AGENDA
Scotts Valley Planning Commission

Date: March 14, 2019
Time: 6pm

CITY OF SCOTTS VALLEY
1 Civic Center Drive
Scotts Valley, CA 95066
831-440-5630

MEETING LOCATION
City Council Chambers
1 Civic Center Drive
Scotts Valley, CA 95066

POSTING: The agenda was posted on March 8, 2019, at City Hall, SV Senior Center, SV Library and on the Internet at www.scottsvalley.org.

<table>
<thead>
<tr>
<th>Appointed Officials</th>
<th>City Staff Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlos Arcangeli, Vice Chair</td>
<td>Taylor Bateman, Community Development Director</td>
</tr>
<tr>
<td>Lori Gentile, Commissioner</td>
<td>Brenda Stevens, Associate Planner</td>
</tr>
<tr>
<td>Rosanna Hererra, Commissioner</td>
<td></td>
</tr>
<tr>
<td>David Hodgin, Commissioner</td>
<td></td>
</tr>
<tr>
<td>Chuck Maffia, Commissioner</td>
<td></td>
</tr>
</tbody>
</table>

Notice regarding Planning Commission Meetings:
The Planning Commission meets regularly on the 2nd Thursday of each month (unless otherwise noticed) at 6pm in the City Hall Council Chambers located at 1 Civic Center Drive, Scotts Valley, CA 95066.

Agenda and Agenda Packet Materials:
The Planning Commission agenda is available for review the Friday before the Thursday meeting on the Internet at the City’s website: www.scottsvalley.org and in the lobby of City Hall at 1 Civic Center Drive, Scotts Valley, CA. Pursuant to Government Code §54957.5, materials related to an agenda item, submitted after distribution of the agenda packet, are available for public inspection in the lobby of City Hall during normal business hours, Monday-Friday, 8am-Noon and 1-5pm. In accordance with AB 1344, such documents will be posted on the City’s website at www.scottsvalley.org.

CALL TO ORDER
(The Planning Commission Chair calls the meeting to order.)

PLEDGE OF ALLEGIANCE and MOMENT OF SILENCE
(The Planning Commission Chair leads the pledge of allegiance.)

ROLL CALL
(Planning Department staff conduct roll call of the Planning Commission.)
**ELECTION OF OFFICERS:** The Planning Commission elects a Chair and Vice-Chair for the calendar year.

**GPAC COMMITTEE SELECTION:** The Planning Commission appoints a member of the body for the General Plan Action Committee.

---

**PUBLIC COMMENT TIME**

This is the opportunity for individuals to make and/or submit written or oral comments to the Commission on any items within the purview of the Commission, which are NOT part of the Agenda. No action on the item may be taken, but the Commission may request the matter be placed on a future agenda.

---

**ALTERATIONS TO CONSENT AGENDA**

(The Commission can remove or add items to the Consent Agenda.)

**CONSENT AGENDA**

(The Consent Agenda is comprised of items which appear to be non-controversial. Persons wishing to speak on any items may do so raising their hand to be recognized by the Chair. These items will be acted upon in one motion unless they are removed from the consent agenda for discussion by the Commission.)

Approve the Action Meeting Minutes from the January 24, 2019 meeting.

**ALTERATIONS TO PUBLIC HEARING AGENDA**

(Commission can remove or add items to the Regular Agenda.)

**PUBLIC HEARING AGENDA**

(Persons wishing to speak on any item may do so by raising their hand to be recognized by the Chair.)

**ALTERATIONS TO REGULAR AGENDA**

(Commission can remove or add items to the Regular Agenda.)

**REGULAR AGENDA**

(Persons wishing to speak on any item may do so by raising their hand to be recognized by the Chair.)

1. **Address:** 213 Blueberry Drive // APN 021-105-05
   **Applicant / Property Owner:** Jeff Mora
   **Planning Permit Application No.:** Design Review DR18-010, EA18-010
   **Project Description:** Consideration of a recommendation to the Scotts Valley Planning commission for a Design Review of a new 624 square foot, two story, single-family dwelling with a two car garage in grading in slopes over 30%.
   **Staff:** Brenda Stevens, Associate Planner, 440-5635  bstevens@scottsvalley.org
DISCUSSION ITEMS AND FUTURE AGENDA ITEMS
(The Planning Commission or Community Development Director may request to schedule items on future agendas.)

WRITTEN COMMUNICATIONS – FOR INFORMATION ONLY
(City Council Minutes or other items are provided if available.)

DIRECTOR UPDATES
(The Community Development Director may provide any department or city updates that are available.)

ADJOURNMENT
(Adjournment shall be no later than 11pm unless extended by a four-fifths vote of all Planning Commission members or a unanimous vote of the members present per City Municipal Code Section 2.21.010.)

The City of Scotts Valley does not discriminate against persons with disabilities. The City Council Chambers is an accessible facility. If you wish to attend a Planning Commission meeting and require assistance such as sign language, a translator, or other special assistance or devices in order to attend and participate at the meeting, please call the Community Development Department at 831-440-5630 five to seven days in advance of the meeting to make arrangements for assistance. If you require the agenda of a Planning Commission meeting be available in an alternative format consistent with a specific disability, please call the Community Development Department. The California State Relay Service (TTY/VCO/HCO to Voice: English 1-800-735-2929, Spanish 1-800-855-3000; or, Voice to TTY/VCO/HCO: English 1-800-735-2922, Spanish 1-800-855-3000), provides Telecommunications Devices for the Deaf and Disabled and will provide a link between the TDD caller and users of telephone equipment.
Minutes

Special Meeting of the Scotts Valley Planning Commission

Date: January 24, 2019
Time: 6:00 PM

CALL TO ORDER: 6:00 pm.

PLEDGE OF ALLEGIANCE and MOMENT OF SILENCE: The Planning Commission Chair led the pledge of allegiance.


PUBLIC COMMENT: None.

ALTERATIONS TO CONSENT AGENDA: None.

CONSENT AGENDA: None scheduled.

A. Action Meeting Minutes from December 13, 2018 meeting.

M/S: Muth/Herrera
Carried: 3/0/1/0 (AYES: Arcangeli, Herrera and Muth. NOES: None; ABSTAIN: Hodgin; ABSENT: None)

ALTERATIONS TO REGULAR AGENDA: None.
PUBLIC HEARING AGENDA:

1. **Address:** 5400 Scotts Valley Drive // APN 022-042-15  
   **Applicant / Property Owner:** Cori Landivar / Josh Simpson  
   **Planning Permit Application No.**: Use Permit U18-012  
   **Project Description:** Consideration of a recommendation to the Scotts Valley Planning Commission for a Use Permit for the operation of a veterinary clinic in the C-S Commercial Service zoning district.  
   **Staff:** Brenda Stevens, Assistant Planner  

   M/S: Muth/Herrera  
   To approve the project via Resolution No. 1740 subject to conditions of approval.  
   **Carried:** 4/0/0 (AYES: Arcangeli, Herrera, Hodgin and Muth; NOES: None; ABSENT: None)

REGULAR AGENDA:

1. **Address:** 260 Mount Hermon Road // APN 022-231-03  
   **Applicant / Property Owner:** Corbett Wright // Hangar at Skypark, LLC  
   **Planning Permit Application No.**: Design Review DR19-001  
   **Project Description:** Consideration of a recommendation to the Scotts Valley Planning Commission for a Design Review for the installation of five freestanding metal sculpture displays of outdoor public art in the C-S Commercial Service zoning district.  
   **Staff:** Brenda Stevens, Assistant Planner  

   M/S: Herrera/Hodgin  
   To approve the project via Resolution No. 1741 subject to conditions of approval.  
   **Carried:** 4/0/0 (AYES: Arcangeli, Herrera, Hodgin and Muth; NOES: None; ABSENT: None)

DISCUSSION ITEMS AND FUTURE AGENDA ITEMS: None.

WRITTEN COMMUNICATIONS – FOR INFORMATION ONLY:

DIRECTOR UPDATES:

ADJOURNMENT: 6:50 pm.
STAFF REPORT

Applicant / Owner: Jeff Mora
Application: Design Review No. DR18-010
Location: 213 Blueberry Drive / APN 021-102-05
General Plan/Zoning: Residential (R-1-10)
Environmental Status: Exempt from CEQA (Section 15303)
Request: Consideration of a Design Review application for a 624 square foot single family dwelling located in a residential district subject to the Hillside Combining District Regulations and with grading proposed in slopes over 30 percent.
Staff Planner: Brenda Stevens, Associate Planner

STAFF RECOMMENDATION

It is recommended that the Planning Commission review the plans for Design Review application No. DR18-010 and approve the application, subject to the attached conditions in Exhibit A.

BACKGROUND

In 2003, a previous property owner received approval from the Planning Commission for a Design Review and Variance to build a 3,111 square foot single family dwelling. The Variance application was required due to slopes, reduced front yard setbacks and increased front yard fence height. The City Council overturned the Planning Commission’s approval of the Variance and Design review due to grading, drainage and erosion concerns raised by the appellants.

In June 2010, the previous owner submitted a new design to relocate the dwelling entirely out of the 40 percent slopes. The new design was approved but not built.
In 2018, a new property owner acquired the property and is proposing a new design for a single family dwelling as discussed in this report.

**LOCATION**

The project site is located at 213 Blueberry Drive (Attachment 1 – Location Map). There are two adjacent single family dwellings, 205 Blueberry Drive to the north and 125 Blueberry Drive to the east. The 12,500 square foot parcel is a steeply sloped, vacant, hillside lot located near the City limits in the southern area of the Whispering Pines neighborhood. The site is located within the Zayante Sandhills, endangered Mount Hermon June Beetle habitat. The project will be required to participate in the Interim Programmatic Habitat Conservation Plan for the Mount Hermon June Beetle as overseen by the United States Fish and Wildlife Service (USFWS) (Condition No. 3).

**PROJECT DESCRIPTION**

**Current Application**

The applicant is proposing to build a 624 square foot, single family dwelling, with a 624 square foot garage. The two story structure would have the garage located at street level and the single family home would be located below the garage. Entrance to the dwelling would be from an exterior staircase. From the street view the structure would appear to be one level. The rear view of the structure is two stories with a total height of 24 feet. A 180 square foot deck would run along the exterior of the rear (east) elevation, upper garage level, of the structure.

**Potential Phase II**

Although plans have not been submitted at this time, the property owner has indicated that there is likely to be a Phase II of development proposed for the site. Namely, to build a larger single family dwelling to the south of this proposed dwelling. In theory, the current project would become a secondary dwelling unit and the additional future dwelling would become the primary dwelling unit. The proposed design would determine the process of review required (i.e. Design Review application before the Planning Commission or Building Permit).

**PROJECT DISCUSSION**

**Hillside Regulations**

The City’s Hillside Regulations (SVMC 17.40.060) apply to all lots having an average slope of more than 10 percent. When construction is proposed in slopes of 30 percent or more, Design Review and Planning Commission approval is required. The Design Review application is required to ensure that the design of the project is consistent with the both the City’s Hillside Residential Combining District Regulations and the
Residential Design Handbook (RDH). Staff has reviewed the project for compliance with the City’s regulations and requirements.

The Hillside Regulations require that construction on hillsides avoid unreasonable interference of views and privacy, preserve the natural landscape, minimize perception of excessive bulk and that bulk and height be compatible with the neighborhood. An analysis of the project for the Planning Commission’s consideration is provided as follows:

**Design Features**

The average slope of the lot is 30.47 percent. Over 60 percent of the lot has slopes greater than 40 percent. Along the property frontage, there is a flat bench, followed by steep slopes that descend to the rear of the property. The two story design of the proposed single family dwelling has minimized the perception of excessive bulk in height by placing one story (the garage) at the street level for the appearance of a single story, while the overall 24 foot height of the two story structure is seen primarily from the rear of the structure.

Proposed design elements include Hardi Board vertical siding in “Countrylane Red” with corrugated metal roofing in either Terra Cotta or Raw. A color board will be presented at the meeting. A color layout is shown on Sheet A-2.0 of attached plans. The natural earth tone and materials will assist in blending the structure in with the natural setting of slopes and trees.

**Soils Report**

A Geologic Investigation report was prepared for the previous property owner (Attachment 2). The same engineering geology company reviewed the current property owner’s plans and concluded that, the plans reviewed are geologically suitable for the design of the proposed structure (Attachment 3).

**Trees**

An Arborist Report was prepared for the site (Attachment 4). There are no trees proposed for removal with this project. Two protected trees that will be impacted are: a 30 inch diameter Coast redwood and a California bay laurel. Each of these trees will have moderate root loss, excavation and compaction, as a result of the proposed construction. The arborist recommends that to minimize root loss that the concrete footings be hand excavated. All arborist recommendations shall be incorporated as conditions of the project approval (Condition No.4).
Resolution to Approve Design Review No. DR18-010

Project Plans ...................................................................................................................................... Attached

1. Location Map .................................................................................................................................. 11
2. Geologic Investigation Report prepared by Nolan, Zinn and Associates
   (2/10/2003) .................................................................................................................................. Attached
3. Geologic Review letter by Erik Zinn (6-5-18) .............................................................................. Attached
4. Arborist Report prepared by Kurt Fouts (11-11-18) ................................................................. Attached
RESOLUTION NO. ______

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF SCOTTS VALLEY APPROVING DESIGN REVIEW PERMIT NO. DR18-010 FOR A 624 SQUARE FOOT SINGLE FAMILY DWELLING LOCATED IN A RESIDENTIAL DISTRICT SUBJECT TO THE HILLSIDE COMBINING DISTRICT REGULATIONS AND WITH GRADING PROPOSED IN SLOPES EXCEEDING 30 PERCENT TO BE LOCATED AT 213 BLUEBERRY DRIVE // APN 021-102-05.

WHEREAS, the Planning Department of the City of Scotts Valley has received an application filed by property owner Jeff Mora, for Design Review Permit No. DR18-010 for a 624 square foot single family dwelling with grading proposed in slopes exceeding 30 percent to be located at 213 Blueberry Drive // APN 021-102-05; and,

WHEREAS, the application was reviewed for completeness and is determined to be a “project” as defined by the California Environmental Quality Act (CEQA); and,

WHEREAS, the project is Categorically Exempt, Class 3 (15303); and,

WHEREAS, the project was reviewed by the Planning Commission at a regularly scheduled meeting on Thursday, March 14, 2019; and

NOW THEREFORE, the Planning Commission of the City of Scotts Valley hereby resolves as follows:

SECTION 1: The environmental determination represents the independent judgment of the City.

SECTION 2: The categorical exemption is hereby approved.

SECTION 3: The Planning Commission of the City of Scotts Valley does hereby specifically make the following findings, as further clarified in the staff report dated March 14, 2019:

A. Proposed grading is limited to the minimum necessary for development of roads, building sites, utilities and driveways with the Hillside Regulations. The proposed grading conforms with the Hillside Regulations. The proposed driveway utilizes the flat bench of soil that runs along the front of the property. Furthermore, the home has been designed to follow the contours of the hillside further reducing site grading.

B. Mass grading will not reasonably affect the natural character of the area. The proposed grading is considerate of the natural character of the area as it follows the contours of the hillside.
C. The proposed buildings and other improvements are consistent with the policies described in the Residential Design Handbook. The proposed structure complies with the principles of the Residential Design Handbook. The applicant has demonstrated that the project, as designed, complies with the Hillside Regulations and the Residential Design Handbook to the extent feasible.

D. The proposed structure minimizes perceptions of bulk in relation to the immediate neighborhood. As designed, the project incorporates design elements such as the rear deck on the upper level which serve to reduce bulk in relation to the immediate neighborhood. Visual impacts will be minimized by the location of the parcel in relation to the rest of the neighborhood.

SECTION 4: After careful consideration of the application and related materials, plans, maps, facts, exhibits, staff report, testimony and other evidence submitted in this matter, and incorporated herein by this reference, the Planning Commission of the City of Scotts Valley does hereby approve Design Review Permit #DR18-010 for a 624 square foot single family dwelling with grading proposed in slopes exceeding 30 percent to be located at 213 Blueberry Drive // APN 021-102-05, subject to the conditions set forth in the attached Exhibit A, which are incorporated herein by this reference.

SECTION 5: This Design Review #DR18-010 shall lapse and shall become void two years from the date of this resolution unless prior to the expiration date, a building permit is issued by the Building Division and construction has commenced and diligently pursued toward completion, or an extension of this approval is granted by the Planning Commission.

THE ABOVE AND FOREGOING RESOLUTION was duly adopted and passed by the Planning Commission of the City of Scotts Valley at a regularly scheduled meeting held on the 14th day of March, 2019, by the following vote:

AYES: 
NOES: 
ABSTAIN: 
ABSENT: 

____________________________________
Vice Chair, Carlos Arcangeli

____________________________________
Taylor Bateman, Community Development Director
EXHIBIT A

CONDITIONS OF APPROVAL

LEGAL

1. Developer has agreed to and shall defend, indemnify and hold harmless the City of Scotts Valley, its officers, agents and employees from any claim, action or proceeding against the City or its officers, agents or employees to attack, set aside, void or annul any action of the City in connection with approvals under the California Environmental Quality Act or with respect to approval of the project, which action is brought within the time period(s) prescribed by law. The City shall promptly notify the developer of any such claim, action or proceeding and shall fully cooperate in defense.

2. The Design Review Approval shall become null and void two years following the date the appeal period ends, unless prior to the expiration of said period, a building permit is issued and construction commenced.

3. All colors, materials, architectural plans shall be maintained as approved. Any changes to the approved plans must receive approval of the Planning Commission.

4. Applicant shall attach one copy of the approved and signed Conditions of Approval with building permit application.

5. All required building permits shall be obtained and the application shall pay all appropriate fees prior to commencement of construction on the property.

PLANNING DEPARTMENT


2. All landscaping and irrigation shall be in place prior to issuance of an Occupancy Permit.
3. The project will be required to participate in the Interim Programmatic Habitat Conservation Plan for the Mount Hermon June Beetle as overseen by the United States Fish and Wildlife Service (USFWS).

4. All recommendations included in the November 11, 2018 Arborist Report prepared by Kurt Fouts shall be incorporated as conditions of the project approval.

5. Prior to the issuance of any grading or building permits, the project arborist shall inspect tree protection fencing and the completion of pre-construction treatments.

6. The project arborist shall routinely inspect the development site through the term of the project.

7. The arborist review and implementation of conditions, site inspection and related work shall be borne by the applicant.

**BUILDING**

1. All requirements of the Building Department of the City of Scotts Valley shall be met.

2. The applicant shall affix a copy of the approving resolution and conditions of approval to each set of construction plans which will be submitted to the Building Department.

3. Site drainage erosion control and foundation plans must be reviewed and approved by a soils engineer.

**PUBLIC WORKS**

1. If required, a registered civil engineer shall provide storm (hydrologic and hydraulic) calculations for appropriate storm drain facilities to control on-site drainage and mitigate off-site impacts. The design shall follow the criteria contained in the City of Scotts Valley Standard Details and the data and analysis contained in the latest adopted City of Scotts Valley Storm Drainage Master Plan. Development shall not increase the rate of flow (cubic feet per second) or velocity (feet per second) of site run-off water to any off-site drainage areas beyond the measured or calculated pre-project rate and velocity.
1. This project as proposed shall conform to the 2016 California Fire Code as amended by the Scotts Valley Fire Protection District.

2. An automatic sprinkler system shall be installed in all buildings in accordance with Chapter 9 of the California Fire Code, current NFPA 13 standards, and Santa Cruz County FPO standards. (Contact the Scotts Valley Fire Protection District to review the FPO standards)
   a. Automatic sprinkler system design plans and calculations shall be submitted directly to the Scotts Valley Fire Protection District for review and permit. Separate permits may be necessary for the "overhead" and "underground" parts of the system.
   b. The automatic sprinkler system drawings must be prepared and submitted for approval by a California State Licensed Contractor (Class A, or C-16) meeting the requirements of NFPA-13, “Standard for the Installation of Fire Sprinkler Systems”. Designer/installer shall submit three (3) sets of plans and calculations to this agency for approval.

3. Required Water Supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the District.
   a. Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6 and Appendix C or by an approved method by the Fire District.
   b. Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads.
   c. Existing non-conforming fire hydrants will need to be upgraded to meet current NFPA standards.

4. A MINIMUM OF 48 HOURS NOTICE to the Fire District is required prior to any inspection.

5. Job copies of the building and fire systems plans and permits must be on-site during inspections

6. Building numbers shall be provided. Numbers shall be a minimum of four (4) inches in height on a contrasting background and visible from the street. Where numbers are not visible from the street, additional numbers shall be installed on a directional sign at the property driveway and the street. Final design and location of the building numbers are subject to Fire District approval.
7. No changes in building use or occupancy type shall be allowed without Fire District approval.

8. Prior to final, provide to the Scotts Valley Fire Protection District a general site plan that details hydrant locations, and water/gas/electrical shutoff locations. The site plan shall be provide in a digital (PDF) non-flattened version.

Signature of Property Owner __________________________  Date________________
5 June 2018                             Job #2016033-G-SC

Jeff Mora  
P.O. Box 75  
Felton, CA 95018  
Cell: 530.945.8415  
jeffmora8@sbcglobal.net  

Re: Review plan set  
    213 Blueberry Drive  
    Scotts Valley, CA 95066  
    County of Santa Cruz APN 021-102-05  

Dear Mr. Mora:  

The purpose of our review was to ascertain if the plan cited below is in general conformance with  
geologic conditions encountered during our past investigation and with the findings and  
recommendations issued for the investigation, as well as for any supplemental analyses and  
letters if applicable.  

PROJECT INFORMATION  
Application Number:  
Parcel # (APN): 021-102-05  
Owner Name: Jeff Mora  
Project Address/Location: 213 Blueberry Drive, Scotts Valley, CA 95066  

ENGINEERING GEOLOGY REPORT INFORMATION  
Company Name: Zinn Geology  
Licensed Geologist In Responsible Charge: Erik N. Zinn  
Date of Engineering Geology Report: 10 February 2003  
Date of Updates/Supplemental Information: 5 January 2016
PROJECT PLAN SHEETS REVIEWED

<table>
<thead>
<tr>
<th>Plan Sheet Number</th>
<th>Plan Prepared By</th>
<th>Date of Latest Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>Spanner Systems</td>
<td>06/05/18</td>
</tr>
<tr>
<td>BMP-1, -2</td>
<td>Spanner Systems</td>
<td>06/05/18</td>
</tr>
<tr>
<td>S1</td>
<td>The Bronson Company</td>
<td>07/11/16</td>
</tr>
<tr>
<td>C-1.0, -1.1, A-0.0, -1.0, -1.1, -2.0, -2.1, -3.0, EM-1,</td>
<td>Spanner Systems</td>
<td>06/05/18</td>
</tr>
<tr>
<td>Sheet S1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0,</td>
<td>Westfall Engineers</td>
<td>06/04/18</td>
</tr>
<tr>
<td>Sheet 8.0</td>
<td>Westfall Engineers</td>
<td>05/14/18</td>
</tr>
</tbody>
</table>

It is our opinion that the geological aspects of the plan reviewed is in general conformance with the geological conditions encountered during our ongoing geological investigation and with the recommendations issued in our report dated 10 February 2003, as well as our update letter dated 5 January 2016.

RECOMMENDATIONS

The recommendations presented herein and in the referenced report should not preclude more restrictive criteria by the governing agencies or by structural considerations.

1. In the event that any further changes are made to the plans, the revised plans should be forwarded to the Project Geologist Of Record to review for conformance with the previous recommendations.

2. All geological observation services must be provided by Zinn Geology during construction of the project. All cuts and pier holes must be observed by Zinn Geology to enable us to form an opinion as to the geological adequacy of the work, the degree of conformance to our report and to provide supplemental recommendations where warranted. Our observation of the pier hole drilling must occur during the drilling of the hole; any pier holes drilled without observation by our firm will be deemed unacceptable. Any cuts or pier holes performed without the direct knowledge and observation of Zinn Geology will render the recommendations of our report and this letter invalid.
LIMITATIONS

Our review was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this review.

Our review of the plans cited at the beginning of this letter was limited to the geological aspects only. Review of all other aspects of the plans was beyond our purview on the project and are specifically excluded from the scope of this review. Our firm makes no warranty, expressed or implied, as to the adequacy of other aspects of the plans.

Conditions revealed during construction may vary with respect to the findings in the original investigation. Should this occur, the changed conditions must be evaluated by the Project Geologist Of Record and revised recommendations provided as required.

This letter is issued with the understanding that it is the responsibility of the Owner, or their Representative, to ensure that the information and recommendations presented herein are brought to the attention of the Architect and Engineers for the project and incorporated into the plans, and that the Contractor and Subcontractors implement such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this review are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether due to natural events or human activity on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur as a result of legislation or a broadening of knowledge. Accordingly, this
review may become invalidated, wholly or partially, by changes outside our control. Therefore, this plan review is subject to review and revision as changed conditions are identified.

If you have any questions regarding this letter, please do not hesitate to contact our office.

Sincerely,
ZINN GEOLOGY

Erik N. Zinn
Principal Geologist
P.G. #6854, C.E.G. #2139

ec: Rick Bowen - Spanner Systems
    John Kasunich - Haro, Kasunich & Associates
    Karel Cymbal - Westfall Engineers
GEOLOGIC INVESTIGATION
Lands of Zamani
213 Blueberry Drive
Scotts Valley, California 95066-4617

Job #02040-SC
10 February 2003
Dear Mr. Zamani:

Our geologic report for the proposed development on the subject property referenced above is attached. This report documents geologic conditions on the subject property and addresses potential hazards and accompanying risks due to landsliding and strong seismic shaking. Based on the information gathered and analyzed, it is our opinion that the proposed development is geologically suitable and will be subject to “ordinary risks” as defined in Appendix B, provided our recommendations are followed. Appendix B should be reviewed in detail by the developer and all property owners to determine whether an "ordinary" risk as defined in the appendix is acceptable. If this level of risk is unacceptable to the developer and the property owners, then the geologic hazards in question should be mitigated to reduce the corresponding risks to an acceptable level.

The primary type of landsliding that may occur on the property is formally known as a dry, open-slope sand flow (after Cruden and Varnes, 1996). We consider the potential for this type of slope movement to occur over the design life of the proposed residence to be moderate to high. If left unmitigated, the resulting risk accompanying the aforementioned landslide hazard is greater than an “ordinary” risk as defined in Appendix B. We recommend that you pursue at least one of the mitigation paths outlined in our recommendations section of this report in order to reduce the potential landslide hazard and risk to the proposed development. If one of our recommended mitigation paths are chosen, adequately designed and constructed, then the proposed development on the property will be subject to an "ordinary risk" due to this hazard.
Another geologic hazard likely to affect the subject property within the design life of the proposed development is intense seismic shaking due to an earthquake on one of the local fault systems, such as the Zayante or San Andreas faults. Your design consultants should carefully review our seismic shaking analysis and incorporate our recommendations where prudent. If the structures on the property are properly designed for the expected intensity and duration of seismic shaking, they will be subject to an "ordinary" risk due to this hazard (see Appendix B).

Sincerely,

Nolan, Zinn and Associates, Inc.

Erik N. Zinn
Principal Geologist
C.E.G. #2139
TABLE OF CONTENTS

INTRODUCTION. .............................................................5  
SCOPE OF INVESTIGATION. ....................................................6  
REGIONAL GEOLOGIC SETTING. ..............................................6  
REGIONAL SEISMIC SETTING. .............................................7  
   San Andreas Fault. .......................................................7  
   Zayante Fault. ...........................................................8  
   San Gregorio Fault........................................................9  
   Monterey Bay-Tularcitos Fault Zone.....................................9  
   TABLE 1 - Modified Mercalli Intensity Scale........................11  
SITE GEOLOGIC SETTING. ...................................................12  
   Topography. ...........................................................12  
   Drainage. ..............................................................12  
   Earth Materials. ........................................................12  
      Santa Margarita Sandstone.. .........................................12  
      Colluvium. ..........................................................13  
      Alluvium. .........................................................13  
      Alluvial Fan. .......................................................13  
      Artificial Fill. ....................................................14  
GEOLOGIC HAZARDS. .......................................................14  
   Landsliding.. ...........................................................14  
   Deterministic Seismic Shaking Analysis...................................16  
   TABLE 2 - Deterministic Seismic Shaking Data. ....................17  
REVIEW OF PRELIMINARY DESIGN PLANS.....................................18  
CONCLUSIONS. .............................................................18  
RECOMMENDATIONS........................................................19  
INVESTIGATION LIMITATIONS..............................................20  
REFERENCES. ..............................................................21  
APPENDIX A - FIGURES. .....................................................26  
   Figure 1 - Topographic Index Map. ....................................27  
   Figure 2 - Regional Geologic Map.. ...................................28  
   Figure 3 - Regional Seismicity Map. ...................................29  
   Figure 4 - Local Geologic Map. ......................................30  
   Figure 5 - Santa Cruz County Landslide Map. .......................31  
APPENDIX B - SCALE OF ACCEPTABLE RISKS FROM GEOLOGIC HAZARDS. . . .32  

PLATES - In pocket at back of report  

NOTE: Plate must accompany text of report in order for report to be considered complete.
INTRODUCTION

This report presents the results of our geologic investigation of the property located at 213 Blueberry Drive, Scotts Valley, in central Santa Cruz County, California (Figure 1). The property is currently undeveloped. Proposed development for the property includes a single-family residence, located atop the crest of a steep slope, along the western edge of the property. Proposed access to the residence will be via a short driveway off of Blueberry Drive. It is assumed that the property will be serviced by the existing city sewer system.

The purpose of this investigation was to characterize the geologic hazard and accompanying risks that might be posed to the proposed development, and to issue geologic mitigation recommendations where warranted.

We have reviewed the following documents for this project:

“Geotechnical services performed at 205 Blueberry Drive, Scotts Valley, California APN 021-102-06” by JCP, dated 3 January 1990, project number JCP-2763.

“Preliminary geotechnical design criteria” by Haro, Kasunich and Associates, dated 17May 1990, job number SC2353.

“Geotechnical investigation for 205 Blueberry Drive, Scotts Valley, California”, by Haro, Kasunich and Associates, dated 27 December 1989, job number SC2353.

“Geotechnical and geological investigation for proposed single family residence, 213 Blueberry Court, Scotts Valley, California” by E2C, dated 29 December 1999, job number 1262SCO1.


Nolan, Zinn And Associates
“Re: 213 Blueberry Drive - Preliminary plan revisions” by City of Scotts Valley Planning and Building Department, dated 11 March 2002.


**SCOPE OF INVESTIGATION**

Work performed during this study included:

1. A review of published and unpublished maps, reports and letters relevant to the property.

2. Examination and interpretation of nine sets of stereo-pair vertical aerial photographs, to assess the past slope stability of the subject property.

3. Co-logging of six exploratory borings advanced by the project geotechnical engineer, Bauldry Engineering.

4. Discussions and meetings with the property owner, project designer and planner, Dennis Norton, project geotechnical engineer, Brian Bauldry of Bauldry Engineering, City of Scotts Valley Principal Planner, Jackie Young, and the peer-reviewing geotechnical engineer, Steven Raas of Pacific Crest Engineering.

5. Analysis and interpretation of the geologic data and preparation of this report.

**REGIONAL GEOLOGIC SETTING**

The subject property is located in the central Santa Cruz Mountains. The Santa Cruz Mountains are formed by a series of rugged, linear ridges and valleys following the pronounced northwest to southeast structural grain of central California geology. Underlying most of the Santa Cruz Mountains is a large, elongate prism of granitic and metamorphic basement rocks, known collectively as the Salinian Block. These rocks are separated from contrasting basement rock types to the northeast and southwest, respectively, by the San Andreas and San Gregorio strike-slip fault systems. Overlying the granitic basement rocks is a sequence of dominantly marine...
sedimentary rocks of Paleocene to Pliocene age and non-marine sediments of Pliocene to Pleistocene age (Figure 2).

Throughout the Cenozoic Era, this portion of California has been dominated by tectonic forces associated with lateral or "transform" motion between the North American and Pacific lithospheric plates, producing long, northwest-trending faults such as the San Andreas and San Gregorio, with horizontal displacements measured in tens to hundreds of miles. Accompanying the horizontal (strike-slip) movement of the plates have been episodes of compressive stress, reflected by repeated uplift, deformation, erosion and deposition. Near the crest of the Santa Cruz Mountains, this tectonic deformation is most evident in the sedimentary rocks older than the middle Miocene and consists of steeply dipping folds, overturned bedding, faulting, jointing, and fracturing. Along the coast, the ongoing tectonic activity is most evident in the formation of a series of uplifted marine terraces. The Loma Prieta earthquake of 1989 is the most recent reminders of the geologic unrest in the region.

REGIONAL SEISMIC SETTING

California's broad system of strike-slip faulting has had a long and complex history. Some of these faults present a seismic hazard to the subject property. The most important of these are the San Andreas, Zayante, and San Gregorio faults and the Monterey Bay-Tularcitos fault zone (Figure 2). These faults are either active or considered potentially active (Buchanan-Banks et al., 1978; Burkland and Associates, 1975; Jennings et al., 1975; Greene, 1977; Hall et al., 1974; Schwartz et al., 1990, and Wallace, 1990; Working Group On Northern California Earthquake Potential [WGONCEP], 1996). Each fault is discussed below. Locations of epicenters associated with the faults are shown in Figure 3. The intensity of seismic shaking that could occur at the site in the event of a future earthquake on some of these faults will be discussed in a later section.

San Andreas Fault

The San Andreas fault is active and represents the major seismic hazard in northern California (Jennings, 1975; Buchanan-Banks et al., 1978; Hall et al., 1974). The main trace of the San Andreas fault trends northwest-southeast and extends over 700 miles from the Gulf of California through the Coast Ranges to Point Arena, where the fault extends offshore.

Geologic evidence suggests that the San Andreas fault has experienced right-lateral, strike-slip movement throughout the latter portion of Cenozoic time, with cumulative offset of hundreds of miles. Surface rupture during historical earthquakes, fault creep, and historical seismicity confirm that the San Andreas fault and its branches, the Hayward, Calaveras, and San Gregorio faults, are all active today.

Historical earthquakes along the San Andreas fault and its branches have caused significant seismic shaking in the Santa Cruz County area. The two largest historical earthquakes on the San Andreas to affect the area were the moment magnitude ($M_w$) 7.9 San Francisco earthquake of 18 April 1906 (actually centered near Olema) and the $M_w$ 6.9 Loma Prieta earthquake of 17 October.
1989. The San Francisco earthquake caused severe seismic shaking and structural damage to many buildings in the Santa Cruz Mountains. The Loma Prieta earthquake appears to have caused more intense seismic shaking than the 1906 event in localized areas of the Santa Cruz Mountains, even though its regional effects were not as extensive. There were also significant earthquakes in northern California along or near the San Andreas fault in 1838, 1865 and possibly 1890 (Sykes and Nishenko, 1984; WGONCEP, 1996).

Geologists have recognized that the San Andreas fault system can be divided into segments with "characteristic" earthquakes of different magnitudes and recurrence intervals (Working Group On California Earthquake Probabilities, 1988 and 1990). A more recent study by the Working Group On Northern California Earthquake Potential (WGONCEP) in 1996 has redefined the segments and the characteristic earthquakes for the San Andreas fault system in northern and central California. Two overlapping segments of the San Andreas fault system represent the greatest potential hazard to the subject property. The first segment is defined by the rupture that occurred from the Mendocino triple junction to San Juan Bautista along the San Andreas fault during the great $M_{w}$ 7.9 earthquake of 1906. The WGONCEP (1996) has hypothesized that this "1906 rupture" segment experiences earthquakes with comparable magnitudes in independent cycles about two centuries long.

The second segment is defined by the rupture zone of the $M_{w}$ 6.9 Loma Prieta earthquake, despite the fact that the oblique slip and focal depth of this event do not fit the typical, right-lateral strike-slip event on the San Andreas fault. Although it is uncertain whether this "Santa Cruz Mountains" segment has a characteristic earthquake independent of great San Andreas fault earthquakes, the WGONCEP (1996) has assumed an “idealized” earthquake of $M_{w}$ 7.0 with the same right-lateral slip as the 1989 Loma Prieta earthquake, but having an independent segment recurrence interval of 138 years and a multi-segment recurrence interval of 400 years.

**Zayante Fault**

The Zayante fault lies west of the San Andreas fault and trends about 50 miles northwest from the Watsonville lowlands into the Santa Cruz Mountains. The southern extension of the Zayante fault, known as the Vergeles fault, merges with the San Andreas fault south of San Juan Bautista.

The Zayante fault has a long, well-documented history of vertical movement (Clark and Reitman, 1973), probably accompanied by right-lateral, strike-slip movement (Hall et al., 1974; Ross and Brabb, 1973). Stratigraphic and geomorphic evidence indicates the Zayante fault has undergone late Pleistocene and Holocene movement and is potentially active (Buchanan-Banks et al., 1978; Coppersmith, 1979).

Some historical seismicity may be related to the Zayante fault (Griggs, 1973). For instance, the Zayante fault may have undergone sympathetic fault movement during the 1906 earthquake centered on the San Andreas fault, although this evidence is equivocal (Coppersmith, 1979). Seismic records strongly suggest that a section of the Zayante fault approximately 3 miles long underwent sympathetic movement in the 1989 earthquake. The earthquake hypocenters...
tentatively correlated to the Zayante fault occurred at a depth of 5 miles; no instances of surface rupture on the fault have been reported.

In summary, the Zayante fault should be considered potentially active. The WGONCEP (1996) considers it capable of generating a magnitude 6.8 earthquake with an effective recurrence interval of 10,000 years.

**San Gregorio Fault**

The San Gregorio fault, as mapped by Greene (1977), Weber and Lajoie (1974), and Weber et al. (1995) skirts the coastline of Santa Cruz County northward from Monterey Bay, and trends onshore at Point Año Nuevo. Northward from Año Nuevo, it passes offshore again, to connect with the San Andreas fault near Bolinas. Southward from Monterey Bay, it may trend onshore north of Big Sur (Greene, 1977), to connect with the Palo Colorado fault, or continue southward through Point Sur to connect with the Hosgri fault in south-central California. Based on these two proposed correlations, the San Gregorio fault zone has a length of at least 100 miles, and possibly as much as 250 miles.

The landward extension of the San Gregorio fault at Point Año Nuevo shows evidence of late Pleistocene (Jennings, 1975; and Buchanan-Banks et al., 1978) and Holocene displacement (Weber and Cotton, 1981). Although stratigraphic offsets indicate a history of horizontal and vertical displacements, the San Gregorio is considered predominantly right-lateral strike slip by most researchers (Greene, 1977; Weber and Lajoie, 1974; and Graham and Dickinson, 1978).

In addition to stratigraphic evidence for Holocene activity, the historical seismicity in the region is partially attributed to the San Gregorio fault (Greene, 1977). Due to inaccuracies of epicenter locations, even the magnitude 6+ earthquakes of 1926, tentatively assigned to the Monterey Bay fault zone, may have actually occurred on the San Gregorio fault (Greene, 1977).

The WGONCEP (1996) has divided the San Gregorio fault into the "San Gregorio" and "San Gregorio, Sur Region" segments. The segmentation boundary is located west of the Monterey Bay, where the fault appears to have a right step-over. The San Gregorio fault has been assigned a slip rate that results in a Mw 7.3 earthquake with a recurrence interval of 400 years. This is based on the preliminary results of a paleoseismic investigation at Seal Cove by Lettis and Associates (see WGONCEP, 1996), and on regional mapping by Weber et al. (1995). The Sur Region segment has been assigned a slip rate that results in a Mw 7.0 earthquake with an effective recurrence interval of 400 years (coincidental with respect to the recurrence interval for the other segment). The Sur Region earthquake was derived from an assumed slip rate similar to that of the Hosgri fault.

**Monterey Bay-Tularcitos Fault Zone**

The Monterey Bay-Tularcitos fault zone is 6 to 9 miles wide, about 25 miles long, and consists of many en échelon faults identified during shipboard seismic reflection surveys (Greene, 1977).
The fault zone trends northwest-southeast and intersects the coast in the vicinity of Seaside and Ford Ord. At this point, several onshore fault traces have been tentatively correlated with offshore traces in the heart of the Monterey Bay-Tularcitos fault zone (Greene, 1977; Clark et al., 1974; Burkland and Associates, 1975). These onshore faults are, from southwest to northeast, the Tularcitos-Navy, Berwick Canyon, Chupines, Seaside, and Ord Terrace faults. Only the larger of these faults, the Tularcitos-Navy and Chupines, are shown on Figure 2. It must be emphasized that these correlations between onshore and offshore portions of the Monterey Bay-Tularcitos fault zone are only tentative; for example, no concrete geologic evidence for connecting the Navy and Tularcitos faults under the Carmel Valley alluvium has been observed, nor has a direct connection between these two faults and any offshore trace been found.

Outcrop evidence indicates a variety of strike-slip and dip-slip movement associated with onshore and offshore traces. Earthquake studies suggest the Monterey Bay-Tularcitos fault zone is predominantly right-lateral, strike-slip in character (Greene, 1977). Stratigraphically, both offshore and onshore fault traces in this zone have displaced Quaternary beds and, therefore, are considered potentially active (Buchanan-Banks et al., 1978). One offshore trace, which aligns with the trend of the Navy fault, has displaced Holocene beds and is therefore active by definition (Buchanan-Banks et al., 1978).

Seismically, the Monterey Bay-Tularcitos fault zone may be historically active. The largest historical earthquakes tentatively located in the Monterey Bay-Tularcitos fault zone are two events, estimated at 6.2 on the Richter Scale, in October 1926 (Greene, 1977). Because of possible inaccuracies in locating the epicenters of these earthquakes, it is possible that they actually occurred on the nearby San Gregorio fault zone (Greene, 1977).

Another earthquake in April 1890 might be attributed to the Monterey Bay-Tularcitos fault zone (Burkland and Associates, 1975); this earthquake had an estimated Modified Mercalli Intensity of VII (Table 1) for Monterey County on a whole.

The WGONCEP (1996) has assigned an earthquake of $M_w$ 7.1 with an effective recurrence interval of 2,600 years to the Monterey Bay-Tularcitos fault zone, based on Holocene offshore offsets. Petersen et al. (1996) have a similar earthquake magnitude, but for a recurrence interval of 2,841 years. Their earthquake is based on a composite slip rate of 0.5 millimeters per year (after Rosenberg and Clark, 1995).
<table>
<thead>
<tr>
<th>Roman Numeral</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not felt by people, except rarely under especially favorable circumstances.</td>
</tr>
<tr>
<td>II</td>
<td>Felt indoors only by persons at rest, especially on upper floors. Some hanging objects may swing.</td>
</tr>
<tr>
<td>III</td>
<td>Felt indoors by several. Hanging objects may swing slightly. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.</td>
</tr>
<tr>
<td>IV</td>
<td>Felt indoors by many, outdoors by few. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing automobiles rock. Windows, dishes, doors rattle. Wooden walls and frame may creak.</td>
</tr>
<tr>
<td>V</td>
<td>Felt indoors and outdoors by nearly everyone; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset; some dishes and glassware broken. Doors swing; shutters, pictures move. Pendulum clocks stop, start, change rate. Swaying of tall trees and poles sometimes noticed.</td>
</tr>
<tr>
<td>VII</td>
<td>Difficult to stand. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in badly designed or poorly built buildings. Noticed by drivers of automobiles. Hanging objects quiver. Furniture broken. Weak chimneys broken. Damage to masonry; fall of plaster, loose bricks, stones, tiles, and unbraced parapets. Small slides and caving in along sand or gravel banks. Large bells ring.</td>
</tr>
<tr>
<td>VIII</td>
<td>People frightened. Damage slight in specially designed structures; considerable in ordinary substantial buildings, partial collapse; great in poorly built structures. Steering of automobiles affected. Damage or partial collapse to some masonry and stucco. Failure of some chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed pilings broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.</td>
</tr>
<tr>
<td>IX</td>
<td>General panic. Damage considerable in specially designed structures; great in substantial buildings, with some collapse. General damage to foundations; frame structures, if not bolted, shifted off foundations and thrown out of plumb. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground; liquefaction.</td>
</tr>
<tr>
<td>XII</td>
<td>Damage nearly total. Waves seen on ground surfaces. Large rock masses displaced. Lines of sight and level distorted. Objects thrown upward into the air.</td>
</tr>
</tbody>
</table>
SITE GEOLOGIC SETTING

The Geologic Map, Cross Sections And Landslide Hazard Cross Sections (Plate 1) depict relevant topographic and geologic information for the property. See also the Local Geologic Map (Figure 4) and Landslide Map (Figure 5) for information of a more general nature.

Topography

The western edge of the subject property is occupied by a gently sloping surface that rolls off steeply to the east, toeing out into gentler valley-bottom terrain near the eastern edge of the property (Figure 1; Plate 1). Total vertical relief across the property is approximately 55 feet, with slopes as steep as 33 degrees.

Drainage

Natural surface drainage across the property occurs by overland sheet flow to the east toward the valley bottom terrain. Some of the rainfall on the property probably infiltrates the ground and enters the groundwater regime. We did not observe seeps, springs or any other surface manifestations of high groundwater levels on the property during our field investigation or in the exploratory borings advanced by Bauldry Engineering.

Earth Materials

Clark (1981) and Brabb et al. (1997) mapped the property as being underlain by Santa Margarita Sandstone (Figure 4). This previous work is partially consistent with observations made during our field reconnaissance and with the exploratory borings advanced by Bauldry Engineering.

It appears that the property is primarily underlain by Santa Margarita Sandstone at depth, which in turn is overlain by a number of surficial earth material units: colluvium, alluvial fan deposits, and artificial fill.

Santa Margarita Sandstone

The Santa Margarita Sandstone encountered in the exploratory borings on the property and exposed in the steep slope on the western side of Blueberry Drive closely matches the description given by Clark (1981) for the upper section of the formation:

“The Santa Margarita is typically very thick-bedded to massive, thickly crossbedded, well-sorted, slightly granular medium to fine arkosic sand (fig. 6). In fresh exposures the sand is yellowish gray but appears brilliant white along ridges.”

The lithology of the Santa Margarita Sandstone encountered in the exploratory borings and outcrops along Blueberry Drive is a fine to medium grained, well sorted (poorly graded), subrounded, massive, friable sandstone. Bedding measured in the outcrop along Blueberry Drive
dips approximately several degrees to the east. Depths to the Santa Margarita Sandstone in the proposed development area range between 11 and 39 feet below the ground surface (Plate 1).

**Colluvium**

The package of mixed sand, gravel, silt and clay that lies unconformably upon the Santa Margarita Sandstone on the property is likely colluvium (Plate 1). This deposit is relatively unconsolidated, and contains angular sand and gravel sized fragments of mudstone, as well as fine to medium grained sand sized particles of subrounded quartz. We have interpreted this unit as being deposited by slow downslope creep. The formational source of this deposit is evidently the Santa Margarita Sandstone and the Santa Cruz Mudstone (which conformably overlies the Santa Margarita Sandstone well above the subject property - see Figure 4), based on the abundance of quartz grains and angular mudstone fragments.

The contact between the Colluvium and Santa Margarita Sandstone is gently sloping along the western edge of the property, and then plunges downward to the east (see Plate 1). We considered the possibility that the geometry of this contact was indicative of landsliding within the Santa Margarita Sandstone and Colluvium, and closely scrutinized the samples taken by Bauldry Engineering in the field for evidence of shearing. No shears or preferential partings (indicative of shearing) were observed in any of the samples obtained from the exploratory borings advanced by Bauldry Engineering, including borings B-1 and B-3, which were continuously sampled across the entire thickness of Colluvium. Hence it is our opinion that the Colluvium was deposited through the process of slow downslope creep, and not catastrophic landsliding. Additionally, we noted that the landform upon the property is not consistent with landforms typical of landslide terrain, particularly when viewed upon the sundry historical aerial photographs.

**Alluvium**

We have mapped a unit labeled as Alluvium upon Plate 1. This unit wasn’t encountered during any of the subsurface work, although surface exposures of the unit reveal a loose, silty, fine- to medium-grained sand. This unit is in essence a “geomorphic” unit, and is distinguished solely upon the basis of its position in the valley-bottom terrain present along the eastern edge of the property. We have portrayed the unit as interfingering with the Colluvium, but hasten to add that this interpretation is conjectural at best.

**Alluvial Fan**

The deposit that overlies the Colluvium is labeled Alluvial Fan. It is comprised of a loose, fine to medium grained, well sorted (poorly graded) sand containing angular fragments of Santa Cruz Mudstone as large as two inches in diameter. This deposit may have been laid down by gentle deposition or slow downslope creep (which would technically make it colluvium) resulting from the slow retreat of the slope underlain by Santa Margarita Formation. The presence of angular Santa Cruz Mudstone fragments indicates that the Santa Cruz Mudstone portion of the slope was
still retreating, although at a somewhat slower rate, and the fragments were incorporated into the
unit as it washed and crept downslope. Thickness of the unit across the property is variable, but
it appears to be as thick as 16 feet under the proposed development area.

Artificial Fill

The artificial fill on the property is composed of a loose, fine to medium grained sand to silty
sand containing scattered angular fragments of gravel sized Santa Cruz Mudstone, ellipsoidal-
shaped clay “blebs”, some organics and an occasional granitic drain rock fragment. The
distinction between the Artificial Fill and Alluvial Fan was based upon the presence or absence
of incidental rock fragments and organics, and a slightly mixed appearance (within the artificial
fill). This unit appears to have laid out upon an existing “shelf”, with a thickness varying
between 7 and 9 feet.

It is important to note that the distinction made between the Artificial Fill and Alluvial Fan units
is strictly academic at this juncture, and doesn’t have much bearing upon the engineering design
of foundations or grading upon the site, since it appears that both units have very similar relative
densities and engineering characteristics.

GEOLOGIC HAZARDS

In our opinion, the potential geologic hazards that could affect the proposed developments are
landsloiding and intense seismic shaking. The following sections address these hazards.

Landsloiding

The primary type of landsloiding that may occur on the property is formally known as a dry, open-
slope sand flow (after Cruden and Varnes, 1996). The loose granular materials within the
Artificial Fill and Alluvial Fan units may fail as a sheet with spatially continuous movement,
containing closely spaced, short-lived surfaces of shear, and a mass resembling a viscous liquid.
We consider the potential for this type of slope movement to occur over the design life of the
proposed residence to be moderate to high. The basis of this opinion is as follows:

1. The existing residence on the adjacent northern property, 205 Blueberry Drive, was damaged
during the 1989 Loma Prieta earthquake. The project geotechnical engineer, Haro, Kasunich and
Associates (HKA), concluded that the most of the earthquake related distress was due to “either
direct ground shaking or from lateral spreading and subsidence...” (HKA, 1989). Although the
description of the damaging process isn’t precisely identical to ours, it is likely just a conflict of
semantics. It appears that the process of lateral spreading and subsidence they were describing
was in fact the process of the underlying loose sand moving downslope during the intense
seismic shaking generated by the 1989 Loma Prieta earthquake.
2. The geologic and geotechnical engineering setting on the subject property is very similar to that of the neighboring property on 205 Blueberry Drive, consisting of loose surficial materials overlying the relatively denser, intact Santa Margarita Sandstone.

3. The loose, fine- to medium-grained sand underlying the steep slope on the property is at the angle of repose (approximately 33 to 35 degrees slope angle) for that material.

4. The subject property is likely to experience seismic shaking of a similar (or greater) intensity and duration within the design life of the proposed residence.

*If left unmitigated*, the resulting risk accompanying the aforementioned landslide hazard is greater than an “ordinary” risk as defined in Appendix B. We have subsequently plotted an “Area Of Earth Materials That Will Potentially Flow” on the cross sections (Plate 1) to take this potential into account. In our opinion, the risk related to the landslide hazard may be reduced to “ordinary”, if the proposed development is adequately engineered and constructed with our “Area Of Earth Materials That Will Potentially Flow” in mind.

An oversight of geologically viable mitigation schemes follows. We recommend that the property owner, project engineers and designers consider at least one of three mitigation paths.

The first path involves removing the earth materials labeled as “Area Of Earth Materials That Will Potentially Flow” (Plate 1) altogether from the property, and retaining any resulting oversteepened slopes or replacing the graded-out materials with engineered fill. If there is a net loss of earth materials at the top of the slope due to grading, this will have the effect of removing the surcharge load of earth materials at the top of the wedge of loose sand underlying the steep slope on the property, thereby lowering the likelihood (or at the very least raising the threshold) of future failures.

The second path is to pursue an engineering mitigation that will essentially “anchor” the residence to the stable earth materials below the “Area Of Earth Materials That Will Potentially Flow” with a deep foundation system, allowing the residence to remain standing, undamaged, in the event a future intense seismic shaking event should cause the loose sand to move downslope. Such a mitigation must involve a careful analysis of our geologic cross sections, as well as the forces that might act upon deep foundation systems, such as piers, if the column of loose sand identified upon our cross sections (Plate 1) were to move downslope. Solely pursuing this mitigation may have some minor effect of lowering the likelihood of future failures, depending upon the type of deep foundation system, although it is more likely that the effect on future slope failures will be negligible, particularly in the case of piers, since the loose sand will simply flow around the foundation.

The third path involves a hybrid of the two prior mitigation recommendations; remove some of the “Area Of Earth Materials That Will Potentially Flow”, and construct a deep foundation system designed to allow the residence to remain undamaged if the column of loose sand moves downslope. Similar to first suggested path, this hybrid will have the net effect of lowering the
likelihood (or at the very least raising the threshold) of future failures, if there is a net loss of earth materials at the top of the slope due to grading.

During our interim meetings with the project geotechnical engineer, Brian Bauldry of Bauldry Engineering, and the designer, Dennis Norton, the design deemed most economical for this project was the hybrid path, involving excavation of a portion of the loose sand, followed by the anchoring of the residence into the stable earth materials at depth with a series of deep piers.

Regardless of the mitigation, we recommend that engineers consider effects of intense seismic shaking. The following section summarizes the results of our deterministic seismic shaking analysis.

**Deterministic Seismic Shaking Analysis**

For the purpose of evaluating deterministic peak ground accelerations for the site, we have considered two seismic sources: the San Andreas and Zayante faults. While other faults or fault zones in this region may be active, their potential contribution to deterministic seismic hazards at the site is overshadowed by these two faults.

Table 2 shows the moment magnitude of characteristic or maximum earthquakes, estimated recurrence interval and the distance from the site for each of these fault systems. We took the fault data from "Database of potential sources for earthquakes larger than magnitude 6 in Northern California" (WGONCEP, 1996) and Petersen et al. (1996). Also shown on Table 2 are calculated on-site accelerations from the listed earthquakes derived using alternative methods. These accelerations are based on attenuation relationships derived from the analysis of historical earthquakes. Because the historical data can be interpreted in different ways, there are a number of different attenuation relationships available. We have employed two fairly conservative attenuation relationships for rock/shallow soil sites in deriving the acceleration values listed in Table 2. As can be seen in the table, the results from these attenuation curves are somewhat similar.

The "maximum considered earthquake ground motion," as defined by FEMA (1998), is also listed in Table 2. FEMA (1998) and the National Earthquake Hazards Reduction Program suggest that in regions of high seismicity, such as coastal California, the appropriate design level for ground shaking is the deterministically derived mean peak horizontal ground acceleration multiplied by 1.5. Applying this method to the subject property results in ground shaking parameters roughly equivalent to the deterministically derived mean values plus one dispersion.

If the deterministically derived accelerations are used for engineering analysis on the subject property, we recommend utilizing the attenuation relationship developed by Abrahamson and Silva (1997). Although the different authors arrived at their values using slightly different techniques of analysis, the end results are roughly the same, as may be noted from Table 2. It is important to note that predicting seismic shaking intensity is a field that is dominated heavily by theory, with a paucity of near-field station readings in rock and shallow soil settings. It should...
also be noted that the accelerations listed in Table 2 are only average values. Therefore, we caution that the listed values are approximations, rather than precise predictions. Actual measured "free-field" accelerations may be larger.

### Table 2

<table>
<thead>
<tr>
<th>Fault</th>
<th>Moment Magnitude of Characteristic or Maximum Earthquake (M&lt;sub&gt;s&lt;/sub&gt;)</th>
<th>Estimated Recurrence Interval (years)</th>
<th>Distance from Site (km)</th>
<th>Estimated Mean Peak Ground Acceleration (g)</th>
<th>Estimated Mean + One Dispersion Ground Acceleration (g)</th>
<th>Maximum Considered Earthquake Ground Motion (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Andreas (1906 rupture)</td>
<td>7.9</td>
<td>210</td>
<td>13.2</td>
<td>0.39&lt;sup&gt;1&lt;/sup&gt; 0.42&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.60&lt;sup&gt;1&lt;/sup&gt; 0.61&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.58&lt;sup&gt;1&lt;/sup&gt; 0.62&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Zayante</td>
<td>6.8</td>
<td>10,000</td>
<td>7.8</td>
<td>0.43&lt;sup&gt;1&lt;/sup&gt; 0.41&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.67&lt;sup&gt;1&lt;/sup&gt; 0.63&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.64&lt;sup&gt;1&lt;/sup&gt; 0.61&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> Abrahamson and Silva, 1997  
<sup>2</sup> Sadigh et al., 1997  
<sup>3</sup> FEMA, 1998

Based on the results listed in Table 2, the estimated mean peak ground acceleration expected at the subject property will be 0.43g, the maximum earthquake ground motion (mean acceleration plus one dispersion) expected at the subject property will be approximately 0.67g, based on a M<sub>s</sub> 6.8 earthquake centered on the Zayante fault, 7.8 kilometers northeast of the site.

Naeim and Anderson (1993) found that "effective peak acceleration" (EPA) is more typically about 75 percent of the peak acceleration. Effective peak acceleration is comparable to "repeatable high ground acceleration" (after Ploessel and Slossen, 1974) and is generally considered to represent the large number of lower amplitude peaks on an accelerogram recording. This suggests that the mean peak horizontal ground acceleration of 0.43 g would generate an EPA of approximately 0.32 g.

The duration of strong shaking is dependent on magnitude. Dobry et al. (1978) have suggested a relationship between magnitude and duration of "significant" or strong shaking expressed by the formula:

\[ \text{Log } D = 0.432 \times M - 1.83 \]  

(where D is the duration and M is the magnitude).

On the basis of the above relationship, the duration of strong shaking associated with a magnitude 6.8 earthquake (the maximum earthquake for the Zayante fault) is estimated to be about 13 seconds. In contrast, the duration of strong shaking associated with a magnitude 7.9 earthquake (the characteristic earthquake for the San Andreas fault) is estimated to be about 38 seconds. Considering the recurrence intervals of the San Andreas and Zayante faults, the existing residence is much more likely to experience the characteristic event on the San Andreas fault.
with lower peak accelerations than the design earthquake on the Zayante fault but lasting about three times as long (see Table 2). Bear in mind that the duration of strong seismic shaking may be even more critical as a design parameter than the peak acceleration itself.

REVIEW OF PRELIMINARY DESIGN PLANS

We have reviewed a set of preliminary building plans prepared by Dennis Norton - Home Design And Project Planning including the following sheets: “Topo, Grading & Drainage Plan”, Sheet 2a, revised 16 May 2002, “Slope Analysis”, Sheet 2b, revised 19 May 2002; and “213 Blueberry Drive - S.V. - Elevations”, Sheet 5A, “Elevations”, Sheet 5b and “Elevations”, Sheet 5c, drawn 16 December 2002. The plans portray a residence located near the top of the steep slope, nestled into a cut pad. The cut is portrayed as a 13 to 14 foot high compound sloping and retained cut slope. The retained portion is located along the western edge of the lower floor, and is about 8 to 9 feet high. No foundation details were available at this time, but it is our understanding that Dennis Norton is working closely with the project geotechnical and structural engineers to develop a foundation that will take our “Area Of Earth Materials That Will Potentially Flow” shown on Plate 1 into account. It also appears that surface water drainage collected by the residence will be directed onto Blueberry Drive.

The net effect of the proposed grading plan, as in the prior “Landsliding” section will be to remove a portion of the surcharge load of earth materials at the top of the wedge of loose sand underlying the steep slope on the property, thereby lowering the likelihood (or at the very least raising the threshold) of future failures. Additionally, issuing surface water drainage onto Blueberry Drive will serve to improve any drainage or erosion problems that might exist on the property. In essence, the project will improve the existing slope conditions, as it is currently proposed. Although we haven’t assessed the potential geologic hazards and attendant risks posed to existing residences downslope from the subject property by landsliding and drainage issues, we feel it is fair to say that the proposed development will lower the potential for those hazards to impact the residences in the future.

CONCLUSIONS

Based on the information gathered and analyzed, it is our opinion that the proposed development is geologically suitable, provided our recommendations are followed. Residential development on the subject property will be subject to “ordinary risks” as defined in Appendix B. Appendix B should be reviewed in detail by the developer and all property owners to determine whether an "ordinary" risk as defined in the appendix is acceptable. If this level of risk is unacceptable to the developer and the property owners, then the geologic hazards in question should be mitigated to reduce the corresponding risks to an acceptable level.

The primary type of landsliding that may occur on the property is formally known as a dry, open-slope sand flow (after Cruden and Varnes, 1996). We consider the potential for this type of slope movement to occur over the design life of the proposed residence to be moderate to high. **If left unmitigated**, the resulting risk accompanying the aforementioned landslide hazard is greater than
an “ordinary” risk as defined in Appendix B. We have subsequently plotted an “Area Of Earth Materials That Will Potentially Flow” on the cross sections (Plate 1) to take this potential hazard into account. In our opinion, the risk related to the landslide hazard may be reduced to “ordinary”, if the proposed development is adequately engineered and constructed with our “Area Of Earth Materials That Will Potentially Flow” in mind.

The subject property is located in an area of high seismic activity and will be subject to strong seismic shaking in the future. Modified Mercalli Intensities of IX are possible. The controlling seismogenic source for the subject property is the Zayante fault, 7.8 kilometers to the northeast. The design earthquake on this fault should be a $M_w$ 6.8. Deterministic analysis for the site yields a mean peak ground acceleration of 0.43 g (which in turn yields an EPA of 0.32) and a mean peak ground acceleration plus one dispersion of 0.67 g. Expected duration of strong shaking for this event is about 13 seconds. Considering the recurrence intervals of the San Andreas and Zayante faults, the existing residence is much more likely to experience the characteristic event on the San Andreas fault, with lower peak accelerations than the design earthquake on the Zayante fault but lasting about three times as long (see Table 2). Bear in mind that the duration of strong seismic shaking may be even more critical as a design parameter than the peak acceleration itself.

**RECOMMENDATIONS**

1. We recommend the project geotechnical and structural engineers evaluate our report and the accompanying maps and cross sections and pursue a course of mitigation that will lower the risk to the proposed development due to the landsliding to an “ordinary” risk (as defined in Appendix B). We recommend that the property owner consider at least one of three primary mitigation paths.

The first path involves grading out the earth materials labeled as “Area Of Earth Materials That Will Potentially Flow” (Plate 3) and retaining any resulting oversteepened slopes or replacing the graded-out materials with engineered fill. If there is a net loss of earth materials at the top of the slope due to grading, this will have the effect of removing the surcharge load of earth materials at the top of the wedge of loose sand underlying the steep slope on the property, thereby lowering the likelihood (or at the very least raising the threshold) of future failures.

The second path is to pursue an engineering mitigation that will essentially “anchor” the residence to the stable earth materials below the “Area Of Earth Materials That Will Potentially Flow” with a deep foundation system, allowing the residence to remain standing, undamaged, in the event a future intense seismic shaking event should cause the loose sand to move downslope. Such a mitigation must involve a careful analysis of our geologic cross sections, as well as the forces that might act upon deep foundation systems, such as piers, if the column of loose sand identified upon our cross sections (Plate 1) were to move downslope. Solely pursuing this mitigation may have some minor effect of lowering the likelihood of future failures, depending upon the type of deep foundation system, although it is more likely that the effect upon future
slope failures will be negligible, particularly in the case of piers, since the loose sand will simply flow around the foundation.

The third path involves a hybrid of the two prior mitigation recommendations; remove some of the “Area Of Earth Materials That Will Potentially Flow”, and construct a deep foundation system designed to allow the residence to remain undamaged if the column of loose sand moves downslope. Similar to first suggested path, this hybrid will have the net effect of lowering the likelihood (or at the very least raising the threshold) of future failures, if there is a net loss of earth materials at the top of the slope due to grading.

2. The project engineers should consider our deterministic analysis for the site yielding an effective peak acceleration (EPA) of 0.32 g, a mean peak ground acceleration of 0.43 g, and a mean peak ground acceleration plus one dispersion of 0.67 g.

3. Aside from the mitigation schemes recommended above, we recommend that all drainage from improved surfaces such as walkways, patios, roofs and driveways be collected in impermeable gutters or pipes and carried to Blueberry Drive. At no time should any concentrated discharge be allowed to spill directly onto the ground adjacent to the residence, nor should it be discharged onto the steep slope below the proposed development.

4. We request the privilege of reviewing all new geotechnical engineering reports and civil engineering and architectural plans pertaining to the proposed development.

5. We recommend that Nolan, Zinn and Associates be retained to inspect all cuts made during grading for the foundation, prior to construction of the footings.

INVESTIGATION LIMITATIONS

1. The conclusions and recommendations noted in this report are based on probability and in no way imply the site will not possibly be subjected to ground failure or seismic shaking so intense that structures will be severely damaged or destroyed. The report does suggest that pursuing mitigation measures structures at the subject site, in compliance with the recommendations noted in this report, will result in an "ordinary" risk to the residence as defined in Appendix B.

2. This report is issued with the understanding that it is the duty and responsibility of the owner or his representative or agent to ensure that the recommendations contained in this report are brought to the attention of the architect and engineer for the project, incorporated into the plans and specifications, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. If any unexpected variations in soil conditions or if any undesirable conditions are encountered during construction or if the proposed construction will differ from that planned at the present time, Nolan, Zinn and Associates should be notified so that supplemental recommendations can be given.

Nolan, Zinn And Associates
REFERENCES

Aerial Photographs

<table>
<thead>
<tr>
<th>DATE FLOWN</th>
<th>FLIGHT LINE</th>
<th>PHOTO NUMBERS</th>
<th>PRINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942</td>
<td>CJA-1B</td>
<td>42 &amp; 43</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>5/5/48</td>
<td>CDF5-2</td>
<td>117 &amp; 118</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>5/5/56</td>
<td>CJA 4R</td>
<td>86 &amp; 87</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>5/16/68</td>
<td>GS-VBZK</td>
<td>172-174</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>10/14/75</td>
<td>SCZCO 2</td>
<td>101 &amp; 102</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>01/08/82</td>
<td>USGS JSC 8</td>
<td>5-7</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>6/17/89</td>
<td>WAC - 89 CA</td>
<td>48 &amp; 49</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>6/22/94</td>
<td>15</td>
<td>8 &amp; 9</td>
<td>Black &amp; white</td>
</tr>
<tr>
<td>9/20/97</td>
<td>WAC-97CA 15</td>
<td>38 &amp; 39</td>
<td>Black &amp; white</td>
</tr>
</tbody>
</table>

Maps and Reports


Burkland and Associates, 1975, Geotechnical study for the seismic safety element, prepared for the Planning Department, Monterey County, California, 125 p.
City of Scotts Valley Planning and Building Department, 2002, Re: 213 Blueberry Drive - Preliminary plan revisions, unpublished agency letter.


Clark, J.C., Dibblee, T.W., Jr., Greene, H.G., and Bowen, O.E., Jr., 1974, Preliminary geologic map of the Monterey and Seaside 7.5 Minute Quadrangles, Monterey County, California, with emphasis on active faults, U.S. Geological Survey Miscellaneous Field Studies Map MF-577, 2 sheets, scale 1:24,000.


Cooper-Clark and Associates, 1975, Preliminary map of landslide deposits in Santa Cruz County, California, in Seismic safety element, an element of the Santa Cruz County General Plan; Santa Cruz Country Planning Dept., California, scale 1:62,500.


E2C, 1999, Geotechnical and geological investigation for proposed single family residence, 213 Blueberry Court, Scotts Valley, California, job number 1262SCO1, unpublished consultant report.


E,C, 2002, Subject: Plan review - 213 Blueberry Drive - Scotts Valley, California, job number 1262SCO1, unpublished consultant letter.


Haro, Kasunich and Associates, 1990, Preliminary geotechnical design criteria, job number SC2353, unpublished consultant letter.

Haro, Kasunich and Associates, 1989, Geotechnical investigation for 205 Blueberry Drive, Scotts Valley, California, job number SC2353, unpublished consultant report.


JCP, 1990, Geotechnical services performed at 205 Blueberry Drive, Scotts Valley, California APN 021-102-06, project number JCP-2763, unpublished consultant report.

Jennings, C.W. et al., 1975, Fault map of California, California Division of Mines and Geology, California Geologic Data Map Series, map no. 1.
Lawson, A.C. et al., 1908, The California Earthquake of April 18, 1906, Report of the State
Earthquake Investigation Commission, Carnegie Institute of Washington, Publication 87,
2 v., 600 p.

Naeim, F., and Anderson, J.C., 1993, Classification and evaluation of earthquake records for
design, The 1993 NEHRP professional fellowship report, Earthquake Engineering
Institute, 288 p.

variance - Stepping of house, unpublished consultant letter.

Pacific Crest Engineering, 2002, Subject: June 11, 2002 E.C letter - Geotechnical peer review -
213 Blueberry Drive - Scotts Valley, California, unpublished consultant letter, Job
number 0042-SZ50-H14.

Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D.,
assessment for the State of California, California Division of Mines and Geology Open-

Ploessel, M.R., and Slossen, J.E., 1974, Repeatable high ground accelerations from earthquakes,
California Geology, v. 27, p. 195-199.

Rosenberg, L.I., and Clark, J.C., 1995, Quaternary faulting of the greater Monterey area,

Ross, D.C., and Brabb, E.E., 1973, Petrography and structural relations of granitic basement
rocks in the Monterey Bay area, California, U. S. Geological Survey Journal of Research,
v. 1, p. 273-282.

relationships for shallow crustal earthquakes based on California strong motion data,

Schwartz, D.P., Prentice, C.S., and Fumal, T., 1990, Geologic constraints on earthquake
recurrence models, Santa Cruz Mountains segment, San Andreas fault zone, EOS,
Transactions of the American Geophysical Union, v. 71, p. 1461.

Stover, C.W., Reagor, B.G., Baldwin, F.W., and Brewer, L.R., 1990, Preliminary isoseismal map
for the Santa Cruz (Loma Prieta), California, earthquake of October 18, 1989 UTC, U. S.


APPENDIX A

FIGURES
Figure 1

Job #02040-SC

Topographic Index Map
Lands Of Zamani
213 Blueberry Drive
Scotts Valley, California

Base Map: Felton, California U.S. Geological Survey
7.5' quadrangle, 1955, scale: 1"=2000'

Nolan, Zinn, and Associates

- Engineering Geology
- Coastal Geology
- Hydrogeology
EXPLANATION

ROCK UNITS

Quaternary Sediments - marine and nonmarine deposits, some Pliocene and Pleistocene nonmarine deposits

Tertiary Sediments - marine and nonmarine deposits, some volcanics

Cretaceous and Tertiary-Cretaceous Sediments - Upper and Lower Cretaceous marine sediments, some Tertiary-Cretaceous marine sediments

Basement Rocks

Franciscan Complex - Cretaceous and Jurassic sediments, fragmented and sheared melange, some metamorphic and ultramafic rocks

Plutonic, Igneous and Metamorphic Rocks - Mesozoic granitic rocks, Paleozoic or Mesozoic and Precambrian schists, pre-Cenozoic metasedimentary and metavolcanic rocks, minor Paleozoic or Mesozoic limestone

SYMBOLS

Geologic boundary

Fault trace

Regional Seismicity Map
Lands of Zamani
213 Blueberry Drive
Scotts Valley, California

FIGURE #
3
JOB #
02040-SC

Intensities

III - V
VI - VIII
IX - XII

Earthquake epicenters plotted by National Geophysical Data Center / NOAA, Boulder, Colorado

Magnitudes

3.5 - 4.9
5.0 - 6.0
6.1 - 7.0
> 7.0

Scale : 1 inch = 15 miles

Nolan, Zinn, and Associates

+ Engineering Geology
+ Coastal Geology
+ Hydrogeology
EXPLANATION

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qal</td>
<td>Alluvial deposits</td>
</tr>
<tr>
<td>Tsm</td>
<td>Santa Margarita Sandstone</td>
</tr>
<tr>
<td>Tsc</td>
<td>Santa Cruz Mudstone</td>
</tr>
<tr>
<td>Tp</td>
<td>Purisima Formation</td>
</tr>
<tr>
<td>qd</td>
<td>quartz diorite</td>
</tr>
</tbody>
</table>

- Earth materials contact
- Bedding attitude; broken where estimated

FIGURE 5
JOB 02040-SC
Santa Cruz County Landslide Map
Lands of Zamani
213 Blueberry Drive
Scotts Valley, California

EXPLANATION

- Landslide deposit; d=definite landslide, p=possible landslide, ?= questionable landslide
- Landslide escarpment
- Small landslide deposit and gully
- Soil creep

Base Map: "Preliminary Map of Landslide Deposits In Santa Cruz County, California," by Cooper-Clark and Associates, 1975, Scale 1:62,500 (compilation map scale 1:24,000).
APPENDIX B

SCALE OF ACCEPTABLE RISKS FROM GEOLOGIC HAZARDS
## SCALE OF ACCEPTABLE RISKS FROM SEISMIC GEOLOGIC HAZARDS

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Structure Types</th>
<th>Extra Project Cost Probably Required to Reduce Risk to an Acceptable Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely low¹</td>
<td>Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.</td>
<td>No set percentage (whatever is required for maximum attainable safety).</td>
</tr>
<tr>
<td>Slightly higher than under &quot;Extremely low&quot; level.¹</td>
<td>Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.</td>
<td>5 to 25 percent of project cost.²</td>
</tr>
<tr>
<td>Lowest possible risk to occupants of the structure.³</td>
<td>Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.</td>
<td>5 to 15 percent of project cost.⁴</td>
</tr>
<tr>
<td>An &quot;ordinary&quot; level of risk to occupants of the structure.⁵</td>
<td>The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.</td>
<td>1 to 2 percent of project cost, in most cases (2 to 10 percent of project cost in a minority of cases).⁴</td>
</tr>
</tbody>
</table>

1 Failure of a single structure may affect substantial populations.

2 These additional percentages are based on the assumptions that the base cost is the total cost of the building or other facility when ready for occupancy. In addition, it is assumed that the structure would have been designed and built in accordance with current California practice. Moreover, the estimated additional cost presumes that structures in this acceptable-risk category are to embody sufficient safety to remain functional following an earthquake.

3 Failure of a single structure would affect primarily only the occupants.

4 These additional percentages are based on the assumption that the base cost is the total cost of the building or facility when ready for occupancy. In addition, it is assumed that the structures would have been designed and built in accordance with current California practice. Moreover the estimated additional cost presumes that structures in this acceptable-risk category are to be sufficiently safe to give reasonable assurance of preventing injury or loss of life during and following an earthquake, but otherwise not necessarily to remain functional.

5 "Ordinary risk": Resist minor earthquakes without damage: resist moderate earthquakes without structural damage, but with some non-structural damage; resist major earthquakes of the intensity or severity of the strongest experienced in California, without collapse, but with some structural damage as well as non-structural damage. In most structures it is expected that structural damage, even in a major earthquake, could be limited to repairable damage. (Structural Engineers Association of California)

### SCALE OF ACCEPTABLE RISKS FROM NON-SEISMIC GEOLOGIC HAZARDS

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Structure Type</th>
<th>Risk Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely low risk</td>
<td>Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.</td>
<td>1. Failure affects substantial populations, risk nearly equals nearly zero.</td>
</tr>
<tr>
<td>Very low risk</td>
<td>Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.</td>
<td>1. Failure affects substantial populations. Risk slightly higher than 1 above.</td>
</tr>
<tr>
<td>Low risk</td>
<td>Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.</td>
<td>1. Failure of a single structure would affect primarily only the occupants.</td>
</tr>
<tr>
<td>&quot;Ordinary&quot; risk</td>
<td>The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.</td>
<td>1. Failure only affects owners /occupants of a structure rather than a substantial population.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. No significant potential for loss of life or serious physical injury.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Risk level is similar or comparable to other ordinary risks (including seismic risks) to citizens of coastal California.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. No collapse of structures; structural damage limited to repairable damage in most cases. This degree of damage is unlikely as a result of storms with a repeat time of 50 years or less.</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>Fences, driveways, non-habitable structures, detached retaining walls, sanitary landfills, recreation areas and open space.</td>
<td>1. Structure is not occupied or occupied infrequently.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Low probability of physical injury.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Moderate probability of collapse.</td>
</tr>
</tbody>
</table>

6. Non-seismic geologic hazards include flooding, landslides, erosion, wave runup and sinkhole collapse
**EXPLANATION**

**EARTH MATERIALS**

- **Af**: Artificial fill
- **Qf**: Alluvial fan
- **Qf/Tsm**: Alluvial overlying Santa Margarita Sandstone
- **Qa**: Colluvium - shown on cross sections only
- **Qal**: Alluvium
- **Tsm**: Santa Margarita Sandstone

**SYMBOLS**

- Earth materials contact - dashed where approximate, queried where uncertain
- Exploratory boring advanced by Bauldry Engineering
- Schematic footprint of proposed residence

**NOTES**

1. Geologic map and cross section were constructed using the supplied topographic map and supplemental tape and bruton surveying.
2. Final location and foundation depth of the proposed residence has not been decided up as of the publication of this report. The residence shown on the map and cross sections shown here are also intended only to assist the reader in understanding where the residence might approximately be upon the existing ground surface with respect to the underlying geologic conditions.

**BASE MAP**


**GEOLOGIC MAP, CROSS SECTIONS AND EARTH MATERIALS**

- Lands Of Zamani
- 213 Blueberry Drive
- Scotts Valley, California

- Scale: 1”=20’, h=v

- Exploratory boring advanced by Bauldry Engineering; Small rectangles indicate where samples were taken; integers next to rectangles are blow counts for that sample, normalized to a Terzaghi sampler - shown on cross sections only.

- The precise geometry of this contact is conjectural

**GEOLOGIC SITE MAP**

- Symbols:
  - Earth materials contact - dashed where approximate, queried where uncertain
  - Exploratory boring advanced by Bauldry Engineering
  - Schematic footprint of proposed residence

- Notes:
  - Exploratory boring advanced by Bauldry Engineering
  - Small rectangles indicate where samples were taken; integers next to rectangles are blow counts for that sample, normalized to a Terzaghi sampler - shown on cross sections only.
  - The precise geometry of this contact is conjectural

**GEOLOGIC CROSS SECTION A-A’**

- Showing landslide hazard area

**GEOLOGIC CROSS SECTION B-B’**

- Showing landslide hazard area

**GEOLOGIC CROSS SECTION B-B’**

- Showing landslide hazard area
ARBORIST REPORT-
Tree Resource Analysis, Construction Impacts & Protection Plan for:

213 Blueberry Drive, APN: 021-102-05
Scotts Valley, CA
November 11, 2018

Prepared for:
Mr. Jeff Mora
213 Blueberry Drive
Scotts Valley, CA 95066

Prepared by:

Kurt Fouts
Arborist Consultant

826 Monterey Avenue
Capitola, CA 95010
831-359-3607
kurtfouts@outlook.com

ISA Certified Arborist WE0681A
Table of Contents

SUMMARY ............................................................................................................ 1
  Background....................................................................................................... 1
  Assignment ...................................................................................................... 1
  Limits of the Assignment .............................................................................. 2
  Purpose and use of the report ..................................................................... 2
  Resources ........................................................................................................ 2

OBSERVATIONS .............................................................................................. 3-4

DISCUSSION ...................................................................................................... 5
  Species List ...................................................................................................... 6
  Tree Evaluation and Recording Methods .................................................... 6
  Condition Rating ............................................................................................. 7
  Suitability for Preservation ........................................................................ 7
  Impact Level .................................................................................................. 7
  Tree Protection Zone .................................................................................... 8
  Critical Root Zone ......................................................................................... 8
  Construction Impacts to Subject Trees ....................................................... 9
  Mitigation Measures for Subject Trees ...................................................... 9
  Tree Protection Specifications .................................................................. 10

CONCLUSION .................................................................................................... 11

RECOMMENDATIONS ..................................................................................... 12
Attachments: Appendix A - F

Appendix A – Tree Assessment Chart

Appendix B – Criteria for Tree Assessment Chart

Appendix C - Tree Protection Plan Sheet

Appendix D – Bibliography

Appendix E – Tree Protection Guidelines & Restrictions

- Protecting Trees During Construction
- Project Arborist Duties & Inspection Schedule
- Tree Protection Fencing
- Tree Protection Signs
- Monitoring
- Root Pruning
- Tree Work Standards & Qualifications
- City of Scotts Valley Protected Trees

Appendix F - Assumptions & Limiting Conditions
SUMMARY

- A new two-story one-bedroom home with two car garage and basement will be constructed on a vacant lot at 213 Blueberry Drive, Scotts Valley.
- Eight "protected" trees within the project limits were inventoried.
- The eight "protected" trees are comprised of four species. Six are in good to fair condition and two trees are in poor condition.
- The proposed improvements will moderately impact two "protected" trees, mitigation methods are specified, and they can be retained.
- The proposed improvements will have a low impact to the remaining six trees and they can be retained.
- Mitigation measures for retained trees are specified and protection methods detailed.
- No trees are proposed for removal for this project.

Background

Plans will be submitted to the City of Scotts Valley Planning Department, for construction of a two-story, one-bedroom home with two car garage and unheated daylight basement at 213 Blueberry Drive, Scotts Valley. Mr. Jeff Mora has requested my services, to assess the condition of ten trees on the applicant's property and two trees on an adjacent property with canopies that overhang the project boundaries, and the construction impacts that may affect them. Further, to provide a report with my findings and recommendations to meet City of Scotts Valley planning requirements.

Assignment

Provide an arborist report that includes an assessment of the trees within the project area. The assessment is to include the species, size (trunk diameter, height and canopy spread), condition (health and structure), and suitability for preservation ratings.

To complete this assignment, the following services were performed:

- **Tree Resource Evaluation**: Inventory, evaluate and assign suitability for preservation ratings for subject trees.
- **Construction Impact Assessment**: Combine tree resource data with anticipated construction impacts, to provide recommendations for removal or retention of trees.
- **Mapping**: Tree canopies were plotted onto: Architectural Site Plan, dated 11/6/2018.
Limits of the Assignment

The information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection on Tree Inventory & Protection Plan Parcel Improvements 213 Blueberry Drive

The inspection is limited to visual examination of accessible items without climbing, dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the trees in questions may not arise in the future.

Purpose and use of the report

The report is intended to identify all the trees within the plan area that could be affected by a project. The report is to be used by the developer, their agents, and the City of Scotts Valley as a reference for existing tree conditions and to help satisfy the City of Scotts Valley planning requirements.

Resources

All information within this report is based on site plans as of the date of this report. Resources are as follows:

- Site Visit, Tree Inventory & Condition Evaluation at, 213 Blueberry Drive, Scotts Valley on November 11, 2018
- City of Scotts Valley Municipal Code –Section 17.44.080 Tree Protection Regulations (applicable sections).
OBSERVATIONS

The property is on a steeply sloped parcel. There are 9 trees within the project area, all are “protected”, and most are located at the property edges. The tree species on the north edge include one each coast redwood (*Sequoia sempervirens*), California bay laurel (*Umbellularia californica*) and Monterey Pine (*Pinus radiata*). Tree species on the south edge include four coast redwood. The is one coast live oak (*Quercus agrifolia*), in the northeast section of the project boundary.

The trees are in good to fair condition, except two coast redwoods are in poor condition. The growth of these two redwoods has been suppressed by the larger adjacent redwoods. Most of the trees are mature, except the planted coast redwood at the top of the property, which is young and maturing. The Monterey pine located below the project boundaries, has a 10-degree lower trunk lean that self corrects in the upper trunk. None of the trees present any significant risk.
Image #2 - Trees T5, T6, T7 & T8 - coast redwood. Trees to right of red line are on adjacent property.
DISCUSSION

Two "protected" trees will be impacted by the new home construction. Tree T1 a coast redwood and T2, a California bay laurel. The Critical Root Zone for the 30-inch diameter coast redwood (3 to 5 times the trunk diameter), is 7.5 to 12.5 feet from the trunk. A vertical cut for the new home foundation wall will take place within the Critical Root Zone or 10 feet from the trunk of this tree.

The Critical Root Zone for the 13-inch, 12-inch & 10-inch diameter bay laurel (trunk diameter averaged at 25 inches), is 6 to 10 feet from the trunk. The vertical cut for the new home foundation wall will take place at the edge of the Critical Root Zone or 10 feet from the trunk of the bay laurel.

Pre-construction hand trenching and root pruning, just outside the staking for the foundation, and prior to machine excavation, will occur at 9.5 feet from both tree trunks. This will minimize root damage from excavation machinery and promote proper root recovery (Tree Protection Plan T1 for hand trenching location).

An outdoor stairway will be installed between the foundation wall and the trees. The stairway will be on top of grade, with concrete footings for support. To minimize root loss, the footings will be hand excavated.

The amount of root loss that is anticipated to occur as a result of the construction impacts described above, is within tolerances for these trees based on their age, species, condition and tolerance to root loss. Coast redwoods have a good tolerance to root loss, and California bay laurel has a moderate tolerance to root loss (Matheny & Clark, Trees & Development, 1998). If mitigation measures are followed, I expect both trees to continue to thrive for many years.
Species List

**TOTAL SUBJECT TREES: 8 Trees**

**Protected: 8**

<table>
<thead>
<tr>
<th></th>
<th>Tree Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Coast Redwood</td>
<td>(Sequoia sempervirens)</td>
</tr>
<tr>
<td>1</td>
<td>California bay laurel</td>
<td>(Umbellularia californica)</td>
</tr>
<tr>
<td>1</td>
<td>Monterey Pine</td>
<td>(Pinus radiata)</td>
</tr>
<tr>
<td>1</td>
<td>Coast live oak</td>
<td>(Quercus agrifolia)</td>
</tr>
</tbody>
</table>

Tree Evaluation and Recording Methods

Site evaluations were made on 11/11/2018. The inventory included all trees on the property within the project limits. The health and structural condition of each tree was assessed and recorded. Based on the trees health and structural condition, each trees suitability for preservation was rated and recorded.

The recorded data is included in the Tree Assessment Chart, Appendix A, of this report. Tree numbers were plotted on the attached Tree Protection Plan sheet, T1. To correlate the data in the Tree Assessment Chart to the tree's location on the site, refer to the Tree Protection Site Plan sheet - Appendix C.
Condition Rating

A tree's condition is determined by assessing both the health and structure, then combining the two factors to reach a condition rating. Tree condition is rated as poor, fair or good. The quantity of trees assigned for each category (good, fair or poor), is indicated below:

Tree Condition Rating

- Good - 1
- Fair - 5
- Poor - 2

Suitability for Preservation

A tree's suitability for preservation is determined based on its health, structure, age, species characteristics and longevity using a scale of good, fair or poor. The quantity of trees assigned to each category (good, fair or poor), is listed below.

Suitability Rating

- Good - 1
- Fair - 5
- Poor - 2

Impact Level

Impact level rates the degree a tree may be impacted by construction activity and is primarily determined by how close the construction procedures occur to the tree. Construction impacts are rated as low, moderate, high. The quantity of trees assigned for each category (low, moderate, high), is indicated below:

Impact Rating

- Low - 6
- Moderate - 2
- High - 0
Tree Protection Zone

The tree protection zone (TPZ), is a defined area within which certain activities are prohibited or restricted to minimize potential injury to designated trees during construction.

The size of the optimal TPZ can be determined by a formula based on: 1) trunk diameter 2) species tolerance to construction impacts, and 3) tree age (Matheny, N. and Clark, J 1998). In some instances, tree drip line is used as the TPZ. Development constraints can also influence the final size of the tree protection zone.

Fencing is installed to delineate the (TPZ), and to protect tree roots, trunk, and scaffold branches from construction equipment. The fenced protection area may be smaller than the optimal or designated TPZ area in some circumstances. Tree protection may also involve the armoring of the tree trunk and/or scaffold limbs with barriers to prevent mechanical damage from construction equipment. See Tree Protection Guidelines & Restrictions – Appendix E.

Once the TPZ is delineated and fenced (prior to any site work, equipment and materials move in), construction activities are only to be permitted within the TPZ if allowed for and specified by the project arborist.

Where tree protection fencing cannot be used, or as an additional protection from heavy equipment, tree wrap may be used. Wooden slats at least one inch thick are to be bound securely, edge to edge, around the trunk. A single layer or more of orange plastic construction fencing is to be wrapped and secured around the outside of the wooden slats. Major scaffold limbs may require protection as determined by the City arborist or Project arborist. Straw wattle may also be used as a trunk wrap and secured with orange plastic fencing.

Data has been entered in the Tree Assessment Chart – Appendix A, which indicates the optimal Tree Protection Zone for each tree.

Additional general tree protection guidelines are included in Tree Protection Guidelines & Restrictions – Appendix G.

Critical Root Zone

Critical Root Zone (CRZ) is the area of soil around the trunk of a tree where roots are located that provide critical stability, uptake of water and nutrients required for a tree’s survival. The CRZ is the minimum distance from the trunk that trenching that requires root cutting should occur and can be calculated as three to the five times the trunk Diameter at Breast Height (DBH). For example, if a tree is one foot in trunk diameter than the CRZ is three to five feet from the trunk location. We will often average this as four times the trunk diameter or 1ft. DBH = 4ft. CRZ (Smiley, E.T., Fraedrich, B. and Hendrickson, N. 2007).
Construction Impacts to Subject Trees

Construction Phases Affecting Subject Trees —
1. Installation of foundation wall on south side of new home.
2. Installation of step footings for stairway on south side of home.

Impacts to Subject Trees by Tree Number —

Construction Phases:
Construction Phases Affecting Subject Trees —
1. Installation of foundation wall on south side of new home, will impact trees T1 and T2.
2. Installation of step footings on south side of home will impact trees T1 & T2.

Mitigation Measures for Retained Trees

The trees retained on this project will require the following methods to protect them from the impacts described above and to minimize root or canopy damage during the demolition and construction phases.

- Tree Protection Fencing.
- Supervised hand excavation.
- Supervised, selective & non-selective root pruning.

Detailed descriptions of the protection requirements (mitigation methods), listed above are specified below. Some of the demolition and construction work will affect the critical root zones of selected trees and mitigation methods including project arborist supervision is specified. The Tree Protection Specifications & Recommended Sequence listed below, are included on the attached Tree Protection Plan sheet T1.

Note: The Tree Protection Plan sheet is to be copied and shall become an element of the final plan set. The owner, contractor and architect are all responsible for knowledge of the information included in this arborist report and adhering to the conditions provided.
Tree Protection Specifications & Recommended Sequence

Construction Phases:

1. Pruning - Clearance prune trees T1 & T2, to provide a minimum of 3 feet clearance from proposed home.
2. Irrigation System - A temporary irrigation system shall be installed in the TPZ of trees T1 & T2, to compensate for loss of some absorbing root area. Apply one inch of water weekly with soaker hoses. Locate hoses 10 feet inside the drip line and extending out to dripline. Continue to provide supplemental irrigation throughout the duration of the project, whenever rainfall is absent or until the permanent irrigation system is installed.
3. Tree Protection Fencing - Fencing shall be installed according to the specifications shown on the Tree Protection Plan and in the locations indicated.
4. Foundation - A trench shall be dug 9 ½ feet from the trunks of trees T1 & T2, and in the location indicated on Tree Protection Plan. The trench shall be dug 30 inches deep using hand methods or electric spade. If roots are encountered 1" in diameter or greater, they shall be pruned by methods indicated on Tree Protection Plan sheet, Pre-Construction Root Pruning.
5. Stairway Footings - Excavation for stairway footings shall be by hand methods. If roots are encountered 2" in diameter or less, they shall be pruned by methods indicated on Tree Protection Plan sheet, Pre-Construction Root Pruning. If roots are encountered 2" or greater the footing location should be adjusted to allow retention of the root.
CONCLUSION

- A new two-story one-bedroom home with two car garage and basement will be constructed on a vacant lot at 213 Blueberry Drive, Scotts Valley.
- Plan sets have been completed and the impacts to the trees have been evaluated.
- Eight "protected" trees within the project limits were inventoried.
- The eight "protected" trees are comprised of four species. Six are in good to fair condition and two trees are in poor condition.
- The proposed improvements will moderately impact two "protected" trees, mitigation methods are specified, and they can be retained.
- The amount of root loss that is anticipated to occur as a result of the construction impacts, is within tolerances for these trees based on their age, species, condition and tolerance to root loss.
- Coast redwoods have a good tolerance to root loss, and California bay laurel has a moderate tolerance to root loss (Matheny & Clark, Trees & Development, 1998). If mitigation measures are followed, I expect both trees to continue to thrive for many years.
- The proposed improvements will have a low impact to the remaining six trees.
- Mitigation measures for retained trees are specified and protection methods detailed.
- No trees are proposed for removal for this project.
RECOMMENDATIONS

1. Obtain all necessary permits prior to removing or significantly altering any trees on site.
2. Clearance prune trees T1 & T1 to provide a minimum of 3 feet clearance from proposed home.
3. Install a temporary irrigation system as specified on Tree Protection Plan sheet T1.
4. Hand trench and root prune as necessary for trees T1 & T2. Remove tree T4 prior to excavation for home foundation.
5. Hand excavate for stairway footings and root prune as necessary.

Respectfully submitted,

Kurt Fouts
Kurt Fouts 11/14/18
Kurt Fouts  ISA Certified Arborist  WE0681A

Kurt Fouts
Arborist Consultant
826 Monterey Avenue
Capitola, CA 95010
831-359-3607
kurtfouts1@outlook.com
**213 Blueberry Drive, Scotts Valley**

**Tree Assessment Chart - Appendix A**

### Suitability for Preservation Ratings:
- **Good:** Trees in good health and structural condition with potential for longevity on the site
- **Fair:** Trees in fair health and/or with structural defects that may be reduced with treatment procedures
- **Poor:** Trees in poor health and/or with poor structure that cannot be effectively abated with treatment

### Retention or Removal Code:
- **RT:** Retain Tree
- **RI:** Remove Due to Construction Impacts
- **I.M.:** Impacts Can Be Mitigated With Pre-Construction Treatments
- **R.C.:** Remove Due to Condition

**Protected Tree City of Scotts Valley** Any tree 13 inches or greater in diameter measured at 4.5 feet above grade. Any oak 8 inches or greater. Any tree 8 inches or greater if within 20' of a slope > 20%.

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Species</th>
<th>Trunk Diameter @ 48 Inches</th>
<th>Protected Tree</th>
<th>Crown Height &amp; Spread</th>
<th>Health Rating</th>
<th>Structural Rating</th>
<th>Suitability for Preservation (Based Upon Condition)</th>
<th>Tree Protection Zone (in feet)</th>
<th>Construction Impacts (Rating &amp; Description)</th>
<th>Retention or Removal Code</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>coast redwood (Sequoia sempervirens)</td>
<td>30''</td>
<td>Yes</td>
<td>80'X35'</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>20'</td>
<td>Moderate (Root loss: excavation &amp; compaction)</td>
<td>RT</td>
<td>Maturing specimen with good vigor.</td>
</tr>
<tr>
<td>T2</td>
<td>California bay laurel (Umbellularia californica)</td>
<td>15'',12'', 10''</td>
<td>Yes</td>
<td>65'X30'</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>14'</td>
<td>Moderate (Root loss: excavation &amp; compaction)</td>
<td>RT</td>
<td>Co-dominant trunks (3), at one foot above grade.</td>
</tr>
</tbody>
</table>

---

**Kurt Fouts**

Arborist Consultant

828 Monterey Avenue, Monterey, CA 93940
831-368-3662
kurt@kurtfouts.com

Page 1 of 3

11/11/2018
# Tree Assessment Chart - Appendix A

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Species</th>
<th>Trunk Diameter @ 48 inches a.g.</th>
<th>Protected Tree</th>
<th>Crown Height &amp; Spread</th>
<th>Health Rating</th>
<th>Structural Rating</th>
<th>Suitability for Preservation (Based Upon Condition)</th>
<th>Tree Protection Zone (in feet)</th>
<th>Construction Impacts (Rating &amp; Description)</th>
<th>Retention or Removal Code</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3</td>
<td>Monterey pine (<em>Pinus radiata</em>)</td>
<td>35”</td>
<td>Yes</td>
<td>95’X45’</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>27’</td>
<td>Low (root loss: excavation)</td>
<td>RT</td>
<td>Lower trunk leans 10 degrees and self corrects in upper trunk. Minor infestation of red terpine beetle (<em>Dendroctonus valens</em>)</td>
</tr>
<tr>
<td>T4</td>
<td>coast live oak (<em>Quercus agrifolia</em>)</td>
<td>11’,7”X6”</td>
<td>No</td>
<td>35’X25’</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>14’</td>
<td>Low (root loss: excavation)</td>
<td>RT</td>
<td>Growth is suppressed by larger adjacent Monterey pine.</td>
</tr>
<tr>
<td>T5</td>
<td>coast redwood (<em>Sequoia sempervirens</em>)</td>
<td>16”</td>
<td>Yes</td>
<td>45’X10’</td>
<td>Poor</td>
<td>Fair</td>
<td>Fair</td>
<td>12’</td>
<td>Low to none.</td>
<td>RT</td>
<td>Growth is suppressed by larger adjacent redwoods.</td>
</tr>
<tr>
<td>T6</td>
<td>coast redwood</td>
<td>36”</td>
<td>Yes</td>
<td>110’X35’</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>27’</td>
<td>Low to none.</td>
<td>RT</td>
<td>Within footprint of new home.</td>
</tr>
</tbody>
</table>

---

**Kurt Fouts**  
Arborist Consultant  
304 Monterey Avenue  
Capitola, CA 95010  
831-559-9607  
skurtfouts@yaxx.com  
11/11/2018
## 213 Blueberry Drive, Scotts Valley
### Tree Assessment Chart - Appendix A

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Species</th>
<th>Trunk Diameter @ 48 inches a.g.</th>
<th>Crown Height &amp; Spread</th>
<th>Health Rating</th>
<th>Structural Rating</th>
<th>Suitability for Preservation (Based Upon Condition)</th>
<th>Tree Protection Zone (In feet)</th>
<th>Construction Impacts (Rating &amp; Description)</th>
<th>Retention or Removal Code</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>T7</td>
<td>coast redwood</td>
<td>28&quot;</td>
<td>Yes</td>
<td>70' x 20'</td>
<td>Poor</td>
<td>Fair</td>
<td>21'</td>
<td>Low to none.</td>
<td>RT</td>
<td>Growth is suppressed by larger adjacent redwoods.</td>
</tr>
<tr>
<td>T8</td>
<td>coast redwood</td>
<td>44&quot;</td>
<td>No</td>
<td>110' x 35'</td>
<td>Good</td>
<td>Fair</td>
<td>33'</td>
<td>Low to none.</td>
<td>RT</td>
<td>3' from new home foundation. Crowded growing conditions.</td>
</tr>
</tbody>
</table>

---

**Kurt Fouts**
Arborist Consultant

526 Monterey Avenue
Capitola, CA 95010
831-589-3407
sueharrington@yahoo.com

Page 3 of 3

11/11/2018
APPENDIX B—CRITERIA FOR TREE ASSESSMENT CHART
Following is an explanation of the data used in the tree evaluations. The data is incorporated in the Tree Assessment Chart, Appendix A.

**Trunk Diameter and Number of Trunks:**
Trunk diameter as measured at 4.5 feet above grade. The number of trunks refers to a single or multiple trunked tree. Multiple trunks are measured at 4.5 feet above grade.

**Health Ratings:**

- **Good:** A healthy, vigorous tree, reasonably free of signs and symptoms of disease
- **Fair:** Moderate vigor, moderate twig and small branch dieback, crown may be thinning and leaf color may be poor
- **Poor:** Tree in severe decline, dieback of scaffold branches and/or trunk, most of foliage from epicormics

**Structure Ratings:**

- **Good:** No significant structural defects. Growth habit and form typical of the species
- **Fair:** Moderate structural defects that might be mitigated with regular care
- **Poor:** Extensive structural defects that cannot be abated.

**Suitability for Preservation Ratings:**

**Rating factors:**

- **Tree Health:** Healthy vigorous trees are more tolerant of construction impacts such as root loss, grading and soil compaction, then are less vigorous specimens.

- **Structural integrity:** Preserved trees should be structurally sound and absent of defects or have defects that can be effectively reduced, especially near structures or high use areas.

- **Tree Age:** Over mature trees have a reduced ability to tolerate construction impacts, generate new tissue and adjust to an altered environment. Young to maturing specimens are better able to respond to change.
Species response: There is a wide variation in the tolerance of individual tree species to construction impacts.

Rating Scale:

Good: Trees in good health and structural condition with potential for longevity on the site.

Fair: Trees in fair health and/or with structural defects that may be reduced with treatment procedures.

Poor: Trees in poor health and/or with poor structure that cannot be effectively abated with treatment. Trees can be expected to decline or fail regardless of construction impacts or management. The species or individual may possess characteristics that are incompatible or undesirable in landscape settings or unsuited for the intended use of the site.

Construction Impacts:

Rating Scale:

High: Development elements proposed that are located within the Tree Protection Zone that would severely impact the health and/or stability of the tree. The tree impacts cannot be mitigated without design changes. The tree may be located within the building footprint.

Moderate: Development elements proposed that are located within the Tree Protection Zone that will impact the health and/or stability of the tree and can be mitigated with tree protection treatments.

Low: Development elements proposed that are located within or near the Tree Protection Zone that will have a minor impact on the health of the tree and can be mitigated with tree protection treatments.

None: Development elements will have no impact on the health and stability of the Tree.

Tree Protection Zone (TPZ):

Defined area within which certain activities are prohibited or restricted to prevent or minimize potential injury to designated trees, particularly during construction or development.
BIBLIOGRAPHY


Appendix E - TREE PROTECTION GUIDELINES AND RESTRICTIONS

Protecting Trees During Construction:

1) Before the start of site work, equipment or materials move in, clearing, excavation, construction, or other work on the site, every tree to be retained shall be securely fenced-off as delineated in approved plans. Such fences shall remain continuously in place for the duration of the work undertaken in connection with the development.

2) If the proposed development, including any site work, will encroach upon the tree protection zone, special measures shall be utilized, as approved by the project arborist, to allow the roots to obtain necessary oxygen, water, and nutrients.

3) Underground trenching shall avoid the major support and absorbing tree roots of protected trees. If avoidance is impractical, hand excavation undertaken under the supervision of the project arborist may be required. Trenches shall be consolidated to service as many units as possible. Boring/tunneling under roots should be considered as an alternative to trenching.

4) Concrete or asphalt paving shall not be placed over the root zones of protected trees, unless otherwise permitted by the project arborist.

5) Artificial irrigation shall not occur within the root zone of native oaks, unless deemed appropriate on a temporary basis by the project arborist to improve tree vigor or mitigate root loss.

6) Compaction of the soil within the tree protection zone shall be avoided.

7) Any excavation, cutting, or filling of the existing ground surface within the tree protection zone shall be minimized and subject to such conditions as the project arborist may impose. Retaining walls shall likewise be designed, sited, and constructed to minimize their impact on protected trees.

8) Burning or use of equipment with an open flame near or within the tree protection zone shall be avoided. All brush, earth, and other debris shall be removed in a manner that prevents injury to the tree.

9) Oil, gas, chemicals, paints, cement, stucco or other substances that may be harmful to trees shall not be stored or dumped within the tree protection zone of any protected tree, or at any other location on the site from which such substances might enter the tree protection zone of a protected tree.

10) Construction materials shall not be stored within the tree protection zone of a protected tree.
Development Site Tree Health Care Measures

RECOMMENDED TO PROVIDE OPTIMUM GROWING CONDITIONS, PHYSIOLOGICAL INVIGORATION AND STAMINA, FOR PROTECTION AND RECOVERY FROM CONSTRUCTION IMPACT.

Establish and maintain TPZ fencing, trunk and scaffold limb barriers for protection from mechanical damage, and other tree protection requirements as specified in the arborist report.

Project arborist to specify site-specific soil surface coverings (wood chip mulch or other) for prevention of soil compaction and loss of root aeration capacity.

Soil, water and drainage management is to follow the ISA BMP for "Managing Trees During Construction" and the ANSI Standard A300(Part 2)- 2011 Soil Management (a. Modification, b. Fertilization, c. Drainage.)

Fertilizer / soil amendment product(s) amounts and method of application to be specified by certified arborist.
City of Scotts Valley - Protected Tree List*

A. Any size tree located within five (5) feet of a public right-of-way or street.

B. Any single-trunk oak tree greater than or equal to eight (8) inch diameter (25 inch circumference).**

C. Any multi-trunk oak tree with any trunk greater than or equal to four (4) inches diameter (12 inch circumference).**

D. Any tree greater than or equal to eight (8) inch diameter (25 inch circumference)** if located within 20 feet of a moderate slope (greater than 20% slope).

E. Any single-trunk tree greater than or equal to 13-inch diameter (40 inch circumference).**

F. Any multi-trunk tree with any trunk greater than or equal to eight (8) inch diameter (25 inch circumference).**

G. Any tree, regardless of size, required as part of a permit approved by the Planning Department, Planning Commission or City Council, or required as a replacement tree for a removed tree.

H. Any Heritage Tree, as specified in Municipal Code Section 17.44.080 and Exhibit A. A list and map of Heritage Trees are available at the Planning Department. Fees for removal of Heritage Trees are higher than other protected tree removals and applications must be approved at a public hearing before the Planning Commission.

* Note: No tree removal permit is required to remove:
c Monterey Pine trees that are infected with pitch canker; proof of infection is required;
c Blue Gum Eucalyptus or Acacia trees;
c Bay Laurel trees if they are growing under the drip-line of an established oak tree; or, c Fruit trees.

** Tree measurement shall be taken 4½ feet (54 inches) above the ground.
ASSUMPTIONS AND LIMITING CONDITIONS

1. Any legal description provided by the appraiser/consultant is assumed to be correct. No responsibility is assumed for matters legal in character nor is any opinion rendered as the quality of any title.

2. The appraiser/consultant can neither guarantee nor be responsible for accuracy of information provided by others.

3. The appraiser/consultant shall not be required to give testimony or to attend court by reason of this appraisal unless subsequent written arrangements are made, including payment of an additional fee for services.

4. Loss or removal of any part of this report invalidates the entire appraisal/evaluation.

5. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person(s) to whom it is addressed without written consent of this appraiser/consultant.

6. This report and the values expressed herein represent the opinion of the appraiser/consultant, and the appraiser/consultant’s fee is in no way contingent upon the reporting of a specified value nor upon any finding to be reported.

7. Sketches. Diagrams. Graphs. Photos. Etc., in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering reports or surveys.

8. This report has been made in conformity with acceptable appraisal/evaluation/diagnostic reporting techniques and procedures, as recommended by the International Society of Arboriculture.

9. When applying any pesticide, fungicide, or herbicide, always follow label instructions.

10. No tree described in this report was climbed, unless otherwise stated. We cannot take responsibility for any defects which could only have been discovered by climbing. A full root collar inspection, consisting of excavating around the tree to uncover the root collar and major buttress roots, was not performed, unless otherwise stated. We cannot take responsibility for any root defects which could only have been discovered by such an inspection.

CONSULTING ARBORIST DISCLOSURE STATEMENT

Arborists are tree specialists who use their education. Knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce risk of living near trees, Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fall in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medicine, cannot be guaranteed.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.

Kurt Fouts
Arborist, Consultant

826 Monterey Avenue
Capitola, CA 95010
831-359-3607
kurtfouts1@outlook.com
Residence for
Jeff Mora
213 Blueberry Drive - Scotts Valley, CA 95066

Design Review

Delta 2.02-26-19 Per meeting with Taylor Bateman & Brenda Stevens on
Wednesday, February 13, 2019 1:30 PM-2:00 PM and decisions driven
by Owner Jeff Mora to address Planning Comments from that meeting.

Owner:
Jeff Mora
P O Box 75
Felton, California 95018
Cell: 530-945-8415
jeffmora@sbcglobal.net

General Contractor:
Jeff Mora
P O Box 75
Felton, California 95018
Cell: 530-945-8415
CCL # 303761

Geotechnical Engineer:
Haro, Kasunich and Assoc., Inc
116 East Lake Ave.
Watsonville, CA 95076
Office: 831-722-4175
Contact: John Kasunich
Cell: 831-247-5466

Structural Engineer:
Westfall Engineers, Inc.
14583 Big Basin Way
Saratoga, California 95070
Contact: Karel Cymbal
Tel: 408-867-0244
Fax: 408-867-6261
karel@westf.com

Geologist
Zinn Geology
2231 40th Avenue
Santa Cruz, CA 95062
Voice 831-334-4853
Contact: Erik N. Zinn
enzinn@gmail.com

Drawings Prepared By:
Spanner Systems
4701 California Avenue
Oakland, CA 95631
Rick Bowen 408-210-8048

Project Data
Zoning: R-1
Occupancy Group: R-3
Construction Type: V-B / U
Parcel Size: 12560 SF
Total Heated Area: 624 SF
Rear Deck: 180 SF
Fire District: SV-FPD
Fire Service Area: SCO-FSA
Water District: SL/NAT
Fault Zone: N / A
Fire Hazard: No

Scope of Work
Construct a 26’ x 24’ Single Family Dwelling at a Daylight Basement
with a Two Car Garage above.

Santa Cruz County
APN 021-102-05

Governing Codes
2013 California Building Code (CBC)
2013 California Electrical Code
2013 California Plumbing Code
2013 California Energy Code
2013 California Mechanical Code
California Green Building Code 2010 Edition
2013 California Fire Code
SCOTTS VALLEY FIRE PROTECTION DISTRICT

General Requirements:

1. This project as proposed shall conform to the 2016 California Fire Code as amended by the Scotts Valley Fire Protection District.

2. An automatic sprinkler system shall be installed in each building in accordance with Chapter 9 of the 2016 California Fire Code, current NFPA 13 standards, and Santa Cruz County PFO standards. Contact the Scotts Valley Fire Protection District to review the PFO standards.
   a. Automatic sprinkler system design plans and calculations shall be submitted directly to the Scotts Valley Fire Protection District for review and approval. Separate plans may be necessary for the "overhead" and "underground" parts of the system.
   b. Automatic sprinkler system drawings must be approved and submitted for approval by a California State Licensed Contractor (Class A or C-15) meeting the requirements of NFPA-13. "Standard for the Installation of Fire Sprinkler Systems". Design/plans shall submit three (3) sets of plans and calculations to this agency for approval.

3. Required Water Supply: An approved water supply capable of supplying the required fire flow for the structure shall be provided to ensure proper sprinkler heads. Buildings or portions of buildings are hereafter constructed or moved into or within the District:
   a. Fire sprinkler systems shall comply with Sections 5.5.1.1 through 5.5.6 and Appendix C or by an approved method by the Fire District.
   b. Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access to the hydrants is established to prevent obstruction of such hydrants.
   c. Existing non-conforming fire hydrants will need to be upgraded to meet current standards.

4. A MINIMUM OF 48 HOURS NOTICE to the Fire District is required prior to any inspection.

5. Job copies of the building and fire systems plans and permits must be on-site during inspections.

6. Building numbers shall be provided. Numbers shall be a minimum of four (4) inches in height on a contrasting background and visible from the street. Where numbers are not visible from the street, additional numbers shall be installed on a directional sign at the property boundary and the street. Final design and location of the building numbers are approved by the District.

7. No changes in building use or occupancy type shall be allowed without Fire District approval.

8. Prior to final, provide to the Scotts Valley Fire Protection District a general site plan that details hydrant locations, and water/gas/electrical shutoff locations. The site plan shall be provided in a digital (PDF) non-annotated version.

Slope Map
Scale: 1/8" = 1'-0"
Structures within 50'-0" of Subject Property Boundary Lines

B/C-1.2 South - Drive way Profile
Scale 1/4" = 1'-0"

A/C-1.2 North - Drive way Profile
Scale 1/4" = 1'-0"

Site Plan
Scale 1/8" = 10'-0"

NOTE:
(N) Elevations After Grubbing & Trash Removal

Spike at 782.84
Bench Mark 0'-0"
Top of Property Pin 782.3

The area has no Public Works - Storm Drain System Street with Curb directs rain waters down slope.

A/C-1.2 North

B/C-1.2 South

Deck of Garage

Water Meter

Shaded Area Indicates
1) Driveway
2) Sidewalks
3) Stair landings
4) Concrete stairs

100.0'-6" Asphalt Berm

NOTE:
(E) Debris and erosion control fence line

Lot Size 12,500 Sq. Ft.
Plant Legend

<table>
<thead>
<tr>
<th>KEY</th>
<th>QTY</th>
<th>SPACE</th>
<th>RATING</th>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>1</td>
<td>3&quot;</td>
<td>LOW</td>
<td>Lavandula Angustifolia 'Hidcote'</td>
<td>Hidcote Lavender</td>
</tr>
<tr>
<td>R</td>
<td>25</td>
<td>2 1/2&quot;</td>
<td>HIGH</td>
<td>Rosemary Rugosa 'Hidcote'</td>
<td>Hidcote Rosemary</td>
</tr>
</tbody>
</table>

**WATER EFFICIENT LANDSCAPE CHECKLIST**

1. **TURF: PLANTING, SOIL MANAGEMENT**
   - No Turf is planted.

2. **PLANTS:**
   - The plant selection is appropriate for the site conditions.
   - Water needs are controlled within hydrangeas. Each hydrangea shall be controlled by a separate group of valves.

3. **FERTILIZER:**
   - A 12-12-12 fertilizer shall be applied to the top of the soil after planting.

4. **IRRIGATION:**
   - All exposed soil surfaces of planting areas except in areas of direct seeding application or sod are covered with mulch to prevent soil erosion, runoff, and water waste.

**IRRIGATION SYSTEM DESIGN:**

- All systems and components are designed for drip irrigation. See the irrigation plan.

**Hydroseeding Mixes:**

- Long-term weathering of hydroseeding material is expected.

**Mora Residence**

213 Blueberry, Scotts Valley, CA
Irrigation Notes

1. Irrigation districts can require a run off irrigation, and they have no maximum allowable run off.
2. Run off irrigation is required for all irrigation systems.
3. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
4. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
5. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
6. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
7. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
8. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
9. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
10. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
11. The irrigation system is designed to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.

Drip Irrigation Notes

1) Scale larger drop size into grade with flow for 1" drip. See table for more information.
2) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
3) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
4) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
5) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
6) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
7) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
8) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
9) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.
10) Ensure drip line is not too close to plant to ensure that the flow is sufficient to provide a adequate irrigation for the landscape.