



809 Center Street, Santa Cruz, CA 95060

Arana Gulch Park Master Plan

Executive Summary

The Arana Gulch Master Plan completes the last master planning work for the parks and open spaces within the City of Santa Cruz. The Plan has evolved from various planning and management efforts spanning many years. Throughout this process, considerable public interest and participation coupled with scientific surveys and evaluations have contributed to the development of this plan. A copy of the Arana Gulch Master Plan is included in the front sleeve of this packet for your review.

The intent of the Master Plan is to establish a vision and goals that will shape the future of Arana Gulch as a unique open space within the City of Santa Cruz. This Master Plan identifies limited recreational uses, maximizes interpretive opportunities, and provides significant resource management guidelines to direct enhancement of the natural areas. It includes a resource and constraints analysis, analyzes existing uses and impacts, prescribes creation of a more appropriate formal trail system, eliminates existing environmentally damaging trails, and establishes resource management guidelines for each unique area.

This Master Plan is a balance between public access and resource protection in an environmentally sensitive habitat area (ESHA). Recognizing the importance and priority of providing habitat protection, and access that is dependent on and sensitive to the resources on site, the Plan is designed to meet Coastal Act Policies. Currently this open space, which is situated in the middle of our urban environment, is impacted by volunteer trials through Santa Cruz tarplant habitat and other sensitive habitats. At the same time the open space is not accessible to people with limited mobility. Two very clear goals of the City, implemented by this plan, are to develop interpretive programs to foster stewardship of our natural environments and to provide multi-use trails to provide ADA access in this open space. The combination of many funding sources provides the financial resources to successfully implement the master plan.

Project Setting

Arana Gulch is a natural area situated along the eastern boundary of the City of Santa Cruz, to the north of the Santa Cruz Harbor. This 67.7 acre City-owned open space features unique natural resources such as coastal prairie, Santa Cruz Tarplant, and the riparian and wetland habitat areas of Arana Gulch Creek.

Overlooking the upper Harbor, a coastal terrace comprises the central portion of Arana Gulch. Grassland covers the expanse of the terrace, with oak woodland along the bluff edges. On the eastern portion of the property, the grassland gives way to riparian scrub and forest, sloping down to the broad floodplain of Arana Gulch Creek. Hagemann Gulch, a steep wooded canyon, forms the southwestern boundary of the property.

Several unimproved earthen trails, most of which existed prior to the City's ownership, provide existing public access within Arana Gulch. The main trail, eroded and steep in some sections, provides an unofficial bicycle/pedestrian connection from Agnes Street at the north end to the Upper Harbor to the south. A pedestrian trail encircles the grassland area. There are no trail entrances or connections along the eastern or western boundaries of the property. There are also no existing wheelchair accessible trails within Arana Gulch. In addition to the designated trails, there are numerous unauthorized trails crossing the property, several of which are located in the southern grassland and tarplant population areas. Dogs are required to be on-leash at all times within Arana Gulch.

The northernmost portion of the Santa Cruz Harbor property features an existing dry storage area, enclosed in chain link fencing. The designated southern access to Arana Gulch is located along the western edge of the dry storage area. There is also an informal, undesignated pathway along the northern boundary of the dry storage area which is used by some members of the public as a cut-through connection to Arana Gulch.

There are no existing structures, parking or restrooms within Arana Gulch. There is limited fencing and park signage.

Site History

The project site was once part of the ranchlands known as Live Oak Ranch in the late 1800s. Cattle were grazed on the portion of the property now known as Arana Gulch. In the 1920s, the Arana Gulch property became the site of the East Side Dairy. The dairy operation continued through the mid-1950s. A barn and other structures were once located within the northern portion of the property, but were demolished after the mid-1970s. Within the Arana Gulch property, no historic buildings or remnants exist from either the Live Oak Ranch or dairy operations. Foundations remain from some of the structures associated with the East Side Dairy, but these are not considered significant historic resources. Cattle grazing continued on the property until the late 1980s.

In 1994, the City of Santa Cruz acquired the 63-acre property known as Arana Gulch. Years prior to that purchase, the City had acquired a narrow strip of land in the central portion of the property (approximately 4.7 acres). This strip of land was originally

intended for a roadway extension between Broadway and Brommer Street, but the City later decided not to pursue the roadway connection and has included all of the property as open space within the Arana Gulch Master Plan.

Shortly after the acquisition of Arana Gulch, the City opened the property to limited public use, with the City Parks and Recreation Department managing the area. In 1997, the City Council approved the *Arana Gulch Interim Management Plan*, which outlined limited actions to maintain the property but did not include any land use decisions.

Most of Arana Gulch has been designated as critical habitat for Santa Cruz tarplant. Since the purchase, the City has provided various tarplant management regimes, including mowing, raking, light scraping, and limited controlled burns. It is known that the tarplant thrived on the property when it was grazed during the dairy operations. Since that time, even with City and volunteer efforts, the tarplant has experienced a severe decline.

Proposed Project Overview

The City of Santa Cruz is submitting a consolidated coastal development permit application for the Arana Gulch Master Plan and trail improvements within the upper Santa Cruz Harbor. The Master Plan addresses the long-term use and resource management of the 67.7 acre City-owned Arana Gulch open space property.

Most of the Arana Gulch property and upper Harbor area is located within the Coastal Zone. The coastal terrace portion of Arana Gulch is under local permitting jurisdiction, while the Arana Gulch and Hagemann Gulch Creek corridors are deemed tidelands and public trust lands within original Coastal Commission jurisdiction.

The Santa Cruz City Council unanimously approved the Arana Gulch Master Plan and certified the associated Final Environmental Impact Report (EIR) in July 2006. A local coastal permit was not considered at that time. A legal challenge was subsequently filed against the Final EIR, in which the Court ruled in favor of the City in the proceeding under CEQA. A subsequent appeal was filed and the appellate court upheld the trial court's decision in favor of the city.

Specifically, the coastal development permit application includes the following project components:

- Protection and management of habitat areas (coastal prairie/Santa Cruz tarplant, Arana Gulch Creek and riparian area, seasonal wetlands, and Hagemann Gulch riparian woodland);
- improvement of portions of the existing trail system within Arana Gulch to provide Americans with Disabilities Act (ADA) compliant public access;
- installation of a pedestrian/bicycle bridge spanning Hagemann Gulch to provide a new west entrance;
- interpretive program displays and trail signage;

Arana Gulch MASTER PLAN

- Avoids tarplant areas
- Seasonal wetland buffers
- Expanded grazing
- Closes unauthorized trails



LEGEND

A-D Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989

Seasonal Wetlands

Meadow Overlook Area (20ft x 20ft)

Interpretive Display

Overlook

Proposed Grazing Area (approx. 14 acres)

Pedestrian/Bicycle Trail (wheelchair accessible)

Pedestrian Trail (unpaved)

Pedestrian Trail (unpaved/no dogs)

Master Plan Boundary

City Limit

Note: Trail width symbol not to scale

- installation of grazing fencing associated with restoration of coastal prairie/Santa Cruz tarplant habitat; and
- removal and restoration of unauthorized environmentally damaging volunteer trails.

Most of Arana Gulch would remain undeveloped, with a focus on protection and enhancement of the sensitive habitat areas. The paved trails would comprise less than 1% of the total area of the Arana Gulch property.

No on-site parking or restrooms are proposed as part of the project. Visitors may either walk or bicycle to Arana Gulch from the adjacent neighborhoods or park on public streets at the north, south and west entrances. Public restrooms are located at Frederick Street Park and the adjacent Harbor.

Coastal Commission Consideration of Arana Gulch Master Plan

On March 11, 2010 the City of Santa Cruz presented a Draft Arana Gulch Master Plan to the California Coastal Commission for the first time. Coastal Commission staff provided a comprehensive staff report that recommended approval of the Master Plan. City representatives requested the hearing be continued to allow the City opportunity to bring additional information back to the Commission related to their questions. On October 14, 2010 the City presented additional analysis in response to the questions and concerns raised at the March 11, 2010 hearing. Coastal Commission staff provided a comprehensive staff report, again recommending approval of the Arana Gulch Master Plan. Coastal Commissioner's took testimony and deliberated and by a 5-5 vote denied the coastal development permit.

This is a new Coastal Development Permit application. As presented the project has been modified to:

- Further consolidate or eliminate trails and pathways.
- Move all existing and proposed pathways out of historic tarplant areas.
- Substantially expand the areas that may be grazed for habitat enhancement.
- Move fencing out of historic tarplant areas.
- Expand and maximize opportunities for Interpretive Programs.
- Provide additional funding for project and clearly describe the sources.
- Set aside a portion of the total plan funding in a City Trust Fund specially designated for long-term habitat management.
- Clarify and further describe parameters and development of the proposed Habitat Management Plan and its implementation
- Provide permeable all-weather surface for the multi-use trails.

Coastal Commission staff also recommended in their staff report for the October 14, 2010 hearing, that the north-south multi-use trail from Agnes Street be moved to the westerly project boundary. This option would further expand the area for grazing in the northerly site, and is shown on the following map. However, this also puts the ADA-accessible trail to the periphery of Arana Gulch rather than providing an access experience into the property in the northern area. While the City is amenable to this change, the preference is for the multi-use trail to remain in the same alignment as the former farm road in the middle of the northern section, and the unpaved path would be on the periphery.

**PREVIOUS
COASTAL STAFF
RECOMENDATION**
October 2010



LEGEND

- | | | |
|--|--|---------------------------------------|
| Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989 | Proposed Grazing Area | Master Plan Boundary |
| Seasonal Wetlands | Pedestrian/Bicycle Trail (wheelchair accessible) | City Limit |
| Meadow Overlook Area (20ft x 20ft) | Pedestrian Trail (unpaved) | Note: Trail width symbol not to scale |
| Interpretive Display | Pedestrian Trail (unpaved/no dogs) | |
| Overlook | | |

Project Highlights

The Arana Gulch Master Plan includes numerous elements that are designed to protect the resources while providing public access, and interpretive themes and programs. The City project team has worked with Coastal Commission staff, resource agencies, biologists, native plant experts and advocates, and local nonprofits to provide the best possible balance between resource protection and public access. Through this process many aspects of the Master Plan have been enhanced and/or modified. Some of these are included in the list of highlights which follows:

Habitat Management and Restoration

- A key component of the Plan is to develop and implant an Adaptive Management Plan for restoring and enhancing the native habitats, especially that of the Santa Cruz tarplant with a more aggressive recovery regime.
- The tarplant management plan will be developed and reviewed by a team of qualified botanists, including representatives from responsible agencies (Coastal Commission, California Department of Fish and Game, and US Fish and Wildlife Service), a botanist representing the California Native Plant Society, and two other non-agency biologists.
- The content and parameters of the Habitat Management Plan will be consistent with the details provided in the Master Plan and the list of requirements provided by Coastal Commission staff, including a baseline assessment, description of goals, procedures and timing for treatments, success criteria, reporting and modification of plan if warranted.
- Santa Cruz tarplant thrived on the site in the past when it was actively grazed. The City has increased its mowing regime in recent time in order to reduce invasive species, until a more focused plan with grazing can be commenced.

Interpretive Programs

- The Interpretative Program includes displays at key locations, on such topics as invasive plant species and habitat restoration, historical use of the property, and watershed stewardship.
- The Interpretive Program provides an opportunity for docents to lead walks, classes and workshops by local experts to educate interested groups. The Plan allows the development of a Docent-led School Program administered by the Museum of Natural History that currently serves over 2,000 students and adults annually in other open space areas of the City. As well, O'Neill Sea Odyssey runs an ocean stewardship program for youth at the adjacent harbor, and would include Arana habitats and watershed in their curriculum.
- The Interpretative Program provides an opportunity to further engage neighbors and other groups to support restoration work and lead walks, similar to efforts by neighborhood groups in other areas of the City. Some of these are coordinated by the Museum of Natural History and/or Parks and Recreation.

- A pavilion area will be installed in the Agnes Street meadow that will include benches, an interpretive display, and oak plantings for shade.

Funding

- The Santa Cruz City Council has committed long term funding of the Santa Cruz Tarplant Adaptive Management Plan and will place those funds in separate account of the City's Trust Fund.
- The County of Santa Cruz approved a resolution recommending approval of the Arana Gulch Master Plan and has committed \$1.38 million dollars of Redevelopment funding to complete the project.
- The City is leveraging federal Transportation Enhancement (TE) funds to develop the multi-use trails for the project, as well as carry out the other project elements described, including habitat enhancement. TE funds are commonly used in this type of setting and for this purpose.

Trails and Pathways

- The Plan provides trail connections to adjacent neighborhoods, as well as providing a spur trail to the Monterey Bay Sanctuary Scenic Trail and the California Coastal Trail.
- Both the paved and unpaved trails shown in the trail alignments avoid all areas of historic tarplant populations and seasonal wetlands.
- The spur trail between the central meadow and the Coastal Prairie Loop trail has been eliminated.
- The multi-use trails will be constructed as ADA accessible paths with a permeable all-weather surface of an integral color that blends with the site soils.
- Multi-use trails will provide public access for pedestrians and bicyclists, and provide access that does not currently exist for persons with physical limitations and those with children in strollers.
- Other pathways will be unimproved, but designed and maintained to guide people away from sensitive areas, and to minimize erosion and other environmental damage
- All unauthorized paths causing environmental damage will be removed.
- Interpretive opportunities are integral to the trail design.

Additional Information/Analyses

Attached to the executive summary, Sections 2 through 6 have been provided to respond to questions from Coastal Commissioners, staff and interested members of the public. Those sections concern tarplant management, the interpretive program, cattle grazing, the funding program and a trail materials analysis and matrix.

Appendices 20 through 29 contain the following analysis and mapping:

20. Habitat Fragmentation Discussion
21. Neary Lagoon Wildlife Refuge and Interpretative Trail System
22. Hydrology Report - drainage conditions adjacent to trail
23. Trail/Bikeway Examples Within Sensitive Habitat Areas
24. Arana Gulch Master Plan Team and Supporters
25. Boardwalk discussion/analysis
26. Caltrans funding requirements
27. Trial alignment alternatives
 - Map 1 - Existing trails
 - Map 2 - City proposed alignment
 - Map 3 - Coastal staff recommendation (July 2010)
 - Map 4 - CNPS alignment
28. Comparison Table between City and CNPS alternative alignments
29. Comparative Engineering Analysis
 - AL-1.1 - City Trail alignment
 - AL-1.2 - Cross Sections
 - AL-1.3 - Slope Analysis (ADA)
 - AL-2.1 - CNPS Trail Alignment
 - AL-2.2 - Cross Sections
 - AL-2.3 – Slope Analysis (ADA)

City of Santa Cruz Interim Tarplant Management 1995 -2011

In 2002 65 acres of Arana Gulch was designated as critical habitat for the Santa Cruz tarplant by the U.S. Fish and Wildlife Service (USFWS). The Arana Gulch Park Master Plan will allow the City to improve and expand tarplant management by removing trails from more sensitive areas, fencing, and adding a proven grazing regime. Since acquisition of Arana Gulch in 1994, the City of Santa Cruz Parks and Recreation Department has actively initiated and overseen Santa Cruz tarplant management, in close coordination with consulting botanists. Throughout this 16-year period, the City has coordinated with the California Department of Fish and Game, US Fish and Wildlife Service, local botanists and tarplant experts in the Bay Area region, and interested members of the public to evaluate and implement tarplant management actions.

Botanists have long recognized that habitat supporting Santa Cruz tarplant requires some form of disturbance, in order to limit the dense non-native grasses that out-complete the tarplant. Natural disturbance processes likely included wildfire, grazing by large herbivores, and disturbance by smaller mammals. Over time the native coastal terrace prairie grasses grew less dense and non-native grasses currently dominant at Arana Gulch and most other similar coastal terraces. In recent history, Arana Gulch was grazed by cattle. After removal of the cattle in 1988, the tarplant population at Arana Gulch significantly declined. Within six years of the removal of cattle, the Santa Cruz tarplant population had declined from approximately 100,000 plants to 0.

The attached Table provides a summary of management actions that have been implemented by the City of Santa Cruz from 1995 through August 8, 2011, after the City's purchase of the site, for each of tarplant subpopulation areas (A, B, C, and D). The table also includes annual survey census data for each of the areas. Generally, the benefits of the management action are expected to be seen in the following year's census. The management actions that have been implemented thus far include:

- mowing only,
- mowing with raking,
- raking only,
- soil scraping (removing vegetation and thin layer of soil from surface), and
- prescribed burns.

1995 – 2001 Scraping/Fire/Mowing Management

Beginning in 1995, a year after acquiring the Arana Gulch property, the City began to work closely with volunteers, the California Native Plant Society, and agencies to implement management actions to enhance the tarplant population. Because the population had declined so dramatically (no plants were found on the site in 1994 or 1995), it was determined that a drastic measure, or catastrophic-type disturbance was needed. Scraping (scraping vegetation, thatch and a thin layer of soil) and fire are considered to be catastrophic-type disturbances.

In 1995, targeted areas within Subpopulation Area A were scraped, mechanically by a tractor and by volunteers with hand tools. A portion of the area was also hand raked by volunteers. The following year over 7,000 plants were found within the treated areas; the majority of the plants were located in the mechanically scraped area. In 1996 and 1997 scraping plots were done in Areas B and D. Plants were found in Area D after these treatments. In 1997, a controlled burn was conducted and the number of plants increased to over 12,000 in 1998.



As discussed in the Santa Cruz Tarplant Adaptive Tarplant Management Program, included as part of the *Arana Gulch Master Plan*, both scraping and fire are considered drastic measures and are not recommended by botanists to be implemented as a frequent management action. Both actions are recommended to be used sparingly through time and across the Santa Cruz tarplant habitat. Thus, in subsequent years, only mowing in some areas was conducted in an effort to reduce non-native grasses.

As shown in the attached table, the population counts declined within a few years of the more drastic management actions. Scraping plots were conducted again in Areas A and D in 2001 and subsequently the population increased in 2002 to approximately 10,000 plants in Area A and 156 plants in Area D. Then, similar to the previous use of scraping, the population declined in the following years. Thus it appears that while scraping or fire may yield a dramatic initial increase, these management actions did not appear to result in a sustainable increased Santa Cruz tarplant population.

2002 -2005 Mowing Management and Experimental Plots

In 2002 to 2005, the City Parks and Recreation Department's Resource Ecologist worked closely with botanists to conduct experimental treatments in designated areas in an effort to identify a more sustainable management strategy and to learn more about tarplant seed bank and reproduction.

2006 City Effort to Reintroduce Grazing

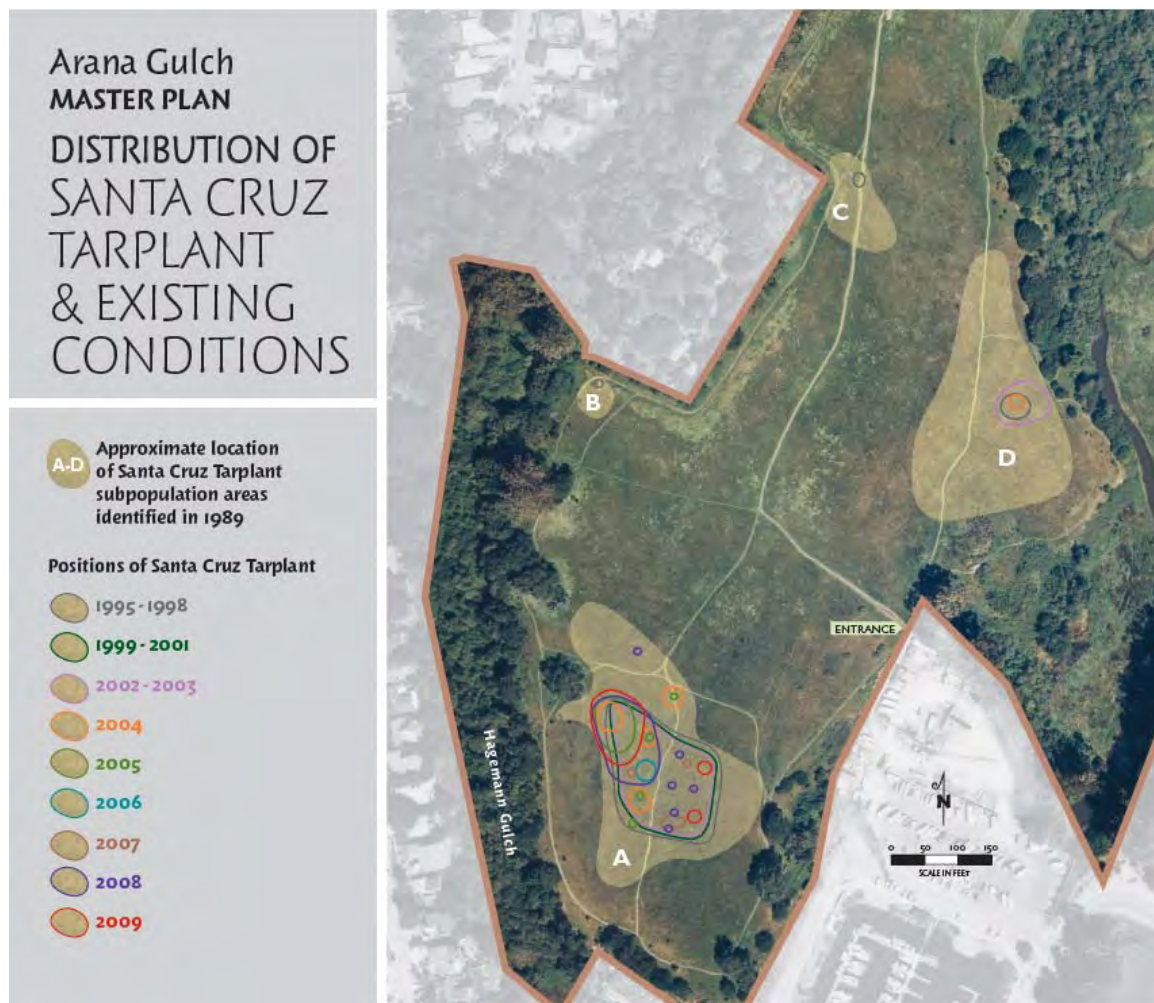
In 2006, with the tarplant population having declined to only 348 plants, the City of Santa Cruz focused on efforts to reintroduce cattle grazing to Arana Gulch. The consensus of botanists was that the re-introduction of cattle grazing was the most beneficial, and sustainable, management action for the Santa Cruz tarplant. The City prepared and submitted an application to the Coastal Commission in fall 2006 to install fencing to allow grazing within a 3-acre site (Area A). The initially proposed grazing area was relatively small because the Arana Gulch Master Plan was being legally challenged in court and had not yet been before the Coastal Commission for review. Opposition to the grazing was voiced by members of CNPS, the Sierra Club and other members of the general public and the City subsequently withdrew the application.



2006 – 2011 Mowing/Raking Management

In 2006 and 2007, all four of the subpopulation areas were mowed and raked; however, plants were only observed in Area A. From 2008 through 2011, twice a year mowing and raking occurred within Areas A and D. Areas B and C were mowed annually in conjunction with adjacent fuel break mowing. In fall 2010 small scraped plots were

created in Areas A and D to stimulate seed bank expression. These management actions were conducted under the direction of a consulting botanist, with input from agency staff and members of the tarplant working group. Despite implementation of these management actions, the tarplant population has continued to decline. However, in 2011 the City's consulting botanist identified and mapped 11 tarplants in Area A. In addition, to mowing and raking of all identified tarplant areas, the City mowed all the meadows in Arana Gulch with the exception of seasonal wetland areas.



In summary, the City has implemented management actions yearly since 1995. These actions, at a minimum, have included mowing. Actions have also included less frequent catastrophic-level measures, such as soil scraping and controlled burns, under the guidance of botanists. The City has also previously made an effort to reintroduce cattle grazing but withdrew the application due to opposition from some community members. It is the City's hope that there will not be another lengthy delay in implementing cattle grazing, which is the management action with the highest likelihood of sustainable success according to a consensus of botanists.

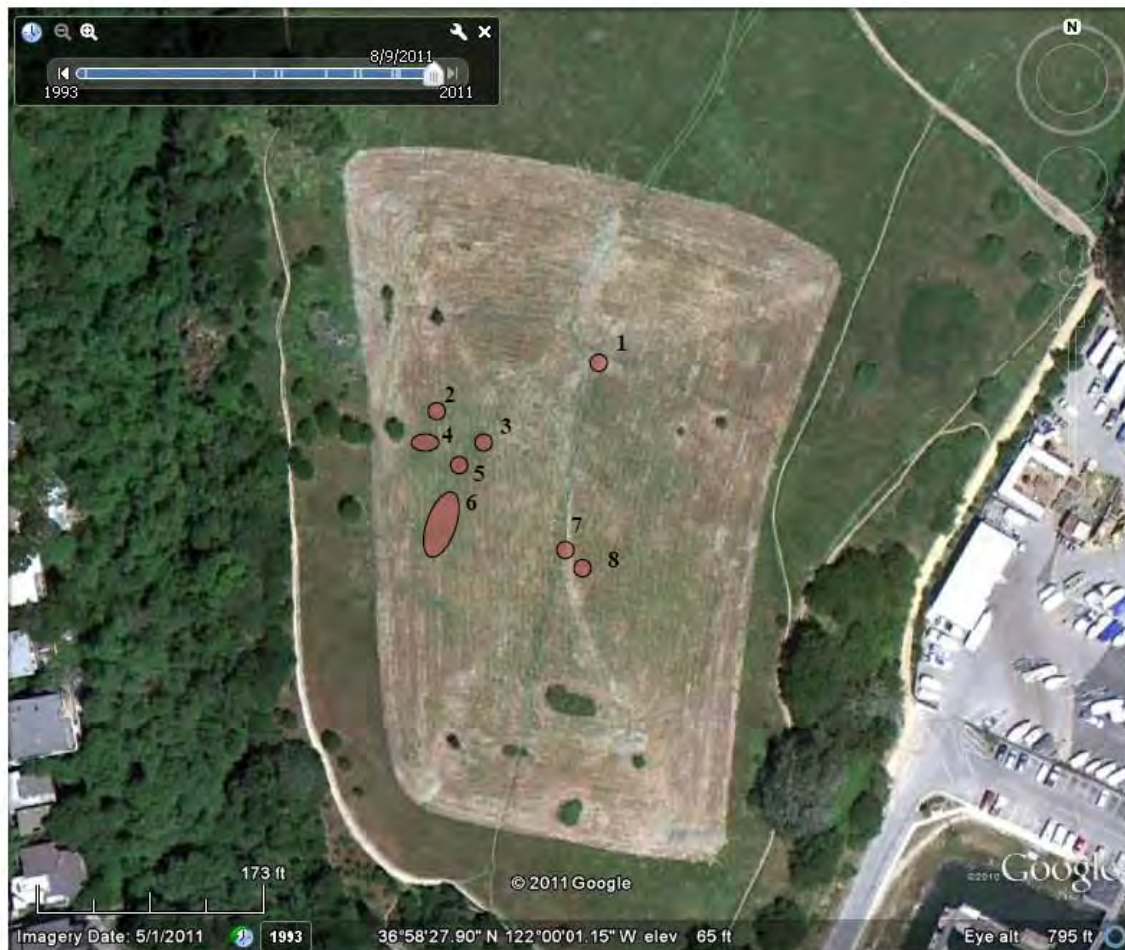


In the absence of grazing, the City will continue to manage the tarplant population and the surrounding grassland. Bi-annual mowing and raking will be the continued management regime. This regime may be supplemented with the use of selectively placed scraping plots, similar to those implemented in 2001 and 2010. Opportunities to utilize other animals for grazing/browsing (i.e., goats) may also be explored for 2011/12. These management actions will continue to be coordinated with botanists, agency personnel, and members of the tarplant working group.



***2 Photos of Mowing at
Arana Gulch meadows (Fall 2011)***

Census of Santa Cruz Tarplant (August 9, 2011)



Census of Santa Cruz Tarplant, 8-9-11

Site No.	# Plants	Form/Fecundity	Previous Treatments
1	1	1 branched, 12 flower heads	Mowed/raked; scraped in 1995 (intensive plot scraping in 1995)
2	1	1 un-branched, 1 flower head	Mowed/raked; scraped in 1995; burn in 96/97
3	1	1 branched, 9 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
4	11	11 un-branched, 11 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
5	1	1 branched, 2 flower heads	Mowed/raked; scraped in 1995; burn in 96/97
6	12	7 un-branched, 7 flower heads 5 branched, 13 flower heads	Mowed/raked; scraped in 1995
7	1	1 branched, 14 flower heads	Mowed/raked; hand scarified in 1995
8	4	3 branched, 14 flower heads 1 un-branched, 1 flower head	Mowed/raked; hand scarified in 1995
TOTAL	32	84 flower heads	

Census Estimates and Management Actions for Subpopulations of Santa Cruz Tarplant at Arana Gulch

Year	Subpopulation A		Subpopulation B		Subpopulation C		Subpopulation D	
	Total Plants	Management	Total Plants	Management	Total Plants	Management	Total Plants	Management
2011 (as of 08/09/11)	32	Mow/Rake (May/October)	0	Mow (June) Mow/Rake (Oct.)	0	Mow (June) Mow/Rake (Oct.)	0	Mow/Rake (May/Oct.)
2010	0	Mow ^M /Rake (May) Mow/Rake/Scrape Plots (Oct.)	0	Mow ^M (June)	0	Mow ^M (June)	0	Mow ^M /Rake (May) Mow/Rake/Scrape Plots (Oct.)
2009	68	Mow/Rake ^M (May) Mow/Rake (Dec)	0	Mow ^M (May)	0	Mow ^M (May)	0	Mow ^M /Rake (May) Mow/Rake (Dec)
2008	44	Mow ^M (April) Mow/Rake (Nov)	0	Mow ^M (April, June)	0	Mow ^M (April, June)	0	Mow ^M (April) Mow/Rake (Nov)
2007	27	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)	0	Mow ^M /Rake (April) Mow ^M /Rake (Nov)
2006	348	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)	0	Mow ^M /Rake (Oct)
2005	1,552	Experimental actions	0	Mow ^U (Fall)	0	Mow ^U (Fall)	0	None
2004	797	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	2	None
2003	2,536	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	57	None
2002	10,230	Experimental actions	0	Mow ^U (May-June)	0	Mow ^U (May-June)	156	None
2001	619	Mow/Scrape Plots (Bainbridge)	N/A	Mow ^U (May-June)	0	Mow ^U (May-June)	N/A	Mow/Scrape Plots (Bainbridge)
2000	1,053	Mow ^U (May-June)	0	Mow ^U (May-June)	0	Mow ^U (May-June)	1	None
1999	1,228	None	0	None	0	Mow ^U (May-June)	1	None
1998	12,800	Mow ^M , Prescribed fire north of A(Oct)	5	Mow ^U (May-June) Prescribed fire (Oct)	20	Mow ^U (May-June)	60	Prescribed fire (Oct)
1997	12,941	Prescribed fire (Oct)	0	Mow ^U (May-June)	0	Mow ^U (May-June)	21	Mow ^U /Rake (May) Scrape (plots) (Oct)
1996	7,420	Mow ^U /Rake (May) Arson fire (Oct)	0	Mow ^U (May) Scrape (plots) (Oct)	0	Mow ^U (May)	0	Mow ^U /Rake (May) Scrape (plots) (Oct)
1995	0	Mow (May) Mow ^M /Rake (June) Mechanical Scrape/Rake (Nov-Dec)	0	Mow(May) Mow (June)	0	Mow (May) Mow (June)	0	Mow (May) Mow/Rake (June)
1994	0	None	0	None	0	None	0	None
1994	City of Santa Cruz Purchases Arana Gulch Property							
1993	2	None	0	None	0	None	131	None
1989	Y ^b	None	Y ^b	None	0	None	Y ^b	None
1988	Cessation of Grazing Operation							
1986	100,000± (Morgan)	Grazing (dairy cattle)			10,000± (Morgan)	Grazing (dairy cattle)		
1977	≤ 100 (Morgan)	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)	N/A	Grazing (35-40 dairy cattle)

Y = present, but no counts available U = indicates mowing type (scythe-type or chopped mulch) unknown M = indicates chopped mulch type mowing

Arana Gulch Interpretive Program

Implementation of the proposed trail system in the *Arana Gulch Master Plan* will create a unique opportunity for the Parks and Recreation Department in partnership with the Santa Cruz Natural History Museum to develop “*The Arana Gulch Interpretive Program*” within an urbanized setting. Opportunities exist for a diverse population of residents and visitors to view a variety of habitats and wildlife, and to learn about resource management and environmental stewardship. Some of the primary objectives of the proposed project are to maximize opportunities to educate, inform, and inspire users of the trail system. The interpretive program will enhance their enjoyment of Arana Gulch and its resources, and encourage them to take action to help protect our local natural resources.

Our proposed program includes interpretive signs, docent-led school programs, and other educational opportunities in coordination with educational partners and local experts. Few interpretive opportunities exist in close proximity to urban areas making access for many of the City’s senior residents a challenge. Arana Gulch, however, is located within short distances some of the City’s and County’s retirement and supportive living communities and can offer peace of mind, fresh air, room to breathe, to walk and to continue their healthy retirement lifestyle. A major occupational rehabilitation facility is also within a very short walk to the new westerly entrance of Arana Gulch.

Arana Gulch is the City’s only greenbelt property located within the urbanized area. The *Arana Gulch Master Plan* would provide greater access for wheelchairs, pedestrians, children in strollers and bicycles by multiple all-weather access points from all sides. The interpretive program in conjunction with the increase in accessibility would encourage greater use of the trails, by both locals passing through and out-of-town visitors to improve overall safety of the open space.

Through interpretive programs, visitors would learn about the natural value of the area, and be inspired to support programs to restore and protect Arana Gulch’s ecological integrity. With an informed public who understand the benefit of healthy local ecosystems, Arana Gulch will attract more funding for restoration to support native plants, animals, and sensitive habitats.

Proposed Program

The Parks and Recreation Department will partner with the Santa Cruz Museum of Natural History to create and manage the interpretive displays and docent-led school programs.

Interpretive Displays

Bike or walk, stop and learn. Interpretive signs will provide a permanent educational opportunity for students, families, seniors, and tourists visiting Arana Gulch. The Museum of Natural History will provide sign content with a balance of information and images that provokes thought and discussion through open-ended questions. Signs will

address diverse audiences. For example, signage could facilitate a scavenger hunt for young people. Bilingual signs could accommodate the diversity of our community. Sign content would inspire and empower visitors to change their behaviors to be better stewards of the environment. The Museum of Natural History works with artists and designers to create high-quality interpretive displays and has developed its own in-house exhibits.

Arana Gulch provides an ideal landscape and setting for learning opportunities that emphasize four major themes:

- Historic impacts
- Bird watching
- Wetland and riparian issues
- Native and invasive plant species

A historic impacts interpretation would include photographs and maps of the region chronicling the events of the past 100 years. This history includes clearing and farming the land, the adverse impacts of sediment created by logging and development upstream in the Arana Creek watershed, and the effects of the construction of the Santa Cruz Small Craft Harbor and its alteration of the tidal-influenced coastal lagoon.

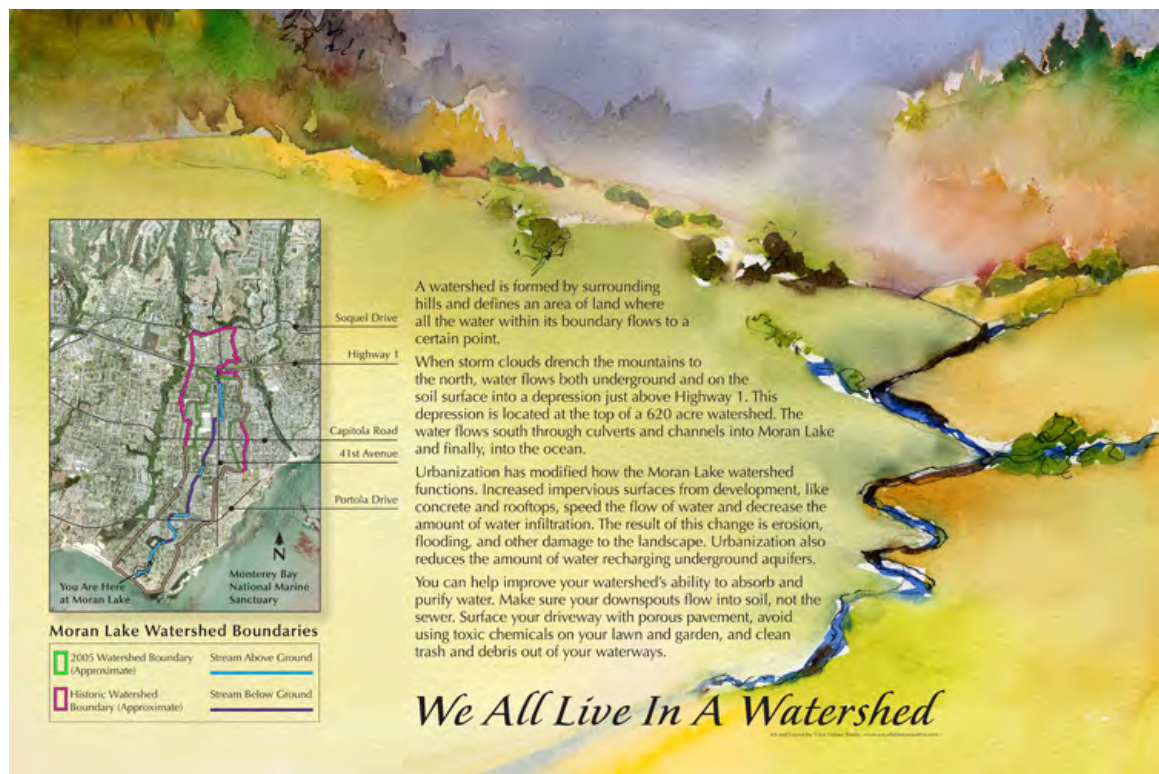


Erica Fielder Studio

Bird watching opportunities within the Arana Gulch Master Plan area will be provided at several unique points. The proposed pedestrian bridge over Hagemann Gulch will be located in the tree canopy nearly 50 feet above the ground. A wide section at mid-span has been incorporated into the design of the bridge to provide an area where people can stop to observe birds from above and within their natural habitat. To the south, the Coastal Prairie Loop trail provides opportunities for bird watching in oak woodlands and coastal prairie habitat. An overlook has been designed to enable observation of both

habitats at the south end of the Coastal Prairie Loop trail. The Creek View trail as it crosses Arana Creek, provides the only open water opportunity to observe aquatic birds in a natural setting. This overlook will provide interpretive displays on fisheries and other wildlife dependent on the creek habitat as well. The Marsh Vista Trail overlooking the riparian area will present unique bird viewing opportunities of waterfowl and birds of prey. These locations are ideal for interpretive signage and displays to inform visitors of the local bird life.

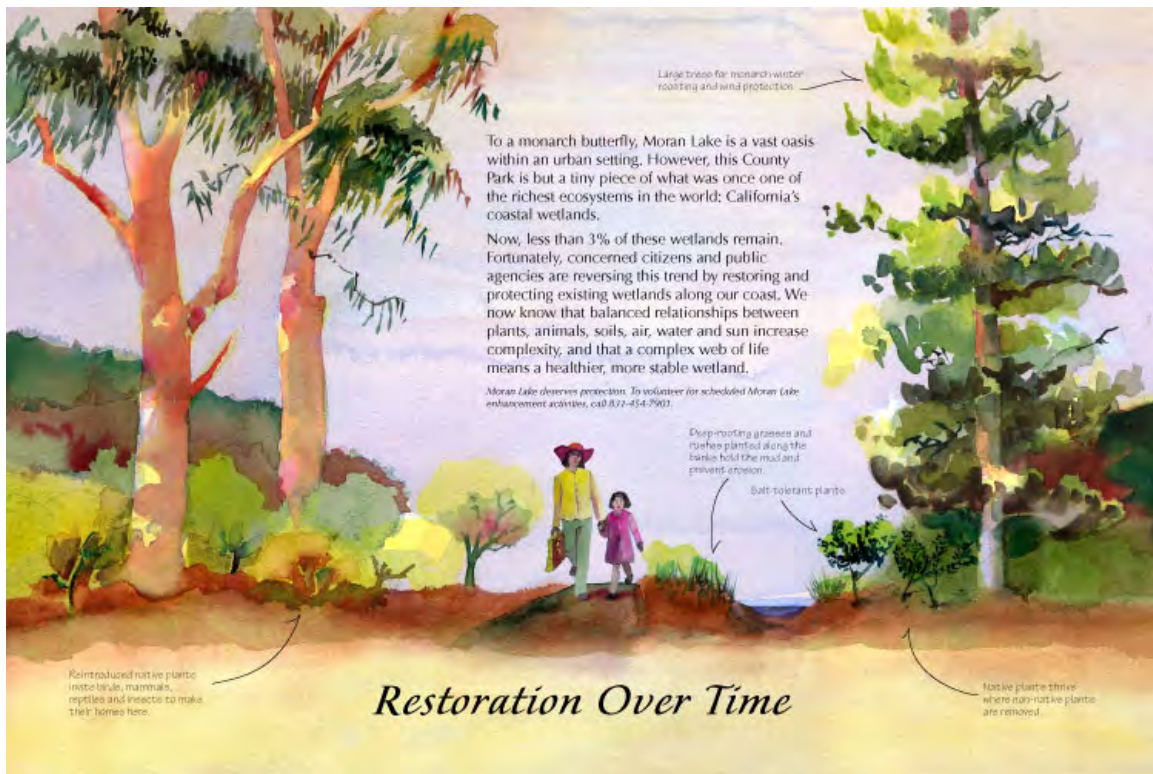
Wetland and riparian interpretation in Arana Gulch is critical in creating greater awareness of the important role of wetlands as wildlife habitat, a buffer zone for storm water run-off, and a filter for urban pollutants. This interpretation would highlight the connection between onshore actions and subsequent effects on marine species and the marine environment.



Native and invasive species interpretation within Arana Gulch will be provided in several locations. Non-native plants are dominant and have crowded out native species including the Santa Cruz Tarplant, recognized as a threatened species by state, local, and federal authorities. The efforts undertaken in the *Tarplant Adaptive Management Program* have provided a valuable case study in invasive species issues. Arana Gulch demonstrates the significance of invasive plant issues and how their effects can be mitigated through rare species conservation, restoration of habitat, trail management, and a local stewards training program.

Docent-led School Programs

Arana Gulch lies at the heart of the community – at a central and accessible location for schools. Topics for school tours would include the four themes described above (history, birds, wetlands and plants). The Santa Cruz Museum of Natural History has a strong docent program and the infrastructure to assume a lead role in developing and implementing a school program at Arana Gulch. The Museum's model for field-based school programs is a three-part educational experience: 1) Museum staff visits the classroom for a pre-trip presentation, introducing key concepts and engaging students in an activity, 2) teachers receive an Education Kit with lessons and resource material to use in the classroom for two weeks and, 3) the class participates in an engaging, multi-sensory docent and staff-led field trip.



Erica Fielder Studio

This model program currently serves over 2,000 students and adults per year in the Museums' third grade wetland walks and fifth grade watershed walks at Neary Lagoon, and the seventh grade Santa Cruz Sandhills Exploration field programs. All Museum school programs are aligned with California state standards and have a well-developed evaluation component. A similar program at Arana Gulch would easily fit into this model.

Walks, classes and workshops

Santa Cruz has many local experts and resources to involve in the interpretation of Arana Gulch. These include: UCSC's Environmental Studies department, university professors, graduate students, and undergraduates, some whom have worked with the UCSC Natural History Museum collections, and participated in the Natural History Field Quarter;

students from Cabrillo College; the Santa Cruz Bird Club; local experts such as Todd Newberry, a retired UCSC biology professor and author of The Ardent Birder; the local chapter of the California Native Plant Society; and various non-profits that run educational programs connected to watersheds and marine science, such as O'Neill Sea Odyssey, Save Our Shores, and the Coastal Watershed Council.

There is also potential to engage neighbors through the City-wide Neighborhood Associations network to do restoration work and lead walks (including limited mobility walks), similar to the Seabright Neighborhood Association and their work on Pilkington Creek, an effort coordinated by the Museum of Natural History. The Parks and Recreation Department can work closely with volunteer groups in organizing “clean up days” in Arana Gulch, similar to programs in place for our beaches and waterways.

Arana Gulch is an amazing natural, educational resource for our community. It provides open space, access to sensitive habitats, and an opportunity to connect with local wildlife and plants. As people travel on the Arana Gulch coastal trail they will gain knowledge of this unique coastal landscape. With knowledge comes connection. And with connection, comes stewardship.

Cattle Grazing Program

The City currently manages three successful grazing operations for the purpose of Coastal Terrace Prairie and other habitat enhancement in our open space parks and greenbelt areas. This narrative describes the proposed cattle grazing program which is compatible with the multi-use east-west trail route as proposed in the *Arana Gulch Master Plan*.

The proposed grazing area would be approximately 14 acres which is nearly triple the acreage originally proposed. The grazing areas would include 3 separate enclosures as shown on the attached mapping. The grazing area would encompass tarplant population areas A, C and D of Map 2, Appendix 27. Enclosing tarplant population area B within a larger grazing area is not feasible due to environmental and visual impacts as a result of the additional retaining walls, grading and tree removal that would be required.

Benefits of Grazing with Separate Fenced Areas

Rather than one contiguous grazing area, the proposed grazing program features three grazing areas. These separately fenced areas are beneficial because they allow the grazer, guided by botanists, to conduct more controlled and focused cattle grazing. Cattle can easily be moved between the grazing areas as needed. For example, as tarplant individuals emerge within areas A and D, cattle can be moved to the northernmost grazing area C. Moving cattle between grazing areas within Arana Gulch on short notice is far more efficient and feasible than requiring the grazer to remove all of the cattle from the property and transport them to another grazing site.

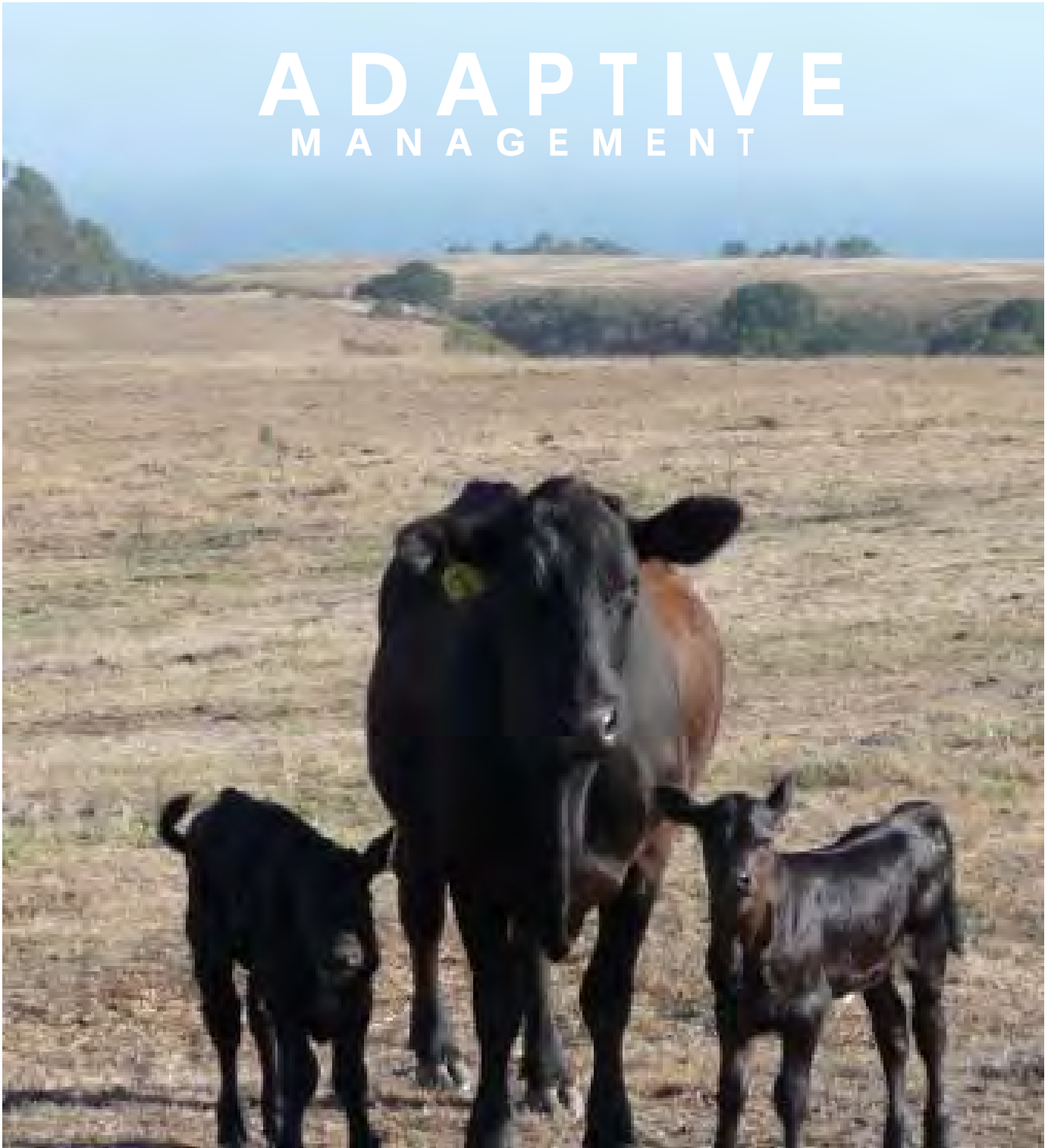
Cattle Grazing for Santa Cruz Tarplant Enhancement

The primary purpose of cattle grazing at Arana Gulch is to enhance the Santa Cruz tarplant (*Holocarpha macradenia*) population. Recent research, as well as discussions of the Santa Cruz Tarplant Working Group, found that for many tarplant sites supporting a dense growth of non-native grasses, a cattle grazing management strategy is likely the most effective management tool for species recovery.

Cattle grazing occurred within Arana Gulch for over 100 years. Since the late 1880s, the property was used as ranchland. In the 1920s, Arana Gulch became the site of a dairy operation, which continued through the mid-1950s. Although the dairy operation ended, cattle grazing continued through the 1980s. Older photographs reveal cattle grazing on the coastal terrace and within the Arana Gulch Creek floodplain. Within six years of removal of the cattle, the Santa Cruz tar plant population declined from approximately 100,000 to zero.

The cattle grazing proposed as part of this Coastal Development Permit would be of significantly lower intensity than occurred historically, and as recently as the 1980s. It is anticipated that a range of approximately 2 to 6 cow/calf pairs would be grazed from approximately January through June initially, with the potential for longer periods as recommended by botanists. The grazing area would not include any riparian habitat.

ADAPTIVE MANAGEMENT



Cattle will be kept on site until the Santa Cruz tarplant flowers, which is typically mid-June. Removing the cattle at this time would prevent cattle from crushing blooming plants. Should the tarplant population increase in future years, an extended grazing period may be recommended by the botanists. The exact grazing schedule each year would depend on specific weather conditions and the flowering period of the Santa Cruz tarplant. Prior to any grazing activities, the grazer will reconnoiter the grazing area and remove any Milk Thistle found within the enclosure.

Goals and Objectives

The specific goal and objectives for the proposed cattle grazing of the Santa Cruz tarplant population areas has been developed consistent with the Santa Cruz Tarplant Adaptive Management Program. They include the following:

Goal: Protect, restore and enhance the Santa Cruz tarplant population areas, which are considered essential to the recovery of the Santa Cruz tarplant at Arana Gulch

Objective 1: Implement a grazing management program that benefits tarplant growing conditions and stimulates expression of the seed bank.

Objective 2: Document, including mapping, of the yearly population of the Santa Cruz tarplant to provide a comparison to past and future data. Document plant fecundity (reproductive productiveness) by recording the number of flowering heads per plant.

Objective 3: Utilize adaptive management strategies by updating grazing management actions based on population and plant fecundity counts, monitoring results and increased scientific knowledge.

Objective 4: Designate the cattle grazing area with secure fencing. Locate grazing support features (e.g. water trough, salt lick, fence posts) in non-sensitive areas, outside of occupied tarplant habitat and the seasonal wetland. Setback the grazing area from public trails and steep slopes.

Objective 3: Implement Best Management Practices to minimize erosion, avoid impacts to the seasonal wetland, and to avoid impacts to water quality from cattle waste.

Transportation and Installation of Fencing Materials/Cattle

Fencing Materials/Installation

The proposed grazing area will require approximately 5,600 linear feet of livestock fencing. The fencing includes round wood posts and wire designed to minimize visual impacts. Posts will be approximately 5 feet above ground and painted green. Metal livestock gates (green) will be installed as shown on the attached map and designed to integrate visually with the post and wire fencing. The gates will be 12 feet in width to create a 12-foot opening for fire vehicle access during dry season.

The fence would be installed during the dry season to avoid rutting/erosion during saturated soil conditions. Installation will require a motorized pick-up truck to haul fencing materials. Hand tools will be used to install posts and footings where required. The above ground tarplant areas and an adequate buffer will be flagged to ensure no motorized vehicle disturbs those areas. The fencing will be installed at the perimeter of the tarplant area; therefore the pick-up truck will not need to be driven within the area with above ground tarplant. The fencing contractor will access the site from the Agnes Street entrance. Once the fencing is installed annual grazing is relatively simple and cost effective for the City to implement and maintain.

Cattle Grazing and Transport

The cattle will be transported to the Agnes Street entrance, then offloaded from the cattle truck and released into a corral located to the west of the park entrance. The cattle would be herded to the northern fenced grazing area. Cattle could then be herded from the northern area to the southern grazing areas with horses, ATVs or a pick-up truck depending on the season. The exact timing of the cattle delivery would depend on weather/soil saturation conditions. The cattle would not be delivered during periods of heavy rainfall/very high soil saturation. Removal of cattle would follow the same route.

Cattle Grazing at Arana Gulch and Coastal Water Quality

The cattle grazing at Arana Gulch will be very low intensity in comparison to grazing operations that historically occurred within the 67.7 acre property. The City will utilize the minimum number of cattle necessary to provide sufficient reduction in non-native grasses and trampling/disturbance beneficial to stimulating tarplant seedbank expression and growth. It is anticipated that a total of 4 to 12 cattle (2 to 6 cow/calf pairs) will be grazed, depending on recommendations from the botanist.

Manure generated by cattle grazing would be allowed to remain on site and naturally decompose. This is consistent with grazing management implemented on other tarplant sites (i.e. High Ground Organics, Elkhorn Slough Foundation lands); no adverse impacts to surrounding areas or the tarplant have been detected from this practice.

The grazing areas are primarily situated on the level coastal terrace. The grazing fencing would be set back from the top of the steep slopes by a minimum of 50 feet, except where above-ground tarplants have been observed. In those areas, the fence line would be adjusted to incorporate these plants/habitat within the grazing area. Fencing would also be installed around the seasonal wetland (with a 50 foot buffer) if required by the Coastal Commission. The seasonal wetland fencing could be installed as temporary to allow grazing within this area during the drier months.

The grazing area would be located on land with gentle slope range from two to nine percent. Grazing would not occur on steeper slopes to prevent erosion.

Much of the grazing area is located on the coastal terrace, over 300 feet from the Arana Gulch Creek. The grazing area encompassing tarplant population D is located approximately 100 feet from Arana Gulch Creek. This area features a gate which allows more controlled grazing and the ability to close off the area from cattle during periods of heavier rainfall. The southern grazing area would be located approximately 150 feet from the Hagemann Gulch drainage.

Given the mostly level topography and soil permeability of the grazing area, setback from steeper slopes, and distance from Arana Gulch Creek, no impacts on coastal water quality are expected from the proposed grazing operation. Nonetheless, water quality protection measures and site monitoring would be conducted to ensure no impacts to coastal water quality occur. Site monitoring and Best Management Practices (BMPs) are presented below.

Specific Best Management Practices (BMPs) and site monitoring requirements will be implemented to ensure there are no impacts on coastal water quality from cattle grazing at Arana Gulch. The BMPs and monitoring will be incorporated in the final grazing plan and implemented in the field and include:

- Install grazing area fencing a minimum distance of 50 feet from the top of the steep slopes. If there are areas where above-ground tarplants have been observed within 50 feet of the top of the terrace slope, the location of the fencing will be adjusted to include these plants/habitat within the fenced grazing area.
- Install temporary fencing, if required by the Coastal Commission, around the seasonal wetland within the southern grazing area to include 50-foot buffer. Allow grazing in the seasonal wetland area during dry conditions as recommended by the botanist.
- Locate water trough and any supplemental feed within grazing areas as far back from the top of the steep slopes as possible. Locate the trough and feed outside of sensitive areas (occupied tarplant areas/seasonal wetland)
- During months of highest rainfall and storm events, keep minimum number of cow/calf pairs on site to avoid erosion and minimize volume of cattle waste.
- Conduct regular visual inspections of fence line to ensure cattle remain within designated grazing area.
- During rainfall events, conduct visual inspections (by foot) to ensure no rilling or other erosion within and from the grazing area. Appropriate erosion control measures, such as straw wattles, will be installed, if necessary, to prevent any accelerated or channelized runoff toward steep slopes.
- Avoid motorized vehicle use during rainy season/soil saturation to maximum extent feasible.

Arana Gulch Funding Program

The City has leveraged a variety of funds from different sources to carry out the Arana Gulch Master Plan - including tarplant and other habitat management, elimination and consolidation of trails, development of the interpretive elements and building the multi-use trails. The City has been successful in obtaining over \$4 million in federal and local funds to construct an all-weather accessible multi-use trail as included in the Arana Gulch Master Plan. These funds are critical to enabling the City to implement the habitat restoration and monitoring programs, and the physical improvements such as the cattle fencing, seasonal wetland protection, interpretive displays and overlooks proposed in the Arana Gulch Master Plan. The federal Transportation Enhancement (TE) funds are commonly used in this type of setting and purpose; to develop pedestrian, bicycle and accessible trails. These funds will also be used to provide habitat enhancement for the project for up to 3 years.



Local city and county funds are also being used for implementation and long term funding of the Santa Cruz Tarplant Adaptive Management Program at Arana Gulch. The local funds come from the County of Santa Cruz and from the sale of City property between Frederick Street and Arana Gulch adjacent to the open space. This property is valued at over \$1.0 million. Of these funds, approximately half is identified in the Santa Cruz County Regional Transportation Plan as a local match to the grants for design and construction of the multi-use trail. The other portion is to be placed in an Arana Gulch Master Plan specific subaccount of the City's Trust Fund and will be designated to restore and manage habitat in the long term.

Trail Materials Analysis and Comparison Matrix

For many years, agencies, trail consultants, land managers and trail stewards have sought the perfect trail surface for sustainable multi-use trails. The ongoing search has led to the development of new alternative surfacing products and the realization that there may be several suitable options depending on the unique characteristics of the area. The best trail materials are determined by trail use, local soils, hydrology, topography, vegetation, availability and local familiarity with the trail material.

Trail materials are compared based on a variety of factors. Relative to the Arana Gulch Master Plan criteria, the trail surfacing must meet a variety of requirements:

- Safe, in all types of conditions for public use
- All weather accessible for wheelchairs, per Americans with Disabilities Act (ADA)
- Protect water quality and subsurface drainage
- Permeable
- Context sensitive
- Low construction impacts and maintenance

The City of Santa Cruz is proposing to use integral colored Porous Concrete or Porous Asphalt for surfacing the multi-use trails in Arana Gulch. Features that the City considered in selecting porous concrete or asphalt include:

- Durable; does not rut, ravel or crack easily
- Strong; stays firm, level and safe
- Long life expectancy
- Low glare
- Integral color of native earth
- Low maintenance
- Good for wheelchairs, strollers etc.
- Less inviting for skateboards and fast traffic
- Accommodates light maintenance vehicles
- Rustic appearance
- Porous
- Cost effective

Porous Concrete: This material is durable and has free flowing drainage characteristics. Porous concrete pavement has a 15-25% void structure, allowing 3-8 gallons of water per minute to pass through each square foot. When it rains, porous concrete drains, putting water back in the ground. It is being used more frequently locally and in this type of environment. Porous concrete provides a safe, firm, level, nonskid surface; its ability to maintain this safe surface in all conditions including heavy rain; its durability and its low maintenance requirements meet the project requirements. Its appearance is more “rustic” than asphalt or conventional concrete due to the voids that allow water infiltration, i.e. a better visual fit for a natural setting. Colors are available similar to the color of the native soil and the adjacent environment in Arana Gulch. This material was reviewed by our

design team, and was deemed acceptable per the project's environmental documents, master plan and permit conditions.

Porous Asphalt: Asphalt is a time tested, low cost material to install and maintain. It is pervious to promote surface and subsurface drainage. It is readily available and can be colored to match the adjacent environment, though the color may have to be re-applied in future years.

Natural Pave: Natural Pave resin pavement binder is mixed with aggregate material to produce a durable and flexible surface, similar to asphalt, but without petroleum products. The foundation layer allows water to move laterally through the foundation, though the surface has limited permeability and unknown longevity. The aggregate color can be selected to match the surrounding environment.

Filter-Pave: This relatively new product is made from recycled crushed and rounded glass that is bound by flexible elastomeric glue. It has not been used in this area before. The color is made up of what recycled glass and granite chips are available locally which is typically mixed colors. It is a porous material allowing for drainage. Long term maintenance requirements are unknown.

Gravel-Pave: Gravel Pave is a system that uses a plastic grid to contain compacted sharp edged aggregate in place. It is a porous material allowing drainage. There is no binder to hold the material in place and so is not suitable for slopped areas and this application. The aggregate color can be selected to match the surrounding environment.

Decomposed Granite: Decomposed granite or DG is crushed granite particles, often a byproduct of granite quarries. DG provides an inexpensive paving option for pedestrian-friendly soft surface trails. It provides a surface texture similar to lightly compacted sand and is a nice material for footpaths. Unfortunately it has some deficiencies. It tends to rut, ravel and erode over time. Ruts and ravel at any time can create unsafe conditions for wheelchairs, the elderly and cyclists. In areas exposed to significant rainfall and /or flooding, puddling occurs and DG can deteriorate rapidly and become impassible.

DG paths on hillsides are prone to erosion. DG paths used for public access should have edging to keep the DG in place. Redwood header boards or steel are commonly used for edging. A DG path with steel edging will cost the same as a concrete path. Construction costs for DG paving include grading, vegetation clearing, edging, geo-textile fabric, aggregate base, and decomposed granite fines. A heavily used DG path will require low spots and washout areas filled-in and re-compacted each year and complete reconstruction every five to seven years which causes environmental impacts.



Trail condition during winter and spring at Agnes Street entrance

Decomposed Granite with Binder: This familiar product can be mixed with a binder, just as cement, to create a light weight resilient though not hard wearing surface. It does erode and rut with use and rain, and has to be re-graded and compacted often, causing greater disturbance. The surface has limited permeability, though the foundation allows for lateral drainage.

Boardwalk: This product is typically used over water or wet areas and the deck can be made of wood or recycled plastic. The substructure is made from wood and any in contact with soil or moisture will be pressure treated for improved longevity. The surface has limited permeability, though water can drain below the deck. It is not slip resistant and cannot be used in slopped areas. 4-1/2 foot high railings are required when it is built above the exiting ground level. Maintenance frequency and cost are high causing greater impacts to the environment.

Paving vs. Decomposed Granite: The goals of using DG as a trail material are to maintain a natural appearance to enhance the aesthetic appeal to users and to construct a hardened, low impact, permeable and accessible trail. Those are the same goals of a paved trail constructed with porous colored concrete. A concrete path can be constructed to look very similar to a DG path and provide a natural look through coloration and surface texture. Permeable concrete has stronger safety characteristics and ADA compliance when compared against DG for use as an all-weather surface and provides a trail surface that is safer, more accessible, and compliant with project requirements.

Recommendation and Construction Method: The City of Santa Cruz is proposing to use Porous Concrete or Porous Asphalt for surfacing the multi-use trails in Arana Gulch. We are proposing these materials for several reasons. There is local experience with these products and availability of experienced contractors. The installation and future maintenance can be completed from within the trails alignment as the work moves forward. The surface is all weather, fully accessible, context sensitive and the trail design will not impact surface or subsurface flows.

The 8 foot wide paths can be constructed within the current confines of the existing trail area. The City alignment is intentionally designed to match the existing terrain to achieve ADA compliance with the least impact to the open space area and in the most context sensitive manner. By placing the trail on this alignment the construction footprint is minimized, the amount of grading is reduced, and drainage is unaffected. The 2 foot wide shoulders will be native soil and planted appropriately according to the management plan.

Trail Material Examples



Porous Asphalt



Porous Concrete



Filter-Pave ®



Natural-Pave ®



Gravel-Pave ®



Decomposed Granite
with Binder



Boardwalk

Trail Materials Comparison Matrix

The higher points in a category denote a beneficial rating. The first two categories have a maximum 20 points and the remainder 10 points.

	CONSTRUCTION & MAINTENANCE IMPACTS	PERMEABILITY	ADA COMPLIANT & SLIP RESISTANT SURFACE	CONTEXT SENSITIVE	CONSTRUCTION COST	MAINTENANCE COST		COMPARATIVE RATING (90 MAX)
POROUS CONCRETE	20	20	10	10	5	10		75
POROUS ASPHALT	20	20	10	5	10	5		70
NATURAL-PAVE	20	10	10	10	5	10		65
FILTER-PAVE	20	20	10	5	5	5		65
GRAVEL-PAVE	20	20	0	5	5	5		55
DECOMPOSED GRANITE WITH BINDER	10	10	5	10	10	0		45
BOARDWALK	10	10	0	5	5	5		35



July 20, 2010

Attn: Department of Planning and Community Development

City of Santa Cruz Planning
and Community Development
809 Center Street, Room 107
Santa Cruz, California 95060

Subject: Response to habitat fragmentation and Santa Cruz tarplant (*Holocarpha macradenia*) at Arana Gulch

During the course of review by the Coastal Commission staff and commissioners, a concern was raised regarding the potential of habitat fragmentation for the Santa Cruz tarplant by the City of Santa Cruz's proposed east-west multi-use paved trail alignment bisecting the central portion of the Arana Gulch terrace, and a north-south trail from Agnes Street to its intersection with the east-west trail. The City proposed Creek View to Canyon Trail alignment is oriented in an arcing east-west alignment over primarily flat to slightly sloping contours through the terrace. The typical width of impact is 12 feet with eight feet of paved trail and two feet on either side as graded shoulders. The majority of the proposed alignment would require little cut or fill to maintain ADA grade with the typical depth of pavement approximately 6 inches. For the most part the walking surface would be at the grade of the existing native substrate of the terrace.

The California Native Plant Society (CNPS) contends that this alignment will result in significant fragmentation of the tarplant habitat on the terrace (CNPS 2010). The CNPS asserts that the east-west trail in association with the north-west trail connector will split the grassland terrace into three smaller habitat units resulting in increased edge effect and a decrease in core habitat necessary for the tarplant's persistence. They also contend that the species movement patterns are altered by fragmentation and dispersal. Specifically, Santa Cruz tarplant recruitment would be limited by the boundaries created by the edge areas and the 8 foot wide multi-use path could potentially present an effective barrier to dispersal of the tarplant seed which is suggested to have a maximum unassisted seed dispersal radius of 1.5 feet (45 cm) from the source plant. In addition, the CNPS asserts that increased edge effect of the paths and the resulting separation of the three habitat blocks (fragments), along with the increased edge disturbance area, will increase the amount of area subject to invasion by non-native weedy plant species. Their calculations for the total area of disturbance including trail edge at three feet on either side of the trails are 0.40 acres with a total linear extent of 5,914 feet. The CNPS states that the combination

of the above factors and other potential incidental impacts over the life of these trails may result in a decline in community composition and native biodiversity.

The classic view of habitat fragmentation “is the breaking up of a large intact area of a single vegetation type into smaller intact units (Lord and Norton 1990). Habitat in this case applies only to the species level because habitat is defined with reference to a particular species (Franklin et al. 2002). Therefore, the case for fragmentation must be made that the action or feature is resulting in an alteration of the spatial configuration of habitat(s). This involves an external disturbance that alters the large patch so as to create isolated or tenuously connected patches of the original habitat that are not interspersed with an extensive mosaic of other habitat types (Franklin et al. 2002). It is argued that habitat fragmentation has not occurred when habitat has been separated by non-habitat while occupancy, reproduction, or survival of the species has not been affected. Key components in defining habitat fragmentation are scale, the mechanism causing separation of habitat from non-habitat, and the spatial arrangement of habitat and non-habitat (Franklin, et. al. 2002). The majority of fragmentation studies demonstrating a reduction in species fecundity focus on birds or small mammals where a significant alteration in community structure resulting from fragmentation alters movement rates, foraging behavior, predator-prey interactions, or niche availability (Foster and Gaines 1991, Robinson et al. 1992, Diffendorfer et al. 1995, Wolf et al. 1997). In many cases, these same conclusions do not hold for non-clonal (i.e. seed dispersed) plant populations (Quinn and Robinson 1987, Robinson et al. 1992, Holt et al. 1995).

In uniform landscapes, such as is found on the Arana Gulch terrace, the presence of a 12-foot wide trail corridor is not likely to result in significant changes in habitat conditions on either side of the proposed trail(s). The current vegetation composition and structure adjacent to the east-west trail alignment is dominated by a dense assortment of non-native grasses and weedy herbs (BMP Ecosciences 2005). The east-west trail will not be a barrier to the persistence or movement of these non-native weedy species since there is already a propensity for establishment in disturbed edge areas. Moreover, since this trail does not require significant cut and fill, there will be less exposure of raw substrates attractive to noxious plant species such as broom that do not currently occupy the site. In particular, due to the already isolated distribution of the historical Santa Cruz tarplant polygons (A-D) the trail would not further contribute to the fragmentation or isolation of these occupied habitats (i.e. these distinct occurrences within Arana Gulch are not bisected). Additionally, Santa Cruz tarplant does not have a singular species pollinator. Rather, the plant is pollinated by as many as 8 different insect families comprised of many different insect species observed on tarplant flowers including bees, weevils, and assassin bugs (Hayes 2003). These pollinators will not face a physical barrier to crossing the trail bordered by a 5-foot tall post and wire cattle fence.

The key potential impact of the paved trails is a permanent loss of potential tarplant habitat. As noted by the CNPS the combined paved trails will occupy an area of 0.4 acres (CNPS 2010). The Coastal Terrace Prairie habitat on Arana Gulch has been estimated at approximately 27 acres (the majority of which is now heavily disturbed and better characterized as non-native grassland). The permanent potential suitable habitat loss therefore represents less than 1.5 percent of the total available habitat as determined in the Critical Habitat designation (USFWS 2002). In 1988, the year with largest estimated count of tarplant individuals at Arana Gulch since census counts began; approximately 115,000 individuals were found occupying four distinct occurrences. The total area occupied by these plants was mapped at 2.6 acres or approximately 9.6 percent of the total potential suitable habitat.

The proposed trail alignments would occur on terrace habitat that has never been documented to support the tarplant during the last 20+ years. Therefore, these trails are not likely to displace any historical seed banks, particularly with the proposed minor adjustments to the alignments that will avoid all occurrences, both contemporary and historic. In contrast, the CNPS alternative would require significant grading and cut/fill to meet ADA standards and will pass through or immediately adjacent to several remaining patches of coastal prairie habitat comprised of indicator species including California oatgrass (*Danthonia californica*) (R. Buck, 2010). The additional grading is far more likely to expose bare ground to a potential increase in weedy propagules originating from activities related to trail usage. Approximately 0.37 acres of remnant coastal prairie as mapped in 2010 will be potentially impacted by the CNPS proposed trail alignment.

It is universally accepted that the tarplant cannot be maintained or expanded without active management, particularly grazing, mowing, fire, and/or scraping. Without active management the species is not expected to persist under the current vegetation structure and cover (BMP Ecosciences 2005, CNPS 2010). A principle concern is whether the trails would inhibit the ability to implement these management activities on the terrace. As recommended by EcoSystems West, realigning the north-south trail closer to the western edge of the property would provide two large pasture units for reintroducing grazing or other large scale management actions such as scraping or mowing. These activities would not be constrained by the trails except for the east-west alignment being the fixed boundary of both the north and south pastures. Cattle or other livestock can be moved freely between these pastures (e.g. via herding through lockable gates) providing for a potential exchange or movement of tarplant seed from one occurrence area to another. These pastures would more than double the size of past management areas, providing more than sufficient habitat area for large-scale ongoing management actions. Without management intervention, natural recruitment alone is likely to result in the extirpation of the species at Arana Gulch whether or not the trails are developed. Finally, assuming an unassisted dispersal radius of 1.5 feet per year, it would take the plants documented in Area A in 2009 over 360 years to come in contact with nearest portion of the east-west trail alignment.

Direct Observations of tarplant populations in other parts of Santa Cruz County demonstrate that this species is inordinately tolerant of edge effect habitat conditions. Examples include the sustaining occurrences between and adjacent to the paved runways of the Watsonville Airport, the population adjacent to the fairways at Spring Hills Golf Course, and the recently observed occurrence at Atkinson Lane adjacent to the paved PG&E substation (Bill Davilla, personal observation).

In summary, Santa Cruz tarplant is not expected to undergo population declines as a result of the City of Santa Cruz proposed trail system at Arana Gulch. The site currently supports extant populations of Santa Cruz tarplant persisting in weedy non-native grassland. The grassland within Arana Gulch supporting Santa Cruz tarplant is already heavily disturbed and will be largely unaffected by weedy propagules originating from trails limited to pedestrian, wheelchair, and bicycle traffic. By placing the trail at the existing grade of the terrace, there will be very little ground disturbance adjacent to the trail to encourage the establishment of noxious weeds not already present on the terrace. The two pastures will be sufficiently large to manage using grazing, mowing, fire and/or scraping and cattle will be allowed to move between the pastures with limited effort providing a vector for tarplant seed dispersal. Moreover, active management is critical for the long-term viability of these populations. Cattle remove vegetative cover of competing plant species and trampling is an effective means of embedding the seed into the soil

layer for germination. Additionally, cattle assisted seed transport is a far more effective means for population expansion than passive dispersal at a rate of 1.5 feet per year. Because cattle will be moved between the two pastures, there is little concern for the creation of genetically isolated populations (bottlenecks/genetic drift) within Arana Gulch. Considering the largest occurrences of Santa Cruz tarplant in 1988 occupied approximately approximately 9.6 percent (2.6 acres) of grassland habitat at Arana Gulch, a reduction of less than 1.5 percent of the total 27 acres of potential suitable habitat is not expected to result in the decline or extirpation of the Santa Cruz tarplant at Arana Gulch.

REFERENCES

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Neary Lagoon Wildlife Refuge and Interpretive Trail System

The City thought it would be useful to provide a similar example of an open space where targeted special funds are used very successfully to preserve and enhance a unique coastal habitat, provide access for the community and visitors and operate an exceptional interpretive program.

Neary Lagoon Wildlife Refuge is a City-owned and managed open space located within the Coastal Zone. Featuring wetland and riparian habitats, Neary Lagoon is a successful example of a resource dependent multi-use trail system within an Environmentally Sensitive Habitat Area (ESHA). The wildlife refuge features interpretive displays, a floating boardwalk, and paved multi-use trails. Neary Lagoon is very popular for bird watching, especially waterfowl. Dogs are prohibited.

The boardwalk, approximately ¼ mile in length, allows visitors to experience the open water area and marsh habitats. The floating boardwalk design was needed in order to provide access within the open water area. This type of trail is expensive to construct and maintain. It is presently funded through a City Sewer Service enterprise fund (not General Fund) as mitigation and leveraged by funds from the expansion of the City's wastewater treatment plant.



The paved pathways are ADA accessible and open to pedestrians and bicycles. In addition to providing access to the wildlife refuge, the paved pathways are also used by community members to travel through the open space between the west side of Santa Cruz and the lower central core area of Santa Cruz, to the Main Beach area.

The Neary Lagoon Management Plan, which guided development of the trail system, ensured entrances to Neary Lagoon were conveniently located to adjoining neighborhood areas. Three trail entrances are provided. The Bay/California Street entrance is located to the west, Chestnut Street entrance to the east, and the Blackburn Street entrance to the north. To the south, Neary Lagoon is bordered by the City's wastewater treatment plant and a bluff. The Management Plan was approved by the Coastal Commission.

Local residents and visitors to Santa Cruz enjoy Neary Lagoon as an open space refuge within the central core of the City. Interpretive displays provide information about wetland and riparian habitats, waterfowl, and other species found within Neary Lagoon. Self-guided brochures have also been created to provide more detailed information about the sensitive resources and trail system.

The Santa Cruz Museum of Natural History sponsors popular docent-led outdoor programs for elementary school children at Neary Lagoon. The Neary Lagoon Wetland Walk for 3rd grade explores the unique characteristics and vital functions of a wetland habitat and the importance of wetland preservation. The two-part experience includes an interactive classroom discussion, followed by a hands-on field trip which includes providing binoculars to students for a bird count and close-up views of the lagoon's abundant bird life. More recently, a Watershed Walk has been added for 5th grade classes. This program focuses on the importance of watersheds and their role in the health of the environment, methods used to assess water quality, and water conservation efforts. Hundreds of school children learn about these habitats through the Neary Lagoon Interpretive program each year.

Subsurface Drainage Conditions – Cleath Harris Geologists, Inc.

At the Coastal Commission hearing on March 11, 2010 members of the public expressed concern that the proposed trail could impact subsurface drainage in areas adjacent to the historic tarplant area D. Coastal Commission staff asked the City to prepare a geologic report to analyze the subsurface drainage in the vicinity of the proposed trail. Cleath-Harris Geologists, Inc. conducted a site visit on May 19, 2010 and conducted seven borings in the center line of the proposed multi use path and adjacent to the historic tarplant area D. The boring locations are mapped on the RRM Preliminary Trail Alignment Study mapping found in Appendix 29.

The results of the geologic report conclude that the subsurface conditions that exist on site, combined with the design and construction of the trail would not impact the subsurface drainage flows to the historic tarplant area D.

The report is attached to this summary.



June 15, 2010

Michael Sherrod
RRM Design Group
3765 South Higuera Street
San Luis Obispo, California 93401

SUBJECT: Subsurface drainage conditions in the vicinity of the Proposed Arana Gulch Trail Site, Santa Cruz, California

Dear Mr. Sherrod:

Cleath-Harris Geologists (CHG) has investigated subsurface drainage in the vicinity of the proposed Arana Gulch multi-use trail in the City of Santa Cruz, California. The purpose of the investigation is to evaluate whether a proposed trail with a mechanically compacted base and pavement would interfere with subsurface water flow that is being tapped or could be tapped by the Santa Cruz tarplant. To determine the characteristics of the subsurface and the depth to groundwater, CHG advanced seven hand-augured borings to depths ranging from five to fifteen feet depth along the proposed trail alignment on May 19, 2010. Prior to drilling, the boring locations and ground surface elevations were surveyed by a licensed surveyor with RRM Design Group. Boring coordinates and ground surface elevations are recorded on the attached boring logs and in the table below.

Table 1

Boring	Survey Point	Northing	Easting	Surface Elevation (feet)	Total Depth (feet)
HA-1	6001	1,816,966	6,123,805	35	5.3
HA-2	6002	1,817,031	6,123,798	40	15
HA-3	6003	1,817,085	6,123,799	45	8.5
HA-4	6004	1,817,145	6,123,806	50	8
HA-5	6005	1,817,208	6,123,813	55	8
HA-6	6006	1,817,321	6,123,809	60	8
HA-7	6000	1,816,903	6,123,814	30	5

Survey based on California State Plane coordinate system

Materials from the borings were described using the Unified Soil Classification System. The color description of logged materials is based on Munsell Soil Color Charts, GretagMacbeth, 2000.

The seven borings were drilled on an undisturbed, southeasterly sloping surface underlain by pedogenic soil and partially eroded marine terrace deposits. The marine terrace is represented by a mix of terrestrially deposited sand, silt, clay and minor amounts of gravel, and by marine deposited clean sand. Material logged near the surface consisted of dark brown silty sand and sandy silt forming a loose and soft organic soil, bioturbated by burrowing animals and roots. Underlying the organic soil are predominantly silty and clayey sands and sandy clays with thin lenses of lower permeability clay. Thin lenses of clean, uniformly fine-grained sand were logged in borings HA-5 and HA-6, and a deeper unit of clean, dense, fine-grained sand was observed in borings HA-2 and HA-7.



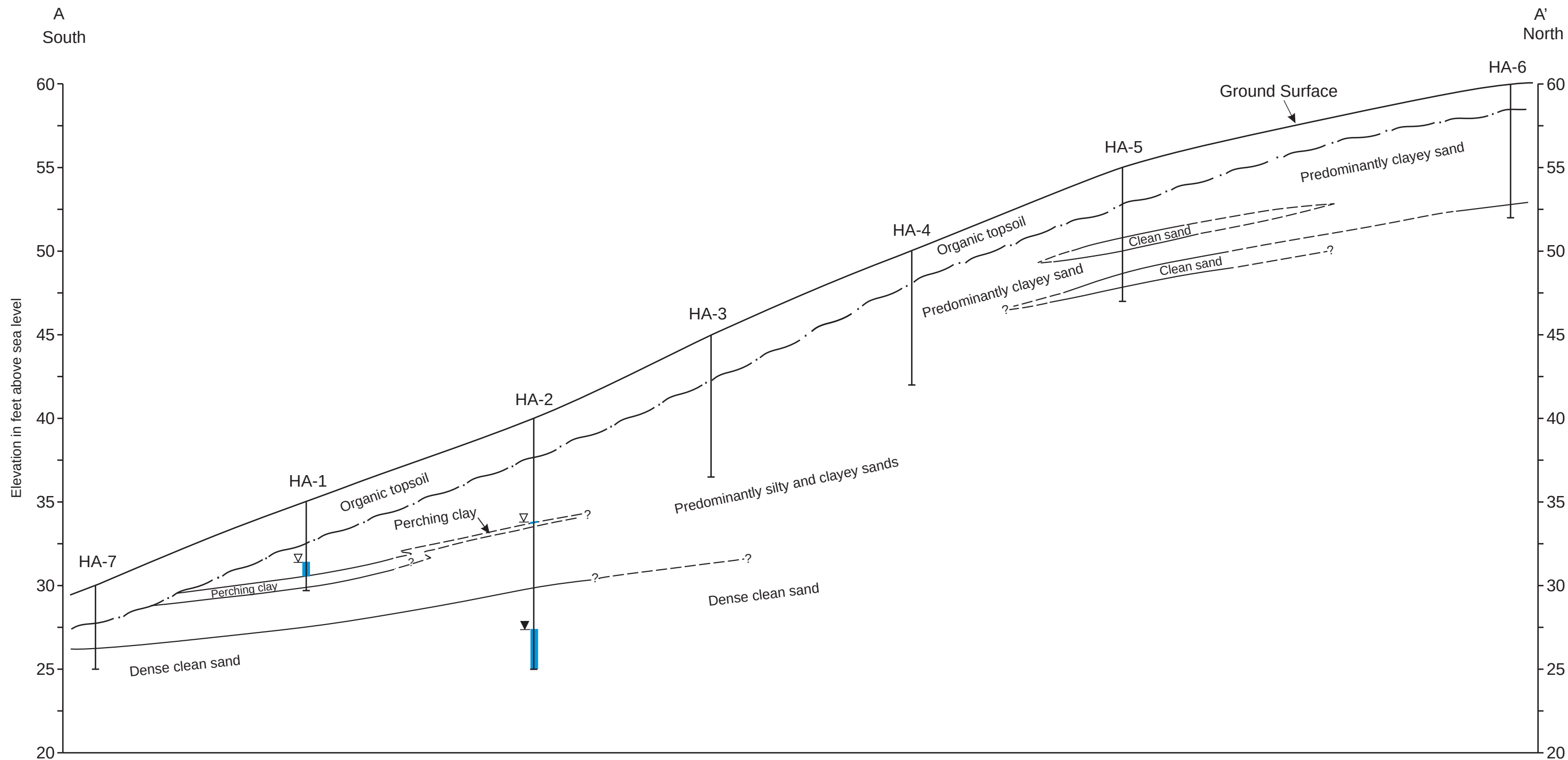
Moisture content ranged from damp to moist in the approximately two-feet thick organic soils. Shallow, saturated conditions were found above perching, low-permeable clay in borings HA-1 and HA-2, at approximately three and one half feet depth and six feet depth respectively. Groundwater moving through silty sand observed at boring HA-2 appeared as seeps from preferential flow paths of relative high permeability controlled by thin perching clay layers and possibly bioturbated materials. A deeper groundwater zone was observed in boring HA-2 at 12.5 feet depth within the clean, dense sand unit. The lateral extent of this deeper saturated zone is not known. Groundwater was not observed in borings HA-3 through HA-7. Groundwater was not observed in the lowest elevation boring, HA-7, although perched groundwater was observed in the nearby upgradient boring HA-1, suggesting that flow is impeded by the lower permeability organic soil layer. Geologic cross sections are shown in Figures 1 and 2.

The perched groundwater observed in borings HA-1 and HA-2 flows within preferential flow paths controlled by variable permeabilities, and the lateral extent of the deeper groundwater zone is undocumented. It does not appear that perched groundwater observed at borings HA-1 and HA-2 reaches documented tarplant sites as the flow is toward Arana Gulch and away from the tarplant sites. Site grading and soil compaction along the trail alignment in the vicinity of borings HA-1 and HA-2 could collapse existing or filled animal burrows and locally disturb other preferred groundwater flow paths in the vicinity. Groundwater beneath the proposed trail alignment north of boring HA-3 is considered to be at a sufficient depth not to be impacted by proposed grading and soil compaction.

The trail design by RRM Design Group will limit disturbance to the upper 10 inches of the subsurface, and will involve no compaction. The trail as designed and its location relative to historic tarplant populations will not adversely impact subsurface groundwater flow to mapped tarplant areas. If you have any questions concerning the boring logs, conclusions, or recommendations, please contact CHG.

Sincerely,
CLEATH-HARRIS GEOLOGISTS, INC.

David R. Williams
Associate Geologist



Scale: 1 inch = 30 feet (horizontal)
1 inch = 6 feet (vertical)

Explanation	
HA-7	Hand auger boring designation
---	Geologic contact, queried and dashed where inferred
▽	Perched groundwater (inferred saturated lense in blue)
▼	Deeper groundwater zone (lateral extent unknown)

Figure 1
Geologic Cross Section A-A'
Arana Gulch Trail Site
City of Santa Cruz

Cleath-Harris Geologists, Inc.

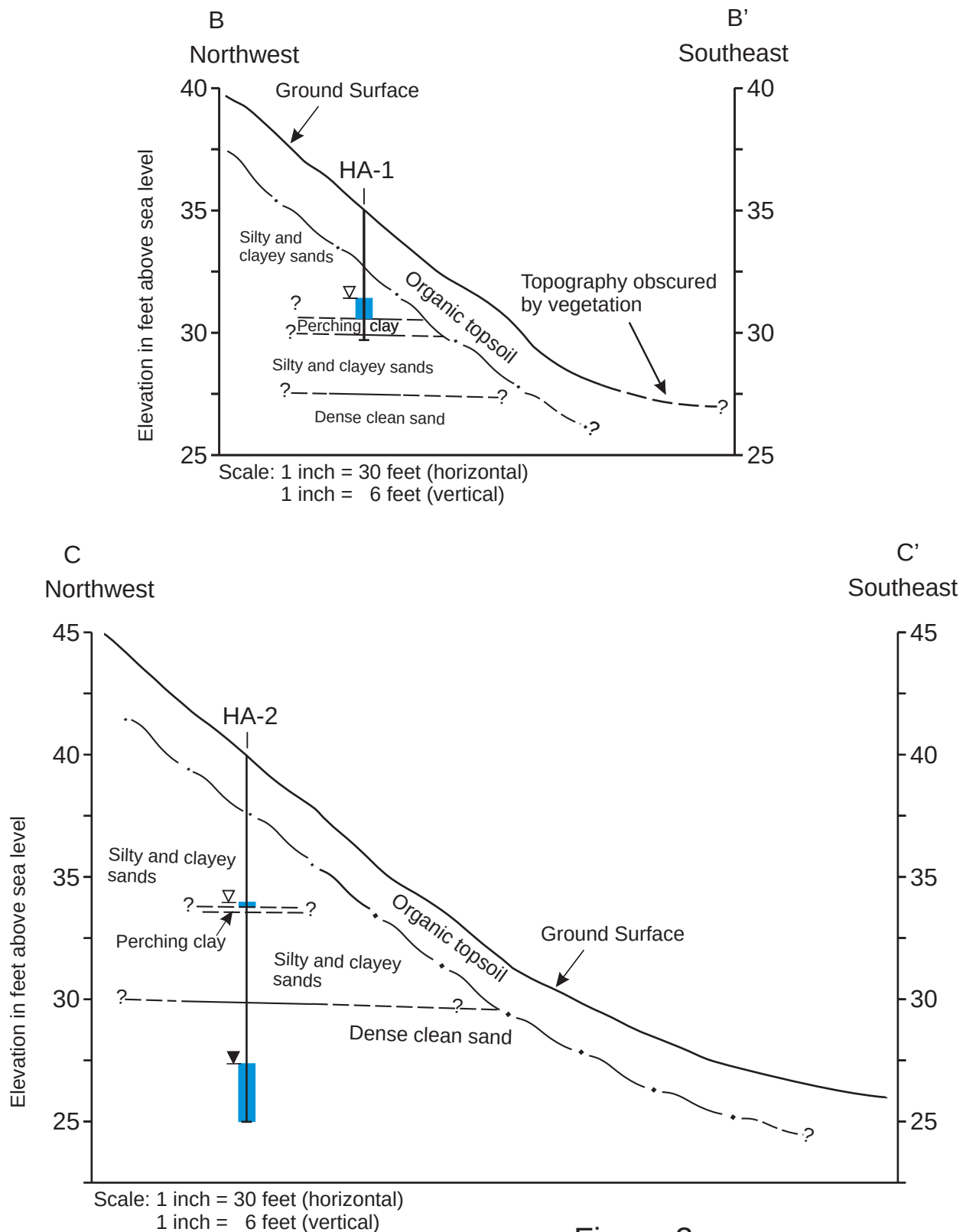


Figure 2
Geologic Cross Sections B-B'
and C-C'
Arana Gulch Trail Site
City of Santa Cruz

Cleath-Harris Geologists, Inc.

Explanation

HA-2 Hand auger boring designation

-? Geologic contact, queried and dashed where inferred



Perched groundwater (lateral extent of lens unknown)



Deeper groundwater zone (lateral extent unknown)

Attachment A
Boring Logs

Boring Logs
Arana Gulch Trail Site, Santa Cruz, California

Date: May 19, 2010

Geologists: Harris/Williams, Cleath-Harris Geologists

Drilling Method: hand auger

Boring HA-1

Elevation: 35 ft above sea level (RRM survey)

Total depth: 5.3 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	2.5	2.5	Silty Sand (SM) ; dark brown (10YR 3/3); fine grained sand; organic; moist. Silt content increased to 40% and moisture increased from 1' to 2.5' depth.
2.5	4.5	2	Silty Sand (SM) ; dark brown (10YR 3/3); weak dark red mottling (2.5YR 3/6); fine sand; common iron oxide nodules to ½" diameter; moist. Becomes saturated at 3.5 feet depth.
4.5	5	0.5	Clay (CH) ; dark yellowish brown (10YR 4/4) soft, moderately plastic; saturated.
5	5.3	0.3	Silty Sand (SM) ; dark brown (10YR 3/3); strong brown mottling (7.5YR 5/6); mostly fine sand with lesser medium to coarse sand; common iron oxide nodules to ¾" diameter; moist.

Total depth at 5.3 feet. Saturated at 3.5 feet depth.

Boring HA-2

Elevation: 40 ft above sea level (RRM survey)

Total depth: 15 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	3	3	Silty Sand (SM) ; dark brown (10YR 3/3); fine sand, angular to subangular; organic; moist. Silt content increased to 30% from 1.5' to 3'; common iron oxide nodules from 2' to 3' depth; moist.
3	3.5	0.5	Silty Sand (SM) ; trace gravel; dark yellowish brown (10YR 4/4), weakly mottled yellowish brown (10YR 5/4); fine sand; subrounded gravel to ¾"; wet.
3.5	5	1.5	Sandy Clay (CL) ; dark yellowish brown (10YR 4/4), weakly mottled yellowish brown (10YR 5/8); soft; mostly fine sand, trace medium; few iron oxide nodules; becoming slightly micaceous from 4' to 5'; moist, with increasing moisture from 4' to 5' depth.

Boring Logs
Arana Gulch Trail Site, Santa Cruz, California

HA-2 (continued)

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
5	8.5	3.5	Silty Sand (SM); dark yellowish brown (10YR 4/6); mostly fine sand, lesser medium; wet; thin saturated zone (seeps) at 6' depth approximately 3" thick on thin low-permeable perching layer with unsaturated zone underlying seeps.
8.5	10	1.5	Sand with Silt (SP-SM); yellowish brown (10YR 5/6), strongly mottled 10YR 5/8); fine sand, with trace medium sand; micaceous; moist, becoming wet at 9' depth.
10	15	5	Sand (SP); yellowish brown (10YR 5/6), strongly mottled 10YR 5/8; angular to subangular, quartzose; wet. Becomes saturated at 12.5' depth.

Total depth at 15 feet. Saturated at 6 feet depth.

Boring HA-3

Elevation: 45 ft above sea level (RRM survey)

Total depth: 8.5 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	3.5	3.5	Silty Sand (SM); dark brown (10YR 3/3); mostly fine sand, trace medium to coarse; organic; moist. Silt content increased to 30% from 2' to 3.5' depth. Becomes dark yellowish brown (10YR 4/4) with weak yellowish brown (10YR 5/6 mottling from 2.5' to 3.5' depth; trace inferred clast at 3' depth.
3.5	5.5	2	Sandy Silt (ML); yellowish brown (10YR 5/6); soft silt; fine to medium sand; slightly micaceous; moist.
5.5	6.5	1	Silty Sand (SM); dark yellowish brown (10YR 4/6), strongly mottled yellowish brown (10YR 5/8); mostly fine sand, lesser medium, angular to subangular; micaceous; few iron oxide nodules to ¼" diameter; 35 to 40% soft fines; moist, becoming wet at 6' depth.
6.5	8	1.5	Sandy Clay (CL); dark yellowish brown (10YR 4/6); strongly mottled yellowish brown (10YR 5/8); soft clay; fine sand; few iron oxide nodules to 1/8" diameter; wet.
8	8.5	0.5	Clayey Sand (SC); dark yellowish brown (10YR 4/6); strongly mottled yellowish brown (10YR 5/8); fine sand; wet.

Total depth at 8.5 feet. No observed groundwater.

Boring Logs
Arana Gulch Trail Site, Santa Cruz, California

Boring HA-4

Elevation: 50 ft above sea level (RRM survey)

Total depth: 8 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	1.5	1.5	Silty Sand (SM) ; dark brown (10YR 3/3); trace gravel; fine sand; moist.
1.5	2	0.5	Silty Sand (SM) ; trace gravel; dark yellowish brown (10YR 4/4), strongly mottled yellowish brown (10YR 5/8); mostly fine sand, lesser medium to coarse; gravel to ½", granitic clasts; moist.
2	3	1	Sandy Clay (CL) ; dark yellowish brown (10YR 4/6), strongly mottled yellowish brown (10YR 5/8) and dark yellowish brown (10YR 3/4); soft clay; fine to medium sand, angular to subangular; few iron oxide nodules; moist.
3	3.5	0.5	Clay with Sand (CL) ; dark yellowish brown (10YR 4/6), weakly mottled yellowish brown (10YR 5/8); soft clay; fine sand; moist.
3.5	5	1.5	Sandy Clay (CL) ; dark yellowish brown (10YR 4/6), weakly mottled yellowish brown (10YR 5/8); soft clay; fine sand; moist. Becoming strongly mottled with friable iron oxide nodules to ¼" from 4' to 5' depth.
5	5.5	0.5	Clay with Sand (CL) ; dark yellowish brown (10YR 4/6); weakly mottled yellowish brown (10YR 5/8); soft clay; fine sand; moist.
5.5	8	2.5	Clayey Sand (SC) ; dark yellowish brown (10YR 4/6), strongly mottled yellowish brown (10YR 5/8); fine sand, angular to subangular, mostly quartz; moist. Becomes weakly mottled and more uniformly yellowish brown; wet from 7' to 8' total depth.

Total depth at 8 feet. No observed groundwater.

Boring HA-5

Elevation: 55 ft above sea level (RRM survey)

Total depth: 8 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	2	2	Silty Sand (SM) ; dark brown (10YR 3/3); roots, organic; fine to medium sand; moist.
2	3.5	1.5	Clay with Sand (CL) ; dark yellowish brown (10YR 4/4); soft clay; slightly plastic; fine sand; moist. Slightly increasing fine sand content from 2.5' to 3.5' depth.

Boring Logs
Arana Gulch Trail Site, Santa Cruz, California

HA-5 (continued)

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
3.5	4	0.5	Silty Sand with Gravel (SM); yellowish brown (10YR 5/4), weakly mottled dark yellowish brown (10YR 3/4); fine sand; gravel to ½", subrounded; moist.
4	5	1	Sand with Silt (SP-SM); yellowish brown (10YR 5/6); fine sand, well sorted, quartzose; wet. Becomes very micaceous from 4.5' to 5' depth.
5	6	1	Sandy Clay (CL); yellowish brown (10YR 5/6); soft clay; fine sand; wet.
6	7	1	Sand with Silt (SP-SM); yellowish brown (10YR 5/6); fine sand, well sorted, quartzose; micaceous; wet.
7	8	1	Silty Sand (SM); yellowish brown (10YR 5/6), weakly mottled 10YR 5/8); fine sand; wet.

Total depth at 8 feet. No observed groundwater.

Boring HA-6

Elevation: 60 ft above sea level (RRM survey)

Total depth: 8 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	1.5	1.5	Silty Sand (SM); dark brown (10YR 3/3); roots, organic; sand, mostly fine grained, lesser medium; slightly micaceous; damp.
1.5	3	1.5	Silty Sand (SM); dark yellowish brown (10YR 3/6), strongly mottled red (2.5YR 4/8); sand, mostly fine, lesser medium to coarse; moist.
3	4	1	Clay (CH); pale brown (10YR 6/3); soft, plastic; moist. Becomes strongly mottled yellowish brown (10YR 5/8) from 3.5' to 4' depth.
4	5	1	Clayey Sand with Gravel (SC); yellowish brown (10YR 5/4), strongly mottled 10YR 5/8); mostly fine to medium sand, lesser coarse; weakly indurated iron oxide cemented sand to ½" diameter, highly weathered granitic clasts; moist.
5	5.5	0.5	Clayey Sand (SC); yellowish brown (10YR 5/4), weakly mottled 10YR 5/8); fine sand; moist to wet.
5.5	6.5	1	Sandy Clay (CL); yellowish brown (10YR 5/4), strongly mottled 10YR 5/8); soft clay; fine sand; slightly micaceous; wet.

Boring Logs
Arana Gulch Trail Site, Santa Cruz, California

HA-6 (continued)

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
6.5	7	0.5	Clayey Sand (SC); trace gravel; yellowish brown (10YR 5/6), strongly mottled red (2.5YR 4/6); sand, mostly fine to medium, lesser coarse; highly weathered gravel to ¾" with abundant decomposed material; wet.
7	8	1	Sand (SP); yellowish brown (10YR 5/6); fine sand, well sorted, quartzose; micaceous; wet. With 3" thick lens of silty sand with gravel, yellowish brown (10YR 5/4), strongly mottled 10YR 5/8; fine to coarse sand; moderately to highly weathered gravel to ½".

Total depth at 8 feet. No observed groundwater.

Boring HA-7

Elevation: 30 ft above sea level (RRM survey)

Total depth: 5 feet

Depth to top and bottom in feet

<u>Top</u>	<u>Bottom</u>	<u>Thickness</u>	<u>Description</u>
0	0.5	0.5	Sandy Silt (ML); dark brown (10YR 3/3); soft silt; roots, organic; fine sand; moist.
0.5	1.5	1.5	Silty Sand (SM); dark brown (10YR 3/3); organic; fine sand; slightly micaceous; moist.
1.5	2	0.5	Sandy Clay (CL); dark brown (10YR 3/3); soft clay; fine sand; moist.
2	3.5	1.5	Sandy Clay (CL); trace gravel; dark yellowish brown (10YR 4/6), strongly mottled red (2.5YR 4/6); mostly fine sand, lesser medium to coarse; gravel to ½"; moist. Becomes wet at 2.5' depth.
3.5	5	1.5	Sand (SP); yellowish brown (10YR 5/4); fine to medium, lesser medium, angular to subangular, quartzose; weakly indurated with iron oxide cement; moist.

Total depth at 5 feet. No observed groundwater.

Trail/Multi-Use Path Examples Within Sensitive Habitat Areas

The following is a list of trail and multi-use pathway projects that have been previously approved by the California Coastal Commission where the project involved some form of potential impact to sensitive natural resources. These approvals occurred over the course of more than ten years (1996-2010) and represent the Commission's on-going precedent of approving such projects when there are both public access and resource goals to be achieved. In many of the approvals, the Commission determined that the public access benefits provided by the project were dependent on their location within the natural habitat. Additionally, they found that the formalization of certain paths improved resource values by controlling and directing public use in a manner that reduced adverse impacts from uncontrolled use. Where projects offer a direct link between existing trail sections, impacts from "volunteer" trails are eliminated. As was the case in many of the following examples, interpretive signage and resource management plans are imperative to successfully protecting and enhancing sensitive habitats, while also improving public access in the Coastal Zone.

Permit No.: 3-05-071 (Morro Bay Harborwalk)
Applicant: City of Morro Bay
Approval Date: February 10, 2006
Project Description: Installation of a pedestrian boardwalk and Class I bike trail along waterfront; phased restoration of approximately 20 acres of degraded coastal dunes; and relocation/realignment of Coleman Drive and a portion of Embarcadero Road at Morro Bay waterfront, San Luis Obispo County.
Similarity: Commission allowed paved road and bike trail through dune habitat.

Relevant Quotes: *"Currently, vehicular access exists to these areas, though there are few opportunities for safe pedestrian and bicycle access to the beach access and parking area at Morro Rock. As a result, people opt for a safer and shorter route to the beach through the dunes. As previously mentioned, this unmanaged access is a primary source of habitat degradation. Implementation of the project is expected to increase the quantity and quality of native coastal dune habitat by redirecting human activity away from sensitive areas."* P.14

"Accordingly, the proposed project is the only alternative that addresses public safety concerns, maximizes and manages public access, and results in effective protection and restoration of the coastal dunes." P.15

Permit No.: 1-07-005 (Crescent City Harbor Trail North Segment)
Applicant: City of Crescent City
Approval Date: October 12, 2007
Project Description: Harbor Trail – North Segment Project entailing construction of: (1) a Class I multipurpose trail from the Cultural Center in Beach Front Park to Sunset Circle/RV Park Road, including a 110-foot

freespan pedestrian/bicycle bridge crossing of Elk Creek; (2) a pedestrian harbor/creek vista overlook;(3) 24-space asphalt surface parking lot with bioswale/ drainage retention basin; (4) couplet restroom facilities; (5) various concrete walkways, bench and seat wall installations and directional & interpretive signage; and (6) a Class III roadside bike route along Sunset Circle to the intersection of Highway 101 and Elk Valley Road, Crescent City, Del Norte County.

Similarity: Commission allowed paved Class I and Class III multiuse trails involving some wetland fill.

Relevant Quotes: *“Trails are utilized for a variety of utilitarian and aesthetic reasons. Although the use of trails does not in every case entail nature study, the proposed facilities certainly support such a pursuit.”* P. 21

“Thus, trails through riparian corridors and shoreline areas such as the project site may similarly be considered a form of “nature study... or similar resource-dependent activities,” as they are: (1) a development type integral to the appreciation and comprehension of biophysical elements that comprise riparian areas; and (2) dependent upon the presence of the natural area resource through which they pass to provide a nature study experience...Therefore, the Commission finds that the proposed placement of fill within coastal waters and wetlands for purposes of constructing the Harbor Trail North Segment is for one of the allowable uses for dredging, diking, and filling of coastal waters pursuant to Section 30233(a)(7) of the Coastal Act.” P. 22

Permit No.: 3-97-062 (Sand City Bike Path)
Applicant: City of Sand City
Approval Date: October 10, 1997
Project Description: Construction of 12’ wide 4,845’ long bike path and 5 acres dune revegetation in Seaside/Sand City, Monterey County. This is a portion of larger project to connect Monterey Regional Trail with Ford Ord Recreation and Bike Trail.
Similarity: Commission allowed paved path through dune habitat. Project represents “missing link” in the 21.5 mile regional bikeway.

Relevant Quote: *“In addition, the fencing and interpretive signs that will be provided will minimize impacts of unmanaged access that would persist under the status quo and, as discussed below, will increase public understanding and appreciation of the unique and sensitive resources of the Monterey Bay dune system.”* P. 11

Permit No.: 3-00-092 (Monterey Dune Recreation Trail and Parking Lot)
Applicants: CA Dept. of Parks and Recreation & City of Monterey
Approval Date: January, 10, 2000
Project Description: Construction of 4,000’ long trail, removal of asphalt, construction of parking lot and restoration of dunes.
Similarity: Commission allowed paved multiuse path through dune habitat. Project provides direct link to existing trail system.

Permit No.: 5 -03-091 Bayview Landing Park, Newport Beach
Applicants: City of Newport Beach and The Related Companies
Approval Date: November 5, 2003
Project Description: 120-unit senior affordable housing project with 146 parking spaces, pool & patio, Wetlands Restoration & Detention Basin & Pond area (on lower part), and public passive park (on upper part), on 15-acre site, at northwest corner of Coast Highway & Jamboree Road, Newport Beach, Orange County.
Similarity: Commission allowed paved bike path in ESHA buffer.

Permit No. 80-P-046-A1 (Humboldt County Public Works Subdivision)
Applicant: Humboldt County Public Works Department
Approval Date: June 15, 2007
Project Description: Construction of a pedestrian-only interpretive trail within an open-space easement placed over the riparian habitat and adjoining lands. Proposed trail would link existing segments of the Hammond Coastal Trail to the north and south and would affect approximately 2,000 square feet of the open space easement (200-ft long by 10-ft wide) along Widow White Creek on the north side of Pacific Sunset Subdivision, off of Fortune Street, McKinleyville, Humboldt County.
Similarity: Commission allowed compacted gravel trail through riparian habitat. Project provides missing trail linkage.

Permit No. 2-07-018 (Sonoma Regional Park, Bodega Bay)
Applicant: Sonoma County Regional Parks
Approval Date: September 6, 2007
Project Description: Installation of bridge over Cheney Creek to connect Birdwalk Coastal Access Trail with Doran Beach Regional Park Trail and widen and upgrade 1,370 foot long Doran Marsh Trail to multiuse, pedestrian and bicycle trail that is 8 feet wide with a crushed rock surface between 355 Highway 1 (Bird Walk Coastal Access Park) and 201 Doran Park Road (Doran Beach Regional Park), Bodega Bay, Sonoma County.
Similarity: Commission allowed bridge and multi-use nature trail with crushed rock surface in ESHA.

Relevant Quote: *“Although development activities will occur outside wetland and tideland areas, the proposed project construction occurs in environmentally sensitive habitat areas and could result in significant resource impacts. Because the project is a resource-dependent use (nature trail), it may be allowed within ESHA.”* P. 3

Permit No. A-1-MEN-06-052 (Redwood Coast Public Access Improvements)
Applicant: Redwood Coast Land Conservancy

Approval Date: April 13, 2007
Project Description: Develop public access facilities by (1) improving two existing trails, (2) paving a new encroachment onto Highway One and constructing a four-car parking area, and (3) installing informational signage and symbolic fencing. The project also includes restoring areas of erosion caused by past vehicle use.
Similarity: Commission allowed unpaved paths through rare plant habitat and riparian habitat.

Relevant Quote: *“The proposed project would consolidate the current indiscriminate public use of the property by formalizing the existing trails for pedestrian use only and by preventing unauthorized vehicle use on the site.... Precluding public use of sensitive areas in this manner would minimize erosion and allow these areas to revegetate naturally and prevent trampling of rare plant habitat.”*
P. 4-5

Permit No.: 6-09-043 (Otay River Valley Trail Improvements)
Applicant: County of San Diego Department of Parks & Recreation
Approval Date: Feb. 11, 2010
Project Description: Construction of a 1,500-foot long, 8-foot wide trail segment connecting Otay Valley River Park (OVRP) trail system to the Bayshore Bikeway.
Similarity: Commission allowed unpaved trail and staging area improvements within wetland buffer.

Relevant Quote: *“The proposed trail will establish a clear, distinct accessway, with log fencing, that will discourage off-trail wandering, and allow the ad hoc trails to revegetate, reducing erosion.”* P. 6

Permit No.: A-3-SLO-04-035 (PG&E Spent Fuel Storage)
Approval Date: December 2004 (Revised Findings January 2005)
Applicant: Pacific Gas and Electric Company
Project Description: Construct and operate a radioactive waste storage facility known as an Independent Spent Fuel Storage Installation (ISFSI) within the high security area of the Diablo Canyon power plant complex approximately 6 miles north of Avila Beach), San Luis Obispo County.
Similarity: Commission allowed unpaved paths through coastal terrace prairie habitat.

Permit No.: 3-06-069 (Fort Ord Dunes State Park Improvements)
Applicants: CA Dept. of Parks and Recreation
Approval Date: March 14, 2007
Project Description: Opening of Fort Ord Dunes State Park for initial public use. Project includes pedestrian and vehicle access at the 8th Street overpass; re-paving and striping of an existing parking lot; use of

an unsurfaced access service road as a pedestrian beach access trail; creation of a temporary observation area west of the parking area; installation of entrance and directional gates and interpretive, directional, and regulatory signage; and fencing of known snowy plover nesting sites.

Similarity: Commission allowed unpaved path through dune habitat.

Permit No.: 3-98-095 and 3-98-095-A1 (Elfin Forest Boardwalk)

Applicant: Department of General Services, San Luis Obispo County

Approval Date: January 13, 1998 and May 2009

Project Description: Construct a 5,300' long boardwalk loop trail with two viewing platforms for public access and recreation in the Los Osos area of San Luis Obispo County. Amendment allowed extension of boardwalk.

Similarity: Commission allowed boardwalk through terrestrial habitat ESHA.

Relevant Quote: *“Trail access within the Elfin Forest is currently provided by a system of sand trails that have been created through many years of unauthorized use by pedestrians and off-road vehicles. Continued use has resulted in the erosion of the sandy soil, and trampling of sensitive vegetation and habitat. By providing a boardwalk, the project will consolidate trails, reduce erosion and the overall degradation of the forest habitat, and facilitate effective revegetation and environmental enhancement.”* P. 7

Permit No. 3-01-003 and 3-01-003-A1

Approval Date: March 7, 2002

Applicants: City of Grover Beach & CA Dept. of Parks and Recreation

Project Description: Development of a 0.5 mile recreational path along coastal backdunes of Grover Beach, San Luis Obispo County. Amendment added at-grade boardwalk w/ restoration component to enhance habitat qualities.

Similarity: Commission allowed boardwalk through dune habitat.

Relevant Quote: *“By abandoning the existing trail and adding the amended at-grade boardwalk, the project has the potential to further disrupt the backdune habitat by dispersing foot-traffic along multiple routes causing further disruption to sensitive habitat...As conditioned, it is likely the abandoned path will quickly grow over with dune vegetation.”* P. 10 of 3-01-003-A1 staff report

Permit No.: 3-01-101

Approval Date: April 11, 2002

Applicants: B&K Monterey, Inc., City of Monterey & Monterey Peninsula Regional Park District

Project Description: Re-subdivision and merger of 60 existing legal lots of record into 14 legal lots of record and 3 open space/habitat preserve parcels.

Project included public access improvements, as well as dune restoration and maintenance for the open space/habitat preserve portions of the project at Beach Way (south end of Del Monte Beach), Monterey, Monterey County.

Similarity: Commission allowed boardwalk through dune habitat.

Permit No. 3-87-258-3 (Asilomar State Beach Boardwalk)

Approval Date: March 14, 1996

Applicants: CA Dept. Parks & Recreation & City of Pacific Grove

Project Description: Amendment to allow continuation of Asilomar Dunes Restoration Project including eradication of exotic plant species, revegetation with indigenous plants, extension of existing trails & fencing at Rocky Shores, Asilomar State Beach, City of Pacific Grove, Monterey County.

Similarity: Commission allowed boardwalk through dune habitat.

Arana Gulch Master Plan Team

City Staff:

Dannettee Shoemaker, Director of Parks and Recreation
Steve Hammack, former Superintendent of Parks
Mauro Garcia, Superintendent of Parks
Susan Harris, Associate Parks Planner
Chris Schneider, Assistant Director of Public Works
Aaron Becker, Associate Engineer, Department of Public Works
Tom Sharp, Associate Engineer, Department of Public Works
Juliana Rebagliati, Director, Planning and Community Development
Ken Thomas, Principal Planner, Planning and Community Development
Michael Ferry, Associate Planner, Planning and Community Development

Consulting staff:

Bruce Pavlik, BMP- Ecosciences - Management Program for the Santa Cruz Tarplant
Erin Espeland, BMP- Ecosciences - Management Program for the Santa Cruz Tarplant
William Davilla - Ecosystems West - Project Biologist
Kathleen Lyons - Biotic Resources Group - Project Botanist
Michael Sherrod, RRM Design - Project Engineer
Chris Dufour, RRM Design - Landscape Architect
David Williams, Cleath-Harris Geologists, Inc. – Subsurface Drainage Conditions
Peter Haase, Fall Creek Engineering – Hydrology, water quality, geology and soils
Jane Bolling Design - Graphics

Technical advisory staff:

Dr. Susan Bainbridge, UC Jepson Herbarium - Management Program for the Santa Cruz Tarplant
Dr. Grey Hayes, Elkhorn Slough National Reserve - Management Program for the Santa Cruz Tarplant
Deborah Hillyard, California Department of Fish and Game - Management Program for the Santa Cruz Tarplant
Connie Rutherford, US Fish and Wildlife Service- Management Program for the Santa Cruz Tarplant
Douglas Cooper, US Fish and Wildlife Service - Biologic Opinion
Lena Chang, US Fish and Wildlife Service - Biologic Opinion
Gary Ruggerone, Caltrans Environmental Stewardship Branch
Donn Miyahara, Caltrans Local Assistance, Federal Funding Criteria

Arana Gulch Master Plan – Selected List of Endorsements

Santa Cruz City Council

Kirby Fosgate, former California State parks District Trails Coordinator

Santa Cruz County Seniors Commission

Santa Cruz County Commission on Disabilities

Ecology Action

Friends of the Harbor Group

Central Coast Council for Independent Living

Arana Gulch Watershed Alliance

Elderly and Disabled Transportation Advisory Committee (of the Santa Cruz County Regional Transportation Commission)

Board of Supervisors, Santa Cruz County

Santa Cruz Sentinel Editorial Board

Dan Haifley, Executive Director of O'Neill Sea Odyssey

Santa Cruz County Regional Transportation Commission

Save Our Shores

People Power

Shared Adventures (an organization providing recreational access for persons with disabilities)

Santa Cruz County Cycling Club

Santa Cruz Surf Riders.

Santa Cruz Port District

Live Oak Family Resource Center

Community Forestry International

And over 900 local residents sending written support to the Coastal Commission, representing 9 out of 10 of all written communications.

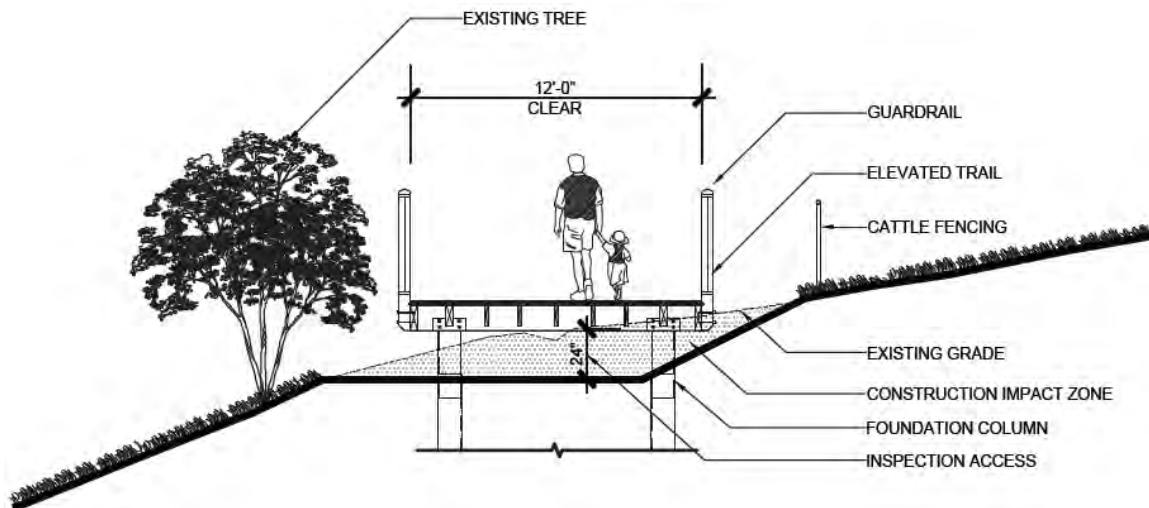
Boardwalk

CNPS representatives expressed their preference for a boardwalk structure along the length of their proposed alignment. Their assumption is that there will be fewer impacts with a boardwalk style trail construction. The City's direct knowledge and experience, and that of the City's trail designer, RRM Design Group, illustrates that there are numerous impacts and limitations on the use of a timber structure. That is why boardwalks are typically limited to small structures or used over water or wet areas, where there are no other solutions. The impacts and limitations that we have addressed are shown below:

- Greater slope constraints to achieving ADA access.
- Slippery surface on wood or plastic deck from fog, rain and moss growth.
- Creating an illegal camping environment.
- Limited longevity from weathering and vandalism.
- Construction and maintenance impacts and costs.

Standards for a multi-use trail require an 8 foot wide minimum accessible surface and 2 feet clear width on each side. Therefore the deck will need to have a 12 foot clear interior width and also require 4-1/2 foot high safety railings. A boardwalk structure is limited to a 3-5% grade, with a strong preference for a flat surface due to limited slip resistance and in consideration of wheelchair/wheeled users limitations, rather than up to 10% slopes allowed for the other surface materials.

A boardwalk section is shown below at Section D2 of the CNPS alignment.



ALTERNATE SECTION D2

A boardwalk for the CNPS alignment will become longer and will require grading (notching into the hillside) due to the existing topography. Grading will also be required to bring in equipment to drill piers and to haul in materials. These conditions will modify existing drainage patterns creating the need for swales, laying back the slope and greater

erosion control measures. The surface of the boardwalk must be raised above the soil by a minimum 2 feet for foundation inspection and the ability to maintain the structure. The space created below the structure will have to be closed off to minimize illegal camping and will become an ongoing maintenance problem, as experienced by the City on other structures.

Longevity of a boardwalk structure in the coastal environment is typically 5 years, after which major maintenance is required to the deck, railings and foundation system. This will require construction vehicles hauling materials and equipment to access the work area on an annual maintenance cycle through the coastal prairie habitat as the boardwalk can not be used for service vehicle access.

Neary Lagoon is a real world example of an appropriate use and cost of boardwalks. On the average the City replaces approximately 500 L.F. of 2x6 yellow cedar lumber on the Neary Lagoon boardwalk. Labor and material costs are approximately \$5,000/yr. Most years require total replacement and/or structural repairs to some sections of boardwalk ranging from \$5,000 to \$25,000 per year depending on the section needing replacing.

DEPARTMENT OF TRANSPORTATION

50 HIGUERA STREET
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<http://www.dot.ca.gov/dist05/>



*Flex your power!
Be energy efficient!*

May 18, 2010

SCR-0-SCR
City of Santa Cruz
CML-5025(012)
Broadway Brommer Bike Path

Chris Schneiter
City of Santa Cruz
Department of Public Works
809 Center Street
Santa Cruz, CA 95060

RE: Comments on the CNPS Alternate Alignment

Dear Mr. Schneiter:

The Caltrans District 5 Environmental Stewardship Branch has reviewed the Preliminary Trail Alignment Study and Cross Sections for the CNPS Trail Alignment (May 2010) and offer the following comments:

The CNPS Trail Alignment is a new alignment that was not considered in previous studies for the Broadway Brommer Bike Path project. Further consideration of the CNPS Trail Alignment would require additional technical studies and consultation with federal resource agencies prior to completion of a NEPA determination. Since the CNPS Trail alignment is outside the study area for the previous project alternatives, a new field review should be scheduled at your earliest convenience and Preliminary Environmental Studies (PES) should be completed.

At a minimum, the CNPS Trail Alignment project would require the following additional studies and federal consultation:

Biological Resources

Natural Environment Study (NES): Due to the potential for new and different impacts, a NES that identifies and quantifies impacts associated with the new alignment will be required.

Biological Assessment (BA): The US Fish and Wildlife Service (USFWS) previously prepared a Biological Opinion (1-8-07-F-46) for the original alignment on September 15, 2008. The opinion requires reinitiation if the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in the original opinion. The CNPS Trail Alignment will require a Biological Assessment for reinitiation of consultation with USFWS. Once the USFWS deems the BA complete it has 135 days to issue a Biological Opinion.

An updated project species list must be obtained from the USFWS and all species on the list that have potentially suitable habitat must be discussed. In particular, Santa Cruz tarplant and California red-legged must be discussed as both have been mentioned in previous USFWS consultations for this project.

State 2081 Permit: Although not within the NEPA oversight process, Santa Cruz tarplant is a State endangered species and may require a 2081 permit from the California Department of Fish and Game. Caltrans suggest early coordination with Fish and Game as it often requires compensatory mitigation in addition to what is proposed under NEPA. Any proposed mitigation should be included in the BA.

Cultural Resources

Historic Property Survey Report (HPSR)

The HPSR serves as a summary document to which the following documents are attached. It also serves to document consultation with interested parties. If the HPSR results do not identify any cultural resources, they should be able to be completed in 2-6 months. If cultural resources are identified, then additional studies and consultation with the SHPO may be warranted.

Area of Potential Effect (APE) Map

This map depicts the area that will be impacted by the CNPS Trail Alignment, including staging and construction access areas. The map should be plotted on an aerial photographic or other base at a scale of approximately 1"=100' or 1"=200', with a bar scale. The map should depict existing and proposed right-of-way, as well as the locations of any cultural resources identified. Roads should be clearly labeled. The APE map will be approved by Caltrans prior to completion of the HPSR.

Archaeological Survey Report

The portion of the project that falls outside the original Broadway Brommer Bike Path APE should be surveyed by a qualified archaeologist and reported in an Archaeological Survey Report.

The preparation of the Cultural Resource Studies should follow the guidelines of the Caltrans Environmental Handbook Volume 2, Cultural Resources, which is available on the internet at <http://www.dot.ca.gov/ser/envhand.htm>. Please contact Kelda Wilson at (805) 542-4697 with questions about these studies.

Please be advised that the above determinations were made based on a review of the Preliminary Trail Alignment Study and Cross Sections for the CNPS Trail Alignment (May 2010). There is the possibility that additional NEPA documentation may be necessary following the field review and review of the PES.

C. Schneider, City of SCR PWD
May 18, 2010
Page 3 of 3

Broadway Brommer
Bike Path

I will be your primary contact at Caltrans District 5 Environmental Stewardship Branch for this project. Please don't hesitate to contact me if you have any questions regarding the environmental requirements for this project. I can be reached at (805) 549-3182 or Gary_Ruggerone@dot.ca.gov.

Sincerely,



Gary Ruggerone
Caltrans District 5
Environmental Stewardship Branch

Enclosure

Email cc: Donn Miyahara, CT Local Assistance
Kelda Wilson, CT Environmental
Tom Edell, CT Environmental

MAP I

EXISTING SITE
CONDITIONS



LEGEND



Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989



Seasonal Wetlands

Pedestrian Trail (unpaved)

Note: Trail width symbol not to scale

Master Plan Boundary

City Limit

MAP 2

Arana Gulch MASTER PLAN

- Avoids tarplant areas
- Seasonal wetland buffers
- Expanded grazing
- Closes unauthorized trails



LEGEND

A-D

Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989



Seasonal Wetlands



Meadow Overlook Area (20ft x 20ft)



Interpretive Display



Overlook



Proposed Grazing Area (approx. 14 acres)



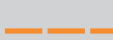
Pedestrian/Bicycle Trail (wheelchair accessible)



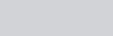
Pedestrian Trail (unpaved)



Pedestrian Trail (unpaved/no dogs)



Area of Engineering Analysis (see RRM plans)



Master Plan Boundary



City Limit

Note: Trail width symbol not to scale

MAP 3

PREVIOUS
COASTAL STAFF
RECOMENDATION
October 2010



LEGEND

A-D

Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989



Seasonal Wetlands



Meadow Overlook Area (20ft x 20ft)



Interpretive Display



Overlook

Proposed Grazing Area

Pedestrian/Bicycle Trail (wheelchair accessible)

Pedestrian Trail (unpaved)

Pedestrian Trail (unpaved/no dogs)

Area of Engineering Analysis (see RRM plans)

Master Plan Boundary

City Limit

Note: Trail width symbol not to scale

CALIFORNIA
NATIVE PLANT
SOCIETY (CNPS)
PREVIOUSLY PROPOSED
ALTERNATIVE – JULY 2010



LEGEND

A-D

Approximate location of Santa Cruz Tarplant subpopulation areas identified in 1989



Seasonal Wetlands



Meadow Overlook Area (20ft x 20ft)



Interpretive Display



Overlook

Proposed Grazing Area (approx. 13.63 acres)

Pedestrian/Bicycle Trail (wheelchair accessible)

Pedestrian Trail (unpaved)

Note: Trail width symbol not to scale

Area of Engineering Analysis (see RRM plans)

Master Plan Boundary

City Limit

Comparison of City and CNPS Alternative Alignments

Background

The City was asked to provide an evaluation of the proposed Arana Gulch Master Plan trail alignment to the California Native Plant Society (CNPS) alternative alignment. The alignment comparison includes only those sections of trail from the proposed Hagemann Street Bridge to the trail terminus at the existing harbor path as shown on the Preliminary Trail Alignment Study plans prepared by RRM Design Group, shown in Appendix 29 of this report. Both alignments were evaluated using Caltrans multi-use trail standards and State Park standards for ADA trail access. It is important to note that RRM Design was selected by the City in part because of their significant experience in designing environmentally sensitive trails in open space areas, and their experience in trail design in Coastal Zone resource areas.

The CNPS alignment map and narrative submitted at the March Coastal hearing was vague in several locations requiring City staff to interpret the route at some locations. As an example, the protection of the oak woodland described in the narrative moved the trail closer to the meadow area. City staff made several unsuccessful efforts to clarify the alignment, such as the location of the eastern route, with CNPS representatives through emails. The City's trail design consultant developed the plans in Appendix 29 of this report based on the same criteria as the City alignment. Once the plans were prepared City staff met with CNPS representatives to review the City's mapping of the CNPS alignment on July 15, 2010. At that meeting it was noted that the CNPS alternative showed the trail north of the historic tarplant population "B". The RRM plans were revised to reflect that alignment. There was also discussion over whether or not to alter the fencing in Area D to allow grazing of the entire area. If that area is determined to be suitable for grazing it could be included in both the City and the CNPS alternatives, without difference in that regard. Otherwise the CNPS representatives stated the map seemed to represent the routes of their alternative.

Comparison

The City alignment is intentionally designed to match the existing terrain to achieve ADA compliance with the least impact to the open space area and in the most context sensitive manner. By placing the trail on this alignment the construction footprint is minimized, the amount of grading is reduced, and drainage is unaffected. Unfortunately this is not possible with the CNPS alignment as the contours of the

existing terrain are much more variable at the interface of the oak woodland habitat and coastal prairie habitat on the west border, and the coastal prairie edge at the southern and eastern borders.

The attached table compares the characteristics of the City and the CNPS alignments in great detail. The CNPS alignment is 647 feet longer than the City alignment and several retaining walls, some exceeding a height of 7 feet, with four foot high guard rails will be required in the steeper areas along the CNPS alignment. The walls and rails would be visible from the harbor. There will be a greater number of contiguous trail sections with steep grades with the CNPS alternative, which are designed to meet ADA standards technically but many people will find difficult to navigate. The construction impact zone for the CNPS alignment is more than twice the square footage of the City alignment due to the construction of the retaining walls and drainage systems. Eleven trees will have to be removed under the CNPS alternative while only one will be removed on the City alignment.

To preserve the oak woodland habitat, the paved path for the CNPS alignment would be moved onto the coastal prairie habitat and require the removal of approximately 3,000 square feet of mapped habitat. The CNPS alignment would require excavations of up to seven feet deep whereas the City alignment, due to following existing topography, would require a maximum cut of two feet. No retaining walls are required for the City alignment; seven retaining walls that total 1,030 lineal feet would be required for the CNPS alternative as well as the associated guard rails. Storm drainage infrastructure for the City alternative would not be required as the grades would continue to allow sheet flow across the site. While the CNPS alternative would require 160 lineal feet of pipe, 910 feet of earthen swale and 24 dissipation structures.

The City alignment maintains the existing dirt trail through the oak woodland habitat and around the coastal terrace prairie habitat; therefore environmental impacts to those habitats associated with the CNPS alignment do not occur. Tree removal is reduced and no retaining walls would be required. The City alignment is shorter in length and more direct to the east/west destinations, reducing the potential for cut through use. The City alignments would provide ADA access for the first time in an open space area within the City. Concurrently the public's experience of the coastal prairie and oak woodland habitats are maximized with the least environmental impact.

Conclusion

An alignment very similar to that proposed by CNPS was evaluated by the City's environmental team early on in the development of the Arana Gulch Master Plan process, and under consultation with USFWS. It was eliminated from further consideration when it was determined to have significant environmental impacts. The engineered analysis CNPS alternative clearly and absolutely validates this earlier decision.

Attached is a table comparing the revised City-proposed alignment with the CNPS alignment:

Comparison Table of City and CNPS Alternatives

Statistics	City of Santa Cruz	CNPS
	Multi-Purpose Trails	
Length	1,194 lineal feet	1,841 lineal feet
Width	8' paved trail + 2' shoulders	8' paved trail + 2' shoulders
Max. height above existing grade	at grade	7 feet high
Construction impact zone	15,804 sq. ft.	32,064 sq. ft.
Tree removal	1 tree	11 trees
Prairie habitat removal	none	3,000 sq. ft.
	Cut/fill	
Net cubic yards	441 cy (cut)	736 cy (cut)
Max. depth of excavation	2 ft.	7 ft.
	Retaining Walls With Guard Rails	
Length	0 ft.	1,030 ft.
Max. height	0 ft.	11 feet
Quantity	none	7 walls
	Storm Drainage	
Length of pipe	0 lf.	160 lineal ft.
Length of earthen swale	0 lf.	910 lineal ft.
Number of structures	none	24