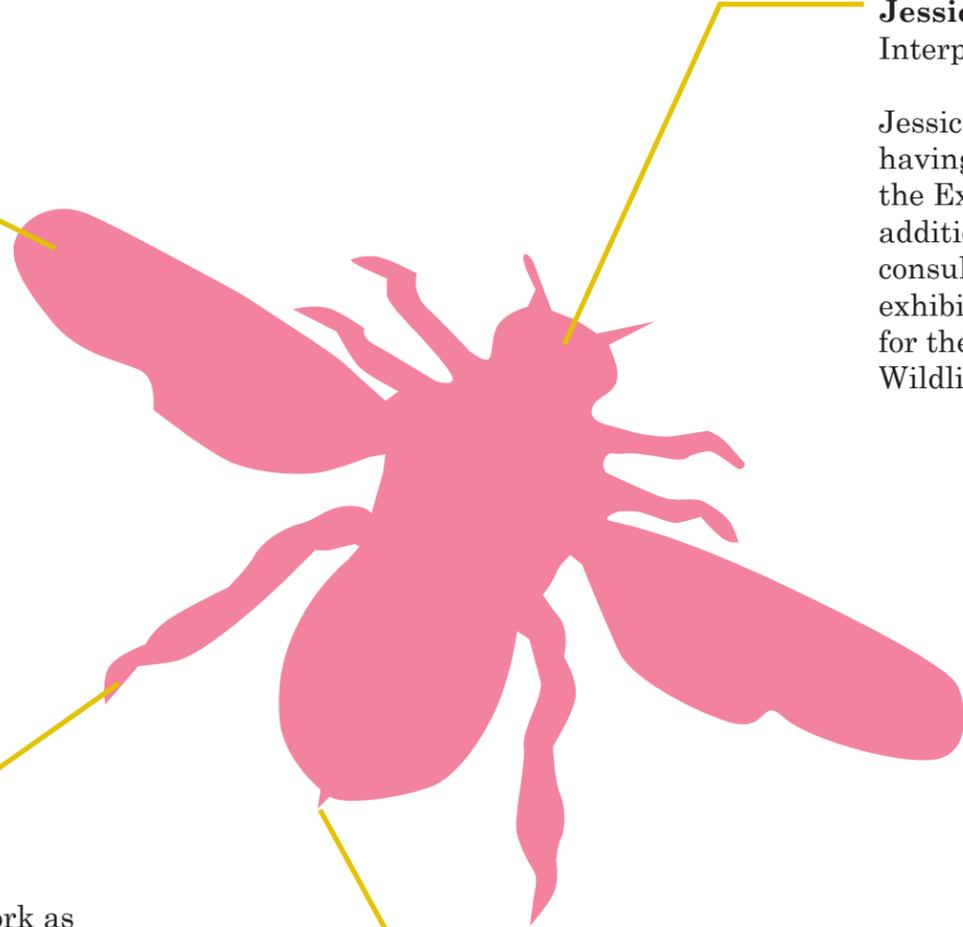
A background in industrial design shapes Chika's work as an exhibit designer. Chika has lent her talents to a broad range of informal education projects including teaming with The Sibbett Group to design an interpretive trail at Pillar Point Harbor, interpretive graphics for the Golden Gate National Parks Conservancy, and hands-on exhibits for the UC Davis Tahoe Environmental Research Center.

Jessica Brainard
Interpretive Planner

Jessica has extensive experience in science communication, having worked at several educational institutions including the Exploratorium and the Monterey Bay Aquarium. In addition to interpretive planning, Jessica is an evaluation consultant and brings her knowledge of visitor studies to exhibit development and writing, including recent projects for the new California Academy of Sciences, the Lindsay Wildlife Museum, and the Huntington Botanical Gardens.

Ann F. Baker
Landscape Architect

Ann brings her expertise and emphasis on ecological design to a broad range of projects, including commercial site planning, urban garden design, trail construction, and stream restoration. A licensed landscape architect since 2002, Ann is skilled in all aspects of planning and design—from conceptual design to financial plans and construction documentation. She presently works as Sr. Landscape Architect with RRM Design Group.



Thanks!

Thanks again for the opportunity to present our ideas for the Honey Bee Haven garden. We are particularly grateful to Häagen-Dazs (Dreyer's Grand Ice Cream, Inc.) for its generous support of the Pollinator Paradise project and for its successful public education efforts with the "HD loves HB" campaign.

We look forward to contributing to the health of the honey bees (and for a chance to indulge in delicious Honey Bee Vanilla ice cream!).



