LAW OFFICE OF MARC CHYTILO

ENVIRONMENTAL LAW

April 30, 2010

Santa Barbara County
Board of Supervisors
105 E. Anapamu Street, Suite 407
Santa Barbara, CA 93101

By email to sbcob@co.santa-barbara.ca.us

RE: Friends of Mission Canyon Appeal of Santa Barbara Botanic Garden Project Approval and EIR Certification

Dear Chair Wolf and Honorable Members of the Board of Supervisors:

This office represents of Friends of Mission Canyon ("FOMC"), a community-based public benefit corporation dedicated to protecting and enhancing the sensitive resources and safety of Mission Canyon. FOMC appealed the Planning Commission's approval of the Conditional Use Permit ("CUP") and Development Plan for the Vital Mission Plan Project ("Project") because the Project lacks the safeguards necessary to avoid jeopardizing the safety and sensitive resources of the Canyon. FOMC also appealed the Planning Commission's certification of the Environmental Impact Report ("EIR") for the Project because it does not comply with the California Environmental Quality Act ("CEQA").

The Findings for the Project are also legally inadequate and must be substantially revised to accurately reflect the Project's impacts and reveal the supporting facts and analysis behind the central conclusions. The Conditions of approval are also inadequate to reduce the Project's significant fire safety, cultural resource and other impacts. In addition, a full consistency analysis with the initiated Mission Canyon Community Plan ("MCCP") is required. Land Use Permits and Zoning Clearances issued for this Project will be required to comply with the initiated changes, and the CUP and Development Plan should also comply to ensure sound planning, or if it does not comply, the public and the Board should be apprised of the inconsistencies before approval the largest single development project in the history of Mission Canyon.

For these reasons we urge the Board to uphold the appeals and reject the project, directing the applicant to revise the Project Description and Development Plan for a Project that is designed around Mission Canyon's resource constraints, rather than trying to overcome them all. The Project needs to be physically smaller to shorten the construction period and reduce impacts to Mission Canyon by avoiding historical, cultural and biological resources. The CUP needs to include substantial restrictions on the intensity of uses, setting a year-round occupancy load, imposing an annual visitation cap based on known safe levels of use, not inflated,

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unverifiable projections that have not been tested for evacuation capability, disallowing large events, shifting portions of the institutional activities off-site to a location outside the extreme high wildfire hazard zone, establishing safe evacuation capacities and tailoring use limitations to those constraints, including the use of large vehicles. Event and daily operational traffic management plans, construction management plans, and construction traffic plans need strengthening and specificity; the construction period must be curtailed and include rest periods; utility infrastructure should be included in the first phase before any other construction may begin, and the plethora of community concerns and unanswered questions must be resolved. See Exhibit

1. CEQA Defects

The EIR serves to "inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made", protecting the environment as well as informed self-government. *Citizens for Goleta Valley v. Board of Supervisors of Santa Barbara County* (1990) 52 Cal. 3d 553, 564. The adequacy of an EIR "depends in large part upon whether it provides the information necessary for the County and the public to understand the nature and environmental consequences of the Project." *Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors* (2001), 91 Cal. App. 4th 342, 356. "Every citizen has a responsibility to contribute to the preservation and enhancement of the environment" (Pub. Res. Code § 21000 (e)) and state agencies shall ensure "that major consideration is given to preventing environmental damage." (Pub. Res. Code § 21000 (g).

The FEIR for the Vital Mission Plan Project does not meet CEQA's standards for adequacy for reasons stated herein, and the Planning Commission's certification of the document should be reversed. Moreover, if the Board wishes to proceed with the Project as approved by the Planning Commission, a recirculated EIR must be prepared to resolve the fundamental defects and to allow the public and government agencies the opportunity to comment on a legally adequate draft EIR and on the significant new information that has come to light subsequent to the release of the revised draft EIR but before certification of the FEIR.

a. The FEIR Is Inadequate under CEQA

i. Failure to Evaluate Ethnic Impacts

The County's CEQA Thresholds manual includes thresholds for evaluating the "ethnic impacts" of a project. The thresholds used in the EIR, derived from CEQA Guidelines sections 15064.5(b)(1) and (2), speak exclusively to historic resources and equates significance with effect on eligibility for listing on the National Register of Historic Places. (*See* FEIR pp. 4.4 – 16 – 4.4-17). The County's ethnic thresholds address a different type of impact, that is impacts to

an archaeological site or property of historical or cultural significance to a community or ethnic or social group. (Exhibit 1, County CEQA Thresholds, p. 53).

The Board letter attempts to justify the failure to address ethnic impacts in the EIR by stating that the "threshold question relating to ethnic impacts is reserved for sites of utmost significance to the Native American community and is not typically applied to every prehistoric archaeological site, regardless of the site's significance under CEQA." (Board Letter, p. 5, Issue 6). The Project site is the location of Kashwa, a Chumash village site (FEIR p. 4.4-5), and also Chumash burial grounds (FEIR p. 4.4-6). To suggest that such a site is not "of utmost significance to the Native American community" misrepresents the significance of the site. Indeed members of the Chumash community have appealed the approval of the Vital Mission Plan precisely because the site is of utmost importance to them (*see* Arredondo Appeal, 11/5/09). In his appeal letter, Mr. Arredondo specifically criticizes the cultural resource study's failure to address ethnic value and concerns of the Chumash community. (*See* Arredondo Appeal, pp. 5-6). Appellant Arredondo also describes the ethnic importance of the Chumash site, for example stating:

> SBa-58 is classified as Native American sacred area, Traditional cultural sites and this includes definitions such as villages, campsites, gathering and harvesting areas, quarries, tool manufacturing areas, rock painting and carving areas, and burial grounds. This location also is considered to be a Religious or spiritual site.

Moreover, there is no indication whatsoever from the thresholds manual that ethnic impacts are reserved for some class of sites "of utmost significance to the Native American community". *See* Exhibit 1, County CEQA Thresholds Manual, p. 53. Pursuant to the ethnic thresholds,

> A project will normally have a significant effect on the environment if it will cause one of the following:
>
> a. Disrupt or adversely affect a prehistoric or historical archaeological site or a property o[f] historical or cultural significance to a community or ethnic or social group.
> b. Conflict with established recreational, educational, religious, or scientific uses of the area.

Here, the Project disrupts and adversely affects an archaeological site and property of cultural significance to the Chumash community. Specifically, the Project will require construction on and near the village of Kashwa and Chumash burial grounds (FEIR p. 4.4-5 – 4.4-6). Staff's asserts that "[w]hile not discussed and evaluated under the context of "ethnic impacts" as a separate impact heading, the EIR does evaluate the impacts of the project on archaeological and historic resources, consistent with the intent of this threshold". (Board Letter, p. 5, Issue 6). Reviewing the FEIR reveals no impact evaluation consistent with the intent of the

ethnic thresholds. For example, "Potential Impacts to CA-SBA-22" describes the project elements that would involve surface or subsurface disturbance to the site, that there is a possibility that development will disturb low density deposits, and that the increase use of the Hansen site would potentially increase indirect impacts to the archaeological resource such as vandalism. *See* FEIR p. 4.4-17. This impact discussion does not even mention impacts to the Chumash community that might result from these direct and indirect disturbances of CA-SBA-22. The only other impact discussion that concerns the Chumash site is "Potential Impacts to Other Arhaeologically Sensitive Areas", which discusses the possibility of unknown resources being disturbed. *See* FEIR pp. 4.4-17 – 4.4-18. The discussion of impacts to archaeological resources does reveal the significant additional impact associated with these disturbances, namely the disruption and loss of "cultural significance" the Chumash community.

ii. Failure to Identify and Analyze Noise Impacts from Fire Safety Drills

The Fire Protection Plan includes a requirement of a "facility-wide emergency alarm system which is audible throughout the SBBG, such as a public address system. The system . . . will function as an alert system to be heard by all occupants and visitors, notifying them of an emergency situation such as a structural fire or wildfire, and will be a component of the regular fire emergency training and drills." FPP, p. 42.

To fulfill this requirement, the applicant will need to install a public address system whose visual and noise impacts were not studied. Since the system must be loud enough to reach all visitors, it will necessarily be very loud, but there is no disclosure of how loud, and its impacts off site. It is unlikely that such a system may be installed and meet the Fire Protection Plan's performance standards without causing exceedences of the General Plan noise standards at the property lines. Since the FPP mandates this system be used as part of regular training and drills, it will be used periodically during non-emergency conditions. This creates significant noise impacts not considered in the EIR, and may involve pole mounted speakers and cause neighborhood confusion and false evacuations during drills and trainings. This is a significant impact unaddressed in the environmental review process. CEQA plainly requires assessment of the potentially significant impacts from the implementation of mitigation measures. *Sundstrom v. County of Mendocino* (1988) 202 Cal. App. 3d 296. In the absence of such analysis, the EIR is incomplete.

iii. Failure to Update List of Present and Probable Future Projects Following the Jesusita and Tea Fires and Analyze Cumulative Impacts from Fire Reconstruction

To be legally adequate the EIR must include a "list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency". CEQA Guidelines § 15130 (b)(1)(A). The County has a duty to use

reasonable efforts to discover, disclose, and discuss related projects. *See San Franciscans for Reasonable Growth v. City & County of San Francisco* (1984) 151 Cal. App. 3d 61, 74 (public agency abused its discretion by omitting other closely related projects that could have been easily ascertained). The list of related projects in the VMP EIR is legally defective because it fails to include the numerous reconstruction projects in Mission Canyon and nearby areas as well as at the Botanic Garden itself that are proposed and anticipated in the wake of the Jesusita and Tea Fires. *See* FEIR pp. 3-1 – 3-3. In the Board Letter, Staff responds by stating that "CEQA does not require updating of the list of related project as the Draft EIR is being prepared, as it would be a constantly moving target as new projects are proposed." Board Letter, p. 4, Issue 4. FOMC does not allege that the County must update the EIR each time a new project is proposed. Rather here there were two discrete events, the Tea fire and the Jesusita Fire, each of which destroyed hundreds of homes in the immediate area and adjacent Riviera neighborhood. Reconstruction of these destroyed and damaged homes are "probable future projects" within the meaning of CEQA Guidelines § 15130. Indeed the FEIR acknowledges that "an estimated 71 residences were destroyed in the recent Jesusita Fire within Mission Canyon, it is expected that most if not all will be rebuilt over time." FEIR p. 4.7-2. The FEIR's failure to account for this radical change in anticipated construction activity in the Project area is a glaring flaw that must be remedied.

The effect of the failure to revise the list of related projects is that the EIR's discussion of cumulative impacts is inadequate. "Before the impacts of a project can be assessed and mitigation measures considered, an EIR must describe the existing environment. It is only against this baseline that any significant environmental effects can be determined." *Amador*, 76 Cal. App. 4th at 952. Staff contends that "the EIR does acknowledge in applicable sections, including aesthetics, biological resources, land use, and noise, that the recent Jesusita Fire and associated rebuilding of homes would result in cumulative impacts such as short-term construction noise and traffic, though these would be less than significant. The cumulative impact assessment in other issue areas was not revised because it was determined that the fire or rebuild efforts would not have any significant bearing or effect on the cumulative discussion." Board Letter, p. 4, Issue 4.

The FEIR was indeed revised to include some reference to Jesusita Fire rebuilding in the sections identified by Staff. The additional text does not remedy the inadequate impact analysis however because it lacks the level of analysis required by CEQA, consisting of conclusory statements with no substantial evidence behind them. For example, in the noise section, the additional text reads as follows:

> Other related projects, including those recently completed by the Botanic Garden and other minor additions or remodels, would not result in long-term noise generation since use levels and intensity would not change, and short-term construction related noise generation would not be significant given the scale of the projects and their location relative to one another. Rebuilding residences in and around the project site that were

> destroyed in the Jesusita Fire will result in temporary construction related noise. However, this would be short-term and standard conditions limiting construction to daytime hours would help to alleviate this impact. Cumulative construction related and operational impacts would be **less than significant** and the **project's contribution would not be cumulatively considerable**.

FEIR p. 4.8-12.

The discussion in the Land Use section is even more cursory:

> Rebuilding residences lost in the Jesusita Fire will result in temporary noise and traffic impacts associated with construction throughout the affected community; however these nuisances will be short-term.

CEQA plainly provides that short-term impacts may be significant. The CEQA Guidelines include within the term "project," "public works construction and related activities, clearing or grading of land [and] improvements to existing public structures . . . " CEQA Guidelines, § 15378 (a)(1)) *County of Amador v. City of Plymouth* (2007) 149 Cal. App. 4th 1089, 1100; *see City of Arcadia v. State Water Resources Control Bd.*(2006), 135 Cal. App. 4th 1392, 1425. Additionally, Staff's contention that the fire rebuilds will not overlap with Project construction lacks foundation given that the two year window for project construction due to permit streamlining not fully effective, and many homeowners who are still trying to get insurance settlements haven't started the process. Additionally many who are in the process will be building for well over 2 years due to money constraints.

A second reason why these additions to the FEIR do not adequately resolve the issue concerns the requirement of public review and comment. Where the information is merely added to the FEIR and the comment and response process is side-stepped, the public and government agencies cannot fulfill their critical function in assuring the adequacy of EIRs (*See Mountain Lion Coalition v. Fish & Game Com.* (1989) 214 Cal. App. 3d 1043, 1051). For this reason CEQA calls for recirculation of the EIR, as discussed in section b, *infra*.

iv. Failure to Identify Inconsistencies with General Plan Policies as Potentially Significant Impacts

An EIR is required to identify any inconsistencies between the Project and the General Plan. *Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors* (Cal. App. 1st Dist. 2001) 91 Cal. App. 4th 342, 356 (citing CEQA Guidelines, § 15125(d)). Inconsistencies with General Plan and other policies designed at least in part to protect the environment constitute substantial evidence supporting a fair argument that a project may have a significant effect on the environment. *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 930. *Protect the Historic Amador Waterways v. Amador Water Agency* ("*Amador*")(2004) 116 Cal.

App. 4th 1099, 1109 discusses the process that the County is required to follow with respect to identifying and analyzing potentially significant impacts:

> [I]n preparing an EIR, the agency must consider and resolve every fair argument that can be made about the possible significant environmental effects of a project, irrespective of whether an established threshold of significance has been met with respect to any given effect. Once the agency has determined that a particular effect will not be significant, however, the EIR need not address that effect in detail. Instead, the EIR need only "contain a statement briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report.

Here, the EIR is fundamentally defective for failing to identify inconsistencies with adopted with adopted plans and policies *as potentially significant* environmental impacts, despite the existence of substantial evidence in the record supporting a fair argument that the Project is inconsistent with policies designed to protect the environment. Consequently, fair arguments supporting significant land use impacts from policy inconsistency have not been discussed or resolved through mitigation or alternatives, as required by CEQA. *See Amador,* 116 Cal. App. 4th at 1109.

Staff's response in the Board Letter (*see* p. 5, Issue 7) is not responsive to the specific issue raised by Appellant. Staff responds that the EIR includes an entire chapter on policy consistency, but this misses the point. While Appellant does argue that the EIR omits reference to several inconsistencies, Appellant fully acknowledges that the EIR does discuss policy consistency. The thrust of Appellant's argument is that the identified policy inconsistencies are not recognized in the EIR as potentially significant environmental impacts. Staff responds stating "Contrary to the appellant's assertion, policy inconsistency does not automatically equate to a significant physical impact that must be analyzed in an EIR." (Board Letter, p. 5, Issue 7). This is not an accurate characterization of appellant's argument. Appellant agrees that policy consistencies do not *automatically equate* to a significant physical impact. Rather, the law provides that inconsistencies with applicable plans and policies *designed at least in part to protect the environment* are *potentially significant impacts that must be identified and evaluated in an EIR*. *Pocket Protectors,* 124 Cal.App.4th at 930; CEQA Guidelines, App. G, § IX (b).

Each of the policy inconsistencies identified in this appeal involve policies that are designed at least in part if not in whole to protect the environment. For example, they protect the natural and human environment from fire risk caused by inadequate road capacity, protect biological and cultural resources, and preclude certain events that generate traffic and noise, again reducing environmental impacts. As such a potentially significant impact exists where the Project is inconsistent with them. The specific policies with which the Project is inconsistent are as follows:

1. Land Use Element Development Policy 4

Findings are required pursuant to Land Use Element Development Policy 4 that adequate public or private services and resources (i.e. water, sewer, roads, etc.) are available to serve the proposed development. A finding that adequate roads are available to serve the Project cannot be made given that Mission Canyon Road does not meet current minimum road width standards and is not capable of sustaining the additional construction and development proposed for the Project without seriously jeopardizing the safety of Mission Canyon residents. A finding that adequate water service also cannot be made as the feasibility of providing water that meets commercial fire-flow standards and does not create deficiencies elsewhere in the system is not established. Because these findings cannot be made, the Project does not conform to this important policy.

In the Board Letter, Staff asserts that Count Fire Department standards for road width do not apply, since Mission Canyon Road is a public road. Board Letter p. 7, Issue 9. This rationale belies the question, because they receive more traffic, wouldn't public roads require even greater widths? The narrow winding nature of Mission Canyon Road is plainly evident to anyone driving it and the notion that it is adequate to carry the existing traffic, let alone the traffic increases generated by the 1.8% yearly increase in Garden attendees, is patently absurd. The steep slopes on either side of the road and lack of adequate turn-outs exacerbates this problem. Moreover, construction activities associated with the Project, as well as with Jesusita fire reconstruction projects, will necessarily involve large trucks and heavy equipment transport on Mission Canyon Road. Again, anyone who has experienced driving up or down Mission Canyon Road together with such heavy equipment understands the plain inadequacy in the width of the road. On countless occasions busses, trucks, tractors, and other vehicles have become stuck on Mission Canyon Road, obstructing one or both lanes of traffic (*see* Exhibit 14). Staff's asserts that the provision of adequate fire flows *not* speculative and the Canyon's water purveyor determined there is adequate water to serve the Project. This assertion is problematic for several reasons, first of which is the now widely acknowledged fact that water scarcity is increasing due to climate change. Similarly reduced rainfall and more extreme weather patterns can increase fire danger, culminating in a substantial increase in risk to the Canyon population.

2. Mission Canyon Area Specific Plan Tree Preservation Policy

Mission Canyon Area Specific Plan Tree Preservation requires that all new development avoid removal of native and specimen ornamental trees to the maximum feasible extent. The Project would remove approximately 50-60 coast live oak trees, two California bays and one bigleaf maple, the majority of which are protected under this policy. The Project is not consistent with this policy because it is feasible to avoid the removal of many protected oak trees through the redesign of the Cavalli path and reconfiguration of the proposed detention basin on the Hansen site. The Policy Consistency Analysis states that the proposed reconfigurations *may* reduce the number of trees requiring removal, however does not require that the reconfigurations

avoid tree removal where feasible. Without such a requirement, the Project is inconsistent with this policy, and required findings of policy consistency (see below Findings discussion) cannot be made.

3. Land Use Element Historical and Archaeological Sites Policy 1

To achieve consistency with Land Use Element Historical and Archaeological Sites Policy 1, "[a]ll available measures, including purchase, tax relief, purchase of development rights, etc., shall be explored to avoid development on significant historic, prehistoric, archaeological, and other classes of cultural sites. The Project involves development on historically significant sites including a designated landmark and the historically significant Historic Garden. The Project also involves development on CA-SBA-22, a significant archaeological and cultural Chumash site. There are available measures for avoiding development on the Garden's historically and culturally significant sites, including elimination of the Meadow Terrace, proposed paving, and development on the Hansen Site. As such, the Project is inconsistent with this Policy.

In the Board Letter, Staff contends that "all available measures" were explored, and determined "not to be appropriate for the site" because the Garden is a non-profit and purchasing the property would be contrary to the Garden's mission. Board Letter, p. 8, Issue 10. Appellant never suggested that the County purchase the land to avoid impacting the Historic Garden or CA-SBA-22. Rather, this policy demonstrates the lengths to which the County is required to go in order to avoid development on significant sites such as these. Appellant contends that the Garden has numerous opportunities to *avoid* development on these significant sites, and that this policy, and the two cultural resource policies discussed below require that avoidance.

4. Land Use Element Historical and Archaeological Sites Policy 2

Land Use Element Historical and Archaeological Sites Policy 2 requires that project design avoids impacts to cultural sites if possible. Discussed above, avoiding CA-SBA-22 could be achieved by relocating or eliminating proposed new development on the Hansen site. The FEIR does not demonstrate that this development could not feasibly be relocated offsite, or that paving of the Hansen site road, detention basin, grading for the Cavalli path, and concomitant impacts to CA-SBA-22 could not be avoided. Other opportunities for providing secondary access must be explored, and adequate surveys must determine *up front* whether avoidance of these resources is feasible. *See* CEQA Guidelines § 15120 (c). For these reasons the Project does not conform to this policy.

5. Historical and Archaeological Sites Policy 5

Historical and Archaeological Sites Policy 5 requires that Native Americans be consulted when development proposals impact significant archaeological or cultural sites. The Policy

Consistency Analysis states that "Native Americans have been consulted and involved in the review of this project." As discussed by Chumash representative Frank Arredondo in his appeal, the record contains no indication that required consultations with Native Americans took place. The FEIR's response to comment includes a response to Mr. Arredondo's February 17, 2009 letter that raised this issue, but is inconclusive and does not establish that the County has complied with Historical and Archaeological Sites Policy 5. *See* Comment and response 24-3.

In addition to these existing policies, the Project is inconsistent with numerous goals and policies of the initiated Mission Canyon Community Plan, as outlined in section 4, *infra.* This planning document expresses the existing community values and environmental concerns that affect Mission Canyon and the Project's marked inconsistency with the Plan is further evidence of the Project's significant land use impacts.

6. Zoning Inconsistency

The recreation zone in which the Project is located clearly provides that certain activities including "art and craft fairs" are prohibited in the zone. Staff raises the unusual argument in the Board Letter that these activities are not prohibited because they are not "principal uses" that instead they are "secondary uses that are ancillary or customarily incidental to the principal use." Board Letter, p. 6, Issue 8. In fact, the section of the zoning ordinance that prohibits art and craft fairs is titled "temporary uses". Specifically the Zoning Ordinance enumerates the temporary uses allowed, conditionally allowed, and prohibited (or exempt, etc.) in REC zones in Table 4-15 on page 4-57 of the LUDC. Each use is then defined in the subsequent sections of the zoning ordinance. "Carnivals, circuses, and similar activities" are prohibited ("— Use Not Allowed"). Table 4-15. "Carnivals, circuses, and similar activities" are further defined as including "art and craft fairs (including the sale of antiquities and art objects)". LUDC § 35.42.260 (F). Ironwood, 2009 Holiday Marketplace, provides an example of a past Garden event that constitutes an "art and craft fair". Exhibit 6. These uses are clearly prohibited by the Zoning Ordinance and Staff's argument that they are permissible as "secondary uses" is utterly lacking in foundation.

Similarly, the Land Use and Development Code defines Festivals as events with music and involving 500 or more people. Festivals, as defined by the Land Use and Development Code, are categorically inappropriate on this site and not permitted by the zoning designation.

Because appellant and others have raised substantial evidence to support the Project's inconsistency with these policies, the EIR was required to identify the inconsistencies as *potentially significant impacts*, evaluate their significance, and if significant, adopt mitigation measures and/or alternatives. Without this information in the EIR, the public, government agencies, and the Planning Commission and Board, lack the information necessary for informed participation and decisionmaking. As such, without this information the EIR is inadequate as an informational document. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal. App. 4th 1184, 1198, 1208).

b. CEQA Requires Recirculation of the EIR to Enable the Public and Government Agencies to Comment on an Adequate Draft EIR and Significant New Information

"The requirement of public review has been called 'the strongest assurance of the adequacy of the EIR.'" *Mountain Lion Coalition v. Fish & Game Com.* (1989) 214 Cal. App. 3d 1043, 1051 (quoting *Sutter Sensible Planning, Inc. v. Board of Supervisors* (1981) 122 Cal. App. 3d 813, 823). To effectuate this public review requirement, the lead agency must prepare an adequate draft EIR that is circulated to the public and government agencies. CEQA Guidelines §§ 15084, 15087. The public has a period of at least 30 days to review the draft EIR and submit comments on each required element and its overall adequacy. CEQA Guidelines § 15105(a). The lead agency then must evaluate the comments and respond in writing, and include the comments and responses in the FEIR. CEQA Guidelines § 15088.

Where fundamental deficiencies are corrected or significant new information is added to the EIR after public notice is given of the availability of the draft but before certification of the EIR, the public agency is required to recirculate the EIR for additional public comment. CEQA Guidelines § 15088.5 (a). Fundamental deficiencies in the draft EIR or the omission of significant information cannot be 'cleared up' in a final EIR that is not circulated to the public. *Mountain Lion Coalition,* 214 Cal. App. 3d at 1052 (court refused to consider whether the final EIR "clears up some of the deficiencies of the draft" because "[i]f we were to allow the deficient analysis in the draft [EIR] to be bolstered by a document that was never circulated for public comment . . . we would be subverting the important public purposes of CEQA."); *see Sutter Sensible Planning v. Board of Supervisors of Sutter County* (1981) 122 Cal. App. 3d 813, 823 (After certification but while additional agency hearings on the project approval were ongoing, numerous deficiencies were 'corrected' and a revised FEIR was prepared but the agency held no formal comment period or respond to comments, which the court concluded was procedural error, given that public review and comment "is the strongest assurance of the adequacy of the EIR"); *see also Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal. App. 4th 74, 95.

The trigger for whether new information is "significant" is whether such that recirculation would be required is whether the omission "deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement." CEQA Guidelines § 15088.5 (a). Examples of significant new information requiring recirculation include: a new significant environmental impact, a substantial increase in the severity of an environmental impact, a new significantly different and environmentally preferable feasible project alternative or mitigation measure, and information required to enable meaningful public review and comment on a fundamentally inadequate draft EIR. CEQA Guidelines § 15088.5 (a) (1-4).

i. Jesusita Fire

The flawed baseline with respect to post-fire reconstruction projects discussed in section i1.a.ii, *supra*, is the sort of defect that renders an EIR fundamentally inadequate and requires recirculation of a draft EIR. "Without a determination and description of the existing physical conditions on the property at the start of the environmental review process, the EIR cannot provide a meaningful assessment of the environmental impacts of the proposed project." *Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001), 87 Cal. App. 4th 99, 119-120; *see Cadiz*, 83 Cal. App. 4th at 95 (the failure of draft EIR to include critical information regarding the Project's environmental setting required recirculation).

Significant new information arising from the Jesusita Fire that substantially increases significant impacts to fire protection is also omitted from the EIR. Specifically, the fire changed short term future fire behavior, shifting the balance to much more vegetation below the Garden. This creates potential for upcanyon fire, which given Mission Canyon's solitary egress point would cause a catastrophe of unimagined proportions. Moreover, dead dry vegetation in burn areas, plus flashy rebound vegetation, results in increased fuel stock flammability. For example the October 22 2007 Witch fire in San Diego reburned the same swath as the October 25, 2003 Cedar fire in only 4 years. Two people died and 39 firefighters were injured in the Witch Creek fire while fifteen perished in the Cedar Fire, most while trying to escape.[1] Each was a firestorm

[1] Fifteen people, including one firefighter, were killed by the fire. The fatalities were:[1]

- Galen Blacklidge — 50, Lakeside, teacher, artist – Died October 26, 2003 while trying to escape in her vehicle
- Christy-Anne Seiler-Davis — 42, Alpine - Died October 26, 2003 while in her home on Vista Viejas Road in Alpine
- Gary Edward Downs — 50, Lakeside, small-business owner – Died October 26, 2003 while trying to escape the flames on Wildcat Canyon Road
- John Leonard Pack — 28, Lakeside - Died October 26, 2003 along with his wife Quynh trying to escape the fire on Wildcat Canyon Road
- Quynh Yen Chau Pack — 28, Lakeside - Died October 26, 2003 along with her husband John trying to escape the fire on Wildcat Canyon Road
- Mary Lynne Peace — 54, Lakeside, nurse - Died on October 26, 2003 along with her sister-in-law Robin Sloan near the Barona Indian Reservation
- Steven Rucker — 38, Novato, firefighter, died October 29, 2003 in Julian on firefighting operations
- Stephen Shacklett — 54, Lakeside, construction superintendent - Died October 26, 2003 while trying to escape the fire in his motorhome on Muth Valley road
- James Shohara — 63, Lakeside, correctional officer - Died October 26, 2003 along with his wife and son while trying to escape near San Vicente Reservoir, Lakeside

occurring outside of what had previously been called the High Fire Season and is now the High Fire Preparedness Season. The conclusion in the final EIR revisions and in staff's analysis is utterly cavalier and sophomoric, relying on uninformed assumptions and a profound lack of technical support, others than oblique references to a generic level of "support" by the Fire Department.

The Jesusita Fire also substantially increases the potential for significant impacts caused by landslides/mudslides and the risk of flash flooding. This in turn increases the risk of bridge damage, road closures, impacts to high pressure gas pipeline – all substantially increasing the severity of the Project's significant fire safety impacts.

ii. Unidentified Significant Impacts

The omission of both "ethnic impacts" and land use impacts based on policy inconsistency, both significant impacts as demonstrated above, are also defects that require recirculation of a draft EIR. CEQA Guidelines § 15088.5 (a)(1) ("Significant new information" requiring recirculation includes a disclosure that "A new significant environmental impact would result from the project").

iii. Cultural Resource Additions

The FEIR includes substantial additions to the Cultural Resource section and mitigation measures, with a large portion of the text of this section indicated in strike-through. [2] This new information includes: an addition to the thresholds of significance explaining that archaeological

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- Solange Shohara — 43, Lakeside, correctional officer - Died October 26, 2003 along with her husband and stepson while trying to escape near San Vicente Reservoir, Lakeside
- Randy Shohara — 32, Lakeside - Died October 26, 2003 with his stepmother and father trying to escape near San Vicente Reservoir, Lakeside
- Robin Sloan — 45, Lakeside, Walmart employee - Died October 26, 2003 attempting to escape the fire near the Barona Indian Reservation
- Jennifer Sloan — 17, Lakeside, student - Died October 26, 2003 along with her mother Robin while attempting to escape the fire near the Barona Indian Reservation
- Ralph Marshall Westley — 77, Lakeside, retired retail clerk, discovered October 27, 2003 at 1088 Barona Road.
- Unknown found mid-December in the I-15/SR 52 area.
  Source: Wikipedia, citing a CBS News report.

[2] Changes to the EIR text since the DEIR and DEIR Recirculation Documents are indicated in strikethrough/ underline format in the FEIR. (FEIR p. 1-1).

sites are included in the definition of "historical resources" under CEQA. Prior to this disclosure, and because the thresholds exclusively reference historic resources, the public's and decisionmaker's understanding of the Project's impacts were thwarted. *See* FEIR p. 4.4-4; p. 4.4-16. Newly added text to the FEIR also includes extensive additional information regarding the location of on-site archaeological resources, previous work done to identify archaeological resources, and an entirely new section on "site significance". FEIR pp. 4.4-5 - 4.4-7. Additionally, the FEIR includes an entirely new mitigation measure related to archaeological resources (*see* pp. 4.4-22 – 4.4-23). This new information adds an entirely new dimension to the cultural resource impact analysis that was not previously vetted through the public review and comment process.

iv. Anticipated change in Red Flag protocol

For the first time at the Planning Commission approval hearing, the Count Fire Department informed the public and Commission that a change to the Red Flag protocol is being developed. Numerous mitigation measures and Conditions of Approval rely on the Red Flag declaration to trigger increased restrictions on activities and attendance at the Garden, among other things. The revised protocol would require that the Garden monitor the National Weather Service information regarding Red Flag conditions, and to limit its activities accordingly. Given the critical importance of ensuring that large events, road closures for construction, and other activities that compromise Mission Canyon's evacuation routes, coupled with the obvious counter-incentive ($$, disruption in Garden operations) not to rigorously enforce the event and visitation limiting conditions, this 'self-enforced' restriction is untenable. The changes to the fire-safety conditions relying on the Red Flag protocol so undermine the efficacy of these mitigation measures, that the change in protocol and shift to self-enforcement significantly increase the severity of the significant fire safety impacts of the Project. Accordingly, recirculation of the EIR is required to re-evaluate these mitigation measures and the Project's fire safety impacts, and provide the public and government agencies the opportunity to comment thereon. *See* CEQA Guidelines § 15088.5(a)(2).

v. New Evacuation Study for Mission Canyon

In March of 2010, a new study was released that models specific evacuation scenarios in Mission Canyon, building on the research of Church and Cova on the evacuation capacity of Mission Canyon. The Thomas study demonstrates the importance of secondary egress, above and beyond any other changes in evacuation protocol such as reducing the number of vehicles leaving the Canyon. For example, the study states "[w]e estimate that losing access to one particular evacuation road would more than double the time to evacuate the neighborhood for both a one- and two-car-per-household scenario. This crippling effect results when an intersection node at either end of this road segment is blocked, and we argue that efforts should be taken to ensure this road is fortified against possible closure due to natural or deliberate attacks. Exhibit 2, William P. Langford, A Space-Time Flow Optimization Model For

Neighborhood Evacuation, (March 2010), p. xiv, 29-30. The risk created by having solitary egress, which may become impassible, is so dire that there is no substantial evidence to support the EIR's conclusion that mitigation measures proposed in the EIR achieve the "same practical effect" of having secondary egress. *See* FEIR pp. 4.5-17, 4.5-17 – 18.

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vi. California Climate Change Center Report

After circulation of the last draft EIR the California's Climate Change Center released a new report, finding "residential wildfire risk increases over time for all climate change scenarios" and that "tripling or even quadrupling of residential wildfire risk is quite plausible by mid-century, with even greater increases by the end of the century." These conclusions of the Report reveal a substantial increase in the future fire risk in Mission Canyon, and corresponding increase in the significance of the Project's significant fire safety impacts. The Board Letter states that it was "impossible" for the EIR to consider this report, because it was released subsequent to the preparation of the FEIR. *See* Board Letter, p. 3. Of course, an addendum, supplement or recirculated EIR could have been prepared to account for this report, and because the report includes information that would substantially increase the fire risk in the Canyon, and consequently the Project's significant fire safety impacts, CEQA requires a recirculated EIR. *See* CEQA Guidelines § 15088.5(a)(2).

vii. Changes to Construction Phasing

Changes to the construction phasing Condition condense eight construction phases down to two. This allows more construction to occur simultaneously, resulting in increased construction impacts at any given time. Coupled with the significant increase in construction-related activity in on the Project site and broader Mission Canyon, anticipated from Jesusita Fire rebuilding projects, these changes to the construction phasing of the Project substantially increase significant cumulative construction impacts, necessitating recirculation of the EIR. *See* CEQA Guidelines § 15088.5(a)(2).

In sum, the EIR's failure to identify inconsistencies with adopted plans and policies as potentially significant environmental impacts, failure to utilize ethnic thresholds and evaluate ethnic impacts, failure to list fire reconstruction projects and account for their contribution to the Project's cumulative impacts, as well as significant new information from the Langford Thesis, change in Red Flag protocol, and changes to construction phasing, require recirculation of the EIR.

2. The Findings Are Inadequate

The "findings requirement serves to conduce the administrative body to draw legally relevant subconclusions supportive of its ultimate decision; the intended effect is to facilitate orderly analysis and minimize the likelihood that the agency will randomly leap from evidence to

conclusions." *Topanga Ass'n for a Scenic Community v. County of Los Angeles* (1974) 11 Cal. 3d 506, 516. Findings required by CEQA, and findings required for CUP and Development Plan approval, must be supported by substantial evidence in the record. Moreover, the findings must include sufficient detail to enable the public, and a reviewing court, to trace the analytic route the agency followed in making its conclusions. *Topanga,* 11 Cal. 3d at 516-517. Appellant identified six findings that do not meet these basic standards for adequacy.

a. Significant Impacts Are Not Mitigated to Insignificance

i. Fire Safety Impacts

The Project will introduce intensive construction and material transport on Mission Canyon Road, will expand garden visitation levels by up to 50% over time, and will substantially increase the amount of development in an area served by woefully inadequate roadways. The FEIR understates the Project's fire safety impacts and overstates the effectiveness of the Fire Protection Plan and other mitigation measures to mitigate those impacts below significance. This conclusion has been reached by the City of Santa Barbara, public safety expert Michael Decapua, and countless informed members of the community. In its June 18, 2009 letter, the City of Santa Barbara states that the EIR's analysis of the wildland fire evacuation and protection plan show:

> [that the proposed] mitigation measures would not be capable of reducing project impacts to less than significant levels. The 2007 City Planning Commission recommendation that this impact should be classified as a Class 1 impact . . . would still apply, as there appears to be no plan option available that could ensure that people living in the project area could be evacuated safely in the event of a Wildland fire ignited near the project site when substantial numbers of people are in the project vicinity. In this case there would only be one route available to evacuees and emergency vehicles and little time for evacuation to be completed.

Public Safety Expert DeCapua stated in his February 17, 2009 letter:

> Under the Vital Mission Plan, the addition of more up-canyon parking, lack of emergency vehicle turn-arounds, additional cars in the existing Garden parking lots, and addition of parking lot that egresses to Mission Canyon Road will exacerbate an already dangerous evacuation situation. *None of the proposed mitigation measures in the DEIR contribute to a more successful evacuation.*

Expert DeCapua's "strongest recommendation for reducing the risk to Mission Canyon residents and visitors would be to relocate a portion of the Botanic Garden's operations to another location away from the wildland urban interface." By erroneously classifying the Project's fire safety impacts as Class II, the FEIR avoids meaningful consideration of off-site alternatives.

The results of the Langford Thesis, discussed in section 1.b.v, *supra*, demonstrates the vital role that having a secondary access road has in alleviating both anticipated traffic congestion in the event of an emergency, and risk created when one egress route becomes obstructed due to a traffic accident, downed tree or power line, and other hazards. Discussed above, the proposed mitigation measures including the FPP are fundamentally unable to compensate for the serious risk to the Garden and Mission Canyon created by the lack of secondary egress.

The Planning Commission's finding that significant fire safety impacts have been mitigated to insignificance is further undermined by County precedent concerning another institutional expansion project similarly situated in an extreme fire zone with limited egress that found Class I (significant and unavoidable) impacts to fire safety. Exhibit 3, FEIR, Windermere Ranch Peace Retreat Project, February 1998. In the Windermere environmental impact analysis, the County used the frequency of wildfire as the central threshold for determining CEQA impact significance. "Fires that have a 'likely' or 'frequent' occurrence interval and could result in an unacceptable risk to life, safety and project structures, would have the potential to result in a significant environmental impact." Windermere FEIR p. 5.8-7. This central County CEQA threshold was ignored in the Botanic Garden's expansion project analysis, and as a consequence, no significant impact was found and the public and decisionmakers were both deprived of an adequate CEQA impact analysis and the more robust alternatives analysis and mitigation measure detail the CEQA demands for this project.

ii. Historic Resource Impacts

The historic significance of the Botanic Garden is undisputed. Protected by County Landmark and nationally recognized for its naturalistic design concept, the Garden is one of Santa Barbara County's most beloved historic sites. The conclusion reached in the FEIR that the drastic changes proposed for the Historic Garden will not have significant impacts to historic resources following mitigation, is not supported by the evidence. HLAC, Historic Resources Group (HRG), and the State Office of Historic Preservation (SOHP) have all concluded that the Project including the Meadow Terrace and paving of additional trails will significantly impact the Historic Garden. SOHP's February 23, 2009 letter severely criticizes the adequacy of proposed mitigation to ensure that the substantial proposed alterations to the Historic Garden Garden would not result in the Garden losing its eligibility for the National and California registers of historic places.

iii. Cultural Resource Impacts

In its February 23, 2009 letter, the SOHP states "the conclusion that impacts to CA-SBA-22 are Class II impacts, significant but can be reduced to a less than significant level with mitigation measures, is unsupported." Proposed mitigation is vague, and merely pays lip-service

to prioritizing avoidance while simultaneously authorizing capping of encountered resources. Specifically, Mitigation Measure Cult 2-2 states that "Project alternatives that would avoid impacts to CA-SBA-22 are evaluated in Section 6.0 of this EIR. If avoidance is not possible through project redesign, the next preferred option is capping. . ." FEIR p. 4.4-23. This mitigation measure is problematic in several respects, the first of which is its failure to describe the nature or extent of the Project redesign that should be considered, and what criteria would be used to assess the feasibility of project redesign. The feasibility of the Project Redesign Alternative is a separate and distinct issue from the feasibility of avoiding CA-SBA-22. The entire alternative may be infeasible for other reasons, as the Findings suggest.

Nowhere is the feasibility of avoiding CA-SBA-22 evaluated, and it has not been established that such avoidance is infeasible such that capping might be appropriate. Indeed, the required mitigation measure is so vague, that whether or not it is 'infeasible' to avoid the resource would seem to be a determination made at the time, on the ground. This is not the sort of analysis expected in an EIR, and amounts to impermissibly deferred mitigation. *See* Guidelines § 15120 (c).

It appears that the EIR failed to properly document the pre-project condition of the roadway in CA-SBA-22. This roadway has experienced considerable expansion during the pendency of environmental review process, as it is characterized and evaluated as being paved when the evidence indicates it had been little more than an "unpaved dirt road (overgrown)" FEIR Appendix D p. 35. Somehow, at some point in the process, that roadway was cleared and widened, but there is no evidence that the roadway in its current condition was properly permitted by the County. The Project Description thus builds upon the assumption of the presence of a road when in fact it is an illegal or non-existent roadway or path through a very sensitive cultural resource area and allows a further expansion and intensification of that use in an area with a very high density of cultural sites without a proper pre-project baseline analysis. The environmental impact analysis failed to establish the baseline conditions and assumed an unpermitted or nonexistent roadway was paved and thus could be expanded without considering the effects or legality of its recent expansion.

iv. Aesthetic Impacts

Mission Canyon is a semi-rural area, with an eclectic array of building styles and wide swaths of vegetation obscuring much of the development. The Garden in particular exemplifies the naturalistic aesthetic of Mission Canyon. As demonstrated by visual simulations including Figures 4.1-8, 4.1-9 in the FEIR, the Project introduces a new uniform structural element that substantially degrades the existing character and quality of the site and its surroundings. This change in visual character is not addressed through mitigation and remains a significant adverse impact. *See* Threshold of Significance (c), FEIR p. 4.1-14. The FEIR however characterizes the aesthetic impacts as adverse but less than significant. Friends disagrees, and the visual simulations support Friends' conclusion that the impacts are significant. Whether significant or

adverse however, the findings of approval require that even adverse impacts be mitigated to the maximum extent feasible and here that has not been done.

As demonstrated in the recent Jesusita fire, the vegetative cover that is so characteristic of Mission Canyon's aesthetic is vulnerable and ephemeral in nature. The FEIR relies on vegetative cover to reduce the Project's significant visual impacts, but this approach does not mitigate the aesthetic impacts caused when vegetation is compromised due to fire, disease, seasonal leaflessness or plant death. Additionally the mitigation proposed is contingent on consistency with the Fire Protection Plan and County Fire Department fuel management requirements (*see* FEIR p. 4.1-33) such that the extent and location of proposed vegetative cover has not been disclosed nor evaluated for sufficiency. AES 2-1 merely requires earth-tone roof-top building materials, hardly sufficient to address the uniform densely-developed aesthetic introduced by the project which compromises the Garden and the Canyon's aesthetic resources. AES 2-1 and 2-2 are fundamentally inadequate to address the Project's significant aesthetic impacts.

The FEIR declines to require removal of existing 6-foot black chain-link (or "cyclone") fencing vigorously objected to by the Historic Resources Group, HLAC, SBAR and others, as causing significant impacts to the aesthetics and historic integrity of the site. Friends maintains that removal of all this fencing is warranted to mitigate for the cumulative visual and historic impacts caused by the incremental development of the Garden without environmental review. At a minimum, the cyclone fencing along Tunnel Road that was constructed since the NOP must be removed. The FEIR describes this portion of the cyclone fencing as a "noticeable foreground feature seen by motorists and pedestrians and is generally considered aesthetically undesirable." FEIR p. 4.1-17. Mitigating the Project's significant aesthetic impacts requires removal of this offensive fencing.

b. General Plan and Zoning Ordinance Consistency

Discussed in section 1.a.i, *supra*, the Project is inconsistent with various General Plan policies, as and allows uses expressly prohibited by Zoning Ordinance requirements applicable in the Recreation Zone. In addition, discussed in section 4, *infra* the Project is also inconsistent with the initiated Mission Canyon Community Plan. The Finding required for both approval of the CUP and Development Plan cannot be made under these circumstances.

c. Mission Canyon Specific Plan Procedural requirements - Failed Consideration of City Concerns

Despite a specific requirement of the 1984 Mission Canyon Specific Plan demanding consultation with the City of Santa Barbara for all projects in Mission Canyon, (§ 6.2.b[3]), the

[3] Requiring, inter alia, that City's response to a proposed discretionary development "be taken into consideration in the decision to . . . approve a discretionary [land use] application."

City's role was limited to commenting on the draft EIR and cursory responses by County staff. There are no findings on the manner in which the City's extensive comments were "taken into consideration by the Board or even staff, as the only apparent analysis was the perfunctory responses to the City Planning Commission's and Fire Department's CEQA comments. The single City Planning Commission hearing revealed deep concerns over the Project's environmental impacts, its impacts upon the City, and most centrally, the public safety risk that is at the core of this and the Mission Canyon Association's appeals. "Owing to the dependence of the Mission Canyon Area on certain City services and the impact on the City of development in Mission Canyon, and opportunity is provided for direct City involvement in Mission Canyon Specific Plan implementation." Mission Canyon Specific Plan § 6.2.b. These impacts include water, sewer, runoff, creek water quality, recreational resources (the need for pedestrian paths and safe bikeways that lead from Mission Canyon into the City through the Botanic Garden, in large part for intrepid pedestrian and bicyclist Botanic Garden visitors), riparian and creek resources, circulation, off-site parking, evacuation planning, occupancy loads, and CEQA issues such as the adequacy of the Project Description, alternatives analysis, impact classification and other specific issues. While theoretically addressed on the CEQA level, the treatment of City input exclusively as a CEQA comment ignores the spirit and letter of the Mission Canyon Specific Plan's review and consideration requirements.

d. Adverse Impacts Are not Mitigated to the Maximum Extent Feasible

Pursuant to section 35.82.080.E.1 of the LUDC, the review authority must find that "[a]dverse impacts will be mitigated to the maximum extent feasible." Substantial evidence does not support this finding because additional feasible mitigation measures exist that could further reduce the Project's adverse impacts. In the initial appeal letter, FOMC raised the further limitations on Garden visitation and activities to lessen the Project's significant and adverse impacts to fire protection. FOMC also suggested prohibiting pavers, eliminating the proposed Meadow Terrace, and eliminating the proposed road on the Hansen site. FOMC Appeal, p. 14. In response Staff asserts that eliminating elements of the Project is not contemplated by the LUDC § 35.82.080.E.1 finding, and instead that "[t]he intent of this finding is that the impacts of *the project* have been mitigated to the maximum extent feasible, meaning that more could not be done with the project as proposed to further reduce impacts." Board Letter, p. 9, Issue 14. Staff's characterization of this finding is at odds with the CEQA guidelines, which define mitigation as including:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing impacts by limiting the degree or magnitude of the action and its Implementation.
(c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

CEQA Guidelines § 15370.

Prohibiting pavers, eliminating the proposed Meadow Terrace, and eliminating the proposed road on the Hansen site is the type of mitigation described in (a), "not taking a certain action" and (c), "rectifying the impact by repairing, rehabilitating, or restoring the impacted environment". The Board Letter cites no legal authority for the proposition that eliminating aspects of a proposed Project, or rehabilitating prior damage that is exacerbated by the Project, is not properly termed "mitigation". With respect to the pavers, a perfectly feasible and reasonable mitigation measure is simply requiring that ADA approved unpaved surfaces be used for all Garden trails. Decomposed granite and compacted earth are ADA friendly surfaces (*see* Exhibit 4, Department of Justice Bulletin on ADA Surfaces). Additionally numerous feasible mitigation measures exist to reduce the Project's adverse visual impacts. Specifically, eliminating, resiting and/or redesigning the highly visible overlook kiosk, reducing development footprints and intrusiveness of structures into important views from within and outside the Garden, adopting a more eclectic, rustic and naturalistic building style consistent with existing development in the Garden and in much of Mission Canyon. Until more robust mitigation is required, findings that the Commission must make that adverse impacts have been mitigated to the maximum extent feasible cannot be sustained.

3. The Conditions Are Inadequate

More restrictive conditions are required to mitigate the Project's significant and adverse impacts to the maximum extent feasible so required findings can be made including findings that the Project conforms to applicable policy. Specifically, the following conditions must be strengthened. In addition, a letter dated April 23, 2010 submitted to the Board by former Chief Deputy County Counsel Jana Zimmer describes additional conditions including "any given time site occupancy limits" that Friends believe must also be implemented for the Conditions to adequately address the severe fire risk and other constraints present in the Canyon.

a. Intensity of use

Condition 63 allows for an annual increase in Garden visitation of 1.8% per year, allowing for an ultimate increase in visitation of 50% above existing levels. Given the fact that even the existing Canyon population could not evacuate safely under a plethora of likely fire scenarios (e.g. down-canyon fire, solitary egress becoming blocked), expanding visitation at the Garden is reckless and moreover unnecessary. The Garden has already reached its capacity, and that any further growth would cause significant and unavoidable impacts. This conclusion is supported by the research of Cova (Public Safety in the Urban–Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy? (August 2005), that advocates setting

"maximum occupancy" limits for communities including Mission Canyon similar to the limits set for buildings, commonly understood to have a finite capacity. An additional condition that would further reduce the Projects significant fire safety impacts includes capping events taking place during high fire season preparedness levels at lower numbers. 180 persons is excessive given the extreme constraints of Canyon roadways, and bussing as mitigation were a fire to break out during one of these large events creates risks of its own, given that large busses have long experienced difficulty maneuvering Mission Canyon Road and have become stuck, themselves forming potentially deadly barricades in an emergency evacuation scenario. Further, the Garden must be required to cancel events during periods of extreme fire danger, and must be required to notify all prospective renters that the Garden reserves the right to cancel the event due to fire conditions at any time without advance notice.

b. Limitations on Garden Events Lacking

The Conditions place no meaningful restriction on the *type* of event that can occur at the Garden, despite the fact that the Zoning Ordinance specifically prohibits events that the Garden has hosted in the past (Exhibit 6, Ironwood, 2009 Holiday Marketplace and discussion in section 1.a.iv.6, *supra*). In addition, numerous other events occur at the Garden on a regular basis and without regard for fire response levels (*see* Exhibit 7, Ironwood, 2009 Members Picnic; Exhibit 8, Ironwood, 2009 Doggie Bagel Brunch; Exhibit 9, Ironwood, 2009 Fall Plant Party). The dates on which these events were held, the Fire Department's response level was either high, or very high (*see* Exhibit 11, County Fire email). Additional limitations regarding the type of event, number of attendees, correlated to the weather/fire risk conditions must be incorporated into the Project. Moreover events that fall within the definition of 'art and craft fair' or other categories of uses prohibited by the Zoning Ordinance must be expressly prohibited in the Conditions.

c. Fire Protection and Public Services

Condition PF 2-1 requires that the Garden fund and construct necessary upgrades to the City of Santa Barbara's existing water system to ensure adequate water capacity and pressure to support domestic water service and fire flows to the Garden as prescribed by the Santa Barbara County Fire Department, including a new 12-inch water main. This condition is relied upon in the FEIR for conclusions that the Project will have adequate water supplies, both for regular consumption and for fire-flows. The condition however is vague as to whether commercial or residential hydrants, pressure, and flows would be required. The condition should prescribe a 1250 gpm minimum fire flow under fire conditions, when the system is experiencing high demand at other hydrants, with compliance demonstrated at startup and periodically thereafter. Additionally, since one BG hydrant connects to upper pressure zone, the Garden must pay to upgrade the hydropneumatic tank system to provide 1250 gpm at Garden hydrant while delivering 750 gpm at top of Mission Canyon Rd.

d. Construction

Impacts from construction are expected to be considerable, particularly when the cumulative impacts of the additional Jesusita Fire related rebuilding is taken into account. The proposed mitigation measure proposed to address the evacuation safety and traffic impacts associated with Mission Canyon Road becoming blocked to traffic due to construction equipment is inadequate. Specifically, Condition 1-3 requiring a traffic flag crew still permits for both lanes of Mission Canyon Road to be closed for up to 20 minutes. This constitutes an unacceptable delay, expected to significantly disrupt the daily lives of Mission Canyon residents. More importantly however, if an emergency were to occur while both lanes were blocked, an evacuation disaster could occur. Condition 1-3 must be modified to preclude closure of both lanes, and additional measures should be explored to further reduce the traffic and evacuation safety impacts caused by road closures.

Construction-related impacts also include air quality, erosion and water quality, solid waste, and other impacts. Particularly given the additional projects occurring and expected to occur in Mission Canyon following the Jesusita fire, additional mitigation measures must be identified and required to achieve tolerable impact levels in the Canyon.

e. Pathway modification

The significant impact caused by paving the Garden's earthen paths is discussed above. Reducing these impacts as required by CEQA and by the Land Use and Development Code (*see* Findings discussion, *supra*), require prohibiting all new trail paving. Additionally, removal of all existing paving within the Historic Garden that contributes to the Project's cumulative impacts to the Historic Garden should be required. Garden representatives have repeatedly contended that paving is required for ADA accessibility. This claim however is not supported by the ADA (see Exhibit 4, Department of Justice Bulletin on ADA Surfaces). The FEIR is defective in misrepresenting the need for the pavers, and the Condition allowing additional paving is fundamentally inadequate.

f. Fences

Given their significant aesthetic impact, discussed above, a condition must be incorporated to eliminate all cyclone fencing constructed since the NOP. Additionally, as a means to mitigate the overall visual impact of the Project, particularly considering the significant loss of vegetative screening following the Jesusita fire, the Commission should require removal of the existing cyclone fences along Mission Canyon Road.

g. Grading Policy

Condition 62 requires modifications to the driveway leading up to the Gane House, a redesign of the Cavalli path to eliminate paving and the need for vertical retaining walls, and reconfigure the detention basin on the Hansen site to comply with County policy requiring the avoidance of development on 30% slopes. This policy is necessary, however does not provide the specificity required. This condition must be clarified and must provide specifics regarding the nature, location and extent of proposed mitigation.

h. Cultural Resources

Proposed conditions addressing the Project's impacts on CA-SBA-22 do not provide the specificity required, or ensure that avoidance is achieved where feasible. This issue is discussed above in the Findings analysis section. Clarification and specificity must be incorporated into this Policy, providing for express criteria to guide the redesign. Additionally, retaining the Hansen site road in its current unpaved condition should be incorporated as an additional condition ensuring avoidance of the culturally significant site as required by County policy. If truly required as stated by Staff, alternative locations for a road that meets the Fire Department's requirements must be explored.

4. Consistency Analysis with the Initiated Mission Canyon Community Plan Required

The County's zoning ordinance requires that Land Use Permits and Zoning Clearances be consistent not only with existing provisions of the code but also with changes initiated by resolution of the Board. *See* LUDC §§ 35.82.110.D.5 (LUP) 35.82.110.D.5 (ZC). A County Counsel memorandum discusses the rationale for this requirement of the zoning code as follows: "California law allows for measures to require that private development be consistent with proposed policy and zoning changes so that interim development does not progress so far as to defeat in whole or in part the ultimate execution of the plan." County Counsel Memorandum: Effect of Initiation of General Plan Amendments and Zoning Ordinance Amendments/Rezones upon Project Applications, July 27, 2004, p. 1. The Board initiated the Mission Canyon Community Plan by resolution on October 7, 2008. *See* Exhibit 5 (Board Resolution Initiating the Mission Canyon Community Plan). As such, land use permits and zoning clearances issued to effectuate the Vital Mission Plan will require findings of consistency with the initiated Plan. Additionally, as the single largest development project in the history of Mission Canyon, sound land use planning requires this Board to understand the Vital Mission Plan's CUP and Development Plan's consistency with the initiated Community Plan, and we urge the Board to direct Staff to prepare such an analysis. FOMC has also analyzed the VMP's consistency with the initiated Mission Canyon Community Plan, and our analysis is as follows.

The initiated Mission Canyon Community Plan will replace the Mission Canyon Area Specific Plan, adopted in 1984. The antiquated Specific Plan lacks meaningful detail and does not reflect many of the community's values and goals. Additionally, as stated in the Mission

Canyon Community Plan ("MCCP" or "Plan"), new issues have emerged since 1984 including traffic, circulation, parking, illegal units, storm water runoff, erosion, and fire hazards. *See* MCCP, p. 8. The MCCP provides the detail required to meaningfully guide new development in the Canyon, addresses the issues that face Mission Canyon today, and clearly articulates the goals and values that the policies are designed to effectuate. Unfortunately, the VMP, perhaps the largest development project in Mission Canyon's history, was not analyzed for consistency with the MCCP. The below provides this consistency analysis (note MCCP language is indicated with underlining throughout).

a. The VMP Is Inconsistent with the Key Goals of the Plan

The Mission Canyon Community Plan has thirteen key goals, articulated on page one of the plan. The VMP is inconsistent with most of these overarching goals for the foregoing reasons.

• Maintain and enhance existing community qualities, including Mission Canyon's natural scenic beauty and charm;

The VMP is inconsistent with this goal because it includes a scale and type of development that increases perceived density and takes away from Mission Canyon's natural scenic beauty and charm. *See* FEIR p. 4.1-5. The new institutional structures of uniform style contrast with and take away from the eclectic and residential character of Mission Canyon. *See e.g.* FEIR Figures 4.1-8, 4.1-9. The FEIR claims that the structures are designed to maintain the 'park-like' visual qualities of the Garden's facilities (FEIR p. 4.1-16). The structures however represent a severe departure from the naturalistic and unobtrusive style of the Garden's cherished structures. While some recent development in the Garden detracts from the original naturalistic character of the Garden, the VMP provides an opportunity to enhance the naturalistic and charming design aesthetic to Garden structures. Unfortunately the VMP does just the opposite.

The cyclone fencing along portions of the Garden's perimeter including new fencing along Mission Canyon Road installed since the NOP, is not in keeping with the visual character of the area. *See* FEIR p. 4.1-16. The VMP is contrary to the above goal because it does not seek to maintain and enhance the Canyon's aesthetic through removal of this unsightly fencing. The County clearly had the discretion to require removal of the segment erected since the NOP as a condition of approval (cite), but failed to do so.

Development on the Cavalli site including the overlook kiosk and the Cavalli path introduce new structural development in an area that is currently undeveloped or primarily maintained in natural vegetation. FEIR p. 4.1-18. This development, and in particular the prominently sited kiosk, will adversely affect the Canyon's natural scenic beauty.

The loss of substantial amounts of vegetation due to the Jesusita fire make these structures more visible than anticipated when the structures were designed, increasing the effect of these structures on the area aesthetic. (FEIR pp. 4.1-10, 4.1 – 16; 4.1-19). Vegetative screening cannot be relied upon to reduce the visual impact of Garden development because the amount and location of future vegetation is wholly speculative due in part to site-specific fire department requirements and more rigorous vegetation management. (see FEIR p. 4.1-13).

The new structures and scale of development, including the overlook kiosk and new cyclone fencing, do not effectuate the above goal of the MCCP.

• Improve fire safe practices including vegetation management, defensible space, hydrants and water supply, road safety, and emergency ingress and egress;

The VMP includes a 25,414 increase in structures relative to existing development and up to 50% increase in Garden visitors that would need to evacuate the Canyon in the event of a wildfire or other disaster (*see* Condition 63). Mission Canyon's roads, including Mission Canyon Road, already provide inadequate means of emergency ingress and egress, discussed in more detail in section 1.a.iv.1, *infra.* Hydrants and water supply available to serve the Canyon is also inadequate and the Project does not include conditions that would ensure adequate hydrant pressure or water supply (see section 3.c, *infra*). Due to these safety constraints, the VMP is inconsistent with this goal of the MCCP.

• Provide for the reasonable use of property and limited additional development that is compatible with the natural terrain and with the scale and character of existing structures in the area;

VMP proponents have sought to characterize the new development proposed as essential for the Garden's mission. Ample evidence however demonstrates the contrary, that in fact Garden facilities can be enhanced and tailored to achieve the Garden's mission without the scale of development included in the VMP. This goal, and other goals and policies of the MCCP require that new development in the Canyon honor the character and constraints.

• Assure that development does not exceed availability of adequate services and infrastructure to provide for public health and safety

Development included in the VMP does exceed the availability of adequate services and infrastructure to provide for public health and safety. Most notably, the road infrastructure serving the Garden and Mission Canyon is woefully inadequate from an evacuation perspective. Additionally, existing water delivery infrastructure is also inadequate, and proposed improvements do not ensure that adequate water and hydrant pressure will be available to serve the new development. The VMP's consistency with this goal is discussed in more detail below (see discussion of GOAL LU-MC-1, section b.i.1, *infra.*)

• Protect sensitive habitats and other biological resources;

The VMP will have significant impacts to sensitive habitats and other biological resources including oak woodland habitat and individual native trees. *See* Findings, p. A-2. Proposed mitigation fails to protect these resources in violation of this MCCP goal.

• Protect watershed function, groundwater and surface water quality, and prevent flooding and erosion;

As proposed, the VMP includes development on slopes in excess of 30%, in plain violation of the existing Mission Canyon Specific Plan. Condition 62 would require modification of numerous project components to avoid development on 30% slopes, but still allows for development on slopes in excess of 20%, which is also contrary to the existing Specific Plan. A primary reason for limiting development on steep slopes is erosion, and the VMP's failure to avoid potential erosion hazards is inconsistent with this goal of the MCCP.

• Provide safe and efficient circulation systems and improve pedestrian and bicyclist access and safety;

The existing circulation system in and around the Garden is not safe and aspects of the Project exacerbate the safety concern. Specifically, the proposed parking area located across Mission Canyon Road from the Las Canoas intersection, will contribute to what currently is an unacceptable safety situation. The angle of the intersection obstructs visibility for vehicles turning left onto Mission Canyon from Las Canoas, creating a collision danger with oncoming vehicles. The addition of a parking lot near that intersection will result in more vehicle congestion in this already hazardous intersection. Additionally, because the circulation system in and around the Garden is inadequate, reductions in development and activity levels should be explored to help fulfill this goal of the MCCP.

• Preserve open space;

VMP proponents repeatedly state that the Project will leave 91% of the Garden in open space. While we don't dispute that statistic, it does not support the contention that the VMP will "preserve open space". Certain components of the Project including proposed development on the Cavalli site will transform previously open and natural areas (cite), diminishing the open space qualities of the area. Specifically, the Cavalli path and 470 square-foot Overlook Kiosk proposed on the Cavalli Site and the Cavalli residence and office/garage will result in new structural development in an area that is currently undeveloped or primarily maintained in natural vegetation. FEIR p. 4.1-18. Resiting, redesigning and scaling back this development is necessary for compliance with this goal of the MCCP.

• Protect historic and cultural resources;

The VMP's affect on historic and cultural resources has, along with fire safety, dominated public criticism of the plan. The presence of spiritually and archaeologically significant Chumash sites, landmarked historical structures, and the landmarked status of the Garden's design concept itself require that any development in the Garden be particularly sensitive to these resources. Unfortunately the VMP degrades the site's historic and cultural resources and as such is inconsistent with this goal of the MCCP. The specific aspects of the Project that adversely affect cultural and historic resources are discussed below in the context of specific cultural and historic resource protection policies.

b. The VMP Is Inconsistent with the Specific Goals and Policies of the MCCP

i. Land Use Policies

1. Assurance of Adequate Services in a Highly Constrained Area

GOAL LU-MC-1: Assure that development does not exceed the availability of adequate services and infrastructure to provide for public health and safety within an area with limited ingress and egress.

Policy LU-MC-1: The County shall recognize that the Mission Canyon Community Plan Area is a constrained community with respect to fire hazard, parking and circulation, flooding and drainage, wastewater and geology, hillsides and topography, and shall require that future development is adequately served by existing services and infrastructure.

The VMP is inconsistent with this goal and policy because it proposes a level of activity and development that exceeds the availability of adequate services and infrastructure, and in so doing poses a threat to public health and safety.

This goal of the Community Plan expressly recognizes the limited ingress and egress opportunities that exist in Mission Canyon. At existing use levels, Mission Canyon Road, which provides the only direct route into and out of the Botanic Garden, is already inadequate from an evacuation safety perspective. *See* Letter from Pubic Safety expert Michael DeCapua to Marc Chytilo, p. 7 (submitted to the Planning Commission on August 3, 2009). Specifically, the Project will bring up to an additional fifty five thousand people per year into Mission Canyon, a 50% increase over existing use levels. *See* Condition 63. Attendance levels for special events and classes also can increase by 50% over existing levels without subsequent Planning Commission approval. *Id.* To comply with the CUP, the Garden is only required to demonstrate that the limits were not exceeded over a three year rolling average, Condition 63 expressly

contemplating that use levels may exceed the prescribed limits in any single year. Moreover, the only compliance monitoring required is for the Garden to submit an annual monitoring report to P&D each year, documenting total visitation and the number of programs and activities and associated attendance within each use category. The adopted limitations on Garden attendance allow an inappropriate and dangerous increase in use, without a robust monitoring plan to assure that even the generous use limitations are complied with.

The VMP is also inconsistent with the above land use goal because it includes 29,554 square feet of new structures, and a 25,414 net increase in structures relative to existing development, in an area with already-inadequate water and infrastructure for fire protection. *See* discussion of water infrastructure, *infra*.

ii. Neighborhood Compatibility

GOAL LU-MC-2: Protect the semi-rural quality of life by encouraging excellence in architectural and landscape design. Promote area-wide and neighborhood compatibility and protect residential privacy, public views and, to the maximum extent feasible, private views of the mountains and ocean.

The VMP conflicts with this policy because the proposed structures do not reflect excellence in architectural design, or protect the semi-rural quality of life in the Canyon. Specifically, the construction of 29,554 square feet of new structures, adding considerably to building density on the site. In addition, project elements, most notably the Overlook Kiosk, interfere with scenic views including private views of the ocean.

GOAL LU-MC-3: Maintain an environment where the relative quiet of the community is a recognized value.

Policy LU-MC-3: The public shall be protected from continuous noise that could jeopardize health and welfare.

The VMP is inconsistent with this goal and policy of the land use element. The noise associated with large events and the noise associated with a prolonged multi-phase construction period.

iii. Fire Protection Policies

The public safety hazard present in Mission Canyon due to its location on the urban-wildland interface, limited roadways available for evacuation, and limited infrastructure for fire-fighting (including fire hydrant flows), is one of the main points emphasized in the Mission Canyon Community Plan. Public testimony regarding the VMP has overwhelmingly opposed

the VMP because it increases the fire hazard in the Canyon by introducing more people, buildings, and vehicles to this highly constrained area.

1. Fire Hazards

GOAL FIRE-MC-1: Maximize effective and appropriate prevention measures to reduce wildfire damage to human and animal life, property, and the Canyon ecosystem.

Policy FIRE-MC-2: Fire hazards in the Mission Canyon Plan Area shall be minimized in order to reduce the cost of, and need for increased fire protection services while protecting the natural resources in undeveloped areas.

The new structures proposed in the Garden increase the fire hazards in Mission Canyon in violation of this policy. As acknowledged in the FEIR, "buildings themselves serve as fuel and can also be sources of a fire in their own right (e.g. gas leaks, electrical shorts, etc.)" FEIR p. 4.5-5. The Project does not seek to minimize the amount of new buildings, or to scale buildings so as to minimize fire hazards (*see also* Community Plan discussion of Size, Bulk, and Scale in the context of post-fire redevelopment).

2. Vegetation Management

DevStd FIRE-MC-2.1: Along access roads and driveways, limbing of oak tree branches shall be subject to the vertical clearance requirements of the California Fire Code and Santa Barbara County Fire Department development standards. To the maximum extent feasible, vegetation management practices shall not result in the removal of protected healthy oak trees.

The VMP includes the removal of 50-60 coast live oak trees. Preservation of some of these oaks is feasible and should be further explored. Moreover, previously required a mitigation measure involving tree replanting at a 10:1 ratio. During the Planning Commission process this ration was reduced to 3:1.

3. Fire Hydrants

DevStd FIRE-MC-2.2: Fire hydrants shall be required on both sides of a roadway whenever: 1) the roadway represents a main route out of the Mission Canyon area; or 2) if the Fire Chief, or his designated representative, determines the use of fire hydrants on the opposite side of the roadway may prove operationally difficult, or may create unsafe working conditions.

The Mission Canyon Community Plan articulates the County Fire Department fire hydrant spacing and flow rate requirements for one-and-two family dwellings. See Table 5, p. 35. Pursuant to these standards, in a Very High Fire Hazard Severity Zone, hydrants must be spaced a minimum of 500 ft apart and must have a minimum flow rate of 1000 gpm.

The FEIR and approved Project Conditions do not specifically require that hydrants be placed every 500 feet or that the hydrants provide 1000 gmp. Rather, they state that the Fire Department's standards must be met. *See* Condition 42 (MM PF 2-1). The FEIR clarifies that currently installed hydrants "meet County Fire Department Standards for residential development (i.e. 750 gallons per minute at 20 psi for two hours"). FEIR p. 4.5-8. However the current fire department standards require 1000 gpm for residential development in Extreme High Fire Hazard Areas (as designated by the California State Board of Forestry). The Board of Forestry fire hazard area maps show Mission Canyon as in the area of highest risk (*see* Exhibit 10).

4. Roadway Standards

DevStd FIRE-MC-2.3: On all private roads, the Fire Department shall require half width road frontage improvements to meet current Fire Department Standards, or to the maximum extent allowable by easement, on any project which requires Special Problems Committee review.

Policy FIRE-MC-4: New discretionary development, including new construction and increases in intensity of use, shall not significantly contribute, individually or cumulatively, to the existing deficiency in roadway evacuation capacity from the Mission Canyon plan area.

The inadequacy of Mission Canyon's evacuation capacity is undisputed and expressly codified into this policy. The VMP is inconsistent with this policy because it does significantly contribute both individually and cumulatively to the existing deficiency in roadway evacuation capacity. In particular, the large special events add significantly to the Canyon's population, in addition to people visiting or attending classes at the Garden. The slow initial spread of the Jesusita fire allowed Canyon residents and Garden visitors ample time to evacuate, yet still getting out of the Canyon was very slow going. A fire breaking out further down-canyon, and/or out during a sundowner wind event like the Tea fire, could easily result in a catastrophe of the likes of the Oakland hills fire, where numerous people burned to death in their vehicles, trying to escape (report from the Oakland Hills fire is attached to the FOMC appeal letter).

DevStd FIRE-MC-4.1: The County shall require two routes of ingress and egress for discretionary development unless the Fire Department waives\modifies the requirement and documents finding(s) for the waiver\modification based upon substantial evidence that public safety will not be compromised.

The Garden does not currently have two routes of ingress and egress, and as discussed above there is no substantial evidence supporting a finding that public safety will not be compromised as a result of the mitigation measures required in the Project. The Langford Thesis makes clear that the consequences of lacking a second egress point cannot be compromised for with mitigation measures including restricting vehicle access.

5. Circulation and Parking

Policy CIRC-MC-1: Land uses and densities shall reflect the desire of the community to maintain local roads and intersections within acceptable capacities and levels of service.

Policy CIRC-MC-6: The minimally acceptable Level of Service (LOS) on roadway segments and intersections in Mission Canyon Community Plan Area is LOS B. Exception to this policy is: Mission Canyon Road south of Foothill Road – LOS C is acceptable.

The Mission Canyon Road (West)/Foothill Road intersection is currently operation at LOS C during both AM and PM peak hours. FEIR Table 4.11-3. The VMP will increase delays at this intersection. FEIR Table 4.11-7.

GOAL CIRC-MC-2: Provide an efficient and safe circulation system with adequate access for emergency vehicles and safe emergency egress for residents and visitors.

Policy CIRC-MC-8: Any temporary construction in a roadway which involves the closure of one or both traffic lanes shall be carefully coordinated with County Fire Department to ensure emergency access to and egress from the Canyon are available at all times.

Condition 33 (Fire 1-3) requires a traffic flag crew on Mission Canyon Road and Las Canoas Road during construction within the road right-of-way. The Condition does not require careful coordination with the County Fire Department and as such is inconsistent with this policy. Moreover, Condition 31 does not ensure that the Garden will be aware and respond to red-flag warning appropriately, relies only on Garden staff to review the NOAA website and respond to red-flag warnings.

GOAL CIRC-MC-3: Development shall provide adequate on site parking for occupants and guests, with mitigation of drainage impacts, to reduce on-street parking to the maximum extent feasible.

Past special events at the Garden have demonstrated that there is currently inadequate on-site parking and that Garden guests park illegally along Mission Canyon. Recent modifications to the VMP have actually reduced the amount of parking from what was previously proposed, and conditions do not ensure that measures would be in place to reduce on-street parking to the maximum extent feasible as required by this fire protection goal of the MCCP.
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iv. Public Services: Water, Resource Recovery, and Green Building & Design

GOAL PS-MC-1: Incorporate environmental principles in the design and construction of new, remodeled, and rebuilt structures.

Policy PS-MC-1: New and rebuilt structures, and remodeled portions of existing structures shall exceed California Energy Efficiency Standards (Title 24) by 20% or greater.

The VMP is only required to "meet or exceed" the Title 24 standards, and is not required to exceed them by 20% or greater as required by PS-MC-1. (Condition 7 – AQ 3-1). Accordingly the Project is not in compliance with this important energy conservation policy.

Action PS-MC-1.2: The County shall encourage developers and homeowners to incorporate green building techniques into new, remodeled, and rebuilt structures, to the greatest extent feasible. This can be achieved, in part, through continued promotion of the incentives and design expertise available to property owners through the Innovative Building Review Program.

v. Biological Resources

Policy BIO-MC-4: Native trees shall be preserved where appropriate to the maximum extent feasible. A "native protected tree" is at least six inches in diameter (largest diameter for non-round trunks) as measured 4.5 feet above level ground (or as measured on the uphill side where sloped). Native trees found in Mission Canyon area include, but are not limited to: coastal live (*Quercus agrifolia*), Western sycamore (*Platanus racemosa*), California bay (*Umbellularia californica*), Bigleaf maple (*Acer macrophyllum*), White alder (*Alnus rhombifolia*) and California black walnut (*Juglans californica*). If it is determined by Planning & Development that native tree removal cannot feasibly be avoided, removed trees shall be relocated or replaced onsite provided the relocated or replaced trees can be accommodated in a location and manner that does not conflict with defensible space clearance requirements. Replacement for native trees should be propagated from onsite or nearby specimens.

The Fire Protection Plan reflects a gross disconnect with both the environmental impact analysis and this policy. Plants that are separately prohibited along roadways (p. 30), in central exhibit areas (p. 31), or anywhere on the site (p.32) are listed in Appendix E of the Fire Protection Plan, and include a number of native and specimen plants at the Botanic Garden. These include <u>all pine trees</u> (*pinus*), madrone (*arbutus*), <u>all manzanita</u> (*arctostaphylos*), sagebrush (a*rtemisia*), all coyote brush (*baccaris*), <u>all buckwheat</u> (*erigonium*), <u>all flannelbush</u> (*fremontodendron*) and <u>all sages</u> (*salvia*) among other plants that are planted in various portions of the Botanic Garden. Unquestionably, the Project will compromise botanical resources if the Fire Protection Plan is adhered to. More fundamentally, the failure of the applicant and/or the

County to integrate the vegetation management and biological resources on the site represents a categorical failure to comply with CEQA's informational requirements.[4]

The Project does not preserve native trees to the maximum extent feasible. Project components including the Cavalli path result in the unnecessary removal of protected trees. *See* section 1.a.iv.2 *supra.*

vi. Flooding and Drainage

Policy FLD-MC-2: Erosion associated with construction and the resulting development shall be minimized.

The VMP fails to minimize erosion associated with construction and the resulting development by constructing the Cavalli path and other Project elements on slopes exceeding 20%.

vii. Geology, Hillsides, and Topography

GOAL GEO-MC-1: Protect the public health, safety and welfare by preserving hillside and watershed areas in the most natural state feasible.

Policy GEO-MC-1: Hillside and watershed areas shall be protected to the maximum extent feasible to avoid adverse geologic impacts and to preserve watershed function.

DevStd GEO-MC-1.1: Development, including grading, shall be prohibited on natural and manmade slopes greater than 30% unless this would preclude development of a parcel to such an extent that an unconstitutional deprivation of property occurs. In areas of unstable soils, highly erosive soils, or on slopes between 20% and 30%, development shall not be allowed unless an evaluation by a qualified professional (e.g., geotechnical engineer, engineering geologist, etc.) establishes that the proposed project will not result in unstable slopes or severe erosion, or unless this would preclude development of a parcel to such an extent that an unconstitutional deprivation of property occurs. Grading and other site preparation shall be minimized to the maximum extent feasible.
Policy GEO-MC-4: Development shall be sited and designed to minimize the potential for geologic hazards, including but not limited to, seismic, soil, or slope hazards.

[4] As another example, the Planning Commission at the last minute reduced the oak tree mitigation ratios from 10:1 to 3:1 at the applicant's request, who claimed this was necessary for fire protection purposes. The Department of Fish and Game specifically requested a 10:1 oak tree placement ratio in their comments.

The Cavalli path, Overlook Kiosk, and other project elements are not sited and designed as to minimize the potential for geological hazards including slope and erosion hazards.

viii. History and Archaeology

GOAL HA-MC-1: Preserve and protect historically significant landscapes, Places of Historic Merit or Landmarks, and other cultural, archaeological and historical resources in Mission Canyon.

This goal unambiguously requires protection of the Historic Garden and its landscape design concept, as well as the cultural and archaeological resources associated with CA-SBA-22. The VMP compromises the Historic Garden and Landmark #24 by installing additional paving of once-naturalistic trails, and installing the Meadow Terrace adjacent to the cherished Meadow. These elements, as discussed extensively in the FEIR and Historic Resources Group reports, during HLAC deliberations and elsewhere, significantly and adversely affect the historically significant landscape of the Garden, as well as Landmark #24. The significant cultural, archaeological, and historic resource CA-SBA-22 will also be significantly and adversely affected by the VMP including proposed development on the Hansen site. For these reasons the VMP is inconsistent with this goal.

Policy HA-MC-1: Archaeological resources shall be protected and preserved to the maximum extent feasible.

There are available measures for avoiding development on and around CA-SBA-22 and other significant archaeological sites, if encountered by reconfiguring, downsizing and/or eliminating development on the Hansen Site. There is no indication that any such measures have been explored to avoid development on the archaeologically significant site and as such the VMP is inconsistent with this policy.

DevStd HA-MC-1.1: A Phase I archaeological survey shall be performed when identified as necessary by a county archaeologist or contract archaeologist or if a county archaeological sensitivity map identifies the need for a study. The survey shall include all areas of projects that would result in ground disturbances. If the archaeologist performing the Phase I report, after conducting a site visit, determines that the likelihood of an archaeology site presence is extremely low, a short-form Phase I report may be submitted.

ix. Visual and Aesthetic Resources

GOAL VIS-MC-1: Protect the character and natural features of Mission Canyon, including public views of the mountains and ocean and the quality of the nighttime sky.

DevStd VIS-MC-1.2: Development and grading shall be sited and designed to avoid or minimize hillside and mountain scarring and minimize the bulk of structures visible from public viewing areas. Mitigation measures may be required to achieve this goal, including but not limited to increased setbacks, reduced structure size and height, reductions in grading, extensive landscaping, low intensity lighting, and the use of narrow or limited length roads/driveways, unless those measures would preclude development of a parcel to such extent that an unconstitutional deprivation of property occurs or pose adverse public safety issues.

DevStd VIS-MC-1.3: Development shall not occur on ridgelines if suitable alternative locations are available on the property. When there is no other suitable alternative location, structures shall not intrude into the skyline or be conspicuously visible from public viewing places. Additional measures such as an appropriate landscape plan and limiting the height of the building may be required in these cases.

The Overlook Kiosk is prominently sited atop a ridgeline, generating substantial concern regarding impacts to the ridgeline itself as well as the interruption of scenic views from surrounding streets and homes including ocean views. The Kiosk is a peripheral element of the Project and could easily be relocated or redesigned to conform to this policy. At the Planning Commission concern was raised concerning providing shade for people who ascend the Cavalli trail. Such shade could be provided by trees, or a shade structure constructed at a lower elevation off the ridgeline itself. Such alterations should be required to achieve consistency with this visual goal, policy and development standard.

Policy VIS-MC-2: The night sky of Mission Canyon shall be protected from excessive and unnecessary light associated with new development and redevelopment.

Unnecessary lighting associated with inappropriate night-time events at the Garden will adversely affect Mission Canyon's night sky and as such is not in compliance with this policy.

GOAL VIS-MC-3: Maintain and enhance the aesthetic qualities of the community in all aspects of residential development and landscaping.

Policy VIS-MC-4: Development shall be sited, designed, and scaled to be compatible with neighborhood character, to protect resources such as sensitive habitat and visual resources, and to respect site constraints such as steep slopes.

Development proposed under the VMP is manifestly contrary to this visual goal and policy. Most notably, the proposed institutional development is not scaled to be compatible with the neighborhood character. Development including the Overlook Kiosk disrupts visual resources and the Cavalli path disrupts sensitive habitat and is proposed on steep slopes.

DevStd VIS-MC-4.1: Development, including houses, roads and driveways, and accessory buildings shall be sited, designed, and scaled to be compatible with and subordinate to significant natural features such as major rock outcroppings, mature trees and woodlands, drainage courses, visually prominent slopes, and hilltops and ridgelines.

The Overlook Kiosk is proposed atop a ridgeline, where it would dominate the natural features and intrude into views from the Garden and from residences surrounding the garden.

DevStd VIS-MC-4.2: Grading for development, including primary and accessory structures, access roads (public and private) and driveways, and vegetation clearance for fire safety purposes shall be kept to a minimum and shall be performed in a way that: Minimizes scarring; and Maintains to the maximum extent feasible the natural appearance of ridgelines and hillsides.

The Cavalli path and Overlook Kiosk require extensive grading and will unnecessarily and adversely alter the natural appearance of the hillside and ridgeline on which the Overlook Kiosk is located. Various proposals have come forth to alter, relocate, or eliminate the Overlook Kiosk, which could, if implemented, achieve consistency with this development standard.

These numerous conflicts with the overarching goals of the MCCP, and with the individual policies of the Plan clearly indicate that the Vital Mission Plan is inappropriate for the Mission Canyon community and must be downsized to achieve consistency. The County's failure to perform this analysis with the initiated MCCP obscures these inconsistencies from both decisionmakers and the public. We strongly urge the Board to take the policies of the MCCP into consideration before acting on the VMP.

5. Conclusion

For all the above reasons, this Development Plan and conditional use permit should not be approved and the appeals of Friends of Mission Canyon, Mission Canyon Association and Frank Arredondo be upheld. Certainly the Botanic Garden can and should have the ability to upgrade its facilities and enjoy the certainty of a CUP, but the proposed project is far too much for the proposed site. With the information from the Mission Canyon Community Plan Evacuation Model and Study and the benefits of time and institutional evolution, we are firmly committed to find a project that can work for both the applicant and the community. The Garden chose a contentious land use path, despite entreaties from the community and demonstrations of how it could have worked. See Exhibit 13, Santa Barbara Independent, ("Hutterer [of the Natural History Museum's expansion plan] has taken truly their travails to heart and tried diligently to avoid the ire stoked by the Garden's with-us-or-against-us approach.")

As shown above, approval of the Project at this time and as proposed would violate CEQA and various land use planning authorities identified herein. We strongly encourage the Board of Supervisors to uphold the community appeals in their entirety.

Sincerely,

LAW OFFICE OF MARC CHYTILO

Marc Chytilo
For Friends of Mission Canyon

Exhibits

Exhibit 1:	County CEQA Thresholds Manual, p. 53 (Ethnic Impacts)
Exhibit 2:	William P. Langford, A Space-Time Flow Optimization Model for Neighborhood Evacuation, (March 2010)
Exhibit 3:	FEIR, Windermere Ranch Peace Retreat Project, February 1998
Exhibit 4:	Department of Justice Bulletin on ADA Surfaces
Exhibit 5:	Board Resolution Initiating the Mission Canyon Community Plan
Exhibit 6:	Ironwood, 2009 Holiday Marketplace
Exhibit 7:	Ironwood, 2009 Members Picnic
Exhibit 8:	Ironwood, 2009 Doggie Bagel Brunch
Exhibit 9:	Ironwood, 2009 Fall Plant Party
Exhibit 10:	California State Board of Forestry Extreme High Fire Hazard Areas Map
Exhibit 11:	County Fire email string regarding fire weather criteria, Station 15 signage, and fire risk stages during various events and fire dates
Exhibit 12:	Outline of suggested Development Plan and CUP modifications
Exhibit 13:	Santa Barbara Independent, Museum of Natural History Expansion Plans, April 25, 2010
Exhibit 14:	Photos of Busses blocking Mission Canyon Road and in Botanic Garden parking lot

Friends of Mission Canyon

Exhibits to Letter of April 30, 2010

Santa Barbara Botanic Garden Development Plan And Conditional Use Permit

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and staffing for insuring research access to the collections. The University of California at Santa Barbara Department of Anthropology is currently the only qualified local institution providing this service to the public and scientific community. In addition to artifacts, all supporting archaeological documentation must be submitted with the artifact collection. Curation arrangements with a qualified institution must be established prior to archaeological proposal preparation. Artifacts curated at the institution may be borrowed by qualified individuals and groups for educational use, display, ceremonies, etc.

The disposition of burial-related artifacts is covered by state law concerning burial remains (see Ethnic Impacts, Discovery of Human Remains).

E. Ethnic Impacts.

1. **Ethnic Impact Assessment.** Appendix G, Significant Effects, of CEQA defines the need for evaluating the impacts a project may have on a community, ethnic, or social group.

   A project will normally have a significant effect on the environment if it will cause one of the following:

   j. Disrupt or adversely affect a prehistoric or historical archaeological site or a property or historical or cultural significance to a community or ethnic or social group.

   w. Conflict with established recreational, educational, religious, or scientific uses of the area.

   In order to evaluate these potential impacts, the County requires that appropriate representatives of affected community groups be contacted to assess their concerns and viewpoints concerning measures to mitigate those impacts. Ethnologists approved by the Planning and Development Department are to carry out this research in accordance with requirements and procedures for assessing ethnic cultural resources and concerns in compliance with the California Environmental Quality Act (Susan Brown n.d.) adopted by the Planning and Development Department, and the Native American Heritage Commission's Guidelines for the Protection of the Native American Heritage Resources. Contact should be made early in the evaluation process during the Phase I investigation as well as subsequent phases of work.

   If the affected community does not consider to mitigation measures proposed by consulting archaeologists and incorporated in the project description by the applicant, the project may be considered to result in a significant impact and an EIR (or EIR section) may be prepared.

   There are currently four recognized Native American groups in Santa Barbara County representing local Native American individuals of Chumash descent. The United Chumash Council represents various Chumash groups of the South Coast. The Santa Ynez Federally Recognized Elders Council represents Chumash living on the Santa Ynez Reservation. The Santa Ynez Kit Wo' N' Unio represents particular families on the Reservation, and the Candelaria American Indian Council represents South Coast documented Chumash. The Planning and Development Department will contact all groups if prehistoric archaeological sites are to be impacted to evaluate this effect on their ethnic values.

2. **Discovery of Human Remains.** The County policy regarding disposition of human remains disturbed during project construction is defined in CEQA Appendix K, Section VIII. If remains are encountered at any time, the County Coroner shall be contacted to determine the

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

A SPACE-TIME FLOW OPTIMIZATION MODEL FOR NEIGHBORHOOD EVACUATION

by

William P. Langford

March 2010

Thesis Advisor:	David L. Alderson
Second Reader:	Richard L. Church

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13. ABSTRACT (maximum 200 words)

We model the evacuation of vehicles in a residential neighborhood using a space-time network flow representation. Our model solves for "best case" evacuation routes and clearing times, as could be identified and implemented by a central authority. Our models are large but can be solved efficiently and quickly. By solving many model excursions for different input parameters, we can assess the importance of different model features, as well as evaluate evacuation behavior for a variety of what-if scenarios. We apply this model to the Mission Canyon neighborhood near Santa Barbara, California, and contrast our results to a previous simulation-based study.

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A SPACE-TIME FLOW OPTIMIZATION MODEL FOR NEIGHBORHOOD EVACUATION

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

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ABSTRACT

We model the evacuation of vehicles in a residential neighborhood using a space-time network flow representation. Our model solves for "best case" evacuation routes and clearing times, as could be identified and implemented by a central authority. Our models are large but can be solved efficiently and quickly. By solving many model excursions for different input parameters, we can assess the importance of different model features, as well as evaluate evacuation behavior for a variety of what-if scenarios. We apply this model to the Mission Canyon neighborhood near Santa Barbara, California, and contrast our results to a previous simulation-based study.

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EXECUTIVE SUMMARY

We model the evacuation of vehicles in a residential neighborhood using a space-time network flow representation. Our model solves for "best case" evacuation routes and clearing times, as could be identified and implemented by a central authority. Our models are large but can be solved efficiently and quickly. By solving many model excursions for different input parameters, we can assess the importance of different model features as well as evaluate evacuation behavior for a variety of what-if scenarios. We apply this model to the Mission Canyon neighborhood near Santa Barbara, California, and contrast our results to a previous simulation-based study.

We develop two network flow models to quantify the clearing times of neighborhood evacuations. Our first model is a spatial model that finds minimum cost evacuation routes. We represent the Mission Canyon neighborhood as a network consisting of supply (e.g., homes), transshipment nodes (e.g., intersections), and connecting arcs (e.g., road segments), all of which are connected to a "super-sink" egress point. From this spatial model, we create a space-time model by replicating the spatial network for each of T time periods, and we solve for best case evacuation flows in space and time.

We first develop a baseline evacuation scenario of Mission Canyon and compare it to the previous analysis of Church and Sexton (2002). We find that our model produces similar evacuation clearance time estimates as those obtained by the more time intensive micro-simulations. With this baseline established, we exercise the model to assess the effects that various changes to our model inputs or network design have on neighborhood evacuation time. Because our model is simple and solves quickly, we are able to consider several scenarios.

We find that staggering the departure times of evacuees does not result in an appreciably longer clearing time than an evacuation with simultaneous departures. We conclude that the presence of background traffic flow on a major evacuation road with non-evacuation traffic does not greatly impact the neighborhood evacuation, but rather

that the overall evacuation time is more largely impacted by the interior roads of the neighborhood. We estimate that losing access to one particular evacuation road would more than double the time to evacuate the neighborhood for both a one- and two-car-per-household scenario. This crippling effect results when an intersection node at either end of this road segment is blocked, and we argue that efforts should be taken to ensure this road is fortified against possible closure due to natural or deliberate attacks.

We ran analyses on our network to determine the effects on evacuation time if any of 21 "critical intersections" are either isolated from the network or have their throughput capacity severely limited. Of the 21 intersections, we find that eight of them would isolate some number of houses from the network if we completely disconnect them. Similarly, we find that complete isolation of 13 of the 21 intersections results in longer evacuations. The least severe of these increases evacuation time by 50 seconds (0:50), while the most severe closure increases clearing time by 45:00.

We examine the results on neighborhood clearing time if each of these same 21 intersections has their throughput capacity limited to one vehicle per time period (360 per hour). These analyses show that 14 of the 21 intersections would have no impact on overall clearance times if restricted. For the other seven, the least severe delay was 0:10, while the most severe increased evacuation times by 22:10.

There are many natural extensions to this work, including modifying the network to allow for additional routes and estimating evacuation times under these conditions. Similarly, we can add an additional exit point to the network to estimate how evacuation times are affected.

ACKNOWLEDGMENTS

Where to begin…

To my parents, **Joseph** and **Patricia Gonzales**, I am who I am today because of you. For that I am eternally grateful. I'm sure you know I love you, but might as well put it in writing.

To my brother, **Remy**, thanks for being you. If there is one thing in this world that drives me to succeed, it is you.

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To **Professor Richard L. Church**, thank you for suggesting the Mission Canyon as a thesis topic, and providing invaluable support throughout. I owe you an enormous debt of gratitude.

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To all those friends and family who were there for me (and there are too many to list here), thank you.

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I. INTRODUCTION

During a disaster, either natural (e.g., wildfires, hurricanes) or man-made (e.g., terrorist attacks), the ability to evacuate an at-risk population can literally be the difference between life and death. In 1991, 25 people died when the Oakland Hills neighborhood of California caught fire, spreading rapidly through the neighborhood with the assistance of strong winds (Church & Sexton, 2002). The loss of life during this fire led to an increased interest in neighborhood evacuation modeling, as concerned communities sought to improve their evacuation plans.

The goal of evacuation modeling is to determine whether a given area can be evacuated in the event of a disaster, and how long it would take. Determining evacuation times is not an easy task to achieve, as the conditions present during an evacuation do not exist under normal circumstances. Unusually large volumes of evacuees on a given route, as well as a heightened emotional state caused by the emergency, are some examples of conditions that are unique to an evacuation scenario. While some of these conditions may be difficult to predict accurately beforehand, we understand that the traffic demand on neighborhood evacuation routes depends on the number of vehicles in a given area in the time preceding an evacuation. We use this notion of "supply" and "demand" to develop an understanding of evacuation dynamics.

There is no shortage of methods relied upon to inform decision makers about the dynamics of an evacuation. These methods range from live simulations such as fire drills at schools to more computationally oriented solutions, including computer simulations and physics-based models that attempt to describe the movement of people during an evacuation in terms of fluid flows. Simulations range in scope from large-scale evacuations that attempt to answer how long it takes to evacuate an entire city to smaller-scale "micro" simulations that focus on individual actors and their behavior during an evacuation event. These micro simulations attempt to represent real-world behaviors of individuals or vehicles as they navigate through an evacuation area; the results highlight areas or situations that could hinder an evacuation process. While informative, these

simulations require considerable time and effort to set up properly, and the required level of programming to implement and test changes to the system can make it prohibitive to respond to emergent threat scenarios.

In this thesis, we develop a network flow model of an evacuation scenario and use optimization to quantify best-case evacuation behavior; we focus on the evacuation of the Mission Canyon neighborhood near Santa Barbara, California. We have chosen this neighborhood for several reasons. First, its location along an urban-wildland boundary combined with the history of wildfires in the adjacent Los Padres National Forest makes it a high-risk area for fires. Second, previous work by Cova and Church (1997) determined that the Mission Canyon neighborhood has a "high bulk-lane demand." Defined as the total demand leaving a neighborhood compared to the number of lanes that leave the neighborhood, a *high bulk-lane demand area* that indicates quick evacuation may be difficult. Because this neighborhood is at-risk, Church and Sexton (2002) directed considerable effort to develop a micro simulation model of its evacuation; we believe this micro simulation model provides an excellent baseline against which to compare the results of our network flow model. While we do not assert that our model captures all the details in the micro simulation model, we believe that it captures the first-order evacuation behavior, such as congestion "hot spots" that could delay evacuation. We maintain that understanding this first-order behavior is critical for planning evacuations. Because we can quickly modify and solve the network flow model if conditions change (e.g., one road used for evacuation becomes blocked and cannot be used) it can be an important tool for emergency planners.

Chapter II of this thesis reviews previous attempts to model evacuation. In Chapter III, we present in detail our network flow model of evacuation. Chapter IV presents our analysis of the Mission Canyon neighborhood, and how the results compare to the previous micro simulation work. In Chapter V, we present our conclusions concerning the efficacy of our model, along with potential follow on work to improve the model.

II. LITERATURE REVIEW

Evacuation modeling has progressed from what essentially amounted to "best-guess estimates" into a wide and mature discipline. The level of detail of research has varied between large-scale city or county evacuations to small-scale building evacuations. This section briefly reviews some of the research most relevant to this study.

A. LARGE-SCALE EVACUATIONS

Evacuation research starts with the notion that an evacuation can be successful only when there is sufficient time for all affected individuals to reach safety. Building on the Federal Emergency Management Agency's Hurricane Evacuation (HURREVAC) system (FEMA, 2000) for determining an evacuation radius in the event of a hurricane, Cova et al. (2005) argue that a similar system can be developed for fires or other smaller scale evacuations. Taking wind speed, available fuel, ground gradient, and other pertinent information as input, they develop a model that identifies "decision arcs" that can help emergency planners determine when an evacuation should be ordered, or when people should be told *not* to evacuate because the fire is too close. Using simulation, the authors are able to identify decision arcs that are not necessarily equidistant or uniform (as would be the case for hurricanes), and can be changed depending upon the varying input conditions. Their work informs our research by demonstrating the ability to model a complex evacuation decision process in a dynamic environment (Cova et al., 2005).

Li and Zhang (2009) assess whether an evacuation is feasible with a stochastic Markov process simulation of evacuee movement within a network as they travel from their origin to the designated "safe zone." Each network node has an initial population and number of evacuation vehicles, and the simulation provides an expected distribution of evacuees over time. The authors conclude that their model informs decision makers about the adequacy of the transportation network to support an evacuation.

Lahmar et al. (2006) use a staged optimization process to determine optimal routes out of an evacuation zone. Using input from the Geographical Information System

(GIS), they consider a geographic region that encompasses the evacuation zone along with safe destinations that can be reached from this area. The authors divide up the evacuation zone by zip codes, and they estimate the population in each zip code as the product of the houses in the zip code and the average number of people per house. They place a node at the geographic center of each zip code, and use the associated population for that zip code as the supply at the node. Arcs represent all roads that connect one node to another, and they model safe regions as destination nodes. Arc costs for their model are the associated distance between nodes. By solving for the maximum passage of people during a specified time window, they determine whether it is feasible for a central authority to evacuate the total population. They argue that this method produces a lower bound on the amount of time needed to evacuate a given area, and that it helps to determine if the network is capable of supporting an evacuation if ordered.

B. SMALL SCALE EVACUATIONS

At the opposite end of the scale is the evacuation of relatively small areas, such as buildings or city blocks. Here, one typically assumes that evacuation is feasible, and the question is simply how long it will take.

Chalmet, Francis, and Saunders (1982) develop a network flow model of building evacuation. They take as inputs to the model: the number of people in the workspaces, the flow capacity of stairwells, halls, and lobbies, and the static capacity of all these areas. Using this information, they first built a static model of the building and then extend that model to account for time. They achieve this by duplicating each node in the static model once for each distinct time period and creating arcs that represent the movement of individuals in space and time. They use time-dependent arc costs along the exit-to-super-sink arcs, and solve for minimum cost flows to obtain minimum evacuation times. The output of their model presents optimum evacuation times and optimal route utilization (Chalmet et al., 1982).

Fahy (1995) also models building evacuation using a network; in this model, rooms and exits are nodes while hallways and stairwells are arcs. Starting with occupant data for each room and walking speeds of individuals, one solves the network flow model

to determine the movements and clearance times during an evacuation. By allowing the modeler to choose between the shortest routes or most familiar routes of evacuees, this model can represent both exit behaviors, and it shows as output such metrics as floor clearing times and how many people use each exit (Fahy, 1995).

Chiu and Zheng (2007) also use a time-step network flow model. Building on the cell transmission model of Daganzo (1994, 1995), the authors represent evacuation behavior as movement along the arcs that can be traveled by unimpeded traffic in one time period. They specify four different types of cells, each with a different equation that describes travel between those cells. They take as input the number of evacuating people from a region, as well as the region itself. They treat each of the applicable border nodes of the "hot zone" as a viable destination node, and they connect all of these nodes to an artificial sink node. In addition, they link all source nodes to an artificial source node. The resulting optimization identifies the number of time steps (and therefore the evacuation time) necessary to evacuate groups of different priorities, as well as the optimal routes that should be taken.

Liu et al. (2006) also build upon the work of Daganzo (1994, 1995). They develop a two-level integrated optimization, and perform follow-on simulation to compare their results. Using a modified cell transmission model consisting of general cells, source cells, and sink cells (each with different flow equations), their high-level optimization seeks to maximize vehicle throughput, while their low-level optimization seeks to minimize travel and waiting time for the evacuation. They report these attributes as outputs for the model, in addition to the routes that are used in the low-level optimization. The results, when compared to simulation, indicate that their approach is capable of effectively and efficiently generating a set of optimal emergency evacuation plans. This research builds on previous research by Liu et al. (2005), which seeks to develop a general framework for an emergency evacuation system.

C. OUR CONTRIBUTION IN CONTEXT

We model the evacuation of the Mission Canyon neighborhood using a space-time network flow representation, similar in concept to that of Chalmet et al. (1982) but for the entire neighborhood. Our model solves for "best case" evacuation routes and clearing times, as could be identified and implemented by a central authority. Our models are large, but we can solve them efficiently and quickly. By solving many model excursions, we can assess the importance of different model features as well as evaluate evacuation behavior for a variety of what-if scenarios. We apply our model to the evacuation of the Mission Canyon neighborhood and compare our results to the simulation-based study of Church and Sexton (2002).

III. MODEL FORMULATION

A. THE SPATIAL MODEL

We model the neighborhood evacuation as a single-commodity network flow optimization problem. We believe that modeling the problem in such a manner is comparably informative to the much more time intensive micro-simulation approaches often used to assess evacuation behavior. We use the Mission Canyon Neighborhood of Santa Barbara as our test neighborhood for two specific reasons. First, its proximity to large wooded areas and its limited number of egress routes make it a likely candidate to need rapid evacuation during wildfire emergencies. Second, Church and Sexton (2002) already modeled this neighborhood using a micro-scale traffic simulation model; the results of this prior micro-simulation provide a baseline against which we can measure the results we obtain. A picture of the neighborhood from that report appears in Figure 1.

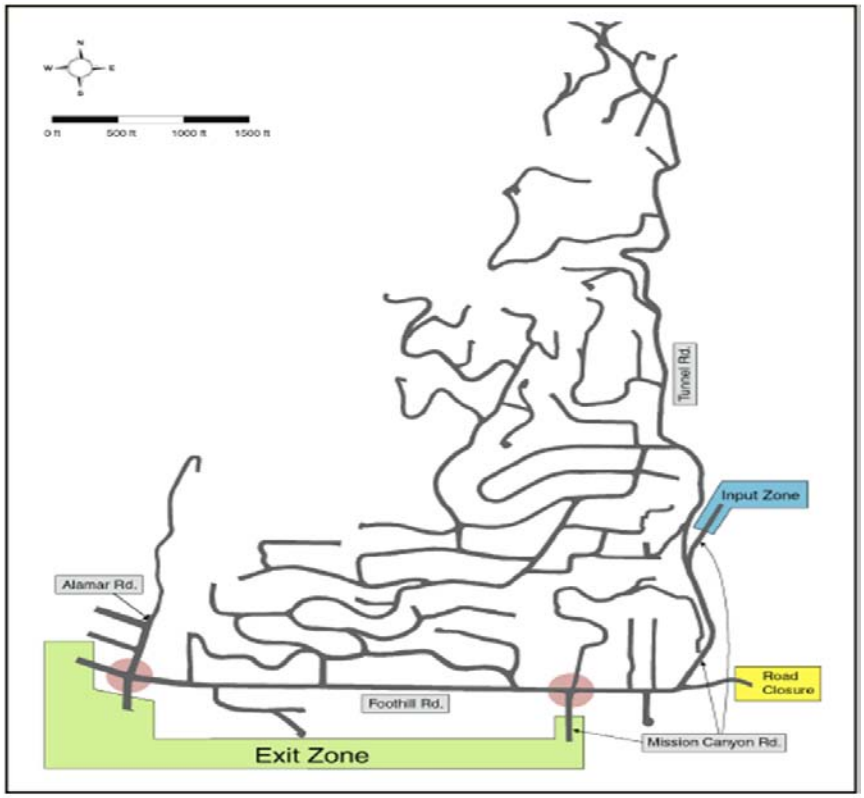

Figure 1. Mission Canyon neighborhood (From Church & Sexton, 2002). The picture shows the street network as well as the two egress points to the exit zone.

We use Google Earth to map out the road network. We segment the neighborhood roads into a series of arcs and nodes, separating long road segments into a series of arcs and "transshipment nodes" at intervals of approximately 264 feet (0.05 miles) apart. We represent each node with a placement marker available in the Google Earth software package. The markers allow us to individually label each node, and provide coordinate data that we use in displaying the network and running our optimization model. We then place nodes on the map overlay corresponding to the location of the houses (source nodes) within the neighborhood. We connect each house node to the closest corresponding node on the road network. We connect each house node to its adjacent road node using a single directed arc, and we connect adjacent road nodes using two directed arcs, one for each possible direction of travel along that road segment. We treat the points of egress in the neighborhood as the destination nodes for all traffic flow; if there is more than one egress we connect these nodes to a "super sink" node that has a demand equal to the sum total of all traffic in the region of interest. Figure 2 represents our spatial model for a simplified neighborhood.

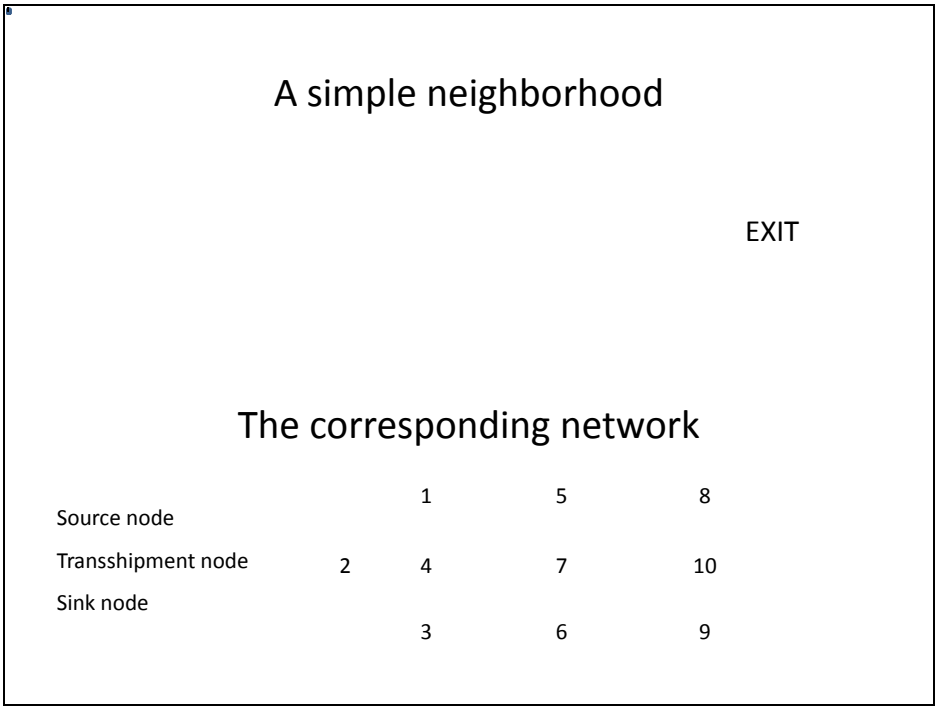

Figure 2. A simple neighborhood and its spatial network representation.

We modify the preliminary network by dividing it into regions and creating special intersection nodes. We split the Mission Canyon neighborhood into five distinct regions to help us visualize and quantify the flow dynamics through the neighborhood. We split each road intersection node into an inbound and outbound node connected by a single directed arc. This allows us to constrain the flow through intersections, as the intersections are likely to be bottlenecks during an evacuation event. Using the Google Earth picture as a guide, we next develop a list of nodes in the network and list of arcs connecting these nodes. The resulting data files are consistent with a forward-star matrix often used in network flow problems (Ahuja, Magnanti, & Orlin, 1993, p. 35).

We formulate the spatial minimum-cost network flow problem SPATIAL as follows.

Index Sets

$i \in L$	Locations (alias *j*)
$(i, j) \in A$	Directed arc from *i* to *j*

Data

$u_{i,j}$	Upper limit on arc (i, j)
$c_{i,j}$	Per-unit cost on arc (i, j)
b_i	Supply present at node (i)

Variables

$X_{i,j}$	Flow on arc (i, j)

Min-Cost Formulation

$$\min_{X} \quad \sum_{i,j} c_{i,j} X_{i,j} \qquad \text{(C0)}$$

$$s.t. \quad \sum_{j} X_{i,j} - \sum_{j} X_{j,i} = b_i \quad i \in L \qquad \text{(C1)}$$

$$X_{i,j} \le u_{i,j} \qquad (i,j) \in A \qquad \text{(C2)}$$

$$X_{i,j} \ge 0 \qquad (i,j) \in A \qquad \text{(C3)}$$

The objective function value for our mathematical formulation (C0) aims to minimize the total cost of moving all supplies to a sink. Constraint (C1) ensures balance of flow at each node. Constraint (C2) ensures that flow along an arc does not exceed the capacity for that arc. Constraint (C3) ensures that there are no negative flows.

B. THE SPACE-TIME MODEL

Building on our spatial model, we develop a space-time model that replicates our spatial network in each of *T* time periods, and optimize the neighborhood evacuation based on time dependent arc costs assigned to those arcs that connect our egress points to our super-sink node. We incentivize movement by assigning a small cost to those arcs that represent remaining stationary in space-time, and assign zero arc costs to all other arcs throughout the network. The approach is as follows: For each time period *t*, we create an exact copy of all nodes in the network. We connect neighboring nodes from the spatial network with arcs that traverse a single time period (e.g., from *t* to *t+1).* In this network no supply ever remains stationary at one node. Although in actuality a vehicle may remain stationary between time periods *t* and *t+1*, they are moving through "space-time." In other words, a car at node *n* that is stationary would move from node *n* at time *t* to node *n* at time *t+1* in our model. By imposing an upper capacity limit on these "horizontal arcs," we define a maximum amount of vehicles that can be held over at one node between time periods; if the inbound flow to a node exceeds its outbound arc capacity and its holding capacity, it forces that inbound flow to backup elsewhere in the

network. This structure allows us to model the buildup of traffic along a road segment during an evacuation. Figure 3 illustrates the time-space model as compared to the spatial model.

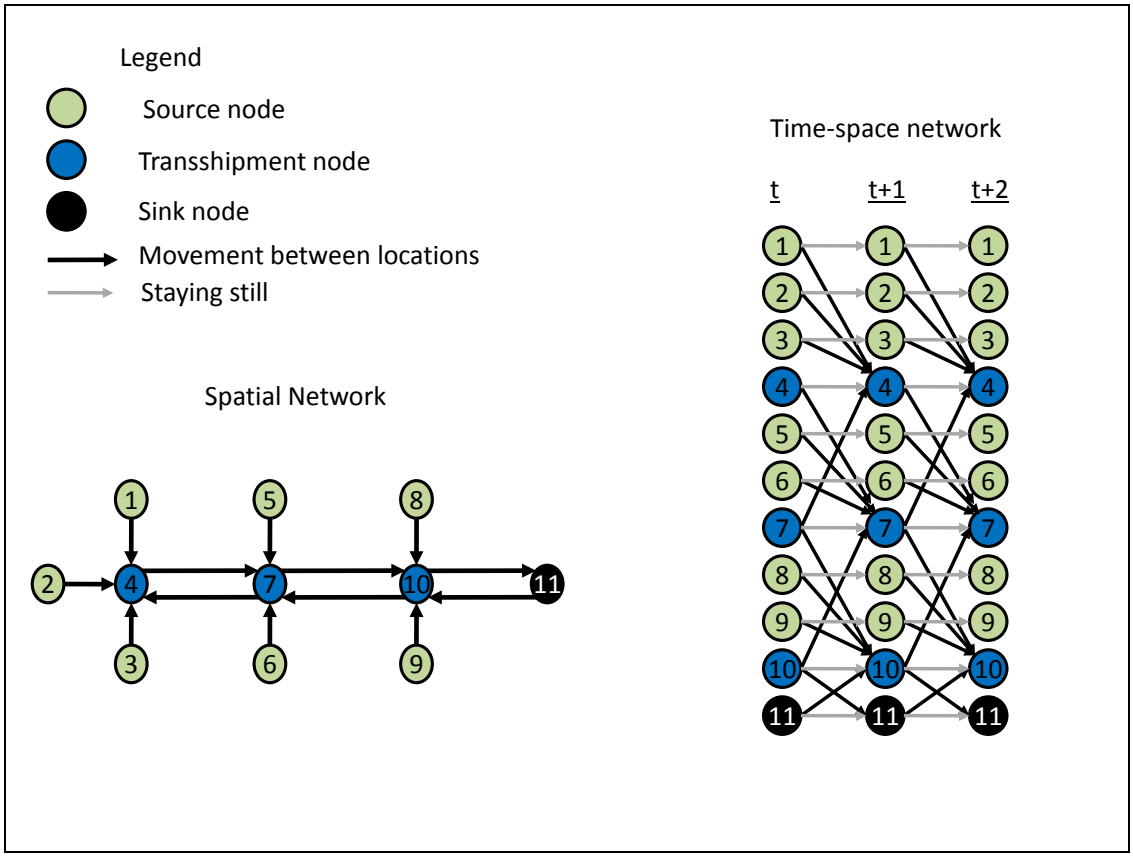

Figure 3. A simple spatial network and its representation in the space-time network.

We model the minimum cost evacuation behavior through time with formulation SPACETIME below.

Index Sets

$i \in L$	Locations (alias j)
$t \in T$	Time Periods (alias tp)
$(i,t) \in N$	Nodes N=L x T
$(i,t,j,tp) \in A$	Arc from (i ,t) to (j, tp)

$(i,t) \in S$	Sink Flows from location *i* in time *t*

Data

$bb_{i,t}$	Supply at node *i* at time *t*
$uu_{i,t,j,tp}$	Upper limit on arc (i,t,j,tp)
$cc_{i,t,j,tp}$	Per-unit cost on arc (i,t,j,tp)

Variables

$XX_{i,t,j,tp}$	Flow on arc (i,t,j,tp)
$WW_{i,t}$	Flow to sink from location *i* in period *t*

Min-Cost Formulation

$$\min_{X} \quad \sum_{(i,t,j,tp)\in A} cc_{i,t,j,tp}\ XX_{i,t,j,tp} + \sum_{(i,t)\in S} t\ WW_{i,t} \qquad (Q0)$$

$$s.t. \quad \sum_{j} XX_{i,t,j,t+1} - \sum_{j} XX_{j,t-1,i,t} + WW_{i,t} = bb_{i,t} \qquad i \in L;\ 0 < t < T \qquad (Q1a)$$

$$\sum_{j} XX_{i,t,j,t+1} + WW_{i,t} = bb_{i,t} \qquad i \in L;\ t = 0 \qquad (Q1b)$$

$$-\sum_{j} XX_{j,t-1,i,t} + WW_{i,t} = bb_{i,t} \qquad i \in L;\ t = T \qquad (Q1c)$$

$$XX_{i,t,j,tp} \le uu_{i,t,j,tp} \qquad (i,t,j,tp) \in A \qquad (Q2)$$

$$XX_{i,t,j,tp} \ge 0 \qquad (i,t,j,tp) \in A \qquad (Q3)$$

In the above formulation, the objective function (Q0) is an intermediate calculation we use to determine the minimum evacuation time for the Mission Canyon neighborhood. The first term represents the cost of flow movement through the space-time network, and the second term is a weighted sum of sink flows. For our model, we assign an arc cost of zero to all movement arcs in the actual network that do not flow into the sink. We assign a minimal cost to arcs that represent remaining stationary to incent movement throughout the network. Additional costs are incurred when flow passes out of the real network into our artificial sink node. For simplicity, we assign to these arcs a

cost that increases with the time period in which the flow occurs (i.e., one unit of flow to the sink node at t=3 incurs a cost of three, while one unit of flow at t=4 incurs a cost of four, etc.). Minimizing this objective means getting all flows to the sink as soon as possible. The objective function value itself does not tell us much about minimum time to evacuate; however, we can recover clearing time by looking at sink flows.

The first three constraints are balance of flow constraints. Constraint (Q1a) ensures that the initial supply at a node plus any incoming supply at that node for time period t is equal to the supply remaining plus any flow from that node at time $t+1$; this constraint does not address the first and last time period. Constraint (Q1b) is the balance of flow constraint for the first time period, t=0. This constraint ensures that all supply initially present at a node (i) in time period t=0 is accounted for as flow to other nodes (j) at t=1. Constraint (Q1c) ensures that we account for all available supply by the final time period $t=T$.

Constraint (Q2) is a capacity constraint on the arcs in the network; it ensures that we do not have a greater volume of flow on any particular arc than the maximum capacity of that arc. Constraint (Q3) is a non-negativity constraint and ensures that there are no negative flows.

C. THE MISSION CANYON EXAMPLE

We apply model SPACETIME to the Mission Canyon neighborhood. We use a time step interval of 10 seconds, which is the approximate time it takes for an unimpeded car to travel over an arc segment of length 264 feet (0.05 miles). We base this interval on a maximum sustainable speed through the neighborhood of approximately 22 miles per hour (Church, 2010), which corresponds to approximately 3 minutes to travel a mile. Furthermore, we assume arc capacities of five vehicles for all transshipment nodes within our network. We base this arc capacity on an average vehicle length of approximately 17 feet, and assuming that an average vehicle will take up approximately 50 feet of road, including spacing between vehicles. Essentially, all of the roads in Mission Canyon are two-lane roads, and we do not attempt to model either contraflow scenarios or traffic control scenarios. In addition to being able to support five vehicles traveling along an arc, we assign a “holding capacity” of five vehicles per node, which translates to

horizontal arc capacities of five vehicles. We assign varying capacities to the different intersection arcs based on their traffic throughput capacities (Church, 2010), and we designate two distinct nodes in our network as sink nodes; our designation corresponds to the intersection Church and Sexton (2002) identified as being exit points for the neighborhood. Figure 4 and Table 1 reflect these details.

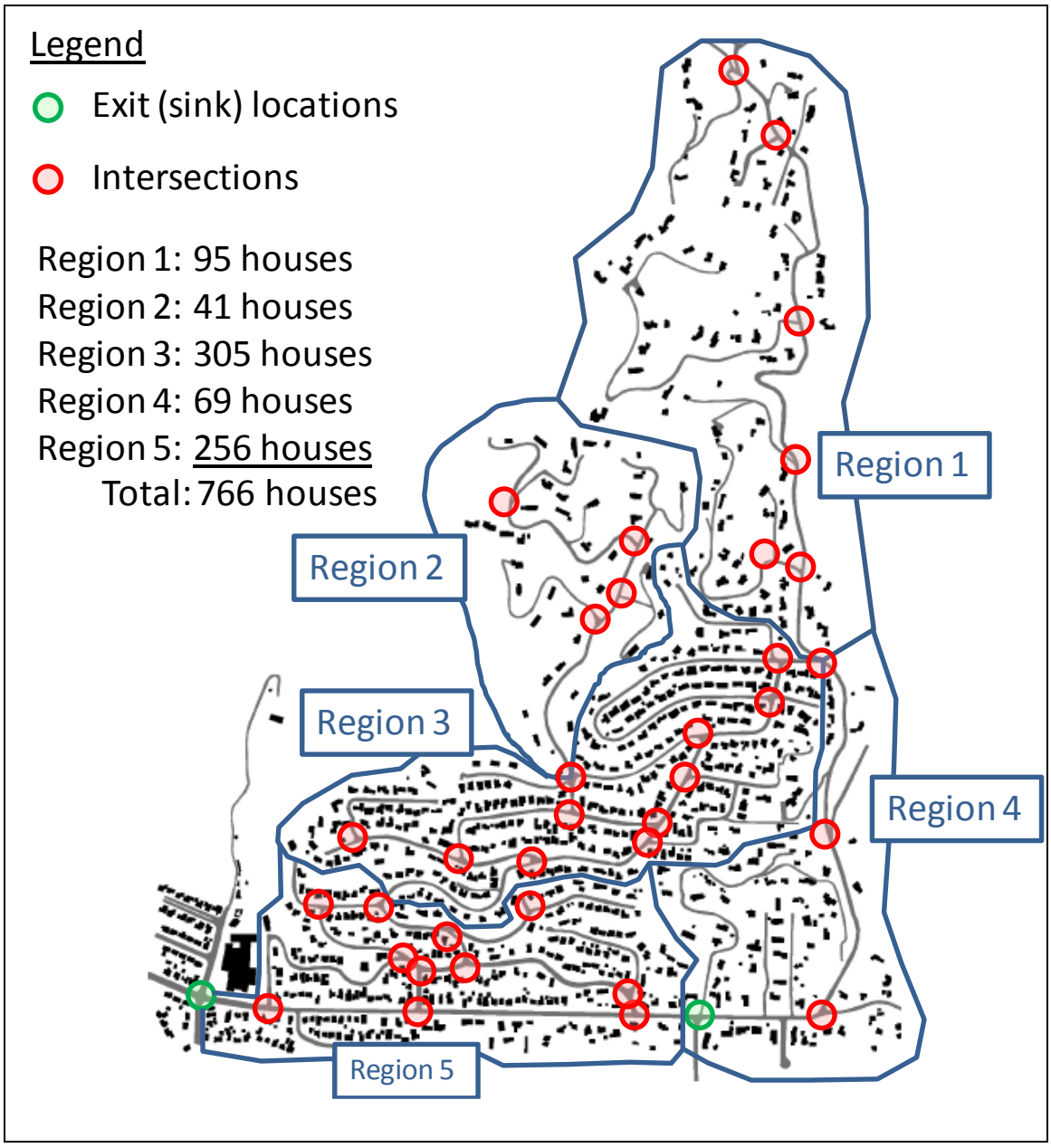

Figure 4. The Mission Canyon neighborhood with intersections and sink nodes identified. (After Church & Sexton, 2002).

Intersection Name	Node Name	Throughput Capacity estimate (cars/hr)*	Throughput per Time Period	Modeled Throughput
1. Ben Lomond and Williams	BEN01	1000	2.8	3
2. Kenmore and Ben Lomond	BEN06	750	2.1	2
3. Cheltenham and Dorking (North)	CHEL01	750	2.1	2
4. Cheltenham and Dorking (South)	CHEL03	750	2.1	2
5. Kenmore and Cheltenham	CHEL06	750	2.1	2
6. Cheltenham and Exeter(North)	CHEL12	750	2.1	2
7. Cheltenham and Selwyn	CHEl13	750	2.1	2
8. Cheltenham and Glen Albyn	CHEL16	750	2.1	2
9. Cheltenham and Tye	CHEL17	900	2.5	3
10. Cheltenham and Exeter(South)	CHEL18	750	2.1	2
11. Windsor and Cheltenham	CHEL23	750	2.1	2
12. Cheltenham and Foothill	CHEL24	1250	3.5	4
13. Exeter and Exeter Place	EX02	1000	2.8	3
14. Tunnel and Mission	FOO01	1200	3.3	4
15. Glen Albyn and Foothill	Gle07in	1200	3.3	4
16. Kenmore and Arriba	KEN04	750	2.1	2
17. Montrose and Cheltenham	MONTROSE01	1000	2.8	3
18. Williams and Palomino	PALOMINO16	850	2.4	3
19. Montrose and Tunnel	TUNNEL24	850	2.4	3
20. Tye and Foothill	TYE01	1200	3.3	4
21. Williams and Cheltenham	WILLIAMS03	1000	2.8	3
* Church (2010)				

Table 1. Critical intersections of the Mission Canyon neighborhood. Using the estimated throughput capacities (in hourly vehicle flow) from Church (2010), we obtain an assumed flow capacity per time period (10-second interval). We use integer throughput for our model because it produces integer results (due to unimodularity). Our model is robust enough that throughputs could be non-integer data, with the understanding that the output would need to be interpreted in an aggregate manner.

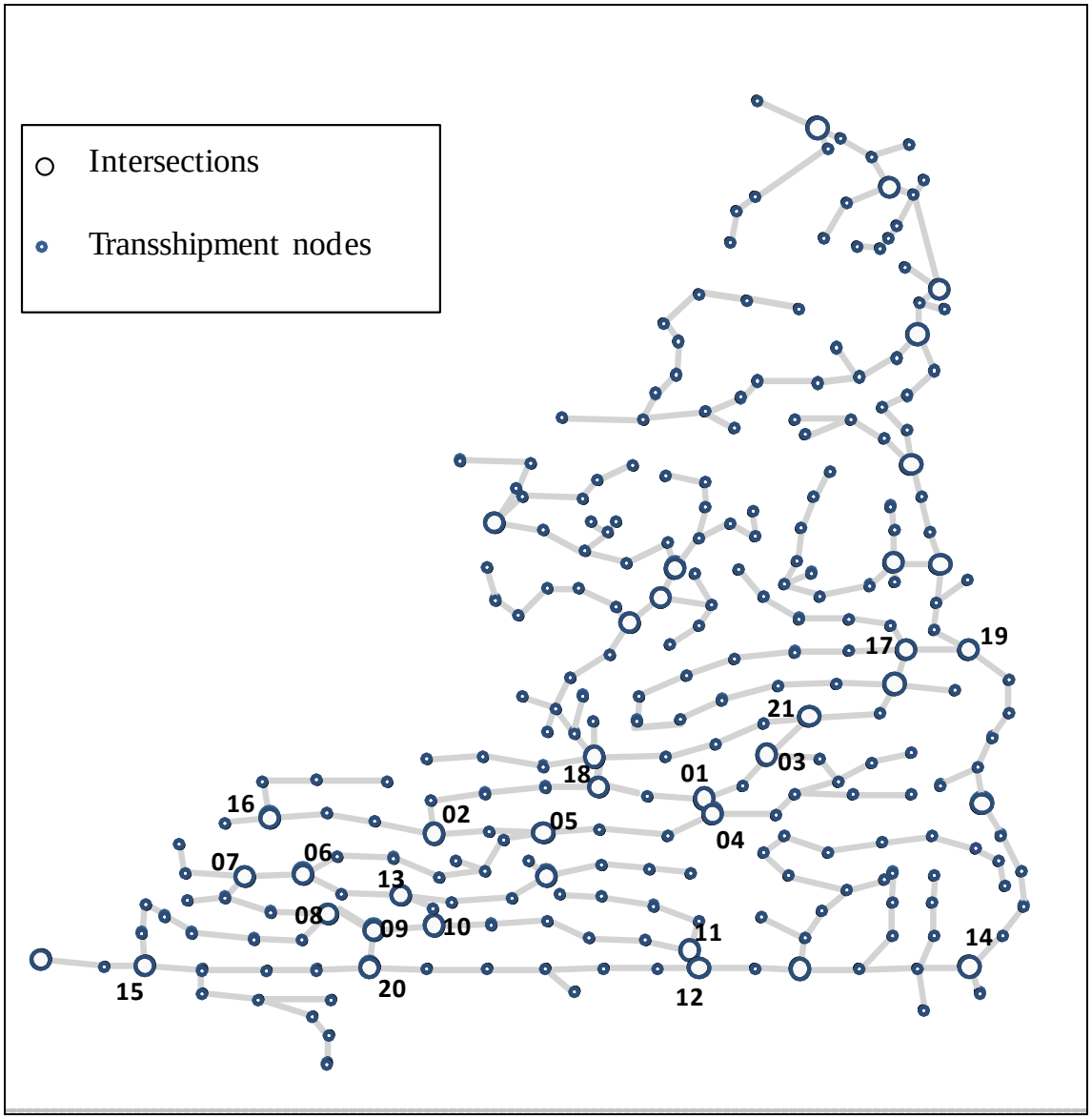

Figure 5. Network Representation of the Mission Canyon neighborhood with each of the 21 critical intersections labeled. See Table 1 for corresponding intersection names.

IV. RESULTS

A. DETERMINING A BASELINE

We first consider the scenario in which one car per household needs to evacuate from the Mission Canyon neighborhood. To be consistent with the previous work done by Church and Sexton (2002), we assume that 30% of all evacuating vehicles leave at t=1, 50% of vehicles begin to evacuate after five minutes (t=30), and 20% of vehicles begin to evacuate after 10 minutes (t=60). Under this scenario, it takes 18 minutes and 10 seconds (denoted as 18:10) for all vehicles to completely evacuate the neighborhood. Figure 6 shows the cumulative number of vehicles that evacuate through each of the sink nodes. Figure 7 shows the number of cars in each of the five regions throughout the evacuation scenario.

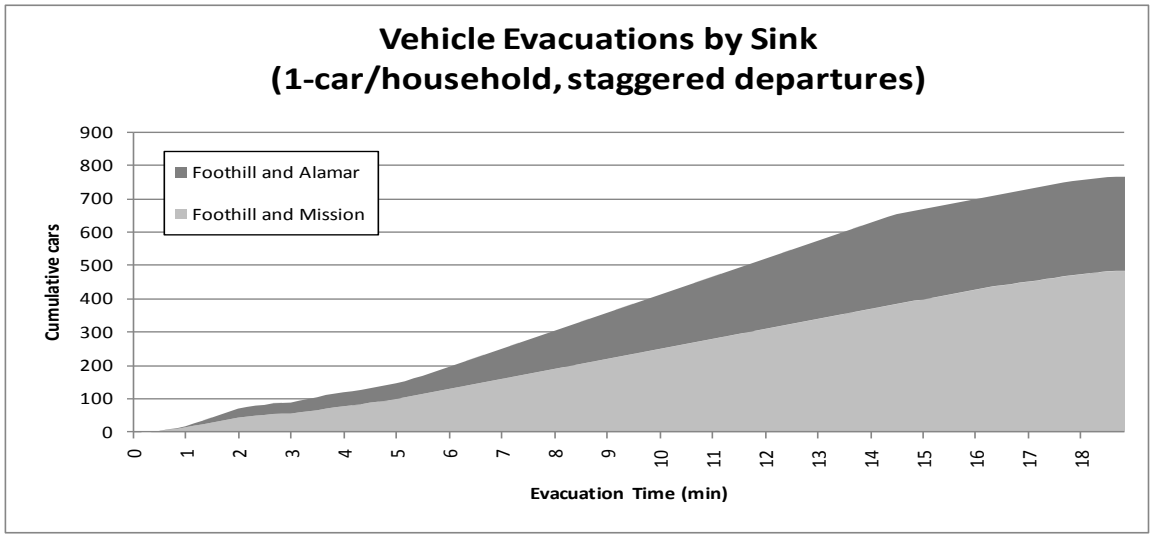

Figure 6. Cumulative vehicle evacuation by exit location (one vehicle per driveway).

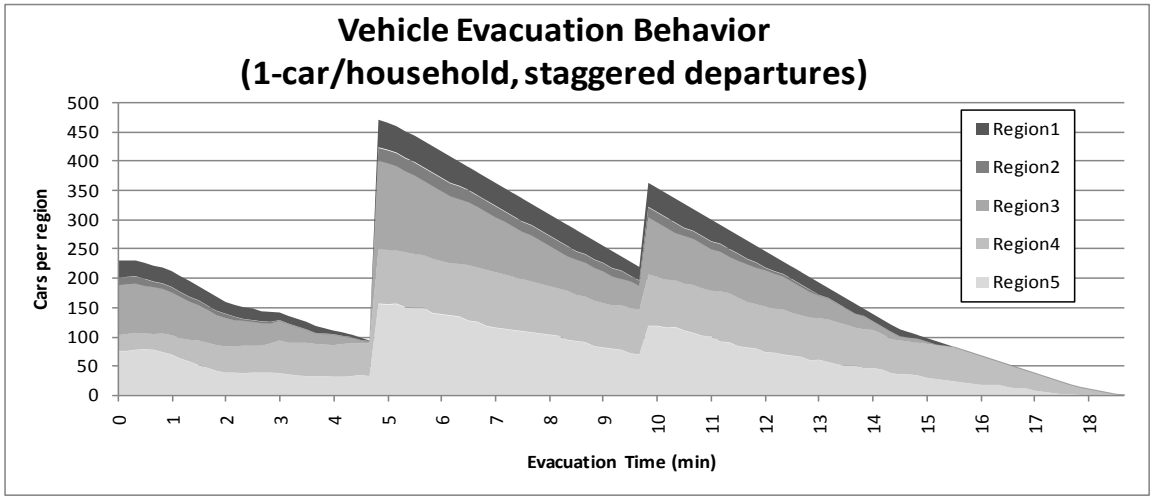

Figure 7. Vehicle clearing times and distribution by region (one vehicle per driveway). The shaded portion of the graph shows the number of vehicles in each region as a function of time. Note that a vehicle leaving one region may have to enter another region before exiting the neighborhood (e.g., vehicles leaving Region 1 must enter Region 4 before exiting).

We next consider the scenario in which two vehicles per household must evacuate the neighborhood, all of which follow the same staggered departures as with the one car scenario. We find that doubling the number of vehicles nearly double the clearing time; for two vehicles per household it takes 33:10 to completely evacuate the neighborhood. Figure 8 shows the cumulative evacuations through each of the sink nodes. Figure 9 shows the number of cars in each of the five regions throughout the two car evacuation.

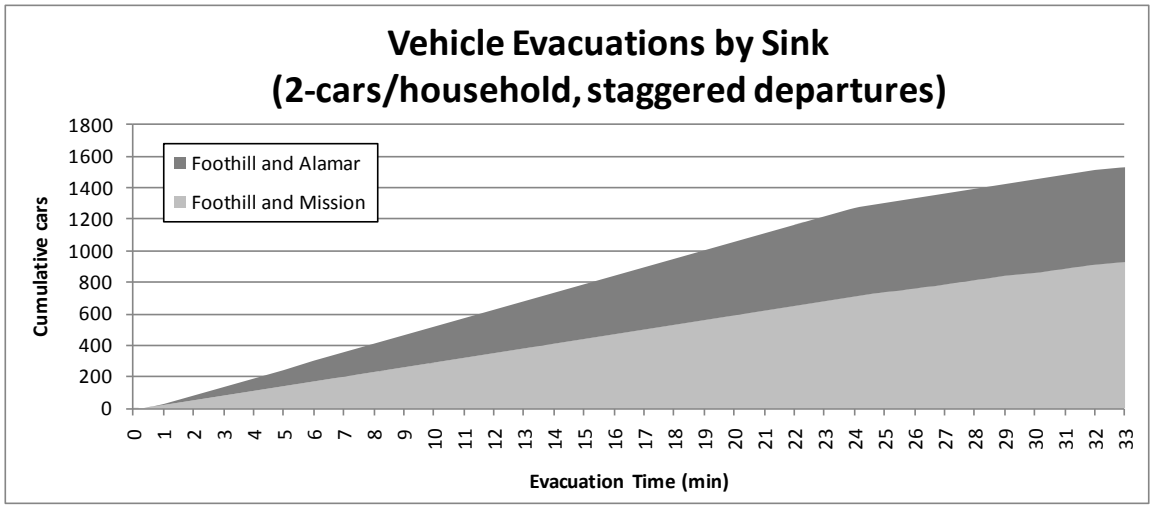

Figure 8. Cumulative vehicle evacuation by exit location (two vehicles per driveway).

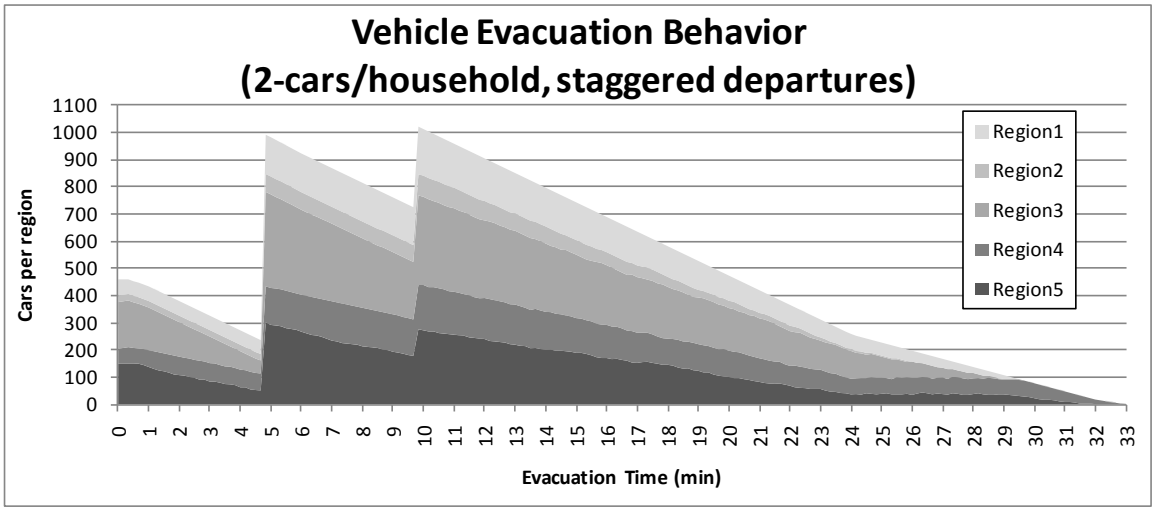

Figure 9. Vehicle clearing times and distribution by region (two vehicle per driveway).

We observe that the clearance times obtained from our network-flow model are consistent with the results from the micro-simulation model of Church and Sexton (2002). Assuming one car per driveway, they estimate that it takes 18:49 for all vehicles to evacuate, our model estimates that 18:50 would be required. Similarly, their model estimates that it would take 34:50 to evacuate all vehicles under a two car per driveway scenario, while our optimization model estimates a total time of 33:10 to evacuate the vehicles. Considering the level of agreement between the predicted clearance times these two models produce, we consider our optimization model to be valid, relative to their simulation model. Table 2 presents full results and a comparison to the Church and Sexton (2002) micro-simulation model, referred to as the "Vital Report."

		Vital Report		Staggered SPACETIME Foothill flow =5		Staggered SPACETIME Foothill flow =10		No Stagger SPACETIME Foothill flow =5		No stagger SPACETIME Foothill flow =10	
		1 car/house	2 cars/house	1 car/house	2 car/house	1 car/house	2 car/house	1 car/house	2 car/house	1 car/house	2 car/house
total cars		763	1526	766	1532	766	1532	766	1532	766	1532
% of cars	50%	8:23	15:43	9:40	14:50	8:30	11:40	7:40	14:40	6:00	10:30
	75%	12:04	24:16	13:10	21:50	12:30	20:00	11:30	21:50	11:30	19:50
	90%	15:28	30:25	15:50	27:40	16:00	27:40	15:20	27:30	15:20	27:30
	95%	16:44	32:40	17:10	30:10	17:10	30:20	16:40	30:00	16:40	30:10
	100%	18:49	34:58	18:50	33:10	18:50	33:10	18:10	33:00	18:10	33:00
# of cars	200	4:57	4:43	6:20	4:20	6:00	3:50	4:20	4:10	3:20	3:00
	400	9:14	8:47	10:00	8:00	8:50	7:00	8:00	8:00	6:20	5:20
	600	13:41	12:59	13:40	11:40	13:10	9:30	12:20	11:40	12:20	8:00
	800		16:55		15:20		12:10		15:20		11:00
	1000		21:54		19:10		15:10		19:00		15:00
	1200		26:53		22:50		21:40		22:40		21:40
	1400		32:45		28:20		28:20		28:10		28:20

Table 2. Comparison of clearance times for the Vital Report and for the staggered and simultaneous departure scenarios of our model.

B. DOES STAGGERING MATTER?

Having established a baseline for our evacuation model, we now ask how much of an impact the assumed staggered departures have on the total time to evacuate the neighborhood. To determine whether there is an effect, we modify our model so that all vehicles begin to evacuate at t=1. Under this scenario, our model estimates a clearing time of 18:10 to evacuate the neighborhood assuming one car per driveway, compared to 18:50 if we stagger the departure times. The results for two cars per household assuming a simultaneous evacuation indicate a clearing time of 33:00, compared to 33:10 if we stagger the departure time.

These results suggest that staggering the departure times has essentially no impact on the total time to evacuate the neighborhood. This implies that the road network is near its limit for clearing capacity in either scenario. Figure 10 shows the number of cars in each of the five regions, for the one-car-per-house scenario during a staggered evacuation, and during a simultaneous evacuation. Figure 11 shows the number of cars in each of the five regions, for the two-car-per-house scenario, during a staggered evacuation, and during a simultaneous evacuation.

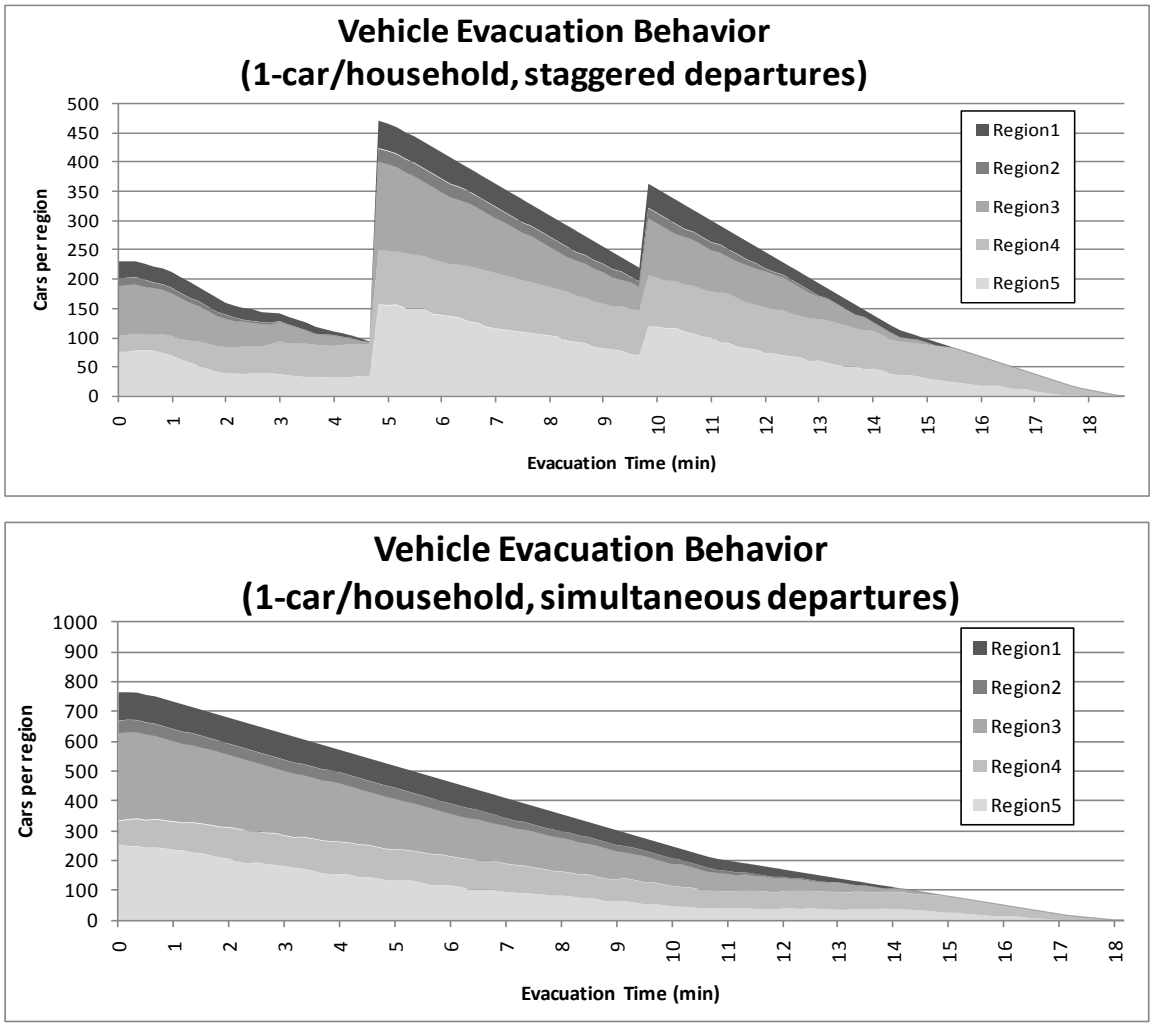

Figure 10. Clearing times by region, staggered departures (top), simultaneous departures (bottom). Note the staggered departure case repeats Figure 7.

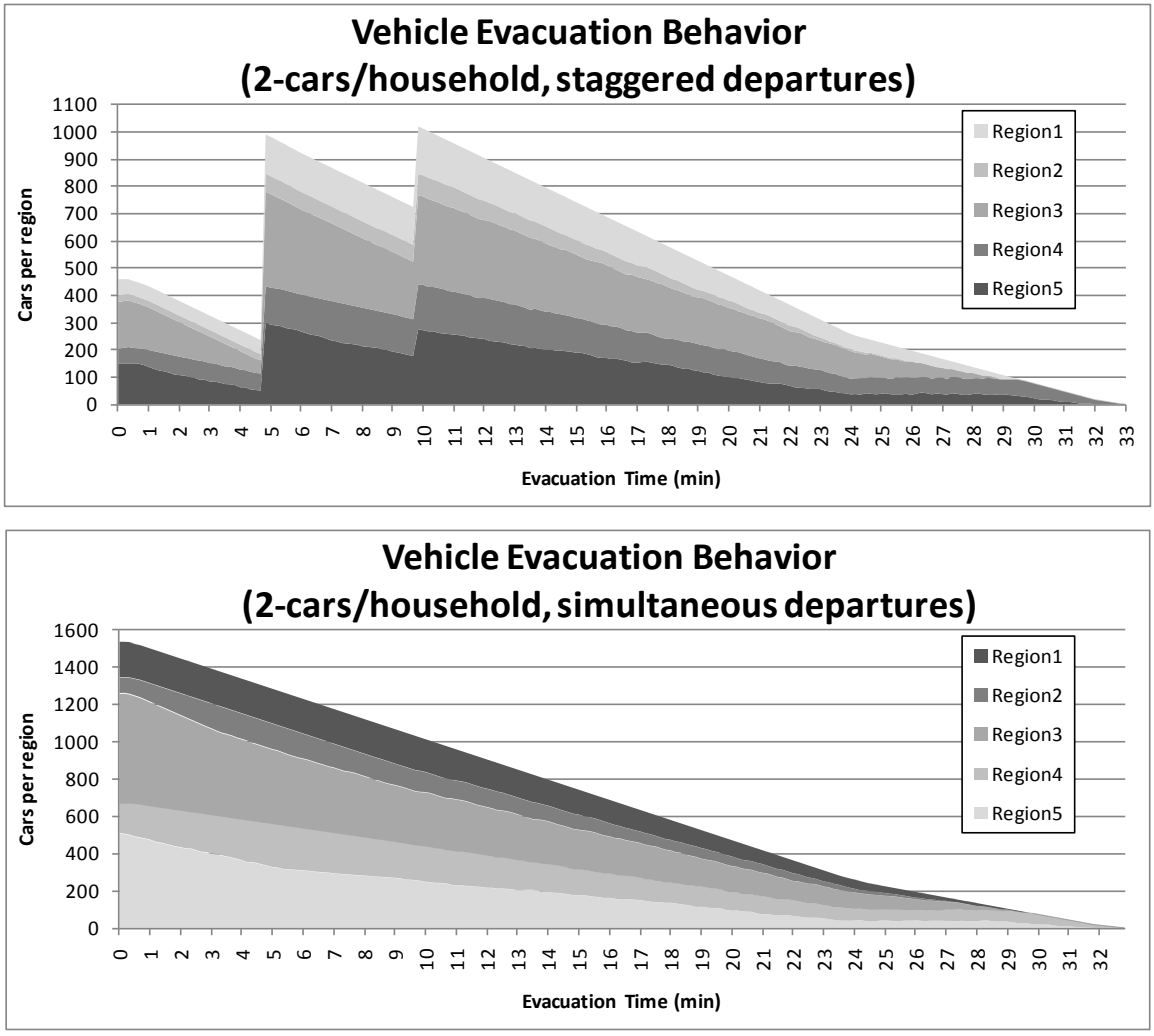

Figure 11. Clearing times by region, staggered departure (top), simultaneous departure (bottom). Note that the staggered departure case repeats Figure 9.

C. THE IMPORTANCE OF FOOTHILL ROAD

1. Reduction in Throughput Capacity

We next consider whether or not the presence of "background" traffic along Foothill Road has an effect on the total amount of time it takes to evacuate the Mission Canyon neighborhood. All neighborhood traffic must travel on Foothill Road in order to evacuate the neighborhood, but there can also be significant traffic on it from surrounding neighborhoods. Thus, there is potential for existing traffic to impede the evacuation. We consider this by running a number of model excursions in which we vary the capacity of the arcs that coincide with Foothill Road. We focus these experiments on the two car staggered baseline scenario, since we believe that any potential problems with evacuation will be more obvious with the greater number of cars on the road.

Foothill Road Status	Clear Time	Increase Over Baseline
arc capacity=1	2:08:40	1:35:30
arc capacity=2	1:05:10	32:00
arc capacity=3	43:50	10:40
arc capacity=4	33:10	-
arc capacity=5	33:10	-
arc capacity=10	33:10	-
arc capacity=15	33:10	-
arc capacity=50	33:10	-
Loss of Foothill/Mission egress	1:04:30	31:20
Loss of Foothill/Alamar egress	51:40	18:30

Table 3. Results of varying vehicle capacity and egress routes along Foothill Road.

Table 3 summarizes the results. We find that as long as there is capacity of four vehicles per time period (1440 per hour), then there is no impact on clearing times. Recall that our baseline assumes five vehicles per time period.

Decreases below four vehicles per time period on Foothill Road affect the clearing times for Mission Canyon. If the arc capacity is only one vehicle per time period (360 per hour), it takes 2:08:40 to evacuate the neighborhood, or 1:35:30 longer than our

baseline scenario. An arc capacity of two vehicles per time period (720 per hour) requires an additional 32:00 over the baseline to clear the neighborhood, while an arc capacity of three vehicles per time period (1080 per hour) requires an additional 10:40 to clear. Increases in capacity above the baseline (up to 50 cars per time period) yield no improvement in clearing times.

Like the other roads in Mission Canyon, Foothill Road is a two-lane road; however, this road can support vehicles at higher speeds and has a higher speed limit. Based on posted speed limits, we conservatively estimate that Foothill Road has a capacity of eight vehicles per time period (2880 vehicles per hour). Thus, as long as there is approximately 50% of free-flow capacity (1400 vehicles per hour) on Foothill Road during an evacuation, the presence of background traffic does not impact the clearing time of the Mission Canyon neighborhood; rather, it is the road network of the neighborhood itself that is the limiting factor during an evacuation. There are a number of intersections in the Mission Canyon neighborhood that have a low throughput capacity, and many of these fall along the main routes out of the neighborhood. These restrictive intersections have a greater impact on how long it takes to evacuate the neighborhood than the presence of traffic on Foothill Road.

2. Loss of an Egress Point

We also consider the impact of losing an egress point by changing the quantity of sink nodes and estimating how much longer it will take to evacuate the neighborhood. By removing the Foothill Road and Mission Canyon Drive intersection as a point of egress, it takes 64:30 to evacuate, an increase of 31:20 over our baseline scenario. Removing the Foothill Road and Alamar Avenue intersection as a point of egress it takes 51:40 to evacuate Mission Canyon, an increase of 18:30 minutes from our baseline scenario. These results also appear in Table 3.

D. IMPACT OF ROAD OR INTERSECTION CLOSURES

We now consider the impact of closing roads and intersections in the Mission Canyon neighborhood on evacuation behavior.

1. Varying the Flow Along Tunnel Road

Tunnel Road runs along the side of the lower Mission Canyon neighborhood, serving as the single egress route for the upper portion of the neighborhood, and one of two main egress routes for the middle portion of the neighborhood. We consider what impact closing the lower portion of the road (below the point of entry for middle Mission Canyon) would have on the overall evacuation time. To assess this, we set the arc capacity of the segment connecting Tunnel Road to Foothill Road (Tunnel33 in our model) to zero. For the one car scenario, the closure of this arc results in a clearing time of 41:10, or 22:20 longer than our baseline model. In fact, losing this egress route results in a longer clearing time than what would be required for the two-car scenario if the arc remained open and at its baseline capacity. Closing this arc in our two-car scenarios results in a clearance time of 1:18:10, or 45 minutes longer than the time required for our baseline model.

We also consider the effect of closing Tunnel Road near the point of entry for middle Mission Canyon (Tunnel24 in our model). Doing so results in clearing times that are nearly identical to those we obtain by closing the road near the entry to Foothill Road. These results clearly indicate that this segment of road is crucial to a quick evacuation of the Mission Canyon neighborhood. Figure 12 shows the location of Tunnel Road, as well as the two intersections we “close.”

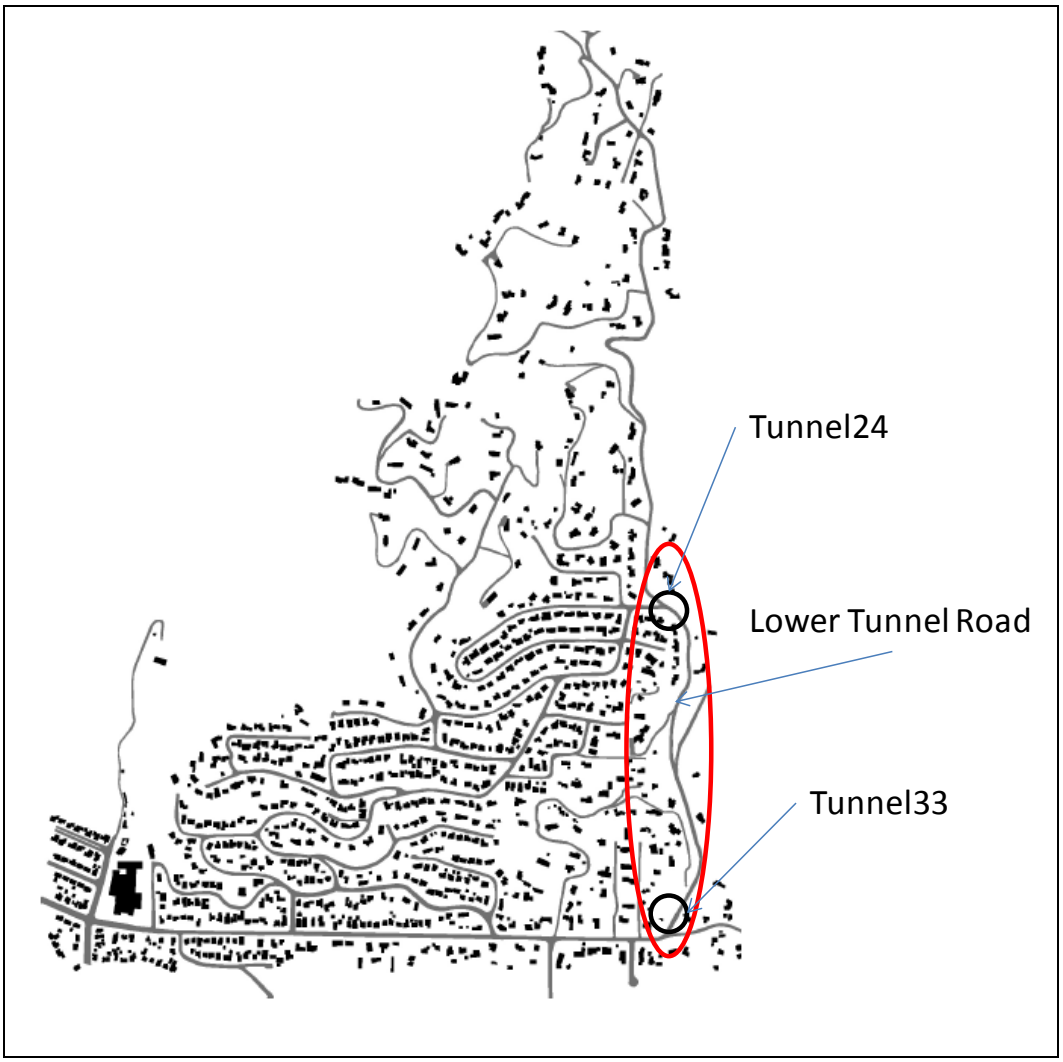

Figure 12. The Mission Canyon Neighborhood with lower Tunnel Road highlighted (After Church & Sexton, 2002).

Because of the importance of this road on the evacuation of the Mission Canyon neighborhood, we now consider how the evacuation would change if we could somehow increase the carrying capacity of this segment of the network. For example, we could increase the carrying capacity of this road segment, if we use both lanes of the road for egress; this is known as *contraflow traffic control*. We study this by increasing the carrying capacity for all arcs along this segment of road from five cars per time period (our baseline) to ten cars per time period. For both the one- and two-car scenarios, this change yields no estimated improvement in clearing time of the Mission Canyon neighborhood, due to a limiting effect that Foothill Road now has on the network.

However, by also increasing the arc capacity along Foothill Road to ten cars per time period, we do see some improvement in clearing times. The one car scenario sees only a modest 0:30 improvement in clearing times when we model for contraflow along Tunnel and increased flow along Foothill Road. The two-car scenario sees a more significant improvement in evacuation times, however, decreasing from 33:10 to 26:30, lowering the evacuation time by 6:40 minutes. Based on this, we believe that the evacuation of Mission Canyon could be improved by utilizing a combination of contraflow traffic routing along Tunnel Road and limiting the non-evacuation traffic along Foothill Road, thereby allowing for greater evacuation traffic flow. We present full results for these model excursions in Table 4 and Table 5.

Intersection and Capacity	Clearance Time with Foothill Capacity=5	Clearance Time with Foothill Capacity=10
Tunnel33 capacity=0	41:10	41:10
Tunnel 33 capacity=1	30:10	30:10
Tunnel 33 capacity=2	22:30	22:30
Tunnel 33 capacity=3	18:50	18:50
Tunnel 33 capacity=4	18:50	18:50
Tunnel 33 capacity=5 (Baseline value)	18:50	18:50
Tunnel 33 capacity=6	18:50	18:50
Tunnel 33 capacity=10	18:50	18:50
Tunnel24 capacity=0	40:30	40:30
Tunnel24 capacity=1	30:00	30:00
Tunnel24 capacity=2	22:30	22:30
Tunnel24 capacity=3 (Baseline value)	18:50	18:50
Tunnel24 capacity=4	18:50	18:50
Tunnel24 capacity=5	18:50	18:50
Tunnel24 capacity=6	18:50	18:50
all lower Tunnel capacity=5	18:50	18:50
all lower Tunnel capacity=6	18:50	18:50
all lower Tunnel capacity=7	18:50	18:50
all lower Tunnel capacity=8	18:50	18:50
all lower Tunnel capacity=10	18:50	18:50

Table 4. Impact of Tunnel Road capacities on clearance times. One car per driveway with staggered departure times. Increasing capacity of Tunnel Road and Foothill Road does not improve evacuation clearing times.

Intersection and Capacity	Clearance Time with Foothill Flow=5	Clearance Time with Foothill Flow=10
Tunnel33 capacity=0	1:18:10	1:18:10
Tunnel 33 capacity=1	55:20	55:20
Tunnel 33 capacity=2	40:50	40:50
Tunnel 33 capacity=3	33:20	33:20
Tunnel 33 capacity=4	33:10	33:10
Tunnel 33 capacity=5 (Baseline value)	33:10	33:10
Tunnel 33 capacity=6	33:10	33:10
Tunnel 33 capacity=10	33:10	33:10
Tunnel24 capacity=0	1:17:00	1:17:00
Tunnel24 capacity=1	54:50	54:50
Tunnel24 capacity=2	40:40	40:40
Tunnel24 capacity=3 (Baseline value)	33:10	33:10
Tunnel24 capacity=4	33:10	28:10
Tunnel24 capacity=5	33:10	26:40
Tunnel24 capacity=6	33:10	26:40
all lower Tunnel capacity=5	33:10	26:40
all lower Tunnel capacity=6	33:10	26:30
all lower Tunnel capacity=7	33:10	26:40
all lower Tunnel capacity=8	33:10	26:40
all lower Tunnel capacity=10	33:10	26:30

Table 5. Impact of Tunnel Road capacities on clearance times. Two cars per driveway with staggered departure times. Increasing capacity of Tunnel Road and Foothill Road improves evacuation clearance times.

2. Impact of Road Closures

We now consider the role of 21 "critical intersections" (Church, 2010) for the Mission Canyon neighborhood. We first look at what happens to the evacuation times if an intersection is completely blocked. Such a scenario could arise due to a natural calamity (e.g., a tree falling or reduced visibility, causing an accident that blocks the road) or due to the actions of an intelligent adversary (e.g., a person intentionally obstructs an intersection with a large vehicle). Of the 21 intersections, we find that eight of them, if blocked individually, would completely isolate some houses. The most severe of these is the Montrose and Tunnel intersection, which connects the entire upper region

of Mission Canyon, 95 homes in total. In addition to isolating 95 homes, a closure of this intersection increases the overall time to evacuate the rest of the neighborhood (assuming 2 cars per driveway) by 27:30. The loss of the intersection at Montrose and Williams would also be disastrous for evacuation times. Losing this intersection isolates 14 homes from the evacuation network and increases the time to evacuate the remaining neighborhood (assuming two cars per driveway) by 25:20. As previously mentioned, a loss of the intersection at Tunnel and Foothill (Tunnel 33) increases evacuation time by 45:00, although it does not isolate any homes.

Losing the intersection of Palomino and Williams isolates 51 homes, but results in an improvement in evacuation time for the remaining homes relative to our baseline model (3:50 faster). Assuming two cars per driveway, this closure removes 102 cars from the system, and this explains why we see an improvement in evacuation time. Similar results hold for the intersection of Ben Lomond and Kenmore; 47 homes are isolated, but evacuation time for the remaining neighborhood is improved by 2:50. Losing the intersection of Kenmore and Arriba isolates 31 homes and results in an improved evacuation time for the remaining neighborhood of 2:00.

Table 6 summarizes the impact of these and other intersection closures on the number of isolated houses and the total clearing times. Intersections whose losses would isolate houses are natural candidates for traffic control or other "protection measures." Figure 14 illustrates the locations of these intersections in the Mission Canyon neighborhood.

2 Car staggered network- variation results					
Intersection	Houses isolated if intersection is "closed"	clearing time for remaining houses (periods)	Δt (minutes)	Clearing time if intersection arc capacity=1 (periods)	Δt (minutes)
1. Ben01	-	199	-	199	-
2. Ben06	47	182	-2:50	199	-
3. Chel01	-	199	-	199	-
4. Chel03	-	199	-	199	-
5. Chel06	-	294	15:50	229	5:00
6. Chel12	-	310	18:30	241	7:00
7. Chel13	10	213	2:20	199	-
8. Chel16	-	224	4:10	199	-
9. Chel17	-	199	-	199	-
10. Chel18	-	221	3:40	199	-
11. Chel23	21	199	-	199	-
12. Chel24	-	210	1:50	199	-
13. Ex02	21	210	1:50	199	-
14. Foo01	-	469	45:00	332	22:10
15. Gle07 *	-	307	18:00	258	9:50
16. Ken04	31	187	-2:00	199	-
17. Montrose01	14	351	25:20	254	9:10
18. Palomino16	51	176	-3:50	199	-
19. Tunnel24	95	364	27:30	329	21:40
20. Tye01	-	204	0:50	199	-
21. Williams03	-	278	13:10	200	0:10
* (closing isolates Foo15 sink)					

Table 6. Effects of intersection closures or restrictions on the evacuation of Mission Canyon.

3. Impact of Severely Limiting Intersection Flow

We also consider the impact of severely limiting the throughput capacity at these 21 critical intersections. We assess this by reducing in isolation each intersection capacity to one vehicle per time period (360/hour). Doing so, we find that a number of these intersections are not critical, provided that they have minimal throughput capacity. In fact, six of the eight intersections that isolate homes when blocked have no impact on clearing times provided they have minimal throughput capacity. The intersection of Cheltenham and Kenmore increases overall evacuation time by 5:00, while restricting the throughput of Cheltenham and Exeter increases evacuation time by 7:00. Restricting the throughput of Glen Albyn and Foothill increases evacuation time by 9:50, because this

intersection is a direct input to one of our two sink nodes. Restricting the throughput of Montrose and Williams increases evacuation times by 9:10.

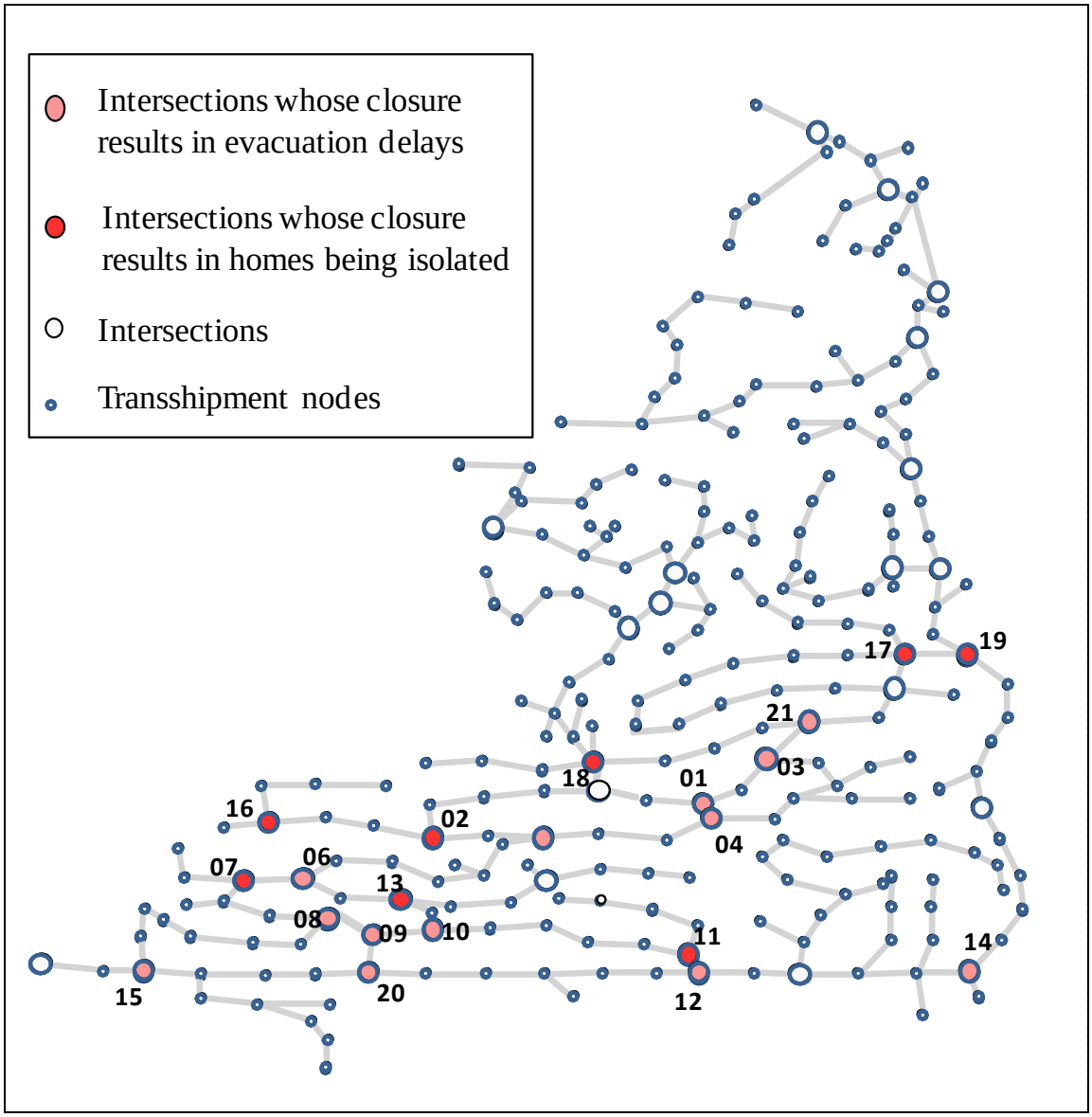

Figure 13. A network representation of Mission Canyon with critical intersections shaded in light grey. Those intersections whose closures result in the isolation of houses from the evacuation network are shaded in dark grey. The numbers correspond to the intersections listed in Table 6.

Restricting the throughput of Tunnel road at either the Tunnel and Montrose intersection or the Tunnel and Foothill intersection has the largest impact of any of the 21 intersections. For the intersection of Montrose and Tunnel, restricting capacity increases the evacuation time by 21:40, while doing so at Tunnel and Foothill increases evacuation time by 22:10. We believe these results further justify the need to ensure this portion of Tunnel Road is either fortified against disruptions or has traffic control enacted during an evacuation event. We present full results for the closure or restriction of critical intersections in Table 6.

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V. CONCLUSION

A. SUMMARY

We develop two network flow models to quantify the clearing times of neighborhood evacuations. Our first model is a spatial model that finds minimum-cost evacuation routes. We represent the Mission Canyon neighborhood as a network consisting of supply (e.g., homes), transshipment nodes (e.g., intersections), and connecting arcs (e.g., road segments), all of which are connect to a "super-sink" egress point. From this spatial model, we create a space-time model by replicating the spatial network for each of T time periods, and we solve for best-case evacuation flows in space and time.

We first develop a baseline evacuation scenario of Mission Canyon and compare it to the previous analysis of Church and Sexton (2002). We find that our model produces similar evacuation clearance time estimates as those obtained by the more time-intensive micro-simulations. With this baseline established, we exercise the model to assess the effects that various changes to our model inputs or network design have on neighborhood evacuation time. Because our model is simple and solves quickly, we are able to consider several scenarios.

We find that staggering departure times does not result in an appreciably longer clearing time than an evacuation with simultaneous departures. We conclude that the presence of background traffic flow on Foothill Road does not greatly impact the neighborhood evacuation, but rather that the overall evacuation time is more largely impacted by the interior roads of the neighborhood. We estimate that losing access to the lower Tunnel Road would more than double the time to evacuate the neighborhood for both a one- and two-car-per-household scenario. This crippling effect results when an intersection node at either end of this road segment is blocked, and we argue that efforts should be taken to ensure this road is fortified against possible closure due to natural or deliberate attacks.

We ran analyses on our network to determine the effects on evacuation time if any of 21 "critical intersections" are either isolated from the network or have their throughput capacity severely limited. Of the 21 intersections, we find that eight of them would isolate some number of houses from the network if we completely disconnect them. Similarly, we find that complete isolation of 13 of the 21 intersections result in longer evacuations. The least severe of these increases evacuation time by 50 seconds, while the most severe closure increases clearing time by 45 minutes.

We examine the results on neighborhood clearing time if each of these same 21 intersections have their throughput capacity limited to one vehicle per time period (360 per hour). These analyses show that 14 of the 21 intersections would have no impact on overall clearance times if restricted. For the other seven, the least severe delay was 0:10, while the most severe increased evacuation times by 22:10.

We recognize there is further work that will improve upon our model and make it more user-friendly and easier to deploy to various neighborhoods.

B. FUTURE WORK

1. Adding Additional Egress Points (Arcs or Sinks)

The micro-simulation work of Church and Sexton (2002) considers additional evacuation scenarios that we do not address here. Specifically, they consider how evacuation time changes if an alternate route out of the neighborhood becomes available. We can easily modify our model to experiment with alternate exit routes. Additionally, we can change our model to allow for an additional egress point from the neighborhood to the "super sink" and estimate evacuation times under this excursion.

2. Input of Data

In developing our model, we focus solely on the Mission Canyon neighborhood and we utilize a simplistic method of network mapping, Google Earth. This method is effective, but manually intensive and tedious. We believe that an automated interface with Google Earth or other Geographical Information Systems (GIS) could drastically

improve the total time necessary to model a neighborhood. By reducing the time to build the spatial network, our model becomes more quickly deployable in the event of an emergent evacuation.

3. Attacking the Network

By changing the capacity of arcs in model SPACETIME, we can assess the impact of any change in the road network on the evacuation times. In this thesis, we consider only a handful of scenarios. A more thorough approach would be to search over all sets of possible road or intersection closures to identify the worst-case disruptions. Specifically, we expect that the application of *attacker-defender models* (e.g., Brown et al., 2006) to these evacuation problems would reveal insights about the vulnerability of evacuation to the intentional actions of an intelligent adversary who wishes to increase the neighborhood clearing times.

By extension, we foresee the use of *defender-attacker-defender* models (Brown et al., 2006) to protect the neighborhood against long evacuation times. First, it provides insight into those areas of the network that should be fortified or somehow controlled to minimize the potential for traffic disruption due to the acts of an intelligent adversary (e.g., terrorist) or natural calamity (e.g., intersection wash out due to a mudslide).

In addition, there is potential for beneficial disruption of traffic flow for short periods of time. A specific example pertinent to our model is the upper region of the Mission Canyon neighborhood and the junction with the middle region of the neighborhood. The Montrose and Tunnel intersection (Tunnel24) is one of the most critical in our model based on its effect on clearing times, and houses isolated if we disconnect the arc. However, our model also indicates that the upper region of the neighborhood will likely clear slower than possible because of road congestion on Tunnel due to the evacuating traffic of middle Mission Canyon. Because upper Mission Canyon is bordered on three sides by chaparral, it is foreseeable that it would be the area of the neighborhood that would most quickly need to be evacuated due to a forest fire. We maintain that temporarily blocking the road that connects traffic from middle Mission Canyon to Tunnel Road would prove beneficial in the evacuation. By temporarily

blocking traffic from middle Mission Canyon, we believe we can achieve a quicker evacuation of the upper Mission Canyon neighborhood while not greatly impacting the overall evacuation time for the entire network. Developing the ability of our model to allow for such temporary disruptions will provide concrete data to support or disprove the notion that we can evacuate the most at-risk area of the neighborhood more quickly without a large impact on overall evacuation time by "shutting off" the arc for a short time.

4. Visualization of Results

We use Microsoft Excel to assist us in visualizing the flow of traffic during our evacuation of Mission Canyon. While this technique is incredibly helpful in seeing how the evacuation takes place, it is not yet in a format that can be easily adapted to show results for different neighborhoods. Without a visualization tool, the immense amount of data generated during our optimization is incredibly difficult to analyze, and certainly cannot be done quickly. Developing an output format, or a program interface that allows us to automatically translate the data into something we can visualize without requiring a large amount of up-front manipulation, will greatly improve the speed at which we can present useful information to decision makers in the event of a short- or no-notice evacuation.

5. Vehicle Tracking

Another natural next step is to develop the ability to tag and track individual vehicles throughout the evacuation optimization. Incorporating this with our improved output interface would allow us to show iteratively the routes that each individual house in a neighborhood should take during the "optimum" evacuation. With this knowledge, and applying our model to a neighborhood before an evacuation is necessary, we can provide each resident with detailed information about possible routes they should follow to ensure that they and the entire neighborhood evacuate as quickly as possible. Such information could be delivered to residents using the "reverse 911" system currently in place or via other social networking technologies (e.g., Twitter). While we cannot ensure

that individuals will comply with the routes presented, there is benefit in providing them the information so they have something they can rely on.

C. FINAL THOUGHTS

Over the last few decades, there has been a trend that people migrate toward areas that are disaster prone (e.g., coastal areas, urban wildland interface areas). This suggests that evacuations will become increasingly common as more people inhabit these areas. As such, understanding when to order an evacuation, how long to allow for an evacuation, and how to route individuals in an evacuation will be important for public safety officials, and often with short notice. We offer our space-time model for optimized network flow evacuation as one of many tools that emergency planners can use in answering these questions, and we provide the Mission Canyon neighborhood analysis as an example of the insights that can be obtained.

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PROPOSED FINAL
ENVIRONMENTAL IMPACT REPORT
WINDERMERE RANCH PEACE RETREAT PROJECT

ENSR Document No. 1998-002

February 1998

Prepared for

COUNTY OF SANTA BARBARA
PLANNING AND DEVELOPMENT DEPARTMENT

THIS REPORT HAS BEEN COPIED
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5.8 FIRE PROTECTION

The following section is based on the proposed Windermere Ranch Fire Management Plan (November 16, 1994; February 1977; and April 1977) prepared by REM & Associates, and Scott Franklin; and a technical review of the plans by Hunt Research Corporation.

5.8.1 Setting

5.8.1.1 Weather Occurrences Along Santa Barbara

Normal daily Santa Barbara weather patterns begin with morning heating of the Santa Ynez Mountain slopes. The air begins to heat and expands, causing an upward flow of air. Cool marine air (onshore breeze) flows across the valley floor toward the mountains to replace this ascending air. The onshore movement of air creates a soft wind up the mountain slopes. Columns of air cool and condense above the mountains, often forming cumulus clouds in the afternoon. Evening winds reverse this process as cool, heavy air descends down-canyon towards the sea (offshore breeze) dissipating the cumulus clouds.

Winds that create extreme fire weather conditions are commonly known as "Santa Ana" winds. These winds can have velocities between 20-80 mph, and occur most often between August and October, however, short periods of Santa Ana winds can occur anytime throughout the year. Santa Ana winds dramatically increase the rate of vegetative transpiration and are accompanied with low humidities producing extremely low (dry) fuel moistures. These extreme fire condition winds blow from the north, northeast, or east, and generally last from 3 to 5 days.

Another type of wind that can cause extreme fire conditions is known as a "sundowner". These northwest winds are created by local atmospheric conditions above the Santa Ynez Mountain Range and usually last 4 to 6 hours. "Sundowner" winds usually occur at sundown, hence the name, however, they can also occur at midday.

Both "Sundowners" and "Santa Ana" conditions provide compressional heating (5 degrees for every 1,000 feet in elevation) to create high temperatures and low relative humidity. Each of the systems also contribute to a "see-saw" burning pattern. During offshore wind episodes, usually above 20 miles per hour, winds funnel the spread of wildfire downslope to the southeast. When the winds abate, usually during the morning hours, the fire reverses, moving upslope to the northwest.

5.8.1.2 Wildfire History

The project site is located within an area that has experienced wildfires on a periodic basis and contains an abundance of vegetation that contribute to the fuel loading during a wildfire. A wildfire is likely to occur on the project site within the next 10 years based on local fire history, and would occur regardless of development of the site. Potential causes could

include arson, downed electrical power lines during high winds, the operation of farm machinery, vehicles, fireworks, and illegal campfires.

In recent history (1800 to 1993), catastrophic wildfire events appear to occur on about a 40- to 50-year rotation in the Santa Ynez Mountains. Wildfire has been a natural part of the landscape in this region, and most species of native vegetation and wildlife have adapted to periodic wildfires. The Santa Ynez Mountain wildfire history contains two of the worst wildfires in California in terms of structure loss (refer to Table 5.8-1). This region has also recorded some of the largest wildfires in total acreage burned in a single event, including the Refugio (1955), the Coyote (1964), and the Wheeler (1985) fires.

Table 5.8-1. Structure Losses in California Fires

Date	Location	Structures*
1991, October	Oakland/Berkeley Hills	2,900
1990, June	**Santa Barbara County**	**641**
1992, August	Shasta County	636
1923, September	Berkeley	584
1961, November	Bel Air	484
1970, September	Cleveland National Forest	382
1993, October	Laguna Beach	366
1980, November	San Bernardino County	325
1993, November	Malibu Area	323
1988, September	Nevada County	312
1977, July	**Santa Barbara County**	**234**

Source: REM & Associates, November 16, 1994

Eight of the eleven structure loss fires listed in Table 5.8-1 occurred in September, October, or November when extreme fire weather periods are most common. The Santa Barbara County "Paint" Fire (June 1990) and Sycamore Canyon Fire (July 1977) also occurred under "Sundowner" wind conditions. The recent occurrence of large structure loss fires illustrates the importance of fire management planning in the wildland/urban "intermix."

The last major wildfire to impact the project area was the "Paint" fire on June 27, 1990. The "Paint" fire, so named for the "Painted Cave" area of San Marcos Pass, burned under catastrophic wildfire conditions. The fire was ignited north of the San Marcos Trout Club and consumed most of the San Jose Creek and Maria Ygnacio drainages, south of State Route 154. Onshore winds pushed the fire toward the Trout Club and Windermere Ranch. Heavy aerial assault with fire retardant, along with assistance from the weather in the form of higher relative humidity and cooler temperatures helped to contain the fire, after consuming over 641 structures and 4,000 acres of watershed. The "Paint" Fire was fueled by decadent untreated vegetation; strong canyon winds, steep slopes, and drought stressed ornamental vegetation.

The Sycamore Canyon Fire (1970) did not represent a threat to Windermere Ranch. The "Coyote" Fire started on September 22, 1964, and burned until October 1, under "Santa Ana" conditions and was contained along State Route 154, about 1 mile east of Windermere Ranch. The "Refugio" Fire (September 6 to 15, 1955) consumed portions of Windermere Ranch, burning under the same weather conditions as the "Coyote" Fire. The rock outcroppings and adjacent oak woodlands on the Windermere Ranch appear to have played a role in slowing the spread of this wildfire.

5.8.1.3 Windermere Ranch

a. Vegetation. The age class of the vegetation existing on Windermere Ranch and the region surrounding the ranch is approximately 40 years old and has not been extensively burned since the 1955 "Refugio" Fire. The decadent stage of the existing vegetation on the Windermere Ranch and its vicinity is considered to pose a significant wildfire threat. Exacerbating this already critical situation is the dieback of vegetation (beginning around 1985) of several shrub species, which has added to the fuel load. The USDA Fire Service has identified the dieback cause to be a fungi, which attacks the root system of these shrubs. The dieback occurs in most broadleaf chaparral species, including ceanothus, manzanita and sumac and has effected coastal oaks. This condition, coupled with over 6 years of previously subnormal rainfall has stressed the existing vegetation. Additionally, two consecutive "wet" seasons (1992 and 1993) has fueled the growth of live and flashy light fuels setting the stage for a repeat of the 1955 "Refugio" fire on or near the project site.

b. Fire Management Units. For fire management assessment and planning purposes, the REM & Associates report divided the Windermere Ranch into four planning areas or units. The four Fire Management Units (FMUs) were determined based on geography, vegetative cover, the location of structures or resources, and existing fire hazard potential. These areas are delineated on the Wildfire Management Map (Figure 5.8-1).

The upper quarter of the project site is FMU zone 1. This FMU consists mostly of mixed chaparral, scattered grasslands and oak woodlands. FMU No. 2 begins in the center of the existing entrance road on the western portion of the ranch and the rock formations in the eastern half of the property. FMU No. 2 is a narrow section consisting primarily of the rock formation that bisects the ranch property, from northwest to southeast. The rock formation is bordered on the north side by an almost continuous oak woodland, and on the south by oak woodland and mixed chaparral. This area also represents the transitional change from the steeper slopes to the south and the flatter slopes found in FMU No. 1.

FMU No. 3 is located south of the rock formation that is the southern boundary of FMU No. 2. FMU No. 3 is a transition zone between oak woodland, mixed chaparral and chamise, to the south. FMU No. 4 comprises the bottom quarter of the Ranch, transitioning from mixed chaparral to primarily chamise along the southern perimeter. FMUs 3 and 4 present the highest wildfire fuel hazard areas on the project site.

c. Access. The project site is located approximately one mile west of SR 154 along West Camino Cielo. West Camino Cielo to SR 154 provides the only means of paved access to the project site and to the West Camino Cielo neighborhood of approximately 44 residences.

5.8.2 Impact Analysis

5.8.2.1 Impact Assessment and Significance Thresholds

a. Fire Hazard Risk Assessment. The Fire Management Plan (FMP) Fire Hazard Risk Assessment conducted by REM & Associates used the BEHAVE fire behavior model system developed by the U.S. Forest Service. This model accepts several parameters important in predicting fire behavior and spreading, such as fuel load, wind speed, and vegetation types. Experienced wildland fire managers can use the BEHAVE modeling system to project the fire size and expected rate-of-spread with a reasonable degree of certainty for use in fire protection planning purposes.

b Fire Protection Codes and Standards. The codes and standards utilized to review the proposed FMP include:

- National Fire Protection Association (NFPA) Standard #299: "Protection of Life and Property from Wildfire," 1991 edition;
- NFPA #1141: "Fire Protection in Planned Building Groups;"
- "Fire Safe Guide for Residential Development in California" published by the State of California;
- 1995 California (and County) Fire Code; and
- High fire hazard area standards of the Santa Barbara County Fire Department.
- "Development Strategies in the Wildland-Urban Interface" published by the Western Fire Chiefs Association.

The FMP prepared by REM & Associates for this project references NFPA 299, and states that NFPA 299 will be followed in design of the infrastructure and structures.

The County Fire Department will establish final conditions for this project, after review of the EIR and final project development plans. Some preliminary approvals have been granted regarding road widths, circulation, fire flow, and duration of flows. The Fire Department is not bound to follow NFPA 299 or any other standard, or Uniform Fire Code requirement, if it finds sufficient mitigating circumstances to allow variance fr what is contained in a code or standard.

The Fire Department does have a development standard for high fire hazard areas, standard #3, which they use as a guideline in establishing specific requirements.

5.8.2.2 Significance Thresholds

The significance of potential fire impacts at the proposed project site can be assessed by evaluating the likelihood that a major fire will affect the site and the potential consequences of a fire. Table 5.8-2 describes the frequency classifications that were used to assess potential project-related impacts. Fires that have a "likely" or "frequent" occurrence interval and could result in an unacceptable risk to life, safety, and project structures, would have the potential to result in a significant environmental impact.

Table 5.8-2. Wildland Fire Frequency Classification

Type	Frequency	Description
Extraordinary	Less than once in 1 million years	An event that has never occurred, but could occur.
Rare	Between once in 10,000 years and once in 1 million years	An event that occurred on a worldwide basis, but only a few times.
Unlikely	Between once in a 100 and once in 10,000 years.	An event that is not expected to occur during the project lifetime.
Likely*	Between once a year and once in 100 years	An event that probably would occur during the project lifetime.
Frequent	Greater than once a year	An event that would occur once a year on average.

* A fire is likely to occur, expose, or impact the proposed project site during the "project lifetime," notwithstanding any development on the property. This is due to the location, fuel loading, and weather.

5.8.2.3 Proposed Fire Management Plan

To reduce the potential of wildfires and the spread of wildfires on the project site, the project applicant has prepared a Fire Management Plan. The Plan consists of several separate elements that address fire prevention and suppression activities that would be implemented at the project site. The plan has been subject to several revisions based on review comments submitted by the Hunt Research Corporation and the Santa Barbara County Fire Department, as part of the preparation of this EIR. Summaries of the contents of the Fire Management Plan are provided below. The entire Plan and its amendments have been incorporated into this EIR by reference.

Fire Hazard Risk Assessment. The potential for a wildfire to spread through the project site was modeled using the BEHAVE Fire Behavior Prediction and Fuel Modeling System. Input parameters for this model were conditions similar to those that occurred during the 1990 "Paint" fire (i.e. air temperature, relative humidity, wind direction and speed, fuel moisture, etc.). Another input parameter for the BEHAVE program is the "fuel model" or type of vegetation that could be burned in a fire. Fuel model selections that could be used for the project site range from grass one foot tall (less than two tons of fuel per acre) through heavy chaparral over six feet high (over 25 tons of fuel per acre).

The effectiveness of a fuel management program can be evaluated using the BEHAVE model. In the existing chaparral areas of the project site (fuel model 4), flames from a wildfire could reach a height of approximately 63 feet. After the implementation of the proposed vegetation management program, the most appropriate fuel model for the majority of the project site that would be developed with structures would be fuel model 8, which is indicative of a "forest litter" fire characterized by a generally smoldering fire with flame heights averaging approximately 2 feet.

b. Vegetation Management Element. The goal of the Vegetation Management Element (VME) is to reduce the amount of dead or highly combustible understory or ladder fuel in selected strategic areas which will reduce overall fuel loads and the potential burning intensity of a wildfire. This would result in a fuelbreak network designed to retard the spread of wildfire threatening key resources.

Vegetation Management Techniques. The VME proposes the use of several vegetation management's techniques such as selective cutting and multicutting to remove dead or highly combustible fuels. In addition, the use of biomass to reduce vegetation propagation and replacement of fire hazard vegetation with natural vegetation has been proposed in the VME. The vegetation management techniques proposed to be used on the project site are summarized below.

- Multicutting would consist of cutting or pruning understory material, primarily dead material and flashy fuel vegetation exceeding 18 inches in height, into lengths of 4 inches or less and allowing them to lie on the ground. Trees would be limbed up to eight feet above the ground. None of the multi-cut material would be removed. Chipping or the multicutting technique and spreading of biomass would be used to preclude invasion of fire-prone flashy fuels (grass, thistle, black mustard).

- In the northern portion of the project site where chaparral is predominate, the recommended fuel modification would be to selectively thin chaparral and remove 100 percent of sage and chamise. Oaks, manzanita, ceanothus, holly leaf cherry, and toyon are to be pruned of all dead material.

- Existing conifers would be removed and replaced with native California trees, primarily coastal live oak (*Quercus agrofolia*), or other appropriate vegetation. Habitat restoration of coastal live oak habitat forms a natural wildfire barrier. Ground cover around the oaks would consist of chipped or multicut material to hold in moisture and to prevent invasive exotics from propagating in the area.

- The access road to Windermere Ranch off of West Camino Cielo Road would be treated by the "fire-safe clearance" techniques such as selective cutting or multi-cutting to provide for a 50- to 75-foot irregular edge or corridor on each side of the road. This would eliminate invasive flashy fuels along the route.

Vegetation Management Units. The Windermere Ranch property has been divided into Fire Management Units (FMU) that were described in Section 5.8.1.3 and are depicted on Figure 5.8-1. Following the FMU number is a capital letter that denotes the basic type of fuel management and fire risk reduction measures that have been recommended for a specific area of the project site. Fuel and fire management techniques proposed by plan are generally described below.

A. Firesafe Road Access Treatment. This technique would include vegetation thinning, chipping, and multicutting of understory and ladder fuels within 50-75 feet of roadways to provide fuel model 8 conditions adjacent to roadways. Trees that overhang roads would be limbed up to 14 above ground level, and biomass would be used to prevent the growth of flashy fuel type plants. Fuel modifications in the mixed chaparral portions of this zone would reduce fuel loading from approximately 25-30 tons per acre to less than 3 tons per acre.

B. Basic Weed Abatement/Open Pasture. This technique includes weed whipping, grazing, or annual mowing.

D. Defensive Space. Two types of zones would be created for structural protection. Zone One is the first 30 feet around the structure. This area is a landscape zone for foundation plantings. It may contain trees, native shrubs and fire-resistant ground covers. Zone Two extends from the perimeter of Zone One an additional 70 feet (30 to 100 feet from the structure). Treatment in Zone Two would involve removal of understory fuels above 18 inches in height and the existing oak woodland trees would be pruned up to 8 feet from the ground and trimmed of all dead material. Clusters of native vegetation not exceeding approximately five feet in diameter, with a minimum separation of 25 feet between clusters, may be retained if located at least 70 feet from structures.

F. Wildland Fuel Management Treatment. These areas include chaparral adjacent to the "firesafe" staging area (northern parking lot), and the rocky outcropping that traverses the project site from east to west. Fuel modification would include thinning mixed chaparral, removal of sage and chamise, pruning of dead plant material, and spreading biomass to achieve a fuel model 8 condition. After implementation of the proposed fuel management plan, existing vegetative fuel loads in these areas (approximately 8.6-acres of the project site) would be reduced in chaparral areas from approximately 25-30 tons per acre to less than 3 tons per acre. The reduction of fuel in the rock outcropping would provide a "strategic" break between the oak woodlands to the north and heavy brush to the south.

G. Ground Water or Water Source. These management areas include the ponds that are located at the project site.

I. **Individual Camping Areas.** Fuel modifications in these areas would be similar to management techniques for defensive space zone 2 areas.

S. **Exterior Class A Foam/Water Fire Protection System.** A foam/water fire protection system has been proposed where the ability to modify fuel characteristics is restricted, primarily by steep slopes. The system would be activated in the event of an approaching wildfire. Foam systems are proposed to be installed on slope areas located south of the proposed South Ridge cabins and to the south and west of the Community Building.

Annual Vegetation Management Monitoring. An annual maintenance report on the compliance of the vegetation management implementation is to be submitted to the Santa Barbara County Fire Department. The report would address structural fire code compliance, wildland fire code compliance, and conformance with the adopted provisions and requirements of the Fire Management Plan for the proposed project.

c. Emergency Evacuation and Red Flag Warning Element. The Emergency Evacuation Element (EEE) discusses a four-step process towards "fire conscious" use of Windermere Ranch. The goal of this plan is to reduce the potential for an emergency evacuation of Windermere Ranch Peace Retreat participants.

Step 1 - Education of Participants. Implementation of the FMP would include the education and orientation of retreat participants which would serve a dual function of teaching the importance of fire prevention/awareness on the Ranch and the appropriate safety precautions to take in the event of a wildfire. This program would discuss activities at the ranch, evacuation procedures, and identify the staging areas for emergency evacuation convoys and the "fire-safe" refuge community building. No smoking or campfires would be allowed at any time.

Step 2 - Red Flag Warning System. Red Flag Alerts are "extreme" wildland fire weather alerts issued by a regional (Riverside) Fire Weather Office of the National Weather Service. Red Flag Alerts are announced for a period of time when the combination of strong dry wind conditions and very low relative humidities occur, which are extremely hazardous fire weather elements. The IIWP would curtail or cancel events on a "red flag day" as recommended by fire authorities. The "red flag day" warning system would help to prevent IIWP activities from contributing to potential ignition sources during this extreme fire weather period. It would also reduce the likelihood and scale of an emergency evacuation in the event a wildfire is reported in the area.

Step 3 - Emergency Evacuation Plan. In the event of wildfire and only if ample time permits, evacuation of Windermere Ranch would utilize a convoy process, with each convoy being led by a vehicle driven by a Ranch staff person. Evacuation convoys would be intermittent to avoid traffic congestion along West Camino Cielo Road. Horse Flats Road (the proposed emergency access road) would not be used as an evacuation route for retreat participants, but

may be used by neighborhood residents, or fire suppression resources for emergency access through the Windermere Ranch.

Step 4 - Fire Safe Refuge Community Building. If time does not permit for evacuation or the designated evacuation route access is threatened by wildfire, the Windermere Ranch Peace Retreat participants would be instructed to take refuge in the "fire-safe" community building. Area residents and fire suppression personnel would also be permitted to use the refuge building if they desire. Open field refuge areas would be used for ranch livestock and would also be available to area resident's livestock.

d. Structural Protection Element. The Structural Protection Element (SPE) provides design guidelines for all proposed structures, and makes retrofit recommendations for the existing structures. The SPE includes criteria for providing defensible space, defensible buildings, water supply, and the provision of an onsite fire warden. These items are further discussed below.

Defensible Space. Defensible space refers to that area between a structure and an oncoming wildfire where the native vegetation has been modified to reduce the wildfire threat. This area is designed to provide an opportunity for firefighters to safely maneuver hose lines and defend the structure. Adequate building setbacks and site location can significantly reduce the radiant heat and convection properties of a wildfire around a structure, and can substantially increase the likelihood of a building surviving a wildfire.

Defensible Buildings. All proposed project structures would incorporate protective measures into building design such as fire-resistant building materials, fire walls, window shutters, and enclosed eaves. All new structures would be internally sprinklered, and existing buildings that are to be retained would be provided with a Class A fire resistant roof.

The "fire-safe" refuge community building would be built into rock outcroppings and to the slope of the land, which would provide fire protection properties. The building would be constructed of Type V 4-hour building materials including Portland cement plaster and masonry concrete. The roof would be a Class A fire resistant covering, and all exterior openings would be protected with dual glazing/infrared reflective glass with exterior sprinklering and/or fire shutters. The entire structure would have an interior sprinkler system. The community building would also be equipped with a heating, venting and air conditioning (HVAC) system designed to monitor and control smoke intrusion/outside air intake. This HVAC system would be designed to provide a healthy air environment if the community building is needed as a wildfire safe refuge.

Water Supply. Adequate water supplies are essential for both structural protection and wildland firefighting activities. Protection of structures intermixed with wildland vegetative fuels during a wildfire situation requires large amounts of continuous water supply capability. Much of the information used in this section of the plan is based on the contents of NFPA 1231 -

Suburban and Rural Fire Fighting Standard, published by the National Fire Protection Association (NFPA) and Santa Barbara County Fire Department minimum requirements.

To determine the minimum amount of water supply requirements for each structure (both existing and proposed) at the project site, the County of Santa Barbara Standard Minimum Water Supply Requirements were used. The County Fire Department's minimum stored water requirements for this project would be 1,500 gpm for 1 hour, or 90,000 gallons. This water supply should be automatically available for distribution at required flow and pressure to potential discharge locations. For the project, this is anticipated to be accomplished by connecting interior sprinkler systems and outside hydrants to a piped distribution system supplied by above ground tanks with an electric pump and backup diesel engine.

In addition, a storage tank and piped distribution system would also supply potable water for the development, and would be pressurized by electric pumps. The fixed tank(s) are to be located in the northwest corner of the Ranch property. The total tank volume would be the sum of fire protection storage plus potable water storage plus dead storage/freeboard. The total volume is anticipated to be on the order of 90,000 gallons plus 20,000 gallons plus 15,000 gallons, respectively, or 125,000 gallons.

Fire Warden. One staff person located full time at the Ranch would be assigned as the "Ranch Fire Warden." The Warden would be responsible for complying with a variety of fire prevention and suppression activities, including: liaison with local fire departments, implementing fire prevention activities at the project site, and directing onsite activities in the event of a fire.

e. Coordinated Resource Management Plan. The FMP includes a chapter that described the benefits of implementing a Coordinated Resource Management Plan (CRMP). A CRMP is a legal document or memorandum of understanding that defines the organizational structure and establishes guidelines for interagency coordination in resource management planning within California. The CRMP is designed to achieve compatibility between land uses such as natural resources, energy and mineral resources, livestock production, watershed, wildlife habitat, wood products, and recreation. The FMP indicates that a CRMP involving the Windermere Ranch could be used to address fire-safe access to the regional road network, fuel management, adjacent linkage to the road network, strategic regional fuelbreaks or fuel modifications, regional emergency evacuation planning, and public fire prevention activities and education.

5.8.2.4 Adequacy of the Proposed Fire Management Plan

The Hunt Research Corporation reviewed the proposed Fire Management Plan and submitted a variety of comments regarding previous fire modeling and the provisions of the original Plan. Based on these comments, a number of revisions to the Plan were made. Some of these changes included new fire modeling, specifying fuel model 8 as an end result vegetation

condition after the implementation of the vegetation management program, increasing primary access road widths on the project site to a width of 20 feet, the provision of a foam system for the South Ridge cabins and community building, improvements to the pump system for fire suppression water, establishment of the rock outcropping that extends across the project site as a fuel break, and various other plan refinements.

The Hunt Research Corporation and the County Fire Department reviewed the revised Fire Management Plan and have identified additional amendments that should be included in the plan to minimize potential fire safety impacts to the extent feasible. The suggested Plan revisions and additions are summarized below.

The key locations for vegetation management zones are along roadsides, around structures, and around refuge and assembly areas. The proposed Fire Management Plan provides these important elements. As proposed, vegetation management adjacent to roadways would be conducted for a distance ranging between 50-75 feet. To improve ingress and egress from the project site during a fire, it is recommended that the vegetation management zone along the main access road from West Camino Cielo be at least 75 feet, and that a five-foot area on each side of the road be cleared of vegetation. The United States Forest Service has reported that the proposed vegetation management along the main access may require a modification to the private road Special Use Permit that was previously issued.

The primary access roads on the project site would be 20 feet in width and paved to provide all-weather access for fire equipment. To ensure that adequate room to maneuver fire engines is provided, paved turnouts must be installed adjacent to fire hydrant locations, and parking shall be restricted.

A phasing program for implementing the proposed vegetation management program has been proposed by the project applicant. The timeframes of the phasing plan must be modified to state that vegetation management will be completed in areas around structures prior to the start of construction, and that fuel management in areas that are critical to site safety, as determined by the County Fire Department, shall also be completed before flammable construction is started. Examples of critical areas would include the slope areas adjacent to the proposed South Ridge cabins and community building (zones 2F.1 and 2F.2 on the Fire Management Plan) and the areas around proposed water tanks and pump facilities.

The road leading to the northeast side of the property and connecting to the adjoining residential area at Romaldo Road should be a net benefit to neighboring development due to the provision of an emergency exit to West Camino Cielo, a route to the onsite fire refuge center, and a route by which to evacuate animals to the open pasture fields located at the ranch. However, in the event that unauthorized egress from the site occurred along this access during an emergency, the effect on the West Camino Cielo residential neighborhood could be significant. Romaldo Road is a private, 10-foot wide road which links approximately 30 residences to West Camino Cielo. A method to preclude Windermere visitors from using this access has not been

identified. A place to keep animals during a fire would also be a benefit, however, to protect the safety of the animals and persons at the ranch during a fire, the livestock safe zone should be provided with a welded pipe enclosure that is set in concrete, to minimize the potential for animals to escape.

The proposed Fire Management Plan states that only new structures would be provided with internal sprinkler systems and that a one-hour supply of fire suppression water would be provided. All existing and new structures must have approved internal fire sprinkler systems, or the amount of fire suppression water that is stored on site must be increased to 2 hours, as required by the California Fire Code. The proposed water storage tank(s) should have automatic refill capability and have a low-level alarm. The wells supplying the tank(s) should have emergency power. The water system storage, pump system, mains, hydrants, and sprinkler systems shall be subject to the review and approval of the County Fire Department.

The FMP discusses the protective actions of evacuation and sheltering in place. The plan correctly states that the preferred protective action is sheltering in place onsite, unless ample time (at least 1 hour) is available to evacuate the area. Receiving accurate information that adequate time is available to safely evacuate the project site, however, may be difficult to obtain. Communications with authorities (such as the Santa Barbara Fire Department) may be disrupted or difficult, and the Department may be reluctant to provide an evacuation recommendation because of incomplete or rapidly changing fire conditions. If adequate information regarding the safety of an evacuation cannot be reliably received, an evacuation of the project site during a major fire could be extremely dangerous, and could lead to clogging of escape roads in the event of mechanical failure or accident.

The proposed evacuation plan should be modified to require the onsite Fire Warden to contact the County Fire Department to obtain a recommendation regarding whether to evacuate or shelter in place. Contingency plans that would be implemented in the event that communications with authorities are not feasible must also be included in the Fire Management Plan. All provisions contained within a final evacuation plan should be reviewed and approved by the County Fire Department.

The state of the art in wildland interface planning is to provide properly protected structures, within properly sized and managed defensible space, to allow occupants to shelter in place. This should be reflected in the FMP. As the preferred method of providing for the safety of retreat participants during a major fire, the use of the proposed shelter in place, or "fire safe refuge", would prevent potential impacts to evacuation routes that may hinder the evacuation by other residents in the project area, and would also avoid other safety impacts that could result from an evacuation of the site under hazardous conditions. It should be noted, however, that the effectiveness of implementing a shelter in place plan could be reduced if retreat participants are reluctant or refuse to take shelter at the project site during a wildfire.

Another duty of the proposed Fire Warden would be to maintain fire-fighting equipment at the project site. The Fire Management Plan proposes to use an existing fire engine

that is kept at the project site, however, this equipment is old and its reliability is questionable. A wildland interface fire engine should be obtained for use on the project site.

The project description states that the proposed firesafe refuge building would be available to area residents in the event of a fire. Therefore, the building must be sized to handle the expected occupant load of the project site plus the nearby neighbors. The nearby offsite population is estimated to be approximately 50 persons. The occupant load should be computed at 15 square feet of usable space per person. The size would be determined by the maximum number of guests (250), plus staff (10), plus the number of neighbors. The number of neighbors could be determined by the number of surrounding residences times 2.3 persons/residence. The proposed size of the refuge building is 5,848 square feet. This will accommodate 389 persons at 15 square feet per occupant, if it is an open, usable room. Therefore, the current size allows for 265 persons onsite plus 124 neighbors.

The proposed Fire Management Plan proposes to curtail or cancel events during red flag days. Proposed project activities should be canceled and the center closed during such days, except for permanent staff. Red flag alert days do not occur frequently.

The proposed Fire Management Plan proposes educating the guests regarding fire safety upon their arrival. This will be an important part of the fire prevention program. In addition, the center should provide safe smoking areas rather than trying to prohibit smoking. Prohibiting smoking causes guests to "sneak a smoke" somewhere. Industries, such as petroleum plants, chemical facilities, and warehouses, commonly provide safe smoking areas rather than prohibiting smoking. This has been found to be an effective mitigation in hazardous occupancies. In addition, if alcohol is banned, the potential of intoxicated individuals smoking is also reduced.

Plant material that is removed and chipped as part of the vegetation management plan would be spread on the project site. This material would help to minimize erosion impacts, hold and absorb moisture, and minimize the germination of weedy plant species that can increase fire hazards. The chipped material could burn under extreme fire conditions, particularly if excessive amounts were allowed to accumulate. Minimizing accumulations of biomass material at the project site would reduce potential fire hazards that could be created until the material decomposes.

As presently proposed, the applicant's Fire Management Plan would minimize potential fire safety risks associated with the proposed project. The Santa Barbara County Fire Department and the EIR fire consultant have concluded that, with incorporation of the identified changes, implementation of the Fire Management Plan would reduce potential fire hazards onsite below those which currently exist. However, for the reasons summarized here, The Planning and Development Department has determined that impacts associated with introducing substantial additional population in this high fire hazard area would result in a significant unavoidable impact. This conclusion is based upon the isolated location of the site in a high fire hazard area;

the availability of only one means of ingress and egress from the site and area along West Camino Cielo, a substandard, windy mountain road; the presence of heavy fuel loads in the area and high likelihood of wildland fire in the immediate area during the life of the project; and the speculative nature of ensuring effective and diligent compliance with the Fire Management Plan over the life of the project. Successfully avoiding catastrophic results in the event of a major wildfire would depend upon ongoing diligent efforts to minimize fuel loads, development of an effective method to notify participants of cancellation on red flag warning days, receiving accurate information regarding the safety of evacuation from authorities, not causing the clogging of roadways in the event of evacuation, precluding use of Romaldo Road by retreat participants if the site access were inaccessible, and retreat participants willingness to remain on site if evacuation was not recommended by authorities. For these reasons, potential fire safety impacts are considered to be significant and unavoidable.

5.8.3 Cumulative Impacts

The introduction of new structures and additional people into a high fire hazard area has the potential to incrementally increase possible fire ignition sources, and to increase potential life, safety and property impacts in the event of a major fire. Project development would incrementally increase demand for fire protection services in the event of a wildfire in the project area. This contribution to cumulative impacts is considered adverse but not significant.

The potential for additional development in the project area is limited by existing zoning designations and Comprehensive Plan policies. As described in Section 3.3.3, no approved or proposed development projects are located in the project vicinity. Therefore, the proposed project would not contribute to a significant fire safety risk resulting from new development in the project region.

5.8.4 Mitigation Measures

FP-1 Implementation of the proposed project in a high fire hazard area has the potential to result in significant fire safety impacts.

1. The project applicant shall implement a Fire Management Plan at the project site that has been reviewed and approved by the Santa Barbara County Fire Department.

Plan Requirements and Timing: A final Fire Management Plan shall be reviewed and approved by the Fire Department prior to the approval of a Land Use Permit. **Monitoring:** A copy of the approved final plan shall be submitted to the Planning and Development Department.

Readers Note: The following is excerpt from the 2003 edition of ADA advisory on surface conditions. The text of this document represents the most current information on slip resistance measurement as understood by the Access Board. While it disclaims its own legal imperative, the reader may find that it debunks many of the false presentations found in both marketing and in court proceedings regarding choice of test methods and acceptable results.

Taken as a whole, one can say that ADA and ASTM have a similar position. That position is:

> Given the present state of the art, it is not possible to designate a single slip measurement device as a representation of absolute value. Slip resistance measurements are useful for comparison as long as the method is defined and results are properly reported.

BULLETIN #4: GROUND AND FLOOR SURFACES

The landmark Americans with Disabilities Act (ADA), enacted on July 26, 1990, provides comprehensive civil rights protections to individuals with disabilities in the areas of employment (title I), State and local government services (title II), public accommodations and commercial facilities (title III), and telecommunications (title IV). Both the Department of Justice and the Department of Transportation, in adopting standards for new construction and alterations of places of public accommodation and commercial facilities covered by title III and public transportation facilities covered by title II of the ADA, have issued implementing rules that incorporate the Americans with Disabilities Act Accessibility Guidelines (ADAAG), developed by the Access Board.

U N I T E D S T A T E S A C C E S S B O A R D
A FEDERAL AGENCY COMMITTED TO ACCESSIBLE DESIGN

Why are surface characteristics specified?
Over twenty-seven million Americans report some difficulty in walking. Of these, eight million have a severe limitation; one-fifth of this population is elderly. Ambulatory persons with mobility impairments-- especially those who use walking aids--are particularly at risk of slipping and falling even on level surfaces. Preliminary research conducted for the Access Board in 1990 through the Pennsylvania Transportation Institute at The Pennsylvania State University compared the slip-resistance needs of persons with mobility impairments and those without disabilities walking on level and ramped surfaces both indoors and out. Findings from this limited human-subject testing confirmed that individuals who have gait and mobility disabilities make greater demands on the walking surfaces of floors, ramps, and walkways. The information in this Bulletin was derived from this and other research in order to provide designers with an understanding of the variables that affect the measurement and performance of materials specified for use on walking surfaces.

What surface characteristics are required of an accessible route?
The Americans with Disabilities Act Accessibility Guidelines (ADAAG) requires only that newly-constructed or altered ground and floor surfaces of accessible routes on sites and in buildings and facilities be stable, firm, and slip-resistant . No standards or methods of measurement are specified in scoping or technical provisions, although the Appendix to ADAAG contains advisory recommendations for slip resistance values derived from Board-sponsored research. Because the sample size was small, the testing method unique, and the findings not yet corroborated by other research, the suggested values have not been included in the body of ADAAG and should not be construed, as part of the regulatory requirements for entities covered by titles II and III of the

ADA.

However, other regulations. such as those imposed by OSHA in the interests of worker safety, or design and testing standards applied by state, local, or industry mandate, such as certain ASTM (American Society for Testing and Materials) procedures, may require specific values or ranges of slip resistance.

A stable surface is one that remains unchanged by contaminants or applied-force, so that when the contaminant or force is removed, the surface returns to its original condition. A firm surface resists deformation by either indentations or particles moving on its surface. A slip-resistant surface provides sufficient frictional counterforce to the forces exerted in walking to permit safe ambulation.

Because of the great number of variables that affect the performance of a given walking surface--its slope and cross-slope, its material, texture and finish, the presence of moisture or contaminants, the material that contacts it and the method of ambulation--no single set of technical specifications or measurement standards can encompass all criteria that contribute to the safety of a walking surface.

Only slip resistance has a commonly applied unit of measurement--the coefficient of friction, which may be measured as static (at rest) or dynamic (in motion). Its calculation is complex and the methods and equipment of its measurement vary. Affected industries--floor finishes, ceramic tile, plumbing fixtures--each employ a different testing methodology in designating the slip resistance of their products. The static coefficients of friction measured according to the four major ASTM-standard testing procedures have never been correlated by research, although a considerable body of data exists.

What is slip resistance?
In its simplest sense, a slip resistant surface is one that will permit an individual to walk across it without slipping. Contrary to popular belief, however, some slippage is in fact necessary for walking, especially for persons with restricted gaits who may drag their feet slightly. While increasing the slip-resistance of a surface is desirable within certain limits, a very high coefficient of friction may actually hinder safe and comfortable ambulation by persons with disabilities. In fact, a truly non-slip surface could not be negotiated.

While visual inspection can provide some Information about a surface such as its degree of cleanliness, whether It is wet or dry, and even the type or texture it exhibits, it cannot provide sufficiently accurate information about a surface to be used in design.

Even clean, dry surfaces with readily-apparent texture will not always be slip resistant. Materials which might be suitable for level surfaces may be inappropriate for sloping surfaces; materials specified for dry conditions may be unsafe when it rains; a leather shoe may perform poorly on smooth dry surfaces yet provide adequate traction when wet. The presence of moisture or other contaminants, the characteristics of the shoe sole or crutch tip making contact, the direction (uphill and downhill effects differ) and slope of travel all will affect the slip resistance of installed surfaces. It is this interaction of material characteristics and human responses which fully characterizes slip resistance.

How is slip resistance measured?
Measuring slip resistance involves the minimum tangential force necessary to initiate sliding of a body over the surface and the body gravity force. The coefficient of friction between the two surfaces is the ratio of the horizontal and vertical forces required to move one surface over another to the total force pressing the two surfaces together.

There are three critical stages in an individual's gait: 1) touchdown, 2) full load, and 3) push-off. In order to avoid slippage while walking, the horizontal and vertical forces applied by the individual must be resisted by forces acting against the foot as it contacts the walking surface. The definitive component of this resisting

force, and the variable most subject to manipulation, is the coefficient of friction of the surface material. Consider, for example, an icy surface with a negligible coefficient of friction. A runner whose forward motion applies a substantial horizontal force will slip-and probably fall-on such a surface. A more careful pedestrian may be able to limit his horizontal force contribution so that it balances the available frictional resistance of the ice and thus cross it safely. Adding sand to the icy surface will increase its coefficient of friction and allow for a more standard gait. Once the ice has melted, the higher coefficient of friction of the newly-exposed surface will offer sufficient resisting force to permit the runner to speed across it without incident.

The dynamic coefficient of friction varies in a complex and non-uniform way. Although R can be calculated and modeled in the laboratory using sophisticated computer programs, the more straightforward measurement of the static coefficient of friction provides a reasonable approximation of the slip resistance of most surfaces and is the method most appropriate for evaluating surface materials and finishes.

A variety of devices are available for such measurements. The most common device, the James machine, was developed in the early 1940s and was the testing device specified by the Underwriters Laboratory (UL) shortly thereafter when it established--from laboratory test data corroborated by field experience--a minimum value of 0.5 for the static coefficient of friction for floor polish bearing the UL seal. Since then, 0.5 has become the commonly-accepted threshold for classifying slip resistance in products. Furthermore, the James machine is the recognized test method and the 0.5 value (when measured by this tester) is the recognized minimum criterion for slip- resistant walking surfaces in courts of law in the United States.

Measurement by the James machine, utilizing a leather sensor, is the only method appropriate for assessing surfaces and products against the 0.5 UL standard for static coefficient of friction. Using a different sensor material, even If measured by the James machine, will give a different reading for the same surface material.

This is a significant point. An informal comparison of data collected under three different research protocols, involving four different friction-testers and four different shoe sensor materials, all applied to the same 8-inch by 8-inch ceramic tile surface, resulted in thirty readings ranging from a low of .29 to a high of .99-for its static coefficient of friction. Even limiting values to those measured by the James machine but using both leather and Neolite sensor material resulted in a range of 0.57 (leather) to 0.79 (Neolite) for the same surface being tested.

It is impossible to correctly specify a slip-resistance rating without identifying the testing method, tester, and sensor material to be used in evaluating the specified product and equally invalid to compare values obtained through one methodology to those resulting from different testing protocols. Because a consensus test protocol has not yet been identified, the Access Board did not specify a value or testing method for determining the coefficient of friction along an accessible route.

The James machine continues to be a laboratory mainstay, but is not portable and thus cannot be used in field testing. In order to measure the slip-resistance of surfaces already in place, researchers at The Pennsylvania State University evaluated three portable testers: the NBS-Brungraber Tester (also known as the Mark I Slip Tester), the PTI (Pennsylvania Transportation Institute) Drag Sled Tester, and the Horizontal Pull Slipmeter.

Study criteria included relevance (the measuring results should correlate in a known and constant manner with human perception of the surface slipperiness); versatility (accurate measurements of slip resistance must be possible on various types of surfaces and under diverse conditions); sensitivity to measuring technique (the difference between measurements performed on the same surface and under the same conditions by different persons should be minimal), and repeatability (tests of the same surfaces under the same conditions should be consistent over time). In addition, the reliability and precision of the testers were assessed.

Based on the results of this study, **the NBS-Brungraber Tester was recommended as the best portable**

device currently available for measuring slip resistance under dry conditions on all but carpeted surfaces. Easy to use, the NBS-Brungraber testing procedure can be mastered In 30 minutes. It measures the static coefficient of friction between a representative sample of shoe sole material and a flooring surface. The result from the recording shaft is converted into an equivalent value of static coefficient of friction by means of a calibration chart supplied with the tester.

The PTI Drag Sled Tester performed well in the tests but was not commercially available at the time of completion of the report. The Horizontal Pull Slipmeter, which proved to be an excellent device for laboratory measurements of slip resistance, did not produce satisfactory results in field measurements. **Other portable testers that may be used to measure static coefficient of friction include the Mark II Slip Tester (available from the manufacturer of the NBS-Brungraber Tester) and the Model 80 Tester.**

The slip resistance of indoor and outdoor walking surfaces already in place can be measured with one of the portable testers listed in this Bulletin in order to monitor the process of wear and polishing of walking surfaces. An initial reading of the coefficient of friction taken after flooring has been placed and finished will provide a baseline for future comparisons. However, do not attempt to compare such readings to the UL 0.5 coefficient of friction standard or to a manufacturer's slip resistance values unless the same testing methodology, machine, and sensor material was used in each instance.

What values are recommended for ground and floor surfaces along an accessible route?
The surfaces of the accessible route on a site or within a building or facility must be designed to provide slip-resistant locomotion for both level and inclined travel by persons with disabilities. Research findings suggest that such surfaces should have a slip resistance somewhat higher than might be provided for individuals without disabilities.

In the study sponsored by the Access Board, laboratory measurements from a Kistler force plate and computer analysis of the gaits of persons with mobility impairments (including crutch users and above- or below-knee amputees using artificial limbs) and persons without disabilities graphed the dynamic coefficients of friction necessary for safe ambulation. The m-shaped curves that resulted gave a range of values from touch-down to take-off (control group: 0.2- 0.3; persons with disabilities 0.7-1.0). Wheelchair users were tested through a full cycle of push and recovery (0.5-0.7).

Correlating these values with a single static coefficient of friction (the relationship is complex and non-linear) is inexact and involves some approximation in order to facilitate simplified field testing procedures. In the Access Board research, the static coefficients of friction for a variety of common indoor and outdoor surfacing materials were measured in place using the NBS-Brungraber Tester with a silastic sensor material. Although this machine operates on a principle similar to that of the James machine, the use of a non-standard silastic sensor (instead of the leather required by the protocol for the UL standard) results in significantly higher values for the coefficient of friction of the surfaces being measured. As no correlation was made to any other standards or methodologies in the research, the values for coefficient of friction cannot be compared.

Researchers' recommendations for a static coefficient of friction for surfaces along an accessible route, when measured by the NBS- Brungraber machine using a silastic sensor shoe, were approximately 0.6 for a level surface and 0.8 for ramps. These values are included in the advisory material in the Appendix to ADAAG, but are not in any way mandatory.

What materials may satisfy ADAAG requirements?
In new construction and alterations, surface materials must be specified to be slip-resistant. If there is a choice between flooring materials otherwise suitable for a particular application, we recommend choosing the material with the higher coefficient of friction, particularly for ramps.

Materials that might be appropriate for ramps and level surfaces include concrete wood float surfaces, asphalt, and some types of carpets and resilient tiles. Materials which might be expected to be satisfactory for level surfaces, but which might not be appropriate for ramps, include concrete metal trowelled surfaces, ceramic tile, hardwood and flagstone. These finishes, tested during the Access Board research project, yielded coefficients of friction that fell within the recommended ranges for accessible routes.

However, not all products of the type mentioned may provide the desired slip resistance and many other materials can be expected to be suitable even though they are not included here. For example, some types of materials for which the coefficient of friction is low, are available--or can be treated--with finishes that increase slip resistance.

Products or finishes applied to surfaces after installation are not covered by ADAAG. but may fall under the Department of Justice (DOJ) regulation governing the maintenance of accessible features. Moisture and debris contamination adversely affect the surface slip resistance of most installed finishes. While floor treatments are available that will increase the coefficient of friction of a walking surface, some products or furnishings, such as furniture wax overspray or loose throw rugs, may reduce slip resistance significantly. Others-- for example, walkoff mats placed on lobby floors during rainy weather--do much to reduce the chance of slipping on a wet floor. Such mats are not considered carpets within the meaning of ADAAG 4.5.3.

What other surface considerations affect wheelchair travel?
In addition to slip resistance requirements, wheelchair users are affected by the rolling resistance of the surface of the floor and--on exterior surfaces--by cross slope. If the rolling resistance of flooring is high, wheelchair users must avoid those areas or expend extra energy maneuvering across the surface. In a limited study of wheelchair rolling resistance, the force needed to traverse four different surfaces was measured: concrete, linoleum, low-pile carpet (loop, 0.1-inch pile height, 10 stitches/inch, 16-ounce face weight excluding backing and glue, on jute), and high-pile carpet (cut, 0.5-inch pile height, 10 stitches/inch, 40-ounce face weight excluding backing and glue, on ActionBac).
Although the study was not intended to be comprehensive, the results provide some guidance in selecting carpet. With the force needed to traverse bare concrete as a baseline, the increase in force needed to cross each surface was measured to be: +3% for linoleum; +20% for low-pile carpet, and +62% for high-pile carpet. From these results it appears that linoleum and concrete equally require minor effort; low-pile carpet requires a noticeable. though moderate, increase in effort; and high-pile carpeting requires a significant increase in effort. Although the slip resistance ratings of carpet fall within the recommended ranges for use on ramps, its rolling resistance makes most types an inappropriate finish for sloped surfaces.

Exterior ramps and walks will generally be constructed with a cross-slope (perpendicular to the direction-of-travel slope) in order to provide positive drainage. Because the effects of cross-slope are particularly difficult for persons using wheelchairs--particularly along a steep running slope--ADAAG provisions limit accessible routes to a 2% cross-slope.

What other considerations are significant for persons with disabilities?
Materials such as gravel, wood chips, or sand, often used for outdoor walkways, are neither firm nor stable, nor can they generally be considered slip-resistant. Thus, walks surfaced in these materials could not constitute an accessible route. However, some natural surfaces, such as compacted earth, soil treated with consolidants, or materials stabilized and retained by permanent or temporary geotextiles, gridforms, or similar construction may perform satisfactorily for persons using wheelchairs and walking aids.

ADAAG also contains provisions that limit surface discontinuities along an accessible route, including elevator cab leveling tolerances at landings, gaps between car and platform in transit facilities, the size and orientation of openings in walkway gratings, the profile of doorway thresholds, and the pile height and attachment of carpeting. ADAAG 4.5.3 specifies that carpet and carpet tile be securely attached. This

provision does not require that each tile--or the entire carpet or pad--be adhered to the floor surface provided the method of securement results in a surface that is stable, firm, and slip-resistant and does not pose a tripping hazard.

This technical assistance is intended solely as informal guidance; it is not a determination of the legal rights or responsibilities of entities subject to the ADA.

RESOLUTION OF THE BOARD OF SUPERVISORS
COUNTY OF SANTA BARBARA, STATE OF CALIFORNIA

IN THE MATTER OF INITIATING THE DRAFT MISSION CANYON COMMUNITY PLAN AS PROPOSED AMENDMENTS TO APPLICABLE PORTIONS OF THE SANTA BARBARA COUNTY COMPREHENSIVE PLAN AND LAND USE AND DEVELOPMENT CODE	))))))	RESOLUTION NO. 08-

WITH REFERENCE TO THE FOLLOWING:

A. On December 20, 1980, by Resolution No. 80-566, the Board of Supervisors adopted the Land Use Element of the Santa Barbara County Comprehensive Plan; and

B. On December 3, 1991, by Resolution 91-696, the Board of Supervisors adopted the Circulation Element of the Santa Barbara County Comprehensive Plan; and

C. On October 17, 2006, by Ordinance No. 4265, the County Board of Supervisors adopted Section 35-1, the Santa Barbara County Land Use and Development Code, of Chapter 35, Zoning, of the Santa Barbara County Code, to implement the Comprehensive Plan; and

D. On November 21, 2006, the Board of Supervisors approved the formation of the Mission Canyon Planning Advisory Committee (MCPAC); and

E. Between December 2006 and May 2008, over 25 MCPAC public meetings were held to prepare the Draft Mission Canyon Community Plan and Residential Design Guidelines; and

F. On May 7, 2008, by Resolution No. 2008-01, the MCPAC recommended that the County Planning Commission and Board of Supervisors take the necessary actions to initiate environmental review for the Draft Mission Canyon Community Plan, Residential Design Guidelines and associated Land Use and Development Code amendments; and

G. On June 4, 2008, by Resolution No. 08-03, the County Planning Commission recommended that the Board of Supervisors initiate environmental review for the Draft Mission Canyon Community Plan, Residential Design Guidelines, and Land Use and Development Code amendments as proposed amendments to applicable portions of the Santa Barbara County Comprehensive Plan and Land Use and Development Code; and

H. On July 10, 2008, the City of Santa Barbara Planning Commission reviewed the Draft Mission Canyon Community Plan, Residential Design Guidelines, and Land Use and Development Code amendments. The Planning Commission unanimously recommended

that the Plan be initiated for environmental review and that the Planning Commission's comments be forwarded to the County Board of Supervisors for their consideration; and

I. Public officials and agencies, civic organizations, and citizens have been consulted on and have advised the Board of Supervisors on the proposed amendments in a duly noticed public hearing; and

J. It is now deemed in the interest of orderly development of the County and important to the preservation of health, safety, and general welfare of the residents of said County that the Board of Supervisors initiate, for purposes of environmental review, specific amendments to applicable portions of the Santa Barbara County Comprehensive Plan and Land Use and Development Code, as set forth in the Draft Mission Canyon Community Plan project description dated May 2008.

NOW, THEREFORE, IT IS HEREBY RESOLVED as follows:

1. The above recitations are true and correct.

2. The proposed map designation and text amendments to the Land Use Element and Circulation Element are hereby initiated as such amendments are set forth in the Draft Mission Canyon Community Plan dated May 2008.

3. Pursuant to the provisions of Section 35.104.030 of the Land Use and Development Code, the proposed rezones set forth in the Draft Mission Canyon Community Plan dated May 2008, and Attachment G of the October 7, 2008 Board of Supervisors staff report, are hereby initiated as amendments to the Land Use and Development Code.

4. The Draft Mission Canyon Community Plan, Residential Design Guidelines, and Land Use and Development Code amendments are adequate to begin environmental review.

PASSED, APPROVED, AND ADOPTED by the Board of Supervisors of the County of Santa Barbara, State of California, this 7th day of October, 2008, by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

SALUD CARBAJAL
Chair, Board of Supervisors
County of Santa Barbara

ATTEST:

MICHAEL F. BROWN
Clerk of the Board of Supervisors

By: _____
Deputy Clerk-Recorder

APPROVED AS TO FORM:

DENNIS MARSHALL
County Counsel

By: _____
Deputy County Counsel

Ana Citrin

From: Marc Chytilo [airlaw5@cox.net]
Sent: Wednesday, December 16, 2009 4:42 PM
To: 'Ana Citrin'
Subject: FW: This Weekend at SBBG 16th Annual Holiday Marketplace

From: Nancy Johnson, Vice President, Marketing & Government Relations [mailto:megan@santabarbarabotanicgarden.ccsend.com] **On Behalf Of** Nancy Johnson, Vice President, Marketing & Government Relations
Sent: Thursday, November 19, 2009 2:21 PM
To: airlaw5@cox.net
Subject: This Weekend at SBBG 16th Annual Holiday Marketplace

Santa Barbara Botanic the GARDEN

Santa Barbara Botanic Garden News Release

For Immediate Release
November 19, 2009

Media Contact:
Nancy Johnson
Vice President, Marketing & Government Relations
njohnson@sbbg.org
(805) 682-4726, ext. 132
805-252-9468

Santa Barbara Botanic Garden's
Celebrates 16th Annual
Holiday Marketplace
10 am - 4 pm
Saturday & Sunday
November 21 & 22

ANNUAL HOLIDAY MARKETPLACE

Saturday & Sunday, November 21 & 22

Featuring Holiday Creations from Local Artisans

Exquisite Handcrafts ~ Delightful Stocking Stuffers

Live Plants ~ New Garden Cultivars

And Unique Gifts from the Garden Gift Shop

Garden Members receive a 10% Discount on all Purchases

Original Artwork by Peter Gazzo

The Perfect Place to Kick Off Your Holiday Season!

Santa Barbara Botanic GARDEN

1212 Mission Canyon Road

For more information, contact (805) 682-4726, or online at

http://www.SantaBarbaraBotanicGarden.org

The Santa Barbara Botanic Garden, 1212 Mission Canyon Road, Santa Barbara, CA 93105

Ana Citrin

From: Marc Chytilo [airlaw5@cox.net]
Sent: Wednesday, December 16, 2009 4:44 PM
To: 'Ana Citrin'
Subject: FW: Annual Members Picnic

I especially like this one – the day after Jesusita fire started.

From: Santa Barbara Botanic Garden [mailto:megan@santabarbarabotanicgarden.ccsend.com] **On Behalf Of** Santa Barbara Botanic Garden
Sent: Thursday, April 30, 2009 4:23 PM
To: airlaw5@cox.net
Subject: Annual Members Picnic

Santa Barbara Botanic GARDEN

The Santa Barbara Botanic Garden
Invites you to the
Annual Members Picnic

May 7th
4:30-7:30 p.m

Come enjoy a members only evening in the Garden

Music, Garden tours, Caricature artist, Crafts for kids, Food available for Purchase, Dessert on us!

RSVP By May 5

TIME: Open House Tours begin at 4:30.
Picnic Starts at 5:30

LOCATION: Meadow Lawn

RSVP BY: May 5

Pre-Order a picnic dinner for $10

- Roasted Turkey Breast Sandwich
- Tri-tip Sandwich
- Vegetarian Sandwich

All meals include pasta salad, chips, and a drink.

To RSVP for the Members Picnic and to order a meal please call:
682-4726 ext. 102

Ana Citrin

From: Marc Chytilo [airlaw5@cox.net]
Sent: Wednesday, December 16, 2009 4:44 PM
To: 'Ana Citrin'
Subject: FW: Doggie Bagel Brunch and Play Date Party

From: Santa Barbara Botanic Garden [mailto:megan@santabarbarabotanicgarden.ccsend.com] **On Behalf Of** Santa Barbara Botanic Garden
Sent: Thursday, June 18, 2009 2:22 PM
To: airlaw5@cox.net
Subject: Doggie Bagel Brunch and Play Date Party

the Santa Barbara Botanic GARDEN

Doggie Bagel Brunch and Play Date Party at the Santa Barbara Botanic Garden

Make it a Dogs Day at the Garden!

See what makes the Garden so special for canines and their owners

DATE: Sunday, July 19th
TIME: 10 am to 1pm
FEE: $10 for members
$25 for non-members
Generously sponsored by:

CARE HOSPITAL
California Animal Referral & Emergency

dioji
K-9 RESORT & ATHLETIC CLUB

You and your dog will enjoy an entire morning of canine fun:

***Get a caricature of you and your pooch!**
***Tasty Treats from the Dioji Doggie Bakery**
***Dog Training Demonstrations by Camp Canine**
***Emergency Veterinarian Services by Care Hospital**
***Doggie News and Events by Animal Fair Magazine**
***Enter to Win a Basket of canine goodies in our Doggie Photo Contest**

Attendance is limited
Please RSVP by July 16 to: lorsua@sbbg.org
$10 members $25 non-members
Include your pooch's best photo to win a doggie gift basket
Winner will be announced at the event
For questions call: (805) 682-4726 ext.110

Santa Barbara Botanic Garden
1212 Mission Canyon Road
Santa Barbara, California 93105

Ana Citrin

From: Marc Chytilo [airlaw5@cox.net]
Sent: Wednesday, December 16, 2009 4:43 PM
To: 'Ana Citrin'
Subject: FW: FALL PLANT SALE MEMBERS PREVIEW PARTY

From: Santa Barbara Botanic Garden [mailto:megan@santabarbarabotanicgarden.ccsend.com] **On Behalf Of** Santa Barbara Botanic Garden
Sent: Tuesday, September 29, 2009 12:11 PM
To: airlaw5@cox.net
Subject: FALL PLANT SALE MEMBERS PREVIEW PARTY

Santa Barbara Botanic GARDEN

LAST CHANCE TO RSVP FOR THIS YEAR'S FALL PLANT PREVIEW PARTY AT THE SANTA BARBARA BOTANIC GARDEN

Fall Plant Sale Preview Party!

Exclusive Members Only Event

Friday, October 2, 4-6 pm
Enjoy one of the best benefits of your Botanic Garden Membership: the fabulous opportunity to be among the first to shop the Fall Plant Sale Spectacular!
Chose your favorite native or Mediterranean plants

while sipping wine and listening to music.
Reservations required; call (805) 682-4726 ext. 102
Fee: $35

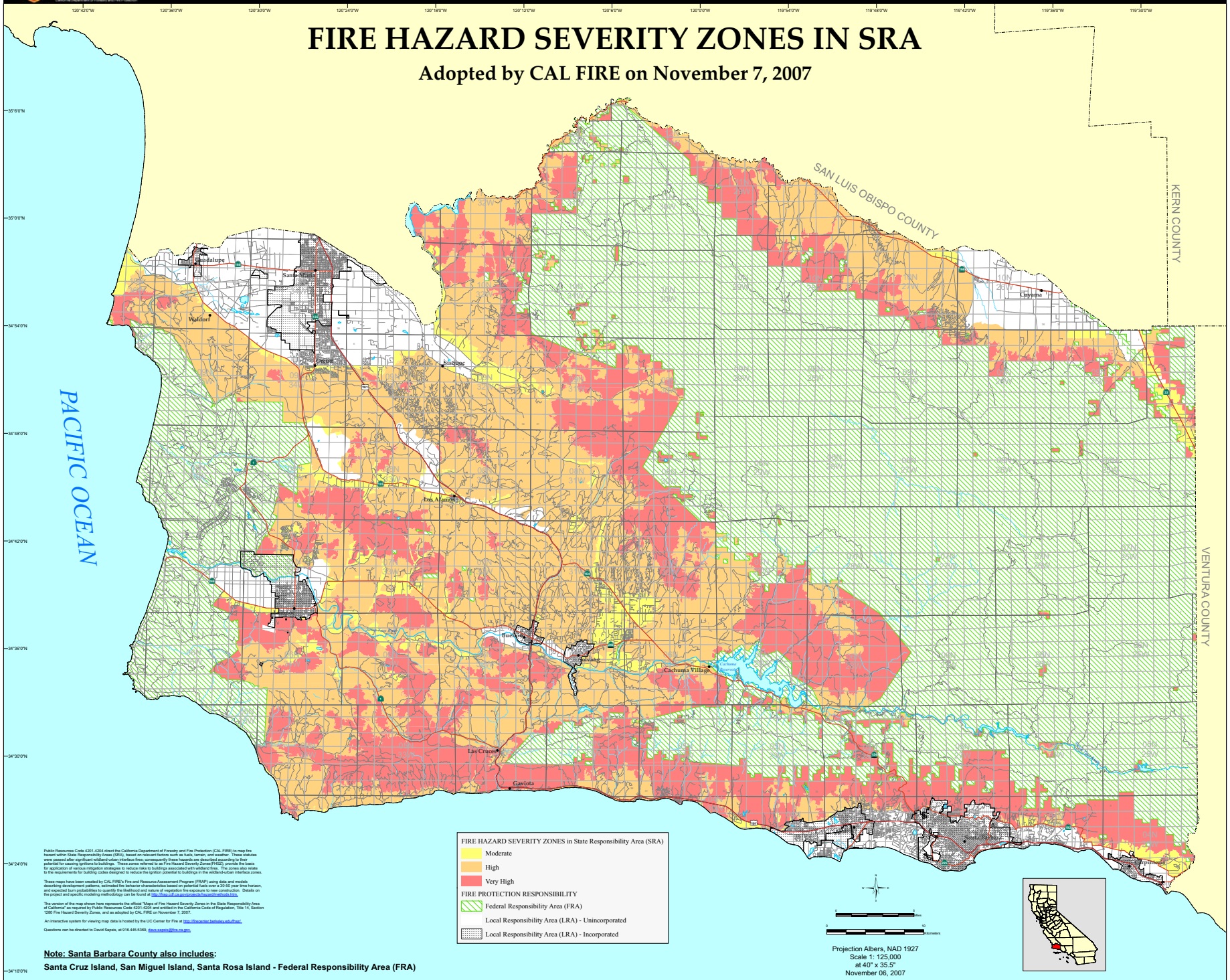
Can't make the Party? Shop the Members Sale
Saturday, October 3, 10 am - 2 pm

Attend both Preview Party and Dara Emery Memorial Lecture
featuring
Susan Van Atta, FASLA
with
Peter Gaede, artist
Susan will lecture *on The Southern California Native Flower Garden*, the subject of her new book illustrated by Mr. Gaede.
Fee: $50 for both the party and lecture
$20 lecture only
Reservations required; call (805) 682-4726 ext. 102

SANTA BARBARA COUNTY

FIRE HAZARD SEVERITY ZONES IN SRA

Adopted by CAL FIRE on November 7, 2007



Public Resources Code 4201-4204 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map fire hazard within State Responsibility Areas (SRA), based on relevant factors such as fuels, terrain, and weather. These statutes were passed after significant wildland-urban interface fires, consequently these hazards are described according to their potential for causing ignitions to buildings. These zones referred to as Fire Hazard Severity Zones(FHSZ), provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildland fires. The zones also relate to the requirements for building codes designed to reduce the ignition potential to buildings in the wildland-urban interface zones.

These maps have been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, estimated fire behavior characteristics based on potential fuels over a 30-50 year time horizon, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure to new construction. Details on the project and specific modeling methodology can be found at http://frap.cdf.ca.gov/projects/hazard/methods.htm.

The version of the map shown here represents the official "Maps of Fire Hazard Severity Zones in the State Responsibility Area of California" as required by Public Resources Code 4201-4204 and entitled in the California Code of Regulation, Title 14, Section 1280 Fire Hazard Severity Zones, and as adopted by CAL FIRE on November 7, 2007.

An interactive system for viewing map data is hosted by the UC Center for Fire at http://firecenter.berkeley.edu/frap/.

Questions can be directed to David Sapsis, at 916.445.5369, dave.sapsis@fire.ca.gov.

Note: Santa Barbara County also includes:

Santa Cruz Island, San Miguel Island, Santa Rosa Island - Federal Responsibility Area (FRA)

Projection Albers, NAD 1927
Scale 1: 125,000
at 40" x 35.5"
November 06, 2007

Obtain FRAP maps, data, metadata and publications on the Internet at http://frap.cdf.ca.gov
For more information, contact CAL FIRE-FRAP, PO Box 944246, Sacramento, CA 94244-2460, (916) 327-3939.

Arnold Schwarzenegger, Governor,
State of California
Mike Chrisman, Secretary for Resources,
The Resources Agency
Ruben Grijalva, Director,
Department of Forestry and Fire Protection

MAP ID: FHSZS_MAP

DATA SOURCES
CAL FIRE Fire Hazard Severity Zones (FHSZS06_3)
CAL FIRE State Responsibility Areas (SRA05_5)
CAL FIRE Incorporated Cities (Incorp07_3)
PLSS (1:100,000 USGS, Land Grants with CAL FIRE grid)

Ana Citrin

From: Bell, Bob [Bob.Bell@sbcfire.com]
Sent: Tuesday, December 22, 2009 3:09 PM
To: 'Ana Citrin'
Subject: RE: Public Records Request
Follow Up Flag: Follow up
Flag Status: Completed

Ms. Citrin,

Thanks for the clarification. Regarding response levels, a simple rule of thumb is if Santa Barbara County has transitioned into the High Fire season period (May – December) give or take some days either direction we will be at a "High Response Level". If we are experiencing heightened fire weather or fuel conditions throughout this period we will move to augment standard staffing which moves us into a "Very High Response Level"

A Santa Barbara County FD "High Fire Response level" for vegetation fires on State Lands or adjacent to US Forest lands in front country Santa Barbara sends the following resources on a first alarm assignment.

4 -Type 3 Engines / 1 Water tender / 2 Dozers / 1 Helicopter / 1 Crew / 1 Battalion Chief /
2 Air Tankers /
1 Air Attack Supervisor
Additionally the US Forest Service will send the same assignment on this incident which essentially doubles the resources.

If weather conditions are predicted that would indicate any fire start would be resistive to control we would move to an augmented staffing pattern. This is commonly known as an "Upstaffing Pattern"
Typically in Santa Barbara County we would upstaff a Task Force which would be;
3 additional type 3 engines / 1 additional water tender / 1 Battalion Chief as Task force Leader.
In addition to the Task Force 1 additional crew and helicopter would be assigned.

Hope this helps.

June 29 – July 1, 2008 Very High (upstaffing pattern)
November 10 – November 13, 2008 Very High (upstaffing Pattern)
May 2 – May 5, 2009 Very High (upstaffing Pattern)
July 16- July 19, 2009 High
September 31 – October 2, 2009 Very High (upstaffing pattern)
November 18 – November 22, 2009 High

Bob Bell
Division Chief - Operations
Santa Barbara County Fire Department
805 681-4202

805 896-6404 cell
bob.bell@sbcfire.com

From: Ana Citrin [mailto:anacitrin@cox.net]
Sent: Tuesday, December 22, 2009 1:32 PM
To: Bell, Bob
Subject: RE: Public Records Request

Chief Bell,

Thank you for explaining your processes and providing documents. I am happy to explain our intentions, they are fairly specific. Our office is working with the community group Friends of Mission Canyon, and reviewing past and proposed development in Mission Canyon. There are concerns that some proposed development and increases in institutional activities may be inappropriate given the fire risk and evacuation capacity of Mission Canyon. Accordingly, we are trying to understand the procedures and criteria that are currently used. Your department's information regarding procedures is useful for us to understand what practices have been regularly employed.

The dates we are interesting in learning what the response level was include times when there were institutional events in Mission Canyon, and also the days leading up to the recent fires in the County. Here are the dates:

June 29 – July 1, 2008
November 10 – November 13, 2008
May 2 – May 5, 2009
July 16- July 19, 2009
September 31 – October 2, 2009
November 18 – November 22, 2009

We can't thank you enough for your assistance, if you desire further clarification of our request, don't hesitate to ask.

Sincerely,

Ana Citrin
Law Office of Marc Chytilo
P.O. Box 92233
Santa Barbara, CA 93190
Phone: (805)570-4190
Fax: (805)682-2379
Email: anacitrin@cox.net

* * * * *
If you believe you have received this message in error, please notify sender immediately.
* * * * *

From: Bell, Bob [mailto:Bob.Bell@sbcfire.com]
Sent: Friday, December 18, 2009 8:12 AM
To: 'Ana Citrin'
Subject: RE: Public Records Request

Ms Citrin,

The SBC Morning Report is an internal document, to my knowledge there is not an archive of old documents. If you send me the dates you are interested in it would not be very difficult to determine our response level for the day.

I am curious as to your intentions. The information you have requested is not necessarily significant yet this piecemeal exchange of information does not paint the entire picture. Fire operations response and readiness is a lot more complex than it would appear. That being said I am happy to help as long as intentions are good.
Thanks.

Bob Bell
Division Chief - Operations
Santa Barbara County Fire Department
805 681-4202
805 896-6404 cell
bob.bell@sbcfire.com

From: Ana Citrin [mailto:anacitrin@cox.net]
Sent: Thursday, December 17, 2009 5:15 PM
To: Bell, Bob
Subject: RE: Public Records Request

Chief Bell,

Thank you very much for your detailed explanation of how the Smokey the Bear sign works – that is indeed the information we needed. One follow-up question for you: are past SBC Morning Reports available for the public to view? There are some specific dates we are interested in, in terms of knowing what the daily response level was. If this is something you can help me with, please let me know and I'll give you the specific dates we're interested in.

Thank you!

Ana Citrin
Law Office of Marc Chytilo
P.O. Box 92233
Santa Barbara, CA 93190
Phone: (805)570-4190
Fax: (805)682-2379
Email: anacitrin@cox.net

From: Bell, Bob [mailto:Bob.Bell@sbcfire.com]
Sent: Tuesday, December 15, 2009 3:02 PM
To: 'Ana Citrin'
Subject: RE: Public Records Request

Ms. Citrin,

I believe that you are inquiring about the Smokey the Bear sign in front of Station 15 and the daily alert level panels. If that is what you are interested in I can explain the process.

The Smokey the Bear sign is a long standing campaign by the US Forest Service to alert the public of the fire danger in the local area. This first started back when this was the only reliable way to notify the public of the local threat. Since those days the National weather Service and the Wildland Agencies Predictive Services Unit provides much more timely and accurate notification for fire danger in local areas.

The Smokey the Bear sign and alert panels are products of the National Fire Danger Rating System. The "NFDRS" takes local weather predictions, local fuel conditions adds factors for local activity and out comes a predicted fire danger rating for the area. In the past we have received the NFDRS rating from the Forest Service and the sign panel is changed to reflect the latest rating. Santa Barbara County Fire has recognized that this passing of data is not as timely as we would like and the designated alert panel is not necessarily representative of our response level.

To clarify, all Southern California Fire Agencies have recognized that Fire Season is a year round event. We at SB County Fire have the responsibility to staff and respond appropriately to meet the threat of wildfire every day. We have adapted the Smokey the Bear sign and the alert panels to correspond with our response level of the day.
Each day we use the predicted Fire Weather from the National weather Service and the latest fuel sample data from the Los Padres National Forest and our observations of local activity. We also use a little professional intuition on top of all the data to determine the response level for the day.

A little more clarification, this is probably more information than you want; Rather than going into and out of Fire Season we use preparedness levels. We have a High preparedness level in the late spring, summer and fall months and transition into a low preparedness level in the winter and early spring months. This still gives us the flexibility on a daily basis to adjust our response levels. The response level is the amount of apparatus and personnel we have responding to a given incident per the predicted weather, fuel conditions and activity level of the given day.

We publish the daily response level on the SBC Morning Report each morning and send this information out to all Stations. The Smokey sign is adjusted to coincide with the response level. I hope this is helps.

Bob Bell
Division Chief - Operations
Santa Barbara County Fire Department
805 681-4202
805 896-6404 cell
bob.bell@sbcfire.com

From: Ana Citrin [mailto:anacitrin@cox.net]

Sent: Friday, December 11, 2009 9:51 AM
To: Bell, Bob
Cc: 'Marc Chytilo'
Subject: RE: Public Records Request

Chief Bell,

Thank you for your prompt response to our request. The document you provided is very helpful, and thank you for clarifying that the red flag protocol is under review by state and federal agencies. One remaining question I have is what criteria the fire department uses for the orange and yellow alert levels at the station 15 sign – any information you can provide regarding that would be much appreciated.

Thank you,

Ana Citrin
Law Office of Marc Chytilo
P.O. Box 92233
Santa Barbara, CA 93190
Phone: (805)682-5695
Fax: (805)682-2379
Email: anacitrin@cox.net

From: Bell, Bob [mailto:Bob.Bell@sbcfire.com]
Sent: Thursday, December 10, 2009 4:07 PM
To: 'anacitrin@cox.net'
Subject: Public Records Request

Ms. Citrin,

In response to your request I have attached a copy of the Red Flag Alert Plan which is Appendix I of the Santa Barbara County Operational Area Mutual Aid Plan. The Red Flag Alert Plan has been and is still currently the guidance document for all Fire jurisdictions in the County of Santa Barbara for Red Flag protocols.

You may have heard that there are some changes pending in regards to this document. That is correct, there are ongoing discussions between State and Federal Fire agencies and the National Weather Service. I don't expect there to be a resolve or any new direction for a couple more months.

I would be happy to speak to you on any issues of interest to you.

Thank you

Bob Bell
Division Chief - Operations
Santa Barbara County Fire Department
805 681-4202
805 896-6404 cell
bob.bell@sbcfire.com

Exhibit 12 CUP and Development Plan Changes

CUP

1. *Strengthen the CUP's Terms and Conditions - Visitation - modify Condition # 63*

   A. **Establish "At Any Time" Site Maximums** of 100-114 people, either all year or during HFPS conditions (PC CUP caps HFPS events at 180, but general visitation at same time is unlimited)
   Rationale: Evacuation Capacity: FPP states that 100 persons is currently their average summer visitation on site at any time. FPP Page 4; 47. BG estimates it can take up to one hour to locate all visitors and evacuate them. It takes 25 minutes to complete the BG staff's "sweeps" of the site, not including any extra time to assist disabled visitors.
   Parking Capacity: There are 70 visitor parking spaces. Average vehicle occupancy (AVO) for classes is 1.1, or 77 persons. 43 employee parking spaces at AVO 1.1 is 47, for total of 114 persons.

   B. **Disallow proposed annual visitation growth** - set cap on general visitation at baseline numbers with no annual growth. (currently allows 1.8% annual increase and is capped at 50% increase).

   C. **Reset Baseline for general visitation**. Baseline was allowed to grow during preparation of EIR - from 85,000, to 98,000, and finally to 110,000. Average visitation up to time of NOP was 85,000 annual visitors and this should be the baseline and cap for future visitation.

   D. **Disallow event and class growth** - set cap at current levels, or disallow events entirely

   E. **Eliminate Festivals and Craft Fairs** - large events draw large numbers of cars and people into the Canyon and are difficult to control. Each is not permitted on Rec zoned lands.

   F. **Eliminate night-time classes and events** (after dark) due to hazards of traffic on Mission Canyon Road

   G. **Eliminate busses as unsafe large vehicles** on Mission Canyon's narrow windy roads. If busses are to be allowed, require shuttle busses to have not more than 31 seats and not be longer than 31 feet, one rear axle, and only if offsite parking and transfer area is well outside of any evacuation route - south of Garden Street and if satellite parking is a permitted or allowed use of the parking lot. Exemptions for school buses used outside of the HFPS are appropriate.
   Rationale: SB Trolley is 31 seats; MTD's bus is 29' and 29 passengers. "Cutaway" busses with 25 -29 passengers are common. Larger busses are less maneuverable and pose greater risk during emergencies.

   H. **Eliminate Alcohol on Site**. Drinking affects driver safety and often induces people to smoke, such as at weddings. Since smoking is prohibited, out of town smokers will sneak smokes in secluded areas, increasing wildfire risk. Alcohol was banned in the Windemere CUP.

2. *Amend Condition # 31, Fire Protection Plan*. The FPP is the core mechanism for most fire risk reduction, yet the FPP remains a "conceptual draft" with only partial integration into the conditions of approval. The conditions should be modified to specify mandatory elements and standards necessary to achieve the promised risk reduction. Any revision should be accomplished in a public process that solicits and considers public input. The condition improperly invites a revision to provide "greater flexibility" within fuel management zones. Mandatory condition requirements should include:

A. General visitation limits and enforcement.

B. At Any Time visitation limits during HFPS, and enforcement.

C. Event Size limitations, and enforcement.

D. Prohibit or Limit use of Shuttle Busses for event parking to not more than 31 seats or not be longer than 31 feet, one rear axle. Identify on-site bus parking areas and ensure they will not interfere with emergency vehicle circulation (to and through the site) and evacuation by staff and visitors in cars.

E. Any offsite parking and transfer area must be south of Garden Street and in a site where satellite parking is a specifically permitted or allowed use.

F. Procedures for training all bus drivers serving the site and for those drivers to brief passengers on emergency evacuation protocols.

G. Procedures for evacuating disabled persons from site.

H. Procedures for evacuating groups of children and others from the site.

I. Procedures for determining when to use shelter in place.

J. Procedures for locating persons to shelter in place facility when evacuation is no longer possible.

K. Procedures for managing persons that are unwilling to shelter in place when evacuation has been determined to not be appropriate.

L. Procedures for deterring parents and guardians from attempting to rescue children and others trapped at the facility in wildfire.

M. Procedures for ensuring public notice, review and comment on FPP revisions, including responses to comment.

N. Procedures for revisions to FPP and conditions of approval should fire protection mechanisms deteriorate, such as but not limited to closure of Fire Station 15.

O. Authority for Fire Chief and Station 15 to declare Mission Canyon in Red Flag conditions at any time based on their independent professional judgment.

3. **Construction Impact Issues:**

Strengthen Post-approval Plan Review Procedures

Currently PDD reviews, revises and approves three management plans that are critical to community safety and impact reduction. **We request that the community be allowed to receive notice of these plans' submittal and offer comments at a meeting.** The applicant has done a poor job of communicating with the community in past projects, violating permit conditions and not responding to complaints.

A. Condition # 33 **Traffic Flag Crew**: add requirement:
"Applicant shall notify residents in advance of all planned road closures and construction or staging activities affecting roadways. Notification shall be by telephone call or email. Applicant shall conduct a noticed public meeting to

inform residents of construction phasing and timetable before any construction affecting roadways and not less than bi-annually thereafter. Public meeting shall disclose planned timing and duration of roadway closures, noise generating activities, night lighting, and any other construction activities with potential to substantially impact surrounding residents. Residents' concerns and suggestions shall be considered by applicant in the formulation of final traffic control and construction management plans. No events over 40 people are allowed when roadway construction is active or there is any other reduction in roadway capacity from construction activities or equipment."

B. Amend Condition # 69, **Construction housekeeping plan** - public review. The construction housekeeping plan to be submitted to PDD should also be made available to the public and the public's input considered in PDD's review and approval of the plan.
C. Require public review and PDD consideration of public comment on draft **Traffic Management Program for events** (referenced in Project Description)

Construction Phasing

Rest Periods - Revise construction rest periods to not more than 3 years on, one year off (originally project was 8 phases, PC made it 2 - east and west sides, with 1 year rest period between them). This could be: Phase 1: install all utilities and infrastructure to site (water, sewer, gas, below-ground electric), followed by 1 year rest period; Phase 2: all east side improvements, followed by 1 year rest period; Phase 3: all west side improvements. ALTERNATIVELY - like Westmont Construction phasing

Limit Fire Risky Activities during HFPS

Reduce allowable construction activities during High Fire Preparedness Season - no complete road closures; no 'hot' work (outdoor welding, grinding, etc); use offsite staging areas and smaller delivery trucks; (no full size highway vehicles to avoid blocking narrow roadways).

Timing of Infrastructure:

Add to Condition 42: "Water line upgrades, sewer installation and all other utility work in right of way shall be completed before starting construction on any other new building or structure on the site."

Rationale: full water pressure should be available on-site to address fires before construction begins. Road closures, that are necessary for utility work, should be completed before other interruptions to traffic from construction of the remaining phases are allowed - to increase probability emergency equipment can get to and past the site if needed.

Development Plan Modification

The amount of proposed development on the site is excessive, as reflected in the ten year construction period.

1. Eliminate proposed Children's Lab building and relocate functions into Caretaker's Cottage in its current location

2. Eliminate Herbarium and Conservation Center buildings, and modify Library/Education Center to eliminate classrooms. Relocate Herbarium and Conservation Center functions, and adult education/lecture classrooms into Gane House
3. Eliminate new houses and road in Hansen Site. Staff has already recommended that new houses not be allowed in the culturally sensitive Hansen site. The zoning ordinance allows development on such a known archaeological site only where avoiding such resources is not possible. Staff contends that CFD "is requiring" this road and so it cannot be avoided, but in fact the applicant proposed the road and offered to improve it as part of the fire mitigation. The project can be designed to avoid impacting the site.
4. Remove all existing chain link fencing
5. Eliminate Guild Studio Parking Lot
6. Eliminate Cavalli housing and development; reject future use of advance wastewater treatment system technology

Santa Barbara Independent
WHO. WHAT. NOW.

Museum of Natural History Expands Into 21st Century

Director Karl Hutterer Lays Out Institution's Hopes for Significant Upgrades and Growth

Sunday, April 25, 2010

When Karl Hutterer started his job as director of the Santa Barbara Museum of Natural History 10 years ago, his first extensive walking tour of the Mission Canyon institution revealed crumbling buildings, cramped quarters, and a confusing layout. It only got worse come the winter, when staffers ran around with buckets to collect rainfall that dripped from leaky roofs. "I was really shocked," explained Hutterer, who recalled thinking, "This is in serious need of major work." Little did the bearded, bespectacled former professor of ethnography and archaeology know that it would be nearly a decade — and an extensive, expensive renovation of the museum-owned Ty Warner Sea Center on Stearns Wharf — before he'd be able to focus on fixing the main campus.

Today, after more than a year of strategic planning and neighborhood outreach, Hutterer is finally prepared to make public the plans he's developed with the help of staff, the board of trustees, and members of the community. "I've always felt very passionately that you don't plan buildings, you plan programs," he said. "Then you plan the buildings to fit the programs."

Paul Wellman

Karl Hutterer

In short, those new and replaced buildings — save for the "historic architectural core" and an outlying structure or two, much of the existing campus would be torn down — will represent about a 50 percent bump in square footage, but less than a 25 percent increase in the building footprint. The new development would remain on the exact zone where there are currently buildings, and the style would remain residential and low-lying in appearance. But it's not just construction and rehabilitation of the buildings that's being proposed — the creek corridor will be restored, the existing oak woodlands will be preserved, the parking lot will be made into a more "garden-like" setting with bioswales to deal with run-off, and the traffic would be re-routed to make more sense and impact the neighborhood less.

While there will certainly be some nay-saying neighbors and citizens who are critical of the project when it finally gets unveiled to the general public during presentations on June 3 and 5 — this is Santa Barbara, of course, and Mission Canyon residents can be the most opinionated around — the museum's plans have only so far been presented in five neighborhood meetings, including a presentation to the Mission Canyon Association on Thursday, April 22. During those,

opposition has been light, mainly coming from “people who object to any change at all,” said Hutterer, though others have wondered whether they’ll still be able to walk their dogs (they will, he promised) and whether noise, traffic, and lighting will get worse (they won’t, he assured). At Thursday night’s meeting, the association members — who have fought the nearby Santa Barbara Botanic Garden expansion tooth and nail and then some — seemed mostly encouraging, explained museum spokesperson Easter Moorman on Friday.

A Strategic Reinvention

The early support is no doubt related to Hutterer’s inclusive, collaborative, and transparent approach, which began with a strategic planning process in 2008. Calling it a “very comprehensive effort,” Hutterer enlisted the entire board and staff, conducted 100 community interviews, commissioned market studies, and analyzed comparable institutions in other cities to determine what was needed. During this introspective period, Hutterer and company came to the realization that a natural history museum’s role is no longer what it was when these types of institutions began proliferating 150 years ago, when European and American explorers wanted to showcase their bizarre discoveries from around the globe.

Paul Wellman

Karl Hutterer

“We are no longer looking at a world of abundance we can wrap our arms around,” said Hutterer. “We are looking at a world in crisis, in dire crisis, and we still don’t understand the systems we live in.” Under that context, the team’s reexamination of what it means to be a 21st century natural history museum led to the determination that collections, conservation, and community awareness-raising were the true future goals. “We are trying to reinvent ourselves,” admitted Hutterer, who said this understanding puts the museum on the “leading edge” of institutions worldwide. “We’re not throwing away our history. We are embracing it, but we’re reinventing ourselves on our foundations.”

Equally important was relating the museum’s future to the desires of everyday Santa Barbara residents, who make up the bulk of the 140,000 visitors who use the institution’s facilities in one way or another every year. “We understand that we serve our community,” said Hutterer. “We are not an institution of our own purpose.” As such, the museum team began door-to-door outreach effort more than a year ago and relied on the market analyses to determine what was truly needed and what was not.

What they quickly found was that the museum has pretty much maxed out when it comes to visitors, so despite the sure-to-be-jaw-dropping cost — estimates currently range wildly, from tens of millions to more than $100 million — Hutterer assures that there will not be a drastic jump in attendance. In fact, the museum isn’t even seeking to raise the allowed levels of their existing conditional use permit (CUP). “We currently have a CUP we feel we can live with,” said Hutterer. “We have been staying for the past 20 years within our CUP, have never exceeded it, and don’t plan to exceed it.” Though he acknowledges such a concession may seem placatingly “virtuous,” Hutterer said it’s also based in their market research, admitting, “We do not have much opportunity to grow in terms of attendance.”

Paul Wellman

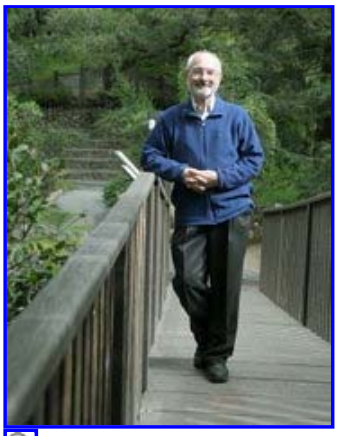
Karl Hutterer

So why spend so much money on such an elaborate plan? “Because we have to,” said Hutterer. “Our museum is falling apart.” Considering that any renovation project is going to be expensive and extensive no matter how it’s carried out — they’ve actually done the math, and knock-down/rebuild of the existing campus would be about as expensive as their expansion plans —the museum team figures that they might as well improve the museum in as many ways possible. “We want to do it right and set an example for museums around the country,” said Hutterer.

Building Bigger and Better

As Hutterer’s first walking tour revealed, the museum needs renovations as soon as possible. “Many of our buildings are in an incredibly decrepit state,” he said, adding that some were also built “in a way that’s offensive to the environment,” specifically those newer buildings — including Hutterer’s own office—that were constructed closer to the creek in the middle of the 20th century “before people had developed the environmental sensibilities they have today.”

But eco-mindedness aside, the day-to-day operations of the museum are hampered. “Every repair becomes a monster project,” he said, explaining how a recent window replacement project quickly became a wall rebuild before turning into an entire building reconstruction. “That just destroys our budget and makes it impossible to plan.” Among other travesties, there are leaks in the beautiful Ray Strong dioramas, insects infesting the exhibits, staircases on the verge of collapse, and termites galore. On top of that, the museum’s fire protection plan sucks and the campus layout is “really squirrelly.” Altogether, said Hutterer, “We’re not treating our visitors well.”



Paul Wellman

Karl Hutterer

There are 15 concepts on the museum’s official wish list, ranging from riparian restoration and woodland conservation to visitor amenities (i.e. more bathrooms, perhaps a café), safer pedestrian corridor, better stormwater runoff, and, ahem, basic building compliance. “None of our buildings comply with current codes,” admitted Hutterer. “And none comply with professional museum standards.” But they want to go further than simple compliance, and are aiming at becoming certified as LEED Gold or Platinum, the epitome of sustainable design. “If anyone needs to be an example of good stewardship,” he said, “it’s us.”

The historic core — which includes Fleischmann Auditorium, the main entrance, the little courtyard, and the connected buildings that line the street — will be refurbished, but some of the buildings that have been tacked on over the years will be torn down, as will the entire western campus not connected to that complex. Aside from moving the historic MacVeagh house to the northwest corner of the property, the only new construction would occur exactly where that current western campus sits. The new construction will increase the overall footprint by 13,637 square feet, but the actual square footage will bump from about 82,000 to 119,000 square feet.

The reason the footprint is proportionally less is because much of the new square footage will be taken up by basements

that will be used for collections, which will be better served by an underground setting and much more protected from fire. The collection areas represent one of the biggest square footage increases, which is a good thing. “Our collections keep growing and thank God they do, “said Hutterer, who’s also excited about a related loading dock. “That means we’re doing our jobs.”

The biggest overall expansion, however, will be in what Hutterer has labeled the “support” category, which will go from 14,000 to 33,000 square feet, a roughly 70 percent jump. That includes more bathrooms, electrical and mechanical hubs, thicker walls, and janitors’ closets. “That is stuff mandated by code,” said Hutterer. “We don’t have a whole lot of choice.”

Presenting the Plans

Just after the June 3 and 5 presentations to the public — which should also feature the first architectural renderings available — the museum’s plans will get their first official vetting on June 17 at a joint meeting of the City of Santa Barbara’s Historic Landmarks Committee and Planning Commission. (The museum straddles the city-county line, but the city has agreed to be the lead agency.) Hutterer remains hopeful that the early support will continue, but is well aware that some hurdles will certainly pop up.

Paul Wellman

Karl Hutterer

For instance, the museum — like most institutions that host events and loads of visitors yet remain located in a residential neighborhood — has managed to arouse suspicions and anger in some neighbors, both the grumpy and legitimately peeved types. But in his decade of work, Hutterer has tried hard to defuse those situations. “We really try to be good neighbors,” he said, explaining that he maintains an open door policy for anyone with problems, promising to always personally return emails and phone calls. That’s the attitude that empowered the extensive outreach campaign, which Hutterer said has resulted in “some kudos” from the neighbors.

There’s also the sensitive sticking point of trees, and whether the museum will be able to save everyone’s favorite oak. “We’ll try to preserve as many trees as we can,” promised Hutterer, who said they’ve been moving buildings around to avoid the large oaks but inferred that there may indeed be casualties in the development envelope.

Hutterer has also “kept a careful eye” on the Santa Barbara Botanic Garden’s expansion project, which is located a mile or so up the road, but seems worlds away when it comes to relationships with the community. Perhaps it’s because the Garden is further down the road with their development plans — they hit the Board of Supervisors on May 4 after an already contentious couple years of government meetings — but it seems that Hutterer has taken truly their travails to heart and tried diligently to avoid the ire stoked by the Garden’s with-us-or-against-us approach.

Regardless of the Garden’s woes, Hutterer believes he would have proceeded in this careful, community-minded fashion no matter what, as he did the same thing during his 10 years as director of the Burke Museum of Natural History and Culture in Seattle, where he was prior to his current post in Santa Barbara. “We would have done it this way anyway because that’s the way I’m built,” he said. Thanks to Hutterer’s build, the Museum of Natural History just might find themselves a relatively smooth path to their own buildings in the future.

Anyone who wishes to comment on the Santa Barbara Museum of Natural History’s expansion plans should email The Independent at tips@independent.com.


702
22 BOTANIC GARDENS
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